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U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105

TDD #: TO-02-09-13-01-0004
E & E PAN #: EE-002693-2213

Attention: Federal On-Scene Coordinator, Dan Shane

**Subject: Removal Assessment Addendum Report; Argonaut Mine Tailings Pile
AOCs 1, 2, 4, and 6; Jackson, Amador County, California**

INTRODUCTION

The United States Environmental Protection Agency (U.S. EPA) Region 9 tasked Ecology and Environment, Inc.'s (E & E's) Superfund Technical Assessment and Response Team (START) to conduct additional removal assessment activities at the Argonaut Mine Tailings Pile (site) located in Jackson, Amador County, California. This removal assessment was initiated by the U.S. EPA in response to concern over adverse impacts to human health or the environment based on findings from the July 2013 U.S. EPA removal assessment documented as *Argonaut Mine Tailings Pile Removal Assessment Report* (E & E, December 2013), and earlier assessment work performed by URS Corporation (URS) on behalf of the California Department of Toxic Substances Control (DTSC) and documented in the *Argonaut Mine Tailings Site, Site Investigation Report, Draft. URS, March 2009*. The prior assessment work identified elevated concentrations of arsenic, lead, and mercury at the site.

On September 24 and 25, 2013, the U.S. EPA and START collected five additional surface soil samples and four shallow subsurface soil samples from area of concern (AOC)-1, one shallow subsurface sediment sample from AOC-2, and two surface sediment samples from AOC-4. Additionally, based on the findings of the previous assessment work, one new AOC (AOC-6) was identified and included in this recent assessment work. AOC-6 is a residential care facility located adjacent to the north side of AOC-1. Three surface soil samples and four shallow subsurface soil samples were collected from AOC-6. These additional sampling locations were selected to better delineate the extent of arsenic, lead, and mercury contamination in surface and shallow subsurface soils. The purpose of this addendum report is to document the additional sampling and analysis results from September 2013, and provide information to assist in determining whether or not environmental hazards that pose an "imminent and substantial endangerment to human health or the environment" are present at these AOCs.

SITE DESCRIPTION

The site is located in an alluvial valley and consists of partially vegetated open space characterized by soil and processed mine tailings impounded behind several berms and dams. The site is abutted by a relatively new single-family residential development (i.e. houses) to the north, northeast, west, and east. City of Jackson administrative offices, an undeveloped residential parcel, and a public high school abut the west side, and open undeveloped areas are adjacent to the northwest, south, and southeast sides. The approximate geographic coordinates for the site are Longitude 120°47'23.44" West and Latitude 38°21'26.95" North (Figure 1, Appendix A).

Removal assessment activity that generated the results summarized in this addendum report took place within three previously identified AOCs (numbers 1, 2, 4) and one new AOC (number 6) at the site. A site features map of each AOC is provided as Figure 2 (Appendix A). The following sections describe each AOC targeted during this assessment. A more detailed description of the site history, site hydrology, and geology is provided under the *Argonaut Mine Tailings Pile Removal Assessment Report* (E & E, December 2013).

AOC-1

In the western portion of the site near the topographical high point, there is an approximately 5-acre AOC designated as AOC-1. The area is characterized by surface deposits of unprocessed and semi-processed ore (Figure 2). During wet weather, AOC-1 contains localized areas of saturated sediments. A surface impoundment appears to have been present in AOC-1 but the dike is currently breached. During this and the July 2013 assessment work, AOC-1 was extended west of Argonaut Lane to incorporate additional area in the eastern portion of undeveloped land adjacent to Argonaut Lane. AOC-1 was also extended at the southeast boundary approximately 100 feet to the south. The previous and additional surface and shallow subsurface sampling locations at AOC-1 are shown on Figure 3 and Figure 4 (Appendix A).

AOC-2

East and down gradient from AOC-1 is a former cyanide processing plant. This approximately 6.5-acre area is designated as AOC-2 and contains abandoned vats and tanks reportedly used for cyanide leaching of processed ore. Additionally there is a former thickening basin in AOC-2 associated with the cyanide plant. During this assessment, one shallow subsurface sediment sample was collected from the contents of abandoned Vat 1 (V-1). The additional sample location within AOC-2 at V-1 is shown on Figure 6 (Appendix A).

AOC-4

Surface waters and sediment discharging from the Eastwood Multiple Arch Dam (EMAD) and from other areas of the site are designated as AOC-4. The EMAD is roughly 390 feet wide and 46 feet tall. Sediment and tailings have filled the basin behind the dam to within a few feet of its top. Standing water flows over the top of the dam during wet periods. During wet periods, water also flows through cracks in the dam, suggesting sediments behind the dam are saturated. During this assessment, sampling was performed at locations approximately 25 feet and 50 feet east-northeast of previous sample location AOC4-SD-01. The additional sampling locations in AOC-4 are depicted on Figure 7 (Appendix A).

AOC-6

Because surface samples collected (samples AOC1-D-02-00 and AOC1-D-20-00) on the northern perimeter of AOC-1 during the July assessment work contained arsenic at levels above the 61 milligrams per kilogram (mg/kg) project investigation level, the area located immediately north of AOC-1 was identified as a new AOC during this assessment and designated as AOC-6. AOC-6 is located at the corner of Pioneer Street and Argonaut Lane, and is currently occupied by a residential care facility. During this assessment, two discrete surface and shallow subsurface soil samples in AOC-6 were collected from a vegetated area approximately 25 feet north of AOC-1. One 5-point composite surface soil sample and two 5-point composite subsurface samples (including one duplicate sample) were collected from a parking area on the south side of the facility. The geographic coordinates for the approximate center of AOC-6 are Longitude 120°47'21.26" West and Latitude 38°21'31.51" North. The sampling locations within AOC-6 are shown on Figure 8 and Figure 9 (Appendix A).

PREVIOUS ASSESSMENTS

The site has undergone multiple assessments since the 1990's, which began with a surface water runoff investigation conducted by the California Central Valley Regional Water Quality Control Board (RWQCB). Following the RWQCB surface water runoff investigation, the DTSC was notified of the site and subsequently performed three additional investigations. A more detailed description of results from these investigations is provided in the *Argonaut Mine Tailings Pile Removal Assessment Report* (E & E, December 2013).

Following investigations by the DTSC, the U.S. EPA performed removal assessment work at the site in July 2013 and September 2013. A detailed description of these removal assessments is included in the *Argonaut Mine Tailings Pile Removal Assessment Report* (E & E, December 2013), and the *Argonaut Mine Tailings Pile AOC 5 Removal Assessment Report* (E & E, January 2014). Except for AOC-5, the sampling locations and analytical results from these removal assessments are included on figures in Appendix A and in the data summary tables under Appendix B of this addendum report.

START ACTIVITIES

Based on findings from the U.S. EPA assessment work conducted in July 2013, the U.S. EPA tasked START to perform additional assessment work to evaluate the nature and extent of elevated arsenic, lead, and mercury concentrations in surface and shallow subsurface soils and sediments at this site. The data generated will be used to determine whether or not removal actions and/or additional assessments are warranted in the respective AOCs.

Prior to mobilizing to the site in July 2013 and in order to support the U.S. EPA's environmental data collection activities, the START identified project data quality objectives (DQOs) and developed a sampling and analysis plan (SAP). The SAP, titled as *Sampling and Analysis Plan, Argonaut Mine Tailings Pile Assessment, Jackson California* (E & E, July 2013) was utilized during this additional removal assessment and is available in the *Argonaut Mine Tailings Pile Removal Assessment Report* (E & E, December 2013) under Appendix C. The scope of work and objectives outlined in the SAP and performed during this additional assessment were derived based on direction from the U.S. EPA. The SAP described the project and data use objectives, data collection rationale, data quality assurance goals, and requirements for sampling and analysis activities. It also defined the sampling and data collection methods used during the removal assessment work.

The specific field sampling and chemical analysis information in the SAP were prepared in accordance with the following U.S. EPA documents: *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R 5, March 2001, EPA/240/B 01/003); *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G 4, February 2006, EPA/240/B-06/001); *Guidance on Choosing a Sampling Design for Environmental Data Collection* (EPA QA/G 5S, December 2002, EPA/240/R 02/005); *Superfund Lead-Contaminated Residential Sites Handbook* (OSWER 9285.7-90, August 2003); and *Uniform Federal Policy for Implementing Environmental Quality System* (EPA/505/F-03/001, March 2005).

The U.S. EPA has determined that arsenic, lead, and mercury are the primary contaminants of concern at the site from previous removal assessment data. The site-specific investigation levels used during this assessment were 61 mg/kg for arsenic, 400 mg/kg for lead, and 10 mg/kg for mercury. These investigation levels were based in part on the U.S. EPA's regional screening levels (r-RSLs) for soil in a residential scenario (U.S. EPA, 2013). Based on direction from the U.S. EPA, the screening level for arsenic corresponds to an estimated excess cancer risk of 10^{-4} for a residential scenario. For the purpose of this assessment, surface soils and sediments were assumed to include a range from 0-inches to 2-inches below ground surface (bgs). With the exception of one shallow subsurface soil sample (AOC2-SD-11-06) which was collected from 6-inches bgs, shallow subsurface soils and sediments were collected from 12-inches to 18-inches bgs.

In addition to the DQOs and the SAP, the START prepared a site-specific health and safety plan for the removal assessment field work.

Removal Assessment Field Activity

On September 24 and 25, 2013, the U.S. EPA and START mobilized to Jackson, California, to perform removal assessment activities (i.e., soil and sediment sampling) at AOC numbers 1, 2, 4, and 6. Photographs of select removal assessment activities are included as Appendix C.

During this removal assessment, the following soil and sediment samples were collected and analyzed from the targeted AOCs:

- **AOC-1:** Four discrete point surface soil samples (AOC1-D-38-00 through AOC1-D-41-00) and one duplicate analysis sample (AOC1-D-38-00-7), and four discrete point shallow subsurface soil samples (AOC1-D-38-12 through AOC1-D-41-12);
- **AOC-2:** One discrete point shallow subsurface sediment sample from 6-inches bgs (AOC2-SD-11-06);
- **AOC-4:** Two discrete point surface sediment samples (AOC4-SD-05-00 and AOC4-SD-06-00);
- **AOC-6:** One 5-point composite surface soil sample (AOC6-C-01-00), one 5-point composite shallow subsurface soil sample and duplicate analysis sample from 12-inches bgs (AOC6-C-01-12 and AOC6-C-01-12-7), two discrete surface soil samples (AOC6-D-01-00 and AOC6-D-02-00), and two discrete shallow subsurface soil samples (AOC6-D-01-12 and AOC6-D-02-12).

All samples were generally collected and analyzed in accordance with the SAP. The addition of AOC-6 was the only significant deviation from the SAP. Minor modifications to the methods proposed in the SAP were incorporated into the sampling at AOC-6. For example, the SAP specified collecting composite samples from residential areas (e.g. at AOC-5) at a frequency of one approximately every 2,500 square feet. However, because the surfaces appeared to be obviously landscaped or paved with imported aggregate base, composite samples were not collected from the eastern, northern, or western sides of AOC-6. Although discrete samples collected from AOC-6 are considered step-out samples to define the lateral extent of contaminants north of AOC-1, and thus would be labeled as AOC-1 samples, AOC-6 was considered a new and unique decision unit because it is a separate parcel with an active residential housing unit. However, in accordance with the methods and procedures specified in the SAP, the four discrete samples in AOC-6 were collected and analyzed as if they were discrete samples at AOC-1 (i.e. they were collected using a similar spacing and at the same depth intervals as those collected from AOC-1).

In general, surface soil and sediment samples were collected from 0-inches to 2-inches bgs at each sampling location using a plastic or stainless steel scoop or clean nitrile glove. Shallow subsurface soil and sediment samples were collected from 6-inches to 12-inches bgs into clean plastic bags or a laboratory-prepared sample jar using a hand auger or shovel.

The START submitted all collected samples to the U.S. EPA Region 9 Laboratory in Richmond, California for definitive analysis for arsenic, lead, and other toxic heavy metals using U.S. EPA SW-846 Method 6010B and for mercury using U.S. EPA Method 7473. Sample locations for sample collected during the September 2013 assessment are shown on Figures 3, 4, 6, 7, 8, and 9 under Appendix A, and identified by a highlighted sample identification and result box.

ANALYTICAL RESULTS AND DISCUSSION

A START chemist validated laboratory data generated from the assessment sampling in accordance with the U.S. EPA *Region 9 Superfund Data Evaluation/Validation Guidance* (R9QA/006.1, draft, dated December 2001) and the *Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plans and Data Validation* (EPA/540/G-90/004, OSWER Directive 9360.4, dated April 1990). The validating chemist found all data to be acceptable as definitive data with qualification and determined to be usable to meet project data use objectives. Sample AOC1-D-40-12 was used for matrix spike (MS) and matrix spike duplicate (MSD) analyses and all recoveries except aluminum (Al), antimony (Sb), calcium (Ca), iron (Fe), manganese (Mn), and molybdenum (Mo) were within the control limits. Qualification for Al, Fe, and Mn was not necessary since the amount of these metals present in the parent sample was greater than 4 times the amount spiked. The recoveries of Sb were 20 percent (MS) and 22 percent (MSD); therefore, non-detected Sb results were qualified as rejected (R). The detected Ca and Mo results were qualified as estimated (J).

A complete summary of all validated analytical site data is included under Appendix B. Data qualifications for samples collected during this assessment are documented in the analytical data review summaries under Appendix D. The following sections provide a discussion of analytical results for contaminants of concern in samples collected at AOCs during this assessment.

Results for Arsenic, Lead and Mercury in AOC-1

A summary of analytical results for arsenic, lead, and mercury in soil samples collected at AOC-1 are shown on Table 1 (Appendix B). The surface soil results for arsenic, lead, and mercury collected at AOC-1 are shown on Figure 3 (Appendix A). The shallow subsurface soil results for arsenic, lead, and mercury collected at AOC-1 are shown on Figure 4 (Appendix A).

Arsenic concentrations in surface and shallow subsurface soil samples collected from AOC-1 west of Argonaut Lane were all below the investigation level of 61 mg/kg. The maximum arsenic concentration of 55 mg/kg was detected in duplicate sample AOC1-D-38-00-7.

Arsenic was detected at a concentration of 750 mg/kg in surface soil AOC1-D-41-00, and at 910 mg/kg in sample AOC1-D-41-12. These arsenic concentrations exceed the total threshold limit concentration (TTLC) value of 500 mg/kg for classification as hazardous waste by the State of California.

Lead concentrations in surface and shallow subsurface soils collected at AOC-1 from the area west of Argonaut Lane and near the southeastern boundary (location AOC1-D-41) were all well below the investigation level of 400 mg/kg. The highest detected lead concentration was 120 mg/kg in surface soil at sample location AOC1-D-41-00.

Mercury concentrations in surface and shallow subsurface soils collected at AOC-1 from the area west of Argonaut Lane and the southeast boundary were all well below the 10 mg/kg investigation level. The highest detected mercury concentration was 2.5 mg/kg in surface soil sample AOC1-D-41-00.

Results for Arsenic, Lead, and Mercury in AOC-2

A summary of analytical results for arsenic, lead, and mercury in the shallow subsurface sediment sample collected from vat V-1 at AOC-2 are shown in Table 2 (Appendix B) and on Figure 6 (Appendix A).

The detected concentrations in sample AOC2-SD-11-06 were 740 mg/kg for lead and 12,000 mg/kg for arsenic. The detected lead concentration was above the investigation level of 400 mg/kg. The detected arsenic concentration was above the investigation level and the 500 mg/kg TTLC value for classification as hazardous waste by the State of California. Mercury was detected at a concentration of 14 mg/kg in this sample, above the investigation level of 10 mg/kg.

Results for Arsenic, Lead, and Mercury in AOC-4

A summary of analytical results for arsenic, lead, and mercury in surface sediment samples collected at AOC-4 are shown in Table 3 (Appendix B), and on Figure 7. (Appendix A).

The arsenic concentrations in surface sediment samples AOC4-SD-05-00 and AOC4-SD-06-00 were 2,900 mg/kg and 1,400 mg/kg, respectively. Both concentrations exceed the TTLC value (500 mg/kg) for classification as hazardous waste by the State of California. The lead and mercury concentrations in surface sediments at sample locations AOC4-SD-05-00 and AOC4-SD-06-00 were all well below the site investigation levels.

Results for Arsenic, Lead, and Mercury in AOC-6

A summary of analytical results for arsenic, lead, and mercury in soil samples collected at AOC-6 are summarized in Table 4 (Appendix B). Surface soil sample results at AOC-6 are shown on Figure 8 (Appendix A) and subsurface soil results are shown on Figure 9 (Appendix A).

The arsenic concentrations in discrete surface soils samples AOC6-D-01-00 and AOC6-D-02-00 were above the investigation level at 150 mg/kg and 130 mg/kg, respectively. Detected arsenic, lead, and mercury concentrations in all other surface and shallow subsurface soil samples collected at AOC-6 were below the investigation levels.

CONCLUSIONS AND RECOMMENDATIONS

In September 2013, the U.S. EPA and START collected additional surface and shallow subsurface soil and sediment samples from AOC numbers 1, 2, 4, and 6 to delineate arsenic, lead, and mercury contamination at the site. Based on review of the analytical laboratory results generated from this sampling event, the following conclusions and recommendations are presented.

- Results from AOC-1 indicate that sample location AOC1-D-41 has arsenic contamination in surface and shallow subsurface soils (up to 18-inches bgs) that exceed the classification as hazardous waste by the State of California. Sample AOC1-D-41 was collected approximately 100 feet south of the previous southeast boundary at AOC-1, and significantly exceeds the site investigation level for arsenic. Additional surface and shallow subsurface soil sampling may be warranted to the south of sample location AOC1-D-41 in order to better delineate the extent of arsenic contamination along the southeast boundary of AOC-1.
- Detected contaminant of concern (COC) concentrations in samples collected from the property west of Argonaut Lane were all below the action level, indicating that the extent of contaminant concentrations above the investigation level was defined to the west of AOC-1. The data also suggest that the results for samples collected at location AOC1-D-01 in July 2013 were anomalous, or that contaminants are limited to a relatively small area near that location.
- Results from AOC-2 indicate that sediments in vat V-1 contain arsenic and lead at concentrations that exceed the classification as hazardous waste by the State of California, as well as mercury concentrations that exceed the site investigation level. Based on the detected arsenic concentrations, a removal action may be warranted.
- Results from AOC-4 indicate that sample locations AOC4-SD-05 and AOC4-SD-06 have arsenic contamination in surface sediments that exceed the classification as hazardous waste by the State of California. Additional sediment sampling may be warranted in the area of these sample locations in order to better delineate the extent of arsenic contamination at AOC-4. This area may also be considered for removal action given the significant contaminant concentrations and because water flowing over these sediments discharges to Jackson Creek, a potential drinking water source.
- Detected arsenic concentrations in surface samples collected from locations AOC6-D-01 and AOC6-D-02 exceeded the site investigation level. These areas may be considered for removal action given the significant contaminant concentrations. However, arsenic concentrations in subsurface samples at these locations were below the investigation level, indicating that the vertical extent of COCs above the level was defined in this area.
- COCs were not detected at concentrations above the investigation levels in composite samples collected at AOC-6, suggesting that the lateral extent of

elevated surface arsenic concentrations extends between about 50 and 75 feet north of AOC-1.

Please contact me at 510-893-6700 ext. 4803 if you have any questions regarding the E & E START activities associated with this additional removal assessment.

Respectfully,



Brian Milton P.E., CHMM, QSD
START Project Manager

Attachment A-Figures

Figure 1 Site Location Map

Figure 2 Site Features Map

Figure 3 AOC-1: Lead, Arsenic, and Mercury Concentrations in Surface Soil Samples

Figure 4 AOC-1: Lead, Arsenic, and Mercury Concentrations in Subsurface Soil Samples

Figure 5 AOC-2: Lead, Arsenic, and Mercury Concentrations in Surface Sediment Samples

Figure 6 AOC-2: Lead, Arsenic, and Mercury Concentrations in Subsurface Sediment Samples

Figure 7 AOC-4: Lead, Arsenic, and Mercury Concentrations in Surface Sediment and Water Samples

Figure 8 AOC-6: Lead, Arsenic, and Mercury Concentrations in Surface Soil Samples

Figure 9 AOC-6: Lead, Arsenic, and Mercury Concentrations in Subsurface Soil Samples

Attachment B-Tables

Table 1 Summary of Lead, Arsenic, and Mercury Soil Sample Results in AOC-1

Table 2 Summary of Lead, Arsenic, and Mercury Soil Sample Results in AOC-2

Table 3 Summary of Lead, Arsenic, and Mercury Sediment Sample Results in AOC-4

Table 4 Summary of Lead, Arsenic, and Mercury Soil Sample Results in AOC-6

Attachment C-Photo Documentation

Attachment D-Analytical Data Review Summaries

Attachment E-References

Attachment A: Figures

Figure 1 Site Location Map

Figure 2 Site Features Map

Figure 3 AOC-1: Lead, Arsenic, and Mercury Concentrations in Surface Soil Samples

Figure 4 AOC-1: Lead, Arsenic, and Mercury Concentrations in Subsurface Soil Samples

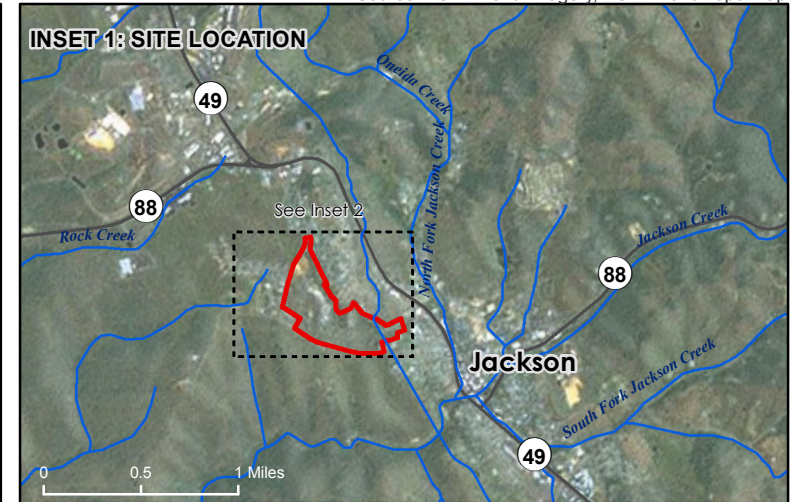
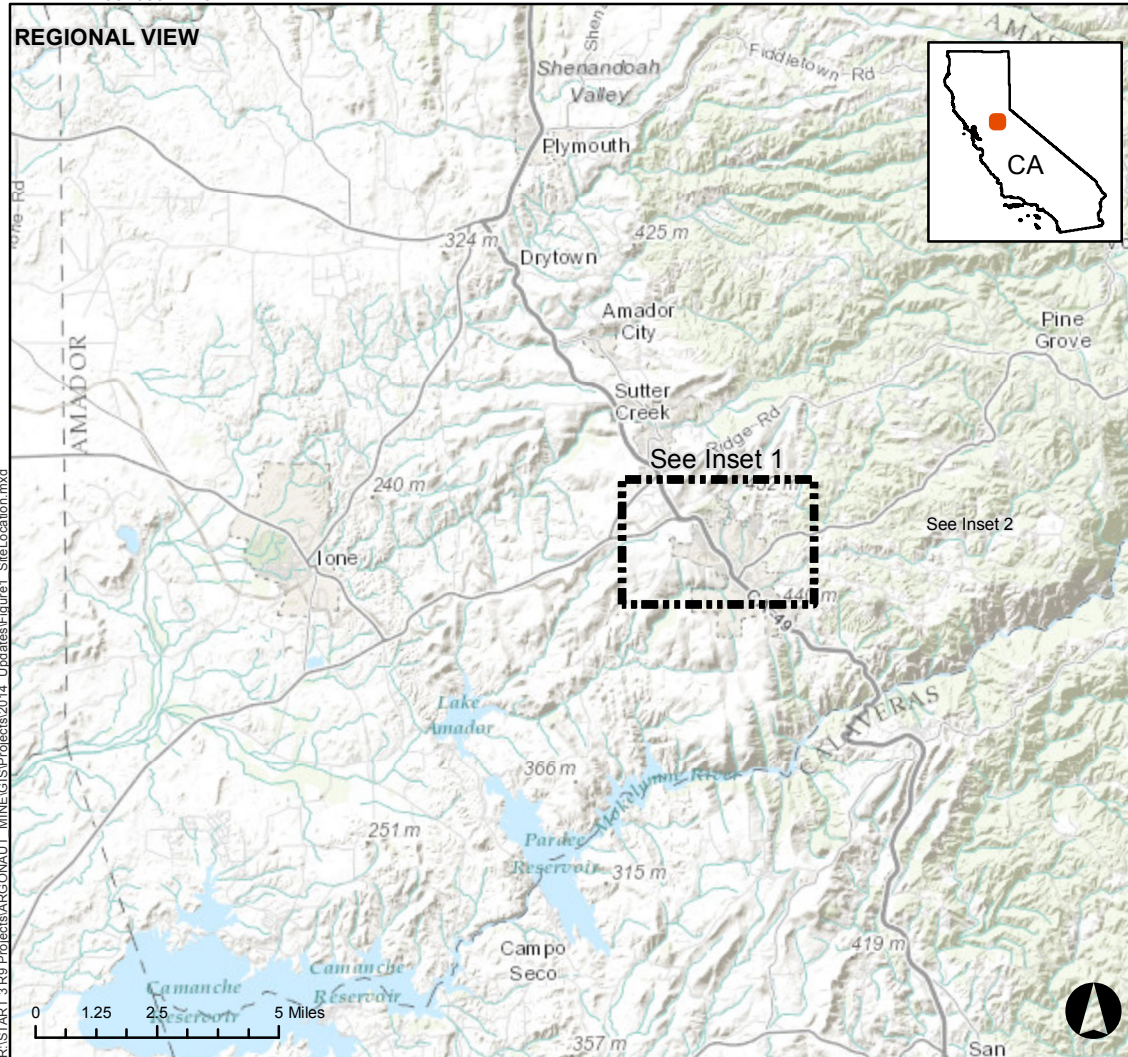
Figure 5 AOC-2: Lead, Arsenic, and Mercury Concentrations in Surface Sediment Samples

Figure 6 AOC-2: Lead, Arsenic, and Mercury Concentrations in Subsurface Sediment Samples

Figure 7 AOC-4: Lead, Arsenic, and Mercury Concentrations in Surface Sediment and Water Samples

Figure 8 AOC-6: Lead, Arsenic, and Mercury Concentrations in Surface Soil Samples

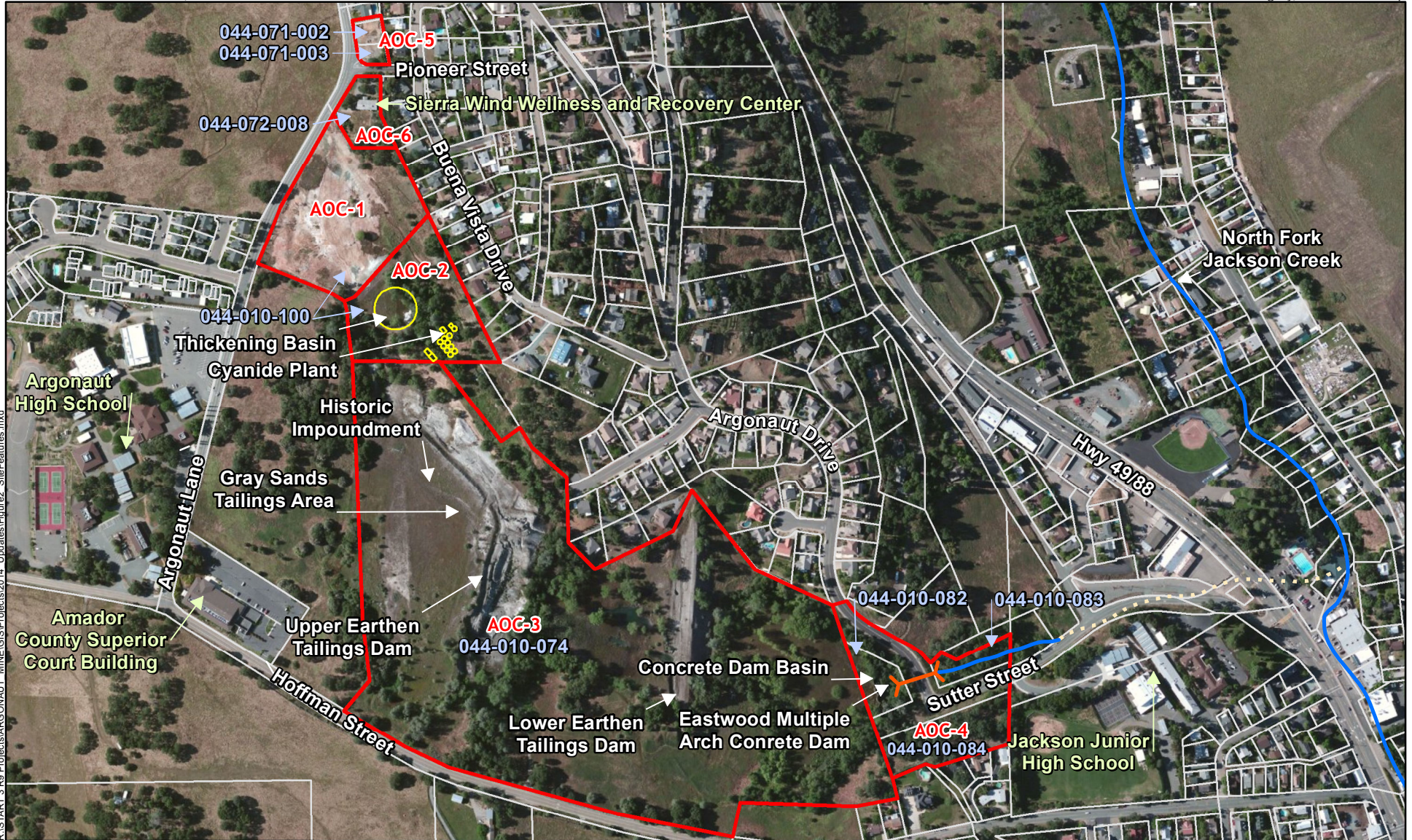
Figure 9 AOC-6: Lead, Arsenic, and Mercury Concentrations in Subsurface Soil Samples



LEGEND

- Topographical Survey Boundary
- Rivers
- Major Roads

Figure 1
Site Location Map
Argonaut Mine Tailings Pile
 Jackson, California



LEGEND

- Vats and Tanks Associated with the Cyanide Plant in AOC2
- Approximate AOC Boundary
- Taxlots (Labeled with 12 digit ID if within the site boundary)
- X Culvert
- Surface Drainage (Approximate)
- Underground Drainage (Approximate)
- AOC: Area of Concern
- 044-071-020: Amador County Assessor's Parcel Number

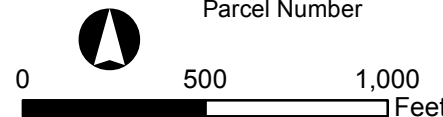


Figure 2
Site Features Map
Argonaut Mine Tailings Pile
 Jackson, California



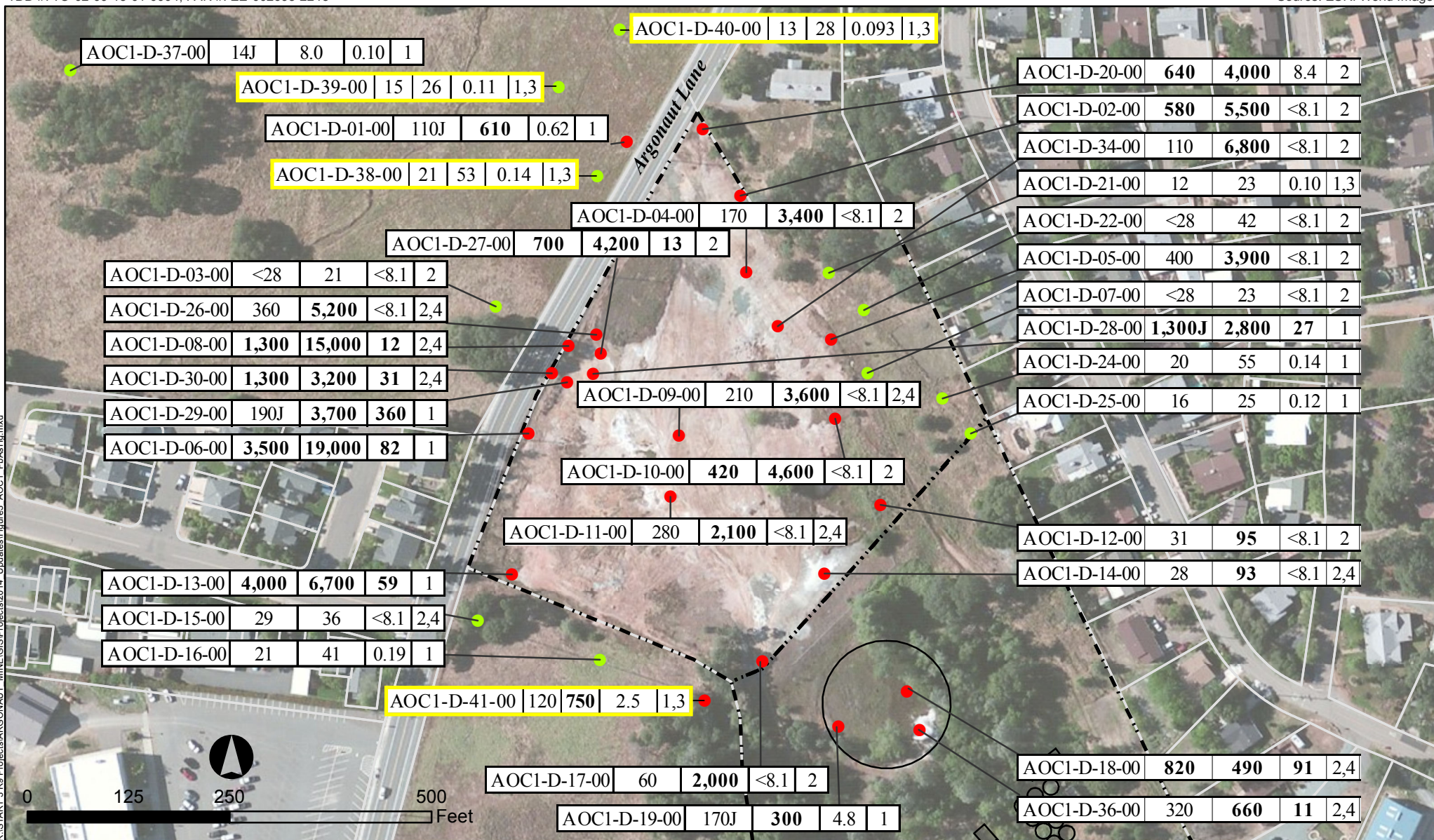


Figure 3

AOC-1: Lead, Arsenic, and Mercury Concentrations in Surface Soil Samples Argonaut Mine Tailings Pile

Jackson, California

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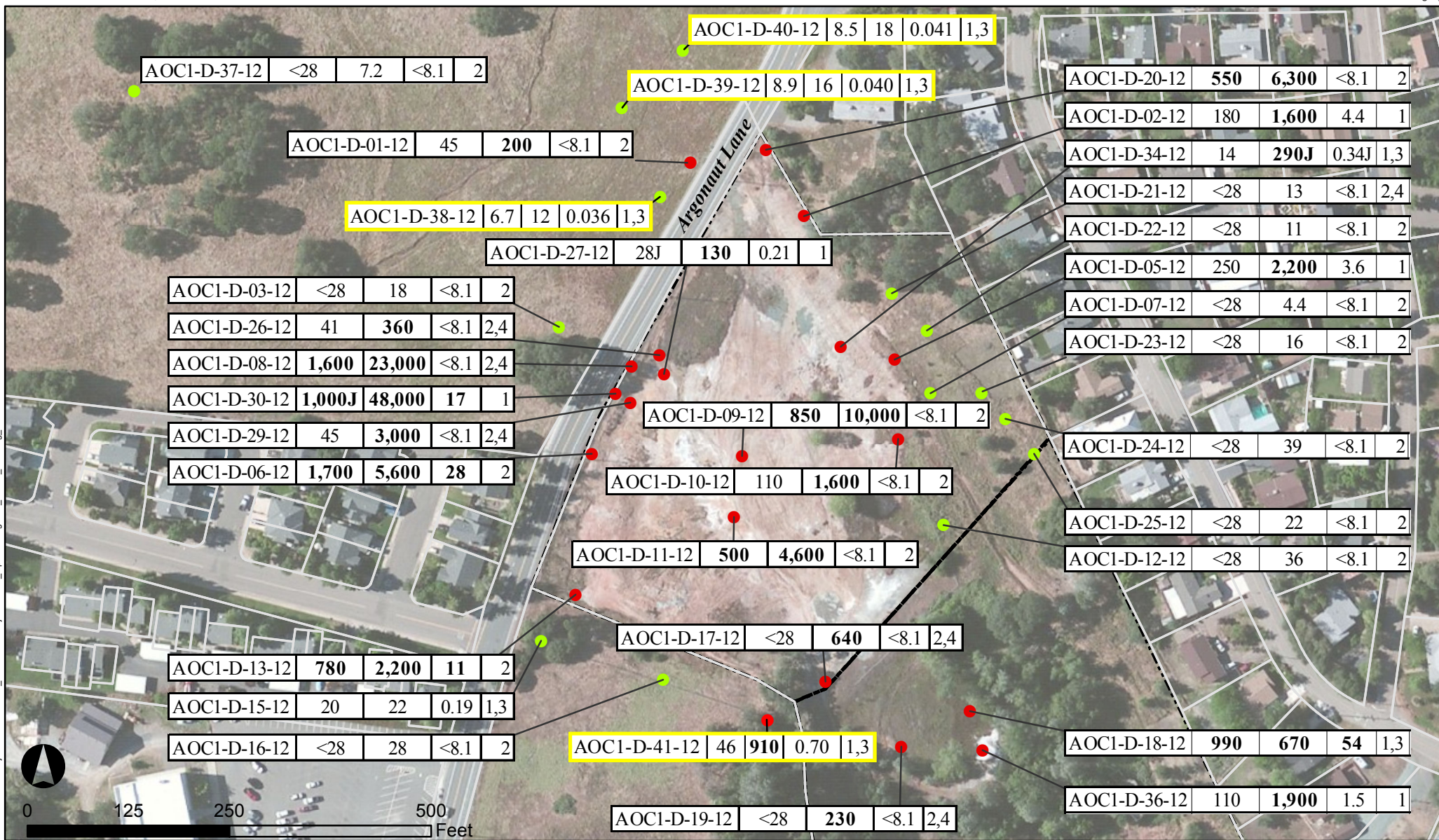


Figure 4

AOC-1: Lead, Arsenic, and Mercury Concentrations in Subsurface Soil Samples Argonaut Mine Tailings Pile

Jackson, California



LEGEND

● Above ESL

ESLs:
Lead: 400
Arsenic: 61
Mercury: 10

Notes:
Lab Analysis shown when possible.
All concentrations in milligrams per kilogram (mg/kg)
< - below the practical quantifiable detection limit
US EPA - United States Environmental Protection Agency
T - Tank
V - Vat

Sample ID	Lead Concentration	Arsenic Concentration	Mercury Concentration	Analytical Method Code
Analytical Method Codes: 1. US EPA Method 6010B 2. Analysis using XRF Technology US EPA Method 6200 3. Lab Analysis on unprocessed sample (not sieved) 4. XRF Analysis on unprocessed sample (analyzed directly through plastic bag)				

Bold - Above Environmental Screening Level (ESL)
SD - Sediment sample
J - Value is estimated
AOC - Area of Concern
XRF - X-Ray Fluorescence

Figure 5

AOC-2: Lead, Arsenic, and Mercury Concentrations in Surface Sediment Samples Argonaut Mine Tailings Pile

Jackson, California



LEGEND

● Above ESL

ESLs:
Lead: 400
Arsenic: 61
Mercury: 10

Yellow border indicates a new sample.

Notes:
Lab Analysis shown when possible.
All concentrations in milligrams per kilogram (mg/kg)
< - below the practical quantifiable detection limit
US EPA - United States Environmental Protection Agency
T - Tank

Sample ID	Lead Concentration	Arsenic Concentration	Mercury Concentration	Analytical Method Code
Analytical Method Codes: 1. US EPA Method 6010B 2. Analysis using XRF Technology US EPA Method 6200 3. Lab Analysis on unprocessed sample (not sieved) 4. XRF Analysis on unprocessed sample (analyzed directly through plastic bag)				

V - Vat
Bold - Above Environmental Screening Level (ESL)
SD - Sediment sample
J - Value is estimated
AOC - Area of Concern
XRF - X-Ray Fluorescence

Figure 6

AOC-2: Lead, Arsenic, and Mercury Concentrations in Subsurface Sediment Samples Argonaut Mine Tailings Pile

Jackson, California

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**LEGEND**

- Below ESL
- Above ESL

Yellow border indicates a new sample.

Notes:

Lab Analysis shown when possible.

Soil and sediment sample results in milligrams per kilogram (mg/kg) as dry weight

Water sample results in micrograms per liter (ug/l)

< - below the practical quantifiable detection limit

US EPA - United States Environmental Protection Agency

Soil ESLs:

Lead: 400

Arsenic: 61

Mercury: 10

Water ESLs:

Lead: 2.4

Arsenic: 150

Mercury: 0.050

Sample ID	Lead Concentration	Arsenic Concentration	Mercury Concentration	Analytical Method Code
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Analytical Method Codes:

1. US EPA Method 6010B

2. Analysis using XRF Technology US EPA Method 6200

3. Lab Analysis on unprocessed sample (not sieved)

4. XRF Analysis on unprocessed sample (analyzed directly through plastic bag)

Bold - Above Environmental Screening Level (ESL)

SD - Sediment sample

J - Value is estimated

AOC - Area of Concern

XRF - X-Ray Fluorescence

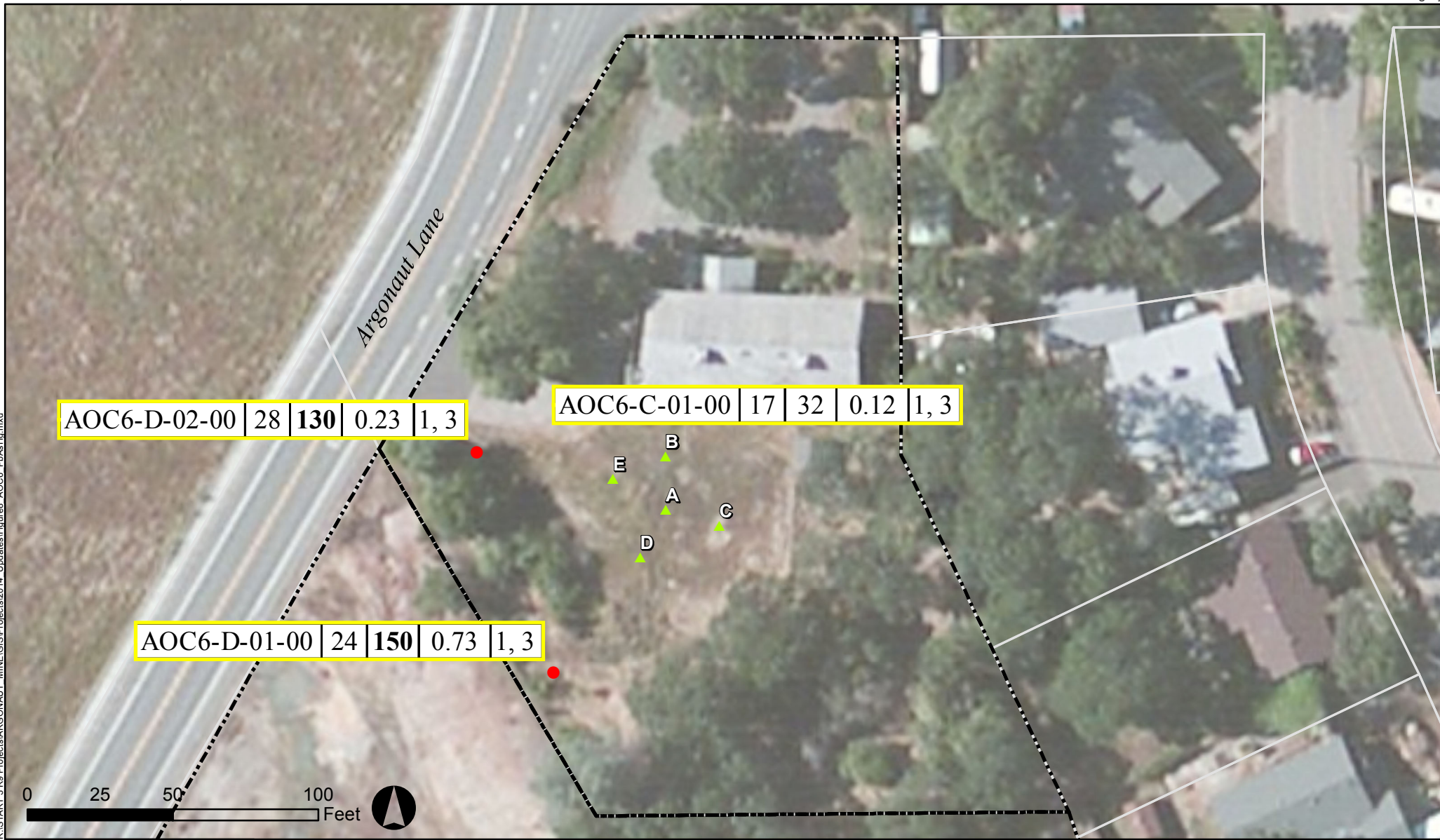
Figure 7

AOC-4: Lead, Arsenic, and Mercury Concentrations in Surface Sediment and Water Samples

Argonaut Mine Tailings Pile

Jackson, California



**LEGEND**

▲ Composite Sample Aliquot Below ESL

● Discrete Sample Above ESL

⬡ Approximate AOC Boundary

Yellow border indicates a new sample.

Notes:

Lab Analysis shown when possible.

All concentrations in milligrams per kilogram (mg/kg)

< - below the practical quantifiable detection limit

US EPA - United States Environmental Protection Agency

ESLs:

Lead: 400

Arsenic: 61

Mercury: 10

Sample ID	Lead Concentration	Arsenic Concentration	Mercury Concentration	Analytical Method Code
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Analytical Method Codes:

1. US EPA Method 6010B

2. Analysis using XRF Technology US EPA Method 6200

3. Lab Analysis on unprocessed sample (not sieved)

4. XRF Analysis on unprocessed sample (analyzed directly through plastic bag)

Bold - Above Environmental Screening Level (ESL)

SD - Sediment sample

J - Value is estimated

AOC - Area of Concern

XRF - X-Ray Fluorescence

Figure 8

AOC-6: Lead, Arsenic, and Mercury Concentrations in Surface Soil Samples Argonaut Mine Tailings Pile

Jackson, California



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**LEGEND**

- ▲ Composite Sample Aliquot Below ESL
- Discrete Sample Below ESL
- ⬡ Approximate AOC Boundary
- Yellow border indicates a new sample.

Notes:

Lab Analysis shown when possible.
 All concentrations in milligrams per kilogram (mg/kg)
 < - below the practical quantifiable detection limit
 US EPA - United States Environmental Protection Agency

ESLs:
 Lead: 400
 Arsenic: 61
 Mercury: 10

Sample ID	Lead Concentration	Arsenic Concentration	Mercury Concentration	Analytical Method Code
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Analytical Method Codes:

1. U.S. EPA Method 6010C/SOP503
2. Analysis using XRF Technology US EPA Method 6200
3. Lab Analysis on unprocessed sample (not sieved)
4. XRF Analysis on unprocessed sample (analyzed directly through plastic bag)

Bold - Above Environmental Screening Level (ESL)
 SD - Sediment sample
 J - Value is estimated
 AOC - Area of Concern
 XRF - X-Ray Fluorescence

Figure 9

AOC-6: Lead, Arsenic, and Mercury Concentrations in Subsurface Soil Samples Argonaut Mine Tailings Pile

Jackson, California



Attachment B: Data Summary Tables

Table 1 Summary of Lead, Arsenic, and Mercury Soil Sample Results in AOC-1

Table 2 Summary of Lead, Arsenic, and Mercury Soil Sample Results in AOC-2

Table 3 Summary of Lead, Arsenic, and Mercury Sediment Sample Results in AOC-4

Table 4 Summary of Lead, Arsenic, and Mercury Soil Sample Results in AOC-6

Table 1. Summary of Lead, Arsenic, and Mercury Soil Sample Results in AOC-1 Argonaut Mine Tailings Pile, Jackson, California								
TDD #: TO-02-09-13-01-0004						PAN #: EE-002693-		
Sample ID	Date Collected	Lead		Arsenic		Mercury		Comment
		Environmental Screening Levels (mg/kg)						
		400		61		10		
		Analysis Results (mg/kg)						
		XRF	Lab	XRF	Lab	XRF	Lab	
AOC1-D-01-00	07/10/13	120	110J	660	610	<8.1	0.62	
AOC1-D-01-12	07/10/13	45		200		<8.1		
AOC1-D-02-00	07/09/13	580		5,500		<8.1		
AOC1-D-02-12	07/09/13	180	180	1,700	1,600	<8.1	4.4	
AOC1-D-02-12-07	07/09/13	180	170	1,700	1,600	<8.1	4.3	3
AOC1-D-03-00	07/10/13	<28		21		<8.1		
AOC1-D-03-12	07/10/13	<28		18		<8.1		
AOC1-D-04-00	07/10/13	170		3,400		<8.1		
AOC1-D-05-00	07/09/13	400		3,900		<8.1		
AOC1-D-05-12	07/09/13	270	250	2,400	2,200	<8.1	3.6	
AOC1-D-06-00	07/09/13	3,000	3,500	19,000	19,000	83	82	
AOC1-D-06-12	07/09/13	1,700		5,600		28		
AOC1-D-07-00	07/09/13	<28		23		<8.1		
AOC1-D-07-12	07/09/13	<28		4.4		<8.1		
AOC1-D-07-12-PD	07/09/13	<28		5.2		<8.1		4
AOC1-D-07-12-PD	07/09/13	<28		4.3		<8.1		4, 5
AOC1-D-08-00	07/09/13	1,300		15,000		12		1
AOC1-D-08-12	07/09/13	1,600		23,000		<8.1		1
AOC1-D-09-00	07/09/13	210		3,600		<8.1		1
AOC1-D-09-12	07/09/13	850		10,000		<8.1		
AOC1-D-10-00	07/09/13	420		4,600		<8.1		
AOC1-D-10-12	07/09/13	110		1,600		<8.1		
AOC1-D-11-00	07/09/13	280		2,100		<8.1		1
AOC1-D-11-12	07/09/13	500		4,600		<8.1		
AOC1-D-12-00	07/09/13	31		95		<8.1		
AOC1-D-12-12	07/09/13	<28		36		<8.1		
AOC1-D-13-00	07/09/13	3,700	4,000	6,800	6,700	71	59	1
AOC1-D-13-12	07/09/13	780		2,200		11		
AOC1-D-13-12-PD	07/09/13	760		2,200		15		4
AOC1-D-14-00	07/09/13	28		93		<8.1		1
AOC1-D-15-00	07/09/13	29		36		<8.1		1
AOC1-D-15-12	07/09/13	<28	20	26	22	<8.1	0.19	1, 2
AOC1-D-15-12-7	07/09/13	<28		29		<8.1		1, 3
AOC1-D-15-12-7	07/09/13	<28		29		<8.1		1, 3, 5
AOC1-D-16-00	07/09/13	<28	21	50	41	<8.1	0.19	
AOC1-D-16-12	07/09/13	<28		28		<8.1		
AOC1-D-17-00	07/09/13	60		2,000		<8.1		
AOC1-D-17-12	07/09/13	<28		640		<8.1		1
AOC1-D-18-00	07/09/13	820		490		91		1
AOC1-D-18-12	07/09/13	970	990	510	670	88	54	1, 2
AOC1-D-19-00	07/09/13	160	170J	270	300	8.1	4.8	1
AOC1-D-19-12	07/09/13	<28		230		<8.1		1
AOC1-D-20-00	07/09/13	640		4,000		8.4		
AOC1-D-20-12	07/09/13	550		6,300		<8.1		
AOC1-D-20-12	07/09/13	580		6,500		<8.1		5
AOC1-D-21-00	07/09/13	<28	12	26	23	<8.1	0.10	1, 2
AOC1-D-21-12	07/09/13	<28		13		<8.1		1
AOC1-D-22-00	07/09/13	<28		42		<8.1		

Table 1. Summary of Lead, Arsenic, and Mercury Soil Sample Results in AOC-1 Argonaut Mine Tailings Pile, Jackson, California								
TDD #: TO-02-09-13-01-0004						PAN #: EE-002693-		
Sample ID	Date Collected	Lead		Arsenic		Mercury		Comment
		Environmental Screening Levels (mg/kg)						
		400		61		10		
		Analysis Results (mg/kg)						
		XRF	Lab	XRF	Lab	XRF	Lab	
AOC1-D-22-12	07/09/13	<28		11		<8.1		
AOC1-D-23-12	07/09/13	<28		16		<8.1		
AOC1-D-24-00	07/09/13	<28	20	67	55	<8.1	0.14	
AOC1-D-24-12	07/09/13	<28		39		<8.1		
AOC1-D-25-00	07/09/13	<28	16	32	25	<8.1	0.12	
AOC1-D-25-12	07/09/13	<28		22		<8.1		
AOC1-D-25-12	07/09/13	<28		23		<8.1		5
AOC1-D-26-00	07/09/13	360		5,200		<8.1		1
AOC1-D-26-12	07/09/13	41		360		<8.1		1
AOC1-D-27-00	07/09/13	700		4,200		13		
AOC1-D-27-12	07/09/13	73	28J	470	130	<8.1	0.21	1
AOC1-D-28-00	07/09/13	1,300	1,300J	3,000	2,800	42	27	1
AOC1-D-28-00-7	07/09/13	1,600	1,600J	3,200	3,200	38	37	3
AOC1-D-28-00-7	07/09/13	1,600	1,600J	3,200	3,200	45	37	3.5
AOC1-D-29-00	07/09/13	190	190J	3,800	3,700	<8.1	360	1
AOC1-D-29-12	07/09/13	45		3,000		<8.1		1
AOC1-D-30-00	07/09/13	1,300		3,200		31		1
AOC1-D-30-12	07/09/13	830	1,000J	41,000	48,000	<8.1	17	1
AOC1-D-34-00	07/09/13	110		6,800		<8.1		
AOC1-D-34-12	07/09/13	410	14	2,800	290J	<8.1	0.34J	1, 2
AOC1-D-36-00	07/09/13	320		660		11		1
AOC1-D-36-12	07/09/13	250	110	770	1,900	10	1.5	1
AOC1-D-37-00	07/10/13	<28	14J	8.0	8.0	<8.1	0.10	6
AOC1-D-37-12	07/10/13	<28		7.2		<8.1		6
AOC1-D-38-00	09/24/13		21		53		0.14	2
AOC1-D-38-00-7	09/24/13		22		55		0.15	2,3
AOC1-D-38-12	09/24/13		6.7		12		0.036	2
AOC1-D-39-00	09/24/13		15		26		0.11	2
AOC1-D-39-12	09/24/13		8.9		16		0.040	2
AOC1-D-40-00	09/24/13		13		28		0.093	2
AOC1-D-40-12	09/24/13		8.5		18		0.041	2
AOC1-D-41-00	09/24/13		120		750		2.5	2
AOC1-D-41-12	09/24/13		46		910		0.70	2
Notes:								
1. Indicates XRF sample was obtained from an unsieved sample analyzed directly through plastic bag.								
2. Indicates laboratory analysis was performed on an unprocessed sample (i.e. not sieved)								
3. Field duplicate								
4. Preparation duplicate								
5. XRF analysis duplicate								
6. Background sample								
-00 - Sample collected 0 to 2 inches below ground surface								
-12 - Sample collected 12 to 18 inches below ground surface								
< - Below the detection limit for the XRF analysis, which was calculated as 3 times the lowest detected value								
J - Value is estimated								
mg/kg - Milligram per kilogram								
D - Discrete sample								
PD - Preparation Duplicate								
AOC - Area of Concern								
Bold - Indicates contaminant was detected above the environmental screening level								
Screening levels are from the <i>Sampling and Analysis Plan, Argonaut Mine Tailings Pile Assessment, Jackson, California, July, 2013</i> , Ecology and Environment Inc. (E & E, 2013).								
Blank results field indicates the sample was not analyzed for the applicable analyte/method.								
XRF Samples analyzed by X-ray fluorescence, U.S. EPA Method 6200								
Laboratory samples analyzed for arsenic and lead using U.S. EPA Method 6010B and for mercury using U.S. EPA Method 7471A								

TDD #: TO-02-09-13-01-0004										PAN #: EE-002693-2213									
Sample ID	Date Collected	Lead		Arsenic		Mercury		Location Description	Comment										
		Environmental Screening Levels (mg/kg)																	
		400		61		10													
		Analysis Results (mg/kg)																	
		XRF	Lab	XRF	Lab	XRF	Lab												
AOC2-SD-01-00	07/10/13	<28	17J	210	230	<8.1	0.20	Thickening basin											
AOC2-SD-01-12	07/10/13	<28		270		<8.1													
AOC2-SD-01-12-7	07/10/13	<28		270		<8.1			3										
AOC2-SD-02-00	07/10/13	54	48J	470	480	16	11	Coal tar tumbling barrel											
AOC2-SD-03-00	07/10/13	180	160J	280	300	53	41	Decant line of the decant tank, roughly 2 feet above ground surface											
AOC2-SD-03-00	07/10/13	180	160J	280	300	53	41		5										
AOC2-SD-04-00	07/10/13	180		390		<8.1		Inside the burn barrel at the SW side of Tank 1											
AOC2-SD-04-00	07/10/13	180		390		10			5										
AOC2-SD-05-00	07/10/13	37		200		<8.1		Tank 5 - Wall was broken and contents were accessible											
AOC2-SD-05-00-PD	07/10/13	37		190		<8.1			4										
AOC2-SD-06-00	07/10/13	94		350		<8.1		Tank 3 - Used hand auger to access contents											
AOC2-SD-06-12	07/10/13	32		320		<8.1													
AOC2-SD-06-12-PD	07/10/13	33		320		<8.1			4										
AOC2-SD-07-00	07/10/13	180		340		<8.1		Between tanks 1, 2, 5, & 6											
AOC2-SD-07-12	07/10/13	170		250		12													
AOC2-SD-08-00	07/10/13	31	30J	64	63	<8.1	1.7	35 gallon (estimated) process drum at the NE side of Tank 6											
AOC2-SD-10-00	07/10/13	490	750J	4,900	6,300	<8.1	13	Vat 2	1, 7										
AOC2-SD-10-00-7	07/10/13	480		4,900		<8.1			1, 3, 5										
AOC2-SD-11-06	09/24/13		740		12,000		14	Vat 1	2										
Notes:																			
1. Indicates XRF sample was obtained from an unsieved sample analyzed directly through plastic bag.																			
2. Indicates laboratory analysis was performed on an unprocessed sample (i.e. not sieved).																			
3. Field duplicate																			
4. Preparation duplicate																			
5. XRF analysis duplicate																			
6. Background sample																			
7. Indicates XRF values are from field duplicate sample AOC2-SD-10-00-7, which was analyzed through bag as an unprocessed sample.																			
-00 - Sample collected 0 to 2 inches below ground surface																			
-06 - Sample collected from 6 inches below surface of material																			
-12 - Sample collected 12 to 18 inches below ground surface																			
< - Below the detection limit for the XRF analysis, which was calculated as 3 times the lowest detected value																			
J - Value is estimated																			
mg/kg - Milligram per kilogram																			
SD - Discrete sediment sample																			
PD - Preparation Duplicate																			
AOC - Area of Concern																			
Bold - Indicates contaminant was detected above the environmental screening level																			
Screening levels are from the <i>Sampling and Analysis Plan, Argonaut Mine Tailings Pile Assessment, Jackson, California, July, 2013</i> , Ecology and Environment Inc. (E & E, 2013).																			
Blank results field indicates the sample was not analyzed for the applicable analyte/method.																			
XRF Samples analyzed by X-ray fluorescence, U.S. EPA Method 6200.																			
Laboratory samples analyzed for arsenic and lead using U.S. EPA Method 6010B and for mercury using U.S. EPA Method 7471A.																			

Table 3. Summary of Lead, Arsenic, and Mercury Sediment Sample Results in AOC-4 Argonaut Mine Tailings Pile, Jackson, California

TDD #: TO-02-09-13-01-0004

PAN #:EE-002693-2213

Sample ID	Date Collected	Lead		Arsenic		Mercury		Comment
		Environmental Screening Levels (mg/kg)						
		400		61		10		
		Analysis Results (mg/kg)						
		XRF	Lab	XRF	Lab	XRF	Lab	
AOC4-SD-01-00	07/09/13		12		4,700		0.25	2
AOC4-SD-02-00	07/10/13	690	750	7,200	7,300	<8.1	14	2
AOC4-SD-02-00	07/10/13	680	750	7,200	7,300	<8.1	14	2, 5
AOC4-SD-02-00-PD	07/10/13	680		7,200		<8.1		2, 4
AOC4-SD-03-00	07/10/13	20	13	50	49	<8.1	0.66	2
AOC4-SD-03-00-7	07/10/13		13		44		0.72	2, 3
AOC4-SD-04-00	07/10/13	13	19	120	190	<8.1	0.11	1, 2
AOC4-SD-05-00	09/25/13		13		2,900		0.22	2
AOC4-SD-06-00	09/25/13		19		1,400		0.21	2

Notes:

1. Indicates XRF sample was obtained from an unsieved sample analyzed directly through plastic bag.

2. Indicates laboratory analysis was performed on an unprocessed sample (i.e. not sieved).

3. Field duplicate

4. Preparation duplicate

5. XRF analysis duplicate

-00 - Sample collected 0 to 2 inches below ground surface

-12 - Sample collected 12 to 18 inches below ground surface

< - Below the detection limit for the XRF analysis, which was calculated as 3 times the lowest detected value

mg/kg - Milligram per kilogram

SD - Discrete sediment sample

PD - Preparation Duplicate

AOC - Area of Concern

Bold - Indicates contaminant was detected above the environmental screening level.

Screening levels are from the *Sampling and Analysis Plan, Argonaut Mine Tailings Pile Assessment, Jackson, California, July, 2013*, Ecology and Environment Inc. (E & E, 2013).

Blank results field indicates the sample was not analyzed for the applicable analyte/method.

Laboratory samples analyzed for arsenic and lead using U.S. EPA Method 6010B and for mercury using U.S. EPA Method 7471A.

**Table 4. Summary of Lead, Arsenic and Mercury Soil Sample Results in AOC-6
Argonaut Mine Tailings Pile, Jackson, California**

TDD #: TO-02-09-13-01-0004

PAN #: EE-

Sample ID	Date Collected	Arsenic (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Comment
AOC6-C-01-00	09/24/13	32	17	0.12	
AOC6-C-01-12	09/24/13	11	4.3	0.16	
AOC6-C-01-12-7	09/24/13	12	3.5	0.17	duplicate sample
AOC6-D-01-00	09/24/13	150	24	0.73	
AOC6-D-01-12	09/24/13	14	3.4	0.32	
AOC6-D-02-00	09/24/13	130	28	0.23	
AOC6-D-02-12	09/24/13	17	3.4	0.083	
Screening Level		61	400	10	

Notes:

Analysis for arsenic and lead by U.S. EPA Method 6010C/SOP503 on unprocessed sample, results reported as dry weight.

Analysis for mercury by U.S. EPA Method 7473/SOP535

Analysis for pH by U.S. EPA Method 9040C/9045D/SOP582

Data are preliminary (not validated)

-7 Indicates sample is a field duplicate

-00 - Sample collected 0 to 2 inches below ground surface

-12 - Sample collected 12 to 18 inches below ground surface

J - Value is estimated

mg/kg - Milligram per kilogram

C- indicates sample is a 5-point composite

D - Discrete sample

AOC - Area of Concern

Bold - Indicates contaminant was detected above the environmental screening level

Screening levels are from the *Sampling and Analysis Plan, Argonaut Mine Tailings Pile Assessment, Jackson, California, July, 2013*, Ecology and Environment Inc. (E & E, 2013).

***Attachment C:
Photographic Documentation***

DRAFT

Argonaut Mine Tailings Pile Removal Assessment at AOCs 1, 2, 4, and 6
Jackson, Amador County, California



PHOTO 1

Date: September 25, 2013

Direction: Northeast

Photographer: B. Milton

Description: View of step-out sampling locations west of Argonaut Lane. These are step-out locations for AOC-1, which is bare area in background of photo.



PHOTO 2

Date: September 25, 2013

Direction: West

Photographer: B. Milton

Description: View of contents of Vat 1 (V-1) in AOC-2.



PHOTO 3

Date: September 25, 2013

Direction: West

Photographer: B. Milton

Description: View of contents of Vat 2 (V-2) in AOC-2.

Argonaut Mine Tailings Pile Removal Assessment at AOCs 1, 2, 4, and 6
Jackson, Amador County, California



PHOTO 4

Date: September 25, 2013

Direction: Southeast

Photographer: B. Milton

Description: View of step-out sample location AOC1-D-41 in AOC-1.



PHOTO 5

Date: September 25, 2013

Direction: North

Photographer: B. Milton

Description: View of composite sample location in AOC-6.



PHOTO 6

Date: September 25, 2013

Direction: South

Photographer: B. Milton

Description: View of composite sample location in AOC-6. Discrete sample location AOC6-D-01 and AOC-1 are in background.

***Attachment D:
Analytical Data Review Summaries***

DRAFT

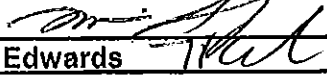

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

Laboratory: EPA Region 9 Laboratory	Lab Project No: 1309109 SDG 13270C
Sampling Dates: 9/24/13 & 9/25/13	Sample Matrix: Soil
Analytical Method: Total Metals (EPA 6010B/7473)	Data Reviewer: M. Song

REVIEW AND APPROVAL:

Data Reviewer: Mindy Song 
 Technical QA Reviewer: Howard Edwards 
 Project Manager: Brian Milton

Date: 1/28/14
 Date: 1/30/14
 Date: _____

SAMPLE IDENTIFICATION:

Sample No.	Sample I.D.	Laboratory I.D.
1	AOC1-D-38-00	1309109-01
2	AOC1-D-38-00-7	1309109-02
3	AOC1-D-38-12	1309109-03
4	AOC1-D-39-00	1309109-04
5	AOC1-D-39-12	1309109-05
6	AOC1-D-40-00	1309109-06
7	AOC1-D-40-12	1309109-07
8	AOC2-SD-11-06	1309109-08
9	AOC1-D-41-00	1309109-09
10	AOC1-D-41-12	1309109-10
11	AOC6-D-01-00	1309109-11
12	AOC6-D-01-12	1309109-12
13	AOC6-D-02-00	1309109-13
14	AOC6-D-02-12	1309109-14
15	AOC6-C-01-00	1309109-15
16	AOC6-C-01-12	1309109-16
17	AOC6-C-01-12-7	1309109-17
18	AOC4-SD-05-00	1309109-18
19	AOC4-SD-06-00	1309109-19
20		

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

DATA PACKAGE COMPLETENESS CHECKLIST:

Checklist Code:

<u> X </u>	Included: no problems
<u> * </u>	Included: problems noted in review
<u> O </u>	Not Included and/or Not Available
<u> NR </u>	Not Required
<u> RS </u>	Provided As Re-submission

Case Narrative:

<u> X </u>	Case Narrative present
--------------	------------------------

Quality Control Summary Package:

<u> X </u>	Data Summary sheets
<u> X </u>	Initial and Continuing Calibration results
<u> NR </u>	CRDL Standard results
<u> * </u>	Preparation Blank and Calibration Blank results
<u> X </u>	ICP Interference Check Sample results
<u> * </u>	Matrix Spike recoveries
<u> * </u>	Matrix Duplicate results
<u> X </u>	Laboratory Control Sample recoveries
<u> NR </u>	Method of Standard Additions results
<u> X </u>	ICP Serial Dilution results
<u> X </u>	Instrument Detection Limits
<u> X </u>	ICP Interelement Correction Factors
<u> X </u>	ICP Linear Ranges
<u> X </u>	Preparation Log
<u> X </u>	Analysis Run Log

Raw QC Data Package Section

<u> X </u>	Chain-of-Custody Records
<u> X </u>	Instrument Printouts
<u> X </u>	Sample Preparation Notebook Pages
<u> X </u>	Logbook and Worksheet Pages
<u> X </u>	Percent Solids Determination

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

DATA VALIDATION SUMMARY

The data were reviewed following procedures and limits specified in the EPA OSWER directive, *Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan and Data Validation Procedures* (EPA/540/G-90/004, OSWER Directive 9360.4-01, dated April 1990).

Indicate with a YES or NO whether each item is acceptable without qualification:

1	Holding Times	YES
2	Initial and Continuing Calibrations	YES
3	Laboratory Control Sample	YES
4	Matrix Spike	NO
5	Blanks and Background Samples	YES
6	Duplicate Analyses	YES
7	Interference Check Samples and Serial Dilution Analysis	YES
8	Post Digestion Spike and Standard Addition Analysis	N/A
9	Analyte Quantitation	YES
10	Overall Assessment of Data	YES
11	Usability of Data	NO

Comments: N/A: Not Applicable.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

1. HOLDING TIMES

☒ Acceptable
☐ Acceptable with qualification
☐ Unacceptable

Samples were extracted and analyzed within required holding times except as noted under Comments. In addition, no problems were identified with regard to sample preservation or custody unless specified. For those samples analyzed outside holding time requirements, the detected results have been qualified as estimated (J), and the nondetected results have been qualified either as estimated (UJ) or rejected (R) based on the reviewer's judgement.

All Sample Matrices:

Mercury: 28 days (from collection) for analysis.

Hexavalent chromium: 24 hours (from collection) for analysis.

All other metals: 180 days (from collection) for analysis.

Comments: All holding times were met.

2. INITIAL AND CONTINUING CALIBRATION VERIFICATION

☒ Acceptable
☐ Acceptable with qualification
☐ Unacceptable

Unless flagged below, an initial calibration verification (ICV) and a calibration blank were analyzed at the beginning of the run, and a continuing calibration verification (CCV) and a calibration blank were analyzed after every ten samples, and at the end of the run. ICV and CCV recoveries were within a range of 80-120% for mercury and tin, and 90-110% for all other metals. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 65% or above 135% (for mercury and tin) or below 75% or above 125% (for all other metals), all associated data are rejected (R).

Comments: All recoveries of metals in initial and continuing calibration verifications were within the control limits.

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

3. LABORATORY CONTROL SAMPLE

- ☒ Acceptable
☐ Acceptable with qualification
☐ Unacceptable
☐ No Laboratory Control Samples Analyzed

Laboratory control sample recoveries are used for a qualitative indication of accuracy (bias) independent of matrix effects. LCS recovery limits should either be specified in the Sampling and Analysis Plan or can be established by the laboratory. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Percent recoveries of LCS were within the control limits.

4. MATRIX SPIKE

- ☐ Acceptable
☒ Acceptable with qualification
☐ Unacceptable
☐ No Matrix Spikes Analyzed

Matrix spike recoveries are used for a qualitative indication of accuracy (bias) due to matrix effects. Unless flagged below, one laboratory control sample was analyzed at a rate of one per batch or one per 20 samples. Recoveries were within a range of 75-125%.

For analytes which exceeded these control limits, associated detected results are qualified as estimated (J). In cases where the recovery was below 30%, all associated nondetected results are rejected (R) and detected results are qualified as estimated (J).

Comments: Sample AOC1-D-40-12 was used for matrix spike and matrix spike duplicate and all recoveries except Al, Sb, Ca, Fe, Mn, and Mo were within the control limits. Qualification for Al, Fe, and Mn was not necessary since the amount of these metals present in the parent sample was greater than 4x the amount spiked. The recoveries of Sb were 20% (MS) and 22%(MSD), therefore, non-detected Sb results were qualified as rejected (R). The detected Ca and Mo results were qualified as estimated (J).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

5. BLANKS AND BACKGROUND SAMPLES

☒ Acceptable
☐ Detection Limits Adjusted

The following blanks were analyzed:

☒ Method (preparation) Blanks
☐ Field Blanks
☐ Calibration Blanks
☒ Rinsate Blanks
☐ Background Samples

Preparation (method) blanks were prepared for each batch of samples extracted. A preparation blank was analyzed after every continuing calibration standard, prior to sample analysis unless noted below. Any compound detected in the sample and also detected in any associated blank, must be qualified as non-detect (U) when the sample concentration is less than 5x the blank concentration.

Comments: No contamination was detected in the method blank at reporting limit levels, however, a trace amount of Aluminum (20 ug/L), Arsenic (3.8 ug/L), Barium (0.58 ug/L), and Calcium (100 ug/L) were detected in the equipment rinsate blank. Qualification was not required for these metals since the sample concentration was higher than 5x the blank concentration.

6. DUPLICATE ANALYSES

☒ Acceptable
☐ Acceptable with qualification
☐ Unacceptable
☐ No Duplicates Analyzed

Type of duplicates analyzed:

☒ Field Duplicates
☐ Laboratory Duplicates

Calculate the relative Percent Difference (RPD) between the members of duplicate pairs using the equation indicated below. Qualify the detected results as estimated (J) for any analyte whose RPD in a laboratory duplicate exceeds 20% for water samples or 35% for soil samples.

$$RPD = \frac{2(\text{Value 1} - \text{Value 2})}{\text{Value 1} + \text{Value 2}} \times 100\%$$

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

Analyte (mg/kg)	AOC1-D-38-00	AOC1-D-38-00-7	RPD (%)
Aluminum	24000	24000	0
Antimony	<2	<2.1	0
Arsenic	53	55	3.70
Barium	160	160	0
Beryllium	0.80	0.85	6.06
Cadmium	0.85	1.0	16.2
Calcium	6100	5700	6.78
Chromium	72	72	0
Cobalt	25	25	0
Copper	54	51	5.71
Iron	45000	50000	10.5
Lead	21	22	4.65
Magnesium	4100	4000	2.47
Manganese	1400	1400	0
Nickel	32	31	3.17
Potassium	1700	1800	5.71
Selenium	<2.2	<2.2	0
Silver	<1.1	<1.1	0
Sodium	57	58	1.74
Thallium	<5.1	<5.1	0
Vanadium	130	140	7.41
Zinc	69	73	5.63
Mercury	0.14	0.15	6.90
Molybdenum	<5.1	<5.1	0

Comments: Sample AOC1-D-38-00-7 was a field duplicate of AOC1-D-38-00 and all RPDs were within the control limits (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

Analyte (mg/kg)	AOC6-C-01-12	AOC6-C-01-12-7	RPD (%)
Aluminum	360000	350000	2.82
Antimony	<2.2	<2.2	0
Arsenic	11	12	8.70
Barium	180	140	25.0
Beryllium	0.84	0.79	6.13
Cadmium	1.2	1.2	0
Calcium	20000	20000	0
Chromium	87	81	7.14
Cobalt	32	30	6.45
Copper	79	73	7.89
Iron	45000	44000	2.25
Lead	4.3	3.5	20.5
Magnesium	9000	8500	5.71
Manganese	1200	1200	0
Nickel	33	33	0
Potassium	1200	1300	8.00
Selenium	<2.2	<2.2	0
Silver	<1.1	<1.1	0
Sodium	140	140	0
Thallium	<5.5	<5.5	0
Vanadium	200	190	5.13
Zinc	63	61	3.23
Mercury	0.16	0.17	6.06
Molybdenum	<5.5	<5.5	0

Comments: Sample AOC6-C-01-12-7 was a field duplicate of AOC6-C-01-12 and all RPDs were within the control limits (<35%).

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

7. INTERFERENCE CHECK SAMPLES AND SERIAL DILUTION ANALYSIS

☒ Acceptable
☐ Acceptable with qualification
☐ Unacceptable
☐ Not required

Interference Check Samples (ICS) - Unless flagged below, an ICS was analyzed at the beginning and end of each run and at least twice every eight hours. Recoveries were within a range of 80-120%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J) if the concentrations of Al, Ca, Fe, or Mg are higher in the sample than in the ICS.

Serial Dilution Analysis - Unless flagged below, a serial dilution analysis was performed at a rate of one per 20 samples on a sample having analyte concentrations greater than 50 times the IDL. Percent differences were within a range of 0-10%. For analytes which exceeded these control limits, associated detected results are qualified as estimated (J).

Comments: ICS recoveries were within the control limit.
Serial Dilution Analysis was not performed.

8. POST DIGESTION SPIKE AND STANDARD ADDITIONS

☐ Acceptable
☐ Acceptable with qualification
☐ Unacceptable
☒ Not required

Post-digestion spikes - If a furnace AA result was flagged by the laboratory with an E to indicate interference, and the associated post-digestion spike recovery was less than 10%, the associated results are rejected (R).

Method of Standard Additions - If the method of standard additions was required and the correlation coefficient was less than 0.995, the associated results were qualified as estimated (J).

Comments:

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

9. ANALYTE QUANTITATION

Confirm that analyte quantitation was performed correctly using the following formulas:

Water samples:

$$\text{ug/L} = \frac{(\text{Instrument printout concentration, mg/L})(1000 \text{ ug/mg})(\text{final volume of extract, mL})}{(\text{Initial volume of extract, mL})}$$

Soil samples:

$$\text{mg/kg} = \frac{(\text{Instrument printout concentration, mg/L})(\text{final volume of extract, mL})(0.001 \text{ L/mL})}{(\text{weight of sample extracted, g})(0.001 \text{ kg/g})(\text{fraction solids})}$$

Comments: Analyte quantitation is acceptable.

Sample AOC1-D-38-00

As: $(0.5195 \text{ mg/L})(0.05 \text{ L}/1.08 \text{ g})(2)(100/91) = 0.05286 \text{ mg/g} = 52.86 \text{ mg/kg}$.

Lab reported 53 mg/kg.

Pb: $(0.2089 \text{ mg/L})(0.05 \text{ L}/1.08 \text{ g})(2)(100/91) = 0.02126 \text{ mg/g} = 21.26 \text{ mg/kg}$.

Lab reported 21 mg/kg.

Sample AOC4-SD-05-00

As: $(1.336 \text{ mg/L})(0.05 \text{ L}/1.09 \text{ g})(20)(100/42) = 2.918 \text{ mg/g} = 2918 \text{ mg/kg}$.

Lab reported 2900 mg/kg.

Pb: $(0.0570 \text{ mg/L})(0.05 \text{ L}/1.09 \text{ g})(2)(100/42) = 0.01245 \text{ mg/g} = 12.45 \text{ mg/kg}$.

Lab reported 13 mg/kg.

Sample AOC2-SD-11-06

Hg: $(8554.7 \text{ ug/kg})(100/62) = 13797.9 \text{ ug/kg} = 13.798 \text{ mg/kg}$.

Lab reported 14 mg/kg.

10. OVERALL ASSESSMENT OF DATA

On the basis of this review, the following determination has been made with regard to the overall data usability for the specified level.

☐ Acceptable
☒ Acceptable with Qualification
☐ Rejected

Accepted data meet the minimum requirements for the following EPA data category:

☐ ERS Screening
☐ Non-definitive with 10 % Confirmation by Definitive Methodology
☐ Definitive, Comprehensive Statistical Error Determination was performed.
☒ Definitive, Comprehensive Statistical Error Determination was not performed.

Any qualifications to individual sample analysis results are detailed in the appropriate section above or appear under the comments section below. In cases where several QC

ANALYTICAL DATA REVIEW SUMMARY

Tier 2 Validation

Site Name: Argonaut Mine	Location: Jackson, CA
TDD Number: 09-13-01-0004	Project No: 002693.2213.01RF

criteria are out of specification, it may be appropriate to further qualify the data usability. The data reviewer must use professional judgment and express concerns and comments on the data validity for each specific data package.

Comments: Data as reported are valid.

11. USABILITY OF DATA

A. These data are considered usable for the data use objectives stated in the SAMPLING AND ANALYSIS PLAN ARGONAUT MINE TAILINGS PILE ASSESSMENT, JACKSON, CALIFORNIA JUNE 2013 (SAP).

The following data use objective was indicated in the SAP:

TO DETERMINE THE ARSENIC, LEAD, AND MERCURY CONCENTRATIONS IN THE SURFACE AND NEAR SURFACE SOILS.

TO DETERMINE THE PRESENCE OF CYANIDE FOR WATER AND SEDIMENT IN THE TANKS AND VATS AT THE FORMER TAILINGS PROCESS AREA.

TO BE USED TO DELINEATE THE EXTENT OF CONTAMINATION OF COCS IN SURFACE AND NEAR SURFACE SOILS, AND IN SURFACE WATER ONSITE

THE DATA ARE USABLE FOR THE ABOVE OBJECTIVES.

B. These data meet quality objectives stated in the SAP.

AS INDICATED IN SECTION 3 OF THE SAP, THE INVESTIGATION WILL GENERATE DEFINITIVE DATA AND TABLE 3-1 AND TABLE 3-2 OF THE SAP OUTLINES THE DATA QUALITY INDICATOR GOALS APPLICABLE TO THE DEFINITIVE DATA QUALITY LEVEL. THE DATA IN THIS PACKAGE MEET THESE REQUIREMENTS.

12. DOCUMENTATION OF LABORATORY CORRECTIVE ACTION

Problem: No problems requiring corrective action were found.

Resolution: Not required.

Attached are copies of all data summary sheets, with data qualifiers indicated, and a copy of the chain of custody for the samples.



United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804

Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed	Method
Lab ID: 1309109-01									Soil - Sampled: 09/24/13 09:30
Sample ID: AOC1-D-38-00									Metals by EPA 6000/7000 Series Methods
Mercury		0.14		0.027	mg/kg dry	B13J031	10/04/13	10/04/13	7473/SOP535
Aluminum		24,000		100	"	B13J038	10/08/13	10/29/13	6010C/SOP503
Antimony		ND	U R	2	"	"	"	"	6010C/SOP503
Arsenic	RE2	53		2	"	"	"	11/01/13	6010C/SOP503
Barium	RE1	160		5.5	"	B13K003	11/03/13	11/05/13	6010C/SOP503
Beryllium		0.80		0.10	"	B13J038	10/08/13	10/29/13	6010C/SOP503
Cadmium		0.85		0.51	"	"	"	"	6010C/SOP503
Calcium		6,100	J	100	"	"	"	"	6010C/SOP503
Chromium		72		1	"	"	"	"	6010C/SOP503
Cobalt		25		2	"	"	"	"	6010C/SOP503
Copper	RE1	54		4.4	"	B13K003	11/03/13	11/05/13	6010C/SOP503
Iron		45,000		100	"	B13J038	10/08/13	10/29/13	6010C/SOP503
Lead		21		3.1	"	"	"	"	6010C/SOP503
Magnesium		4,100		51	"	"	"	"	6010C/SOP503
Manganese		1,400		5.1	"	"	"	"	6010C/SOP503
Molybdenum		ND	U	5.1	"	"	"	"	6010C/SOP503
Nickel		32		5.1	"	"	"	"	6010C/SOP503
Potassium		1,700		510	"	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.2	"	B13K003	11/03/13	11/05/13	6010C/SOP503
Silver	RE1	ND	U	1.1	"	"	"	"	6010C/SOP503
Sodium		57		51	"	B13J038	10/08/13	10/29/13	6010C/SOP503
Thallium		ND	U	5.1	"	"	"	"	6010C/SOP503
Vanadium		130		2	"	"	"	"	6010C/SOP503
Zinc		69		8.1	"	"	"	"	6010C/SOP503

Sample ID: AOC1-D-38-00
% Solids 91
Conventional Chemistry Parameters by APHA/EPA Methods
B13J021 10/02/13 10/03/13 3550C/SOP460

Lab ID: 1309109-02
Sample ID: AOC1-D-38-00-7
Soil - Sampled: 09/24/13 09:30

									Metals by EPA 6000/7000 Series Methods
Mercury		0.15		0.027	mg/kg dry	B13J031	10/04/13	10/04/13	7473/SOP535
Aluminum		24,000		100	"	B13J038	10/08/13	10/29/13	6010C/SOP503
Antimony		ND	U R	2.1	"	"	"	"	6010C/SOP503
Arsenic	RE2	55		2.1	"	"	"	11/01/13	6010C/SOP503
Barium	RE1	160		5.5	"	B13K003	11/03/13	11/05/13	6010C/SOP503
Beryllium		0.85		0.10	"	B13J038	10/08/13	10/29/13	6010C/SOP503
Cadmium		1.0		0.51	"	"	"	"	6010C/SOP503
Calcium		5,700	J	100	"	"	"	"	6010C/SOP503
Chromium		72		1	"	"	"	"	6010C/SOP503
Cobalt		25		2.1	"	"	"	"	6010C/SOP503
Copper	RE1	51		4.4	"	B13K003	11/03/13	11/05/13	6010C/SOP503
Iron		50,000		100	"	B13J038	10/08/13	10/29/13	6010C/SOP503



United States Environmental Protection Agency Region 9 Laboratory

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Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
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Lab ID: 1309109-02

Soil - Sampled: 09/24/13 09:30

Sample ID: AOC1-D-38-00-7

Metals by EPA 6000/7000 Series Methods								
Lead		22		3.1	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
Magnesium		4,000		51	"	"	"	6010C/SOP503
Manganese		1,400		5.1	"	"	"	6010C/SOP503
Molybdenum		ND	U	5.1	"	"	"	6010C/SOP503
Nickel		31		5.1	"	"	"	6010C/SOP503
Potassium		1,800		510	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND	U	1.1	"	"	"	6010C/SOP503
Sodium		58		51	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.1	"	"	"	6010C/SOP503
Vanadium		140		2.1	"	"	"	6010C/SOP503
Zinc		73		8.2	"	"	"	6010C/SOP503

Sample ID: AOC1-D-38-00-7

Conventional Chemistry Parameters by APHA/EPA Methods								
% Solids		91		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460

Lab ID: 1309109-03

Soil - Sampled: 09/24/13 09:40

Sample ID: AOC1-D-38-12

Metals by EPA 6000/7000 Series Methods								
Mercury		0.036		0.026	mg/kg dry	B13J031	10/04/13	10/04/13 7473/SOP535
Aluminum		27,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.1	"	"	"	6010C/SOP503
Arsenic	RE2	12		2.1	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	180		5.3	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.81		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		0.85		0.53	"	"	"	6010C/SOP503
Calcium		6,200	J	110	"	"	"	6010C/SOP503
Chromium		77		1.1	"	"	"	6010C/SOP503
Cobalt		25		2.1	"	"	"	6010C/SOP503
Copper	RE1	53		4.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Iron		45,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		6.7		3.2	"	"	"	6010C/SOP503
Magnesium		4,500		53	"	"	"	6010C/SOP503
Manganese		1,300		5.3	"	"	"	6010C/SOP503
Molybdenum		ND	U	5.3	"	"	"	6010C/SOP503
Nickel		30		5.3	"	"	"	6010C/SOP503
Potassium		1,300		530	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.1	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND	U	1.1	"	"	"	6010C/SOP503
Sodium		60		53	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.3	"	"	"	6010C/SOP503
Vanadium		150		2.1	"	"	"	6010C/SOP503

m 1/28/14



United States Environmental Protection Agency Region 9 Laboratory

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Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane

Project Number: R13S90

Project: Argonaut Mine July 2013 Sampling

Emergency Response Section

75 Hawthorne Street

San Francisco CA, 94105

SDG: 13270C

Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID: 1309109-03							Soil - Sampled: 09/24/13 09:40	
Sample ID: AOC1-D-38-12							Metals by EPA 6000/7000 Series Methods	
Zinc		54		8.5	mg/kg dry	B13J038	10/08/13 10/29/13	6010C/SOP503
Sample ID: AOC1-D-38-12							Conventional Chemistry Parameters by APHA/EPA Methods	
% Solids		94		1	%	B13J021	10/02/13 10/03/13	3550C/SOP460
Lab ID: 1309109-04							Soil - Sampled: 09/24/13 09:50	
Sample ID: AOC1-D-39-00							Metals by EPA 6000/7000 Series Methods	
Mercury	RE1	0.11		0.027	mg/kg dry	B13J063	10/16/13 10/16/13	7473/SOP535
Aluminum		21,000		110	"	B13J038	10/08/13 10/29/13	6010C/SOP503
Antimony		ND	U R	2.2	"	"	"	6010C/SOP503
Arsenic	RE2	26		2.2	"	"	11/01/13	6010C/SOP503
Barium	RE1	180		5.5	"	B13K003	11/03/13 11/05/13	6010C/SOP503
Beryllium		0.74		0.11	"	B13J038	10/08/13 10/29/13	6010C/SOP503
Cadmium		0.50	CI, J	0.55	"	"	"	6010C/SOP503
Calcium		3,800	J	110	"	"	"	6010C/SOP503
Chromium		63		1.1	"	"	"	6010C/SOP503
Cobalt		19		2.2	"	"	"	6010C/SOP503
Copper	RE1	48		4.4	"	B13K003	11/03/13 11/05/13	6010C/SOP503
Iron		40,000		110	"	B13J038	10/08/13 10/29/13	6010C/SOP503
Lead		15		3.3	"	"	"	6010C/SOP503
Magnesium		3,900		55	"	"	"	6010C/SOP503
Manganese		1,100		5.5	"	"	"	6010C/SOP503
Molybdenum		ND	U	5.5	"	"	"	6010C/SOP503
Nickel		29		5.5	"	"	"	6010C/SOP503
Potassium		1,600		550	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.2	"	B13K003	11/03/13 11/05/13	6010C/SOP503
Silver	RE1	ND	U	1.1	"	"	"	6010C/SOP503
Sodium		47	CI, J	55	"	B13J038	10/08/13 10/29/13	6010C/SOP503
Thallium		ND	U	5.5	"	"	"	6010C/SOP503
Vanadium		110		2.2	"	"	"	6010C/SOP503
Zinc		61		8.8	"	"	"	6010C/SOP503
Sample ID: AOC1-D-39-00							Conventional Chemistry Parameters by APHA/EPA Methods	
% Solids		91		1	%	B13J021	10/02/13 10/03/13	3550C/SOP460
Lab ID: 1309109-05							Soil - Sampled: 09/24/13 10:00	
Sample ID: AOC1-D-39-12							Metals by EPA 6000/7000 Series Methods	
Mercury		0.040		0.026	mg/kg dry	B13J031	10/04/13 10/04/13	7473/SOP535
Aluminum		22,000		100	"	B13J038	10/08/13 10/29/13	6010C/SOP503
Antimony		ND	U R	2.1	"	"	"	6010C/SOP503
Arsenic	RE2	16		2.1	"	"	11/01/13	6010C/SOP503
Barium	RE1	200		5.2	"	B13K003	11/03/13 11/05/13	6010C/SOP503
Beryllium		0.81		0.10	"	B13J038	10/08/13 10/29/13	6010C/SOP503
Cadmium		0.72		0.52	"	"	"	6010C/SOP503

[Signature] 1/28/14



United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804
Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
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Lab ID: 1309109-05

Soil - Sampled: 09/24/13 10:00

Sample ID: AOC1-D-39-12

Metals by EPA 6000/7000 Series Methods								
Calcium		3,100	J	100	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
Chromium		68		1	"	"	"	6010C/SOP503
Cobalt		23		2.1	"	"	"	6010C/SOP503
Copper	RE1	48		4.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Iron		46,000		100	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		8.9		3.1	"	"	"	6010C/SOP503
Magnesium		4,600		52	"	"	"	6010C/SOP503
Manganese		1,400		5.2	"	"	"	6010C/SOP503
Molybdenum		ND	U	5.2	"	"	"	6010C/SOP503
Nickel		31		5.2	"	"	"	6010C/SOP503
Potassium		1,400		520	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.1	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND	U	1	"	"	"	6010C/SOP503
Sodium		42	Cl, J	52	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.2	"	"	"	6010C/SOP503
Vanadium		120		2.1	"	"	"	6010C/SOP503
Zinc		62		8.4	"	"	"	6010C/SOP503

Sample ID: AOC1-D-39-12

% Solids 96 1 % Conventional Chemistry Parameters by APHA/EPA Methods
B13J021 10/02/13 10/03/13 3550C/SOP460

Lab ID: 1309109-06

Soil - Sampled: 09/24/13 10:10

Sample ID: AOC1-D-40-00

Metals by EPA 6000/7000 Series Methods								
Mercury	RE1	0.093		0.027	mg/kg dry	B13J063	10/16/13	10/16/13 7473/SOP535
Aluminum		23,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.2	"	"	"	6010C/SOP503
Arsenic	RE2	28		2.2	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	170		5.5	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.79		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		0.74		0.55	"	"	"	6010C/SOP503
Calcium		5,300	J	110	"	"	"	6010C/SOP503
Chromium		81		1.1	"	"	"	6010C/SOP503
Cobalt		24		2.2	"	"	"	6010C/SOP503
Copper	RE1	55		4.4	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Iron		47,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		13		3.3	"	"	"	6010C/SOP503
Magnesium		4,300		55	"	"	"	6010C/SOP503
Manganese		1,300		5.5	"	"	"	6010C/SOP503
Molybdenum		ND	U	5.5	"	"	"	6010C/SOP503
Nickel		31		5.5	"	"	"	6010C/SOP503
Potassium		1,500		550	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503

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[Signature] 1/28/14



United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804
Phone:(510) 412-2300 Fax:(510) 412-2302

Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID: 1309109-06						Soil - Sampled: 09/24/13 10:10		
Sample ID: AOC1-D-40-00						Metals by EPA 6000/7000 Series Methods		
Silver	RE1	ND	U	1.1	mg/kg dry	B13K003	11/03/13	11/05/13 6010C/SOP503
Sodium		68		55	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.5	"	"	"	6010C/SOP503
Vanadium		130		2.2	"	"	"	6010C/SOP503
Zinc		66		8.8	"	"	"	6010C/SOP503
Sample ID: AOC1-D-40-00						Conventional Chemistry Parameters by APHA/EPA Methods		
% Solids		91		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460
Lab ID: 1309109-07						Soil - Sampled: 09/24/13 10:20		
Sample ID: AOC1-D-40-12						Metals by EPA 6000/7000 Series Methods		
Mercury		0.041		0.026	mg/kg dry	B13J031	10/04/13	10/04/13 7473/SOP535
Aluminum		25,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	J, Q4, U R	2.1	"	"	"	6010C/SOP503
Arsenic	RE2	18		2.1	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	170		5.3	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.80		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		0.96		0.53	"	"	"	6010C/SOP503
Calcium		5,300	J, Q4 J	110	"	"	"	6010C/SOP503
Chromium		81		1.1	"	"	"	6010C/SOP503
Cobalt	RE1	30		2.1	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	58		4.2	"	"	"	6010C/SOP503
Iron		48,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		8.5		3.2	"	"	"	6010C/SOP503
Magnesium	RE1	5,000		53	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		1,900		5.3	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	J, Q4, U	5.3	"	"	"	6010C/SOP503
Nickel		32		5.3	"	"	"	6010C/SOP503
Potassium		1,300		530	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.1	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND	U	1.1	"	"	"	6010C/SOP503
Sodium		57		53	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.3	"	"	"	6010C/SOP503
Vanadium		150		2.1	"	"	"	6010C/SOP503
Zinc		58		8.4	"	"	"	6010C/SOP503
Sample ID: AOC1-D-40-12						Conventional Chemistry Parameters by APHA/EPA Methods		
% Solids		95		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460
Lab ID: 1309109-08						Sediment - Sampled: 09/24/13 11:20		
Sample ID: AOC2-SD-11-06						Metals by EPA 6000/7000 Series Methods		
Mercury		14		0.040	mg/kg dry	B13J063	10/16/13	10/16/13 7473/SOP535
Aluminum		22,000		160	"	B13J038	10/08/13	10/29/13 6010C/SOP503



United States Environmental Protection Agency Region 9 Laboratory

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Project Manager: Daniel Shane

Project Number: R13S90

Project: Argonaut Mine July 2013 Sampling

Emergency Response Section

75 Hawthorne Street

San Francisco CA, 94105

SDG: 13270C

Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID: 1309109-08								Sediment - Sampled: 09/24/13 11:20
Sample ID: AOC2-SD-11-06								Metals by EPA 6000/7000 Series Methods
Antimony		ND	U R	3.2	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
Arsenic	RE2	12,000		320	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	250		8	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.25		0.16	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		1.7		0.80	"	"	"	6010C/SOP503
Calcium		4,000	J	160	"	"	"	6010C/SOP503
Chromium		63		1.6	"	"	"	6010C/SOP503
Cobalt	RE1	7.2		3.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	130		6.4	"	"	"	6010C/SOP503
Iron		120,000		160	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		740		4.8	"	"	"	6010C/SOP503
Magnesium	RE1	3,100		80	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		160		8	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		17	J	8	"	"	"	6010C/SOP503
Nickel		22		8	"	"	"	6010C/SOP503
Potassium		3,000		800	"	"	"	6010C/SOP503
Selenium	RE1	25		3.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	3.5		1.6	"	"	"	6010C/SOP503
Sodium		1,300		80	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	8	"	"	"	6010C/SOP503
Vanadium		94		3.2	"	"	"	6010C/SOP503
Zinc		88		13	"	"	"	6010C/SOP503

Sample ID: AOC2-SD-11-06

% Solids 62 1 % Conventional Chemistry Parameters by APHA/EPA Methods
B13J021 10/02/13 10/03/13 3550C/SOP460

Lab ID: 1309109-09

Soil - Sampled: 09/24/13 12:00

Sample ID: AOC1-D-41-00

Mercury		2.5		0.028	mg/kg dry	B13J063	10/16/13	10/16/13 7473/SOP535
Aluminum		36,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.2	"	"	"	6010C/SOP503
Arsenic	RE2	750		22	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	190		5.6	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.87		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		1.2		0.56	"	"	"	6010C/SOP503
Calcium		7,700	J	110	"	"	"	6010C/SOP503
Chromium		30		1.1	"	"	"	6010C/SOP503
Cobalt	RE1	19		2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	68		4.5	"	"	"	6010C/SOP503
Iron		52,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		120		3.3	"	"	"	6010C/SOP503
Magnesium	RE1	7,500		56	"	B13K003	11/03/13	11/05/13 6010C/SOP503

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1/28/14



United States Environmental Protection Agency Region 9 Laboratory

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Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID: 1309109-09						Soil - Sampled: 09/24/13 12:00		
Sample ID: AOC1-D-41-00						Metals by EPA 6000/7000 Series Methods		
Manganese		1,100		5.6	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		3.7	CI, J	5.6	"	"	"	6010C/SOP503
Nickel		18		5.6	"	"	"	6010C/SOP503
Potassium		3,900		560	"	"	"	6010C/SOP503
Selenium	RE1	1.1	CI, J	2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	0.94	CI, J	1.1	"	"	"	6010C/SOP503
Sodium		97		56	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.6	"	"	"	6010C/SOP503
Vanadium		120		2.2	"	"	"	6010C/SOP503
Zinc		230		8.9	"	"	"	6010C/SOP503
Sample ID: AOC1-D-41-00						Conventional Chemistry Parameters by APHA/EPA Methods		
% Solids		90		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460
Lab ID: 1309109-10						Soil - Sampled: 09/24/13 12:10		
Sample ID: AOC1-D-41-12						Metals by EPA 6000/7000 Series Methods		
Mercury		0.70		0.027	mg/kg dry	B13J063	10/16/13	10/16/13 7473/SOP535
Aluminum		42,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.2	"	"	"	6010C/SOP503
Arsenic	RE2	910		22	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	210		5.4	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.84		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		1.7		0.54	"	"	"	6010C/SOP503
Calcium		6,000	J	110	"	"	"	6010C/SOP503
Chromium		31		1.1	"	"	"	6010C/SOP503
Cobalt	RE1	14		2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	82		4.3	"	"	"	6010C/SOP503
Iron		60,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		46		3.3	"	"	"	6010C/SOP503
Magnesium	RE1	8,500		54	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		650		5.4	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	U	5.4	"	"	"	6010C/SOP503
Nickel		15		5.4	"	"	"	6010C/SOP503
Potassium		4,100		540	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	0.73	CI, J	1.1	"	"	"	6010C/SOP503
Sodium		76		54	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.4	"	"	"	6010C/SOP503
Vanadium		140		2.2	"	"	"	6010C/SOP503
Zinc		92		8.7	"	"	"	6010C/SOP503
Sample ID: AOC1-D-41-12						Conventional Chemistry Parameters by APHA/EPA Methods		
% Solids		92		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460



United States Environmental Protection Agency Region 9 Laboratory

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Project Manager: Daniel Shane
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Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID: 1309109-11							Soil - Sampled: 09/24/13 13:40	
Sample ID: AOC6-D-01-00							Metals by EPA 6000/7000 Series Methods	
Mercury		0.73		0.028	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		35,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.3	"	"	"	6010C/SOP503
Arsenic	RE2	150		2.3	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	180		5.6	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.66		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		1.3		0.56	"	"	"	6010C/SOP503
Calcium		20,000	J	110	"	"	"	6010C/SOP503
Chromium		80		1.1	"	"	"	6010C/SOP503
Cobalt	RE1	30		2.3	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	79		4.5	"	"	"	6010C/SOP503
Iron		45,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		24		3.4	"	"	"	6010C/SOP503
Magnesium	RE1	7,800		56	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		1,000		5.6	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	U	5.6	"	"	"	6010C/SOP503
Nickel		36		5.6	"	"	"	6010C/SOP503
Potassium		2,400		560	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.3	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	0.59	Cl, J	1.1	"	"	"	6010C/SOP503
Sodium		130		56	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.6	"	"	"	6010C/SOP503
Vanadium		200		2.3	"	"	"	6010C/SOP503
Zinc		90		9	"	"	"	6010C/SOP503

Sample ID: AOC6-D-01-00
% Solids 89 1 % Conventional Chemistry Parameters by APHA/EPA Methods
B13J021 10/02/13 10/03/13 3550C/SOP460

Lab ID: 1309109-12
Sample ID: AOC6-D-01-12
Soil - Sampled: 09/24/13 13:50

Metals by EPA 6000/7000 Series Methods								
Mercury		0.32		0.027	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		40,000		100	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2	"	"	"	6010C/SOP503
Arsenic	RE2	14		2	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	190		5.1	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.77		0.10	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		1.4		0.51	"	"	"	6010C/SOP503
Calcium		21,000	J	100	"	"	"	6010C/SOP503
Chromium		89		1	"	"	"	6010C/SOP503
Cobalt	RE1	37		2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	83		4.1	"	"	"	6010C/SOP503
Iron		49,000		100	"	B13J038	10/08/13	10/29/13 6010C/SOP503



United States Environmental Protection Agency Region 9 Laboratory

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Project Manager: Daniel Shane

Project Number: R13S90

Project: Argonaut Mine July 2013 Sampling

Emergency Response Section

75 Hawthorne Street

San Francisco CA, 94105

SDG: 13270C

Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID: 1309109-12						Soil - Sampled: 09/24/13 13:50		
Sample ID: AOC6-D-01-12						Metals by EPA 6000/7000 Series Methods		
Lead		3.4		3	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
Magnesium	RE1	9,100		51	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		1,400		5.1	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND U		5.1	"	"	"	6010C/SOP503
Nickel		34		5.1	"	"	"	6010C/SOP503
Potassium		1,500		510	"	"	"	6010C/SOP503
Selenium	RE1	ND U		2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND U		1	"	"	"	6010C/SOP503
Sodium		130		51	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND U		5.1	"	"	"	6010C/SOP503
Vanadium		230		2	"	"	"	6010C/SOP503
Zinc		64		8.1	"	"	"	6010C/SOP503
Sample ID: AOC6-D-01-12						Conventional Chemistry Parameters by APHA/EPA Methods		
% Solids		93		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460
Lab ID: 1309109-13						Soil - Sampled: 09/24/13 14:00		
Sample ID: AOC6-D-02-00						Metals by EPA 6000/7000 Series Methods		
Mercury		0.23		0.031	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		18,000		130	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND UR		2.5	"	"	"	6010C/SOP503
Arsenic	RE2	130		2.5	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	88		6.3	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.43		0.13	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		0.64		0.63	"	"	"	6010C/SOP503
Calcium		6,900 J		130	"	"	"	6010C/SOP503
Chromium		52		1.3	"	"	"	6010C/SOP503
Cobalt	RE1	14		2.5	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	40		5	"	"	"	6010C/SOP503
Iron		25,000		130	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		28		3.8	"	"	"	6010C/SOP503
Magnesium	RE1	6,000		63	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		510		6.3	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND U		6.3	"	"	"	6010C/SOP503
Nickel		44		6.3	"	"	"	6010C/SOP503
Potassium		2,000		630	"	"	"	6010C/SOP503
Selenium	RE1	ND U		2.5	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND U		1.3	"	"	"	6010C/SOP503
Sodium		80		63	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND U		6.3	"	"	"	6010C/SOP503
Vanadium		80		2.5	"	"	"	6010C/SOP503



United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804

Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane

Project Number: R13S90

Project: Argonaut Mine July 2013 Sampling

Emergency Response Section

75 Hawthorne Street

San Francisco CA, 94105

SDG: 13270C

Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
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Lab ID: 1309109-13

Soil - Sampled: 09/24/13 14:00

Sample ID: AOC6-D-02-00

Metals by EPA 6000/7000 Series Methods

Zinc		90		10	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
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Sample ID: AOC6-D-02-00

Conventional Chemistry Parameters by APHA/EPA Methods

% Solids		80		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460
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Lab ID: 1309109-14

Soil - Sampled: 09/24/13 14:05

Sample ID: AOC6-D-02-12

Metals by EPA 6000/7000 Series Methods

Mercury		0.083		0.030	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		41,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.2	"	"	"	6010C/SOP503
Arsenic	RE2	17		2.2	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	200		6	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.87		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		1.2		0.56	"	"	"	6010C/SOP503
Calcium		23,000	J	110	"	"	"	6010C/SOP503
Chromium		96		1.1	"	"	"	6010C/SOP503
Cobalt	RE1	46		2.4	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	72		4.8	"	"	"	6010C/SOP503
Iron		50,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		3.4		3.4	"	"	"	6010C/SOP503
Magnesium	RE1	7,600		60	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		1,900		5.6	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	U	5.6	"	"	"	6010C/SOP503
Nickel		34		5.6	"	"	"	6010C/SOP503
Potassium		1,200		560	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.4	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND	U	1.2	"	"	"	6010C/SOP503
Sodium		130		56	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.6	"	"	"	6010C/SOP503
Vanadium		230		2.2	"	"	"	6010C/SOP503
Zinc		69		9	"	"	"	6010C/SOP503

Sample ID: AOC6-D-02-12

Conventional Chemistry Parameters by APHA/EPA Methods

% Solids		83		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460
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Lab ID: 1309109-15

Soil - Sampled: 09/24/13 14:30

Sample ID: AOC6-C-01-00

Metals by EPA 6000/7000 Series Methods

Mercury	RE1	0.12		0.028	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		18,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.2	"	"	"	6010C/SOP503
Arsenic	RE2	32		2.2	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	110		5.6	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.41		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		0.59		0.56	"	"	"	6010C/SOP503



United States Environmental Protection Agency Region 9 Laboratory

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Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane	Emergency Response Section	SDG: 13270C
Project Number: R13S90	75 Hawthorne Street	Reported: 11/12/13 16:37
Project: Argonaut Mine July 2013 Sampling	San Francisco CA, 94105	

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID: 1309109-15		Soil - Sampled: 09/24/13 14:30						
Sample ID: AOC6-C-01-00		Metals by EPA 6000/7000 Series Methods						
Calcium		12,000	J	110	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
Chromium		46		1.1	"	"	"	6010C/SOP503
Cobalt	RE1	15		2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	41		4.5	"	"	"	6010C/SOP503
Iron		25,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		17		3.4	"	"	"	6010C/SOP503
Magnesium	RE1	4,000		56	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		750		5.6	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	U	5.6	"	"	"	6010C/SOP503
Nickel		21		5.6	"	"	"	6010C/SOP503
Potassium		2,100		560	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND	U	1.1	"	"	"	6010C/SOP503
Sodium		82		56	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.6	"	"	"	6010C/SOP503
Vanadium		98		2.2	"	"	"	6010C/SOP503
Zinc		79		9	"	"	"	6010C/SOP503

Sample ID: AOC6-C-01-00	Conventional Chemistry Parameters by APHA/EPA Methods							
% Solids		89		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460

Lab ID: 1309109-16 Soil - Sampled: 09/24/13 14:50

Sample ID: AOC6-C-01-12		Metals by EPA 6000/7000 Series Methods						
Mercury	RE1	0.16		0.028	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		36,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.2	"	"	"	6010C/SOP503
Arsenic	RE2	11		2.2	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	180		5.5	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.84		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		1.2		0.55	"	"	"	6010C/SOP503
Calcium		20,000	J	110	"	"	"	6010C/SOP503
Chromium		87		1.1	"	"	"	6010C/SOP503
Cobalt	RE1	32		2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	79		4.4	"	"	"	6010C/SOP503
Iron		45,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		4.3		3.3	"	"	"	6010C/SOP503
Magnesium	RE1	9,000		55	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		1,200		5.5	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	U	5.5	"	"	"	6010C/SOP503
Nickel		33		5.5	"	"	"	6010C/SOP503
Potassium		1,200		550	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503

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United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804

Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID: 1309109-16						Soil - Sampled: 09/24/13 14:50		
Sample ID: AOC6-C-01-12						Metals by EPA 6000/7000 Series Methods		
Silver	RE1	ND	U	1.1	mg/kg dry	B13K003	11/03/13	11/05/13 6010C/SOP503
Sodium		140		55	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.5	"	"	"	6010C/SOP503
Vanadium		200		2.2	"	"	"	6010C/SOP503
Zinc		63		8.9	"	"	"	6010C/SOP503
Sample ID: AOC6-C-01-12						Conventional Chemistry Parameters by APHA/EPA Methods		
% Solids		90		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460
Lab ID: 1309109-17						Soil - Sampled: 09/24/13 14:50		
Sample ID: AOC6-C-01-12-7						Metals by EPA 6000/7000 Series Methods		
Mercury	RE1	0.17		0.028	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		35,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	2.2	"	"	"	6010C/SOP503
Arsenic	RE2	12		2.2	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	140		5.5	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.79		0.11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		1.2		0.55	"	"	"	6010C/SOP503
Calcium		20,000	J	110	"	"	"	6010C/SOP503
Chromium		81		1.1	"	"	"	6010C/SOP503
Cobalt	RE1	30		2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	73		4.4	"	"	"	6010C/SOP503
Iron		44,000		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		3.5		3.3	"	"	"	6010C/SOP503
Magnesium	RE1	8,500		55	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		1,200		5.5	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	U	5.5	"	"	"	6010C/SOP503
Nickel		33		5.5	"	"	"	6010C/SOP503
Potassium		1,300		550	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	2.2	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	ND	U	1.1	"	"	"	6010C/SOP503
Sodium		140		55	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		ND	U	5.5	"	"	"	6010C/SOP503
Vanadium		190		2.2	"	"	"	6010C/SOP503
Zinc		61		8.8	"	"	"	6010C/SOP503
Sample ID: AOC6-C-01-12-7						Conventional Chemistry Parameters by APHA/EPA Methods		
% Solids		91		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460
Lab ID: 1309109-18						Sediment - Sampled: 09/25/13 14:20		
Sample ID: AOC4-SD-05-00						Metals by EPA 6000/7000 Series Methods		
Mercury		0.22		0.060	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		15,000		220	"	B13J038	10/08/13	10/29/13 6010C/SOP503

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United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804
Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID:	1309109-18							Sediment - Sampled: 09/25/13 14:20
Sample ID:	AOC4-SD-05-00							Metals by EPA 6000/7000 Series Methods
Antimony		ND	U R	4.4	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
Arsenic	RE2	2,900		44	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	280		12	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.34		0.22	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		2.6		1.1	"	"	"	6010C/SOP503
Calcium		93,000	J	220	"	"	"	6010C/SOP503
Chromium		13		2.2	"	"	"	6010C/SOP503
Cobalt	RE1	52		4.8	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	78		9.6	"	"	"	6010C/SOP503
Iron		70,000		220	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		13		6.6	"	"	"	6010C/SOP503
Magnesium	RE1	8,700		120	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Manganese		57,000		11	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	U	11	"	"	"	6010C/SOP503
Nickel		68		11	"	"	"	6010C/SOP503
Potassium		1,500		1,100	"	"	"	6010C/SOP503
Selenium	RE1	ND	U	4.8	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	RE1	1.3	Cl, J	2.4	"	"	"	6010C/SOP503
Sodium		260		110	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		48		11	"	"	"	6010C/SOP503
Vanadium		56		4.4	"	"	"	6010C/SOP503
Zinc		210		18	"	"	"	6010C/SOP503

Sample ID: AOC4-SD-05-00
% Solids 42 1 % Conventional Chemistry Parameters by APHA/EPA Methods
B13J021 10/02/13 10/03/13 3550C/SOP460

Lab ID:	1309109-19							Sediment - Sampled: 09/25/13 14:30
Sample ID:	AOC4-SD-06-00							Metals by EPA 6000/7000 Series Methods
Mercury		0.21		0.051	mg/kg dry	B13J032	10/04/13	10/04/13 7473/SOP535
Aluminum		20,000		200	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Antimony		ND	U R	4	"	"	"	6010C/SOP503
Arsenic	RE2	1,400		40	"	"	"	11/01/13 6010C/SOP503
Barium	RE1	230		9.5	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Beryllium		0.47		0.20	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Cadmium		2.2		1	"	"	"	6010C/SOP503
Calcium		110,000	J	200	"	"	"	6010C/SOP503
Chromium		17		2	"	"	"	6010C/SOP503
Cobalt	RE1	75		3.8	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Copper	RE1	120		7.6	"	"	"	6010C/SOP503
Iron		59,000		200	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Lead		19		6.1	"	"	"	6010C/SOP503
Magnesium	RE1	7,900		95	"	B13K003	11/03/13	11/05/13 6010C/SOP503



United States Environmental Protection Agency
Region 9 Laboratory

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Project Manager: Daniel Shane

Project Number: R13S90

Project: Argonaut Mine July 2013 Sampling

Emergency Response Section

75 Hawthorne Street

San Francisco CA, 94105

SDG: 13270C

Reported: 11/12/13 16:37

Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed Method
Lab ID:	1309109-19							
Sample ID:	AOC4-SD-06-00							
Sediment - Sampled: 09/25/13 14:30								
Metals by EPA 6000/7000 Series Methods								
Manganese		29,000		10	mg/kg dry	B13J038	10/08/13	10/29/13 6010C/SOP503
Molybdenum		ND	U	10	"	"	"	6010C/SOP503
Nickel		74		10	"	"	"	6010C/SOP503
Potassium		1,900		1,000	"	"	"	6010C/SOP503
Selenium	REI	ND	U	3.8	"	B13K003	11/03/13	11/05/13 6010C/SOP503
Silver	REI	1.3	CI, J	1.9	"	"	"	6010C/SOP503
Sodium		300		100	"	B13J038	10/08/13	10/29/13 6010C/SOP503
Thallium		29		10	"	"	"	6010C/SOP503
Vanadium		70		4	"	"	"	6010C/SOP503
Zinc		290		16	"	"	"	6010C/SOP503
Sample ID:	AOC4-SD-06-00							
Conventional Chemistry Parameters by APHA/EPA Methods								
% Solids		49		1	%	B13J021	10/02/13	10/03/13 3550C/SOP460

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United States Environmental Protection Agency
Region 9 Laboratory

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Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane	Emergency Response Section	SDG: 13270C
Project Number: R13S90	75 Hawthorne Street	Reported: 11/12/13 16:37
Project: Argonaut Mine July 2013 Sampling	San Francisco CA, 94105	

Quality Control

Analyte	Result	Qualifiers / Comments	Quantitation Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch B13J021 - Solids, Dry Weight (Prep) - Solids, Dry Weight					Prepared: 10/02/13 Analyzed: 10/03/13					
					Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control					
Blank (B13J021-BLK1)										
% Solids	ND	U		1 %						
Duplicate (B13J021-DUP1)										
Source: 1309109-07										
% Solids	95			1 %		95			0.04	20
Batch B13J031 - 7473 Hg Prep - Mercury by 7473					Prepared & Analyzed: 10/04/13					
					Metals by EPA 6000/7000 Series Methods - Quality Control					
Blank (B13J031-BLK1)										
Mercury	ND	U		0.025 mg/kg wet						
Matrix Spike (B13J031-MS2)										
Source: 1309109-07										
Mercury	0.602			0.026 mg/kg dry	0.524	0.0411	107	80-120		20
Matrix Spike Dup (B13J031-MSD2)										
Source: 1309109-07										
Mercury	0.597			0.026 mg/kg dry	0.515	0.0411	108	80-120	0.9	20
Reference (B13J031-SRM1)										
Mercury	1.2			0.025 mg/kg wet	1.10		109	80-120		
Batch B13J032 - 7473 Hg Prep - Mercury by 7473					Prepared & Analyzed: 10/04/13					
					Metals by EPA 6000/7000 Series Methods - Quality Control					
Blank (B13J032-BLK2)										
Mercury	ND	U		0.025 mg/kg wet						
Reference (B13J032-SRM1)										
Mercury	1.13			0.025 mg/kg wet	1.10		103	80-120		
Batch B13J038 - 3050B Std Acid Dig - Metals by 6010					Prepared: 10/08/13 Analyzed: 10/29/13					
					Metals by EPA 6000/7000 Series Methods - Quality Control					
Blank (B13J038-BLK1)										
Aluminum	ND	U		100 mg/kg wet						
Antimony	ND	U		2 "						
Beryllium	ND	U		0.1 "						
Cadmium	ND	U		0.5 "						
Calcium	ND	U		100 "						
Chromium	ND	U		1 "						
Cobalt	ND	U		2 "						
Iron	ND	U		100 "						
Lead	ND	U		3 "						
Magnesium	ND	U		50 "						
Manganese	ND	U		5 "						
Molybdenum	ND	U		5 "						
Nickel	ND	U		5 "						
Potassium	ND	U		500 "						
Sodium	ND	U		50 "						



United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804
Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Quality Control

Analyte	Result	Qualifiers / Comments	Quantitation Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch B13J038 - 3050B Sld Acid Dig - Metals by 6010

Prepared: 10/08/13 Analyzed: 10/29/13
Metals by EPA 6000/7000 Series Methods - Quality Control

Blank (B13J038-BLK1)

Thallium	ND	U		5 "						
Vanadium	ND	U		2 "						
Zinc	ND	U		8 "						

Blank (B13J038-BLK2)

Arsenic	ND	U		2 mg/kg wet						
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Matrix Spike (B13J038-MS1)

Source: 1309109-07

Aluminum	27,900	Q10		110 mg/kg dry	417	25,300	636	75-125		20
Antimony	20.5			2.1 "	104	ND	20	75-125		20
Beryllium	11.3			0.11 "	10.4	0.8	101	75-125		20
Cadmium	10.5			0.53 "	10.4	0.964	92	75-125		20
Calcium	7,340			110 "	2090	5,340	96	75-125		20
Chromium	124			1.1 "	41.7	80.8	104	75-125		20
Iron	48,200	Q10		110 "	209	47,600	265	75-125		20
Lead	102			3.2 "	104	8.54	89	75-125		20
Manganese	1,450	Q10		5.3 "	104	1,880	NR	75-125		20
Molybdenum	72.2			5.3 "	104	ND	69	75-125		20
Nickel	126			5.3 "	104	32.4	89	75-125		20
Potassium	3,290			530 "	2090	1,330	94	75-125		20
Sodium	2,180			53 "	2090	57.3	102	75-125		20
Thallium	375			5.3 "	417	ND	90	75-125		20
Vanadium	247			2.1 "	104	146	97	75-125		20
Zinc	165			8.4 "	104	58.1	103	75-125		20

Matrix Spike (B13J038-MS2)

Source: 1309109-07RE2

Arsenic	422			2.1 mg/kg dry	417	18.1	97	75-125		20
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Matrix Spike Dup (B13J038-MSD1)

Source: 1309109-07

Aluminum	25,900	Q10		110 mg/kg dry	413	25,300	163	75-125	7	20
Antimony	22.5			2.1 "	103	ND	22	75-125	9	20
Beryllium	11.1			0.11 "	10.3	0.8	100	75-125	2	20
Cadmium	10.6			0.53 "	10.3	0.964	93	75-125	0.7	20
Calcium	6,770			110 "	2060	5,340	69	75-125	8	20
Chromium	124			1.1 "	41.3	80.8	104	75-125	0.1	20
Iron	51,400	Q10		110 "	206	47,600	NR	75-125	6	20
Lead	101			3.2 "	103	8.54	89	75-125	0.7	20
Manganese	1,300	Q10		5.3 "	103	1,880	NR	75-125	11	20
Molybdenum	73.5			5.3 "	103	ND	71	75-125	2	20
Nickel	127			5.3 "	103	32.4	91	75-125	0.8	20
Potassium	3,130			530 "	2060	1,330	87	75-125	5	20
Sodium	2,140			53 "	2060	57.3	101	75-125	2	20
Thallium	372			5.3 "	413	ND	90	75-125	0.9	20



United States Environmental Protection Agency
Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804
Phone: (510) 412-2300 Fax: (510) 412-2302

Project Manager: Daniel Shane	Emergency Response Section	SDG: 13270C
Project Number: R13S90	75 Hawthorne Street	Reported: 11/12/13 16:37
Project: Argonaut Mine July 2013 Sampling	San Francisco CA, 94105	

Quality Control

Analyte	Result	Qualifiers / Comments	Quantitation Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch B13J038 - 3050B Sld Acid Dig - Metals by 6010

Prepared: 10/08/13 Analyzed: 10/29/13
Metals by EPA 6000/7000 Series Methods - Quality Control

Matrix Spike Dup (B13J038-MSD1)

Source: 1309109-07

Vanadium	240		2.1	"	103	146	91	75-125	3	20
Zinc	170		8.4	"	103	58.1	109	75-125	3	20

Matrix Spike Dup (B13J038-MSD2)

Source: 1309109-07RE2

Arsenic	425		2.1	mg/kg dry	413	18.1	99	75-125	0.7	20
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Reference (B13J038-SRM1)

Aluminum	110		100	mg/kg wet	115		96	47.6-152		
Antimony	44.8		2	"	66.0		68	41.2-158		
Beryllium	4.08		0.1	"	4.90		83	61.2-139		
Cadmium	8.53		0.5	"	10.9		78	70.6-128		
Calcium	38,100		100	"	44200		86	68.6-132		
Chromium	22.9		1	"	27.1		84	68.3-132		
Cobalt	28.6		2	"	37.4		77	64.7-135		
Iron	4,840		100	"	6470		75	66.2-134		
Manganese	51.8		5	"	61.0		85	68.2-132		
Nickel	12.3		5	"	16.3		75	55.2-145		
Potassium	ND	U	500	"	39.7			0-215		
Sodium	ND	U	50	"	72.5			0-298		
Thallium	4.21	Cl, J	5	"	9.50		44	30.5-169		
Vanadium	14		2	"	17.6		79	65.9-135		
Zinc	42.5		8	"	47.5		89	43.2-157		

Reference (B13J038-SRM2)

Arsenic	212		2	mg/kg wet	253		84	60.9-139		
Lead	42		3	"	56.9		74	72.8-127		
Magnesium	21,900		50	"	29200		75	70.2-130		

Batch B13J063 - 7473 Hg Prep - Mercury by 7473

Prepared & Analyzed: 10/16/13
Metals by EPA 6000/7000 Series Methods - Quality Control

Blank (B13J063-BLK1)

Mercury	ND	U	0.025	mg/kg wet						
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Reference (B13J063-SRM1)

Mercury	1.21		0.025	mg/kg wet	1.10		110	80-120		
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Batch B13K003 - 3050B Sld Acid Dig - Metals by 6010

Prepared: 11/03/13 Analyzed: 11/05/13
Metals by EPA 6000/7000 Series Methods - Quality Control

Blank (B13K003-BLK1)

Barium	ND	U	5	mg/kg wet						
Cobalt	ND	U	2	"						
Copper	ND	U	4	"						
Magnesium	ND	U	50	"						



United States Environmental Protection Agency Region 9 Laboratory

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Project Manager: Daniel Shane
Project Number: R13S90
Project: Argonaut Mine July 2013 Sampling

Emergency Response Section
75 Hawthorne Street
San Francisco CA, 94105

SDG: 13270C
Reported: 11/12/13 16:37

Quality Control

Analyte	Result	Qualifiers / Comments	Quantitation Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch B13K003 - 3050B Std Acid Dig - Metals by 6010

Prepared: 11/03/13 Analyzed: 11/05/13
Metals by EPA 6000/7000 Series Methods - Quality Control

Blank (B13K003-BLK1)

Selenium	ND	U	2	"						
Silver	ND	U	1	"						

Matrix Spike (B13K003-MS1)

Source: 1309109-07RE1

Barium	575		5.3	mg/kg dry	413	166	99	75-125	20	
Cobalt	124		2.1	"	103	30	91	75-125	20	
Copper	103		4.2	"	51.6	58.1	88	75-125	20	
Magnesium	7,090		53	"	2060	5,000	101	75-125	20	
Selenium	390		2.1	"	413	ND	95	75-125	20	
Silver	10.8		1.1	"	10.3	ND	105	75-125	20	

Matrix Spike Dup (B13K003-MSD1)

Source: 1309109-07RE1

Barium	592		5.3	mg/kg dry	413	166	103	75-125	3	20
Cobalt	129		2.1	"	103	30	96	75-125	4	20
Copper	106		4.2	"	51.6	58.1	92	75-125	2	20
Magnesium	7,190		53	"	2060	5,000	106	75-125	1	20
Selenium	393		2.1	"	413	ND	95	75-125	0.6	20
Silver	11		1.1	"	10.3	ND	107	75-125	2	20

Reference (B13K003-SRM1)

Barium	ND	U	5	mg/kg wet	1.60			62.5-138		
Cobalt	38.1		2	"	37.5		102	64.7-135		
Copper	1,700		4	"	1770		96	74.6-126		
Magnesium	29,800		50	"	29300		102	70.2-130		
Selenium	4.9		2	"	10.0		49	41-159		
Silver	6.23		1	"	5.91		105	45.8-154		

Reference (B13K003-SRM2)

Barium	ND	U	5	mg/kg wet	1.59			62.5-138		
Cobalt	36.3		2	"	37.2		98	64.7-135		
Copper	1,620		4	"	1760		92	74.6-126		
Magnesium	28,700		50	"	29100		99	70.2-130		
Selenium	4.46		2	"	9.95		45	41-159		
Silver	6.32		1	"	5.87		108	45.8-154		

ENVIRONMENTAL PROTECTION AGENCY
Region 9 Laboratory

CHAIN OF CUSTODY RECORD

1337 S. 46th St., Bldg. 201
Richmond, CA 94804-4608

PROJ. NO. R13S90		PROJECT NAME Argonaut Mine Tailings Pile Assessment		NO. OF CONTAINERS		REMARKS											
SAMPLERS: (Signature) <i>Brian M. Hon</i> 9/4/13																	
DATE	TIME	MATRIX	CONC	GRAB	SAMPLE IDENTIFICATION												
09/24/13	0930	Soil		X	AOC1-D-38-00	1	14oz jar	X	X								
	0930	Soil		X	AOC1-D-38-00-7	2	14oz jar	X	X								
	0940	Soil		X	AOC1-D-38-12"	3	14oz jar	X	X								
	0950	Soil		X	AOC1-D-39-00	4	14oz jar	X	X								
	1000	Soil		X	AOC1-D-39-12"	5	14oz jar	X	X								
	1000	Soil		X	AOC1-D-40-00	6	14oz jar	X	X								
	1020	Soil		X	AOC1-D-40-12"	7	14oz jar	X	X								Extra sample for MSMSD
	1120	Soil		X	AOC2-50-11-06"	8	14oz jar	X	X								
	1200	Soil		X	AOC1-D-41-00	9	14oz jar	X	X								
	1210	Soil		X	AOC1-D-41-12"	10	14oz jar	X	X								
	1340	Soil		X	AOC6-D-01-00	11	1	X	X								
	1350	Soil		X	AOC6-D-01-12"	12	1	X	X								
	1400	Soil		X	AOC6-D-02-00	13	1	X	X								
	1405	Soil		X	AOC6-D-02-12"	14	1	X	X								
	1430	Soil	X		AOC6-C-01-00	15	1	X	X								
Relinquished by: (Signature) <i>Brian M. Hon</i>		Date / Time 9/7/13 1147		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)	
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)	
Received by Laboratory by: (Signature) <i>[Signature]</i>		Date / Time 9/27/13 1506		Temp. 1506 °C		Seals Intact (Y/N)		Conditions / Remarks E+E PAN N- 002693, 2213									

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

9-3971

ENVIRONMENTAL PROTECTION AGENCY
Region 9 Laboratory

CHAIN OF CUSTODY RECORD

1337 S. 46th St., Bldg. 201
Richmond, CA 94804-4698

PROJ. NO. R13590		PROJECT NAME Argonaut Mine Tailings Pile Assessment				NO. OF CON- TAINERS	REMARKS										
SAMPLERS: (Signature) <i>Tom Miller</i>																	
DATE	TIME	MATRIX	COARSE	GOOD	SAMPLE IDENTIFICATION												
09/24/13	1450	Soil	X		AOC6-C-01-12"	16	1										
09/24/13	1450	Soil	X		AOC6-C-01-12"-7	17	1										
09/25/13	1420	Soil	X		AOC4-SD-05-00	18	1										
09/25/13	1430	Soil	X		AOC4-SD-06-00	19	1										
09/26/13	0810	Soil	X		AOC5-C-01-00	1	1										
09/26/13	0830		X		AOC5-C-01-12"	2	1										
09/26/13	0840		X		AOC5-C-02-00	3	1										
09/26/13	0855		X		AOC5-C-02-12"	4	1										
09/26/13	0915		X		AOC5-C-03-00	5	1										
	0935		X		AOC5-C-03-12"	6	1										
	1000		X		AOC5-C-04-00	7	1										
	1015		X		AOC5-C-04-12"	8	1										
	1015		X		AOC5-C-04-12"-7	9	1										
	1105		X		AOC5-D-01-00	10	1										
✓	1115		X		AOC5-D-01-12"	11	1										
Relinquished by: (Signature) <i>Tom Miller</i>		Date / Time 09/27/13 1147		Received by: (Signature) _____		Relinquished by: (Signature) _____		Date / Time		Received by: (Signature) _____		Relinquished by: (Signature) _____		Date / Time		Received by: (Signature) _____	
Relinquished by: (Signature) _____		Date / Time		Received by: (Signature) _____		Relinquished by: (Signature) _____		Date / Time		Received by: (Signature) _____		Relinquished by: (Signature) _____		Date / Time		Received by: (Signature) _____	
Received for Laboratory by: (Signature) <i>SS</i>		Date / Time 9/27/13 1150		Temp. 62	Seals Intact (Y/N) ✓	Conditions / Remarks PAN N. 002698.2213											

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

9-3372



***Attachment E:
References***

DRAFT

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DRAFT