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December 3, 2015

Electronic Mail and Federal Express

Ms. Joey Pace, Project Manager
Arizona Department of Environmental Quality
Voluntary Remediation Program
1110 W. Washington St.
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**Re: Voluntary Remediation Program – VRP Site Code: 100073-03
Freeport-McMoRan Sierrita Inc., Green Valley, AZ Revised CLEAR
Plant Area Paving Project Soil Removal and Confirmation Sampling Report**

Dear Ms. Pace:

Please find enclosed the Revised Former CLEAR Plant Area Paving Project Soil Removal and Confirmation Sampling Report.

The report has been updated based on comments received from you in an email dated September 15, 2015. Below in italics are your comments followed by Sierrita's response:

1. *General Report: Add support for one GPL exceedance not a concern base on site-specific information.*

Sierrita's Response:

Support has been added to the document regarding the single Lead GPL exceedance. In summary:

- The leaching potential for lead from the soil was indicated to be low (below laboratory detection levels) when comparing the results derived from TCLP analysis from the excavated soils.
- Lead binds with iron minerals in soil, and can also form lead hydroxide and phosphate minerals, and is extremely non-soluble in surface waters.
- The strong retention of lead in soil, as demonstrated by the TCLP test results, along with the asphalt paving that will limit infiltration of precipitation into the soil column, provides support for the fact that lead will not be soluble or mobile in this soil environment, and will not impact groundwater.

2. *General Report: Add support for size of decision unit and use of 95% UCL residential SRL NFA.*

Sierrita's Response:

Support has been added to the document regarding the size of decision unit and use of 95% UCL residential SRL NFA. In summary:

- Data for the EPC analysis were used from a total project area of 0.9 acre, which is slightly larger than conventionally assessed (typically less than 0.5 acre used). However, this method was considered to provide a reasonable measure of the potential area over which exposure might occur. Based on past, present, and expected future use of the area, it is anticipated that exposure could occur, on average, across the entire 0.9-acre area, as opposed to a smaller or discrete portion of the area. Therefore, this approach is considered appropriate for the Tier 1 SRE.
- Consistent with USEPA guidelines for risk assessment, the EPC used in this evaluation is the lesser of the maximum detected concentration and the 95 percent upper confidence limit (UCL; USEPA 1989). The 95% UCLs for arsenic, copper, and lead are lower than their respective maximum detected concentrations. As a result, the 95% UCLs were selected as the EPCs for all three site-related constituents.
- Report reference: U.S. Environmental Protection Agency (USEPA). 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). EPA/540/1 89 002. U.S. Environmental Protection Agency.

Ms. Joey Pace
November 4, 2015
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3. *Section 5: Remove the reference to the GPL comparison to the EPCs (last paragraph).*

Sierrita's Response:

The reference to the GPL comparison to EPCs has been removed from the final paragraph of Section 5 of the report text.

4. *Figure 5 & Figure 6: Change typo GLP to GPL.*

Sierrita's Response:

The typo of GLP has been altered to GPL in both Figures 5 and 6.

5. *Table 6: Remove reference to GPLs.*

Sierrita's Response:

The reference to GPLs has been removed from Table 6.

6. *Appendix D: Revise non-detect inputs (Should be 3 NDs, 1 Distinct ND, Maximum ND 2.5). Provide both input and output spreadsheets.*

Sierrita's Response:

The non-detect inputs have been revised and the input and output spreadsheets are provided on a compact disk attached to Appendix D and the output files are also presented as a hard copy in Appendix D.

7. *Update Table 6 and all other relevant areas of the General Report if the new EPC for As changes with correction of the ND inputs.*

Sierrita's Response:

The EPC for As has been amended for Table 6 and Sections 5 and 6, where required.

Please do not hesitate to contact me at (520) 393-2655 if you have any questions regarding this submittal.

Sincerely,



Deborah Chismar
Sr. Environmental Specialist
Freeport-McMoRan Sierrita Inc.

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20151203_001

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Voluntary Remediation Program

VRP Site Code 100073-03

**Revised Former CLEAR Plant Area
Paving Project Soil Removal and
Confirmation Sampling Report**

Sierrita Mine
Green Valley, Arizona

December 3, 2015



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**Revised Former CLEAR Plant
Area Paving Project Soil
Removal and Confirmation
Sampling**

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Green Valley, Arizona

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- B Laboratory Analytical Reports
- C Data Validation Reports
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1. Introduction

This document presents the results of soil removal and confirmation soil sampling associated with a paving project conducted in the Former Continuous Liquid Extraction and Regeneration (CLEAR) Plant Area at the Sierrita Mine, Green Valley, Arizona (the Site; Figure 1). Freeport-McMoRan Sierrita Inc. (Sierrita) entered the Arizona Department of Environmental Quality (ADEQ) Voluntary Remediation Program (VRP) in 2008. The Former CLEAR Plant Area was identified for investigation under the VRP.

A Work Plan (ARCADIS 2015) for the proposed soil removal and confirmatory soil sampling activities prior to paving two areas near the Training Facility was submitted to ADEQ and approved in a letter dated May 22, 2015 (ADEQ 2015). The objective of the Work Plan was to obtain information to support a No Further Action (NFA) determination for soil in the Former CLEAR Plant Area affected by the construction of the paved areas.

Previous soil sampling activities in the area have identified constituents of interest (COIs) detected in soil at concentrations higher than non-residential soil remediation levels (nr-SRLs) or groundwater protection levels (GPLs; URS 2012, ARCADIS 2013a and 2013b). These were reviewed and considered during development of the Work Plan. This report presents a summary of the sampling activities conducted in May and June 2015, analytical results, and a Tier I Screening Risk Evaluation (SRE).

The Tier I SRE was conducted to support closure of this paving project. However, a site-wide baseline human health risk assessment (BHHRA) is being conducted to provide a basis for ongoing evaluation of soil and sediment data collected under the VRP. Following the outcome of the BHHRA, draft remediation levels or controls for soil media will be proposed if needed in a feasibility study.

This scope of work included soil removal, grading, and paving two areas totaling approximately 0.9 acre (0.27 acre and 0.63 acre). The two areas are located northwest and southwest of the Former CLEAR Plant Building (Figure 2) along the western edge of the VRP Former CLEAR Plant subarea defined in the Soil and Sediment Characterization Report (SSCR; URS 2012). Prior to being paved, these areas were most recently used for roadways and parking. The southern area contained a former septic tank and leach field (Figure 2), and the former pre-construction plans are included as Appendix A.

1.1 Site Description

The Sierrita mine is an open-pit copper and molybdenum mining complex. The Former CLEAR Plant was historically located in the north-central portion of the Sierrita property. The CLEAR Plant used sodium and potassium chloride brines and sodium hydroxide and ferric chloride reagents to produce metallic copper. The area is now used as a training center, asset recovery yard, contractor offices and material storage, metal fabrication shop, and the Central Accumulation Area, as presented on Figure 2. The Former CLEAR Plant Building is currently used as offices and for storage of miscellaneous materials such as computers and office equipment.

The topography of the CLEAR Plant area generally slopes eastward and is incised by east-west trending drainages. Fill ranges from a few inches to approximately 25 feet across the CLEAR Plant area. In the western portion of the area, where the paving activities were conducted, fill is thin or non-existent, bedrock is at or near surface, and outcrops of granodiorite are visible at some locations. Additional information about the Former CLEAR Plant area topography is provided in the remedial soils and sediment characterization reports (URS 2012 and ARCADIS 2013a).

1.2 Summary of Previous Investigations

Initial soil characterization activities were conducted between August and October 2004 at the Former CLEAR Plant, and additional soil characterization was performed between July and August of 2008. The soil investigation activities included the collection and analysis of soil samples from the Former CLEAR Plant Area, as well as several other subareas on the Sierrita property.

The focus of the site characterization activities was on suspected or known releases of COIs. The soil and sediment COIs selected for analysis include mining-related total metals (antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, thallium, and zinc), total uranium, uranium isotopes (uranium-234, uranium-235, and uranium-238), and radium isotopes (radium-226 and radium-228). Many of these constituents occur naturally in soils, rocks, and groundwater at non-mineralized and mineralized mine sites (URS 2012). However, within the Former CLEAR Plant Area, where 78 soil samples from 34 locations were collected, only arsenic, copper, and lead concentrations were detected higher than their respective nr-SRL and/or the GPL.

Additional characterization was performed in May 2012 as part of construction activities for the training center (ARCADIS 2013b). Soil samples were collected from the building excavations and parking lot areas to be paved. These samples were only analyzed for arsenic, copper, and lead, as these were the only constituents detected at concentrations higher than their respective nr-SRL and/or the GPL.

Figures 3 and 4 display the locations of the previous soil samples (URS 2012, ARCADIS 2013a and 2013b) relative to the location of the current paving project areas. No previous samples were collected from within the footprints of the two areas. Selected analytical results for arsenic, copper, and lead in proximity to the current paving project are presented in Table 1. Of these samples, 13 locations exhibited sample concentrations that exceeded nr-SRL and/or GPL for arsenic, copper, or lead. Additionally, two samples exceeded the residential SRL (r-SRL) for copper, but not the nr-SRL or GPL.

2. Former CLEAR Plant Paving Project Soil Sampling Activities

Soil samples were collected in accordance with the Work Plan (ARCADIS 2015) and were primarily analyzed for arsenic, copper, and lead, with 10 percent of the grid soil samples and soil samples collected from areas where staining was observed also analyzed for antimony, barium, beryllium, cadmium, chromium, cobalt, manganese, mercury, molybdenum, nickel, selenium, thallium, uranium, and zinc (extended metals analysis). Additionally, soil and rinsate samples were collected for quality assurance/quality control (QA/QC) purposes, and for stockpiled soil characterization purposes in accordance with the Work Plan. This section presents the collection methodology and any deviations from the Work Plan.

2.1 Soil Sample Collection Activities

Between May 19, 2015 and June 19, 2015, 29 soil samples were collected and analyzed for comparison with the applicable ADEQ SRLs and GPLs. The locations of these samples are presented on Figures 5 and 6. Soil samples were collected by qualified personnel from areas identified in the Work Plan including:

- Two samples from the septic tank leach field in the southern paving area
- Ten samples from the northern paving area
- Seventeen samples from the southern paving area.

Two soil samples were collected from the leach field directly adjacent to clay pipe leach lines, which were identified by potholing down to approximately 2.5 feet below ground surface (bgs). Samples were collected from 3.5 feet bgs using a hand auger and placed directly from the hand auger into a laboratory-supplied glass jar. The hand auger was decontaminated following procedures described in the Work Plan (ARCADIS 2015). A rinsate sample was collected by pouring deionized water over the hand auger, collected into a laboratory-supplied bottle, and preserved with nitric acid.

The top of a septic tank, including the manhole cover and cleanout port, was uncovered north of the leach field by potholing down to approximately 2.5 feet bgs. The septic tank was later abandoned by flushing the tank with water and pumping out the remaining waste. The tank was collapsed, and the void was backfilled to grade with clean fill.

Discrete soil samples were collected immediately following the excavation and grading of the northern and southern paving areas. These samples were collected at randomly determined locations within a grid placed over the graded area. The grid squares were each approximately 625 feet in area, with one sample being collected per 1,875 square feet, or one in every three grid squares, per the Work Plan.

To achieve this, the graded areas were measured and divided into numbered grid squares of approximately 25 feet by 25 feet. A random number generator was used to select one numbered grid for every three grid squares. Soil samples were collected centrally within the grid sections, except where a portion of the grid was outside the boundary of the paved area or the central location could not be sampled to due to the presence of gravel or asphalt. In these cases, a sample was collected as close to the central location as was practical.

Soil samples from these areas were collected using a disposable plastic scoop and were then transferred to laboratory-supplied glass jars. Duplicate samples were collected for 10 percent of the samples.

During the soil removal and grading of the northern area, two discretionary samples were collected after encountering and removing a small area of visually impacted soils. Once the visually impacted soils were removed, a soil sample (CP-NPA-S-01) was collected as a confirmation sample from the base of the area. Soil sample NP-NPA-S-10 was collected at the same location after the area was backfilled and graded, to verify that the fill material was non-impacted. The soil used to backfill this excavation

was visually clean surplus soil obtained from other areas. These two samples were analyzed for the extended metals analyte list.

The soil samples were shipped to SVL Laboratories under chain-of-custody procedures and submitted for analysis. Soil samples collected as part of the grid collection were analyzed by U.S. Environmental Protection Agency (USEPA) Method 6010B for arsenic, copper, and lead. Ten percent of the grid section samples, duplicate samples, discretionary soil samples, and rinsate water samples were analyzed for additional metals constituents by USEPA Method 6010B for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, thallium, and zinc; by USEPA Method 7471 for mercury; and by USEPA Method 6020A for uranium. A summary of the soil analytical results is provided in Table 2, rinsate sample results are provided in Table 3, and laboratory analytical reports are included in Appendix B.

2.2 Investigation Derived Waste

During the soil removal activities, the soil was stored adjacent to the paving area sites and periodically transported to the soil storage area (Figure 2). Visually impacted soils were segregated upon removal. Three soil piles were stored in the storage soil area: non-visually impacted soil from the southern paving area (soil pile 1); non-visually impacted soil from the northern paving area (soil pile 2); and visually impacted soil from the northern paving area (soil pile 3). The soil was stored on the ground, surrounded by straw wattles and soil berms, and covered with plastic.

On June 10, 2012, following completion of the soil removal activities, three composite samples were collected from the excavated soil storage area, one from each soil pile as follows:

- CP-E-01 from the southern non-visually impacted soil pile 1, with a volume of approximately 111 cubic yards
- CP-E02 from the northern non-visually impacted soil pile 2, with a volume of approximately 11 cubic yards
- CP-E03 from the northern visually impacted soil pile 3, with a volume of approximately 12 cubic yards.

The samples were collected using a disposable plastic scoop and transferred to a metal bowl. The composite samples were collected from at least four distinct locations from each soil pile and homogenized in a metal mixing bowl before being transferred to laboratory supplied glass jars. The metal mixing bowl was decontaminated following procedures described in the Work Plan (ARCADIS 2015), using a triple rinse with detergent solution, tap water, and deionized water. A rinsate sample was collected by pouring deionized water over the mixing bowl, collected into a laboratory-supplied bottle, and preserved with nitric acid.

The samples were shipped to SVL Laboratories under chain-of-custody procedures for analysis. Samples were submitted to be analyzed by USEPA Method 6010B for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, thallium, and zinc; by USEPA Method 7471 for mercury; and by USEPA Method 6020A for uranium. The soil samples were also analyzed by the Toxicity Characteristic Leaching Procedures (TCLP) SW846 Method 1311 for arsenic, barium, cadmium, chromium, mercury, lead, selenium, and silver.

A summary of the rinsate sample results is provided in Table 3, a summary of the stock pile composite soil analytical results is provided in Table 4, and laboratory analytical reports are included in Appendix B. Based on the analytical results, the soil in all three piles was placed into the Sierrita processing system for copper recovery (SX/EW or Mill/Concentration) per the Work Plan.

2.3 Deviations from Work Plan

The following deviations from the Work Plan were noted:

- Soil samples were not collected from the four sides of the septic tank after reviewing data objectives. The samples collected from adjacent to the leach lines were believed to be representative for this feature.
- The northern paving area was graded to 4 inches bgs rather than 10 inches bgs. Additional grading was not required as part of the work.
- In cases where there were hindering features, an abundance of gravel, or a portion of the grid square was outside the boundary of the paved area, the soil sample was collected off-center of the grid square. In these cases, the soil sample was collected as close to the center as was feasibly possible.

3. Data Quality

The analytical reports provided by the laboratory were subjected to data review for control/quality assurance. Data quality was evaluated based on precision, accuracy, representativeness, comparability, and completeness characteristics. A summary of the data verification is provided in Appendix C. Copies of the analytical reports are provided in Appendix B. The results were considered useable for the intended purposes, and the project data objectives specified in Quality Assurance Project Plan (QAPP; URS 2008) were met. All analytes associated with matrix spike/matrix spike duplicate (MS/MSD) recoveries were within control limits with the exception of those labeled with a “J” flag qualifier in Tables 2 and 4. The “J” flag qualifier indicates that the compound was positively identified; however, the associated numerical value is an estimated concentration only. The analytes with qualifiers include barium, cobalt, manganese, zinc, and uranium. The qualifiers were assigned due to the following:

- MS/MSD recoveries outside of the control limits
- MS/MSD recoveries exhibiting a relative percentage difference (RPD) greater than of the control limit
- Field duplicate precision was outside of the control limit RPD of 50 percent for the parent sample compared to the field duplicate.

4. Analytical Results

4.1 Paving Area Soil Sampling

The soil data collected at locations specified in Section 2 were evaluated by comparing detected constituent concentrations to ADEQ SRLs and GPLs. As shown in Table 2, detected concentrations of all metals, except arsenic, copper, and lead, were lower than their respective residential and non-residential SRLs and GPLs.

Arsenic was detected in 26 of 29 soil samples. Detected arsenic concentrations ranged from 2.5 milligrams per kilogram (mg/kg) in sample CP-SPA-S-08 (0-0.25 ft bgs) to 23.6 mg/kg in sample CP-NPA-S-07 (0-0.25 ft bgs). Arsenic concentrations in seven samples were higher than the residential and non-residential SRL of 10 mg/kg; however, arsenic concentrations in all samples were lower than the GPL of 290 mg/kg. Copper was detected in all 29 soil samples. Detected copper concentrations ranged from 515 mg/kg in sample CP-SPA-S-16 (0-0.25 ft bgs) to 12,800 mg/kg in sample CP-

NPA-S-03 (0-0.25 ft bgs). Copper concentrations in five samples were higher than the r-SRL of 3,100 mg/kg; however, copper concentrations in all samples were lower than the nr-SRL of 41,000 mg/kg, and there is no GPL established for copper. Lead was also detected in all 29 soil samples. Detected lead concentrations ranged from 2.3 mg/kg in a duplicate sample collected at CP-SPA-S-09 (0-0.25 ft bgs) to 311 mg/kg in sample CP-SPA-S-02 (0-0.25 ft bgs). The lead concentration in one out of the 29 soil samples was slightly higher than its GPL of 290 mg/kg, and all were lower than the r-SRL and nr-SRL for lead of 400 mg/kg and 800 mg/kg respectively.

The leaching potential for lead from the soil was indicated to be low when comparing the results derived from TCLP analysis from the excavated soils, as presented in Table 4. For one of the excavated soil samples (CP-E-03) lead was indicated to be present at a concentration of 290 mg/kg. However, the TCLP test conducted on this soil sample indicated a leached concentration lower than the laboratory detection level of 0.05 milligram per liter (mg/L), thereby indicating the low leachability of this constituent. Similarly, arsenic was detected at concentrations lower than detection levels for each of the TCLP tests conducted on the soil samples. Also, the leachability potential for the investigation areas has been significantly reduced by paving, reducing infiltration.

As discussed above, lead leaching in the TCLP test was lower than the detection limit, demonstrating the strong retention of lead in soil, and is consistent with the understanding of lead mobility in soil systems. Lead binds with iron minerals in soil, can also form lead hydroxide and phosphate minerals, and is extremely non-soluble in surface waters (Carroll et al. 1998). Lead binding with iron minerals is well understood, with the formation of strong lead-iron mineral chemical complexes (Trivedi et al. 2003). The strong retention of lead in soil, as demonstrated by the TCLP test results, along with the asphalt paving that will limit infiltration of precipitation into the soil column, provides support for the fact that lead will not be soluble or mobile in this soil environment, and will not impact groundwater.

The chemical concentrations detected as part of this investigation were typically comparable to or lower than indicated for a previous adjacent soil investigation program in the CLEAR Plant, as conducted for construction of the training center (ARCADIS 2013b).

4.2 Investigation Derived Waste

The soil samples collected from the soil stockpiles were evaluated by comparing detected constituent concentrations to ADEQ SRLs and GPLs, with the results presented in Table 4. Soil sample CP-E-01 was collected from soil stockpiled from the southern excavation, and all metals were at concentrations lower than their respective residential and non-residential SRLs and GPLs. Soil samples CP-E-02 and CP-E-03 were collected from the non-visually impacted and visually impacted soil piles from the northern paving area, and the concentrations of all detected metals, except arsenic, copper, and molybdenum were lower than their respective residential and non-residential SRLs and GPLs.

Excavated soil samples analyzed by TCLP for the Resource Conservation and Recovery Act (RCRA) eight metals all exhibited concentrations lower than associated laboratory detection limits, with the exception of cadmium. The concentration of cadmium detected was more than ten times lower than the required TCLP regulatory level. This indicates that the leaching potential for each of the metals constituents from the soil is low.

Each of the soil piles was disposed of by placing it in the appropriate Sierrita copper recovery process (SX/EW or Mill/Concentration), in accordance with the Work Plan (ARCADIS 2015).

5. Tier I Screening Risk Evaluation

A Tier I SRE was performed based on the soil data collected at locations specified in Section 2 and summarized in Table 5, as follows:

- a. Estimating exposure point concentrations (EPCs) for arsenic, copper, and lead, which are the site-wide constituent concentrations to which a hypothetical human receptor might be exposed
- b. Consistent with the Work Plan (ARCADIS 2015), comparing EPCs against available Arizona nr-SRLs (Arizona Administrative Code [A.A.C.] § R18-7-205).

Data for the EPC analysis were used from a total project area of 0.9 acre, which is slightly larger than conventionally assessed (typically less than 0.5 acre used). However, this method was considered to provide a reasonable measure of the

potential area over which exposure might occur. Based on past, present, and expected future use of the area, it is anticipated that exposure could occur, on average, across the entire 0.9-acre area, as opposed to a smaller or discrete portion of the area. Therefore, this approach is considered appropriate for the Tier 1 SRE. Additionally, the project area is a sub-section of a larger exposure area that has been included in the VRP BHHRA being conducted for the Sierrita mine site. Although not part of the Work Plan (ARCADIS 2015), EPCs were also compared against Arizona r-SRLs (A.A.C. § R18-7-205) to provide additional information for risk management purposes.

Consistent with USEPA guidelines for risk assessment, the EPC used in this evaluation is the lesser of the maximum detected concentration and the 95 percent upper confidence limit (UCL; USEPA 1989). The 95 percent UCLs were estimated using ProUCL 5.0.00 (USEPA 2013). Related ProUCL output files are presented in Appendix D. In addition, the ProUCL input files are included on the CD attached to this report. The 95 percent UCLs for arsenic, copper, and lead are lower than their respective maximum detected concentrations. As a result, the 95 percent UCLs were selected as the EPCs for all three site-related constituents.

The results of the Tier I SRE are summarized in Table 6. These indicate that the EPCs for arsenic, copper, and lead are lower than both the residential and non-residential SRLs.

6. Summary

The current site investigation within the Former CLEAR Plant Area has been performed to delineate potential impacts in the surface soils in connection with the construction of two paved areas. Soil samples were collected in accordance with the Work Plan with minor deviations. The analytical results indicated that detected concentrations of all metals, except arsenic and copper, were lower than their respective residential and non-residential SRLs, and only lead was slightly elevated higher than its respective GPL. The leaching potential for lead and arsenic from the soil was indicated to be low by TCLP testing conducted on excavated soil, which in each case reported leached concentrations lower than detection levels. The two areas have also been paved, which will minimize potential infiltration through the soil column.

The analytical results for the soil samples collected were used to conduct a Tier I SRE, the results of which suggest that the paving project area within the Former CLEAR Plant Subarea is an NFA site because the EPCs of arsenic, copper, and lead in soil

are lower than available SRLs. These results imply that potential adverse impacts to either residential or commercial/industrial receptors are not expected.

The results of this investigation are being incorporated into a site-wide BHHRA to provide a basis for ongoing evaluation of soil and sediment data collected under the VRP.

7. References

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URS. 2008. Addendum to Sampling & Analyses Plan (SAP) & Quality Assurance Project Plan (QAPP), Voluntary Remediation Program (VRP), Freeport-McMoRan Sierrita Green Valley, Arizona. Prepared for Freeport-McMoRan Sierrita Inc. September.

URS. 2012. Final Voluntary Remediation Program (VRP) Soil and Sediment Characterization Report, Freeport-McMoRan Sierrita Inc., Green Valley, Arizona. December.

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Tables

Table 1
Previous Soil Sample Arsenic, Copper and Lead Analytical Results Near Paving Project Area
Former CLEAR Plant Area Paving Project
Sierrita Mine, Arizona

Area Description	Sample Name	Sample Date	Depth (ft bgs)	Arsenic (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Location Notes
Area Adjacent to Northern Paving Area	CP-7	8/13/2004	0-0.25	31.3	20,000	152	230 ft NE
	CP-9	8/13/2004	0-0.25	40.1	59,300	200	30 ft N
	CP-13	7/15/2008	0-0.25	5.44	1,090	15.4	110 ft E
	CP-M06-00-01	7/11/2008	0-1	2.60	207	7.76	120 ft E
	CP-M06-01-03	7/11/2008	1-3	3.00	200	8.17	120 ft E
	CP-T-3-0.5'	8/13/2004	0.5	5.60	4,750	31.1	170 ft SE
	CP-T-3-0.75'	10/4/2004	0.75	20.9	978	6.03	170 ft SE
	CP-T-3-8'	10/4/2004	8	26.9	14,100	488	170 ft SE
	CP-JS-02-00-01	10/4/2004	0-1	6.30	2,690	39.7	175 ft SE
	CP-JS-02-01-03	7/15/2008	1-3	2.80	174	7.39	175 ft SE
	(42) CPF-AN-SWS-D0.5-05	5/21/2012	0.5	6.30	3,760	578	60ft SE
	(45) CPF-AN-SWN-D1-03	5/11/2012	1	10.7	3,800	473	95 ft ESE
	(46) CPF-AN-SWS-D0.5-03	5/11/2012	0.5	18.0	3,810	470	105 ft ESE
	(54) CPB-S-05	5/11/2012	0.0-0.25	17.5	1,640	174	90 ft SE
	(9) CPF-AW-SWE-D0.5-04	5/11/2012	0.5	15.0	8,970 J	1140	60 ft SSE
	(10) CPF-AW-SWW-D)0.75-04	5/11/2012	0.75	6.90	4,610	622	660 ft S
Area Adjacent to Southern Paving Area	CP-15	8/13/2004	0-0.25	13.7	8,260	116	390 ft NE
	(24) CPS-SWW-D2.5-01	5/1/2012	2.5	12.3	3,250	126	220 ft N
	CP-16	8/13/2004	0-0.25	34.9	109,000	950	230 ft NNE
	CP-19	8/13/2004	0-0.25	9.10	23,800	45.0	65 ft E
	CP-T-5-1.5'	7/11/2008	1.5	4.70	839	13.90	240 ft E
	CP-T-5-3'	7/11/2008	3	4.14	1,050	12.40	240 ft E
	CP-T-5-6'	7/11/2008	6	5.27	746	3.98	240 ft E
r-SRL (mg/kg)				10	3,100	400	
nr-SRL (mg/kg)				10	41,000	800	
GPL (mg/kg)				290	NE	290	

Notes:

XX - Value Exceeds r-SRL but not nr-SRL and not GPL

XX - Value Exceeds nr-SRL or GPL

NE - Not Established

r-SRL - Residential Soil Remediation Levels

nr-SRL - Non-Residential Soil Remediation Levels

GPL - Groundwater Protection Limit

mg/kg - milligrams per kilogram

ft bgs - feet below ground surface

(24) - Bracketed numbers prior to sample name indicate map reference for Figure 4

Table 2
Soil Sample Analytical Results
Former CLEAR Plant Area Paving Project
Sierrita Mine, Arizona

Sample ID	Figure ID	Sample Date	Latitude	Longitude	Depth (ft bgs)	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Manganese (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Thallium (mg/kg)	Zinc (mg/kg)	Mercury (mg/kg)	Uranium (mg/kg)	% Solids
CP-NPA-S-01	N1	5/28/2015	31° 52' 43.946" N	111° 05' 57.757" W	0-0.25	< 2.0	< 2.5	115	0.42	0.43	4.52	7.46	1,580	3.9	< 0.40	13.6	8.53	< 4.0	< 1.5	187	< 0.033	2.64	97.1
CP-NPA-S-02	N2	5/28/2015	31° 52' 44.664" N	111° 05' 57.748" W	0-0.25	-	5.1	-	-	-	-	-	2,550	19.8	-	-	-	-	-	-	-	-	99.0
CP-NPA-S-03	N3	5/28/2015	31° 52' 44.414" N	111° 05' 57.449" W	0-0.25	-	7.9	-	-	-	-	-	12,800	69.0	-	-	-	-	-	-	-	-	97.0
CP-NPA-S-04	N4	5/28/2015	31° 52' 44.137" N	111° 05' 57.176" W	0-0.25	-	7.3	-	-	-	-	-	4,730	41.6	-	-	-	-	-	-	-	-	96.5
CP-NPA-S-05	N5	5/28/2015	31° 52' 43.843" N	111° 05' 57.534" W	0-0.25	< 2.0	< 2.5	68.9	0.44	< 0.20	3.45	5.64	764	5.8	231J	26.6	4.88	< 4.0	< 1.5	67.3	< 0.033	1.32	97.4
FD052815-A (05 Dup)	N5 (Dup)	5/28/2015	31° 52' 43.843" N	111° 05' 57.534" W	0-0.25	< 2.0	< 2.5	57.8	0.44	< 0.20	3.02	5.12	633	5.8	201J	29	4.79	< 4.0	< 1.5	54.5	< 0.033	0.86	97.6
CP-NPA-S-06	N6	5/28/2015	31° 52' 43.660" N	111° 05' 57.503" W	0-0.25	-	18.9	-	-	-	-	-	4,810	97.0	-	-	-	-	-	-	-	-	93.2
CP-NPA-S-07	N7	5/28/2015	31° 52' 43.374" N	111° 05' 57.456" W	0-0.25	-	23.6	-	-	-	-	-	3,200	57.0	-	-	-	-	-	-	-	-	96.0
CP-NPA-S-08	N8	5/28/2015	31° 52' 43.184" N	111° 05' 57.155" W	0-0.25	-	2.9	-	-	-	-	-	618	20.6	-	-	-	-	-	-	-	-	96.4
CP-NPA-S-09	N9	5/28/2015	31° 52' 43.184" N	111° 05' 57.150" W	0-0.25	-	3.8	-	-	-	-	-	1,290	23.9	-	-	-	-	-	-	-	-	96.8
CP-NPA-S-10	N10	5/28/2015	31° 52' 43.946" N	111° 05' 57.757" W	0-0.25	5.1	10.3	51.8	0.38	0.98	3.12	8.4	5,090	80.7	168J	366	6.53	< 4.0	< 1.5	249	0.037	2.33	95.4
CP-SPA-S-01	S1	6/09/2015	31° 52' 39.027" N	111° 05' 57.789" W	0-0.25	-	10.3	-	-	-	-	-	1,050	6.2	-	-	-	-	-	-	-	-	92.7
CP-SPA-S-02	S2	6/09/2015	31° 52' 38.783" N	111° 05' 58.644" W	0-0.25	-	3.8	-	-	-	-	-	2,310	311	-	-	-	-	-	-	-	-	96.6
CP-SPA-S-03	S3	6/09/2015	31° 52' 38.802" N	111° 05' 58.370" W	0-0.25	< 2.0	6.2	134	0.45	0.43	6.63	7.67	823	4.2	292J	216	7.44	< 4.0	< 1.5	35.2J	< 0.033	7.25J	95.3
FD060915-A (03 Dup)	S3 (Dup)	6/09/2015	31° 52' 38.802" N	111° 05' 58.370" W	0-0.25	< 2.0	5.0	139	0.38	0.22	7.1	8.95	842	5.1	323J	136	8.38	< 4.0	< 1.5	35.4J	< 0.033	5.72J	94.7
CP-SPA-S-04	S4	6/09/2015	31° 52' 38.533" N	111° 05' 58.676" W	0-0.25	-	12.0	-	-	-	-	-	2,340	33.1	-	-	-	-	-	-	-	-	93.1
CP-SPA-S-05	S5	6/09/2015	31° 52' 37.982" N	111° 05' 57.788" W	0-0.25	-	6.1	-	-	-	-	-	2,490	35.1	-	-	-	-	-	-	-	-	94.6
CP-SPA-S-06	S6	6/09/2015	31° 52' 37.725" N	111° 05' 58.284" W	0-0.25	-	4.5	-	-	-	-	-	1,420	14.2	-	-	-	-	-	-	-	-	93.3
CP-SPA-S-07	S7	6/09/2015	31° 52' 37.723" N	111° 05' 58.542" W	0-0.25	-	6.4	-	-	-	-	-	1,770	20.5	-	-	-	-	-	-	-	-	92.7
CP-SPA-S-08	S8	6/09/2015	31° 52' 37.344" N	111° 05' 59.388" W	0-0.25	-	2.5	-	-	-	-	-	943	4.6	-	-	-	-	-	-	-	-	94.3
CP-SPA-S-09	S9	6/09/2015	31° 52' 37.458" N	111° 05' 58.858" W	0-0.25	< 2.0	3.1	318	0.41	< 0.20	7.53	13.1J	922	2.7	306J	47.7J	10.4	< 4.0	< 1.5	39.1J	< 0.033	2.72J	94.0
FD060915-B (09 Dup)	S9 (Dup)	6/09/2015	31° 52' 37.458" N	111° 05' 58.858" W	0-0.25	< 2.0	< 2.5	200	0.29	< 0.20	7.31	7.8J	667	2.3	276J	28.6J	8.63	< 4.0	< 1.5	36.3J	< 0.033	4.17J	94.2
CP-SPA-S-10	S10	6/09/2015	31° 52' 37.262" N	111° 05' 58.218" W	0-0.25	-	5.6	-	-	-	-	-	1,770	16.0	-	-	-	-	-	-	-	-	93.4
CP-SPA-S-11	S11	6/09/2015	31° 52' 37.010" N	111° 05' 57.978" W	0-0.25	-	3.7	-	-	-	-	-	1,920	15.5	-	-	-	-	-	-	-	-	92.1
CP-SPA-S-12	S12	6/09/2015	31° 52' 36.746" N	111° 05' 58.510" W	0-0.25	-	3.1	-	-	-	-	-	1,500	12.2	-	-	-	-	-	-	-	-	92.6
CP-SPA-S-13	S13	6/09/2015	31° 52' 36.780" N	111° 05' 58.765" W	0-0.25	-	11.1	-	-	-	-	-	767	4.2	-	-	-	-	-	-	-	-	92.9
CP-SPA-S-14	S14	6/09/2015	31° 52' 36.750" N	111° 05' 57.998" W	0-0.25	-	5.6	-	-	-	-	-	2,970	17.4	-	-	-	-	-	-	-	-	90.8
CP-SPA-S-15	S15	6/09/2015	31° 52' 36.591" N	111° 05' 57.962" W	0-0.25	-	8.9	-	-	-	-	-	2,820	40.1	-	-	-	-	-	-	-	-	95.0
CP-SPA-S-16	S16	6/09/2015	31° 52' 36.401" N	111° 05' 57.955" W	0-0.25	-	< 2.5	-	-	-	-	-	515	4.9	-	-	-	-	-	-	-	-	95.4
CP-SPA-S-17	S17	6/09/2015	31° 52' 36.793" N	111° 05' 58.214" W	0-0.25	-	4.8	-	-	-	-	-	1,710	17.7	-	-	-	-	-	-	-	-	91.3
CP-SPA-SL-E-D3.5-01	S-SL-E	5/19/2015	31° 52' 37.067" N	111° 05' 57.916" W	3.5	<0.2	4.1	136J	0.42	0.42	8.35	5.72	2,100	17.3	220J	157	8.73	<4.0	<1.5	57.8	0.05	4.16J	95.6
CP-SPA-SL-W-D3.5-01	S-SL-W	5/19/2015	31° 52' 37.092" N	111° 05' 58.112" W	3.5	<0.2	18.7	167J	0.48	1.04	21.5	5.38	1,310	22.6	235J	263	14.3	<4.0	<1.5	78.9	0.14	6.28J	95.4
Residential Soil Remediation Level Non-Carcinogen (r-SRL-2007)						31	10	15,000	150	39	120,000 (Cr III)	1,400	3,100	400	3,300	390	1,600	390	5.2	23,000	23	16	-
Non-Residential Soil Remediation Level (nr-SRL-2007)						410	10	170,000	1,900	510	1,000,000 (Cr III)	13,000	41,000	800	32,000	5,100	20,000	5,100	67	310,000	310	200	-
Groundwater Protection Level (GPL)						35	290	12,000	23	29	590 (total)	NE	NE	290	NE	NE	590	290	12	NE	12	NE	-

Notes:

XX - Value Exceeds r-SRL but not nr-SRL and not GPL

XX - Value Exceeds nr-SRL or GPL

mg/kg - milligrams per kilogram

ft bgs - feet below ground surface

NE - Not Established

"J" - Compound was positively identified, however the associated numerical value is an estimated concentration only.

"-" - Not Analyzed

Table 3
Quality Assurance Analytical Results
Former CLEAR Plant Area Paving Project
Sierrita Mine, Arizona

Sample ID	Sample Date	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)	Beryllium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Lead (mg/L)	Manganese (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Selenium (mg/L)	Thallium (mg/L)	Zinc (mg/L)	Mercury (mg/L)	Uranium (mg/L)
EB061915	5/19/2015	<0.020	<0.025	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	<0.0100	<0.0075	<0.0040	<0.008	<0.0100	<0.040	<0.015	<0.010	< 0.00020	<0.00100
EB061015	6/10/2015	< 0.020	< 0.025	< 0.0020	< 0.0020	< 0.0020	< 0.0060	< 0.0060	< 0.0100	< 0.0075	< 0.0040	< 0.008	< 0.0100	< 0.040	< 0.015	< 0.010	< 0.00020	< 0.00100

Notes:

mg/L - miligrams per Liter

Table 4
Waste Characterization Analytical Results
Former CLEAR Plant Area Paving Project
Sierrita Mine, Arizona

Sample ID	Sample Date	Total Metals																		TCLP									
		Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Manganese (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Thallium (mg/kg)	Zinc (mg/kg)	Mercury (mg/kg)	Uranium (mg/kg)	% Solids	TCLP Arsenic (mg/L)	TCLP Barium (mg/L)	TCLP Cadmium (mg/L)	TCLP Chromium (mg/L)	TCLP Lead (mg/L)	TCLP Mercury (mg/L)	TCLP Selenium (mg/L)	TCLP Silver (mg/L)	Final pH	% Dry solids
CP-E-01	6/10/2015	2.2	5.0	123	0.32	0.21	5.85	7.06	2,040	13.6	259J	196	6.76	< 4.0	< 1.5	59.2J	< 0.033	6.01J	94.1	< 0.050	< 1.00	< 0.0100	< 0.0500	< 0.0500	< 0.00020	< 0.050	< 0.0500	5.08	94.0
CP-E-02	6/10/2015	5.4	10.7	59.3	0.36	1.17	5.90	8.39	4,860	67.7	204J	399J	7.79	< 4.0	< 1.5	273J	< 0.033	2.85J	98.5	< 0.050	< 1.00	0.0325	< 0.0500	< 0.0500	< 0.00020	< 0.050	< 0.0500	5.13	98.3
CP-E-03	6/10/2015	9.4	21.0	70.5	0.36	1.40	3.84	10.4	10,700	231	178J	422J	8.20	4.20	< 1.5	357J	0.045	3.69J	97.9	< 0.050	< 1.00	0.0417	< 0.0500	< 0.0500	< 0.00020	< 0.050	< 0.0500	5.08	98.0
Residential Soil Remediation Level (r-SRL)		31	10	15,000	150	39	120,000 (Cr III)	1,400	3,100	400	3,300	390	1,600	390	5.2	23,000	23	16	-	-	-	-	-	-	-	-	-	-	-
Non-Residential Soil Remediation Level (nr-SRL) ¹		410	10	170,000	1,900	510	1,000,000 (Cr III)	13,000	41,000	800	32,000	5,100	20,000	5,100	67	310,000	310	200	-	-	-	-	-	-	-	-	-	-	-
Groundwater Protection Level (GPL) ²		35	290	12000	23	29	590 (total)	NE	NE	290	NE	NE	590	290	12	NE	NE	NE	-	-	-	-	-	-	-	-	-	-	-
TCLP Regulatory Level		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	100.0	1.0	5.0	5.0	0.2	1.0	5.0	-	-

Notes:

XX - Value Exceeds r-SRL but not nr-SRL and not GPL

XX - Value Exceeds nr-SRL or GPL

mg/kg - milligrams per kilogram

ft bgs - feet below ground surface

TCLP - Toxicity Characteristic Leaching Procedure

mg/L - milligrams per Liter

% - Percent

"J" - Compound was positively identified, however the associated numerical value is an estimated concentration only.

NE - Not Established

Table 5
Soil Analytical Results Used to Conduct the Tier I Screening Risk Evaluation
Former CLEAR Plant Area Paving Project
Sierrita Mine, Arizona

Sample ID	Date	Depth (ft bgs)	Units	Constituent		
				Arsenic (mg/kg)	Copper (mg/kg)	Lead (mg/kg)
CP-NPA-S-01	5/28/2015	0-0.25	mg/kg	< 2.5	1,580	3.9
CP-NPA-S-02	5/28/2015	0-0.25	mg/kg	5.1	2,550	19.8
CP-NPA-S-03	5/28/2015	0-0.25	mg/kg	7.9	12,800	69
CP-NPA-S-04	5/28/2015	0-0.25	mg/kg	7.3	4,730	41.6
CP-NPA-S-05	5/28/2015	0-0.25	mg/kg	< 2.5 [<2.5]	764 [633]	5.8 [5.8]
CP-NPA-S-06	5/28/2015	0-0.25	mg/kg	18.9	4,810	97
CP-NPA-S-07	5/28/2015	0-0.25	mg/kg	23.6	3,200	57
CP-NPA-S-08	5/28/2015	0-0.25	mg/kg	2.9	618	20.6
CP-NPA-S-09	5/28/2015	0-0.25	mg/kg	3.8	1,290	23.9
CP-NPA-S-10	5/28/2015	0-0.25	mg/kg	10.3	5,090	80.7
CP-SPA-S-01	6/9/2015	0-0.25	mg/kg	10.3	1,050	6.2
CP-SPA-S-02	6/9/2015	0-0.25	mg/kg	3.8	2,310	311
CP-SPA-S-03	6/9/2015	0-0.25	mg/kg	6.2 [5]	823 [842]	4.2 [5.1]
CP-SPA-S-04	6/9/2015	0-0.25	mg/kg	12	2,340	33.1
CP-SPA-S-05	6/9/2015	0-0.25	mg/kg	6.1	2,490	35.1
CP-SPA-S-06	6/9/2015	0-0.25	mg/kg	4.5	1,420	14.2
CP-SPA-S-07	6/9/2015	0-0.25	mg/kg	6.4	1,770	20.5
CP-SPA-S-08	6/9/2015	0-0.25	mg/kg	2.5	943	4.6
CP-SPA-S-09	6/9/2015	0-0.25	mg/kg	3.1 [<2.5]	922 [667]	2.7 [2.3]
CP-SPA-S-10	6/9/2015	0-0.25	mg/kg	5.6	1,770	16
CP-SPA-S-11	6/9/2015	0-0.25	mg/kg	3.7	1,920	15.5
CP-SPA-S-12	6/9/2015	0-0.25	mg/kg	3.1	1,500	12.2
CP-SPA-S-13	6/9/2015	0-0.25	mg/kg	11.1	767	4.2
CP-SPA-S-14	6/9/2015	0-0.25	mg/kg	5.6	2,970	17.4
CP-SPA-S-15	6/9/2015	0-0.25	mg/kg	8.9	2,820	40.1
CP-SPA-S-16	6/9/2015	0-0.25	mg/kg	< 2.5	515	4.9
CP-SPA-S-17	6/9/2015	0-0.25	mg/kg	4.8	1,710	17.7
CP-SPA-SL-E-D3.5-01	5/19/2015	3.5	mg/kg	4.1	2,100	17.3
CP-SPA-SL-W-D3.5-01	5/19/2015	3.5	mg/kg	18.7	1,310	22.6

Notes:

< = Indicates constituent was not detected at concentration above laboratory reporting limit.

[] = Duplicate sample result.

ft bgs = Feet below ground surface.

mg/kg = milligrams per kilogram.

Table 6
Results Tier I Screening Evaluation
Former CLEAR Plant Area Paving Project
Freeport McMoRan Sierrita Operations

Constituent	No. of Detects	No. of Non-Detects	Detection Frequency	95% UCL Concentration	Maximum Detected Concentration (mg/kg)	EPC (mg/kg)	SRLs (mg/kg)		Is the EPC below the rSRL?
							Residential	Non-Residential	
Arsenic	26	3	90%	8.9	23.6	8.9	10	10	Yes
Copper	29	0	100%	3,084	12,800	3,084	3,100	41,000	Yes
Lead	29	0	100%	59	311	59	400	800	Yes

Notes:

95% UCL concentrations were calculated using ProUCL version 5.0.00 (USEPA, 2013).

95% UCL = 95 percent upper confidence limit of the arithmetic average concentration.

EPC = Exposure point concentration (lesser of the maximum detected concentration and the 95% UCL).

mg/kg = milligram(s) per kilogram.

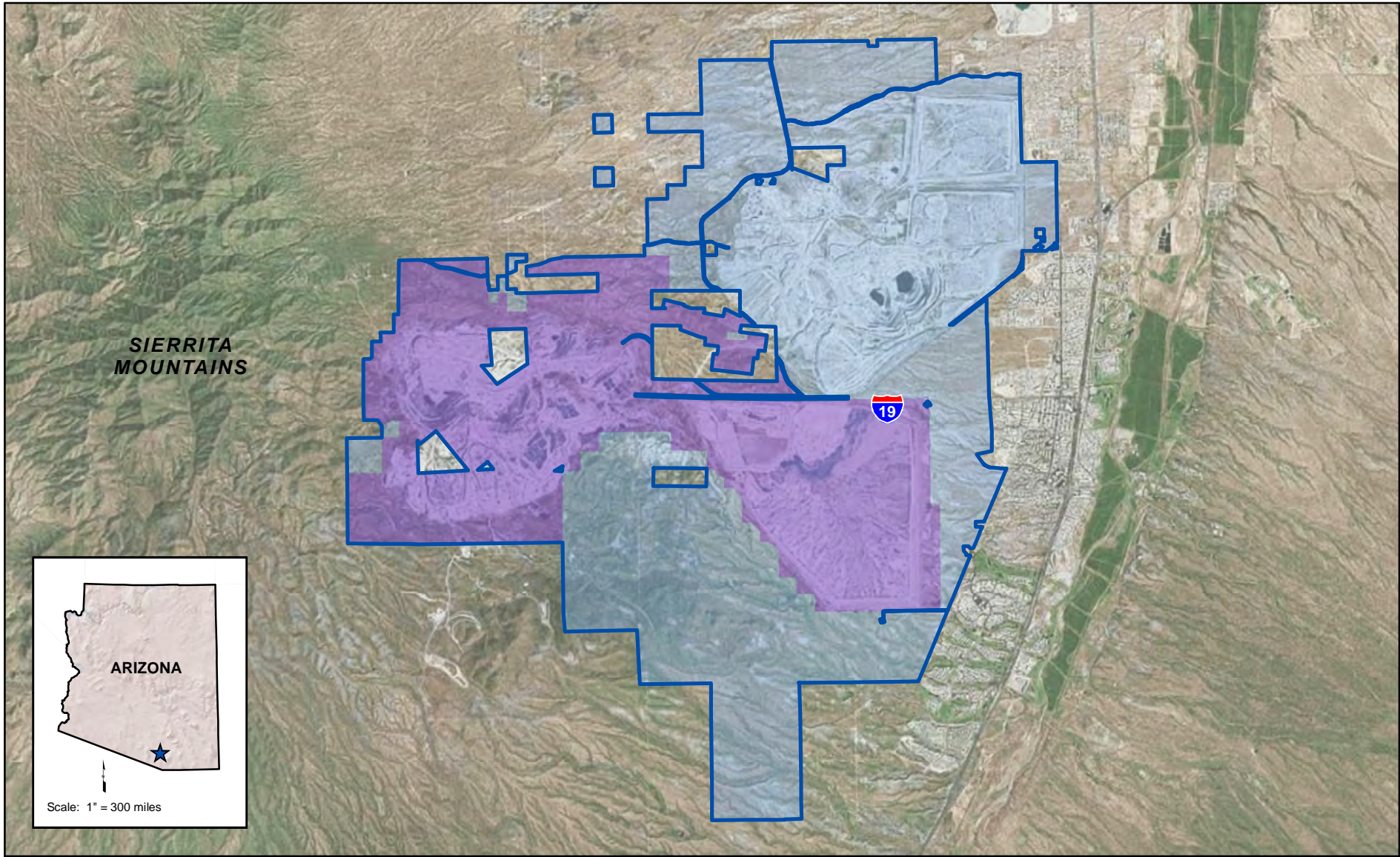
NA = not available.

rSRL = Residential Soil Remediation Level.



SRLs = Soil Remediation Levels.



Figures

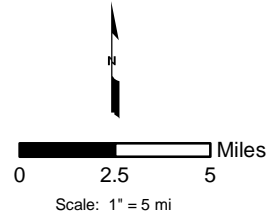


LEGEND

-  Approximate property boundary
-  Approximate VRP site definition

NOTES

· Topographic map source:
ESRI USA Topo Maps.





SIERRITA MINE
GREEN VALLEY, ARIZONA
VOLUNTARY REMEDIATION PROGRAM
FORMER CLEAR PLANT AREA PAVING PROJECT

SITE LOCATION



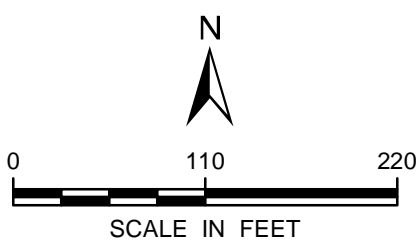


LEGEND

-  PAVING PROJECT AREAS
-  SEPTIC TANK AND LEACH FIELD

CAA - CENTRAL ACCUMULATION AREA

Imagery Source: Google Earth Pro, georeferenced in GIS



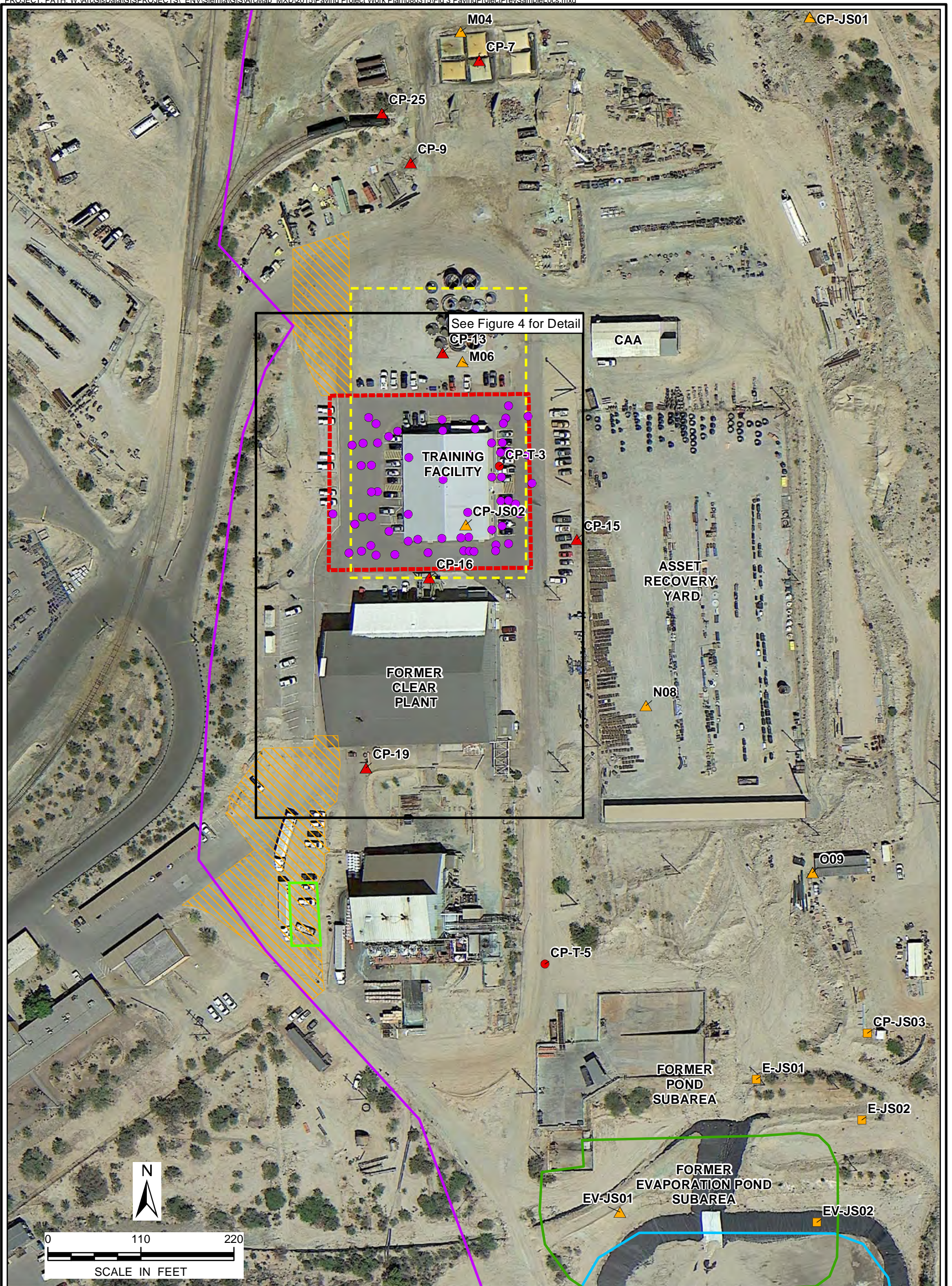
SIERRITA MINE
 GREEN VALLEY, ARIZONA
VOLUNTARY REMEDIATION PROGRAM
FORMER CLEAR PLANT AREA PAVING PROJECT

PAVING PROJECT LOCATION



FIGURE

2



LEGEND

- ▲ SURFACE SOIL SAMPLE (2004/2008)
- TRENCH SAMPLE LOCATION (2004/2008)
- ▲ JUDGMENTAL SAMPLING LOCATION (2004/2008)
- ▲ GRID SAMPLING LOCATION (2004/2008)
- SOIL SAMPLING LOCATION (2012)
- FORMER CLEAR PLANT SUBAREA BOUNDARY
- - - FORMER CLEAR PLANT TANKS AREA
- FORMER EVAPORATION POND SUBAREA
- NEW POND AREA
- ▨ PAVING PROJECT AREAS
- ▭ TRAINING FACILITY NO FURTHER ACTION BOUNDARY
- ▭ SEPTIC TANK AND LEACH FIELD AREA

CAA - CENTRAL ACCUMULATION AREA

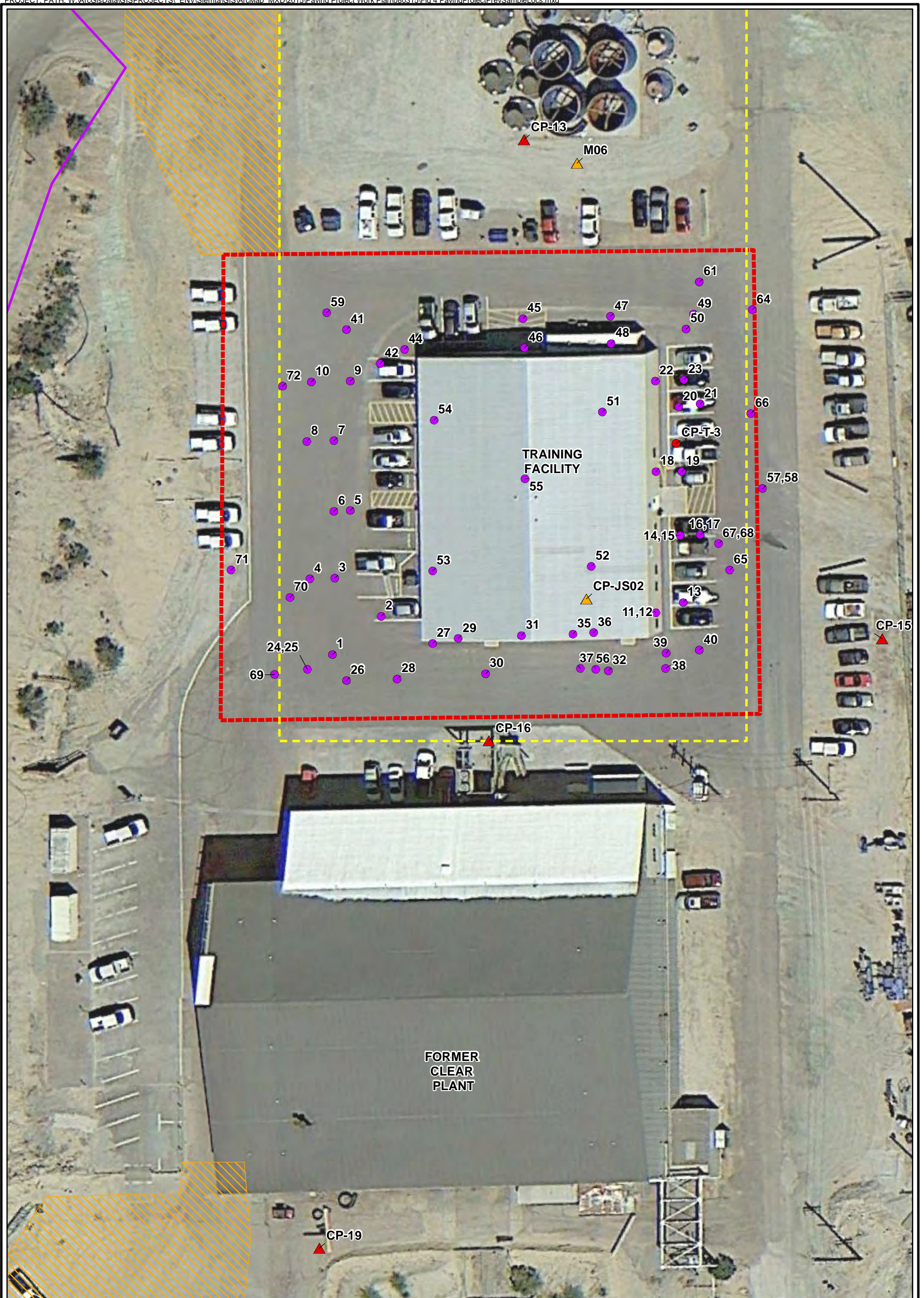
Imagery Source: Google Earth Pro, georeferenced in GIS

SIERRITA MINE
 GREEN VALLEY, ARIZONA
VOLUNTARY REMEDIATION PROGRAM
FORMER CLEAR PLANT AREA PAVING PROJECT
PREVIOUS SOIL SAMPLING LOCATIONS
NEAR PAVING PROJECT AREA



FIGURE

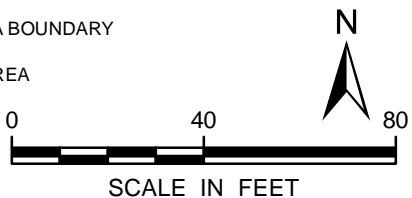
3



LEGEND

Imagery Source: Google Earth Pro, georeferenced in GIS

- ▲ SURFACE SOIL SAMPLE (2004/2008)
- TRENCH LOCATION (2004/2008)
- ▲ GRID SAMPLING LOCATION (2004/2008)
- SOIL SAMPLING LOCATION (2012)
- ▨ PAVING PROJECT AREAS
- ▭ TRAINING FACILITY NO FURTHER ACTION BOUNDARY
- FORMER CLEAR PLANT SUBAREA BOUNDARY
- FORMER CLEAR PLANT TANKS AREA



SIERRITA MINE
 GREEN VALLEY, ARIZONA
VOLUNTARY REMEDIATION PROGRAM
FORMER CLEAR PLANT AREA PAVING PROJECT

PREVIOUS SAMPLING LOCATIONS

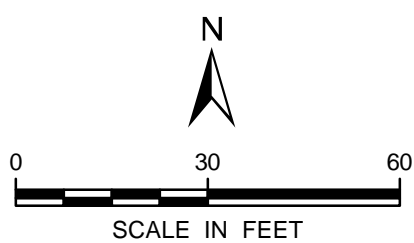


FIGURE
4



- LEGEND**
- PAVING AREA SOIL SAMPLE
 - PAVING PROJECT AREA
 - FORMER CLEAR PLANT TANKS AREA

- SOIL SAMPLE RESULTS**
- PAVING AREA SOIL SAMPLE BELOW R-SRL, NR-SRL AND GPL
 - PAVING AREA SOIL SAMPLE ABOVE R-SRL, BUT BELOW NR-SRL AND GPL
 - PAVING AREA SOIL SAMPLE ABOVE R-SRL AND NR-SRL, BUT BELOW GPL



SIERRITA MINE
 GREEN VALLEY, ARIZONA
 VOLUNTARY REMEDIATION PROGRAM
 FORMER CLEAR PLANT AREA PAVING PROJECT

**SOIL SAMPLE LOCATIONS IN THE
 NORTHERN PAVING PROJECT AREA**



FIGURE

5

FOR
 CL
 PL



Imagery Source: Google Earth Pro, georeferenced in GIS

LEGEND

- PAVING AREA SOIL SAMPLE
- △ SEPTIC TANK LEACH LINE SOIL SAMPLE
- PAVING AREA SOIL SAMPLE BELOW R-SRL, NR-SRL AND GPL
- PAVING AREA SOIL SAMPLE ABOVE R-SRL, BUT BELOW NR-SRL AND GPL
- PAVING AREA SOIL SAMPLE ABOVE R-SRL AND NR-SRL, BUT BELOW GPL
- ▨ PAVING PROJECT AREA
- ▭ SEPTIC TANK AND LEACH FIELD

SCALE IN FEET

0 30 60

N

SIERRITA MINE
 GREEN VALLEY, ARIZONA
 VOLUNTARY REMEDIATION PROGRAM
 FORMER CLEAR PLANT AREA PAVING PROJECT

SOIL SAMPLE LOCATIONS IN THE SOUTHERN PAVING PROJECT AREA

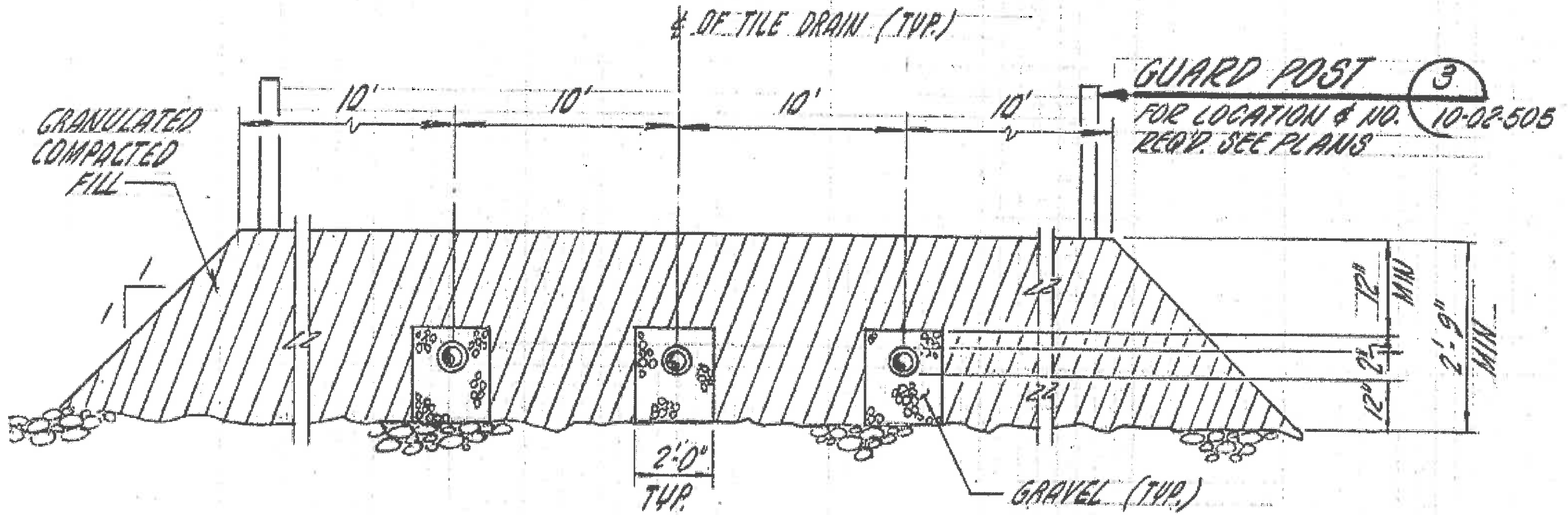
FIGURE 6

ARCADIS



Appendix A

Septic System Pre-Build
Diagrams



LEACHING FIELD

NOT TO SCALE

B

10-06-562

REF.
10-06-557

3



Appendix B

Laboratory Analytical Reports



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
EB061915	W5E0400-01	Grab	19-May-15 08:52	BW	20-May-2015	
CP-SPA-SL-E-D3.5-01	W5E0400-02	Soil	19-May-15 09:18	BW	20-May-2015	
CP-SPA-SL-W-D3.5-01	W5E0400-03	Soil	19-May-15 09:55	BW	20-May-2015	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

Case Narrative

05/29/2015mab: Report reissued. Copper has been added.



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

Client Sample ID: **EB061915**
SVL Sample ID: **W5E0400-01 (Grab)**

Sampled: 19-May-15 08:52
Received: 20-May-15
Sampled By: BW

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.00004		W521149	STA	05/22/15 12:04	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W521217	DT	05/22/15 09:26	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.010		W521217	DT	05/22/15 09:26	
EPA 6010B	Barium	< 0.0020	mg/L	0.0020	0.0006		W521217	DT	05/22/15 09:26	
EPA 6010B	Beryllium	< 0.0020	mg/L	0.0020	0.0009		W521217	DT	05/22/15 09:26	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W521217	DT	05/22/15 09:26	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0018		W521217	DT	05/22/15 09:26	
EPA 6010B	Cobalt	< 0.0060	mg/L	0.0060	0.0008		W521217	DT	05/22/15 09:26	
EPA 6010B	Copper	< 0.0100	mg/L	0.0100	0.0023		W521217	DT	05/22/15 09:26	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0038		W521217	DT	05/22/15 09:26	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0023		W521217	DT	05/22/15 09:26	
EPA 6010B	Molybdenum	< 0.008	mg/L	0.008	0.005		W521217	DT	05/22/15 09:26	
EPA 6010B	Nickel	< 0.0100	mg/L	0.0100	0.0028		W521217	DT	05/22/15 09:26	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.015		W521217	DT	05/22/15 09:26	
EPA 6010B	Thallium	< 0.015	mg/L	0.015	0.009		W521217	DT	05/22/15 09:26	
EPA 6010B	Zinc	< 0.010	mg/L	0.010	0.003		W521217	DT	05/22/15 09:26	
EPA 6020A	Uranium	< 0.00100	mg/L	0.00100	0.000014		W521207	KWH	05/22/15 06:59	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

Client Sample ID: **CP-SPA-SL-E-D3.5-01**
SVL Sample ID: **W5E0400-02 (Soil)**

Sampled: 19-May-15 09:18
Received: 20-May-15
Sampled By: BW

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	4.16	mg/kg	0.500	0.0012	2	W521208	KWH	05/22/15 07:08	M1
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W521210	AS	05/21/15 13:51	
EPA 6010B	Arsenic	4.1	mg/kg	2.5	0.8		W521206	DT	05/22/15 09:49	
EPA 6010B	Barium	136	mg/kg	0.20	0.08		W521206	DT	05/22/15 09:49	M2
EPA 6010B	Beryllium	0.42	mg/kg	0.20	0.06		W521206	DT	05/22/15 09:49	
EPA 6010B	Cadmium	0.42	mg/kg	0.20	0.07		W521206	DT	05/22/15 09:49	
EPA 6010B	Chromium	8.35	mg/kg	0.60	0.16		W521206	DT	05/22/15 09:49	
EPA 6010B	Cobalt	5.72	mg/kg	0.60	0.11		W521206	DT	05/22/15 09:49	
EPA 6010B	Copper	2100	mg/kg	1.00	0.28		W521206	DT	05/22/15 09:49	M3
EPA 6010B	Lead	17.3	mg/kg	0.8	0.4		W521206	DT	05/22/15 09:49	
EPA 6010B	Manganese	220	mg/kg	0.40	0.16		W521206	DT	05/22/15 09:49	M2
EPA 6010B	Molybdenum	157	mg/kg	0.80	0.21		W521206	DT	05/22/15 09:49	
EPA 6010B	Nickel	8.73	mg/kg	1.00	0.22		W521206	DT	05/22/15 09:49	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W521206	DT	05/22/15 09:49	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W521206	DT	05/22/15 09:49	
EPA 6010B	Zinc	57.8	mg/kg	1.0	0.3		W521206	DT	05/22/15 09:49	
EPA 7471A	Mercury	0.052	mg/kg	0.033	0.005		W521232	STA	05/22/15 13:15	

Percent Solids / Percent Moisture

Percent Solids	% Solids	95.6	%	0.1			W521215	ESB	05/22/15 08:31	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

Client Sample ID: **CP-SPA-SL-W-D3.5-01**
SVL Sample ID: **W5E0400-03 (Soil)**

Sampled: 19-May-15 09:55
Received: 20-May-15
Sampled By: BW

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	6.28	mg/kg	0.500	0.0012	2	W521208	KWH	05/22/15 07:16	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W521210	AS	05/21/15 14:00	
EPA 6010B	Arsenic	18.7	mg/kg	2.5	0.8		W521206	DT	05/22/15 10:04	
EPA 6010B	Barium	167	mg/kg	0.20	0.08		W521206	DT	05/22/15 10:04	
EPA 6010B	Beryllium	0.48	mg/kg	0.20	0.06		W521206	DT	05/22/15 10:04	
EPA 6010B	Cadmium	1.04	mg/kg	0.20	0.07		W521206	DT	05/22/15 10:04	
EPA 6010B	Chromium	21.5	mg/kg	0.60	0.16		W521206	DT	05/22/15 10:04	
EPA 6010B	Cobalt	5.38	mg/kg	0.60	0.11		W521206	DT	05/22/15 10:04	
EPA 6010B	Copper	1310	mg/kg	1.00	0.28		W521206	DT	05/22/15 10:04	
EPA 6010B	Lead	22.6	mg/kg	0.8	0.4		W521206	DT	05/22/15 10:04	
EPA 6010B	Manganese	235	mg/kg	0.40	0.16		W521206	DT	05/22/15 10:04	
EPA 6010B	Molybdenum	263	mg/kg	0.80	0.21		W521206	DT	05/22/15 10:04	
EPA 6010B	Nickel	14.3	mg/kg	1.00	0.22		W521206	DT	05/22/15 10:04	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W521206	DT	05/22/15 10:04	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W521206	DT	05/22/15 10:04	
EPA 6010B	Zinc	78.9	mg/kg	1.0	0.3		W521206	DT	05/22/15 10:04	
EPA 7471A	Mercury	0.137	mg/kg	0.033	0.005		W521232	STA	05/22/15 13:17	

Percent Solids / Percent Moisture

Percent Solids	% Solids	95.4	%	0.1			W521215	ESB	05/22/15 08:31	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **WSE0400**
Reported: 29-May-15 13:02

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	<0.500	0.0012	0.500	W521208	22-May-15	
EPA 7470A	Mercury	mg/L	<0.00020	0.00004	0.00020	W521149	22-May-15	

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	<2.0	0.6	2.0	W521210	21-May-15	
EPA 6010B	Arsenic	mg/kg	<2.5	0.8	2.5	W521206	22-May-15	
EPA 6010B	Barium	mg/kg	<0.20	0.08	0.20	W521206	22-May-15	
EPA 6010B	Beryllium	mg/kg	<0.20	0.06	0.20	W521206	22-May-15	
EPA 6010B	Cadmium	mg/kg	<0.20	0.07	0.20	W521206	22-May-15	
EPA 6010B	Chromium	mg/kg	<0.60	0.16	0.60	W521206	22-May-15	
EPA 6010B	Cobalt	mg/kg	<0.60	0.11	0.60	W521206	22-May-15	
EPA 6010B	Copper	mg/kg	<1.00	0.28	1.00	W521206	22-May-15	
EPA 6010B	Lead	mg/kg	<0.8	0.4	0.8	W521206	22-May-15	
EPA 6010B	Manganese	mg/kg	<0.40	0.16	0.40	W521206	22-May-15	
EPA 6010B	Molybdenum	mg/kg	<0.80	0.21	0.80	W521206	22-May-15	
EPA 6010B	Nickel	mg/kg	<1.00	0.22	1.00	W521206	22-May-15	
EPA 6010B	Selenium	mg/kg	<4.0	1.5	4.0	W521206	22-May-15	
EPA 6010B	Thallium	mg/kg	<1.5	0.8	1.5	W521206	22-May-15	
EPA 6010B	Zinc	mg/kg	<1.0	0.3	1.0	W521206	22-May-15	
EPA 7471A	Mercury	mg/kg	<0.033	0.005	0.033	W521232	22-May-15	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	<0.020	0.009	0.020	W521217	22-May-15	
EPA 6010B	Arsenic	mg/L	<0.025	0.010	0.025	W521217	22-May-15	
EPA 6010B	Barium	mg/L	<0.0020	0.0006	0.0020	W521217	22-May-15	
EPA 6010B	Beryllium	mg/L	<0.0020	0.0009	0.0020	W521217	22-May-15	
EPA 6010B	Cadmium	mg/L	<0.0020	0.0006	0.0020	W521217	22-May-15	
EPA 6010B	Chromium	mg/L	<0.0060	0.0018	0.0060	W521217	22-May-15	
EPA 6010B	Cobalt	mg/L	<0.0060	0.0008	0.0060	W521217	22-May-15	
EPA 6010B	Copper	mg/L	<0.0100	0.0023	0.0100	W521217	22-May-15	
EPA 6010B	Lead	mg/L	<0.0075	0.0038	0.0075	W521217	22-May-15	
EPA 6010B	Manganese	mg/L	<0.0040	0.0023	0.0040	W521217	22-May-15	
EPA 6010B	Molybdenum	mg/L	<0.008	0.005	0.008	W521217	22-May-15	
EPA 6010B	Nickel	mg/L	<0.0100	0.0028	0.0100	W521217	22-May-15	
EPA 6010B	Selenium	mg/L	<0.040	0.015	0.040	W521217	22-May-15	
EPA 6010B	Thallium	mg/L	<0.015	0.009	0.015	W521217	22-May-15	
EPA 6010B	Zinc	mg/L	<0.010	0.003	0.010	W521217	22-May-15	
EPA 6020A	Uranium	mg/L	<0.00100	0.000014	0.00100	W521207	22-May-15	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	2.48	2.50	99.2	80 - 120	W521208	22-May-15	
EPA 7470A	Mercury	mg/L	0.00492	0.00500	98.4	80 - 120	W521149	22-May-15	

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	97.7	100	97.7	80 - 120	W521210	21-May-15	
EPA 6010B	Arsenic	mg/kg	97.1	100	97.1	80 - 120	W521206	22-May-15	
EPA 6010B	Barium	mg/kg	105	100	105	80 - 120	W521206	22-May-15	
EPA 6010B	Beryllium	mg/kg	101	100	101	80 - 120	W521206	22-May-15	
EPA 6010B	Cadmium	mg/kg	97.6	100	97.6	80 - 120	W521206	22-May-15	
EPA 6010B	Chromium	mg/kg	100	100	100	80 - 120	W521206	22-May-15	
EPA 6010B	Cobalt	mg/kg	99.1	100	99.1	80 - 120	W521206	22-May-15	

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **WSE0400**
Reported: 29-May-15 13:02

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total) by EPA 6000/7000 Methods (Continued)

EPA 6010B	Copper	mg/kg	104	100	104	80 - 120	W521206	22-May-15	
EPA 6010B	Lead	mg/kg	97.6	100	97.6	80 - 120	W521206	22-May-15	
EPA 6010B	Manganese	mg/kg	99.4	100	99.4	80 - 120	W521206	22-May-15	
EPA 6010B	Molybdenum	mg/kg	104	100	104	80 - 120	W521206	22-May-15	
EPA 6010B	Nickel	mg/kg	97.2	100	97.2	80 - 120	W521206	22-May-15	
EPA 6010B	Selenium	mg/kg	97.6	100	97.6	80 - 120	W521206	22-May-15	
EPA 6010B	Thallium	mg/kg	97.1	100	97.1	80 - 120	W521206	22-May-15	
EPA 6010B	Zinc	mg/kg	94.6	100	94.6	80 - 120	W521206	22-May-15	
EPA 7471A	Mercury	mg/kg	0.843	0.833	101	80 - 120	W521232	22-May-15	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.01	1.00	101	80 - 120	W521217	22-May-15	
EPA 6010B	Arsenic	mg/L	0.965	1.00	96.5	80 - 120	W521217	22-May-15	
EPA 6010B	Barium	mg/L	1.04	1.00	104	80 - 120	W521217	22-May-15	
EPA 6010B	Beryllium	mg/L	0.985	1.00	98.5	80 - 120	W521217	22-May-15	
EPA 6010B	Cadmium	mg/L	0.973	1.00	97.3	80 - 120	W521217	22-May-15	
EPA 6010B	Chromium	mg/L	0.987	1.00	98.7	80 - 120	W521217	22-May-15	
EPA 6010B	Cobalt	mg/L	0.976	1.00	97.6	80 - 120	W521217	22-May-15	
EPA 6010B	Copper	mg/L	1.03	1.00	103	80 - 120	W521217	22-May-15	
EPA 6010B	Lead	mg/L	0.979	1.00	97.9	80 - 120	W521217	22-May-15	
EPA 6010B	Manganese	mg/L	0.969	1.00	96.9	80 - 120	W521217	22-May-15	
EPA 6010B	Molybdenum	mg/L	1.03	1.00	103	80 - 120	W521217	22-May-15	
EPA 6010B	Nickel	mg/L	0.961	1.00	96.1	80 - 120	W521217	22-May-15	
EPA 6010B	Selenium	mg/L	0.993	1.00	99.3	80 - 120	W521217	22-May-15	
EPA 6010B	Thallium	mg/L	0.979	1.00	97.9	80 - 120	W521217	22-May-15	
EPA 6010B	Zinc	mg/L	0.939	1.00	93.9	80 - 120	W521217	22-May-15	
EPA 6020A	Uranium	mg/L	0.0248	0.0250	99.0	80 - 120	W521207	22-May-15	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
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Percent Solids / Percent Moisture

Percent Solids	% Solids	%	95.3	95.6	0.3	20	W521215	22-May-15	
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Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	7.92	4.16	2.50	150	75 - 125	W521208	22-May-15	M1
EPA 7470A	Mercury	mg/L	0.00092	<0.00020	0.00100	91.9	75 - 125	W521149	22-May-15	

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	97.1	<2.0	100	96.0	75 - 125	W521210	21-May-15	
EPA 6010B	Arsenic	mg/kg	99.4	4.1	100	95.3	75 - 125	W521206	22-May-15	
EPA 6010B	Barium	mg/kg	210	136	100	73.9	75 - 125	W521206	22-May-15	M2
EPA 6010B	Beryllium	mg/kg	97.3	0.42	100	96.9	75 - 125	W521206	22-May-15	
EPA 6010B	Cadmium	mg/kg	94.9	0.42	100	94.5	75 - 125	W521206	22-May-15	
EPA 6010B	Chromium	mg/kg	105	8.35	100	96.9	75 - 125	W521206	22-May-15	
EPA 6010B	Cobalt	mg/kg	96.9	5.72	100	91.2	75 - 125	W521206	22-May-15	
EPA 6010B	Copper	mg/kg	2130	2100	100	R > 4S	75 - 125	W521206	22-May-15	M3

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **WSE0400**
Reported: 29-May-15 13:02

Quality Control - MATRIX SPIKE Data (Continued)

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total) by EPA 6000/7000 Methods (Continued)

EPA 6010B	Lead	mg/kg	105	17.3	100	87.8	75 - 125	W521206	22-May-15	
EPA 6010B	Manganese	mg/kg	288	220	100	67.3	75 - 125	W521206	22-May-15	M2
EPA 6010B	Molybdenum	mg/kg	256	157	100	99.1	75 - 125	W521206	22-May-15	
EPA 6010B	Nickel	mg/kg	97.2	8.73	100	88.5	75 - 125	W521206	22-May-15	
EPA 6010B	Selenium	mg/kg	95.1	<4.0	100	95.1	75 - 125	W521206	22-May-15	
EPA 6010B	Thallium	mg/kg	87.9	<1.5	100	87.9	75 - 125	W521206	22-May-15	
EPA 6010B	Zinc	mg/kg	138	57.8	100	79.8	75 - 125	W521206	22-May-15	
EPA 7471A	Mercury	mg/kg	0.483	0.137	0.333	104	75 - 125	W521232	22-May-15	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.01	<0.020	1.00	101	75 - 125	W521217	22-May-15	
EPA 6010B	Arsenic	mg/L	0.983	<0.025	1.00	98.3	75 - 125	W521217	22-May-15	
EPA 6010B	Barium	mg/L	1.05	<0.0020	1.00	105	75 - 125	W521217	22-May-15	
EPA 6010B	Beryllium	mg/L	0.990	<0.0020	1.00	99.0	75 - 125	W521217	22-May-15	
EPA 6010B	Cadmium	mg/L	0.976	<0.0020	1.00	97.6	75 - 125	W521217	22-May-15	
EPA 6010B	Chromium	mg/L	0.987	<0.0060	1.00	98.7	75 - 125	W521217	22-May-15	
EPA 6010B	Cobalt	mg/L	0.981	<0.0060	1.00	98.1	75 - 125	W521217	22-May-15	
EPA 6010B	Copper	mg/L	1.04	<0.0100	1.00	104	75 - 125	W521217	22-May-15	
EPA 6010B	Lead	mg/L	0.979	<0.0075	1.00	97.9	75 - 125	W521217	22-May-15	
EPA 6010B	Manganese	mg/L	0.992	<0.0040	1.00	99.2	75 - 125	W521217	22-May-15	
EPA 6010B	Molybdenum	mg/L	1.03	<0.008	1.00	103	75 - 125	W521217	22-May-15	
EPA 6010B	Nickel	mg/L	0.964	<0.0100	1.00	96.4	75 - 125	W521217	22-May-15	
EPA 6010B	Selenium	mg/L	0.997	<0.040	1.00	99.7	75 - 125	W521217	22-May-15	
EPA 6010B	Thallium	mg/L	0.981	<0.015	1.00	98.1	75 - 125	W521217	22-May-15	
EPA 6010B	Zinc	mg/L	0.943	<0.010	1.00	94.3	75 - 125	W521217	22-May-15	
EPA 6020A	Uranium	mg/L	0.0250	<0.00100	0.0250	100	75 - 125	W521207	22-May-15	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	6.32	7.92	2.50	86.4	22.4	20	W521208	22-May-15	M1
EPA 7470A	Mercury	mg/L	0.00092	0.00092	0.00100	91.9	0.0	20	W521149	22-May-15	

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	99.4	97.1	100	98.3	2.4	20	W521210	21-May-15	
EPA 6010B	Arsenic	mg/kg	100	99.4	100	96.4	1.1	20	W521206	22-May-15	
EPA 6010B	Barium	mg/kg	239	210	100	104	13.2	20	W521206	22-May-15	
EPA 6010B	Beryllium	mg/kg	98.2	97.3	100	97.8	1.0	20	W521206	22-May-15	
EPA 6010B	Cadmium	mg/kg	96.6	94.9	100	96.2	1.7	20	W521206	22-May-15	
EPA 6010B	Chromium	mg/kg	107	105	100	99.0	2.0	20	W521206	22-May-15	
EPA 6010B	Cobalt	mg/kg	98.1	96.9	100	92.4	1.3	20	W521206	22-May-15	
EPA 6010B	Copper	mg/kg	2400	2130	100	R > 4S	12.1	20	W521206	22-May-15	M3
EPA 6010B	Lead	mg/kg	109	105	100	91.2	3.2	20	W521206	22-May-15	
EPA 6010B	Manganese	mg/kg	305	288	100	84.3	5.8	20	W521206	22-May-15	
EPA 6010B	Molybdenum	mg/kg	258	256	100	100	0.5	20	W521206	22-May-15	
EPA 6010B	Nickel	mg/kg	100	97.2	100	91.3	2.8	20	W521206	22-May-15	
EPA 6010B	Selenium	mg/kg	96.1	95.1	100	96.1	1.1	20	W521206	22-May-15	
EPA 6010B	Thallium	mg/kg	88.6	87.9	100	88.6	0.8	20	W521206	22-May-15	
EPA 6010B	Zinc	mg/kg	145	138	100	87.0	5.1	20	W521206	22-May-15	
EPA 7471A	Mercury	mg/kg	0.475	0.483	0.333	102	1.7	20	W521232	22-May-15	



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

Quality Control - MATRIX SPIKE DUPLICATE Data (Continued)

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total Recoverable)											
EPA 6010B	Antimony	mg/L	1.02	1.01	1.00	102	0.8	20	W521217	22-May-15	
EPA 6010B	Arsenic	mg/L	0.986	0.983	1.00	98.6	0.4	20	W521217	22-May-15	
EPA 6010B	Barium	mg/L	1.06	1.05	1.00	106	0.7	20	W521217	22-May-15	
EPA 6010B	Beryllium	mg/L	0.993	0.990	1.00	99.3	0.3	20	W521217	22-May-15	
EPA 6010B	Cadmium	mg/L	0.984	0.976	1.00	98.4	0.8	20	W521217	22-May-15	
EPA 6010B	Chromium	mg/L	0.997	0.987	1.00	99.7	1.0	20	W521217	22-May-15	
EPA 6010B	Cobalt	mg/L	0.989	0.981	1.00	98.9	0.8	20	W521217	22-May-15	
EPA 6010B	Copper	mg/L	1.05	1.04	1.00	105	0.5	20	W521217	22-May-15	
EPA 6010B	Lead	mg/L	0.987	0.979	1.00	98.7	0.9	20	W521217	22-May-15	
EPA 6010B	Manganese	mg/L	0.999	0.992	1.00	99.9	0.7	20	W521217	22-May-15	
EPA 6010B	Molybdenum	mg/L	1.04	1.03	1.00	104	1.1	20	W521217	22-May-15	
EPA 6010B	Nickel	mg/L	0.969	0.964	1.00	96.9	0.6	20	W521217	22-May-15	
EPA 6010B	Selenium	mg/L	0.992	0.997	1.00	99.2	0.6	20	W521217	22-May-15	
EPA 6010B	Thallium	mg/L	0.995	0.981	1.00	99.5	1.4	20	W521217	22-May-15	
EPA 6010B	Zinc	mg/L	0.948	0.943	1.00	94.8	0.5	20	W521217	22-May-15	
EPA 6020A	Uranium	mg/L	0.0247	0.0250	0.0250	98.9	1.1	20	W521207	22-May-15	

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total)										
EPA 6020A	Uranium	mg/kg	13.6	4.16	10.0	94.5	75 - 125	W521208	22-May-15	
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Barium	mg/kg	228	136	100	91.6	75 - 125	W521206	22-May-15	
EPA 6010B	Manganese	mg/kg	302	220	100	81.9	75 - 125	W521206	22-May-15	
Metals (Total Recoverable)										
EPA 6020A	Uranium	mg/L	0.105	<0.001000	0.100	105	75 - 125	W521207	22-May-15	

Notes and Definitions

- M1 Matrix spike recovery was high, but the LCS recovery was acceptable.
- M2 Matrix spike recovery was low, but the LCS recovery was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0016**
Reported: 04-Jun-15 09:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
CP-NPA-S-01	W5F0016-01	Soil	28-May-15 11:46	BG	01-Jun-2015	
CP-NPA-S-02	W5F0016-02	Soil	28-May-15 13:35	BG	01-Jun-2015	
CP-NPA-S-03	W5F0016-03	Soil	28-May-15 13:39	BG	01-Jun-2015	
CP-NPA-S-04	W5F0016-04	Soil	28-May-15 13:46	BG	01-Jun-2015	
CP-NPA-S-05	W5F0016-05	Soil	28-May-15 13:59	BG	01-Jun-2015	
FD052815-A	W5F0016-06	Soil	28-May-15 13:59	BG	01-Jun-2015	
CP-NPA-S-06	W5F0016-07	Soil	28-May-15 14:23	BG	01-Jun-2015	
CP-NPA-S-07	W5F0016-08	Soil	28-May-15 14:35	BG	01-Jun-2015	
CP-NPA-S-08	W5F0016-09	Soil	28-May-15 14:41	BG	01-Jun-2015	
CP-NPA-S-09	W5F0016-10	Soil	28-May-15 14:47	BG	01-Jun-2015	
CP-NPA-S-10	W5F0016-11	Soil	28-May-15 14:56	BG	01-Jun-2015	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-01**

SVL Sample ID: **W5F0016-01 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 11:46
Received: 01-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	2.64	mg/kg	0.500	0.0012	2	W523050	KWH	06/03/15 11:09	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W523048	DT	06/03/15 13:30	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:08	
EPA 6010B	Barium	115	mg/kg	0.20	0.08		W523047	AS	06/03/15 16:08	
EPA 6010B	Beryllium	0.42	mg/kg	0.20	0.06		W523047	AS	06/03/15 16:08	
EPA 6010B	Cadmium	0.43	mg/kg	0.20	0.07		W523047	AS	06/03/15 16:08	
EPA 6010B	Chromium	4.52	mg/kg	0.60	0.16		W523047	AS	06/03/15 16:08	
EPA 6010B	Cobalt	7.46	mg/kg	0.60	0.11		W523047	AS	06/03/15 16:08	
EPA 6010B	Copper	1580	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:08	
EPA 6010B	Lead	3.9	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:08	
EPA 6010B	Manganese	< 0.40	mg/kg	0.40	0.16		W523047	AS	06/03/15 17:06	
EPA 6010B	Molybdenum	13.6	mg/kg	0.80	0.21		W523047	AS	06/03/15 16:08	
EPA 6010B	Nickel	8.53	mg/kg	1.00	0.22		W523047	AS	06/03/15 16:08	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W523047	AS	06/03/15 16:08	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W523047	AS	06/03/15 16:08	
EPA 6010B	Zinc	187	mg/kg	1.0	0.3		W523047	AS	06/03/15 16:08	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W523051	STA	06/02/15 10:17	

Percent Solids / Percent Moisture

Percent Solids	% Solids	97.1	%	0.1			W523049	JAA	06/02/15 09:40	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-02**

SVL Sample ID: **W5F0016-02 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:35

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	5.1	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:10	
EPA 6010B	Copper	2550	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:10	
EPA 6010B	Lead	19.8	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:10	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	99.0	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-03**

SVL Sample ID: **W5F0016-03 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:39

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	7.9	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:12	
EPA 6010B	Copper	12800	mg/kg	10.0	2.80	10	W523047	AS	06/03/15 16:52	D2
EPA 6010B	Lead	69.0	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:12	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	97.0	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-04**

SVL Sample ID: **W5F0016-04 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:46

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	7.3	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:14	
EPA 6010B	Copper	4730	mg/kg	10.0	2.80	10	W523047	AS	06/03/15 16:55	D2
EPA 6010B	Lead	41.6	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:14	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.5	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-05**

SVL Sample ID: **W5F0016-05 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:59

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	1.32	mg/kg	0.500	0.0012	2	W523050	KWH	06/03/15 11:11	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W523048	DT	06/03/15 13:33	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:16	
EPA 6010B	Barium	68.9	mg/kg	0.20	0.08		W523047	AS	06/03/15 16:16	
EPA 6010B	Beryllium	0.44	mg/kg	0.20	0.06		W523047	AS	06/03/15 16:16	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.07		W523047	AS	06/03/15 16:16	
EPA 6010B	Chromium	3.45	mg/kg	0.60	0.16		W523047	AS	06/03/15 16:16	
EPA 6010B	Cobalt	5.64	mg/kg	0.60	0.11		W523047	AS	06/03/15 16:16	
EPA 6010B	Copper	764	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:16	
EPA 6010B	Lead	5.8	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:16	
EPA 6010B	Manganese	231	mg/kg	0.40	0.16		W523047	AS	06/03/15 17:09	
EPA 6010B	Molybdenum	26.6	mg/kg	0.80	0.21		W523047	AS	06/03/15 16:16	
EPA 6010B	Nickel	4.88	mg/kg	1.00	0.22		W523047	AS	06/03/15 16:16	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W523047	AS	06/03/15 16:16	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W523047	AS	06/03/15 16:16	
EPA 6010B	Zinc	67.3	mg/kg	1.0	0.3		W523047	AS	06/03/15 16:16	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W523051	STA	06/02/15 10:19	

Percent Solids / Percent Moisture

Percent Solids	% Solids	97.4	%	0.1			W523049	JAA	06/02/15 09:40	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **FD052815-A**

SVL Sample ID: **W5F0016-06 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:59

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	0.858	mg/kg	0.500	0.0012	2	W523050	KWH	06/03/15 11:04	M1
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W523048	DT	06/03/15 13:36	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:18	
EPA 6010B	Barium	57.8	mg/kg	0.20	0.08		W523047	AS	06/03/15 16:18	
EPA 6010B	Beryllium	0.44	mg/kg	0.20	0.06		W523047	AS	06/03/15 16:18	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.07		W523047	AS	06/03/15 16:18	
EPA 6010B	Chromium	3.02	mg/kg	0.60	0.16		W523047	AS	06/03/15 16:18	
EPA 6010B	Cobalt	5.12	mg/kg	0.60	0.11		W523047	AS	06/03/15 16:18	
EPA 6010B	Copper	633	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:18	M3
EPA 6010B	Lead	5.8	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:18	
EPA 6010B	Manganese	201	mg/kg	0.40	0.16		W523047	AS	06/03/15 17:12	M1
EPA 6010B	Molybdenum	29.0	mg/kg	0.80	0.21		W523047	AS	06/03/15 16:18	
EPA 6010B	Nickel	4.79	mg/kg	1.00	0.22		W523047	AS	06/03/15 16:18	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W523047	AS	06/03/15 16:18	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W523047	AS	06/03/15 16:18	
EPA 6010B	Zinc	54.5	mg/kg	1.0	0.3		W523047	AS	06/03/15 16:18	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W523051	STA	06/02/15 10:20	

Percent Solids / Percent Moisture

Percent Solids	% Solids	97.6	%	0.1			W523049	JAA	06/02/15 09:40	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-06**

SVL Sample ID: **W5F0016-07 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:23

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	18.9	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:30	
EPA 6010B	Copper	4810	mg/kg	10.0	2.80	10	W523047	AS	06/03/15 16:57	D2
EPA 6010B	Lead	97.0	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:30	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	93.2	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-07**

SVL Sample ID: **W5F0016-08 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:35

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	23.6	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:32	
EPA 6010B	Copper	3200	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:32	
EPA 6010B	Lead	57.0	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:32	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.0	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-08**

SVL Sample ID: **W5F0016-09 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:41

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	2.9	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:34	
EPA 6010B	Copper	618	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:34	
EPA 6010B	Lead	20.6	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:34	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.4	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-09**

SVL Sample ID: **W5F0016-10 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:47

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	3.8	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:36	
EPA 6010B	Copper	1290	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:36	
EPA 6010B	Lead	23.9	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:36	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.8	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0016**
Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-10**

SVL Sample ID: **W5F0016-11 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:56
Received: 01-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	2.33	mg/kg	0.500	0.0029	5	W523050	KWH	06/03/15 11:16	D8
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	5.1	mg/kg	2.0	0.6		W523048	DT	06/03/15 13:45	
EPA 6010B	Arsenic	10.3	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:38	
EPA 6010B	Barium	51.8	mg/kg	0.20	0.08		W523047	AS	06/03/15 16:38	
EPA 6010B	Beryllium	0.38	mg/kg	0.20	0.06		W523047	AS	06/03/15 16:38	
EPA 6010B	Cadmium	0.98	mg/kg	0.20	0.07		W523047	AS	06/03/15 16:38	
EPA 6010B	Chromium	3.12	mg/kg	0.60	0.16		W523047	AS	06/03/15 16:38	
EPA 6010B	Cobalt	8.40	mg/kg	0.60	0.11		W523047	AS	06/03/15 16:38	
EPA 6010B	Copper	5090	mg/kg	10.0	2.80	10	W523047	AS	06/03/15 16:59	D2
EPA 6010B	Lead	80.7	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:38	
EPA 6010B	Manganese	168	mg/kg	0.40	0.16		W523047	AS	06/03/15 17:21	
EPA 6010B	Molybdenum	366	mg/kg	0.80	0.21		W523047	AS	06/03/15 16:38	
EPA 6010B	Nickel	6.53	mg/kg	1.00	0.22		W523047	AS	06/03/15 16:38	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W523047	AS	06/03/15 16:38	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W523047	AS	06/03/15 16:38	
EPA 6010B	Zinc	249	mg/kg	1.0	0.3		W523047	AS	06/03/15 16:38	
EPA 7471A	Mercury	0.037	mg/kg	0.033	0.005		W523051	STA	06/02/15 10:26	

Percent Solids / Percent Moisture

Percent Solids	% Solids	95.4	%	0.1			W523049	JAA	06/02/15 09:40	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0016**
Reported: 04-Jun-15 09:50

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	<0.500	0.0012	0.500	W523050	03-Jun-15	M1
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	<2.0	0.6	2.0	W523048	03-Jun-15	
EPA 6010B	Arsenic	mg/kg	<2.5	0.8	2.5	W523047	03-Jun-15	
EPA 6010B	Barium	mg/kg	<0.20	0.08	0.20	W523047	03-Jun-15	
EPA 6010B	Beryllium	mg/kg	<0.20	0.06	0.20	W523047	03-Jun-15	
EPA 6010B	Cadmium	mg/kg	<0.20	0.07	0.20	W523047	03-Jun-15	
EPA 6010B	Chromium	mg/kg	<0.60	0.16	0.60	W523047	03-Jun-15	
EPA 6010B	Cobalt	mg/kg	<0.60	0.11	0.60	W523047	03-Jun-15	
EPA 6010B	Copper	mg/kg	<1.00	0.28	1.00	W523047	03-Jun-15	
EPA 6010B	Lead	mg/kg	<0.8	0.4	0.8	W523047	03-Jun-15	
EPA 6010B	Manganese	mg/kg	<0.40	0.16	0.40	W523047	03-Jun-15	
EPA 6010B	Molybdenum	mg/kg	<0.80	0.21	0.80	W523047	03-Jun-15	
EPA 6010B	Nickel	mg/kg	<1.00	0.22	1.00	W523047	03-Jun-15	
EPA 6010B	Selenium	mg/kg	<4.0	1.5	4.0	W523047	03-Jun-15	
EPA 6010B	Thallium	mg/kg	<1.5	0.8	1.5	W523047	03-Jun-15	
EPA 6010B	Zinc	mg/kg	<1.0	0.3	1.0	W523047	03-Jun-15	
EPA 7471A	Mercury	mg/kg	<0.033	0.005	0.033	W523051	02-Jun-15	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	2.67	2.50	107	80 - 120	W523050	03-Jun-15	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	98.3	100	98.3	80 - 120	W523048	03-Jun-15	
EPA 6010B	Arsenic	mg/kg	103	100	103	80 - 120	W523047	03-Jun-15	
EPA 6010B	Barium	mg/kg	106	100	106	80 - 120	W523047	03-Jun-15	
EPA 6010B	Beryllium	mg/kg	106	100	106	80 - 120	W523047	03-Jun-15	
EPA 6010B	Cadmium	mg/kg	98.8	100	98.8	80 - 120	W523047	03-Jun-15	
EPA 6010B	Chromium	mg/kg	102	100	102	80 - 120	W523047	03-Jun-15	
EPA 6010B	Cobalt	mg/kg	101	100	101	80 - 120	W523047	03-Jun-15	
EPA 6010B	Copper	mg/kg	102	100	102	80 - 120	W523047	03-Jun-15	
EPA 6010B	Lead	mg/kg	102	100	102	80 - 120	W523047	03-Jun-15	
EPA 6010B	Manganese	mg/kg	102	100	102	80 - 120	W523047	03-Jun-15	
EPA 6010B	Molybdenum	mg/kg	105	100	105	80 - 120	W523047	03-Jun-15	
EPA 6010B	Nickel	mg/kg	101	100	101	80 - 120	W523047	03-Jun-15	
EPA 6010B	Selenium	mg/kg	96.4	100	96.4	80 - 120	W523047	03-Jun-15	
EPA 6010B	Thallium	mg/kg	101	100	101	80 - 120	W523047	03-Jun-15	
EPA 6010B	Zinc	mg/kg	101	100	101	80 - 120	W523047	03-Jun-15	
EPA 7471A	Mercury	mg/kg	0.870	0.833	104	80 - 120	W523051	02-Jun-15	



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0016**
Reported: 04-Jun-15 09:50

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
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Percent Solids / Percent Moisture

Percent Solids	% Solids	%	97.5	97.6	0.2	20	W523049	02-Jun-15	
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Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	3.09	0.858	2.50	89.2	75 - 125	W523050	03-Jun-15	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	95.4	<2.0	100	94.7	75 - 125	W523048	03-Jun-15	
EPA 6010B	Arsenic	mg/kg	101	<2.5	100	99.7	75 - 125	W523047	03-Jun-15	
EPA 6010B	Barium	mg/kg	171	57.8	100	113	75 - 125	W523047	03-Jun-15	
EPA 6010B	Beryllium	mg/kg	105	0.44	100	104	75 - 125	W523047	03-Jun-15	
EPA 6010B	Cadmium	mg/kg	101	<0.20	100	100	75 - 125	W523047	03-Jun-15	
EPA 6010B	Chromium	mg/kg	106	3.02	100	103	75 - 125	W523047	03-Jun-15	
EPA 6010B	Cobalt	mg/kg	106	5.12	100	101	75 - 125	W523047	03-Jun-15	
EPA 6010B	Copper	mg/kg	697	633	100	R > 4S	75 - 125	W523047	03-Jun-15	M3
EPA 6010B	Lead	mg/kg	104	5.8	100	98.2	75 - 125	W523047	03-Jun-15	
EPA 6010B	Manganese	mg/kg	307	201	100	106	75 - 125	W523047	03-Jun-15	
EPA 6010B	Molybdenum	mg/kg	121	29.0	100	92.2	75 - 125	W523047	03-Jun-15	
EPA 6010B	Nickel	mg/kg	104	4.79	100	98.7	75 - 125	W523047	03-Jun-15	
EPA 6010B	Selenium	mg/kg	98.2	<4.0	100	98.2	75 - 125	W523047	03-Jun-15	
EPA 6010B	Thallium	mg/kg	92.4	<1.5	100	92.4	75 - 125	W523047	03-Jun-15	
EPA 6010B	Zinc	mg/kg	155	54.5	100	100	75 - 125	W523047	03-Jun-15	
EPA 7471A	Mercury	mg/kg	0.340	<0.033	0.333	102	75 - 125	W523051	02-Jun-15	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	3.04	3.09	2.50	87.2	1.7	20	W523050	03-Jun-15	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	96.6	95.4	100	95.9	1.3	20	W523048	03-Jun-15	
EPA 6010B	Arsenic	mg/kg	101	101	100	99.1	0.6	20	W523047	03-Jun-15	
EPA 6010B	Barium	mg/kg	169	171	100	111	0.9	20	W523047	03-Jun-15	
EPA 6010B	Beryllium	mg/kg	104	105	100	104	0.7	20	W523047	03-Jun-15	
EPA 6010B	Cadmium	mg/kg	98.4	101	100	98.3	2.2	20	W523047	03-Jun-15	
EPA 6010B	Chromium	mg/kg	103	106	100	99.7	2.8	20	W523047	03-Jun-15	
EPA 6010B	Cobalt	mg/kg	104	106	100	98.5	2.6	20	W523047	03-Jun-15	
EPA 6010B	Copper	mg/kg	728	697	100	95.4	4.4	20	W523047	03-Jun-15	M3
EPA 6010B	Lead	mg/kg	103	104	100	97.6	0.6	20	W523047	03-Jun-15	
EPA 6010B	Manganese	mg/kg	332	307	100	131	7.8	20	W523047	03-Jun-15	M1
EPA 6010B	Molybdenum	mg/kg	122	121	100	93.3	0.9	20	W523047	03-Jun-15	
EPA 6010B	Nickel	mg/kg	102	104	100	97.1	1.5	20	W523047	03-Jun-15	
EPA 6010B	Selenium	mg/kg	96.6	98.2	100	96.6	1.7	20	W523047	03-Jun-15	
EPA 6010B	Thallium	mg/kg	93.0	92.4	100	93.0	0.7	20	W523047	03-Jun-15	
EPA 6010B	Zinc	mg/kg	155	155	100	101	0.2	20	W523047	03-Jun-15	
EPA 7471A	Mercury	mg/kg	0.338	0.340	0.333	102	0.5	20	W523051	02-Jun-15	



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0016**
Reported: 04-Jun-15 09:50

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	12.6		10.0	126	75 - 125	W523050	03-Jun-15	M1
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Manganese	mg/kg	282	201	100	81.3	75 - 125	W523047	03-Jun-15	
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Notes and Definitions

- D2 Sample required dilution due to high concentration of target analyte.
- D8 Sample required dilution to meet internal standard recovery limits.
- M1 Matrix spike recovery was high, but the LCS recovery was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
CP-SPA-S-01	W5F0266-01	Soil	09-Jun-15 16:29	BG	11-Jun-2015	
CP-SPA-S-02	W5F0266-02	Soil	09-Jun-15 16:34	BG	11-Jun-2015	
CP-SPA-S-03	W5F0266-03	Soil	09-Jun-15 16:44	BG	11-Jun-2015	
FD060915-A	W5F0266-04	Soil	09-Jun-15 16:44	BG	11-Jun-2015	
CP-SPA-S-04	W5F0266-05	Soil	09-Jun-15 16:57	BG	11-Jun-2015	
CP-SPA-S-05	W5F0266-06	Soil	09-Jun-15 17:03	BG	11-Jun-2015	
CP-SPA-S-06	W5F0266-07	Soil	09-Jun-15 17:09	BG	11-Jun-2015	
CP-SPA-S-07	W5F0266-08	Soil	09-Jun-15 17:13	BG	11-Jun-2015	
CP-SPA-S-08	W5F0266-09	Soil	09-Jun-15 17:26	BG	11-Jun-2015	
CP-SPA-S-09	W5F0266-10	Soil	09-Jun-15 17:33	BG	11-Jun-2015	
FD060915-B	W5F0266-11	Soil	09-Jun-15 17:33	BG	11-Jun-2015	
CP-SPA-S-10	W5F0266-12	Soil	09-Jun-15 17:44	BG	11-Jun-2015	
CP-SPA-S-11	W5F0266-13	Soil	09-Jun-15 17:48	BG	11-Jun-2015	
CP-SPA-S-12	W5F0266-14	Soil	09-Jun-15 17:54	BG	11-Jun-2015	
CP-SPA-S-13	W5F0266-15	Soil	09-Jun-15 18:02	BG	11-Jun-2015	
CP-SPA-S-14	W5F0266-16	Soil	09-Jun-15 18:10	BG	11-Jun-2015	
CP-SPA-S-15	W5F0266-17	Soil	09-Jun-15 18:16	BG	11-Jun-2015	
CP-SPA-S-16	W5F0266-18	Soil	09-Jun-15 18:22	BG	11-Jun-2015	
CP-SPA-S-17	W5F0266-19	Soil	09-Jun-15 18:26	BG	11-Jun-2015	
EB061015	W5F0266-20	Water	10-Jun-15 08:09	BG	11-Jun-2015	
CP-E-01	W5F0266-21	Soil	10-Jun-15 08:20	BG	11-Jun-2015	
CP-E-02	W5F0266-22	Soil	10-Jun-15 08:33	BG	11-Jun-2015	
CP-E-03	W5F0266-23	Soil	10-Jun-15 08:48	BG	11-Jun-2015	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-01**

SVL Sample ID: **W5F0266-01 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:29

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	10.3	mg/kg	2.5	0.8		W525010	AS	06/23/15 11:54	
EPA 6010B	Copper	1050	mg/kg	1.00	0.28		W525010	AS	06/23/15 11:54	
EPA 6010B	Lead	6.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 11:54	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.7	%	0.1			W524081	JAA	06/16/15 09:05	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-02**

SVL Sample ID: **W5F0266-02 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:34

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	3.8	mg/kg	2.5	0.8		W525010	AS	06/23/15 11:57	
EPA 6010B	Copper	2310	mg/kg	1.00	0.28		W525010	AS	06/23/15 11:57	
EPA 6010B	Lead	311	mg/kg	0.8	0.4		W525010	AS	06/23/15 11:57	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.6	%	0.1			W524081	JAA	06/16/15 09:05	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-03**

SVL Sample ID: **W5F0266-03 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:44
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	7.25	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:27	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:08	
EPA 6010B	Arsenic	6.2	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:00	
EPA 6010B	Barium	134	mg/kg	0.20	0.08		W525010	AS	06/23/15 12:00	
EPA 6010B	Beryllium	0.45	mg/kg	0.20	0.06		W525010	AS	06/23/15 12:00	
EPA 6010B	Cadmium	0.43	mg/kg	0.20	0.07		W525010	AS	06/23/15 12:00	
EPA 6010B	Chromium	6.63	mg/kg	0.60	0.16		W525010	AS	06/23/15 12:00	
EPA 6010B	Cobalt	7.67	mg/kg	0.60	0.11		W525010	AS	06/23/15 12:00	
EPA 6010B	Copper	823	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:00	
EPA 6010B	Lead	4.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:00	
EPA 6010B	Manganese	292	mg/kg	0.40	0.16		W525010	AS	06/23/15 12:00	
EPA 6010B	Molybdenum	216	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:10	
EPA 6010B	Nickel	7.44	mg/kg	1.00	0.22		W525010	AS	06/23/15 12:00	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 12:00	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:10	
EPA 6010B	Zinc	35.2	mg/kg	1.0	0.3		W525010	AS	06/23/15 12:00	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:17	

Percent Solids / Percent Moisture

Percent Solids	% Solids	95.3	%	0.1			W524081	JAA	06/16/15 09:05	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **FD060915-A**

SVL Sample ID: **W5F0266-04 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:44

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	5.72	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:22	M2
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:10	
EPA 6010B	Arsenic	5.0	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:03	
EPA 6010B	Barium	139	mg/kg	0.20	0.08		W525010	AS	06/23/15 12:03	
EPA 6010B	Beryllium	0.38	mg/kg	0.20	0.06		W525010	AS	06/23/15 12:03	
EPA 6010B	Cadmium	0.22	mg/kg	0.20	0.07		W525010	AS	06/23/15 12:03	
EPA 6010B	Chromium	7.10	mg/kg	0.60	0.16		W525010	AS	06/23/15 12:03	
EPA 6010B	Cobalt	8.95	mg/kg	0.60	0.11		W525010	AS	06/23/15 12:03	
EPA 6010B	Copper	842	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:03	M3
EPA 6010B	Lead	5.1	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:03	
EPA 6010B	Manganese	323	mg/kg	0.40	0.16		W525010	AS	06/23/15 12:03	M1
EPA 6010B	Molybdenum	136	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:12	
EPA 6010B	Nickel	8.38	mg/kg	1.00	0.22		W525010	AS	06/23/15 12:03	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 12:03	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:12	
EPA 6010B	Zinc	35.4	mg/kg	1.0	0.3		W525010	AS	06/23/15 12:03	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:19	

Percent Solids / Percent Moisture

Percent Solids	% Solids	94.7	%	0.1			W525012	JAA	06/16/15 10:10	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-04**

SVL Sample ID: **W5F0266-05 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:57

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	12.0	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:12	
EPA 6010B	Copper	2340	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:12	
EPA 6010B	Lead	33.1	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:12	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	93.1	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-05**

SVL Sample ID: **W5F0266-06 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:03

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	6.1	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:15	
EPA 6010B	Copper	2490	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:15	
EPA 6010B	Lead	35.1	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:15	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	94.6	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-06**

SVL Sample ID: **W5F0266-07 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:09

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	4.5	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:25	
EPA 6010B	Copper	1420	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:25	
EPA 6010B	Lead	14.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:25	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	93.3	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-07**

SVL Sample ID: **W5F0266-08 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:13

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	6.4	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:28	
EPA 6010B	Copper	1770	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:28	
EPA 6010B	Lead	20.5	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:28	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.7	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-08**

SVL Sample ID: **W5F0266-09 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:26

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	2.5	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:31	
EPA 6010B	Copper	943	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:31	
EPA 6010B	Lead	4.6	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:31	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	94.3	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-09**

SVL Sample ID: **W5F0266-10 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:33
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 6020A	Uranium	2.72	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:28	
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:16	
EPA 6010B	Arsenic	3.1	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:34	
EPA 6010B	Barium	318	mg/kg	0.20	0.08		W525010	AS	06/23/15 12:34	
EPA 6010B	Beryllium	0.41	mg/kg	0.20	0.06		W525010	AS	06/23/15 12:34	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.07		W525010	AS	06/23/15 12:34	
EPA 6010B	Chromium	7.53	mg/kg	0.60	0.16		W525010	AS	06/23/15 12:34	
EPA 6010B	Cobalt	13.1	mg/kg	0.60	0.11		W525010	AS	06/23/15 12:34	
EPA 6010B	Copper	922	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:34	
EPA 6010B	Lead	2.7	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:34	
EPA 6010B	Manganese	306	mg/kg	0.40	0.16		W525010	AS	06/23/15 12:34	
EPA 6010B	Molybdenum	47.7	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:18	
EPA 6010B	Nickel	10.4	mg/kg	1.00	0.22		W525010	AS	06/23/15 12:34	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 12:34	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:18	
EPA 6010B	Zinc	39.1	mg/kg	1.0	0.3		W525010	AS	06/23/15 12:34	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:28	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	94.0	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **FD060915-B**

SVL Sample ID: **W5F0266-11 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:33

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	4.17	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:30	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:18	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:37	
EPA 6010B	Barium	200	mg/kg	0.20	0.08		W525010	AS	06/23/15 12:37	
EPA 6010B	Beryllium	0.29	mg/kg	0.20	0.06		W525010	AS	06/23/15 12:37	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.07		W525010	AS	06/23/15 12:37	
EPA 6010B	Chromium	7.31	mg/kg	0.60	0.16		W525010	AS	06/23/15 12:37	
EPA 6010B	Cobalt	7.80	mg/kg	0.60	0.11		W525010	AS	06/23/15 12:37	
EPA 6010B	Copper	667	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:37	
EPA 6010B	Lead	2.3	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:37	
EPA 6010B	Manganese	276	mg/kg	0.40	0.16		W525010	AS	06/23/15 12:37	
EPA 6010B	Molybdenum	28.6	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:20	
EPA 6010B	Nickel	8.63	mg/kg	1.00	0.22		W525010	AS	06/23/15 12:37	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 12:37	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:20	
EPA 6010B	Zinc	36.3	mg/kg	1.0	0.3		W525010	AS	06/23/15 12:37	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:30	

Percent Solids / Percent Moisture

Percent Solids	% Solids	94.2	%	0.1			W525012	JAA	06/16/15 10:10	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-10**

SVL Sample ID: **W5F0266-12 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:44

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	5.6	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:41	
EPA 6010B	Copper	1770	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:41	
EPA 6010B	Lead	16.0	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:41	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	93.4	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-11**

SVL Sample ID: **W5F0266-13 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:48

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	3.7	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:44	
EPA 6010B	Copper	1920	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:44	
EPA 6010B	Lead	15.5	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:44	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.1	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-12**

SVL Sample ID: **W5F0266-14 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:54

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	3.1	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:47	
EPA 6010B	Copper	1500	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:47	
EPA 6010B	Lead	12.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:47	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.6	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-13**

SVL Sample ID: **W5F0266-15 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:02

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	11.1	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:50	
EPA 6010B	Copper	767	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:50	
EPA 6010B	Lead	4.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:50	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.9	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-14**

SVL Sample ID: **W5F0266-16 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:10

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	5.6	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:53	
EPA 6010B	Copper	2970	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:53	
EPA 6010B	Lead	17.4	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:53	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	90.8	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-15**

SVL Sample ID: **W5F0266-17 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:16

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	8.9	mg/kg	2.5	0.8		W525010	AS	06/23/15 13:03	
EPA 6010B	Copper	2820	mg/kg	1.00	0.28		W525010	AS	06/23/15 13:03	
EPA 6010B	Lead	40.1	mg/kg	0.8	0.4		W525010	AS	06/23/15 13:03	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	95.0	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-16**

SVL Sample ID: **W5F0266-18 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:22

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W525010	AS	06/23/15 13:06	
EPA 6010B	Copper	515	mg/kg	1.00	0.28		W525010	AS	06/23/15 13:06	
EPA 6010B	Lead	4.9	mg/kg	0.8	0.4		W525010	AS	06/23/15 13:06	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	95.4	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-17**

SVL Sample ID: **W5F0266-19 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:26

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	4.8	mg/kg	2.5	0.8		W525010	AS	06/23/15 13:09	
EPA 6010B	Copper	1710	mg/kg	1.00	0.28		W525010	AS	06/23/15 13:09	
EPA 6010B	Lead	17.7	mg/kg	0.8	0.4		W525010	AS	06/23/15 13:09	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	91.3	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **EB061015**
SVL Sample ID: **W5F0266-20 (Water)**

Sampled: 10-Jun-15 08:09
Received: 11-Jun-15
Sampled By: BG

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.00004		W525140	STA	06/19/15 13:26	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W524283	AS	06/24/15 14:17	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.010		W524283	AS	06/24/15 14:17	
EPA 6010B	Barium	< 0.0020	mg/L	0.0020	0.0006		W524283	AS	06/24/15 14:17	
EPA 6010B	Beryllium	< 0.0020	mg/L	0.0020	0.0009		W524283	AS	06/24/15 14:17	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W524283	AS	06/24/15 14:17	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0018		W524283	AS	06/24/15 14:17	
EPA 6010B	Cobalt	< 0.0060	mg/L	0.0060	0.0008		W524283	AS	06/24/15 14:17	
EPA 6010B	Copper	< 0.0100	mg/L	0.0100	0.0023		W524283	AS	06/24/15 14:17	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0038		W524283	AS	06/24/15 14:17	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0023		W524283	AS	06/24/15 14:17	
EPA 6010B	Molybdenum	< 0.008	mg/L	0.008	0.005		W524283	AS	06/24/15 14:17	
EPA 6010B	Nickel	< 0.0100	mg/L	0.0100	0.0028		W524283	AS	06/24/15 14:17	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.015		W524283	AS	06/24/15 14:17	
EPA 6010B	Thallium	< 0.015	mg/L	0.015	0.009		W524283	AS	06/24/15 14:17	
EPA 6010B	Zinc	< 0.010	mg/L	0.010	0.003		W524283	AS	06/24/15 14:17	
EPA 6020A	Uranium	< 0.00100	mg/L	0.00100	0.000014		W524235	KWH	06/22/15 13:07	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-E-01**

SVL Sample ID: **W5F0266-21 (Soil)**

Sample Report Page 1 of 1

Sampled: 10-Jun-15 08:20
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	6.01	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:31	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	2.2	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:21	
EPA 6010B	Arsenic	5.0	mg/kg	2.5	0.8		W525010	AS	06/23/15 13:12	
EPA 6010B	Barium	123	mg/kg	0.20	0.08		W525010	AS	06/23/15 13:12	
EPA 6010B	Beryllium	0.32	mg/kg	0.20	0.06		W525010	AS	06/23/15 13:12	
EPA 6010B	Cadmium	0.21	mg/kg	0.20	0.07		W525010	AS	06/23/15 13:12	
EPA 6010B	Chromium	5.85	mg/kg	0.60	0.16		W525010	AS	06/23/15 13:12	
EPA 6010B	Cobalt	7.06	mg/kg	0.60	0.11		W525010	AS	06/23/15 13:12	
EPA 6010B	Copper	2040	mg/kg	1.00	0.28		W525010	AS	06/23/15 13:12	
EPA 6010B	Lead	13.6	mg/kg	0.8	0.4		W525010	AS	06/23/15 13:12	
EPA 6010B	Manganese	259	mg/kg	0.40	0.16		W525010	AS	06/23/15 13:12	
EPA 6010B	Molybdenum	196	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:22	
EPA 6010B	Nickel	6.76	mg/kg	1.00	0.22		W525010	AS	06/23/15 13:12	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 13:12	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:22	
EPA 6010B	Zinc	59.2	mg/kg	1.0	0.3		W525010	AS	06/23/15 13:12	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:32	

Percent Solids / Percent Moisture

Percent Solids	% Solids	94.1	%	0.1			W525012	JAA	06/16/15 10:10	
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TCLP Extraction Parameters

EPA 1311	Final pH	5.08	pH Units				W525025	ESB	06/16/15 09:30	
EPA 1311	% Dry Solids	94.0	%				W525025	ESB	06/16/15 09:30	

TCLP Leachates (Metals) Extracted: 06/16/15 09:30

EPA 6010B	Arsenic	< 0.050	mg/L Extract	0.050	0.010		W525185	AS	06/22/15 16:10	
EPA 6010B	Barium	< 1.00	mg/L Extract	1.00	0.0006		W525185	AS	06/22/15 16:10	
EPA 6010B	Cadmium	< 0.0100	mg/L Extract	0.0100	0.0006		W525185	AS	06/22/15 16:10	
EPA 6010B	Chromium	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:10	
EPA 6010B	Lead	< 0.0500	mg/L Extract	0.0500	0.0038		W525185	AS	06/22/15 16:10	
EPA 6010B	Selenium	< 0.050	mg/L Extract	0.050	0.015		W525185	AS	06/22/15 16:10	
EPA 6010B	Silver	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:10	
EPA 7470A	Mercury	< 0.00020	mg/L Extract	0.00020	0.00004		W525181	STA	06/19/15 11:04	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-E-02**

SVL Sample ID: **W5F0266-22 (Soil)**

Sample Report Page 1 of 1

Sampled: 10-Jun-15 08:33
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	2.85	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:35	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	5.4	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:23	
EPA 6010B	Arsenic	10.7	mg/kg	2.5	0.8		W525011	AS	06/23/15 13:39	
EPA 6010B	Barium	59.3	mg/kg	0.20	0.08		W525011	AS	06/23/15 13:39	
EPA 6010B	Beryllium	0.36	mg/kg	0.20	0.06		W525011	AS	06/23/15 13:39	
EPA 6010B	Cadmium	1.17	mg/kg	0.20	0.07		W525011	AS	06/23/15 13:39	
EPA 6010B	Chromium	5.90	mg/kg	0.60	0.16		W525011	AS	06/23/15 13:39	
EPA 6010B	Cobalt	8.39	mg/kg	0.60	0.11		W525011	AS	06/23/15 13:39	
EPA 6010B	Copper	4860	mg/kg	10.0	2.80	10	W525011	AS	06/23/15 14:26	D2
EPA 6010B	Lead	67.7	mg/kg	0.8	0.4		W525011	AS	06/23/15 13:39	
EPA 6010B	Manganese	204	mg/kg	0.40	0.16		W525011	AS	06/23/15 13:39	M1
EPA 6010B	Molybdenum	399	mg/kg	0.80	0.21		W525011	AS	06/23/15 12:31	M1
EPA 6010B	Nickel	7.79	mg/kg	1.00	0.22		W525011	AS	06/23/15 13:39	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525011	AS	06/23/15 13:39	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525011	AS	06/23/15 12:31	
EPA 6010B	Zinc	273	mg/kg	1.0	0.3		W525011	AS	06/23/15 13:39	M1
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:33	

Percent Solids / Percent Moisture

Percent Solids	% Solids	98.5	%	0.1			W525012	JAA	06/16/15 10:10	
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TCLP Extraction Parameters

EPA 1311	Final pH	5.13	pH Units				W525025	ESB	06/16/15 09:30	
EPA 1311	% Dry Solids	98.3	%				W525025	ESB	06/16/15 09:30	

TCLP Leachates (Metals) Extracted: 06/16/15 09:30

EPA 6010B	Arsenic	< 0.050	mg/L Extract	0.050	0.010		W525185	AS	06/22/15 16:17	
EPA 6010B	Barium	< 1.00	mg/L Extract	1.00	0.0006		W525185	AS	06/22/15 16:17	
EPA 6010B	Cadmium	0.0325	mg/L Extract	0.0100	0.0006		W525185	AS	06/22/15 16:17	
EPA 6010B	Chromium	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:17	
EPA 6010B	Lead	< 0.0500	mg/L Extract	0.0500	0.0038		W525185	AS	06/22/15 16:17	
EPA 6010B	Selenium	< 0.050	mg/L Extract	0.050	0.015		W525185	AS	06/22/15 16:17	
EPA 6010B	Silver	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:17	
EPA 7470A	Mercury	< 0.00020	mg/L Extract	0.00020	0.00004		W525181	STA	06/19/15 11:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-E-03**

SVL Sample ID: **W5F0266-23 (Soil)**

Sample Report Page 1 of 1

Sampled: 10-Jun-15 08:48
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	3.69	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:36	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	9.4	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:30	
EPA 6010B	Arsenic	21.0	mg/kg	2.5	0.8		W525011	AS	06/23/15 13:48	
EPA 6010B	Barium	70.5	mg/kg	0.20	0.08		W525011	AS	06/23/15 13:48	
EPA 6010B	Beryllium	0.36	mg/kg	0.20	0.06		W525011	AS	06/23/15 13:48	
EPA 6010B	Cadmium	1.40	mg/kg	0.20	0.07		W525011	AS	06/23/15 13:48	
EPA 6010B	Chromium	3.84	mg/kg	0.60	0.16		W525011	AS	06/23/15 13:48	
EPA 6010B	Cobalt	10.4	mg/kg	0.60	0.11		W525011	AS	06/23/15 13:48	
EPA 6010B	Copper	10700	mg/kg	10.0	2.80	10	W525011	AS	06/23/15 14:35	D2
EPA 6010B	Lead	231	mg/kg	0.8	0.4		W525011	AS	06/23/15 13:48	
EPA 6010B	Manganese	178	mg/kg	0.40	0.16		W525011	AS	06/23/15 13:48	
EPA 6010B	Molybdenum	422	mg/kg	0.80	0.21		W525011	AS	06/23/15 12:38	
EPA 6010B	Nickel	8.20	mg/kg	1.00	0.22		W525011	AS	06/23/15 13:48	
EPA 6010B	Selenium	4.2	mg/kg	4.0	1.5		W525011	AS	06/23/15 13:48	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525011	AS	06/23/15 12:38	
EPA 6010B	Zinc	357	mg/kg	1.0	0.3		W525011	AS	06/23/15 13:48	
EPA 7471A	Mercury	0.045	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:35	

Percent Solids / Percent Moisture

Percent Solids	% Solids	97.9	%	0.1			W525012	JAA	06/16/15 10:10	
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TCLP Extraction Parameters

EPA 1311	Final pH	5.08	pH Units				W525025	ESB	06/16/15 09:30	
EPA 1311	% Dry Solids	98.0	%				W525025	ESB	06/16/15 09:30	

TCLP Leachates (Metals) Extracted: 06/16/15 09:30

EPA 6010B	Arsenic	< 0.050	mg/L Extract	0.050	0.010		W525185	AS	06/22/15 16:20	
EPA 6010B	Barium	< 1.00	mg/L Extract	1.00	0.0006		W525185	AS	06/22/15 16:20	
EPA 6010B	Cadmium	0.0417	mg/L Extract	0.0100	0.0006		W525185	AS	06/22/15 16:20	
EPA 6010B	Chromium	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:20	
EPA 6010B	Lead	< 0.0500	mg/L Extract	0.0500	0.0038		W525185	AS	06/22/15 16:20	
EPA 6010B	Selenium	< 0.050	mg/L Extract	0.050	0.015		W525185	AS	06/22/15 16:20	
EPA 6010B	Silver	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:20	
EPA 7470A	Mercury	< 0.00020	mg/L Extract	0.00020	0.00004		W525181	STA	06/19/15 11:15	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**
Work Order: **WSF0266**
Reported: 24-Jun-15 14:55

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	<0.500	0.0012	0.500	W524236	22-Jun-15	
EPA 7470A	Mercury	mg/L	<0.00020	0.00004	0.00020	W525140	19-Jun-15	

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	<2.0	0.6	2.0	W525014	22-Jun-15	
EPA 6010B	Arsenic	mg/kg	<2.5	0.8	2.5	W525010	23-Jun-15	
EPA 6010B	Arsenic	mg/kg	<2.5	0.8	2.5	W525011	23-Jun-15	
EPA 6010B	Barium	mg/kg	<0.20	0.08	0.20	W525010	23-Jun-15	
EPA 6010B	Barium	mg/kg	<0.20	0.08	0.20	W525011	23-Jun-15	
EPA 6010B	Beryllium	mg/kg	<0.20	0.06	0.20	W525010	23-Jun-15	
EPA 6010B	Beryllium	mg/kg	<0.20	0.06	0.20	W525011	23-Jun-15	
EPA 6010B	Cadmium	mg/kg	<0.20	0.07	0.20	W525010	23-Jun-15	
EPA 6010B	Cadmium	mg/kg	<0.20	0.07	0.20	W525011	23-Jun-15	
EPA 6010B	Chromium	mg/kg	<0.60	0.16	0.60	W525010	23-Jun-15	
EPA 6010B	Chromium	mg/kg	<0.60	0.16	0.60	W525011	23-Jun-15	
EPA 6010B	Cobalt	mg/kg	<0.60	0.11	0.60	W525010	23-Jun-15	
EPA 6010B	Cobalt	mg/kg	<0.60	0.11	0.60	W525011	23-Jun-15	
EPA 6010B	Copper	mg/kg	<1.00	0.28	1.00	W525010	23-Jun-15	
EPA 6010B	Copper	mg/kg	<1.00	0.28	1.00	W525011	23-Jun-15	
EPA 6010B	Lead	mg/kg	<0.8	0.4	0.8	W525010	23-Jun-15	
EPA 6010B	Lead	mg/kg	<0.8	0.4	0.8	W525011	23-Jun-15	
EPA 6010B	Manganese	mg/kg	<0.40	0.16	0.40	W525010	23-Jun-15	
EPA 6010B	Manganese	mg/kg	<0.40	0.16	0.40	W525011	23-Jun-15	
EPA 6010B	Molybdenum	mg/kg	<0.80	0.21	0.80	W525010	23-Jun-15	
EPA 6010B	Molybdenum	mg/kg	<0.80	0.21	0.80	W525011	23-Jun-15	
EPA 6010B	Nickel	mg/kg	<1.00	0.22	1.00	W525010	23-Jun-15	
EPA 6010B	Nickel	mg/kg	<1.00	0.22	1.00	W525011	23-Jun-15	
EPA 6010B	Selenium	mg/kg	<4.0	1.5	4.0	W525010	23-Jun-15	
EPA 6010B	Selenium	mg/kg	<4.0	1.5	4.0	W525011	23-Jun-15	
EPA 6010B	Thallium	mg/kg	<1.5	0.8	1.5	W525010	23-Jun-15	
EPA 6010B	Thallium	mg/kg	<1.5	0.8	1.5	W525011	23-Jun-15	
EPA 6010B	Zinc	mg/kg	<1.0	0.3	1.0	W525010	23-Jun-15	
EPA 6010B	Zinc	mg/kg	<1.0	0.3	1.0	W525011	23-Jun-15	
EPA 7471A	Mercury	mg/kg	<0.033	0.005	0.033	W525024	17-Jun-15	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	<0.020	0.009	0.020	W524283	24-Jun-15	
EPA 6010B	Arsenic	mg/L	<0.025	0.010	0.025	W524283	24-Jun-15	
EPA 6010B	Barium	mg/L	<0.0020	0.0006	0.0020	W524283	24-Jun-15	
EPA 6010B	Beryllium	mg/L	<0.0020	0.0009	0.0020	W524283	24-Jun-15	
EPA 6010B	Cadmium	mg/L	<0.0020	0.0006	0.0020	W524283	24-Jun-15	
EPA 6010B	Chromium	mg/L	<0.0060	0.0018	0.0060	W524283	24-Jun-15	
EPA 6010B	Cobalt	mg/L	<0.0060	0.0008	0.0060	W524283	24-Jun-15	
EPA 6010B	Copper	mg/L	<0.0100	0.0023	0.0100	W524283	24-Jun-15	
EPA 6010B	Lead	mg/L	<0.0075	0.0038	0.0075	W524283	24-Jun-15	
EPA 6010B	Manganese	mg/L	<0.0040	0.0023	0.0040	W524283	24-Jun-15	
EPA 6010B	Molybdenum	mg/L	<0.008	0.005	0.008	W524283	24-Jun-15	
EPA 6010B	Nickel	mg/L	<0.0100	0.0028	0.0100	W524283	24-Jun-15	
EPA 6010B	Selenium	mg/L	<0.040	0.015	0.040	W524283	24-Jun-15	
EPA 6010B	Thallium	mg/L	<0.015	0.009	0.015	W524283	24-Jun-15	
EPA 6010B	Zinc	mg/L	<0.010	0.003	0.010	W524283	24-Jun-15	
EPA 6020A	Uranium	mg/L	<0.00100	0.000014	0.00100	W524235	22-Jun-15	

TCLP Extraction Parameters

EPA 1311	Final pH	pH Units	4.96			W525025	16-Jun-15	
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ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0266**
Reported: 24-Jun-15 14:55

Quality Control - EXTRACTION BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
TCLP Leachates (Metals) Extracted: 06/16/15 09:30 Batch: W525025								
EPA 6010B	Arsenic	mg/L Extract	<0.050	0.010	0.050	W525185	22-Jun-15	
EPA 6010B	Barium	mg/L Extract	<1.00	0.0006	1.00	W525185	22-Jun-15	
EPA 6010B	Cadmium	mg/L Extract	<0.0100	0.0006	0.0100	W525185	22-Jun-15	
EPA 6010B	Chromium	mg/L Extract	<0.0500	0.0018	0.0500	W525185	22-Jun-15	
EPA 6010B	Lead	mg/L Extract	<0.0500	0.0038	0.0500	W525185	22-Jun-15	
EPA 6010B	Selenium	mg/L Extract	<0.050	0.015	0.050	W525185	22-Jun-15	
EPA 6010B	Silver	mg/L Extract	<0.0500	0.0018	0.0500	W525185	22-Jun-15	
EPA 7470A	Mercury	mg/L Extract	<0.00020	0.00004	0.00020	W525181	19-Jun-15	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total)									
EPA 6020A	Uranium	mg/kg	2.30	2.50	92.1	80 - 120	W524236	22-Jun-15	
EPA 7470A	Mercury	mg/L	0.00507	0.00500	101	80 - 120	W525140	19-Jun-15	

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	103	100	103	80 - 120	W525014	22-Jun-15	
EPA 6010B	Arsenic	mg/kg	102	100	102	80 - 120	W525010	23-Jun-15	
EPA 6010B	Arsenic	mg/kg	99.8	100	99.8	80 - 120	W525011	23-Jun-15	
EPA 6010B	Barium	mg/kg	98.7	100	98.7	80 - 120	W525010	23-Jun-15	
EPA 6010B	Barium	mg/kg	96.6	100	96.6	80 - 120	W525011	23-Jun-15	
EPA 6010B	Beryllium	mg/kg	101	100	101	80 - 120	W525010	23-Jun-15	
EPA 6010B	Beryllium	mg/kg	97.8	100	97.8	80 - 120	W525011	23-Jun-15	
EPA 6010B	Cadmium	mg/kg	100	100	100	80 - 120	W525010	23-Jun-15	
EPA 6010B	Cadmium	mg/kg	97.0	100	97.0	80 - 120	W525011	23-Jun-15	
EPA 6010B	Chromium	mg/kg	98.9	100	98.9	80 - 120	W525010	23-Jun-15	
EPA 6010B	Chromium	mg/kg	95.8	100	95.8	80 - 120	W525011	23-Jun-15	
EPA 6010B	Cobalt	mg/kg	99.1	100	99.1	80 - 120	W525010	23-Jun-15	
EPA 6010B	Cobalt	mg/kg	96.5	100	96.5	80 - 120	W525011	23-Jun-15	
EPA 6010B	Copper	mg/kg	101	100	101	80 - 120	W525010	23-Jun-15	
EPA 6010B	Copper	mg/kg	96.7	100	96.7	80 - 120	W525011	23-Jun-15	
EPA 6010B	Lead	mg/kg	100	100	100	80 - 120	W525010	23-Jun-15	
EPA 6010B	Lead	mg/kg	97.9	100	97.9	80 - 120	W525011	23-Jun-15	
EPA 6010B	Manganese	mg/kg	98.5	100	98.5	80 - 120	W525010	23-Jun-15	
EPA 6010B	Manganese	mg/kg	97.8	100	97.8	80 - 120	W525011	23-Jun-15	
EPA 6010B	Molybdenum	mg/kg	102	100	102	80 - 120	W525011	23-Jun-15	
EPA 6010B	Molybdenum	mg/kg	105	100	105	80 - 120	W525010	23-Jun-15	
EPA 6010B	Nickel	mg/kg	100	100	100	80 - 120	W525010	23-Jun-15	
EPA 6010B	Nickel	mg/kg	98.9	100	98.9	80 - 120	W525011	23-Jun-15	
EPA 6010B	Selenium	mg/kg	102	100	102	80 - 120	W525010	23-Jun-15	
EPA 6010B	Selenium	mg/kg	98.1	100	98.1	80 - 120	W525011	23-Jun-15	
EPA 6010B	Thallium	mg/kg	100	100	100	80 - 120	W525011	23-Jun-15	
EPA 6010B	Thallium	mg/kg	103	100	103	80 - 120	W525010	23-Jun-15	
EPA 6010B	Zinc	mg/kg	99.9	100	99.9	80 - 120	W525010	23-Jun-15	
EPA 6010B	Zinc	mg/kg	97.2	100	97.2	80 - 120	W525011	23-Jun-15	
EPA 7471A	Mercury	mg/kg	0.823	0.833	98.8	80 - 120	W525024	17-Jun-15	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.02	1.00	102	80 - 120	W524283	24-Jun-15	
EPA 6010B	Arsenic	mg/L	1.03	1.00	103	80 - 120	W524283	24-Jun-15	

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**
Work Order: **WSF0266**
Reported: 24-Jun-15 14:55

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total Recoverable) (Continued)

EPA 6010B	Barium	mg/L	0.997	1.00	99.7	80 - 120	W524283	24-Jun-15	
EPA 6010B	Beryllium	mg/L	1.01	1.00	101	80 - 120	W524283	24-Jun-15	
EPA 6010B	Cadmium	mg/L	1.01	1.00	101	80 - 120	W524283	24-Jun-15	
EPA 6010B	Chromium	mg/L	1.00	1.00	100	80 - 120	W524283	24-Jun-15	
EPA 6010B	Cobalt	mg/L	1.00	1.00	100	80 - 120	W524283	24-Jun-15	
EPA 6010B	Copper	mg/L	1.01	1.00	101	80 - 120	W524283	24-Jun-15	
EPA 6010B	Lead	mg/L	1.01	1.00	101	80 - 120	W524283	24-Jun-15	
EPA 6010B	Manganese	mg/L	1.00	1.00	100	80 - 120	W524283	24-Jun-15	
EPA 6010B	Molybdenum	mg/L	1.02	1.00	102	80 - 120	W524283	24-Jun-15	
EPA 6010B	Nickel	mg/L	1.02	1.00	102	80 - 120	W524283	24-Jun-15	
EPA 6010B	Selenium	mg/L	1.03	1.00	103	80 - 120	W524283	24-Jun-15	
EPA 6010B	Thallium	mg/L	1.01	1.00	101	80 - 120	W524283	24-Jun-15	
EPA 6010B	Zinc	mg/L	1.01	1.00	101	80 - 120	W524283	24-Jun-15	
EPA 6020A	Uranium	mg/L	0.0232	0.0250	92.9	80 - 120	W524235	22-Jun-15	

TCLP Leachates (Metals)

EPA 6010B	Arsenic	mg/L Extract	1.07	1.00	107	80 - 120	W525185	22-Jun-15	
EPA 6010B	Barium	mg/L Extract	18.6	20.0	93.2	80 - 120	W525185	22-Jun-15	
EPA 6010B	Cadmium	mg/L Extract	0.198	0.200	98.8	80 - 120	W525185	22-Jun-15	
EPA 6010B	Chromium	mg/L Extract	0.973	1.00	97.3	80 - 120	W525185	22-Jun-15	
EPA 6010B	Lead	mg/L Extract	0.921	1.00	92.1	80 - 120	W525185	22-Jun-15	
EPA 6010B	Selenium	mg/L Extract	0.223	0.200	112	80 - 120	W525185	22-Jun-15	
EPA 6010B	Silver	mg/L Extract	1.02	1.00	102	80 - 120	W525185	22-Jun-15	
EPA 7470A	Mercury	mg/L Extract	0.00588	0.00500	118	80 - 120	W525181	19-Jun-15	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
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Percent Solids / Percent Moisture

Percent Solids	% Solids	%	81.1	81.0	0.2	20	W524081	16-Jun-15	
Percent Solids	% Solids	%	95.0	94.7	0.4	20	W525012	16-Jun-15	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	7.57	5.72	2.50	73.9	75 - 125	W524236	22-Jun-15	M2
EPA 7470A	Mercury	mg/L	0.00099	<0.00020	0.00100	99.0	75 - 125	W525140	19-Jun-15	

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	90.2	<2.0	100	88.9	75 - 125	W525014	22-Jun-15	
EPA 6010B	Arsenic	mg/kg	105	5.0	100	100	75 - 125	W525010	23-Jun-15	
EPA 6010B	Arsenic	mg/kg	116	10.7	100	106	75 - 125	W525011	23-Jun-15	
EPA 6010B	Barium	mg/kg	247	139	100	109	75 - 125	W525010	23-Jun-15	
EPA 6010B	Barium	mg/kg	172	59.3	100	113	75 - 125	W525011	23-Jun-15	
EPA 6010B	Beryllium	mg/kg	98.2	0.38	100	97.8	75 - 125	W525010	23-Jun-15	
EPA 6010B	Beryllium	mg/kg	103	0.36	100	103	75 - 125	W525011	23-Jun-15	
EPA 6010B	Cadmium	mg/kg	99.4	0.22	100	99.2	75 - 125	W525010	23-Jun-15	
EPA 6010B	Cadmium	mg/kg	102	1.17	100	101	75 - 125	W525011	23-Jun-15	
EPA 6010B	Chromium	mg/kg	104	7.10	100	96.7	75 - 125	W525010	23-Jun-15	

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:C573



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0266**
Reported: 24-Jun-15 14:55

Quality Control - MATRIX SPIKE Data (Continued)

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total) by EPA 6000/7000 Methods (Continued)

EPA 6010B	Chromium	mg/kg	103	5.90	100	96.7	75 - 125	W525011	23-Jun-15	
EPA 6010B	Cobalt	mg/kg	102	8.95	100	92.7	75 - 125	W525010	23-Jun-15	
EPA 6010B	Cobalt	mg/kg	106	8.39	100	97.2	75 - 125	W525011	23-Jun-15	
EPA 6010B	Copper	mg/kg	1030	842	100	R > 4S	75 - 125	W525010	23-Jun-15	M3
EPA 6010B	Copper	mg/kg	5920	4860	100	R > 4S	75 - 125	W525011	23-Jun-15	D2
EPA 6010B	Lead	mg/kg	97.1	5.1	100	92.1	75 - 125	W525010	23-Jun-15	
EPA 6010B	Lead	mg/kg	176	67.7	100	108	75 - 125	W525011	23-Jun-15	
EPA 6010B	Manganese	mg/kg	422	323	100	99.3	75 - 125	W525010	23-Jun-15	M1
EPA 6010B	Manganese	mg/kg	354	204	100	150	75 - 125	W525011	23-Jun-15	M1
EPA 6010B	Molybdenum	mg/kg	601	399	100	202	75 - 125	W525011	23-Jun-15	M1
EPA 6010B	Molybdenum	mg/kg	221	136	100	85.2	75 - 125	W525010	23-Jun-15	
EPA 6010B	Nickel	mg/kg	103	8.38	100	94.5	75 - 125	W525010	23-Jun-15	
EPA 6010B	Nickel	mg/kg	105	7.79	100	96.9	75 - 125	W525011	23-Jun-15	
EPA 6010B	Selenium	mg/kg	97.9	<4.0	100	97.9	75 - 125	W525010	23-Jun-15	
EPA 6010B	Selenium	mg/kg	107	<4.0	100	107	75 - 125	W525011	23-Jun-15	
EPA 6010B	Thallium	mg/kg	93.1	<1.5	100	93.1	75 - 125	W525011	23-Jun-15	
EPA 6010B	Thallium	mg/kg	82.1	<1.5	100	82.1	75 - 125	W525010	23-Jun-15	
EPA 6010B	Zinc	mg/kg	134	35.4	100	98.2	75 - 125	W525010	23-Jun-15	
EPA 6010B	Zinc	mg/kg	423	273	100	149	75 - 125	W525011	23-Jun-15	M1
EPA 7471A	Mercury	mg/kg	0.322	<0.033	0.333	92.5	75 - 125	W525024	17-Jun-15	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.03	<0.020	1.00	103	75 - 125	W524283	24-Jun-15	
EPA 6010B	Arsenic	mg/L	1.04	<0.025	1.00	104	75 - 125	W524283	24-Jun-15	
EPA 6010B	Barium	mg/L	1.00	<0.0020	1.00	100	75 - 125	W524283	24-Jun-15	
EPA 6010B	Beryllium	mg/L	1.02	<0.0020	1.00	102	75 - 125	W524283	24-Jun-15	
EPA 6010B	Cadmium	mg/L	1.02	<0.0020	1.00	102	75 - 125	W524283	24-Jun-15	
EPA 6010B	Chromium	mg/L	1.00	<0.0060	1.00	100	75 - 125	W524283	24-Jun-15	
EPA 6010B	Cobalt	mg/L	1.01	<0.0060	1.00	101	75 - 125	W524283	24-Jun-15	
EPA 6010B	Copper	mg/L	1.02	<0.0100	1.00	102	75 - 125	W524283	24-Jun-15	
EPA 6010B	Lead	mg/L	1.02	<0.0075	1.00	102	75 - 125	W524283	24-Jun-15	
EPA 6010B	Manganese	mg/L	1.02	<0.0040	1.00	102	75 - 125	W524283	24-Jun-15	
EPA 6010B	Molybdenum	mg/L	1.03	<0.008	1.00	103	75 - 125	W524283	24-Jun-15	
EPA 6010B	Nickel	mg/L	1.03	<0.0100	1.00	103	75 - 125	W524283	24-Jun-15	
EPA 6010B	Selenium	mg/L	1.06	<0.040	1.00	106	75 - 125	W524283	24-Jun-15	
EPA 6010B	Thallium	mg/L	1.02	<0.015	1.00	102	75 - 125	W524283	24-Jun-15	
EPA 6010B	Zinc	mg/L	1.03	<0.010	1.00	103	75 - 125	W524283	24-Jun-15	
EPA 6020A	Uranium	mg/L	0.0245	<0.00100	0.0250	97.8	75 - 125	W524235	22-Jun-15	

TCLP Leachates (Metals)

EPA 6010B	Arsenic	mg/L Extract	1.08	<0.050	1.00	108	75 - 125	W525185	22-Jun-15	
EPA 6010B	Barium	mg/L Extract	19.7	<1.00	20.0	96.8	75 - 125	W525185	22-Jun-15	
EPA 6010B	Cadmium	mg/L Extract	0.203	<0.0100	0.200	99.9	75 - 125	W525185	22-Jun-15	
EPA 6010B	Chromium	mg/L Extract	0.953	<0.0500	1.00	95.3	75 - 125	W525185	22-Jun-15	
EPA 6010B	Lead	mg/L Extract	0.925	<0.0500	1.00	92.1	75 - 125	W525185	22-Jun-15	
EPA 6010B	Selenium	mg/L Extract	0.216	<0.050	0.200	108	75 - 125	W525185	22-Jun-15	
EPA 6010B	Silver	mg/L Extract	1.03	<0.0500	1.00	103	75 - 125	W525185	22-Jun-15	
EPA 7470A	Mercury	mg/L Extract	0.00109	<0.00020	0.00100	109	70 - 130	W525181	19-Jun-15	



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0266**
Reported: 24-Jun-15 14:55

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	6.48	7.57	2.50	30.2	15.5	20	W524236	22-Jun-15	M2
EPA 7470A	Mercury	mg/L	0.00099	0.00099	0.00100	99.0	0.0	20	W525140	19-Jun-15	

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	89.8	90.2	100	88.5	0.5	20	W525014	22-Jun-15	
EPA 6010B	Arsenic	mg/kg	107	105	100	102	1.6	20	W525010	23-Jun-15	
EPA 6010B	Arsenic	mg/kg	114	116	100	104	1.9	20	W525011	23-Jun-15	
EPA 6010B	Barium	mg/kg	257	247	100	118	3.8	20	W525010	23-Jun-15	
EPA 6010B	Barium	mg/kg	166	172	100	107	3.6	20	W525011	23-Jun-15	
EPA 6010B	Beryllium	mg/kg	103	98.2	100	102	4.6	20	W525010	23-Jun-15	
EPA 6010B	Beryllium	mg/kg	99.4	103	100	99.0	3.4	20	W525011	23-Jun-15	
EPA 6010B	Cadmium	mg/kg	104	99.4	100	104	4.3	20	W525010	23-Jun-15	
EPA 6010B	Cadmium	mg/kg	101	102	100	100	0.9	20	W525011	23-Jun-15	
EPA 6010B	Chromium	mg/kg	108	104	100	100	3.6	20	W525010	23-Jun-15	
EPA 6010B	Chromium	mg/kg	105	103	100	99.3	2.5	20	W525011	23-Jun-15	
EPA 6010B	Cobalt	mg/kg	114	102	100	105	11.6	20	W525010	23-Jun-15	
EPA 6010B	Cobalt	mg/kg	103	106	100	94.9	2.2	20	W525011	23-Jun-15	
EPA 6010B	Copper	mg/kg	1050	1030	100	R > 4S	1.9	20	W525010	23-Jun-15	M3
EPA 6010B	Copper	mg/kg	5200	5920	100	R > 4S	13.0	20	W525011	23-Jun-15	D2
EPA 6010B	Lead	mg/kg	101	97.1	100	96.2	4.2	20	W525010	23-Jun-15	
EPA 6010B	Lead	mg/kg	170	176	100	102	3.6	20	W525011	23-Jun-15	
EPA 6010B	Manganese	mg/kg	563	422	100	240	28.6	20	W525010	23-Jun-15	M1
EPA 6010B	Manganese	mg/kg	306	354	100	102	14.5	20	W525011	23-Jun-15	
EPA 6010B	Molybdenum	mg/kg	224	221	100	87.5	1.1	20	W525010	23-Jun-15	
EPA 6010B	Molybdenum	mg/kg	553	601	100	155	8.2	20	W525011	23-Jun-15	M1
EPA 6010B	Nickel	mg/kg	107	103	100	98.2	3.5	20	W525010	23-Jun-15	
EPA 6010B	Nickel	mg/kg	104	105	100	96.7	0.2	20	W525011	23-Jun-15	
EPA 6010B	Selenium	mg/kg	102	97.9	100	102	3.9	20	W525010	23-Jun-15	
EPA 6010B	Selenium	mg/kg	103	107	100	103	3.3	20	W525011	23-Jun-15	
EPA 6010B	Thallium	mg/kg	87.7	82.1	100	87.7	6.6	20	W525010	23-Jun-15	
EPA 6010B	Thallium	mg/kg	91.9	93.1	100	91.9	1.3	20	W525011	23-Jun-15	
EPA 6010B	Zinc	mg/kg	135	134	100	99.8	1.2	20	W525010	23-Jun-15	
EPA 6010B	Zinc	mg/kg	398	423	100	125	5.9	20	W525011	23-Jun-15	
EPA 7471A	Mercury	mg/kg	0.325	0.322	0.333	93.5	1.0	20	W525024	17-Jun-15	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.02	1.03	1.00	102	1.4	20	W524283	24-Jun-15	
EPA 6010B	Arsenic	mg/L	1.02	1.04	1.00	102	1.6	20	W524283	24-Jun-15	
EPA 6010B	Barium	mg/L	0.992	1.00	1.00	99.2	1.3	20	W524283	24-Jun-15	
EPA 6010B	Beryllium	mg/L	1.01	1.02	1.00	101	1.4	20	W524283	24-Jun-15	
EPA 6010B	Cadmium	mg/L	1.00	1.02	1.00	100	2.0	20	W524283	24-Jun-15	
EPA 6010B	Chromium	mg/L	0.992	1.00	1.00	99.2	1.1	20	W524283	24-Jun-15	
EPA 6010B	Cobalt	mg/L	0.993	1.01	1.00	99.3	1.5	20	W524283	24-Jun-15	
EPA 6010B	Copper	mg/L	1.01	1.02	1.00	101	1.4	20	W524283	24-Jun-15	
EPA 6010B	Lead	mg/L	1.01	1.02	1.00	101	1.3	20	W524283	24-Jun-15	
EPA 6010B	Manganese	mg/L	1.00	1.02	1.00	100	1.4	20	W524283	24-Jun-15	
EPA 6010B	Molybdenum	mg/L	1.02	1.03	1.00	102	0.8	20	W524283	24-Jun-15	
EPA 6010B	Nickel	mg/L	1.01	1.03	1.00	101	1.2	20	W524283	24-Jun-15	
EPA 6010B	Selenium	mg/L	1.02	1.06	1.00	102	3.5	20	W524283	24-Jun-15	
EPA 6010B	Thallium	mg/L	1.01	1.02	1.00	101	1.2	20	W524283	24-Jun-15	
EPA 6010B	Zinc	mg/L	1.01	1.03	1.00	101	1.9	20	W524283	24-Jun-15	
EPA 6020A	Uranium	mg/L	0.0242	0.0245	0.0250	97.0	0.9	20	W524235	22-Jun-15	

TCLP Leachates (Metals)

EPA 6010B	Arsenic	mg/L Extract	1.06	1.08	1.00	106	1.8	20	W525185	22-Jun-15	
EPA 6010B	Barium	mg/L Extract	19.2	19.7	20.0	94.2	2.6	20	W525185	22-Jun-15	
EPA 6010B	Cadmium	mg/L Extract	0.200	0.203	0.200	98.3	1.6	20	W525185	22-Jun-15	



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0266**
Reported: 24-Jun-15 14:55

Quality Control - MATRIX SPIKE DUPLICATE Data (Continued)

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
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TCLP Leachates (Metals) (Continued)

EPA 6010B	Chromium	mg/L Extract	0.944	0.953	1.00	94.4	1.0	20	W525185	22-Jun-15	
EPA 6010B	Lead	mg/L Extract	0.908	0.925	1.00	90.4	1.8	20	W525185	22-Jun-15	
EPA 6010B	Selenium	mg/L Extract	0.220	0.216	0.200	110	2.0	20	W525185	22-Jun-15	
EPA 6010B	Silver	mg/L Extract	1.01	1.03	1.00	101	1.6	20	W525185	22-Jun-15	
EPA 7470A	Mercury	mg/L Extract	0.00112	0.00109	0.00100	112	2.7	20	W525181	19-Jun-15	

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	14.8	5.72	10.0	90.3	75 - 125	W524236	22-Jun-15	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Manganese	mg/kg	282	204	100	78.4	75 - 125	W525011	23-Jun-15	
EPA 6010B	Manganese	mg/kg	412	323	100	88.5	75 - 125	W525010	23-Jun-15	
EPA 6010B	Molybdenum	mg/kg	468	399	100	69.4	75 - 125	W525011	23-Jun-15	M2
EPA 6010B	Zinc	mg/kg	346	273	100	73.1	75 - 125	W525011	23-Jun-15	M2

Metals (Total Recoverable)

EPA 6020A	Uranium	mg/L	0.101	<0.001000	0.100	101	75 - 125	W524235	22-Jun-15	
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Notes and Definitions

- D2 Sample required dilution due to high concentration of target analyte.
- M1 Matrix spike recovery was high, but the LCS recovery was acceptable.
- M2 Matrix spike recovery was low, but the LCS recovery was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable



Appendix C

Data Validation Reports

**Freeport – McMoran, Sierrita, Inc.
Sierrita Mine - Paving Project in Former CLEAR Plant
Area**

Data Review

SIERRITA MINE
GREEN VALLEY, AZ

Metals Analyses

SDGs #W5E0400

Analyses Performed By:
SVL Laboratories
Kellogg, ID

Report #23737R
Review Level: Tier II
Project: AZ001233.0019.00003

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) #W5E0400 for samples collected in association with the Sierrita Mine project located in Green Valley, AZ. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	TOC
EB061915	W5E0400-01	Water	05/19/2015					X	
CP-SPA-SL-E-D3.5-01	W5E0400-02	Soil	05/19/2015					X	
CP-SPA-SL-W-D3.5-01	W5E0400-03	Soil	05/19/2015					X	

Note:

1. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location CP-SPA-SL-E-D3.5-01.

ANALYTICAL DATA PACKAGE DOCUMENTATION

This table is an evaluation of the completeness of the data packages.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Method SW-846 6010, 6020, 7470, and 7471. Data were reviewed in accordance with USEPA National Functional Guidelines of October 2004.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within the control limits.
 - * Duplicate analysis is not within the control limits.
- Validation Qualifiers
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 - UB Compound considered non-detect at the listed value due to associated blank contamination.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010B/6020A	Water	180 days from collection to analysis	Cool @ <6°C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool @ <6°C.
SW-846 7470	Water	28 days from collection to analysis	Cool @ <6°C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool @ <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks also measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected analyte in an associated blank (common laboratory contaminant analytes are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Laboratory Duplicate Sample Analysis

MS/MSD and laboratory duplicate sample data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit recoveries within the established acceptance limits of 75% to 125%, and the relative percent difference (RPD) between the MS and MSD results must be no greater than the established acceptance limit of 20%.

Note: The MS/MSD control limits do not apply for MS/MSDs performed on sample locations where the analyte concentration detected in the parent sample exceeds the MS/MSD spiking concentration by a factor of four or greater. Sample results associated with MS/MSD QC exceedances where the parent samples are not site-specific are not qualified.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analytes present in the table below.

Sample Location	Analytes	MS Recovery	MSD Recovery
CP-SPA-SL-E-D3.5-01	Uranium	>125%	86.4%
	Barium	73.9%	104%
	Manganese	67.3%	99.9%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

Sample locations associated with MS/MSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Analyte
CP-SPA-SL-E-D3.5-01	Uranium

The criteria used to evaluate the RPD between the MS/MSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

3.2 Laboratory Duplicate Sample Analysis

The laboratory duplicate sample relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to five times the RL. A control limit of 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the RL, a control limit of two times the RL is applied for soil matrices.

The laboratory duplicate sample results exhibited RPD within the control limit.

4. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit recoveries between the control limits of 80% and 120%.

All analytes associated with the LCS analysis exhibited acceptable recoveries.

5. Field Duplicate Sample Analysis

The field duplicate sample analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the RL, a control limit of three times the RL is applied for soil matrices.

Field duplicate analysis was not performed on a sample location within this SDG.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010/6020, 7470/7471	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP/AES) Inductively Coupled Plasma-Mass Spectrometry (ICP/MS) Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method Blanks		X		X	
B. Equipment Blanks					X
Laboratory Control Sample (LCS) Accuracy (%R)		X		X	
Laboratory Control Sample Duplicate (LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) Accuracy (%R)		X	X		
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X	X		
Post-Digestion Spike (PDS) Accuracy (%R)		X		X	
Laboratory Duplicate Sample RPD		X		X	
Field Duplicate Sample RPD					X
Dilution Factor					X
Dissolved versus Total Results					X
Moisture Content		X		X	

%R – Percent recovery

RPD – Relative percent difference

VALIDATION PERFORMED BY: Jennifer Chandler

SIGNATURE: 

DATE: June 15, 2015

PEER REVIEW: Joseph C. Houser

DATE: June 17, 2015

**CHAIN OF CUSTODY /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

ID#: _____

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

RUSH

Lab Work Order #

W5E0400

Send Results to: **Katy Brentingham ARCADIS** Telephone: **602 797-4523**

Address: **410 N 44th St, Ste 1000** Fax: **602 438-0102**

City: **Phoenix** State: **AZ** Zip: **85008** E-mail Address: **Katy.brentingham@arcadis-us.com**

Project Name/Location (City, State): **SR-As-CLEAR Plant** Project #: **A2001233.009**

Sampler's Printed Name: **Ben Greenwell** Sampler's Signature: *[Signature]*

Sample ID	Collection		Type (✓)		Matrix	PARAMETER ANALYSIS & METHOD										
	Date	Time	Comp	Grab		As Rec'd	As Rec'd	As Rec'd	As Rec'd	As Rec'd	As Rec'd	As Rec'd	As Rec'd	As Rec'd	As Rec'd	As Rec'd
EBO61915	6-19-15	0852		X	W	X	X	X	X	X	X	X	X	X	X	X
CP-SPA-SL-E-D3.5-01		0918		X	SO	X	X	X	X	X	X	X	X	X	X	X
CP-SPA-SL-W-D3.5-01		0955		X	SO	X	X	X	X	X	X	X	X	X	X	X
CP-SPA-ST-01		1050		X	SL	X	X	X	X	X	X	X	X	X	X	X
CP-EA-01		1106		X	SO	X	X	X	X	X	X	X	X	X	X	X

Keys

Preservation Key:
A. H₂SO₄
B. HCl
C. HNO₃
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

REMARKS

Preservative: HNO₃

Hold prior to analysis

Hold prior to analysis

Special Instructions/Comments: _____ Special QA/QC Instructions(✓): _____

• on this work order

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Cooler Custody Seal (✓)	Printed Name: Ben Greenwell	Printed Name: M. Duce	Printed Name:	Printed Name:
<input type="checkbox"/> Cooler packed with ice (✓)	<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	Signature:	Signature:
Specify Turnaround Requirements: 2 Day	Sample Receipt:	Firm: ARCADIS	Firm/Courier: SVL	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 5-19-15 1540	Date/Time: 5/20/19 13:30	Date/Time:	Date/Time:



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

Quality Control - MATRIX SPIKE DUPLICATE Data (Continued)

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total Recoverable)											
EPA 6010B	Antimony	mg/L	1.02	1.01	1.00	102	0.8	20	W521217	22-May-15	
EPA 6010B	Arsenic	mg/L	0.986	0.983	1.00	98.6	0.4	20	W521217	22-May-15	
EPA 6010B	Barium	mg/L	1.06	1.05	1.00	106	0.7	20	W521217	22-May-15	
EPA 6010B	Beryllium	mg/L	0.993	0.990	1.00	99.3	0.3	20	W521217	22-May-15	
EPA 6010B	Cadmium	mg/L	0.984	0.976	1.00	98.4	0.8	20	W521217	22-May-15	
EPA 6010B	Chromium	mg/L	0.997	0.987	1.00	99.7	1.0	20	W521217	22-May-15	
EPA 6010B	Cobalt	mg/L	0.989	0.981	1.00	98.9	0.8	20	W521217	22-May-15	
EPA 6010B	Copper	mg/L	1.05	1.04	1.00	105	0.5	20	W521217	22-May-15	
EPA 6010B	Lead	mg/L	0.987	0.979	1.00	98.7	0.9	20	W521217	22-May-15	
EPA 6010B	Manganese	mg/L	0.999	0.992	1.00	99.9	0.7	20	W521217	22-May-15	
EPA 6010B	Molybdenum	mg/L	1.04	1.03	1.00	104	1.1	20	W521217	22-May-15	
EPA 6010B	Nickel	mg/L	0.969	0.964	1.00	96.9	0.6	20	W521217	22-May-15	
EPA 6010B	Selenium	mg/L	0.992	0.997	1.00	99.2	0.6	20	W521217	22-May-15	
EPA 6010B	Thallium	mg/L	0.995	0.981	1.00	99.5	1.4	20	W521217	22-May-15	
EPA 6010B	Zinc	mg/L	0.948	0.943	1.00	94.8	0.5	20	W521217	22-May-15	
EPA 6020A	Uranium	mg/L	0.0247	0.0250	0.0250	98.9	1.1	20	W521207	22-May-15	

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total)										
EPA 6020A	Uranium	mg/kg	13.6	4.16	10.0	94.5	75 - 125	W521208	22-May-15	
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Barium	mg/kg	228	136	100	91.6	75 - 125	W521206	22-May-15	
EPA 6010B	Manganese	mg/kg	302	220	100	81.9	75 - 125	W521206	22-May-15	
Metals (Total Recoverable)										
EPA 6020A	Uranium	mg/L	0.105	<0.001000	0.100	105	75 - 125	W521207	22-May-15	

Notes and Definitions

- M1 Matrix spike recovery was high, but the LCS recovery was acceptable.
- M2 Matrix spike recovery was low, but the LCS recovery was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

Client Sample ID: **EB061915**
SVL Sample ID: **W5E0400-01 (Grab)**

Sampled: 19-May-15 08:52
Received: 20-May-15
Sampled By: BW

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.00004		W521149	STA	05/22/15 12:04	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W521217	DT	05/22/15 09:26	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.010		W521217	DT	05/22/15 09:26	
EPA 6010B	Barium	< 0.0020	mg/L	0.0020	0.0006		W521217	DT	05/22/15 09:26	
EPA 6010B	Beryllium	< 0.0020	mg/L	0.0020	0.0009		W521217	DT	05/22/15 09:26	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W521217	DT	05/22/15 09:26	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0018		W521217	DT	05/22/15 09:26	
EPA 6010B	Cobalt	< 0.0060	mg/L	0.0060	0.0008		W521217	DT	05/22/15 09:26	
EPA 6010B	Copper	< 0.0100	mg/L	0.0100	0.0023		W521217	DT	05/22/15 09:26	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0038		W521217	DT	05/22/15 09:26	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0023		W521217	DT	05/22/15 09:26	
EPA 6010B	Molybdenum	< 0.008	mg/L	0.008	0.005		W521217	DT	05/22/15 09:26	
EPA 6010B	Nickel	< 0.0100	mg/L	0.0100	0.0028		W521217	DT	05/22/15 09:26	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.015		W521217	DT	05/22/15 09:26	
EPA 6010B	Thallium	< 0.015	mg/L	0.015	0.009		W521217	DT	05/22/15 09:26	
EPA 6010B	Zinc	< 0.010	mg/L	0.010	0.003		W521217	DT	05/22/15 09:26	
EPA 6020A	Uranium	< 0.00100	mg/L	0.00100	0.000014		W521207	KWH	05/22/15 06:59	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

Client Sample ID: **CP-SPA-SL-E-D3.5-01**
SVL Sample ID: **W5E0400-02 (Soil)**

Sampled: 19-May-15 09:18
Received: 20-May-15
Sampled By: BW

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	4.16	mg/kg	0.500	0.0012	2	W521208	KWH	05/22/15 07:08	M4 J
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W521210	AS	05/21/15 13:51	
EPA 6010B	Arsenic	4.1	mg/kg	2.5	0.8		W521206	DT	05/22/15 09:49	
EPA 6010B	Barium	136	mg/kg	0.20	0.08		W521206	DT	05/22/15 09:49	M2 J
EPA 6010B	Beryllium	0.42	mg/kg	0.20	0.06		W521206	DT	05/22/15 09:49	
EPA 6010B	Cadmium	0.42	mg/kg	0.20	0.07		W521206	DT	05/22/15 09:49	
EPA 6010B	Chromium	8.35	mg/kg	0.60	0.16		W521206	DT	05/22/15 09:49	
EPA 6010B	Cobalt	5.72	mg/kg	0.60	0.11		W521206	DT	05/22/15 09:49	
EPA 6010B	Copper	2100	mg/kg	1.00	0.28		W521206	DT	05/22/15 09:49	M3
EPA 6010B	Lead	17.3	mg/kg	0.8	0.4		W521206	DT	05/22/15 09:49	
EPA 6010B	Manganese	220	mg/kg	0.40	0.16		W521206	DT	05/22/15 09:49	M2 J
EPA 6010B	Molybdenum	157	mg/kg	0.80	0.21		W521206	DT	05/22/15 09:49	
EPA 6010B	Nickel	8.73	mg/kg	1.00	0.22		W521206	DT	05/22/15 09:49	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W521206	DT	05/22/15 09:49	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W521206	DT	05/22/15 09:49	
EPA 6010B	Zinc	57.8	mg/kg	1.0	0.3		W521206	DT	05/22/15 09:49	
EPA 7471A	Mercury	0.052	mg/kg	0.033	0.005		W521232	STA	05/22/15 13:15	

Percent Solids / Percent Moisture

Percent Solids	% Solids	95.6	%	0.1			W521215	ESB	05/22/15 08:31	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015
Work Order: **W5E0400**
Reported: 29-May-15 13:02

Client Sample ID: **CP-SPA-SL-W-D3.5-01**
SVL Sample ID: **W5E0400-03 (Soil)**

Sampled: 19-May-15 09:55
Received: 20-May-15
Sampled By: BW

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	6.28	mg/kg	0.500	0.0012	2	W521208	KWH	05/22/15 07:16	J
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W521210	AS	05/21/15 14:00	
EPA 6010B	Arsenic	18.7	mg/kg	2.5	0.8		W521206	DT	05/22/15 10:04	
EPA 6010B	Barium	167	mg/kg	0.20	0.08		W521206	DT	05/22/15 10:04	J
EPA 6010B	Beryllium	0.48	mg/kg	0.20	0.06		W521206	DT	05/22/15 10:04	
EPA 6010B	Cadmium	1.04	mg/kg	0.20	0.07		W521206	DT	05/22/15 10:04	
EPA 6010B	Chromium	21.5	mg/kg	0.60	0.16		W521206	DT	05/22/15 10:04	
EPA 6010B	Cobalt	5.38	mg/kg	0.60	0.11		W521206	DT	05/22/15 10:04	
EPA 6010B	Copper	1310	mg/kg	1.00	0.28		W521206	DT	05/22/15 10:04	
EPA 6010B	Lead	22.6	mg/kg	0.8	0.4		W521206	DT	05/22/15 10:04	
EPA 6010B	Manganese	235	mg/kg	0.40	0.16		W521206	DT	05/22/15 10:04	J
EPA 6010B	Molybdenum	263	mg/kg	0.80	0.21		W521206	DT	05/22/15 10:04	
EPA 6010B	Nickel	14.3	mg/kg	1.00	0.22		W521206	DT	05/22/15 10:04	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W521206	DT	05/22/15 10:04	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W521206	DT	05/22/15 10:04	
EPA 6010B	Zinc	78.9	mg/kg	1.0	0.3		W521206	DT	05/22/15 10:04	
EPA 7471A	Mercury	0.137	mg/kg	0.033	0.005		W521232	STA	05/22/15 13:17	

Percent Solids / Percent Moisture

Percent Solids	% Solids	95.4	%	0.1			W521215	ESB	05/22/15 08:31	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

**Freeport – McMoran, Sierrita, Inc.
Sierrita Mine - Paving Project in Former CLEAR Plant
Area**

Data Review

SIERRITA MINE
GREEN VALLEY, AZ

Metals Analyses

SDGs #W5F0016

Analyses Performed By:
SVL Laboratories
Kellogg, ID

Report #23738R
Review Level: Tier II
Project: AZ001233.0019.00003

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # W5F0016 for samples collected in association with the Sierrita Mine project located in Green Valley, AZ. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	TOC
CP-NPA-S-01	W5F0016-01	Soil	05/28/2015					X	
CP-NPA-S-02	W5F0016-02	Soil	05/28/2015					X	
CP-NPA-S-03	W5F0016-03	Soil	05/28/2015					X	
CP-NPA-S-04	W5F0016-04	Soil	05/28/2015					X	
CP-NPA-S-05	W5F0016-05	Soil	05/28/2015					X	
FD052815-A	W5F0016-06	Soil	05/28/2015	CP-NPA-S-05				X	
CP-NPA-S-06	W5F0016-07	Soil	05/28/2015					X	
CP-NPA-S-07	W5F0016-08	Soil	05/28/2015					X	
CP-NPA-S-08	W5F0016-09	Soil	05/28/2015					X	
CP-NPA-S-09	W5F0016-10	Soil	05/28/2015					X	
CP-NPA-S-10	W5F0016-11	Soil	05/28/2015					X	

Note:

1. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location FD052815-A.

ANALYTICAL DATA PACKAGE DOCUMENTATION

This table is an evaluation of the completeness of the data packages.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Method SW-846 6010, 6020, and 7471. Data were reviewed in accordance with USEPA National Functional Guidelines of October 2004.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within the control limits.
 - * Duplicate analysis is not within the control limits.
- Validation Qualifiers
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 - UB Compound considered non-detect at the listed value due to associated blank contamination.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010B/6020A	Water	180 days from collection to analysis	Cool @ <6°C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool @ <6°C.
SW-846 7470	Water	28 days from collection to analysis	Cool @ <6°C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool @ <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks also measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected analyte in an associated blank (common laboratory contaminant analytes are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Laboratory Duplicate Sample Analysis

MS/MSD and laboratory duplicate sample data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit recoveries within the established acceptance limits of 75% to 125%, and the relative percent difference (RPD) between the MS and MSD results must be no greater than the established acceptance limit of 20%.

Note: The MS/MSD control limits do not apply for MS/MSDs performed on sample locations where the analyte concentration detected in the parent sample exceeds the MS/MSD spiking concentration by a factor of four or greater. Sample results associated with MS/MSD QC exceedances where the parent samples are not site-specific are not qualified.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analytes present in the table below.

Sample Location	Analytes	MS Recovery	MSD Recovery
FD052815-A	Manganese	106%	>125%

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

3.2 Laboratory Duplicate Sample Analysis

The laboratory duplicate sample relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to five times the RL. A control limit of 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the RL, a control limit of two times the RL is applied for soil matrices.

The laboratory duplicate sample results exhibited RPD within the control limit.

4. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit recoveries between the control limits of 80% and 120%.

All analytes associated with the LCS analysis exhibited acceptable recoveries.

5. Field Duplicate Sample Analysis

The field duplicate sample analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
CP-NPA-S-05/ FD052815-A	Uranium	1.32	0.858	AC
	Barium	68.9	57.8	17.5%
	Beryllium	0.44	0.44	AC
	Chromium	3.45	3.02	13.3%
	Cobalt	5.64	5.12	9.7%
	Copper	764	633	18.8%
	Lead	5.8	5.8	AC
	Manganese	231	201	13.9%
	Molybdenum	26.6	29.0	8.6%
	Nickel	4.88	4.79	AC
	Zinc	67.3	54.5	21.0%

AC = Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010/6020, 7471	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP/AES) Inductively Coupled Plasma-Mass Spectrometry (ICP/MS) Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method Blanks		X		X	
B. Equipment Blanks					X
Laboratory Control Sample (LCS) Accuracy (%R)		X		X	
Laboratory Control Sample Duplicate (LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) Accuracy (%R)		X		X	
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Post-Digestion Spike (PDS) Accuracy (%R)		X	X		
Laboratory Duplicate Sample RPD		X		X	
Field Duplicate Sample RPD		X		X	
Dilution Factor					X
Dissolved versus Total Results					X
Moisture Content		X		X	

%R – Percent recovery

RPD – Relative percent difference

VALIDATION PERFORMED BY: Jennifer Chandler

SIGNATURE: 

DATE: June 15, 2015

PEER REVIEW: Joseph C. Houser

DATE: June 17, 2015

**CHAIN OF CUSTODY /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

W05F0016

Lab Work Order #

Send Results to:	Contact & Company Name: Shawn Roberts	Telephone: 913 492-0900
	Address: 8725 Roshill, Ste 350	Fax: 913 492-0902
	City State Zip: Lenexa KS 66215	E-mail Address: shawn.roberts@arcadis-us.com

Preservative									
Filtered (✓)									
# of Containers									
Container Information	8	8	8	8					

Keys

Preservation Key:
 A. H₂SO₄
 B. HCl
 C. HNO₃
 D. NaOH
 E. None
 F. Other: _____
 G. Other: _____
 H. Other: _____

Container Information Key:
 1. 40 ml Vial
 2. 1 L Amber
 3. 250 ml Plastic
 4. 500 ml Plastic
 5. Encore
 6. 2 oz. Glass
 7. 4 oz. Glass
 8. 8 oz. Glass
 9. Other: _____
 10. Other: _____

Matrix Key:
 SO - Soil SE - Sediment NL - NAPL/Oil
 W - Water SL - Sludge SW - Sample Wipe
 T - Tissue A - Air Other: _____

Project Name/Location (City, State): Syracuse - CLEAR Plant	Project #: AZ001233.0019
Sampler's Printed Name: Ben Greenwell	Sampler's Signature: <i>Ben Greenwell</i>

PARAMETER ANALYSIS & METHOD

6010B	As, Pb, Cu	6010B Extended * (see comments)	6020A	Uranium	TH11	Hg			

Sample ID	Collection		Type (✓)		Matrix	PARAMETER ANALYSIS & METHOD										REMARKS		
	Date	Time	Comp	Grab		6010B	As, Pb, Cu	6010B Extended * (see comments)	6020A	Uranium	TH11	Hg						
CP-NPA-S-01	5-28-15	1146		✓	SO		X	X	X									2ctns
CP-NPA-S-02		1335				X												1ctr
CP-NPA-S-03		1339				X												1ctr
CP-NPA-S-04		1346				X												1ctr
CP-NPA-S-05		1359						X	X	X								2ctns
FD052815-A		1359						X	X	X								3ctns, Add sample volume for M/S/M&D
CP-NPA-S-06		1423				X												1ctr
CP-NPA-S-07		1435				X												1ctr
CP-NPA-S-08		1441				X												1ctr
CP-NPA-S-09		1447				X												1ctr
CP-NPA-S-10		1456						X	X	X								2ctns RUSH

Special Instructions/Comments: Archive remaining sample volume for potential SPLP analysis. Special QA/QC Instructions (✓) 16 total containers

* 6010B Extended Metals as per quote [Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Mo, Ni, Se, Tl, Zn]

Laboratory Information and Receipt		Relinquished By		Received By		Relinquished By		Laboratory Received By	
Lab Name: SVL Analytical	Cooler Custody Seal (✓) <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Printed Name: Ben Greenwell	Signature: <i>Ben Greenwell</i>	Printed Name: C. FLORES	Signature: <i>C. Flores</i>	Printed Name:	Signature:	Printed Name:	Signature:
Specify Turnaround Requirements: 3 Day (by Thu 6-4-15)	Sample Receipt:	Firm: ARCADIS	Date/Time: 5-29-15/1450	Firm/Courier: SVL	Date/Time: 6/1/15 11:00	Firm:	Date/Time:	Firm:	Date/Time:
Shipping Tracking #:	Condition/Cooler Temp:								



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0016**
Reported: 04-Jun-15 09:50

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	mg/kg	12.6		10.0	126	75 - 125	W523050	03-Jun-15	M1
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Manganese	mg/kg	282	201	100	81.3	75 - 125	W523047	03-Jun-15	
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Notes and Definitions

- D2 Sample required dilution due to high concentration of target analyte.
- D8 Sample required dilution to meet internal standard recovery limits.
- M1 Matrix spike recovery was high, but the LCS recovery was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-01**

SVL Sample ID: **W5F0016-01 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 11:46
Received: 01-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	2.64	mg/kg	0.500	0.0012	2	W523050	KWH	06/03/15 11:09	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W523048	DT	06/03/15 13:30	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:08	
EPA 6010B	Barium	115	mg/kg	0.20	0.08		W523047	AS	06/03/15 16:08	
EPA 6010B	Beryllium	0.42	mg/kg	0.20	0.06		W523047	AS	06/03/15 16:08	
EPA 6010B	Cadmium	0.43	mg/kg	0.20	0.07		W523047	AS	06/03/15 16:08	
EPA 6010B	Chromium	4.52	mg/kg	0.60	0.16		W523047	AS	06/03/15 16:08	
EPA 6010B	Cobalt	7.46	mg/kg	0.60	0.11		W523047	AS	06/03/15 16:08	
EPA 6010B	Copper	1580	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:08	
EPA 6010B	Lead	3.9	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:08	
EPA 6010B	Manganese	< 0.40	mg/kg	0.40	0.16		W523047	AS	06/03/15 17:06	
EPA 6010B	Molybdenum	13.6	mg/kg	0.80	0.21		W523047	AS	06/03/15 16:08	
EPA 6010B	Nickel	8.53	mg/kg	1.00	0.22		W523047	AS	06/03/15 16:08	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W523047	AS	06/03/15 16:08	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W523047	AS	06/03/15 16:08	
EPA 6010B	Zinc	187	mg/kg	1.0	0.3		W523047	AS	06/03/15 16:08	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W523051	STA	06/02/15 10:17	

Percent Solids / Percent Moisture

Percent Solids	% Solids	97.1	%	0.1			W523049	JAA	06/02/15 09:40	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-02**

SVL Sample ID: **W5F0016-02 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:35

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	5.1	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:10	
EPA 6010B	Copper	2550	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:10	
EPA 6010B	Lead	19.8	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:10	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	99.0	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-03**

SVL Sample ID: **W5F0016-03 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:39

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	7.9	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:12	
EPA 6010B	Copper	12800	mg/kg	10.0	2.80	10	W523047	AS	06/03/15 16:52	D2
EPA 6010B	Lead	69.0	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:12	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	97.0	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-04**

SVL Sample ID: **W5F0016-04 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:46

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	7.3	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:14	
EPA 6010B	Copper	4730	mg/kg	10.0	2.80	10	W523047	AS	06/03/15 16:55	D2
EPA 6010B	Lead	41.6	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:14	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.5	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0016**
Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-05**

SVL Sample ID: **W5F0016-05 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:59
Received: 01-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	1.32	mg/kg	0.500	0.0012	2	W523050	KWH	06/03/15 11:11	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W523048	DT	06/03/15 13:33	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:16	
EPA 6010B	Barium	68.9	mg/kg	0.20	0.08		W523047	AS	06/03/15 16:16	
EPA 6010B	Beryllium	0.44	mg/kg	0.20	0.06		W523047	AS	06/03/15 16:16	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.07		W523047	AS	06/03/15 16:16	
EPA 6010B	Chromium	3.45	mg/kg	0.60	0.16		W523047	AS	06/03/15 16:16	
EPA 6010B	Cobalt	5.64	mg/kg	0.60	0.11		W523047	AS	06/03/15 16:16	
EPA 6010B	Copper	764	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:16	
EPA 6010B	Lead	5.8	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:16	
EPA 6010B	Manganese	231	mg/kg	0.40	0.16		W523047	AS	06/03/15 17:09	J
EPA 6010B	Molybdenum	26.6	mg/kg	0.80	0.21		W523047	AS	06/03/15 16:16	
EPA 6010B	Nickel	4.88	mg/kg	1.00	0.22		W523047	AS	06/03/15 16:16	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W523047	AS	06/03/15 16:16	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W523047	AS	06/03/15 16:16	
EPA 6010B	Zinc	67.3	mg/kg	1.0	0.3		W523047	AS	06/03/15 16:16	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W523051	STA	06/02/15 10:19	

Percent Solids / Percent Moisture

Percent Solids	% Solids	97.4	%	0.1			W523049	JAA	06/02/15 09:40	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **FD052815-A**

SVL Sample ID: **W5F0016-06 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 13:59

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	0.858	mg/kg	0.500	0.0012	2	W523050	KWH	06/03/15 11:04	M1
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W523048	DT	06/03/15 13:36	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:18	
EPA 6010B	Barium	57.8	mg/kg	0.20	0.08		W523047	AS	06/03/15 16:18	
EPA 6010B	Beryllium	0.44	mg/kg	0.20	0.06		W523047	AS	06/03/15 16:18	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.07		W523047	AS	06/03/15 16:18	
EPA 6010B	Chromium	3.02	mg/kg	0.60	0.16		W523047	AS	06/03/15 16:18	
EPA 6010B	Cobalt	5.12	mg/kg	0.60	0.11		W523047	AS	06/03/15 16:18	
EPA 6010B	Copper	633	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:18	M3
EPA 6010B	Lead	5.8	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:18	
EPA 6010B	Manganese	201	mg/kg	0.40	0.16		W523047	AS	06/03/15 17:12	M1 J
EPA 6010B	Molybdenum	29.0	mg/kg	0.80	0.21		W523047	AS	06/03/15 16:18	
EPA 6010B	Nickel	4.79	mg/kg	1.00	0.22		W523047	AS	06/03/15 16:18	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W523047	AS	06/03/15 16:18	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W523047	AS	06/03/15 16:18	
EPA 6010B	Zinc	54.5	mg/kg	1.0	0.3		W523047	AS	06/03/15 16:18	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W523051	STA	06/02/15 10:20	

Percent Solids / Percent Moisture

Percent Solids	% Solids	97.6	%	0.1			W523049	JAA	06/02/15 09:40	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-06**

SVL Sample ID: **W5F0016-07 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:23

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	18.9	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:30	
EPA 6010B	Copper	4810	mg/kg	10.0	2.80	10	W523047	AS	06/03/15 16:57	DZ
EPA 6010B	Lead	97.0	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:30	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	93.2	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-07**

SVL Sample ID: **W5F0016-08 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:35

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	23.6	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:32	
EPA 6010B	Copper	3200	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:32	
EPA 6010B	Lead	57.0	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:32	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.0	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-08**

SVL Sample ID: **W5F0016-09 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:41

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	2.9	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:34	
EPA 6010B	Copper	618	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:34	
EPA 6010B	Lead	20.6	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:34	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.4	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-09**

SVL Sample ID: **W5F0016-10 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:47

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	3.8	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:36	
EPA 6010B	Copper	1290	mg/kg	1.00	0.28		W523047	AS	06/03/15 16:36	
EPA 6010B	Lead	23.9	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:36	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.8	%	0.1			W523049	JAA	06/02/15 09:40	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0016**

Reported: 04-Jun-15 09:50

Client Sample ID: **CP-NPA-S-10**

SVL Sample ID: **W5F0016-11 (Soil)**

Sample Report Page 1 of 1

Sampled: 28-May-15 14:56

Received: 01-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	2.33	mg/kg	0.500	0.0029	5	W523050	KWH	06/03/15 11:16	D8
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	5.1	mg/kg	2.0	0.6		W523048	DT	06/03/15 13:45	
EPA 6010B	Arsenic	10.3	mg/kg	2.5	0.8		W523047	AS	06/03/15 16:38	
EPA 6010B	Barium	51.8	mg/kg	0.20	0.08		W523047	AS	06/03/15 16:38	
EPA 6010B	Beryllium	0.38	mg/kg	0.20	0.06		W523047	AS	06/03/15 16:38	
EPA 6010B	Cadmium	0.98	mg/kg	0.20	0.07		W523047	AS	06/03/15 16:38	
EPA 6010B	Chromium	3.12	mg/kg	0.60	0.16		W523047	AS	06/03/15 16:38	
EPA 6010B	Cobalt	8.40	mg/kg	0.60	0.11		W523047	AS	06/03/15 16:38	
EPA 6010B	Copper	5090	mg/kg	10.0	2.80	10	W523047	AS	06/03/15 16:59	D2
EPA 6010B	Lead	80.7	mg/kg	0.8	0.4		W523047	AS	06/03/15 16:38	
EPA 6010B	Manganese	168	mg/kg	0.40	0.16		W523047	AS	06/03/15 17:21	J
EPA 6010B	Molybdenum	366	mg/kg	0.80	0.21		W523047	AS	06/03/15 16:38	
EPA 6010B	Nickel	6.53	mg/kg	1.00	0.22		W523047	AS	06/03/15 16:38	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W523047	AS	06/03/15 16:38	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W523047	AS	06/03/15 16:38	
EPA 6010B	Zinc	249	mg/kg	1.0	0.3		W523047	AS	06/03/15 16:38	
EPA 7471A	Mercury	0.037	mg/kg	0.033	0.005		W523051	STA	06/02/15 10:26	

Percent Solids / Percent Moisture

Percent Solids	% Solids	95.4	%	0.1			W523049	JAA	06/02/15 09:40	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director

**Freeport – McMoran, Sierrita, Inc.
Sierrita Mine - Paving Project in Former CLEAR Plant
Area**

Data Review

SIERRITA MINE
GREEN VALLEY, AZ

Metals Analyses

SDGs #W5F0266

Analyses Performed By:
SVL Laboratories
Kellogg, ID

Report #23887R
Review Level: Tier II
Project: AZ001233.0019.00003

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Groups (SDGs) # W5F0016 for samples collected in association with the Sierrita Mine project located in Green Valley, AZ. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PCB	MET	TOC
CP-SPA-S-01	W5F0226-01	Soil	06/09/2015					X	
CP-SPA-S-02	W5F0226-02	Soil	06/09/2015					X	
CP-SPA-S-03	W5F0226-03	Soil	06/09/2015					X	
FD060915-A	W5F0226-04	Soil	06/09/2015	CP-SPA-S-03				X	
CP-SPA-S-04	W5F0226-05	Soil	06/09/2015					X	
CP-SPA-S-05	W5F0226-06	Soil	06/09/2015					X	
CP-SPA-S-06	W5F0226-07	Soil	06/09/2015					X	
CP-SPA-S-07	W5F0226-08	Soil	06/09/2015					X	
CP-SPA-S-08	W5F0226-09	Soil	06/09/2015					X	
CP-SPA-S-09	W5F0226-10	Soil	06/09/2015					X	
FD060915-B	W5F0226-11	Soil	06/09/2015	CP-SPA-S-09				X	
CP-SPA-S-10	W5F0226-12	Soil	06/09/2015					X	
CP-SPA-S-11	W5F0226-13	Soil	06/09/2015					X	
CP-SPA-S-12	W5F0226-14	Soil	06/09/2015					X	
CP-SPA-S-13	W5F0226-15	Soil	06/09/2015					X	
CP-SPA-S-14	W5F0226-16	Soil	06/09/2015					X	
CP-SPA-S-15	W5F0226-17	Soil	06/09/2015					X	
CP-SPA-S-16	W5F0226-18	Soil	06/09/2015					X	
CP-SPA-S-17	W5F0226-19	Soil	06/09/2015					X	
EB061015	W5F0226-20	Water	06/10/2015					X	
CP-E-01	W5F0226-21	Soil	06/10/2015					X	
CP-E-02	W5F0226-22	Soil	06/10/2015					X	
CP-E-03	W5F0226-23	Soil	06/10/2015					X	

Note:

1. TCLP Metals analysis on samples CP-E-01, CP-E-02, and CP-E-03.
2. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location FD060915-A.

ANALYTICAL DATA PACKAGE DOCUMENTATION

This table is an evaluation of the completeness of the data packages.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

QA - Quality Assurance

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Method SW-846 6010, 6020, and 7471. Data were reviewed in accordance with USEPA National Functional Guidelines of October 2004.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within the control limits.
 - * Duplicate analysis is not within the control limits.
- Validation Qualifiers
 - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
 - UB Compound considered non-detect at the listed value due to associated blank contamination.
 - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

METALS ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010B/6020A	Water	180 days from collection to analysis	Cool @ <6°C; preserved to a pH of less than 2.
	Soil	180 days from collection to analysis	Cool @ <6°C.
SW-846 7470	Water	28 days from collection to analysis	Cool @ <6°C; preserved to a pH of less than 2.
SW-846 7471	Soil	28 days from collection to analysis	Cool @ <6°C
SW-846 1311/6010B	Water	180 days from collection to leachate and 180 days from leachate to analysis	Cool @ <6°C; preserved to a pH of less than 2.
SW-846 1311/7471	Soil	28 days from collection to leachate and 28 days from leachate to analysis	Cool @ <6°C

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e. laboratory method blanks and equipment rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks also measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected analyte in an associated blank (common laboratory contaminant analytes are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Analytes were not detected above the MDL in the associated blanks; therefore detected sample results were not associated with blank contamination.

3. Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Laboratory Duplicate Sample Analysis

MS/MSD and laboratory duplicate sample data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit recoveries within the established acceptance limits of 75% to 125%, and the relative percent difference (RPD) between the MS and MSD results must be no greater than the established acceptance limit of 20%.

Note: The MS/MSD control limits do not apply for MS/MSDs performed on sample locations where the analyte concentration detected in the parent sample exceeds the MS/MSD spiking concentration by a factor of four or greater. Sample results associated with MS/MSD QC exceedances where the parent samples are not site-specific are not qualified.

All analytes associated with MS/MSD recoveries were within control limits with the exception of the following analytes present in the table below.

Sample Location	Analytes	MS Recovery	MSD Recovery
FD060915-A (B 1)	Manganese (total)	99.3%	>125%
	Zinc	>125%	99.8%
FD060915-A (B 2)	Manganese	>125%	102%
	Molybdenum	>125%	>125%
	Zinc	>125%	125%
FD060915-A	Uranium	73.9%	30.2%

B 1 = Batch W525010
B 2 = Batch W525011

The criteria used to evaluate MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified. The qualifications are applied to all sample results associated with this SDG.

Control limit	Sample Result	Qualification
MS/MSD percent recovery 30% to 74%	Non-detect	UJ
	Detect	J
MS/MSD percent recovery <30%	Non-detect	R
	Detect	J
MS/MSD percent recovery >125%	Non-detect	No Action
	Detect	J

3.2 Laboratory Duplicate Sample Analysis

The laboratory duplicate sample relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to five times the RL. A control limit of 35% for soil matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the RL, a control limit of two times the RL is applied for soil matrices.

The laboratory duplicate sample results exhibited RPD within the control limit.

4. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit recoveries between the control limits of 80% and 120%.

All analytes associated with the LCS analysis exhibited acceptable recoveries.

5. Field Duplicate Sample Analysis

The field duplicate sample analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for soil matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the RL, a control limit of three times the RL is applied for soil matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
CP-SPA-S-03/ FD060915-A	Arsenic	6.2	5.0	AC
	Barium	134	139	3.7%
	Beryllium	0.45	0.38	AC
	Cadmium	0.43	0.22	AC
	Chromium	6.63	7.10	6.8%
	Cobalt	7.67	8.95	15.4%
	Copper	823	842	2.3%
	Lead	4.2	5.1	19.4%
	Manganese	292	323	10.1%
	Molybdenum	216	136	45.5%
	Nickel	7.44	8.38	11.9%
	Zinc	35.2	35.4	0.6%
	Uranium	7.25	5.72	23.6%
CP-SPA-S-09/ FD060915-B	Arsenic	3.1	2.5 U	AC
	Barium	318	200	45.6%
	Beryllium	0.41	0.29	AC
	Chromium	7.53	7.31	3.0%
	Cobalt	13.1	7.80	50.0%
	Copper	922	667	32.1%

Sample ID/Duplicate ID	Analyte	Sample Result	Duplicate Result	RPD
CP-SPA-S-09/ FD060915-B	Lead	2.7	2.3	AC
	Manganese	306	276	10.3%
	Molybdenum	47.7	28.6	50.1%
	Nickel	10.4	8.63	18.6%
	Zinc	39.1	36.3	7.4%
	Uranium	2.72	4.17	42.1%

AC = Acceptable

The analytes cobalt and molybdenum associated with samples locations CP-SPA-S-09 and FD060915-B exhibited a field duplicate RPD greater than the control limit. The associated sample results from sample locations for the listed analyte were qualified as estimated.

6. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010/6020, 7471	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP/AES) Inductively Coupled Plasma-Mass Spectrometry (ICP/MS) Atomic Absorption – Manual Cold Vapor (CV)					
Tier II Validation					
Holding Times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method Blanks		X		X	
B. Equipment Blanks		X		X	
Laboratory Control Sample (LCS) Accuracy (%R)		X		X	
Laboratory Control Sample Duplicate (LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) Accuracy (%R)		X	X		
Matrix Spike Duplicate (MSD) %R		X	X		
MS/MSD Precision (RPD)		X		X	
Laboratory Duplicate Sample RPD		X		X	
Field Duplicate Sample RPD		X	X		
Dilution Factor					X
Dissolved versus Total Results					X
Moisture Content		X		X	

%R – Percent recovery

RPD – Relative percent difference

VALIDATION PERFORMED BY: Jennifer Chandler

SIGNATURE: 

DATE: July 4, 2015

PEER REVIEW: Joseph C. Houser

DATE: July 5, 2015

**CHAIN OF CUSTODY /
CORRECTED SAMPLE ANALYSIS DATA SHEETS**

ID#: _____

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order # WBF0266

Send Results to:	Contact & Company Name: Shawn Roberts	Telephone: 913 492-0900
	Address: 8725 Roxhill, Ste 350	Fax: 913 492-0902
	City State Zip: Lenexa KS 66215	E-mail Address: shawn.roberts@arcadis-us.com
	Project Name/Location (City, State): Sanita - CLEAR Plant	Project #: AZ001233.0019
Sampler's Printed Name: Ben Greenwell		Sampler's Signature: <i>Ben Greenwell</i>

Preservative					
Filtered (✓)					
# of Containers					
Container Information					

Keys

Preservation Key:
 A. H₂SO₄
 B. HCl
 C. HNO₃
 D. NaOH
 E. None
 F. Other: _____
 G. Other: _____
 H. Other: _____

Container Information Key:
 1. 40 ml Vial
 2. 1 L Amber
 3. 250 ml Plastic
 4. 500 ml Plastic
 5. Encore
 6. 2 oz. Glass
 7. 4 oz. Glass
 8. 8 oz. Glass
 9. Other: _____
 10. Other: _____

Matrix Key:
 SO - Soil
 W - Water
 T - Tissue
 SE - Sediment
 SL - Sludge
 A - Air
 NL - NAPL/Oil
 SW - Sample Wipe
 Other: _____

PARAMETER ANALYSIS & METHOD

6010 B	As, Pb, Cu	6010 B Extended	6020 A	Mn, Ni, Vm	7471	Hg
		* (see comments)				

Sample ID	Collection		Type (✓)		Matrix	PARAMETER ANALYSIS & METHOD						REMARKS	
	Date	Time	Comp	Grab		6010 B	As, Pb, Cu	6010 B Extended	6020 A	Mn, Ni, Vm	7471		Hg
CP-SPA-S-01	6-9-15	1629		X	SO	X							1 ctr
CP-SPA-S-02		1634				X							1 ctr
CP-SPA-S-03		1644					X	X	X				2 ctrs
CP-SPA-S-03 FD060915-A		1644					X	X	X				4 ctrs, Add sample volume for MS/MSD
CP-SPA-S-04		1657				X							1 ctr
CP-SPA-S-05		1703				X							1 ctr
CP-SPA-S-06		1709				X							1 ctr
CP-SPA-S-07		1713				X							1 ctr
CP-SPA-S-08		1726				X							1 ctr
CP-SPA-S-09		1733					X	X	X				2 ctrs
FD060915-B		1733					X	X	X				2 ctrs
CP-SPA-S-10		1744				X							1 ctr
CP-SPA-S-11		1748				X							1 ctr
CP-SPA-S-12		1754				X							1 ctr

Special Instructions/Comments: Archive remaining sample volume. Special QA/QC Instructions (✓):

*6010B Extended Metals as per quote [Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Mo, Ni, Se, Tl, Zn]

Laboratory Information and Receipt		Relinquished By		Received By		Relinquished By		Laboratory Received By	
Lab Name: SVL Analytical	Cooler Custody Seal (✓) <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Printed Name: Ben Greenwell	Signature: <i>Ben Greenwell</i>	Printed Name: Ch Flores	Signature: <i>Ch Flores</i>	Printed Name:	Signature:	Printed Name:	Signature:
<input type="checkbox"/> Cooler packed with ice (✓)		Firm: ARCADIS	Date/Time: 6-10-15 / 1514	Firm/Courier: SVL	Date/Time: 6/11/15 12:30	Firm/Courier:	Date/Time:	Firm:	Date/Time:
Specify Turnaround Requirements: Standard 10-day	Sample Receipt:								
Shipping Tracking #:	Condition/Cooler Temp:								

ID#: _____

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order # W5F0266

Send Results to: **Shawn Roberts**
 Telephone: **913 492-0900**
 Address: **8725 Rosehill, Ste 350**
 Fax: **913 492-0902**
 City: **Leawards KS 66215**
 State: **KS** Zip: **66215**
 E-mail Address: **shawn.roberts@arcadis-us.com**

Preservative: _____
 Filtered (✓): _____
 # of Containers: _____
 Container Information: _____

Project Name/Location (City, State): **Standard - CLEAR Plant**
 Project #: **AZ001233.0019**
 Sampler's Printed Name: **Ben Greenwell**
 Sampler's Signature: *[Signature]*

PARAMETER ANALYSIS & METHOD

6010 B
As, Pb, Cu
6010 B Extended
**(See comments)*
6020 A
Uranium
7471
Hg
TCLP - 8 RCRA metals
BS

Keys

Preservation Key:
 A. H₂SO₄
 B. HCl
 C. HNO₃
 D. NaOH
 E. None
 F. Other: _____
 G. Other: _____
 H. Other: _____

Container Information Key:
 1. 40 ml Vial
 2. 1 L Amber
 3. 250 ml Plastic
 4. 500 ml Plastic
 5. Encore
 6. 2 oz. Glass
 7. 4 oz. Glass
 8. 8 oz. Glass
 9. Other: _____
 10. Other: _____

Matrix Key:
 SO - Soil
 W - Water
 T - Tissue

SE - Sediment
SL - Sludge
A - Air

NL - NAPL/Oil
SW - Sample Wipe
Other: _____

Sample ID	Collection		Type (✓)		Matrix	PARAMETER ANALYSIS & METHOD								REMARKS	
	Date	Time	Comp	Grab		6010 B	As, Pb, Cu	6010 B Extended	6020 A	Uranium	7471	Hg	TCLP - 8 RCRA metals		
CP-SPA-S-13	6-9-15	1802		X	SO	X									1 ctr
CP-SPA-S-14		1810				X									1 ctr
CP-SPA-S-15		1816				X									1 ctr
CP-SPA-S-16		1822				X									1 ctr
CP-SPA-S-17		1826				X									1 ctr
CP ^{BS} EB061015	6-10-15	0809		X	W		X	X	X						1 ctr, preserved w/ nitric acid
CP-E-01	6-10-15	0820	X		S		X	X	X	X	X				3 ctrs
CP-E-02		0833					X	X	X	X	X				3 ctrs
CP-E-03		0848					X	X	X	X	X				3 ctrs

Special Instructions/Comments: ~~Arch~~ ^{BS} Archive remaining sample volume. Special QA/QC Instructions (✓): 35 total containers

* 6010 B Extended Metals as per quote [Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Mn, Mo, Ni, Se, Tl, Zn]

Laboratory Information and Receipt		Relinquished By		Received By		Relinquished By		Laboratory Received By	
Lab Name: SVL Analytical	Cooler Custody Seal (✓) <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Printed Name: Ben Greenwell	Signature: <i>[Signature]</i>	Printed Name: J. FLORES	Signature: <i>[Signature]</i>	Printed Name: _____	Signature: _____	Printed Name: _____	Signature: _____
Specify Turnaround Requirements: Standard 10-day	Sample Receipt:	Firm: ARCADIS	Firm/Courier: SVL	Firm/Courier: _____	Firm/Courier: _____	Firm/Courier: _____	Firm/Courier: _____	Firm/Courier: _____	Firm/Courier: _____
Shipping Tracking #: _____	Condition/Cooler Temp: _____	Date/Time: 6-10-15 / 1514	Date/Time: 6/11/15 12:30	Date/Time: _____	Date/Time: _____	Date/Time: _____	Date/Time: _____	Date/Time: _____	Date/Time: _____



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **WSF0266**
Reported: 24-Jun-15 14:55

Quality Control - MATRIX SPIKE DUPLICATE Data (Continued)

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	%R	RPD	RPD Limit	Batch ID	Analyzed	Notes
TCLP Leachates (Metals) (Continued)											
EPA 6010B	Chromium	mg/L Extract	0.944	0.953	1.00	94.4	1.0	20	W525185	22-Jun-15	
EPA 6010B	Lead	mg/L Extract	0.908	0.925	1.00	90.4	1.8	20	W525185	22-Jun-15	
EPA 6010B	Selenium	mg/L Extract	0.220	0.216	0.200	110	2.0	20	W525185	22-Jun-15	
EPA 6010B	Silver	mg/L Extract	1.01	1.03	1.00	101	1.6	20	W525185	22-Jun-15	
EPA 7470A	Mercury	mg/L Extract	0.00112	0.00109	0.00100	112	2.7	20	W525181	19-Jun-15	

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total)										
EPA 6020A	Uranium	mg/kg	14.8	5.72	10.0	90.3	75 - 125	W524236	22-Jun-15	
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Manganese	mg/kg	282	204	100	78.4	75 - 125	W525011	23-Jun-15	
EPA 6010B	Manganese	mg/kg	412	323	100	88.5	75 - 125	W525010	23-Jun-15	
EPA 6010B	Molybdenum	mg/kg	468	399	100	69.4	75 - 125	W525011	23-Jun-15	M2
EPA 6010B	Zinc	mg/kg	346	273	100	73.1	75 - 125	W525011	23-Jun-15	M2
Metals (Total Recoverable)										
EPA 6020A	Uranium	mg/L	0.101	<0.001000	0.100	101	75 - 125	W524235	22-Jun-15	

Notes and Definitions

- D2 Sample required dilution due to high concentration of target analyte.
- M1 Matrix spike recovery was high, but the LCS recovery was acceptable.
- M2 Matrix spike recovery was low, but the LCS recovery was acceptable.
- M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
- LCS Laboratory Control Sample (Blank Spike)
- RPD Relative Percent Difference
- UDL A result is less than the detection limit
- R > 4S % recovery not applicable, sample concentration more than four times greater than spike level
- <RL A result is less than the reporting limit
- MRL Method Reporting Limit
- MDL Method Detection Limit
- N/A Not Applicable



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-01**

SVL Sample ID: **W5F0266-01 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:29

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	10.3	mg/kg	2.5	0.8		W525010	AS	06/23/15 11:54	
EPA 6010B	Copper	1050	mg/kg	1.00	0.28		W525010	AS	06/23/15 11:54	
EPA 6010B	Lead	6.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 11:54	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.7	%	0.1			W524081	JAA	06/16/15 09:05	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-02**

SVL Sample ID: **W5F0266-02 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:34

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	3.8	mg/kg	2.5	0.8		W525010	AS	06/23/15 11:57	
EPA 6010B	Copper	2310	mg/kg	1.00	0.28		W525010	AS	06/23/15 11:57	
EPA 6010B	Lead	311	mg/kg	0.8	0.4		W525010	AS	06/23/15 11:57	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	96.6	%	0.1			W524081	JAA	06/16/15 09:05	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-03**

SVL Sample ID: **W5F0266-03 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:44
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 6020A	Uranium	7.25 J	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:27	
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:08	
EPA 6010B	Arsenic	6.2	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:00	
EPA 6010B	Barium	134	mg/kg	0.20	0.08		W525010	AS	06/23/15 12:00	
EPA 6010B	Beryllium	0.45	mg/kg	0.20	0.06		W525010	AS	06/23/15 12:00	
EPA 6010B	Cadmium	0.43	mg/kg	0.20	0.07		W525010	AS	06/23/15 12:00	
EPA 6010B	Chromium	6.63	mg/kg	0.60	0.16		W525010	AS	06/23/15 12:00	
EPA 6010B	Cobalt	7.67	mg/kg	0.60	0.11		W525010	AS	06/23/15 12:00	
EPA 6010B	Copper	823	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:00	
EPA 6010B	Lead	4.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:00	
EPA 6010B	Manganese	292 J	mg/kg	0.40	0.16		W525010	AS	06/23/15 12:00	
EPA 6010B	Molybdenum	216	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:10	
EPA 6010B	Nickel	7.44	mg/kg	1.00	0.22		W525010	AS	06/23/15 12:00	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 12:00	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:10	
EPA 6010B	Zinc	35.2 J	mg/kg	1.0	0.3		W525010	AS	06/23/15 12:00	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:17	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	95.3	%	0.1			W524081	JAA	06/16/15 09:05	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019

Work Order: W5F0266

Reported: 24-Jun-15 14:55

Client Sample ID: FD060915-A

SVL Sample ID: W5F0266-04 (Soil)

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:44
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 6020A	Uranium	5.72 J	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:22	M2
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:10	
EPA 6010B	Arsenic	5.0	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:03	
EPA 6010B	Barium	139	mg/kg	0.20	0.08		W525010	AS	06/23/15 12:03	
EPA 6010B	Beryllium	0.38	mg/kg	0.20	0.06		W525010	AS	06/23/15 12:03	
EPA 6010B	Cadmium	0.22	mg/kg	0.20	0.07		W525010	AS	06/23/15 12:03	
EPA 6010B	Chromium	7.10	mg/kg	0.60	0.16		W525010	AS	06/23/15 12:03	
EPA 6010B	Cobalt	8.95	mg/kg	0.60	0.11		W525010	AS	06/23/15 12:03	
EPA 6010B	Copper	842	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:03	M3
EPA 6010B	Lead	5.1	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:03	
EPA 6010B	Manganese	323 J	mg/kg	0.40	0.16		W525010	AS	06/23/15 12:03	M1
EPA 6010B	Molybdenum	136	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:12	
EPA 6010B	Nickel	8.38	mg/kg	1.00	0.22		W525010	AS	06/23/15 12:03	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 12:03	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:12	
EPA 6010B	Zinc	35.4 J	mg/kg	1.0	0.3		W525010	AS	06/23/15 12:03	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:19	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	94.7	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-04**

SVL Sample ID: **W5F0266-05 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 16:57
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	12.0	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:12	
EPA 6010B	Copper	2340	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:12	
EPA 6010B	Lead	33.1	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:12	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	93.1	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-05**

SVL Sample ID: **W5F0266-06 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:03

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	6.1	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:15	
EPA 6010B	Copper	2490	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:15	
EPA 6010B	Lead	35.1	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:15	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	94.6	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-06**

SVL Sample ID: **W5F0266-07 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:09

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	4.5	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:25	
EPA 6010B	Copper	1420	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:25	
EPA 6010B	Lead	14.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:25	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	93.3	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-07**

SVL Sample ID: **W5F0266-08 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:13

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	6.4	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:28	
EPA 6010B	Copper	1770	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:28	
EPA 6010B	Lead	20.5	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:28	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.7	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-08**

SVL Sample ID: **W5F0266-09 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:26

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	2.5	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:31	
EPA 6010B	Copper	943	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:31	
EPA 6010B	Lead	4.6	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:31	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	94.3	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-09**

SVL Sample ID: **W5F0266-10 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:33

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	2.72 J	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:28	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:16	
EPA 6010B	Arsenic	3.1	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:34	
EPA 6010B	Barium	318	mg/kg	0.20	0.08		W525010	AS	06/23/15 12:34	
EPA 6010B	Beryllium	0.41	mg/kg	0.20	0.06		W525010	AS	06/23/15 12:34	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.07		W525010	AS	06/23/15 12:34	
EPA 6010B	Chromium	7.53	mg/kg	0.60	0.16		W525010	AS	06/23/15 12:34	
EPA 6010B	Cobalt	13.1 J	mg/kg	0.60	0.11		W525010	AS	06/23/15 12:34	
EPA 6010B	Copper	922	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:34	
EPA 6010B	Lead	2.7	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:34	
EPA 6010B	Manganese	306 J	mg/kg	0.40	0.16		W525010	AS	06/23/15 12:34	
EPA 6010B	Molybdenum	47.7 J	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:18	
EPA 6010B	Nickel	10.4	mg/kg	1.00	0.22		W525010	AS	06/23/15 12:34	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 12:34	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:18	
EPA 6010B	Zinc	39.1 J	mg/kg	1.0	0.3		W525010	AS	06/23/15 12:34	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:28	

Percent Solids / Percent Moisture

Percent Solids	% Solids	94.0	%	0.1			W525012	JAA	06/16/15 10:10	
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This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **FD060915-B**

SVL Sample ID: **W5F0266-11 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:33
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 6020A	Uranium	4.17 J	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:30	
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:18	
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:37	
EPA 6010B	Barium	200	mg/kg	0.20	0.08		W525010	AS	06/23/15 12:37	
EPA 6010B	Beryllium	0.29	mg/kg	0.20	0.06		W525010	AS	06/23/15 12:37	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.07		W525010	AS	06/23/15 12:37	
EPA 6010B	Chromium	7.31	mg/kg	0.60	0.16		W525010	AS	06/23/15 12:37	
EPA 6010B	Cobalt	7.80 J	mg/kg	0.60	0.11		W525010	AS	06/23/15 12:37	
EPA 6010B	Copper	667	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:37	
EPA 6010B	Lead	2.3	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:37	
EPA 6010B	Manganese	276 J	mg/kg	0.40	0.16		W525010	AS	06/23/15 12:37	
EPA 6010B	Molybdenum	28.6 J	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:20	
EPA 6010B	Nickel	8.63	mg/kg	1.00	0.22		W525010	AS	06/23/15 12:37	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 12:37	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:20	
EPA 6010B	Zinc	36.3 J	mg/kg	1.0	0.3		W525010	AS	06/23/15 12:37	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:30	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	94.2	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-10**

SVL Sample ID: **W5F0266-12 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:44

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	5.6	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:41	
EPA 6010B	Copper	1770	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:41	
EPA 6010B	Lead	16.0	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:41	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	93.4	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-11**

SVL Sample ID: **W5F0266-13 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:48

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	3.7	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:44	
EPA 6010B	Copper	1920	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:44	
EPA 6010B	Lead	15.5	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:44	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.1	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-12**

SVL Sample ID: **W5F0266-14 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 17:54

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	3.1	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:47	
EPA 6010B	Copper	1500	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:47	
EPA 6010B	Lead	12.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:47	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.6	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-13**

SVL Sample ID: **W5F0266-15 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:02

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	11.1	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:50	
EPA 6010B	Copper	767	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:50	
EPA 6010B	Lead	4.2	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:50	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	92.9	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-14**

SVL Sample ID: **W5F0266-16 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:10

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	5.6	mg/kg	2.5	0.8		W525010	AS	06/23/15 12:53	
EPA 6010B	Copper	2970	mg/kg	1.00	0.28		W525010	AS	06/23/15 12:53	
EPA 6010B	Lead	17.4	mg/kg	0.8	0.4		W525010	AS	06/23/15 12:53	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	90.8	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-15**

SVL Sample ID: **W5F0266-17 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:16

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	8.9	mg/kg	2.5	0.8		W525010	AS	06/23/15 13:03	
EPA 6010B	Copper	2820	mg/kg	1.00	0.28		W525010	AS	06/23/15 13:03	
EPA 6010B	Lead	40.1	mg/kg	0.8	0.4		W525010	AS	06/23/15 13:03	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	95.0	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-16**

SVL Sample ID: **W5F0266-18 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:22

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	< 2.5	mg/kg	2.5	0.8		W525010	AS	06/23/15 13:06	
EPA 6010B	Copper	515	mg/kg	1.00	0.28		W525010	AS	06/23/15 13:06	
EPA 6010B	Lead	4.9	mg/kg	0.8	0.4		W525010	AS	06/23/15 13:06	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	95.4	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-SPA-S-17**

SVL Sample ID: **W5F0266-19 (Soil)**

Sample Report Page 1 of 1

Sampled: 09-Jun-15 18:26

Received: 11-Jun-15

Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	4.8	mg/kg	2.5	0.8		W525010	AS	06/23/15 13:09	
EPA 6010B	Copper	1710	mg/kg	1.00	0.28		W525010	AS	06/23/15 13:09	
EPA 6010B	Lead	17.7	mg/kg	0.8	0.4		W525010	AS	06/23/15 13:09	
Percent Solids / Percent Moisture										
Percent Solids	% Solids	91.3	%	0.1			W525012	JAA	06/16/15 10:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: Sierrita Mine Soils 2015 / AZ001233.0019
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **EB061015**
SVL Sample ID: **W5F0266-20 (Water)**

Sampled: 10-Jun-15 08:09
Received: 11-Jun-15
Sampled By: BG

Sample Report Page 1 of 1

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.00004		W525140	STA	06/19/15 13:26	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.009		W524283	AS	06/24/15 14:17	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.010		W524283	AS	06/24/15 14:17	
EPA 6010B	Barium	< 0.0020	mg/L	0.0020	0.0006		W524283	AS	06/24/15 14:17	
EPA 6010B	Beryllium	< 0.0020	mg/L	0.0020	0.0009		W524283	AS	06/24/15 14:17	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0006		W524283	AS	06/24/15 14:17	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0018		W524283	AS	06/24/15 14:17	
EPA 6010B	Cobalt	< 0.0060	mg/L	0.0060	0.0008		W524283	AS	06/24/15 14:17	
EPA 6010B	Copper	< 0.0100	mg/L	0.0100	0.0023		W524283	AS	06/24/15 14:17	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0038		W524283	AS	06/24/15 14:17	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0023		W524283	AS	06/24/15 14:17	
EPA 6010B	Molybdenum	< 0.008	mg/L	0.008	0.005		W524283	AS	06/24/15 14:17	
EPA 6010B	Nickel	< 0.0100	mg/L	0.0100	0.0028		W524283	AS	06/24/15 14:17	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.015		W524283	AS	06/24/15 14:17	
EPA 6010B	Thallium	< 0.015	mg/L	0.015	0.009		W524283	AS	06/24/15 14:17	
EPA 6010B	Zinc	< 0.010	mg/L	0.010	0.003		W524283	AS	06/24/15 14:17	
EPA 6020A	Uranium	< 0.00100	mg/L	0.00100	0.000014		W524235	KWH	06/22/15 13:07	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-E-01**

SVL Sample ID: **W5F0266-21 (Soil)**

Sample Report Page 1 of 1

Sampled: 10-Jun-15 08:20
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	6.01 J	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:31	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	2.2	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:21	
EPA 6010B	Arsenic	5.0	mg/kg	2.5	0.8		W525010	AS	06/23/15 13:12	
EPA 6010B	Barium	123	mg/kg	0.20	0.08		W525010	AS	06/23/15 13:12	
EPA 6010B	Beryllium	0.32	mg/kg	0.20	0.06		W525010	AS	06/23/15 13:12	
EPA 6010B	Cadmium	0.21	mg/kg	0.20	0.07		W525010	AS	06/23/15 13:12	
EPA 6010B	Chromium	5.85	mg/kg	0.60	0.16		W525010	AS	06/23/15 13:12	
EPA 6010B	Cobalt	7.06	mg/kg	0.60	0.11		W525010	AS	06/23/15 13:12	
EPA 6010B	Copper	2040	mg/kg	1.00	0.28		W525010	AS	06/23/15 13:12	
EPA 6010B	Lead	13.6	mg/kg	0.8	0.4		W525010	AS	06/23/15 13:12	
EPA 6010B	Manganese	259 J	mg/kg	0.40	0.16		W525010	AS	06/23/15 13:12	
EPA 6010B	Molybdenum	196	mg/kg	0.80	0.21		W525010	AS	06/23/15 13:22	
EPA 6010B	Nickel	6.76	mg/kg	1.00	0.22		W525010	AS	06/23/15 13:12	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525010	AS	06/23/15 13:12	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525010	AS	06/23/15 13:22	
EPA 6010B	Zinc	59.2 J	mg/kg	1.0	0.3		W525010	AS	06/23/15 13:12	
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:32	

Percent Solids / Percent Moisture

Percent Solids	% Solids	94.1	%	0.1			W525012	JAA	06/16/15 10:10	
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TCLP Extraction Parameters

EPA 1311	Final pH	5.08	pH Units				W525025	ESB	06/16/15 09:30	
EPA 1311	% Dry Solids	94.0	%				W525025	ESB	06/16/15 09:30	

TCLP Leachates (Metals) Extracted: 06/16/15 09:30

EPA 6010B	Arsenic	< 0.050	mg/L Extract	0.050	0.010		W525185	AS	06/22/15 16:10	
EPA 6010B	Barium	< 1.00	mg/L Extract	1.00	0.0006		W525185	AS	06/22/15 16:10	
EPA 6010B	Cadmium	< 0.0100	mg/L Extract	0.0100	0.0006		W525185	AS	06/22/15 16:10	
EPA 6010B	Chromium	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:10	
EPA 6010B	Lead	< 0.0500	mg/L Extract	0.0500	0.0038		W525185	AS	06/22/15 16:10	
EPA 6010B	Selenium	< 0.050	mg/L Extract	0.050	0.015		W525185	AS	06/22/15 16:10	
EPA 6010B	Silver	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:10	
EPA 7470A	Mercury	< 0.00020	mg/L Extract	0.00020	0.00004		W525181	STA	06/19/15 11:04	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**
Work Order: **W5F0266**
Reported: 24-Jun-15 14:55

Client Sample ID: **CP-E-02**

SVL Sample ID: **W5F0266-22 (Soil)**

Sample Report Page 1 of 1

Sampled: 10-Jun-15 08:33
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	2.85 J	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:35	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	5.4	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:23	
EPA 6010B	Arsenic	10.7	mg/kg	2.5	0.8		W525011	AS	06/23/15 13:39	
EPA 6010B	Barium	59.3	mg/kg	0.20	0.08		W525011	AS	06/23/15 13:39	
EPA 6010B	Beryllium	0.36	mg/kg	0.20	0.06		W525011	AS	06/23/15 13:39	
EPA 6010B	Cadmium	1.17	mg/kg	0.20	0.07		W525011	AS	06/23/15 13:39	
EPA 6010B	Chromium	5.90	mg/kg	0.60	0.16		W525011	AS	06/23/15 13:39	
EPA 6010B	Cobalt	8.39	mg/kg	0.60	0.11		W525011	AS	06/23/15 13:39	
EPA 6010B	Copper	4860	mg/kg	10.0	2.80	10	W525011	AS	06/23/15 14:26	D2
EPA 6010B	Lead	67.7	mg/kg	0.8	0.4		W525011	AS	06/23/15 13:39	
EPA 6010B	Manganese	204 J	mg/kg	0.40	0.16		W525011	AS	06/23/15 13:39	M1
EPA 6010B	Molybdenum	399 J	mg/kg	0.80	0.21		W525011	AS	06/23/15 12:31	M1
EPA 6010B	Nickel	7.79	mg/kg	1.00	0.22		W525011	AS	06/23/15 13:39	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.5		W525011	AS	06/23/15 13:39	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525011	AS	06/23/15 12:31	
EPA 6010B	Zinc	273 J	mg/kg	1.0	0.3		W525011	AS	06/23/15 13:39	M1
EPA 7471A	Mercury	< 0.033	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:33	

Percent Solids / Percent Moisture

Percent Solids	% Solids	98.5	%	0.1			W525012	JAA	06/16/15 10:10	
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TCLP Extraction Parameters

EPA 1311	Final pH	5.13	pH Units				W525025	ESB	06/16/15 09:30	
EPA 1311	% Dry Solids	98.3	%				W525025	ESB	06/16/15 09:30	

TCLP Leachates (Metals) Extracted: 06/16/15 09:30

EPA 6010B	Arsenic	< 0.050	mg/L Extract	0.050	0.010		W525185	AS	06/22/15 16:17	
EPA 6010B	Barium	< 1.00	mg/L Extract	1.00	0.0006		W525185	AS	06/22/15 16:17	
EPA 6010B	Cadmium	0.0325	mg/L Extract	0.0100	0.0006		W525185	AS	06/22/15 16:17	
EPA 6010B	Chromium	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:17	
EPA 6010B	Lead	< 0.0500	mg/L Extract	0.0500	0.0038		W525185	AS	06/22/15 16:17	
EPA 6010B	Selenium	< 0.050	mg/L Extract	0.050	0.015		W525185	AS	06/22/15 16:17	
EPA 6010B	Silver	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:17	
EPA 7470A	Mercury	< 0.00020	mg/L Extract	0.00020	0.00004		W525181	STA	06/19/15 11:10	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



ARCADIS (Kansas)
8725 Rosehill, Suite 350
Lenexa, KS 66215

Project Name: **Sierrita Mine Soils 2015 / AZ001233.0019**

Work Order: **W5F0266**

Reported: 24-Jun-15 14:55

Client Sample ID: **CP-E-03**

SVL Sample ID: **W5F0266-23 (Soil)**

Sample Report Page 1 of 1

Sampled: 10-Jun-15 08:48
Received: 11-Jun-15
Sampled By: BG

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
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Metals (Total)

EPA 6020A	Uranium	3.69 J	mg/kg	0.500	0.0012	2	W524236	KWH	06/22/15 13:36	
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Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	9.4	mg/kg	2.0	0.6		W525014	AS	06/22/15 15:30	
EPA 6010B	Arsenic	21.0	mg/kg	2.5	0.8		W525011	AS	06/23/15 13:48	
EPA 6010B	Barium	70.5	mg/kg	0.20	0.08		W525011	AS	06/23/15 13:48	
EPA 6010B	Beryllium	0.36	mg/kg	0.20	0.06		W525011	AS	06/23/15 13:48	
EPA 6010B	Cadmium	1.40	mg/kg	0.20	0.07		W525011	AS	06/23/15 13:48	
EPA 6010B	Chromium	3.84	mg/kg	0.60	0.16		W525011	AS	06/23/15 13:48	
EPA 6010B	Cobalt	10.4	mg/kg	0.60	0.11		W525011	AS	06/23/15 13:48	
EPA 6010B	Copper	10700	mg/kg	10.0	2.80	10	W525011	AS	06/23/15 14:35	D2
EPA 6010B	Lead	231	mg/kg	0.8	0.4		W525011	AS	06/23/15 13:48	
EPA 6010B	Manganese	178 J	mg/kg	0.40	0.16		W525011	AS	06/23/15 13:48	
EPA 6010B	Molybdenum	422 J	mg/kg	0.80	0.21		W525011	AS	06/23/15 12:38	
EPA 6010B	Nickel	8.20	mg/kg	1.00	0.22		W525011	AS	06/23/15 13:48	
EPA 6010B	Selenium	4.2	mg/kg	4.0	1.5		W525011	AS	06/23/15 13:48	
EPA 6010B	Thallium	< 1.5	mg/kg	1.5	0.8		W525011	AS	06/23/15 12:38	
EPA 6010B	Zinc	357 J	mg/kg	1.0	0.3		W525011	AS	06/23/15 13:48	
EPA 7471A	Mercury	0.045	mg/kg	0.033	0.005		W525024	STA	06/17/15 10:35	

Percent Solids / Percent Moisture

Percent Solids	% Solids	97.9	%	0.1			W525012	JAA	06/16/15 10:10	
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TCLP Extraction Parameters

EPA 1311	Final pH	5.08	pH Units				W525025	ESB	06/16/15 09:30	
EPA 1311	% Dry Solids	98.0	%				W525025	ESB	06/16/15 09:30	

TCLP Leachates (Metals) Extracted: 06/16/15 09:30

EPA 6010B	Arsenic	< 0.050	mg/L Extract	0.050	0.010		W525185	AS	06/22/15 16:20	
EPA 6010B	Barium	< 1.00	mg/L Extract	1.00	0.0006		W525185	AS	06/22/15 16:20	
EPA 6010B	Cadmium	0.0417	mg/L Extract	0.0100	0.0006		W525185	AS	06/22/15 16:20	
EPA 6010B	Chromium	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:20	
EPA 6010B	Lead	< 0.0500	mg/L Extract	0.0500	0.0038		W525185	AS	06/22/15 16:20	
EPA 6010B	Selenium	< 0.050	mg/L Extract	0.050	0.015		W525185	AS	06/22/15 16:20	
EPA 6010B	Silver	< 0.0500	mg/L Extract	0.0500	0.0018		W525185	AS	06/22/15 16:20	
EPA 7470A	Mercury	< 0.00020	mg/L Extract	0.00020	0.00004		W525181	STA	06/19/15 11:15	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



Appendix D

ProUCL 5.0.00 Input and Output
Files (ProUCL input files are
provided electronically on CD)

Appendix D
ProUCL 5.0.00 Input
Former CLEAR Plant Area Paving Project
Freeport McMoRan Sierrita Operations

Arsenic	d_Arsenic	Copper	d_Copper	Lead	d_Lead
2.5	0	1580	1	3.9	1
5.1	1	2550	1	19.8	1
7.9	1	12800	1	69.0	1
7.3	1	4730	1	41.6	1
2.5	0	698.5	1	5.8	1
18.9	1	4810	1	97.0	1
23.6	1	3200	1	57.0	1
2.9	1	618	1	20.6	1
3.8	1	1290	1	23.9	1
10.3	1	5090	1	80.7	1
10.3	1	1050	1	6.2	1
3.8	1	2310	1	311	1
5.6	1	832.5	1	4.65	1
12	1	2340	1	33.1	1
6.1	1	2490	1	35.1	1
4.5	1	1420	1	14.2	1
6.4	1	1770	1	20.5	1
2.5	1	943	1	4.6	1
3.1	1	794.5	1	2.5	1
5.6	1	1770	1	16.0	1
3.7	1	1920	1	15.5	1
3.1	1	1500	1	12.2	1
11.1	1	767	1	4.2	1
5.6	1	2970	1	17.4	1
8.9	1	2820	1	40.1	1
2.5	0	515	1	4.9	1
4.8	1	1710	1	17.7	1
4.1	1	2100	1	17.3	1
18.7	1	1310	1	22.6	1

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Arsenic

General Statistics

Total Number of Observations	29	Number of Distinct Observations	21
Number of Detects	26	Number of Non-Detects	3
Number of Distinct Detects	21	Number of Distinct Non-Detects	1
Minimum Detect	2.5	Minimum Non-Detect	2.5
Maximum Detect	23.6	Maximum Non-Detect	2.5
Variance Detects	29.56	Percent Non-Detects	10.34%
Mean Detects	7.681	SD Detects	5.437
Median Detects	5.6	CV Detects	0.708
Skewness Detects	1.663	Kurtosis Detects	2.345
Mean of Logged Detects	1.846	SD of Logged Detects	0.609

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.801	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.92	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.208	Lilliefors GOF Test
5% Lilliefors Critical Value	0.174	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	7.145	Standard Error of Mean	1.002
SD	5.289	95% KM (BCA) UCL	8.869
95% KM (t) UCL	8.849	95% KM (Percentile Bootstrap) UCL	8.834
95% KM (z) UCL	8.792	95% KM Bootstrap t UCL	9.45
90% KM Chebyshev UCL	10.15	95% KM Chebyshev UCL	11.51
97.5% KM Chebyshev UCL	13.4	99% KM Chebyshev UCL	17.11

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.745	Anderson-Darling GOF Test
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.153	Kolmogrov-Smirnoff GOF
5% K-S Critical Value	0.173	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.749	k star (bias corrected MLE)	2.457
Theta hat (MLE)	2.794	Theta star (bias corrected MLE)	3.126
nu hat (MLE)	142.9	nu star (bias corrected)	127.8
MLE Mean (bias corrected)	7.681	MLE Sd (bias corrected)	4.9

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.825	nu hat (KM)	105.8
Approximate Chi Square Value (105.83, α)	83.09	Adjusted Chi Square Value (105.83, β)	81.89
95% Gamma Approximate KM-UCL (use when $n \geq 50$)	9.1	95% Gamma Adjusted KM-UCL (use when $n < 50$)	9.234

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	6.887
Maximum	23.6	Median	5.6
SD	5.661	CV	0.822
k hat (MLE)	0.791	k star (bias corrected MLE)	0.732
Theta hat (MLE)	8.704	Theta star (bias corrected MLE)	9.403
nu hat (MLE)	45.9	nu star (bias corrected)	42.48
MLE Mean (bias corrected)	6.887	MLE Sd (bias corrected)	8.048
		Adjusted Level of Significance (β)	0.0407
Approximate Chi Square Value (42.48, α)	28.54	Adjusted Chi Square Value (42.48, β)	27.86
95% Gamma Approximate UCL (use when $n \geq 50$)	10.25	95% Gamma Adjusted UCL (use when $n < 50$)	10.5

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.952	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.92	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.119	Lilliefors GOF Test
5% Lilliefors Critical Value	0.174	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

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Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	7.045	Mean in Log Scale	1.698
SD in Original Scale	5.48	SD in Log Scale	0.728
95% t UCL (assumes normality of ROS data)	8.776	95% Percentile Bootstrap UCL	8.749
95% BCA Bootstrap UCL	8.994	95% Bootstrap t UCL	9.401
95% H-UCL (Log ROS)	9.58		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.75	95% H-UCL (KM -Log)	8.988
KM SD (logged)	0.632	95% Critical H Value (KM-Log)	2.062
KM Standard Error of Mean (logged)	0.12		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	7.016	Mean in Log Scale	1.678
SD in Original Scale	5.511	SD in Log Scale	0.764
95% t UCL (Assumes normality)	8.756	95% H-Stat UCL	9.843

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	8.869	95% GROS Adjusted Gamma UCL	10.5
95% Adjusted Gamma KM-UCL	9.234		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Copper

General Statistics

Total Number of Observations	29	Number of Distinct Observations	28
		Number of Missing Observations	0
Minimum	515	Mean	2369
Maximum	12800	Median	1770
SD	2357	Std. Error of Mean	437.6
Coefficient of Variation	0.995	Skewness	3.356

Normal GOF Test

Shapiro Wilk Test Statistic	0.645	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.926	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.228	Lilliefors GOF Test
5% Lilliefors Critical Value	0.165	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3113	95% Adjusted-CLT UCL (Chen-1995)	3380
		95% Modified-t UCL (Johnson-1978)	3159

Gamma GOF Test

A-D Test Statistic	0.669	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.124	Kolmogrov-Smirnoff Gamma GOF Test
5% K-S Critical Value	0.165	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.904	k star (bias corrected MLE)	1.73
Theta hat (MLE)	1244	Theta star (bias corrected MLE)	1369
nu hat (MLE)	110.4	nu star (bias corrected)	100.3
MLE Mean (bias corrected)	2369	MLE Sd (bias corrected)	1801
		Approximate Chi Square Value (0.05)	78.23
Adjusted Level of Significance	0.0407	Adjusted Chi Square Value	77.06

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3038	95% Adjusted Gamma UCL (use when n<50)	3084
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Lognormal GOF Test

Shapiro Wilk Test Statistic	0.972	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.926	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0709	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.165	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.244	Mean of logged Data	7.485
Maximum of Logged Data	9.457	SD of logged Data	0.723

Assuming Lognormal Distribution

95% H-UCL	3103	90% Chebyshev (MVUE) UCL	3287
95% Chebyshev (MVUE) UCL	3739	97.5% Chebyshev (MVUE) UCL	4367
99% Chebyshev (MVUE) UCL	5601		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3089	95% Jackknife UCL	3113
95% Standard Bootstrap UCL	3072	95% Bootstrap-t UCL	3713
95% Hall's Bootstrap UCL	6174	95% Percentile Bootstrap UCL	3143
95% BCA Bootstrap UCL	3426		
90% Chebyshev(Mean, Sd) UCL	3682	95% Chebyshev(Mean, Sd) UCL	4276
97.5% Chebyshev(Mean, Sd) UCL	5102	99% Chebyshev(Mean, Sd) UCL	6723

Suggested UCL to Use

95% Adjusted Gamma UCL 3084

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulation results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

Lead

General Statistics

Total Number of Observations	29	Number of Distinct Observations	29
		Number of Missing Observations	0
Minimum	2.5	Mean	35.14
Maximum	311	Median	17.7
SD	58.18	Std. Error of Mean	10.8
Coefficient of Variation	1.656	Skewness	4.107

Normal GOF Test

Shapiro Wilk Test Statistic	0.514	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.926	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.287	Lilliefors GOF Test
5% Lilliefors Critical Value	0.165	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	53.52	95% Adjusted-CLT UCL (Chen-1995)	61.71
		95% Modified-t UCL (Johnson-1978)	54.89

Gamma GOF Test

A-D Test Statistic	0.986	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.779	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.179	Kolmogrov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.168	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

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Gamma Statistics

k hat (MLE)	0.883	k star (bias corrected MLE)	0.815
Theta hat (MLE)	39.79	Theta star (bias corrected MLE)	43.13
nu hat (MLE)	51.22	nu star (bias corrected)	47.26
MLE Mean (bias corrected)	35.14	MLE Sd (bias corrected)	38.93
		Approximate Chi Square Value (0.05)	32.48
Adjusted Level of Significance	0.0407	Adjusted Chi Square Value	31.75

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	51.13	95% Adjusted Gamma UCL (use when n<50)	52.3
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Lognormal GOF Test

Shapiro Wilk Test Statistic	0.966	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.926	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.107	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.165	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.916	Mean of logged Data	2.896
Maximum of Logged Data	5.74	SD of logged Data	1.119

Assuming Lognormal Distribution

95% H-UCL	58.92	90% Chebyshev (MVUE) UCL	56.74
95% Chebyshev (MVUE) UCL	67.6	97.5% Chebyshev (MVUE) UCL	82.68
99% Chebyshev (MVUE) UCL	112.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	52.91	95% Jackknife UCL	53.52
95% Standard Bootstrap UCL	52.22	95% Bootstrap-t UCL	76.38
95% Hall's Bootstrap UCL	120.1	95% Percentile Bootstrap UCL	53.91
95% BCA Bootstrap UCL	65.14		
90% Chebyshev(Mean, Sd) UCL	67.55	95% Chebyshev(Mean, Sd) UCL	82.23
97.5% Chebyshev(Mean, Sd) UCL	102.6	99% Chebyshev(Mean, Sd) UCL	142.6

Suggested UCL to Use

95% H-UCL 58.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulation results will not cover all Real World data sets.

For additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.