Appendix D

Methods and Results for Upland and Drainage Bank Analysis

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Smelter/Tailing Soils Investigation Unit
Feasibility Study

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Acronyms and Abbreviations

AOC	Administrative Order on Consent
bgs	below ground surface
BLM	Bureau of Land Management
COC	constituents of concern
CRWQCB	California Regional Water Quality Control Board
DEL	de minimis effect levels
ERA	ecological risk assessment
FS	Feasibility Study
FS Proposal	Smelter/Tailing Soils Unit Feasibility Study Proposal
HHRA	human health risk assessment
IRA	Interim Remedial Action
IRAWP	Interim Removal Action Work Plan
LCL	lower confidence limit
m	meter
mg	milligrams
mg/kg	milligrams per kilogram
mm	millimeters
NCP	National Contingency Plan
NDVI	normalized difference vegetation index
NIR	near-infrared
nm	nanometer
NMED	New Mexico Environment Department
NRCS	Natural Resources Conservation Service
OAT	observed apparent trend
pCu	Cupric ion activity (pCu2+)
PEL	probable effect level
pH	Hydrogen ion (standard units)
PRG	preliminary remediation goal
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan

RAC	remedial action criteria
RI	Remedial Investigation
ROD	Record of Decision
SCS	Soil Conservation Service
SGFB	small ground-feeding birds
SOP	Standard Operating Procedure
STSIU	Smelter/Tailing Soils Unit
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
XRF	x-ray fluorescence

1 Introduction

This Appendix documents the tasks and methodology conducted to fulfill the upland data needs and analysis identified in the Smelter/Tailing Soils Unit (STSIU) Feasibility Study (FS) Proposal (FS Proposal; Arcadis 2011c). The FS Proposal was designed to generate data necessary to evaluate the area affected by pre-FS remedial action criteria (RAC) issued by New Mexico Environment Department (NMED) on March 3, 2011. This Appendix describes the field investigation objectives, sampling methods, and the final analysis of the soil and vegetation community data collected in terrestrial areas for that purpose. Sampling procedures and analysis are consistent with those detailed in the Upland Sampling Work Plan (Appendix A) of the FS Proposal (herein referred to as the FS Work Plan and provided as Attachment F), except as noted in the sections below. Sampling activities were conducted following Standard Operating Procedures (SOPs) and in accordance with quality assurance/quality control (QA/QC) protocols outlined in the FS Work Plan and specifically stated in the Remedial Investigation (RI) Quality Assurance Project Plan (QAPP; Chino Mines Company [Chino] 1997). The QAPP defines how site-wide QA/QC activities were implemented during the RI sampling and analysis. The objective of the QAPP was to ensure that data are of adequate quality for their intended use. SOPs were developed as part of the QAPP and are incorporated by reference in this appendix.

2 Site Background

In accordance with the Administrative Order on Consent (AOC) Scope of Work, a RI(SRK 2008) for the STSIU was conducted to generate the data necessary to evaluate the potential effects to human health and the environment from historically-affected media in the STSIU. Data were collected in the STSIU starting in 1995 and continuing to 2019 to determine potential impacts to soil, sediment, and surface water from historical mineral processing activities. The approved RI human health risk assessment (HHRA; Gradient 2008) and ecological risk assessment (ERA; NewFields 2008) for the STSIU have shown that areas of the STSIU have elevated metals concentrations and depressed pH in soil and surface water. Based on these evaluations, the NMED established pre-FS RAC for the STSIU for arsenic, copper, iron, and cupric ion activity (calculated as $pCu^{2+} = -\log[Cu^{2+}]$, herein referred to as “pCu”). The pre-FS criteria for remedial action (Pre-FS RAC) for surface soils, the focus of this Appendix, include (NMED 2011a,b):

- Arsenic concentrations greater than 27 milligrams per kilogram (mg/kg) in 0-1 inch depth soils to protect human health;
- Copper concentrations greater than 5,000 mg/kg in 0-1 inch depth soils to protect human health;
- Iron concentrations greater than 100,000 mg/kg in 0-1 inch depth soils to protect human health;
- 95 percent upper confidence limit (95UCL) on the arithmetic mean concentration of the area-weighted average concentration of copper greater than 1,600 mg/kg in 0-6” depth soils within an exposure unit for small ground-feeding birds (SGFB);
- Monitoring of exposure units where the 95UCL on copper concentrations is greater than 1,100 mg/kg but less than 1,600 mg/kg in 0-6” depth soils for SGFB; and,
- pCu less than 5 where copper is greater than 327 mg/kg areas are evaluated to reduce soil toxicity to plants.

The FS and Record of Decision (ROD) will be completed consistent with the National Contingency Plan (NCP). Pre-FS RAC are consistent with the use of preliminary remediation goals (PRGs) by the United States Environmental Protection Agency (USEPA) in the NCP; therefore, new information can be used to refine the pre-FS RAC and selection of alternatives (§300.430(e)(2)(i) NCP). Evaluation of the pre-FS RAC is summarized in Sections 9 and 10 of this Appendix, below; final remediation goals will be documented in the ROD.

Prior to 2008, the two most wide-spread constituents of concern (COC), copper and pCu, had been sampled across the Chino Mine site to characterize the concentrations for ecological and human health risk assessment purposes (Gradient 2008; SRK 2008). The FS Proposal evaluated the data available in 2010 for all COCs and recommended additional sampling for copper and pCu, which were collected in 2011. To delineate potential areas for remediation, more extensive sampling of the soil was needed and has since occurred, following the FS Work Plan protocols over the years. More data were collected up to 2018 as part of later related studies or field events and used in this FS.

In addition to soil sampling, rangeland condition for livestock and the quality of habitat (vegetation cover and richness) for wildlife were assessed within the exposure units. Because destruction of vegetation and reduction in soil stability associated with remediation may do more harm than good in areas with good range and wildlife habitat conditions, the areas with pCu less than 5 were evaluated for their rangeland and wildlife habitat quality. Rangeland condition for livestock was initially assessed at Chino using a variety of methods within polygons of unique soil and vegetation combinations in 1997 (Woodward Clyde 1997 and unpublished data). For purposes of the FS, rangeland condition was evaluated in the field again in areas on and off the site. Soil data were also collected in these areas The field data, collected between 2011 and 2018, were combined with remote sensing training to map rangeland conditions within the STSIU using the observed apparent trend (OAT) method. Comparison of onsite scores within exposure units to thresholds for acceptable rangeland or to offsite reference OAT scores indicates whether pCu is of concern in the exposure unit in terms of adversely affecting the vegetation for livestock.

For wildlife habitat evaluations, plant species richness and vegetation cover were initially assessed in 1999 in relatively low slope, lower elevation, non-bedrock areas for the ERA to represent wildlife habitat quality relative to pCu impacts (Newfields 2006). These areas surveyed in 1999 do not represent the diversity of habitat types in the STSIU, which include steep slopes and areas with a high percentage of bedrock. Also, the white rain in January 2008 (see Appendix B of FS Report) increased pCu and possibly improved these vegetation indices as well as the rangeland condition (Arcadis 2011a). Therefore, additional soil pCu and vegetation assessments of richness and cover were completed for the FS in 2014 and 2018 to compare the post-white rain condition to offsite reference conditions to determine if adverse effects of pCu remain.

In addition to sampling for the nature and extent of copper and pCu impacts after the white rain, a phytotoxicity and vegetation community study was completed to evaluate the pCu effects on the STSIU plant community (Appendix C to the FS Report). This study expanded upon the initial phytotoxicity study conducted for the sitewide ERA and evaluated effects in more depth. Thresholds called *de minimis* effect levels (DEL) and probable effect levels (PELs) were developed from that study and are discussed in this Appendix. Because reference areas representative of the major soil and topographic conditions discovered in the STSIU during FS field sampling were missing for that study, additional sampling in new reference areas was completed in 2018. Rather than revising the phytotoxicity study report (Appendix C to FS Report), those results and the analysis are presented in this Appendix.

3 Objectives

As described in the FS Work Plan (Attachment F) and later related studies, the soil and vegetation sampling program addressed the following specific objectives:

- Fill in the data gaps in the distribution of total copper and pCu in the STSIU soils, estimating concentrations throughout the STSIU in areas where the levels of constituents are changing from background levels to potential levels of ecological (total copper and pCu) or human health (copper) concern;
- Identify exposure units for copper and pCu for calculating the pre-FS RAC using existing vegetation maps and refine unit boundaries as needed using field data and remote sensing.
- Evaluate if upland and drainage habitats differ to determine if separate drainage habitat exposure units are necessary to evaluate risk to SGFBs;
- Identify and tally the acreage of exposure units for SGFB that have copper in soil exceeding (1) the pre-FS RAC of 1,600 mg/kg (requiring remediation) and (2) the monitoring pre-FS RAC of 1,100 milligrams (mg).
- Identify and tally the acreage of exposure units for human health that have copper in soil exceeding the pre-FS RAC of 5,000 mg/kg.
- Identify and tally the acreage of exposure units for vegetation that have pCu in soil not meeting the generic pre-FS RAC (those that have mean pCu < 5 in areas with copper > 327 mg/kg).
- Sample and map rangeland condition, cover, and richness to assess if these vegetative attributes fall within the range of natural variability of reference areas (are acceptable). The pCu exposure units not meeting the pre-FS RAC of > 5 pCu that show no vegetative difference from unimpacted reference areas do not need to be remediated to protect the vegetation community and were screened out from remedy consideration (see Section 9.2, below, for the decision criteria for determining if vegetative differences are present between impacted and reference areas);
- Identify exposure units not meeting the pre-FS RAC that have either unacceptable rangeland condition or wildlife habitat quality relative to reference areas in the same soil category ; and
- Of exposure units identified in the previous bullet, identify those with mean pCu below the PEL calculated for the soil category the unit occurs in, and tally the acreage of those areas that will be considered for remediation.

This program of soil or vegetation sampling and exposure unit field verification was employed to meet the above objectives. The sampling program is described in detail in the FS Work Plan and later documents (Appendices A, B, C) and is summarized or elaborated upon in Sections 4 through 9, below.

4 Soil Field Investigation Methods

This section describes the September and October 2011 upland soil investigation activities dictated by the FS Work Plan, which consisted of collecting upland soil samples for laboratory analysis to fill in data gaps in the nature and extent of the distribution of copper and pCu in the STSIU within exposure units. This section also describes sampling updates to the FS Work Plan in terms of data collected in later years (after 2011) that were useful in the FS. These data were used to interpolate soil copper concentrations and pCu across the landscape of the STSIU and identify rangeland polygons with mean values (pCu) or 95UCLs of the mean values (copper) not meeting the pre-FS RAC criteria.

In 2011, additional copper sampling was needed for the FS to evaluate the pre-FS RAC for SGFB and human health; 57 samples were collected at the blue triangle locations in 2011 shown in Figure 6 of the FS work plan (Attachment F) to fill in spatial data gaps on the nature and extent of the copper distribution (within area of copper distribution uncertainty). Figure D-1 shows copper sample locations and concentrations through 2010 and sample locations added for the FS in 2011 (in area of uncertainty on transects) and locations added in later studies after 2011.

For the pCu extent, copper and pH, needed to calculate pCu, were sampled together at 41 locations in 2011 for the FS, shown in Figure D-2 in the area of uncertainty. Figure D-2 also shows all post-white rain pCu sample locations evaluated in the FS Report, including those collected through 2010 and those collected after 2011, which include 2012 bedrock data but exclude 2013 soil data from the phytotoxicity study because these overlap with previous sampling locations. The pCu at each location was calculated from the copper and pH data using the upland pCu predictive (R^2 = 0.97) equation in NewFields (2006):

$$pCu = 7.34+(0.93*pH)-(1.15*\ln[Cu_{total}])$$

Newfields (2006) provides other predictive equations that included ephemeral drainage bank locations. This upland equation was used because all soil samples were in the upland areas. The methodology for soil sample collection was implemented in accordance with the QAPP (Chino 1997) and applicable SOPs in the FS Work Plan to meet the data quality objectives in that plan.

Deviations from the FS Work Plan included:

1. Instead of using x-ray fluorescence (XRF) to collect copper samples, all copper soil samples for avian pre-FS RAC analysis were analyzed in the laboratory, as it was found to be as efficient to send samples to the laboratory as to measure in the field.
2. A proposed phytotoxicity and vegetation community study was approved and completed (field work completed in 2014) that collected additional soil copper and pH data on the STSIU site as well as offsite to evaluate reference areas. These data were used to calculate pCu and included for evaluation in the FS (not included in interpolations, however, due to high overlap of previous datasets). During this study, four soil/topographic units (referred to herein as “soil categories”) were found to influence the plant community and phytotoxicity. Thus, in 2018, more soil data were collected offsite in reference areas that represented the four soil categories (only one category had been sampled in reference areas), in addition to some onsite soil sampling as discussed in Section 5, below, and in Attachment A. These 2018 reference and site data were included in the FS evaluation for pCu.
3. The amendment study (with a last year of monitoring in 2013) and a pH monitoring study (with a last year of monitoring in 2014) included soil sampling for copper and pH at four amendment and adjacent untreated plots (Appendix A of the FS Report) and at long-term pH monitoring locations (Appendix B of the FS Report) that were included in the FS evaluation of copper and pCu.
4. Locations in bedrock were sampled for copper and pH to obtain pCu in 2012 in potential reference areas to obtain a better understanding of bedrock exposure more distant from the former smelter, and these data were included in the FS pCu interpolation. The results indicated these bedrock locations have lower pH and thus were classified as *de minimis* effect locations (treated as impacted), rather than as reference locations with no pCu effects for bedrock. Based on NMED comments on the phytotoxicity report (Appendix C to the FS Report), *de minimis* locations are defined as locations with background copper concentrations that are far

from or upwind of the smelter and tailings, but they may still have some elevated acidity. These locations were treated as site locations in all analyses.

5. All vegetation investigation locations identified in Section 5 were sampled for pCu in the soil in 2013 as part of the phytotoxicity study or reference area sampling (see Figure 3-10 of the FS Report, which illustrates years plots were sampled and data collected each year). Soil data collected in 2013 for the phytotoxicity study were not included in the FS evaluation due to a fair amount of overlap with previous sampling locations.
6. Interim Remedial Actions (IRAs) areas for human health protection in the Golf Course area in 2008 (Arcadis 2009), Railroad area in 2012 (Golder 2013), Razorback Ridge in 2013 to 2014 (Golder 2015), and B Ranch in 2020 (Arcadis 2021) included confirmation sampling that were included in the copper interpolations, adjusted to 0-6" and sieved to < 2 millimeters (mm) when applied to ecological analyses.

As a result of the additional sampling outlined above, the dataset available for delineating concentrations or copper and pCu within exposure units was larger than originally planned. The development of the FS was delayed until all the various supporting studies (Appendices A, B, and C of the FS Report and Attachment A of this Appendix; Arcadis 2009; Golder 2013; Golder 2015; Arcadis 2021) were completed to better inform remedial decisions, resulting in an expanded and more robust dataset.

URS (2012) completed a data validation report on all the data collected in 2011 for the FS (Attachment B) to identify the data to be used in the FS evaluation. The data quality and SOPs of the other supplemental investigations are described in the indicated appendices (Appendices A, B, and C) and their corresponding attachments for each investigation.

In accordance with the objectives of the QAPP, SOPs were implemented during field activities to maximize consistency in field activities, as outlined in the FS Work Plan and described briefly herein. The SOPs are provided as Appendix B of the RI QAPP (Chino 1997). General SOPs implemented during soil sampling activities included Field Document Control (SOP-1), Field Logbook and Field Sample Data Sheets (SOP-2), Field Quality Control (SOP-3), Sample Custody Procedures (SOP-4), Packaging and Shipping of Environmental Sample Containers (SOP-5), Decontamination of Equipment Used to Sample Soil and Water (SOP-6), Requesting Environmental Laboratory Services (SOP-7), and Sampling, Preservation and Containerization (SOP-14).

SOP-22 "Surface Soil Sampling" was followed for 2011 field sampling procedures focused on SGFB and plant pre-FS RACs. Each soil sample was a composite of five sub-samples taken over a sample interval of six inches in sample depth as measured from the ground surface. Following the FS Work Plan, the five sub-samples were collected over a 50 x 50 meter (m) area (rather than 20 feet in the original SOP) at the corners and center to reduce microscale variability; the locations were chosen to be representative of the area. Samples were sieved to less than 2 mm.[1] The coordinates for the 2011 copper and pCu sample locations are presented in Table 6 of the STSIU FS Work Plan (also see Table 3-2 and Table 3-4 of FS Report for all samples used for copper and pCu interpolation in FS). Following standard USEPA methods, the soils sampled were analyzed at ACZ laboratory for copper sampled at the new locations shown on Figure D-1 and for pH and copper for pCu locations shown on Figure D-2. Analysis used inductively coupled plasma (USEPA 6010) with a method detection limit of 1 mg/kg.

In accordance with SOP-3 "Field Quality Control", field QC samples (one per 10 samples) and rinsate blanks (one per 20 samples) were collected as part of the sampling program. These blind field duplicate samples and rinsate

[1] These samples were used for ecological evaluations. Human health samples generally were sampled at 0-1" and represented samples sieved at 0.25 mm in IRA areas focused on human health.

blanks were submitted for laboratory analyses. The comparison of duplicates to parent samples for copper and pH met the QAPP criteria of 50 percent or less (Table E-2 in Attachment E).

Additionally, copper was sampled in soil and analyzed in the laboratory on transects along drainage banks in conjunction with woody cover sampling described in Section 5.1, below. During the field sampling, 12 composite soil samples from the same locations sampled for vegetation on the banks were collected (FS Work Plan stated samples would be on a 50-m transect for soil and 100-m transect for woody cover, but 300-foot transect was actually used for both for efficiency). The soil samples were taken from the start (0 feet), middle (150 feet), and end (300 feet) of the transect at a depth of 0-6 inches below ground surface (bgs), composited, and sieved to less than 2 mm. The soil samples were collected to verify that the three drainages evaluated had high copper concentrations, which was suggested based on the limited data collected during earlier investigations. These bank data were included in the upland copper interpolations.

The laboratory data for each location collected specifically for the FS in 2011 (not for other studies, which have the laboratory data included in the associated reports) are in Attachment E.

5 Vegetation Field Investigation Methods

This section discusses the vegetation investigation activities described in the FS Work Plan, which, in upland areas, consisted of three activities:

1) defining exposure areas for avian and vegetation communities for copper and pCu, respectively;
2) collecting rangeland and wildlife habitat quality survey data at the 23 locations shown on Figure D-3, collected in September and October 2011 and 2012; and
3) collecting vegetation data on reference areas.

The exposure areas need to be delineated to identify exposure point concentrations in different areas. The purpose of the rangeland and wildlife habitat quality investigations was to evaluate which of the rangeland polygons not meeting the pre-FS RAC (determined in Section 4) should be retained for consideration for remediation due to evidence that pCu is actually adversely impacting the vegetation. The data on the condition of vegetation on reference areas was required to evaluate if vegetation on the areas identified by the pre-FS RAC was impacted and to what extent relative to reference areas, when refining areas retained for remediation.

No chemical data were collected in the vegetation assessment plots in 2011; however, all plots were revisited in 2013 and sampled for soil copper and pH to obtain an estimate of pCu for the phytotoxicity study (see Figure D-2 or Figure 3-10 of main FS report). These soil data, however, were not included in the copper and pCu datasets for interpolation as many had already been sampled in previous years.

As stated above, although some reference areas were sampled for vegetation for the FS in 2011, potential reference areas in bedrock locations were missing from the FS Work Plan and thus, bedrock locations STS-RWU-2012-B1, STS-RWU-2012-B2, and STS-RWU-2012-B3 in Figure D-3 were sampled for vegetation in 2012. Also, reference areas in all but flat granular soil types were missing from the FS work plan and added in 2018. Figure D-3 shows all areas surveyed for vegetation community characteristics in 2011 (for FS work plan), 2012 (for bedrock locations distant from smelter), 2014 (for the phytoxicity study), and 2018 (for additional reference areas).

Deviations from the FS Work Plan included:

- The FS Work Plan identified 15 locations in rangeland polygons believed to represent the range of vegetation conditions in the STSIU. However, the field team, which included NMED representatives, added 2 more in the field in 2011.
- Additional vegetation sampling occurred in new plots in 2014 as part of the phytotoxicity and community study (see Figure 3-10 of main FS report), and these data for the vegetation were included with the 2011 and 2012 data for development of the richness, cover, and rangeland condition maps used for the FS.
- Additional reference plots east of the STSIU (inset of Figure D-3 or Figure 3-10 of main FS report) were added for vegetation sampling in 2018 to obtain reference data across all 4 soil categories present on the site (three soil categories were lacking, as described earlier in deviation point 4 of Section 4 of this appendix and in Attachment A).

All the data described in the bullets above were used in the FS evaluation.

5.1 Delineation of Exposure Units for Copper and pCu

In the FS, the pre-FS RAC are compared to a representative statistic calculated for copper and pCu within exposure units to identify exceedances of the pre-FS RAC. The pre-FS RAC are evaluated within exposure units delineated based on habitat. The term “habitat unit” had not been defined for the AOC. The exposure units representing habitat units were preliminarily identified in the FS Work Plan as vegetation alliance polygons for copper and rangeland polygons for pCu. For copper, the SGFB pre-FS RAC value is estimated within an exposure unit representing habitat for the SGFB, as requested by NMED (NMED 2011a,b). The existing alliance level vegetation maps developed by Daniel B. Stephens & Associates (DBS&A; 1999, 2000) and used in the site-wide ERA (NewFields 2006) were designated as the habitat unit. However, NMED highlighted a concern related to drainage banks, especially those drainages with valued ecological habitat in this semi-arid ecosystem such as riparian woodland. The ephemeral drainage banks in the STSIU are potentially of high value to SGFB because they may have denser woody vegetation than adjacent upland areas. Section A4.4 in the FS Work Plan (Attachment F) discussed that different remedial technologies may be required along the ephemeral drainage banks when compared to the adjacent upland if there were large differences in overall habitat. Specifically, NMED was interested in evaluating if separate exposure units for drainage banks with elevated copper should be delineated. To evaluate the concern for the FS, woody cover of drainage bank habitats was mapped using remote sensing to determine if the bank habitat significantly differed from the adjacent upland habitats. If it differed, the banks would be included as separate exposure units from adjacent upland vegetation alliance polygons. If not different, the upland polygons would include the drainage banks. Therefore, not just riparian areas along streambanks, but also their immediately adjacent upland areas were mapped for woody cover percentages to evaluate if upland and drainage habitats differ, an objective presented in Section 3.

The vegetation alliance map of the STSIU (Figure 3-3 in main FS Report, which was taken from Figure 2.1-2 in NewFields [2006]) was used to identify the drainages to map for woody cover using remote sensing. The alliance map identified two woodland vegetation alliances that frequently occur in drainages and are expected to have higher woody density than the other grassland/shrubland alliances, specifically the (1) fluvial forest and shrubland alliance and the (2) alligator-juniper oak woodland alliance. For portions of drainages in the STSIU that fall within these alliances that are also expected to have elevated copper, woody cover was mapped, and its percentages measured to determine if the banks of these drainages have higher quality habitat than adjacent upland areas. Three drainages were identified that potentially had copper concentrations in excess of the avian RAC on their banks and occurred in the woodland or fluvial forest alliances (Figure D-4). Chino mapped woody cover percentages along the three STSIU drainages and in the adjacent uplands of the same drainages using remote sensing. Figure D-5 shows the remote sensing image and derived woody cover map of one drainage (called D3, see Attachment D for details on remote sensing methods).

Additionally, field data were collected on woody cover along 12 ground transects to ground-truth the remote sensing map of woody cover percentages that was developed in these drainage areas (transects are shown in Figure D-D-4 in Attachment D). The field sampling data were not intended to be used to compare upland and drainage bank woody cover because, unlike the remote sensing images, the transects do not cover the conditions of the entire drainage. At each of the 12 locations, field data consisted of estimates of percent woody cover on one 300-foot transect along one bank parallel to the drainage and one 300-foot transect in the nearby upland (at least 500 m away) at each sampling point in Figure D-4. The line intercept method was used, measuring the percent of the transect intersecting open versus woody vegetation canopy.[2] Upland transects were parallel to the bank transects. The photographs of the transects are in Attachment C, and field data collected from the woody cover sampling and analysis results are in Attachment D.

Because field cover can only be estimated to within approximately 10% accuracy with line intercept methods for woody vegetation,[3] woody cover modeled to within about 10 percentage points of ground reference was considered “correct” in the accuracy assessment of the map created using remote sensing. The accuracy requirement in the FS Work Plan was that at least 70% of the transects are correctly classified to be able to use the remotely sensed results to compare upland and drainage vegetation. If such accuracy is obtained, the woody canopy cover of the drainage area based on the remote sensing map must be at least 25 percentage points different from the adjacent upland cover to be considered different. If the map does not meet the accuracy requirement, the mean cover values of the field data were statistically compared to see if those data change the interpretation of the remote sensing results. Remote sensing results for woody cover and results of the field investigation are discussed in Section 7.

Exposure units also were delineated for pCu calculations. Cupric ion activity can be phytotoxic to the plant community. Thus, the exposure units need to represent habitat units for the plant community, which is the assessment endpoint for pCu. Because the ERA discusses protecting the vegetation community for its function as wildlife habitat and rangeland for livestock, rangeland polygons (defined in Woodward Clyde 1997) representing a variety of habitat conditions for plants, were selected as the exposure unit for pCu (Figure D-3). To estimate pCu in each rangeland polygon, first the spatial distribution of pCu across the STSIU after the January 2008 white rain event was estimated using interpolation. As discussed in Section 4, pCu was estimated from pH and copper (0-6” bgs, sieved to < 2 mm) using the upland regression equation at each field sample location that was sampled for both constituents after the January 2008 white rain (Table 3-4 of the FS Report) or after remediation and reclamation (using pCu of 6 if remediated or reclaimed). When interpolating pCu across the STSIU using these data, however, some pre-white rain samples had to be included on the borders of the STSIU to bound the interpolation because of lack of data in such areas (as discussed in more detail in the

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[2] Because banks undulate along the drainages, rather than providing a straight line, the transect laid out with a measuring tape where one could walk approximated the bank line. The intersecting portion of the tape was extended up to 7.5 feet on either side to capture the bank vegetation. If a woody plant intersected the tape within that band, its entire length was measured and included as intersecting the tape. This same technique was used in the upland transect. Therefore, woody cover is actually an index of woody cover that is used to compare the bank and upland transect woody cover.

[3] This 10% in the FS work plan was optimistic as it did not consider the challenge of sampling the irregularities of the bank line, which often is eroded and not well defined (see photos in Attachment C). Nor did it consider the ground cover would be an approximate index, not actual woody cover estimates.

main FS report). The resulting pCu interpolated raster map (Figure 3-8 in the main FS report) was averaged within each rangeland polygon to estimate mean pCu for each exposure unit.

An average pCu for each polygon was used rather than a more conservative 95% lower confidence limit (95LCL) of pCu for several reasons. First, the pre-FS RAC does not specify using a 95% confidence limit of the mean pCu, whereas it is specified in the Pre-FS RAC for copper. Second, the number of data points within each rangeland polygon are adequate for interpolation but inadequate to estimate a standard deviation needed for a 95LCL of pCu for each polygon (48 polygons have only 1 sample, 11 with 2, 7 with 3, 4 with 4, 1 with 5, 2 with 6, 1 with 7 and 1 with 8). Third, and more importantly, the natural neighbor method, which was the selected and best interpolation method for pCu (see Figure D-6, discussed in Section 6.2.2), does not have a method available to spatially weight a 95LCL in each exposure area that represents its smoothed interpolation surface. Calculating a 95LCL only on the field data points, as can be done with Thiessen polygons, does not represent the variability of the smoothed interpolation trend across the polygon. Because the historical sulfur dioxide emissions from the smelter generated acid deposited in the soil in a manner that should steadily decrease with distance, a discrete Thiessen polygon method of interpolation is not appropriate. Use of an arithmetic mean best represents the central tendency of pCu trends in polygons, and avoids being overprotective, which can be very detrimental to the plants (killing plants to save them when uncertain it is needed). The mean is the standard method in remedial investigations used to represent continuous interpolations such as natural neighbor, inverse distance weighting and kriging.

As described in the FS Work Plan, the 1997 rangeland polygon borders were evaluated in the field and on aerial imagery in 2011, with the intent to split the polygons if sharp boundaries in rangeland or wildlife condition were observed within polygons on aerial photos, spectral images, or in the field. No sharp boundaries were observed, and thus the rangeland polygons delineated in 1997 were not changed.

5.2 Upland Vegetation Sampling and Mapping

In upland areas, data representing rangeland quality (OAT score), plant richness, and plant cover were collected in the field in 100 foot x 100 foot square plots (for richness and cover) or along a 200-m transect that included one side of the plot and extended beyond (OAT score). These data were used to calibrate remote sensing maps that depict the spatial distribution of these three vegetation community characteristics. The maps were used to refine polygons retained for consideration for remediation based on the pre-FS RAC so the decision is also based on the condition of the vegetation relative to the condition on reference areas.

Because the sampling effort of the 1997 rangeland study was too low at too coarse of a resolution to assess effects to rangeland condition within the pCu < 5 contour, OAT score sampling was conducted for the FS in representative rangeland polygons across the STSIU, following the FS Work Plan. The OAT score is one measure of rangeland condition that Woodward Clyde (1997) quantified on the STSIU in some of the rangeland polygons in 1997. This metric was subsequently re-sampled and mapped for use in the FS to assess rangeland conditions in all areas with pCu < 5, as described in the FS Work Plan. The OAT method is a rapid assessment technique promoted by the Bureau of Land Management (BLM) and Natural Resources Conservation Service (NRCS) whereby the investigator walks through a defined area and visually estimates scores. The method was used to estimate “apparent” trend in rangeland condition without sampling more than one time period. A high score represents good rangeland condition. The 200-m transect was walked to evaluate the criteria used in developing the OAT score. The OAT score is the sum of six criteria scores, three of which address vegetation characteristics and three address soil condition, as shown in the OAT score form in Table D-1. The OAT score assigned to the 200-m long transect (observations were up to 50 feet on either side of transect) in the field was only used to train or ground truth the OAT score of the corresponding 100 x 100 foot map pixel that contained the start of the transect. The OAT scores were then mapped for every pixel in the STSIU using remote sensing techniques and then were averaged within rangeland polygons to represent the final polygon scores.

The field investigators from NMED and Chino jointly decided on the OAT scores and did not refer to the 1997 OAT score. Their joint approach differed from the investigators' approach in 1997 because the FS focus was on the quality of the vegetation along the entire transect including its abundance, whereas in 1997, if vegetation was minimal (e.g., in bedrock), the score was based only on the small patches of vegetation that were present (e.g., within the cracks of the bedrock). Therefore, the 1997 OAT scores were not used in the FS, only scores collected for the FS or phytotoxicity study. The methodology for the vegetation survey data was implemented in accordance with the applicable SOP (the SOP is in Appendix F within Appendix C of the FS Report).

Procedures for surveying vegetation for OAT, richness, and cover were as follows. OAT scores were the sum of ratings assigned for plant characteristics (vigor of desirable plants, seedling establishment, and litter) and soil characteristics (pedestals, crusting, and gullying; Table D-1). Plant richness was surveyed by counting the number of vegetation species in each of five 20 foot by 20 foot subplots of the 100 foot x 100 foot main plot. Percent cover was visually estimated in four 1 meter by 1 meter Daubenmire frames, with two frames each placed on two sides of the subplots (as shown in the diagram in the SOP provided in Appendix F of Appendix C of the FS Report). These sampling methods for richness and cover were consistent with methods used for the 100 foot by 100 foot amendment plots (see Attachment A to Appendix A of the FS Report) following DBS&A (1999) dog-leg sampling protocol on subplots.

Reference areas for richness and cover were preliminarily identified and sampled in 2011, referred to as Wildlife Reference Plot North and Wildlife Reference Plot South. Soil sampling to estimate pCu at these plots in 2013 indicated only the Wildlife Reference Plot North was a good reference plot and the Wildlife Reference Plot South is actually a *de minimis* plot. Also, the FS Work Plan assumed north and south-facing slopes would strongly affect vegetation conditions, but analysis of the cover and richness data did not support that assumption. Instead, four soil/topographic categories had the largest effect (see Appendix C of FS report). Thus, additional reference sampling occurred in 2018 to better represent these categories, as discussed in Section 5.3 below.

For the OAT score reference area, several reference locations were identified in 2011 to calibrate the field investigators' estimates of OAT score on the site to areas with very high scores, and to allow for visual comparison and score adjustment for the varying climatic conditions when sampled again in the future (in 2012, 2014 and 2018; conditions were very dry in 2011 and 2012). This adjustment for climatic conditions was performed in the investigator's rating scale while in the field, and thus did not require adjustment during the desktop analysis (whereas cover was adjusted during the desktop analysis). The locations used for reference were the cell phone hill NW and SW and the Lampbright outcrop (Figure F-2 in Appendix C of the FS Report). For example, 2014 was a wetter year than 2011. Although the vigor of the plants was greater in 2014, the investigators adjusted their scaling to ensure that these reference areas received the same OAT score as they assigned in 2011 and used that same adjusted scale when evaluating all locations in 2014.

The 2011 and 2012 sampled locations were supplemented with additional plots sampled for the same three vegetation characteristics (OAT, richness, cover) in 2014 as part of the phytotoxicity and vegetation community study (Appendix C of the FS Report) and again in 2018, as part of the reference area investigation (Attachment A).

Cover data collected in years other than 2011 (i.e., in 2014 and 2018) were adjusted to conditions in 2011 using a normalized difference vegetation index (NDVI) calculated from Landsat imagery (Landsat 7 for 2011 and 2014, Landsat 8 for 2018) collected those years to account for climatic differences among years. The NDVI was scaled from 0 to 1 (removes artifacts of differences between the two Landsat sensors), and the NDVI ratio between years was applied to the later year data to convert to 2011 estimates. Richness was not adjusted because it requires high-resolution IKONOS imagery in the adjusted years, and such imagery was not readily available. OAT score did not require adjustment because investigators adjusted their scale in the field each year based on climatic conditions that year, as discussed above.

Photographs of each plot and survey field data sheets surveyed except 2018 plots are presented in Attachments I and F within Appendix C of the FS Report, respectively. Photographs and field data sheets of the 2018 plots are in Appendix D of Attachment A to this appendix.

5.3 Establishment of Additional Reference Areas

As noted in the deviations listed above and in Section 4, additional reference areas were located in 2018 to help interpret background conditions of the plant community for the FS had there been no mining-related chemical impacts, including defining the background soil chemistry, range condition, and wildlife habitat quality. Prior to this investigation, existing reference areas with available plant community data consisted only of two reference areas (referred to as Wildlife Reference Plot North and Wildlife Reference Plot South). The phytotoxicity and community study (Appendix C to the FS report) identified four soil categories that affect plant community response to pCu:

- Flat granular soils
- Flat rocky soils
- Steep slope (>13%) soils
- Bedrock soils

The phytotoxicity and community study had reference soils representing just one of the four soil categories (flat granular) determined to have a strong influence on STSIU plant community richness and cover. As such, the purpose of the reference areas sampled in 2018 was to provide background values for community metric endpoints of cover, richness, and rangeland condition (via OAT score) across the four soil categories identified as important in the phytotoxicity study.

Selection criteria for the new reference areas included:

- possessing a similar elevation, geology, and grazing management history to those of the STSIU locations;
- located far enough away and not in the path of wind deposition so as to be unaffected from the smelter (as determined by low copper, neutral pH, and low sulfate concentrations); and,
- represent the topographic and soil conditions of impacted, grazed locations on the STSIU.

Eight new reference locations were located east of Lampbright Draw that matched these criteria, including one flat rocky reference location, two flat granular locations, two slope locations, and three bedrock locations. Together with the two flat granular reference locations with community data collected previously (STS-PT-2013-26, Wildlife Reference Plot North), the number of reference locations sums to 10 following this investigation (see Figure 1 in

Attachment A). A detailed description of each of the reference locations selected in 2018 is provided in a technical memorandum in Attachment A.

Sampling and survey methods for the new reference locations match those used in the field community study described in the phytotoxicity study report (Appendix C to the FS Report), which are based on the methods more generally outlined in the approved FS Work Plan (Attachment F). The soil was sampled for pH, total copper, and sulfate, as described in Attachment A. Vegetation endpoints surveyed included vegetation cover, species richness, and OAT score. Data from the new reference locations were used to determine appropriate DELs and PELs for evaluating remediation approaches for pCu impacts on the vegetation community in the FS, as described in Section 9.2.

6 Soil Results and Interpolation Maps

This section describes the interpolated maps of copper and pCu on the STSIU, data used to create the spatial interpolation of those maps, and the procedures for selecting and evaluating the interpolation method.

6.1 Data Used for Spatial Interpolation

6.1.1 Copper

Figure D-1 shows the locations of the samples used to develop the understanding of copper distributions in STSIU before accounting for remediation or reclamation. Unlike for pCu (described in Section 6.1.2, below), this map of locations was not limited to post-white rain (after January 7, 2008) data locations as the white rain event is not expected to have changed copper concentrations. The locations with circles around the points on the map are where soil data were collected from 1995 through 2010 when the FS Work Plan was first developed and include data from the following reports: Chino 1995; NewFields 2006 (based on data reported out in Arcadis JSA 2001), 2008; SRK 2008; Arcadis 2009; Arcadis 2010a; Arcadis 2010b; Arcadis 2011a; Arcadis 2011b. The locations with triangles around the points are where soil data were collected after development of the FS Work Plan and include samples collected as part of the FS Work Plan in 2011 and 2012 and subsequent work on the amendment study (Appendix A of the main FS report) and pH monitoring report (Appendix B of the FS report). Together all 401 samples shown on Figure D-1 make up the ‘pre-IRA’ dataset (as shown in Table 3-2 of the main text), which reflects the status of soil copper across the STSIU prior to remediation and reclamation activities implemented during the IRAs.

An additional 1,496 samples were collected during four IRAs: Golf Course (Arcadis 2009), Railroad (Golder 2013), Razorback Ridge (Golder 2015), and B-Ranch (Arcadis 2021), and Railroad XRF (data not submitted in a report). The IRA samples were added to the pre-IRA database to create an updated, more precise understanding of the current situation for the nature and extent of soil copper contamination at the site. Adjustments and data corrections were then made to form the ‘post-IRA’ dataset used to conduct spatial interpolation analyses, as follows:

1) In reclaimed or remediated areas, sample data prior to clean-up were removed and replaced with confirmation sample data, if available. If confirmation sample data were not available, it was assumed that post-removal copper concentrations are at background levels given the depth of excavation, and so a background value of 327 mg/kg was used in place of the original samples to represent remediated areas. A

total of 491 samples from the STSIU RI were removed and replaced with a background value of 327 mg/kg because those areas were cleaned (samples noted as "Removed*" in Table 3-2 of the main text).

2) Some bedrock samples collected during confirmation sampling after remediation were dust that could be wiped off the rock. These samples were removed from the dataset for the SGFB Pre-FS RAC evaluation.
3) Samples were removed from the spatial interpolation dataset if they were collected from areas outside of the extent of the vegetation alliance polygons, or from areas where existing mine infrastructure is present (e.g., the railroad depot) or were part of the right-of-way and could not be remediated.
4) All copper samples were analyzed in the laboratory with the exception of the Golf Course IRA (Arcadis 2009) and supplemental IRA confirmation samples to the north and west of Hurley (Golder 2013). These Golf Course and IRA samples, taken in 2008 and 2012, respectively, were analyzed using XRF and corrected using a regression equation based on a subset of the samples analyzed by a laboratory. The regression equation used was $\log(\text{lab } Cu_i) = 1.0184*\log(\text{XRF } Cu_i)$ with $R^2 = 0.996$ for the Golf Course IRA (Arcadis 2009) and lab $Cu_i = 0.837*\text{XRF } Cu_i + 91.48$ with $R^2 = 0.964$ for the IRA in Golder (2013). The data and methods used to develop these regressions are described in the IRA Completion Reports (Arcadis 2009, Golder 2013).
5) Some of the samples were collected for human health purposes but were included for the ecological assessment to have a more comprehensive dataset. To combine the many datasets in Figure D-7b for copper for the SGFB and make them consistent, soil samples collected at 0-1 inch bgs for human health purposes (many sieved at < 0.25 mm) were multiplied by the median ratio between the two depths to represent the 0-6 inch bgs evaluated for the SGFB (many sieved at < 2 mm), as described in the FS Work Plan. Details on the approach of developing the ratios are as follows:

   Co-located copper concentrations in 2009 for samples from 0-1 inch bgs and 0-6 inch bgs were compared by dividing 0-1" by 0-6" concentrations to develop a ratio for depth effects (see Table 3 in FS work plan [Attachment F] for the pairs of data). Because the ratio differed greatly in site soils with windblown tailings versus site soils without windblown tailings, a different ratio was used in these two areas. The median of the ratios was used to convert copper concentrations at 0-1 inch bgs to 0-6 inch bgs. Specifically, the 0-1 inch bgs concentrations were multiplied by 0.7 to represent the 0-6 inch bgs soils based upon the finding that the ratio of 0-6 inch to 0-1 inch bgs strata for copper is 0.7, calculated as the median of 37 co-located samples in soils without deposits of windblown tailings.[4] For soils in areas with windblown tailings, the multiplier was 1.5, calculated as the median of 7 co-located samples in soils with windblown tailing deposits. These median ratios were chosen after comparing three methods for conversion: the average ratio, median ratio, and the slope of the regression of a plot of 0-1 inch data against 0-6 inch data (see the plot in Figure 4 of the FS Work Plan in Attachment F). The slope of the regression had the lowest value, whereas the median and average ratio values for copper were very similar. The median was selected as best because, unlike the regression slope, it was not strongly influenced by the two highest data values, was more conservative than the regression slope, and best represented the central tendency because the ratio data were not normally distributed (Shapiro Wilk test, $P < 0.01$). For sites with windblown tailings, where the tailings have low copper, the ratio flips so that the 0-1 inch bgs stratum has lower copper than the 0-6 inch bgs stratum on average.

[4] For unsieved samples collected in 2009 not in the windblown tailings area in Table 3 of Attachment F, the median ratio was 0.74; for sieved samples collected for the RI (S or SS samples), the ratio was 0.69, and for both combined was 0.7. Laboratory for Environmental and Geological Studies (2009) also analyzed a subset of the 2009 samples (see Appendix D of Appendix B of main FS) but sieved the samples (sieved = <0.25 mm for 0-1" and <2 mm for 0-6" bgs) and the median ratio was 1.08 in windblown tailing areas and 0.48 in areas outside of the tailings area, indicating including the unsieved 2009 data to estimate the depth adjustment ratios might have overestimated copper concentrations in some sieved samples.

The median was the most conservative method for these data and was selected to be consistent with the method chosen for areas outside the tailings.

The final ‘post-IRA’ copper dataset for all years, including the IRA and reclaimed area samples, resulted in 1,851 samples across the STSIU, shown as all samples in Table 3-2 of the main FS Report except those marked as “Removed” in the final two columns due to the reasons discussed above. Copper concentrations were grouped into bins and are shown within habitat polygons to illustrate potential exceedances of the pre-FS RAC; the concentration bin of each sample is shown on Figure D-7a, and the source of each sample is shown on Figure D-7b. All vegetation alliance polygons with at least one copper concentration inside the polygon greater than 1,100 mg/kg (the monitoring pre-FS RAC for copper exposure to SGFB) were identified for this FS, adding to the polygons listed in Table 4 of the FS work plan [Attachment F] that only included data up to 2010. Table 3-3 of the main FS report shows the final 18 alliance polygons with at least one copper concentration greater than 1100.

Using the post-IRA dataset described above, copper concentrations were developed across the STSIU using an interpolation routine in ArcGIS (as described in Section 6.2, below). After determining the best interpolation method (Thiessen polygons) for copper following the flow chart in Figure D-6 (see Section 6.2.1), the datasets for each exposure unit were determined by intersecting interpolated copper Thiessen polygons with the DBS&A vegetation alliances, as shown in Figure 3-4 of the FS Report. Figure 3-4 in the FS Report illustrates all the Thiessen polygons, where the center represents the location of a copper sample. This revised soil sampling map shows coverage of samples across the site without any remaining distinct data gaps. Thus, existing soil data are considered sufficient to define the current nature and extent of the COCs of surface soil.

6.1.2 pCu

Figure D-8a shows the locations of the samples used to develop the understanding of pCu distributions in STSIU in 2010 (locations with circle symbols), when the FS Work Plan was first developed, and their exposure units (rangeland polygons). The soil data at these locations were collected in 2009 and 2010 to evaluate and monitor pH and pCu changes in the soil following the white rain event in January 2008 (Arcadis 2011a) and in 2010 during the insect bioaccumulation study (Arcadis 2010b). Only data collected after the white rain event (see Table E-2 of Appendix B of the FS Report) were initially included because the alkaline precipitation in the white rain event altered the soil pH and thus changed the current pCu. Post-white rain samples best define areas that might require remediation because they best represent current conditions.

Many samples collected as part of the FS Work Plan or later studies were added to the existing point samples to create an updated, more precise understanding of pCu concentrations and potential exceedances of the pre-FS RAC, as shown in Figure D-8a (locations with square symbols). The intent was to include only post-white rain samples to develop the interpolation of pCu to represent the most current pCu condition. A total of102 locations were sampled in the STSIU after the white rain event. These 102 samples did not fully cover the outer edges of the STSIU, however, and the interpolation based on these samples incorrectly modeled the edges as low pCu when, even the pre-white rain data indicate pCu is high at background levels on the edges. Therefore, 53 pre-white rain samples were added to the data gaps along the edges (pre-white rain data shown on Figure D-8a and also in Figure 3-7 and Table 3-4 of the FS Report). All pre-white rain samples used to bound the post-white rain samples were likely well buffered (white rain would not have changed them much) because they had pCu > 5 with the exception of a few locations directly north of Hurley and just east of Tailing Pond 7. It is assumed the pre-white rain pCu concentrations on the edges are similar to what they would be post-white rain if they had been sampled, and the map generally represents post-white rain conditions.

These samples were used for the spatial interpolation of pCu (raster files produced with natural neighbor interpolation) and copper (Thiessen polygons), as described in Section 6.2, below. Figure 3-8 of the FS Report illustrates the binned pCu values for all the data and the interpolation using all the data.

6.2 Spatial Interpolation Methods

6.2.1 Copper

The distribution of copper across the STSIU was interpolated spatially using the Thiessen polygon method. Figure D-6 provides the decision tree that was used to select this spatially-weighted averaging method. The method must be able to calculate an are-weighted 95UCL of total copper concentration in the exposure units in ArcGIS, which is possible with the Thiessen polygon method. The interpolation techniques in Figure D-6 are discussed in detail in USEPA (2004). The spatial interpolation/estimation choices included Thiessen polygons, inverse distance weighting, natural neighbor, or kriging. Factors that affected the decision included frequency of detections (which is high for copper), spatial autocorrelation, relationship between polygon weights and concentration, exposure concentration relative to RAC, need for confidence limits, intensity of site border sampling, Moran's I and semi-variogram fit.

The semi-variogram and Moran's I for copper is shown in Figure D-8b. Moran's I is 0.07409 with a z-score of 24.59. The z score is high enough to consider kriging (>1.645, see decision tree Figure D-6). However, the semi-variogram indicates spatial structure for kriging is inadequate because, although the dataset demonstrates high spatial autocorrelation (variance increasing with distance, h, until large distances reached), which is the first prerequisite for kriging, the slope prior to the curve flattening out is very low. The point at which the curve flattens out is the sill on the y axis and is the range on the x axis (range = 1,872 feet, sill after subtracting non-zero y intercept called the nugget = 1,064,339 of copper variance). This point represents the location on the curve at which the correlation between distance and concentration breaks down. Because the slope of the curve is low and almost similar to the slope after the range distance is exceeded, the effect of the spatial correlation is very small, resulting in a weak model. Thus, it is best not to use a stochastic interpolation model, and to instead use a deterministic model that does not draw inference from the entire dataset to interpolate the data.

The plot of copper concentrations versus weights of those samples (weights based on Thiessen polygon size) showed a trend of generally higher concentrations for lower weights, reflecting increased sampling effort in areas of higher copper concentration (Figure D-8b). However, the plot indicates two general downward trends, one where the mass of data are concentrated, and the second showing many outlier peaks trending downward. The peaks stand in sharp contrast to the mass of data and may represent topographic or on-the ground sharp differences (bedrock vs. soil, etc.). In conjunction with the need to calculate area-weighted 95UCLs, this plot below and the decision rule flow chart in the revised Figure D-6 support Thiessen polygons as the best method to interpolate copper spatially at the STSIU.

Figure 3-4 of the FS Report presents the Thiessen polygons and their binned concentrations for polygons that exceed 1,100 mg/kg of copper, after changing remediated or reclaimed area copper values to their post-clean up value or for those without data, to a background value of 327 mg/kg. Figure D-8c shows the key 95UCL concentration bins for copper for each exposure unit (vegetation alliance polygons) after weighted averaging of the Thiessen polygon data.

6.2.2 pCu

Following the Figure D-6 flow chart, natural neighbor was selected as the best interpolation method for pCu. The natural neighbor method was used instead of kriging (which was proposed in the FS Work Plan) because the final dataset supplemented with 2011 data did not produce a semi-variogram that met assumptions of a kriging model. The semi-variogram for pCu is shown in Figure D-8b and Moran's I for pCu is 0.58953 with a z-score of 16.69. The z score is high enough to consider kriging (>1.645, see decision tree. However, the semi-variogram indicates there is no spatial structure for kriging for the same reasons as copper, the slope of the curve is too weak for a strong statistical model (range = 13,554 feet, sill minus nugget = 1.664 variance of pCu).

Figure D-8b also presents the C_i vs. W_i plot for pCu, showing the opposite direction in the trend than for copper (upward, not downward) because lower, not higher, pCu is more toxic. Because the trend is less bimodal than copper (even lower values are trending upward at higher pCu) and the pre-FS RAC does not specify use of a spatially-weighted 95UCL, Thiessen polygons were not used for pCu , and this decision follows the decision rules in the Figure D-6 flow diagram.

Natural neighbor was chosen as an interpolation method requiring fewer up-front assumptions which also requires no choice of parameterization. A natural neighbor interpolation uses a Thiessen polygon surface created using existing samples to interpolate a raster grid. Each output grid cell is treated as a new sample and used to create a new Thiessen polygon layer adjusted using the additional point. The value of each cell is calculated as a weighted average of the portions of the original Thiessen polygon that intersect the new polygon. This is done for all raster grid cells to create an interpolated surface. This is a simple method of interpolation that favors the local neighborhood over more distant samples by basing interpolated values only on the closest sample locations. Unlike more complex interpolations such as kriging, natural neighbor has few prerequisites or data distribution requirements for use, and no varying parameters. The resulting map has pCu values for every grid cell as shown in Figure 3-8 of the FS Report (a pre-IRA map). However, contours were not used; rather each grid cell is given a pCu value. To estimate exposure in an exposure unit, the average value of all interpolated pCu grid cells within each rangeland polygon (the pCu exposure unit) was determined using zonal statistics in ArcPro (pre-IRA results are in Table D-2) after changing all interim remediated or reclaimed or borrow areas to a pCu of 6 (conservative assumption of pCu estimate for background). "Zonal statistics" is a tool in ArcPro that calculates the average value of all grid cells within a specified zone, in this case, the average of interpolated pCu values within each rangeland polygon, which is compared against the pre-FS RAC.

6.2.3 Spatial Model Assessment for Sampling Intensity

As stated in the approved FS work plan, the pCu sampling plan was designed so that it supports that the pCu sample data collected are adequate for identifying an area to be remediated with a 10% false positive (Type I error of over-remediating) rate and a 20% false negative rate (Type II error of under-remediating). The concentrations on the site range from 2.7 to 10.2 standard unit for pCu and from 14 to 21,350 mg/kg for total copper.[5] The consequences of decision errors (incorrect classification of an area) of the magnitude of one pCu unit are low at pCu values < 4 and > 7, and at copper concentrations < 800 and > 1,900 mg/kg because the values are far from the pre-FS RAC. Consequences of errors at concentrations between these values that

[5] Copper data adjusted to represent 0 to 6-inch soil depth and sieved to < 2 mm, as needed (Table 3-2 of the FS Report).

encompass the pre-FS RAC threshold are of more concern, and thus were targeted for more sampling to ensure most values obtained for the FS fall within these ranges and meet the desired confidence level.

7 Upland Vegetation Results and Mapping

The data available for rangeland condition, cover, and richness in key areas of the large STSIU site, were limited, and thus field sampling and remote sensing was proposed in the FS Work Plan to produce a map of these metrics across the STSIU. Only four ERA samples that had habitat sampling in Newfields (2006) fall within the current estimated pCu < 5 contour zone. Therefore, OAT scores, percent cover and richness maps in the pCu < 5 area were developed using remote sensing with ground truthing data to update knowledge of wildlife habitat quality in this area. The upland vegetation data collected in the field are reported in Appendix C of the FS Report (data collected from 2011 to 2014) and Attachment A of this Appendix (data collected in 2018) for all plots and OAT score transects evaluated for the FS. Data not used to train the remote sensing classifications were used to test the accuracy of the remote sensing maps of OAT score, vegetation cover, and vegetation richness.

7.1 Map Development using Remote Sensing

Rangeland condition, vegetative cover, and species richness were assessed using IKONOS satellite imagery of the site collected on September 4, 2011 (Figure D-4). The IKONOS image has four multispectral bands, blue, green, red, and near-infrared (NIR). The sensor also collects imagery in a panchromatic band that senses across the visible portion of the electromagnetic spectrum. The raw multispectral bands have a ground sample distance of 3.2 m at nadir, while the panchromatic band senses at 0.8 m at nadir. The panchromatic band was used to pan-sharpen the multispectral imagery, bringing the final imagery to the full 0.8 m ground sample distance while retaining its more detailed spectral information.

Rangeland condition was represented by an OAT score. As mentioned earlier in Section 5, an OAT score is an observed apparent trend score used by the BLM to assess rangeland condition that assesses both health of the vegetation and soil erosion (Table D-1). Rangeland condition using the OAT score was classified using a maximum likelihood supervised classification of the IKONOS imagery. The ground-surveyed sites that had an OAT score available were randomly divided into training (majority of sites, needed to develop a good model) and independent validation datasets and were classified as acceptable or unacceptable. An OAT score of 22 (see Section 9.2) or higher was considered acceptable (unless it was bedrock, in which case a bedrock-specific threshold of 13 was used because good rangeland on bedrock is never as high as 22; see Section 9.2). Training data were used to train a maximum likelihood classifier. Reflectance intensity in all four bands (blue, green, red, and NIR) of the unsampled cells in the IKONOS image was compared to the values of the training clusters and assigned the class (acceptable or unacceptable) they were closest to in terms of spectral distance. The independent ground-surveyed sites were used to assess the accuracy of the classification (described in Section 7.2, below). The final OAT score map with two classes of acceptable (fair to good) and unacceptable (poor) rangeland condition is shown in Figure D-9.

Percent vegetative cover was classified using a scaled NDVI derived from the IKONOS imagery. The NDVI is a widely-used metric for quantifying the health and density of vegetation using sensor data, often on a satellite. NDVI uses the relative difference of NIR and red bands to differentiate between vegetation and other types of cover (e.g. concrete or bare soil) that also reflect NIR solar radiation). Vegetation undergoing photosynthesis tends to absorb sunlight in visible wavelengths (~400-700 nanometer [nm]), particularly red wavelengths (~600-

700 nm) while reflecting the majority of sunlight in NIR wavelengths (~700-1100 nm). NDVI is calculated using an equation with the intensity of reflectance (spectrometric data) at two specific bands (wavelengths) of remotely sensed data: red and NIR.

The equation is: NDVI=(NIR-Red)/(NIR+Red)

The normalization of NIR wavelengths with red light accounts for surfaces and objects which reflect highly in the spectrum, such as bare rock or concrete. Corroborated by training datasets, NDVI can be used to separate vegetation from soil and even separate different types of vegetation such as differentiating woody vegetation from non-woody vegetation and non-vegetation.

A standard NDVI score was used to classify the image initially. A standard NDVI score is a unitless value ranging from -1 to 1, with values influenced both by conditions on the ground, time of year, and atmospheric effects during image collection. The scaled NDVI method does not use the ground data, but rather uses areas of known full vegetation and zero cover to calibrate a given NDVI image (with clear sky) so that the scale is linear and the pixel values range from 0 to 100% cover. Known full vegetation and zero cover areas selected were based on discussions with field biologists and were selected after reviewing photos of the general area and comparing photos to the imagery. The vegetation cover map produced from the scaled NDVI scores was then converted into a final binary map of acceptable and unacceptable cover (Figure D-10), using percent cover acceptability thresholds for each mapped soil category to specify whether a rangeland polygon was acceptable or unacceptable based on the classification of the majority of the pixels (see development of reference area-based thresholds for acceptability described in Section 9.2). The data collected on the ground was used to evaluate the accuracy of the final cover map.

Species richness (number of vegetation species) was classified using a hybrid maximum likelihood classifier. To develop the richness map with this method, the ground data collected on richness were not used, except for ground-truthing the final maps. While in the office, the remote sensing specialist identified various ground locations (30 x 30 m grid cells) on images with high versus very low species richness to establish a scale of high to low plant species richness, using not just satellite imagery (both IKONOS and finer-resolution Quickbird imagery), but also high resolution aerial imagery. The remote sensing specialist could visually identify different tree and shrub species and different herbaceous infrared signatures. When he found a few locations with a very high variety of species and signatures, he called those areas high richness (he did not look at actual ground richness data). He then found areas with little vegetation and what appeared to be only one species and called it low richness. These high and low richness areas became training plots. As discussed below, the IKONOS spectral data then were used to calculate a “richness” metric approximately correlated to this scale of high to low richness (the metric is not same as actual count of species but correlated to count of species).

Because species richness requires more than a single grid cell (0.8 m pixel of pan-sharpened IKONOS imagery to represent the variety of species on the ground, richness was assessed over larger 30x30 m cells. To calculate the richness metric, the NDVI was created from the red and NIR bands of the IKONOS image for each 0.8 m pixel. The mean and standard deviation of the NDVI across all 0.8 m pixels within each 30x30 m grid cell was plotted in 2-dimensional space with the mean on one axis and standard deviation on other. The training plots grouped into two training clusters of high and low richness in this space. These derived plotted values, rather than primary IKONOS reflectance intensity, were used as input for the hybrid maximum likelihood classifier of richness. The combination of the mean and standard deviation of the NDVI across all the pixels within a larger 30x30 m grid cell for every grid cell in the study area was entered into ERDAS/IMAGINE remote sensing software’s maximum likelihood classifier, which identified if each grid cell was closer to the high (classified as acceptable) or low (classified as unacceptable) training cluster in spectral space, and classified it as belonging to the closer cluster. Each rangeland polygon then was assigned the majority classification of the grid cells. The species richness map was converted into a map of acceptable and unacceptable richness (Figure D-11) using acceptability thresholds for each mapped soil category defined in Section 9.2, below. The ground truthing was used to evaluate if the metric was successful in bounding the reference area threshold for actual counts of species. The development of the richness reference area threshold is discussed in Section 9.2.

The OAT, cover, and richness maps (Figures D-9 to D-11), not the IKONOS spectral data, were ground-truthed for accuracy, by comparing all the 100’ x 100’ ground plots’ measured status as acceptable vs. unacceptable to the mapped acceptability status of the polygon. Accuracy was calculated using the matrix for each endpoint in Table 3-5.

An exposure unit had to be unacceptable for either rangeland condition or wildlife habitat to be unacceptable and retained for remediation consideration. Unacceptable rangeland condition in Figure D-9 is based on the OAT score. Unacceptable wildlife habitat in Figure D-12 is defined as having either unacceptable richness or cover, and includes all polygons with unacceptable percent vegetation cover in Figure D-10 and unacceptable plant species richness in Figure D-11. Figure D-12 maps the unacceptable wildlife habitat with the pCu contour < 5 overlaid on the habitat map. The pCu contour came from the pCu contour map in Figure D-13, with the contours derived from the pCu raster map in Figure 3-8 in the main FS report. This map was joined with the rangeland condition (OAT) map in Figure D-9 to create the final map of unacceptable rangeland polygons (unacceptable for either rangeland or wildlife habitat) that have an average pCu < 5 with copper > 327 mg/kg. This final map incorporating unacceptability is shown in Figure D-14.

7.2 Accuracy Assessment of Remote-Sensing Derived Vegetation Maps

The target accuracy of the remote sensing maps of vegetation characteristics in Figures 3-9, 3-10, and 3-11 was set to 70% correct classification in the approved FS work plan, which is a typical accuracy expected for management purposes (80% for research-level accuracy, Congalton et al. 1993). The FS work plan indicated jackknife cross-validation would be used for assessing accuracy, but the approach was changed for the OAT score to using a randomly selected subset to train the supervised classification and using the remaining independent set to assess accuracy, as discussed in the previous section.[6] For cover and richness, the mapping method did not use any plot data for training, and thus all the ground data could be used in the accuracy assessment and a jackknife method was not required. A level of 80% is desirable for well-defined remote sensing methods (Environmental Systems Research Institute 1994) but may not be attainable given the high, often undetectable small-scale variability that affects the vegetation; thus 70% was the target, which is often acceptable for management purposes.

For rangeland condition and species richness/cover mapping, the variables mapped (for example, acceptable versus unacceptable OAT scores for the rangeland condition map) have two classes that were evaluated for accuracy. Errors of omission are instances where an acceptable condition is classified and mapped as unacceptable and errors of commission are where unacceptable condition is classified as acceptable. In general, it is desirable to make the rates of these errors approximately equal. But to be conservative, the focus was on

[6] Jackknife method is less certain than using a completely independent dataset.

finding all areas on the ground of unacceptable condition even at the expense of missing some areas of acceptable condition. The goal was to attain no more than a 15% error of commission for the class mapped as acceptable. The FS work plan stated that, if the remote sensing data are inadequate at differentiating these two classes for OAT scores and species richness, then the two classes of vegetation cover (acceptable or unacceptable) may be the main criteria used to screen areas with pCu < 5 for remediation because vegetation cover may be easier to identify using remote sensing. However, as discussed below, overall accuracy was relatively similar between cover and richness and best for the OAT score, although error of commission was poorer for richness.

For rangeland condition, approximately three-fourths of the 31 available ground locations were used for training and one-fourth (8 locations) of the locations were used for accuracy assessment (locations are shown in Figures D-9 through D-11).[7] The accuracy of the OAT score maps in identifying the two classes on the independent data that was one-fourth of the dataset (8 locations) was very good at 88% (Table 3-5 of the FS Report). The error of commission was 17%; this error rate is above the targeted 15% but likely would have met the goal if more than 6 locations were available to compare (only 1 of 6 was misclassified, meaning minimum error can only be 0% or 17%, not the targeted 15%).

For vegetation cover, more data were available to assess accuracy. Because ground location data were independent of the high and low value endpoints used on the imagery to calibrate the vegetative cover model, all field data (19 sites in Figure D-3 plus data from 12 supplemental locations available on the STSIU from later studies up to 2018) were used to assess the accuracy of vegetation cover. Overall accuracy of vegetation cover was 74% (Table 3-5 of the FS Report), meeting the target of at least 70% and considered adequate for FS purposes. Error of commission for the “acceptable” mapped class was 18%, only slightly over the goal of 15% error. This means that areas of actual acceptable cover were generally identified correctly as acceptable on the map, although a small percentage (18%) of areas of unacceptable cover were classified as acceptable.[8]

As with vegetation cover, all field sites were used to evaluate map accuracy of species richness. Overall accuracy of the richness map was 71%, with a 40% error of commission for the “acceptable” class (Table 3-5 of the FS Report). The error of commission target was missed for richness, but, as described above and in the FS Work Plan, richness may be challenging to model, and results should rely more heavily on vegetation cover. However, if relying only on vegetation cover for screening polygons, more areas would be screened out of consideration for remediation than if richness were included. Since the objective is to ensure the rangeland polygon has *both* acceptable cover and richness before being screened out from remediation, richness was still included to ensure areas with potentially poor richness were retained for further evaluation. Richness is important because it is generally the most sensitive to effects of pCu, as seen by its response to the white rain on amendment plots in the amendment study (richness was affected while cover did not substantially change; see Appendix A of the FS Report).

8 Exposure Unit Finalization

As described in Section 5.1, woody cover was evaluated to determine if drainage banks should be delineated as exposure units separate from upland exposure units for copper. Remote sensing with scaled NDVI was used to

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[7] Like jackknifing and cross-validation methods, the training dataset is larger than independent validation dataset because the training dataset must include enough samples to develop a robust, credible model, given number of parameters in the model (Chi et al. 2008).
[8] Just as Type I and II errors are balanced in statistical analyses, the error of commission and omission must be balanced and the balance selected of lowering error of commission (18% for cover) to detriment of error of omission (36% error) is conservative.

obtain the full coverage of three drainage banks on both sides of the drainage (Figure D-5 shows the most northern drainage, D3), and field data were used to validate the woody cover map of the drainages generated by the remote sensing. Using the line intercept method, percent cover of woody vegetation was estimated in the field on 300-foot line transects at 12 locations along three STSIU drainages of concern (Figure D-4) and their adjacent uplands to ground truth the maps. These ground-truthing field data and more detailed maps of the bank and upland field transects are presented in Attachment D.[9]

The NDVI, calculated on the IKONOS 4-band imagery, was employed to estimate the percent of the vegetation in these areas that is woody. As described in the previous Section 7, NVDI is high in dense, healthy, growing vegetation, and previous work has shown spectral bands in NDVI, particularly in the NIR, have a unique signature for dense woody versus non-woody vegetation (Huete et al. 1997). The four-band IKONOS imagery of the STSIU obtained is described in Section 7.1 Remote sensing of bank vegetation along ephemeral drainages on this imagery focused on the NIR portion of the electromagnetic spectrum to assess percent woody cover using a scaled NDVI (see Section 7) but also evaluated shape to identify objects that are shrubs or trees. Thus, two approaches were evaluated: using scaled NDVI alone, and a hybrid approach of combining shape and spectral reflectance of clusters of similar pixels. Both methods do not use a ground dataset to train the classifier (as was discussed in Section 7.1). Although results were similar between the two methods, the scaled NDVI was found to best identify woody plants and estimate woody cover (Figure D-5), when compared to the field estimates of woody cover. Results comparing the two methods are presented in Attachment D, showing higher R^2 for scaled estimates when plotted against field estimates (e.g. R^2 of 0.99 vs. 0.77 for Drainage D-3, compare Attachment D Figure D-D-1 correlation results to Attachment D Figure D-D-2a cluster correlation plots). The percent of the ground area with woody canopy cover was estimated with the scaled NDVI for the entire area of the two banks in the imagery and in the adjacent uplands (see Figure D-4 for length of drainages evaluated and Figure D-D-2b in Attachment D for width of buffers used).

Only one composite sample on one of the three sampled drainages (Drainage D-3) had soil copper concentrations along the banks greater than the SGFB pre-FS RAC (2,110 mg/kg at STS-BWC-2011-7 in Figure D-4; also, see Table D-D-1 in Attachment D).[10] Nevertheless, woody cover for the entire streambank of the three drainages and adjacent upland was estimated using remote sensing from the 0.8 m resolution imagery (Figure D-5 shows one drainage's imagery, D-3) in case any future additional sampling might show the other drainages also have high copper concentrations in the soils. For all three, there was less than a 25% absolute difference in woody cover between the banks and upland, indicating separate exposure units for the banks are not needed (see remote sensing columns [not transect columns] in Table D-D-1 in Attachment D for results). If field data are relied upon instead of the remote sensing results, the field data for Drainage D3 also showed a small mean difference between upland and bank woody cover of 13%, which is not statistically significant (paired t-test, P = 0.21), and still less than the threshold of 25%. The same is true for the other two drainages, where the difference is within 23% for drainage D4 and within 7% for drainage D3.5 (see field woody cover columns Table D-D-1 in Attachment D).

The accuracy of the woody cover remote sensing images partly met targets set in the FS work plan. The average accuracy for remote-sensing based results for upland and banks combined is within 10 percentage points of field measurements for Drainage D3, within 4 percentage points for Drainage D-3.5 and within 8 percentage points for

[9] In Attachment D, Table D-D-1 has summary field data, Table D-D-2 has the line intercept lengths, Figure D-D-1a,b,c shows the accuracy assessment, Figure D-D-2 illustrates buffer sizes used for remote sensing, Figure D-D-3 presents the locations of the 4 field transects on Drainage D3, and Figure D-D-4 presents the locations of all transects on Drainage D3, D3.5, and D4.

[10] Relative percent difference in copper on bank sample with duplicate sample was 59%, which is slightly higher than targeted $\leq$ 50% in QAPP.

Drainage D-4 (Figure D-D-1 a,b,c in Attachment D), which meets the target accuracy of being within 10 percentage points. However, less than 70% of all the transects of all the drainages were within 10% of field estimates, which was a target not met (42% of the 12 transects in Figure D-D-1 a,b,c combined in Attachment D). It may not have been met because of the irregularity of the bank line that was difficult to sample accurately in the field. Nevertheless, both the field and remote sensing data support the difference between upland and bank woody cover is less than 25%. Therefore, the existing vegetation alliance polygons that encompass the upland and banks of the drainages were used as the ecological exposure units for SGFB, without differentiating between upland and banks of drainages. Thus, the habitat polygons in the existing Alliance Level vegetation maps from the site wide ERA were used as habitat units for both upland and bank areas. The vegetation alliance map, developed by DSB&A (2000), used more than 350 sampled areas and 1:18,000 scale black and white aerial photos for interpretation, an approach considered to be sufficient to define general vegetation boundaries and for defining habitat units for SGFB exposure. Field reconnaissance of these boundaries supported the boundaries were adequate.

The pre-FS RAC for copper of 1,600 mg/kg for protection of the SGFB (and 1,100 mg/kg for monitoring) was applied to the spatially-weighted 95UCL concentrations in the vegetation alliance polygons used as exposure units for the SGFB. A number of units exceeded 1,600 mg/kg before IRAs and reclamation borrow activities occurred. Spatially-weighted 95UCL concentrations were re-calculated with the IRA dataset included; the results are discussed in Section 10.1, below.

In contrast, the copper human health RAC of 5,000 mg/kg was applied on a point-by-point basis to human health copper concentrations (points are the centers of the Thiessen polygons, see Table 3-2 of the FS Report for human health concentrations at all the locations); this point-by-point approach is similar to methods described in the STSIU Interim Removal Action Work Plan (IRAWP; Arcadis 2006).

As discussed previously, the vegetation-based exposure units for pCu are the existing rangeland polygons (Woodward Clyde 1997, Figure D-8a) defined by combinations of different soil and vegetation types. Only rangeland polygons within areas with mean copper concentrations greater than 327 mg/kg were included (shaded rows in Table D-2). The rangeland polygons were overlaid on the map of IRA and borrow areas (Figure 3-9 of the main FS report), and the portion of the polygon in a removed or remediated area was assigned a pCu of 6 to represent a conservative background value before averaging pCu for the rangeland polygon. Twenty-four rangeland polygons (2,459 acres) were preliminarily identified in the STSIU areas with average pCu < 5 and ranged from less than 3 to 533 acres (Table D-2).

9 Copper and pCu Decision Criteria

Exposure unit concentrations compared to decision criteria for evaluating exceedances of the pre-FS RAC are discussed below.

9.1 Decision Criteria for Comparing to Copper pre-FS-RAC

For assessing areas that might need remediation for birds represented by the SGFB, if an exposure unit (vegetation alliance polygon) contained copper concentrations greater than or equal to the pre-FS RAC for SGFB exposure monitoring (1,100 mg/kg for 6 inch depth and sieved at 2 mm), a spatially-weighted 95UCL of the mean copper concentration was calculated for the given exposure unit using a bootstrapping dataset method that accounts for skewed datasets. The method was developed by a California Regional Water Quality Control Board

(CRWQCB; Casmalia Resources Site Steering Committee 2011). The approach for calculating spatially-weighted 95UCLs using Thiessen polygons developed by the CRWQCB involves producing bootstrapped datasets for the original dataset (with replacement) using the statistical software program R version 4.3.2 (R code provided in Attachment G). These bootstrapped datasets are then entered into ProUCL 5.2 to have the ProUCL program recommend the best 95UCL based on the best statistical distribution of the individual dataset. The recommended 95UCLs from 500 iterations[11] of the bootstrapped datasets were averaged to produce the final 95UCL for each alliance polygon, using arithmetic mean if the distribution of 95UCLs was symmetric or geometric mean if the distribution was asymmetric.

The area (acreage) of each Thiessen polygon surrounding the sample point was used for the spatial weighting, and the bootstrap method described above provided the standard deviation of the mean used in the calculation of the 95UCL. For these calculations, when soil was removed in a borrow area or interim action area without concentrations (Figure 3-7 of the FS report shows borrow pit and IRA areas where soil was excavated and removed), the 95UCLs for the SGFB exposure units were recalculated by replacing the Thiessen polygon values with 327 mg/kg (assumed post-removal copper concentration is at background, given depth of excavation). All exposure units with a spatially-weighted 95UCL greater than the pre-FS RAC criteria of 1,600 mg/kg that were not removed as borrow or in IRAs would be evaluated for remedial alternatives in the FS Report. Figure D-8c (or Figure 3-5 of the FS Report) presents the results spatially, showing none of the exposure unit 95UCL estimates exceeded the pre-FS RAC of 1,600 mg/kg (all ratios are less than or equal to 1.0 in Table 3-3 of the FS Report). Exposure units with copper 95UCLs greater than 1,100 mg/kg but less than 1,600 mg/kg (yellow exposure units on Figure D-8c) will require biotic and/or abiotic media monitoring to evaluate risk to SGFBs, as requested by NMED (2011a,b) with specifics of monitoring to be decided in the future. If an exposure unit did not have a 95UCL copper result greater than 1,100 mg/kg, it was not considered further. Table 3-3 of the FS Report includes the alliance-sized exposure units that have concentrations in excess of 1,100 mg/kg for at least one of the Thiessen polygons within each alliance polygon and tabulates each exposure unit's final 95UCL concentration.

For human health criteria, if an individual sample point within a Thiessen polygon (the exposure unit for human health) contained a copper concentration greater than the 5,000 mg/kg human health pre-FS RAC (evaluated with 0.25 mm sieve and at 0-1 inch depth) after all the remediation and borrow activities were accounted for, the polygon was retained for remedial evaluation for compliance with the human health pre-FS RAC. However, those few locations that remained after the large areas were remediated or removed (see Table 3-2 in FS report) either had bedrock with unimportant exposure (sample result represents dust that could be wiped off the rock), were too steep for remedy, had infrastructure present, or were part of the right-of-way and could not be remediated. Thus, copper remediation or monitoring alternatives in the FS are focused on compliance with the avian pre-FS RAC, as human health remediation already has been completed as part of interim action plans and borrow activities.

9.2 Decision Criteria for Comparing to pCu pre-FS-RAC

A challenge with defining areas for remediation based solely upon the pCu pre-FS RAC criteria is that in many areas that may have pCu < 5, good rangeland or habitat conditions may still exist; more harm than good may be

[11] The CRWQCB used 250 iterations of the bootstrapped datasets during their development and application of this method. This was increased to 500 iterations for the purposes of this analysis, which is just below the limit imposed by ProUCL 5.2 (column limit of 512). For three alliance polygons, ProUCL was not successful in generating all 500 iterations of the bootstrapped datasets; the 95UCL for Polygon 42-15 is based on 354 iterations, Polygon 88-17 is based on 149 iterations, and Polygon 88-22 is based on 224 iterations. One alliance polygon (Polygon 1-5) had only two samples and did not meet the minimum sample count to generate bootstrap datasets and calculate a 95UCL; therefore, the average concentration was estimated.

done if remediated. The assumption of environmental benefit is based on the likely amount of time required for the ecosystem to recover after remedial disturbance. For fair to good rangeland, these ecosystems are predicted to require at least 1 to 2 decades to regain an equivalent level of function assuming that soil loss is minimal (Bestelmeyer et al. 2004, Abella 2010, Romme et al. 2003, DBS&A 1999, Chino 2007, see Section 7.8 and Appendix B-3 within Appendix A of the FS Report for a more detailed evaluation). The inherent climatic variability in this region complicates the predictability of the plant response and likelihood of near-term success. Furthermore, range conditions likely improved since 1997 following cessation of smelter activities in 2003 and the white rain event in 2008 (see Appendix A and B of the FS Report). Therefore, the decision to remediate areas with pCu < 5 was based upon consideration of the current rangeland condition and wildlife habitat quality.

9.2.1 Development of Thresholds for Acceptable Rangeland Condition and Wildlife Habitat Quality.

The adequacy of wildlife habitat in ungrazed areas was defined in the FS Work Plan as acceptable if cover was greater than 32% and richness was greater than 8, in accordance with MMD guidance and revegetation success guidelines developed for Chino, assuming climatic and grazing conditions are relatively similar to conditions of the reference plots used to assign these criteria (DBS&A 1999). However, those guidelines apply to ungrazed areas. All areas with pCu < 5 were grazed; as such, these numeric criteria do not apply. Rather, as was done in DBS&A (1999), proportional success guidelines were applied to the endpoints measured on grazed reference areas. As discussed in Section 5.3, above, and detailed further in Attachment A, eight grazed reference areas east of Lampbright Draw with little impact from the smelter were found to represent the range of topographic and soil conditions of impacted, grazed locations on the STSIU. Additionally, the phytotoxicity and vegetation community study on the STSIU (Appendix C of the FS Report) demonstrated that four “soil/slope categories” (soil categories) have a strong influence on STSIU plant community richness and cover, and NMED agreed that the effect of these soil categories on the pre-FS RAC should be considered in the STSIU FS Report (see NMED comments at end of Appendix C). The vegetation community study that was part of that phytotoxicity report, conducted in 2014, identified and sampled two additional reference locations for the community analysis, which were also included as reference areas for the FS, resulting in a total of ten reference areas used for comparing plant communities on site to reference areas. Sampling of these ten reference areas provided background values for community metric endpoints of cover, richness, and rangeland condition (via OAT score) across the following four soil categories identified in the phytotoxicity and vegetation community study (Appendix C of the FS Report):

1. Flat granular
2. Flat rocky
3. Bedrock
4. Steeper slopes (>13%).

Only areas in unacceptable vegetative condition that are also in areas with concentrations below the pre-FS RAC for pCu were considered for remediation. To determine the threshold between unacceptable and acceptable habitat quality in the STSIU, the guideline for establishing target thresholds for richness and cover was based on a proportion of the mean reference value for each soil category, determined by the spatial variability observed in the reference locations. To determine these proportional success guideline targets, vegetation cover measured in 2018 at the reference location first was adjusted to vegetation cover expected at the same location in 2011 (the year of vegetation cover estimates for the STSIU locations in the phytotoxicity study) by applying a correction factor calculated from NDVI derived from Landsat 7 and 8 Images for 2011 and 2018, respectively (as described previously in Section 5.2). No correction factor was applied to richness due to lack of an adjustment method but richness was often similar. Climatic differences that change the OAT score were taken into account by the investigators prior to assigning scores each year (by comparing the OAT score of the same plot each year). After these adjustments for interannual differences, a threshold value based on 2011 data, was selected for each soil category. Specifically, the spatial variability was measured using the relative percent difference (RPD = difference/mean) between the maximum and minimum value of reference locations in each soil category. This RPD was used to determine the proportion of the reference mean to be used as the target to classify a rangeland polygon on the STSIU as acceptable (if above target) or unacceptable (below target) for the screening step (e.g., if the RPD of a soil category is 50%, then the threshold for acceptability was based on half the reference value of that soil category). The calculations were performed on the reference vegetation data reported in Table 3 in Attachment A.

Using the "acceptable" criteria described above to calculate targets, Table D-3 presents the target community endpoints for each soil category to determine which rangeland polygons with pCu < 5 appear to have acceptable wildlife habitat (cover and richness). Depending on the soil category, the target thresholds for percent cover range from 7 (bedrock) to 45 (slope) percent and from 4 (bedrock) to 10 (slope) for richness (number of species; Table D-3).

For rangeland condition (as predicted by OAT score), the threshold between an unacceptable and acceptable OAT score was set to 22 for the STSIU non-bedrock areas based on data in the area. Notably, the threshold can vary depending on the area, and the selected value of 22 is higher than thresholds used in some areas outside of the STSIU and is also too high for the bedrock soil category within the STSIU. For example, BLM Environmental Impact Statement, Drewsey Resource Area in Oregon used 17 as the threshold (BLM 1984), which was also used by NRCS in Wyoming. The threshold for the STSIU was determined by evaluating all soil stability and plant distribution data collected for the rangeland evaluation in 1997 in the STSIU (see worksheet in Appendix B of Woodward Clyde 1997), which produced preliminary rangeland classifications ranging from Excellent, Good, Fair, to Poor. Comparing the OAT score to these classifications for rangeland polygons that potentially have pCu < 5 suggested an OAT score greater than 22 mostly represented fair to good rangeland condition in habitats that are not dominated by bedrock. Photographs from the vegetation investigation conducted for the FS further supported that 22 and above represents fair to good rangeland (see photos of sites in Appendix I within Appendix C of the FS Report). [12] However, all the bedrock reference areas were in areas with an OAT score less than 22. Because all bedrock locations were poor rangeland, the target criterion for bedrock of 22 was changed for bedrock to the proportional success approach used for richness and cover. Using this approach, for bedrock areas in the STSIU, the OAT score threshold was set at 13 to determine fair-good rangeland condition for bedrock areas in the STSIU based on bedrock reference areas in the vicinity of the STSIU.

The decision criteria for remediation was to identify rangeland polygons with pCu < 5 in areas with copper concentration > 327 mg that have a poor (unacceptable) rangeland condition or polygons that have unacceptable

[12] The following information further supports using an OAT score of 22 as the threshold for unacceptable condition for non-bedrock areas and that a fair rangeland condition (25 to 50% of theoretical optimum for soil type) is typical in the area. Past grazing alone has depressed vegetation cover levels by up to 39% (Gamougoun et al. 1984; Weltz and Wood 1986). Many of the soils in the STSIU have limitations associated with high clay contents and restricted thickness over bedrock or indurated caliche layers (Soil Conservation Service [SCS] 1983). The combined effects are seen at Chino on the rangeland to the east of the tailing impoundments, where some of these areas had OAT scores < 22 where pCu was > 5 (based on OAT score data collected, see Section 5.1), a result of moderate to heavy grazing over the last 100 years on areas with marginal soils.

richness or cover.[13] Specifically, the following criteria were used to remove polygons from remedial consideration where the destruction of the existing vegetation and inevitable increase in soil erosion associated with remediation could lead to a loss of environmental benefits, causing more harm than good.

- If the OAT score of the rangeland polygon was ≥ 22 for all soil categories except bedrock, the polygon was considered to have "fair-good" rangeland condition and was acceptable rangeland condition. For bedrock, the threshold for being acceptable was ≥ 13 (Table D-3). If the OAT score was < 22 (or < than 13 for bedrock), the polygon's rangeland condition was considered "poor" and therefore unacceptable.
- If the percent cover was ≥ the targeted percentage of reference mean area values in Table D-3 for the four soil categories (10% for flat granular, 12% for flat rocky, 45% for slope, and 7% for bedrock), the polygon was considered to have "acceptable" wildlife habitat for cover.
- If the species richness was ≥ a targeted percentage of reference area mean values in Table D-3 for the four soil categories (7 for flat granular, 8 for flat rocky, 10 for slope, and 4 for bedrock), the polygon was considered to have "acceptable" wildlife habitat for richness.
- A rangeland polygon must have acceptable vegetation cover and richness to be considered acceptable wildlife habitat. It must have an acceptable OAT score to have acceptable rangeland condition. Both rangeland condition and wildlife habitat must be acceptable to exclude a polygon from consideration for remediation. If a polygon was unacceptable in richness, cover, or OAT score, it was retained for further remedial evaluation.

Figure D-14 shows the final remote-sensing based map of acceptable and unacceptable rangeland polygons, which were produced using the target thresholds for acceptability.

In summary, for pCu, if an area's rangeland condition was determined to be fair to good (based on OAT score) and wildlife habitat is acceptable (based on cover and richness data), the area was not considered for remediation and is not discussed further in the FS Report. The criteria for acceptable wildlife habitat and fair to good rangeland condition was determined using proportional success guidelines relative to corresponding reference plots for each soil category, as described above. All areas with unacceptable rangeland and wildlife habitat condition as described above were identified and their respective pCu values were compared to the pre-FS RAC. Figure 3-11 of FS report shows the exposure units (rangeland polygons) with average pCu < 5 and copper > 327 mg/kg (after adjusting pCu for areas with IRAs or borrow activities).

9.2.2 Application of Probable Effect Level Criteria

A problem with the generic "one RAC fits all areas" approach, even after adjusting for habitat quality to prevent more harm done than good, is that the pre-FS RAC does not consider that the "response" of vegetation to pCu varies by soil category (see Appendices B and C). The assumption of the pre-FS RAC is that pCu can adversely impact and be correlated to rangeland condition and wildlife habitat quality, with the latter shown by correlations with vegetation richness and cover, as was done for the phytotoxicity and community study (Appendix B of main FS report). However, soil surface pCu may be a poor correlate or predictor if certain conditions apply. One condition is when grazing is strongly affecting the percent cover of the vegetation community (e.g., flat rocky soil

[13] If all or most of the reference sites of a soil category were considered unacceptable rangeland condition, however, as found for bedrock types, the numerical threshold of 22 for the OAT score was considered too high as a target, and a value consistent with reference was used instead. Note that the FS Work Plan indicated one reference plot would be used east of Lampbright Draw to define acceptability thresholds, but the number was increased to capture the variability in the vegetation condition across the soil categories.

that mostly grows mesquite and few grasses is often the result of overgrazing, Bestelmeyer et al. 2004). A second condition is when the soil chemistry contains a buffer (lime) not accounted for by pCu that reduces vegetative degradation. Figure D-15 shows lime and alkalinity (indications of buffer capacity) concentrations by soil category across ranges of pH for all plots that had such data. It indicates slope and flat granular soils have higher buffering capacity than bedrock or flat rocky soils. Therefore, thresholds for defining an unacceptable condition likely resulting from pCu versus other factors need to be derived separately for each soil category (to account for soil chemistry) and from appropriate reference locations (i.e., factoring in the effects of grazing) before applying the pre-FS RAC. PELs, initially derived in the phytotoxicity study, can be developed to provide such thresholds for each soil category. The pre-FS RAC was based on the PEL, rather than the DEL. The DEL in the community studies is a no effect level, whereas the PEL is at most a 50% effect level. The PEL incorporates uncertainty on the unknown pCu level that begins to cause a statistically significant decrease in plant endpoints in the field, and most importantly, its use protects the plant community from destruction from remediation with recovery taking decades, when the effects are minor.

Before being considered for remedial alternatives in the FS report, the pCu of retained exposure units (those with unacceptable rangeland and wildlife habitat condition that do not meet the pre-FS RAC based on the spatially interpolated pCu and copper maps) were compared to a probable effect level (PEL) of pCu that depends on the soil category of the rangeland polygon. Existing dose-response curves from the phytotoxicity report in Appendix C were updated with the 2018 reference plot data in Figure D-16 to develop average PELs for each soil category. Some of the regression analyses (general linear models) used to develop the curves indicated no significant relationship ($p<0.05$), including between pCu and richness or pCu and OAT score in flat granular soils, and between pCu and cover in slope and flat rocky soils (Table D-4). No relationship indicates either that other factors strongly override pCu effects (e.g., grazing) or the plant community has high tolerance or low copper uptake in low pCu soils because of a soil category's chemical or physical properties. Notably, however, when all three endpoints are considered, all had some significant relationships with pCu ($p<0.05$), which suggests that pCu can be a predictor of the plant community condition.

The PEL was calculated from the dose-response curves as the pCu that represents the endpoint value that is 50% of the endpoint value for the reference endpoints, where the value of the reference endpoints was conservatively assumed to be the DEL (Figure D-16 shows DELs and PELs with their corresponding endpoint and pCu values). The PEL for each of the three endpoints is informative for evaluating tolerance of plant communities in each soil category to pCu (Table D-5). The average of the wildlife habitat endpoints (cover and richness) and the rangeland condition endpoint (OAT score) characterize the vegetation quality for wildlife and livestock. However, the insignificant relationships do not have a numeric PEL value to apply to the average for wildlife habitat or to rangeland condition. To correct this omission, buffering capacity classes were employed to assign a value for insignificant values. When a non-significant PEL was identified for a soil category for an endpoint, it was replaced with the significant PEL value of a soil category in its buffering class, as shown in Table D-5 (in red). With this adjustment, average PELs across the soil categories for wildlife habitat ranged from 4.11 to 4.98, with the highest values in the flat rocky soil category. The rangeland condition PELs ranged from 0.69 to 3.83 with highest value in the flat rocky soil category. The higher (maximum) of the wildlife habitat versus rangeland condition PELs was selected for the threshold for pCu effects large enough to require remediation. The wildlife habitat PELs were always higher. As expected, PELs were highest in the low buffering capacity soils (bedrock and flat rocky) and lowest in the high buffering capacity (flat granular and slope) soils (the analysis to derive PELs is fully presented in the phytotoxicity study in Appendix C and in Attachment A).

The final pCu PELs developed for each soil category are as follows:

- Flat Granular: 4.11
- Slopes: 4.11
- Flat Rocky:4.98
- Bedrock: 4.40

Each exposure unit (rangeland polygon) has a soil category assigned (see Figure 3-10 of main FS report for soil category map), based on its dominant soil category, or if split almost evenly between two types, the exposure unit was split into two separate units. If the exposure unit is less than the PEL, the unit was retained for remedial alternative evaluation. This approach and development of the PEL is discussed further in the next section.

10 Results and Estimate of Acreage to Consider for Remediation

10.1 Copper

The IRA and borrow area activities removed all habitat polygons with copper exceeding the SGFB pre-FS RAC of 1600 mg/kg. All Thiessen polygons with copper exceeding the human health pre-FS RAC of 5,000 mg/kg that could be remediated have been remediated. The acres that exceed the copper concentration of 1,100 mg/kg that would require monitoring to protect the SGFB are approximately 140 acres, which will be evaluated as part of a monitoring program. These acres are discussed in the main FS report.

10.2 pCu

The pre-FS RAC outlined in this Appendix are consistent with USEPA's use of PRGs in the NCP, which can be modified as new information becomes available; therefore, this new information can be used to refine the pre-FS RAC for pCu, which affects the selection of areas retained for remedial evaluation (§300.430(e)(2)(i) NCP).

The pre-FS RAC is generic in that it does not vary by soil category; yet soil category and its buffering capacity, have a strong influence on the relative effect of pCu on the plant community. To better understand actual adverse effect thresholds for plant communities in exposure units retained for remediation (retained based on the pre-FS RAC and habitat conditions as described in Section 9.2), DELs and PELs for pCu were calculated for each soil category.

The revised DELs and PELs, presented in the last column in Table D-5, provide context for net environmental benefit when evaluating remediation approaches. The average PELs across the soil types for wildlife habitat ranged from 4.11 to 4.98, with the highest values in the flat rocky soil category. Based on this new, site-specific refined information, the PELs for each soil category are used to identify acres for remedial alternative evaluation in this FS Report in accordance with the soil category of the exposure unit. This identification occurs after percent cover, richness and OAT score are used to identify exposure units with acceptable rangeland or wildlife habitat, as described in the approved FS Work Plan and detailed in previous sections of this Appendix. The comparison to PELs occurs after vegetation communities in soils still not meeting the pre-FS RAC post-IRA, but have acceptable vegetation quality, are removed from further consideration.

The identified acres that remain after the PEL screening are reviewed for remedial alternatives in the main FS Report. The sequence of maps in the main FS report display acres by rangeland polygon meeting the Pre-FS RAC for plants after accounting for IRA improvements (Figure 3-11 of the FS Report), then the removal of acres that meet acceptability criteria (Figure 3-12 of the FS Report), and then acres remaining above the soil-category-specific PELs (Figure 3-13 of the FS Report).

The mapped acres with pCu < PELs for each soil category within rangeland polygons consisted of 377 total acres carried forward for evaluation (Table D-6). The pCu of exposure units in flat granular soil category did not exceed their PEL; however, the other three categories - bedrock, flat rocky, and slope >13% soils types - did exceed their PELs (Table 3-7 in FS report). If a retained rangeland polygon had an average pCu ≥ its PEL, it was removed from further analysis. The acres associated with retained rangeland polygons in bedrock, flat rocky, and slope >13% soil types with PEL values of 4.4, 4.98, and 4.11 respectively, amounted to 377 acres (Figure 3-13 of the FS Report, Table D-6; the ten Bolton diversion acres in the northern flat rocky polygon were already reclaimed and are not included in the 377 acres). The FS Report evaluates remedial alternatives for these 377 acres to restore the plant community adversely affected in those areas by pCu.

As the FS discusses in Section 7.3.1.1, the uncertainty of the PEL thresholds needs to be considered when selecting remedial alternatives. The rangeland condition PEL is not included using the approach discussed above because it is lower than the wildlife habitat average PEL, and the most sensitive PEL was selected of the two as the final PEL for each soil category. If all three endpoints (cover, richness, and OAT score) were averaged instead, then the PEL thresholds would be lower at PEL values of 3.98, 4.6, and 2.97 for bedrock, flat rocky, and slope > 13% soil types, respectively (see Table D-7). It is uncertain whether the benefits of remediation to the most sensitive species and endpoints using the higher PEL approach outweigh negative effects of temporary habitat destruction to the entire plant community, which requires time for recovery that may be potentially long in semi-arid ecosystems. Thus, benefits are uncertain between the PEL of 3.98 and 4.4 for bedrock, 4.6 and 4.98 in flat rocky soils, and 2.97 and 4.11 in slope soils, which is discussed in detail when evaluating the 377 acres identified for potential remediation in Section 7.3 of the FS.

10.3 Summary

In summary, no exposure units for SGFB exceed the pre-FS RAC of 1600 mg/kg of copper. For pCu, 377 acres are considered for remediation of pCu to protect the vegetation that serves as rangeland for livestock and habitat for wildlife. Additionally, 140 acres are considered for monitoring to ensure SGFB are protected at copper concentrations that occur in some polygons between 1,100 mg/kg and 1,600 mg/kg.

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Appendix D – Methods and Results for Upland and Drainage Bank Analysis

Tables

Table D-1
Criteria used to score Observed Apparent Trend (OAT)
Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Check appropriate box in each category which best fits area being observed. Points may vary within each category. Points are recorded and summed to derive final OAT score.

☐ VIGOR (10 points)		Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points)		Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)		Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ SEEDLINGS (10 points)		There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)		Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points)		Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ SURFACE LITTER (5 points)		Surface litter is accumulating in place.
☐ (3 points)		Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)		Very little surface litter is remaining.
☐ **PEDESTALS** (5 points)		There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)		There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)		Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ SURFACE CRUSTING (5 points)		There is little visual evidence of surface crusting.
☐ (3 points)		There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)		Severe surface crusting. (Note reason for cause)
☐ RILLS AND GULLIES (5 points)		Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)		Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)		Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: ______		

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
HW112/163	2883	1271	6.88
HE189/191	495	1177	5.45
HW168	1837	1125	5.97
HE186	768	1076	5.04
HE216	1309	1064	3.87
HW125	177	1024	5.47
HW111/165	5589	1020	7.06
HE192	3449	993	4.61
HE193B	523	916	4.19
HE187	568	897	5.33
HW120	820	876	5.74
HE196	964	856	4.50
HE309	460	831	4.79
HE305/306	126	814	6.30
HE193	5738	802	4.48
HW112B	810	795	5.69
HW116	460	785	5.94
HE196B	1158	767	4.69
HW121	163	741	5.83
HE190	447	732	5.59
HE382	105	710	7.96
HW161	795	626	7.50
HW161	694	626	7.50
HE291	3116	620	5.13
HE308	2020	615	4.77
HW124	332	607	5.52
HW118	320	606	5.74
HE32A	976	603	4.70
HE292	279	600	5.65
HW184	10	598	8.24
HE176	39	598	5.67
HW156/157	39	597	7.19
HE311	19	595	5.16
HE211	67	595	4.98
HE195	24	584	4.76
HE533A, HE203/204/205/206	652	579	5.43
HE93F	132	563	5.37
HE312	126	561	4.86
HE533B	44	555	5.31
HW155/160	349	536	7.74
HE337	24	534	5.15
20221107-1	1694	524	6.43
HE179	53	510	5.82
HW142/153/154	102	501	7.66
HW136A	17	497	7.02
HE4	143	492	6.02
HE46A	69	491	5.02
HE180	13	481	5.85

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
HE177	0	481	5.99
HE177	27	481	5.99
HE93D	136	479	5.16
HE413	3	477	3.65
HE213	45	470	5.17
HE412	17	463	3.85
HE214	36	456	5.27
HW136/152	305	451	7.89
HE212	104	450	6.02
HE315	23	447	4.74
HE365/369/373	99	438	6.72
HE370/371/372	210	437	7.59
HE178	5	430	6.00
HE319	25	429	4.60
HE336A	64	429	5.28
HE314	37	427	4.85
Hurley/Smelter/Tailings	5280	426	6.39
HE14	214	426	5.92
HE317	43	425	4.60
HE5	47	423	6.07
HE183	92	423	5.56
HE2	112	421	6.12
HE409	45	418	6.43
HE200D	40	417	5.05
HE6/9	10	407	6.04
HE32B	287	403	5.40
HE192B	42	398	5.55
HE417	11	397	7.73
HE10/7	61	395	6.00
HE18	212	392	5.82
HE368	390	388	7.01
HE411	133	386	5.07
HE392	16	385	5.64
HE397	674	383	5.53
HE45A	0	383	5.45
HE45A	0	383	5.45
HE45A	133	383	5.45
HE45A	35	383	5.45
HW170	2607	383	8.11
HW170	547	383	8.11
HE318	45	381	5.57
HE44	117	380	5.31
HE416	717	378	7.84
HE401	11	371	4.61
HE8	18	369	6.06
HE200A	66	367	5.47
HE395	209	366	5.17
HE339	39	364	5.80

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
HE31	138	363	5.53
HE200B	47	362	5.48
HE363	724	361	7.22
SR14	182	361	6.51
HE320	25	360	4.26
HE93E	250	356	4.86
HE328	386	353	5.27
HE1	5	351	6.18
HE407	121	351	5.66
HE222D	36	349	5.14
HE340	29	346	5.33
HE390	54	345	4.97
HE402	3	344	5.61
HE228B	54	343	5.28
HE45C	38	343	5.40
HE326	17	343	5.26
HE316	123	340	4.71
HE359/360/362	241	339	6.07
HE393/394	69	337	4.94
FS2	96	336	6.00
HE364	26	335	6.57
HE17	16	333	6.04
HE343	20	333	4.98
HE387	51	332	8.59
HE85	105	332	5.72
HE400	20	331	4.35
HE336B	128	330	5.41
FS1	15	329	6.52
HE334	130	328	4.85
WATER	2	327	6.57
WATER	0	327	6.57
WATER	0	327	6.57
WATER	1	327	6.57
WATER	1	327	6.57
WATER	0	327	6.57
WATER	1	327	6.57
WATER	1	327	6.57
WATER	0	327	6.57
HE346	5	327	5.74
HE93C	36	327	5.21
20221107-2	11	326	5.34
HE408/410	102	325	6.55
HE321	60	323	4.54
HW158/159	412	323	7.99
FS20	15	322	6.46
HE345	17	322	4.88
HE351	10	321	6.30
SR7/8/10/11	143	319	7.04

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
HE21	34	319	6.00
HE45B	143	319	5.62
HE11	30	318	6.12
HE333	171	317	5.20
HE205	859	316	5.59
HE367	81	315	5.57
HE405	5	315	6.19
SR13	21	314	6.19
HE220	161	311	5.40
HE93B	31	311	5.78
HE93B	22	311	5.78
HE342	64	310	6.02
HE327	32	307	5.50
20221107-4	5	306	6.62
HE403	1	304	5.03
HE19	164	304	6.24
HE20	28	302	6.07
HE35	57	301	5.75
HE344	47	300	5.59
HE347/348	198	299	5.91
HE282A	15	299	6.81
HE22	139	293	6.06
HE338	67	293	5.90
HE356	15	293	6.71
HE93A	58	292	5.24
HE406	8	291	6.59
HE349	41	291	6.19
HE352	42	288	7.04
HE228	33	288	5.87
HE46	29	286	5.91
No Data	56	286	5.68
HE86B	2	285	5.69
HE86B	21	285	5.69
HE12	6	285	6.25
HE223	6	282	5.71
HE229	353	281	6.12
HE13	67	281	6.28
SR5	102	277	7.62
HE87/88	32	276	6.13
HE335	27	271	4.71
HE29	107	271	6.06
HE240	19	271	5.81
HE330	58	271	5.17
HE241	86	264	5.98
HE230	91	263	5.45
HE86	27	261	6.25
HE350	4	260	7.34
HE227	267	260	5.82

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
SR20	29	259	
HW185/388	84	256	8.58
HE16/15	42	256	6.42
HE222B	189	253	5.24
HE257	373	251	6.09
SR18	95	248	
HE24A	53	244	6.39
SR26	20	243	
HE34	49	243	6.16
HE80/90/91/92/94/95/96/97	466	240	6.34
HE381/FS7/FS8/FS9	584	240	8.42
HE381/FS7/FS8/FS9	185	240	8.42
HE33C	39	237	6.16
HE258	150	234	6.70
HE23/27	47	232	6.50
HE26	45	231	6.41
SR19	63	229	7.61
HE255	60	226	6.15
HE222A	62	226	5.24
HE102A	72	226	5.96
HE227B	105	226	5.73
HE33B	117	225	6.32
HE226	45	225	5.18
SR42	15	223	6.77
SR27	33	222	
HE238	167	221	6.52
SR30	4	221	
HE519	85	219	6.78
SR9/12/15/16/38/41	684	217	6.99
HE103A	53	216	6.02
HE103A	98	216	6.02
SR44	95	211	6.71
SR210B	25	206	
FS11	43	205	8.24
HE263	50	205	6.64
HE236	7	204	6.84
SR118	230	203	
SR75	6	202	
HE25	115	202	6.64
HE82	33	200	6.51
HE82	6	200	6.51
HE82	48	200	6.51
HE254	13	197	6.41
SR91	33	197	
SR74	4	196	
SR89	12	193	
SR102A	67	193	
SR36	63	193	7.55

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
20221107-3	27	191	
SR120	84	191	
SR122	12	189	
HE232	62	189	6.53
SR37	15	188	7.30
HE36	37	188	6.56
SR85	46	187	
HE81	53	186	6.70
HE84	9	185	6.50
SR103	69	183	
SR88	39	183	
SR210A	153	182	7.48
SR87	26	182	
HE43	49	180	6.55
HE28	33	177	6.76
SR92	19	176	
SR31	4	176	
SR182	51	176	
SR32	13	175	
SR35	94	175	7.52
HE42	99	173	6.64
HE36A	24	173	6.70
HE235	24	173	6.56
SR100C	24	173	
SR73	6	173	
SR72	39	173	7.45
SR129	116	172	
HE37	11	171	6.69
SR123	130	171	
SR100A	34	171	7.40
HE83	63	170	6.65
SR67	10	170	
SR104	99	169	
HE154	181	168	6.98
HE389	97	168	8.86
SR141C	3	168	
HE98D	77	167	7.02
HE231	31	166	6.93
HE151	92	166	7.10
SR141A	52	164	
HE24B	81	164	7.02
SR181	17	163	
SR99	22	162	7.45
SR170	132	161	
HE33A	28	161	6.85
SR100B	39	160	7.50
SR124	15	160	
SR68	8	160	7.51

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
HE128	37	160	7.80
SR141B	108	159	8.08
SR97	11	159	7.37
SR173/174	66	159	
SR94	20	157	7.30
HE157	24	156	7.55
SR95	8	155	7.36
SR176	34	154	
HE120	226	153	7.85
SR96	16	153	7.40
SR98	80	153	7.69
SR110	44	153	7.71
SR111	31	152	7.71
SR112B	22	152	7.67
SR112A	93	151	7.66
SR108	80	151	7.90
SR101	70	150	7.87
SR71	106	150	7.39
SR40	40	149	7.34
SR84	11	149	7.38
HE119	71	149	7.93
HE71	59	149	7.83
HE129	9	149	7.74
HE116	21	149	7.93
HE228A	68	149	7.27
SR113	15	149	7.52
SR105	62	148	
SR116	66	148	7.93
HE105	117	148	7.28
HE105	110	148	7.28
HE115	74	148	7.96
SR53	24	148	7.77
HE114	180	148	7.98
SR114	45	148	7.85
HE68	54	147	7.99
HE98C	59	147	7.22
HE117	14	147	7.99
HE300	120	147	7.75
HE63	9	147	7.91
HE69	46	147	7.99
HE70	26	146	7.99
HE62B	6	146	7.83
SR117	37	146	8.01
HE65	19	146	8.00
HE62A	15	145	7.73
HE67	39	145	8.01
HE113	86	145	8.00
SR82	82	145	7.49

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
HE122	108	145	8.00
HE122	1	145	8.00
HE40B	48	145	7.05
HE53	22	144	7.57
HE144	49	144	7.44
HE60	7	144	7.63
HE54	5	143	7.58
HE58	19	143	7.59
HE89	11	143	7.58
HE61	7	143	7.58
HE40A	51	142	7.09
SR124X	128	141	
SR109	83	141	8.09
HE126	178	141	7.75
HE57	6	140	7.52
SR130	130	140	
HE73	57	140	7.57
SR39A	35	140	7.66
SR81	32	140	7.43
HE123/124	118	139	8.00
HE145	251	139	8.05
HE72	95	139	7.39
HE41	26	139	7.09
HE98B	47	138	7.66
HE52	49	138	7.49
HE55	10	138	7.49
SR69	7	137	7.45
SR142	271	137	8.08
HE38	45	136	7.27
HE77	137	136	7.20
HE125	52	135	7.75
HE75	72	135	7.62
SR137	48	135	
HE39	165	135	7.40
HE130	5	135	7.71
SR136	17	135	
HE134	38	134	8.01
SR39B	50	134	7.75
SR138	28	134	
SR127A	27	134	
SR139	22	133	
SR127F	86	132	
SR80A	31	132	7.45
HE98A	31	132	7.67
HE51B	23	132	7.45
HE99	122	132	7.62
SR132	119	132	
SR143	15	132	

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
HE104	275	132	7.51
HE50	25	131	7.36
SR127B	117	131	
HE148	123	131	7.33
SR52/59	337	130	7.70
SR144	11	129	
SR70	43	129	7.50
SR83	6	129	7.39
HE51A	25	128	7.42
HE146	108	127	7.70
SR77	63	126	7.47
SR64B	33	126	7.47
SR178A/177	92	125	
SR127E	68	125	
SR146	142	125	7.71
SR126C	63	124	
HE49B	16	124	7.37
HE49A	23	124	7.32
SR145	53	124	7.96
SR66	42	124	7.62
SR80B	29	124	7.44
SR55	8	124	7.36
HE110	130	123	8.08
HE127	24	123	7.56
HE48	21	122	7.32
HE109/108/107	201	121	7.98
HE160	15	120	8.32
HE112/121/139	340	120	8.22
SR65	84	120	7.58
SR79C	3	119	7.43
SR54	104	119	7.42
SR135	14	119	
SR63	21	118	7.63
SR79A	21	118	7.49
HE286A	157	118	7.35
SR127D	6	118	
HE159	23	118	8.16
SR79B	4	117	7.48
HE143/161	271	117	8.27
HE147	64	117	7.40
HE47	13	117	7.39
SR133	106	117	
SR78	18	116	7.46
SR198	15	116	
SR198	19	116	
SR186	348	116	
HE131	9	116	7.58
SR126B	13	115	

Table D-2
Rangeland polygon mean copper and pCu values (pre-IRA)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Mean copper (mg/kg)	Mean pCu
SR64	175	115	7.47
SR127C	18	114	
SR147	93	113	7.72
SR56	91	112	7.43
HE174	25	112	7.54
HE135	36	111	7.60
HE137	50	110	7.77
SR60	8	110	7.45
HE133	0	110	7.46
HE133	92	110	7.46
HE140/141/142/160	221	109	8.47
HE284	4	109	7.36
HE173B	62	108	7.49
HE136	34	108	7.62
SR192	7	108	
HE138	256	105	8.38
SR194	15	104	
SR196	46	104	
SR200/201/202	138	104	
HE166	169	103	7.40
SR149	84	102	
HE175	0	102	7.37
HE175	163	102	7.37
SR150	63	102	
HE287A	184	102	7.45
SR189	17	101	
SR58	97	100	7.68
SR126A	61	97	
HE302	37	95	7.59
SR190	36	92	
SR195	71	90	
SR128	3	87	
SR197	123	82	
SR61	6	82	7.77

*Note: Gray shaded rows denote rangeland polygons where Cu > 327 mg/kg
Pre-IRA mean data collected before areas interim action remediation or borrow area removals.
Blank indicates the copper and pCu interpolation did not cover that polygon.

Table D-3
Mean, RPD, and Target Community Endpoint Values for Each Soil Category

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Soil Category	Cover 2011	Richness	OAT
Mean of Reference Areas[a]			
Bedrock	17	7	16
Flat Rocky	20	13	22
Flat Granular	32	12	24
Slope	53	15	33
Relative Percent Difference (maximum - minimum/mean)[b]			
Bedrock	47%	40%	19%
Flat Rocky	39%	39%	25%
Flat Granular[a]	53%	43%	34%
Slope	16%	33%	22%
Target Threshold for Acceptability Criteria[c]			
Bedrock	7	4	13
Flat Rocky	12	8	22
Flat Granular	10	7	22
Slope	45	10	22

Notes:

[a]Wildlife Reference North had 8 species in 2018, 11 in 2011, and 14 in 2018, averaging to 11 over the three years; the average was used I this table. This location was the only reference sampled in more than one year. The raw vegetation data are in Table 3 of Attachment A.

[b]RPD omits extremes that cause percent difference to be over 80-100%. Also, flat rocky category had only one reference area and its RPD was the average of the other three soil category RPDs (RPD = relative percent difference).

[c]Except for OAT, calculated as 1-RPD x mean, unless result is higher than minimum reference and then minimum used. For OAT, the threshold is 22 except for bedrock, which was based on the RPD.

Table D-4
General Linear Model Results for Richness, Cover, and OAT Score

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Effect	Coefficient	Standard Error	Standardized Coefficient	t-value	p-value
Richness (n = 27[a], R^2=0.74) for all categories except flat granular[a]					
Constant	-1.46	2.05	0	-0.71	0.4849
Calculated pCu	1.85	0.29	0.66	6.31	**<0.0001**
Bedrock	-5.08	1.10	-0.61	-4.64	**<0.0001**
Flat Rocky	-2.85	1.18	-0.33	-2.41	**0.0244**
Cover (n = 24, R^2 = 0.83) for flat granular and bedrock locations only[b]					
Constant	0.03	0.28	0	0.11	0.9125
Calculated pCu	0.39	0.04	0.76	8.83	**<0.0001**
Flat Granular	1.15	0.20	0.50	5.84	**<0.0001**
OAT score (n = 28, R^2 = 0.72) for all categories except flat granular					
Constant	15.63	4.11	0.00	3.80	**0.0009**
Calculated pCu	1.95	0.60	0.35	3.25	**0.0034**
Bedrock	-13.91	2.13	-0.85	-6.52	**<0.0001**
Flat Rocky	-12.09	2.32	-0.70	-5.21	**<0.0001**

Notes:
a. Excludes three outliers
b. Excludes one outlier, transforms cover by raising it to 0.37th power
OAT = Observed apparent trend
Slope is the reference group for the "indicator" variable of soil category (bedrock, flat granular, flat rocky, slope) in the multiple regression. Excluded categories were not significantly related to pCu in the model. R^2 is adjusted for number of variables in model.

Bolded P values have $p < 0.05$.
pCu = cupric ion activity

Table D-5

DELs and PELs by Soil Category and Endpoint[a]

Freeport-McMoRan Chino Mines Company

Vanadium, New Mexico

Appendix D of Smelter/Tailings Soils Feasibility Study

Soil Category	Richness for Wildlife		Cover for Wildlife		OAT Score for Rangeland		Average DEL for Wildlife Habitat	Average PEL for Wildlife Habitat	Maximum DEL of Wildlife or Rangeland Habitat	Maximum PEL of Wildlife or Rangeland Habitat
	DEL	PEL	DEL	PEL	DEL	PEL	DEL	PEL	DEL	PEL
Flat granular	7.71	4.25	6.03	3.98	6.87	0.69	6.87	4.11	6.87	4.11
Slope	7.71	4.25	6.03	3.98	6.87	0.69	6.87	4.11	6.87	4.11
Flat rocky	9.47	5.90	5.28	4.07	9.48	3.83	7.37	4.98	9.48	4.98
Bedrock	5.91	4.72	5.28	4.07	6.31	2.71	5.60	4.40	6.31	4.40

Notes

[a]Red numbers are substitutions for a non-significant regression at P<0.05, where substitutions are from another soil category in the same buffering capacity group (Group 1: flat granular, slope; Group 2: flat rocky, bedrock).

Table D-6
Unacceptable Rangeland Polygons Exceeding their Probable Effects Level (PEL) for pCu (using pCu < 4.98 for flat rocky)

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Appendix D of Smelter/Tailings Soils Feasibility Study

Rangeland Polygon ID	Acres	Dominant Soil Category	Mean Copper (mg/kg)	Mean pCu	PEL Threshold
HE216a	74.8	Flat Rocky Soil	1063.62	4.18	4.98
HE312	125.6	Flat Rocky Soil	560.51	4.86	4.98
HE315	22.9	Flat Rocky Soil	447.10	4.74	4.98
HE317	41.0	Flat Rocky Soil	425.11	4.67	4.98
HE319	25.2	Flat Rocky Soil	429.19	4.60	4.98
HE400	20.2	Flat Rocky Soil	330.66	4.35	4.98
HE401	10.7	Flat Rocky Soil	370.52	4.61	4.98
HE412	16.6	Slope > 13%	463.44	3.85	4.11
HE413	3.4	Flat Rocky Soil	476.62	3.65	4.11
HE216b	46.7	Bedrock	1063.62	4.18	4.4

Notes:
Bolded are less than PEL for soil category.
HE 320, HE 393/394, and HE343 are largely reclaimed territory and do not move forward for evaluation because average pCu was high.
Acres sum to 387. For HE216a, ~10 acres are included that are Bolton diversion, which are "clean" and will not need to be remediated.

Table D-7

Alternative DELs and PELs by Soil Category and Endpoint when Including OAT Score[a]

Freeport-McMoRan Chino Mines Company

Vanadium, New Mexico

Appendix D of Smelter/Tailings Soils Feasibility Study

Soil Category	Richness for Wildlife		Cover for Wildlife		OAT Score for Rangeland		Average DEL	Average PEL
	DEL	PEL	DEL	PEL	DEL	PEL	DEL	PEL
Flat granular	7.71	4.25	6.03	3.98	6.87	0.69	6.87	2.97
Slope	7.71	4.25	6.03	3.98	6.87	0.69	6.87	2.97
Flat rocky	9.47	5.90	5.28	4.07	9.48	3.83	8.08	4.60
Bedrock	5.91	4.72	5.28	4.07	6.31	2.71	5.83	3.83

Notes

[a]Red numbers are substitutions for a non-significant regression at P<0.05, where substitutions are from another soil category in the same buffering capacity group (Group 1: flat granular, slope; Group 2: flat rocky, bedrock).

Figures

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
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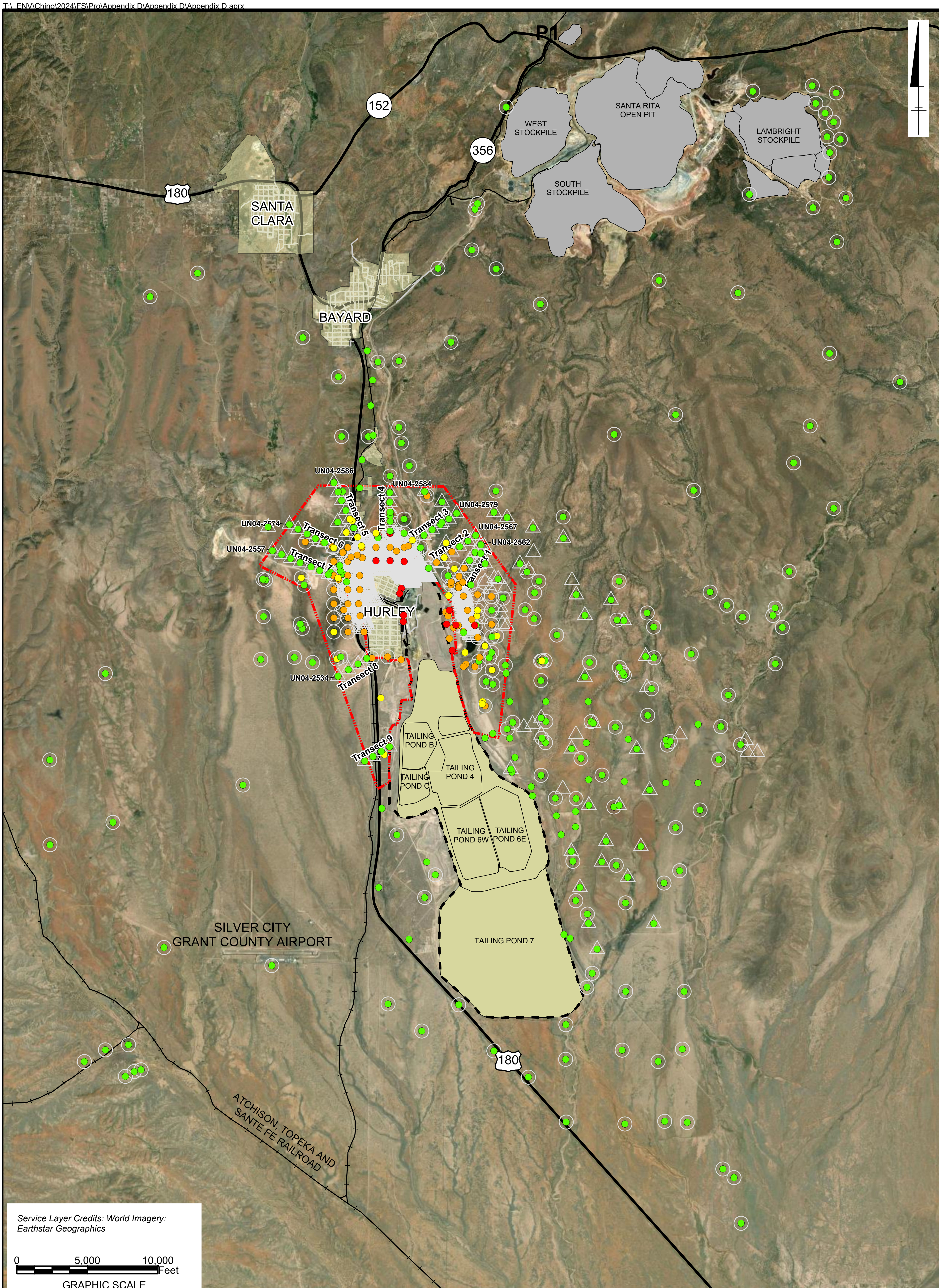


LEGEND:

Copper Concentration (mg/kg)

- <1,100
- 1,100 - 1,600
- 1,600 - 5,000
- >5,000

Sampling Year

- Sampled through 2010
- Sampled after 2010
- Major Roads
- Town_Roads
- Railroad

- Tailing Pond
- Stockpile
- City Limits
- Smelter Tailings Boundary
- Copper Area of Uncertainty Sampled for FS in 2011
- City Limits

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

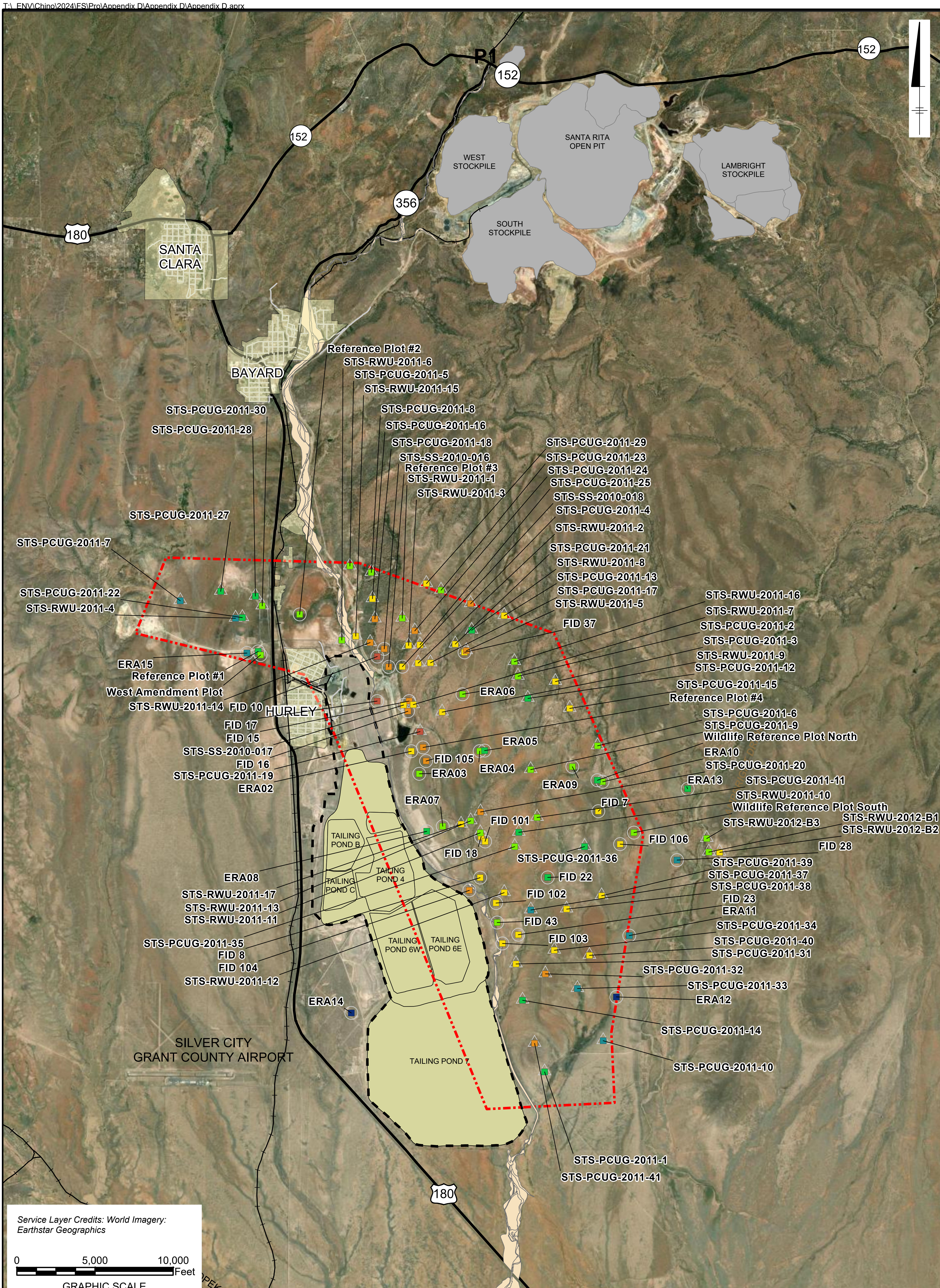
SMELTER/TAILINGS SOILS IU FS

COPPER SAMPLE LOCATIONS AND CONCENTRATIONS IN SOIL FOR PRE-IRA SAMPLES

ARCADIS

APPENDIX D-1

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

pCu Concentration
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9

Sampling Year
- Sampled through 2010
- Sampled after 2010
- Major Roads
- Town Roads
- Railroad
- Stockpiles
- City Limits

- Tailing Ponds
- Smelter Taililng Boundary
- pCu Area of Uncertainty Sampled for FS in 2011

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

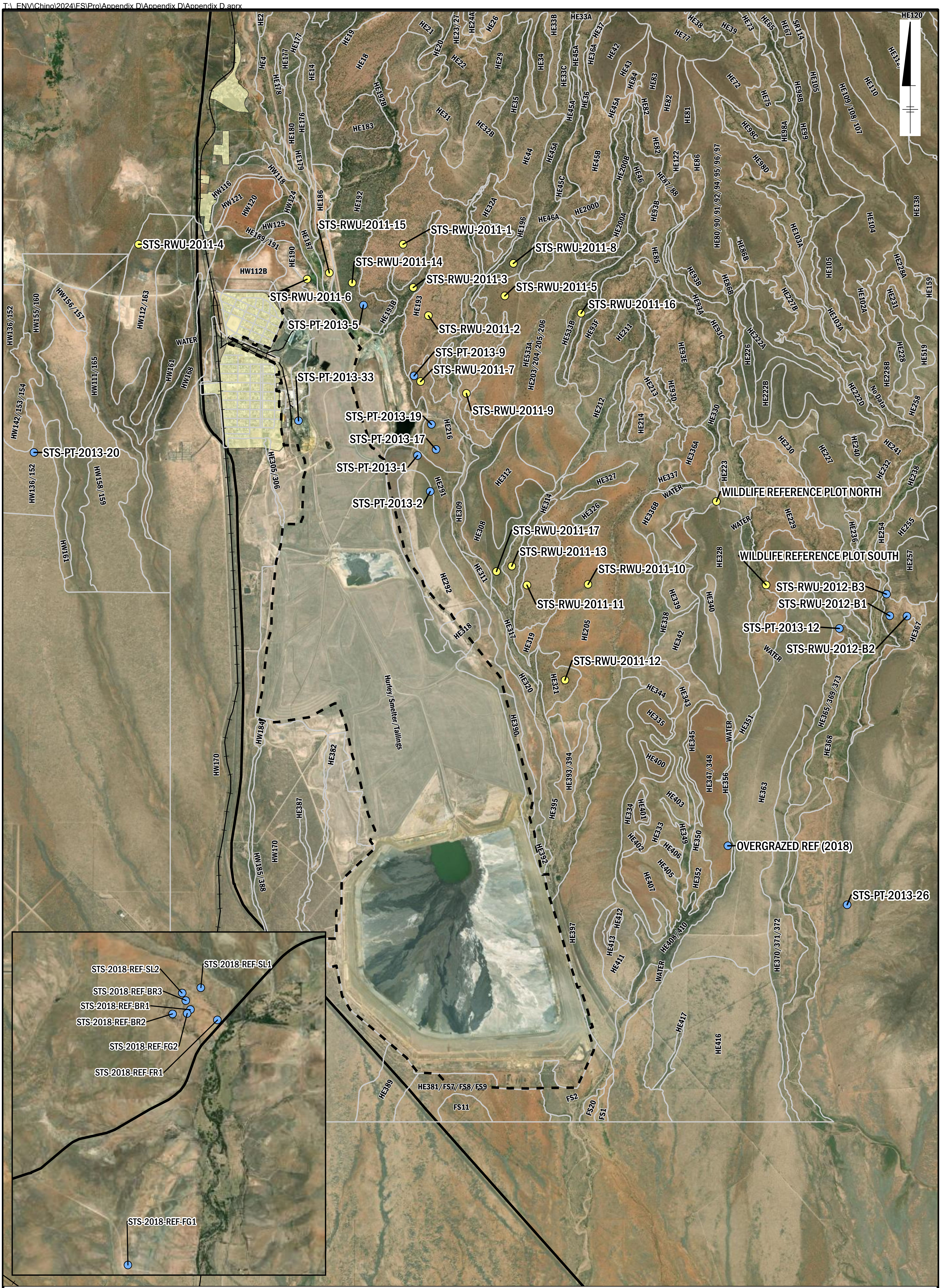
SMELTER/TAILINGS SOILS IU FS

POST-WHITE RAIN pCu LOCATIONS SAMPLED

ARCADIS

APPENDIX
D-2

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

Sampling Year

- Sampled after 2012
- Sampled through 2012
- Rangeland Polygon
- Railroad
- Town Roads
- Major Roads
- Operations Boundary
- City Limits

Imagery Sources:
1. Esri, Maxar, Earthstar Geographics, and the GIS User Community

0 3,000 6,000
Feet
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

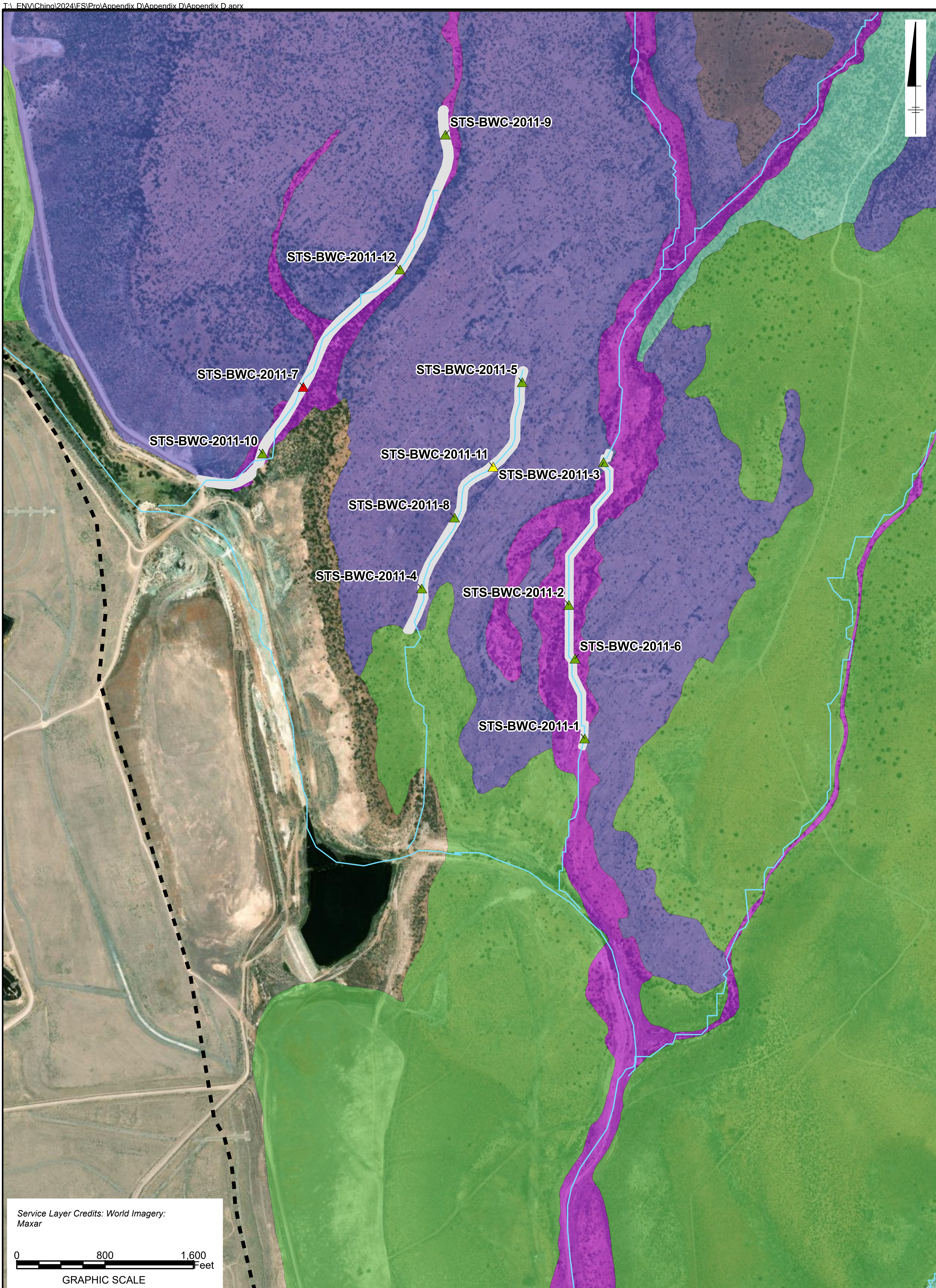
SMELTER/TAILINGS SOILS IU FS

VEGETATION COMMUNITY SAMPLING LOCATIONS WITHIN RANGELAND POLYGONS

ARCADIS

APPENDIX
D-3

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

Copper Concentration (mg/kg)
- 327 - 1,100
- 1,100 - 1,600
- > 1,600
- Drainage Banks Sampled
- Drainages
- Smelter Tailing Boundary

Vegetation Alliances
- Alligator Juniper-Oak Woodland Alliance
- Alligator Juniper-Oak/ Grama Woodland Alliance
- Fluvial Forest and Shrubland Alliance
- Mesquite/Mixed Grama Shrubland Alliance
- Mountain Mahogany Shrubland Alliance

Service Layer Credits: World Imagery: Maxar

0 500 1,000 1,500 2,000 Feet
GRAPHIC SCALE

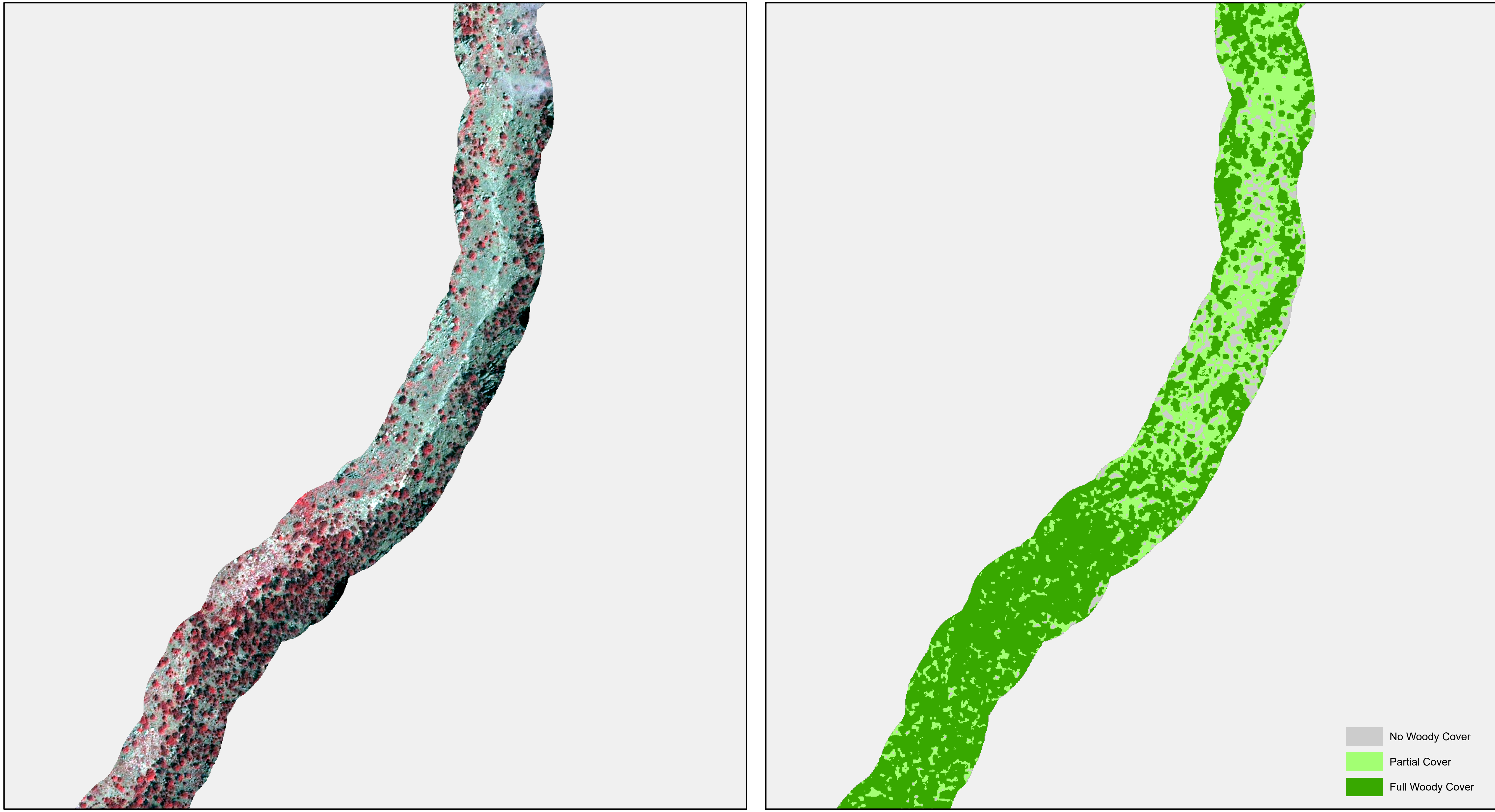
FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS

SAMPLING LOCATIONS FOR WOODY COVER AND COPPER ALONG DRAINAGE BANKS

ARCADIS

APPENDIX
D-4



Source: IKONOS, 2011

Left Image: IKONOS image; red, green, and near-infrared bands.
Right Image: Classification of woody vegetation based on scaled Normalized Difference Vegetation Index (NDVI).

NOTE:
1. Part of Drainage D-3 is shown.

0 400 800 Feet
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS

IKONOS IMAGE AND CLASSIFICATION OF WOODY VEGETATION

ARCADIS

APPENDIX D-5

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PROJECT# B0063543.0000
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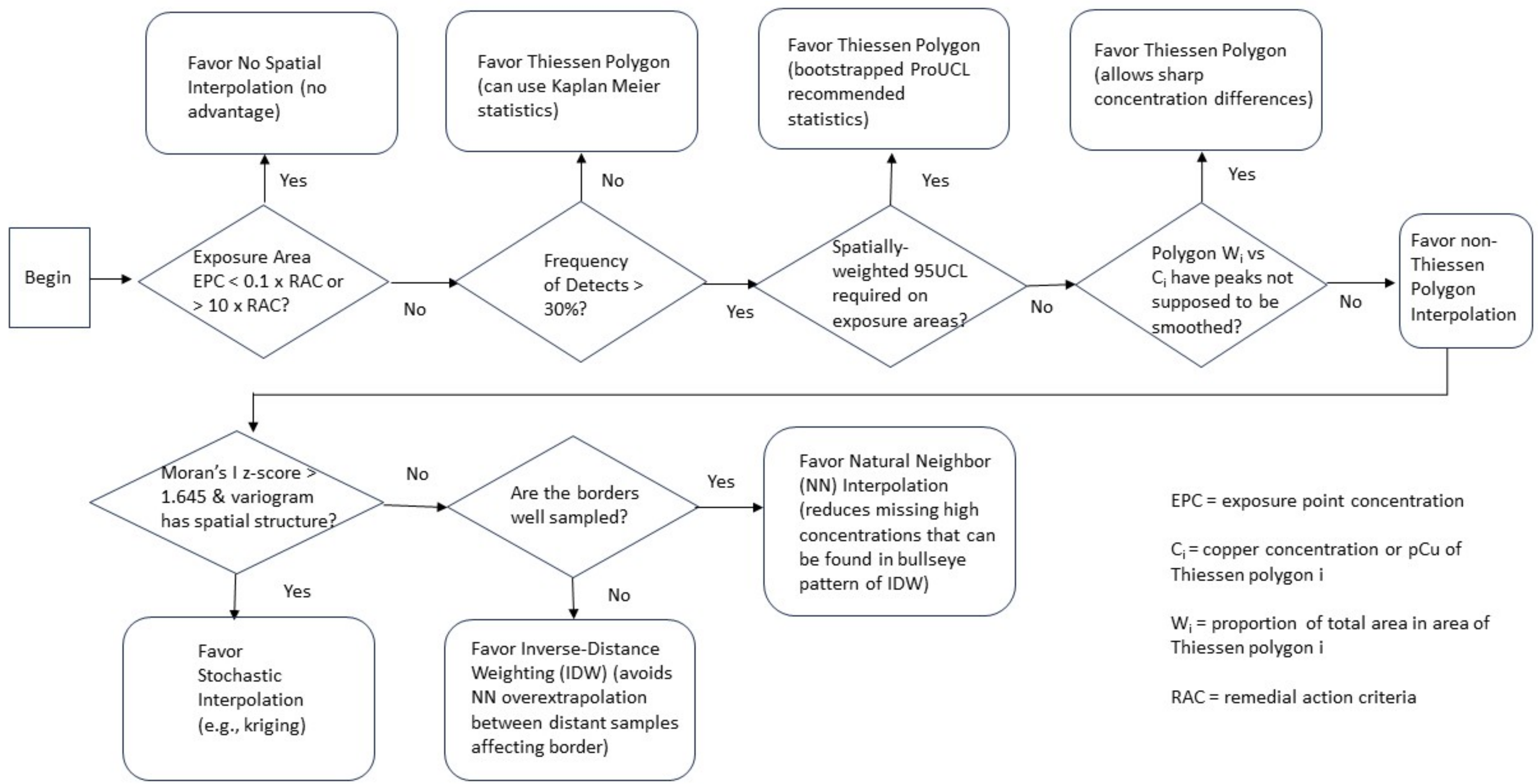

EPC = exposure point concentration

C_i = copper concentration or pCu of Thiessen polygon i

W_i = proportion of total area in area of Thiessen polygon i

RAC = remedial action criteria

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS

DECISION TREE FOR INTERPOLATION METHOD

ARCADIS

APPENDIX **D-6**

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PROJECT# B0063543.0000
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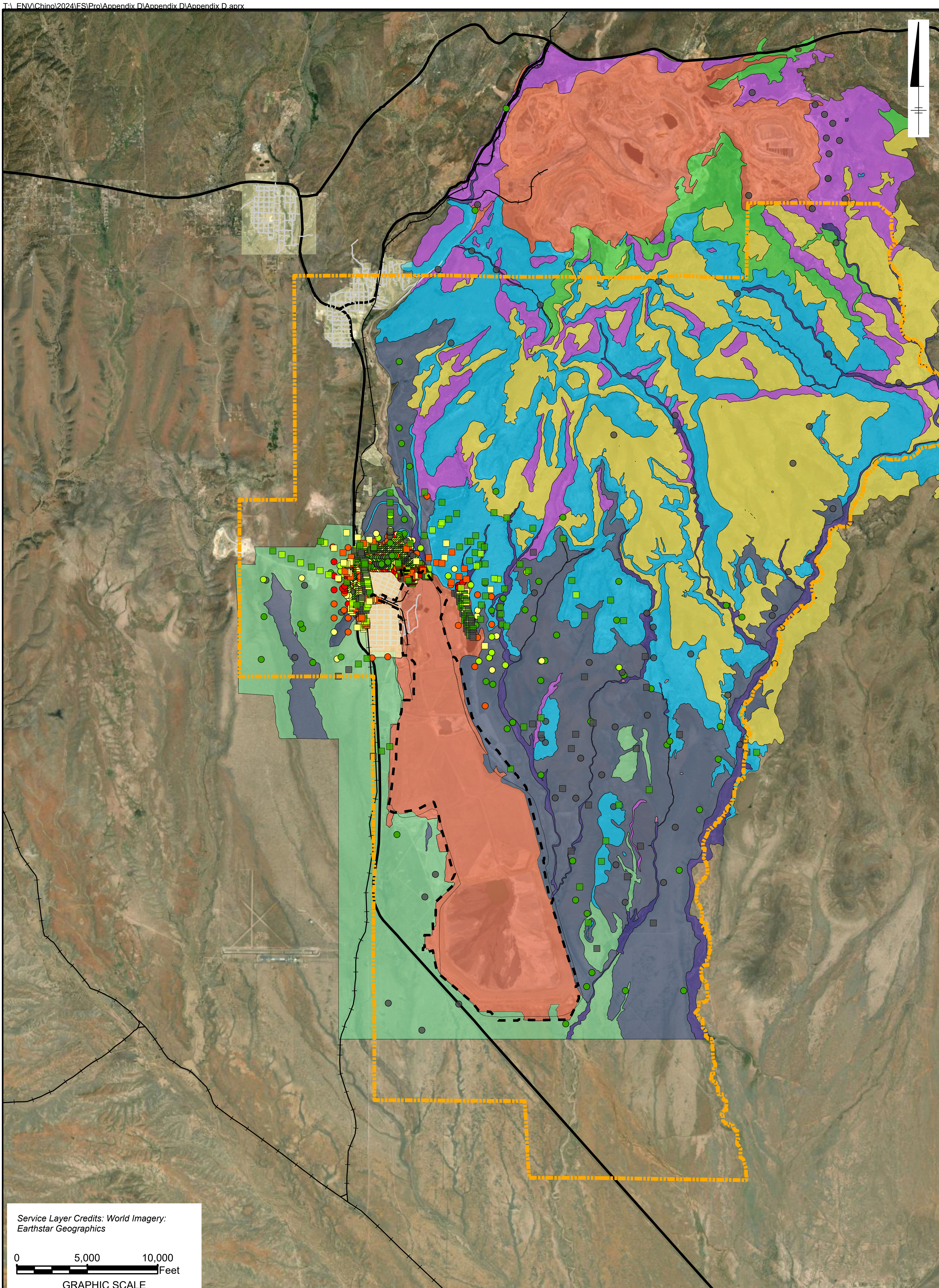


LEGEND:

Copper Concentration (mg/kg)

- 2,700-5,000
- 1,600-2,700
- 1,100-1,600
- 800-1,100
- 327-800
- <327
- Data collected through 2010
- Data collected after 2010

Vegetation alliance (individual polygons used as exposure units)

- Fluvial Forest and Shrubland Alliance
- Mesquite/Mixed Grama Shrubland Alliance
- Mine Facilities/Urban
- Ponderosa Pine-Oak Forest Alliance
- Alligator Juniper-Oak Woodland Alliance
- Mountain Mahogany Shrubland Alliance
- Not Classified
- Mixed-Grama Herbacious Alliance
- Alligator Juniper-Oak/Grama Woodland Alliance
- City Limits
- STSIU Boundary

Note:
Vegetation alliances will be used as the exposure unit for the SGFB.

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

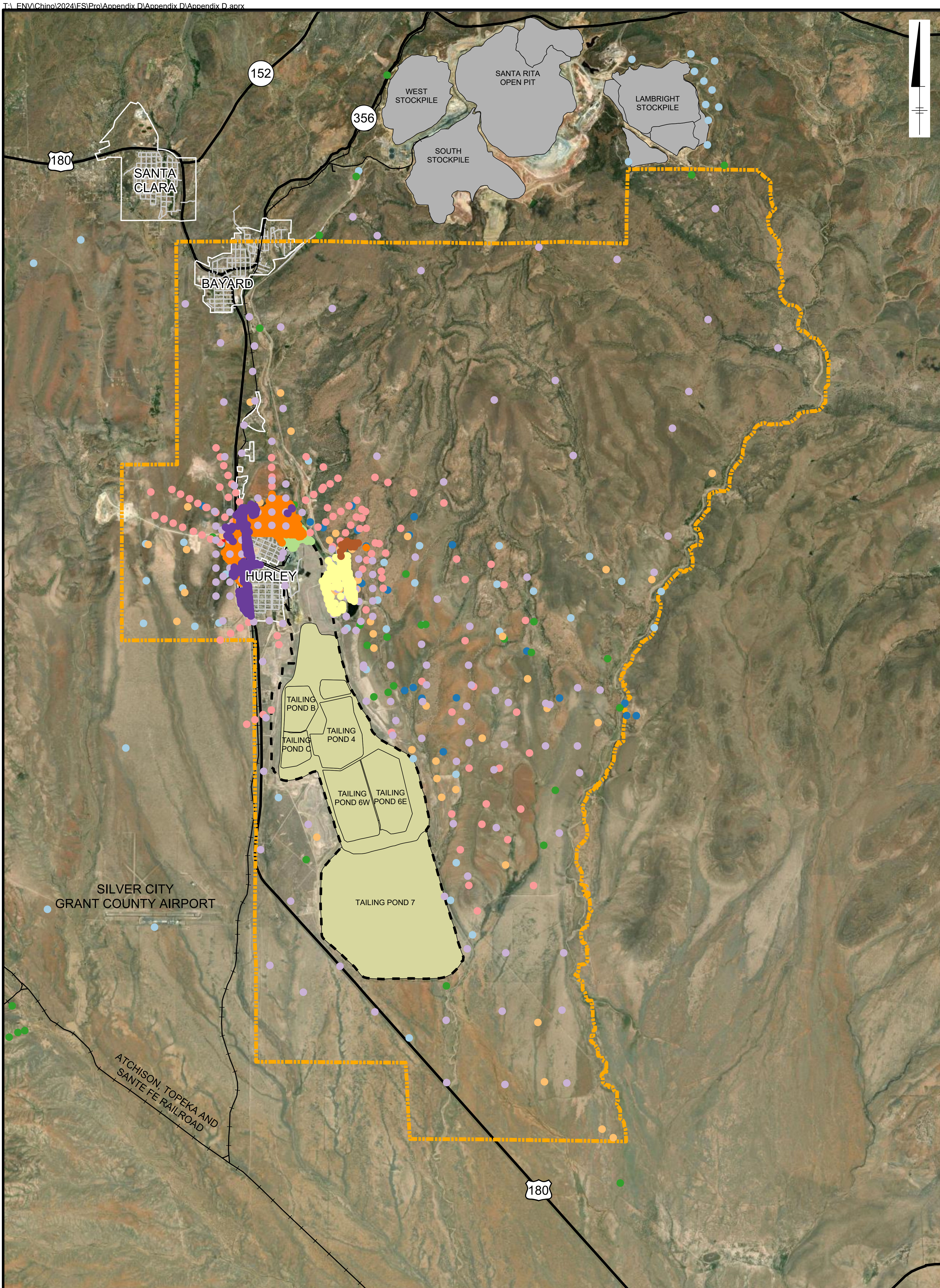
SMELTER/TAILINGS SOILS IU FS

COPPER CONCENTRATION DATA COLLECTED AND USED IN INTERPOLATION

ARCADIS

APPENDIX
D-7a

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

- AOC Background Report, Chino 1995; AOC Background Report, Chino 1996
- Appendix C
- B Ranch Interim Removal Action, Arcadis 2020
- Ecological Risk Assessment, Newfields 2005
- FS Data Collection, submitted herein
- Five Year Report Amendment Study
- Five Year pH Monitoring Report, Arcadis 2009
- Golf Course Interim Removal Action, Arcadis 2009
- Phase I Remedial Investigation Report, SRK 2008
- Railroad Interim Removal Action, Golder 2013
- Razorback Ridge Interim Removal Action, Golder 2015
- XRF Data Collected with Railroad IRA, previously unsubmitted
- STSIU Boundary

Notes:
1. This data, sourced and compiled from different reports, is reflected in Table 3-2.
2.Service Layer Credits: World Imagery: Earthstar Geographics

0 5,000 10,000 Feet
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

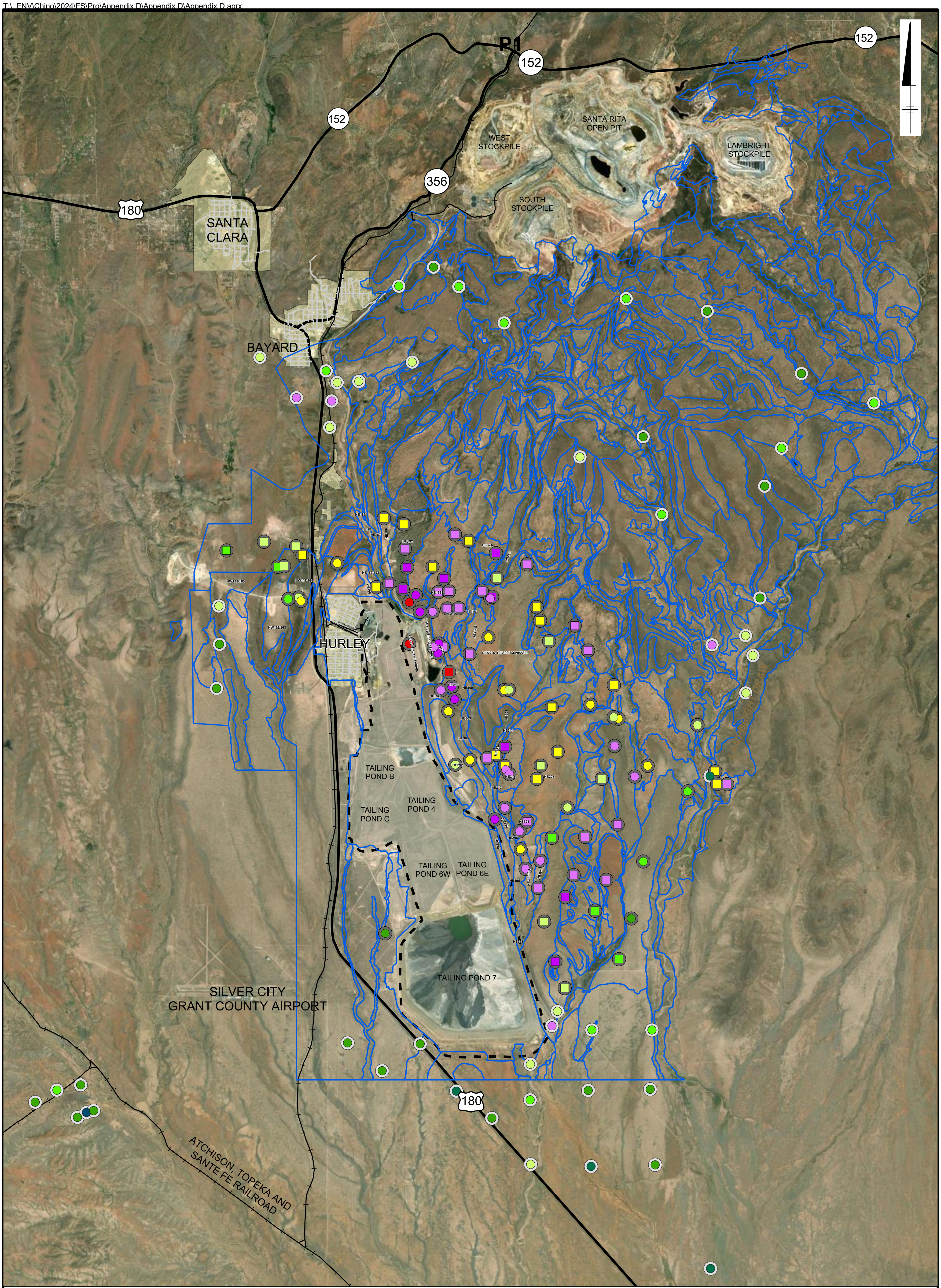
SMELTER/TAILINGS SOILS IU FS

SOURCE OF COPPER DATA IN COPPER DATASET

ARCADIS

APPENDIX
D-7b

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

- < 3.0
- 3 - 4
- 4 - 5
- 5- 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- > 10
- Data collected through 2010
- Data collected after 2010
- Pre-White Rain Sample Location
- Post-White Rain Sample Location
- Railroad
- Town Roads
- Major Roads
- Smelter Tailing Boundary
- City Areas
- Rangeland Polygons (Exposure Unit for pCu)

NOTE:
1. Post-white rain symbols that do not have a pCu color code indicated were not used.

Service Layer Credits: World Imagery: Earthstar Geographics

0 5,000 10,000 Feet
GRAPHIC SCALE

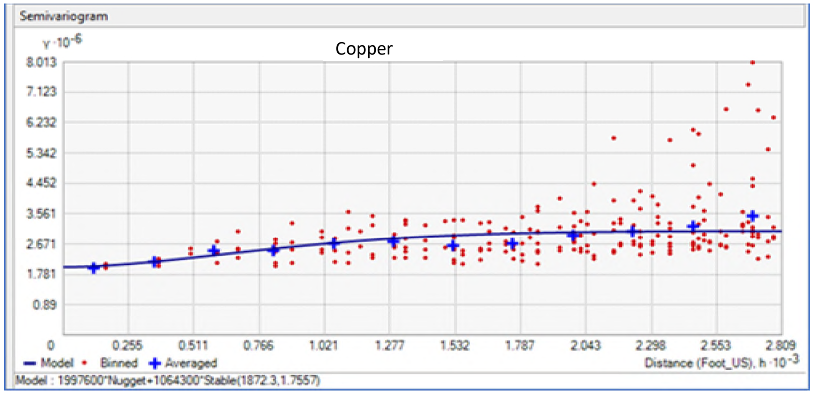
FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

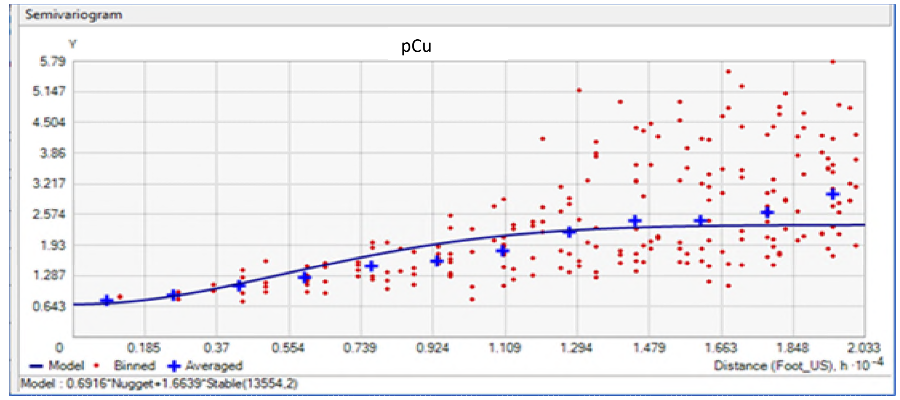
SMELTER/TAILINGS SOILS IU FS

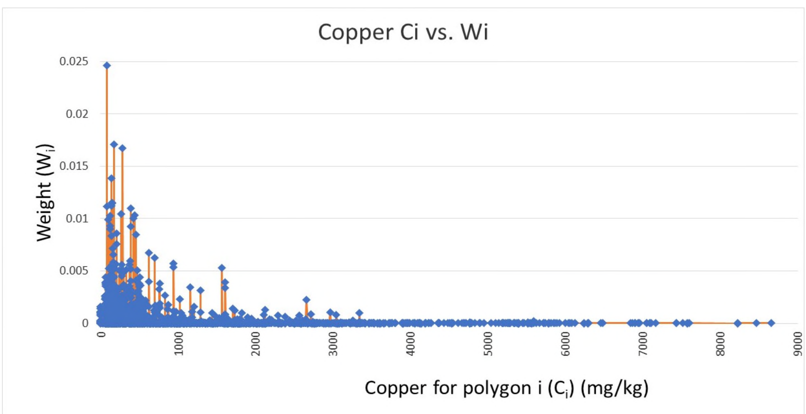
pCu DATA COLLECTED AND USED IN INTERPOLATION

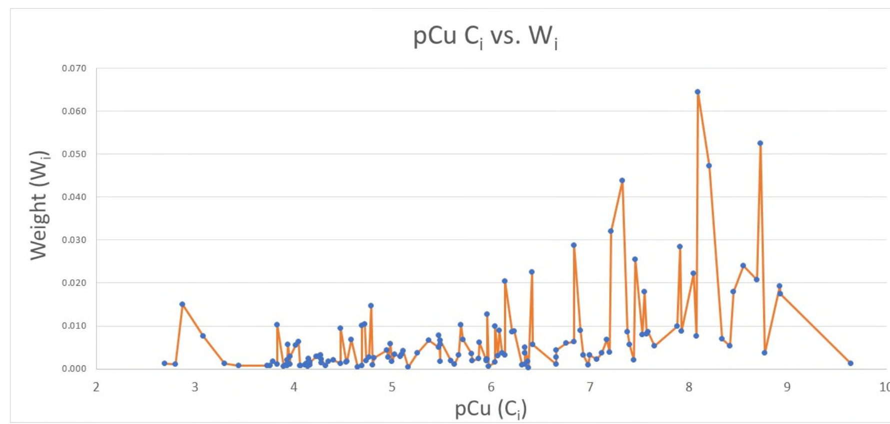
ARCADIS

APPENDIX D-8a









FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

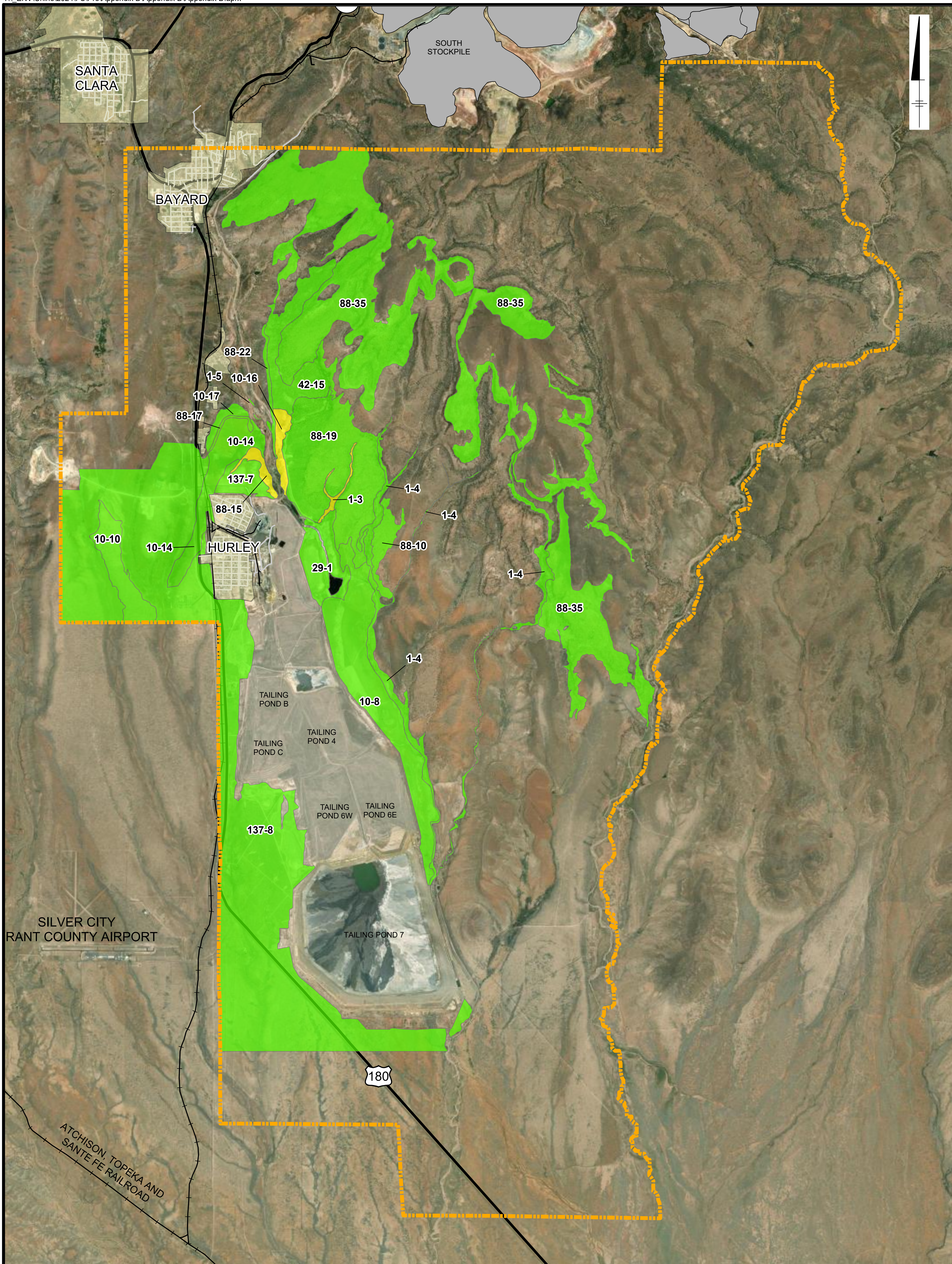
SMELTER/TAILINGS SOILS IU FS
APPENDIX D

SEMI-VARIOGRAM AND C_i vs. W_i PLOTS FOR COPPER AND PCU SOIL SAMPLES

ARCADIS

FIGURE
D-8b

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

95 UCL Copper Concentration (mg/kg)

<1,100

1,100 - 1,600

STSIU Boundary

Local City

Stockpiles

Notes:
1. This is a copy of Figure 3-5 from the FS workplan.
2. Service Layer Credits: World Imagery: Earthstar Geographics

0 5,500 11,000 Feet

GRAPHIC SCALE

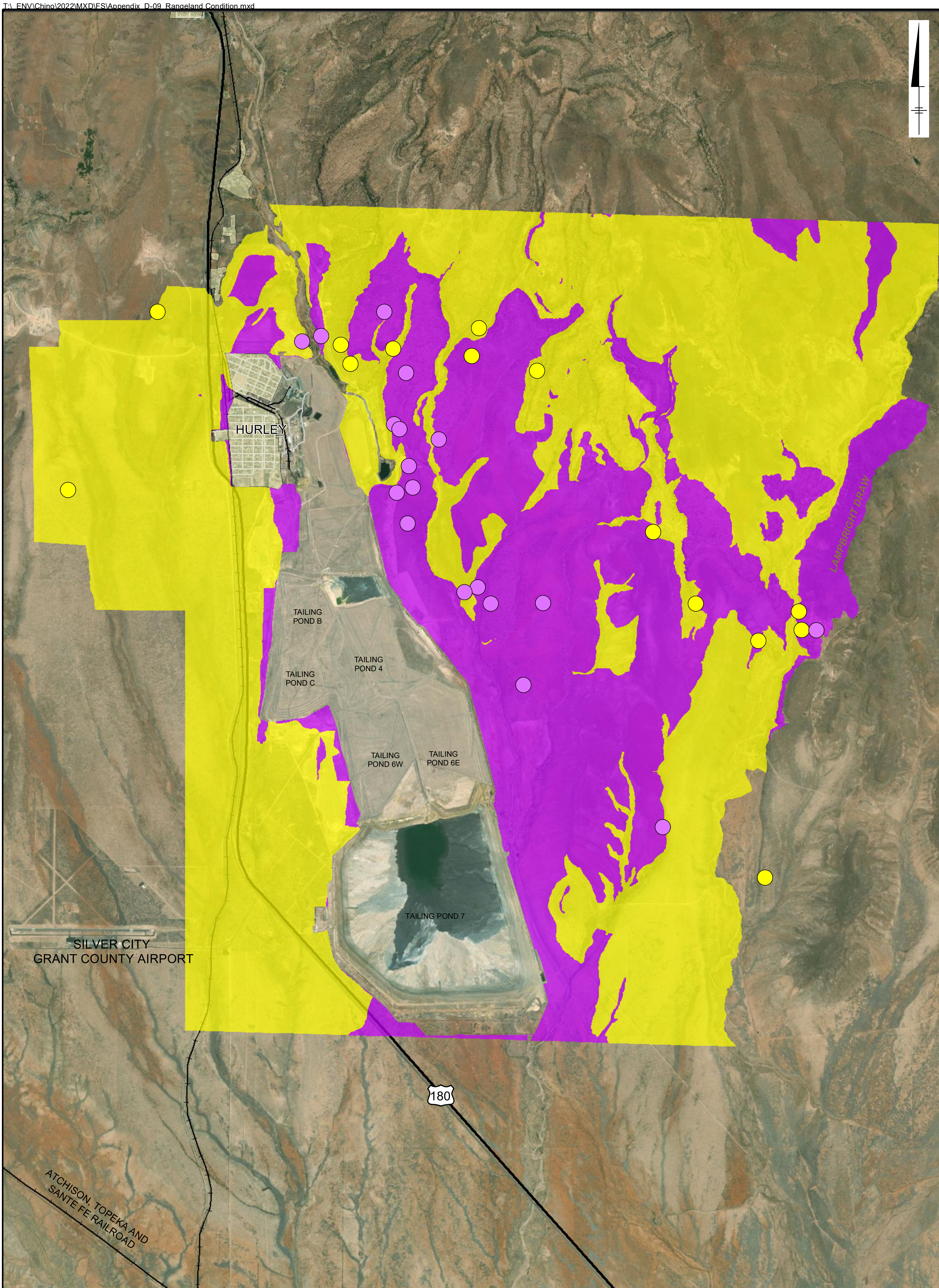
FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILINGS SOILS IU FS

95 UCL AREA-WEIGHTED AVERAGE COPPER CONCENTRATIONS ACROSS VEGETATION ALLIANCES

ARCADIS

FIGURE
D-8c

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2022\MXD\FS\Appendix_D-09_Rangeland Condition.mxd



LEGEND:

Field Sampled Rangeland Condition Location

- Acceptable
- Unacceptable

Range Condition Class Derived from Remote Sensing

- Acceptable
- Unacceptable

- City Limits
- Railroad
- Town Roads
- Major Roads

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

0 4,000 8,000 Feet
GRAPHIC SCALE

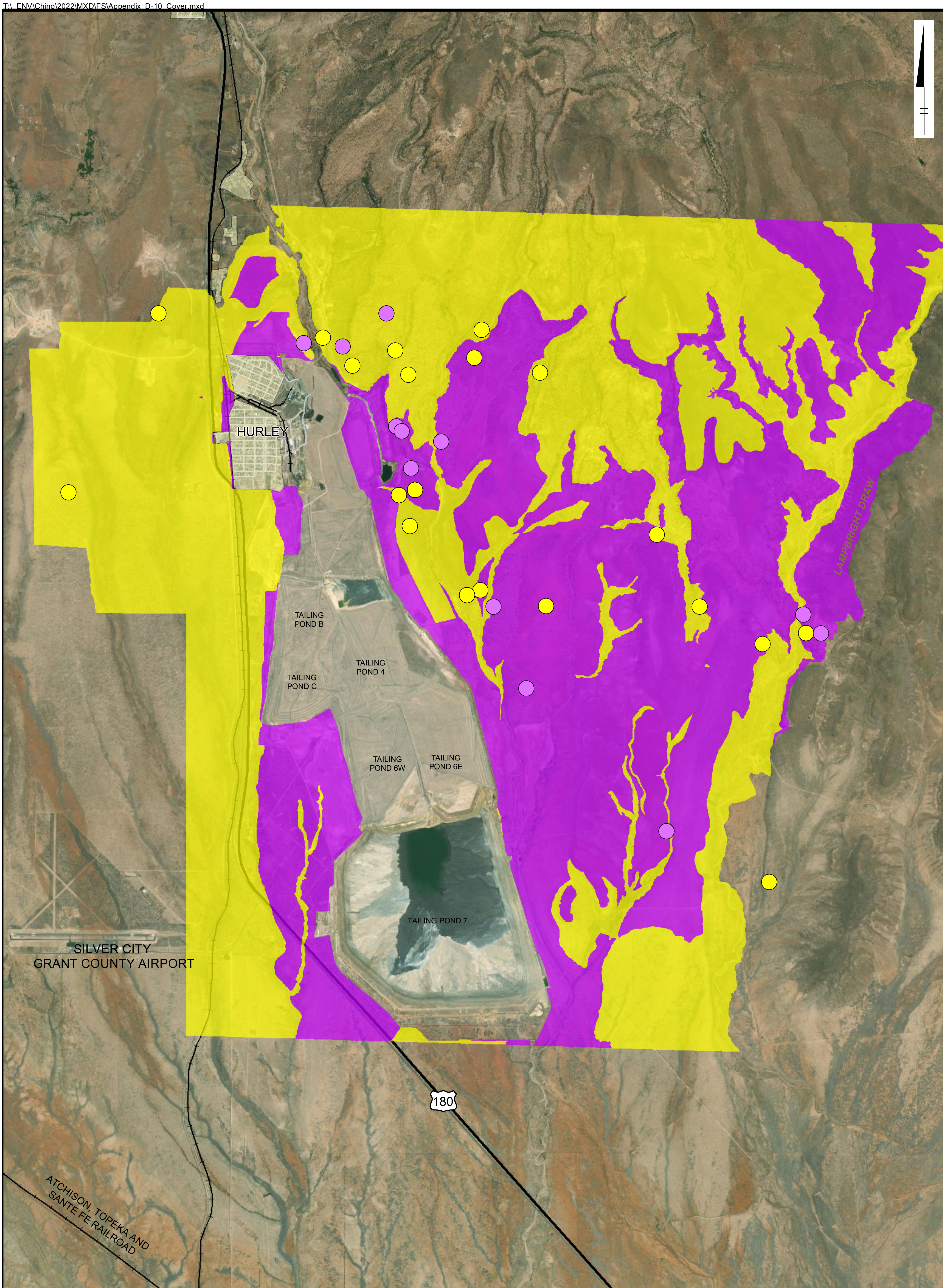
FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS

FIELD SAMPLED RANGELAND CONDITION LOCATIONS vs. CLASS DERIVED FROM REMOTE SENSING

ARCADIS

APPENDIX
D-9



LEGEND:

Field Sampled Cover Location
- Acceptable
- Unacceptable

Cover Class Derived from Remote Sensing
- Acceptable
- Unacceptable

- City Limits
- Railroad
- Town Roads
- Major Roads

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

0 4,000 8,000 Feet
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

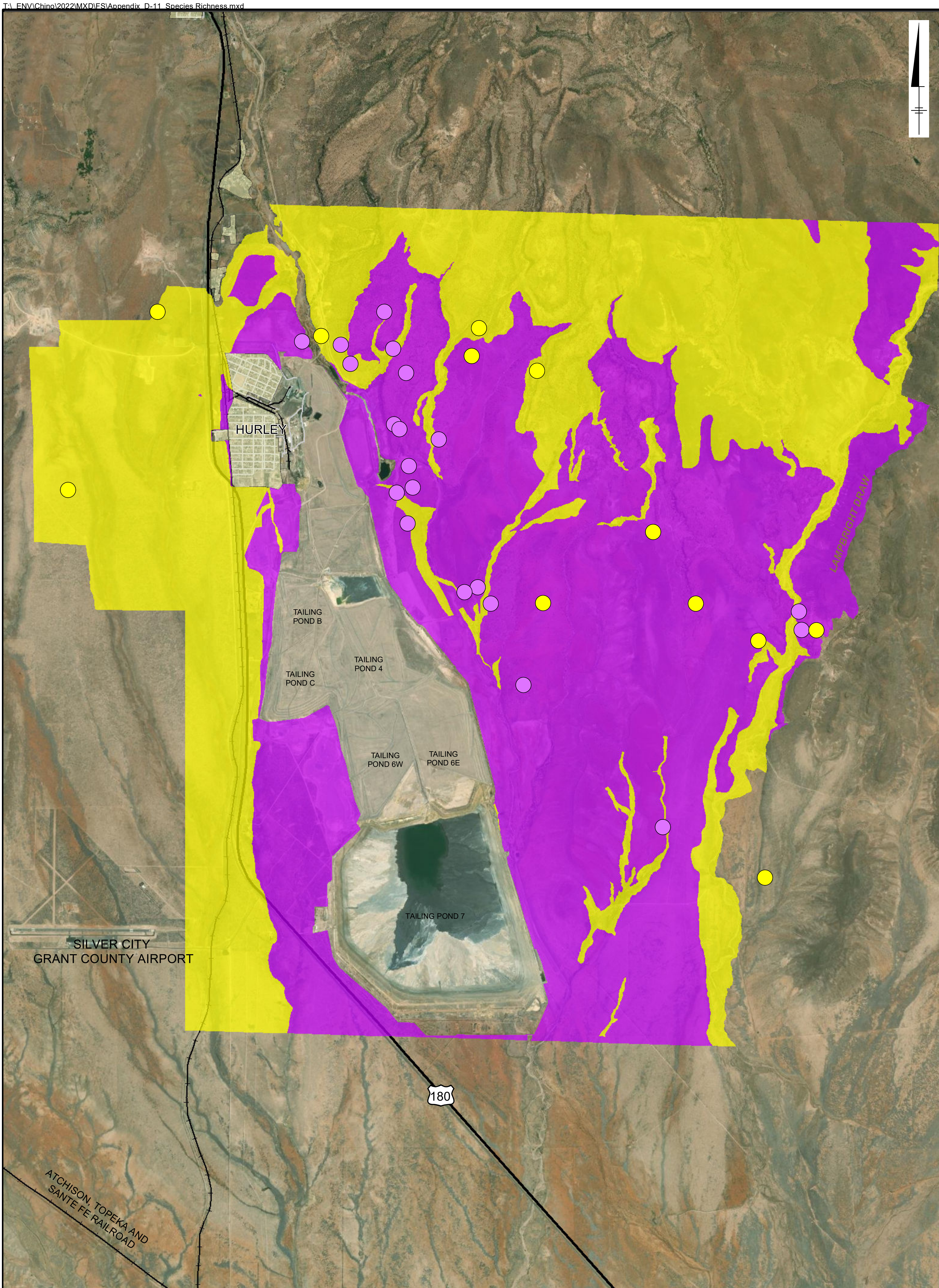
SMELTER/TAILINGS SOILS IU FS

FIELD SAMPLED COVER LOCATIONS vs. CLASS DERIVED FROM REMOTE SENSING

ARCADIS

APPENDIX D-10

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2022\MXD\FS\Appendix_D-11_Species Richness.mxd



LEGEND:

Field Sampled Plant Richness Location
- Acceptable
- Unacceptable

Plant Richness Class Derived from Remote Sensing
- Acceptable
- Unacceptable

- City Limits
- Railroad
- Town Roads
- Major Roads

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

0 4,000 8,000 Feet
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

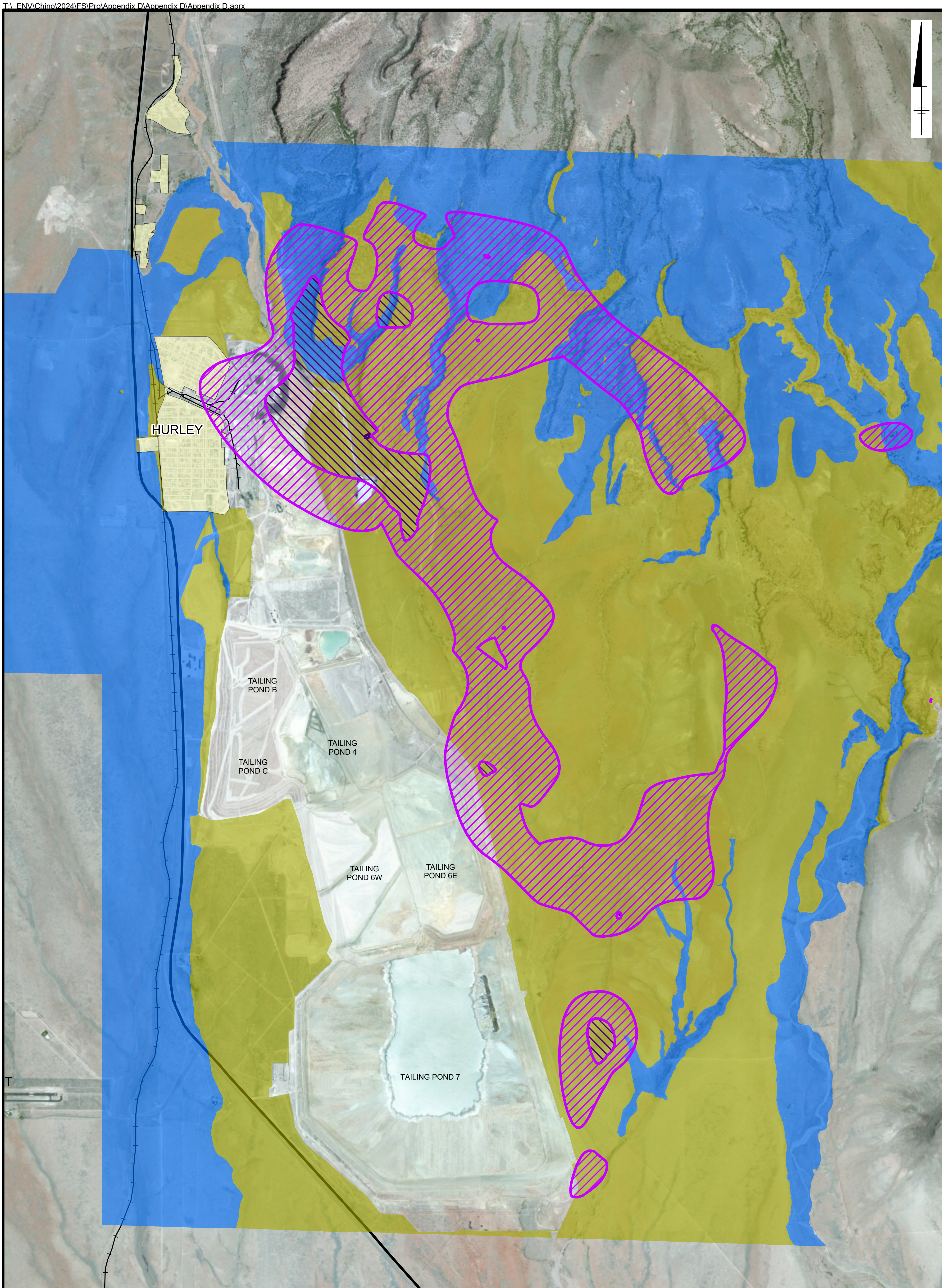
SMELTER/TAILINGS SOILS IU FS

FIELD SAMPLED PLANT RICHNESS LOCATIONS vs. CLASS DERIVED FROM REMOTE SENSING

ARCADIS

APPENDIX
D-11

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

pCu Range (Cu > 327)

- < 4
- 4 - 5

- Cover, Richness, or Rangeland Condition Unacceptable
- Cover, Richness, or Rangeland Condition Acceptable

Service Layer Credits: World_Imagery (Clarity): Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

0 3,000 6,000 Feet
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

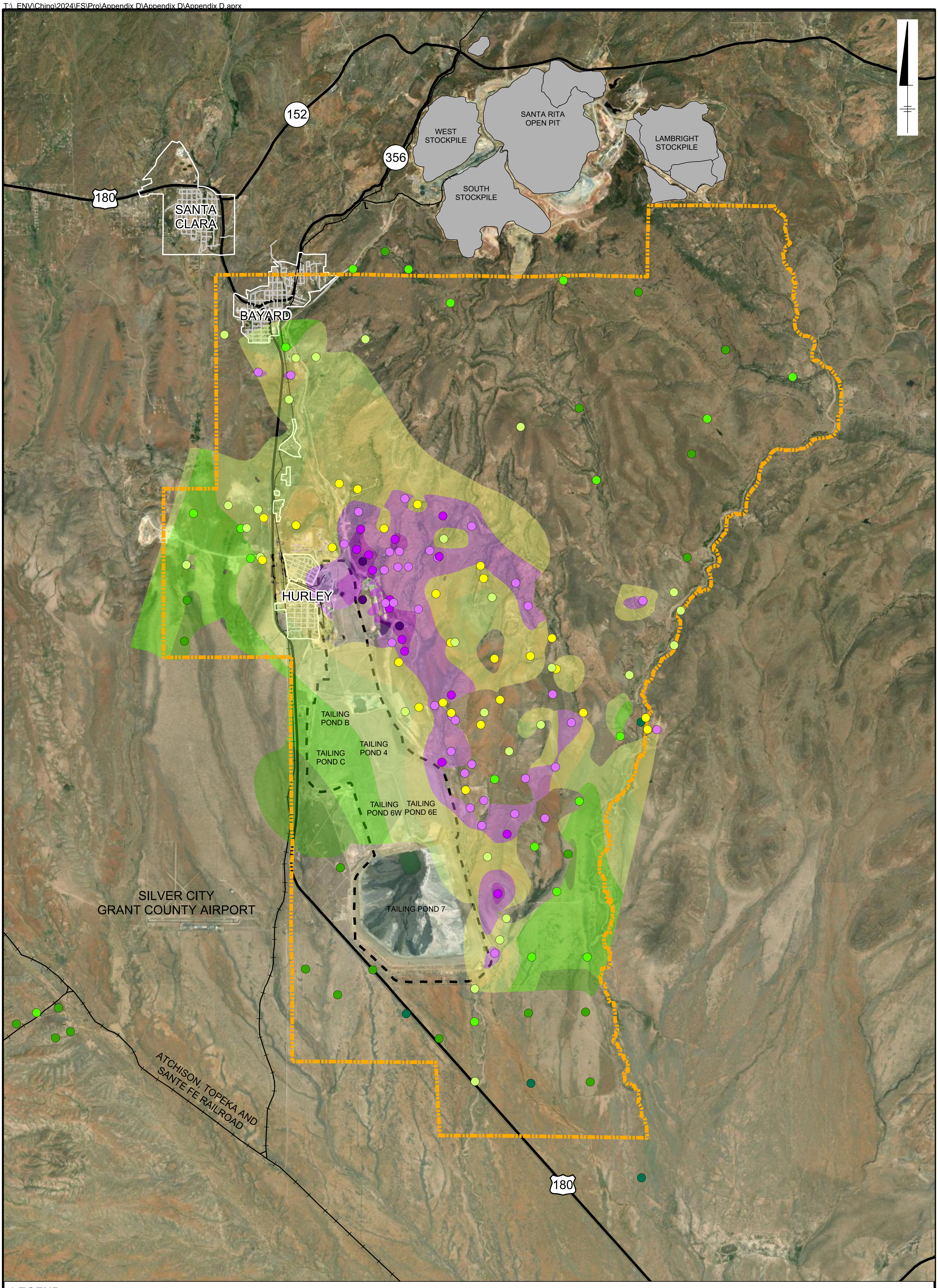
SMELTER/TAILINGS SOILS IU FS

ACCEPTABLE AND UNACCEPTABLE WILDLIFE HABITAT AND pCu < 5 and < 4 CONTOUR

ARCADIS

APPENDIX D-12

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

pCu Concentration
- <3
- 3 - 4
- 4 - 5
- 5 -6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- >10

STSIU Boundary

pCu Range
- <3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9

Service Layer Credits: World Imagery: Earthstar Geographics

0 5,000 10,000 Feet
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

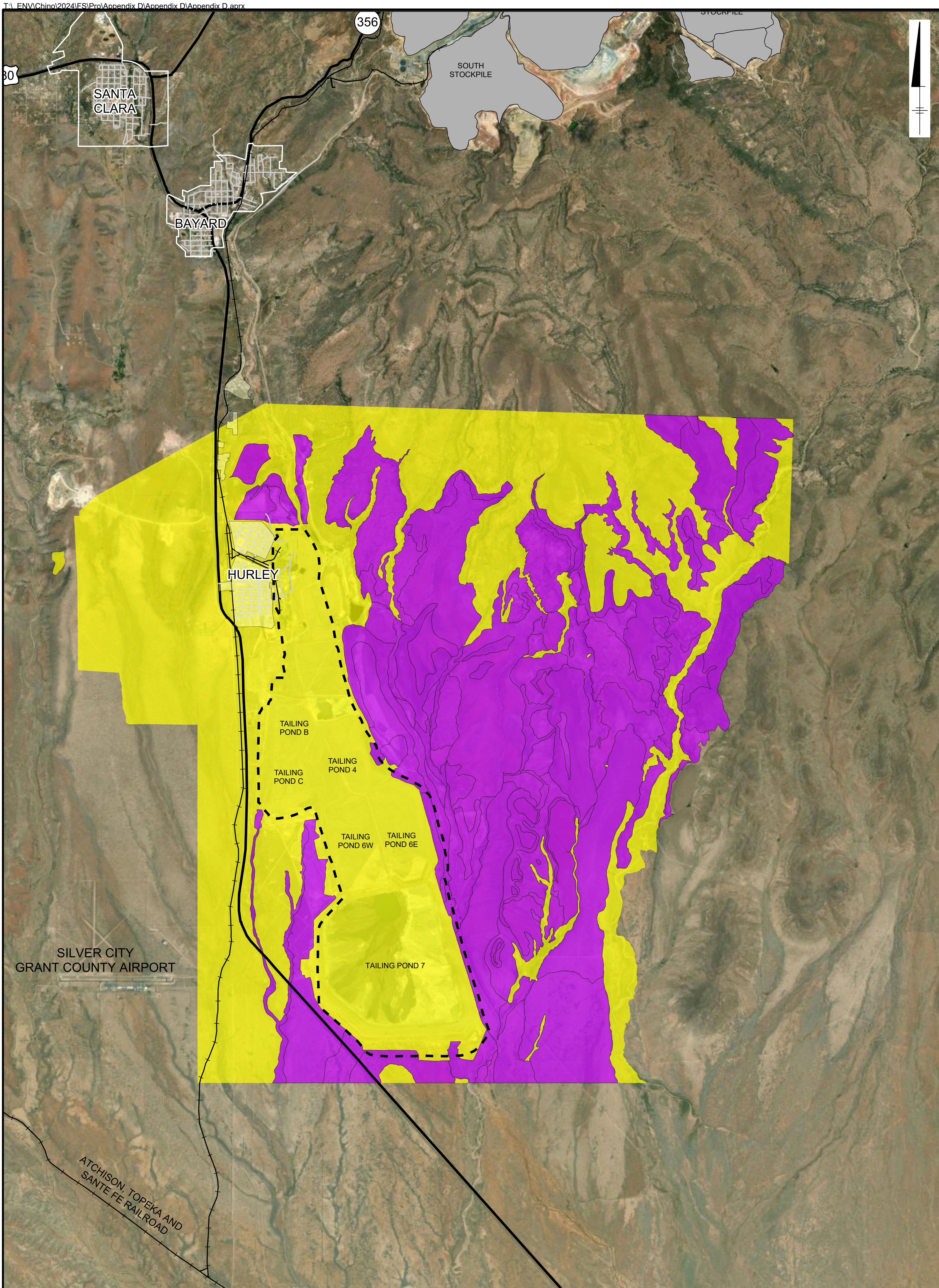
SMELTER/TAILINGS SOILS IU FS

pCu Interpolation

ARCADIS

APPENDIX
D-13

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2024\FS\Pro\Appendix D\Appendix D\Appendix D.aprx



LEGEND:

- Acceptable Criteria
- Unacceptable Criteria
- City Limits
- Railroad
- Town Roads
- Major Roads

Service Layer Credits: World Imagery: Earthstar Geographics

0 5,000 10,000 Feet
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

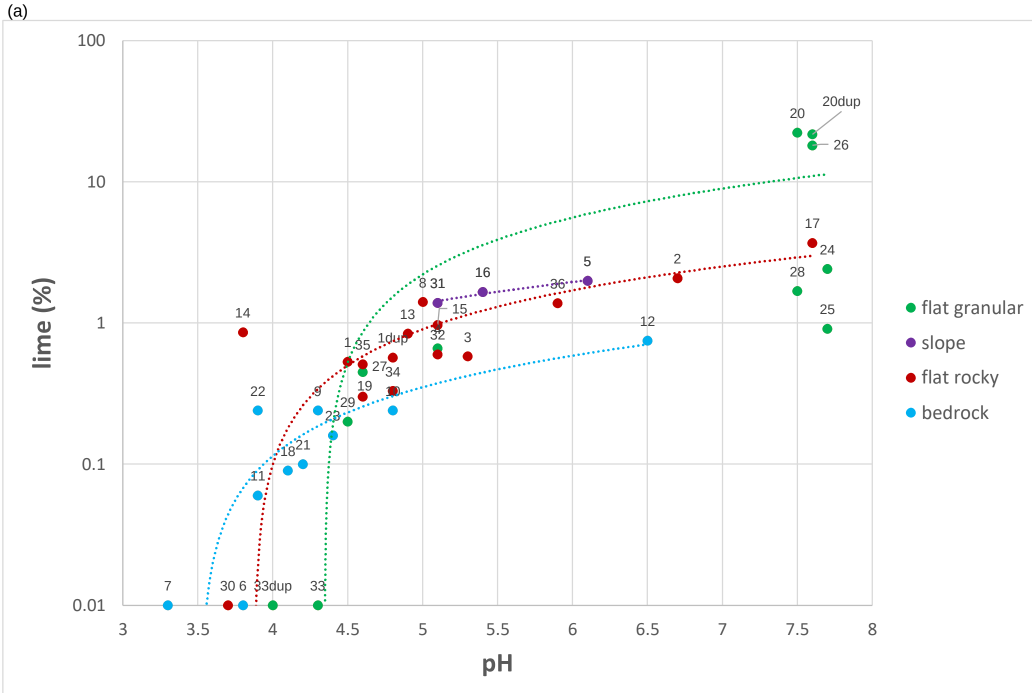
SMELTER/TAILINGS SOILS IU FS

ACCEPTABLE AND UNACCEPTABLE RANGELAND POLYGONS BASED ON WILDLIFE HABITAT AND RANGELAND CONDITION

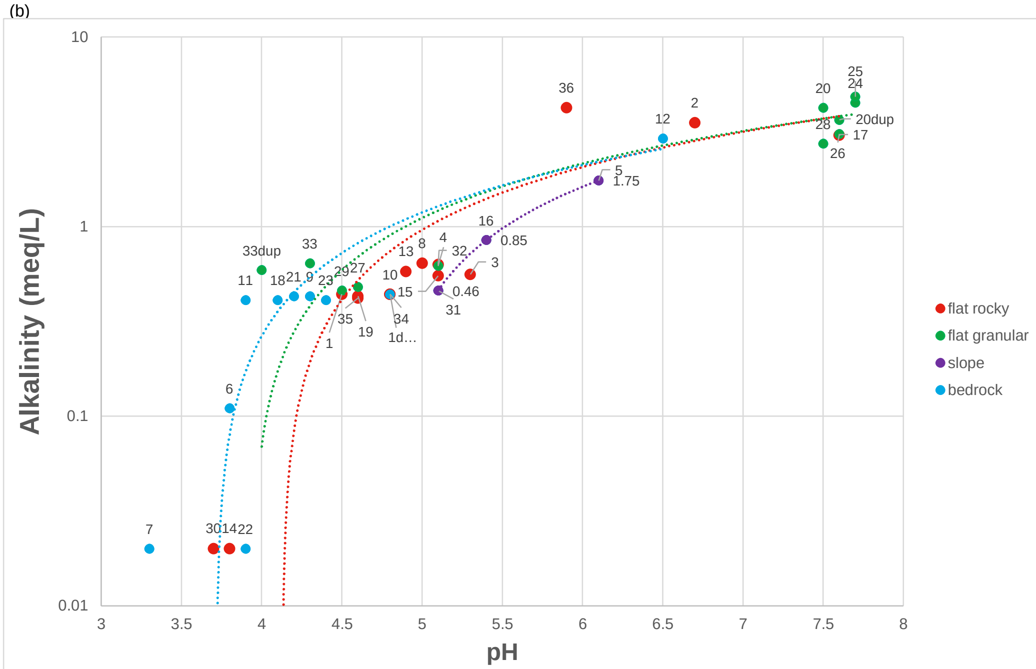
ARCADIS

APPENDIX D-14

(a)



(b)



Notes:

Lime is Calcium carbonate ($CaCO_3$).

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VANADIUM, NEW MEXICO

SMELTER/TAILINGS IU FS

Relationship of pH with Lime and Alkalinity by Soil Category

ARCADIS

FIGURE

D-15

Attachment A

2018 Reference Area Evaluation Technical Memorandum

MEMO

ARCADIS

To:

Pam Pinson

Copies:

Anne Thatcher

Arcadis U.S., Inc.
630 Plaza Drive
Suite 100
Highlands Ranch
Colorado 80129
Tel 720 344 3500
Fax 720 344 3535

From:

Carolyn Meyer

Date:

October 8, 2024

Arcadis Project No.:

30006782

Subject:

Technical Memorandum on pCu Reference Area Visit and Analysis

1 INTRODUCTION

On October 2 and 3, 2018, personnel of Chino Mines (Chino), Arcadis, New Mexico Environment Department (NMED), and Formation visited areas off site to identify suitable reference areas for the Smelter Tailings Soils Investigation Unit (STSIU) Feasibility Study (FS). This technical memorandum discusses the methods used to select and sample these reference areas and the results from the sampling. It also summarizes how these reference areas can be used to evaluate adverse effect thresholds for pCu to assist in remedial decisions for the plant communities on the STSIU.

The purpose of the off-site reference area sampling and analysis is to help interpret background conditions of the plant community for the FS had there been no mining-related chemical impacts on the vegetation.[1] To reduce soil toxicity to plants from copper, NMED issued a pre-FS Remedial Action Criterion (RAC) for shallow soil within the STSIU of pCu ≥ 5, where the total copper concentration in soil is > 327 milligrams per kilogram (mg/kg). Not all areas of the STSIU that meet the pre-FS RAC should be remediated, however, especially if the plant community is in good condition, similar to reference areas.

As stated in the STSIU FS proposal (FS Work Plan; Arcadis 2011), “Chino proposes the decision to remediate areas with pCu < 5 be based upon consideration of the current range condition and habitat quality.” Reference areas help define the background range condition and wildlife habitat quality and assist in separating mine-related soil chemistry effects on the plant community from background soil chemistry effects. The STSIU Work Plan specifically states, “a grazed reference area east of Lampbright Draw with

[1] The reference areas were for evaluating the vegetation community endpoints, which are impacted by soil pCu, not wildlife toxicity, which is controlled by copper ingestion.

little impact from the smelter will be found to represent reference areas for cover and richness of grazed areas." This technical memorandum discusses the reference areas found in the grazed areas east of Lampbright Draw, areas that will be used to define acceptable wildlife habitat that does not require remediation for the FS.

The FS Work Plan also lists numeric criteria for determining acceptable wildlife habitat in ungrazed areas. The criteria are from the closure/closeout plan reclamation guidelines for Chino (DBS&A 1999) required by the New Mexico Mining and Minerals Division (MMD) and are at least 32 percent vegetation cover and at least eight species for richness. However, all areas with pCu < 5 appear to be grazed; as such, these numeric criteria do not apply. Rather, as was done in DBS&A (1999), proportional success standards can be applied to the endpoints measured on the grazed reference areas. The grazed reference areas were selected to represent the topographic and soil conditions of impacted, grazed locations on the STSIU.

A phytotoxicity and community study (phytotoxicity study) on the STSIU (Arcadis 2018) demonstrated that four "soil/slope categories" (soil categories) have a strong influence on STSIU plant community richness and cover, and that the effect of these soil categories should be considered in the STSIU FS Report. The revised phytotoxicity study incorporated two reference locations for the community analysis to identify adverse effect thresholds,[2] but these two reference areas represent one soil category and do not represent the full range of conditions across all four soil categories. As such, the purpose of the reference areas sampled in 2018 is to provide background values for community metric endpoints of cover, richness, and rangeland condition (via Observed Apparent Trend [OAT] score) across the following four soil categories identified in the phytotoxicity study (Arcadis 2018):

1. Flat granular
2. Flat rocky
3. Bedrock
4. Steeper slopes (>13%).

NMED agreed to accompany Chino to these locations and was present for sampling.

The new reference areas sampled in 2018 will be used in the FS to screen acres for their quality of wildlife habitat. Specifically, if a location meets the wildlife habitat criteria for richness, cover and rangeland condition (measured with OAT score), it will not be carried forward into the FS for remedy evaluation. However, OAT score is not determined by the reference area data because a numeric criterion was set in the FS Work Plan that stated good to fair rangeland condition is present when a location's OAT score exceeds 22. The reference areas were reviewed to assess whether they represented fair-good or poor rangeland based on this criterion. If all or most of reference sites of a soil category are considered poor rangeland, however, the threshold of 22 was considered too high as a target, and a value consistent with reference was used instead, as explained further below.

The identified acres that remain after screening will be reviewed for pCu impacts and remedial alternatives in the FS. The results from the phytotoxicity study (Arcadis 2018), amendment study (Arcadis 2017a), and white rain study (with subsequent 5-year pH monitoring, Arcadis 2017b), combined with information from this memorandum, will be used for that evaluation. The new reference area data will **not** be used to revise

[2] One of these (Wildlife Reference North) was slightly west of Lampbright Draw, but its chemistry represented background conditions as discussed in the phytotoxicity study and was deemed acceptable as a reference.

the phytotoxicity study report, however, which has been through several review cycles with NMED. Instead, data from the new reference locations are evaluated as to how they affect de minimis effect levels (DELs) and probable effect levels (PELs) for pCu impacts on the vegetation community. Revised DELs and PELs provide context for net environmental benefit when evaluating remediation approaches.

2 SELECTION CRITERIA FOR REFERENCE LOCATIONS

As introduced above, this 2018 field study was designed to fill the data gaps on community endpoints for the other three soil categories (bedrock, slope, and flat rocky soils) not represented by the current set of reference locations. NMED requested that de minimis locations identified in the phytotoxicity study not be used.[3] Reference areas that have been identified as acceptable in the sitewide Ecological Risk Assessment (Newfields 2007) include an area near the airport, and in the phytotoxicity study areas west of the smelter (STS-PT-2013-24), and in the far southeast corner of the STSIU (STS-PT-2013-25, 26, 28 and "wildlife reference north" locations in the greenhouse experiments of the phytotoxicity study; Figure 1). Of the phytotoxicity study's five locations, two locations (STS-PT-2013-26 and wildlife reference north) have plant community data available for screening, whereas all have laboratory phytotoxicity data. The two reference areas with plant community data are in the flat granular soil category and do not adequately represent the full range of conditions on the STSIU.

The criteria specified for selecting the new reference locations included:

1. Two locations per soil category, totaling eight new reference locations. For the FS, each STSIU location will be matched to the reference locations within the same soil category. However, only one flat rocky reference location was identified in the field and sampled, and an extra bedrock location was sampled.
2. Elevation, geology, and grazing management history similar to those of the STSIU locations
3. No locations on the eastern side of the Black Range; preference for areas close to Faywood, which is on the western side of the Range.
4. Soils developed from rhyolitic pyroclastic flows, the same geology as areas found to have low pCu and higher sulfate on the STSIU. Rhyolitic soils have lower buffering capacity than basaltic soils or other soils derived from other non-rhyolite rock types and are most sensitive to pH changes.
5. Distant from the former Hurley smelter. The locations should not be in the path of wind deposition from the smelter or else be far enough away to have low copper, neutral pH, and low sulfate concentrations.
6. Permission to access the property. This criterion limited selection of locations to public lands.
7. Season of collection in September-October timeframe. This timeframe matches that of vegetation data collection at the STSIU locations.

[3] Other potential reference areas that Chino and NMED jointly selected in the field in 2011 and 2012 for a community analysis include bedrock areas (STS-PT-2013-21, 22, 23) and a flat granular area (STS-PT-2013-27, also known as wildlife reference area south). These are considered "de minimis" locations that represent areas with copper concentrations below background levels. Those locations could not be considered reference areas, however, because their low pH and high sulfate concentrations do not appear to be representative of background, as shown on Figure 3 of that report. Further, though distant from the historic smelter by about 2.5 to 3 miles, they are in the path of the former smelter's wind direction and thus may have been impacted by historic smelter emissions.

When including the two flat granular reference locations with community data collected previously (STS-PT-2013-26, Wildlife Reference Plot North), the number of reference locations available for the FS sums to 10 (Figure 1).

3 DESCRIPTION OF THE REFERENCE LOCATIONS

Based on the seven criteria in Section 2, eight locations, two of each soil category, initially were identified to sample in early October 2018. It was not possible to always sample two of each soil category because of the difficulty of finding flat rocky soils that met the criteria. Only one flat rocky location was identified as a reference site. An additional bedrock location similar to site bedrock locations was sampled to bring the total number of reference locations sampled in 2018 to eight (Figure 1).

The eight locations met the other criteria. They had elevations similar to the compared site locations on the STSIU, ranging from 5,000 feet to just over 5,700 feet above sea level. The STSIU sites ranged from 5,000 feet to 6,500 feet in elevation. The locations also met the geologic criteria of having soils developed on rhyolite, as they were situated on Kneeling Nun rhyolite or Sugar Lump rhyolite (only STS-2018-REF-FG1 was on Sugar Lump rhyolite). All locations were grazed, which matches the STSIU grazing history. The locations were close to the town of Faywood. All were on public land (Bureau of Land Management) to facilitate access. All eight locations were more than 13 miles from the smelter. Aspect can also impact plant communities; obtaining a north- and south-facing wildlife reference area was the focus initially in 2011. However, it was not included in the final criteria list in Section 2 because aspect turned out not to be predictive of plant cover, richness, or of the OAT score. Soil category was much more predictive (Arcadis 2018) and became the focus for the sampling design. Table 1 summarizes the physical characteristics of the selected locations by soil category.

Additionally, two locations were selected for re-sampling to characterize effects of climatic differences among years. One of those was a site location with impacts (wildlife reference south) and the other a reference location (wildlife reference north). Two other site locations farther from the smelter but with smelter impacts were selected to fill in data gaps on pCu effects on locations more distant from the smelter that are heavily affected by grazing. They are referred to as overgrazed reference area[4] and overgrazed rocky area 2; the latter is an area just uphill of the overgrazed reference area, shown on Figure 1.

For comparison; the reference, de minimis, and STSIU locations are mapped onto the soil category map on Figure 2[5] and the geology map on Figure 3.[6]

---

[4] Although referred to as overgrazed reference area, this location is not a reference area, as it has been impacted by the smelter.

[5] The soil category map was created by identifying all obvious bedrock areas (> 65% rock at surface) from aerial imagery and labeling it bedrock. For the remaining rangeland polygons, slopes greater than 13 percent were identified as slope soils, and the rest were divided into flat granular soils if considered good to fair rangeland condition (OAT score $\geq$ 22) and flat rocky soils if not. The last rule is an approximation because, as the reference data results show, some flat granular areas are in poor rangeland condition and some flat rocky areas are in good rangeland condition. Overall accuracy of ground locations is 74 percent, and user accuracy is above 70 percent for all soil categories, except flat granular (33 percent). For the errors, flat granular was most frequently mapped as flat rocky, which will be conservative for the FS.

[6] The geological classifications beginning with Q have deeper soils because they are derived from alluvium. This geology map considers shallow soils of less than 6 inches on average with bedrock underneath as representing areas where tilling, ripping, and soil removal remedial technologies to improve the plant community may not be an option. The map is an approximation, however, and not used to eliminate areas.

4 SAMPLING, SURVEY, AND ANALYTICAL METHODS

Appendix A of this memorandum contains the detailed standard operating procedures (SOPs) used for sampling soils and surveying the vegetation. The methods match those used in the field community study described in the phytotoxicity study report (Arcadis 2018), which are based on the methods more generally outlined in Appendix A of the approved FS Work Plan (Arcadis 2011). Soil was collected from 0 to 6 inches below ground surface at five locations (corners and center) of a 100 x 100 foot square area and composited. The soil was sampled for pH, total copper, and sulfate, analyzed at ACZ laboratories using Energy Laboratories' analytical methods described in the phytotoxicity study work plan (Arcadis 2014) and report (Arcadis 2018). The exception was sulfate, which was sampled using a turbidimetric method rather than the inductively coupled plasma (ICP) method. The ICP method sampled all forms of sulfur including sulfate, whereas the turbidimetric method sampled only sulfate. Because sulfide in the soil would convert to sulfate quickly (Keller-Lehmann et al. 2006, USEPA 1983, APHA 2017), the two methods should give the same results. ACZ reported the sulfate results in mg/kg. The units were converted to milliequivalents per liter (mEq/L) for this report to compare to STSIU sulfate results that were reported in mEq/L in the phytotoxicity study report.

Vegetation endpoints surveyed included vegetation cover, species richness, and the OAT score.

The data analysis was composed of three components as follows:

1. Evaluate if the soil chemistry reference locations selected fall within the background range for pH, copper, and sulfate concentrations to confirm they represent background chemistry.
2. Identify target vegetation endpoint values for screening based on reference data. This entails three steps.
   I. Adjust the vegetation cover measured in 2018 at the reference locations to vegetation cover expected at those locations in 2011, the year of vegetation cover estimates for the STSIU locations in the phytotoxicity and community study (Arcadis 2018). To accomplish this, a normalized vegetation difference index (NDVI) was calculated from Landsat 7 and 8 Images for 2011 and 2018, respectively, at all locations and scaled from 0 to 1 (removes artifacts of differences between the two Landsat sensors). The ratio between years was applied to 2018 data to convert to 2011 estimates using the same method applied in the phytotoxicity study to adjust 2014 vegetation data to 2011 conditions.[7]
   II. Identify the mean value of the reference envelope (envelope ranges from minimum to maximum) for each community endpoint for each soil category.
   III. Using the proportional success guidelines, identify the percentage of the mean value that will be the target used to classify a rangeland polygon[8] on the STSIU as acceptable (if above target) or unacceptable (below target) for the screening step.
3. Identify pCu effect thresholds for rangeland polygons not screened out using the following two steps:
   I. Create dose-response regression curves (using general linear models) between pCu and the three community endpoints. These will look similar to the community dose-response curves in the

[7] As was done in the phytotoxicity study, richness was not adjusted because it requires high-resolution IKONOS imagery in both years, and such imagery was not readily available in fall 2018. OAT score did not require adjustment because investigators adjusted their scale in the field each year based on climatic conditions that year.
[8] Rangeland polygons are defined and shown in the STSIU FS proposal.

phytotoxicity study. However, these curves will be fit to a dataset that includes the new reference and site data collected in October 2018 in addition to the data collected in 2011, 2012, and 2014.

II. Calculate a DEL and PEL from each regression curve. The DEL and PEL are the respective pCu effect thresholds corresponding to 100 percent and 50 percent of the reference community endpoint value for each community endpoint and soil category (as defined in Appendix C).[9]

5 RESULTS

Section 5.2 reports the results for the soil chemistry data, and Section 5.3 reports the results for the plant community endpoints and threshold targets for screening out areas from remediation. Section 5.4 presents the calculated DEL and PEL values.

5.1 Soil Chemistry

Table 2 presents the soil chemistry results for the locations sampled in 2018. Of the reference locations, soil pH ranged from 5 to 6.4 in the bedrock locations, from 6 to 6.4 in the slope locations, and from 6.2 to 7.7 in the flat rocky and flat granular locations. One of the flat granular locations (STS-2018-REF-FG1) had the highest pH (7.7), probably because it did not occur in the same vicinity as the other sites and was on a different rock formation, the Sugar Lump Formation. Copper concentrations never exceeded 180 mg/kg, which is well below the pre-FS background threshold for copper of 327 mg/kg. Soluble sulfate was low, ranging from 0.21 to 0.25 mEq/L for the reference locations, except at STS-2018-REF-BR2, which had 0.38 mEq/L, a value still considered low.

To determine if these locations fit the profile of background soil conditions, their pH and sulfate data were plotted on Figure 4, a figure that was also presented in the phytotoxicity report using the greenhouse experiment data[10] and is now modified for the new data in this memorandum. All fell within the expected pH range and low range for sulfate (meaning no smelter influence) for the pertinent soil category and were similar to other reference locations deemed adequate as background soils in the NMED-reviewed phytotoxicity report. The background ranges were updated with the new reference data on Figure 4. Notably, the background for pH of rhyolitic bedrock now ranges from 5 to 6.4, indicating that this bedrock type can have low pH naturally.

In contrast, the two STSIU site soils with soil chemistry sampled (overgrazed reference, overgrazed rocky 2 in Table 2) contained copper concentrations greater than the background threshold of 327 mg/kg and pH lower than 5. When plotted on Figure 4 (labelled O and O2), they fell within the range of other STSIU site soils.

The soil chemistry and Figure 4 support that the 2018 reference soils represent background and the 2018 site soils represent site impacts. The laboratory reports with these data are included in Appendix B.

[9] The DEL is a “de minimis effect level”, preferably at 90 or 80 percent of reference (e.g., a 10 or 20 percent effect level), as discussed in the phytotoxicity work plan, but to be conservative, it was set at 100 percent of reference in the phytotoxicity report and in this memo.

[10] The phytotoxicity study included two components: a field community study (data shown in Table E-1) and a greenhouse experiment (data shown in Table E-2, Figure F-1 and F-2). Most of this memo focuses on the field community study locations, but not all of these locations had extensive chemistry sampled. Because all the greenhouse experiment locations for soil collection had extensive chemistry sampled including sulfate, bicarbonates, and calcium, these locations were used to evaluate and discuss chemical factors differentiating the four soil categories.

5.2 Plant Community Endpoints

Table 3 presents the OAT scores, mean cover, and mean richness values recorded for the new sample locations in 2018. Appendix C to this attachment contains the raw vegetation data used to calculate the means. Table 3 shows the ratio of scaled NDVI values in 2011 and 2018, and the estimated 2011 values when that ratio is applied to the 2018 mean cover values for each location to convert them to 2011 values. These estimated 2011 cover values are considered comparable to the STSIU site values used for analysis in the phytotoxicity study, which were also 2011 values.

As mentioned previously, the percentage of reference area cover and richness used as the target for screening out rangeland polygons was based on proportional success guidelines. The guideline for establishing targets for richness and cover was based on a proportion of the mean reference value for each soil category, determined by the spatial variability observed in the reference locations. Specifically, the spatial variability was measured using the relative percent difference (RPD[11]) between the maximum and minimum value of reference locations in each soil category; it determines the proportion of the reference mean that will be the target. The flat rocky soil category only had one reference site; therefore, the average RPD for the three other soil categories was used as its RPD. This RPD approach works for small reference datasets (n = 2 or 3) because it helps account for expected variability in a reference dataset if a larger sample had been taken. This method has been used on other mine sites (Arcadis 2019). The OAT score indicates that all the bedrock reference areas were in poor rangeland condition (less than 22) and all the slope reference areas were in fair-good rangeland condition. The flat granular reference areas surveyed in 2018 were variable, with two thirds in fair-good rangeland condition and one third in poor rangeland condition. When all flat granular reference locations are included by adding the STS-PT-2013-26 location sampled in 2014 (shown in footnote of Table 3), half are in fair-good rangeland condition and half are in poor rangeland condition. The flat rocky reference location was in borderline poor/fair-good rangeland condition with an OAT score of 22 (Table 3). Because all bedrock locations were poor rangeland, the target criterion of 22 was changed for bedrock to the proportional success approach used for richness and cover.

Table 4 identifies the mean, RPD of the four soil categories, and target values for screening.[12] The mean value of the average 2011 cover for the reference areas was used to calculate a cover target for screening, and ranged from 17 percent cover in bedrock areas to 53 percent cover on the slope areas (Table 4). In contrast, the location with flat rocky soils on the STSIU sampled in 2018 (overgrazed reference in Table 3) had a low estimated mean cover in 2011 of 6 percent and low mean richness of six species. This location was not randomly selected but rather sampled to evaluate a highly overgrazed location on the site.[13] It may not fully represent the rangeland polygon in which it is located. For example, immediately uphill of that location (in the same rangeland polygon), the vegetation, which was not formally surveyed, visually looked more diverse, and had higher cover than the downhill location (see photograph comparisons in Appendix D), even though soil pCu was somewhat similar (compare pCu of 4.4 on uphill location called “overgrazed rocky 2” to pCu of 4.6 on the downhill “overgrazed reference” location in Table

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[11] Calculated as maximum minus minimum value divided by average value times 100 to convert to a percentage.
[12] For flat granular soils, the creosote bush location had different cover than the other locations, creating an RPD for cover of more than 100 percent and therefore was eliminated when calculating the RPD for cover. Similarly, one bedrock reference location had a large patch of non-bedrock, creating a very high RPD for cover and richness for bedrock of more than 80 percent and was eliminated for cover and richness before calculating the RPD.
[13] Although visually overgrazed in photographs, it improved somewhat by 2018.

2). These differences may be due to less intense grazing on the uphill location because the uphill site is farther from a drainage where livestock often prefer to graze. Grazing impacts (reduced vegetation, topsoil erosion, compaction) vary even within a soil category and complicate the interpretation of pCu effects on the plant community. The mean richness of reference areas, which could not be adjusted to 2011 values is used to calculate a target for richness screening. Mean richness ranges from seven species in bedrock areas to 15 species in slope areas (Table 4).

Using the “acceptable” criteria discussed above to calculate targets, Table 4 presents the target community endpoints for each soil category that were used in the STSIU FS to determine which rangeland polygons with pCu < 5 appear to have acceptable wildlife habitat (cover and richness) or fair-good rangeland condition. Depending on the soil category, the target thresholds for percent cover range from 7 (bedrock) to 45 (slope) percent and from 4 (bedrock) to 10 (slope) for richness (number of species; Table 4). The target for fair-good rangeland condition is an OAT score of 22 for all but the bedrock category, which has a target of 13 for the OAT score. The criteria are used to evaluate habitat quality for livestock and wildlife. Specifically, OAT scores are used for the livestock assessment and cover and richness for the wildlife habitat assessment. Therefore, to evaluate wildlife, both richness and cover targets must be met. To evaluate livestock rangeland quality, only the OAT score target of 13 must be met. When both goals (meeting livestock and wildlife targets) are met, the rangeland polygon can be screened out from consideration for remediation because remediation in this arid, slow-recovery environment likely would do more harm than good to the goal of the remediation because the goal (an intact plant community) is already met.

Maps to be used for this screening were developed using remote sensing (see Figures D-9, D-10, and D-11 in main Appendix D to FS) and include:

1. OAT score fair-good (acceptable) versus poor (unacceptable) rangeland map (88 percent accuracy with 17 percent error of commission on the acceptable class based on independent data points[14]).
2. Vegetation cover acceptable versus unacceptable rangeland map (74 percent accuracy based on all datapoints with 18 percent error of commission on the acceptable class).
3. Vegetation species richness acceptable versus unacceptable rangeland map (71 percent accuracy based on all datapoints with 40 percent error of commission on the acceptable class).

The accuracy for usability of these maps was set at 70 percent or greater total accuracy in the FS Work Plan, with no more than 15 percent error of commission (such commission error is where unacceptable areas are mapped as acceptable). All three metrics met the total accuracy criteria. The error of commission was close to the criteria for OAT and vegetation cover (generally met the criteria considering the sample size), but the richness map did not meet the 15 percent error of commission (see main Appendix D accuracy section). Part of the challenge is that the FS Work Plan criteria were based on the assumption that the community endpoints mostly will vary based on aspect, not on the soil categories. The change to modeling four soil categories, each with different target thresholds, versus two aspect categories (north- and south-facing) makes it more difficult to attain a low error of commission with the low sample size in the mapped “acceptable” category (n = 5 for OAT, n=10 for richness, and n = 14 for cover).

[14] 23 locations were used to train data for OAT scores, and a randomly selected 8 were used for accuracy assessment. For cover and richness, locations were not used to train data; instead, NDVI and variance in NDVI were scaled to the endpoint. Therefore, all 31 locations were used to assess accuracy. This differs slightly from FS work plan, which says jack-knife cross-validation method should be used, but that method had too much uncertainty.

For example, a sample size of six that has one error can have no lower than 17 percent error of commission due to that small sample size. Thus, the 17 percent error for OAT score that represents only one error should be acceptable. The richness map had a larger error of commission but the map was deemed acceptable to use to be conservative in retaining more areas for remedial evaluation, as discussed in the main text of Appendix D. For cover, the 18% error of commission was higher than the target of 15% but close enough to be useful, considering the alternative of intense field sampling of this large, vegetatively heterogeneous area would likely still have very large standard errors around estimates (e.g., higher error expected than with the remote sensing).

A minor issue with this screening approach is that the soil category map was used to develop the remote sensing maps when the above thresholds were applied to each soil category to create the binary classifications of the maps (see main Appendix D for more details). The soil category map required some assumptions that increase errors in classifications. Specifically, flat granular soil areas were initially defined as non-bedrock fair-good (acceptable) rangeland that is not in steep areas using an early OAT score map unless field observations indicated otherwise. However, some of the flat granular areas have poor rangeland condition, as seen by viewing the ground data in Table E-1, which shows 5 of 12 flat granular locations, defined as that class on the ground, had poor rangeland. The OAT score map remote sensing training was refined based on this knowledge and resulted in three of these later being classified as flat rocky on the map (the other two were not classified because outside the STSIU), indicating the final remote sensing OAT map correctly identified the polygons as poor rangeland.

A final issue is that the flat rocky reference location had shallow soil over bedrock. Although at least one STSIU flat rocky location also had shallow soil over bedrock, most flat rocky locations on the STSIU had compacted soils with rock armoring. They are not as well represented by the single flat rocky reference location. The Natural Resources Conservation Service (NRCS) web soil data indicate that flat rocky soils are in a Hills ecotype commonly found in the STSIU. Heavy grazing in this ecotype can convert areas with abundant grasses to mostly shrubs (e.g., mesquite) and bare ground with overgrazing (Bestelmeyer et al. 2004, also see the succession section of Appendix B-3 of the Amendment study, Arcadis 2017a). At the time of sampling, other possible flat rocky areas representative of this type could not be accessed and no additional suitable areas that could be accessed were subsequently located at that time. Therefore more uncertainty in PELs is likely for flat rocky because it only had one reference location and that location is not as representative of flat rocky soils on the site.

5.3 Effect Levels for Plant Community Dose-Response Curves

Dose-response curves in the phytotoxicity report were updated with the 2018 reference data,[15] and the resulting curves are shown on Figure 5. The methods used to develop the curves and the pCu DELs and PELs for each soil category are described in the phytotoxicity study report. The same outliers were removed from richness regression calculations (e.g., represented very different juniper habitat than other sites or unusually heavy trampling) except that the new flat granular reference site STS-REF-2018-FG1 was removed as an outlier (due to it having a different vegetation community dominated by creosote and lemonweed) from the richness and cover regressions (but retained as a point in the plot). This flat granular

[15] Cover data were adjusted to 2011 values. Data used for the models are shown in Appendix E, Table E-1.

reference site was an outlier because it had unusually low richness and was predicted to have unusually low cover in 2011 even though it had at very high pCu (Figure 5).[16]

As was done in the phytotoxicity and community study, the regression analysis was a multiple regression that included soil categories as “dummy” variables, following Kutner et al. (2004). This more complex approach, rather than estimating a simple linear regression line for each soil category, is recommended for more complex systems because it

- accounts for the partial correlations between soil category and pCu, controlling for the effect of soil category on pCu
- reduces the variation from pCu and provides more precise estimates and greater power to detect the difference between soil categories because entire dataset is used
- allows identification of whether slopes of the relationship differ among the soil categories

The multiple regression analysis included testing for significant interaction terms (at $p < 0.05$) to evaluate if the slope of the relationship between pCu and community endpoints varied among soil categories. They did not based on finding no interaction terms were significant ($p > 0.40$).

The regression analyses indicated a number of significant relationships with pCu. The exceptions were that there was no significant relationship ($p < 0.05$) between pCu and richness or pCu and OAT score in flat granular soils, and no relationship between pCu and cover in slope and flat rocky soils (Table 5). The results are similar to those reported in the phytotoxicity study report, except that: (1) flat granular soils no longer correlate with pCu for richness, and (2) the OAT score has significant correlations with three of the four categories, instead of only one category. No relationship indicates other factors strongly override pCu effects or the plant community has either high tolerance to copper or low copper uptake from soils because of a soil category’s properties.

The PELs and DELs for significant relationships for the four soil categories and endpoints are plotted on Figure 5 and shown in Table 6. Most importantly, when all three endpoints are considered, all had some significant relationships with pCu ($p < 0.05$), which suggests that pCu can be a predictor of the plant community condition.

The maximum DEL and PEL between wildlife habitat endpoints and rangeland habitat endpoints was selected as the final DEL and PEL for each soil category to use in decisions of screening out habitat to consider for remediation. This approach ensures that clean-up will be focused on the more sensitive habitat type. The DEL and PEL for the endpoints related to wildlife habitat (richness and cover) were averaged together to reflect wildlife habitat tolerance to pCu. The OAT score endpoint was used to reflect rangeland tolerance to pCu. However, the insignificant DELs and PELs did not have a numeric value for a PEL or DEL. To correct this omission, buffering capacity classes were employed to assign a value for insignificant values.[17] When a non-significant PEL or DEL was identified for a soil category for an

[16] This unusual condition is likely a result of STS-REF-2018-FG1 representing a creosote bush community rather than the mesquite-grama or mixed grama community of most of the other flat granular locations.
[17] Because the data show that buffering capacity (and vegetation community response) usually is highest in the flat granular soils, followed by the slope soils (Figure F-1, also see Figure 5), these two soil categories were grouped together as the “high buffering capacity soils class” relative to their sulfate concentration/potential acidity. The lowest buffering capacity is in bedrock and flat rocky soils (Figure F-1), so these two were grouped together in the “low buffering capacity soils class.” The other option is to include the

endpoint, it was replaced with the significant DEL or PEL value of a soil category in its buffering class, as shown in Table 7. With this adjustment, DELs for the average of the wildlife habitat endpoints range from 5.60 to 7.37 depending on the soil category (Table 7). The rangeland endpoint DELs range from 6.31 to 9.48. The rangeland DELs are higher than the wildlife habitat DELs and were selected as the final DELs. For PELs, the average of the wildlife habitat endpoints range from 4.11 to 4.98, depending on the soil category, with the highest values in the flat rocky category. In contrast to the DELs, the rangeland endpoint PELs were lower for all soil categories, ranging from 0.69 to 3.83. As expected, PELs were highest in the low buffering capacity soils (bedrock and flat rocky) and lowest in the high buffering capacity (flat granular and slope) soils. The maximum PELs used for the final PELs range from 4.11 to 4.98 and will be used to screen out rangeland polygons from consideration for remediation.

6 DISCUSSION

The pre-FS RAC for pCu and performance criteria discussed in this memorandum can be used to screen out rangeland polygons from requiring remediation and subsequently for refining remedial decisions for areas not screened out and carried forward to the FS. For pCu, often the four soil categories had a significant relationship for at least one plant community endpoint. The fourth soil category (bedrock) had all three endpoints correlated to pCu but has very little buffering capacity (low lime, Figure 6a) compared to the other three soil categories. It is sensitive to the pH and pCu changes from the former smelter and windblown tailings (has low alkalinity in acidic soils to offset any added acidity, Figure 6b). However, bedrock always was in poor rangeland condition, even in reference areas (reference OAT score was as low as 14, Table 3), indicating that bedrock areas may be unimportant to livestock. Also, they have more limited value to wildlife than slopes or flat granular soils because bedrock locations have hard rock at the surface and contain only small, shallow pockets of soil with limited cover by the herbaceous, non-woody plants that are typically most affected by pCu (Arcadis 2017a). These pockets are subject to erosion from monsoon rains and do not provide as much wildlife habitat or livestock rangeland as areas without large areas covered in bedrock. Remediation for small pockets of vegetation on naturally poor-quality rangeland and habitat is questionable because the pCu Remedial Action Objective (RAO) is intended to protect naturally good rangeland that may have been degraded due to historical mineral processing.

Like bedrock, flat rocky soils also appear to experience greater impacts from pCu to the plant community than slope or flat granular soils (Figure 5). This soil category is not limited by large areas of hard bedrock on the surface, and its low pCu areas may require remediation measures that increase the pCu when the plant community endpoints are below the screening thresholds. However, in contrast to the other three soil categories, Figure 4 indicates that pH is not negatively correlated to sulfate as expected[18] in the flat rocky areas. The lack of correlation appears to be from three flat rocky soils that had unusually high lime and alkalinity (STS-PT-2013-2, 17, and 36), likely from their topography and location capturing greater deposition of nearby alkaline windblown tailings or white rain (Figures 6a and 6b). If these three soils are removed from Figure 4 as outliers, the flat rocky soil negative relationship between pH and sulfate becomes similar and parallel to the other three soil categories as expected (see Appendix F, Figure F-1),

insignificant regression coefficients to calculate a PEL and DEL, but this method does not work when the trend line is positive, as it was for some relationships such as cover in slope soils vs. pCu.

[18]Sulfate was likely derived from sulfuric acid deposition from the smelter; thus, low pH is correlated with high sulfate in impacted areas.

falling below slope and flat granular soils, and appearing to be more similar to bedrock soils. This trend line indicates that this soil category's buffering capacity, specifically its ability to resist pH reductions with the former smelter deposition of sulfuric acid (which converted to sulfate), is typically poor and more similar to bedrock. In support, Figure 6a shows that lime is relatively low in this flat rocky soil category if one ignores the three outliers (outlier locations 2, 17, and 36).[19]

It might be expected that the three impacted outlier flat rocky locations with high pH soils would have high soil pCu and consequently greater cover, richness, and OAT scores than lower pCu soils, and would be more similar to the high pCu reference flat rocky soil. Of the three soils, only two have community data to evaluate that hypothesis. The two locations both had high pCu (>5, up to 6.3) and had similar or greater cover (though lower richness and OAT scores) than the flat rocky reference location (STS-2018-REF-FR1, Table E-1). Although they had greater or similar cover, it was mostly woody cover. Non-woody cover is often more impacted by pCu (Arcadis 2017a), and in the two locations, non-woody cover was lower than in the reference soil (2.5 to 4.8 percent vs. 8 percent), and non-woody cover fell within the range of non-woody cover of impacted flat rocky locations that had pCu < 5 (three locations with available non-woody data ranged from 1.1 to 5.3 percent). This result suggests that even currently high pCu flat rocky locations have poor amounts of non-woody cover because of compaction and erosion in that soil category.

The third flat rocky location (STS-PT-2013-36) was at the top of a hillslope near former tailing operations and did not have community data, but did have a high copper concentration, at 3,770 mg/kg, and a correspondingly low pCu of 3.36. As such, it may not be expected to have as healthy a plant community. Yet, it had some large bunchgrass growing on the site that was visible in the location's photo (see photos in Appendix I of phytotoxicity study and grass data in Table E-1). The unexpected large bunchgrass is likely a result of the amount of grazing and associated compaction in the soil because areas up on slopes are often less grazed. Though categorized as a flat rocky location, this third location is on the border of a slope and represents more of an intermediate condition between flat rocky and slope categories. These observations further support conclusions in the amendment study (Arcadis 2017a) that a strong non-woody vegetation cover response to lime application alone is not guaranteed in flat rocky soils because of past grazing pressure effects on the soil. This information will be useful for remedial decisions in the FS.

7 SUMMARY AND CONCLUSIONS

To support the STSIU FS, this technical memorandum summarizes the results from the 2018 field sampling and surveying of reference areas to fill data gaps. Eight reference areas were sampled for soil and surveyed for plant endpoints in October 2018, bringing the total reference area dataset to be used for comparing plant communities on site to reference areas off site to ten, given that two reference sites (wildlife reference north and STS-PT-2013-26) had been sampled previously. Three additional STSIU site locations were sampled or surveyed. Two of these were sampled for soil to evaluate pCu at highly overgrazed areas on the site, and one was sampled and surveyed along with the wildlife reference north location to calibrate changes[20] in plant cover due to the climatic differences over 3 different years of sampling; this repeat survey ensured that on-site and off-site area data are comparable.

[19] Also see Appendix F, Figure F-2 piper diagrams for cations such as calcium from lime and buffering anions such as bicarbonate in the various soils.
[20] Wildlife Reference North and South locations were sampled each year of community sampling to calibrate cover.

Like the two previously sampled reference locations, all new reference locations had sulfate concentrations and pH in the soil within the expected range for the geology and soils of the location, indicating that they do not have any smelter or windblown tailing impacts. These results support that the new reference locations adequately represent background conditions without mining impacts.

The purpose of the new data was to identify target thresholds for classifying a “rangeland polygon” on the STSIU site that has pCu less than 5 (below the pre-FS RAC threshold) as acceptable or unacceptable wildlife habitat. Thresholds were developed for each of the four soil/slope categories that strongly affect plant communities, which are:

- Flat granular
- Flat rocky
- Slope
- Bedrock soils.

In conjunction with the OAT score, which identifies areas with fair-good or poor rangeland condition using a threshold of 22 (13 for bedrock), these criteria will help identify if some areas have acceptable wildlife habitat or rangeland condition, and if so, then remediation of such areas would likely do more harm than good. Target thresholds were identified based on a proportional success guideline developed from the reference locations. Depending on the soil category, target thresholds ranged from 7 to 45 percent for cover and from 4 to ten species for richness. An issue that arose with the OAT score threshold of 22 for “fair-good” rangeland identified in the Work Plan is that one soil category, bedrock, always is in poor rangeland condition, even in reference areas. Therefore, the OAT score threshold for bedrock was changed from 22 to a proportional success target developed using the same approach as for richness and cover, which was an OAT score of 13. When an area’s livestock rangeland and wildlife habitat was found to be “fair-good” or “acceptable,” the area will be screened out from consideration for remediation in the STSIU FS because it may already be in a condition adequate for livestock or for wildlife.

To understand plant community effect thresholds in areas retained for remediation consideration, DELs and PELs presented in the phytotoxicity study were recalculated with the new data. The recalculation is important because the phytotoxicity study did not have any reference areas representative of flat rocky, bedrock, or flat granular soils. That study only had two reference areas to develop DELs and PELs from the plant community analysis, both falling in the flat granular soil category. The new DELs and PELs will be incorporated into the decision analyses for the FS. DELs and PELs for some soil categories and endpoints were not significantly correlated to pCu and were replaced with DELs and PELs of a soil category having a similar buffering capacity. When the average DEL and PEL for wildlife habitat endpoints (richness, cover) were compared to the DEL and PEL for the rangeland endpoint (OAT score), the rangeland endpoint had higher DELs and the wildlife habitat endpoints had higher PELs. The more conservative higher DELs and PELs between wildlife habitat and rangeland were established as the final DELs and PELs for screening out rangeland polygons from consideration for remediation. The final DELs across the soil categories ranged from 6.31 to 9.48, and PELs ranged from 4.11 to 4.98, with the highest values in the flat rocky soil category. PELs were used to set the pre-FS RAC for pCu, and thus the PELs will be used for remedial decisions.

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Enclosures

Tables

Figures

Appendices

TABLES

Table 1. Characteristics of locations sampled in October 2018.

Freeport-McMoRan Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Sample ID	Soil Category	Latitude and Longitude	Elevation (ft)	Slope (%)	Aspect	Distance to Smelter (ft)	Percent bedrock	Soil Complex	Ecological Site	Vegetation Alliance	Average Productivity (lbs/acre dw)	Media sampled/ surveyed
Reference Locations												
STS-2018-REF-FG1	flat granular	N32° 33.308' W107° 56.161'	5103 ft	0	Flat	71889	0	37, Muzzler-Rock outcrop association, 25-45%	Hills	creosote-lemonweed	600	soil, vegetation
STS-2018-REF-FG2	flat granular	N32° 35.498' W107° 55.554'	5138 ft	12.84	Southeast	77523	0	37, Muzzler-Rock outcrop association, 25-45%	Hills	mesq/mix grama	600	soil, vegetation
STS-2018-REF-BR1	bedrock	N32° 35.552' W107° 55.520'	5156 ft	21.87	Southeast	71925	80	37, Muzzler-Rock outcrop association, 25-45%	Hills	mtn mahogany/shrub	600	soil, vegetation
STS-2018-REF-BR2	bedrock	N32° 35.444' W107° 55.204'	5047 ft	30.18	Southeast	71256	63	RU, Rough, broken and rockland (likely Muzzler)	Hills	mesq/mix grama	600	soil, vegetation
STS-2018-REF-BR3	bedrock	N32° 35.610' W107° 55.568'	5171 ft	16.24	Southwest	71775	95	37, Muzzler-Rock outcrop association, 25-45%	Hills	mtn mahogany/shrub	600	soil, vegetation
STS-2018-REF-FR1	flat rocky	N32° 35.442' W107° 55.243'	5076 ft	5.74	East	73418	20	LD, Lehmans extremly rocky loam, 10 to 25%	Hills	mesq/mix grama	325	soil, vegetation
STS-2018-REF-SL1	slope	N32° 35.722' W107° 55.414'	5177 ft	25.44	South	71090	7	37, Muzzler-Rock outcrop association, 25-45%	Hills	mtn mahogany/shrub	600	soil, vegetation
STS-2018-REF-SL2	slope	N32° 35.676' W107° 55.605'	5270 ft	39.89	Northeast	71464	17	37, Muzzler-Rock outcrop association, 25-45%	Hills	mtn mahogany/shrub	600	soil, vegetation
Wildlife Reference North	flat granular	N32° 41.040' W108° 04.062'	5714 ft	5.35	North	8101	0	37, Muzzler-Rock outcrop association, 25-45%	Hills	mesq/mix grama	600	vegetation
Site Locations												
Overgrazed Reference	flat rocky	N32° 38.754' W108° 03.938'	5408 ft	6.38	East	25884	0	13, Encierro-Rock outcrop complex, 15-35%	Hills	mesq/mix grama	579	soil, vegetation
Overgrazed Rocky 2	flat rocky	N32° 38.804' W108° 04.031'	5417 ft	2.87	East	25339	0	13, Encierro-Rock outcrop complex, 15-35%	Hills	mesq/mix grama	579	soil
Wildlife Reference South	flat granular	N32° 40.488' W108° 03.606'	5663 ft	3.02	Southwest	12723	0	37, Muzzler-Rock outcrop association, 25-45%	Hills	mesq/mix grama	600	vegetation

Notes

"--" means soil was not sampled because the location was sampled in previous years

Overgrazed Reference and Wildlife Reference South, despite their names, had low pH and high sulfate and were in the path of the smelter deposition and were not actually reference sites.

mesq = mesquite, mix grama = mixed grama, dw = dry weight

Table 2. Soil chemistry of locations sampled in October 2018.

Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Sample ID	Soil Category	Collection Date	Copper, total (mg/kg) dw	pH, Saturated Paste (s.u.)	pCu, Calculated (s.u.)	Soluble Sulfate (meq/L)
Reference Locations						
STS-2018-REF-FG1	flat granular	10/2/2018	22	7.7	10.95	0.25
STS-2018-REF-FG2	flat granular	10/3/2018	82	6.5	8.32	0.25
STS-2018-REF-BR1	bedrock	10/2/2018	96	5.7	7.39	0.38
STS-2018-REF-BR2	bedrock	10/2/2018	49	6.4	8.82	0.21
STS-2018-REF-BR3	bedrock	10/3/2018	180	5	6.02	0.21
STS-2018-REF-FR1	flat rocky	10/2/2018	82	6.2	8.04	0.21
STS-2018-REF-SL1	slope	10/2/2018	72	6.4	8.37	0.25
STS-2018-REF-SL2	slope	10/3/2018	100	6	7.62	0.21
Wildlife Reference North[a]	flat granular	10/2/2018	--	--	--	--
Site Locations						
Overgrazed Reference	flat rocky	10/3/2018	361	4.3	4.57	1.96
Overgrazed Rocky 2	flat rocky	10/3/2018	348	4.1	4.42	0.67
Wildlife Reference South[a]	flat granular	10/2/2018	--	--	--	--

Notes

[a]Though not measured in 2018, soil at these locations was measured in 2013, with copper, pH, pCu, and sulfate of 164-288 mg/kg, 4.6, 5.1-5.8, and 1.4 meq/L, respectively for wildlife reference south location and for copper, pH, and pCu of 213 mg/kg, 5.9, and 6.66, respectively for wildlife reference north location (Arcadis 2018)

"--" means soil was not sampled because the location was sampled in previous years

Overgrazed Reference and Wildlife Reference South, despite their names and low copper concentrations, had low pH and high sulfate and were in the path of the smelter deposition and were not retained as reference sites.

Table 3. Summary of cover and richness of locations surveyed in October 2018

Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Site ID	Soil Category	2018 OAT Score	Rangeland Condition	2018 Mean richness (no. species)[b]					2018 Mean cover (%)[a]					Scaled NDVI 2011/2018	adjusted to 2011 (%)
				shrub/tree	grass	forb	succulent	total	shrub/tree	grass	forb	succulent	total	ratio	total
2018 Reference Locations															
STS-2018-REF-FG1	flat granular	28	Good	3.4	1.2	6.4	0	**11**	30.03	6.25	3.13	0.00	32.40	0.026/0.088	**9.58**
STS-2018-REF-FG2	flat granular	20	Poor	2.0	4.0	5.8	0.8	**12.6**	16.15	22.00	4.88	1.63	35.35	0.250/0.242	**36.48**
STS-2018-REF-BR1	bedrock	**17**	Poor	0.6	2.4	2.8	0.8	**6.6**	5.88	3.50	1.13	0.00	8.50	0.173/0.125	**11.76**
STS-2018-REF-BR2	bedrock	**14**	Poor	1.6	4.0	3.8	1.2	**10.6**	8.93	11.68	2.88	0.00	24.35	0.386/0.286	**32.84**
STS-2018-REF-BR3	bedrock	**16**	Poor	0.4	2.4	1.2	0.4	**4.4**	0.75	3.40	0.13	0.00	2.38	0.080/0.026	**7.25**
STS-2018-REF-FR1	flat rocky	22	Good	2.6	3.8	6.8	0.0	**13.2**	6.55	16.23	5.63	0.00	22.70	0.122/0.137	**20.15**
STS-2018-REF-SL1	slope	29	Good	2.4	4.2	5.4	2.0	**12.8**	3.25	37.10	4.25	11.53	50.40	0.245/0.252	**49.05**
STS-2018-REF-SL2	slope	36	Good	1.8	5.4	10.2	0.4	**17.8**	11.93	52.10	9.03	1.90	68.60	0.209/0.248	**57.85**
Wildlife Reference North	flat granular	27	Good	1.2	2.6	3.6	0.2	**8.2**[c]	23.58	27.95	5.63	1.90	50.85	0.194/0.270	**30.00**[e]
2018 Site Locations															
Overgrazed reference	flat rocky	16	Poor	1.0	1.4	3.4	0.0	5.8	16.45	2.75	8.28	0.00	25.78	0.001/0.004	6.37
Wildlife Reference South	flat granular	24	Good	2.8	3.2	5.8	0.6	12.4[d]	10.90	15.43	2.38	4.90	27.25	0.119/0.180	19.90[e]

Notes

2014 reference location data for same columns above are shown below (except replace 2018 with 2014 in headings). This location combined with the above reference locations was used to define target thresholds in Table 4

STS-PT-2013-26	flat granular	20	Poor	1	7	7.8	0	**15.8**	13.9	16.15	16.15	0	37	0.22/0.16	**51**

[a]Cover was calculated as midpoints of Daubenmire class ranges and averaged to obtain the mean.

[b]Richness was calculated as average number of species across five 20x20' sample blocks.

[c]This mean richness value was 10 in 2011 and 13 In 2014.

[d]This mean richness value was 11 in 2011 and 14 in 2014.

[e]This value was measured in 2011, whereas other 2011 cover values in the column were estimated by applying a scaled (0-1) NDVI ratio to 2018 NDVI corrected data. The estimated 2011 value based on NDVI ratio is similar to observed (estimated at 18 vs. 20% in 2011) for wildlife reference south and somewhat higher for wildlife reference north, which appeared to have more of a community shift over time (estimated at 41 vs. 30% in 2011) with more bristlegrass dominance reducing other species (possibly from some disturbance).

OAT score and richness were not adjusted to 2011 because OAT was re-calibrated every year by observers to weather conditions and richness could not be adjusted without IKONOS imagery (resulting in richness error of about 20-35%).

Mean of bolded values will define the mean of the reference envelope, shown in Table 4. Only bedrock is bolded for calculating OAT targets because only bedrock did not use OAT of 22 as the threshold.

Table 4. Mean, RPD, and final target community endpoint values for each soil category

Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Soil Category	Cover 2011	Richness	OAT
Mean of Reference Areas[a]			
Bedrock	17	7	16
Flat Rocky	20	13	22
Flat Granular	32	12	24
Slope	53	15	33
Relative Percent Difference (maximum - mininum/mean)[b]			
Bedrock	47%	40%	19%
Flat Rocky	39%	39%	25%
Flat Granular[a]	53%	43%	34%
Slope	16%	33%	22%
Target Threshold for Acceptability Criteria[c]			
Bedrock	7	4	13
Flat Rocky	12	8	22
Flat Granular	10	7	22
Slope	45	10	22

[a]Wildlife Reference North had 8 species in 2018, 11 in 2011, and 14 in 2018, averaging to 11 over the three years; the average was used I this table. This location was the only reference sampled in more than one year.

[b]RPD omits extremes that cause percent difference to be over 80-100%. Also, flat rocky category had only one reference area and its RPD was the average of the other three soil category RPDs (RPD = relative percent difference).

[c]Except for OAT, calculated as 1-RPD x mean, unless result is higher than minimum reference and then minimum used. For OAT, the threshold is 22 except for bedrock, which was based on the RPD.

Table 5. General Linear Model Results for Richness, Cover, and OAT Scores

Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Effect	Coefficient	Standard Error	Standardized Coefficient	t-value	p-value
Richness (n = 27[a], R^2=0.74) for all categories except flat granular[a]					
Constant	-1.46	2.05	0	-0.71	0.4849
Calculated pCu	1.85	0.29	0.66	6.31	**<0.0001**
Bedrock	-5.08	1.10	-0.61	-4.64	**<0.0001**
Flat Rocky	-2.85	1.18	-0.33	-2.41	**0.0244**
Cover (n = 24, R^2 = 0.83) for flat granular and bedrock locations only[b]					
Constant	0.03	0.28	0	0.11	0.9125
Calculated pCu	0.39	0.04	0.76	8.83	**<0.0001**
Flat Granular	1.15	0.20	0.50	5.84	**<0.0001**
OAT score (n = 28, R^2 = 0.72) for all categories except flat granular					
Constant	15.63	4.11	0.00	3.80	0.0009
Calculated pCu	1.95	0.60	0.35	3.25	**0.0034**
Bedrock	-13.91	2.13	-0.85	-6.52	**<0.0001**
Flat Rocky	-12.09	2.32	-0.70	-5.21	**<0.0001**

Notes:

a. Excludes three outliers

b. Excludes one outlier, transforms cover by raising it to 0.37th power

OAT = Observed apparent trend

Slope is the reference group for the "indicator" variable of soil category (bedrock, flat granular, flat rocky, slope) in the multiple regression. Excluded categories were not significantly related to pCu in the model. R^2 is adjusted for number of variables in model.

Bolded P values have $p < 0.05$.

pCu = cupric ion activity

Table 6. DELs and PELs calculated with new reference data included.

Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Soil category	Richness		Cover		OAT Score	
	DEL	PEL	DEL	PEL	DEL	PEL
flat granular	not sig.	not sig.	6.03	3.98	not sig.	not sig.
slope[a]	7.71	4.25	not sig.	not sig.	6.87	0.69
flat rocky	9.47	5.90	not sig.	not sig.	9.48	3.83
bedrock	5.91	4.72	5.28	4.07	6.31	2.71

Notes

not sig. = not significant in regression at $P<0.05$

[a]OAT PEL is the estimated measured pCu because calculated pCu dipped slightly below 0 but measured more realistically does not (using measured pCu = 0.7388*calculated pCu+1.0974 in Figure J-1 in Phytotoxicity and Community Report).

Table 7. DELs and PELs calculated with new reference data included and substitutions for categories that were not significant.[a]

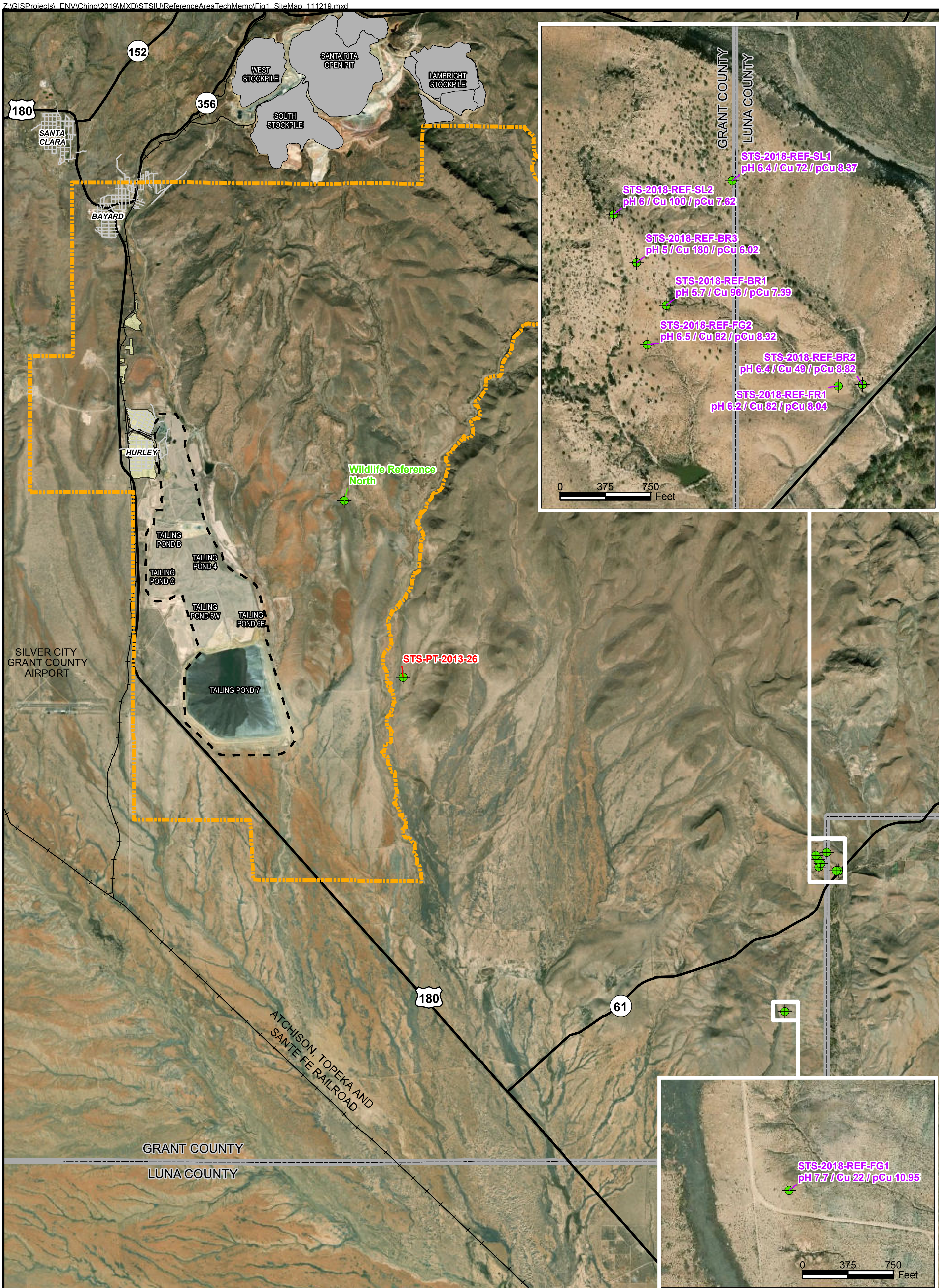
Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Soil category	Richness for Wildlife		Cover for Wildlife		OAT Score for Rangeland		Average DEL for Wildlife Habitat	Average PEL for Wildlife Habitat	Maximum DEL of Wildlife or Rangeland Habitat	Maximum PEL of Wildlife or Rangeland Habitat
	DEL	PEL	DEL	PEL	DEL	PEL	DEL	PEL	DEL	PEL
flat granular	7.71	4.25	6.03	3.98	6.87	0.69	6.87	4.11	6.87	4.11
slope	7.71	4.25	6.03	3.98	6.87	0.69	6.87	4.11	6.87	4.11
flat rocky	9.47	5.90	5.28	4.07	9.48	3.83	7.37	4.98	9.48	4.98
bedrock	5.91	4.72	5.28	4.07	6.31	2.71	5.60	4.40	6.31	4.40

Notes

[a]Red numbers are substitutions for a non-significant regression at P<0.05, where substitutions are from another soil category in the same buffering capacity group.

FIGURES



Legend

- Reference vegetation survey and soil sampling location
- STSIU Boundary
- Smelter Tailings Boundary
- County Boundary

Aerial Source: DigitalGlobe, photo dated 11/15/2018; accessed via ESRI World Imagery Service on 11/21/2019.

Notes:

Red labels denote sites sampled for vegetation only in 2014
Green labels denote sites sampled for vegetation in 2011, 2014 and 2018
Purple labels denote sites sampled for vegetation only in 2018

Soil samples taken at all purple-labeled locations in 2018

Copper (Cu) units are mg/kg
pH and pCu units are s.u.

0 0.75 1.5 3 Miles
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

TECHNICAL MEMORANDUM ON REFERENCE AREAS

SITE MAP WITH 2018 REFERENCE LOCATIONS

ARCADIS

FIGURE
1

OFFICE: LAKEWOOD DB:MEB TM: MB PM: AT
PROJECT# B0063543.0000 11/21/2019 3:13:44 PM
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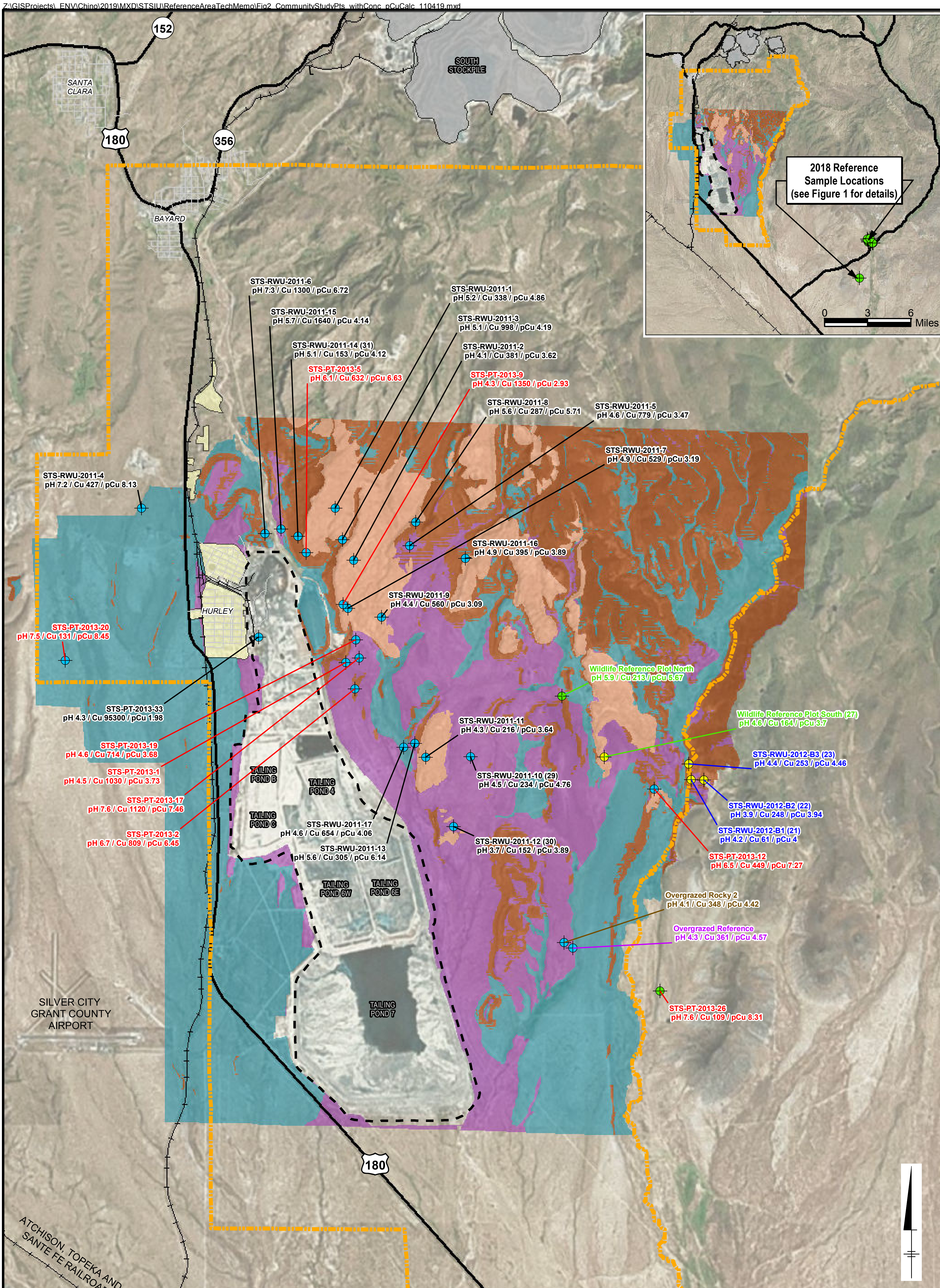

Legend

- Site vegetation survey and soil sampling location
- De minimus vegetation survey and soil sampling location
- Reference vegetation survey and soil sampling location
- STSIU Boundary
- Smelter Tailings Boundary

Soil Category

- Flat Granular Soil
- Flat Rocky Soil
- Slope > 13%
- Bedrock

Aerial Source: DigitalGlobe, photo dated 11/15/2018; accessed via ESRI World Imagery Service on 11/21/2019.

Notes:

Black labels denote sites surveyed for vegetation only in 2011
Brown labels denote sites never sampled for vegetation
Blue labels denote sites sampled for vegetation only in 2012
Red labels denote sites sampled for vegetation only in 2014
Green labels denote sites sampled for vegetation in 2011, 2014 and 2018
Purple labels denote sites sampled for vegetation only in 2018

Soil samples taken at all locations in 2013 or 2018

Location labels with a number in parenthesis are for locations also sampled in the laboratory phytotoxicity study and indicate the X in that study's STS-PT-2013-X label.

Copper (Cu) units are mg/kg; pH and pCu units are s.u.

0 0.5 1 2 Miles
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

TECHNICAL MEMORANDUM ON REFERENCE AREAS

SOIL/SLOPE CATEGORY MAP WITH SITE AND 2018 SAMPLE LOCATIONS

ARCADIS

FIGURE
2

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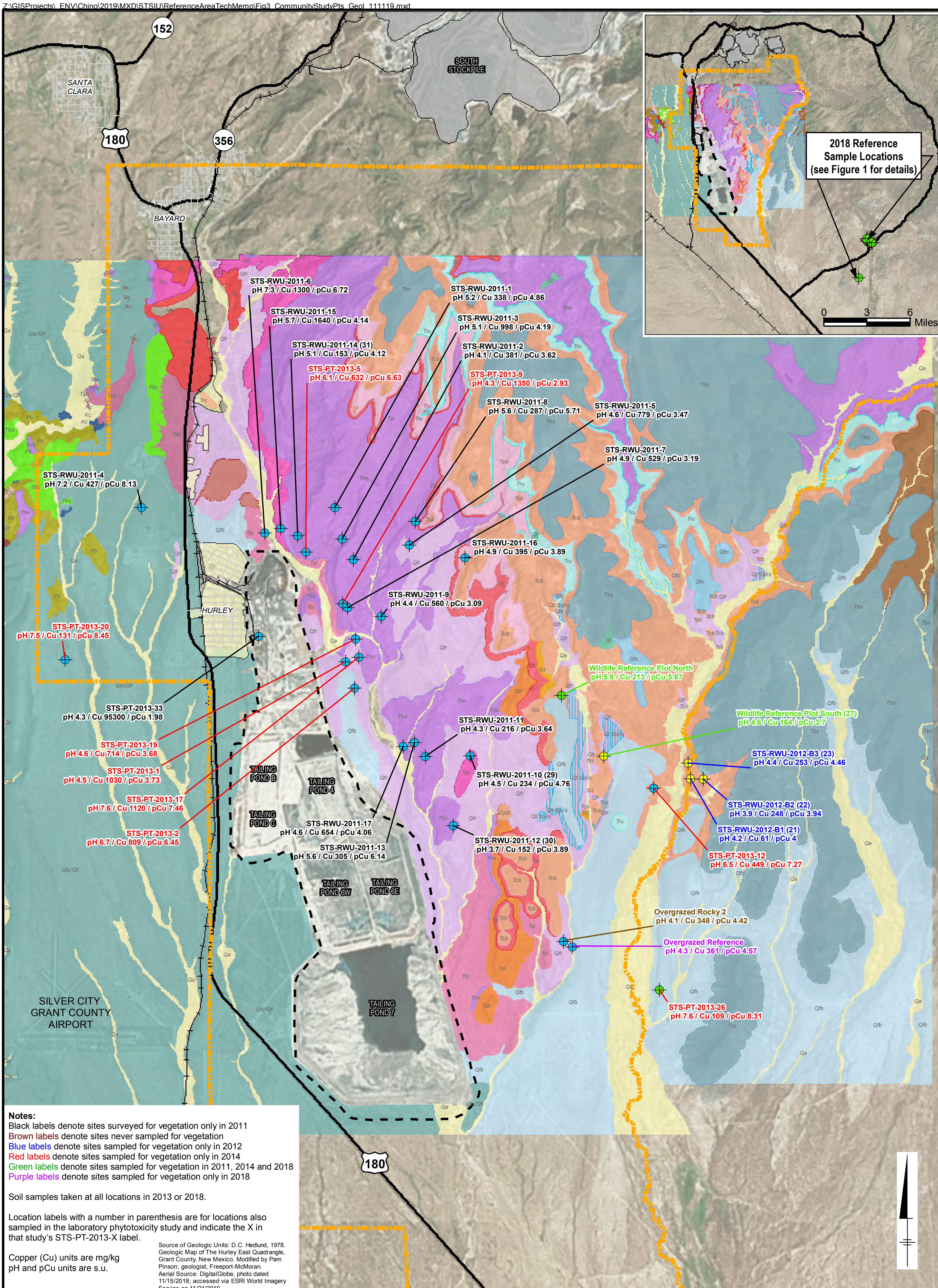


Notes:

Black labels denote sites surveyed for vegetation only in 2011
Brown labels denote sites never sampled for vegetation
Blue labels denote sites sampled for vegetation only in 2012
Red labels denote sites sampled for vegetation only in 2014
Green labels denote sites sampled for vegetation in 2011, 2014 and 2018
Purple labels denote sites sampled for vegetation only in 2018

Soil samples taken at all locations in 2013 or 2018.

Location labels with a number in parenthesis are for locations also sampled in the laboratory phytotoxicity study and indicate the X in that study's STS-PT-2013-X label.

Copper (Cu) units are mg/kg
pH and pCu units are s.u.

Source of Geologic Units: D.C. Hedlund, 1978. Geologic Map of The Hurley East Quadrangle, Grant County, New Mexico. Modified by Pam Pinson, geologist, Freeport-McMoran.
Aerial Source: DigitalGlobe, photo dated 11/15/2018; accessed via ESRI World Imagery Service on 11/21/2019.

Legend

Site vegetation survey and soil sampling location
De minimus vegetation survey and soil sampling location
Reference vegetation survey and soil sampling location

Geologic Unit

Qa, Qts/Qfl, Qt Soils, Qfr, Qfb, Qfo, Qt, Kb, Kc, Mlt, Oc, Po, Tbs, Tr, Tcb, Tct, Tru, Tpk, Tp, Tpt, Tptd, Thn, Tst, Tsl, Trt, Trc, Tkh, TKa, TKc

STSIU Boundary
Smelter Tailings Boundary

0 0.5 1 2 Miles
GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

TECHNICAL MEMORANDUM ON REFERENCE AREAS

GEOLOGY MAP WITH SITE AND 2018 SAMPLE LOCATIONS

ARCADIS

FIGURE
3

DESCRIPTION OF ROCK UNITS

Qa **ALLUVIUM (HOLOCENE)**--Gravel , sand and, and silt deposits containing chiefly fragments of Tertiary volcanic rock. . Thickness probably exceeds 10 m along parts of Whitewater Creek and Lamphright Draw.

Qts/Qfl **GILA CONGLOMERATE** -- The material of the deposits is derived from the neighboring mountains and consists of fragment of lava or of pre-Cambrian igneous rocks or younger sediments, its character depending upon the kind of rock that id exposed to the neighboring uplands. The fragments range in size from fine dust to blocks several feet in diameter. In some places large boulders form a part of the deposits Most of the fragments are Subangular, as would be expected in view of the proximity of their source and the mechanical nature of the rock disintegration by which erosion was aided in Pleistocene time, as it is at present. "** description of individual specimens * * * can have but very local application, for the debris was deposited rapidly from areas that contributed abundant supplies and the deposits formed were various: indeed, they are characterized by lack or homogeneity. The bedding, though discernible, lacks the continuity that is generally characteristic of sediments deposited in bodies of water but illustrates admirably the features that mark rapid continental deposition. * * * Calcite, silica, and iron oxide, each or a combination of each- in differing proportions, are the cementing materials which in places bind together the otherwise loosely collected fragments and make of them a resistant conglomerate.

Qf **FAN DEPOSITS (HOLOCENE AND (OR) PLEISTOCENE)**--Sheetflood fan deposits that contain chiefly subangular to angular , poorly sorted fragments of Tertiary volcanic rock. Fan deposits are probably as much as 30 m thick.

Qt **TALUS (HOLOCENE AND (OR) PLEISTOCENE)**--Poorly sorted, unconsolidated, locally derived rock fragments largely deposited by gravity on or at the foot of a slope . Thickness commonly exceeds 15 m

Qfo **OLDER FAN DEPOSITS (PLEISTOCENE)**--Sheetflood and lag deposits that contain chiefly angular fragments of Bear Springs Basalt (Tbs) as much as 30 cm across . Deposits commonly overlie ash-flow tuff of the Caballo Blanco RhyoliteTuff (Tcb) at elevations of 5 ,700-5,800 f t (1,737-1768 m). Maximum thickness about 50 m.

Tbs **BEAR SPRINGS BASALT OF ELSTON, 1957 (OLIGOCENE)**--Dark brownish-gray to medium dark-gray basaltic andesite and basalt with a locally reddened and rubbly Locally scoriaceous with calcite-filled amygdules . Rock is generally weakly porphyrit i c and contains less than 5 percent phenocrysts of andesine-labradorite (An4 3_ 55), clinopyroxene, and olivine. The olivine which i s commonly a l tered to iddingsite fills interstices of the plagioclase microlites. Magnetite-ilmenite granules are disper sed throughout the rock. Maximum thickness about 155 m.

Tr **RAZORBACK RHYOLITE OF ELSTON , 1957 (OLIGOCENE)**-Medium light-gray to medium-gray, flow-laminated rhyolite to latite flows with locally reddened flow tops . Pilotaxitic groundmass with a lined microlites of sanidine and minor plagioclase (?). Less than 1 percent marginally resorbed and rounded quartz phenocrysts about 1-2 mm across and sparse amounts of sodic oligoclase (An 16-phenocrysts. Abundant fine-grained granules of iron oxides are dispersed throughout the groundmass. Accessory amounts of biotite and apatite . Thickness ranges from 0 to 60 m.

Tcb **CABALLO BLANCO RHYOLITE TUFF OF ELSTON, 1957 (OLIGOCENE)**-Pale -red to pinkish- gray ash-flow tuff that commonly displays cavernous outcrops and pinnacle forms in the densely welded and strongly jointed middle unit. Base of ash-flow sheet is locally white to pinkish-gray , l ess welded, and contains about 10 percent andesite lithic fragments. This basal unit is as much as 30 m thick. The ash-flow sheet is characterized by abundant quartz phenocrysts that are as much as 4 mm across. The tuff typically contains35 percent phenocrysts of which 6 percent are of sanidine, 18 percent oligoclase (An 27- 28), 12 to 15 percent bipyramidal quartz, 1 percent biotite and accessory amounts of oxyhornblende,s phene , and i ron oxides . The ash-flow tuff isgenerally about 95 m_thick. AK-Ar age determination from sanidine has yielded an age of 29.8±0.8 m.y. (Elston and others, 1973.

Tct **ASH-FLOW TUFF**--Light-gray to pale-red, slightly welded, devitrified tuff containing about 5 percent phenocrysts less than l mm across. The shards of the groundmass are s lightly deformed, devitrified , and display small vugs a few millimeters The phenocrysts consists of 3 percent oligoclase (An27), 1 percent sanidine, and 0 .8 percent biotite. The ash-flow is discontinuous and has a maximum thickness in sec. 3 of T. 19 s . , R. 12 W. of about 10 m.

Tru **RUSTLER CANYON BASALT OF ELSTON , 1957 (OLIGOCENE)**--Medium-gray to dark-gray, flow-laminated, amygdaloidal to vesicular, aphanitic basaltic andesite Flows are locally autobrecciated. Minor amounts of iddingsitic after olivine or clinopyroxene and about 2 percent sodic andesine phenocrysts less than 2 mm across are set in a pilotaxitic groundmass. Amygdale fillings of calcite and elongate vesicles lined with quartz are distinctive Thickness varies from 0 to 40 m.

BOX CANYON RHYOLITE TUFF OF ELSTON , 1957 (OLIGOCENE)

Tpk **Ash-flow tuff**--Pale-red to grayish- orange-pink, densely welded, devitrified, crystal- rich tuff containing 25-30 percent phenocryst fragments. Ash-flow sheet i s a conspicuous cliffformer and weathers to large rounded boulders. Phenocrysts include 6 percent sanidine, 13 percent oligoclaseodic andesine (An2a_32), 4-5 percent quartz, 2 percent biotite, 0.7 percent oxyhornblende, and accessory amounts of sphene and iron oxides . The quartz phenocrysts show resorption pitting and rounding. Maximum thickness about 30 m.

Tp **Tuffaceous sandstone , air-fall tuff , and vitrophyre**-- Brown, thin-bedded, sandstone and pebble conglomerate containing clasts of grayish-red and purplish-gray latite and andesite as much as 7 mm across . Locally strongly crossbedded suggesting fluviatile deposition. Thickness varies from 0 to 6 m and clastics consistently overlie the airfall tuff . The air-fall tuff is commonly pinkishgray to white and consists of abundant nondeformed devitrified shards with the vesicles still intact. Phenocrysts comprise about 2-3 percent of the tuff and consist largely of oligoclase (An 27), with accessory amounts of biotite, oxyhornblende, and iron oxides . Tuff is as much as 10 m thick and locally contains t hin, discontinuous, black, vitric , wel ded ash- flow units at the base that are generally less than 1 m thick.

Tpt **Ash-flow tuff**--Pale -red to medium light-gray, densely welded, devitrified tuff locally overlying a nonwelded base . The ash-flow tuff displays a strong eutaxitic texture and in the upper parts of the ash flow there are abundant compressed pumice fragments as much as 4 cm across . The rock contains about 20 percent phenocrysts including about 10 percent sanidine , 5 percent smoky quartz , 3 percent plagioclase , and1 percent black to bronzy biotite plates about 1 mm across . Unit is a prominent cli ff- former that is well jointed and commonly weathers to a medium light Upper we lded secti on of t he ash-flow tuff is about 15 m thick; t he nonwelded base as much as 3 m thick.

Tpbl **Ash- flow tuff** --Pale-r ed to moderate-brown, densely welded , devitrified tuff containing about 8 percent phenocrysts . The ash-flow tuff displays a strongly eutaxitic texture with the shards highly deformed . Phenocrysts include 1 percent sanidine, 6 percent oligoclase (An 27), 1 percent biotite, and accessory amounts of quartz and iron oxides. The altered dusky brown biotite plates are as much as 2 mm across.

Tkn **KNEELING NUN TUFF (OLIGOCENE)**--Pale -red to grayishpink, welded , devitrified, crystal- rich , ash-flow tuff with phenocrysts as much as 4 mm across. Ash flow typically contains 35 percent phenocrysts of which 5 percent are of sanidine , 20 percent oligoclase (An 24 - 26), 3 percent quartz, and accessory amounts of biotite (0.8 percent), oxyhornblende (0.6 per cent), and iron oxides (0.7 percent). The groundmass is completely devitrified and spherulitic and axiolitic textures are common. Near the top , the ash flow contains fewer phenocrysts, about 20 percent , and mostly less than 2 mm across. Maximum thickness of the ash-flow tuff is about 350 m. A sample of biotite from this ash-flow tuff yielded a K-Ar age of 33.4±1.0 m. y . (McDowell, 1971).

SUGARLUMP TUFF (OLIGOCENE)

Tsl **Air-fall tuff , tuffaceous s andstone , and pebble conglomerate** --Air-fall tuff is medium light gray to pinkish gray , medium bedded and contains about 15 percent phenocryst fragments 1-2 mm across . The phenocrysts include 3 percent sanidine , 8 percent sodic andesine (An33), 3 percent quartz, and accessory biotite and iron oxides. Air- fall tuffs comprise most of the section near Rustler Canyon and aggregate as much as 240 m. The interbedded clastic rocks consist of light-gray tuffaceous sandstone and pebble conglomerate beds with angular clasts of latite and andesite. The more massive nonwelded tuff units within the airfall tuff sequences may represent poorly welded ash-flow sheets that are correlative with the units Tsfd and Tsd described near Hurley.

Tsfd **Ash-flow tuff**--Light-gray , densely welded, devitrified ash-flow tuff that contains highly compressed yellowish-gray pumice lapilli. Prominent cliffformer with a caprock that weathers white to very light gray . Rock typically contains 5 percent phenocrysts of which 3-4 percent are sanidine; accessory minerals are oligoclase (An24), quartz, biotite , and iron oxides. Maximum thickness about 40 m.

Tss **Air-fall tuff, sandstone, and pebble conglomerate**--Yellowish-gray , thin-bedded air- fall tuff about 8 m thick overlies about 20 m of brown sandstone and pebble conglomerate. Pebble conglomerate and course-grained sandstone are medium to thin bedded , locally crossbedded, and contain angular medium to coarse-grained clasts of latite and andesite.

Tsd **Ash-flow tuff**--Light brownish-gray, densely welded, devitrified, ash flow tuff with about 5 percent phenocrysts of sanidine and quartz; accessory bronzy biotite . Prominent cliff-former with a caprock that weathers white to very light gray. Thickness about 10 m.

Ts **sandstone and pebble conglomerate**--Brown, thin-bedded, medium- to coarse-grained , crossbedded clastic beds of probable fluivatile origin. Maximum exposed thickness about 6 m.

RUBIO PEAK FORMATION (OLIGOCENE)

Trp **Andesite** --Medium light-gray to medium-gray , scoriaceous flow that weathers dark purplish gray. Pilotaxitic groundmass with interstitial brown iddingsite replacive after olivine and pyroxene. Weakly porphyritic with generally less than 5 percent andesine (An40) phenocrysts as much as 4 mm across. Maximum thickness about 30 m as exposed in the extreme northeast corner of the map.

Trt **Ash-flow tuff**--Medium light-gray, densely welded, devitrified, crystal-poor tuffs. Shown here as part of the Rubio Peak Formation as mapped by Pratt (1967) but are probably a part of the Sugarlump Tuff . Very poorly exposed and largely covered by fan debris. Maximum exposed thickness only a few meters in the northwest corner of the map.

Trc **Conglomerate**--Reddish-brown, poorly sorted, thickbedded, clastic units containing angular fragments of silicic volcanic rock. Very poorly exposed and may be correlative with pebble conglomerate of the Sugarlump Tuff (Tss) as exposed in the northwest corner of the map.

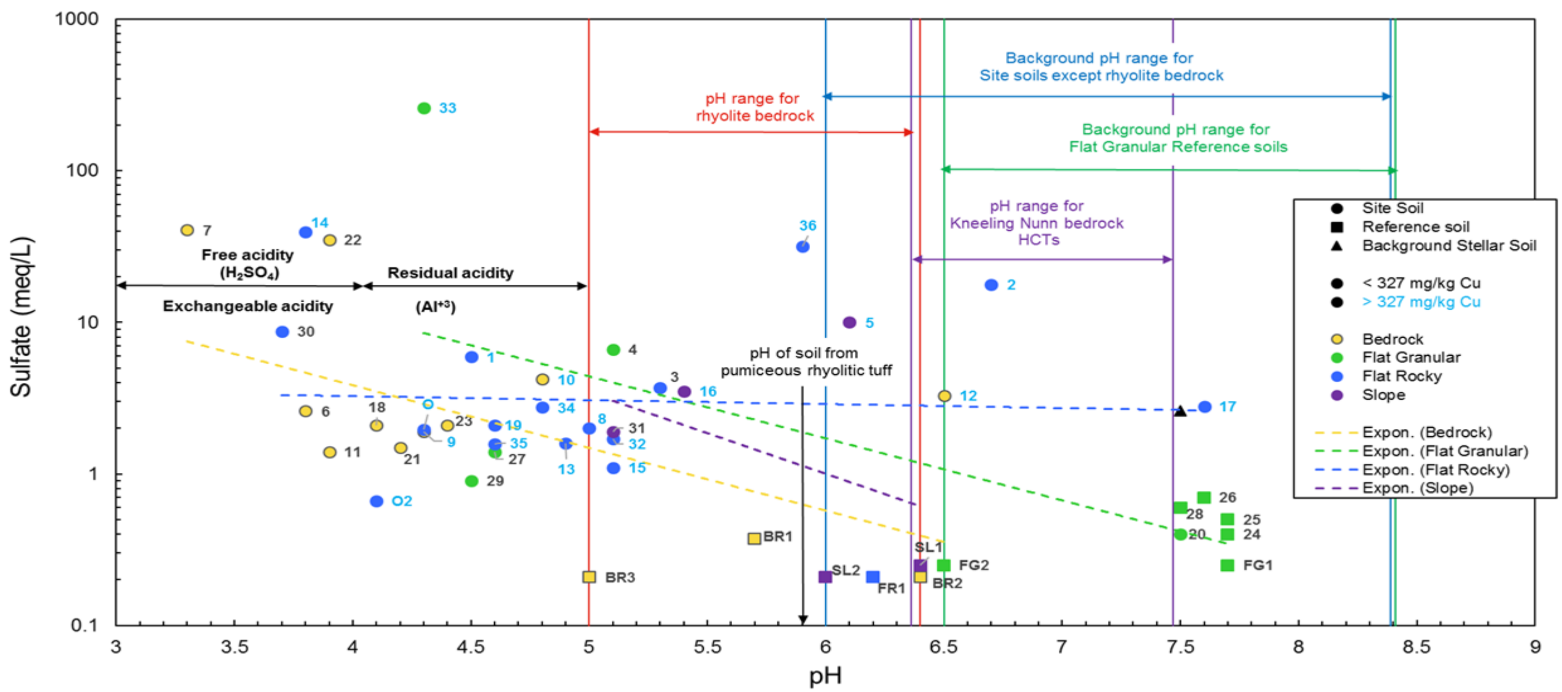
SCALE IN MILE

Reference:
D.C, Hedlund (1978) Geologic Map of the Hurley East Quadrangle, Grant County, New Mexico, USGS.
Walden P. Pratt and WR Jones (1960) Geology Map of the Hurley West Quadrangle, Grant County, New Mexico, USGS

Geologic Map or Hurley East and West Quadrangle, Grant County New Mexico.

(Incorporating Alluvial Soils Developed From Ryolite Tuffs or Basalt)

Date: December 29, 2017



Notes:

Numbers represent the last number of the location IDs on Figure 2.

HCTs = Humidity Cell Tests for kinetic testing of rock

Location 27 is wildlife reference south.

Location 2,17,and 36 had flat, rocky soils with high alkalinity, if removed blue dashed line would be parallel to flat granular green dashed line but position between bedrock and slope lines, showing same order of the four categories as seen in Figure 5 (i.e., flat granular has highest quality and bedrock has lowest quality in terms of plant endpoints or sulfate impacts relative to pH or pCu).

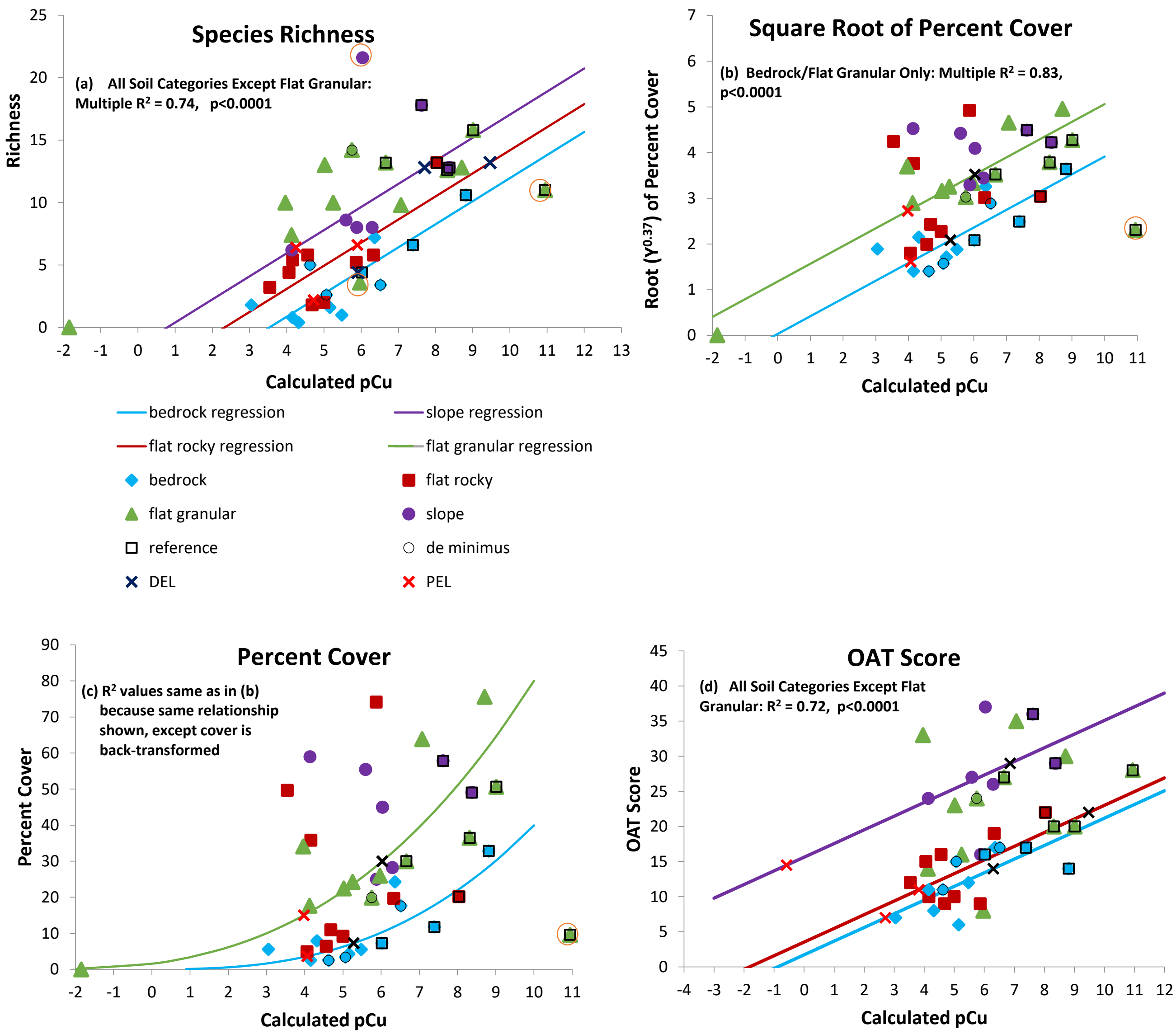
FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

TECHNICAL MEMORANDUM ON REFERENCE AREAS

Relationship between Soluble Sulfate and pH used to Identify Impacted Locations

ARCADIS

FIGURE 4



Notes:
(a) Regression lines for richness exclude the high "slope" (purple) juniper outlier (STS-RWU-201108) and low "flat granular" (green) "trampled" outlier (STS-RWU-2011-13) and creosote bush flat granular reference site with very high pCu (STS-2018-REF-FG1) [outliers are circled in orange]. (b) The percent cover was modeled with box-cox transformation (y^0.37) to meet assumptions of regression (backcalculated curve also shown in (c)). The creosote bush reference outlier was removed from b and c. (d) Relationship between calculated pCu and OAT score is significant for each soil category except flat granular. R^2 represents R^2 adjusted for number of variables in model. Only significant relationships (p<0.05) shown as regression lines.

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

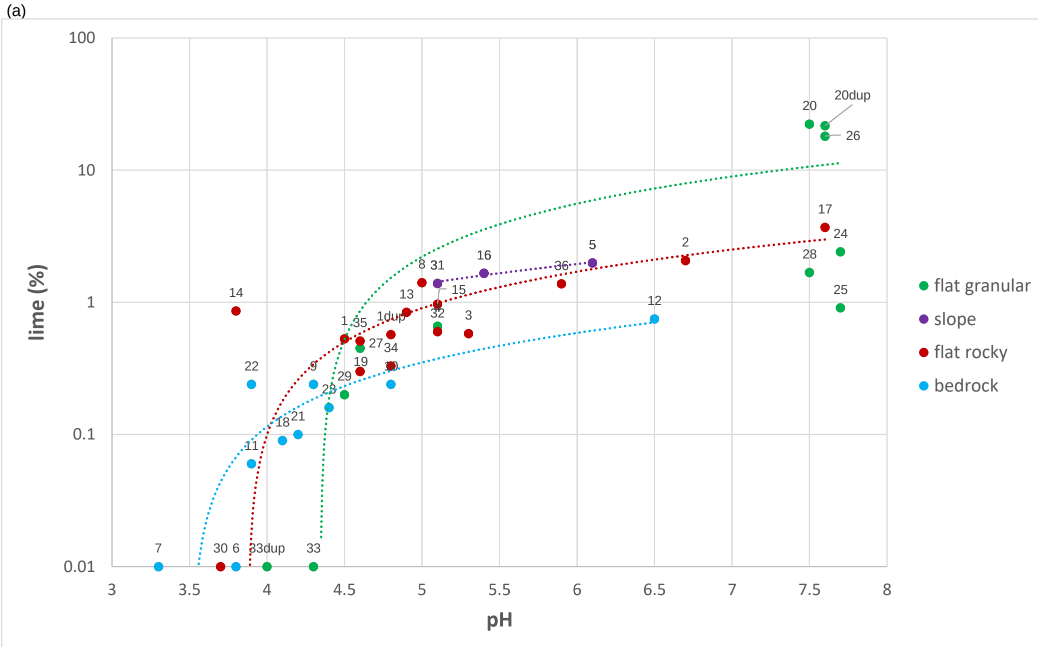
TECHNICAL MEMORANDUM ON REFERENCE AREAS

Relationship between pCu and Community Endpoints with Soil Category Covariate

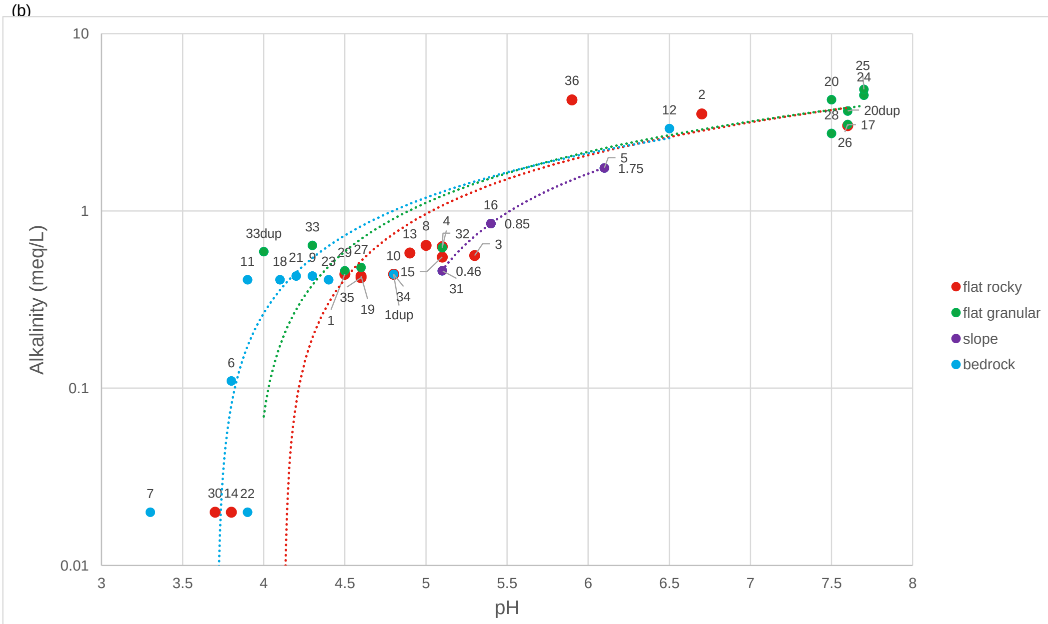
ARCADIS

FIGURE
5

(a)



(b)



Notes:
Lime is Calcium carbonate ($CaCO_3$).

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

TECHNICAL MEMORANDUM ON REFERENCE AREAS

Relationship of pH with lime and alkalinity

ARCADIS

FIGURE

6

APPENDIX A

Standard Operating Procedures for 2018

Soil SOPs (from STSIU Feasibility Study Proposal)

SOP-22 “Surface Soil Sampling” will be followed for field sampling procedures. Each soil sample will be a composite of five sub-samples taken over a sample interval of six inches in sample depth as measured from the ground surface. The five sub-samples will be sampled over a 50 x 50 m area (rather than 20 feet in the SOP) to reduce microscale variability and the locations will be representative of the area.

A description of the composition of each soil sample and other relevant information will be noted in the field logbook and/or field sample data sheets. In accordance with SOP-3 “Field Quality Control”, field QC samples (one per 10 samples) and rinsate blanks (one per 20 samples) will be collected as part of the sampling program. These blind field duplicate samples and rinsate blanks will be submitted for laboratory analyses.

Sample Handling and Analysis

Sample bottle requirements for rinsate, holding times, and preservation techniques are listed in SOP-14 “Sampling, Containerization and Preservation”, and are consistent with the laboratory requirements. Rinsate samples for chemical analysis will be placed into media-appropriate bottles and stored in ice filled coolers until delivery to the laboratory. Soil samples will be sealed in plastic bags and shipped in coolers. Samples will be handled and shipped in accordance with SOP-4 “Sample Custody Procedures” and SOP-5 “Packaging and Shipping of Environmental Sample Containers.”

Soil will be sieved to 2 mm in the laboratory (specify in COC)

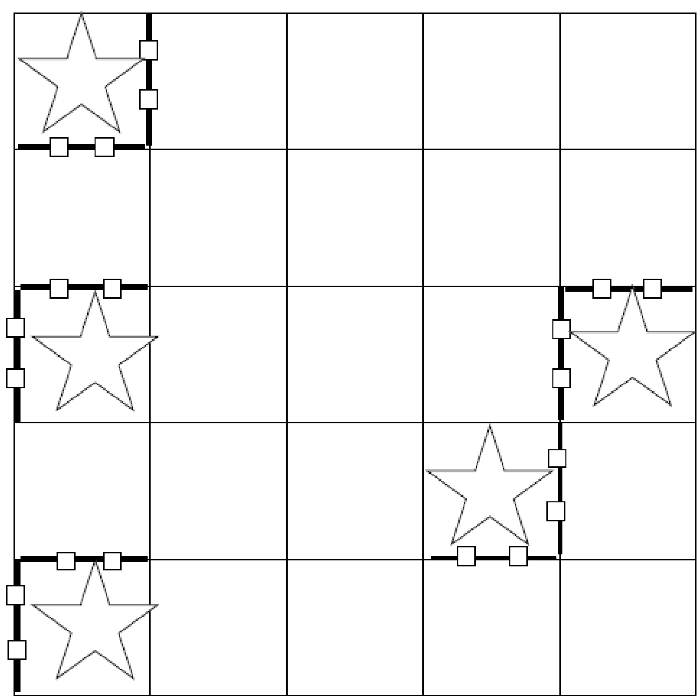
<u>Equipment list:</u>

Quart bags for soil samples
Bucket for mixing composite
Trowel and shovel to dig 6”
Ruler
Alconox
Bottles for rinsate blanks
Two 50-m tape measures
COC forms
Coolers for soil
Permanent marker
Tailgate safety forms
Field notebook

Standard Operating Procedure for Reference Site Plant Community Survey

Locate the site using GPS. This procedure ideally will be performed on 9 reference sites indicated on the map and at wildlife reference north (to calibrate to the year's dryness). If short on time, at minimum, complete it on one of each of the following types (flat rocky, bedrock, and slope) as well as wildlife reference north (which is flat granular—stay out of the bedrock). Randomly select which site of each type to conduct (or which looks most representative of STSIU). For the wildlife reference north and south, go to the coordinates, which is the plot corner (stay away from bedrock area).

1. Move to a location in that area that is the size of a 100'x 100' plot and representative of the soil category type. If it is for a bedrock category location, make sure the area has at least 60 percent bedrock on the surface. If it is a slope location, make sure that the area is relatively steep and has boulders. If it is for a flat rocky location, make sure the area shows signs of erosion, which means the rocks are armoring the surface and mostly are sitting on top of the soil, not embedded part way into it. If it is for a flat granular location, the soil may be more granular or sandy. Rocks can be abundant but embedded more into the soil (at least half way).
2. Move to the corner of the plot and measure out 100' of tape toward the other two corners (tape at right angles), placing pin flags every 20 feet along the tapes.
3. Walk to the opposite corner of the starting corner and stretch out 100' tapes toward the other corners (at right angles) and place pin flags every 20 feet along the tapes.
4. Place pin flags at every intersection of 20' x 20' grid cell of plot to mark off their locations (intersection of lines to create the 25 grid cells in the diagram shown below). If needed, you can number the pin flags to help keep track of which grid cell you are in and to find the cell selected for sampling. (e.g, 0, 0 for first flag, 1, 0 for next flag over on first row, etc.). However, if flags are easy to see, a person can count the grid cells to find the selected locations.



5. Using the first set of paired, random numbers shown below, find the grid cell that will be starred, which means it will be sampled (diagram below is only an example). So if paired numbers are 3,4, then count across 3 at the top of the grid and then down 4 and place a star in that grid cell. Do this using next set of random numbers until five grid cells are selected for sampling. The flags outline the corners of each grid cell.

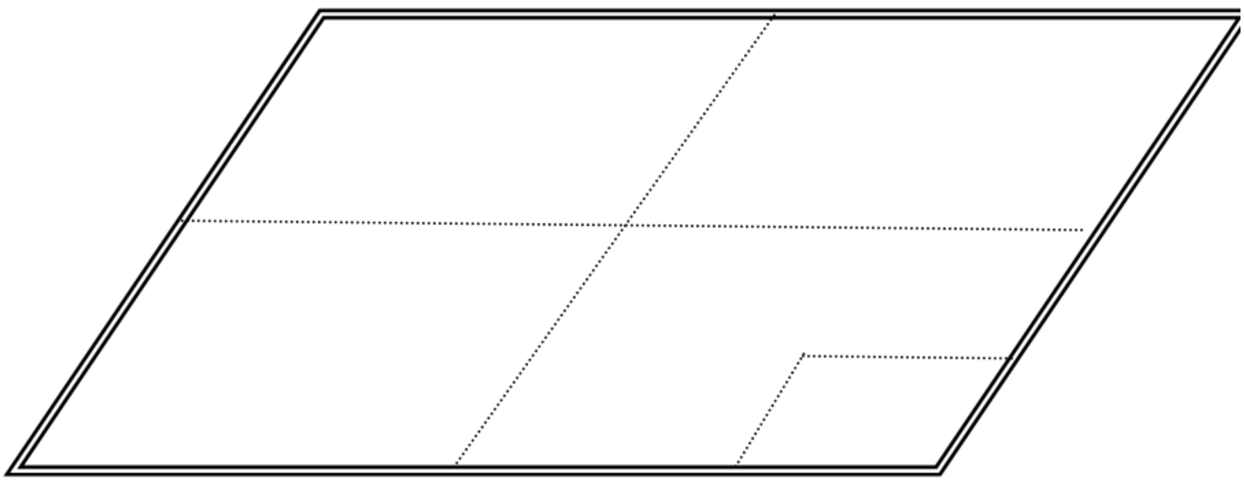
   <u>Paired random numbers:</u>
   RS1: 1,4; 4,4; 1,3; 3,1; 3,3
   BR1: 1,3; 3,2; 4,3; 5,5; 4,3
   S1: 5,5; 3,5; 5,3; 5,4; 4,3
   RS2: 1,1; 5,5; 4,2; 2,5; 3,1
   BR2: 5,2; 4,1; 3,2; 2,1; 3,3
   RS3: 2,4; 5,5; 3,1; 4,4: 4,5
   RS4: 2,3; 3,1; 3,3; 5,1; 1,3
   S2: 1,1; 1,5; 5,5; 3,5; 5,3
   S3: 4,2; 5,2; 4,1; 3,2; 1,5
   Wildlife Reference North: 5,2: 2,2; 2,1; 1,4; 5;3
   Wildlife Reference South: 4,5; 1,2; 5,5; 3,5; 3,1

6. Place the Daubenmire frame (1 meter by 1 meter PVC square as shown below) along two of the adjacent sides of each selected grid cell as shown in diagram—spaced evenly. Do one frame at a time until four are completed for each selected grid cell. Record the percent cover category for all plants combined and then every life form (woody, grass or grass-like, forb, cactus) in that frame using the Daubenmire percent cover range below in the table and field form. See first column of table for ranges to record (ignore midpoints when in field).

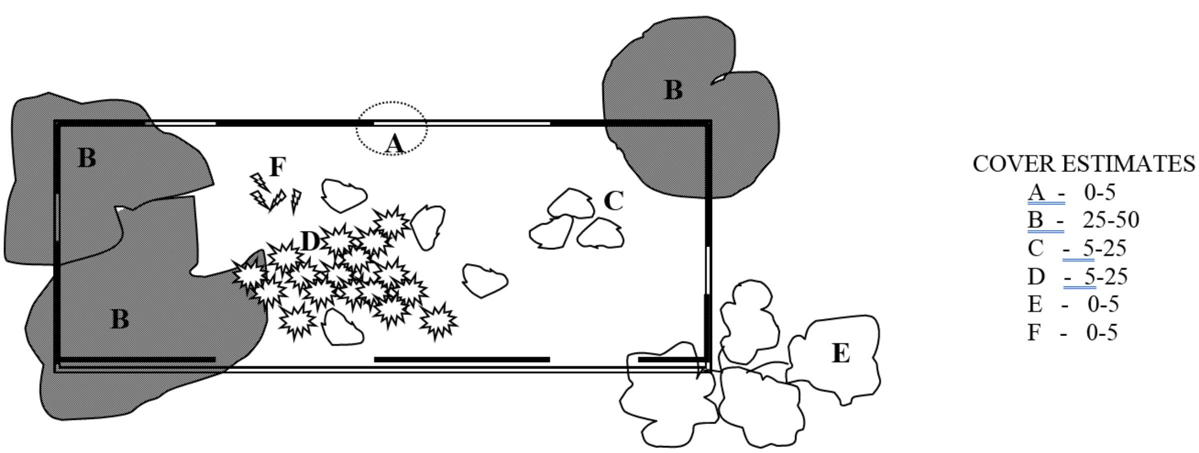
Table 1. Vegetation Cover Class Midpoints

Percent Cover Range	Cover Class Midpoint
< 1	0.5
1 – 5	3
6 – 15	10.5
16 – 25	20.5
26 – 50	38
51 – 75	63
76 – 90	85.5
> 95	98

The Daubenmire frame shown below has dotted imaginary lines that divide the frame area into quarters or 95% or 5% (corner square is 5%). Imagine these lines when looking straight down on the frame.



Imagine a line drawn about the leaf tips of the undisturbed canopies (ignoring inflorescences) and project these polygonal images onto the ground. This projection is considered the canopy-coverage. See Figure below for the method using a rectangle, but same principle applies to a square meter. Mentally "cram" the projected area for the life form into the five percent area, then if too big, the 25 percent area, if too big the 50 percent area (2 quarters), if too big into the 75 percent area (75 percent), etc. Decide which of the following classes the canopy coverage finally falls into, recording the coverage class value on the data form. The imaginary lines of the frame provide visual reference areas equal to 5, 25, 50, 75, and 95 percent of the quadrat area. Repeat the above for each species in the plot or over it.



7. To record species richness, a second person will walk throughout the selected grid cell and count the number of different plant species. Do this for every selected grid cell. If uncertain if two that appear to be different but not sure because they could be the same species, take a picture of the two, treat them as separate species, but make a note next to that cell's data entry that two photographs were taken to evaluate if they are separate species.
8. Take two photographs of the plot from each corner, first aiming the camera into the plot, then aiming 180^o in other direction outside the plot. Write on notebook name of plot and date surveyed and take a picture. Always do this after surveying and taking the photographs, so clear which plot is sampled.
9. If you can make it to cell phone hill, take photos on northeast facing side to help calibrate type of year it is (wet or dry) relative to 2011 and 2014. Also, take a picture at Lampbright Outcrop. Take close-ups of plants and soil as well as landscape photos. Be sure to record photos or at least take a picture of notes that label the location and which pictures (before or after) are the area shown. These areas are considered good rangeland condition, with cell phone hill (northeast facing slope) having an OAT score of 40, the best possible score. Lampbright outcrop averages a score of 36 (1 point lost each for lower litter, some crusting, and 2 points lost for pedestals).
10. Optional: Fill out an OAT scoring sheet for each general area around each of the reference area plots (look out over an area up to 500' distance from edge of plot). Ratings should be relative to cell phone hill, remembering how that looked with rating of 40 for each rating category. Do the same for the wildlife reference north and south plots.
11. Finally, visually estimate average size of open patches without vegetation and take photos of patchiness (combined with aerial photo information will show if pCu increased patchiness).

Equipment:
This SOP
Two 100' measuring tapes
20 pin flags
1 m x 1 m PVC sampling frame (with elbows)
Water bottles and cooler with ice for drinking
1 compass
1 GPS and many AA batteries
1 camera
Field notebook
Field forms (OAT and wildlife)
Map with point locations and Field IDs
Pencil/pen and clipboard
PPE (level D), bug spray, sun lotion
Snake chaps
Tailgate safety forms
First aid kit including moleskin

APPENDIX B

Laboratory Reports from ACZ for Soil

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

November 02, 2018

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Accounts Payable
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Trish Potter

Project ID: ZN0000036K
ACZ Project ID: L47602

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 15, 2018. This project has been assigned to ACZ's project number, L47602. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L47602. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 02, 2018. If the samples are determined to be hazardous, additional charges apply for disposal (typically $11/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical raw data reports for ten years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN0000036K

Sample ID: STS-2018-REF-FG-1

ACZ Sample ID: ***L47602-01***

Date Sampled: *10/02/18 09:30*

Date Received: *10/15/18*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010D ICP	102	22			mg/Kg	1	5	11/02/18 3:31	aeh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	2000		*	um			10/26/18 0:00	llr
pH		1	7.7		*	units	0.1	0.1	10/26/18 0:00	llr
Solids, Percent	D2216-80	1	91.9		*	%	0.1	0.5	10/18/18 18:34	llr

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972				*				10/18/18 12:09	llr
Digestion - Hot Plate	M3050B ICP								10/24/18 11:47	dbt
Saturated Paste Extraction	USDA No. 60 (2)				*				10/25/18 15:36	llr
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2				*				10/19/18 14:50	dbt
Water Extraction	ASA No. 9 10-2.3.2				*				10/24/18 13:05	gkh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate, soluble (Water)	SM4500 SO4-D	5	60	B	*	mg/Kg	50	250	10/31/18 9:18	emk

Arizona license number: AZ0102

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN0000036K	ACZ Sample ID:	***L47602-02***
Sample ID:	STS-2018-REF-BR-1	Date Sampled:	*10/02/18 10:40*
		Date Received:	*10/15/18*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010D ICP	101	96			mg/Kg	1	5	11/02/18 3:43	aeh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	2000		*	um			10/26/18 0:00	llr
pH		1	5.7		*	units	0.1	0.1	10/26/18 0:00	llr
Solids, Percent	D2216-80	1	97.7		*	%	0.1	0.5	10/18/18 20:06	llr

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972				*				10/18/18 12:13	llr
Digestion - Hot Plate	M3050B ICP								10/24/18 13:04	dbt
Saturated Paste Extraction	USDA No. 60 (2)				*				10/25/18 15:38	llr
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2				*				10/19/18 14:52	dbt
Water Extraction	ASA No. 9 10-2.3.2				*				10/24/18 13:20	gkh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate, soluble (Water)	SM4500 SO4-D	5	90	B	*	mg/Kg	50	250	10/31/18 9:21	emk

Arizona license number: AZ0102

* *Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN0000036K
Sample ID: STS-2018-REF-BR-2

ACZ Sample ID: ***L47602-03***
Date Sampled: *10/02/18 13:20*
Date Received: *10/15/18*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010D ICP	101	49			mg/Kg	1	5	11/02/18 3:47	aeh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	2000		*	um			10/26/18 0:00	llr
pH		1	6.4		*	units	0.1	0.1	10/26/18 0:00	llr
Solids, Percent	D2216-80	1	98.1		*	%	0.1	0.5	10/18/18 21:38	llr

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972				*				10/18/18 12:17	llr
Digestion - Hot Plate	M3050B ICP								10/24/18 13:30	dbt
Saturated Paste Extraction	USDA No. 60 (2)				*				10/25/18 15:42	llr
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2				*				10/19/18 14:55	dbt
Water Extraction	ASA No. 9 10-2.3.2				*				10/24/18 13:35	gkh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate, soluble (Water)	SM4500 SO4-D	5		U	*	mg/Kg	50	250	10/31/18 9:24	emk

Arizona license number: AZ0102

Freeport-McMoRan - Chino Mines Company

Project ID: ZN0000036K
Sample ID: STS-2018-REF-FR-1

ACZ Sample ID: ***L47602-04***
Date Sampled: *10/02/18 13:40*
Date Received: *10/15/18*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010D ICP	101	82			mg/Kg	1	5	11/02/18 3:51	aeh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	2000		*	um			10/26/18 0:00	llr
pH		1	6.2		*	units	0.1	0.1	10/26/18 0:00	llr
Solids, Percent	D2216-80	1	98.3		*	%	0.1	0.5	10/18/18 23:11	llr

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972				*				10/18/18 12:21	llr
Digestion - Hot Plate	M3050B ICP								10/24/18 13:55	dbt
Saturated Paste Extraction	USDA No. 60 (2)				*				10/25/18 15:44	llr
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2				*				10/19/18 14:58	dbt
Water Extraction	ASA No. 9 10-2.3.2				*				10/24/18 14:05	gkh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate, soluble (Water)	SM4500 SO4-D	5		U	*	mg/Kg	50	250	10/31/18 9:30	emk

Arizona license number: AZ0102

Freeport-McMoRan - Chino Mines Company
Project ID: ZN0000036K
Sample ID: STS-2018-REF-SL1

ACZ Sample ID: ***L47602-05***
Date Sampled: *10/02/18 12:00*
Date Received: *10/15/18*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010D ICP	101	72			mg/Kg	1	5	11/02/18 3:55	aeh

Soil Analysis

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2									
Max Particle Size		1	2000		*	um			10/26/18 0:00	llr
pH		1	6.4		*	units	0.1	0.1	10/26/18 0:00	llr
Solids, Percent	D2216-80	1	98.1		*	%	0.1	0.5	10/19/18 0:43	llr

Soil Preparation

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972				*				10/18/18 12:25	llr
Digestion - Hot Plate	M3050B ICP								10/24/18 14:21	dbt
Saturated Paste Extraction	USDA No. 60 (2)				*				10/25/18 15:45	llr
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2				*				10/19/18 15:01	dbt
Water Extraction	ASA No. 9 10-2.3.2				*				10/24/18 14:20	gkh

Wet Chemistry

Parameter	EPA Method	Dilution	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate, soluble (Water)	SM4500 SO4-D	5	60	B	*	mg/Kg	50	250	10/31/18 9:33	emk

Arizona license number: AZ0102

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Reference

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit unless omitted or equal to the PQL (see comment #5). Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit. Synonymous with the EPA term "minimum level".
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Recovered amount of the true value or spike added, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste.
(5) Standard Methods for the Examination of Water and Wastewater.

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.
(5) If the MDL equals the PQL or the MDL column is omitted, the PQL is the reporting limit.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

REP001.03.15.02

Freeport-McMoRan - Chino Mines Company   ACZ Project ID: ***L47602***

NOTE: If the Rec% column is null, the high/low limits are in the same units as the result. If the Rec% column is not null, then the high/low limits are in % Rec.

Copper, total (3050)   M6010D ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG459758													
WG459758ICV	ICV	11/02/18 2:52	II181002-1	2		1.959	mg/L	98	90	110			
WG459758ICB	ICB	11/02/18 2:55				U	mg/L		-0.03	0.03			
WG459088PBS	PBS	11/02/18 3:20				U	mg/Kg		-3	3			
WG459088LCSS	LCSS	11/02/18 3:24	PCN56332	166		154.9	mg/Kg		139	192			
WG459088LCSSD	LCSSD	11/02/18 3:28	PCN56332	166		158.8	mg/Kg		139	192	2	20	
L47602-01MS	MS	11/02/18 3:35	II181018-2	50.6515	22	68.5	mg/Kg	92	75	125			
L47602-01MSD	MSD	11/02/18 3:39	II181018-2	51.153	22	67.5	mg/Kg	89	75	125	1	20	

pH, Saturated Paste   EPA 600/2-78-054 section 3.2.2

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG459368													
WG459368ICV	ICV	10/26/18 11:04	PCN56119	4		4	units	100	3.9	4.1			
L47602-02DUP	DUP	10/26/18 11:10			5.7	5.59	units				2	20	

Solids, Percent   D2216-80

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG458824													
WG458824PBS	PBS	10/18/18 12:25				U	%		-0.1	0.1			
L47531-02DUP	DUP	10/18/18 17:01			5.2	5.01	%				4	20	

Sulfate, soluble (Water)   SM4500 SO4-D

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec%	Lower	Upper	RPD	Limit	Qual
WG459618													
WG459618PBW	PBW	10/31/18 9:09				U	mg/Kg		-30	30			
WG459618LCSW	LCSW	10/31/18 9:12	WC180914-2	100		100	mg/Kg	100	80	120			
WG459173PBS	PBS	10/31/18 9:15				58	mg/Kg		-150	150			
L47602-03DUP	DUP	10/31/18 9:27			U	U	mg/Kg				0	20	RA

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L47602-01	WG459618	Sulfate, soluble (Water)	SM4500 SO4-D	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L47602-02	WG459618	Sulfate, soluble (Water)	SM4500 SO4-D	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L47602-03	WG459618	Sulfate, soluble (Water)	SM4500 SO4-D	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L47602-04	WG459618	Sulfate, soluble (Water)	SM4500 SO4-D	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).
L47602-05	WG459618	Sulfate, soluble (Water)	SM4500 SO4-D	HD	Analysis is outside the intended scope of the method, which does not provide hold time information for soil extracts. No hold time is observed for collection to extraction. The referenced method hold time is observed for extraction-to-analysis.
			SM4500 SO4-D	RA	Relative Percent Difference (RPD) was not used for data validation because the concentration of the duplicated sample is too low for accurate evaluation (< 10x MDL).

Soil Analysis

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.		
	pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2
	Solids, Percent	D2216-80
The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.		
	pH, Saturated Paste	EPA 600/2-78-054 section 3.2.2
	Solids, Percent	D2216-80

Wet Chemistry

The following parameters are not offered for certification or are not covered by AZ certificate #AZ0102.		
	Sulfate, soluble (Water)	SM4500 SO4-D
The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.		
	Sulfate, soluble (Water)	SM4500 SO4-D

ACZ Laboratories, Inc.
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Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN0000036K

ACZ Project ID:	L47602
Date Received:	10/15/2018 10:49
Received By:	
Date Printed:	10/17/2018

Receipt Verification

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody form or other directive shipping papers present?	X		
3) Does this project require special handling procedures such as CLP protocol?		X	
4) Are any samples NRC licensable material?			X
5) If samples are received past hold time, proceed with requested short hold time analyses?	X		
6) Is the Chain of Custody form complete and accurate?	X		
7) Were any changes made to the Chain of Custody form prior to ACZ receiving the samples?	X		

A change was made in the Report to: Telephone section prior to ACZ custody.

Samples/Containers

	YES	NO	NA
8) Are all containers intact and with no leaks?	X		
9) Are all labels on containers and are they intact and legible?	X		
10) Do the sample labels and Chain of Custody form match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits? [1]			X
12) Is there sufficient sample volume to perform all requested work?	X		
13) Is the custody seal intact on all containers?			X
14) Are samples that require zero headspace acceptable?			X
15) Are all sample containers appropriate for analytical requirements?	X		
16) Is there an Hg-1631 trip blank present?			X
17) Is there a VOA trip blank present?			X
18) Were all samples received within hold time?	X		

NA indicates Not Applicable

Chain of Custody Related Remarks

Client Contact Remarks

Shipping Containers

Cooler Id	Temp(°C)	Temp Criteria(°C)	Rad(µR/Hr)	Custody Seal Intact?
4509	2.5	NA	15	Yes

Was ice present in the shipment container(s)?

No - Wet or gel ice was not present in the shipment container(s).

Client must contact an ACZ Project Manager if analysis should not proceed for samples received outside of their thermal preservation acceptance criteria.

ACZ Laboratories, Inc.
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Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN0000036K

ACZ Project ID:	L47602
Date Received:	10/15/2018 10:49
Received By:	
Date Printed:	10/17/2018

[1] The preservation of the following bottle types is not checked at sample receipt: Orange (oil and grease), Purple (total cyanide), Pink (dissolved cyanide), Brown (arsenic speciation), Sterile (fecal coliform), EDTA (sulfite), HCl preserved vial (organics), Na2S2O3 preserved vial (organics), and HG-1631 (total/dissolved mercury by method 1631).

ACZ Laboratories, Inc. L47602

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name:	Pam Pinson	Address:	PO Box 10
Company:	Chino Mines Co		Bayard NM 88023
E-mail:	ppinson@fmi.com	Telephone:	575-912-5213

Copy of Report to:

Name:	Trish Potter	E-mail:	tpotter@fmi.com
Company:	Chino	Telephone:	575-912-5319

Invoice to:

Name:	Pam Pinson	Address:	As Above
Company:	As Above		
E-mail:		Telephone:	

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ✓ NO ☐

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for SDWA Compliance Monitoring? Yes ☐ No ✓

If yes, please include state forms. Results will be reported to PQL for Colorado.

Sampler's Name: Nick Lemme Sampler's site Information NM State Zip code Time Zone

PROJECT INFORMATION ANALYSES REQUESTED (attach list or use quote number)

Quote #:

Project/PO #: SO# ZN 0000 36K

Reporting state for compliance testing:

Check box if samples include NRC licensed material?

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers								
STS-2018-REF-FG-1	10.2.18 / 0930	SO	1								
STS-2018-REF-BR-1	10.2.18 / 1040	SO	1								
STS-2018-REF-BR-2	10.2.18 / 1320	SO	1								
STS-2018-REF-FR-1	10.2.18 / 1340	SO	1								
STS-2018-REF-SL1	10.2.18 / 1200	SO	1								

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Email Pam Pinson for analyses

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
Nick Lemme	10.3.18 / 1245	[signature]	10/15/18 10:46

FRMAD050.02.11.11 White - Return with sample. Yellow - Retain for your records.

L47602 Chain of Custod

L47602-1811021403

APPENDIX C

2018 WILDLIFE HABITAT DATA

Wildlife Habitat Data

Date 10/2/2018

Site ID STS-2018-REF-FG1

Exposed

Bedrock 0%

Investigators David Mercer, Joe Allen, Carolyn Meyer, Pam Pinson, Will, Nick, Lewis

cover averaged over 1 m x 1 m areas
richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	63	15	38	15	32.75
Block 2	38	38	38	15	32.25
Block 3	38	38	38	15	32.25
Block 4	15	38	15	38	26.50
Block 5	15	38	85	15	38.25
average	33.8	33.4	42.8	19.6	32.40

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	63	15	38	2.5	29.63	
Block 2	38	38	15	15	26.50	
Block 3	38	38	38	15	32.25	
Block 4	15	38	15	38	26.50	
Block 5	15	38	88	0	35.25	
average	33.8	33.4	38.8	14.1	30.03	0.93

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	2.5	15	2.5	15	8.75	
Block 2	2.5	2.5	2.5	15	5.63	
Block 3	2.5	2.5	2.5	2.5	2.50	
Block 4	15	15	15	2.5	11.88	
Block 5	2.5	2.5	2.5	2.5	2.50	
average	5.0	7.5	5.0	7.5	6.25	0.19

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	2.5	2.5	2.5	2.5	2.50	
Block 2	2.5	2.5	2.5	2.5	2.50	
Block 3	2.5	2.5	2.5	2.5	2.50	
Block 4	2.5	2.5	2.5	2.5	2.50	
Block 5	2.5	2.5	2.5	15	5.63	
average	2.5	2.5	2.5	5.0	3.13	0.10

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	0.0	0.0	0.00	0.00

# of Species

	#Tree/Shrub	# Grass	# Forb	# Cactus	# Species in block
Block 1	3	1	6	0	10
Block 2	4	1	7	0	12
Block 3	3	1	5	0	9
Block 4	4	1	6	0	11
Block 5	3	2	8	0	13
average	3.4	1.2	6.4	0.0	11.0

	Woody %	Non-Woody %
	0.93	0.19
	0.00	0.10
	0.93	0.29
Relative % c	0.76	0.237944

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

Wildlife Habitat Data

Date 10/3/2018

Site ID STS-2018-REF-FG2

Exposed

Bedrock 0%

Investigators PP, CM, JA, DM, LS, WG

cover averaged over 1 m x 1 m areas

richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	38	38	15	38	32.25
Block 2	38	15	38	38	32.25
Block 3	38	15	15	15	20.75
Block 4	38	98	63	38	59.25
Block 5	38	38	15	38	32.25
average	38.0	40.8	29.2	33.4	35.35

\# of Species

	#Tree/Shrul	# Grass	# Forb	# Cactus	# Species in block
Block 1	2	4	6	0	12
Block 2	1	5	7	1	14
Block 3	3	3	4	1	11
Block 4	2	4	5	1	12
Block 5	2	4	7	1	14
average	2.0	4.0	5.8	0.8	12.6

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

TREE/SHRUB COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	15	15	15	2.5	11.88
Block 2	15	0	15	0	7.50
Block 3	15	15	2.5	15	11.88
Block 4	15	85	15	0	28.75
Block 5	15	38	15	15	20.75
average	15.0	30.6	12.5	6.5	16.15

0.46

	Woody %	Non-Woody %
	0.46	0.62
	0.05	0.14
	0.50	0.76
Relative % c	0.40	0.601904

GRASS COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	38	15	15	15	20.75
Block 2	15	15	38	38	26.50
Block 3	15	15	15	15	15.00
Block 4	15	38	63	15	32.75
Block 5	15	15	15	15	15.00
average	19.6	19.6	29.2	19.6	22.00

0.62

FORB COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	2.5	2.5	2.5	2.5	2.50
Block 2	2.5	2.5	2.5	2.5	2.50
Block 3	2.5	2.5	15	2.5	5.63
Block 4	15	0	2.5	15	8.13
Block 5	2.5	15	2.5	2.5	5.63
average	5.0	4.5	5.0	5.0	4.88

0.14

CACTUS COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	0	0	0	15	3.75
Block 2	0	0	0	15	3.75
Block 3	0	0	0	0	0.00
Block 4	0	2.5	0	0	0.63
Block 5	0	0	0	0	0.00
average	0.0	0.5	0.0	6.0	1.63

0.05

Wildlife Habitat Data

Date 10/2/2018

Investigators PM, DM, CM, J, A, Nick, Will, Lewis

Site ID STS-2018-REF-FR1

Exposed

Bedrock 20%

cover averaged over 1 m x 1 m areas

richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	2.5	38	15	15	17.63
Block 2	2.5	0	0	63	16.38
Block 3	15	38	38	38	32.25
Block 4	38	38	15	15	26.50
Block 5	38	15	15	15	20.75
average	19.2	25.8	16.6	29.2	22.70

# of Species	#Tree/Shrul	# Grass	# Forb	# Cactus	# Species in block
Block 1	3	3	9	0	15
Block 2	4	3	2	0	9
Block 3	1	3	9	0	13
Block 4	2	5	8	0	15
Block 5	3	5	6	0	14
average	2.6	3.8	6.8	0.0	13.2

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	15	0	3.75	
Block 2	0	0	0	63	15.75	
Block 3	0	0	15	38	13.25	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	6.0	20.2	6.55	0.29

	Woody %	Non-Woody %
	0.29	0.71
	0.00	0.25
	0.29	0.96
Relative % c	0.23	0.769366

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	2.5	38	15	15	17.63	
Block 2	2.5	0	0	2.5	1.25	
Block 3	15	15	15	38	20.75	
Block 4	38	15	15	15	20.75	
Block 5	38	15	15	15	20.75	
average	19.2	16.6	12.0	17.1	16.23	0.71

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	2.5	15	2.5	2.5	5.63	
Block 2	0	0	0	2.5	0.63	
Block 3	2.5	15	0	2.5	5.00	
Block 4	15	2.5	15	2.5	8.75	
Block 5	15	0	2.5	15	8.13	
average	7.0	6.5	4.0	5.0	5.63	0.25

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	0.0	0.0	0.00	0.00

Date 10/2/2018
Site ID STS-2018-REF-BR1
Exposed
Bedrock 80%

Investigators CM, PP, DM, JA, Nick, Louis, Will

cover averaged over 1 m x 1 m areas
richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	2.5	15	0	0	4.38
Block 2	2.5	15	100	2.5	30.00
Block 3	0	0	0	2.5	0.63
Block 4	15	15	0	0	7.50
Block 5	0	0	0	0	0.00
average	4.0	9.0	20.0	1.0	8.50

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	15	100	2.5	29.38	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	3.0	20.0	0.5	5.88	0.69

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	2.5	15	0	0	4.38	
Block 2	2.5	15	2.5	0	5.00	
Block 3	0	0	0	2.5	0.63	
Block 4	15	15	0	0	7.50	
Block 5	0	0	0	0	0.00	
average	4.0	9.0	0.5	0.5	3.50	0.41

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	2.5	2.5	15	0	5.00	
Block 3	0	0	2.5	0	0.63	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.5	0.5	3.5	0.0	1.13	0.13

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	0.0	0.0	0.00	0.00

# of Species

	#Tree/Shrul	# Grass	# Forb	# Cactus	# Species in block
Block 1	0	4	3	1	8
Block 2	1	3	5	1	10
Block 3	2	2	6	1	11
Block 4	0	2	0	1	3
Block 5	0	1	0	0	1
average	0.6	2.4	2.8	0.8	6.6

	Woody %	Non-Woody %
	0.69	0.41
	0.00	0.13
	0.69	0.54
Relative % c	0.56	0.440476

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

Wildlife Habitat Data

Date 10/2/2018 Investigators CM, PP, DM, JA, Nick, Louis, Will

Site ID STS-2018-REF-BR2

Exposed Bedrock 63%

cover averaged over 1 m x 1 m areas
richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	0	0	0	0	0.00
Block 2	15	63	0	15	23.25
Block 3	100	98	15	15	57.00
Block 4	15	38	15	15	20.75
Block 5	15	38	15	15	20.75
average	29.0	47.4	9.0	12.0	24.35

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	38	0	0	9.50	
Block 3	38	85	2.5	0	31.38	
Block 4	0	0	0	0	0.00	
Block 5	0	15	0	0	3.75	
average	7.6	27.6	0.5	0.0	8.93	0.37

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	15	15	0	15	11.25	
Block 3	2.5	15	2.5	15	8.75	
Block 4	38	38	15	15	26.50	
Block 5	15	15	2.5	15	11.88	
average	14.1	16.6	4.0	12.0	11.68	0.48

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	2.5	0	0	0.63	
Block 3	2.5	2.5	2.5	2.5	2.50	
Block 4	2.5	15	15	2.5	8.75	
Block 5	2.5	2.5	2.5	2.5	2.50	
average	1.5	4.5	4.0	1.5	2.88	0.12

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	0.0	0.0	0.00	0.00

\# of Species

	#Tree/Shru	# Grass	# Forb	# Cactus	# Species in block
Block 1	2	5	0	3	10
Block 2	1	4	0	0	5
Block 3	3	4	6	1	14
Block 4	2	3	5	1	11
Block 5	0	4	8	1	13
average	1.6	4.0	3.8	1.2	10.6

	Woody %	Non-Woody %
	0.37	0.48
	0.00	0.12
	0.37	0.60
Relative % c	0.38	0.619808

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

Wildlife Habitat Data

Date 10/2/2018 Investigators PM, DM, CM, JA, Nick, Will, Lewis

Site ID STS-2018-REF-SL1

Exposed

Bedrock 7%

cover averaged over 1 m x 1 m areas

richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	38	63	38	38	44.25
Block 2	98	15	38	15	41.50
Block 3	98	15	63	63	59.75
Block 4	63	38	38	63	50.50
Block 5	38	85	63	38	56.00
average	67.0	43.2	48.0	43.4	50.40

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	15	2.5	0	0	4.38	
Block 2	0	0	0	0	0.00	
Block 3	0	0	15	15	7.50	
Block 4	0	0	0	2.5	0.63	
Block 5	15	0	0	0	3.75	
average	6.0	0.5	3.0	3.5	3.25	0.06

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	38	38	15	38	32.25	
Block 2	38	15	38	15	26.50	
Block 3	15	15	38	38	26.50	
Block 4	63	38	38	38	44.25	
Block 5	38	85	63	38	56.00	
average	38.4	38.2	38.4	33.4	37.10	0.74

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	2.5	2.5	2.5	2.5	2.50	
Block 2	2.5	2.5	2.5	0	1.88	
Block 3	15	2.5	2.5	15	8.75	
Block 4	2.5	15	2.5	2.5	5.63	
Block 5	2.5	2.5	2.5	2.5	2.50	
average	5.0	5.0	2.5	4.5	4.25	0.08

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	15	0	3.75	
Block 2	85	0	0	0	21.25	
Block 3	98	2.5	15	0	28.88	
Block 4	0	15	0	0	3.75	
Block 5	0	0	0	0	0.00	
average	36.6	3.5	6.0	0.0	11.53	0.23

# of Species

	#Tree/Shrul	# Grass	# Forb	# Cactus	# Species in block
Block 1	1	4	7	1	13
Block 2	2	3	2	2	8
Block 3	3	5	7	1	16
Block 4	2	3	6	6	12
Block 5	4	6	5	0	15
average	2.4	4.2	5.4	2.0	12.8

	Woody %	Non-Woody %
	0.06	0.74
	0.23	0.08
	0.29	0.82
Relative % c	0.26	0.736748

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

Wildlife Habitat Data

Date 10/3/2018

Site ID STS-2018-REF-S2

Exposed Bedrock 17%

Investigators CM, JA, PP, DM, W, L

cover averaged over 1 m x 1 m areas
richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	63	85	98	85	82.75
Block 2	0	63	85	98	61.50
Block 3	63	15	63	38	44.75
Block 4	63	85	63	86	74.25
Block 5	38	98	85	98	79.75
average	45.4	69.2	78.8	81.0	68.60

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	15	2.5	15	38	17.63	
Block 2	0	0	55	98	38.25	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	15	0	0	0	3.75	
average	6.0	0.5	14.0	27.2	11.93	0.17

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	63	38	63	38	50.50	
Block 2	0	63	0	38	25.25	
Block 3	68	15	38	38	39.75	
Block 4	63	85	63	85	74.00	
Block 5	38	98	63	85	71.00	
average	46.4	59.8	45.4	56.8	52.10	0.76

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	2.5	2.5	2.5	2.5	2.50	
Block 2	0	15	15	0	7.50	
Block 3	15	15	38	2.5	17.63	
Block 4	2.5	2.5	2.5	2.5	2.50	
Block 5	15	15	15	15	15.00	
average	7.0	10.0	14.6	4.5	9.03	0.13

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	38	9.50	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	0.0	7.6	1.90	0.03

# of Species

	#Tree/Shrul	# Grass	# Forb	# Cactus	# Species in block
Block 1	2	5	9	1	17
Block 2	2	5	6	0	13
Block 3	1	5	16	0	22
Block 4	2	6	7	1	16
Block 5	2	6	13	0	21
average	1.8	5.4	10.2	0.4	17.8

	Woody %	Non-Woody %
	0.17	0.76
	0.03	0.13
	0.20	0.89
Relative % c	0.18	0.815544

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

Wildlife Habitat Data

Date 10/3/2018

Site ID STS-2018-REF-BR3

Exposed Bedrock 95%

Investigators PP, CM, JA, DM, LS, WG

cover averaged over 1 m x 1 m areas
richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	15	0	15	0	7.50
Block 2	0	0	0	0	0.00
Block 3	0	0	0	0	0.00
Block 4	0	0	15	0	3.75
Block 5	2.5	0	0	0	0.63
average	3.5	0.0	6.0	0.0	2.38

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	15	0	0	0	3.75	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	3.0	0.0	0.0	0.0	0.75	0.32

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	15	0	15	0	7.50	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	38	0	9.50	
Block 5	0	0	0	0	0.00	
average	3.0	0.0	10.6	0.0	3.40	1.43

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	2.5	0	0.63	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	0.5	0.0	0.13	0.05

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	0.0	0.0	0.00	0.00

# of Species

	#Tree/Shrub	# Grass	# Forb	# Cactus	# Species in block
Block 1	1	3	2	0	6
Block 2	0	3	1	0	4
Block 3	1	2	1	1	5
Block 4	0	2	2	1	5
Block 5	0	2	0	0	2
average	0.4	2.4	1.2	0.4	4.4

	Woody %	Non-Woody %
	0.32	1.43
	0.00	0.05
	0.32	1.48
Relative % c	0.18	0.824561

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

Wildlife Habitat Data

Date 10/3/2018

Site ID STS-PT-2013-Reference plot S

Exposed

Bedrock 0%

Investigators CM, JA, PP, DM, LS, CN, CO

cover averaged over 1 m x 1 m areas

richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	2.5	15	15	98	32.63
Block 2	38	63	38	15	38.50
Block 3	15	15	15	2.5	11.88
Block 4	15	15	15	15	15.00
Block 5	38	85	15	15	38.25
average	21.7	38.6	19.6	29.1	27.25

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	15	15	7.50	
Block 2	2.5	15	38	15	17.63	
Block 3	15	2.5	15	2.5	8.75	
Block 4	15	2.5	15	15	11.88	
Block 5	15	2.5	15	2.5	8.75	
average	9.5	4.5	19.6	10.0	10.90	0.40

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	2.5	15	15	0	8.13	
Block 2	38	15	2.5	2.5	14.50	
Block 3	15	15	0	0	7.50	
Block 4	15	15	2.5	2.5	8.75	
Block 5	38	85	15	15	38.25	
average	21.7	29.0	7.0	4.0	15.43	0.57

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	2.5	0	0.63	
Block 2	2.5	15	2.5	2.5	5.63	
Block 3	2.5	2.5	0	2.5	1.88	
Block 4	2.5	0	2.5	2.5	1.88	
Block 5	2.5	2.5	0	2.5	1.88	
average	2.0	4.0	1.5	2.0	2.38	0.09

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	98	24.50	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	0	0	0	0	0.00	
average	0.0	0.0	0.0	19.6	4.90	0.18

# of Species

	#Tree/Shrul	# Grass	# Forb	# Cactus	# Species in block
Block 1	2	3	6	2	13
Block 2	3	4	6	1	14
Block 3	4	3	4	0	11
Block 4	3	3	7	0	13
Block 5	2	3	6	0	11
average	2.8	3.2	5.8	0.6	12.4

	Woody %	Non-Woody %
	0.40	0.57
	0.18	0.09
	0.58	0.65
Relative % c	0.47	0.529762

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

Wildlife Habitat Data

Date 10/3/2018

Investigators PP, CM, JA, NDM, LS, WG

Site ID STS-PT-2013-Reference plot N

Exposed

Bedrock 0%

cover averaged over 1 m x 1 m areas
richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	63	38	38	38	44.25
Block 2	38	38	63	38	44.25
Block 3	38	85	63	63	62.25
Block 4	38	38	38	98	53.00
Block 5	38	63	38	63	50.50
average	43.0	52.4	48.0	60.0	50.85

TREE/SHRUB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	63	2.5	15	15	23.88	
Block 2	15	38	38	15	26.50	
Block 3	38	15	38	38	32.25	
Block 4	38	63	2.5	2.5	26.50	
Block 5	2.5	15	2.5	15	8.75	
average	31.3	26.7	19.2	17.1	23.58	0.46

GRASS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	38	38	15	22.75	
Block 2	15	15	15	38	20.75	
Block 3	15	68	15	15	28.25	
Block 4	15	15	15	98	35.75	
Block 5	15	38	38	38	32.25	
average	12.0	34.8	24.2	40.8	27.95	0.55

FORB COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	15	2.5	2.5	2.5	5.63	
Block 2	2.5	0	0	2.5	1.25	
Block 3	0	15	15	15	11.25	
Block 4	2.5	2.5	0	15	5.00	
Block 5	2.5	15	2.5	0	5.00	
average	4.5	7.0	4.0	7.0	5.63	0.11

CACTUS COVER						
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt	
Block 1	0	0	0	0	0.00	
Block 2	0	0	0	0	0.00	
Block 3	0	0	0	0	0.00	
Block 4	0	0	0	0	0.00	
Block 5	38	0	0	0	9.50	
average	7.6	0.0	0.0	0.0	1.90	0.04

# of Species

	#Tree/Shrul	# Grass	# Forb	# Cactus	# Species in block
Block 1	1	3	4	0	8
Block 2	1	3	3	0	7
Block 3	1	2	6	0	9
Block 4	1	2	4	0	7
Block 5	2	3	1	1	10
average	1.2	2.6	3.6	0.2	8.2

	Woody %	Non-Woody %
	0.46	0.55
	0.04	0.11
	0.50	0.66
Relative % c	0.43	0.568586

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

Wildlife Habitat Data

Date 10/3/2018

Site ID Overgrazed Reference

Exposed

Bedrock 0%

Investigators CM, JA, PP, DM, LS, WG

cover averaged over 1 m x 1 m areas
richness is in entire 20 by 20' area

TOTAL COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	15	2.5	15	15	11.88
Block 2	15	2.5	85		34.17
Block 3	0	2.5	63	2.5	17.00
Block 4	38	100	15	2.5	38.88
Block 5	15	15	63	15	27.00
average	16.6	24.5	48.2	8.8	25.78

# of Species

	#Tree/Shru	# Grass	# Forb	# Cactus	# Species in block
Block 1	1	1	4	0	6
Block 2	1	1	4	0	6
Block 3	1	3	4	0	8
Block 4	1	1	3	0	5
Block 5	1	1	2	0	4
average	1.0	1.4	3.4	0.0	5.8

Table 1. Vegetation Cover Class Midpoints

Cover Range	Cover Class Midpoint
< 5	2.5
5-25	15
25-50	38
50-75	63
75-95	85
95-100	98

TREE/SHRUB COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	0	0	0	0	0.00
Block 2	15	0	85	0	25.00
Block 3	0	2.5	63	2.5	17.00
Block 4	0	98	0	0	24.50
Block 5	0	0	63	0	15.75
average	3.0	20.1	42.2	0.5	16.45

0.64

	Woody %	Non-Woody %
	0.64	0.11
	0.00	0.32
	0.64	0.43
Relative % c	0.60	0.401274

GRASS COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	2.5	0	15	2.5	5.00
Block 2	0	2.5	2.5	0	1.25
Block 3	0	0	0	0	0.00
Block 4	0	0	0	0	0.00
Block 5	15	0	0	15	7.50
average	3.5	0.5	3.5	3.5	2.75

0.11

FORB COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	15	2.5	2.5	15	8.75
Block 2	15	2.5	0	15	8.13
Block 3	0	2.5	2.5	2.5	1.88
Block 4	38	0	15	2.5	13.88
Block 5	15	15	2.5	2.5	8.75
average	16.6	4.5	4.5	7.5	8.28

0.32

CACTUS COVER					
	midpt cover	midpt cover	midpt cover	midpt cover	avg. midpt
Block 1	0	0	0	0	0.00
Block 2	0	0	0	0	0.00
Block 3	0	0	0	0	0.00
Block 4	0	0	0	0	0.00
Block 5	0	0	0	0	0.00
average	0.0	0.0	0.0	0.0	0.00

0.00

Wildlife Habitat Sampling Form

Site ID: Overgrazed Reference **Lat:** **Long:**

Date 10-3-18 **Investigators** CM, JA, PP, DM, ~~M~~ LS, WG

Photo number before page - last ones are overgrazed rocky 2 sampled uphill of this one for soil only ~~labeled~~

% Exposed Bedrock 0

Nightshade-hots	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1 tabosa	0 0 0 0	0-5 0 5-25 0-5	5-25 0-5 0-5 5-25	0 0 0 0	5-25 0-5 5-25 5-25
Block 2	5-25 0 25-45 0	0 0-5 0-5 0	5-25 0-5 0 5-25	0 0 0 0	5-25 0-5 25-45
Block 3 ~~tobosa gr~~	0 0-5 50-75 0-5	0 0 0 0	0 0-5 0-5 0-5	0 0 0	0 0-5 50-75 0-5
Block 4	0 95-100 0 0	0 0 0 0	25-50 0 5-25 0-5	0 0 0 0	25-50 100 5-25 0-5
Block 5 3 ~~Re~~ Awn	0 0 50-75 0	5-25 0 0 5-25	5-25 5-25 0-5 0-5	0 0 0 0	5-25 5-25 50-75 5-25

	# ~~Trees~~ shrubs	# ~~Shrubs~~ grasses	# Cactus and Succulents	# ~~Yucca~~ forbs	Number of species in block
Block 1	1	1	0	4	6
Block 2	1	1	0	4	6
Block 3	1	3	0	4	8
Block 4	1	1	0	3	5
Block 5	1	1	0	2	4

	1	2	3	4	5
1	3		1	4	
2					
3					
4	2	5			
5					

Nightshade = Forb

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location Overgrazed reference

UTM Coord

Picture #	**Description**

Date/Time: Oct 3, 2018
Observer CM, JA
Soil Map Unit Name
Veg Alliance Name
Surface texture
Parent material rhyolite Kenedy Non - flat rocky ~~soil~~ eroded
Slope %
Elevation (ft)
Topographic position
Aspect

Signs of Disturbance(s) observed

OAT score of 200-m transect 16
OAT score of polygon

Notes:

mesquite
nightshade
some tobosa
threeawn
sharp
hogpotatoes?

up rise to
more diverse
area
- see photos
comparing
areas

Sideoats ? as go up hill
more lemongrass
beardgrass
Sugar loaf

Tailings - maybe in many of this area?

Still overgrazed
more armored

then
yucca - bigger healthy yucca
near the - lots tobosa, too
top.

took
soil
sample
uphill of
overgrazed
reference

Overgrazed
Rocky Soil
Soil
Sample
2 (uphill
of overgrazed)

Overgrazed Reference 10-3-18

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points)	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☑ (2 points) 2	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☑ (2 points) 2 many dying	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points) 2	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points)	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points) 3	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points)	There is little visual evidence of surface crusting.
☐ (3 points) 2	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 5	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 14 **FIELD NOTES:**	

2011 30%, 11 sp
2014 30%, 14 sp. 14.4 gr%
2018, ~~30~~%, 8 sp. 29.7 gr% **Wildlife Habitat Sampling Form**

32.6840
-108.0677

Site ID: Wildlife Reference N

Lat: 32.68399 **Long:** -108.06769

Date 10-3-18 **Investigators** PP, CM, JA, MDM, LS, WG

Photo number labelled after **% Exposed Bedrock** 0

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover	
grass						
22.5 Block 1 ✓	50-75, 0-5, 5-25, 5-25	0, 25-50, 25-50, 5-25	5-25, 0-5, 0-5, 0-5	0, 0, 0, 0	50-75, 25-50, ~~25~~-50, 25-50	43.75 ~~41.25~~
20.6 Block 2 ✓	5-25, 25-50, 25-50, 5-25	5-25, 5-25, 5-75, 25-50	0-5, 0-5, 0	0, 0, 0, 0	25-50, 25-50, 50-75, 25-50	43.75
38.1 Block 3 Bristlegrass	25-50, 5-25, 25-50, 25-50	5-25, 50-75, 25-50, 5-25	0, 5-25, 5-25, 5-25	0, 0, 0, 0	25-50, 75-95, 50-75, 50-75	61.8
46.9 Block 4 ~~[illegible]~~	5-25, 5-25, 25-50, 5-25	25-50, 25-50, 5-25, 75-100	0-5, 0-5, 0, 5-25	0, 0, 0, 0	25-50, 25-50, 25-50, 95-100	~~[illegible]~~ 62.5
20.6 Block 5 ✓ Lemongrass weed, side oats	5-25, 5-25, ~~25~~ 50, 5-25	5-25, 25-50, 25-50, 25-50	0-5, 5-25, 0-5, 0?	25-50, 0, 0, 0	25-50, 50-75, 25-50, 50-75	50 ~~47.5~~
29.74						~~46.63~~ 50.36

	# Trees Shrubs	# ~~Shrubs~~ grasses	# Cactus and Succulents	# ~~Yucca~~ forbs	Number of species in block
Block 1	1	3	0	4	8
Block 2	1	3	0	3	7
Block 3	1	2	0	6	9
Block 4	1	2	0	4	7
Block 5	2	3	1	4	10

N	1	2	3	4	5
1					
2				2	3
3		1			4
4				5	
5					

cocklebur weed in sample?

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location Wildlife Reference North

UTM Coord

Picture #	Description

Date/Time: 10-3-18 ~10am

Observer [illegible] JA, CM

Soil Map Unit Name

Veg Alliance Name

Surface texture

Parent material Rhyolite / Basalt or Andesite mix

Slope % Slight

Elevation (ft)

Topographic position

Aspect N-facing

Signs of Disturbance(s) observed

OAT score of 200-m transect 27

OAT score of polygon

Notes:

mesquite - here + on builders

tobosa

nightshade

camelweed.

Some lemonweed

cactus - coming back from

vine mesquite blight

Wildlife Reference North

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points) 6	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points) 5	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points)	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points) 4	Surface litter is accumulating in place.
☐ (3 points)	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points) 4	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points)	There is little visual evidence of surface crusting.
☐ (3 points) 3	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 5	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 27 **FIELD NOTES:**	

2011, 206, 10 sp
2014, 372, 13 sp 11.32 gr.
2018 272, 12 sp 14.82 gr.

Wildlife Habitat Sampling Form

Site ID: Wildlife Reference South

Lat: 32.68399 Long: -108.06769

32.6748
-108.06601

Date 10-3-18 Investigators CM, JA, PP, AM, LS, WC

Photo number info page / labelled

% Exposed Bedrock 0

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover	
Gram 8.125 — Block 1 ✓ Yucca	0 0 5-25 5-25	0-5 5-25 5-25 0	0 0 0-5 0	0 0 0 95-100	3-5 5-25 5-25 95-100	32.5
14.3 — Block 2 ✓	0-5 5-25 25-50 5-25	25-50 5-25 0-5 0-5	0-5 5-25 0-5 0-5	0 0 0 0	25-50 50-75 25-50 5-25	38
3.79 — Block 3 ✓ Oak tree	5-25 0-5 5-25 0-5	5-25 5-25 0 0	0-5 0-5 0 0-5	0 0 0 0	5-25 5-25 5-25 0-5	11.875
9.7 — Block 4 ✓ careless weed	5-25 0-5 5-25 5-25	5-25 5-25 0-5 0-5	0-5 0 0-5 0-5	0 0 0 0	5-25 5-25 5-25 5-25	15
38 — Block 5 ✓	5-25 0-5 5-25 0-5	25-50 ~~75~~-95 5-25 5-25	0-5 0-5 0 0-5	0 0 0 0	25-50 75-95 5-25 5-25	38.1
14.8						272

	# Trees Shrubs	# ~~Shrubs~~ Grasses	# Cactus and Succulents	# ~~Yucca~~ Forbs	Number of species in block
Block 1	2	3	2	6	13
Block 2	3	4	1	6	14
Block 3	4	3	0	4	11
Block 4	3	3	0	7	13
Block 5	2	3	0	6	11

	1	2	3	4	5
1					
2		2			1
3					
4			4	3	
5			5		

12.4 avg

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location Wildlife Reference South

UTM Coord

Picture #	**Description**

Date/Time: 10-3-18 ~9am
Observer JA, CM
Soil Map Unit Name
Veg Alliance Name
Surface texture
Parent material Rhyolite - near bedrock area from knolling? Area
Slope % flat ish
Elevation (ft)
Topographic position
Aspect Slightly S-facing

Signs of Disturbance(s) observed

OAT score of 200-m transect 24
OAT score of polygon

Notes:

vine mesquite
sideoats
bendgrass
3 awn
tobosa

2 Yucca types

catclaw - small shrub
Cowlesscened - small seedlings

Wildlife Reference South

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points) 7	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points) 2	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points) 3	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points) 4	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points)	There is little visual evidence of surface crusting.
☐ (3 points) 3	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 5	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 24 **FIELD NOTES:**	

Wildlife Habitat Sampling Form

Site ID: SB-2018-REF BR3

Lat:

Long:

Date 10-3-18

Investigators PP, CM, JH, DM, LS, WG

Photo number labelled

% Exposed Bedrock 95%

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1 ✓	5-25 0 0 0	5-25 0 5-25 0	0 0 0 0	0 0 0 0	5-25 0 5-25 0
Block 2 ✓	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
Block 3	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
Block 4 ✓	0 0 0 0	0 0 25-50 0	0 0 0-5 0	0 0 0 0	0 0 25-50 0
Block 5 ✓	0 0 0 0	0-5 0 0 0	0 0 0 0	0 0 0 0	0-5 0 0 0

	# Trees Shrubs	# ~~Shrubs~~ Grasses	# Cactus and Succulents	# ~~Yucca~~ Forbs	Number of species in block
Block 1	1	3	0	2	6
Block 2	0	3	0	1	4
Block 3	1	2	1	1	5
Block 4	0	2	1	2	5
Block 5	0	2	0	0	2

	1	2	3	4	5
1					
2				1	
3	3				
4				4	5
5					2

RS3

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location STS-2018-REF-BR3

UTM Coord

Picture #	**Description**

Date/Time: 10-3-18 4pm
Observer JA, CM
Soil Map Unit Name
Veg Alliance Name
Surface texture
Parent material Rhyolite Knelling Near
Slope % steeper
Elevation (ft)
Topographic position
Aspect

Signs of Disturbance(s) observed

OAT score of 200-m transect 16
OAT score of polygon

Notes: Oak trees
tall condensed manny-like
Bridlegrass

STB-2018-REP-B3 10-3-18

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points)	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points) 2	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points) ~~2~~ 1	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points)	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point) 1	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points) 4	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points)	There is little visual evidence of surface crusting.
☐ (3 points) 3	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 5 ?	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 16 **FIELD NOTES:**	

Wildlife Habitat Sampling Form

Site ID: STJ-2018-REF-S2

Lat:

Long:

Date 10-3-18

Investigators CM, JA, PP, DM, W, L

Photo number labelled before 9:16

% Exposed Bedrock 17% - boulders/bedrock

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1 ✓ Sage Oats blue grama	5-25 0-5 5-25 25-50	50-75 25-50 50-75 25-50	0-5 0-5 0-5 0-5	0 25-50 0 0	50-75 75-95 95-100 75-95
Block 2 ✓ Oak tree	0 0 35-75 95-100	0 50-75 0 25-50	0 5-25 5-25 0	0 0 0 0	0 50-75 75-95 95-100
Block 3 ✓	0 0 0 0	50-75 5-25 25-50 25-50	5-25 5-25 25-50 0-5	0 0 0 0	~~50-75~~ 5-25 50-75 25-50
Block 4 ✓	0 0 0 0	50-75 75-95 50-75 75-95	0-5 0-5 0-5 0-5	0 0 0 0	50-75 75-95 50-75 75-95
Block 5 ✓	5-25 0 0 0	25-50 95-100 50-75 75-95	5-25 5-25 5-25 5-25	0 0 0 0	25-50 99-100 75-95 95-100

	# Trees Shrubs	# ~~Shrubs~~ grasses	# Cactus and Succulents	# ~~Yucca~~ forbs	Number of species in block
Block 1	2	5	1	9	17
Block 2	2	5	0	6	13
Block 3	1	5	0	16	22
Block 4	2	6	1	7	16
Block 5	2	6	0	13	21

	1	2	3	4	5
1	1				
2					4
3	5				
4		3			
5					2

L

RS 2

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location STS-2018-REF-52

UTM Coord

Picture #	**Description**

Date/Time: 10-3-18 3pm
Observer JA, CM
Soil Map Unit Name
Veg Alliance Name
Surface texture
Parent material Rhyolite - Kneeling Nun
Slope % Steep
Elevation (ft)
Topographic position
Aspect

Signs of Disturbance(s) observed

OAT score of 200-m transect 36
OAT score of polygon

Notes:

Sideoats
manna grass -
blue grama
beard grass
lemonweed
lambsquarters

has big boulders
some bedrock
Very nice condition
cows probably
do not
come up
this steep
a slope

→ big
grass

STS-2018-REF-S2 10-3-18

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points) 9	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points)	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points) 9	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points)	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points) 5	Surface litter is accumulating in place.
☐ (3 points)	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points) 4	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points) 4	There is little visual evidence of surface crusting.
☐ (3 points)	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 5	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 36 **FIELD NOTES:**	

Slope 1

Wildlife Habitat Sampling Form

Slope ~14%

Site ID: SIJ-2018-RDF-SL1 **Lat:** **Long:**

Date 10-2-2018 **Investigators** PM, DM, CM, JA, Nick, Will, Lewis

Photo number SL1-1 to SL1-6 **% Exposed Bedrock** 7%

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1✓	5-25 0-5 0 0	25-50/25-50 5-25/25-50	0-5 0-5 0-5 0-5	0 0 5-25 0	25-50 50-75 25-50 25-50
Block 2✓	0 0 0 0	25-50 5-25 25-50 5-25	0-5 0-5 0-5 0	75-95 0 0 0	95-100 5-25 25-50 5-25
Block 3✓ Mesquite	0 0 5-25 5-25	5-25 5-25 25-50 25-50	5-25 0-5 0-5 5-25	75-100 0-5 5-25 0	75-100 5-25 50-75 50-75
Block 4✓ Lemon grass	0 0 0 0-5	50-75 25-50 25-50 25-50	0-5 5-25 0-5 0-5	0 5-25 0 0	50-75 25-50 25-50 50-75
Block 5	0 0 0 0	25-50 75-95 50-75 25-50	0-5 0-5 0-5 0-5	0 0 0 0	25-50 75-95 50-75 25-50

	# ~~Trees~~ Shrubs	# ~~Shrubs~~ grasses	# Cactus and Succulents	# ~~Yucca~~ forbs	Number of species in block
Block 1	0	4	1	7	13
Block 2	2	3	0	2	8
Block 3	3	5	1	7	16
Block 4	2	3	1	6	12
Block 5	4	6	0	5	15

	1	2	3	4	5
1					5
2					
3		4			
4	3	1			
5		2			

L

S3

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location STS - 2018 - REF - SL1

UTM Coord

Picture #	**Description**

Date/Time: Oct 2, 2018 11am
Observer CM, TA
Soil Map Unit Name
Veg Alliance Name
Surface texture
Parent material
Slope % ~14%
Elevation (ft) 5177
Topographic position
Aspect

Signs of Disturbance(s) observed

OAT score of 200-m transect 29

OAT score of polygon

Notes: Sotol, juniper trees, sideoats -bearded grass

blue grama
hairy grama
catclaw
tobosa
lemonweed?

FR-1 had shrub for globemallow

STJ-2018-REF-SC1 10-2-18

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points) 8	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points)	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points) 7	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points)	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points) 2	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points)	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points) 3	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points) 5	There is little visual evidence of surface crusting.
☐ (3 points)	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 4	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 29 **FIELD NOTES:**	

Bedrock 1

Wildlife Habitat Sampling Form

Site ID: STS-2018 REF-BR1 **Lat:** 32° 35.5521' N **Long:** 107° 55.520' W

Date Oct 2, 2018 **Investigators** CM, PP, DM, J.A, Nick, Louis, Will

Photo number before BR1 + one after labeled **% Exposed Bedrock** 80%

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1 ✓	0 0 0 0	0-5 5-25 0 0	0 0 0 0	0 0 0 0	0-5 5-25 0 0
Block 2 ✓ Juniper!	0 5-25 100 0-5	0-5 5-25 0-5 0	0-5 0-5 5-25 0	0 0 0 0	0-5 5-25 100 0-5
Block 3 ✓	0 0 0 0	0 0 0-5	0 0 0-5 0	0 0 0 0	0 0 0 0-5
Block 4 ✓	0 0 0 0	5-25 5-25 0 0	0 0 0 0	0 0 0 0	5-25 5-25 0 0
Block 5	0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0

	# Trees shrubs	# ~~Shrubs~~ grasses	# Cactus and Succulents	# ~~Yucca~~ forbs	Number of species in block
Block 1	0	4	1	3	8
Block 2	1	3	1	5	10
Block 3	2	2	1	6	11
Block 4	0	0	1	0	3
Block 5	0	1	0	0	1

	1	2	3	4	5
1			5		
2			1		
3	2		3		
4					
5	4				

0.16 L

RS4

BR1

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location STB-2018-REP-BR1

UTM Coord ______

Picture #	Description

Date/Time: 10-2-18 12pm
Observer CM, JA
Soil Map Unit Name
Veg Alliance Name
Surface texture bedrock ~80%
Parent material Kneeling nun rhyolite
Slope %
Elevation (ft) 5156'
Topographic position
Aspect

Signs of Disturbance(s) observed

OAT score of 200-m transect 17
OAT score of polygon ______

Notes:

Sotol oak ocotillo

prickly pear

Some dead yucca + see photos of shrub health

Aristida

tabosa

blue grama

bristlegrass patch w/ ocotillo

10-2-18 STS-2018-REF-BR1

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points)	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points) 3	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points) ~~0~~ 1	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points) 2	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points)	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points) 3	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points)	There is little visual evidence of surface crusting.
☐ (3 points) 4	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 4	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: ~~16~~ 17 **FIELD NOTES:**	

Bedrock 2

Wildlife Habitat Sampling Form

Site ID: STS- 2018 - ~~REF~~ BR2 **Lat:** 32°35.444 N **Long:** 107°55.204'W

Date Oct 2, 2018 **Investigators** CM, PP, DM, JA, Nick Lowe, Will Lewis

Photo number ~~BR 1to7~~ BR1.1 to BR1-7 (C before BR2 then after)

% Exposed Bedrock 60-65 2 = 62.5%

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1 Bedrock	0 0 / 0 0	0 0 / 0 0	0 0 / 0 0	0 0 / 0 0	0 0 / 0 0
Block 2 Catclaw shrub	0 25-50 / 0 0	5-25 5-25 / 0 5-25	0 0-5 / 0 0	0 0 / 0 0	5-25 50-75 / 0 5-25
Block 3 Flat granular	95 100 75-95 / 0-5 0	0-5 5-25 / 0-5 5-25	0-5 0-5 / 0-5 0-5	0 0 / 0 0	100 75-100 / 5-25 5-25
Block 4 Flat granular	0 0 / 0 0	25-50 25-50 / 5-25 5-25	0-5 5-25 / 5-25 0-5	0 0 / 0 0	5-25 25-50 / 5-25 5-25
Block 5 not bedrock Flat granular	0 5-25 / 0 0	5-25 5-25 / 0-5 5-25	0-5 0-5 / 0-5 0-5	0 0 / 0 0	5-25 25-50 / 5-25 5-25

	# Trees shrubs	# ~~Shrubs~~ grasses	# Cactus and Succulents	# ~~Yucca~~ forbs	Number of species in block
Block 1	2	5	3	0	10
Block 2	1	4	0	0	5
Block 3	3	4	1	6	14
Block 4	2	3	1	5	11
Block 5	0	4	1	8	13

	1	2	3	4	5
1	1				2
2					
3					4
4					
5			5		3

52

BR2

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location STB-2018-REF-BR2

UTM Coord

Picture #	**Description**

Date/Time: 10/2/18 3pm

Observer CM, JA

Soil Map Unit Name

Veg Alliance Name -60%

Surface texture bedrock + flat granular -40%

Parent material rhyolite - Kneeling Nun

Slope % Low

Elevation (ft) 5047

Topographic position

Aspect

Signs of Disturbance(s) observed

OAT score of 200-m transect 14

OAT score of polygon similar

Notes:

sideoats grama
blue grama
beardgrass - some
Aristida - threeawn
catclaw
mesquite
lemon grass
bristlegrass

UTS - 2018 - REF - BRZ 10-2-18

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)		Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points)		Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☑ (2 points)	2	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)		There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)		Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☑ (2 points)	2	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)		Surface litter is accumulating in place.
☑ (3 points)	3	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)		Very little surface litter is remaining.
☐ **PEDESTALS** (5 points)		There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)		There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	2	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points)		There is little visual evidence of surface crusting.
☑ (3 points)	3	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)		Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points)		Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	2	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)		Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 14 **FIELD NOTES:**		

Flatroad day 1

6

Wildlife Habitat Sampling Form

Site ID: SK-2018-REF-FR-1

Lat: 32°35.442 N **Long:** 107°55.243 W

Date 10-2-18 **Investigators** PM, DM, CM, J, A, Nickell, Lowe

Photo number After FR-1 photo FRL1 to FRL4

% Exposed Bedrock 20

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1	0- 0 525 0	0-5 25-50 5-25 5-25	0-5 5-25 0-5 0-5	0 0 0 0	0-5 25-50 5-25 5-25
Block 2 Bedrock N Soil	0 0 0 50-75	0-5 0 0 0-5	0 0 0 0-5	0 0 0 0	0-5 0 0 50-75
Block 3	0 0 5-25 25-50	5-25 5-25 5-25 25-50	0-5 5-25 0 0-5	0 0 0 0	5-25 25-50 25-50 25-50
Block 4 ✓	0 0 0 0	25-50 5-25 5-25 5-25	5-25 0-5 5-25 0-5	0 0 0 0	25-50 25-50 5-25 5-25
Block 5	0 0 0 0	25-50 5-25 5-25 5-25	5-25 0 0-5 5-25	0 0 0 0	25-50 5-25 5-25 5-25

	# Trees Shrubs	# ~~Shrubs~~ grasses	# Cactus and Succulents	# ~~Yucca~~ forbs	Number of species in block
Block 1	3	3	0	9	15
Block 2	4	3	0	2	9
Block 3	1	3	0	9	13
Block 4	2	5	0	8	15
Block 5	3	5	0	6	14

	1	2	3	4	5
1					
2					
3					2
4			5		
5			3	4	1

Sideoats

S1

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location SJS - 2018 - RFF - FR-1

UTM Coord ,

Picture #	Description

Date/Time: 10-2-18 9:30am
Observer CW, JA, PP
Soil Map Unit Name
Veg Alliance Name
Surface texture
Parent material Rhyolite bedrock - Emily Nun.
Slope % slight
Elevation (ft) 5076
Topographic position
Aspect

Signs of Disturbance(s) observed

OAT score of 200-m transect 22
OAT score of polygon

Notes:

S dusty
mesquite
globe mallow

bedrock more than surface crusting

ST - 2018 - REF - FR - 1

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points) 5	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points) 2	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points)	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point) 2	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points) 4	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points) 5	There is little visual evidence of surface crusting.
☐ (3 points)	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 4	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 22 **FIELD NOTES:**	

Wildlife Habitat Sampling Form

Site ID: STS-2018-REF-FG-1

Lat: 32°33.308'N **Long:** 107°56.161'W

Date 10-2-18 **Investigators** David Mercer, Joe Allen, Carolyn Meyer, Pam Pinson, Will, Nick, Lewis

Photo number 3 before FG-1 photo on FG-Lit FG1_4 paper **% Exposed Bedrock** 0

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1	50-75, 5-25 25-50, 0-5	0-5, 5-25 0-5, 5-25	0-5, 0-5 0-5, 0-5	0, 0 0, 0	50-75, 5-25 25-50, 5-25
Block 2	25-50, 25-50 5-25, 5-25	0-5, 0-5 0-5, 5-25	0-5, 0-5 0-5, 0-5	0, 0 0, 0	25-50, 25-50 25-50, 5-25
Block 3	25-50, 25-50 25-50, 5-25	0-5, 0-5 0-5, 0-5	0-5, 0-5 0-5, 0-5	0, 0 0, 0	25-50, 25-50 25-50, 5-25
Block 4	5-25, 25-50 5-25, 25-50	5-25, 5-25 5-25, 0-5	0-5, 0-5 0-5, 0-5	0, 0 0, 0	5-25, 25-50 5-25, 25-50
Block 5	5-25, 25-50 75-[illegible], 0-5	0-5, 0-5 0-5, 0-5	0-5, 0-5 0-5, 5-25	0, 0 0, 0	5-25, 25-50 75-95, 5-25

5-25

	# Trees/ Shrubs	~~# Shrubs~~ # grasses	# Cactus and Succulents	# ~~Yucca~~ forbs	Number of species in block
Block 1	4 3	1	0	6	~~9~~ 10
Block 2	~~3~~ 4	1	0	7	12
Block 3	~~4~~ 3	1	0	~~4~~ 5	9
Block 4	~~3~~ 4	1	0	6	11
Block 5	3	2	0	8	13

	1	2	3	4	5
1			1		
2					
3		2		5	
4			3		
5					4

Lemon weed-woody

BRI

Rangeland Health Evaluation Summary Worksheet

Part 1. Area of Interest Documentation

Location STS-2018-REF-F6-1

UTM Coord

Picture #	**Description**
	Flat granular

Date/Time: 10-2-18 8am
Observer CM, JH, PP
Soil Map Unit Name Tertiary Sugar Lump formation
Veg Alliance Name
Surface texture Shallow soil - see picture after F6-1 pic
Parent material Rhyolite - Sugar Lump
Slope % Very Flat
Elevation (ft) 5103'
Topographic position
Aspect

Signs of Disturbance(s) observed

OAT score of 200-m transect 28
OAT score of polygon

Notes: tobosa lemonweed - herb + woody small mesquite (threadleaf) creosote

5 to 1? very little cactus tufted grass good.

STS-2018-REF-FG-1 10-2-18

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points) 7	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points) 6	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points)	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points) 2	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points) 4	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points) 4	There is little visual evidence of surface crusting.
☐ (3 points)	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points) 5	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 28 **FIELD NOTES:**	

Wildlife Habitat Sampling Form

Site ID: ST-2018-REF-FG2 **Lat:** **Long:**

Date 10-3-18 **Investigators** PP, CM, JA, DM, LS, WG

Photo number ~~[illegible]~~ bedrock pics labeled **% Exposed Bedrock** 0

	% Tree/ Shrub Cover	% Grass Cover	% Forb Cover	% Cactus Cover	% Total Cover
Block 1 Prickly Rows	[illegible] 5-25 5-25 0-5	25-50 5-25 5-25 5-25	0-5 0-5 0-5 0-5	0 0 0 5-25	25-50 25-50 5-25 25-50
Block 2 √	5-25 5-25 0	5-25 5-25 25-50 25-50	0-5 0-5 0-5 0-5	0 0 0 5-25	25-50 5-25 25-50 25-50
Block 3 √	5-25 5-25 0-5 5-25	5-25 5-25 5-25 5-25	0-5 0-5 5-25 0-5	0 0 0 0	25-50 5-25 5-25 5-25
Block 4	5-25 75-95 5-25 0	5-25 25-50 50-75 5-25	5-25 0 0-5 5-25	0 0-5 0 0	25-50 95-100 50-75 25-50
Block 5 √	5-25 25-50 5-25 5-25	5-25 5-25 5-25 5-25	0-5 5-25 0-5 0-5	0 0 0 0	25-50 25-50 5-25 25-50

	# ~~Trees~~ Shrubs	# ~~Shrubs~~ Grasses	# Cactus and Succulents	# ~~Yucca~~ Forbs	Number of species in block
Block 1	2	4	0	6	12
Block 2	1	5	1	7	14
Block 3	3	3	1	4	11
Block 4	2	4	1	5	12
Block 5	2	4	1	7	14

	1	2	3	4	5
1					
2	4				
3		3	5		
4	2				
5		1			

BR2

Criteria used to score Observed Apparent Trend (OAT). ***Check appropriate box in each category which best fits area being observed. Points may vary within each category.***

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points) 5	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points) 5	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points)	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points) 2	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points)	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points) 3	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.
☐ **SURFACE CRUSTING** (5 points) 4	There is little visual evidence of surface crusting.
☐ (3 points)	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points)	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point) 1	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: 20 **FIELD NOTES:**	

APPENDIX D

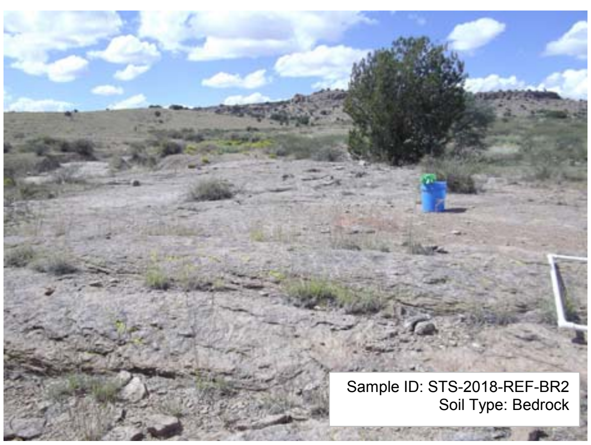
PHOTOLOG OF 2018 SAMPLED LOCATIONS

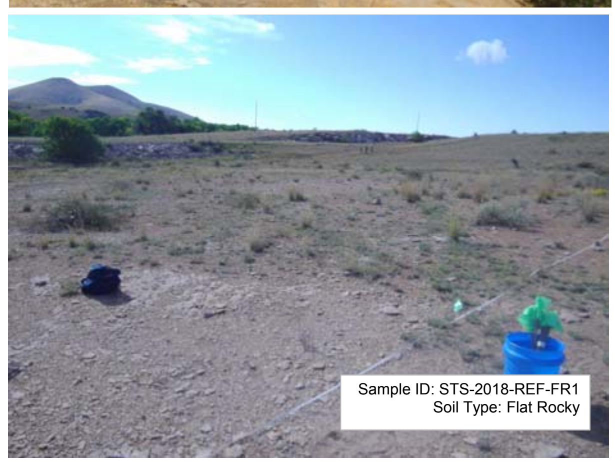

Sample ID: STS-2018-REF-BR3
Soil Type: Bedrock


Sample ID: STS-2018-REF-SL2
Soil Type: Slope


Sample ID: STS-2018-REF-SL1
Soil Type: Slope


Sample ID: STS-2018-REF-BR1
Soil Type: Bedrock


Sample ID: STS-2018-REF-BR2
Soil Type: Bedrock


Sample ID: STS-2018-REF-FR1
Soil Type: Flat Rocky

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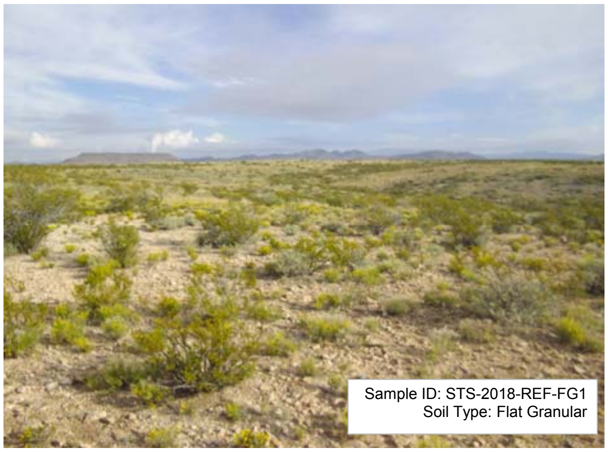
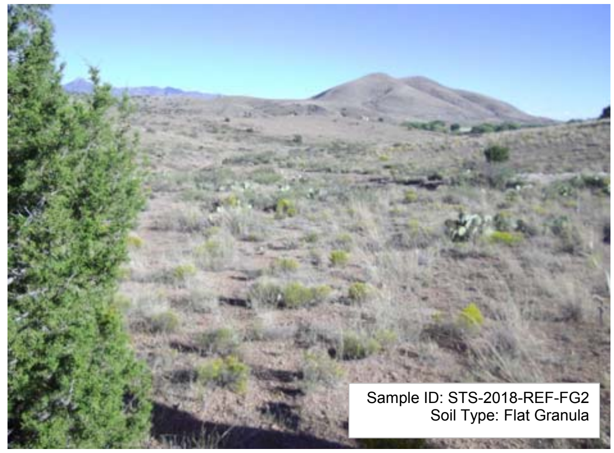
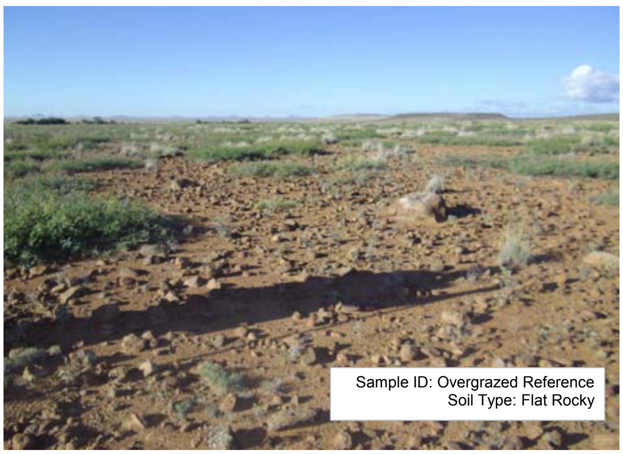


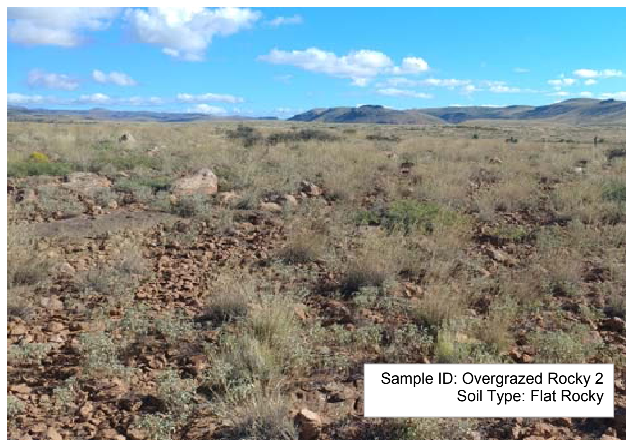
Sample ID: STS-2018-REF-FG1
Soil Type: Flat Granular



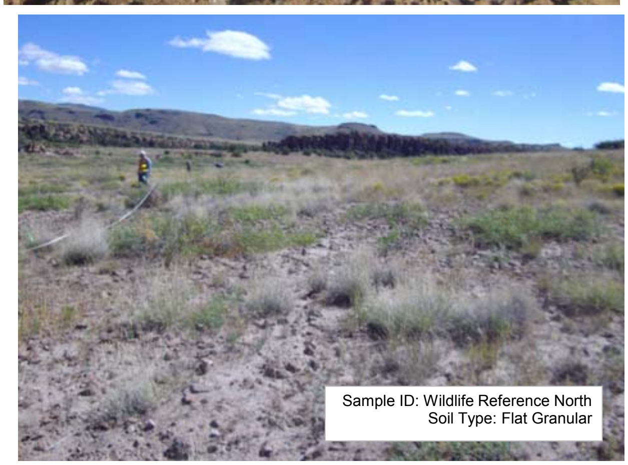
Sample ID: STS-2018-REF-FG2
Soil Type: Flat Granula



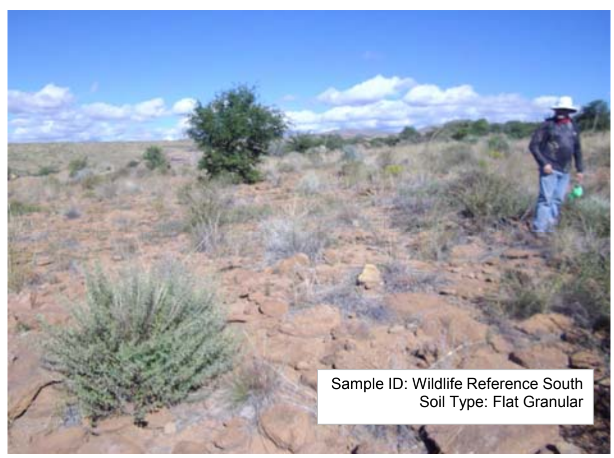
Sample ID: Overgrazed Reference
Soil Type: Flat Rocky



Sample ID: Overgrazed Rocky 2
Soil Type: Flat Rocky



Sample ID: Wildlife Reference North
Soil Type: Flat Granular



Sample ID: Wildlife Reference South
Soil Type: Flat Granular

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APPENDIX D

APPENDIX E

STSIU AND REFERENCE COMMUNITY AND SOIL DATA

Table E-1. Data for Community Analysis

Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Site ID	Site Type	Latitude	Longitude	Percent Cover Unadjusted	Cover Adjusted to 2011 Conditions	Species Richness	OAT Score	Shrub/ Tree Cover (%)	Grass Cover (%)	Forb Cover (%)	Succulent Cover (%)	Shrub/ Tree Richness	Grass Richness	Forb Richness	Succulent Richness	Soil Category	Acceptability richness	Acceptability cover	Acceptability OAT
STS-RWU-2011-1	Site	32.7124	-108.1083	6	6	1	12	-	-	-	-	0.0	0.0	0.8	0.2	bedrock	unacceptable	unacceptable	unacceptable
STS-RWU-2011-2	Site	32.7045	-108.1050	8	8	0.4	8	-	-	-	-	0.0	0.0	0.4	0.0	bedrock	unacceptable	acceptable	unacceptable
STS-RWU-2011-9	Site	32.6959	-108.1000	3	3	0.8	11	-	-	-	-	0.4	0.0	0.0	0.4	bedrock	unacceptable	unacceptable	unacceptable
STS-RWU-2011-11	Site	32.6747	-108.0920	4	4	1.6	6	-	-	-	-	0.8	0.0	0.0	0.8	bedrock	unacceptable	unacceptable	unacceptable
STS-PT-2013-9	Site	32.6978	-108.1069	5	6	1.8	7	4.9	0.0	0.1	0.0	0.6	0.0	1.0	0.2	bedrock	unacceptable	unacceptable	acceptable
STS-PT-2013-12	Site	32.6700	-108.0511	20	24	7.2	17	10.1	10.5	2.2	0.0	1.8	3.2	1.8	0.4	bedrock	acceptable	acceptable	acceptable
STS-RWU-2011-4	Site	32.7123	-108.1430	64	64	9.8	35	-	-	-	-	0.8	4.4	4.4	0.2	flat granular	acceptable	acceptable	acceptable
STS-RWU-2011-5	Site	32.7067	-108.0950	34	34	10	33	-	-	-	-	2.4	4.0	3.2	0.4	flat granular	acceptable	acceptable	acceptable
STS-RWU-2011-10	Site	32.6748	-108.0840	24	24	10	16	-	-	-	-	1.0	2.6	5.8	0.8	flat granular	acceptable	acceptable	unacceptable
STS-RWU-2011-13	Site	32.6768	-108.0940	26	26	3.6	8	-	-	-	-	1.4	0.2	1.8	0.2	flat granular	unacceptable	acceptable	unacceptable
STS-RWU-2011-15	Site	32.7092	-108.1180	18	18	7.4	14	-	-	-	-	1.4	0.6	5.4	0.0	flat granular	acceptable	acceptable	unacceptable
STS-RWU-2011-16	Site	32.7048	-108.0850	22	22	13	23	-	-	-	-	2.8	5.2	4.2	0.8	flat granular	acceptable	acceptable	acceptable
STS-PT-2013-20	Site	32.6892	-108.1566	24	76	12.8	30	1.8	22.0	22.0	0.1	2.2	3.8	6.2	0.6	flat granular	acceptable	acceptable	acceptable
STS-PT-2013-33	Site	32.6928	-108.1220	0	0	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	flat granular	unacceptable	unacceptable	unacceptable
STS-RWU-2011-7	Site	32.6972	-108.1060	11	11	1.8	9	-	-	-	-	0.2	0.2	1.2	0.2	flat rocky	unacceptable	unacceptable	unacceptable
STS-RWU-2011-12	Site	32.6642	-108.0870	9	9	2	10	-	-	-	-	1.0	0.2	0.4	0.0	flat rocky	unacceptable	unacceptable	unacceptable
STS-RWU-2011-17	Site	32.6762	-108.0960	36	36	5.4	10	-	-	-	-	2.8	0.0	2.6	0.0	flat rocky	unacceptable	acceptable	unacceptable
STS-PT-2013-1	Site	32.6890	-108.1064	32	50	3.2	12	31.1	0.0	1.5	0.0	1.0	0.4	1.6	0.4	flat rocky	unacceptable	acceptable	unacceptable
STS-PT-2013-2	Site	32.6850	-108.1047	31	74	5.2	9	29.3	3.0	1.4	0.0	1.2	1.0	3.2	0.0	flat rocky	unacceptable	acceptable	unacceptable
STS-PT-2013-17	Site	32.6897	-108.1040	19	20	5.8	19	18.5	0.6	1.6	0.0	1.6	1.2	3.0	0.0	flat rocky	unacceptable	acceptable	unacceptable
STS-PT-2013-19	Site	32.6925	-108.1046	5	5	4.4	15	3.4	0.0	1.0	0.0	2.2	0.2	1.6	0.4	flat rocky	unacceptable	unacceptable	unacceptable
STS-RWU-2011-3	Site	32.7076	-108.1070	59	59	6.2	24	-	-	-	-	0.6	2.8	1.6	1.2	slope	unacceptable	acceptable	acceptable
STS-RWU-2011-6	Site	32.7085	-108.1209	25	25	8	16	-	-	-	-	2.2	1.4	3.8	0.6	slope	unacceptable	unacceptable	unacceptable
STS-RWU-2011-8	Site	32.7103	-108.0939	45	45	21.6	37	-	-	-	-	4.0	5.8	11.3	0.4	slope	acceptable	acceptable	acceptable
STS-PT-2013-5	Site	32.7056	-108.1135	38	55	8.6	27	20.2	3.6	0.9	17.7	2.6	1.8	2.8	1.4	slope	unacceptable	acceptable	acceptable
STS-RWU-2011-14	Site	32.7081	-108.1150	27	28	8	26	-	-	-	-	1.8	2.0	4.0	0.2	slope	unacceptable	unacceptable	acceptable
Overgazed reference	Site	32.6459	-108.0656	26	6	5.8	16	16.5	2.8	8.3	0.0	1.0	1.4	3.4	0.0	flat rocky	unacceptable	unacceptable	unacceptable
STS-RWU-2012-B1	De Minimus	32.6714	-108.0445	18	18	3.4	17	13.2	3.0	0.1	0.8	1.4	0.6	0.2	1.2	bedrock	unacceptable	acceptable	acceptable
STS-RWU-2012-B2	De Minimus	32.6714	-108.0423	3	3	5	11	0.3	2.4	0.0	1.0	1.8	1.0	1.0	1.2	bedrock	acceptable	unacceptable	unacceptable
STS-RWU-2012-B3	De Minimus	32.6738	-108.0449	3	3	2.6	15	3.4	0.0	0.0	0.0	1.2	0.8	0.2	0.4	bedrock	unacceptable	unacceptable	acceptable
WILDLIFE REFERENCE SOUTH	De Minimus	32.6748	-108.0601	20/37/27	20	11/14.2/12.4	24	22.6/10.9	11.3/15.4	11.3/2.4	0.1/4.9	0.0	0.0	0.0	0.0	flat granular	acceptable	acceptable	acceptable
STS-PT-2013-26	Reference	32.6394	-108.0500	37	51	15.8	20	13.9	16.2	16.2	0.0	1.0	7.0	7.8	0.0	flat granular	acceptable	acceptable	unacceptable
WILDLIFE REFERENCE NORTH	Reference	32.6840	-108.0677	30/30/51	30	10/13.2/8.2	27	18.4/23.6	14.5/28.0	14.5/5.6	0/1.9	3.2	4.2	2.8	0.0	flat granular	acceptable	acceptable	acceptable
STS-2018-REF-FG1	Reference	32.5551	-107.9360	32.4	10	11	28	30.0	6.3	3.1	0.0	3.4	1.2	6.4	0.0	flat granular	acceptable	acceptable	acceptable
STS-2018-REF-FG2	Reference	32.5916	-107.9259	35.35	36	12.6	20	16.2	22.0	4.9	1.6	2.0	4.0	5.8	0.8	flat granular	acceptable	acceptable	unacceptable
STS-2018-REF-BR1	Reference	32.5922	-107.9253	8.5	12	6.6	17	5.9	3.5	1.1	0.0	0.6	2.4	2.8	0.8	bedrock	acceptable	acceptable	acceptable
STS-2018-REF-BR2	Reference	32.5916	-107.9284	24.35	33	10.6	14	8.9	11.7	2.9	0.0	1.6	4.0	3.8	1.2	bedrock	acceptable	acceptable	acceptable
STS-2018-REF-BR3	Reference	32.5935	-107.9261	2.375	7	4.4	16	0.8	3.4	0.1	0.0	0.4	2.4	1.2	0.4	bedrock	acceptable	acceptable	acceptable
STS-2018-REF-FR1	Reference	32.5907	-107.9207	22.7	20	13.2	22	6.6	16.2	5.6	0.0	2.6	3.8	6.8	0.0	flat rocky	acceptable	acceptable	acceptable
STS-2018-REF-SL1	Reference	32.5954	-107.9236	50.4	49	12.8	29	3.3	37.1	4.3	11.5	2.4	4.2	5.4	2.0	slope	acceptable	acceptable	acceptable
STS-2018-REF-SL2	Reference	32.5946	-107.9268	68.6	58	17.8	36	11.9	52.1	9.0	1.9	1.8	5.4	10.2	0.4	slope	acceptable	acceptable	acceptable

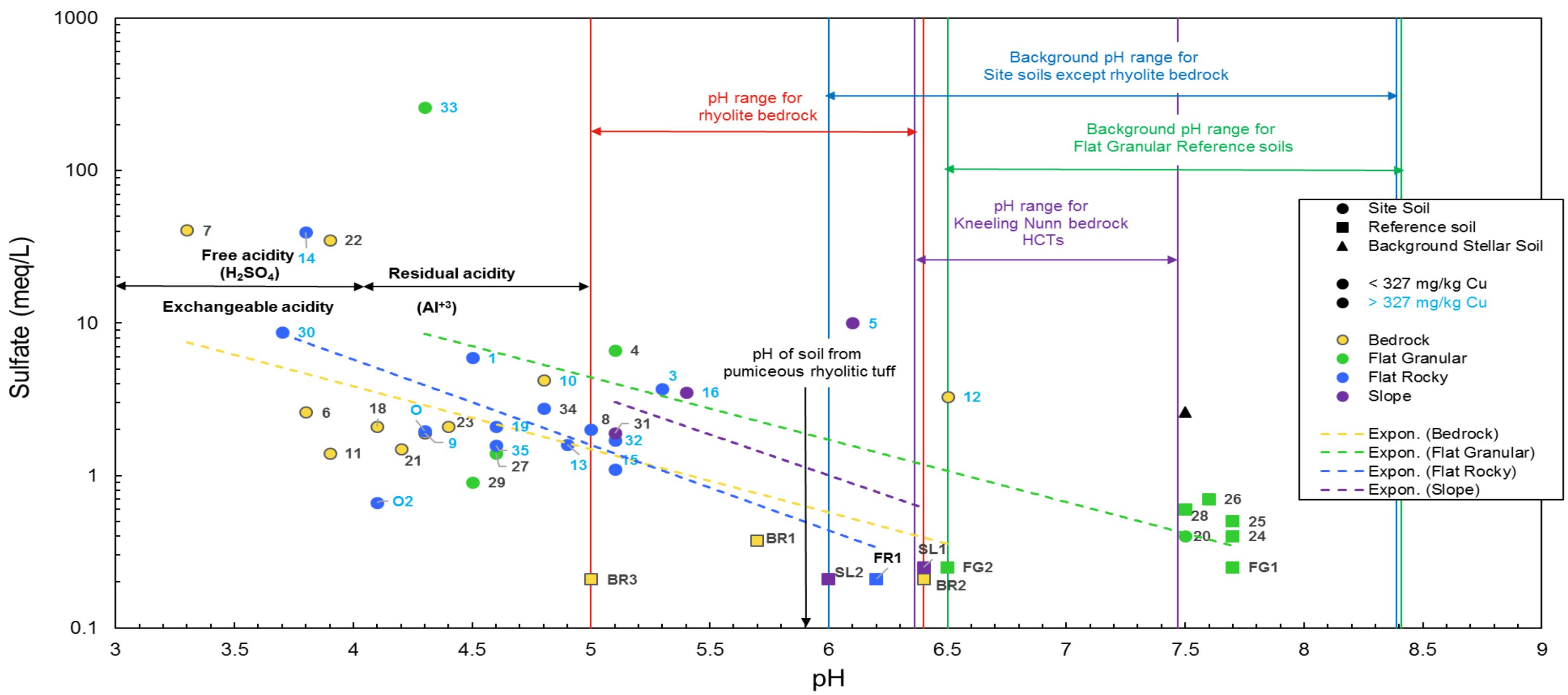
Table E-2. Soil (0-6 inch depth) with Chemistry Data from Greenhouse study and 2018 Sampling Event

Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Technical Memorandum on Reference Areas

Location ID	Site Type	Community Data	Soil Category	pH Saturated Paste (s.u.)	Copper Total (mg/kg)	Calculated pCu	Sulfate Saturated Paste (meq/L)	Calcium Saturated Paste (meq/L)	Magnesium Saturated Paste (meq/L)	Potassium Saturated Paste (meq/L)	Sodium Saturated Paste (meq/L)	Alkalinity Saturated Paste (meq/L)	Bicarbonate Saturated Paste (meq/L)	Chloride Saturated Paste (meq/L)	Lime (%)
STS-PT-2013-1	Site	Yes	Flat Rocky	4.5	1030	3.55	5.9	4.14	1.19	0.24	0.69	0.44	0.44	0.2	0.53
Dup1 for STS-PT-2013-1	Site	Yes	Flat Rocky	4.8	879	4.01	9.1	4.51	1.25	0.25	0.82	0.44	0.44	0.3	0.57
STS-PT-2013-2	Site	Yes	Flat Rocky	6.7	809	5.87	17.7	16.8	2.74	0.24	0.66	3.53	3.53	0.3	2.07
STS-PT-2013-3	Site	No	Flat Rocky	5.3	189	6.24	3.7	3.46	1.46	0.42	0.61	0.56	0.56	0.2	0.58
STS-PT-2013-4	Site	No	Flat Granular	5.1	193	6.03	6.6	7.77	3.59	0.69	1.04	0.62	0.62	0.8	0.66
STS-PT-2013-5	Site	Yes	Slope	6.1	632	5.60	10	8.21	2.62	0.21	1.47	1.75	1.75	0.3	1.99
STS-PT-2013-6	Site	No	Bedrock	3.8	202	4.77	2.6	1.72	0.34	0.26	0.33	0.11	0.11	0.2	<0.01
STS-PT-2013-7	Site	No	Bedrock	3.3	279	3.93	40.6	25.1	4.08	0.1	0.81	<0.02	<0.02	0.2	<0.01
STS-PT-2013-8	Site	No	Flat Rocky	5	626	4.58	2	1.16	0.5	0.15	1.1	0.64	0.64	0.4	1.41
STS-PT-2013-9	Site	Yes	Bedrock	4.3	1350	3.05	1.9	1.45	0.4	0.17	0.59	0.43	0.43	0.2	0.24
STS-PT-2013-10	Site	No	Bedrock	4.8	557	4.53	4.2	2.86	0.7	0.18	0.81	0.44	0.44	0.3	0.24
STS-PT-2013-11	Site	No	Bedrock	3.9	189	4.94	1.4	0.94	0.18	0.14	0.5	0.41	0.41	0.2	0.06
STS-PT-2013-12	Site	Yes	Bedrock	6.5	449	6.36	3.3	4.51	0.76	0.14	0.8	2.92	2.91	0.2	0.75
STS-PT-2013-13	Site	No	Flat Rocky	4.9	360	5.13	1.6	1.07	0.58	0.33	0.95	0.58	0.58	0.3	0.84
STS-PT-2013-14	Site	No	Flat Rocky	3.8	725	3.30	39.3	24.6	10.5	0.33	1.32	<0.02	<0.02	0.2	0.86
STS-PT-2013-15	Site	No	Flat Rocky	5.1	501	4.93	1.1	0.35	0.18	0.08	0.63	0.55	0.55	0.4	0.97
STS-PT-2013-16	Site	No	Slope	5.4	1200	4.21	3.5	2.46	1.01	0.19	1.21	0.85	0.85	0.5	1.66
STS-PT-2013-17	Site	Yes	Flat Rocky	7.6	1120	6.33	2.8	4.6	0.65	0.23	0.71	3.03	3.02	0.4	3.69
STS-PT-2013-18	Site	No	Bedrock	4.1	311	4.55	2.1	1.14	0.29	0.1	0.75	0.41	0.41	0.2	0.09
STS-PT-2013-19	Site	Yes	Flat Rocky	4.6	714	4.06	2.1	1.79	0.44	0.13	0.79	0.43	0.43	0.2	0.3
STS-PT-2013-20	Site	Yes	Flat Granular	7.5	131	8.71	<0.4	3.67	0.37	0.09	0.94	4.24	4.24	0.8	22.3
Dup3 for STS-PT-2013-20	Site	No	Flat Granular	7.6	174	8.48	4.4	3.68	0.37	0.13	0.37	3.66	3.66	0.5	21.7
STS-PT-2013-21	De Minimus	No	Bedrock	4.2	61	6.52	1.5	0.71	0.24	0.11	0.71	0.43	0.43	0.2	0.1
STS-PT-2013-22	De Minimus	No	Bedrock	3.9	248	4.63	35	22.4	5.78	0.33	1.89	<0.02	<0.02	0.4	0.24
STS-PT-2013-23	De Minimus	No	Bedrock	4.4	253	5.07	2.1	1.52	0.35	0.17	0.61	0.41	0.41	0.2	0.16
STS-PT-2013-24	Reference	No	Flat Granular	7.7	56	9.87	<0.4	3.73	0.31	0.23	0.52	4.5	4.49	0.3	2.41
STS-PT-2013-25	Reference	No	Flat Granular	7.7	130	8.90	0.5	3.57	0.46	0.8	0.55	4.85	4.85	0.4	0.91
STS-PT-2013-26	Reference	No	Flat Granular	7.6	109	9.01	0.7	2.74	0.23	0.26	0.61	3.08	3.08	0.3	18.1
STS-PT-2013-27	De Minimus	Yes	Flat Granular	4.6	164	5.75	1.4	0.78	0.33	0.16	0.87	0.48	0.48	0.3	0.45
STS-PT-2013-28	Reference	No	Flat Granular	7.5	58	9.65	0.6	2.02	0.42	0.15	0.84	2.74	2.74	0.4	1.68
STS-PT-2013-29	Site	Yes	Flat Granular	4.5	234	5.25	0.9	0.56	0.16	0.25	0.61	0.46	0.46	0.3	0.2
STS-PT-2013-30	Site	Yes	Flat Rocky	3.7	152	5.00	8.7	5.8	0.94	0.27	0.61	<0.02	<0.02	0.3	<0.01
STS-PT-2013-31	Site	Yes	Slope	5.1	153	6.30	1.9	1.53	0.6	0.09	1.2	0.46	0.46	0.5	1.39
STS-PT-2013-32	Site	No	Flat Rocky	5.1	816	4.37	1.7	1.89	0.58	0.32	0.44	0.63	0.63	0.3	0.6
STS-PT-2013-33	Site	Yes	Flat Granular	4.3	95300	-1.85	260	18.8	35.4	<0.03	1.33	0.64	0.64	4.9	<0.01
Dup2 for STS-PT-2013-33	Site	Yes	Flat Granular	4	92500	-2.09	491	18.1	42.6	0.03	1.23	0.59	0.59	5.5	<0.01
STS-PT-2013-34	Site	No	Flat Rocky	4.8	1200	3.65	2.74	2.74	0.86	0.31	0.31	0.44	0.44	0.16	0.33
STS-PT-2013-35	Site	No	Flat Rocky	4.6	1630	3.11	1.57	1.7	0.61	0.16	0.24	0.42	0.42	0.13	0.51
STS-PT-2013-36	Site	No	Flat Rocky	5.9	3770	3.36	31.7	31.2	5.02	0.18	0.56	4.23	4.22	0.22	1.38
STS-2018-REF-FG1	Reference	Yes	Flat Granular	7.7	22	10.95	0.25	--	--	--	--	--	--	--	--
STS-2018-REF-FG2	Reference	Yes	Flat Granular	6.5	82	8.32	0.25	--	--	--	--	--	--	--	--
STS-2018-REF-BR1	Reference	Yes	Bedrock	5.7	96	7.39	0.38	--	--	--	--	--	--	--	--
STS-2018-REF-BR2	Reference	Yes	Bedrock	6.4	49	8.82	0.21	--	--	--	--	--	--	--	--
STS-2018-REF-BR3	Reference	Yes	Bedrock	5	180	6.02	0.21	--	--	--	--	--	--	--	--
STS-2018-REF-FR1	Reference	Yes	Flat Rocky	6.2	82	8.04	0.21	--	--	--	--	--	--	--	--
STS-2018-REF-SL1	Reference	Yes	Slope	6.4	72	8.37	0.25	--	--	--	--	--	--	--	--
STS-2018-REF-SL2	Reference	Yes	Slope	6	100	7.62	0.21	--	--	--	--	--	--	--	--
Wildlife Reference North	Reference	Yes	Flat Granular	4.6	164	5.75	--	--	--	--	--	--	--	--	--
Overgrazed Reference	Site	Yes	Flat rocky	4.3	361	4.57	1.96	--	--	--	--	--	--	--	--
Overgrazed Rocky 2	Site	No	Flat Rocky	4.1	348	4.42	0.67	--	--	--	--	--	--	--	--

APPENDIX F

SOIL CHEMISTRY PLOTS



Notes:
Numbers represent the last number of the location IDs on Figure 2.
HCTs = Humidity Cell Tests for kinetic testing of rock
Location 27 is wildlife reference south.
Location 2,17,and 36 had flat, rocky soils with high alkalinity, and were removed in this plot. Within the pH range of site soils, flat granular has highest quality and bedrock has lowest quality in terms of plant endpoints or sulfate impacts relative to pH or pCu.

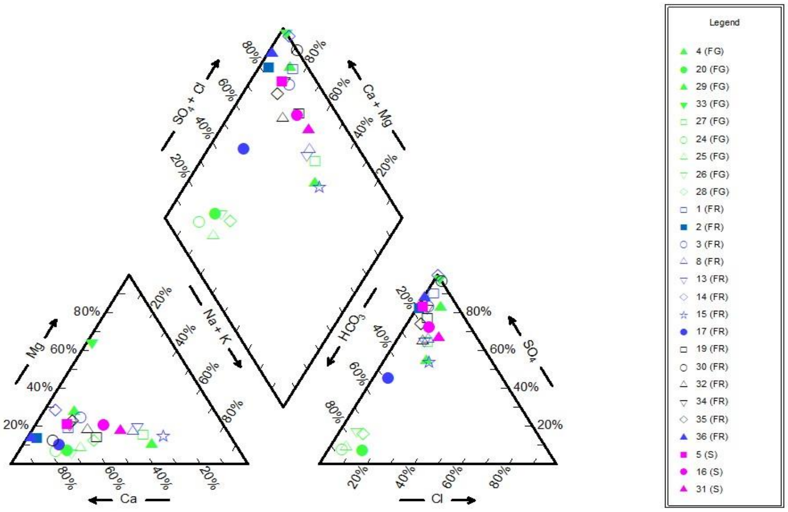
FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

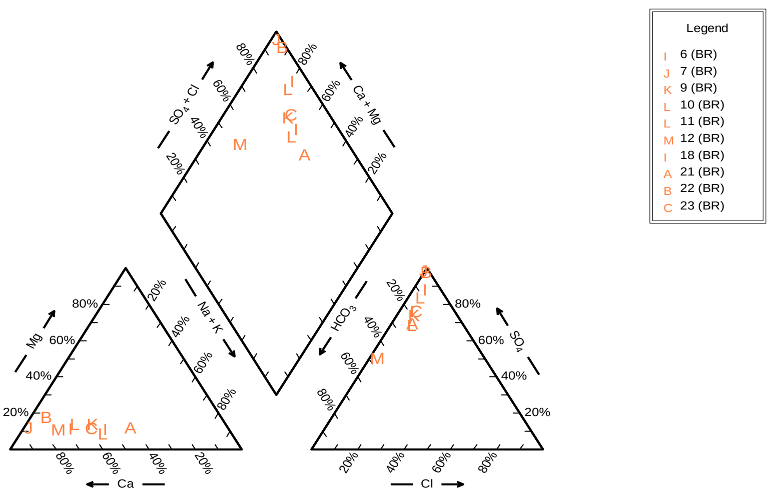
TECHNICAL MEMORANDUM ON REFERENCE AREAS

Relationship between Soluble Sulfate and pH used to Identify Impacted Locations without outliers

ARCADIS

FIGURE
F-1





Notes: Bedrock category is in bottom graph, other 3 categories in top graph.

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VANADIUM, NEW MEXICO

TECHNICAL MEMORANDUM ON REFERENCE AREAS

Piper Diagrams of Locations in the Soil Categories

ARCADIS

FIGURE

F-2

Attachment B

URS Data Validation Report

Draft REPORT

DATA VALIDATION REPORT FEASIBILITY STUDY PROPOSAL-SMELTER/TAILINGS SOIL INVESTIGATIONAL UNIT

Prepared for
Freeport-McMoRan Copper & Gold

May 21, 2012

URS

URS Corporation
8181 East Tufts Avenue
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Project No. 22242587 Task 00003

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LIST OF APPENDICES

1. INTRODUCTION

This report contains the results of the data validation conducted for the soil samples collected during the Feasibility Study Proposal –Smelter/Tailing Soils Investigation Unit. The data were reviewed in accordance with the approved Quality Assurance Plan (QAP) prepared by Chino Mines Company and Steffen, Robertson and Kirsten (U.S.), Inc. (March 1997).

The samples were collected in September and October 2011. The samples were sent to ACZ Laboratories, Inc. (ACZ) in Steamboat, Colorado for analysis. The soil samples were analyzed for one or more of the following parameters: total copper, copper (Synthetic Precipitation Leaching Procedure (SPLP)), pH, total calcium, total organic carbon (TOC), total carbon (TC), nitrate/ nitrite as nitrogen (N), ammonia nitrogen, total Kjedahl nitrogen, nitrate as N, nitrite as N, total potassium, neutralization potential as $CaCO_3$, sulfur organic residual, sulfur pyritic sulfide, sulfur sulfate, total sulfur, and total sulfur minus sulfate. Results of the data validation performed on samples reported in these packages are presented in Sections 4 and 5.1 – 5.17 of this report.

Table 1-1 lists the samples for which data were validated, the corresponding data package, and the review narrative section in which validation results are presented. The cross reference to the laboratory identification numbers can be found in each of the review sections.

TABLE 1-1
DATA PACKAGE AND SAMPLE IDENTIFICATION SUMMARY

Data Package	Report Section[1]	Field Sample Identification	Depth (inches)
L90608	5.1	STS-BWC-2011-3	-
		STS-BWC-2011-4	-
		STS-BWC-2011-5	-
		STS-BWC-2011-6	-
		STS-BWC-2011-7	-
		STS-BWC-2011-8	-
		STS-BWC-2011-9	-
		STS-BWC-2011-10	-
		STS-BWC-2011-11	-
		STS-BWC-2011-12	-
		STS-BWC-2011-1	-
		STS-BWC-2011-2	-

TABLE 1-1
DATA PACKAGE AND SAMPLE IDENTIFICATION SUMMARY

Data Package	Report Section[1]	Field Sample Identification	Depth (inches)
L91218[1]	5.2	STS-AMD-2011-E3 0-6	0-6
		STS-AMD-2011-E1 6-12	6-12
		STS-AMD-2011-E2 6-12	6-12
		STS-AMD-2011-E3 6-12	6-12
		STS-AMD-2011-WREF1 0-6	0-6
		STS-AMD-2011-WREF2 0-6	0-6
		STS-AMD-2011-WREF1 12-18	12-18
		STS-AMD-2011-WREF2 18-24	18-24
		STS-AMD-2011-NREF1 0-6	0-6
		STS-AMD-2011-NREF2 0-6	0-6
		STS-AMD-2011-NREF1 18-24	18-24
		STS-AMD-2011-NREF2 18-24	18-24
		STS-AMD-2011-NEREF1 0-6	0-6
		STS-AMD-2011-NEREF2 0-6	0-6
		STS-AMD-2011-NEREF1 18-24	18-24
		STS-AMD-2011-NEREF2 12-18	12-18
		STS-AMD-2011-EREF1 0-6	0-6
		STS-AMD-2011-EREF2 0-6	0-6
		STS-AMD-2011-EREF1 6-12	6-12
		STS-AMD-2011-EREF2 6-12	6-12
L91360	5.3	STS-CG-2011-31	-
		DUP5	-
		STS-CG-2011-33	-
		STS-CG-2011-34	-
		STS-CG-2011-35	-
		STS-CG-2011-36	-
		DUP6	-
		STS-CG-2011-38	-
		STS-CG-2011-39	-
		STS-CG-2011-40	
L91219	5.4	DUP13	0-6
		DUP14	0-6
		DUP15	0-6
		DUP16	0-6
L91358	5.5	STS-PH-2011-FID37	-
		STS-PCUG-2011-40	-
		STS-PH-2011-FID101	-
		STS-PH-2011-REFPLOT3	-

TABLE 1-1
DATA PACKAGE AND SAMPLE IDENTIFICATION SUMMARY

Data Package	Report Section[1]	Field Sample Identification	Depth (inches)
		STS-PH-2011-REFPLOT4	-
		DUP11	-
		STS-PH-2011-FID105	-
		DUP12	-
		STS-PH-2011-REFPLOT1	-
		STS-PH-2011-REFPLOT2	-
		STS-PH-2011-FID22	-
		STS-PH-2011-FID10	-
		STS-PH-2011-FID15	-
		STS-PH-2011-FID16	-
		STS-PH-2011-FID17	-
		STS-PH-2011-FID18	-
L91357	5.6	STS-PCUG-2011-11	-
		STS-PCUG-2011-12	-
		STS-PCUG-2011-13	-
		STS-PCUG-2011-14	-
		STS-PCUG-2011-41	-
		STS-PCUG-2011-16	-
		STS-PCUG-2011-17	-
		STS-PCUG-2011-18	-
		STS-PCUG-2011-19	-
		STS-PCUG-2011-20	-
		STS-CG-2011-21	-
		STS-CG-2011-09	-
		STS-CG-2011-10	-
		STS-CG-2011-24	-
		STS-CG-2011-25	-
		STS-CG-2011-26	-
		STS-CG-2011-27	-
		STS-CG-2011-28	-
		STS-CG-2011-29	-
		STS-CG-2011-30	-
L91355	5.7	STS-PCUG-2011-21	-
		STS-PCUG-2011-22	-
		STS-PCUG-2011-23	-
		STS-PCUG-2011-24	-
		STS-PCUG-2011-25	-
		DUP1	-

TABLE 1-1
DATA PACKAGE AND SAMPLE IDENTIFICATION SUMMARY

Data Package	Report Section[1]	Field Sample Identification	Depth (inches)
		DUP2	-
		STS-PCUG-2011-28	-
		STS-PCUG-2011-29	-
		STS-PCUG-2011-30	-
		DUP7	-
		STS-CG-2011-42	-
		STS-CG-2011-43	-
		DUP8	-
		STS-CG-2011-45	-
		STS-CG-2011-46	-
		DUP9	-
		DUP3	-
		STS-CG-2011-49	-
		STS-CG-2011-50	-
L91220	5.8	STS-AMD-2011-W1 0-6	0-6
		STS-AMD-2011-W2 0-6	0-6
		STS-AMD-2011-W3 0-6	6-12
		STS-AMD-2011-W1 6-12	6-12
		STS-AMD-2011-W2 12-18	12-18
		STS-AMD-2011-W3 12-18	12-18
		STS-AMD-2011-N1 0-6	0-6
		STS-AMD-2011-N2 0-6	0-6
		STS-AMD-2011-N3 0-6	0-6
		STS-AMD-2011-N1 18-24	18-24
		STS-AMD-2011-N2 18-24	18-24
		STS-AMD-2011-N3 18-24	18-24
		STS-AMD-2011-NE1 0-6	0-6
		STS-AMD-2011-NE2 0-6	0-6
		STS-AMD-2011-NE3 0-6	0-6
		STS-AMD-2011-NE1 18-24	18-24
		STS-AMD-2011-NE2 18-24	18-24
		STS-AMD-2011-NE3 18-24	18-24
		STS-AMD-2011-E1 0-6	0-6
		STS-AMD-2011-E2 0-6	0-6
L91393	5.9	RINSATE3	-
		RINSATE4	-
		RINSATE1	-
		RINSATE5	-

TABLE 1-1
DATA PACKAGE AND SAMPLE IDENTIFICATION SUMMARY

Data Package	Report Section[1]	Field Sample Identification	Depth (inches)
		RINSATE7	-
		RINSATE8	-
		RINSATE2	-
		RINSATE6	-
L91526	5.10	STS-PCUG-2011-27	-
		STS-PCUG-2011-31	-
		DUP4	-
		STS-PCUG-2011-5	-
		STS-PCUG-2011-6	-
		STS-PCUG-2011-8	-
		STS-PCUG-2011-9	-
		STS-PCUG-2011-15	-
		STS-PH-2011-FID106	-
		STS-PCUG-2011-32	-
		STS-PCUG-2011-34	-
		STS-PCUG-2011-35	-
		STS-PCUG-2011-36	-
		STS-PCUG-2011-37	-
		DUP10	-
		STS-CG-2011-44	-
		STS-CG-2011-47	-
		STS-CG-2011-48	-
		STS-CG-2011-16	-
		STS-CG-2011-7	-
L91527	5.11	STS-CG-2011-51	-
		STS-CG-2011-52	-
		STS-CG-2011-53	-
		STS-CG-2011-54	-
		STS-CG-2011-55	-
		STS-CG-2011-56	-
		STS-CG-2011-57	-
		STS-CG-2011-32	-
		STS-CG-2011-37	-
		STS-CG-2011-41	-
		STS-CG-2011-1	-
		STS-CG-2011-2	-
		STS-CG-2011-3	-
		STS-CG-2011-4	-

TABLE 1-1
DATA PACKAGE AND SAMPLE IDENTIFICATION SUMMARY

Data Package	Report Section[1]	Field Sample Identification	Depth (inches)
		STS-CG-2011-5	-
		STS-CG-2011-6	-
		STS-CG-2011-18	-
		STS-CG-2011-8	-
		STS-CG-2011-22	-
		STS-CG-2011-23	-
L91528	5.12	STS—PH-2011-FID102	-
		STS—PH-2011-FID7	-
		STS—PH-2011-FID8	-
		STS—PH-2011-FID28	-
L92172	5.13	STS—PH-2011-FID37	-
		STS—PH-2011-FID101	-
		STS—PH-2011-REFPLOT3	-
		STS—PH-2011-REFPLOT4	-
		STS—PH-2011-FID105	-
		STS—PH-2011-REFPLOT1	-
		STS—PH-2011-REFPLOT2	-
		STS—PH-2011-FID22	-
		STS—PH-2011-FID10	-
		STS—PH-2011-FID15	-
		STS—PH-2011-FID16	-
		STS—PH-2011-FID17	-
		STS—PH-2011-FID18	-
		STS—PH-2011-FID106	-
		STS—PH-2011-FID102	-
		STS—PH-2011-FID7	-
		STS—PH-2011-FID8	-
		STS—PH-2011-FID28	-
L92223[1]	5.14	STS-AMD-2011-W1 0-6	0-6
		STS-AMD-2011-W2 0-6	0-6
		STS-AMD-2011-W3 0-6	0-6
		STS-AMD-2011-W1 6-12	6-12
		STS-AMD-2011-W2 12-18	12-18
		STS-AMD-2011-W3 12-18	12-18
		STS-AMD-2011-N1 0-6	0-6
		STS-AMD-2011-N2 0-6	0-6
		STS-AMD-2011-N3 0-6	0-6
		STS-AMD-2011-N1 18-24	18-24

TABLE 1-1
DATA PACKAGE AND SAMPLE IDENTIFICATION SUMMARY

Data Package	Report Section[1]	Field Sample Identification	Depth (inches)
		STS-AMD-2011-N2 18-24	18-24
		STS-AMD-2011-N3 18-24	18-24
		STS-AMD-2011-NE1 0-6	0-6
		STS-AMD-2011-NE2 0-6	0-6
		STS-AMD-2011-NE3 0-6	0-6
		STS-AMD-2011-NE1 18-24	18-24
		STS-AMD-2011-NE2 18-24	18-24
		STS-AMD-2011-NE3 18-24	18-24
		STS-AMD-2011-E1 0-6	0-6
		STS-AMD-2011-E2 0-6	0-6
L92224	5.15	STS-AMD-2011-E3 0-6	0-6
		STS-AMD-2011-E1 6-12	6-12
		STS-AMD-2011-E2 6-12	6-12
		STS-AMD-2011-E3 6-12	6-12
		STS-AMD-2011-WREF1 0-6	0-6
		STS-AMD-2011-WREF2 0-6	0-6
		STS-AMD-2011-WREF1 12-18	12-18
		STS-AMD-2011-WREF2 18-24	18-24
		STS-AMD-2011-NREF1 0-6	0-6
		STS-AMD-2011-NREF2 0-6	0-6
		STS-AMD-2011-NREF1 18-24	18-24
		STS-AMD-2011-NREF2 18-24	18-24
		STS-AMD-2011-NEREF1 0-6	0-6
		STS-AMD-2011-NEREF2 0-6	0-6
		STS-AMD-2011-NEREF1 18-24	18-24
		STS-AMD-2011-NEREF2 12-18	12-18
		STS-AMD-2011-EREF1 0-6	0-6
		STS-AMD-2011-EREF2 0-6	0-6
		STS-AMD-2011-EREF1 6-12	6-12
		STS-AMD-2011-EREF2 6-12	6-12
L91359	5.16	STS-CG-2011-11	-
		STS-CG-2011-12	-
		STS-CG-2011-13	-
		STS-CG-2011-14	-
		STS-CG-2011-15	-
		STS-CG-2011-17	-
		STS-CG-2011-19	-
		STS-CG-2011-20	-

TABLE 1-1
DATA PACKAGE AND SAMPLE IDENTIFICATION SUMMARY

Data Package	Report Section[1]	Field Sample Identification	Depth (inches)
		STS-PCUG-2011-1	-
		STS-PCUG-2011-2	-
		STS-PCUG-2011-3	-
		STS-PCUG-2011-4	-
		STS-PCUG-2011-33	-
		STS-PCUG-2011-7	-
		STS-PCUG-2011-38	-
		STS-PCUG-2011-39	-
		STS-PCUG-2011-10	-
L90609	5.17	RINSATE BLANK #1	-

[1]Data packages L91218 and L92223 were used to evaluate both laboratory performance criteria (Section 4) and sample specific criteria (Section 5).
- No depth given

This data validation report describes the data validation process used and presents the data review results for surface water samples and associated quality control (QC) sample analyses.

In accordance with the QAP, a review of all data was conducted independently of the laboratory. The review consisted of evaluation of laboratory performance criteria and sample-specific criteria using guidance from the USEPA National Functional Guidelines for Inorganic Data Review (January 2010). The laboratory performance criteria evaluated included: initial calibration procedures and results, continuing calibration procedures and results, inductively coupled plasma (ICP) interference check sample results, contract required detection limit (CRDL) standard analysis and results, laboratory control sample results, and result quantitation and verification, as applicable to the method. An evaluation of laboratory performance criteria was conducted on at least 10% of the data set per analysis type. Section 2 and Tables 2-1 and 2-2 provide the QC requirements for the laboratory performance criteria.

The sample-specific criteria evaluated included: chain-of-custody (COC) and sample receipt documentation, holding times, blank contamination, duplicate sample analysis, matrix spike/matrix spike duplicate sample analysis, serial dilution results (as applicable to the method), post digestion spike recovery (as applicable to the method), and field duplicate results agreement as applicable to the method. The sample specific criteria were evaluated for every data package received. Section 3 and Table 3-1 summarize the sample-specific criteria that were used in the data validation process and how data were qualified.

Section 4 presents the results of the evaluation of laboratory performance criteria. The review of sample-specific criteria is presented in Section 5. The results obtained for field quality control samples are discussed in Section 6 and an overall assessment of data, with respect to the data quality indicators, is presented in Section 7.

During the data validation process, the data reviewer annotated on the analytical data sheets any data validation qualifiers assigned (“U”, “J”, “UJ”, and “R”) and associated qualifier and bias codes as listed in Tables 1-2 and 1-3. The purpose of the qualifier codes is to provide information with regard to the data quality condition(s) that resulted in the assigned qualifiers. The bias code provides an indication of the bias direction of the results qualified as estimated based on data quality condition(s) that resulted in the data qualification and the results of the other associated quality control analyses. The data qualifier codes are followed by a hyphen and the applicable bias code. For example, a result qualified as estimated due to a holding time exceedance, which resulted in a potential low bias in the result, has the following code annotated on the data sheet, “HT-L.” In the case of multiple data quality conditions resulting in qualification, each qualifier code is listed and separated by a comma. For example, a result qualified as estimated due to low matrix spike recovery and poor method duplicate precision would have the following codes annotated on the data sheet, “MS, D – I. The data reporting forms with assigned data qualifiers are included in Appendix A.

TABLE 1-2
DATA VALIDATION QUALIFIER DEFINITIONS

Qualifier	Definitions [1]
U	The analyte was analyzed for, but was not detected above the level of the associated value. The associate value is either the sample quantitation limit or the sample detection limit.
J	The associated value is an estimated quantity.
UJ	The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The data are unusable. (Note: Analyte may or may not be present.)

[1] USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, January 2010.

TABLE 1-3
DATA VALIDATION QUALIFIER CODES

Qualifier Code	Data Quality Condition Resulting In Assigned Qualification
General use	
HT	Holding time requirement was not met
MB or PB	Method blank or preparation blank contamination
LCS	Laboratory control sample evaluation criteria not met
RB	Rinsate blank contamination
FD	Field duplicate evaluation criteria not met
P	Preservation requirement was not met
EF	Extraction fluid contamination
RL	Reporting limit exceeds decision criteria (for nondetects)
Inorganic methods	
ICV	Initial calibration verification evaluation criteria not met
CCV	Continuing calibration verification evaluation criteria not met
CCB	Continuing calibration blank contamination
PB	Preparation blank contamination
ICS	Interference check sample evaluation criteria not met
MS and/or MSD	Matrix spike and/or matrix spike duplicate recovery outside acceptance range
PDS	Post-digestion spike recovery outside acceptance range
MSA	Method of standard additions correlation coefficient ≤ 0.995
D	Duplicate precision evaluation criteria not met
IS	Internal standard recovery outside acceptance range for ICP-MS
ICS	Interferent check solution evaluation criteria not met
SD	Serial dilution results did not meet evaluation criteria
CRDL	Contract Required Detection Limit standard recovery not met
CE	Counting error
Bias Codes	**Bias Direction**
H	Bias in sample result likely to be high
L	Bias in sample result likely to be low
I	Bias in sample result is indeterminate

2. EVALUATION OF LABORATORY PERFORMANCE CRITERIA

The laboratory performance review criteria used in validation are summarized in Tables 2-1 and 2-2. Table 2-1 is pertinent to metals determination by ICP and ICP-MS. Table 2-2 is pertinent to general chemistry parameters. Laboratory performance criteria were evaluated for one of the packages for each analysis parameter group. The results of the laboratory performance criteria review are presented in Section 4.

TABLE 2-1
LABORATORY PERFORMANCE CRITERIA – METALS

Method	QC Check*	Minimum Frequency	Acceptance Criteria	Qualifiers
ICP (6010B or 200.7)/ ICP-MS (6020 or 200.8)	Initial calibration (minimum 1 standard and a blank)	Daily prior to sample analysis	• Correlation Coefficient ≥0.995 for linear regression.	• If r <0.995, qualify all results as estimated (J/UJ).
	Second source initial calibration verification (ICV)	Daily after initial calibration	• All analytes within ±10% of expected value. • RSD of replicate integrations <5%.	• If %R falls outside the acceptance range but within range of 75-89% or 111-125%, qualify results >IDL (MDL) as estimated (J). • If %R is within 111-125%, results <IDL (MDL) are acceptable. • If %R is 75-89%, qualify results <IDL (MDL) as estimated (UJ). • If %R is <75%, qualify all results as unusable (R). • If %R is >125%, qualify results >IDL (MDL) as unusable (R); results <IDL (MDL) are acceptable without qualification. • No qualification issued for RSD >5%.
	Continuing calibration verification (CCV)	After every 10 samples and at the end of the analysis sequence	• All analytes within ±10% of expected value. • RSD of replicate integrations <5%.	
	Linear Range Analysis (LRA)	Quarterly	• All analytes agree within 5% of true value.	• NA
	Contract Required Detection Limit (CRDL) standard	At beginning and end of each sample analysis	• None	• Professional judgment will be used for the need for qualification for %Rs outside 50-150% based on the relative concentration of the CRDL standard and the sample concentration.
	Interference check solution (ICS)	At the beginning and end of the analytical run	• Recovery of spiked analytes within ±20% of expected value. • Results for analytes not present in the ICS solution must be <RL (PQL).	• If %R is >120%, results <IDL (MDL) are acceptable. • If %R is >120%, qualify results >IDL (MDL) as estimated (J). • If %R is within 50-79%, qualify results >IDL (MDL) as estimated (J). • If %R is within 50-79%, qualify results <IDL (MDL) as estimated (UJ). • If %R is <50%, qualify all results as unusable (R). • If results > IDL (MDL) are observed that are not present in the ICS solution and the sample has concentrations at the level of the interferents concentrations, qualify sample results >IDL (MDL) as estimated (J) if the amount of bias is ≥25% of sample result. • If negative concentrations are observed that are not present in the ICS solution at a concentration where the absolute value is >IDL (MDL), qualify sample results as estimated (J/UJ) if the bias is more than 25% of the reported result and the sample has a concentration comparable to the interferent concentrations in the ICS solution.
	Laboratory Control Sample (LCS) (aqueous)	One per analytical batch containing aqueous samples	• 80-120% recovery for water samples.	• If %R is within 50-79% or >120%, qualify results >IDL (MDL) as estimated (J). • If %R >120%, results <IDL (MDL) are acceptable without qualification. • If %R is within 50-79%, qualify results <IDL (MDL) as estimated (J/UJ) • If %R is <50%, qualify all results as unusable (R).
	Laboratory Control Sample (LCS) (solid)	One per analytical batch containing solid samples	• LCS results must fall within the control limits established by the EPA.	• If LCS recovery falls outside the control limits, qualify results >IDL (MDL) as estimated (J). • If LCS recovery is > control limits, results <IDL (MDL) are acceptable without qualification. • If LCS recovery is>50 % and < control limits, qualify results <IDL (MDL) as estimated (J/UJ). • If %R is <50%, qualify all results as unusable (R).

*As applicable to the method.

TABLE 2-2
LABORATORY PERFORMANCE CRITERIA – GENERAL CHEMISTRY PARAMETERS

Method	QC Check*	Minimum Frequency	Acceptance Criteria	Qualifiers
General Chemistry Parameters	Initial multipoint calibration (minimum 3 standards and a blank)	Daily prior to sample analysis	• Correlation Coefficient ≥0.995 for linear regression.	• If r <0.995, qualify all results as estimated (J/UJ).
	CRDL standard	At beginning and end of each sample analysis	None	• Professional judgment will be used for the need for qualification for %Rs outside 50-150% based on the relative concentration of the CRDL standard and the sample concentration.
	Second source initial calibration verification (ICV)	Daily after initial calibration	• Analyte within ± 20% of expected value.	• If %R falls outside the acceptance range but within range of 65-79% or 121-135%, qualify results >IDL (MDL) as estimated (J). • If %R is within 121-135%, results <IDL (MDL) are acceptable without qualification. • If %R is 65-79%, qualify results <IDL (MDL) as estimated (UJ). • If %R is <65%, qualify all results as unusable (R). • If %R is >135%, qualify results >IDL (MDL) as unusable (R); results <IDL (MDL) are acceptable.
	Continuing calibration verification (CCV)	After every 10 samples and at the end of the analysis sequence	• Analyte within 20% of expected value.	• If %R falls outside the acceptance range but within range of 65-79% or 121-135%, qualify results >IDL (MDL) as estimated (J). • If %R is within 121-135%, results <IDL (MDL) are acceptable without qualification. • If %R is 65-79%, qualify results <IDL (MDL) as estimated (UJ). • If %R is <65%, qualify all results as unusable (R). • If %R is >135%, qualify results >IDL (MDL) as unusable (R); results <IDL (MDL) are acceptable.
	Laboratory Control Sample (LCS) (aqueous)	One per analytical batch containing aqueous samples	• 80-120% recovery for water samples.	• If %R is within 50-79% or >120%, qualify results >IDL (MDL) as estimated (J). • If %R >120%, results <IDL (MDL) are acceptable without qualification. • If %R is within 50-79%, qualify results <IDL (MDL) as estimated (J/UJ) • If %R is <50%, qualify all results as unusable (R).
	Laboratory Control Sample (LCS) (solid)	One per analytical batch containing solid samples	• LCS results must fall within the control limits.	• If LCS recovery falls outside the control limits, qualify results >IDL (MDL) as estimated (J). • If LCS recovery is > control limits, results <IDL (MDL) are acceptable without qualification. • If LCS recovery is>50 % and < control limits, qualify results <IDL (MDL) as estimated (J/UJ). • If %R is <50%, qualify all results as unusable (R).

*As applicable to the method.

3. EVALUATION OF SAMPLE-SPECIFIC CRITERIA

Sample-specific criteria were reviewed for all data packages. The review criteria and resultant actions are summarized in Table 3-1. The results of the sample-specific review are detailed in Section 5. Each subsection of Section 5 presents the review narrative for one data package.

TABLE 3-1
SAMPLE-SPECIFIC CRITERIA

Method*	QC Check	Minimum Frequency	Acceptance Criteria	Qualifiers
ICP (6010B or 200.7) ICPMS (6020 or 200.8) General Chemistry Parameters	Holding Time	Each Sample	• Analysis within the holding time requirements specified in the QAPP. • No holding time was specified in the QAPP for pH. The reviewer used a holding time of 2 days for soil samples. • No holding time was specified in the QAPP for soil general chemistry parameters. The reviewer used general chemistry parameter water limits. • There is no holding time criterion for acid base accounting over burden parameters or the sulfur forms.	• If sample was analyzed outside the holding time requirements, then the sample results were qualified as estimated (J/UJ).
	Continuing calibration blank (CCB)	After every calibration verification	• <RL (PQL) for positive results. • <RL (PQL) for |negative results|.	• Sample results, for an analyte detected in an associated blank at a concentration, <5x the blank concentration, qualify as nondetect (U). • Sample results for an analyte reported in an associated blank at a negative concentration <|4x blank concentration|, qualify results as estimated (J/UJ).
	Method Blank	One per analytical batch	• No analytes detected ≥ RL (PQL).	• Sample results, for an analyte detected in the method blank at a concentration, <5x the blank concentration, qualify as nondetect (U). • Sample results for an analyte reported in the method blank at a negative concentration <|4x blank concentration|, qualify results as estimated (J/UJ).
	ICP Serial Dilution Test	One per analytical batch	• 1:5 dilution must agree within ±10% of the original determination for analytes present at concentrations >50x MDL.	• If %D is >10%, qualify associated data as estimated (J/UJ).
	Matrix Spike (MS)	One per 20 samples	• Recovery within 75-125% for both water and soils. • If sample result is ≥4x the spike amount then the matrix spike is not an appropriate for assessing accuracy measurement.	• If % R is >125%, results <IDL (MDL) are acceptable without qualification. • If %R is >125% or <75%, qualify results >IDL (MDL) as estimated (J). • If % R is within 30-74%, qualify results <IDL (MDL) as estimated (J/UJ). • If % R is <30%, qualify results <IDL (MDL) as unusable(R).

TABLE 3-1
SAMPLE-SPECIFIC CRITERIA (continued)

Method*	QC Check	Minimum Frequency	Acceptance Criteria	Qualifiers
	Laboratory Duplicate or Matrix Spike Duplicate	One per 20 samples	If both results >5x RL (PQL) • RPD for water is ≤20%. • RPD for soils is ≤35%. If either sample result is <5x the RL (PQL) then • Absolute difference ≤1x RL (PQL) (waters). • Absolute difference ≤2x RL (PQL) (soils).	• If the RPD or absolute difference falls outside the appropriate fixed control windows, qualify the results for that analyte as estimated (J/UJ).
	Field Duplicate		If both results >5x RL (PQL) • RPD for soils is ≤50%. If either sample result is <5x then • Absolute difference ≤ 3x RL (PQL).	• If the RPD or absolute difference falls outside the appropriate fixed control windows, qualify the results for that analyte as estimated (J/UJ).
	Post-digestion spike (PDS) 200.7 (ICP)	Typically, when the MS failed or at analyst discretion	• Recovery within 75-125% for both water and soils. • If sample result is ≥4x the spike amount then the PDS is not an appropriate for assessing accuracy measurement.	• No qualification was issued. • Post-digestion spikes were conducted to aid in determining whether the MS results that were out of acceptance limits were caused by the sample matrix, a bias in the analytical system, or a combination of both.
	Internal Standard Recoveries (200.8 ICPMS and 6020)	Required for all samples	• Recoveries within 65-125% (200.8) • Recoveries within 30-120% (6020)	• Qualify associated sample results as estimated (J/UJ).

*As applicable to the method.

4. REVIEW OF LABORATORY PERFORMANCE EVALUATION CRITERIA

Data packages L91218 and L92223 were used to evaluate laboratory performance parameters for metals (Method 200.7), total carbon (TC), total organic carbon (TOC), saturated paste pH, percent solids, nitrate as N, nitrite as N, nitrate/ nitrite as N, total Kjeldahl nitrogen, and ammonia as N. The data reported in these data packages accounted for greater than 10% of the investigation data. The evaluation of laboratory performance criteria was conducted as summarized in Tables 2-1 and 2-2. No information could be provided for recalculation for acid base accounting over burden analyses (ABA) including the sulfur forms.

4.1 Initial Calibration

ICP – Each ICP analytical run was initiated with the analysis of a blank and at least one standard, which satisfied the initial calibration criterion. All metals in the second source ICV standard were recovered within the acceptance range of 90-110% for all ICV analyses. Target analytes were not detected in the initial calibration blank sample. Site-specific samples were not analyzed directly after the initial calibration blank and before the first continuing calibration blank. Therefore, data qualification for ICP metals data was not necessary based on the initial calibration.

General Chemistry

- TC/ TOC – The laboratory used 3 calibration standards (high sulfur, low sulfur, and carbon). Each standard is run through the instrument at three different weights that bracket our standard sample size (0.1 grams, 0.3 grams, and 0.5 grams). These three points are then plotted on a linear graph that is fixed at the origin to validate each instrument response cell against the true value of the standard. The percent concentrations and intensities are calculated from the mass analyzed as part of the computer program designed for the instrument. As ACZ could not provide this information, the calibration curves could not be recalculated.

- Saturated Paste pH – The relationship between instrument response and concentration was established with a pH 2 buffer, pH 7 buffer, and pH 10 buffer.

- Nitrate/ Nitrite as N – The relationship between instrument response and concentrations was established with a blank and six standards.

- Nitrite as N – The relationship between instrument response and concentration was established with a blank and six standards.

- Ammonia as N – The relationship between instrument response and concentration was established with a blank and four standards.

- Total Kjeldahl Nitrogen – The relationship between instrument response and concentration was established with a blank and five standards.

The correlation coefficients for all general chemistry methods were >0.995. The calibrations were verified with the analysis of an ICV. All analytes were recovered within the acceptance range of 80-120%. Because all response and linearity criteria were met, data qualification on the basis of initial calibration was not necessary.

4.2 Continuing Calibration Verification

The continuing calibration verification solutions (CCV) were analyzed at the required frequency for all methods. All continuing calibration criteria were satisfied and data qualification was not necessary.

4.3 Interference Check Sample (ICS) for Metals

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interfering elements present could not be evaluated for positive and negative biases suggested by the ICSA.

As method 6010B requires an ICS be analyzed, the subsequent data packages were evaluated on the basis of ICS results where applicable. Method 200.8 (rinsate blanks) does not require that an ICS be analyzed.

4.4 Laboratory Control Samples (LCS)

Laboratory control samples were prepared with each batch of samples. The recoveries for all analytes were within the control limits of 80-120%. Therefore, data qualification based on LCS results was not necessary.

4.5 CRDL Standard (Metals Only)

A CRDL standard (a low standard with concentrations at the laboratory reporting limit) is not required by methods 200.7, 200.8, 6010B, or 6020 and was not run by the laboratory. Further action was not necessary.

4.6 Tune (ICP-MS)

Tune was evaluated for data package L91393 in Section 5.9.

4.7 Sample Quantitation and Result Verification

Sample quantitation was checked by recalculating a minimum of 10% of the reported sample results from the raw system printouts. Examples of calculated results included correlation coefficients, reported sample results, percent differences for serial dilutions, recoveries for calibration standards, and RPDs between duplicate results. No calculation or reporting errors were found.

5. REVIEW OF SAMPLE SPECIFIC CRITERIA FOR ALL DATA PACKAGES

Sample-specific criteria were evaluated for all data packages. The evaluation of sample-specific criteria was conducted as summarized in Table 3-1. The data review narratives for the fourteen data packages are presented in Subsection 5.1 -5.17.

5.1 ACZ Data Package L90608

Data package L90608 contained the analytical results for twelve soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L90608-01	STS-BWC-2011-3	Total Copper, pH, percent solids	MS/MSD - Total Copper MD - pH	-
L90608-02	STS-BWC-2011-4			-
L90608-03	STS-BWC-2011-5			-
L90608-04	STS-BWC-2011-6		SD – Total Copper	-
L90608-05	STS-BWC-2011-7			-
L90608-06	STS-BWC-2011-8			-
L90608-07	STS-BWC-2011-9			-
L90608-08	STS-BWC-2011-10			-
L90608-09	STS-BWC-2011-11			-
L90608-10	STS-BWC-2011-12			-
L90608-11	STS-BWC-2011-1			-
L90608-12	STS-BWC-2011-2			-

ID – Identification
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
SD – Serial Dilution
MD – Method Duplicate
QC – Quality Control
- no depth given

5.1.1 *Overall Assessment*

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.1.2 *COC and Sample Receipt Documentation*

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact. The cooler was received at a temperature of 15.8 °C, above the temperature criterion of ≤6°C. Based on the stability of total copper, pH, and percent solids, data qualification was not considered necessary for these analytes.

Sample DUPLICATE#1STS-BWC-2 was listed on the COC; however, this samples is not associated with the Smelter/ Tailing Soils Investigation Unit and was not included in the report. Further action was not considered necessary.

5.1.3 Holding Times

With the exception listed below, the samples were prepared and analyzed within the required holding time limits.

The holding time criterion of 2 days for pH analysis was exceeded for all the samples in this data package. The pH results for the samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.1.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method or calibration blanks.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.1.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.1.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.1.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample STS-BWC-2011-6. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.1.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.1.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.1.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.1.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.2 ACZ Data Package L91218

Data package L91218 contained the analytical results for twenty soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91218-01	STS-AMD-2011-E3 0-6	Total Calcium, Copper (SPLP), Total Copper, Total Potassium, TC, TOC, pH, Percent Solids, Nitrate as N, Nitrate/Nitrite as N, Nitrite as N, Ammonia as N*, Total Kjeldahl Nitrogen*	MD – TC, TOC, Nitrate/Nitrite as N, Nitrite as N, pH MS/MSD – Copper (SPLP)	0-6
L91218-02	STS-AMD-2011-E1 6-12		MS – Nitrate/ Nitrite as N, Nitrite as N	6-12
L91218-03	STS-AMD-2011-E2 6-12			6-12
L91218-04	STS-AMD-2011-E3 6-12			6-12
L91218-05	STS-AMD-2011-WREF1 0-6			0-6
L91218-06	STS-AMD-2011-WREF2 0-6		SD – Total Calcium, Total Copper, Total Potassium	0-6
L91218-07	STS-AMD-2011-WREF1 12-18		SD – Total Copper	12-18
L91218-08	STS-AMD-2011-WREF2 18-24			18-24
L91218-09	STS-AMD-2011-NREF1 0-6			0-6
L91218-10	STS-AMD-2011-NREF2 0-6		MS/MSD – Total Calcium, Total Copper, Total Potassium SD – Copper (SPLP)	0-6
L91218-11	STS-AMD-2011-NREF1 18-24			18-24
L91218-12	STS-AMD-2011-NREF2 18-24			18-24
L91218-13	STS-AMD-2011-NEREF1 0-6			0-6
L91218-14	STS-AMD-2011-NEREF2 0-6			0-6
L91218-15	STS-AMD-2011-NEREF1 18-24			18-24
L91218-16	STS-AMD-2011-NEREF2 12-18			12-18
L91218-17	STS-AMD-2011-EREF1 0-6			0-6
L91218-18	STS-AMD-2011-EREF2 0-6			0-6
L91218-19	STS-AMD-2011-EREF1 6-12			6-12
L91218-20	STS-AMD-2011-EREF2 6-12		MD – Copper (SPLP), Percent Solids	6-12

ID – Identification
MD – Method Duplicate
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
QC – Quality Control
SD – Serial Dilution
TC – Total Carbon
TOC – Total Organic Carbon
SPLP – Synthetic Precipitation Leaching Procedure
* Ammonia as nitrogen and total Kjeldahl nitrogen were requested on the COC, but not reported in this data package. The ammonia as nitrogen and total Kjeldahl nitrogen results for all samples are reported in SDG L92224.

5.2.1 Overall Assessment

With two exceptions, data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The non-detect nitrite as N results for samples STS-AMD-2011-EREF2 6-12 and STS-AMD-2011-EREF2 0-6 were analyzed 2x past the 48 hour holding time criterion and were qualified as unusable (R) due to holding time exceedance. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.2.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 8°C - 11°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

Ammonia as nitrogen and total Kjeldahl nitrogen were requested on the COC, but not reported in this data package. The ammonia as nitrogen and total Kjeldahl nitrogen results for all samples are reported in SDG L92224. Further action was not necessary.

The field IDs for numerous samples were truncated on the data sheets due to laboratory software limitations. The datasheets were updated to include the depths and reflect the proper nomenclature. Further action was not necessary.

5.2.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits.

The total carbon and total organic carbon results for all samples were analyzed 5-8 days outside of the 28 day holding time requirement. Therefore, the total carbon and total organic carbon results for all samples were qualified as estimated (J HT-L) to reflect the potential low bias.

The nitrite as N results for all samples were analyzed >2x the 48 hour holding time requirement. The detected nitrite as N results were qualified as estimated (J HT-L) and the non-detect nitrite as N results for samples STS-AMD-2011-EREF2 0-6 and STS-AMD-2011-EREF2 6-12 were qualified as unusable (R).

The nitrate/ nitrite as N results for all samples were analyzed 5-8 days outside of the 28 day holding time requirement. The nitrite/ nitrate as N results were qualified as estimated (J HT-L) to reflect the potential low bias.

As the nitrate as N results were calculated from the nitrite as N and nitrate/ nitrite as N results, the detected nitrate as N results were qualified as estimated (J HT-L) to reflect the potential low bias.

The holding time criterion of 2 days for pH analysis was exceeded for all the samples in this data package. The pH results for the samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.2.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

With the exceptions noted below, target analytes were not detected in the method or calibration blanks.

Blank	Analyte	Concentration	Data Qualification
WG313308			
MB	Total Calcium	22 mg/Kg	None. The associated sample listed analytical results were reported at concentrations >5x the blank contamination.
CCB02		0.21 mg/L*	
CCB01	Total Copper	0.025 mg/L*	
CCB03	Total Potassium	0.57 mg/L*	
WG313352			
MB	Total Copper	3.5 mg/Kg	None. The associated sample listed analytical results were reported at concentrations >5x the blank contamination.
CCB01		0.033 mg/L*	
CCB02		0.067 mg/L*	

\> – Greater Than
mg/Kg – Milligrams per kilogram
CCB – Continuing Calibration Blank
mg/L – Milligrams per Liter
MB – Method Blank
* The CCB concentration was converted from mg/L to mg/Kg by multiplying by 100.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.2.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.2.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.2.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. Serial dilutions were conducted on samples STS-AMD-2011-WREF2 0-6, STS-AMD-2011-WREF1 12-18, and STS-AMD-2011-NREF2 0-6. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.2.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.2.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.2.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.2.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.3 ACZ Data Package L91360

Data package L91360 contained the analytical results for eight soil samples and two field duplicates. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L91360-01	STS-CG-2011-31	Total Copper, Percent Solids	MS/MSD – Total Copper MD – Percent Solids	-
L91360-02	DUP5		FD to STS-CG-2011-28	-
L91360-03	STS-CG-2011-33			-
L91360-04	STS-CG-2011-34			-
L91360-05	STS-CG-2011-35		SD – Total Copper	-
L91360-06	STS-CG-2011-36			-
L91360-07	DUP6		FD to STS-PCUG-2011-7	-
L91360-8	STS-CG-2011-38			-
L91360-09	STS-CG-2011-39			-
L91360-10	STS-CG-2011-40			-

FD – Field Duplicate
ID – Identification
MD – Method Duplicate
- no depth given
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
QC – Quality Control
SD – Serial Dilution

5.3.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.3.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 10.4°C – 13.6°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.3.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification was not necessary.

5.3.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

With the exception noted below, target analytes were not detected in the method and calibration blanks.

Blank	Analyte	Concentration	Data Qualification
WG313584			
MB	Total Copper	1.4 mg/Kg	None. The associated sample total copper sample results were reported at concentrations >5x the blank contamination.

> – Greater Than
mg/Kg – Milligrams per kilogram
MB – Method Blank

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.3.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.3.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.3.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample STS-CG-2011-35. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.3.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.3.9 Field Duplicate

Two field duplicates, DUP5 and DUP6, were reported in this data package. Field duplicate results are discussed in Section 6.

5.3.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.3.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.4 ACZ Data Package L91219

Data package L91219 contained the analytical results for four field duplicate soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91219-01	DUP13	Total Calcium, Copper (SPLP), Total Copper, Total Potassium, TC, TOC, pH, Percent Solids, Nitrate as N, Nitrate/Nitrite as N, Nitrite as N	MS/MSD – Total Calcium, Total Copper, Total Potassium MD – TC, TOC, Copper (SPLP), Nitrite/ Nitrate as N, Nitrite as N, pH FD to STS-AMD-2011-W3 0-6	0-6
L91219-02	DUP14		SD – Copper (SPLP) MS – Nitrate/Nitrite as N, Nitrite as N FD to STS-AMD-2011-NREF1 0-6	0-6
L91219-03	DUP15		FD to STS-AND-2011-E1 0-6	0-6
L91219-04	DUP16		SD – Total Calcium, Total Copper, Total Potassium MS/MSD – Copper (SPLP) MD – Percent Solids FD to STS-AMD-2011-NE1 0-6	0-6

FD – Field Duplicate
MD – Method Duplicate
QC – Quality Control
TC – Total Carbon
TOC – Total Organic Carbon
ID – Identification
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
SD – Serial Dilution
SPLP – Synthetic Precipitation Leaching Procedure

5.4.1 Overall Assessment

With two exceptions, data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The non-detect nitrite as N results for samples DUP14 and DUP16 were analyzed >2x the 48 hour holding time criterion and were therefore qualified as unusable (R) due to holding time exceedance. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.4.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 10°C – 12°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.4.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits.

The total carbon and total organic carbon results for all samples were analyzed 8 days outside of the 28 day holding time requirement. Therefore, the total carbon and total organic carbon results were qualified as estimated (J HT-L) to reflect the potential low bias.

The nitrite as N results for all samples were analyzed >2x the 48 hour holding time requirement. The detected nitrite as N results for were qualified as estimated (J HT-L) and the non-detect nitrite as N results for samples DUP14 and DUP16 were qualified as unusable (R).

The nitrite/ nitrate as N results for all samples were analyzed 9 days outside of the 28 day holding time requirement. The nitrite/ nitrate as N results for all samples were qualified as estimated (J HT-L) to reflect the potential low bias.

As the nitrate as N results were calculated from the nitrite as N and nitrate/ nitrite as N results, the detected nitrate as N results for all samples were qualified as estimated (J HT-L) to reflect the potential low bias.

The holding time criterion of 2 days for pH analysis was exceeded for all the samples in this data package. The pH results for the samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.4.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

With the exception noted below, target analytes were not detected in the method and calibration blanks.

Blank	Analyte	Concentration	Data Qualification
WG313470			
MB	Nitrate/ Nitrite as N	0.1 mg/Kg	None. The associated sample nitrate/ nitrite as N sample results were reported at concentrations >5x the blank contamination.

> – Greater Than
MB – Method Blank
mg/Kg – Milligrams per kilogram
N – Nitrogen

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.4.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.4.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.4.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. Serial dilutions were conducted on samples DUP14 (SPLP copper) and DUP16 (total calcium, total copper, and total potassium). With the exceptions listed below, the applicable percent differences were within ±10% for the 1:5 dilution of the sample.

Associated Sample	Analyte	%D	Qualification
DUP16			
All Samples	Total Calcium	14.7	The detected results for the listed analytes in the associated samples were qualified as estimated (J SD-L) to reflect the potential low bias. The bias is considered to be low as the native sample concentration is less than the diluted result.
	Total Copper	13.1	
	Total Potassium	14.2	

%D – Percent Difference
L – Low Bias
J – Estimated
SD – Serial Dilution

5.4.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.4.9 Field Duplicate

Four field duplicate, DUP13, DUP14, DUP15, and DUP16, were reported in this data package. Field duplicate results are discussed in Section 6.

5.4.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.4.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.5 ACZ Data Package L91358

Data package L91358 contained the analytical results for fourteen soil samples and two field duplicate soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91358-01	STS-PH-2011-FID37	Total Copper, ABA Parameters	MS/MSD – Total Copper MD – Sulfur Organic Residual, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, Total Sulfur minus Sulfate	-
L91358-02	STS-PCUG-2011-40	Total Copper, pH, Percent Solids		-
L91358-03	STS-PH-2011-FID101	Total Copper, ABA Parameters		-
L91358-04	STS-PH-2011-REFPLOT3			-
L91358-05	STS-PH-2011-REFPLOT4		SD – Total Copper	-
L91358-06	DUP11		FD to STS-PH-2011-FID 101	-
L91358-07	STS-PH-2011-FID105			-
L91358-08	DUP12		FD to STS-PH-2011-FID22	-
L91358-09	STS-PH-2011-REFPLOT1			-
L91358-10	STS-PH-2011-REFPLOT2			-
L91358-11	STS-PH-2011-FID22			-
L91358-12	STS-PH-2011-FID10			-
L91358-13	STS-PH-2011-FID15		MD - Percent Solids	-
L91358-14	STS-PH-2011-FID16			-

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91358-15	STS-PH-2011-FID17			-
L91358-16	STS-PH-2011-FID18			-

ABA – Acid Base Accounting Overburden Analysis
ID – Identification
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
SD – Serial Dilution
FD – Field Duplicate
MD – Method Duplicate
QC – Quality Control
\- no depth given
ABA parameters include: Acid Generation, Acid Neutralization, Acid-Base Potential, Neutralization Potential as $CaCO_3$, pH, Percent Solids, Organic Sulfur, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, and Total Sulfur minus Sulfate.

5.5.1 Overall Assessment

Data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.5.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 7.2°C – 11.6°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.5.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits.

The holding time criterion of 2 days for pH analysis was exceeded for sample STS-PCUG-2011-40. The pH result for this sample was qualified as estimated (J HT-L) to reflect the potential low bias.

5.5.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method or calibration blanks.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.5.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.5.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.5.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample STS-PH-2011-REFPLOT4. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.5.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.5.9 Field Duplicate

Two field duplicates, DUP11 and DUP12, were reported in this data package. Field duplicate results are discussed in Section 6.

5.5.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.5.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution.

Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.6 ACZ Data Package L91357

Data package L91357 contained the analytical results for twenty soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L91357-01	STS-PCUG-2011-11	Total Copper, pH, percent solids	MS/MSD - Total Copper	-
L91357-02	STS-PCUG-2011-12			-
L91357-03	STS-PCUG-2011-13			-
L91357-04	STS-PCUG-2011-14			-
L91357-05	STS-PCUG-2011-41			-
L91357-06	STS-PCUG-2011-16			-
L91357-07	STS-PCUG-2011-17			-
L91357-08	STS-PCUG-2011-18			-
L91357-09	STS-PCUG-2011-19			-
L91357-10	STS-PCUG-2011-20			-
L91357-11	STS-PCUG-2011-21	Total Copper, percent solids		-
L91357-12	STS-PCUG-2011-09			-
L91357-13	STS-PCUG-2011-10		SD – Total Copper	-
L91357-14	STS-PCUG-2011-24			-
L91357-15	STS-PCUG-2011-25			-
L91357-16	STS-PCUG-2011-26			-
L91357-17	STS-PCUG-2011-27			-
L91357-18	STS-PCUG-2011-28			-
L91357-19	STS-PCUG-2011-29			-
L91357-20	STS-PCUG-2011-30		MD – percent solids	-

ID – Identification
MD – Method Duplicate
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
QC – Quality Control
SD – Serial Dilution
- no depth given

5.6.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.6.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 9.2°C – 13.6°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.6.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits.

The holding time criterion of 2 days for pH analysis was exceeded for all samples in this data package. The pH results for these samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.6.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method or calibration blanks.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.6.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.6.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.6.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample STS-PCUG-2011-10. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.6.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.6.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.6.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.6.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.7 ACZ Data Package L91355

Data package L91355 contained the analytical results for fourteen soil samples and six field duplicate soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L91355-01	STS-PCUG-2011-21	Total Copper, pH, percent solids	MS/MSD - Total Copper MD – Percent Solids, pH	-
L91355-02	STS-PCUG-2011-22			-
L91355-03	STS-PCUG-2011-23			-
L91355-04	STS-PCUG-2011-24			-
L91355-05	STS-PCUG-2011-25			-
L91355-06	DUP1		FD to STS-PCUG-2011-19	-
L91355-07	DUP2		SD – Total Copper FD to STS-PCUG-2011-29	-
L91355-08	STS-PCUG-2011-28			-
L91355-09	STS-PCUG-2011-29			-
L91355-10	STS-PCUG-2011-30			-
L91355-11	DUP7	Total Copper, percent solids	FD to STS-CG-2011-43	-
L91355-12	STS-CG-2011-42			-
L91355-13	STS-CG-2011-43			-
L91355-14	DUP8		FD to STS-CG-2011-10	-
L91355-15	STS-CG-2011-45			-
L91355-16	STS-CG-2011-46			-
L91355-17	DUP9		FD to STS-CG-2011-42	-
L91355-18	DUP3		FD to STS-PCUG-2011-14	-
L91355-19	STS-CG-2011-49			-
L91355-20	STS-CG-2011-50			-

FD – Field Duplicate
ID – Identification
MD – Method Duplicate
- no depth given
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
QC – Quality Control
SD – Serial Dilution

5.7.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.7.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 9.2°C – 13.6°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.7.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits.

The holding time criterion of 2 days for pH analysis was exceeded for all samples in this data package. The pH results for these samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.7.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method and calibration blanks.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.7.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.7.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.7.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample DUP2. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.7.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.7.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.7.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.7.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.8 ACZ Data Package L91220

Data package L91220 contained the analytical results for twenty soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91220-01	STS-AMD-2011-W1 0-6	Total Calcium, Copper (SPLP), Total Copper, Total Potassium, TC, TOC, pH, Percent Solids, Nitrate as N, Nitrate/Nitrite as N, Nitrite as N,	MD – TC, TOC, Nitrate/ Nitrite as N, Nitrite as N, pH MS/MSD – Copper (SPLP)	0-6
L91220-02	STS-AMD-2011-W2 0-6		MS - Nitrate/ Nitrite as N, Nitrite as N	0-6
L91220-03	STS-AMD-2011-W3 0-6			6-12
L91220-04	STS-AMD-2011-W1 6-12			6-12
L91220-05	STS-AMD-2011-W2 12-18			12-18

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91220-06	STS-AMD-2011-W3 12-18	Ammonia as N*, Total Kjeldahl Nitrogen*		12-18
L91220-07	STS-AMD-2011-N1 0-6		SD – Copper (SPLP)	0-6
L91220-08	STS-AMD-2011-N2 0-6			0-6
L91220-09	STS-AMD-2011-N3 0-6			0-6
L91220-10	STS-AMD-2011-N1 18-24		SD – Total Calcium, Total Copper, Total Potassium	18-24
L91220-11	STS-AMD-2011-N2 18-24			18-24
L91220-12	STS-AMD-2011-N3 18-24			18-24
L91220-13	STS-AMD-2011-NE1 0-6			0-6
L91220-14	STS-AMD-2011-NE2 0-6			0-6
L91220-15	STS-AMD-2011-NE3 0-6			0-6
L91220-16	STS-AMD-2011-NE1 18-24			18-24
L91220-17	STS-AMD-2011-NE2 18-24			18-24
L91220-18	STS-AMD-2011-NE3 18-24		SD – Total Calcium, Total Copper	18-24
L91220-19	STS-AMD-2011-E1 0-6			0-6
L91220-20	STS-AMD-2011-E2 0-6		MS/MSD – Total Calcium, Total Copper, Total Potassium MD – Copper (SPLP), Percent Solids	0-6

ID – Identification
MD – Method Duplicate
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
QC – Quality Control
SD – Serial Dilution
TC – Total Carbon
TOC – Total Organic Carbon
SPLP – Synthetic Precipitation Leaching Procedure
* Ammonia as nitrogen and total Kjeldahl nitrogen were requested on the COC, but not reported in this data package. The ammonia as nitrogen and total Kjeldahl nitrogen results for all samples are reported in SDG L92223.

5.8.1 Overall Assessment

Data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.8.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 11.6°C – 13.0°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

Ammonia as nitrogen and total Kjeldahl nitrogen were requested on the COC, but not reported in this data package. The ammonia as nitrogen and total Kjeldahl nitrogen results for all samples are reported in SDG L92223. Further action was not necessary.

5.8.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits.

The total carbon and total organic carbon results for all samples were analyzed 6-8 days outside of the 28 day holding time requirement. The total carbon and total organic carbon results for all samples were qualified as estimated (J HT-L) to reflect the potential low bias.

The nitrite as N results for all samples were analyzed >2x the 48 hour holding time requirement. The detected nitrite as N results for all samples were qualified as estimated (J HT-L) to reflect the potential low bias. No nitrite as N results were reported as non-detect.

The nitrite/ nitrate as N results for all samples were analyzed 6-9 days outside of the 28 day holding time requirement. The nitrite/ nitrate as N results for all samples were qualified as estimated (J HT-L) to reflect the potential low bias.

As the nitrate as N results were calculated from the nitrite as N and nitrate/ nitrite as N results, the detected nitrate as N results for all samples were qualified as estimated (J HT-L) to reflect the potential low bias.

The holding time criterion of 2 days for pH analysis was exceeded for all samples in this data package. The pH results for these samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.8.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

With the exceptions noted below, target analytes were not detected in the method or calibration blanks.

Blank	Analyte	Concentration*	Data Qualification
WG313324			
CCB01	Total Calcium	0.34 mg/L*	None. The associated sample listed analytical results were reported at concentrations >5x the blank contamination.
CCB01	Total Copper	0.035 mg/L*	
CCB02		0.052 mg/L*	
CCB03		0.046 mg/L*	
CCB01	Total Potassium	0.42 mg/L*	

> – Greater Than
CCB – Continuing Calibration Blank
mg/L – Milligrams per Liter
* The CCB concentration was converted from mg/L to mg/Kg by multiplying by 100.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.8.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.8.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.8.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. Serial dilutions were conducted on samples STS-AMD-2011-N1 0-6 (SPLP copper), STS-AMD-2011-N1 18-24 (total calcium, total copper, and total potassium), and STS-AMD-2011-NE3 18-24 (total calcium and total copper). With the exceptions listed in the table below, the applicable percent differences were within ±10% for the 1:5 dilution of the sample.

Associated Sample	Analyte	%D	Qualification
STS-AMD-2011-NE3 18-24			
Batch WG313367 Sample STS-AMD-2011-W2 12-18	Total Calcium	17.2	None. The total calcium result for the sample that the serial dilution was conducted on was not reported from this batch; therefore, data qualification was not considered necessary.
STS-AMD-2011-N1 0-6			
Batch WG313042 All Samples	Copper (SPLP)	10.6	The detected results for the listed analytes in the associated samples were qualified as estimated (J SD-L) to reflect the potential low bias. The bias is considered to be low as the native sample concentration is less than the diluted result.

%D – Percent Difference L – Low Bias
J – Estimated SD – Serial Dilution

5.8.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.8.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.8.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.8.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.9 ACZ Data Package L91393

Data package L91393 contained the analytical results for eight rinsate blanks. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L91393-01	RINSATE3	Total Copper	RB	NA
L91393-02	RINSATE4		RB	NA
L91393-03	RINSATE1		RB	NA
L91393-04	RINSATE5		RB	NA
L91393-05	RINSATE7		RB	NA
L91393-06	RINSATE8		RB	NA
L91393-07	RINSATE2		RB	NA
L91393-08	RINSATE6		RB	NA

ID – Identification
NA – Not applicable
QC – Quality Control
RB – Rinsate Blank

5.9.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.9.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt were within the required ≤6°C temperature criterion. Data qualification was not considered necessary.

It was noted in the case narrative that the copper (SPLP), total calcium, total potassium and total organic carbon analyses requested on the COC for all samples could not be performed due to insufficient volume submitted to the laboratory. Further action was not necessary.

5.9.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification was not necessary.

5.9.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method or calibration blanks.

Rinsate Blanks

Eight rinsate blank samples were reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.9.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.9.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.9.7 Serial Dilution

A serial dilution is not required for Method 200.8. Further action was not necessary.

5.9.8 Post Digestion Spike

A post digestion spike is not required for Method 200.8. Further action was not necessary.

5.9.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.9.10 Internal Standards (ICP-MS Method 200.8)

All internal standard recoveries were within the acceptance limits. Data qualification was not necessary.

5.9.11 ICP Interference Check Standards (ICS)

Method 200.8 does not require that an ICSA be analyzed. No further action was necessary.

5.9.12 Tune (ICPMS)

Method 200.8 does not require that an ICSA be analyzed. No further action was necessary.

5.10 ACZ Data Package L91526

Data package L91526 contained the analytical results for eighteen soil samples and two field duplicate soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91526-01	STS-PCUG-2011-27	Total Copper, pH, Percent Solids	MS/MSD – Total Copper MD - pH	-
L91526-02	STS-PCUG-2011-31			-
L91526-03	DUP4		FD to STS-PCUG-2011-31	-
L91526-04	STS-PCUG-2011-5		SD – Total Copper	-
L91526-05	STS-PCUG-2011-6			-
L91526-06	STS-PCUG-2011-8			-
L91526-07	STS-PCUG-2011-9			-
L91526-08	STS-PCUG-2011-15			-
L91526-09	STS-PH-2011-FID106	Total Copper, ABA Parameters	MD – Neutralization Potential as $CaCO_3$, pH, Percent Solids, Sulfur Organic Residual, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, Total Sulfur minus Sulfate	-
L91526-10	STS-PCUG-2011-32	Total Copper, pH, Percent Solids		-
L91526-11	STS-PCUG-2011-34			-
L91526-12	STS-PCUG-2011-35			-
L91526-13	STS-PCUG-2011-36			-
L91526-14	STS-PCUG-2011-37			-
L91526-15	DUP10		FD to STS-CG-2011-1	-
L91526-16	STS-CG-2011-44			-
L91526-17	STS-CG-2011-47			-
L91526-18	STS-CG-2011-48			-

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91526-19	STS-CG-2011-16			-
L91526-20	STS-CG-2011-7		MD – Percent Solids	-

ABA – Acid Base Accounting Overburden Analysis
ID – Identification
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
SD – Serial Dilution
FD – Field Duplicate
MD – Method Duplicate
QC – Quality Control
- no depth given

ABA parameters include: Acid Generation, Acid Neutralization, Acid-Base Potential, Neutralization Potential as $CaCO_3$, pH, Percent Solids, Sulfur HCL Residue, Sulfur HNO_3 Residue, Organic Sulfur, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, and Total Sulfur minus Sulfate.

5.10.1 Overall Assessment

Data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.10.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 6.4°C – 8.4°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.10.3 Holding Times

With the exceptions noted below, the samples were prepared and analyzed within the required holding time limits.

The holding time criterion of 2 days for pH analysis was exceeded for all samples in this data package. The pH results for these samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.10.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

With the exception noted below, target analytes were not detected in the method or calibration blanks.

Blank	Analyte	Concentration*	Data Qualification
WG314273			
CCB03	Total Copper	0.023 mg/L*	None. The associated listed analytical sample results were reported at concentrations >5x the blank contamination.

> – Greater Than
CCB – Continuing Calibration Blank
mg/L – Milligrams per Liter
* The CCB concentration was converted from mg/L to mg/Kg by multiplying by 100.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.10.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.10.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.10.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample STS-PCUG-2011-5. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.10.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.10.9 Field Duplicate

Two field duplicates, DUP4 and DUP10, were reported in this data package. Field duplicate results are discussed in Section 6.

5.10.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.10.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.11 ACZ Data Package L91527

Data package L91527 contained the analytical results for twenty soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L91527-01	STS-CG-2011-51	Total Copper, percent solids	MS/MSD - Total Copper	-
L91527-02	STS-CG-2011-52			-
L91527-03	STS-CG-2011-53			-
L91527-04	STS-CG-2011-54		SD – Total Copper	-
L91527-05	STS-CG-2011-55			-
L91527-06	STS-CG-2011-56			-
L91527-07	STS-CG-2011-57			-
L91527-08	STS-CG-2011-32			-
L91527-09	STS-CG-2011-37			-
L91527-10	STS-CG-2011-41			-
L91527-11	STS-CG-2011-1			-

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L91527-12	STS-CG-2011-2			-
L91527-13	STS-CG-2011-3			-
L91527-14	STS-CG-2011-4			-
L91527-15	STS-CG-2011-5			-
L91527-16	STS-CG-2011-6			-
L91527-17	STS-CG-2011-18			-
L91527-18	STS-CG-2011-8			-
L91527-19	STS-CG-2011-22			-
L91527-20	STS-CG-2011-23		MD – percent solids	-

ID – Identification
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
SD – Serial Dilution
MD – Method Duplicate
QC – Quality Control
- no depth given

5.11.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.11.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 6.4°C – 7.5°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.11.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification was not necessary.

5.11.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

<u>Method/ Calibration Blanks</u>

With the exceptions noted below, target analytes were not detected in the method or calibration blanks.

Blank	Analyte	Concentration*	Data Qualification
WG314276			
CCB02	Total Copper	0.013 mg/L*	None. The associated total copper sample results were reported at concentrations >5x the blank contamination.
CCB03		0.027 mg/L*	

> – Greater Than
CCB – Continuing Calibration Blank
mg/L – Milligrams per Liter
* The CCB concentration was converted from mg/L to mg/Kg by multiplying by 100.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.11.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.11.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.11.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample STS-CG-2011-54. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.11.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.11.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.11.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.11.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.12 ACZ Data Package L91528

Data package L91528 contained the analytical results for four soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L91528-01	STS-PH-2011-FID102	Total Copper, ABA Parameters	MS/MSD – Total Copper	-
L91528-02	STS-PH-2011-FID7			-
L91528-03	STS-PH-2011-FID8			-
L91528-04	STS-PH-2011-FID28		SD – Total Copper	-

ABA – Acid Base Accounting Overburden Analysis
ID – Identification
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
QC – Quality Control
SD – Serial Dilution
- no depth given
ABA parameters include: Acid Generation, Acid Neutralization, Acid-Base Potential, Neutralization Potential as $CaCO_3$, pH, Percent Solids, Sulfur HCL Residue, Sulfur HNO_3 Residue, Organic Sulfur, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, and Total Sulfur minus Sulfate.

5.12.1 Overall Assessment

Data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.12.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 8.4°C – 8.5°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.12.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits.

The holding time criterion of 2 days for pH analysis was exceeded for all samples in this data package. The pH results for these samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.12.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method or calibration blanks.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.12.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.12.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.12.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample STS-PH-2011-FID28 (Total Copper). With the exceptions listed in the table below, the applicable percent differences were within ±10% for the 1:5 dilution of the sample.

Associated Sample	Analyte	%D	Qualification
STS-PH-2011-FID28			
All Samples	Total Copper	11.8	The detected results for total copper in the associated samples were qualified as estimated (J SD-L) to reflect the potential low bias. The bias is considered to be low as the native sample concentration is less than the diluted result.

%D – Percent Difference L – Low Bias
J – Estimated SD – Serial Dilution

5.12.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.12.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.12.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.12.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.13 ACZ Data Package L92172

Data package L92172 contained the analytical results for eighteen soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L92172-01	STS-PH-2011-FID37	Sulfur HCL Residue, Sulfur HNO_3 Residue, Organic Sulfur, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, Total Sulfur minus Sulfate	MD – Sulfur Organic Residual Mod, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, Total Sulfur minus Sulfate	-
L92172-02	STS-PH-2011-FID101			-
L92172-03	STS-PH-2011-REFPLOT3			-
L92172-04	STS-PH-2011-REFPLOT4			-
L92172-05	STS-PH-2011-FID105			-
L92172-06	STS-PH-2011-REFPLOT1			-
L92172-07	STS-PH-2011-REFPLOT2			-
L92172-08	STS-PH-2011-FID22			-
L92172-09	STS-PH-2011-FID10			-
L92172-10	STS-PH-2011-FID15			-
L92172-11	STS-PH-2011-FID16			-
L92172-12	STS-PH-2011-FID17			-
L92172-13	STS-PH-2011-FID18			-
L92172-14	STS-PH-2011-FID106			-
L92172-15	STS-PH-2011-FID102			-
L92172-16	STS-PH-2011-FID7			-
L92172-17	STS-PH-2011-FID8			-
L92172-18	STS-PH-2011-FID28			-

ID – Identification
MD – Method Duplicate
QC – Quality Control
- no depth given

5.13.1 Overall Assessment

Data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.13.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 9.2°C – 13.6°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.13.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification was not necessary.

5.13.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method Blanks

Target analytes were not detected in the method blanks.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.13.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.13.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.13.7 Serial Dilution

A serial dilution is not applicable for the methods analyzed in this data package. Further action was not necessary.

5.13.8 Post Digestion Spike

A post digestion spike is not applicable for the methods analyzed in this data package. Further action was not necessary.

5.13.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.13.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.13.11 ICP Interference Check Standards (ICS)

Not applicable.

5.14 ACZ Data Package L92223

Data package L92223 contained the analytical results for twenty soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L92223-01	STS-AMD-2011-W1 0-6	Ammonia as Nitrogen, Total Kjelddahl Nitrogen, Total Calcium, Copper (SPLP), Total Copper, Total Potassium, Total Carbon, Total Organic Carbon, pH, Percent Solids, Nitrate as N, Nitrate/ Nitrite as N, and Nitrite as N*		0-6
L92223-02	STS-AMD-2011-W2 0-6			0-6
L92223-03	STS-AMD-2011-W3 0-6			0-6
L92223-04	STS-AMD-2011-W1 6-12			6-12
L92223-05	STS-AMD-2011-W2 12-18			12-18
L92223-06	STS-AMD-2011-W3 12-18			12-18
L92223-07	STS-AMD-2011-N1 0-6		MS – Total Kjeldahl Nitrogen	0-6
L92223-08	STS-AMD-2011-N2 0-6		MS – Ammonia Nitrogen MD – Ammonia Nitrogen, Total Kjeldahl Nitrogen	0-6
L92223-09	STS-AMD-2011-N3 0-6			0-6
L92223-10	STS-AMD-2011-N1 18-24			18-24
L92223-11	STS-AMD-2011-N2 18-24			18-24
L92223-12	STS-AMD-2011-N3 18-24			18-24
L92223-13	STS-AMD-2011-NE1 0-6			0-6
L92223-14	STS-AMD-2011-NE2 0-6			0-6
L92223-15	STS-AMD-2011-NE3 0-6			0-6
L92223-16	STS-AMD-2011-NE1 18-24			18-24
L92223-17	STS-AMD-2011-NE2 18-24			18-24
L92223-18	STS-AMD-2011-NE3 18-24			18-24
L92223-19	STS-AMD-2011-E1 0-6			0-6

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L92223-20	STS-AMD-2011-E2 0-6			0-6

ID – Identification
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
MD – Method Duplicate
QC – Quality Control
*The total calcium, copper (SPLP), total copper, total potassium, total carbon, total organic carbon, pH, percent solids, nitrate as N, nitrate/ nitrite as N, and nitrite as N analyses were reported in data package L91220.

5.14.1 Overall Assessment

With several exceptions, data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The non-detect ammonia as nitrogen results for samples STS-AMD-2011-W1 0-6, STS-AMD-2011-W2 0-6, STS-AMD-2011-W3 0-6, STS-AMD-2011-W1 6-12, STS-AMD-2011-W2 12-18, STS-AMD-2011-W3 12-18, STS-AMD-2011-N1 18-24, STS-AMD-2011-N2 18-24, STS-AMD-2011-NE1 18-24, STS-AMD-2011-NE2 18-24 and STS-AMD-2011-E1 0-6 were analyzed >2x the 28 day holding time criterion. These non-detect results were qualified as unusable due to holding time exceedances (R). The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.14.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 11.6°C – 14.6°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

The total copper, copper (SPLP), pH, total calcium, total potassium, total organic carbon, total carbon, nitrate as N, nitrite as N, and nitrite/nitrate as N analyses for all samples were reported in data package L91220.

The field IDs for numerous samples were truncated on the data sheets due to laboratory software limitations. The datasheets were updated to include the depths and reflect the proper nomenclature. Further action was not necessary.

5.14.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits. The ammonia as nitrogen and total Kjeldahl nitrogen results were analyzed >2x the 28 day holding time requirement. Detected ammonia as nitrogen and total Kjeldahl nitrogen results were qualified as estimated (J HT-L) and non-detect ammonia as nitrogen results were qualified as unusable (R).

5.14.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method or calibration blanks.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.14.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.14.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.14.7 Serial Dilution

A serial dilution is not applicable for the methods analyzed in this data package. Further action was not necessary.

5.14.8 Post Digestion Spike

A post digestion spike is not applicable for the methods analyzed in this data package. Further action was not necessary.

5.14.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.14.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.14.11 ICP Interference Check Standards (ICS)

Not applicable.

5.15 ACZ Data Package L92224

Data package L92224 contained the analytical results for twenty soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth (Inches)
L92224-01	STS-AMD-2011-E3 0-6	Ammonia Nitrogen, Total Kjelddahl Nitrogen, Total Calcium, Copper (SPLP), Total Copper, Total Potassium, Total Carbon, Total Organic Carbon, pH, Percent Solids, Nitrate as N, Nitrate/ Nitrite as N, and Nitrite as N*	MD – Ammonia Nitrogen, Total Kjeldahl Nitrogen MS – Ammonia Nitrogen	0-6
L92224-02	STS-AMD-2011-E1 6-12		MS – Total Kjeldahl Nitrogen	6-12
L92224-03	STS-AMD-2011-E2 6-12			6-12
L92224-04	STS-AMD-2011-E3 6-12			6-12
L92224-05	STS-AMD-2011-WREF1 0-6			0-6
L92224-06	STS-AMD-2011-WREF2 0-6			0-6
L92224-07	STS-AMD-2011-WREF1 12-18			12-18
L92224-08	STS-AMD-2011-WREF2 18-24			18-24
L92224-09	STS-AMD-2011-NREF1 0-6			0-6
L92224-10	STS-AMD-2011-NREF2 0-6			0-6
L92224-11	STS-AMD-2011-NREF1 18-24			18-24
L92224-12	STS-AMD-2011-NREF2 18-24			18-24
L92224-13	STS-AMD-2011-NEREF1 0-6			0-6
L92224-14	STS-AMD-2011-NEREF2 0-6			0-6
L92224-15	STS-AMD-2011-NEREF1 18-24			18-24
L92224-16	STS-AMD-2011-NEREF2 12-18			12-18
L92224-17	STS-AMD-2011-EREF1 0-6			0-6
L92224-18	STS-AMD-2011-EREF2 0-6			0-6
L92223-19	STS-AMD-2011-EREF1 6-12			6-12
L92223-20	STS-AMD-2011-EREF2 6-12			6-12

ID – Identification
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
MD – Method Duplicate
QC – Quality Control
*The total calcium, copper (SPLP), total copper, total potassium, total carbon, total organic carbon, pH, percent solids, nitrate as N, nitrate/ nitrite as N, and nitrite as N analyses were reported in data package L91218.

5.15.1 Overall Assessment

With several exceptions, data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The non-detect ammonia as nitrogen results for samples STS-AMD-2011-E1 6-12, STS-AMD-2011-E3 6-12, STS-AMD-2011-WREF1 0-6, STS-AMD-2011-WREF2 0-6, STS-AMD-2011-WREF1 12-18, STS-AMD-2011-WREF2 18-24, STS-AMD-2011-NREF1 18-24, STS-AMD-2011-NREF2 18-24, STS-AMD-2011-NEREF1 18-24, STS-AMD-2011-NEREF2 12-18, STS-AMD-2011-EREF1 6-12 and STS-AMD-2011-EREF2 6-12 were analyzed >2x the 28 day holding time criterion and were therefore qualified as unusable (R) due to holding time exceedance. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.15.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 10.0°C – 12.2°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

The total copper, copper (SPLP), pH, total calcium, total potassium, total organic carbon, total carbon, nitrate as N, nitrite as N, and nitrite/nitrate as N analyses for all samples were reported in data package L91218.

The field IDs for numerous samples were truncated on the data sheets due to laboratory software limitations. The datasheets were updated to include the depths and reflect the proper nomenclature. Further action was not necessary.

5.15.3 Holding Times

With the exceptions noted below, the samples were prepared and analyzed within the required holding time limits. The ammonia as nitrogen and total Kjeldahl nitrogen results were analyzed >2x the 28 day holding time requirement. Detected ammonia as nitrogen and total Kjeldahl nitrogen results were qualified as estimated

(J HT-L) and non-detect ammonia as nitrogen results were qualified as unusable (R).

5.15.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method or calibration blanks.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.15.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.15.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.15.7 Serial Dilution

A serial dilution is not applicable for the methods analyzed in this data package. Further action was not necessary.

5.15.8 Post Digestion Spike

A post digestion spike is not applicable for the methods analyzed in this data package. Further action was not necessary.

5.15.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.15.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.15.11 ICP Interference Check Standards (ICS)

Not applicable.

5.16 ACZ Data Package L91359

Data package L91359 contained the analytical results for seventeen soil samples. The table below lists the laboratory IDs, corresponding field IDs, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L91359-01	STS-CG-2011-11	Total Copper, Percent Solids	MS/MSD – Total Copper MD - pH	-
L91359-02	STS-CG-2011-12			-
L91359-03	STS-CG-2011-13			-
L91359-04	STS-CG-2011-14			-
L91359-05	STS-CG-2011-15			-
L91359-06	STS-CG-2011-17			-
L91359-07	STS-CG-2011-19			-
L91359-08	STS-CG-2011-20		SD – Total Copper	-
L91359-09	STS-PCUG-2011-1	Total Copper, Percent Solids, pH		-
L91359-10	STS-PCUG-2011-2			-
L91359-11	STS-PCUG-2011-3			-
L91359-12	STS-PCUG-2011-4			-
L91359-13	STS-PCUG-2011-33			-
L91359-14	STS-PCUG-2011-7		MD – Percent Solids	-
L91359-15	STS-PCUG-2011-38			-
L91359-16	STS-PCUG-2011-39			-
L91359-17	STS-PCUG-2011-10			-

ID – Identification
MD – Method Duplicate
MS/MSD – Matrix Spike/ Matrix Spike Duplicate
QC – Quality Control
SD – Serial Dilution
- no depth given

5.16.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.16.2 COC and Sample Receipt Documentation

The samples were shipped to ACZ under COC. The laboratory sample custodian noted that all samples were received intact.

The cooler temperatures upon receipt ranged from 9.2°C – 17.6°C above the required ≤6°C temperature criterion. As the samples were air-dried and sieved upon receipt; the elevated cooler temperatures are not considered to affect the usability of the results to meet projects. Data qualification was not considered necessary.

5.16.3 Holding Times

With the exceptions below, the samples were prepared and analyzed within the required holding time limits.

The holding time criterion of 2 days for pH analysis was exceeded for all samples in this data package. The pH results for these samples were qualified as estimated (J HT-L) to reflect the potential low bias.

5.16.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

With the exceptions noted below, target analytes were not detected in the method or calibration blanks.

Blank	Analyte	Concentration*	Data Qualification
WG313608			
CCB01	Total Copper	0.013 mg/L*	None. The associated sample listed analytical results were reported at concentrations >5x the blank contamination.

> – Greater Than CCB – Continuing Calibration Blank
mg/L – Milligrams per Liter
* The CCB concentration was converted from mg/L to mg/Kg by multiplying by 100.

Rinsate Blanks

A rinsate blank sample was not reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.16.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.16.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.16.7 Serial Dilution

A serial dilution is required for Method 6010B for all sample delivery groups, but is only pertinent to analytes present at greater than 50x the detection limit. A serial dilution was conducted on sample STS-CG-2011-20. The applicable percent differences were within ±10% for the 1:5 dilution of the sample. Data qualification was not necessary.

5.16.8 Post Digestion Spike

For Method 6010B, a post digestion spike is required when the matrix spike recovery is outside of the acceptance limits of 75-125%. As the matrix spike recoveries were within the QAP acceptance limits of 75-125%, a post digestion spike was not necessary.

5.16.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.16.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.16.11 ICP Interference Check Standards (ICS)

The ICS AB solutions were analyzed at the proper frequency. The target analytes were recovered within the acceptance range of 80-120% in the ICS AB solution. Interferent elements (e.g. aluminum, calcium, and iron) were present in some or all of the samples in this data package at concentrations approaching the interfering element concentrations for the ICSAB solution. As the laboratory did not analyze the ICSA solution, those samples with interferent elements present could not be evaluated for positive and negative biases suggested by the ICSA.

5.17 ACZ Data Package L90609

Data package L90609 contained the analytical results for one rinsate blank sample. The table below lists the laboratory ID, corresponding field ID, and QC designations.

Laboratory ID	Field ID	Analyses	QC Designation	Depth
L90609-01	RINSATE BLANK #1	Total Copper	RB	-

ID – Identification
RB – Rinsate Blank
QC – Quality Control
\- no depth given

5.17.1 Overall Assessment

The data are considered usable for meeting project objectives with the qualifications noted in the following narrative. The data qualifiers and associated bias codes were hand-entered on the sample reporting forms. The sample reporting forms are included in Appendix A.

5.17.2 COC and Sample Receipt Documentation

The sample was shipped to ACZ under COC. The laboratory sample custodian noted that the sample was received intact. The cooler was received at a temperature of 21.8 °C, above the temperature criterion of ≤6°C. Based on the stability of total copper, data qualification was not considered necessary for these analytes.

5.17.3 Holding Times

The samples were prepared and analyzed within the required holding time limits. Data qualification was not necessary.

5.17.4 Method Blanks, Calibration Blanks, and Rinsate Blanks

Method/ Calibration Blanks

Target analytes were not detected in the method or calibration blanks.

Rinsate Blanks

One rinsate blank sample was reported in this data package. Detections in rinsate blanks are discussed in Section 6.

5.17.5 Duplicate Sample Analysis

Method duplicate results are discussed in Section 6.

5.17.6 Matrix Spike Analysis

Matrix spike and matrix spike duplicate results are discussed in Section 6.

5.17.7 Serial Dilution

A serial dilution is not required for Method 200.8. Further action was not necessary.

5.17.8 Post Digestion Spike

A post digestion spike is not required for Method 200.8. Further action was not necessary.

5.17.9 Field Duplicate

A field duplicate pair was not reported in this data package. Field duplicate results are discussed in Section 6.

5.17.10 Internal Standards (ICP-MS Methods 6020 or 200.8)

The samples in this data package were not analyzed for metals by Methods 6020 or 200.8. Further action was not necessary.

5.17.11 ICP Interference Check Standards (ICS)

An ICS is not required for Method 200.8. Further action was not necessary.

6. METHOD & FIELD QUALITY PARAMETERS

The results obtained for the method and field quality control samples are discussed in the sections below.

When quality control issues accounted for less than 35% of the quality control analyses conducted, applicable data qualification was limited to parent samples. When quality control issues accounted for more than 35% of the quality control analyses conducted, applicable data qualification was extended to qualification of all samples.

6.1 Method Quality Parameters

Method Duplicate

The table below lists the sample for which a method duplicate was performed. This number of method duplicate samples met the QAP required frequency of one set per twenty site samples per matrix.

Sample	Analyses
Data Package L90608	
STS-BWC-2011-3	pH
Data Package L91218	
STS-AMD-2011-E3 0-6	TC, TOC, Nitrate/Nitrite as N, Nitrite as N, pH
STS-AMD-2011-EREF2 6-12	Copper (SPLP), Percent Solids
Data Package L91360	
STS-CG-2011-31	Percent Solids
Data Package L91219	
DUP13	TC, TOC, Copper (SPLP), Nitrite/ Nitrate as N, Nitrite as N, pH
DUP16	Percent Solids
Data Package L91358	
STS-PH-2011-FID37	Sulfur Organic Residual, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, Total Sulfur minus Sulfate
STS-PH-2011-FID15	Percent Solids
Data Package L91357	
STS-PCUG-2011-30	Percent Solids

Sample	Analyses
Data Package L91355	
STS-PCUG-2011-21	Percent Solids, pH
Data Package L91220	
STS-AMD-2011-W1 0-6	TC, TOC, Nitrate/ Nitrite as N, Nitrite as N, pH
STS-AMD-2011-E2 0-6	Copper (SPLP), Percent Solids
Data Package L91526	
STS-PH-2011-FID106	Neutralization Potential as CaCO3, Sulfur Organic Residual, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, Total Sulfur minus Sulfate
STS-PCUG-2011-27	pH
STS-CG-2011-7	Percent Solids
Data Package L91526	
STS-CG-2011-23	Percent Solids
Data Package L92172	
STS-PH-2011-FID37	Sulfur Organic Residual Mod, Sulfur Pyritic Sulfide, Sulfur Sulfate, Total Sulfur, Total Sulfur minus Sulfate
Data Package L92223	
STS-AMD-2011-N2 0-6	Ammonia Nitrogen, Total Kjeldahl Nitrogen
Data Package L92224	
STS-AMD-2011-E3 0-6	Ammonia Nitrogen, Total Kjeldahl Nitrogen
Data Package L91359	
STS-CG-2011-11	pH
STS-PCUG-2011-7	Percent Solids

$CaCO_3$ – Calcium Carbonate
SPLP – Synthetic Precipitation Leaching Procedure
TC – Total Carbon
TOC – Total Organic Carbon

The concentration – dependent evaluation criteria listed in Table 3-1 were met for all analytes. Further action was not necessary.

Matrix Spike and Matrix Spike Duplicate

The table below lists the samples for which matrix spike and/or matrix spike duplicates were performed. This number of MS/MSD samples met the QAP required frequency of one set per twenty site samples per matrix.

Samples	Analyses
Data Package L90608	
STS-BWC-2011-3	MS/MSD - Total Copper
Data Package L91218	
STS-AMD-2011-E3 0-6	MS/MSD - Copper (SPLP)
STS-AMD-2011-E1 6-12	MS – Nitrate/ Nitrite as N, Nitrite as N
STS-AMD-2011-NREF2 0-6	MS/MSD - Total Calcium, Total Copper, Total Potassium
Data Package L91360	
STS-CG-2011-31	MS/MSD – Total Copper
Data Package L91219	
DUP13	MS/MSD - Total Calcium, Total Copper, Total Potassium
DUP14	MS - Nitrate/ Nitrite as N, Nitrite as N
DUP16	MS/MSD – Copper (SPLP)
Data Package L91358	
STS-PH-2011-FID37	MS/MSD – Total Copper
Data Package L91357	
STS-PCUG-2011-11	MS/MSD - Total Copper
Data Package L91355	
STS-PCUG-2011-21	MS/MSD - Total Copper
Data Package L91220	
STS-AMD-2011-W1 0-6	MS/MSD – Copper (SPLP)
STS-AMD-2011-W2 0-6	MS - Nitrate/ Nitrite as N, Nitrite as N
STS-AMD-2011-E2 0-6	MS/MSD – Total Calcium, Total Copper, Total Potassium
Data Package L91526	
STS-PCUG-2011-27	MS/MSD – Total Copper
Data Package L91527	
STS-CG-2011-51	MS/MSD – Total Copper
Data Package L91528	
STS-PH-2011-FID102	MS/MSD – Total Copper
Data Package L92223	
STS-AMD-2011-N2 0-6	MS - Total Kjeldahl Nitrogen
STS-AMD-2011-N1 0-6	MS - Ammonia Nitrogen

Samples	Analyses
Data Package L92224	
STS-AMD-2011-E3 0-6	MS - Ammonia Nitrogen
STS-AMD-2011-E1 6-12	MS - Total Kjeldahl Nitrogen
Data Package L91359	
STS-CG-2011-11	MS/MSD – Total Copper

MS/MSD – Matrix Spike/ Matrix Spike Duplicate
TOC – Total Organic Carbon

All applicable matrix spike and matrix spike duplicate recoveries were within the QAP acceptance range of 75-125%. Data qualification was not necessary.

MS/MSD recoveries could not be evaluated for results in the native sample that were greater than four times the concentration of the spike added during sample preparation. Since the sample concentrations are so much greater than the spike amount added to these samples, the MS/MSD recoveries are not considered to be a representative measure of accuracy and precision.

6.2 Field Quality Parameters

Rinsate Blanks

Eight rinsate blank samples were collected during this sampling event are listed in the table below. This number of rinsate blank samples met the QAP required frequency of one set per twenty site samples per matrix.

Rinsate Blank	Associated Sample
Data Package L91393	
RINSATE3	STS-CG-2011-40
RINSATE4	STS-CG-2011-43
RINSATE1	STS-PCUG-2011-22
RINSATE5	STS-CG-2011-34
RINSATE7	STS-AMD-2011-NE2 18-24
RINSATE8	STS-AMD-2011-NEREF2 0-6
RINSATE2	STS-PCUG-2011-4
RINSATE6	STS-PH-2011-FID101
RINSATE BLANK #1	STS-PCUG-2011-22

The table below presents detections in rinsate blanks collected for this sampling event.

Rinsate Blank	Parent Sample	Analyte	Concentration (mg/L)*	Data Qualification
Data Package L91393				
RINSATE6	STS-PH-2011-FID101	Total Copper	0.0007	As <35% (two in eight rinsate blanks) of the rinsate blanks had a total copper detection, data qualification was not necessary.
Data Package L90609				
RINSATE BLANK #1	STS-PCUG-2011-22	Total Copper	0.0048	As <35% (two in eight rinsate blanks) of the rinsate blanks had a total copper detection, data qualification was not necessary.

> – Greater than
mg/L – Milligrams per Liter
* The CCB concentration was converted from mg/L to mg/Kg by multiplying by 100.

Field Blank

As organic parameters were not collected in association with the Smelter/Tailings Soils Investigational Unit sampling event, a field blank was not applicable. Further action was not necessary.

Field Duplicate Agreement

The field duplicate sample pairs collected during this sampling event are listed in the table below. This number of field duplicate samples met the QAP required frequency of one set per ten site samples per matrix.

Field Duplicates
DUP5/ STS-CG-2011-28
DUP6/ STS-PCUG-2011-7
DUP13/ STS-AMD-2011-W3 0-6
DUP14/ STS-AMD-2011-NREF1 0-6
DUP15/ STS-AND-2011-E1 0-6
DUP16/ STS-AMD-2011-NE1 0-6
DUP11/ STS-PH-2011-FID101
DUP12/ STS-PH-2011-FID22
DUP1/ STS-PCUG-2011-19
DUP2/ STS-PCUG-2011-29
DUP7/ STS-CG-2011-43
DUP8/ STS-CG-2011-10

Field Duplicates
DUP9/ STS-CG-2011-42
DUP3/ STS-PCUG-2011-14
DUP4/ STS-PCUG-2011-31
DUP10/ STS-CG-2011-1

Field duplicate results satisfied the applicable evaluation criterion in Table 3-1. This indicates an acceptable level of overall sampling and analysis precision.

7. OVERALL ASSESSMENT

The sample data are considered to be acceptable for use in reconciliation with project objectives as qualified. A general overall assessment of each of the QAP's data quality assurance objectives is provided below.

7.1 Reporting Limits

Reporting limits (RLs/ PQLs) are established by the analytical laboratory based on the method detection limits (MDLs/ IDLs), historical data, and comparison to EPA limits for the respective methods. With the exceptions noted in the table below, the reporting limits (or PQLs) satisfied the reporting limit requirements specified in the Quality Assurance Plan (QAP) prepared by Chino Mines Company and Steffen, Robertson and Kirsten (U.S.), Inc. (March 1997).

Analyte	Affected Samples	Reported MDL	Reported PQL	QAP RL	Result D or ND
Metals (mg/L)					
Copper (SPLP)	STS-AMD-2011-E3 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-E1 6-12	0.01	0.05	0.025	ND
	STS-AMD-2011-E2 6-12	0.01	0.05	0.025	D
	STS-AMD-2011-E3 6-12	0.01	0.05	0.025	D
	STS-AMD-2011-WREF1 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-WREF2 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-WREF1 12-18	0.01	0.05	0.025	ND
	STS-AMD-2011-WREF2 18-24	0.01	0.05	0.025	ND
	STS-AMD-2011-NREF1 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-NREF2 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-NREF1 18-24	0.01	0.05	0.025	ND
	STS-AMD-2011-NREF2 18-24	0.01	0.05	0.025	D
	STS-AMD-2011-NEREF1 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-NEREF2 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-NEREF1 18-24	0.01	0.05	0.025	D
	STS-AMD-2011-NEREF2 12-18	0.01	0.05	0.025	D
	STS-AMD-2011-EREF1 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-EREF2 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-EREF1 6-12	0.01	0.05	0.025	ND
	STS-AMD-2011-EREF2 6-12	0.01	0.05	0.025	D
	DUP13	0.01	0.05	0.025	D
	DUP14	0.01	0.05	0.025	D
	DUP15	0.01	0.05	0.025	D

Analyte	Affected Samples	Reported MDL	Reported PQL	QAP RL	Result D or ND
	DUP16	0.01	0.05	0.025	D
	STS-AMD-2011-W1 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-W2 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-W3 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-W1 6-12	0.01	0.05	0.025	D
	STS-AMD-2011-W2 12-18	0.01	0.05	0.025	D
	STS-AMD-2011-W3 12-18	0.01	0.05	0.025	D
	STS-AMD-2011-N1 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-N2 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-N3 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-N1 18-24	0.01	0.05	0.025	D
	STS-AMD-2011-N2 18-24	0.01	0.05	0.025	D
	STS-AMD-2011-N3 18-24	0.01	0.05	0.025	D
	STS-AMD-2011-NE1 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-NE2 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-NE3 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-NE1 18-24	0.01	0.05	0.025	D
	STS-AMD-2011-NE2 18-24	0.01	0.05	0.025	D
	STS-AMD-2011-NE3 18-24	0.01	0.05	0.025	ND
	STS-AMD-2011-E1 0-6	0.01	0.05	0.025	D
	STS-AMD-2011-E2 0-6	0.01	0.05	0.025	D
Inorganics (mg/Kg)					
Nitrate as N	STS-AMD-2011-N1 0-6	0.4	2	1	D
	STS-AMD-2011-NE3 0-6	0.3	2	1	D
	STS-AMD-2011-E2 0-6	0.4	2	1	D

D – Detected
ND – Non-detect
MDL- Method Detection Limit
PQL – Practical Quantitation Limit
mg/Kg – Milligrams per Kilogram
QAP – Quality Assurance Plan
mg/L – Milligram per Liter
RL – Reporting Limit

The copper (SPLP) PQL was 0.05 mg/L for all samples, exceeding the required QAP RL of 0.025 mg/L. As the copper (SPLP) MDLs were below the QAP RLs, there is no effect to the usability of the data.

The nitrate as N PQL was 2 mg/Kg for samples STS-AMD-2011-N1 0-6, STS-AMD-2011-NE3 0-6 and STS-AMD-2011-E2 0-6, exceeding the required QAP RL of 1 mg/Kg. As the nitrate as N results were reported as detected, the elevated PQL does not affect the usability of the data.

7.2 Accuracy

Accuracy is defined as the degree of agreement of a measurement to an accepted reference or true value. Accuracy was measured as the percent recovery (%R) of an analyte in a reference standard or spiked sample.

All laboratory control samples, matrix spike and matrix spike duplicate recoveries, and all calibration standards were within acceptance limits demonstrating acceptable overall accuracy of the analytical system. As such, acceptable accuracy with respect to the analytical method and site-specific sample matric was acceptable.

7.3 Precision

Precision is defined as the agreement between a set of replicate measurements without assumption or knowledge of the true value. Precision of laboratory measurements was evaluated by the comparison of sample/sample duplicate results.

All of the laboratory duplicate results satisfied the applicable evaluation criteria. Therefore, the overall level of precision demonstrated by the analyses is considered to be acceptable

Precision of field sampling and laboratory analysis was evaluated by the comparison of field duplicate sample results. The agreement shown by all of the field duplicate results is indicative of an acceptable level of overall sampling and analysis precision.

7.4 Completeness

With the exception of some nitrite as N results and ammonia as nitrogen results that were qualified as unusable (R) due to holding time exceedances, the results are considered usable as qualified. As such, the analytical completeness for the sampling, defined as the ratio of the number of valid analytical results (valid analytical results include estimated values) to the total number of analytical results requested on samples submitted for analysis, is 97% which satisfies the QAP requirement of 80%. All valid results are considered acceptable for use in meeting project objectives.

7.5 Representativeness

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness was maintained during sampling efforts by completing sampling in compliance with the FSP, and relevant SOPs.

Consistent, uniform sample collection protocols, including such tasks as storage, preservation and transportation, were used to assure that the representativeness of the samples gathered during the AOC met project objectives. Proper documentation in the field and laboratory verified that protocols were followed and that sample identification as well as integrity was preserved.

7.6 Comparability

Comparability expresses the confidence with which one data set can be compared to another. Comparability can be related to accuracy and precision because these quantities are measures of data reliability. Data are comparable if collection techniques, measurement procedures, method, and reporting limits are equivalent for the samples within a sample set. As the samples in this set were analyzed in accordance with appropriate methods and quality control measures described in the methods, and acceptable levels of overall accuracy and precision were attained, the data within this set are considered to be comparable to each other.

APPENDIX A

DATA REPORTING FORMS

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-BWC-2011-3

ACZ Sample ID: ***L90608-01***
Date Sampled: *09/14/11 14:00*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	622		*	mg/Kg	1	5	10/07/11 10:57	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-IL	5.4		*	units	0.1	0.1	10/19/11 10:32	zsh
Solids, Percent	CLPSOW390, PART F, D-98	87.6		*	%	0.1	0.5	10/19/11 16:35	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:30	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 13:52	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:15	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 11:45	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 11:45	thf

EB 03/29/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-4

ACZ Sample ID: ***L90608-02***
Date Sampled: *09/16/11 10:00*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	521		*	mg/Kg	1	5	10/07/11 11:07	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	4.9		*	units	0.1	0.1	10/19/11 10:36	zsh
Solids, Percent	CLPSOW390, PART F, D-98	86.9		*	%	0.1	0.5	10/19/11 17:52	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:32	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 14:45	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:21	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 11:52	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 11:52	thf

EB 03/29/12

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-5

ACZ Sample ID: ***L90608-03***
Date Sampled: *09/16/11 13:00*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	975		*	mg/Kg	1	5	10/07/11 11:10	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-IL	4.9		*	units	0.1	0.1	10/19/11 10:37	zsh
Solids, Percent	CLPSOW390, PART F, D-98	82.7		*	%	0.1	0.5	10/19/11 19:09	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:34	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 15:02	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:25	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 11:59	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 11:59	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L90608-04*
Sample ID:	STS-BWC-2011-6	Date Sampled:	*09/14/11 14:45*
		Date Received:	*09/20/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	426		*	mg/Kg	1	5	10/07/11 11:13	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	5.6		*	units	0.1	0.1	10/19/11 10:39	zsh
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	10/19/11 20:27	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:36	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 15:20	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:28	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:06	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:06	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-7

ACZ Sample ID: ***L90608-05***
Date Sampled: *09/15/11 09:10*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2110		*	mg/Kg	1	5	10/07/11 11:25	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	5.5		*	units	0.1	0.1	10/19/11 10:41	zsh
Solids, Percent	CLPSOW390, PART F, D-98	82.4		*	%	0.1	0.5	10/19/11 21:44	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:38	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 15:37	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:32	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:13	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:13	thf

EB 03/29/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-BWC-2011-8

ACZ Sample ID: ***L90608-06***
Date Sampled: *09/16/11 11:00*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	691		*	mg/Kg	1	5	10/07/11 11:29	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	4.5		*	units	0.1	0.1	10/19/11 10:43	zsh
Solids, Percent	CLPSOW390, PART F, D-98	87.8		*	%	0.1	0.5	10/19/11 23:01	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:41	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 15:55	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:35	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:20	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:20	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-9

ACZ Sample ID: ***L90608-07***
Date Sampled: *09/15/11 10:45*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	610		*	mg/Kg	1	5	10/07/11 11:32	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	4.8		*	units	0.1	0.1	10/19/11 10:45	zsh
Solids, Percent	CLPSOW390, PART F, D-98	93.9		*	%	0.1	0.5	10/20/11 0:18	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:43	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 16:12	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:39	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:27	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:27	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-10

ACZ Sample ID: ***L90608-08***
Date Sampled: *09/15/11 08:00*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	972		*	mg/Kg	1	5	10/07/11 11:35	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	5.6		*	units	0.1	0.1	10/19/11 10:47	zsh
Solids, Percent	CLPSOW390, PART F, D-98	89.8		*	%	0.1	0.5	10/20/11 1:36	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:45	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 16:30	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:42	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:34	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:34	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L90608-09*
Sample ID:	STS-BWC-2011-11	Date Sampled:	*09/16/11 12:00*
		Date Received:	*09/20/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1590		*	mg/Kg	1	5	10/07/11 11:38	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	4.6		*	units	0.1	0.1	10/19/11 10:49	zsh
Solids, Percent	CLPSOW390, PART F, D-98	84.4		*	%	0.1	0.5	10/20/11 2:53	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:47	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 16:47	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:46	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:41	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:41	thf

EB 03/29/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-12

ACZ Sample ID: ***L90608-10***
Date Sampled: *09/15/11 10:15*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	709		*	mg/Kg	1	5	10/07/11 11:41	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT-ZL	5.2		*	units	0.1	0.1	10/19/11 10:52	zsh
Solids, Percent	CLPSOW390, PART F, D-98	94.6		*	%	0.1	0.5	10/20/11 4:10	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:50	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 17:05	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:49	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:48	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:48	thf

EB 03/29/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-1

ACZ Sample ID: ***L90608-11***
Date Sampled: *09/14/11 11:20*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	766		*	mg/Kg	1	5	10/07/11 11:44	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	5.2		*	units	0.1	0.1	10/19/11 10:54	zsh
Solids, Percent	CLPSOW390, PART F, D-98	90.9		*	%	0.1	0.5	10/20/11 5:28	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 14:00	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 17:22	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:53	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:55	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:55	thf

EB 03/29/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-2

ACZ Sample ID: ***L90608-12***
Date Sampled: *09/14/11 12:50*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	667		*	mg/Kg	1	5	10/07/11 11:47	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-ZL	6.0		*	units	0.1	0.1	10/19/11 10:56	zsh
Solids, Percent	CLPSOW390, PART F, D-98	90.9		*	%	0.1	0.5	10/20/11 6:45	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 14:01	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 17:40	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:56	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 13:02	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 13:02	thf

EB 03/29/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L90608-13***
Sample ID:	DUPLICATE#1STS-BWC-2	Date Sampled:	*09/14/11 14:45*
		Date Received:	*09/20/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	363		*	mg/Kg	1	5	10/07/11 11:50	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT-ZL	5.8		*	units	0.1	0.1	10/19/11 10:58	zsh
Solids, Percent	CLPSOW390, PART F, D-98	93.9		*	%	0.1	0.5	10/20/11 8:02	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 14:02	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 17:57	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 14:00	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 13:10	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 13:10	thf

EB 03/29/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company		ACZ Sample ID:	***L91218-01***
Project ID:	ZN000000J8	Date Sampled:	*10/06/11 09:55*
Sample ID:	STS-AMD-2011-E3 0-6	Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 10:13	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	2700			mg/Kg	20	100	11/10/11 11:31	aeb
Copper (1312)	M6010B ICP	0.12		*	mg/L	0.01	0.05	11/07/11 14:01	jjc
Copper, total (3050)	M6010B ICP	1080		*	mg/Kg	1	5	11/10/11 11:31	aeb
Potassium, total (3050)	M6010B ICP	2600			mg/Kg	30	200	11/10/11 11:31	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	0.8 J HT-L	H	*	%	0.1	0.5	11/08/11 16:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.1		*	%	0.1	0.5	11/08/11 16:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	5.0 J HT-L		*	units	0.1	0.1	11/09/11 15:51	ndj
Solids, Percent	CLPSOW390, PART F, D-98	88.0		*	%	0.1	0.5	11/01/11 17:31	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:00	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:03	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 15:49	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 15:49	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:06	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 11:41	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	4.8 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	5.0		*	mg/Kg	0.1	0.5	11/09/11 21:57	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-~~Z~~ L	0.13	B	*	mg/Kg	0.05	0.3	11/09/11 21:57	pjb

EB 03/30/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E1 6-12

ACZ Sample ID: *L91218-02*
Date Sampled: *10/06/11 09:40*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 10:55	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	6770			mg/Kg	20	100	11/10/11 11:35	aeb
Copper (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	11/07/11 14:10	jjc
Copper, total (3050)	M6010B ICP	113		*	mg/Kg	1	5	11/10/11 11:35	aeb
Potassium, total (3050)	M6010B ICP	6600			mg/Kg	30	200	11/10/11 11:35	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.4 J HT-L	H	*	%	0.1	0.5	11/08/11 18:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.3		*	%	0.1	0.5	11/08/11 18:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	6.9 J HT-L		*	units	0.1	0.1	11/09/11 15:55	ndj
Solids, Percent	CLPSOW390, PART F, D-98	81.8		*	%	0.1	0.5	11/01/11 17:32	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:04	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:04	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:03	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 15:52	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 15:52	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:09	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 12:04	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.3 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	1.5		*	mg/Kg	0.1	0.5	11/09/11 22:00	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-~~I~~ L	0.18	B	*	mg/Kg	0.05	0.3	11/09/11 22:00	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E2 6-12

ACZ Sample ID: ***L91218-03***
Date Sampled: *10/06/11 09:35*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 11:09	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	3860			mg/Kg	20	100	11/10/11 11:38	aeb
Copper (1312)	M6010B ICP	0.06		*	mg/L	0.01	0.05	11/07/11 14:14	jjc
Copper, total (3050)	M6010B ICP	868		*	mg/Kg	1	5	11/10/11 11:38	aeb
Potassium, total (3050)	M6010B ICP	3780			mg/Kg	30	200	11/10/11 11:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.2 J HT-L	H	*	%	0.1	0.5	11/08/11 19:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.1 ↓		*	%	0.1	0.5	11/08/11 19:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	5.8 J HT-L		*	units	0.1	0.1	11/09/11 15:56	ndj
Solids, Percent	CLPSOW390, PART F, D-98	91.1		*	%	0.1	0.5	11/01/11 17:34	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:08	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:05	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:04	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 15:55	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 15:55	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:10	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 12:15	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	12.3 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	12.4		*	mg/Kg	0.1	0.5	11/09/11 22:02	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-Z L	0.11	B	*	mg/Kg	0.05	0.3	11/09/11 22:02	pjb

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REPIN.02.06.05.01

* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E3 6-12

ACZ Sample ID: *L91218-04*
Date Sampled: *10/06/11 10:15*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 11:23	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	3190			mg/Kg	20	100	11/10/11 11:41	aeb
Copper (1312)	M6010B ICP	0.06		*	mg/L	0.01	0.05	11/07/11 14:17	jjc
Copper, total (3050)	M6010B ICP	630		*	mg/Kg	1	5	11/10/11 11:41	aeb
Potassium, total (3050)	M6010B ICP	3110			mg/Kg	30	200	11/10/11 11:41	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.1 J HT-L	H	*	%	0.1	0.5	11/08/11 20:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.1		*	%	0.1	0.5	11/08/11 20:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	5.2 J HT-L		*	units	0.1	0.1	11/09/11 15:58	ndj
Solids, Percent	CLPSOW390, PART F, D-98	88.3		*	%	0.1	0.5	11/01/11 17:35	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:12	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:06	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:06	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 15:58	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 15:58	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:11	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 12:27	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	3.4 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	3.7		*	mg/Kg	0.1	0.5	11/09/11 22:03	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-~~Z~~ L	0.21	B	*	mg/Kg	0.05	0.3	11/09/11 22:03	pjb

EB 03/30/12

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Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-WREF1 0

ACZ Sample ID: *L91218-05*
Date Sampled: *10/04/11 09:30*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 11:37	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	13500			mg/Kg	20	100	11/10/11 11:44	aeb
Copper (1312)	M6010B ICP J SQL-I	0.02	B	*	mg/L	0.01	0.05	11/07/11 14:20	jjc
Copper, total (3050)	M6010B ICP	731		*	mg/Kg	1	5	11/10/11 11:44	aeb
Potassium, total (3050)	M6010B ICP	3670			mg/Kg	30	200	11/10/11 11:44	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.7 J HT-L	H	*	%	0.1	0.5	11/08/11 21:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.3		*	%	0.1	0.5	11/08/11 21:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.8 J HT-L		*	units	0.1	0.1	11/09/11 16:00	ndj
Solids, Percent	CLPSOW390, PART F, D-98	92.6		*	%	0.1	0.5	11/01/11 17:37	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:16	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:07	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:07	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:01	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:01	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:12	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 12:38	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.3 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	1.7		*	mg/Kg	0.1	0.5	11/09/11 22:04	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-~~I~~ L	0.34		*	mg/Kg	0.05	0.3	11/09/11 22:04	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-WREF2 0

ACZ Sample ID: ***L91218-06***

Date Sampled: *10/04/11 09:55*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 11:51	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	28200			mg/Kg	20	100	11/10/11 11:47	aeb
Copper (1312)	M6010B ICP J SQL-I	0.03	B	*	mg/L	0.01	0.05	11/07/11 14:23	jjc
Copper, total (3050)	M6010B ICP	690		*	mg/Kg	1	5	11/10/11 11:47	aeb
Potassium, total (3050)	M6010B ICP	3740			mg/Kg	30	200	11/10/11 11:47	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	2.6 J HT-L	H	*	%	0.1	0.5	11/08/11 22:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.8		*	%	0.1	0.5	11/08/11 22:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.8 J HT-L		*	units	0.1	0.1	11/09/11 16:01	ndj
Solids, Percent	CLPSOW390, PART F, D-98	91.8		*	%	0.1	0.5	11/01/11 17:38	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:20	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:08	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:09	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:04	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:04	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:13	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 12:50	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	2.0 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	2.3		*	mg/Kg	0.1	0.5	11/09/11 22:06	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-I L	0.26	B	*	mg/Kg	0.05	0.3	11/09/11 22:06	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-WREF1 1

ACZ Sample ID: **L91218-07**

Date Sampled: *10/04/11 10:26*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 12:05	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	49900			mg/Kg	20	100	11/10/11 11:59	aeb
Copper (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	11/07/11 14:32	jjc
Copper, total (3050)	M6010B ICP	316		*	mg/Kg	1	5	11/11/11 0:31	jjc
Potassium, total (3050)	M6010B ICP	4180			mg/Kg	30	200	11/10/11 11:59	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	3.4 J HT-L	H	*	%	0.1	0.5	11/08/11 23:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.3		*	%	0.1	0.5	11/08/11 23:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.9 J HT-L		*	units	0.1	0.1	11/09/11 16:03	ndj
Solids, Percent	CLPSOW390, PART F, D-98	90.1		*	%	0.1	0.5	11/01/11 17:40	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:25	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:09	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:10	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:07	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:07	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:15	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 13:01	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.5	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	1.7		*	mg/Kg	0.1	0.5	11/09/11 22:09	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-~~Z~~ L	0.18	B	*	mg/Kg	0.05	0.3	11/09/11 22:09	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-WREF2 1

ACZ Sample ID: *L91218-08*
Date Sampled: *10/04/11 10:40*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 12:19	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	77800			mg/Kg	20	100	11/10/11 12:02	aeb
Copper (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	11/07/11 14:35	jjc
Copper, total (3050)	M6010B ICP	267		*	mg/Kg	1	5	11/11/11 0:37	jjc
Potassium, total (3050)	M6010B ICP	4060			mg/Kg	30	200	11/10/11 12:02	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	4.4 J HT-L	H	*	%	0.1	0.5	11/09/11 0:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.8		*	%	0.1	0.5	11/09/11 0:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.9 J HT-L		*	units	0.1	0.1	11/09/11 16:05	ndj
Solids, Percent	CLPSOW390, PART F, D-98	90.2		*	%	0.1	0.5	11/01/11 17:41	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:29	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:10	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:12	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:10	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:10	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:16	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 13:12	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	0.8 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	1.1		*	mg/Kg	0.1	0.5	11/09/11 22:10	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-~~I~~ L	0.21	B	*	mg/Kg	0.05	0.3	11/09/11 22:10	pjb

EB 03/30/12

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company		ACZ Sample ID:	***L91218-09***
Project ID:	ZN000000J8	Date Sampled:	*10/05/11 10:00*
Sample ID:	STS-AMD-2011-NREF1 0	Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 12:33	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	6510			mg/Kg	20	100	11/10/11 12:05	aeb
Copper (1312)	M6010B ICP	0.08		*	mg/L	0.01	0.05	11/07/11 14:38	jjc
Copper, total (3050)	M6010B ICP	821		*	mg/Kg	1	5	11/11/11 0:41	jjc
Potassium, total (3050)	M6010B ICP	4040			mg/Kg	30	200	11/10/11 12:05	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.4 J HT-L	H	*	%	0.1	0.5	11/09/11 1:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.3 ↓		*	%	0.1	0.5	11/09/11 1:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	6.4 J HT-L		*	units	0.1	0.1	11/09/11 16:06	ndj
Solids, Percent	CLPSOW390, PART F, D-98	93.4		*	%	0.1	0.5	11/01/11 17:42	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:33	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:11	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:13	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:13	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:13	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:17	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 13:24	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	17.8	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	18.0		*	mg/Kg	0.1	0.5	11/09/11 22:12	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-~~Z~~ L	0.16	B	*	mg/Kg	0.05	0.3	11/09/11 22:12	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NREF2 0

ACZ Sample ID: *L91218-10*

Date Sampled: *10/05/11 10:50*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 12:47	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	4680			mg/Kg	20	100	11/10/11 12:08	aeb
Copper (1312)	M6010B ICP	0.06		*	mg/L	0.01	0.05	11/07/11 14:42	jjc
Copper, total (3050)	M6010B ICP	901		*	mg/Kg	1	5	11/11/11 0:44	jjc
Potassium, total (3050)	M6010B ICP	3200			mg/Kg	30	200	11/10/11 12:08	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.2 J HT-L	H	*	%	0.1	0.5	11/09/11 2:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.2		*	%	0.1	0.5	11/09/11 2:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	5.1 J HT-L		*	units	0.1	0.1	11/09/11 16:10	ndj
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/01/11 17:44	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:37	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:12	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:15	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:16	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:16	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:18	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 13:35	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	2.9 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	3.1		*	mg/Kg	0.1	0.5	11/09/11 22:13	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-~~Z~~ L	0.11	B	*	mg/Kg	0.05	0.3	11/09/11 22:13	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NREF1 1

ACZ Sample ID: ***L91218-11***
Date Sampled: *10/05/11 10:50*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 13:01	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	51200			mg/Kg	20	100	11/10/11 12:17	aeb
Copper (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	11/07/11 14:48	jjc
Copper, total (3050)	M6010B ICP	128		*	mg/Kg	1	5	11/11/11 1:01	jjc
Potassium, total (3050)	M6010B ICP	3900			mg/Kg	30	200	11/10/11 12:17	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.7	J HT-L H	*	%	0.1	0.5	11/09/11 3:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.5	↓	*	%	0.1	0.5	11/09/11 3:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.6	J HT-L	*	units	0.1	0.1	11/09/11 16:11	ndj
Solids, Percent	CLPSOW390, PART F, D-98	89.5		*	%	0.1	0.5	11/01/11 17:45	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:41	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:15	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:16	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:20	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:20	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:19	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 13:47	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	2.6	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	2.8		*	mg/Kg	0.1	0.5	11/09/11 22:14	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT,SQL: ~~Z~~ L	0.15	B	*	mg/Kg	0.05	0.3	11/09/11 22:14	pjb

EB 03/30/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NREF2 1

ACZ Sample ID: *L91218-12*
Date Sampled: *10/05/11 11:20*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 13:15	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	9470			mg/Kg	20	100	11/10/11 12:20	aeb
Copper (1312)	M6010B ICP J SQL-I	0.02	B	*	mg/L	0.01	0.05	11/07/11 14:51	jjc
Copper, total (3050)	M6010B ICP	98		*	mg/Kg	1	5	11/11/11 1:04	jjc
Potassium, total (3050)	M6010B ICP	4650			mg/Kg	30	200	11/10/11 12:20	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.0 J HT-L	H	*	%	0.1	0.5	11/09/11 4:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.9		*	%	0.1	0.5	11/09/11 4:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.5 J HT-L		*	units	0.1	0.1	11/09/11 16:13	ndj
Solids, Percent	CLPSOW390, PART F, D-98	88.0		*	%	0.1	0.5	11/01/11 17:47	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:46	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:16	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:18	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:23	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:23	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:20	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 13:58	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.6 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:25	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	1.8		*	mg/Kg	0.1	0.5	11/09/11 22:15	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT,SQL-I L	0.15	B	*	mg/Kg	0.05	0.3	11/09/11 22:15	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NEREF1

ACZ Sample ID: *L91218-13*

Date Sampled: *10/07/11 10:20*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 13:29	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	4130			mg/Kg	20	100	11/10/11 12:23	aeb
Copper (1312)	M6010B ICP	6.29		*	mg/L	0.01	0.05	11/07/11 14:54	jjc
Copper, total (3050)	M6010B ICP	4050		*	mg/Kg	1	5	11/11/11 1:07	jjc
Potassium, total (3050)	M6010B ICP	3590			mg/Kg	30	200	11/10/11 12:23	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.3 J HT-L	H	*	%	0.1	0.5	11/09/11 5:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.3		*	%	0.1	0.5	11/09/11 5:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	4.2 J HT-L		*	units	0.1	0.1	11/09/11 16:15	ndj
Solids, Percent	CLPSOW390, PART F, D-98	92.3		*	%	0.1	0.5	11/01/11 17:48	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:50	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:17	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:19	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:26	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:26	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:21	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 14:10	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	17.1 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:26	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	17.2		*	mg/Kg	0.1	0.5	11/09/11 22:16	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.08	B	*	mg/Kg	0.05	0.3	11/09/11 22:16	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91218-14***
Sample ID:	STS-AMD-2011-NEREF2	Date Sampled:	*10/07/11 10:05*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 13:43	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	5330			mg/Kg	20	100	11/10/11 12:26	aeb
Copper (1312)	M6010B ICP	0.21		*	mg/L	0.01	0.05	11/07/11 14:57	jjc
Copper, total (3050)	M6010B ICP	2420		*	mg/Kg	1	5	11/11/11 1:11	jjc
Potassium, total (3050)	M6010B ICP	4590			mg/Kg	30	200	11/10/11 12:26	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.4	JHT-L H	*	%	0.1	0.5	11/09/11 6:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.3		*	%	0.1	0.5	11/09/11 6:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	5.0	J HT-L	*	units	0.1	0.1	11/09/11 16:16	ndj
Solids, Percent	CLPSOW390, PART F, D-98	90.6		*	%	0.1	0.5	11/01/11 17:50	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:54	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:18	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:21	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:29	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:29	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:22	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 14:21	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	7.0	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:26	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	7.1		*	mg/Kg	0.1	0.5	11/09/11 22:18	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.06	B	*	mg/Kg	0.05	0.3	11/09/11 22:18	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NEREF1

ACZ Sample ID: ***L91218-15***
Date Sampled: *10/07/11 11:05*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 13:57	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	41800			mg/Kg	20	100	11/10/11 12:35	aeb
Copper (1312)	M6010B ICP J SQL:I	0.02	B	*	mg/L	0.01	0.05	11/07/11 15:00	jjc
Copper, total (3050)	M6010B ICP	136		*	mg/Kg	1	5	11/11/11 1:14	jjc
Potassium, total (3050)	M6010B ICP	5090			mg/Kg	30	200	11/10/11 12:35	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	2.2 J HT-L	H	*	%	0.1	0.5	11/09/11 7:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.0		*	%	0.1	0.5	11/09/11 7:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.5 J HT-L		*	units	0.1	0.1	11/09/11 16:18	ndj
Solids, Percent	CLPSOW390, PART F, D-98	84.0		*	%	0.1	0.5	11/01/11 17:51	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 11:58	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:19	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:22	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:32	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:32	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:23	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 14:32	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	3.0 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:26	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	3.5		*	mg/Kg	0.1	0.5	11/09/11 22:19	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	0.45		*	mg/Kg	0.05	0.3	11/09/11 22:19	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NEREF2

ACZ Sample ID: *L91218-16*

Date Sampled: *10/07/11 10:45*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 14:11	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	8350			mg/Kg	20	100	11/10/11 12:38	aeb
Copper (1312)	M6010B ICP J SQL-I	0.01	B	*	mg/L	0.01	0.05	11/07/11 15:10	jjc
Copper, total (3050)	M6010B ICP	168		*	mg/Kg	1	5	11/11/11 1:17	jjc
Potassium, total (3050)	M6010B ICP	4980			mg/Kg	30	200	11/10/11 12:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.6 J HT-L	H	*	%	0.1	0.5	11/09/11 8:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.4		*	%	0.1	0.5	11/09/11 8:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	6.9 J HT-L		*	units	0.1	0.1	11/09/11 16:20	ndj
Solids, Percent	CLPSOW390, PART F, D-98	82.1		*	%	0.1	0.5	11/01/11 17:52	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:02	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:20	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:24	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:35	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:35	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:24	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 14:44	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.3	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:26	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	1.5		*	mg/Kg	0.1	0.5	11/09/11 22:20	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.20	B	*	mg/Kg	0.05	0.3	11/09/11 22:20	pjb

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* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-EREF1 0

ACZ Sample ID: *L91218-17*

Date Sampled: *10/06/11 08:55*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 14:25	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	3710			mg/Kg	20	100	11/10/11 12:41	aeb
Copper (1312)	M6010B ICP	0.07		*	mg/L	0.01	0.05	11/07/11 15:13	jjc
Copper, total (3050)	M6010B ICP	1240		*	mg/Kg	1	5	11/11/11 1:21	jjc
Potassium, total (3050)	M6010B ICP	5390			mg/Kg	30	200	11/10/11 12:41	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	0.8 J HT-L	H	*	%	0.1	0.5	11/09/11 9:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.8 ↓		*	%	0.1	0.5	11/09/11 9:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	4.7 J HT-L		*	units	0.1	0.1	11/09/11 16:21	ndj
Solids, Percent	CLPSOW390, PART F, D-98	84.1		*	%	0.1	0.5	11/01/11 17:54	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:06	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:21	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:25	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:38	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:38	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:26	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 14:55	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	2.9 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:26	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	3.1		*	mg/Kg	0.1	0.5	11/09/11 22:24	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT,SQL-L	0.11	B	*	mg/Kg	0.05	0.3	11/09/11 22:24	pjb

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REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-EREF2 0

ACZ Sample ID: *L91218-18*

Date Sampled: *10/06/11 08:50*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 14:39	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	2550			mg/Kg	20	100	11/10/11 12:44	aeb
Copper (1312)	M6010B ICP	0.39		*	mg/L	0.01	0.05	11/07/11 15:16	jjc
Copper, total (3050)	M6010B ICP	1400		*	mg/Kg	1	5	11/11/11 1:24	jjc
Potassium, total (3050)	M6010B ICP	2720			mg/Kg	30	200	11/10/11 12:44	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	0.5 J HT-L	H	*	%	0.1	0.5	11/09/11 10:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.5		*	%	0.1	0.5	11/09/11 10:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	4.7 J HT-L		*	units	0.1	0.1	11/09/11 16:23	ndj
Solids, Percent	CLPSOW390, PART F, D-98	92.1		*	%	0.1	0.5	11/01/11 17:55	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:11	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:22	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:27	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:41	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:41	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:27	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 15:07	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	2.6 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:26	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	2.6		*	mg/Kg	0.1	0.5	11/09/11 22:25	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	R	~~U~~	*	~~mg/Kg~~	~~0.05~~	~~0.3~~	~~11/09/11 22:25~~	~~pjb~~

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-EREF1 6

ACZ Sample ID: *L91218-19*

Date Sampled: *10/06/11 09:05*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 14:53	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	7020			mg/Kg	20	100	11/10/11 12:47	aeb
Copper (1312)	M6010B ICP		U	*	mg/L	0.01	0.05	11/07/11 15:19	jjc
Copper, total (3050)	M6010B ICP	116		*	mg/Kg	1	5	11/11/11 1:27	jjc
Potassium, total (3050)	M6010B ICP	7320			mg/Kg	30	200	11/10/11 12:47	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	0.8 J HT-L	H	*	%	0.1	0.5	11/09/11 11:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.8		*	%	0.1	0.5	11/09/11 11:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	6.8 J HT-L		*	units	0.1	0.1	11/09/11 16:25	ndj
Solids, Percent	CLPSOW390, PART F, D-98	85.9		*	%	0.1	0.5	11/01/11 17:57	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:15	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:23	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:28	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:44	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:44	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:28	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 15:18	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	4.5 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:26	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	4.8		*	mg/Kg	0.1	0.5	11/09/11 22:26	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT,SQL-L	0.27	B	*	mg/Kg	0.05	0.3	11/09/11 22:26	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-EREF2 6

ACZ Sample ID: ***L91218-20***
Date Sampled: *10/06/11 09:00*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 15:07	jjc

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	2240			mg/Kg	20	100	11/10/11 12:50	aeb
Copper (1312)	M6010B ICP	0.34		*	mg/L	0.01	0.05	11/07/11 15:22	jjc
Copper, total (3050)	M6010B ICP	964		*	mg/Kg	1	5	11/11/11 1:31	jjc
Potassium, total (3050)	M6010B ICP	3430			mg/Kg	30	200	11/10/11 12:50	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	0.9 JHT-L	H	*	%	0.1	0.5	11/09/11 12:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.9		*	%	0.1	0.5	11/09/11 12:30	bsu
pH, Saturated Paste	USDA No. 60 (21A)	4.5 JHT-L		*	units	0.1	0.1	11/09/11 16:28	ndj
Solids, Percent	CLPSOW390, PART F, D-98	90.1		*	%	0.1	0.5	11/01/11 17:58	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:19	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:24	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 10:30	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/07/11 16:47	thf/ndj
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/07/11 16:47	thf/ndj
Synthetic Precip. Leaching Procedure	M1312							11/02/11 12:29	lwt/brd
Water Extraction	ASA No. 9 10-2.3.2							11/09/11 15:30	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	6.9 JHT-L			mg/Kg	0.1	0.5	11/14/11 12:26	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction JHT-L	6.9		*	mg/Kg	0.1	0.5	11/09/11 22:27	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	R	~~U~~	~~*~~	~~mg/Kg~~	~~0.05~~	~~0.3~~	~~11/09/11 22:27~~	~~pjb~~

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91219-01*
Sample ID:	DUP13	Date Sampled:	*10/04/11 00:00*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/14/11 16:48	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP J SD-L	6050		*	mg/Kg	20	100	11/11/11 12:53	jjc
Copper (1312)	M6010B ICP J SQL-I	0.03	B	*	mg/L	0.01	0.05	11/15/11 11:01	aeb
Copper, total (3050)	M6010B ICP J SD-L	842		*	mg/Kg	1	5	11/11/11 12:53	jjc
Potassium, total (3050)	M6010B ICP	3210		*	mg/Kg	30	200	11/11/11 12:53	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.5 J HT-L	H	*	%	0.1	0.5	11/10/11 15:22	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.5		*	%	0.1	0.5	11/10/11 15:22	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.7 J HT-L		*	units	0.1	0.1	11/10/11 8:43	ndj
Solids, Percent	CLPSOW390, PART F, D-98	90.7		*	%	0.1	0.5	11/01/11 17:01	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:23	lwt
Digestion - Hot Plate	M3050B ICP							11/10/11 13:30	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 7:00	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 7:00	lwt
Synthetic Precip. Leaching Procedure	M1312							11/11/11 3:36	brd
Water Extraction	ASA No. 9 10-2.3.2							11/11/11 8:36	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2 J HT-L	0.7			mg/Kg	0.1	0.5	11/16/11 9:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	0.8		*	mg/Kg	0.1	0.5	11/11/11 22:06	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.08	B	*	mg/Kg	0.05	0.3	11/11/11 22:06	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91219-02*
Sample ID:	DUP14	Date Sampled:	*10/05/11 00:00*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/14/11 18:12	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP J SD-L	4430		*	mg/Kg	20	100	11/11/11 13:02	jjc
Copper (1312)	M6010B ICP J SQL-I	0.04	B	*	mg/L	0.01	0.05	11/15/11 11:07	aeb
Copper, total (3050)	M6010B ICP J SD-L	639		*	mg/Kg	1	5	11/11/11 13:02	jjc
Potassium, total (3050)	M6010B ICP	2850		*	mg/Kg	30	200	11/11/11 13:02	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.4 J HT-L	H	*	%	0.1	0.5	11/10/11 16:11	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.3		*	%	0.1	0.5	11/10/11 16:11	bsu
pH, Saturated Paste	USDA No. 60 (21A)	6.3 J HT-L		*	units	0.1	0.1	11/10/11 8:50	ndj
Solids, Percent	CLPSOW390, PART F, D-98	89.3		*	%	0.1	0.5	11/01/11 17:02	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:27	lwt
Digestion - Hot Plate	M3050B ICP							11/10/11 14:33	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:30	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 7:12	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 7:12	lwt
Synthetic Precip. Leaching Procedure	M1312							11/11/11 7:09	brd
Water Extraction	ASA No. 9 10-2.3.2							11/11/11 9:48	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2 J HT-L	5.0			mg/Kg	0.3	2	11/16/11 9:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	5.0		*	mg/Kg	0.3	2	11/11/11 22:17	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction R		~~U~~	~~*~~	~~mg/Kg~~	~~0.05~~	~~0.3~~	~~11/11/11 22:09~~	~~pjb~~

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company		ACZ Sample ID:	***L91219-03***
Project ID:	ZN000000J8	Date Sampled:	*10/06/11 00:00*
Sample ID:	DUP15	Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/14/11 18:54	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP J SD-L	5060		*	mg/Kg	20	100	11/11/11 13:05	jjc
Copper (1312)	M6010B ICP J SQL-I	0.02	B	*	mg/L	0.01	0.05	11/15/11 11:13	aeb
Copper, total (3050)	M6010B ICP J SD-L	481		*	mg/Kg	1	5	11/11/11 13:05	jjc
Potassium, total (3050)	M6010B ICP	3830		*	mg/Kg	30	200	11/11/11 13:05	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.3 J HT-L	H	*	%	0.1	0.5	11/10/11 16:35	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.2		*	%	0.1	0.5	11/10/11 16:35	bsu
pH, Saturated Paste	USDA No. 60 (21A)	7.1 J HT-L		*	units	0.1	0.1	11/10/11 8:53	ndj
Solids, Percent	CLPSOW390, PART F, D-98	82.5		*	%	0.1	0.5	11/01/11 17:03	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:32	lwt
Digestion - Hot Plate	M3050B ICP							11/10/11 14:54	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:45	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 7:24	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 7:24	lwt
Synthetic Precip. Leaching Procedure	M1312							11/11/11 8:55	brd
Water Extraction	ASA No. 9 10-2.3.2							11/11/11 10:24	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2 J HT-L	3.8			mg/Kg	0.1	0.5	11/16/11 9:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT-L	3.9		*	mg/Kg	0.1	0.5	11/11/11 22:11	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.06	B	*	mg/Kg	0.05	0.3	11/11/11 22:11	pjb

EB 03/30/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91219-04***
Sample ID:	DUP16	Date Sampled:	*10/07/11 00:00*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/14/11 19:36	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP J SD-L	5640		*	mg/Kg	20	100	11/11/11 13:09	jjc
Copper (1312)	M6010B ICP	0.45		*	mg/L	0.01	0.05	11/15/11 11:17	aeb
Copper, total (3050)	M6010B ICP J SD-L	3010		*	mg/Kg	1	5	11/11/11 13:09	jjc
Potassium, total (3050)	M6010B ICP	3480		*	mg/Kg	30	200	11/11/11 13:09	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	2.5 J HT-L	H	*	%	0.1	0.5	11/10/11 16:59	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	2.2		*	%	0.1	0.5	11/10/11 16:59	bsu
pH, Saturated Paste	USDA No. 60 (21A)	5.3 J HT-L		*	units	0.1	0.1	11/10/11 8:56	ndj
Solids, Percent	CLPSOW390, PART F, D-98	87.2		*	%	0.1	0.5	11/01/11 17:04	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:36	lwt
Digestion - Hot Plate	M3050B ICP							11/10/11 15:15	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 12:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 7:37	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 7:37	lwt
Synthetic Precip. Leaching Procedure	M1312							11/11/11 10:41	brd
Water Extraction	ASA No. 9 10-2.3.2							11/11/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	J HT-L 15.4			mg/Kg	0.1	0.5	11/16/11 9:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	J HT-L 15.4		*	mg/Kg	0.1	0.5	11/11/11 22:12	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	R	U	*	mg/Kg	0.05	0.3	11/11/11 22:12	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company		ACZ Sample ID:	***L91220-01***
Project ID:	ZN000000J8	Date Sampled:	*10/04/11 08:20*
Sample ID:	STS-AMD-2011-W1 0-6	Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 15:55	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	8620			mg/Kg	20	100	11/10/11 13:50	aeb
Copper (1312)	M6010B ICP J SQL ZSD-L	0.03	B	*	mg/L	0.01	0.05	11/07/11 18:39	aeb
Copper, total (3050)	M6010B ICP ~~J S~~	880		*	mg/Kg	1	5	11/10/11 13:50	aeb
Potassium, total (3050)	M6010B ICP	4380			mg/Kg	30	200	11/10/11 13:50	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.6	J HT-L H	*	%	0.1	0.5	11/09/11 14:35	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.6		*	%	0.1	0.5	11/09/11 14:35	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.8		*	units	0.1	0.1	11/10/11 8:43	ndj
Solids, Percent	CLPSOW390, PART F, D-98	91.1		*	%	0.1	0.5	11/01/11 17:01	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:40	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:03	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 7:49	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 7:49	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:38	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	0.5	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:34	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	0.8		*	mg/Kg	0.1	0.5	11/10/11 22:28	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.21	B	*	mg/Kg	0.05	0.3	11/10/11 22:28	pjb

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** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-W2 0-6

ACZ Sample ID: *L91220-02*
Date Sampled: *10/04/11 09:23*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 16:33	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	8500			mg/Kg	20	100	11/10/11 13:53	aeb
Copper (1312)	M6010B ICP J SD-L	0.06		*	mg/L	0.01	0.05	11/07/11 18:48	aeb
Copper, total (3050)	M6010B ICP	2440		*	mg/Kg	1	5	11/10/11 13:53	aeb
Potassium, total (3050)	M6010B ICP	3470			mg/Kg	30	200	11/10/11 13:53	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	2.0	J HT-L H	*	%	0.1	0.5	11/09/11 16:40	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.8		*	%	0.1	0.5	11/09/11 16:40	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.7		*	units	0.1	0.1	11/10/11 8:50	ndj
Solids, Percent	CLPSOW390, PART F, D-98	93.2		*	%	0.1	0.5	11/01/11 17:03	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:44	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:04	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:18	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 8:02	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 8:02	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:43	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.4	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	1.7		*	mg/Kg	0.1	0.5	11/10/11 22:30	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.21	B	*	mg/Kg	0.05	0.3	11/10/11 22:30	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-W3 0-6

ACZ Sample ID: ***L91220-03***

Date Sampled: *10/04/11 09:05*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 16:46	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	8160			mg/Kg	20	100	11/10/11 13:56	aeb
Copper (1312)	M6010B ICP J SQL, ZSD-L	0.03	B	*	mg/L	0.01	0.05	11/07/11 18:52	aeb
Copper, total (3050)	M6010B ICP	761		*	mg/Kg	1	5	11/10/11 13:56	aeb
Potassium, total (3050)	M6010B ICP	4110			mg/Kg	30	200	11/10/11 13:56	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.5	J HT-L H	*	%	0.1	0.5	11/09/11 17:43	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.4		*	%	0.1	0.5	11/09/11 17:43	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.8		*	units	0.1	0.1	11/10/11 8:53	ndj
Solids, Percent	CLPSOW390, PART F, D-98	90.3		*	%	0.1	0.5	11/01/11 17:05	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:48	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:05	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:27	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 8:14	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 8:14	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:44	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	0.8	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	1.0		*	mg/Kg	0.1	0.5	11/10/11 22:33	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.20	B	*	mg/Kg	0.05	0.3	11/10/11 22:33	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91220-04*
Sample ID:	STS-AMD-2011-W1 6-12	Date Sampled:	*10/04/11 08:30*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 16:58	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	33900			mg/Kg	20	100	11/10/11 13:59	aeb
Copper (1312)	M6010B ICP J SQL,ZSD-L	0.01	B	*	mg/L	0.01	0.05	11/07/11 18:55	aeb
Copper, total (3050)	M6010B ICP	249		*	mg/Kg	1	5	11/10/11 13:59	aeb
Potassium, total (3050)	M6010B ICP	5230			mg/Kg	30	200	11/10/11 13:59	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	3.7	J HT-L H	*	%	0.1	0.5	11/09/11 18:46	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	2.2		*	%	0.1	0.5	11/09/11 18:46	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.8		*	units	0.1	0.1	11/10/11 8:56	ndj
Solids, Percent	CLPSOW390, PART F, D-98	89.9		*	%	0.1	0.5	11/01/11 17:07	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:52	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:06	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:36	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 8:26	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 8:26	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:45	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.0	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	1.3		*	mg/Kg	0.1	0.5	11/10/11 22:34	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.23	B	*	mg/Kg	0.05	0.3	11/10/11 22:34	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91220-05*
Sample ID:	STS-AMD-2011-W2 12-1	Date Sampled:	*10/04/11 09:41*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 17:11	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP ~~J SD-L~~	107000		*	mg/Kg	200	1000	11/11/11 11:51	jjc
Copper (1312)	M6010B ICP J SQL, SD-L	0.03	B	*	mg/L	0.01	0.05	11/07/11 18:58	aeb
Copper, total (3050)	M6010B ICP	264		*	mg/Kg	1	5	11/10/11 14:02	aeb
Potassium, total (3050)	M6010B ICP	3530			mg/Kg	30	200	11/10/11 14:02	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	4.9	J HT-L H	*	%	0.1	0.5	11/09/11 19:49	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.7	↓	*	%	0.1	0.5	11/09/11 19:49	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.7		*	units	0.1	0.1	11/10/11 9:00	ndj
Solids, Percent	CLPSOW390, PART F, D-98	91.9		*	%	0.1	0.5	11/01/11 17:09	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 12:57	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:07	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:45	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 8:39	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 8:39	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:47	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	3.0	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	3.2	↓	*	mg/Kg	0.1	0.5	11/10/11 22:35	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	0.17	B	*	mg/Kg	0.05	0.3	11/10/11 22:35	pjb

J HT, SQL-L

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91220-06*
Sample ID:	STS-AMD-2011-W3 12-1	Date Sampled:	*10/04/11 09:20*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 17:24	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	59400			mg/Kg	20	100	11/10/11 14:05	aeb
Copper (1312)	M6010B ICP J SQL, ZSD-L	0.02	B	*	mg/L	0.01	0.05	11/07/11 19:01	aeb
Copper, total (3050)	M6010B ICP	253		*	mg/Kg	1	5	11/10/11 14:05	aeb
Potassium, total (3050)	M6010B ICP	4190			mg/Kg	30	200	11/10/11 14:05	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	4.0	J HT-LH	*	%	0.1	0.5	11/09/11 20:51	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.8	↓	*	%	0.1	0.5	11/09/11 20:51	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.7		*	units	0.1	0.1	11/10/11 9:03	ndj
Solids, Percent	CLPSOW390, PART F, D-98	88.9		*	%	0.1	0.5	11/01/11 17:11	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:01	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:08	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 11:54	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 8:51	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 8:51	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:48	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.0	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	1.2	↓	*	mg/Kg	0.1	0.5	11/10/11 22:36	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	0.19	B	*	mg/Kg	0.05	0.3	11/10/11 22:36	pjb

J HT, SQL-L

EB 03/30/12

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91220-07*
Sample ID:	STS-AMD-2011-N1 0-6	Date Sampled:	*10/05/11 08:45*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 17:37	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	10000			mg/Kg	20	100	11/10/11 14:08	aeb
Copper (1312)	M6010B ICP J SD-L	0.33		*	mg/L	0.01	0.05	11/07/11 19:10	aeb
Copper, total (3050)	M6010B ICP	2320		*	mg/Kg	1	5	11/10/11 14:08	aeb
Potassium, total (3050)	M6010B ICP	3730			mg/Kg	30	200	11/10/11 14:08	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.9	JHT-L H	*	%	0.1	0.5	11/09/11 21:54	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.8		*	%	0.1	0.5	11/09/11 21:54	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.4		*	units	0.1	0.1	11/10/11 9:06	ndj
Solids, Percent	CLPSOW390, PART F, D-98	90.8		*	%	0.1	0.5	11/01/11 17:13	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:05	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:09	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 12:03	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 9:04	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 9:04	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:51	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	43.7	J HT-L		mg/Kg	0.4	2	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	43.8		*	mg/Kg	0.4	2	11/10/11 23:10	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	0.14	B	*	mg/Kg	0.05	0.3	11/10/11 22:40	pjb

J HT, SQL-L

EB 03/30/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-N2 0-6

ACZ Sample ID: *L91220-08*

Date Sampled: *10/05/11 08:50*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 17:49	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	9650			mg/Kg	20	100	11/10/11 14:17	aeb
Copper (1312)	M6010B ICP J SD-L	0.18		*	mg/L	0.01	0.05	11/07/11 19:16	aeb
Copper, total (3050)	M6010B ICP	1080		*	mg/Kg	1	5	11/10/11 14:17	aeb
Potassium, total (3050)	M6010B ICP	3070			mg/Kg	30	200	11/10/11 14:17	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.4	J HT-L H	*	%	0.1	0.5	11/09/11 22:57	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.3		*	%	0.1	0.5	11/09/11 22:57	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.9		*	units	0.1	0.1	11/10/11 9:10	ndj
Solids, Percent	CLPSOW390, PART F, D-98	93.7		*	%	0.1	0.5	11/01/11 17:15	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:09	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:10	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 12:12	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 9:16	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 9:16	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:53	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	18.1	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	18.2		*	mg/Kg	0.1	0.5	11/10/11 22:41	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.15	B	*	mg/Kg	0.05	0.3	11/10/11 22:41	pjb

EB 03/30/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-N3 0-6

ACZ Sample ID: *L91220-09*
Date Sampled: *10/05/11 08:50*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 18:02	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	7500			mg/Kg	20	100	11/10/11 14:20	aeb
Copper (1312)	M6010B ICP J SD-L	0.15		*	mg/L	0.01	0.05	11/07/11 19:19	aeb
Copper, total (3050)	M6010B ICP	990		*	mg/Kg	1	5	11/10/11 14:20	aeb
Potassium, total (3050)	M6010B ICP	3140			mg/Kg	30	200	11/10/11 14:20	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.3	JHT-L H	*	%	0.1	0.5	11/10/11 0:00	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.2		*	%	0.1	0.5	11/10/11 0:00	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.8		*	units	0.1	0.1	11/10/11 9:13	ndj
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	11/01/11 17:17	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:13	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:11	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 12:21	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 9:29	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 9:29	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:54	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	21.9	J HT-L		mg/Kg	0.3	2	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	22.1		*	mg/Kg	0.3	2	11/10/11 23:11	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.16	B	*	mg/Kg	0.05	0.3	11/10/11 22:42	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-N1 18-2

ACZ Sample ID: *L91220-10*
Date Sampled: *10/05/11 09:10*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 18:15	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	14700			mg/Kg	20	100	11/10/11 14:23	aeb
Copper (1312)	M6010B ICP J SD-L	0.05		*	mg/L	0.01	0.05	11/07/11 19:22	aeb
Copper, total (3050)	M6010B ICP	640		*	mg/Kg	1	5	11/10/11 14:23	aeb
Potassium, total (3050)	M6010B ICP	3210			mg/Kg	30	200	11/10/11 14:23	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.0	JHT-L H	*	%	0.1	0.5	11/10/11 1:02	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.8		*	%	0.1	0.5	11/10/11 1:02	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.4		*	units	0.1	0.1	11/10/11 9:20	ndj
Solids, Percent	CLPSOW390, PART F, D-98	86.8		*	%	0.1	0.5	11/01/11 17:19	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:18	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:12	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 12:30	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 9:41	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 9:41	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:56	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	4.7	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	5.0		*	mg/Kg	0.1	0.5	11/10/11 22:43	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.29	B	*	mg/Kg	0.05	0.3	11/10/11 22:43	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-N2 18-2

ACZ Sample ID: ***L91220-11***

Date Sampled: *10/05/11 09:40*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 18:27	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	10700			mg/Kg	20	100	11/10/11 14:29	aeb
Copper (1312)	M6010B ICP J SQL, ZSD-L	0.03	B	*	mg/L	0.01	0.05	11/07/11 19:25	aeb
Copper, total (3050)	M6010B ICP	91		*	mg/Kg	1	5	11/10/11 14:29	aeb
Potassium, total (3050)	M6010B ICP	2390			mg/Kg	30	200	11/10/11 14:29	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	0.7 J HT-L	H	*	%	0.1	0.5	11/10/11 2:05	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.7		*	%	0.1	0.5	11/10/11 2:05	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.3		*	units	0.1	0.1	11/10/11 9:23	ndj
Solids, Percent	CLPSOW390, PART F, D-98	87.5		*	%	0.1	0.5	11/01/11 17:20	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:22	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:13	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 12:39	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 9:53	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 9:53	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:57	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	2.7	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	3.0		*	mg/Kg	0.1	0.5	11/10/11 22:44	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.26	B	*	mg/Kg	0.05	0.3	11/10/11 22:44	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-N3 18-2

ACZ Sample ID: *L91220-12*
Date Sampled: *10/05/11 10:07*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 18:40	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	9960			mg/Kg	20	100	11/10/11 14:32	aeb
Copper (1312)	M6010B ICP J SQL, ISD-L	0.02	B	*	mg/L	0.01	0.05	11/07/11 19:28	aeb
Copper, total (3050)	M6010B ICP	59		*	mg/Kg	1	5	11/10/11 14:32	aeb
Potassium, total (3050)	M6010B ICP	2740			mg/Kg	30	200	11/10/11 14:32	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.1 J HT-L H		*	%	0.1	0.5	11/10/11 3:08	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.0		*	%	0.1	0.5	11/10/11 3:08	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.2		*	units	0.1	0.1	11/10/11 9:26	ndj
Solids, Percent	CLPSOW390, PART F, D-98	91.1		*	%	0.1	0.5	11/01/11 17:22	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:26	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:14	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 12:48	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 10:06	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 10:06	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 13:59	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.6 J HT-L			mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	1.9		*	mg/Kg	0.1	0.5	11/10/11 22:46	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.24	B	*	mg/Kg	0.05	0.3	11/10/11 22:46	pjb

EB 03/30/12

* Please refer to Qualifier Reports for details.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91220-13*
Sample ID:	STS-AMD-2011-NE1 0-6	Date Sampled:	*10/07/11 08:40*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 18:53	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	6820			mg/Kg	20	100	11/10/11 14:35	aeb
Copper (1312)	M6010B ICP J SD-L	0.34		*	mg/L	0.01	0.05	11/07/11 19:31	aeb
Copper, total (3050)	M6010B ICP	3770		*	mg/Kg	1	5	11/10/11 14:35	aeb
Potassium, total (3050)	M6010B ICP	4300			mg/Kg	30	200	11/10/11 14:35	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	2.4 J HT-L	H	*	%	0.1	0.5	11/10/11 4:11	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	2.1		*	%	0.1	0.5	11/10/11 4:11	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.5		*	units	0.1	0.1	11/10/11 9:30	ndj
Solids, Percent	CLPSOW390, PART F, D-98	84.0		*	%	0.1	0.5	11/01/11 17:24	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:30	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:15	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 12:57	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 10:18	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 10:18	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 14:00	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	16.0	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	16.1		*	mg/Kg	0.1	0.5	11/10/11 22:47	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	0.13	B	*	mg/Kg	0.05	0.3	11/10/11 22:47	pjb

J HT, SQL-L

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NE2 0-6

ACZ Sample ID: ***L91220-14***

Date Sampled: *10/07/11 08:35*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 19:05	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	5670			mg/Kg	20	100	11/10/11 14:38	aeb
Copper (1312)	M6010B ICP J SD-L	0.15		*	mg/L	0.01	0.05	11/07/11 19:34	aeb
Copper, total (3050)	M6010B ICP	2310		*	mg/Kg	1	5	11/10/11 14:38	aeb
Potassium, total (3050)	M6010B ICP	4150			mg/Kg	30	200	11/10/11 14:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.3	JHT-L H	*	%	0.1	0.5	11/10/11 5:13	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.2		*	%	0.1	0.5	11/10/11 5:13	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.4		*	units	0.1	0.1	11/10/11 9:33	ndj
Solids, Percent	CLPSOW390, PART F, D-98	89.5		*	%	0.1	0.5	11/01/11 17:26	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:34	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:16	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 13:06	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 10:31	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 10:31	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 14:01	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	4.8	JHT-L		mg/Kg	0.1	0.5	11/14/11 12:35	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	5.0		*	mg/Kg	0.1	0.5	11/10/11 22:48	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.17	B	*	mg/Kg	0.05	0.3	11/10/11 22:48	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NE3 0-6

ACZ Sample ID: *L91220-15*
Date Sampled: *10/07/11 08:56*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 19:18	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	5270			mg/Kg	20	100	11/10/11 14:41	aeb
Copper (1312)	M6010B ICP J SD-L	0.21		*	mg/L	0.01	0.05	11/07/11 19:37	aeb
Copper, total (3050)	M6010B ICP	2330		*	mg/Kg	1	5	11/10/11 14:41	aeb
Potassium, total (3050)	M6010B ICP	4880			mg/Kg	30	200	11/10/11 14:41	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.6	J HT-L H	*	%	0.1	0.5	11/10/11 6:16	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.6		*	%	0.1	0.5	11/10/11 6:16	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.8		*	units	0.1	0.1	11/10/11 9:36	ndj
Solids, Percent	CLPSOW390, PART F, D-98	91.0		*	%	0.1	0.5	11/01/11 17:28	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:38	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:17	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 13:15	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 10:43	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 10:43	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 14:03	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	13.6	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	13.7		*	mg/Kg	0.1	0.5	11/10/11 22:49	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.13	B	*	mg/Kg	0.05	0.3	11/10/11 22:49	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NE1 18-

ACZ Sample ID: ***L91220-16***

Date Sampled: *10/07/11 08:55*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 19:31	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	7760			mg/Kg	20	100	11/10/11 14:44	aeb
Copper (1312)	M6010B ICP JSD-L	0.05		*	mg/L	0.01	0.05	11/07/11 19:47	aeb
Copper, total (3050)	M6010B ICP	105		*	mg/Kg	1	5	11/10/11 14:44	aeb
Potassium, total (3050)	M6010B ICP	3180			mg/Kg	30	200	11/10/11 14:44	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	0.8	JHT-L H	*	%	0.1	0.5	11/10/11 7:19	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.7		*	%	0.1	0.5	11/10/11 7:19	bsu
pH, Saturated Paste	USDA No. 60 (21A) JHT-L	7.2		*	units	0.1	0.1	11/10/11 9:40	ndj
Solids, Percent	CLPSOW390, PART F, D-98	88.9		*	%	0.1	0.5	11/01/11 17:30	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:43	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:18	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 13:24	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 10:55	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 10:55	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 14:04	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	2.0	JHT-L		mg/Kg	0.1	0.5	11/14/11 12:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	2.2		*	mg/Kg	0.1	0.5	11/10/11 22:50	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction JHT, SQL-L	0.16	B	*	mg/Kg	0.05	0.3	11/10/11 22:50	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NE2 18-

ACZ Sample ID: *L91220-17*

Date Sampled: *10/07/11 09:20*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 19:44	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	8530			mg/Kg	20	100	11/10/11 14:53	aeb
Copper (1312)	M6010B ICP J SQL, ISD-L	0.01	B	*	mg/L	0.01	0.05	11/07/11 19:50	aeb
Copper, total (3050)	M6010B ICP	121		*	mg/Kg	1	5	11/10/11 14:53	aeb
Potassium, total (3050)	M6010B ICP	4640			mg/Kg	30	200	11/10/11 14:53	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.1 J HT-L	H	*	%	0.1	0.5	11/10/11 8:21	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.1		*	%	0.1	0.5	11/10/11 8:21	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.3		*	units	0.1	0.1	11/10/11 9:43	ndj
Solids, Percent	CLPSOW390, PART F, D-98	84.8		*	%	0.1	0.5	11/01/11 17:32	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:47	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:19	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 13:33	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 11:08	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 11:08	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 14:07	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.8	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	2.1		*	mg/Kg	0.1	0.5	11/10/11 22:54	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.30	B	*	mg/Kg	0.05	0.3	11/10/11 22:54	pjb

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REPIN.02.06.05.01

* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NE3 18-

ACZ Sample ID: *L91220-18*

Date Sampled: *10/07/11 09:00*

Date Received: *10/12/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 19:56	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	8000			mg/Kg	20	100	11/10/11 14:56	aeb
Copper (1312)	M6010B ICP UJ SD L		U	*	mg/L	0.01	0.05	11/07/11 19:53	aeb
Copper, total (3050)	M6010B ICP ~~J SD L~~	26		*	mg/Kg	1	5	11/11/11 11:54	jjc
Potassium, total (3050)	M6010B ICP	5680			mg/Kg	30	200	11/10/11 14:56	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	0.9	J HT-H	*	%	0.1	0.5	11/10/11 9:24	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	0.8		*	%	0.1	0.5	11/10/11 9:24	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.1		*	units	0.1	0.1	11/10/11 9:46	ndj
Solids, Percent	CLPSOW390, PART F, D-98	83.4		*	%	0.1	0.5	11/01/11 17:34	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:51	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:20	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 13:42	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 11:20	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 11:20	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 14:09	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	1.4	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	1.6		*	mg/Kg	0.1	0.5	11/10/11 22:55	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	0.17	B	*	mg/Kg	0.05	0.3	11/10/11 22:55	pjb

J HT, SQ L L

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REPIN.02.06.05.01

* Please refer to Qualifier Reports for details.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91220-19*
Sample ID:	STS-AMD-2011-E1 0-6	Date Sampled:	*10/06/11 09:20*
		Date Received:	*10/12/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 20:09	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	6030			mg/Kg	20	100	11/10/11 14:59	aeb
Copper (1312)	M6010B ICP J SQL, ~~Z~~ SDL	0.02	B	*	mg/L	0.01	0.05	11/07/11 19:56	aeb
Copper, total (3050)	M6010B ICP	495		*	mg/Kg	1	5	11/10/11 14:59	aeb
Potassium, total (3050)	M6010B ICP	5190			mg/Kg	30	200	11/10/11 14:59	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.2	J HT-L H	*	%	0.1	0.5	11/10/11 10:27	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.1		*	%	0.1	0.5	11/10/11 10:27	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.2		*	units	0.1	0.1	11/10/11 9:50	ndj
Solids, Percent	CLPSOW390, PART F, D-98	83.0		*	%	0.1	0.5	11/01/11 17:36	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:55	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:21	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 13:51	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 11:33	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 11:33	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 14:10	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	4.1	J HT-L		mg/Kg	0.1	0.5	11/14/11 12:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	4.4		*	mg/Kg	0.1	0.5	11/10/11 22:56	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction J HT, SQL-L	0.30	B	*	mg/Kg	0.05	0.3	11/10/11 22:56	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E2 0-6

ACZ Sample ID: *L91220-20*
Date Sampled: *10/06/11 09:15*
Date Received: *10/12/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M3010A ICP							11/04/11 20:22	aeb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, total (3050)	M6010B ICP	3910			mg/Kg	20	100	11/10/11 15:02	aeb
Copper (1312)	M6010B ICP J SD-L	0.20		*	mg/L	0.01	0.05	11/07/11 19:59	aeb
Copper, total (3050)	M6010B ICP	1030		*	mg/Kg	1	5	11/10/11 15:02	aeb
Potassium, total (3050)	M6010B ICP	3260			mg/Kg	30	200	11/10/11 15:02	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Carbon, total (TC)	ASA No.9 29-2.2.4 Combustion/IR	1.3	JHT-L H	*	%	0.1	0.5	11/10/11 11:30	bsu
Carbon, total organic (TOC)	ASA No.9 29-2.2.4 Combustion/IR	1.2		*	%	0.1	0.5	11/10/11 11:30	bsu
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	6.4		*	units	0.1	0.1	11/10/11 9:56	ndj
Solids, Percent	CLPSOW390, PART F, D-98	95.0		*	%	0.1	0.5	11/01/11 17:38	lwt

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/01/11 13:59	lwt
Digestion - Hot Plate	M3050B ICP							11/09/11 7:22	lwt
Saturated Paste Extraction	USDA No. 60 (2)							11/09/11 14:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/08/11 11:45	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/08/11 11:45	lwt
Synthetic Precip. Leaching Procedure	M1312							11/03/11 14:12	lwt/ndj
Water Extraction	ASA No. 9 10-2.3.2							11/10/11 11:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrate as N, soluble (Water)	Calculation: NO3NO2 minus NO2	43.0	JHT-L		mg/Kg	0.4	2	11/14/11 12:36	calc
Nitrate/Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	43.1		*	mg/Kg	0.4	2	11/10/11 23:12	pjb
Nitrite as N, soluble (Water)	M353.2 - Automated Cadmium Reduction	0.09	B	*	mg/Kg	0.05	0.3	11/10/11 22:58	pjb

J HT, SQL-L

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-21

ACZ Sample ID: ***L91355-01***

Date Sampled: *10/11/11 09:05*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	558			mg/Kg	1	5	11/14/11 10:58	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	4.8		*	units	0.1	0.1	11/14/11 17:28	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.7		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:00	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 10:52	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 14:45	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:00	lwt

ATM 2/22/12

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-22

ACZ Sample ID: ***L91355-02***
Date Sampled: *10/10/11 15:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	976			mg/Kg	1	5	11/14/11 11:07	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.4		*	units	0.1	0.1	11/14/11 18:50	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:06	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 11:45	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 16:36	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:02	lwt

MJM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91355-03*
Sample ID:	STS-PCUG-2011-23	Date Sampled:	*10/11/11 13:35*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	551			mg/Kg	1	5	11/14/11 11:10	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT-L	5.8		*	units	0.1	0.1	11/14/11 19:31	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:12	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 12:02	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 17:31	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:04	lwt

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-24

ACZ Sample ID: ***L91355-04***
Date Sampled: *10/08/11 14:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1000			mg/Kg	1	5	11/14/11 11:14	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	4.2		*	units	0.1	0.1	11/14/11 20:12	thf
Solids, Percent	CLPSOW390, PART F, D-98	90.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:18	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 12:20	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 18:27	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:07	lwt

MTM 2/22/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-25

ACZ Sample ID: ***L91355-05***
Date Sampled: *10/10/11 09:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	706			mg/Kg	1	5	11/14/11 11:17	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	4.6		*	units	0.1	0.1	11/14/11 20:53	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.2		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:25	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 12:37	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 19:23	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:09	lwt

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-06***
Sample ID:	DUP1	Date Sampled:	*10/06/11 00:00*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1310			mg/Kg	1	5	11/14/11 11:26	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT-L	4.0		*	units	0.1	0.1	11/14/11 21:34	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:31	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 12:55	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 20:18	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:12	lwt

MTM 2/22/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: DUP2

ACZ Sample ID: ***L91355-07***
Date Sampled: *10/11/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	555			mg/Kg	1	5	11/14/11 11:29	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	4.9		*	units	0.1	0.1	11/14/11 22:15	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:37	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 13:12	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 21:14	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:14	lwt

ATM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-28

ACZ Sample ID: ***L91355-08***
Date Sampled: *10/09/11 16:45*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	959			mg/Kg	1	5	11/14/11 11:35	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.5		*	units	0.1	0.1	11/14/11 22:56	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.3		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:44	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 13:30	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 22:10	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:16	lwt

NTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-29

ACZ Sample ID: ***L91355-09***

Date Sampled: *10/11/11 14:25*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	671			mg/Kg	1	5	11/14/11 11:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.2		*	units	0.1	0.1	11/14/11 23:37	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.2		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:50	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 13:47	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 23:05	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:19	lwt

NTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-30

ACZ Sample ID: ***L91355-10***

Date Sampled: *10/09/11 16:10*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1500			mg/Kg	1	5	11/14/11 11:42	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT-L	7.4		*	units	0.1	0.1	11/15/11 0:59	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.6		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:56	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 14:05	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 0:01	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:21	lwt

ATM 2/22/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: DUP7

ACZ Sample ID: *L91355-11*
Date Sampled: *10/06/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	567			mg/Kg	1	5	11/14/11 11:45	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.0		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:03	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 14:22	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:24	lwt

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-12***
Sample ID:	STS-CG-2011-42	Date Sampled:	*10/09/11 10:00*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	958			mg/Kg	1	5	11/14/11 11:48	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.8		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:09	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 14:40	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:26	lwt

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-13***
Sample ID:	STS-CG-2011-43	Date Sampled:	*10/06/11 16:00*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	626			mg/Kg	1	5	11/14/11 11:51	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.4		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:15	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 14:57	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:28	lwt

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: DUP8

ACZ Sample ID: ***L91355-14***

Date Sampled: *10/07/11 00:00*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2450			mg/Kg	1	5	11/14/11 11:54	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.8		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:22	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 15:15	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:31	lwt

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-15***
Sample ID:	STS-CG-2011-45	Date Sampled:	*10/06/11 14:50*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	668			mg/Kg	1	5	11/14/11 12:03	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.3		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:28	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 15:32	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:33	lwt

NTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company		ACZ Sample ID:	***L91355-16***
Project ID:	ZN000000J8	Date Sampled:	*10/09/11 13:40*
Sample ID:	STS-CG-2011-46	Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1100			mg/Kg	1	5	11/14/11 12:06	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.6		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:34	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 15:50	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:36	lwt

NTM 2/22/12

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-17***
Sample ID:	DUP9	Date Sampled:	*10/09/11 00:00*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1050			mg/Kg	1	5	11/14/11 12:09	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.6		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:41	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 16:07	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:38	lwt

NTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: DUP3

ACZ Sample ID: ***L91355-18***

Date Sampled: *10/13/11 00:00*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	372			mg/Kg	1	5	11/14/11 12:12	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.9		*	units	0.1	0.1	11/15/11 1:40	thf
Solids, Percent	CLPSOW390, PART F, D-98	97.0		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:47	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 16:25	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 0:57	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:40	lwt

MTM 2/22/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-49

ACZ Sample ID: ***L91355-19***
Date Sampled: *10/09/11 11:55*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	733			mg/Kg	1	5	11/14/11 12:16	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.8		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:53	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 16:42	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:43	lwt

ATM 2/22/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-50

ACZ Sample ID: *L91355-20*

Date Sampled: *10/09/11 11:10*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	620			mg/Kg	1	5	11/14/11 12:19	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.4		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 13:00	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 17:00	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:45	lwt

MTM 2/22/12

* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-11

ACZ Sample ID: ***L91357-01***

Date Sampled: *10/13/11 17:30*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	254		*	mg/Kg	1	5	11/15/11 18:27	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	4.6		*	units	0.1	0.1	11/14/11 22:53	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.3		*	%	0.1	0.5	11/15/11 15:33	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:45	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 19:48	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:30	thf

ATM 2/22/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-12

ACZ Sample ID: ***L91357-02***
Date Sampled: *10/12/11 12:20*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	536		*	mg/Kg	1	5	11/15/11 18:36	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	6.7		*	units	0.1	0.1	11/14/11 23:56	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.3		*	%	0.1	0.5	11/15/11 16:28	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:48	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 21:25	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:32	thf

MTM 2/22/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-13

ACZ Sample ID: ***L91357-03***

Date Sampled: *10/11/11 13:55*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	602		*	mg/Kg	1	5	11/15/11 18:39	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT-L	5.1		*	units	0.1	0.1	11/15/11 0:59	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.2		*	%	0.1	0.5	11/15/11 17:24	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:51	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 23:02	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:35	thf

MTM 2/22/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-14

ACZ Sample ID: ***L91357-04***
Date Sampled: *10/13/11 10:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	354		*	mg/Kg	1	5	11/15/11 18:42	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.9		*	units	0.1	0.1	11/15/11 2:03	thf
Solids, Percent	CLPSOW390, PART F, D-98	97.2		*	%	0.1	0.5	11/15/11 18:19	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:54	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 0:39	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:38	thf

MTM 2/22/12

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-41

ACZ Sample ID: *L91357-05*
Date Sampled: *10/13/11 08:40*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	587		*	mg/Kg	1	5	11/15/11 18:45	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT·L	3.3		*	units	0.1	0.1	11/15/11 3:06	thf
Solids, Percent	CLPSOW390, PART F, D-98	96.7		*	%	0.1	0.5	11/15/11 19:14	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:58	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 2:16	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:41	thf

MTM 2/22/12

* *Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-06***
Sample ID:	STS-PCUG-2011-16	Date Sampled:	*10/09/11 12:55*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	864		*	mg/Kg	1	5	11/15/11 18:54	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT-L	5.2		*	units	0.1	0.1	11/15/11 4:09	thf
Solids, Percent	CLPSOW390, PART F, D-98	89.1		*	%	0.1	0.5	11/15/11 20:10	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:01	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 3:53	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:44	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-17

ACZ Sample ID: *L91357-07*

Date Sampled: *10/10/11 10:50*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	994		*	mg/Kg	1	5	11/15/11 18:57	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.1		*	units	0.1	0.1	11/15/11 5:12	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.2		*	%	0.1	0.5	11/15/11 21:05	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:04	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 5:30	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:47	thf

mm 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-18

ACZ Sample ID: ***L91357-08***

Date Sampled: *10/09/11 14:50*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1540		*	mg/Kg	1	5	11/15/11 19:00	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.3		*	units	0.1	0.1	11/15/11 6:15	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.3		*	%	0.1	0.5	11/15/11 22:00	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:08	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 7:07	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:49	thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-19

ACZ Sample ID: ***L91357-09***
Date Sampled: *10/06/11 12:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1210		*	mg/Kg	1	5	11/15/11 19:03	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	3.9		*	units	0.1	0.1	11/15/11 8:21	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.4		*	%	0.1	0.5	11/15/11 22:56	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:11	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 8:44	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:52	thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-20

ACZ Sample ID: ***L91357-10***

Date Sampled: *10/12/11 15:00*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	520		*	mg/Kg	1	5	11/15/11 19:06	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	4.1		*	units	0.1	0.1	11/15/11 9:24	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.9		*	%	0.1	0.5	11/15/11 23:51	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:14	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 10:21	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:55	thf

MTM 2/22/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-21

ACZ Sample ID: ***L91357-11***
Date Sampled: *10/05/11 15:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	448		*	mg/Kg	1	5	11/15/11 19:09	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.4		*	%	0.1	0.5	11/16/11 0:46	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:18	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:58	thf

NTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-9

ACZ Sample ID: *L91357-12*
Date Sampled: *10/04/11 12:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	646		*	mg/Kg	1	5	11/15/11 19:12	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/16/11 1:42	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:21	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:01	thf

NTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-13***
Sample ID:	STS-CG-2011-10	Date Sampled:	*10/07/11 13:23*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1930		*	mg/Kg	1	5	11/15/11 19:15	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.8		*	%	0.1	0.5	11/16/11 2:37	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:24	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:04	thf

ntm 2/22/12

* Please refer to Qualifier Reports for details.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-24

ACZ Sample ID: ***L91357-14***

Date Sampled: *10/05/11 17:20*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	917		*	mg/Kg	1	5	11/15/11 19:21	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.4		*	%	0.1	0.5	11/16/11 3:32	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:28	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:07	thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-25

ACZ Sample ID: ***L91357-15***

Date Sampled: *10/10/11 17:00*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1640		*	mg/Kg	1	5	11/15/11 19:31	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.0		*	%	0.1	0.5	11/16/11 4:28	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:31	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:09	thf

mpm 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-16***
Sample ID:	STS-CG-2011-26	Date Sampled:	*10/08/11 15:45*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	416		*	mg/Kg	1	5	11/15/11 19:34	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.4		*	%	0.1	0.5	11/16/11 5:23	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:34	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:12	thf

mm 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-27

ACZ Sample ID: ***L91357-17***
Date Sampled: *10/08/11 10:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1870		*	mg/Kg	1	5	11/15/11 19:37	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.3		*	%	0.1	0.5	11/16/11 6:18	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:38	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:15	thf

MTM 2/22/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-28

ACZ Sample ID: ***L91357-18***
Date Sampled: *10/05/11 16:35*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	606		*	mg/Kg	1	5	11/15/11 19:40	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	88.2		*	%	0.1	0.5	11/16/11 7:14	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:41	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:18	thf

MM 2/22/12

* *Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-29

ACZ Sample ID: ***L91357-19***

Date Sampled: *10/10/11 14:15*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1390		*	mg/Kg	1	5	11/15/11 19:43	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/16/11 8:09	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:44	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:21	thf

NTM 2/22/12

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-20***
Sample ID:	STS-CG-2011-30	Date Sampled:	*10/08/11 10:50*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	575		*	mg/Kg	1	5	11/15/11 19:46	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.0		*	%	0.1	0.5	11/16/11 9:04	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:48	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:24	thf

ntm 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID37

ACZ Sample ID: ***L91358-01***

Date Sampled: *10/11/11 09:45*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	654		*	mg/Kg	1	5	11/17/11 9:42	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3 J SQL-I	1	B		t CaCO3/Kt	1	5	11/30/11 10:13	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	1			t CaCO3/Kt	1	5	11/30/11 10:13	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	0			t CaCO3/Kt	1	5	11/30/11 10:13	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 J SQL-I	0.1	B	*	%	0.1	0.5	11/17/11 0:07	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.6		*	units	0.1	0.1	11/21/11 19:53	bsu
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual	J SQL-I	0.03	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Pyritic Sulfide	J SQL-I	0.01	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Sulfate			U	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Total	J SQL-I	0.04	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Total Sulfur minus Sulfate		0.04	B	*	%	0.01	0.1	11/16/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:26	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 13:00	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 11:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:00	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 15:48	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 15:48	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-40

ACZ Sample ID: ***L91358-02***
Date Sampled: *10/13/11 13:55*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	312		*	mg/Kg	1	5	11/17/11 9:52	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	3.8		*	units	0.1	0.1	11/21/11 20:36	bsu
Solids, Percent	CLPSOW390, PART F, D-98	96.6		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:28	zsh
Digestion - Hot Plate	M3050B ICP							11/16/11 12:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:04	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 15:53	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 15:53	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID101

ACZ Sample ID: *L91358-03*
Date Sampled: *10/12/11 16:45*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	272		*	mg/Kg	1	5	11/17/11 10:01	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-4			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 J SQL-I	0.2	B	*	%	0.1	0.5	11/17/11 4:37	brd
pH, Saturated Paste	USDA No. 60 (21A)	3.8		*	units	0.1	0.1	11/21/11 21:19	bsu
Solids, Percent	CLPSOW390, PART F, D-98	93.8		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.11		*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Pyritic Sulfide	J SQL-I	0.02	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Sulfate		0.06	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/16/11 0:00	bsu
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	11/16/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:31	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 13:17	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 12:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:08	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 15:59	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 15:59	cra/thf

EB 03/30/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PH-2011-REFPLOT3

ACZ Sample ID: *L91358-04*
Date Sampled: *10/07/11 11:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1950		*	mg/Kg	1	5	11/17/11 10:04	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3 J SQL-I	3	B		t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	13			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	10			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1.3		*	%	0.1	0.5	11/17/11 2:26	brd
pH, Saturated Paste	USDA No. 60 (21A)	5.6		*	units	0.1	0.1	11/21/11 22:02	bsu
Solids, Percent	CLPSOW390, PART F, D-98	91.2		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual	J SQL-I	0.07	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Pyritic Sulfide		0.01	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Total		0.10		*	%	0.01	0.1	11/16/11 0:00	bsu
Total Sulfur minus Sulfate	J SQL-I	0.08	B	*	%	0.01	0.1	11/16/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:33	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 13:35	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 12:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:13	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:05	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:05	cra/thf

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PH-2011-REFPLOT4

ACZ Sample ID: *L91358-05*
Date Sampled: *10/06/11 10:39*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1130		*	mg/Kg	1	5	11/17/11 10:07	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	7			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-7			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/28/11 14:33	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.4		*	units	0.1	0.1	11/21/11 22:46	bsu
Solids, Percent	CLPSOW390, PART F, D-98	90.8		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.13		*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Pyritic Sulfide	J SQL-I	0.03	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Sulfate		0.05	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Total		0.21		*	%	0.01	0.1	11/16/11 0:00	bsu
Total Sulfur minus Sulfate		0.16		*	%	0.01	0.1	11/16/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:35	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 13:52	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 13:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:17	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:10	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:10	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP11

ACZ Sample ID: ***L91358-06***
Date Sampled: *10/12/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	341		*	mg/Kg	1	5	11/17/11 10:14	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/17/11 6:35	brd
pH, Saturated Paste	USDA No. 60 (21A)	3.9		*	units	0.1	0.1	11/21/11 23:29	bsu
Solids, Percent	CLPSOW390, PART F, D-98	93.7		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.13		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate	J SQL-I	0.06	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:37	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 14:10	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 13:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:22	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:16	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:16	cra/thf

EB 03/30/12

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID105

ACZ Sample ID: ***L91358-07***
Date Sampled: *10/06/11 13:30*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	668		*	mg/Kg	1	5	11/17/11 10:17	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3 J SQL-I	3	B		t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	8			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	5			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.8		*	%	0.1	0.5	11/17/11 8:32	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.9		*	units	0.1	0.1	11/22/11 0:12	bsu
Solids, Percent	CLPSOW390, PART F, D-98	91.1		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual	J SQL-I	0.07	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.01	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.10		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate	J SQL-I	0.08	B	*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:39	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 14:27	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 13:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:26	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:22	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:22	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91358-08***
Sample ID:	DUP12	Date Sampled:	*10/13/11 00:00*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	467		*	mg/Kg	1	5	11/17/11 10:20	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	26			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	20			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	2.6		*	%	0.1	0.5	11/17/11 10:30	brd
pH, Saturated Paste	USDA No. 60 (21A)	6.3		*	units	0.1	0.1	11/22/11 0:55	bsu
Solids, Percent	CLPSOW390, PART F, D-98	95.3		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.12		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide	J SQL- I	0.03	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.04	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.15		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:42	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 14:45	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 14:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:30	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:27	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:27	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company		ACZ Sample ID:	***L91358-09***
Project ID:	ZN000000J8	Date Sampled:	*10/04/11 11:09*
Sample ID:	STS-PH-2011-REFPLOT1	Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	597		*	mg/Kg	1	5	11/17/11 10:23	aeb

Soil Analysis

Parameter	EPA Method		Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	J SQL-I	2	B		t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3		101			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3		99			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		10.1		*	%	0.1	0.5	11/17/11 7:05	brd
pH, Saturated Paste	USDA No. 60 (21A)		7.5		*	units	0.1	0.1	11/22/11 1:39	bsu
Solids, Percent	CLPSOW390, PART F, D-98		92.7		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4									
Sulfur Organic Residual		J SQL-I	0.06	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide				U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate				U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		J SQL-I	0.05	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate			0.05	B	*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:44	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 15:02	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 14:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:35	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:33	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:33	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91358-10*
Sample ID:	STS-PH-2011-REFPLOT2	Date Sampled:	*10/05/11 12:30*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	687		*	mg/Kg	1	5	11/17/11 10:26	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	0			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	11			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	11			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1.1		*	%	0.1	0.5	11/17/11 12:27	brd
pH, Saturated Paste	USDA No. 60 (21A)	6.0		*	units	0.1	0.1	11/22/11 2:22	bsu
Solids, Percent	CLPSOW390, PART F, D-98	91.9		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual	J SQL-I	0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate	J SQL-I	0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:46	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 15:20	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 14:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:39	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:39	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:39	cra/thf

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** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID22

ACZ Sample ID: ***L91358-11***
Date Sampled: *10/13/11 16:40*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	430			mg/Kg	1	5	11/17/11 10:29	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	16			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	10			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1.6		*	%	0.1	0.5	11/17/11 16:22	brd
pH, Saturated Paste	USDA No. 60 (21A)	6.2		*	units	0.1	0.1	11/22/11 3:49	bsu
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.11		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide	J SQL-I	0.04	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.04	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.15		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:48	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 15:37	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 15:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:44	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:44	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:44	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID10

ACZ Sample ID: ***L91358-12***

Date Sampled: *10/07/11 14:35*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2140		*	mg/Kg	1	5	11/17/11 10:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3 J SQL-I	3	B		t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	5			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	2			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 J SQL-I	0.5	B	*	%	0.1	0.5	11/17/11 18:20	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.8		*	units	0.1	0.1	11/22/11 4:32	bsu
Solids, Percent	CLPSOW390, PART F, D-98	91.5		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual	J SQL-I	0.07	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.10		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate	J SQL-I	0.09	B	*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:50	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 15:55	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 15:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:48	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:50	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:50	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID15

ACZ Sample ID: ***L91358-13***

Date Sampled: *10/10/11 11:50*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2260		*	mg/Kg	1	5	11/17/11 10:41	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/17/11 20:17	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.8		*	units	0.1	0.1	11/22/11 5:15	bsu
Solids, Percent	CLPSOW390, PART F, D-98	92.8		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.13		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide	J SQL-I	0.04	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.17		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:53	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 16:12	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 15:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:53	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:56	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:56	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID16

ACZ Sample ID: *L91358-14*

Date Sampled: *10/10/11 12:30*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2020		*	mg/Kg	1	5	11/17/11 10:44	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3 J SQL-I	5	B		t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-5			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/17/11 22:15	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.5		*	units	0.1	0.1	11/22/11 5:58	bsu
Solids, Percent	CLPSOW390, PART F, D-98	90.9		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.16		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate	J SQL-I	0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.15		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:55	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 16:30	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 16:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:57	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 17:01	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 17:01	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID17

ACZ Sample ID: *L91358-15*

Date Sampled: *10/11/11 17:35*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	4220		*	mg/Kg	1	5	11/17/11 10:48	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	14			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	8			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-6			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.8		*	%	0.1	0.5	11/18/11 0:12	brd
pH, Saturated Paste	USDA No. 60 (21A)	6.0		*	units	0.1	0.1	11/22/11 6:42	bsu
Solids, Percent	CLPSOW390, PART F, D-98	94.0		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.21		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.18		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate J SQL-I		0.06	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.45		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.39		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:57	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 16:47	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 16:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 18:01	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 17:07	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 17:07	cra/thf

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID18

ACZ Sample ID: ***L91358-16***
Date Sampled: *10/12/11 15:55*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	254		*	mg/Kg	1	5	11/17/11 10:51	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	5			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-5			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/18/11 2:10	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.3		*	units	0.1	0.1	11/22/11 7:25	bsu
Solids, Percent	CLPSOW390, PART F, D-98	96.5		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.10		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide	J SQL-I	0.06	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.17		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.16		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:59	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 17:05	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 16:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 18:06	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 17:13	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 17:13	cra/thf

EB 03/30/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91359-01***
Sample ID:	STS-CG-2011-11	Date Sampled:	*10/04/11 13:55*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1370		*	mg/Kg	1	5	11/15/11 20:31	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.0		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:00	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 15:08	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:50	thf

MTM 3/6/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91359-02*
Sample ID:	STS-CG-2011-12	Date Sampled:	*10/07/11 15:15*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1670		*	mg/Kg	1	5	11/15/11 20:40	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.0		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:03	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 16:17	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:52	thf

MTM 3/6/12

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91359-03*
Sample ID:	STS-CG-2011-13	Date Sampled:	*10/04/11 14:25*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	906		*	mg/Kg	1	5	11/15/11 20:43	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.1		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:06	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 16:39	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:55	thf

MTM 3/6/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-14

ACZ Sample ID: ***L91359-04***
Date Sampled: *10/04/11 15:05*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	977		*	mg/Kg	1	5	11/15/11 20:46	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:09	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 17:02	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:58	thf

MTM 3/6/12

* Please refer to Qualifier Reports for details.

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-15

ACZ Sample ID: ***L91359-05***
Date Sampled: *10/07/11 16:05*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1790		*	mg/Kg	1	5	11/15/11 20:49	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.7		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:12	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 17:25	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:01	thf

NTM 3/6/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-17

ACZ Sample ID: ***L91359-06***

Date Sampled: *10/04/11 15:50*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	637		*	mg/Kg	1	5	11/15/11 20:58	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.3		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:15	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 17:48	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:04	thf

MTM 3/4/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-19

ACZ Sample ID: ***L91359-07***
Date Sampled: *10/05/11 15:05*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1050		*	mg/Kg	1	5	11/15/11 21:01	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.4		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:18	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 18:11	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:07	thf

MTM 3/8/12

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-20

ACZ Sample ID: ***L91359-08***
Date Sampled: *10/08/11 16:40*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	555		*	mg/Kg	1	5	11/15/11 21:04	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.4		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:21	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 18:34	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:10	thf

vJm 3/6/12

* Please refer to Qualifier Reports for details.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-1

ACZ Sample ID: *L91359-09*

Date Sampled: *10/13/11 10:45*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	263		*	mg/Kg	1	5	11/15/11 21:10	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	5.6		*	units	0.1	0.1	11/15/11 2:21	thf
Solids, Percent	CLPSOW390, PART F, D-98	96.4		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:24	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 18:57	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 1:52	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:13	thf

MTM 3/4/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-2

ACZ Sample ID: ***L91359-10***
Date Sampled: *10/12/11 11:15*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	876		*	mg/Kg	1	5	11/15/11 21:13	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	6.5		*	units	0.1	0.1	11/15/11 3:02	thf
Solids, Percent	CLPSOW390, PART F, D-98	95.6		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:27	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 19:19	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 2:48	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:15	thf

NTM 3/6/12

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-3

ACZ Sample ID: ***L91359-11***

Date Sampled: *10/12/11 09:30*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	587		*	mg/Kg	1	5	11/15/11 21:16	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) JHT-L	4.8		*	units	0.1	0.1	11/15/11 3:43	thf
Solids, Percent	CLPSOW390, PART F, D-98	91.0		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:30	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 19:42	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 3:44	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:18	thf

MTM 3/6/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-4

ACZ Sample ID: ***L91359-12***

Date Sampled: *10/11/11 11:00*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	794		*	mg/Kg	1	5	11/15/11 21:19	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	4.6		*	units	0.1	0.1	11/15/11 4:24	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.2		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:33	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 20:05	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 4:39	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:21	thf

nTa 3/4/12

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-33

ACZ Sample ID: ***L91359-13***
Date Sampled: *10/13/11 12:15*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	273		*	mg/Kg	1	5	11/15/11 21:22	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	6.7		*	units	0.1	0.1	11/15/11 5:05	thf
Solids, Percent	CLPSOW390, PART F, D-98	95.8		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:36	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 20:28	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 5:35	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:24	thf

nTm 3/4/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-7

ACZ Sample ID: *L91359-14*

Date Sampled: *10/05/11 18:15*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	387		*	mg/Kg	1	5	11/15/11 21:25	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.7		*	units	0.1	0.1	11/15/11 5:46	thf
Solids, Percent	CLPSOW390, PART F, D-98	89.8		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:39	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 20:51	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 6:31	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:27	thf

MTM 3/6/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91359-15*
Sample ID:	STS-PCUG-2011-38	Date Sampled:	*10/13/11 15:55*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	350		*	mg/Kg	1	5	11/15/11 21:35	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	3.9		*	units	0.1	0.1	11/15/11 6:27	thf
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:42	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 21:14	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 7:26	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:30	thf

NTM 3/4/12

REPIN.02.06.05.01

* Please refer to Qualifier Reports for details.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-39

ACZ Sample ID: *L91359-16*
Date Sampled: *10/13/11 15:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	360		*	mg/Kg	1	5	11/15/11 21:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	4.7		*	units	0.1	0.1	11/15/11 7:08	thf
Solids, Percent	CLPSOW390, PART F, D-98	96.6		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:45	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 21:37	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 8:22	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:33	thf

MTM 3/4/12

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91359-17***
Sample ID:	STS-PCUG-2011-10	Date Sampled:	*10/13/11 11:20*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	324		*	mg/Kg	1	5	11/15/11 21:41	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A) J HT-L	7.4		*	units	0.1	0.1	11/15/11 8:30	thf
Solids, Percent	CLPSOW390, PART F, D-98	96.1		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:48	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 21:59	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 9:18	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:36	thf

MTM 3/4/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-31

ACZ Sample ID: ***L91360-01***

Date Sampled: *10/05/11 14:05*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1770		*	mg/Kg	1	5	11/15/11 12:34	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.6		*	%	0.1	0.5	11/21/11 17:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:00	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 15:20	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:39	thf

mTm 3/8/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: DUP5

ACZ Sample ID: ***L91360-02***

Date Sampled: *10/05/11 00:00*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	528		*	mg/Kg	1	5	11/15/11 12:43	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.4		*	%	0.1	0.5	11/21/11 19:02	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:06	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 16:40	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:41	thf

NTM 3/8/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-33

ACZ Sample ID: ***L91360-03***

Date Sampled: *10/08/11 13:50*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	666		*	mg/Kg	1	5	11/15/11 12:46	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.2		*	%	0.1	0.5	11/21/11 20:02	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:13	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 18:00	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:44	thf

mm 3/8/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-34

ACZ Sample ID: ***L91360-04***

Date Sampled: *10/10/11 15:30*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1190		*	mg/Kg	1	5	11/15/11 12:49	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.4		*	%	0.1	0.5	11/21/11 21:03	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:20	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 18:26	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:47	thf

MTM 3/8/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-35

ACZ Sample ID:	***L91360-05***
Date Sampled:	*10/08/11 11:40*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	362		*	mg/Kg	1	5	11/15/11 12:53	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.2		*	%	0.1	0.5	11/21/11 22:04	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:26	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 18:53	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:50	thf

MTM 3/8/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-36

ACZ Sample ID: ***L91360-06***
Date Sampled: *10/10/11 16:10*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	507		*	mg/Kg	1	5	11/15/11 13:05	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.3		*	%	0.1	0.5	11/21/11 23:04	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:33	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 19:20	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:53	thf

NJM 3/8/12

* Please refer to Qualifier Reports for details.

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP6

ACZ Sample ID: ***L91360-07***
Date Sampled: *10/05/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	613		*	mg/Kg	1	5	11/15/11 13:08	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.7		*	%	0.1	0.5	11/22/11 0:05	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:40	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 19:46	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:56	thf

ndm 3/8/12

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-38

ACZ Sample ID: ***L91360-08***
Date Sampled: *10/08/11 12:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	633		*	mg/Kg	1	5	11/15/11 13:11	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.4		*	%	0.1	0.5	11/22/11 1:06	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:46	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 20:13	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:59	thf

ATM 3/8/12

* Please refer to Qualifier Reports for details.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-39
ACZ Sample ID:	***L91360-09***
Date Sampled:	*10/09/11 08:35*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	682		*	mg/Kg	1	5	11/15/11 13:14	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.7		*	%	0.1	0.5	11/22/11 2:06	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:53	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 20:40	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 13:02	thf

MTM 3/8/12

* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-40
ACZ Sample ID:	***L91360-10***
Date Sampled:	*10/06/11 17:00*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	608		*	mg/Kg	1	5	11/15/11 13:17	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.0		*	%	0.1	0.5	11/22/11 3:07	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 17:00	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 21:06	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 13:04	thf

MTM 3/8/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: RINSATE3

ACZ Sample ID: ***L91393-01***
Date Sampled: *10/06/11 17:05*
Date Received: *10/19/11*
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							10/25/11 11:01	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS		U		mg/L	0.0005	0.003	10/26/11 21:48	pmc

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: RINSATE4

ACZ Sample ID: ***L91393-02***
Date Sampled: *10/06/11 16:45*
Date Received: *10/19/11*
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							10/25/11 11:03	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS		U		mg/L	0.0005	0.003	10/26/11 21:51	pmc

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: RINSATE1

ACZ Sample ID: ***L91393-03***
Date Sampled: *10/10/11 15:10*
Date Received: *10/19/11*
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							10/25/11 11:04	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS		U		mg/L	0.0005	0.003	10/26/11 21:54	pmc

mm 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: RINSATE5

ACZ Sample ID: ***L91393-04***
Date Sampled: *10/10/11 15:35*
Date Received: *10/19/11*
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							10/25/11 11:05	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS		U		mg/L	0.0005	0.003	10/26/11 21:57	pmc

MYM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: RINSATE7

ACZ Sample ID: ***L91393-05***

Date Sampled: *10/07/11 09:40*

Date Received: *10/19/11*

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							10/25/11 11:09	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS		U		mg/L	0.0005	0.003	10/26/11 22:12	pmc

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: RINSATE8

ACZ Sample ID: ***L91393-06***
Date Sampled: *10/07/11 10:20*
Date Received: *10/19/11*
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							10/25/11 11:10	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS		U		mg/L	0.0005	0.003	10/26/11 22:15	pmc

MTM 2/22/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: RINSATE2

ACZ Sample ID: ***L91393-07***

Date Sampled: *10/11/11 11:20*

Date Received: *10/19/11*

Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							10/25/11 11:11	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS		U		mg/L	0.0005	0.003	10/26/11 22:18	pmc

mm 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: RINSATE6

ACZ Sample ID: ***L91393-08***
Date Sampled: *10/12/11 17:15*
Date Received: *10/19/11*
Sample Matrix: *Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							10/25/11 11:12	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS J-SBL-I	0.0007	B		mg/L	0.0005	0.003	10/26/11 22:21	pmc

MTA 2/22/12

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-01***
Sample ID:	STS-PCUG-2011-27	Date Sampled:	*10/20/11 16:05*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	438			mg/Kg	1	5	11/28/11 21:40	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		6.9	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.7			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.3		*	%	0.1	0.5	11/29/11 13:02	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:00	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 14:45	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 10:52	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 14:45	mfm/thf

ATm 2/22/12

* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-31

ACZ Sample ID: ***L91526-02***

Date Sampled: *10/19/11 10:50*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	304			mg/Kg	1	5	11/28/11 21:49	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.3	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.5			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.7		*	%	0.1	0.5	11/29/11 14:05	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:01	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 16:01	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 11:45	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 16:01	mfm/thf

MTM 2/22/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91526-03*
Sample ID:	DUP4	Date Sampled:	*10/19/11 00:00*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	261			mg/Kg	1	5	11/28/11 21:52	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.2	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.3			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.7		*	%	0.1	0.5	11/29/11 15:08	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:03	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 17:18	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:02	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 17:18	mfm/thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-04***
Sample ID:	STS-PCUG-2011-5	Date Sampled:	*10/20/11 13:25*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	458			mg/Kg	1	5	11/28/11 21:55	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.8	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.4			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	94.8		*	%	0.1	0.5	11/29/11 16:11	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:04	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 18:34	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:20	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 18:34	mfm/thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-05***
Sample ID:	STS-PCUG-2011-6	Date Sampled:	*10/18/11 10:55*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	290			mg/Kg	1	5	11/28/11 22:07	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.0	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.3			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/29/11 17:14	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:06	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 19:51	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:37	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 19:51	mfm/thf

MJM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-06***
Sample ID:	STS-PCUG-2011-8	Date Sampled:	*10/20/11 12:15*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	449			mg/Kg	1	5	11/28/11 22:10	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.8	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.4			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.4		*	%	0.1	0.5	11/29/11 18:17	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:07	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 21:07	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:55	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 21:07	mfm/thf

MJM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-9

ACZ Sample ID: *L91526-07*

Date Sampled: *10/18/11 14:05*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	246			mg/Kg	1	5	11/28/11 22:13	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.8	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.3			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	97.9		*	%	0.1	0.5	11/29/11 19:19	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:09	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 22:24	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:12	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 22:24	mfm/thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-15

ACZ Sample ID: *L91526-08*
Date Sampled: *10/18/11 10:15*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	357			mg/Kg	1	5	11/28/11 22:16	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.3	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.4			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.5		*	%	0.1	0.5	11/29/11 20:22	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:11	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 23:41	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:30	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 23:41	mfm/thf

mtm 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID106

ACZ Sample ID: *L91526-09*
Date Sampled: *10/18/11 12:05*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	254			mg/Kg	1	5	11/28/11 22:19	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3 J SQL-I	1	B		t CaCO3/Kt	1	5	12/05/11 13:30	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	12/05/11 13:30	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-1			t CaCO3/Kt	1	5	12/05/11 13:30	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)		U	*	%	0.1	0.5	11/29/11 7:48	bsu
pH, Corrosivity	M9045D/M9040C								
pH		5.0 J HT-L			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.2			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.4		*	%	0.1	0.5	11/29/11 21:25	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue	~~J HT, P, SQL-I~~ J SQL·I	0.03	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur HNO3 Residue		0.03	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur Organic Residual Mod		0.03	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur Pyritic Sulfide	~~UJ HT, P-J~~		U	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur Sulfate	~~J HT, P, SQL-I~~ J SQL·I	0.01	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur Total		0.04	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Total Sulfur minus Sulfate		0.03	B	*	%	0.01	0.1	11/28/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:12	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 0:57	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:47	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 0:57	mfm/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/22/11 0:57	mfm/thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-32

ACZ Sample ID: ***L91526-10***
Date Sampled: *10/19/11 11:25*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	420			mg/Kg	1	5	11/28/11 22:22	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		3.8	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.3			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.6		*	%	0.1	0.5	11/29/11 22:28	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:14	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 2:14	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:05	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 2:14	mfm/thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-34

ACZ Sample ID: **L91526-11**
Date Sampled: 10/19/11 12:00
Date Received: 10/26/11
Sample Matrix: Soil

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	364			mg/Kg	1	5	11/28/11 22:25	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.0	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.0			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/29/11 23:31	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:15	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 3:30	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:22	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 3:30	mfm/thf

mm 2/22/12

* Please refer to Qualifier Reports for details.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-35

ACZ Sample ID: ***L91526-12***

Date Sampled: *10/18/11 13:30*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	287			mg/Kg	1	5	11/28/11 22:28	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.5	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.0			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	97.4		*	%	0.1	0.5	11/30/11 0:34	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:17	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 4:47	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:40	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 4:47	mfm/thf

MTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-36

ACZ Sample ID: ***L91526-13***

Date Sampled: *10/18/11 12:40*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	270			mg/Kg	1	5	11/28/11 22:31	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.6	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		21.9			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.5		*	%	0.1	0.5	11/30/11 1:37	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:19	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 6:04	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:57	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 6:04	mfm/thf

MTM 2/22/12

* Please refer to Qualifier Reports for details.

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-37

ACZ Sample ID: ***L91526-14***
Date Sampled: *10/19/11 10:05*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	244			mg/Kg	1	5	11/28/11 22:34	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		6.9	J HT-L		units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		21.9			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.8		*	%	0.1	0.5	11/30/11 2:39	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:20	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 7:20	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:15	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 7:20	mfm/thf

mTM 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP10

ACZ Sample ID: ***L91526-15***
Date Sampled: *10/19/11 00:00*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	248			mg/Kg	1	5	11/28/11 22:43	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.9		*	%	0.1	0.5	11/30/11 3:42	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:22	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 8:37	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:32	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 8:37	mfm/thf

MTM 2/22/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-44

ACZ Sample ID: *L91526-16*

Date Sampled: *10/20/11 11:25*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	761			mg/Kg	1	5	11/28/11 22:46	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.6		*	%	0.1	0.5	11/30/11 4:45	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:23	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 9:53	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:50	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 9:53	mfm/thf

TFM 2/22/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-47

ACZ Sample ID: ***L91526-17***

Date Sampled: *10/20/11 14:30*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	472			mg/Kg	1	5	11/28/11 22:49	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.3		*	%	0.1	0.5	11/30/11 5:48	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:25	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 11:10	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:07	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 11:10	mfm/thf

MTM 4/22/12

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-48

ACZ Sample ID: ***L91526-18***
Date Sampled: *10/20/11 09:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1260			mg/Kg	1	5	11/28/11 22:52	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.8		*	%	0.1	0.5	11/30/11 6:51	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:26	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 12:26	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:25	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 12:26	mfm/thf

NJM 2/2/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-19***
Sample ID:	STS-CG-2011-16	Date Sampled:	*10/19/11 17:40*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	949			mg/Kg	1	5	11/28/11 22:55	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.6		*	%	0.1	0.5	11/30/11 7:54	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:28	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 13:43	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:42	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 13:43	mfm/thf

NTM 2/22/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-7

ACZ Sample ID: ***L91526-20***
Date Sampled: *10/19/11 15:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	627			mg/Kg	1	5	11/28/11 22:58	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.2		*	%	0.1	0.5	11/30/11 8:57	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:30	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 15:00	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 17:00	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 15:00	mfm/thf

rom 2/22/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91527-01*
Sample ID:	STS-CG-2011-51	Date Sampled:	*10/20/11 14:50*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	463		*	mg/Kg	1	5	11/28/11 23:44	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.5		*	%	0.1	0.5	11/29/11 16:51	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:00	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:00	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 11:52	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:00	thf

MTM 2/24/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-52

ACZ Sample ID: ***L91527-02***

Date Sampled: *10/20/11 10:00*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	780		*	mg/Kg	1	5	11/28/11 23:53	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.8		*	%	0.1	0.5	11/29/11 17:42	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:03	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:03	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:45	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:03	thf

MTM 2/24/12

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91527-03*
Sample ID:	STS-CG-2011-53	Date Sampled:	*10/20/11 15:20*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	426		*	mg/Kg	1	5	11/28/11 23:56	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/29/11 18:34	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:06	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:06	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:02	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:06	thf

NTM 2/24/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-54

ACZ Sample ID: ***L91527-04***

Date Sampled: *10/20/11 16:40*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1100		*	mg/Kg	1	5	11/28/11 23:59	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.9		*	%	0.1	0.5	11/29/11 19:25	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:09	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:09	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:20	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:09	thf

nTm 2/24/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-05***
Sample ID:	STS-CG-2011-55	Date Sampled:	*10/20/11 15:40*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	633		*	mg/Kg	1	5	11/29/11 0:11	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.5		*	%	0.1	0.5	11/29/11 20:17	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:12	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:12	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:37	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:12	thf

MTM 2/24/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-56

ACZ Sample ID: ***L91527-06***
Date Sampled: *10/20/11 16:55*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	177		*	mg/Kg	1	5	11/29/11 0:14	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	97.6		*	%	0.1	0.5	11/29/11 21:08	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:15	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:15	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:55	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:15	thf

NTM 2/24/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-57

ACZ Sample ID: ***L91527-07***
Date Sampled: *10/20/11 17:10*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	434		*	mg/Kg	1	5	11/29/11 0:17	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.7		*	%	0.1	0.5	11/29/11 22:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:18	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:18	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:12	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:18	thf

mtm 2/24/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-32

ACZ Sample ID: ***L91527-08***
Date Sampled: *10/20/11 10:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1500		*	mg/Kg	1	5	11/29/11 0:20	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.9		*	%	0.1	0.5	11/29/11 22:51	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:22	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:22	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:30	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:22	thf

MTM 2/24/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-37

ACZ Sample ID: ***L91527-09***
Date Sampled: *10/20/11 11:00*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1560		*	mg/Kg	1	5	11/29/11 0:23	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.4		*	%	0.1	0.5	11/29/11 23:42	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:25	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:25	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:47	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:25	thf

MTM 2/24/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-10***
Sample ID:	STS-CG-2011-41	Date Sampled:	*10/20/11 14:15*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	321		*	mg/Kg	1	5	11/29/11 0:26	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.9		*	%	0.1	0.5	11/30/11 0:34	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:28	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:28	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:05	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:28	thf

MTM 2/24/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-1

ACZ Sample ID: ***L91527-11***

Date Sampled: *10/19/11 14:40*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	274		*	mg/Kg	1	5	11/29/11 0:29	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.9		*	%	0.1	0.5	11/30/11 1:25	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:31	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:31	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:22	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:31	thf

nTm 6/24/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-12***
Sample ID:	STS-CG-2011-2	Date Sampled:	*10/19/11 14:15*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	288		*	mg/Kg	1	5	11/29/11 0:32	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.9		*	%	0.1	0.5	11/30/11 2:17	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:34	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:34	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:40	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:34	thf

ntm 2/24/12

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-13***
Sample ID:	STS-CG-2011-3	Date Sampled:	*10/19/11 13:20*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	573		*	mg/Kg	1	5	11/29/11 0:35	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.6		*	%	0.1	0.5	11/30/11 3:08	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:37	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:37	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:57	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:37	thf

mtm 2/24/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-4
ACZ Sample ID:	*L91527-14*
Date Sampled:	*10/19/11 13:35*
Date Received:	*10/26/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	337		*	mg/Kg	1	5	11/29/11 0:38	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.1		*	%	0.1	0.5	11/30/11 4:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:40	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:40	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:15	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:40	thf

MTM 2/24/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-5

ACZ Sample ID: ***L91527-15***

Date Sampled: *10/19/11 16:05*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	309		*	mg/Kg	1	5	11/29/11 0:47	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/30/11 4:51	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:44	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:44	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:32	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:44	thf

ntm 2/24/12

* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-6

ACZ Sample ID: *L91527-16*
Date Sampled: *10/19/11 15:45*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	316		*	mg/Kg	1	5	11/29/11 0:50	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.7		*	%	0.1	0.5	11/30/11 5:42	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:47	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:47	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:50	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:47	thf

MTm 2/24/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-CG-2011-18

ACZ Sample ID: ***L91527-17***
Date Sampled: *10/20/11 08:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1640		*	mg/Kg	1	5	11/29/11 0:53	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.7		*	%	0.1	0.5	11/30/11 6:34	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:50	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:50	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 17:07	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:50	thf

MTM 2/24/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-8

ACZ Sample ID: ***L91527-18***

Date Sampled: *10/19/11 15:10*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	490		*	mg/Kg	1	5	11/29/11 0:56	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.5		*	%	0.1	0.5	11/30/11 7:25	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:53	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:53	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 17:25	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:53	thf

MTM 2/24/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-22

ACZ Sample ID: ***L91527-19***
Date Sampled: *10/20/11 08:05*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1560		*	mg/Kg	1	5	11/29/11 0:59	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.4		*	%	0.1	0.5	11/30/11 8:17	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:56	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:56	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 17:42	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:56	thf

MTM 2/24/12

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-20***
Sample ID:	STS-CG-2011-23	Date Sampled:	*10/19/11 18:20*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2070		*	mg/Kg	1	5	11/29/11 1:02	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.3		*	%	0.1	0.5	11/30/11 9:08	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:59	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:59	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 18:00	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:59	thf

MTM 2/24/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L91528-01*
Sample ID:	STS-PH-2011-FID102	Date Sampled:	*10/19/11 09:15*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP J SD·L	303		*	mg/Kg	1	5	11/30/11 13:43	scp

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	23			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-23			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)		U	*	%	0.1	0.5	11/29/11 10:54	bsu
pH, Corrosivity	M9045D/M9040C								
pH		3.6 J HT-L			units	0.1	0.1	11/15/11 0:00	mss2
pH measured at		22.5			C	0.1	0.1	11/15/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.8		*	%	0.1	0.5	11/22/11 4:08	bsu
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.48		*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur HNO3 Residue	J SQL-I	0.04	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Organic Residual Mod		0.04	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Pyritic Sulfide		0.44		*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Sulfate		0.27		*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Total		0.75		*	%	0.01	0.1	11/29/11 0:00	bsu
Total Sulfur minus Sulfate		0.48		*	%	0.01	0.1	11/29/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/05/11 12:34	nrc
Crush and Pulverize	USDA No. 1, 1972							11/09/11 10:00	mss2
Digestion - Hot Plate	M3050B ICP							11/29/11 12:40	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:52	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/09/11 11:52	lwt

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID7

ACZ Sample ID: ***L91528-02***

Date Sampled: *10/18/11 11:45*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP J SD·L	494		*	mg/Kg	1	5	11/30/11 13:53	scp

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3 J SQL·I	4	B		t CaCO3/Kt	1	5	12/01/11 11:12	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-4			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)		U	*	%	0.1	0.5	11/29/11 12:27	bsu
pH, Corrosivity	M9045D/M9040C								
pH		4.8 J HT-L			units	0.1	0.1	11/15/11 0:00	mss2
pH measured at		22.4			C	0.1	0.1	11/15/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	97.4		*	%	0.1	0.5	11/22/11 5:08	bsu
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue	J SQL·I	0.06	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Pyritic Sulfide		0.04	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Sulfate		0.07	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Total		0.13		*	%	0.01	0.1	11/29/11 0:00	bsu
Total Sulfur minus Sulfate	J SQL·I	0.06	B	*	%	0.01	0.1	11/29/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/05/11 12:42	nrc
Crush and Pulverize	USDA No. 1, 1972							11/09/11 10:20	mss2
Digestion - Hot Plate	M3050B ICP							11/29/11 15:20	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:55	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/09/11 11:55	lwt

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID8

ACZ Sample ID: *L91528-03*

Date Sampled: *10/19/11 17:00*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP J SD-L	332		*	mg/Kg	1	5	11/30/11 13:56	scp

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	15			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	16			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	1			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)	1.6		*	%	0.1	0.5	11/29/11 9:42	bsu
pH, Corrosivity	M9045D/M9040C								
pH		6.4 J HT-L			units	0.1	0.1	11/15/11 0:00	mss2
pH measured at		22.2			C	0.1	0.1	11/15/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	92.9		*	%	0.1	0.5	11/22/11 6:09	bsu
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.25		*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur HNO3 Residue	J SQL-I	0.03	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Organic Residual Mod	↓	0.03	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Pyritic Sulfide		0.22		*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Sulfate		0.22		*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Total		0.47		*	%	0.01	0.1	11/29/11 0:00	bsu
Total Sulfur minus Sulfate		0.25		*	%	0.01	0.1	11/29/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/05/11 12:51	nrc
Crush and Pulverize	USDA No. 1, 1972							11/09/11 10:40	mss2
Digestion - Hot Plate	M3050B ICP							11/29/11 16:13	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:57	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/09/11 11:57	lwt

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID28

ACZ Sample ID: *L91528-04*
Date Sampled: *10/18/11 15:35*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP J SD-L	400		*	mg/Kg	1	5	11/30/11 13:59	scp

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3 J SQL-I	4	B		t CaCO3/Kt	1	5	12/01/11 11:12	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	35			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	31			t CaCO3/Kt	1	5	12/01/11 11:12	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)	3.5		*	%	0.1	0.5	11/29/11 12:36	bsu
pH, Corrosivity	M9045D/M9040C								
pH		6.9 J HT-L			units	0.1	0.1	11/15/11 0:00	mss2
pH measured at		22.2			C	0.1	0.1	11/15/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	97.5		*	%	0.1	0.5	11/22/11 7:10	bsu
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.12		*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur HNO3 Residue	J SQL-I	0.04	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Organic Residual Mod		0.04	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Pyritic Sulfide	J SQL-I	0.08	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	11/29/11 0:00	bsu
Sulfur Total		0.13		*	%	0.01	0.1	11/29/11 0:00	bsu
Total Sulfur minus Sulfate		0.12		*	%	0.01	0.1	11/29/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/05/11 12:59	nrc
Crush and Pulverize	USDA No. 1, 1972							11/09/11 11:00	mss2
Digestion - Hot Plate	M3050B ICP							11/29/11 17:06	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 12:00	lwt
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/09/11 12:00	lwt

EB 03/30/12

REPIN.02.06.05.01

* Please refer to Qualifier Reports for details.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID37

ACZ Sample ID: ***L92172-01***
Date Sampled: *10/11/11 09:45*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue	J SQL·I	0.05	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.03	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Sulfate			U	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Total	J SQL·I	0.05	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.05	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd

EB 03/30/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID101

ACZ Sample ID: *L92172-02*
Date Sampled: *10/12/11 16:45*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method		Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue			0.15		*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur HNO3 Residue		J SQL-I	0.02	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Organic Residual Mod			0.02	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			0.13		*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Sulfate		J SQL-I	0.06	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Total			0.21		*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Total Sulfur minus Sulfate			0.15		*	%	0.01	0.1	12/12/11 0:00	bsu/brd

EB 03/30/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-REFPLOT3

ACZ Sample ID: ***L92172-03***

Date Sampled: *10/07/11 11:50*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		JSQL-I 0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.07	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.07	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.16		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		J SQL-I 0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

EB 03/30/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-REFPLOT4

ACZ Sample ID: ***L92172-04***

Date Sampled: *10/06/11 10:39*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method		Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue			0.18		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Sulfur HNO3 Residue		J SQL-I	0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod			0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			0.14		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Sulfur Sulfate		J SQL-I	0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total			0.23		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Total Sulfur minus Sulfate			0.18		*	%	0.01	0.1	12/13/11 0:00	osu/brd

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID105

ACZ Sample ID: ***L92172-05***
Date Sampled: *10/06/11 13:30*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue	J SQL·I	0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.10		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate	J SQL·I	0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-REFPLOT1

ACZ Sample ID: ***L92172-06***
Date Sampled: *10/04/11 11:09*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue	J SQL-I	0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.03	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8		ACZ Sample ID:	*L92172-07*
Sample ID:	STS-PH-2011-REFPLOT2		Date Sampled:	*10/05/11 12:30*
			Date Received:	*12/02/11*
			Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue	J SQL-I	0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate			U	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total	J SQL-I	0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID22

ACZ Sample ID: *L92172-08*
Date Sampled: *10/13/11 16:40*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method		Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue			0.23		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		J SQL·I	0.03	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod			0.03	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			0.20		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		J SQL·I	0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total			0.28		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate			0.23		*	%	0.01	0.1	12/13/11 0:00	bsu/brd

EB 03/30/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID10

ACZ Sample ID: ***L92172-09***

Date Sampled: *10/07/11 14:35*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method		Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue		J SQL·I	0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue			0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod			0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			0.07	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate			0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total			0.11		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		J SQL·I	0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID15

ACZ Sample ID: ***L92172-10***

Date Sampled: *10/10/11 11:50*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method		Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue			0.19		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Sulfur HNO3 Residue		J SQL·I	0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod			0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			0.17		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Sulfur Sulfate		J SQL·I	0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total			0.21		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Total Sulfur minus Sulfate			0.19		*	%	0.01	0.1	12/13/11 0:00	osu/brd

EB 03/30/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID16

ACZ Sample ID: ***L92172-11***
Date Sampled: *10/10/11 12:30*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.13		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Sulfur HNO3 Residue		0.14		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Sulfur Organic Residual Mod		0.14		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.13		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Sulfur Total		0.26		*	%	0.01	0.1	12/13/11 0:00	osu/brd
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	12/13/11 0:00	bsu/brd

EB 03/30/12

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID17

ACZ Sample ID: **L92172-12**
Date Sampled: 10/11/11 17:35
Date Received: 12/02/11
Sample Matrix: Soil

Soil Analysis

Parameter	EPA Method		Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue			0.43		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		J SQL·I	0.05	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		↓	0.05	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			0.38		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		J SQL·I	0.05	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total			0.48		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate			0.43		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

EB 03/30/12

* Please refer to Qualifier Reports for details.

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID18

ACZ Sample ID: ***L92172-13***

Date Sampled: *10/12/11 15:55*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method		Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD									
Sulfur HCl Residue			0.13		*	%	0.01	0.1	12/14/11 0:00	osu/brd
Sulfur HNO3 Residue		J SQL-I	0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		↓	0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			0.11		*	%	0.01	0.1	12/14/11 0:00	osu/brd
Sulfur Sulfate		J SQL-I	0.03	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total			0.16		*	%	0.01	0.1	12/14/11 0:00	osu/brd
Total Sulfur minus Sulfate			0.13		*	%	0.01	0.1	12/14/11 0:00	osu/brd

EB 03/30/12

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID106

ACZ Sample ID: ***L92172-14***

Date Sampled: *10/18/11 12:05*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue	J SQL·I	0.04	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.05	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.04	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd

EB 03/30/12

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID102

ACZ Sample ID: ***L92172-15***
Date Sampled: *10/19/11 09:15*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.56		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue	J SQL·I	0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.50		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.36		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.92		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.56		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

EB 03/30/12

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID7

ACZ Sample ID: ***L92172-16***

Date Sampled: *10/18/11 11:45*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue	J SQL·I	0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.03	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.03	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.03	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.07	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd

EB 03/30/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-PH-2011-FID8

ACZ Sample ID:	***L92172-17***
Date Sampled:	*10/19/11 17:00*
Date Received:	*12/02/11*
Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.32		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue	J SQL-I	0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.26		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.27		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.59		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.32		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

EB 03/30/12

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L92172-18*
Sample ID:	STS-PH-2011-FID28	Date Sampled:	*10/18/11 15:35*
		Date Received:	*12/02/11*
		Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.12		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue	J SQL-I	0.04	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.04	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.08	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.07	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.19		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.12		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-W1 0-6

ACZ Sample ID: *L92223-01*

Date Sampled: *10/04/11 08:20*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 9:41	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/06/12 16:52~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	5.6		*	mg/Kg	0.5	3	01/05/12 21:39	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-W2 0-6

ACZ Sample ID: ***L92223-02***
Date Sampled: *10/04/11 09:23*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 10:02	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 16:53~~	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor JHT-L	5.5		*	mg/Kg	0.5	3	01/05/12 21:40	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-W3 0-6

ACZ Sample ID: *L92223-03*
Date Sampled: *10/04/11 09:05*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 10:23	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 16:54~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	6.1		*	mg/Kg	0.5	3	01/05/12 21:42	pjb

EB 03/30/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-W1 6-12

ACZ Sample ID: *L92223-04*

Date Sampled: *10/04/11 08:30*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 10:44	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 16:55~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	9.4		*	mg/Kg	0.5	3	01/05/12 21:43	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-W2 12-1

ACZ Sample ID: *L92223-05*
Date Sampled: *10/04/11 09:41*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 11:05	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 16:56~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	6.7		*	mg/Kg	0.5	3	01/05/12 21:44	pjb

EB 03/30/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-W3 12-1

ACZ Sample ID: ***L92223-06***

Date Sampled: *10/04/11 09:20*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 11:26	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 16:57~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor JHT-L	8.0		*	mg/Kg	0.5	3	01/05/12 21:45	pjb

EB 03/30/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-N1 0-6

ACZ Sample ID: *L92223-07*
Date Sampled: *10/05/11 08:45*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 11:46	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate JHT, SQL-L	2.6	B	*	mg/Kg	0.5	3	01/05/12 16:58	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor JHT-L	18.2		*	mg/Kg	0.5	3	01/05/12 21:46	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-N2 0-6

ACZ Sample ID: *L92223-08*
Date Sampled: *10/05/11 08:50*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 12:28	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate JHT, SQL-L	0.8	B	*	mg/Kg	0.5	3	01/05/12 16:59	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor JHT-L	12.8		*	mg/Kg	0.5	3	01/05/12 21:51	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-N3 0-6

ACZ Sample ID: ***L92223-09***

Date Sampled: *10/05/11 08:50*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 13:10	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT, SQL-L	0.9	B	*	mg/Kg	0.5	3	01/05/12 17:05	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	11.6		*	mg/Kg	0.5	3	01/05/12 21:53	pjb

EB 03/30/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-N1 18-2

ACZ Sample ID: ***L92223-10***
Date Sampled: *10/05/11 09:10*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 13:31	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:06~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	5.3		*	mg/Kg	0.5	3	01/05/12 21:54	pjb

EB 03/30/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-N2 18-2

ACZ Sample ID: *L92223-11*
Date Sampled: *10/05/11 09:40*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 13:52	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:07~~	~~ted~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	5.5		*	mg/Kg	0.5	3	01/05/12 21:55	pjb

EB 03/30/12

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-N3 18-2

ACZ Sample ID: ***L92223-12***
Date Sampled: *10/05/11 10:07*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 14:13	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate JHT,SQL-L	0.6	B	*	mg/Kg	0.5	3	01/05/12 17:08	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor JHT-L	5.5		*	mg/Kg	0.5	3	01/05/12 21:56	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NE1 0-6

ACZ Sample ID: ***L92223-13***

Date Sampled: *10/07/11 08:40*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 14:33	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT,SQL-L	2.1	B	*	mg/Kg	0.5	3	01/05/12 17:09	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	16.2		*	mg/Kg	0.5	3	01/05/12 21:57	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NE2 0-6

ACZ Sample ID: *L92223-14*
Date Sampled: *10/07/11 08:35*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 14:54	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT, SQL-L	0.7	B	*	mg/Kg	0.5	3	01/05/12 17:10	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	9.0		*	mg/Kg	0.5	3	01/05/12 21:58	pjb

EB 03/30/12

* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NE3 0-6

ACZ Sample ID: ***L92223-15***

Date Sampled: *10/07/11 08:56*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 15:15	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT, SQL-L	2.4	B	*	mg/Kg	0.5	3	01/05/12 17:11	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor JHT-L	17.6		*	mg/Kg	0.5	3	01/05/12 22:00	pjb

EB 03/30/12

REPIN.02.06.05.01

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NE1 18-

ACZ Sample ID: ***L92223-16***
Date Sampled: *10/07/11 08:55*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 15:36	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:12~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	4.9		*	mg/Kg	0.5	3	01/05/12 22:01	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NE2 18-

ACZ Sample ID: *L92223-17*

Date Sampled: *10/07/11 09:20*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 15:57	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/06/12 17:16~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	7.4		*	mg/Kg	0.5	3	01/05/12 22:04	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NE3 18-

ACZ Sample ID: *L92223-18*

Date Sampled: *10/07/11 09:00*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 16:18	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT,SQL-L	0.6	B	*	mg/Kg	0.5	3	01/05/12 17:17	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	7.0		*	mg/Kg	0.5	3	01/05/12 22:05	pjb

EB 03/30/12

* *Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E1 0-6

ACZ Sample ID: *L92223-19*
Date Sampled: *10/06/11 09:20*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 16:39	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:18~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	8.1		*	mg/Kg	0.5	3	01/05/12 22:06	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E2 0-6

ACZ Sample ID: *L92223-20*
Date Sampled: *10/06/11 09:15*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor							01/05/12 16:59	mpb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							01/03/12 9:00	ndj

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT-L	5.1		*	mg/Kg	0.5	3	01/05/12 17:19	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor	22.4		*	mg/Kg	0.5	3	01/05/12 22:08	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E3 0-6

ACZ Sample ID: ***L92224-01***
Date Sampled: *10/06/11 09:55*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 9:58	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 9:50	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J SQL, HT-L	0.8	B	*	mg/Kg	0.5	3	01/05/12 17:32	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	4.2	H	*	mg/Kg	0.5	3	01/05/12 0:05	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E1 6-12

ACZ Sample ID: *L92224-02*
Date Sampled: *10/06/11 09:40*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 10:27	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 10:30	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:35~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	5.4	H	*	mg/Kg	0.5	3	01/05/12 0:07	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-E2 6-12

ACZ Sample ID: ***L92224-03***
Date Sampled: *10/06/11 09:35*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 10:56	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 10:50	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate	0.6 J HT, SQL-L	B	*	mg/Kg	0.5	3	01/05/12 17:36	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor	10.3 J HT-L	H	*	mg/Kg	0.5	3	01/05/12 0:09	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-E3 6-12

ACZ Sample ID: ***L92224-04***

Date Sampled: *10/06/11 10:15*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 11:10	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 11:10	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/06/12 17:37~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	4.5	H	*	mg/Kg	0.5	3	01/05/12 0:10	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-WREF1 0

ACZ Sample ID: ***L92224-05***
Date Sampled: *10/04/11 09:30*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 11:24	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 11:30	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:38~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	7.1	H	*	mg/Kg	0.5	3	01/05/12 0:12	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-WREF2 0

ACZ Sample ID: *L92224-06*
Date Sampled: *10/04/11 09:55*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 11:39	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 11:50	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
~~Nitrogen, ammonia (Water)~~	~~M350.1 - Automated Phenate~~ R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:39~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	6.8	H	*	mg/Kg	0.5	3	01/05/12 0:13	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-WREF1 1

ACZ Sample ID: *L92224-07*

Date Sampled: *10/04/11 10:26*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 11:53	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 12:10	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:42~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	4.7	H	*	mg/Kg	0.5	3	01/05/12 0:16	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-WREF2 1

ACZ Sample ID: **L92224-08**
Date Sampled: 10/04/11 10:40
Date Received: 12/07/11
Sample Matrix: Soil

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 12:07	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 12:30	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:44~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	5.8	H	*	mg/Kg	0.5	3	01/05/12 0:17	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NREF1 0

ACZ Sample ID: *L92224-09*
Date Sampled: *10/05/11 10:00*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 12:22	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 12:50	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT, SQL-L	0.8	B	*	mg/Kg	0.5	3	01/05/12 17:45	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	13.2	H	*	mg/Kg	0.5	3	01/05/12 0:18	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L92224-10*
Sample ID:	STS-AMD-2011-NREF2 0	Date Sampled:	*10/05/11 10:50*
		Date Received:	*12/07/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 12:36	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 13:10	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT, SQL-L	1.3	B	*	mg/Kg	0.5	3	01/05/12 17:46	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	9.8	H	*	mg/Kg	0.5	3	01/05/12 0:19	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NREF1 1

ACZ Sample ID: *L92224-11*
Date Sampled: *10/05/11 10:50*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 12:50	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 13:30	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:47~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	3.4	H	*	mg/Kg	0.5	3	01/05/12 0:21	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NREF2 1

ACZ Sample ID: ***L92224-12***

Date Sampled: *10/05/11 11:20*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 13:05	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 13:50	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate	R	~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:48~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor	8.3	H	*	mg/Kg	0.5	3	01/05/12 0:22	pjb

J HT-L

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-NEREF1

ACZ Sample ID: *L92224-13*

Date Sampled: *10/07/11 10:20*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 13:19	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 14:10	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT-L	11.6		*	mg/Kg	0.5	3	01/05/12 17:49	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor	18.5	H	*	mg/Kg	0.5	3	01/05/12 0:23	pjb

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NEREF2

ACZ Sample ID: *L92224-14*
Date Sampled: *10/07/11 10:05*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 13:33	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 14:30	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT, SQL-L	0.8	B	*	mg/Kg	0.5	3	01/05/12 17:50	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	9.6	H	*	mg/Kg	0.5	3	01/05/12 0:24	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NEREF1

ACZ Sample ID: *L92224-15*
Date Sampled: *10/07/11 11:05*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 13:48	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 14:50	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate	R	~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:51~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	4.8	H	*	mg/Kg	0.5	3	01/05/12 0:25	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-NEREF2

ACZ Sample ID: *L92224-16*
Date Sampled: *10/07/11 10:45*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 14:02	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 15:10	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:52~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	8.7	H	*	mg/Kg	0.5	3	01/05/12 0:26	pjb

EB 03/30/12

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-EREF1 0

ACZ Sample ID: ***L92224-17***

Date Sampled: *10/06/11 08:55*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 14:17	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 15:30	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate J HT, SQL-L	0.8	B	*	mg/Kg	0.5	3	01/05/12 17:56	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	5.6	H	*	mg/Kg	0.5	3	01/05/12 0:30	pjb

EB 03/30/12

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-AMD-2011-EREF2 0

ACZ Sample ID: *L92224-18*
Date Sampled: *10/06/11 08:50*
Date Received: *12/07/11*
Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 14:31	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 15:50	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate	0.6	B	*	mg/Kg	0.5	3	01/05/12 17:57	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor	2.3	BH	*	mg/Kg	0.5	3	01/05/12 0:31	pjb

J HT, SQL-L

J HT, SQL-L

EB 03/30/12

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	*L92224-19*
Sample ID:	STS-AMD-2011-EREF1 6	Date Sampled:	*10/06/11 09:05*
		Date Received:	*12/07/11*
		Sample Matrix:	*Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 14:45	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 16:10	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate R		~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:58~~	tcd
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor J HT-L	4.1	H	*	mg/Kg	0.5	3	01/05/12 0:32	pjb

EB 03/30/12

REPIN.02.06.05.01

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-AMD-2011-EREF2 6

ACZ Sample ID: ***L92224-20***

Date Sampled: *10/06/11 09:00*

Date Received: *12/07/11*

Sample Matrix: *Soil*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor		H	*				01/04/12 15:00	lhb

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Water Extraction	ASA No. 9 10-2.3.2							12/30/11 16:30	bsu

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Nitrogen, ammonia (Water)	M350.1 - Automated Phenate	R	~~U~~	~~*~~	~~mg/Kg~~	~~0.5~~	~~3~~	~~01/05/12 17:59~~	~~tcd~~
Nitrogen, total Kjeldahl, water extract	M351.2 - Block Digestor JHT-L	5.9	H	*	mg/Kg	0.5	3	01/05/12 0:33	pjb

EB 03/30/12

Attachment C

Photographs of Woody Cover Transects along Drainages

Drainage Bank Study Photo Log

Freeport-McMoran Chino Mines Company
Vanadium, New Mexico
Smelter/Tailing Soils Investigation Unit Feasibility Study

Transect Photo ID	Transect Location	Longitude	Latitude
STS-BWC-2011-7-712	Drainage Bank	-108.125579	32.68687279
STS-BWC-2011-7-713	Drainage Bank	-108.125579	32.68687279
STS-BWC-2011-7-714	Upland	-108.125579	32.68687279
STS-BWC-2011-7-715	Upland	-108.125579	32.68687279
STS-BWC-2011-7-716	Upland	-108.125579	32.68687279
STS-BWC-2011-8-755	Drainage Bank	-108.1251833	32.68513381
STS-BWC-2011-8-756	Drainage Bank	-108.1251833	32.68513381
STS-BWC-2011-8-757	Upland	-108.1251833	32.68513381
STS-BWC-2011-8-758	Upland	-108.1251833	32.68513381
STS-BWC-2011-9-724	Drainage Bank	-108.1010343	32.6962483
STS-BWC-2011-9-725	Drainage Bank	-108.1010343	32.6962483
STS-BWC-2011-9-726	Drainage Bank	-108.1010343	32.6962483
STS-BWC-2011-9-727	Drainage Bank	-108.1010343	32.6962483
STS-BWC-2011-9-728	Upland	-108.1010343	32.6962483
STS-BWC-2011-9-729	Upland	-108.1010343	32.6962483
STS-BWC-2011-9-730	Upland	-108.1010343	32.6962483
STS-BWC-2011-10-707	Drainage Bank	-108.1014994	32.69957595
STS-BWC-2011-10-708	Drainage Bank	-108.1014994	32.69957595
STS-BWC-2011-10-709	Drainage Bank	-108.1014994	32.69957595
STS-BWC-2011-10-710	Upland	-108.1014994	32.69957595
STS-BWC-2011-10-711	Upland	-108.1014994	32.69957595
STS-BWC-2011-11-759	Drainage Bank	-108.1005023	32.70313759
STS-BWC-2011-11-760	Drainage Bank	-108.1005023	32.70313759
STS-BWC-2011-11-761	Drainage Bank	-108.1005023	32.70313759
STS-BWC-2011-11-762	Drainage Bank	-108.1005023	32.70313759
STS-BWC-2011-11-763	Upland	-108.1005023	32.70313759
STS-BWC-2011-11-764	Upland	-108.1005023	32.70313759
STS-BWC-2011-11-765	Upland	-108.1005023	32.70313759
STS-BWC-2011-12-718	Drainage Bank	-108.1058242	32.69997892
STS-BWC-2011-12-719	Drainage Bank	-108.1058242	32.69997892
STS-BWC-2011-12-720	Drainage Bank	-108.1058242	32.69997892
STS-BWC-2011-12-721	Upland	-108.1058242	32.69997892
STS-BWC-2011-12-722	Upland	-108.1058242	32.69997892
STS-BWC-2011-12-723	Upland	-108.1058242	32.69997892

Transect Photo ID: STS-BWC-2011-1-687

Transect Photo ID: STS-BWC-2011-1-688
Location: Upland

Transect Photo ID: STS-BWC-2011-1-689
Location: Drainage Bank

Transect Photo ID: STS-BWC-2011-1-690
Location: Drainage Bank

Transect Photo ID: STS-RWU-2012-2-693
Location: Upland

Transect Photo ID: STS-RWU-2012-2-694
Location: Upland

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

ARCADIS

ATTACHMENT C

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

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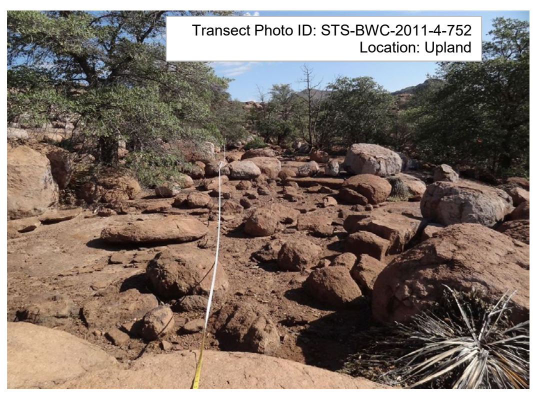
ATTACHMENT C



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VANADIUM, NEW MEXICO

ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

ARCADIS

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ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

ARCADIS

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VANADIUM, NEW MEXICO

ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

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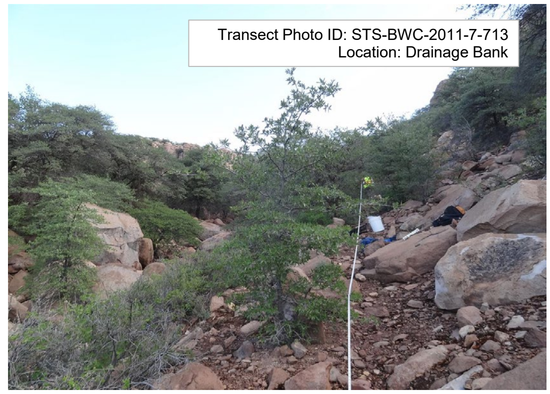

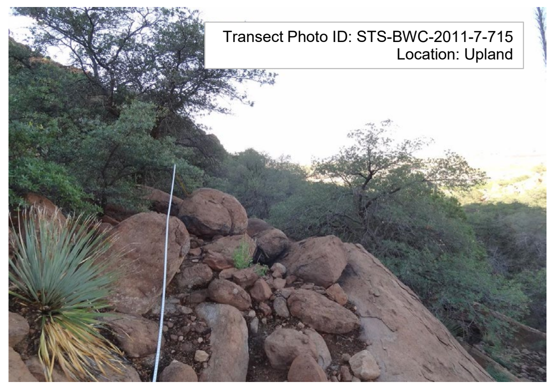

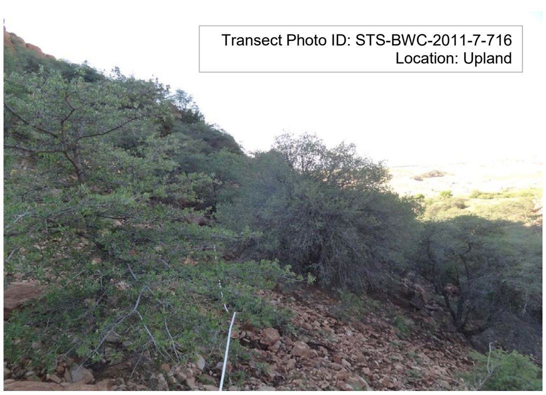

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VANADIUM, NEW MEXICO

ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

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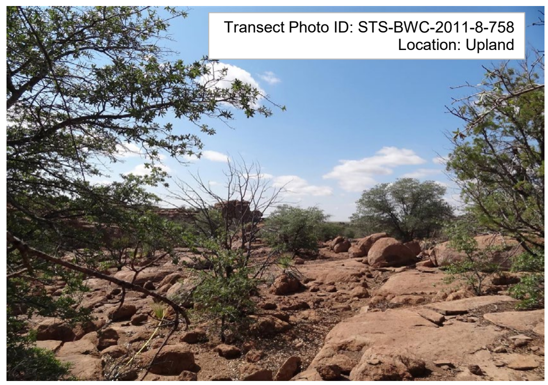
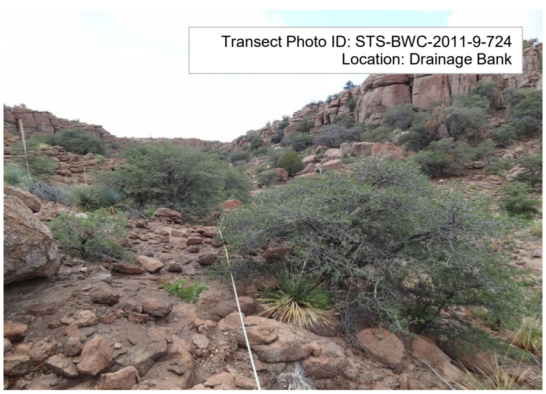
Transect Photo ID: STS-BWC-2011-8-755
Location: Drainage Bank

Transect Photo ID: STS-BWC-2011-8-756
Location: Drainage Bank

Transect Photo ID: STS-BWC-2011-8-757
Location: Upland



Transect Photo ID: STS-BWC-2011-8-758
Location: Upland



Transect Photo ID: STS-BWC-2011-9-724
Location: Drainage Bank

Transect Photo ID: STS-BWC-2011-9-725
Location: Drainage Bank

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VANADIUM, NEW MEXICO

ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

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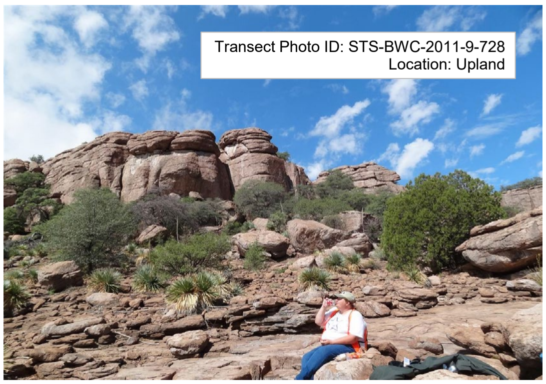
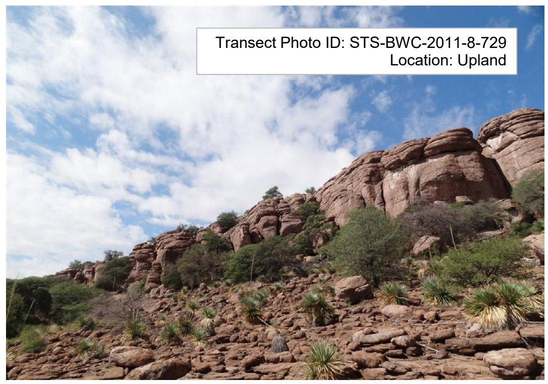
Transect Photo ID: STS-BWC-2011-9-726
Location: Drainage Bank


Transect Photo ID: STS-BWC-2011-9-727
Location: Drainage Bank


Transect Photo ID: STS-BWC-2011-9-728
Location: Upland


Transect Photo ID: STS-BWC-2011-8-729
Location: Upland


Transect Photo ID: STS-BWC-2011-9-730
Location: Upland


Transect Photo ID: STS-BWC-2011-10-707
Location: Drainage Bank

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ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

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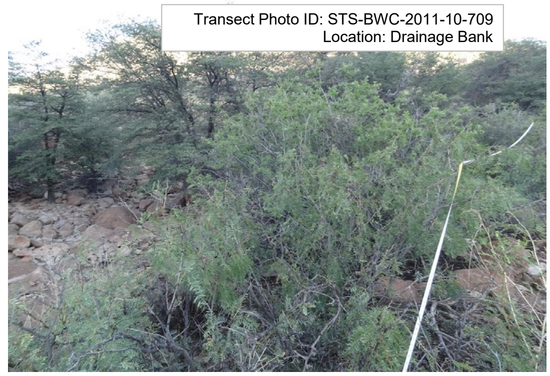
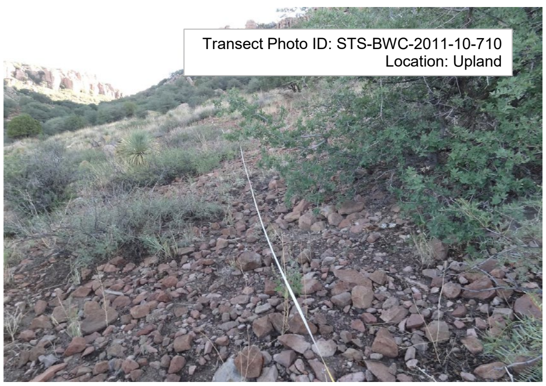
Transect Photo ID: STS-BWC-2011-10-708
Location: Drainage Bank



Transect Photo ID: STS-BWC-2011-10-709
Location: Drainage Bank



Transect Photo ID: STS-BWC-2011-10-710
Location: Upland

Transect Photo ID: STS-BWC-2011-10-711
Location: Upland

Transect Photo ID: STS-BWC-2011-11-759
Location: Drainage Bank

Transect Photo ID: STS-BWC-2011-11-760
Location: Drainage Bank

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ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

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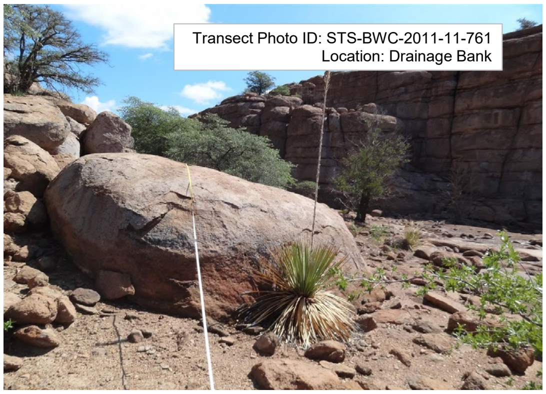
Transect Photo ID: STS-BWC-2011-11-761
Location: Drainage Bank


Transect Photo ID: STS-BWC-2011-11-762
Location: Drainage Bank


Transect Photo ID: STS-BWC-2011-11-763
Location: Upland


Transect Photo ID: STS-BWC-2011-11-764
Location: Upland


Transect Photo ID: STS-BWC-2011-11-765
Location: Upland

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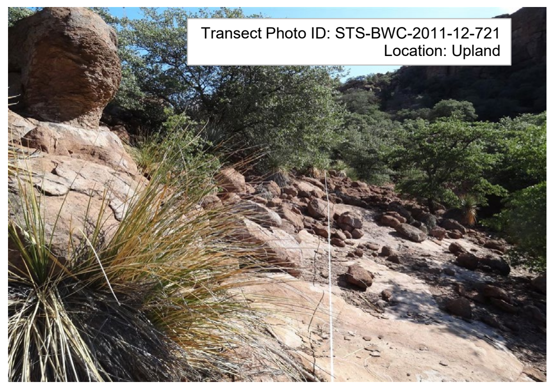
ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

ARCADIS



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VANADIUM, NEW MEXICO

ATTACHMENT C IN APPENDIX D

DRAINAGE BANK PHOTO LOG

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Attachment D

Woody Cover Field and Remote Sensing Data along Drainages

Attachment Table D-D-1. Drainage bank study data.

Date sampled	Drainage ID	Remote Sensing Woody Cover Bank: Entire Drainage (%)	Remote Sensing Woody Cover Upland: Entire Drainage (%)	Location_ID of Ground Transect	GPS Starting Point for Bank Transect[1]				Field Woody Cover (%)[2]			Transect Remote Sensing Woody Cover by scaled NDVI (%)		Transect Remote Sensing Woody Cover by spectrally similar clusters (%)		Bank dominant species	Adjacent upland dominant species	Photograph Information		Soil Chemistry		
					State Plane_x_coord	State Plane_y coord	Latitude	Longitude	Bank	Upland	Difference in Means	Bank	Upland	Bank	Upland			Photo numbers	Photo notes	Cu (mg/kg)	pH (SU)	pCu calculated (ephemeral equation)
9/14/2011	D-4	62	43	STS-BWC-2011-1	2640740	617135	32.696	-108.101	64	0	75-52 = 23	90	0	89	0	oak, mesquite	oak trees in bedrock but missed on transect	687-690	upland is 688	766	5.2	5.11
9/14/2011	D-4			STS-BWC-2011-2	2640600	618346	32.700	-108.102	85	81		51	56	36	51	oak (some willow)	mesquite	693-697	upland is 693-694	667	6	6.19
9/14/2011	D-4			STS-BWC-2011-3	2640910	619641	32.703	-108.100	66	63		65	79	64	51	oak, juniper	mesquite	698-702	upland is 698-699	622	5.4	5.41
9/14/2011	D-4			STS-BWC-2011-6	2640660	617859	32.698	-108.101	86	64		93	61	95	48	oak (some mesquite)	mesquite (some oak)	703-705	upland is 705	426	5.6	5.74
9/16/2011	D-3.5	26	21	STS-BWC-2011-4	2639270	618496	32.700	-108.106	36	52	43-36=7	24	13	12	1	oak	oak	749-754	upland is 752-754	521	4.9	4.78
9/16/2011	D-3.5			STS-BWC-2011-5	2640180	620366	32.705	-108.103	48	13		10	7	2	0	oak	oak	766-770	upland is 769-770	975	4.9	4.67
9/16/2011	D-3.5			STS-BWC-2011-11	2639910	619599	32.703	-108.104	49	48		19	3	3	0	oak	oak	759-765	upland is 763-765	1590	4.6	4.19
9/16/2011	D-3.5			STS-BWC-2011-8	2639560	619139	32.702	-108.105	38	32		20	24	0	13	oak	oak	755-758	upland is 757-758	691	4.5	4.20
9/15/2011	D-3	70	77	STS-BWC-2011-7	2638190	620323	32.705	-108.109	85	83	74-61=13	86	96	92	100	oak (some juniper)	oak (some juniper)	712-716	upland is 714-716	2110	5.5	5.32
9/15/2011	D-3			STS-BWC-2011-9	2639480	622610	32.711	-108.105	50	54		54	71	41	62	oak (some juniper)	oak (some mesquite)	724-731	upland 728-731	610	4.8	4.62
9/15/2011	D-3			STS-BWC-2011-10	2637830	619720	32.703	-108.111	89	60		93	78	94	44	oak (some juniper, mesquite)	mesquite (some oak)	707-711	upland is 710-711	972	5.6	5.59
9/15/2011	D-3			STS-BWC-2011-12	2639070	621388	32.708	-108.106	70	46		75	60	69	47	oak (small mahogany)	oak (some mesquite)	718-723	upland is 721-723	709	5.2	5.12

Notes:

[1]0 m (southern end) is always at GPS point in table (or closest point on bank to GPS since points off somewhat on mapped hydrography).

[2]Canopy cover was estimated for all woody species (trees, shrubs) intersecting line intercept or that would intercept it if tape were moved to within 7.5' on either side of transect.

Placement of tape could not always follow irregular line of trees on bank, and to make upland estimate comparable, both used the 15' strip method.

Therefore canopy cover is not true canopy cover for woody species but an index for comparison of banks to upland areas, and remote sensing estimate is closer to true estimate.

[3]Soil samples were composite of 3 samples at 0 feet, 150 feet, and 300 feet sieved to < 2 mm. Sample interval was 0-6" depth below ground surface mostly (some 0-4" if hit refusal because soil shallow).

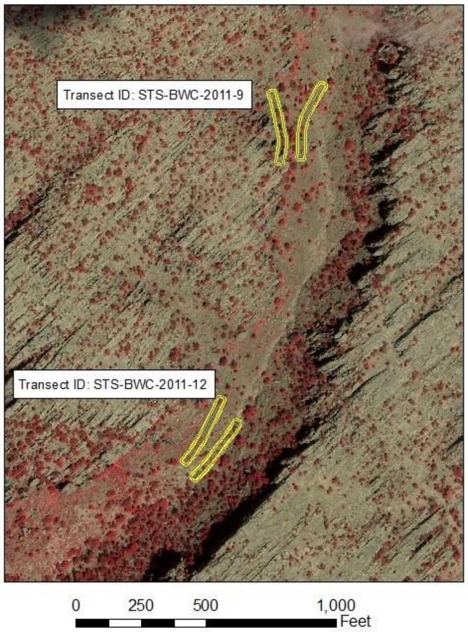
For the remote sensing woody cover estimates for upland, the location of the buffer evaluated was not along the same exact route as the field transects, since field transect locations were not placed along a linear line equidistant from the drainage, due to inaccuracies of field placement in rough terrain. The field transects do not need to line up with the evaluated upland buffers as they were only used to evaluate remote sensing accuracy at the transects, not along the entire buffer zone.

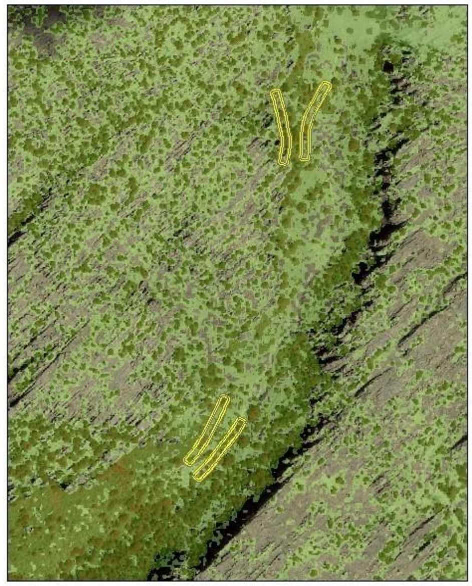
Attachment Table D-D-2. Distance (feet) with no woody vegetation on 300-foot tape using line-intercept sampling. Subtract from 300 feet of the tape and divide by 300 to calculate percent cover.

	Site 1 (bank)	Site 1 (upland)	Site 2 (bank)	Site 2 (upland)	Site 3 (bank)	Site 3 (upland)	site 4 (bank)	site 4 (upland)	site 5 (bank)	site 5 (upland)	Site 6 (bank)	site 6 (upland)	site 7 (bank)	site 7 (upland)	site 8 (bank)	site 8 (upland)	site 9 (bank)	site 9 (upland)	site 10 (bank)	site 10 (upland)	site 11 (bank)	site 11 (upland)	site 12 (bank)	site 12 (upland)
	21.6	300	2.8	31	18	13	45	16	4	10	2	1	1	3	63	5	13	3	10	8	19	3	10	29
	23.3		17.5	0.25	14	13	64	17	27	150	1	42	2	1	45	21	12	17	7	28	61	40	3	11
	7.6		4.2	1	3	6	14	2	53	100	4	6	4	2	34	38	8	17	16	1	14	9	32	8
	3.3		3.7	2	4	2	15	5	73		12	4	5	4	3	4	6	30	1	19	7	30	7	7
	13.2		2.0	7.8	4	6	17	13			14	9	2	12	3	18	4	18		2	3	2	6	90
	38.6		14.0	10.9	13	1	12	15			5	6	7	4	28	117	73	5		6	49	71	10	16
				3	15	4	25	48			3.5	10	20	4	11		26	23		5			15	
					5	1		29				7	3	11			9	26		6			7	
					5	2						24		4						11				
					5	4								1						22				
					2	1								1						8				
					13	2								1						5				
					1	8								1										
						48								3										
Sum	108	300	44	56	102	111	192	145	157	260	41.5	109	44	52	187	203	151	139	34	121	153	155	90	161
% cover	64%	0%	85%	81%	66%	63%	36%	52%	48%	13%	86%	64%	85%	83%	38%	32%	50%	54%	89%	60%	49%	48%	70%	46%

Note:
Site X is the same as STS-BWC-2011-X.

Example of 2 of the 4 Transects on Aerial Image on which Woody Cover was Estimated (left image is near infrared photo, right is remote sensing classification of woody cover in green)



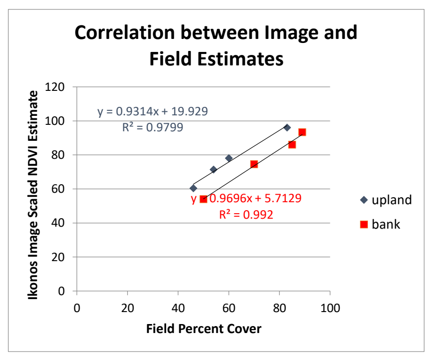


Woody Cover, Hybrid Classification

Comparison of Percent Woody Cover in Drainage D-3 Transects from Image and Field.

Transect ID	Ikonos Woody Cover (scaled NDVI)	Field Estimate	Absolute Value of Difference by type & transect ID	Average difference by Transect ID
Upland				
STS-BWC-2011-9	71	54	17	10.7
STS-BWC-2011-12	60	46	14	9.5
STS-BWC-2011-7	96	83	13	7.1
STS-BWC-2011-10	78	60	18	11.3
Bank				
STS-BWC-2011-9	54	50	4	--
STS-BWC-2011-12	75	70	5	--
STS-BWC-2011-7	86	85	1	--
STS-BWC-2011-10	93	89	4	--

Average upland	77	61	16
Average bank	77	74	3
Average Difference	**10**		



Average of entire bank of Drainage D3 from remote sensing: 70
Average of entire upland of Drainage D3 from remote sensing: 77

Note: transects are incomplete representation of entire bank and upland and only used to ground truth the remote sensing estimates, which is the method that evaluates the entre banks and upland of drainage. Also, upland transects were not always exactly parallel to banks and thus difference is best estimated based on difference in average upland and average bank values to represent the drainage.

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ATTACHMENT D IN APPENDIX D

ACCURACY OF REMOTE SENSING ESTIMATES OF WOODY COVER USING SCALED NDVI for DRAINAGE D-3

ARCADIS

ATTACHMENT D
Figure D-D-1a

Comparison of Percent Woody Cover in Drainage D-3.5 Transects from Image and Field.

Transect ID	Ikonos Woody Cover (scaled NDVI)	Field Estimate	Absolute Value of Difference by type & transect ID	Average difference by Transect ID
Upland				
STS-BWC-2011-5	66	13	53	51
STS-BWC-2011-11	22	48	26	28
STS-BWC-2011-8	25	32	7	13
STS-BWC-2011-4	13	52	39	26
Bank				
STS-BWC-2011-5	97	48	49	--
STS-BWC-2011-11	19	49	30	--
STS-BWC-2011-8	20	38	18	--
STS-BWC-2011-4	24	36	12	--

Average upland	32	36	5
Average bank	40	43	3
Average Difference	**4**		

Average of entire bank of Drainage D3.5 from remote sensing: 26
Average of entire upland of Drainage D3.5 from remote sensing: 21

Note: transects are incomplete representation of entire bank and upland and only used to ground truth the remote sensing estimates, which is the method that evaluates the entre banks and upland of drainage.
Also, upland transects were not always exactly parallel to banks and thus difference is best estimated based on difference in average upland and average bank values to represent the drainage.

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ATTACHMENT D IN APPENDIX D

ACCURACY OF REMOTE SENSING ESTIMATES OF WOODY COVER USING SCALED NDVI for DRAINAGE D-3.5

ARCADIS

ATTACHMENT D

Figure D-D-1b

Comparison of Percent Woody Cover in Drainage D-4 Transects from Image and Field.

Transect ID	Ikonos Woody Cover (scaled NDVI)	Field Estimate	Absolute Value of Difference by type & transect ID	Average difference by Transect ID
Upland				
STS-BWC-2011-3	79	63	16	9
STS-BWC-2011-2	56	81	25	30
STS-BWC-2011-6	93	64	29	31
STS-BWC-2011-1	0	0	0	13
Bank				
STS-BWC-2011-3	65	66	1	--
STS-BWC-2011-2	51	85	34	--
STS-BWC-2011-6	54	86	32	--
STS-BWC-2011-1	89	64	25	--

Average upland	57	52	5
Average bank	65	75	11
Average Difference	**8**		

Average of entire bank of Drainage D4 from remote sensing: 62
Average of entire upland of Drainage D4 from remote sensing: 43

Note: transects are incomplete representation of entire bank and upland and only used to ground truth the remote sensing estimates, which is the method that evaluates the entre banks and upland of drainage.
Also, upland transects were not always exactly parallel to banks and thus difference is best estimated based on difference in average upland and average bank values to represent the drainage.

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ATTACHMENT D IN APPENDIX D

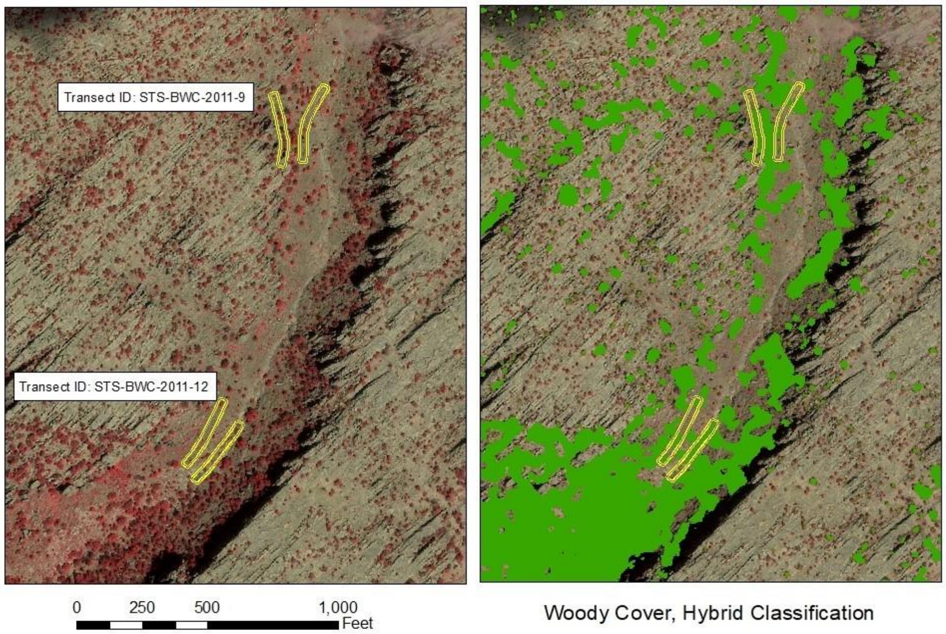
ACCURACY OF REMOTE SENSING ESTIMATES OF WOODY COVER USING SCALED NDVI for DRAINAGE D-4

ARCADIS

ATTACHMENT D

Figure D-D-1c

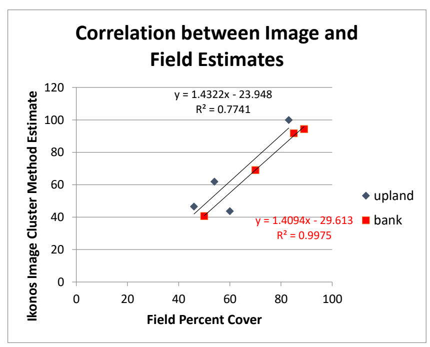
Example of 2 of the 4 Transects on Aerial Image on which Woody Cover was Estimated (left image is near infrared photo, right is remote sensing classification of woody cover in green)



Comparison of Percent Woody Cover in Drainage D-3 Transects from Image and Field.

Transect ID	Ikonos Woody Cover (cluster)	Field Estimate	Absolute Value of Difference by type & transect ID	Average difference by Transect ID
Upland				
STS-BWC-2011-9	62	54	8	8.6
STS-BWC-2011-12	47	46	1	0.8
STS-BWC-2011-7	100	83	17	11.9
STS-BWC-2011-10	44	60	16	10.8
Bank				
STS-BWC-2011-9	41	50	9	--
STS-BWC-2011-12	69	70	1	--
STS-BWC-2011-7	92	85	7	--
STS-BWC-2011-10	94	89	5	--

Average upland	63	61	2
Average bank	74	74	0
Average Difference	1		



Average of entire bank of Drainage D3 from remote sensing:	56
Average of entire upland of Drainage D3 from remote sensing:	65

Note: transects are incomplete representation of entire bank and upland and only used to ground truth the remote sensing estimates, which is the method that will evaluate the entre banks and upland of drainage.

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ATTACHMENT D IN APPENDIX D

ACCURACY OF REMOTE SENSING ESTIMATES OF WOODY COVER USING CLUSTER METHOD on DRAINAGE D3

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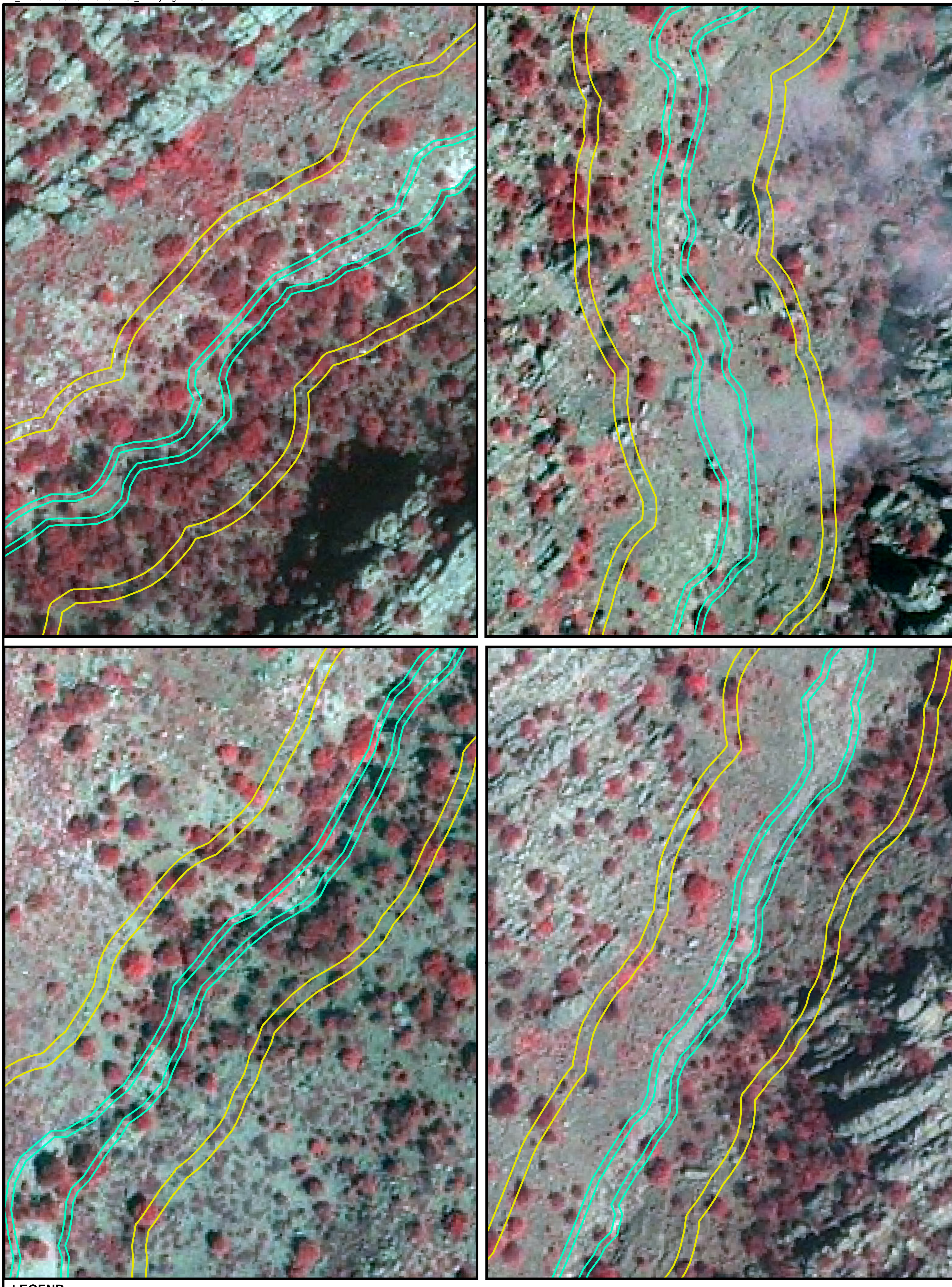
ATTACHMENT D

Figure D-D-2a



LEGEND:

Bank

Upland

0 100 200 Feet

GRAPHIC SCALE

NOTE:
Percent cover estimated from classification of IKONOS imagery (dated 09/04/2011) for Drainage D-3.

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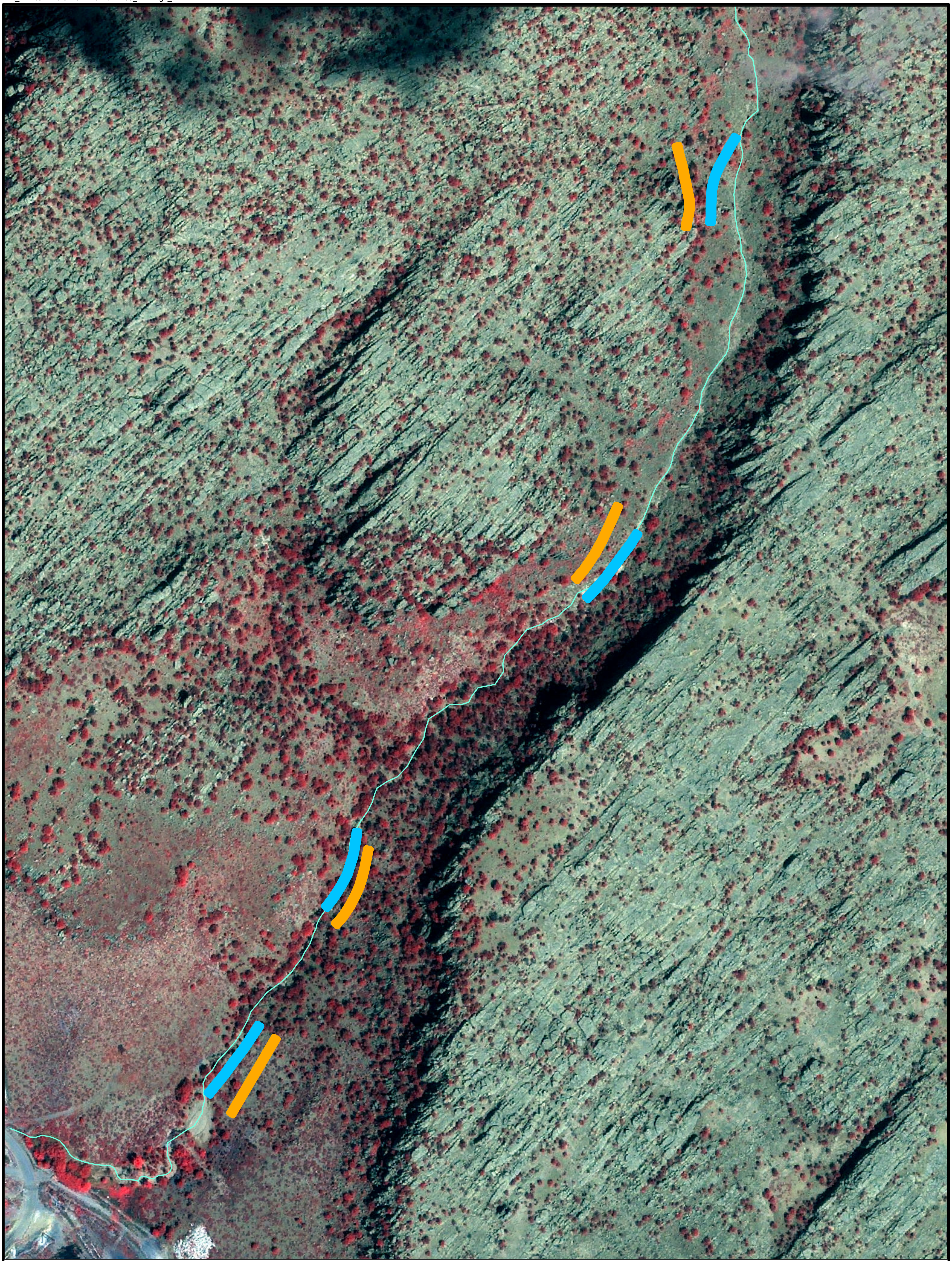
SMELTER/TAILINGS SOILS IU FS, APPENDIX D, ATTACHMENT D

EXAMPLES OF BUFFERS ON WOODY VEGETATION CLASSIFICATION

ARCADIS

FIGURE
D-D-2b

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
T:_ENV\Chino\2022\MXD\FS\D-D-03_Drainage_Transects.mxd



LEGEND:

- Bank Transect
- Upland Transect
- Approximate Drainage Centerline

0 300 600 Feet
GRAPHIC SCALE

Imagery Source: Ikonos, dated 09/04/2011.

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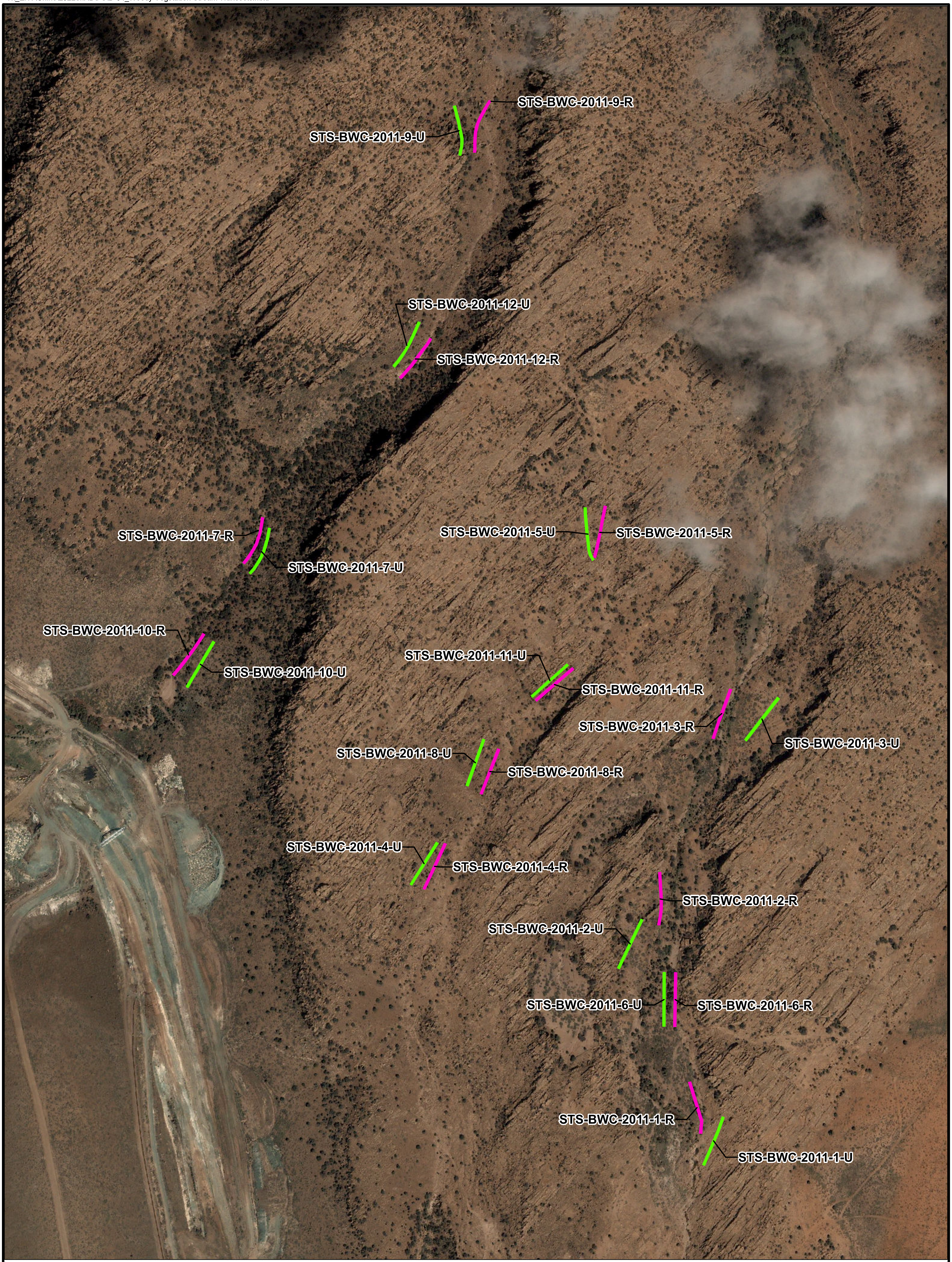
SMELTER/TAILINGS SOILS IU FS, APPENDIX D, ATTACHMENT D

ZOOMED IN VIEW OF FIELD TRANSECTS OF UPLAND & BANK TRANSECTS USING DRAINAGE D3 AS EXAMPLE

ARCADIS

FIGURE
D-D-3



LEGEND:

Bank Transect

Upland Transect

0 500 1,000 Feet

GRAPHIC SCALE

Imagery Source: Ikonos, dated 09/04/2011.

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SMELTER/TAILINGS SOILS IU FS, APPENDIX D, ATTACHMENT D

LOCATION OF FIELD TRANSECTS MEASURING WOODY COVER

ARCADIS

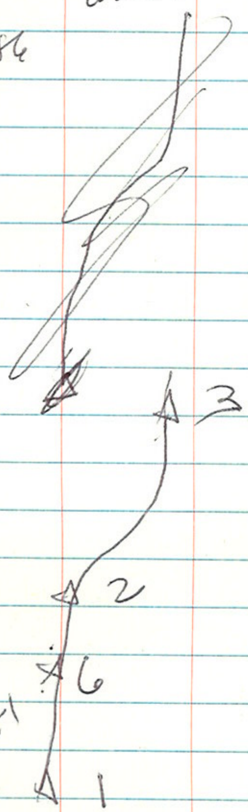
FIGURE
D-D-4

AOC
Sampling
at Chino

Rangeland Condition
(CHAT)
Wildlife Habitat
condition —
richness +
cover

Woody Cover on
drainages vs.
nearby upland

Photo
102-0684 – other areas
around site RWW-9
to
102-0686



frog at site BWC-1
= photo
102-0692

Photo
102-0688 = upland near
site BWC-1

Photos
102-0691 = between channels
0694, 0693 – exposure area
& banks

9-14-11 Site 1 cm

Bank on ept. drainage water in places

Veg & Soil Sampling

Line Intercept

Bank

~~24.9~~ mostly oak
~~24.6, 8"~~ open. [illegible]
21, 7" – 25, 7" 21.7
~~[illegible]~~ 23.3
~~[illegible]~~ ~~[illegible]~~
48, 10" to men with
84, 8" ~~[illegible]~~ 7.7
62, 3" – ~~66, 5"~~ oak
~~65, 2~~ – 93, 9" 3.4
~~[illegible]~~
97, 1 – 127, 5 ~~[illegible]~~ 13, 2
140, 7 to
261, 5 38.7

Photo 102-0687, 0689, 0690 642

300' tape site BWC-2011-1 = Site 1
~~open~~ bank

exposure unit is wide between
~~Upland~~ many channel
between channel
< middle
area ~~0 woody cover~~
lots mesquite
1 mm mulungu
lots of ——— Shrub

GPS beg/end of upland
+ middle

~~Upland~~ Site 1 BWC1

BWC1US south end
tape
tape BWC1UM M middle
BWC1UN N – north end
tape

0 woody for site 1 upland – bedrock
on upland photo
102-0688

0%

Tx laid out – mussed
few oak trees on upland bedrock

3 samples 5 ft BWC-ROLL-1
composite ~~BWC~~
1 mudcat Bank-1

Collected by Vic, Phil & Pam

15' wide tx strip Site 2 9/14/11
10:05

BWC – ~~bank~~
bank

3 steps extends
~10' strip
on either side

	open ft
0 – 18'	
20.9 – 24.0	2.9
41.6 – ~~98~~ 106.10	17.6
	4.2
111 – 115	~~0~~
118.8' – ~~178~~ ~~199~~ 199'	~~3.80~~ 3.8
not true C.C	oak
201' – 257'	willow
	2
268 – 300' ~~[illegible]~~ site 6 R (853)	~~0~~14

photo 102-0695:696 to 0697

Upland

		open ft
31' – 66	mesquite	31
	mesquite	.3
66.3 – 97	on flats	1.2
98.2 – 111		2

photo 102-0693-694 ~~0698~~ ~~to 0699~~

113 - ~~128~~

~~[illegible]~~ - 143.2

~~143.8~~ 7,80

151 - 153.6 10,41

164.5 - ~~[illegible]~~ 239 3

240 - 300' (812)

Site 3 Bank 1:35 cm vm PH pp JA

0-27' 18

lots carex sunburnt grass

45'-63' oak

77'-95' 14 3

trees - oak

98'-108' juniper 4

photo 020200

112 - 122' 4

126' - 132' 13

145' - 175' 15

190' - 214' 5

219' - 229' 5

234' - 238' 5

240' - 269' 2 (662)

282' - 299' 13 1 (~~3~~78)

9/14 Site 3 2:50 pm cm, vm etc.

BWC - 3 Upland 13 slope

0-14' mesquite

27-57' 13

70' - 89'

	open (ft)
95 - 113	6
115 - 126	2
132 - 144'	6
148 - 151'	1
155' - 174'	4
175' - 188'	1
190' - 205'	2
3 spaces small ~~2~~	4
209 - 214 (other side included)	
215 - 219	1
221 - 226	2
234 - 245.5	8

293.5 - 295 48

632 ~~[illegible]~~

Dux 698 - 702

- Site 3 banks

~~3 [illegible]~~ - riparian & 2 [700-702] then upland types

698, 699 ST X in mesquite

Site 6

bank	open ft.
	3.5
296.5 - 276 mesquite	5
271 - 265	14
251 - 243 oak	12
231 - 159	4

~~[illegible]~~ 862

155 – 62 oak ?
Dub / 102-0704 102-0703

61 – 59 – mesquite 1

57 – 0 2 open pit

upland ?

~~300 – 284~~
300 – 299 oak 1
257 – 25~~6~~ island between channels 42

~~23~~
250 – ~~23~~ 227 6

4

mesquite

223 – 179 9

170 – 162 95 – 31 6

25 –

156 – 135 10

Mub / 102-0705

125 – 109 7

102 – 49 24

Dup at Site Awc 6 -DUP

25 – 0 sage

mesquite

1.42

Whirlpack – soil

9-15-11 CM

Drainage bank scraply

Site 10 photo 707-709

Bank woodycover

line intercept' - 300' tape

Buft

10 0-51

7 61-99 oak-dn

14 106-~~132~~ 159 juniper

~~132~~ 175-268 some mesquite

1 269-300 (89%)

Upland

mesquite & dn oak

300-274 Open (ft) 8

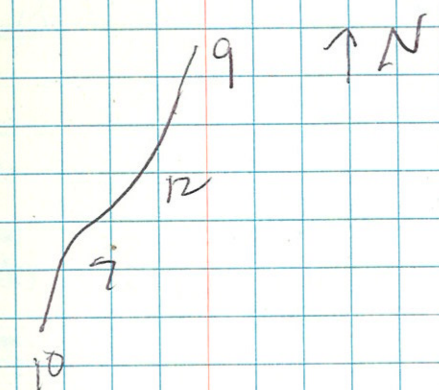
268-260 28

232-211 1

210-196 19

177-164 2

9-15-11 CM



Upland cont'd Site 10

162-157

6 ~~149~~

5 151-126 Photo 710-

6 121-117 711

11 111-104

93-91

22 69-45

8 37-24 (60%)

5 21-0

Cm Site 7 9-15-11
8:40 am

Bank Photo 712-713

Open ft

1 0-14
2 15-89
4 91-~~87~~ 131 all
5 oak
2 135-~~139~~ 143 ~~little~~
148-213 one
juniper
215-227 & mesquite
7 234-~~236~~ ~~247~~ 268
~~242~~
20 288-292
3 295-300 oak

856

Cm Site 7 10:05 9-15-11

Upland Photo 714-716

717 - across ~~up~~ drainage upland side

Open (ft)

3 300-285 oak
282-~~276~~ ~~271~~ 259 oak - ~~small~~ Shrub-like
~~270-268~~
1 258-252
2 250-209 oak
4 205-199
12 187-184
4 180-177 oak
4 173-140
11 129-76 oak - juniper
4 72-62
1 61-~~60~~ 59
1 58-45 oak
1
1
3 44-11 10-4

833

no water

9-15-11 Site 12 cm

9:40 am

Bank

photo 718-720

open ft

10 10-38 oak

3 41-51

32 83-130

7 137-142 oak

6 148-163

10 173-234

15 249-280 small mahogany

7 287-302

44

702

~7' on each side

Upland

15' south

Open ft

29 271-243 oak

11 232-224 mesquite

8 216-194 oak/leaves some mesq.

7 187-168

90 78-61 mesq.

photo 721-723

~~82~~

10 45-37

462

9-15-11 Site 9 Can

Bank

		[illegible]
13-33		13
		12
45-61	oak	8
		6
69-78		4
94-135	photos 724-725	
139-160		73
233-246	juniper	26
272-291	oak	9
~~54-0~~	~~mesquite~~	

OK

50%

9-15-11 Site 9 Can

Upland

	photos 726-727	
0-292		3
289-288	oak	17
271-263		17
246-224	mesquite	30
194-187		18
169-161		5
156-124	oak	23
101-80		26
54-0	mesquite	

54%

728-731 photos of cliffs around

Site 9

BWC-4
CM Site 4 9-16-11
PP
Nick Bank
Lemmve

Line intercept for % woody cover

749-751 open ft

~~701~~ 45
780-751 45-92 oak
are down 156-171 64
then upstream 185-195 14
pics
210-220 15
17
237-246 12
25
249-265
290-300

~~223~~ ~~212~~
207-199 36%
~~186-175~~

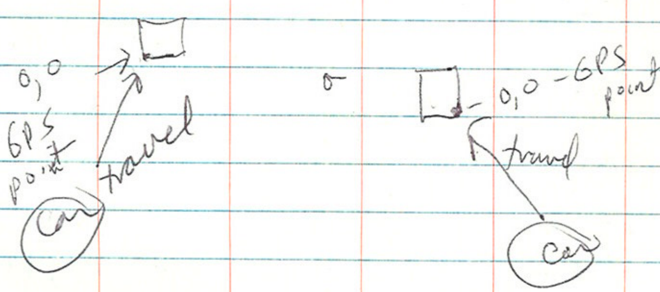
Jumped at RWC-7 BWC-4 Site 4

9-16-11

Upland 16
284-268 17
2
251-237 oak
5
235-212 13
~~182~~ 15 photos
~~223~~ 212 48 752-754
207-199 29 Direction of photos
186-175 Note 1st photo South
160-153 are ~~of~~ ~~south~~
~~164~~ ends + 2nd
106-91 set are northern
62-41 ends for
bank + opposite
5.22% ~~for~~ for
~~drainage~~ upland
~~photos~~ of
those
BWC
locations

Note direction of photos of ~~veg~~ wildlife plots is usually from NE or NW corner 1st established as ~~G~~ GPS point – plot set up depends on direction came from to access site.

for 9/12-9/16



Other photos close-ups of vegetation condition or landscape panorama photos – see air photo for direction & aspect of latter photos

OAT scores for polygon are the score given for 200 m – similar when looked around. Did not have time to ground truth whole polygon – but observed as walked/drove into areas to access the GPS point

Pam Pinson – helped 9/12-9/16
Senior Environmental Engineer
Nicole Lemme) helped 9/16/11
Environmental Technician
Carolyn ~~M~~ Meyer – 9/12-9/16
Principal Ecologist

Phil Harrigan] helped from 9/12-9/15
Chiru ADC manager
Joe Allen) helped from 9/13-9/15

Victor Meyer) helped from 9/12-9/14

Site BWC-8

9/16/11

Bank

63-76' oak

121-140

174-~~194~~ 202

~~202~~-

205 - 215

2~~1~~8 - 234

262 - 284

295 - 300

⊈ riparian → BWC8RP - GPS
→ end tape

BWC8RS-s end tape

63
45
34
3
3
28
11

Photos
~~755~~-756 → end tape
5,4 = 5 end tape

382

Site 8 9/16/11 Cm

Upland

295 - 286 5
21
38
265 - ~~245~~ 234 oak 4
18
117
~~225~~ -
photos
196 - 187 757-758
N
183 - 177 5
159 - 154
37 - ~~30~~ 0
upland
↓
BWC8ON north end
BWC8US ↑ south end
tape

322

BWC Site 11 9/16/11 Cm

Bank

19 - 36 19
61
14
97 - 110 oak 7
3
124 - 185 49

photos
192 - 211 759-742
214 - 243 P 1 2nd
292 - 300 1st 2 2
N end S. end
(looking S) (looking N)

493

Site 11 9/16/11 Cm

Upland

Photos

743 - 765

Need Send

300 - 290

3 287 - 240

764 4 middle looking down on river

oak

40 200 - ~~161~~ 169

9

30 ~~169 - 161~~

2 161 - 150

71 120 - 95

93 - ~~80~~ 71

482

9/16/11 Site 5 BLUC-5 Cm

Bank

open (ft)

Photos

4

21

296 - 282 53 766 Need riparian

255 - 233 73 767-768 Send

180 - 161

oak

88 - 64

Upland

10

Photos

769 - Need

10 - 27 150 ~50

100

oak

Soil is wet from on upland TX in S,

~~20~~ 177 - 200

692

Photos

769 - 770

N end

last one Send

Photos
771-775 on site 5
Nos see rain effect
on flow

RWU - rangeland

Site 2 photos

776 looking up plot

777 looking to right

778 looking behind
down valley.

132

~~BLC~~

See wildlife habitat
forms for cover & richness
data.
See OAT score forms
for OAT scores

Attachment E

Laboratory Data Collected for the FS

Attachment Table E-1. Compilation of laboratory results for data collected in 2011 for Feasibility Study

LABID	CLIENTID	PROJECTID	DEPTNAME	COLLECTD	RECEIVEDATE	ANALYTE	MATRIX	METHOD	RESULT	TEXTRESULT	UNITS	MDL	PQL	ANALYZEDATE	ANALYST	CAS
L91357-12	STS-CG-2011-9	ZN000000J8	Metals Analysis	10/4/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	646	646	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-12	STS-CG-2011-9	ZN000000J8	Soil Analysis	10/4/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.6	93.6	%	0.1	0.5	11/16/2011	thf/nrc	
L91359-01	STS-CG-2011-11	ZN000000J8	Metals Analysis	10/4/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1370	1370	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-01	STS-CG-2011-11	ZN000000J8	Soil Analysis	10/4/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92	92.0	%	0.1	0.5	11/16/2011	ndj	
L91359-03	STS-CG-2011-13	ZN000000J8	Metals Analysis	10/4/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	906	906	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-03	STS-CG-2011-13	ZN000000J8	Soil Analysis	10/4/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.1	93.1	%	0.1	0.5	11/16/2011	ndj	
L91359-04	STS-CG-2011-14	ZN000000J8	Metals Analysis	10/4/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	977	977	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-04	STS-CG-2011-14	ZN000000J8	Soil Analysis	10/4/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.5	93.5	%	0.1	0.5	11/16/2011	ndj	
L91359-06	STS-CG-2011-17	ZN000000J8	Metals Analysis	10/4/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	637	637	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-06	STS-CG-2011-17	ZN000000J8	Soil Analysis	10/4/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91.3	91.3	%	0.1	0.5	11/16/2011	ndj	
L91360-02	DUP5 (STS-CG-2011-28)	ZN000000J8	Metals Analysis	10/5/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	528	528	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-02	DUP5 (STS-CG-2011-28)	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	89.4	89.4	%	0.1	0.5	11/21/2011	bsu	
L91360-07	DUP6 (STS-PCUG-2011-7)	ZN000000J8	Metals Analysis	10/5/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	613	613	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-07	DUP6 (STS-PCUG-2011-7)	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	90.7	90.7	%	0.1	0.5	11/22/2011	bsu	
L91360-01	STS-CG-2011-31	ZN000000J8	Metals Analysis	10/5/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1770	1770	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-01	STS-CG-2011-31	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	90.6	90.6	%	0.1	0.5	11/21/2011	bsu	
L91359-07	STS-CG-2011-19	ZN000000J8	Metals Analysis	10/5/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1050	1050	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-07	STS-CG-2011-19	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91.4	91.4	%	0.1	0.5	11/16/2011	ndj	
L91357-11	STS-CG-2011-21	ZN000000J8	Metals Analysis	10/5/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	448	448	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-11	STS-CG-2011-21	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	90.4	90.4	%	0.1	0.5	11/16/2011	thf/nrc	
L91357-18	STS-CG-2011-28	ZN000000J8	Metals Analysis	10/5/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	606	606	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-18	STS-CG-2011-28	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	88.2	88.2	%	0.1	0.5	11/16/2011	thf/nrc	
L91357-14	STS-CG-2011-24	ZN000000J8	Metals Analysis	10/5/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	917	917	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-14	STS-CG-2011-24	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91.4	91.4	%	0.1	0.5	11/16/2011	thf/nrc	
L91359-14	STS-PCUG-2011-7	ZN000000J8	Metals Analysis	10/5/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	387	387	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-14	STS-PCUG-2011-7	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	7.7	7.7	units	0.1	0.1	11/15/2011	thf	
L91359-14	STS-PCUG-2011-7	ZN000000J8	Soil Analysis	10/5/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	89.8	89.8	%	0.1	0.5	11/16/2011	ndj	
L91355-06	DUP1 (STS-PCUG-2011-19)	ZN000000J8	Metals Analysis	10/6/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1310	1310	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-06	DUP1 (STS-PCUG-2011-19)	ZN000000J8	Soil Analysis	10/6/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4	4.0	units	0.1	0.1	11/14/2011	thf	
L91355-06	DUP1 (STS-PCUG-2011-19)	ZN000000J8	Soil Analysis	10/6/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.5	92.5	%	0.1	0.5	11/16/2011	ndj	
L91355-11	DUP7 (STS-CG-2011-43)	ZN000000J8	Metals Analysis	10/6/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	567	567	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-11	DUP7 (STS-CG-2011-43)	ZN000000J8	Soil Analysis	10/6/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91	91.0	%	0.1	0.5	11/16/2011	ndj	
L91357-09	STS-PCUG-2011-19	ZN000000J8	Metals Analysis	10/6/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1210	1210	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-09	STS-PCUG-2011-19	ZN000000J8	Soil Analysis	10/6/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	3.9	3.9	units	0.1	0.1	11/15/2011	thf	
L91357-09	STS-PCUG-2011-19	ZN000000J8	Soil Analysis	10/6/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.4	92.4	%	0.1	0.5	11/15/2011	thf/nrc	
L91355-15	STS-CG-2011-45	ZN000000J8	Metals Analysis	10/6/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	668	668	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-15	STS-CG-2011-45	ZN000000J8	Soil Analysis	10/6/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.3	92.3	%	0.1	0.5	11/16/2011	ndj	
L91355-13	STS-CG-2011-43	ZN000000J8	Metals Analysis	10/6/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	626	626	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-13	STS-CG-2011-43	ZN000000J8	Soil Analysis	10/6/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	90.4	90.4	%	0.1	0.5	11/16/2011	ndj	
L91360-10	STS-CG-2011-40	ZN000000J8	Metals Analysis	10/6/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	608	608	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-10	STS-CG-2011-40	ZN000000J8	Soil Analysis	10/6/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94	94.0	%	0.1	0.5	11/22/2011	bsu	
L91355-14	DUP8 (STS-CG-2011-10)	ZN000000J8	Metals Analysis	10/7/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	2450	2450	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-14	DUP8 (STS-CG-2011-10)	ZN000000J8	Soil Analysis	10/7/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	89.8	89.8	%	0.1	0.5	11/16/2011	ndj	
L91357-13	STS-CG-2011-10	ZN000000J8	Metals Analysis	10/7/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1930	1930	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-13	STS-CG-2011-10	ZN000000J8	Soil Analysis	10/7/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	89.8	89.8	%	0.1	0.5	11/16/2011	thf/nrc	
L91359-02	STS-CG-2011-12	ZN000000J8	Metals Analysis	10/7/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1670	1670	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-02	STS-CG-2011-12	ZN000000J8	Soil Analysis	10/7/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93	93.0	%	0.1	0.5	11/16/2011	ndj	
L91359-05	STS-CG-2011-15	ZN000000J8	Metals Analysis	10/7/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1790	1790	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-05	STS-CG-2011-15	ZN000000J8	Soil Analysis	10/7/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	89.7	89.7	%	0.1	0.5	11/16/2011	ndj	
L91357-17	STS-CG-2011-27	ZN000000J8	Metals Analysis	10/8/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1870	1870	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-17	STS-CG-2011-27	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.3	92.3	%	0.1	0.5	11/16/2011	thf/nrc	
L91357-20	STS-CG-2011-30	ZN000000J8	Metals Analysis	10/8/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	575	575	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-20	STS-CG-2011-30	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93	93.0	%	0.1	0.5	11/16/2011	thf/nrc	
L91360-05	STS-CG-2011-35	ZN000000J8	Metals Analysis	10/8/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	362	362	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-05	STS-CG-2011-35	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91.2	91.2	%	0.1	0.5	11/21/2011	bsu	
L91360-08	STS-CG-2011-38	ZN000000J8	Metals Analysis	10/8/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	633	633	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-08	STS-CG-2011-38	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91.4	91.4	%	0.1	0.5	11/22/2011	bsu	
L91360-03	STS-CG-2011-33	ZN000000J8	Metals Analysis	10/8/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	666	666	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-03	STS-CG-2011-33	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91.2	91.2	%	0.1	0.5	11/21/2011	bsu	
L91355-04	STS-PCUG-2011-24	ZN000000J8	Metals Analysis	10/8/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1000	1000	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-04	STS-PCUG-2011-24	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.2	4.2	units	0.1	0.1	11/14/2011	thf	
L91355-04	STS-PCUG-2011-24	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	90.5	90.5	%	0.1	0.5	11/16/2011	ndj	
L91357-16	STS-CG-2011-26	ZN000000J8	Metals Analysis	10/8/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	416	416	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-16	STS-CG-2011-26	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91.4	91.4	%	0.1	0.5	11/16/2011	thf/nrc	
L91359-08	STS-CG-2011-20	ZN000000J8	Metals Analysis	10/8/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	555	555	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-08	STS-CG-2011-20	ZN000000J8	Soil Analysis	10/8/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	89.4	89.4	%	0.1	0.5	11/16/2011	ndj	
L91355-17	DUP9 (STS-CG-2011-42)	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1050	1050	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-17	DUP9 (STS-CG-2011-42)	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	90.6	90.6	%	0.1	0.5	11/16/2011	ndj	
L91360-09	STS-CG-2011-39	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	682	682	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-09	STS-CG-2011-39	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	89.7	89.7	%	0.1	0.5	11/22/2011	bsu	
L91355-12	STS-CG-2011-42	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	958	958	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-12	STS-CG-2011-42	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	90.8	90.8	%	0.1	0.5	11/16/2011	ndj	
L91355-20	STS-CG-2011-50	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	620	620	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-20	STS-CG-2011-50	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.4	92.4	%	0.1	0.5	11/16/2011	ndj	
L91355-19	STS-CG-2011-49	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	733	733	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-19	STS-CG-2011-49	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.8	93.8	%	0.1	0.5	11/16/2011	ndj	
L91357-06	STS-PCUG-2011-16	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	864	864	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-06	STS-PCUG-2011-16	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.2	5.2	units	0.1	0.1	11/15/2011	thf	
L91357-06	STS-PCUG-2011-16	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	89.1	89.1	%	0.1	0.5	11/15/2011	thf/nrc	
L91355-16	STS-CG-2011-46	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1100	1100	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-16	STS-CG-2011-46	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	90.6	90.6	%	0.1	0.5	11/16/2011	ndj	
L91357-08	STS-PCUG-2011-18	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1540	1540	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-08	STS-PCUG-2011-18	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.3	5.3	units	0.1	0.1	11/15/2011	thf	
L91357-08	STS-PCUG-2011-18	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.3	93.3	%	0.1	0.5	11/15/2011	thf/nrc	
L91355-10	STS-PCUG-2011-30	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1500	1500	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-10	STS-PCUG-2011-30	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	7.4	7.4	units	0.1	0.1	11/15/2011	thf	
L91355-10	STS-PCUG-2011-30	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.6	94.6	%	0.1	0.5	11/16/2011	ndj	
L91355-08	STS-PCUG-2011-28	ZN000000J8	Metals Analysis	10/9/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	959	959	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-08	STS-PCUG-2011-28	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	7.5	7.5	units	0.1	0.1	11/14/2011	thf	
L91355-08	STS-PCUG-2011-28	ZN000000J8	Soil Analysis	10/9/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.3	94.3	%	0.1	0.5	11/16/2011	ndj	
L91355-05	STS-PCUG-2011-25	ZN000000J8	Metals Analysis	10/10/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	706	706	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-05	STS-PCUG-2011-25	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.6	4.6	units	0.1	0.1	11/14/2011	thf	
L91355-05	STS-PCUG-2011-25	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.2	92.2	%	0.1	0.5	11/16/2011	ndj	
L91357-07	STS-PCUG-2011-17	ZN000000J8	Metals Analysis	10/10/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	994	994	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-07	STS-PCUG-2011-17	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.1	5.1	units	0.1	0.1	11/15/2011	thf	

L91357-07	STS-PCUG-2011-17	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.2	94.2	%	0.1	0.5	11/15/2011	thf/nrc	
L91357-19	STS-CG-2011-29	ZN000000J8	Metals Analysis	10/10/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1390	1390	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-19	STS-CG-2011-29	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.6	93.6	%	0.1	0.5	11/16/2011	thf/nrc	
L91355-02	STS-PCUG-2011-22	ZN000000J8	Metals Analysis	10/10/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	976	976	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-02	STS-PCUG-2011-22	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	7.4	7.4	units	0.1	0.1	11/14/2011	thf	
L91355-02	STS-PCUG-2011-22	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.5	93.5	%	0.1	0.5	11/16/2011	ndj	
L91360-04	STS-CG-2011-34	ZN000000J8	Metals Analysis	10/10/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1190	1190	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-04	STS-CG-2011-34	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.4	96.4	%	0.1	0.5	11/21/2011	bsu	
L91360-06	STS-CG-2011-36	ZN000000J8	Metals Analysis	10/10/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	507	507	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91360-06	STS-CG-2011-36	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.3	94.3	%	0.1	0.5	11/21/2011	bsu	
L91357-15	STS-CG-2011-25	ZN000000J8	Metals Analysis	10/10/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	1640	1640	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-15	STS-CG-2011-25	ZN000000J8	Soil Analysis	10/10/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95	95.0	%	0.1	0.5	11/16/2011	thf/nrc	
L91355-07	DUP2 (STS-PCUG-2011-29)	ZN000000J8	Metals Analysis	10/11/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	555	555	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-07	DUP2 (STS-PCUG-2011-29)	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.9	4.9	units	0.1	0.1	11/14/2011	thf	
L91355-07	DUP2 (STS-PCUG-2011-29)	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.5	94.5	%	0.1	0.5	11/16/2011	ndj	
L91355-01	STS-PCUG-2011-21	ZN000000J8	Metals Analysis	10/11/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	558	558	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-01	STS-PCUG-2011-21	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.8	4.8	units	0.1	0.1	11/14/2011	thf	
L91355-01	STS-PCUG-2011-21	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.7	93.7	%	0.1	0.5	11/16/2011	ndj	
L91359-12	STS-PCUG-2011-4	ZN000000J8	Metals Analysis	10/11/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	794	794	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-12	STS-PCUG-2011-4	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.6	4.6	units	0.1	0.1	11/15/2011	thf	
L91359-12	STS-PCUG-2011-4	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.2	92.2	%	0.1	0.5	11/16/2011	ndj	
L91355-03	STS-PCUG-2011-23	ZN000000J8	Metals Analysis	10/11/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	551	551	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-03	STS-PCUG-2011-23	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.8	5.8	units	0.1	0.1	11/14/2011	thf	
L91355-03	STS-PCUG-2011-23	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.5	93.5	%	0.1	0.5	11/16/2011	ndj	
L91357-03	STS-PCUG-2011-13	ZN000000J8	Metals Analysis	10/11/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	602	602	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-03	STS-PCUG-2011-13	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.1	5.1	units	0.1	0.1	11/15/2011	thf	
L91357-03	STS-PCUG-2011-13	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.2	94.2	%	0.1	0.5	11/15/2011	thf/nrc	
L91355-09	STS-PCUG-2011-29	ZN000000J8	Metals Analysis	10/11/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	671	671	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-09	STS-PCUG-2011-29	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.2	5.2	units	0.1	0.1	11/14/2011	thf	
L91355-09	STS-PCUG-2011-29	ZN000000J8	Soil Analysis	10/11/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.2	94.2	%	0.1	0.5	11/16/2011	ndj	
L91359-11	STS-PCUG-2011-3	ZN000000J8	Metals Analysis	10/12/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	587	587	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-11	STS-PCUG-2011-3	ZN000000J8	Soil Analysis	10/12/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.8	4.8	units	0.1	0.1	11/15/2011	thf	
L91359-11	STS-PCUG-2011-3	ZN000000J8	Soil Analysis	10/12/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	91	91.0	%	0.1	0.5	11/16/2011	ndj	
L91359-10	STS-PCUG-2011-2	ZN000000J8	Metals Analysis	10/12/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	876	876	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-10	STS-PCUG-2011-2	ZN000000J8	Soil Analysis	10/12/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	6.5	6.5	units	0.1	0.1	11/15/2011	thf	
L91359-10	STS-PCUG-2011-2	ZN000000J8	Soil Analysis	10/12/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.6	95.6	%	0.1	0.5	11/16/2011	ndj	
L91357-02	STS-PCUG-2011-12	ZN000000J8	Metals Analysis	10/12/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	536	536	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-02	STS-PCUG-2011-12	ZN000000J8	Soil Analysis	10/12/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	6.7	6.7	units	0.1	0.1	11/14/2011	thf	
L91357-02	STS-PCUG-2011-12	ZN000000J8	Soil Analysis	10/12/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.3	93.3	%	0.1	0.5	11/15/2011	thf/nrc	
L91357-10	STS-PCUG-2011-20	ZN000000J8	Metals Analysis	10/12/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	520	520	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-10	STS-PCUG-2011-20	ZN000000J8	Soil Analysis	10/12/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.1	4.1	units	0.1	0.1	11/15/2011	thf	
L91357-10	STS-PCUG-2011-20	ZN000000J8	Soil Analysis	10/12/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.9	92.9	%	0.1	0.5	11/15/2011	thf/nrc	
L91355-18	DUP3 (STS-PCUG-2011-14)	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	372	372	mg/Kg	1	5	11/14/2011	aeb	7440-50-8
L91355-18	DUP3 (STS-PCUG-2011-14)	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.9	5.9	units	0.1	0.1	11/15/2011	thf	
L91355-18	DUP3 (STS-PCUG-2011-14)	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	97	97.0	%	0.1	0.5	11/16/2011	ndj	
L91357-05	STS-PCUG-2011-41	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	587	587	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-05	STS-PCUG-2011-41	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	3.3	3.3	units	0.1	0.1	11/15/2011	thf	
L91357-05	STS-PCUG-2011-41	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.7	96.7	%	0.1	0.5	11/15/2011	thf/nrc	
L91357-04	STS-PCUG-2011-14	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	354	354	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-04	STS-PCUG-2011-14	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.9	5.9	units	0.1	0.1	11/15/2011	thf	
L91357-04	STS-PCUG-2011-14	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	97.2	97.2	%	0.1	0.5	11/15/2011	thf/nrc	
L91359-09	STS-PCUG-2011-1	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	263	263	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-09	STS-PCUG-2011-1	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	5.6	5.6	units	0.1	0.1	11/15/2011	thf	
L91359-09	STS-PCUG-2011-1	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.4	96.4	%	0.1	0.5	11/16/2011	ndj	
L91359-17	STS-PCUG-2011-10	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	324	324	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-17	STS-PCUG-2011-10	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	7.4	7.4	units	0.1	0.1	11/15/2011	thf	
L91359-17	STS-PCUG-2011-10	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.1	96.1	%	0.1	0.5	11/16/2011	ndj	
L91359-13	STS-PCUG-2011-33	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	273	273	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-13	STS-PCUG-2011-33	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	6.7	6.7	units	0.1	0.1	11/15/2011	thf	
L91359-13	STS-PCUG-2011-33	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.8	95.8	%	0.1	0.5	11/16/2011	ndj	
L91358-02	STS-PCUG-2011-40	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	312	312	mg/Kg	1	5	11/17/2011	aeb	7440-50-8
L91358-02	STS-PCUG-2011-40	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	3.8	3.8	units	0.1	0.1	11/21/2011	bsu	
L91358-02	STS-PCUG-2011-40	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.6	96.6	%	0.1	0.5	11/16/2011	ndj	
L91359-16	STS-PCUG-2011-39	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	360	360	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-16	STS-PCUG-2011-39	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.7	4.7	units	0.1	0.1	11/15/2011	thf	
L91359-16	STS-PCUG-2011-39	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.6	96.6	%	0.1	0.5	11/16/2011	ndj	
L91359-15	STS-PCUG-2011-38	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	350	350	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91359-15	STS-PCUG-2011-38	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	3.9	3.9	units	0.1	0.1	11/15/2011	thf	
L91359-15	STS-PCUG-2011-38	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.4	95.4	%	0.1	0.5	11/16/2011	ndj	
L91357-01	STS-PCUG-2011-11	ZN000000J8	Metals Analysis	10/13/2011	10/18/2011	Copper, total (3050)	SO	M6010B ICP	254	254	mg/Kg	1	5	11/15/2011	aeb	7440-50-8
L91357-01	STS-PCUG-2011-11	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	pH, Saturated Paste	SO	USDA No. 60 (21A)	4.6	4.6	units	0.1	0.1	11/14/2011	thf	
L91357-01	STS-PCUG-2011-11	ZN000000J8	Soil Analysis	10/13/2011	10/18/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.3	94.3	%	0.1	0.5	11/15/2011	thf/nrc	
L91526-08	STS-PCUG-2011-15	ZN000000J8	Metals Analysis	10/18/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	357	357	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-08	STS-PCUG-2011-15	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH	SO	M9045D/M9040C	4.3	4.3	units	0.1	0.1	11/29/2011	mss2	
L91526-08	STS-PCUG-2011-15	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.4	22.4	C	0.1	0.1	11/29/2011	mss2	
L91526-08	STS-PCUG-2011-15	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.5	95.5	%	0.1	0.5	11/29/2011	nrc	
L91526-05	STS-PCUG-2011-6	ZN000000J8	Metals Analysis	10/18/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	290	290	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-05	STS-PCUG-2011-6	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH	SO	M9045D/M9040C	5	5.0	units	0.1	0.1	11/29/2011	mss2	
L91526-05	STS-PCUG-2011-6	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.3	22.3	C	0.1	0.1	11/29/2011	mss2	
L91526-05	STS-PCUG-2011-6	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.4	95.4	%	0.1	0.5	11/29/2011	nrc	
L91526-13	STS-PCUG-2011-36	ZN000000J8	Metals Analysis	10/18/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	270	270	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-13	STS-PCUG-2011-36	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH	SO	M9045D/M9040C	5.6	5.6	units	0.1	0.1	11/29/2011	mss2	
L91526-13	STS-PCUG-2011-36	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	21.9	21.9	C	0.1	0.1	11/29/2011	mss2	
L91526-13	STS-PCUG-2011-36	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.5	96.5	%	0.1	0.5	11/30/2011	nrc	
L91526-12	STS-PCUG-2011-35	ZN000000J8	Metals Analysis	10/18/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	287	287	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-12	STS-PCUG-2011-35	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH	SO	M9045D/M9040C	5.5	5.5	units	0.1	0.1	11/29/2011	mss2	
L91526-12	STS-PCUG-2011-35	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22	22.0	C	0.1	0.1	11/29/2011	mss2	
L91526-12	STS-PCUG-2011-35	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	97.4	97.4	%	0.1	0.5	11/30/2011	nrc	
L91526-07	STS-PCUG-2011-9	ZN000000J8	Metals Analysis	10/18/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	246	246	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-07	STS-PCUG-2011-9	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH	SO	M9045D/M9040C	4.8	4.8	units	0.1	0.1	11/29/2011	mss2	
L91526-07	STS-PCUG-2011-9	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.3	22.3	C	0.1	0.1	11/29/2011	mss2	
L91526-07	STS-PCUG-2011-9	ZN000000J8	Soil Analysis	10/18/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	97.9	97.9	%	0.1	0.5	11/29/2011	nrc	
L91526-03	DUP4 (STS-PCUG-2011-31)	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	261	261	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-03	DUP4 (STS-PCUG-2011-31)	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH	SO	M9045D/M9040C	4.2	4.2	units	0.1	0.1	11/29/2011	mss2	
L91526-03	DUP4 (STS-PCUG-2011-31)	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.3	22.3	C	0.1	0.1	11/29/2011	mss2	
L91526-03	DUP4 (STS-PCUG-2011-31)	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.7	96.7	%	0.1	0.5	11/29/2011	nrc	
L91526-15	DUP10 (STS-CG-2011-1)	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	248	248	mg/Kg	1	5	11/28/2011	jjc	7440-50-8

L91526-15	DUP10 (STS-CG-2011-1)	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.9	95.9	%	0.1	0.5	11/30/2011	nrc	
L91526-14	STS-PCUG-2011-37	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	244	244	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-14	STS-PCUG-2011-37	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH	SO	M9045D/M9040C	6.9	6.9	units	0.1	0.1	11/29/2011	mss2	
L91526-14	STS-PCUG-2011-37	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	21.9	21.9	C	0.1	0.1	11/29/2011	mss2	
L91526-14	STS-PCUG-2011-37	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.8	95.8	%	0.1	0.5	11/30/2011	nrc	
L91526-02	STS-PCUG-2011-31	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	304	304	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-02	STS-PCUG-2011-31	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH	SO	M9045D/M9040C	4.3	4.3	units	0.1	0.1	11/29/2011	mss2	
L91526-02	STS-PCUG-2011-31	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.5	22.5	C	0.1	0.1	11/29/2011	mss2	
L91526-02	STS-PCUG-2011-31	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.7	96.7	%	0.1	0.5	11/29/2011	nrc	
L91526-10	STS-PCUG-2011-32	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	420	420	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-10	STS-PCUG-2011-32	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH	SO	M9045D/M9040C	3.8	3.8	units	0.1	0.1	11/29/2011	mss2	
L91526-10	STS-PCUG-2011-32	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.3	22.3	C	0.1	0.1	11/29/2011	mss2	
L91526-10	STS-PCUG-2011-32	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.6	96.6	%	0.1	0.5	11/29/2011	nrc	
L91526-11	STS-PCUG-2011-34	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	364	364	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-11	STS-PCUG-2011-34	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH	SO	M9045D/M9040C	4	4.0	units	0.1	0.1	11/29/2011	mss2	
L91526-11	STS-PCUG-2011-34	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22	22.0	C	0.1	0.1	11/29/2011	mss2	
L91526-11	STS-PCUG-2011-34	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.4	95.4	%	0.1	0.5	11/29/2011	nrc	
L91527-13	STS-CG-2011-3	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	573	573	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-13	STS-CG-2011-3	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.6	95.6	%	0.1	0.5	11/30/2011	nrc	
L91527-14	STS-CG-2011-4	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	337	337	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-14	STS-CG-2011-4	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.1	96.1	%	0.1	0.5	11/30/2011	nrc	
L91527-12	STS-CG-2011-2	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	288	288	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-12	STS-CG-2011-2	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.9	95.9	%	0.1	0.5	11/30/2011	nrc	
L91527-11	STS-CG-2011-1	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	274	274	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-11	STS-CG-2011-1	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.9	95.9	%	0.1	0.5	11/30/2011	nrc	
L91527-18	STS-CG-2011-8	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	490	490	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-18	STS-CG-2011-8	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.5	95.5	%	0.1	0.5	11/30/2011	nrc	
L91526-20	STS-CG-2011-7	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	627	627	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-20	STS-CG-2011-7	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.2	95.2	%	0.1	0.5	11/30/2011	nrc	
L91527-16	STS-CG-2011-6	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	316	316	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-16	STS-CG-2011-6	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.7	95.7	%	0.1	0.5	11/30/2011	nrc	
L91527-15	STS-CG-2011-5	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	309	309	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-15	STS-CG-2011-5	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.4	95.4	%	0.1	0.5	11/30/2011	nrc	
L91526-19	STS-CG-2011-16	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	949	949	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-19	STS-CG-2011-16	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	92.6	92.6	%	0.1	0.5	11/30/2011	nrc	
L91527-20	STS-CG-2011-23	ZN000000J8	Metals Analysis	10/19/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	2070	2070	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-20	STS-CG-2011-23	ZN000000J8	Soil Analysis	10/19/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.3	96.3	%	0.1	0.5	11/30/2011	nrc	
L91527-19	STS-CG-2011-22	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	1560	1560	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-19	STS-CG-2011-22	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.4	94.4	%	0.1	0.5	11/30/2011	nrc	
L91527-17	STS-CG-2011-18	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	1640	1640	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-17	STS-CG-2011-18	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.7	93.7	%	0.1	0.5	11/30/2011	nrc	
L91526-18	STS-CG-2011-48	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	1260	1260	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-18	STS-CG-2011-48	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.8	95.8	%	0.1	0.5	11/30/2011	nrc	
L91527-02	STS-CG-2011-52	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	780	780	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91527-02	STS-CG-2011-52	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.8	96.8	%	0.1	0.5	11/29/2011	nrc	
L91527-08	STS-CG-2011-32	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	1500	1500	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-08	STS-CG-2011-32	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.9	95.9	%	0.1	0.5	11/29/2011	nrc	
L91527-09	STS-CG-2011-37	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	1560	1560	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-09	STS-CG-2011-37	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.4	94.4	%	0.1	0.5	11/29/2011	nrc	
L91526-16	STS-CG-2011-44	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	761	761	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-16	STS-CG-2011-44	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.6	94.6	%	0.1	0.5	11/30/2011	nrc	
L91526-06	STS-PCUG-2011-8	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	449	449	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-06	STS-PCUG-2011-8	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	pH	SO	M9045D/M9040C	5.8	5.8	units	0.1	0.1	11/29/2011	mss2	
L91526-06	STS-PCUG-2011-8	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.4	22.4	C	0.1	0.1	11/29/2011	mss2	
L91526-06	STS-PCUG-2011-8	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.4	96.4	%	0.1	0.5	11/29/2011	nrc	
L91526-04	STS-PCUG-2011-5	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	458	458	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-04	STS-PCUG-2011-5	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	pH	SO	M9045D/M9040C	5.8	5.8	units	0.1	0.1	11/29/2011	mss2	
L91526-04	STS-PCUG-2011-5	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.4	22.4	C	0.1	0.1	11/29/2011	mss2	
L91526-04	STS-PCUG-2011-5	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.8	94.8	%	0.1	0.5	11/29/2011	nrc	
L91527-10	STS-CG-2011-41	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	321	321	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-10	STS-CG-2011-41	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.9	93.9	%	0.1	0.5	11/30/2011	nrc	
L91526-17	STS-CG-2011-47	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	472	472	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-17	STS-CG-2011-47	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.3	94.3	%	0.1	0.5	11/30/2011	nrc	
L91527-01	STS-CG-2011-51	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	463	463	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91527-01	STS-CG-2011-51	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	94.5	94.5	%	0.1	0.5	11/29/2011	nrc	
L91527-03	STS-CG-2011-53	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	426	426	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91527-03	STS-CG-2011-53	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	93.6	93.6	%	0.1	0.5	11/29/2011	nrc	
L91527-05	STS-CG-2011-55	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	633	633	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-05	STS-CG-2011-55	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.5	95.5	%	0.1	0.5	11/29/2011	nrc	
L91526-01	STS-PCUG-2011-27	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	438	438	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91526-01	STS-PCUG-2011-27	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	pH	SO	M9045D/M9040C	6.9	6.9	units	0.1	0.1	11/29/2011	mss2	
L91526-01	STS-PCUG-2011-27	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	pH measured at	SO	M9045D/M9040C	22.7	22.7	C	0.1	0.1	11/29/2011	mss2	
L91526-01	STS-PCUG-2011-27	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.3	96.3	%	0.1	0.5	11/29/2011	nrc	
L91527-04	STS-CG-2011-54	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	1100	1100	mg/Kg	1	5	11/28/2011	jjc	7440-50-8
L91527-04	STS-CG-2011-54	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	96.9	96.9	%	0.1	0.5	11/29/2011	nrc	
L91527-06	STS-CG-2011-56	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	177	177	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-06	STS-CG-2011-56	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	97.6	97.6	%	0.1	0.5	11/29/2011	nrc	
L91527-07	STS-CG-2011-57	ZN000000J8	Metals Analysis	10/20/2011	10/26/2011	Copper, total (3050)	SO	M6010B ICP	434	434	mg/Kg	1	5	11/29/2011	jjc	7440-50-8
L91527-07	STS-CG-2011-57	ZN000000J8	Soil Analysis	10/20/2011	10/26/2011	Solids, Percent	SO	CLPSOW390, PART F, D	95.7	95.7	%	0.1	0.5	11/29/2011	nrc	

Table E-2 Relative Percent Difference of Duplicate Pairs

Sample ID	Copper (mg/kg)			pH		
	Parent Sample	Duplicate	RPD	Parent Sample	Duplicate	RPD
STS-CG-2011-28	606	528	0.14	--	--	--
STS-PCUG-2011-7	387	613	0.45	7.7	--	--
STS-PCUG-2011-19	1210	1310	0.08	3.9	4	0.03
STS-CG-2011-43	626	567	0.10	--	--	--
STS-CG-2011-10	1930	2450	0.24	--	--	--
STS-CG-2011-42	958	1050	0.09	--	--	--
STS-PCUG-2011-29	671	555	0.19	5.2	4.9	0.06
STS-PCUG-2011-14	354	372	0.05	5.9	5.9	0.00
STS-PCUG-2011-31	304	261	0.15	22.5	22.3	0.01
STS-CG-2011-1	274	248	0.10	--	--	--

Notes:

Parent and duplicate laboratory analytical results are presented in Table E-1.

mg/kg = milligrams per kilogram

RPD = relative percent difference, calculated as the difference between the parent and duplicate samples divided by the average of the two samples.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

October 21, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L90608

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 20, 2011. This project has been assigned to ACZ's project number, L90608. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L90608. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 21, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACCREDITED IN ACCORDANCE WITH nelac
ACIL

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L90608-01***
Sample ID:	STS-BWC-2011-3	Date Sampled:	*09/14/11 14:00*
		Date Received:	*09/20/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	622		*	mg/Kg	1	5	10/07/11 10:57	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.4		*	units	0.1	0.1	10/19/11 10:32	zsh
Solids, Percent	CLPSOW390, PART F, D-98	87.6		*	%	0.1	0.5	10/19/11 16:35	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:30	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 13:52	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:15	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 11:45	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 11:45	thf

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-BWC-2011-4

ACZ Sample ID: ***L90608-02***

Date Sampled: *09/16/11 10:00*

Date Received: *09/20/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	521		*	mg/Kg	1	5	10/07/11 11:07	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.9		*	units	0.1	0.1	10/19/11 10:36	zsh
Solids, Percent	CLPSOW390, PART F, D-98	86.9		*	%	0.1	0.5	10/19/11 17:52	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:32	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 14:45	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:21	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 11:52	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 11:52	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-BWC-2011-5

ACZ Sample ID: ***L90608-03***

Date Sampled: *09/16/11 13:00*

Date Received: *09/20/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	975		*	mg/Kg	1	5	10/07/11 11:10	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.9		*	units	0.1	0.1	10/19/11 10:37	zsh
Solids, Percent	CLPSOW390, PART F, D-98	82.7		*	%	0.1	0.5	10/19/11 19:09	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:34	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 15:02	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:25	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 11:59	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 11:59	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-BWC-2011-6

ACZ Sample ID: ***L90608-04***

Date Sampled: *09/14/11 14:45*

Date Received: *09/20/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	426		*	mg/Kg	1	5	10/07/11 11:13	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.6		*	units	0.1	0.1	10/19/11 10:39	zsh
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	10/19/11 20:27	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:36	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 15:20	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:28	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:06	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:06	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-7

ACZ Sample ID: ***L90608-05***
Date Sampled: *09/15/11 09:10*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2110		*	mg/Kg	1	5	10/07/11 11:25	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.5		*	units	0.1	0.1	10/19/11 10:41	zsh
Solids, Percent	CLPSOW390, PART F, D-98	82.4		*	%	0.1	0.5	10/19/11 21:44	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:38	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 15:37	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:32	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:13	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:13	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-BWC-2011-8

ACZ Sample ID: ***L90608-06***

Date Sampled: *09/16/11 11:00*

Date Received: *09/20/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	691		*	mg/Kg	1	5	10/07/11 11:29	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.5		*	units	0.1	0.1	10/19/11 10:43	zsh
Solids, Percent	CLPSOW390, PART F, D-98	87.8		*	%	0.1	0.5	10/19/11 23:01	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:41	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 15:55	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:35	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:20	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:20	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-9

ACZ Sample ID: ***L90608-07***
Date Sampled: *09/15/11 10:45*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	610		*	mg/Kg	1	5	10/07/11 11:32	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.8		*	units	0.1	0.1	10/19/11 10:45	zsh
Solids, Percent	CLPSOW390, PART F, D-98	93.9		*	%	0.1	0.5	10/20/11 0:18	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:43	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 16:12	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:39	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:27	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:27	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-10

ACZ Sample ID: ***L90608-08***
Date Sampled: *09/15/11 08:00*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	972		*	mg/Kg	1	5	10/07/11 11:35	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.6		*	units	0.1	0.1	10/19/11 10:47	zsh
Solids, Percent	CLPSOW390, PART F, D-98	89.8		*	%	0.1	0.5	10/20/11 1:36	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:45	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 16:30	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:42	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:34	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:34	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-11

ACZ Sample ID: ***L90608-09***
Date Sampled: *09/16/11 12:00*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1590		*	mg/Kg	1	5	10/07/11 11:38	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.6		*	units	0.1	0.1	10/19/11 10:49	zsh
Solids, Percent	CLPSOW390, PART F, D-98	84.4		*	%	0.1	0.5	10/20/11 2:53	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:47	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 16:47	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:46	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:41	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:41	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-BWC-2011-12

ACZ Sample ID: ***L90608-10***
Date Sampled: *09/15/11 10:15*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	709		*	mg/Kg	1	5	10/07/11 11:41	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.2		*	units	0.1	0.1	10/19/11 10:52	zsh
Solids, Percent	CLPSOW390, PART F, D-98	94.6		*	%	0.1	0.5	10/20/11 4:10	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 11:50	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 17:05	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:49	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:48	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:48	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-BWC-2011-1
ACZ Sample ID:	***L90608-11***
Date Sampled:	*09/14/11 11:20*
Date Received:	*09/20/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	766		*	mg/Kg	1	5	10/07/11 11:44	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.2		*	units	0.1	0.1	10/19/11 10:54	zsh
Solids, Percent	CLPSOW390, PART F, D-98	90.9		*	%	0.1	0.5	10/20/11 5:28	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 14:00	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 17:22	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:53	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 12:55	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 12:55	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L90608-12***
Sample ID:	STS-BWC-2011-2	Date Sampled:	*09/14/11 12:50*
		Date Received:	*09/20/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	667		*	mg/Kg	1	5	10/07/11 11:47	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	6.0		*	units	0.1	0.1	10/19/11 10:56	zsh
Solids, Percent	CLPSOW390, PART F, D-98	90.9		*	%	0.1	0.5	10/20/11 6:45	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 14:01	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 17:40	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 13:56	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 13:02	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 13:02	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUPLICATE#1STS-BWC-2

ACZ Sample ID: ***L90608-13***
Date Sampled: *09/14/11 14:45*
Date Received: *09/20/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	363		*	mg/Kg	1	5	10/07/11 11:50	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.8		*	units	0.1	0.1	10/19/11 10:58	zsh
Solids, Percent	CLPSOW390, PART F, D-98	93.9		*	%	0.1	0.5	10/20/11 8:02	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							10/04/11 14:02	cra
Digestion - Hot Plate	M3050B ICP							10/06/11 17:57	mss2/nd
Saturated Paste Extraction	USDA No. 60 (2)							10/17/11 14:00	zsh
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							10/06/11 13:10	thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							10/06/11 13:10	thf

** Please refer to Qualifier Reports for details.*

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8

ACZ Project ID: ***L90608***

Copper, total (3050) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG311108													
WG311108ICV	ICV	10/07/11 10:33	II110816-2	2		1.947	mg/L	97.4	90	110			
WG311108ICB	ICB	10/07/11 10:36				U	mg/L		-0.03	0.03			
WG311108PQV	PQV	10/07/11 10:39	II110923-2	.05		.052	mg/L	104	70	130			
WG311108ICSAB	ICSAB	10/07/11 10:42	II110922-1	.255		.256	mg/L	100.4	80	120			
WG311046PBS	PBS	10/07/11 10:48				U	mg/Kg		-3	3			
WG311046LCSS	LCSS	10/07/11 10:51	PCN38229	117		125.6	mg/Kg		98	136			
WG311046LCSSD	LCSSD	10/07/11 10:54	PCN38229	117		121.6	mg/Kg		98	136	3.2	20	
L90608-01MS	MS	10/07/11 11:01	II110914-5	50.5	622	628.1	mg/Kg	12.1	75	125			M3
L90608-01MSD	MSD	10/07/11 11:04	II110914-5	50.5	622	639	mg/Kg	33.7	75	125	1.72	20	M3
L90608-04SDL	SDL	10/07/11 11:16			426	422.5	mg/Kg				0.8	10	
WG311108CCV1	CCV	10/07/11 11:19	II110816-3	1		.974	mg/L	97.4	90	110			
WG311108CCB1	CCB	10/07/11 11:22				U	mg/L		-0.03	0.03			
WG311108CCV2	CCV	10/07/11 11:53	II110816-3	1		.969	mg/L	96.9	90	110			
WG311108CCB2	CCB	10/07/11 11:56				U	mg/L		-0.03	0.03			

pH, Saturated Paste USDA No. 60 (21A)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG311692													
WG311692ICV	ICV	10/19/11 10:30	PCN36616	4		4.05	units	101.3	97	103			
L90608-01DUP	DUP	10/19/11 10:34			5.4	5.4	units				0	20	
WG311692CCV1	CCV	10/19/11 10:50	PCN36616	4		4.04	units	101	97	103			
WG311692CCV2	CCV	10/19/11 11:00	PCN36616	4		4.07	units	101.8	97	103			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG311894													
WG311894PBS	PBS	10/19/11 15:18				U	%		99.9	100.1			
L90608-13DUP	DUP	10/20/11 9:19			93.9	93.82	%				0.1	20	

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L90608-01	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-02	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-03	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-04	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-05	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-06	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-07	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-08	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-09	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-10	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-11	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-12	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L90608-13	WG311108	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.	
pH, Saturated Paste	USDA No. 60 (21A)
Solids, Percent	CLPSOW390, PART F, D-98

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID:	L90608
Date Received:	09/20/2011 09:16
Received By:	ksj
Date Printed:	9/21/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
Na13908		21.8	23

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L90608
Date Received: 09/20/2011 09:16
Received By: ksj
Date Printed: 9/21/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L90608-01	STS-BWC-2011-3									X		
L90608-02	STS-BWC-2011-4									X		
L90608-03	STS-BWC-2011-5									X		
L90608-04	STS-BWC-2011-6									X		
L90608-05	STS-BWC-2011-7									X		
L90608-06	STS-BWC-2011-8									X		
L90608-07	STS-BWC-2011-9									X		
L90608-08	STS-BWC-2011-10									X		
L90608-09	STS-BWC-2011-11									X		
L90608-10	STS-BWC-2011-12									X		
L90608-11	STS-BWC-2011-1									X		
L90608-12	STS-BWC-2011-2									X		
L90608-13	DUPLICATE#1STS-BWC-2									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L90608

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES X NO

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES NO X

If yes, please include state forms. Results will be reported to PQL.

Quote #:

Project/PO #: See below

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	pH	Total CU
STS-BWC-2011-3	9-14-11 2:00pm	SO	1	X	X	X
STS-BWC-2011-4	9-16-11 10:00am	SO	1	X	X	X
STS-BWC-2011-5	9-16-11 13:00	SO	1	X	X	X
STS-BWC-2011-6	9-14-11 2:45pm	SO	1	X	X	X
STS-BWC-2011-7	9-15-11 9:10am	SO	1	X	X	X
STS-BWC-2011-8	9-16-11 11:00am	SO	1	X	X	X
STS-BWC-2011-9	9-15-11 10:45am	SO	1	X	X	X
STS-BWC-2011-10	9-15-11 8:00am	SO	1	X	X	X
STS-BWC-2011-11	9-16-11 12:00pm	SO	1	X	X	X
STS-BWC-2011-12	9-15-11 10:15	SO	1	X	X	X

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please send to Sheri Fling at URS for validation. Please sieve to <2 mm before analysis.

PO#2N000000J8

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Pam Pinson	9-19-11 / 3:00pm		
		WGS	9/20/11

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L90608 Chain of Custody

09:20

ACZ Laboratories, Inc. 190608

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Copy of Report to:

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Invoice to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]
If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]
If yes, please include state forms. Results will be reported to PQL.

Project Information

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

Analyses Requested

Sample Identification	Date Time	Matrix	# of Containers	soil sieved to < 2mm	pH	Total CU					
STS-BWC-2011-1	9-19-11 11:20am	SO	1	x	x	x					
STS-BWC-2011-2	9-14-11 12:50pm	SO	1	x	x	x					
~~STS-BWC-2011-5~~		~~SO~~	~~1~~	~~x~~	~~x~~	~~x~~					
~~STS-BWC-2011-6~~		~~SO~~	~~1~~	~~x~~	~~x~~	~~x~~					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Remarks

Please sent to Sheri Fling at URS for validation. Please sieve to <2mm before analysis.

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

Relinquished By	Date Time	Received By	Date Time
Pam Pinson	9-19-11/3pm		
		WES	9/20/11

2

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

09:20

ACZ Laboratories, Inc. L90608

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Copy of Report to:

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Invoice to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES x NO

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES NO x

If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	pH	Total CU					
Rinsate Blank #1	9/14/2011 2:45	SW	1		x	x					
Duplicate #1 STS BWC2011-6 Dup	9/14/2011 2:45pm	SO	1	x	x	x					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please sent to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weigh basis.

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
Pam Pinson	9-19-2011/3:00pm		
		WGS	9/20/11 09:20

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

3

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

September 28, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L90609

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 20, 2011. This project has been assigned to ACZ's project number, L90609. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L90609. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 28, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	RINSATE BLANK #1
ACZ Sample ID:	***L90609-01***
Date Sampled:	*09/14/11 14:45*
Date Received:	*09/20/11*
Sample Matrix:	*Surface Water*

Inorganic Prep

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Total Hot Plate Digestion	M200.2 ICP-MS							09/26/11 8:52	mfm

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total	M200.8 ICP-MS	0.0048			mg/L	0.0005	0.003	09/27/11 0:52	msh

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	LCSWD	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	LFB	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	LFM	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	LFMD	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	LRB	Laboratory Reagent Blank
ICB	Initial Calibration Blank	MS	Matrix Spike
ICV	Initial Calibration Verification standard	MSD	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	PBS	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	PBW	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	PQV	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	SDL	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.

(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.

(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.

(5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.

(6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.

(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.

(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company ACZ Project ID: ***L90609***
Project ID: ZN000000J8

Copper, total M200.8 ICP-MS

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG310201													
WG310201ICV	ICV	09/27/11 0:35	MS110912-5	.05		.04861	mg/L	97.2	90	110			
WG310201ICB	ICB	09/27/11 0:38				U	mg/L		-0.0015	0.0015			
WG310092LRB	LRB	09/27/11 0:41				U	mg/L		-0.0011	0.0011			
WG310092LFB	LFB	09/27/11 0:45	MS110913-2	.05005		.04755	mg/L	95	85	115			
L90673-03LFM	LFM	09/27/11 1:06	MS110913-2	.05005	U	.04335	mg/L	86.6	70	130			
L90673-03LFMD	LFMD	09/27/11 1:09	MS110913-2	.05005	U	.04517	mg/L	90.2	70	130	4.11	20	
WG310201CCV1	CCV	09/27/11 1:12	MS110919-5	.25025		.2641	mg/L	105.5	90	110			
WG310201CCB1	CCB	09/27/11 1:15				U	mg/L		-0.0015	0.0015			
WG310201CCV2	CCV	09/27/11 1:54	MS110919-5	.25025		.2629	mg/L	105.1	90	110			
WG310201CCB2	CCB	09/27/11 1:57				U	mg/L		-0.0015	0.0015			
WG310201CCV3	CCV	09/27/11 2:24	MS110919-5	.25025		.2485	mg/L	99.3	90	110			
WG310201CCB3	CCB	09/27/11 2:28				U	mg/L		-0.0015	0.0015			

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION

No extended qualifiers associated with this analysis

No certification qualifiers associated with this analysis

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company

ZN000000J8

ACZ Project ID: L90609

Date Received: 09/20/2011 09:16

Received By: ksj

Date Printed: 9/21/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?		X	
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

The pH could not be entered as the proper container was not received.

Contact (For any discrepancies, the client must be contacted)

The client was not contacted.

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
Na13908		21.8	23

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L90609
Date Received: 09/20/2011 09:16
Received By: ksj
Date Printed: 9/21/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L90609-01	RINSATE BLANK #1	Y										

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L90609

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Copy of Report to:

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Invoice to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]

If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

ANALYSES REQUESTED *(attach list or use quote number)*

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	pH	Total CU					
Rinsate Blank #1	9/14/2011 2:45	SW	1		x	x					
Duplicate #1 STS BWC2011-6 Dup	9/14/2011 2:45pm	SO	1	x	x	x					

COPY

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please sent to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weigh basis.

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
Pam Pinson	9-19-2011/3:00pm		
		WGS	9/20/11 09:10

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L90609 Chain of Custody

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

November 18, 2011

Report to:	Bill to:
Pam Pinson	Pam Pinson
Freeport-McMoRan - Chino Mines Company	Freeport-McMoRan - Chino Mines Company
PO Box 10	P.O. Box 13308
Bayard, NM 88023	Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L91355

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 18, 2011. This project has been assigned to ACZ's project number, L91355. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L91355. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 18, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-21

ACZ Sample ID: ***L91355-01***

Date Sampled: *10/11/11 09:05*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	558			mg/Kg	1	5	11/14/11 10:58	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.8		*	units	0.1	0.1	11/14/11 17:28	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.7		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:00	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 10:52	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 14:45	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:00	lwt

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-22

ACZ Sample ID: ***L91355-02***
Date Sampled: *10/10/11 15:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	976			mg/Kg	1	5	11/14/11 11:07	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	7.4		*	units	0.1	0.1	11/14/11 18:50	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:06	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 11:45	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 16:36	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:02	lwt

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-03***
Sample ID:	STS-PCUG-2011-23	Date Sampled:	*10/11/11 13:35*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	551			mg/Kg	1	5	11/14/11 11:10	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.8		*	units	0.1	0.1	11/14/11 19:31	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:12	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 12:02	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 17:31	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:04	lwt

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-24

ACZ Sample ID: ***L91355-04***
Date Sampled: *10/08/11 14:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1000			mg/Kg	1	5	11/14/11 11:14	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.2		*	units	0.1	0.1	11/14/11 20:12	thf
Solids, Percent	CLPSOW390, PART F, D-98	90.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:18	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 12:20	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 18:27	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:07	lwt

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-05***
Sample ID:	STS-PCUG-2011-25	Date Sampled:	*10/10/11 09:50*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	706			mg/Kg	1	5	11/14/11 11:17	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.6		*	units	0.1	0.1	11/14/11 20:53	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.2		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:25	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 12:37	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 19:23	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:09	lwt

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-06***
Sample ID:	DUP1	Date Sampled:	*10/06/11 00:00*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1310			mg/Kg	1	5	11/14/11 11:26	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.0		*	units	0.1	0.1	11/14/11 21:34	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:31	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 12:55	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 20:18	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:12	lwt

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP2

ACZ Sample ID: ***L91355-07***
Date Sampled: *10/11/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	555			mg/Kg	1	5	11/14/11 11:29	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.9		*	units	0.1	0.1	11/14/11 22:15	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.5		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:37	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 13:12	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 21:14	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:14	lwt

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-PCUG-2011-28

ACZ Sample ID:	***L91355-08***
Date Sampled:	*10/09/11 16:45*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	959			mg/Kg	1	5	11/14/11 11:35	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	7.5		*	units	0.1	0.1	11/14/11 22:56	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.3		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:44	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 13:30	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 22:10	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:16	lwt

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-29

ACZ Sample ID: ***L91355-09***
Date Sampled: *10/11/11 14:25*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	671			mg/Kg	1	5	11/14/11 11:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.2		*	units	0.1	0.1	11/14/11 23:37	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.2		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:50	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 13:47	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 23:05	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:19	lwt

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-10***
Sample ID:	STS-PCUG-2011-30	Date Sampled:	*10/09/11 16:10*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1500			mg/Kg	1	5	11/14/11 11:42	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	7.4		*	units	0.1	0.1	11/15/11 0:59	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.6		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 11:56	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 14:05	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 0:01	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:21	lwt

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: DUP7

ACZ Sample ID: ***L91355-11***

Date Sampled: *10/06/11 00:00*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	567			mg/Kg	1	5	11/14/11 11:45	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.0		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:03	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 14:22	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:24	lwt

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-42

ACZ Sample ID: ***L91355-12***
Date Sampled: *10/09/11 10:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	958			mg/Kg	1	5	11/14/11 11:48	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.8		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:09	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 14:40	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:26	lwt

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-43

ACZ Sample ID: ***L91355-13***
Date Sampled: *10/06/11 16:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	626			mg/Kg	1	5	11/14/11 11:51	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.4		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:15	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 14:57	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:28	lwt

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP8

ACZ Sample ID: ***L91355-14***
Date Sampled: *10/07/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2450			mg/Kg	1	5	11/14/11 11:54	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.8		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:22	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 15:15	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:31	lwt

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-45

ACZ Sample ID: ***L91355-15***
Date Sampled: *10/06/11 14:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	668			mg/Kg	1	5	11/14/11 12:03	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.3		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:28	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 15:32	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:33	lwt

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-46

ACZ Sample ID: ***L91355-16***
Date Sampled: *10/09/11 13:40*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1100			mg/Kg	1	5	11/14/11 12:06	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.6		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:34	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 15:50	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:36	lwt

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: DUP9

ACZ Sample ID: ***L91355-17***

Date Sampled: *10/09/11 00:00*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1050			mg/Kg	1	5	11/14/11 12:09	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.6		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:41	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 16:07	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:38	lwt

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-18***
Sample ID:	DUP3	Date Sampled:	*10/13/11 00:00*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	372			mg/Kg	1	5	11/14/11 12:12	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.9		*	units	0.1	0.1	11/15/11 1:40	thf
Solids, Percent	CLPSOW390, PART F, D-98	97.0		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:47	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 16:25	nrc
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 0:57	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:40	lwt

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91355-19***
Sample ID:	STS-CG-2011-49	Date Sampled:	*10/09/11 11:55*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	733			mg/Kg	1	5	11/14/11 12:16	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.8		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 12:53	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 16:42	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:43	lwt

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-50
ACZ Sample ID:	***L91355-20***
Date Sampled:	*10/09/11 11:10*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	620			mg/Kg	1	5	11/14/11 12:19	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.4		*	%	0.1	0.5	11/16/11 15:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/04/11 13:00	nrc
Digestion - Hot Plate	M3050B ICP							11/11/11 17:00	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/09/11 11:45	lwt

** Please refer to Qualifier Reports for details.*

Inorganic Reference

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8

ACZ Project ID: ***L91355***

Copper, total (3050) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313493													
WG313493ICV	ICV	11/14/11 10:33	II111012-2	2		1.992	mg/L	99.6	90	110			
WG313493ICB	ICB	11/14/11 10:36				U	mg/L		-0.03	0.03			
WG313493PQV	PQV	11/14/11 10:39	II111024-4	.05		.048	mg/L	96	70	130			
WG313493ICSAB	ICSAB	11/14/11 10:43	II110922-1	.255		.251	mg/L	98.4	80	120			
WG313416PBS	PBS	11/14/11 10:49				U	mg/Kg		-3	3			
WG313416LCSS	LCSS	11/14/11 10:52	PCN38231	117		124.1	mg/Kg		98	136			
WG313416LCSSD	LCSSD	11/14/11 10:55	PCN38231	117		120.7	mg/Kg		98	136	2.8	20	
L91355-01MS	MS	11/14/11 11:01	II111104-3	50.5	558	596.3	mg/Kg	75.8	75	125			
L91355-01MSD	MSD	11/14/11 11:04	II111104-3	50.5	558	601.3	mg/Kg	85.7	75	125	0.84	20	
WG313493CCV1	CCV	11/14/11 11:20	II111031-1	1		.99	mg/L	99	90	110			
WG313493CCB1	CCB	11/14/11 11:23				U	mg/L		-0.03	0.03			
L91355-07SDL	SDL	11/14/11 11:32			555	576.5	mg/Kg				3.9	10	
WG313493CCV2	CCV	11/14/11 11:57	II111031-1	1		.986	mg/L	98.6	90	110			
WG313493CCB2	CCB	11/14/11 12:00				U	mg/L		-0.03	0.03			
WG313493CCV3	CCV	11/14/11 12:22	II111031-1	1		.976	mg/L	97.6	90	110			
WG313493CCB3	CCB	11/14/11 12:25				U	mg/L		-0.03	0.03			

pH, Saturated Paste USDA No. 60 (21A)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313542													
WG313542ICV	ICV	11/14/11 16:47	PCN36616	4		4.01	units	100.3	97	103			
L91355-01DUP	DUP	11/14/11 18:09			4.8	4.74	units				1.3	20	
WG313542CCV1	CCV	11/15/11 0:18	PCN36616	4		3.99	units	99.8	97	103			
WG313542CCV2	CCV	11/15/11 7:49	PCN36616	4		3.99	units	99.8	97	103			
WG313542CCV3	CCV	11/15/11 9:11	PCN36616	4		3.98	units	99.5	97	103			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313733													
WG313733PBS	PBS	11/16/11 15:00				U	%		99.9	100.1			
L91355-01DUP	DUP	11/16/11 15:00			93.7	93.77	%				0.1	20	

Inorganic Extended Qualifier Report

Freeport-McMoRan - Chino Mines Company

ACZ Project ID: ***L91355***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION

No extended qualifiers associated with this analysis

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

pH, Saturated Paste	USDA No. 60 (21A)
Solids, Percent	CLPSOW390, PART F, D-98

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91355
Date Received: 10/18/2011 09:23
Received By: ksj
Date Printed: 10/19/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3282		9.2	18
3164		10.4	18
2316		13.3	22
3045		13.6	20

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91355
Date Received: 10/18/2011 09:23
Received By: ksj
Date Printed: 10/19/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91355-01	STS-PCUG-2011-21									X		
L91355-02	STS-PCUG-2011-22									X		
L91355-03	STS-PCUG-2011-23									X		
L91355-04	STS-PCUG-2011-24									X		
L91355-05	STS-PCUG-2011-25									X		
L91355-06	DUP1									X		
L91355-07	DUP2									X		
L91355-08	STS-PCUG-2011-28									X		
L91355-09	STS-PCUG-2011-29									X		
L91355-10	STS-PCUG-2011-30									X		
L91355-11	DUP7									X		
L91355-12	STS-CG-2011-42									X		
L91355-13	STS-CG-2011-43									X		
L91355-14	DUP8									X		
L91355-15	STS-CG-2011-45									X		
L91355-16	STS-CG-2011-46									X		
L91355-17	DUP9									X		
L91355-18	DUP3									X		
L91355-19	STS-CG-2011-49									X		
L91355-20	STS-CG-2011-50									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L91355 **CHAIN of CUSTODY**

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Report to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Copy of Report to:

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Invoice to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified. YES [X] NO [ ]

Are samples for CO DW Compliance Monitoring? If yes, please include state forms. Results will be reported to PQL. YES [ ] NO [X]

PROJECT INFORMATION

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	pH	Total CU					
STS-PCUG-2011-21	10.11.11 : 09:05"	SO	1	X	X	X					
STS-PCUG-2011-22	10.10.11 : 15:00"	SO	1	X	X	X					
STS-PCUG-2011-23	10.11.11 : 13:35"	SO	1	X	X	X					
STS-PCUG-2011-24	10.8.11 : 14:50"	SO	1	X	X	X					
STS-PCUG-2011-25	10.10.11 : 09:50"	SO	1	X	X	X					
DUP1	10.6.11 : ---"	SO	1	X	X	X					
DUP2	10.11.11 : ---"	SO	1	X	X	X					
STS-PCUG-2011-28	10.9.11 : 16:45"	SO	1	X	X	X					
STS-PCUG-2011-29	10.11.11 : 14:25"	SO	1	X	X	X					
STS-PCUG-2011-30	10.9.11 : 16:10"	SO	1	X	X	X					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
pH - 9045C and Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY	DATE:TIME	RECEIVED BY	DATE:TIME
[signature]	10.14.11 10:30	[signature] 10-18-11 9:42	

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L91355 Chain of Custody

1

ACZ Laboratories, Inc. L91355

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson

Company: Chino Mines Company

E-mail: Pamela_Pinson@FMI.com

Address: P.O. Box 10

Bayard, NM 88023

Telephone: 575-912-5213

Name: Matthew Barkley

Company: ARCADIS

E-mail: Matthew.Barkley@arcadis-us.com

Telephone: 303-231-9115 ext 157

Name: Pam Pinson

Company: Chino Mines Company

E-mail: Pamela_Pinson@FMI.com

Address: P.O. Box 10

Bayard, NM 88023

Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ✘ NO ☐

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES ☐ NO ✘

If yes, please include state forms. Results will be reported to PQL.

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	Total Copper	pH					
DUP7•	10.6.11 : ---"	SO	1	x	x						
STS-CG-2011-42	10.9.11 : 10:00"	SO	1	x	x						
STS-CG-2011-43•	10.6.11 : 16:00"	SO	1	x	x						
DUP8 •	10.7.11 : ---"	SO	1	x	x						
STS-CG-2011-45•	10.6.11 : 14:50"	SO	1	x	x						
STS-CG-2011-46	10.9.11 : 13:40"	SO	1	x	x						
DUP9 •	10.9.11 : ---"	SO	1	x	x						
DUP3 •	10.13.11 : --- "	SO	1	x	x	x					
STS-CG-2011-49•	10.9.11 : 11:55"	SO	1	x	x						
STS-CG-2011-50•	10.9.11 : 11:10"	SO	1	x	x						

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.

Methods:

Copper - 6010B

(2)

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY	DATE:TIME	RECEIVED BY	DATE:TIME
[signature]	10.14.11 10:3[illegible]		
		[signature]	10-15-11 9:2[illegible]

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

November 18, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L91357

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 18, 2011. This project has been assigned to ACZ's project number, L91357. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L91357. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 18, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed and approved this report.

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-01***
Sample ID:	STS-PCUG-2011-11	Date Sampled:	*10/13/11 17:30*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	254		*	mg/Kg	1	5	11/15/11 18:27	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.6		*	units	0.1	0.1	11/14/11 22:53	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.3		*	%	0.1	0.5	11/15/11 15:33	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:45	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 19:48	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:30	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-12

ACZ Sample ID: ***L91357-02***
Date Sampled: *10/12/11 12:20*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	536		*	mg/Kg	1	5	11/15/11 18:36	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	6.7		*	units	0.1	0.1	11/14/11 23:56	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.3		*	%	0.1	0.5	11/15/11 16:28	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:48	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 21:25	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:32	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-PCUG-2011-13
ACZ Sample ID:	***L91357-03***
Date Sampled:	*10/11/11 13:55*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	602		*	mg/Kg	1	5	11/15/11 18:39	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.1		*	units	0.1	0.1	11/15/11 0:59	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.2		*	%	0.1	0.5	11/15/11 17:24	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:51	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/14/11 23:02	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:35	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-14

ACZ Sample ID: ***L91357-04***
Date Sampled: *10/13/11 10:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	354		*	mg/Kg	1	5	11/15/11 18:42	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.9		*	units	0.1	0.1	11/15/11 2:03	thf
Solids, Percent	CLPSOW390, PART F, D-98	97.2		*	%	0.1	0.5	11/15/11 18:19	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:54	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 0:39	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:38	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-41

ACZ Sample ID: ***L91357-05***
Date Sampled: *10/13/11 08:40*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	587		*	mg/Kg	1	5	11/15/11 18:45	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	3.3		*	units	0.1	0.1	11/15/11 3:06	thf
Solids, Percent	CLPSOW390, PART F, D-98	96.7		*	%	0.1	0.5	11/15/11 19:14	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 14:58	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 2:16	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:41	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-06***
Sample ID:	STS-PCUG-2011-16	Date Sampled:	*10/09/11 12:55*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	864		*	mg/Kg	1	5	11/15/11 18:54	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.2		*	units	0.1	0.1	11/15/11 4:09	thf
Solids, Percent	CLPSOW390, PART F, D-98	89.1		*	%	0.1	0.5	11/15/11 20:10	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:01	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 3:53	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:44	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-17

ACZ Sample ID: ***L91357-07***
Date Sampled: *10/10/11 10:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	994		*	mg/Kg	1	5	11/15/11 18:57	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.1		*	units	0.1	0.1	11/15/11 5:12	thf
Solids, Percent	CLPSOW390, PART F, D-98	94.2		*	%	0.1	0.5	11/15/11 21:05	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:04	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 5:30	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:47	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-18

ACZ Sample ID: ***L91357-08***
Date Sampled: *10/09/11 14:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1540		*	mg/Kg	1	5	11/15/11 19:00	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.3		*	units	0.1	0.1	11/15/11 6:15	thf
Solids, Percent	CLPSOW390, PART F, D-98	93.3		*	%	0.1	0.5	11/15/11 22:00	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:08	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 7:07	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:49	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-PCUG-2011-19
ACZ Sample ID:	*L91357-09*
Date Sampled:	*10/06/11 12:00*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1210		*	mg/Kg	1	5	11/15/11 19:03	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	3.9		*	units	0.1	0.1	11/15/11 8:21	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.4		*	%	0.1	0.5	11/15/11 22:56	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:11	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 8:44	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:52	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-20

ACZ Sample ID: ***L91357-10***
Date Sampled: *10/12/11 15:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	520		*	mg/Kg	1	5	11/15/11 19:06	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.1		*	units	0.1	0.1	11/15/11 9:24	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.9		*	%	0.1	0.5	11/15/11 23:51	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:14	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 10:21	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:55	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-21
ACZ Sample ID:	***L91357-11***
Date Sampled:	*10/05/11 15:50*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	448		*	mg/Kg	1	5	11/15/11 19:09	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.4		*	%	0.1	0.5	11/16/11 0:46	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:18	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 10:58	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-12***
Sample ID:	STS-CG-2011-9	Date Sampled:	*10/04/11 12:50*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	646		*	mg/Kg	1	5	11/15/11 19:12	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/16/11 1:42	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:21	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:01	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-13***
Sample ID:	STS-CG-2011-10	Date Sampled:	*10/07/11 13:23*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1930		*	mg/Kg	1	5	11/15/11 19:15	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.8		*	%	0.1	0.5	11/16/11 2:37	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:24	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:04	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8		ACZ Sample ID:	***L91357-14***
Sample ID:	STS-CG-2011-24		Date Sampled:	*10/05/11 17:20*
			Date Received:	*10/18/11*
			Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	917		*	mg/Kg	1	5	11/15/11 19:21	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.4		*	%	0.1	0.5	11/16/11 3:32	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:28	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:07	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-25

ACZ Sample ID: ***L91357-15***
Date Sampled: *10/10/11 17:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1640		*	mg/Kg	1	5	11/15/11 19:31	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.0		*	%	0.1	0.5	11/16/11 4:28	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:31	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:09	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-26

ACZ Sample ID: ***L91357-16***

Date Sampled: *10/08/11 15:45*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	416		*	mg/Kg	1	5	11/15/11 19:34	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.4		*	%	0.1	0.5	11/16/11 5:23	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:34	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:12	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91357-17***
Sample ID:	STS-CG-2011-27	Date Sampled:	*10/08/11 10:00*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1870		*	mg/Kg	1	5	11/15/11 19:37	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.3		*	%	0.1	0.5	11/16/11 6:18	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:38	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:15	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-28
ACZ Sample ID:	***L91357-18***
Date Sampled:	*10/05/11 16:35*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	606		*	mg/Kg	1	5	11/15/11 19:40	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	88.2		*	%	0.1	0.5	11/16/11 7:14	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:41	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:18	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-29

ACZ Sample ID: ***L91357-19***
Date Sampled: *10/10/11 14:15*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1390		*	mg/Kg	1	5	11/15/11 19:43	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/16/11 8:09	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:44	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:21	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-30

ACZ Sample ID: ***L91357-20***
Date Sampled: *10/08/11 10:50*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	575		*	mg/Kg	1	5	11/15/11 19:46	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.0		*	%	0.1	0.5	11/16/11 9:04	thf/nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/10/11 15:48	thf/nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 11:00	ndj
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:24	thf

** Please refer to Qualifier Reports for details.*

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8

ACZ Project ID: ***L91357***

Copper, total (3050) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313604													
WG313604ICV	ICV	11/15/11 18:03	II111012-2	2		1.982	mg/L	99.1	90	110			
WG313604ICB	ICB	11/15/11 18:06				U	mg/L		-0.03	0.03			
WG313604PQV	PQV	11/15/11 18:09	II111024-4	.05		.046	mg/L	92	70	130			
WG313604ICSAB	ICSAB	11/15/11 18:12	II110922-1	.255		.264	mg/L	103.5	80	120			
WG313517PBS	PBS	11/15/11 18:18				U	mg/Kg		-3	3			
WG313517LCSS	LCSS	11/15/11 18:21	PCN38231	117		124.1	mg/Kg		98	136			
WG313517LCSSD	LCSSD	11/15/11 18:24	PCN38231	117		122.1	mg/Kg		98	136	1.6	20	
L91357-01MS	MS	11/15/11 18:30	II111104-3	50.5	254	286.6	mg/Kg	64.6	75	125			M3
L91357-01MSD	MSD	11/15/11 18:33	II111104-3	50.5	254	280.2	mg/Kg	51.9	75	125	2.26	20	M3
WG313604CCV1	CCV	11/15/11 18:48	II111031-1	1		.988	mg/L	98.8	90	110			
WG313604CCB1	CCB	11/15/11 18:51				U	mg/L		-0.03	0.03			
L91357-13SDL	SDL	11/15/11 19:18			1930	2042	mg/Kg				5.8	10	
WG313604CCV2	CCV	11/15/11 19:24	II111031-1	1		.964	mg/L	96.4	90	110			
WG313604CCB2	CCB	11/15/11 19:27				U	mg/L		-0.03	0.03			
WG313604CCV3	CCV	11/15/11 19:49	II111031-1	1		.981	mg/L	98.1	90	110			
WG313604CCB3	CCB	11/15/11 19:52				U	mg/L		-0.03	0.03			

pH, Saturated Paste USDA No. 60 (21A)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313553													
WG313553ICV	ICV	11/14/11 19:44	PCN36616	4		3.96	units	99	97	103			
L91312-01DUP	DUP	11/14/11 21:50			5.8	5.8	units				0	20	
WG313553CCV1	CCV	11/15/11 7:18	PCN36616	4		3.96	units	99	97	103			
WG313553CCV2	CCV	11/15/11 10:27	PCN36616	4		4.01	units	100.3	97	103			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313360													
WG313360PBS	PBS	11/15/11 14:38				U	%		99.9	100.1			
L91357-20DUP	DUP	11/16/11 10:00			93	92.77	%				0.2	20	

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91357-01	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-02	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-03	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-04	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-05	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-06	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-07	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-08	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-09	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-10	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-11	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-12	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-13	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-14	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91357-15	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-16	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-17	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-18	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-19	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91357-20	WG313604	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

pH, Saturated Paste	USDA No. 60 (21A)
Solids, Percent	CLPSOW390, PART F, D-98

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID:	L91357
Date Received:	10/18/2011 09:24
Received By:	ksj
Date Printed:	10/19/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3045		13.6	20
2316		13.3	22
3164		10.4	18
3282		9.2	18

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91357
Date Received: 10/18/2011 09:24
Received By: ksj
Date Printed: 10/19/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91357-01	STS-PCUG-2011-11									X		
L91357-02	STS-PCUG-2011-12									X		
L91357-03	STS-PCUG-2011-13									X		
L91357-04	STS-PCUG-2011-14									X		
L91357-05	STS-PCUG-2011-41									X		
L91357-06	STS-PCUG-2011-16									X		
L91357-07	STS-PCUG-2011-17									X		
L91357-08	STS-PCUG-2011-18									X		
L91357-09	STS-PCUG-2011-19									X		
L91357-10	STS-PCUG-2011-20									X		
L91357-11	STS-CG-2011-21									X		
L91357-12	STS-CG-2011-9									X		
L91357-13	STS-CG-2011-10									X		
L91357-14	STS-CG-2011-24									X		
L91357-15	STS-CG-2011-25									X		
L91357-16	STS-CG-2011-26									X		
L91357-17	STS-CG-2011-27									X		
L91357-18	STS-CG-2011-28									X		
L91357-19	STS-CG-2011-29									X		
L91357-20	STS-CG-2011-30									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L91357

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Copy of Report to:

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Invoice to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ✗ NO ☐
If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES ☐ NO ✗
If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

ANALYSES REQUESTED

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	pH	Total CU					
STS-PCUG-2011-11	10.13.11 : 17:30"	SO	1	✗	✗	✗					
STS-PCUG-2011-12•	10.12.11 : 12:20"	SO	1	✗	✗	✗					
STS-PCUG-2011-13•	10.11.11 : 13:55"	SO	1	✗	✗	✗					
STS-PCUG-2011-14	10.13.11 : 10:00"	SO	1	✗	✗	✗					
STS-PCUG-2011-41•	10.13.11 : 08:40"	SO	1	✗	✗	✗					
STS-PCUG-2011-16	10.9.11 : 12:55"	SO	1	✗	✗	✗					
STS-PCUG-2011-17	10.10.11 : 10:50"	SO	1	✗	✗	✗					
STS-PCUG-2011-18	10.9.11 : 14:50"	SO	1	✗	✗	✗					
STS-PCUG-2011-19•	10.6.11 : 12:00"	SQ	1	✗	✗	✗					
STS-PCUG-2011-20•	10.12.11 : 15:00"	SO	1	✗	✗	✗					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
pH - 9045C and Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY	DATE:TIME	RECEIVED BY	DATE:TIME
[signature]	10.14.11 10:30	[signature]	10-15-11 9:05

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L91357 Chain of Custody

(1)

ACZ Laboratories, Inc. L91357

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]

If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	Total Copper					
STS-CG-2011-21	10.5.11 : 15:50"	SO	1	x	x					
STS-CG-2011-9	10.4.11 : 12:50"	SO	1	x	x					
STS-CG-2011-10	10.7.11 : 13:23"	SO	1	x	x					
STS-CG-2011-24	10.5.11 : 17:20"	SO	1	x	x					
STS-CG-2011-25	10.10.11 : 17:00"	SO	1	x	x					
STS-CG-2011-26	10.8.11 : 15:45"	SO	1	x	x					
STS-CG-2011-27	10.8.11 : 10:00"	SO	1	x	x					
STS-CG-2011-28	10.5.11 : 16:35"	SO	1	x	x					
STS-CG-2011-29	10.10.11 : 14:15"	SO	1	x	x					
STS-CG-2011-30	10.8.11 : 10:50"	SO	1	x	x					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.

Methods:

Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY	DATE:TIME	RECEIVED BY	DATE:TIME
[signature]	10.14.11 10:30		
		[signature]	10/14/11 9:05

2

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

November 30, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L91358

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 18, 2011. This project has been assigned to ACZ's project number, L91358. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L91358. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 30, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed and approved this report.

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91358-01***
Sample ID:	STS-PH-2011-FID37	Date Sampled:	*10/11/11 09:45*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	654		*	mg/Kg	1	5	11/17/11 9:42	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	1	B		t CaCO3/Kt	1	5	11/30/11 10:13	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	1			t CaCO3/Kt	1	5	11/30/11 10:13	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	0			t CaCO3/Kt	1	5	11/30/11 10:13	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.1	B	*	%	0.1	0.5	11/17/11 0:07	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.6		*	units	0.1	0.1	11/21/11 19:53	bsu
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.03	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Pyritic Sulfide		0.01	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Sulfate			U	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Total		0.04	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Total Sulfur minus Sulfate		0.04	B	*	%	0.01	0.1	11/16/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:26	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 13:00	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 11:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:00	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 15:48	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 15:48	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-40

ACZ Sample ID: ***L91358-02***
Date Sampled: *10/13/11 13:55*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	312		*	mg/Kg	1	5	11/17/11 9:52	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	3.8		*	units	0.1	0.1	11/21/11 20:36	bsu
Solids, Percent	CLPSOW390, PART F, D-98	96.6		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:28	zsh
Digestion - Hot Plate	M3050B ICP							11/16/11 12:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:04	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 15:53	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 15:53	cra/thf

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91358-03***
Sample ID:	STS-PH-2011-FID101	Date Sampled:	*10/12/11 16:45*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	272		*	mg/Kg	1	5	11/17/11 10:01	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-4			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.2	B	*	%	0.1	0.5	11/17/11 4:37	brd
pH, Saturated Paste	USDA No. 60 (21A)	3.8		*	units	0.1	0.1	11/21/11 21:19	bsu
Solids, Percent	CLPSOW390, PART F, D-98	93.8		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.11		*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Pyritic Sulfide		0.02	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Sulfate		0.06	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/16/11 0:00	bsu
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	11/16/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:31	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 13:17	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 12:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:08	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 15:59	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 15:59	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91358-04***
Sample ID:	STS-PH-2011-REFPLOT3	Date Sampled:	*10/07/11 11:50*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1950		*	mg/Kg	1	5	11/17/11 10:04	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	3	B		t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	13			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	10			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1.3		*	%	0.1	0.5	11/17/11 2:26	brd
pH, Saturated Paste	USDA No. 60 (21A)	5.6		*	units	0.1	0.1	11/21/11 22:02	bsu
Solids, Percent	CLPSOW390, PART F, D-98	91.2		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.07	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Pyritic Sulfide		0.01	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Total		0.10		*	%	0.01	0.1	11/16/11 0:00	bsu
Total Sulfur minus Sulfate		0.08	B	*	%	0.01	0.1	11/16/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:33	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 13:35	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 12:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:13	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:05	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:05	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91358-05***
Sample ID:	STS-PH-2011-REFPLOT4	Date Sampled:	*10/06/11 10:39*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1130		*	mg/Kg	1	5	11/17/11 10:07	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	7			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-7			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/28/11 14:33	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.4		*	units	0.1	0.1	11/21/11 22:46	bsu
Solids, Percent	CLPSOW390, PART F, D-98	90.8		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.13		*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Pyritic Sulfide		0.03	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Sulfate		0.05	B	*	%	0.01	0.1	11/16/11 0:00	bsu
Sulfur Total		0.21		*	%	0.01	0.1	11/16/11 0:00	bsu
Total Sulfur minus Sulfate		0.16		*	%	0.01	0.1	11/16/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:35	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 13:52	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 13:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:17	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:10	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:10	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP11

ACZ Sample ID: ***L91358-06***
Date Sampled: *10/12/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	341		*	mg/Kg	1	5	11/17/11 10:14	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/17/11 6:35	brd
pH, Saturated Paste	USDA No. 60 (21A)	3.9		*	units	0.1	0.1	11/21/11 23:29	bsu
Solids, Percent	CLPSOW390, PART F, D-98	93.7		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.13		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.06	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:37	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 14:10	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 13:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:22	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:16	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:16	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID105

ACZ Sample ID: ***L91358-07***
Date Sampled: *10/06/11 13:30*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	668		*	mg/Kg	1	5	11/17/11 10:17	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	3	B		t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	8			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	5			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.8		*	%	0.1	0.5	11/17/11 8:32	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.9		*	units	0.1	0.1	11/22/11 0:12	bsu
Solids, Percent	CLPSOW390, PART F, D-98	91.1		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.07	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.01	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.10		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.08	B	*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:39	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 14:27	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 13:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:26	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:22	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:22	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP12

ACZ Sample ID: ***L91358-08***
Date Sampled: *10/13/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	467		*	mg/Kg	1	5	11/17/11 10:20	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	26			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	20			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	2.6		*	%	0.1	0.5	11/17/11 10:30	brd
pH, Saturated Paste	USDA No. 60 (21A)	6.3		*	units	0.1	0.1	11/22/11 0:55	bsu
Solids, Percent	CLPSOW390, PART F, D-98	95.3		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.12		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.03	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.04	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.15		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:42	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 14:45	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 14:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:30	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:27	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:27	cra/thf

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-REFPLOT1

ACZ Sample ID: ***L91358-09***
Date Sampled: *10/04/11 11:09*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	597		*	mg/Kg	1	5	11/17/11 10:23	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	2	B		t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	101			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	99			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	10.1		*	%	0.1	0.5	11/17/11 7:05	brd
pH, Saturated Paste	USDA No. 60 (21A)	7.5		*	units	0.1	0.1	11/22/11 1:39	bsu
Solids, Percent	CLPSOW390, PART F, D-98	92.7		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.06	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.05	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.05	B	*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:44	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 15:02	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 14:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:35	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:33	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:33	cra/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-REFPLOT2

ACZ Sample ID: ***L91358-10***

Date Sampled: *10/05/11 12:30*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	687		*	mg/Kg	1	5	11/17/11 10:26	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	0			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	11			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	11			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1.1		*	%	0.1	0.5	11/17/11 12:27	brd
pH, Saturated Paste	USDA No. 60 (21A)	6.0		*	units	0.1	0.1	11/22/11 2:22	bsu
Solids, Percent	CLPSOW390, PART F, D-98	91.9		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:46	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 15:20	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 14:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:39	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:39	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:39	cra/thf

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID22

ACZ Sample ID: ***L91358-11***
Date Sampled: *10/13/11 16:40*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	430			mg/Kg	1	5	11/17/11 10:29	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	16			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	10			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1.6		*	%	0.1	0.5	11/17/11 16:22	brd
pH, Saturated Paste	USDA No. 60 (21A)	6.2		*	units	0.1	0.1	11/22/11 3:49	bsu
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.11		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.04	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.04	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.15		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:48	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 15:37	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 15:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:44	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:44	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:44	cra/thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID10

ACZ Sample ID: ***L91358-12***

Date Sampled: *10/07/11 14:35*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2140		*	mg/Kg	1	5	11/17/11 10:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	3	B		t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	5			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	2			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.5	B	*	%	0.1	0.5	11/17/11 18:20	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.8		*	units	0.1	0.1	11/22/11 4:32	bsu
Solids, Percent	CLPSOW390, PART F, D-98	91.5		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.07	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.10		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.09	B	*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:50	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 15:55	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 15:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:48	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:50	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:50	cra/thf

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91358-13***
Sample ID:	STS-PH-2011-FID15	Date Sampled:	*10/10/11 11:50*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2260		*	mg/Kg	1	5	11/17/11 10:41	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-6			t CaCO3/Kt	1	5	11/30/11 10:14	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/17/11 20:17	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.8		*	units	0.1	0.1	11/22/11 5:15	bsu
Solids, Percent	CLPSOW390, PART F, D-98	92.8		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.13		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.04	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.19		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.17		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:53	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 16:12	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 15:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:53	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 16:56	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 16:56	cra/thf

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID16

ACZ Sample ID: ***L91358-14***
Date Sampled: *10/10/11 12:30*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2020		*	mg/Kg	1	5	11/17/11 10:44	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	5	B		t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-5			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/17/11 22:15	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.5		*	units	0.1	0.1	11/22/11 5:58	bsu
Solids, Percent	CLPSOW390, PART F, D-98	90.9		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.16		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.15		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:55	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 16:30	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 16:00	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 17:57	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 17:01	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 17:01	cra/thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91358-15***
Sample ID:	STS-PH-2011-FID17	Date Sampled:	*10/11/11 17:35*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	4220		*	mg/Kg	1	5	11/17/11 10:48	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	14			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	8			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-6			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.8		*	%	0.1	0.5	11/18/11 0:12	brd
pH, Saturated Paste	USDA No. 60 (21A)	6.0		*	units	0.1	0.1	11/22/11 6:42	bsu
Solids, Percent	CLPSOW390, PART F, D-98	94.0		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.21		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.18		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.06	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.45		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.39		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:57	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 16:47	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 16:20	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 18:01	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 17:07	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 17:07	cra/thf

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID18

ACZ Sample ID: ***L91358-16***
Date Sampled: *10/12/11 15:55*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	254		*	mg/Kg	1	5	11/17/11 10:51	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	5			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-5			t CaCO3/Kt	1	5	11/30/11 10:15	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	11/18/11 2:10	brd
pH, Saturated Paste	USDA No. 60 (21A)	4.3		*	units	0.1	0.1	11/22/11 7:25	bsu
Solids, Percent	CLPSOW390, PART F, D-98	96.5		*	%	0.1	0.5	11/16/11 16:00	ndj
Sulfur Forms	M600/2-78-054 3.2.4								
Sulfur Organic Residual		0.10		*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Pyritic Sulfide		0.06	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	11/17/11 0:00	bsu
Sulfur Total		0.17		*	%	0.01	0.1	11/17/11 0:00	bsu
Total Sulfur minus Sulfate		0.16		*	%	0.01	0.1	11/17/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 11:59	zsh
Crush and Pulverize	USDA No. 1, 1972							11/15/11 17:05	cra
Digestion - Hot Plate	M3050B ICP							11/16/11 16:40	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/21/11 18:06	bsu
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/15/11 17:13	cra/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/15/11 17:13	cra/thf

** Please refer to Qualifier Reports for details.*

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8

ACZ Project ID: ***L91358***

Copper, total (3050) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313764													
WG313764ICV	ICV	11/17/11 9:08	II111012-2	2		1.983	mg/L	99.2	90	110			
WG313764ICB	ICB	11/17/11 9:11				U	mg/L		-0.03	0.03			
WG313764PQV	PQV	11/17/11 9:15	II111024-4	.05		.052	mg/L	104	70	130			
WG313764ICSAB	ICSAB	11/17/11 9:18	II110922-1	.255		.244	mg/L	95.7	80	120			
WG313678PBS	PBS	11/17/11 9:24				U	mg/Kg		-3	3			
WG313678LCSS1	LCSS	11/17/11 9:27	PCN38231	117		120.3	mg/Kg		98	136			
WG313678LCSSD1	LCSSD	11/17/11 9:30	PCN38231	117		122	mg/Kg		98	136	1.4	20	
L91358-01MS	MS	11/17/11 9:46	II111115-2	50.5	654	690.1	mg/Kg	71.5	75	125			M3
L91358-01MSD	MSD	11/17/11 9:49	II111115-2	50.5	654	729.8	mg/Kg	150.1	75	125	5.59	20	M3
WG313764CCV1	CCV	11/17/11 9:55	II111031-1	1		.995	mg/L	99.5	90	110			
WG313764CCB1	CCB	11/17/11 9:58				U	mg/L		-0.03	0.03			
L91358-05SDL	SDL	11/17/11 10:10			1130	1187.5	mg/Kg				5.1	10	
WG313764CCV2	CCV	11/17/11 10:32	II111031-1	1		.989	mg/L	98.9	90	110			
WG313764CCB2	CCB	11/17/11 10:35				U	mg/L		-0.03	0.03			
WG313764CCV3	CCV	11/17/11 10:57	II111031-1	1		.989	mg/L	98.9	90	110			
WG313764CCB3	CCB	11/17/11 11:00				U	mg/L		-0.03	0.03			

Neutralization Potential as CaCO3 M600/2-78-054 3.2.3

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313690													
WG313690PBS	PBS	11/16/11 18:50				U	%		-0.1	0.1			
WG313690LCSS	LCSS	11/16/11 20:47	PCN33453	100		111.12	%	111.1	80	120			
L91597-04DUP	DUP	11/18/11 8:02			U	.13	%				200	20	RA
WG313692													
L91597-05DUP	DUP	11/17/11 16:23			5.1	5.07	%				0.6	20	
WG313692LCSS	LCSS	11/18/11 8:40	PCN33453	100		113.44	%	113.4	80	120			
WG313692PBS	PBS	11/18/11 11:00				U	%		-0.1	0.1			
WG314263													
L91350-09DUP	DUP	11/28/11 13:51			12.3	12.32	%				0.2	20	
WG314263LCSS	LCSS	11/28/11 16:39	PCN33453	100		108.26	%	108.3	80	120			
WG314263PBS	PBS	11/28/11 17:00				U	%		-0.1	0.1			

pH, Saturated Paste USDA No. 60 (21A)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314045													
WG314045ICV	ICV	11/21/11 19:09	PCN36616	4		4.01	units	100.3	97	103			
WG314045CCV1	CCV	11/22/11 3:05	PCN36616	4		4.02	units	100.5	97	103			
L91396-01DUP	DUP	11/22/11 8:51			7.2	7.67	units				6.3	20	
WG314045CCV2	CCV	11/22/11 9:35	PCN36616	4		4.09	units	102.3	97	103			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313740													
WG313740PBS	PBS	11/16/11 16:00				U	%		99.9	100.1			
L91358-13DUP	DUP	11/16/11 16:00			92.8	92.93	%				0.1	20	

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8

ACZ Project ID: ***L91358***

Sulfur Organic Residual M600/2-78-054 3.2.4

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313719													
L91358-01DUP	DUP	11/16/11 18:17			.03	.04	%				28.6	20	RA

Sulfur Pyritic Sulfide M600/2-78-054 3.2.4

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313719													
L91358-01DUP	DUP	11/16/11 18:17			.01	.02	%				66.7	20	RA

Sulfur Sulfate M600/2-78-054 3.2.4

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313719													
L91358-01DUP	DUP	11/16/11 18:17			U	U	%				0	20	RA

Sulfur Total M600/2-78-054 3.2.4

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313719													
WG313719PBS	PBS	11/16/11 14:00				U	%		-0.03	0.03			
WG313719LCSS	LCSS	11/16/11 15:25	PCN38174	4.07		4.13	%	101.5					
L91358-01DUP	DUP	11/16/11 18:17			.04	.05	%				22.2	20	RA

Total Sulfur Minus Sulfate M600/2-78-054 3.2.4

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313719													
L91358-01DUP	DUP	11/16/11 18:17			.04	.05	%				22.2	20	RA

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91358-01	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-02	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91358-03	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-04	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91358-05	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-06	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-07	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91358-08	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-09	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-10	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91358-11	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-12	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-13	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91358-14	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L91358-15	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

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ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91358-16	WG313764	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
	WG313690	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG313719	Sulfur Organic Residual	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Neutralization Potential as CaCO3	M600/2-78-054 3.2.3
pH, Saturated Paste	USDA No. 60 (21A)
Solids, Percent	CLPSOW390, PART F, D-98
Sulfur Organic Residual	M600/2-78-054 3.2.4
Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4
Sulfur Sulfate	M600/2-78-054 3.2.4
Sulfur Total	M600/2-78-054 3.2.4
Total Sulfur minus Sulfate	M600/2-78-054 3.2.4

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID:	L91358
Date Received:	10/18/2011 09:23
Received By:	ksj
Date Printed:	10/19/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3282		9.2	18
3164		10.4	18
3045		13.6	20

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.

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Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91358
Date Received: 10/18/2011 09:23
Received By: ksj
Date Printed: 10/19/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91358-01	STS-PH-2011-FID37									X		
L91358-02	STS-PCUG-2011-40									X		
L91358-03	STS-PH-2011-FID101									X		
L91358-04	STS-PH-2011-REFPLOT3									X		
L91358-05	STS-PH-2011-REFPLOT4									X		
L91358-06	DUP11									X		
L91358-07	STS-PH-2011-FID105									X		
L91358-08	DUP12									X		
L91358-09	STS-PH-2011-REFPLOT1									X		
L91358-10	STS-PH-2011-REFPLOT2									X		
L91358-11	STS-PH-2011-FID22									X		
L91358-12	STS-PH-2011-FID10									X		
L91358-13	STS-PH-2011-FID15									X		
L91358-14	STS-PH-2011-FID16									X		
L91358-15	STS-PH-2011-FID17									X		
L91358-16	STS-PH-2011-FID18									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L91358

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]
If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [X]
If yes, please include state forms. Results will be reported to PQL.

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	pH	Total CU	ABA				
STS-PH-2011-FID37	10.11.11 : 09:45"	SO	1	x	x	x	x				
STS-PCUG-2011-40	10.13.11 : 13:55"	SO	1	x	x	x					
STS-PH-2011-FID101	10.12.11 : 16:45"	SO	1	x	x	x	x				
STS-PH-2011-REFPLOT3	10.7.11 : 11:50"	SO	1	x	x	x	x				
STS-PH-2011-REFPLOT4	10.6.11 : 10:39"	SO	1	x	x	x	x				
DUP11	10.12.11 : ---"	SO	1	x	x	x	x				
STS-PH-2011-FID105	10.6.11 : 13:30"	SO	1	x	x	x	x				
DUP12	10.13.11 : --- "	SO	1	x	x	x	x				
STS-PH-2011-REFPLOT1	10.4.11 : 11:09"	SO	1	x	x	x	x				
STS-PH-2011-REFPLOT2	10.5.11 : 12:30"	SO	1	x	x	x	x				

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
pH - 9045C, Total Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY	DATE:TIME	RECEIVED BY	DATE:TIME
[signature]	10.14.11 10:30		
		[signature]	10-17-11 9:22

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L91358 Chain of Custody

(1)

ACZ Laboratories, Inc. L91358

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Copy of Report to:

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Invoice to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ✗ NO ☐

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES ☐ NO ✗

If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	pH	Total CU	ABA				
STS-PH-2011-FID22	10.13.11 : 16:40	SO	1	x	x	x	x				
mb ~~STS-PH-2011-FID8~~	~~10.12.11 : 15:55~~	~~SO~~	~~1~~	~~x~~	~~x~~	~~x~~	~~x~~				
STS-PH-2011-FID10	10.7.11 : 14:35	SO	1	x	x	x	x				
STS-PH-2011-FID15	10.10.11 : 11:50	SO	1	x	x	x	x				
STS-PH-2011-FID16	10.10.11 : 12:30	SO	1	x	x	x	x				
STS-PH-2011-FID17	10.11.11 : 17:35	SO	1	x	x	x	x				
STS-PH-2011-FID18	10.12.11 : 15:55	SO	1	x	x	x	x				

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.

Methods:

pH - 9045C, Total Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY	DATE:TIME	RECEIVED BY	DATE:TIME
[signature]	10.14.11 10:30	[signature]	10-18-11 9:14

2

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

November 21, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L91359

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 18, 2011. This project has been assigned to ACZ's project number, L91359. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L91359. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 21, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-11

ACZ Sample ID: ***L91359-01***
Date Sampled: *10/04/11 13:55*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1370		*	mg/Kg	1	5	11/15/11 20:31	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.0		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:00	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 15:08	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:50	thf

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-12

ACZ Sample ID: ***L91359-02***
Date Sampled: *10/07/11 15:15*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1670		*	mg/Kg	1	5	11/15/11 20:40	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.0		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:03	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 16:17	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:52	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-13

ACZ Sample ID: ***L91359-03***
Date Sampled: *10/04/11 14:25*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	906		*	mg/Kg	1	5	11/15/11 20:43	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.1		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:06	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 16:39	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:55	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-14

ACZ Sample ID:	***L91359-04***
Date Sampled:	*10/04/11 15:05*
Date Received:	*10/18/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	977		*	mg/Kg	1	5	11/15/11 20:46	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.5		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:09	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 17:02	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 11:58	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91359-05***
Sample ID:	STS-CG-2011-15	Date Sampled:	*10/07/11 16:05*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1790		*	mg/Kg	1	5	11/15/11 20:49	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.7		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:12	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 17:25	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:01	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91359-06***
Sample ID:	STS-CG-2011-17	Date Sampled:	*10/04/11 15:50*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	637		*	mg/Kg	1	5	11/15/11 20:58	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.3		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:15	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 17:48	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:04	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91359-07***
Sample ID:	STS-CG-2011-19	Date Sampled:	*10/05/11 15:05*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1050		*	mg/Kg	1	5	11/15/11 21:01	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.4		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:18	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 18:11	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:07	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-20

ACZ Sample ID: ***L91359-08***

Date Sampled: *10/08/11 16:40*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	555		*	mg/Kg	1	5	11/15/11 21:04	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.4		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:21	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 18:34	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:10	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-1

ACZ Sample ID: ***L91359-09***
Date Sampled: *10/13/11 10:45*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	263		*	mg/Kg	1	5	11/15/11 21:10	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	5.6		*	units	0.1	0.1	11/15/11 2:21	thf
Solids, Percent	CLPSOW390, PART F, D-98	96.4		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:24	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 18:57	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 1:52	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:13	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91359-10***
Sample ID:	STS-PCUG-2011-2	Date Sampled:	*10/12/11 11:15*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	876		*	mg/Kg	1	5	11/15/11 21:13	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	6.5		*	units	0.1	0.1	11/15/11 3:02	thf
Solids, Percent	CLPSOW390, PART F, D-98	95.6		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:27	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 19:19	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 2:48	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:15	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91359-11***
Sample ID:	STS-PCUG-2011-3	Date Sampled:	*10/12/11 09:30*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	587		*	mg/Kg	1	5	11/15/11 21:16	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.8		*	units	0.1	0.1	11/15/11 3:43	thf
Solids, Percent	CLPSOW390, PART F, D-98	91.0		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:30	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 19:42	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 3:44	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:18	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-4

ACZ Sample ID: ***L91359-12***
Date Sampled: *10/11/11 11:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	794		*	mg/Kg	1	5	11/15/11 21:19	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.6		*	units	0.1	0.1	11/15/11 4:24	thf
Solids, Percent	CLPSOW390, PART F, D-98	92.2		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:33	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 20:05	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 4:39	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:21	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-33

ACZ Sample ID: ***L91359-13***
Date Sampled: *10/13/11 12:15*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	273		*	mg/Kg	1	5	11/15/11 21:22	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	6.7		*	units	0.1	0.1	11/15/11 5:05	thf
Solids, Percent	CLPSOW390, PART F, D-98	95.8		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:36	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 20:28	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 5:35	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:24	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-7

ACZ Sample ID: ***L91359-14***
Date Sampled: *10/05/11 18:15*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	387		*	mg/Kg	1	5	11/15/11 21:25	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	7.7		*	units	0.1	0.1	11/15/11 5:46	thf
Solids, Percent	CLPSOW390, PART F, D-98	89.8		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:39	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 20:51	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 6:31	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:27	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8		ACZ Sample ID:	***L91359-15***
Sample ID:	STS-PCUG-2011-38		Date Sampled:	*10/13/11 15:55*
			Date Received:	*10/18/11*
			Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	350		*	mg/Kg	1	5	11/15/11 21:35	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	3.9		*	units	0.1	0.1	11/15/11 6:27	thf
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:42	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 21:14	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 7:26	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:30	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-39

ACZ Sample ID: ***L91359-16***
Date Sampled: *10/13/11 15:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	360		*	mg/Kg	1	5	11/15/11 21:38	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	4.7		*	units	0.1	0.1	11/15/11 7:08	thf
Solids, Percent	CLPSOW390, PART F, D-98	96.6		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:45	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 21:37	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 8:22	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:33	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-10

ACZ Sample ID: ***L91359-17***
Date Sampled: *10/13/11 11:20*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	324		*	mg/Kg	1	5	11/15/11 21:41	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Saturated Paste	USDA No. 60 (21A)	7.4		*	units	0.1	0.1	11/15/11 8:30	thf
Solids, Percent	CLPSOW390, PART F, D-98	96.1		*	%	0.1	0.5	11/16/11 16:00	ndj

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 14:48	mss2
Digestion - Hot Plate	M3050B ICP							11/14/11 21:59	mss2
Saturated Paste Extraction	USDA No. 60 (2)							11/15/11 9:18	thf
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:36	thf

** Please refer to Qualifier Reports for details.*

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company ACZ Project ID: ***L91359***
Project ID: ZN000000J8

Copper, total (3050) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313608													
WG313608ICV	ICV	11/15/11 20:07	II111012-2	2		1.969	mg/L	98.5	90	110			
WG313608ICB	ICB	11/15/11 20:10				U	mg/L		-0.03	0.03			
WG313608PQV	PQV	11/15/11 20:13	II111024-4	.05		.046	mg/L	92	70	130			
WG313608ICSAB	ICSAB	11/15/11 20:16	II110922-1	.255		.265	mg/L	103.9	80	120			
WG313533PBS	PBS	11/15/11 20:22				U	mg/Kg		-3	3			
WG313533LCSS	LCSS	11/15/11 20:25	PCN38231	117		120.4	mg/Kg		98	136			
WG313533LCSSD	LCSSD	11/15/11 20:28	PCN38231	117		121	mg/Kg		98	136	0.5	20	
L91359-01MS	MS	11/15/11 20:34	II111104-3	50.5	1370	1355.2	mg/Kg	-29.3	75	125			M3
L91359-01MSD	MSD	11/15/11 20:37	II111104-3	50.5	1370	1315.8	mg/Kg	-107.3	75	125	2.95	20	M3
WG313608CCV1	CCV	11/15/11 20:52	II111031-1	1		.995	mg/L	99.5	90	110			
WG313608CCB1	CCB	11/15/11 20:55				.013	mg/L		-0.03	0.03			
L91359-08SDL	SDL	11/15/11 21:07			555	576.5	mg/Kg				3.9	10	
WG313608CCV2	CCV	11/15/11 21:28	II111031-1	1		.966	mg/L	96.6	90	110			
WG313608CCB2	CCB	11/15/11 21:32				U	mg/L		-0.03	0.03			
WG313608CCV3	CCV	11/15/11 21:44	II111031-1	1		.971	mg/L	97.1	90	110			
WG313608CCB3	CCB	11/15/11 21:47				U	mg/L		-0.03	0.03			

pH, Saturated Paste USDA No. 60 (21A)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313542													
WG313542ICV	ICV	11/14/11 16:47	PCN36616	4		4.01	units	100.3	97	103			
L91355-01DUP	DUP	11/14/11 18:09			4.8	4.74	units				1.3	20	
WG313542CCV1	CCV	11/15/11 0:18	PCN36616	4		3.99	units	99.8	97	103			
WG313542CCV2	CCV	11/15/11 7:49	PCN36616	4		3.99	units	99.8	97	103			
WG313542CCV3	CCV	11/15/11 9:11	PCN36616	4		3.98	units	99.5	97	103			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313741													
WG313741PBS	PBS	11/16/11 16:00				U	%		99.9	100.1			
L91359-14DUP	DUP	11/16/11 16:00			89.8	90.14	%				0.4	20	

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91359-01	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-02	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-03	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-04	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-05	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-06	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-07	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-08	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-09	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-10	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-11	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-12	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-13	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-14	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91359-15	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-16	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91359-17	WG313608	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

pH, Saturated Paste	USDA No. 60 (21A)
Solids, Percent	CLPSOW390, PART F, D-98

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID:	L91359
Date Received:	10/18/2011 09:23
Received By:	ksj
Date Printed:	10/19/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3045		17.6	20
2316		13.3	22
3164		10.4	18
3282		9.2	18

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91359
Date Received: 10/18/2011 09:23
Received By: ksj
Date Printed: 10/19/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91359-01	STS-CG-2011-11									X		
L91359-02	STS-CG-2011-12									X		
L91359-03	STS-CG-2011-13									X		
L91359-04	STS-CG-2011-14									X		
L91359-05	STS-CG-2011-15									X		
L91359-06	STS-CG-2011-17									X		
L91359-07	STS-CG-2011-19									X		
L91359-08	STS-CG-2011-20									X		
L91359-09	STS-PCUG-2011-1									X		
L91359-10	STS-PCUG-2011-2									X		
L91359-11	STS-PCUG-2011-3									X		
L91359-12	STS-PCUG-2011-4									X		
L91359-13	STS-PCUG-2011-33									X		
L91359-14	STS-PCUG-2011-7									X		
L91359-15	STS-PCUG-2011-38									X		
L91359-16	STS-PCUG-2011-39									X		
L91359-17	STS-PCUG-2011-10									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L91359

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]
If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]
If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	Total Copper						
STS-CG-2011-11	10.4.11 : 13:55	SO	1	x	x						
STS-CG-2011-12	10.7.11 : 15:15	SO	1	x	x						
STS-CG-2011-13	10.4.11 : 14:25	SO	1	x	x						
STS-CG-2011-14	10.4.11 : 15:05	SO	1	x	x						
STS-CG-2011-15	10.7.11 : 16:05	SO	1	x	x						
~~STS-CG-2011-16~~	~~10.9.11 : 12:55~~	~~SO~~	~~1~~	~~x~~	~~x~~						
STS-CG-2011-17	10.4.11 : 15:50	SO	1	x	x						
~~STS-CG-2011-7~~	~~10.5.11 : 18:15~~	~~SO~~	~~1~~	~~x~~	~~x~~						
STS-CG-2011-19	10.5.11 : 15:05	SO	1	x	x						
STS-CG-2011-20	10.8.11 : 16:40	SO	1	x	x						

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY	DATE:TIME	RECEIVED BY	DATE:TIME
[signature]	10.14.11 10:30		
		[signature]	10/14/11 9:44

L91359 Chain of Custody

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc. L91359

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ✗ NO

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES NO ✗

If yes, please include state forms. Results will be reported to PQL.

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	pH	Total CU
STS-PCUG-2011-1	10.13.11 : 10:45"	SO	1	✗	✗	✗
STS-PCUG-2011-2	10.12.11 : 11:15"	SO	1	✗	✗	✗
STS-PCUG-2011-3	10.12.11 : 09:30"	SO	1	✗	✗	✗
STS-PCUG-2011-4	10.11.11 : 11:00"	SO	1	✗	✗	✗
~~STS-PCUG-2011-31~~	~~10.5.11 : 14:05'~~	~~SO~~	~~1~~	~~✗~~	~~✗~~	~~✗~~
STS-PCUG-2011-33	10.13.11 : 12:15"	SO	1	✗	✗	✗
STS-PCUG-2011-7	10.5.11 : 18:15"	SO	1	✗	✗	✗
STS-PCUG-2011-38	10.13.11 : 15:55"	SO	1	✗	✗	✗
STS-PCUG-2011-39	10.13.11 : 15:00"	SO	1	✗	✗	✗
STS-PCUG-2011-10	10.13.11 : 11:20"	SO	1	✗	✗	✗

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.

Methods:

pH - 9045C and Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10.14.11 10:30	[signature]	10-15-11 9:26

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

November 22, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L91360

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 18, 2011. This project has been assigned to ACZ's project number, L91360. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L91360. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after December 22, 2011. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91360-01***
Sample ID:	STS-CG-2011-31	Date Sampled:	*10/05/11 14:05*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1770		*	mg/Kg	1	5	11/15/11 12:34	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.6		*	%	0.1	0.5	11/21/11 17:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:00	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 15:20	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:39	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP5

ACZ Sample ID: ***L91360-02***
Date Sampled: *10/05/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	528		*	mg/Kg	1	5	11/15/11 12:43	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.4		*	%	0.1	0.5	11/21/11 19:02	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:06	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 16:40	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:41	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-33

ACZ Sample ID: ***L91360-03***

Date Sampled: *10/08/11 13:50*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	666		*	mg/Kg	1	5	11/15/11 12:46	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.2		*	%	0.1	0.5	11/21/11 20:02	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:13	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 18:00	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:44	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-34

ACZ Sample ID: ***L91360-04***
Date Sampled: *10/10/11 15:30*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1190		*	mg/Kg	1	5	11/15/11 12:49	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.4		*	%	0.1	0.5	11/21/11 21:03	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:20	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 18:26	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:47	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-35

ACZ Sample ID: ***L91360-05***
Date Sampled: *10/08/11 11:40*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	362		*	mg/Kg	1	5	11/15/11 12:53	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.2		*	%	0.1	0.5	11/21/11 22:04	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:26	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 18:53	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:50	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-36

ACZ Sample ID: ***L91360-06***

Date Sampled: *10/10/11 16:10*

Date Received: *10/18/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	507		*	mg/Kg	1	5	11/15/11 13:05	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.3		*	%	0.1	0.5	11/21/11 23:04	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:33	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 19:20	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:53	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP6

ACZ Sample ID: ***L91360-07***
Date Sampled: *10/05/11 00:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	613		*	mg/Kg	1	5	11/15/11 13:08	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	90.7		*	%	0.1	0.5	11/22/11 0:05	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:40	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 19:46	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:56	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91360-08***
Sample ID:	STS-CG-2011-38	Date Sampled:	*10/08/11 12:50*
		Date Received:	*10/18/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	633		*	mg/Kg	1	5	11/15/11 13:11	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	91.4		*	%	0.1	0.5	11/22/11 1:06	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:46	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 20:13	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 12:59	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-39

ACZ Sample ID: ***L91360-09***
Date Sampled: *10/09/11 08:35*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	682		*	mg/Kg	1	5	11/15/11 13:14	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	89.7		*	%	0.1	0.5	11/22/11 2:06	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 16:53	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 20:40	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 13:02	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-40

ACZ Sample ID: ***L91360-10***
Date Sampled: *10/06/11 17:00*
Date Received: *10/18/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	608		*	mg/Kg	1	5	11/15/11 13:17	aeb

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.0		*	%	0.1	0.5	11/22/11 3:07	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/11/11 17:00	nrc
Digestion - Hot Plate	M3050B ICP							11/14/11 21:06	mss2
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/14/11 13:04	thf

** Please refer to Qualifier Reports for details.*

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company ACZ Project ID: ***L91360***
Project ID: ZN000000J8

Copper, total (3050) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG313584													
WG313584ICV	ICV	11/15/11 12:09	II111012-2	2		1.967	mg/L	98.4	90	110			
WG313584ICB	ICB	11/15/11 12:12				U	mg/L		-0.03	0.03			
WG313584PQV	PQV	11/15/11 12:15	II111024-4	.05		.046	mg/L	92	70	130			
WG313584ICSAB	ICSAB	11/15/11 12:18	II110922-1	.255		.247	mg/L	96.9	80	120			
WG313530PBS	PBS	11/15/11 12:25				1.4	mg/Kg		-3	3			
WG313530LCSS	LCSS	11/15/11 12:28	PCN38231	117		117.4	mg/Kg		98	136			
WG313530LCSSD	LCSSD	11/15/11 12:31	PCN38231	117		112.2	mg/Kg		98	136	4.5	20	
L91360-01MS	MS	11/15/11 12:37	II111104-3	50.5	1770	1832.2	mg/Kg	123.2	75	125			
L91360-01MSD	MSD	11/15/11 12:40	II111104-3	50.5	1770	1611.5	mg/Kg	-313.9	75	125	12.82	20	M3
WG313584CCV1	CCV	11/15/11 12:56	II111031-1	1		.979	mg/L	97.9	90	110			
WG313584CCB1	CCB	11/15/11 12:59				U	mg/L		-0.03	0.03			
L91360-05SDL	SDL	11/15/11 13:02			362	377	mg/Kg				4.1	10	
WG313584CCV2	CCV	11/15/11 13:27	II111031-1	1		.975	mg/L	97.5	90	110			
WG313584CCB2	CCB	11/15/11 13:30				U	mg/L		-0.03	0.03			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314028													
WG314028PBS	PBS	11/21/11 16:00				U	%		99.9	100.1			
L91360-01DUP	DUP	11/21/11 18:01			90.6	90.08	%				0.6	20	

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91360-01	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-02	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-03	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-04	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-05	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-06	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-07	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-08	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-09	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91360-10	WG313584	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Certification Qualifiers

Freeport-McMoRan - Chino Mines Company

ACZ Project ID: ***L91360***

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.	
Solids, Percent	CLPSOW390, PART F, D-98

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91360
Date Received: 10/18/2011 09:23
Received By: ksj
Date Printed: 10/19/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3164		10.4	18
3045		13.6	20
2316		13.3	22

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.

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Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID:	L91360
Date Received:	10/18/2011 09:23
Received By:	ksj
Date Printed:	10/19/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91360-01	STS-CG-2011-31									X		
L91360-02	DUP5									X		
L91360-03	STS-CG-2011-33									X		
L91360-04	STS-CG-2011-34									X		
L91360-05	STS-CG-2011-35									X		
L91360-06	STS-CG-2011-36									X		
L91360-07	DUP6									X		
L91360-08	STS-CG-2011-38									X		
L91360-09	STS-CG-2011-39									X		
L91360-10	STS-CG-2011-40									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L91360

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Report to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Copy of Report to:

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Invoice to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [X]

If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	Total Copper						
STS-CG-2011-31	10.5.11 : 14:05"	SO	1	x	x						
DUP5	10.5.11 : ---"	SO	1	x	x						
STS-CG-2011-33	10.8.11 : 13:50"	SO	1	x	x						
STS-CG-2011-34	10.10.11 : 15:30"	SO	1	x	x						
STS-CG-2011-35	10.8.11 : 11:40"	SO	1	x	x						
STS-CG-2011-36	10.10.11 :16:10"	SO	1	x	x						
DUP6	10.5.11 : ---"	SO	1	x	x						
STS-CG-2011-38	10.8.11 : 12:50"	SO	1	x	x						
STS-CG-2011-39	10.9.11 : 08:35"	SO	1	x	x						
STS-CG-2011-40	10.6.11 : 17:00"	SO	1	x	x						

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.

Methods:

Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
[signature]	10-14-11 10:30	[signature]	10/15/11 9:15

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L91360 Chain of Custody

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

December 05, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L91526

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 26, 2011. This project has been assigned to ACZ's project number, L91526. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L91526. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 05, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed and approved this report.

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-27

ACZ Sample ID: ***L91526-01***
Date Sampled: *10/20/11 16:05*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	438			mg/Kg	1	5	11/28/11 21:40	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		6.9			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.7			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.3		*	%	0.1	0.5	11/29/11 13:02	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:00	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 14:45	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 10:52	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 14:45	mfm/thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-31

ACZ Sample ID: ***L91526-02***
Date Sampled: *10/19/11 10:50*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	304			mg/Kg	1	5	11/28/11 21:49	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.3			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.5			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.7		*	%	0.1	0.5	11/29/11 14:05	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:01	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 16:01	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 11:45	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 16:01	mfm/thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP4

ACZ Sample ID: ***L91526-03***
Date Sampled: *10/19/11 00:00*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	261			mg/Kg	1	5	11/28/11 21:52	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.2			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.3			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.7		*	%	0.1	0.5	11/29/11 15:08	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:03	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 17:18	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:02	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 17:18	mfm/thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-5

ACZ Sample ID: ***L91526-04***

Date Sampled: *10/20/11 13:25*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	458			mg/Kg	1	5	11/28/11 21:55	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.8			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.4			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	94.8		*	%	0.1	0.5	11/29/11 16:11	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:04	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 18:34	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:20	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 18:34	mfm/thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-05***
Sample ID:	STS-PCUG-2011-6	Date Sampled:	*10/18/11 10:55*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	290			mg/Kg	1	5	11/28/11 22:07	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.0			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.3			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/29/11 17:14	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:06	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 19:51	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:37	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 19:51	mfm/thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-8

ACZ Sample ID: ***L91526-06***
Date Sampled: *10/20/11 12:15*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	449			mg/Kg	1	5	11/28/11 22:10	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.8			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.4			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.4		*	%	0.1	0.5	11/29/11 18:17	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:07	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 21:07	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:55	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 21:07	mfm/thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-07***
Sample ID:	STS-PCUG-2011-9	Date Sampled:	*10/18/11 14:05*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	246			mg/Kg	1	5	11/28/11 22:13	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.8			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.3			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	97.9		*	%	0.1	0.5	11/29/11 19:19	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:09	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 22:24	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:12	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 22:24	mfm/thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-15

ACZ Sample ID: ***L91526-08***
Date Sampled: *10/18/11 10:15*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	357			mg/Kg	1	5	11/28/11 22:16	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.3			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.4			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.5		*	%	0.1	0.5	11/29/11 20:22	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:11	ndj
Crush and Pulverize	USDA No. 1, 1972							11/21/11 23:41	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:30	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/21/11 23:41	mfm/thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-09***
Sample ID:	STS-PH-2011-FID106	Date Sampled:	*10/18/11 12:05*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	254			mg/Kg	1	5	11/28/11 22:19	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Acid Generation Potential (calc on Sulfur total)	M600/2-78-054 1.3	1	B		t CaCO3/Kt	1	5	12/05/11 13:30	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	12/05/11 13:30	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-1			t CaCO3/Kt	1	5	12/05/11 13:30	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)		U	*	%	0.1	0.5	11/29/11 7:48	bsu
pH, Corrosivity	M9045D/M9040C								
pH		5.0			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.2			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.4		*	%	0.1	0.5	11/29/11 21:25	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.03	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur HNO3 Residue		0.03	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur Organic Residual Mod		0.03	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Sulfur Total		0.04	B	*	%	0.01	0.1	11/28/11 0:00	bsu
Total Sulfur minus Sulfate		0.03	B	*	%	0.01	0.1	11/28/11 0:00	bsu

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:12	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 0:57	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:47	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 0:57	mfm/thf
Sieve-250 um (60 mesh)	ASA No.9, 15-4.2.2							11/22/11 0:57	mfm/thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-32

ACZ Sample ID: ***L91526-10***

Date Sampled: *10/19/11 11:25*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	420			mg/Kg	1	5	11/28/11 22:22	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		3.8			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.3			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.6		*	%	0.1	0.5	11/29/11 22:28	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:14	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 2:14	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:05	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 2:14	mfm/thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-PCUG-2011-34
ACZ Sample ID:	***L91526-11***
Date Sampled:	*10/19/11 12:00*
Date Received:	*10/26/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	364			mg/Kg	1	5	11/28/11 22:25	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		4.0			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.0			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/29/11 23:31	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:15	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 3:30	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:22	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 3:30	mfm/thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-35

ACZ Sample ID: ***L91526-12***
Date Sampled: *10/18/11 13:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	287			mg/Kg	1	5	11/28/11 22:28	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.5			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		22.0			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	97.4		*	%	0.1	0.5	11/30/11 0:34	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:17	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 4:47	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:40	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 4:47	mfm/thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PCUG-2011-36

ACZ Sample ID: ***L91526-13***
Date Sampled: *10/18/11 12:40*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	270			mg/Kg	1	5	11/28/11 22:31	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		5.6			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		21.9			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	96.5		*	%	0.1	0.5	11/30/11 1:37	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:19	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 6:04	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:57	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 6:04	mfm/thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PCUG-2011-37

ACZ Sample ID: ***L91526-14***

Date Sampled: *10/19/11 10:05*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	244			mg/Kg	1	5	11/28/11 22:34	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
pH, Corrosivity	M9045D/M9040C								
pH		6.9			units	0.1	0.1	11/29/11 0:00	mss2
pH measured at		21.9			C	0.1	0.1	11/29/11 0:00	mss2
Solids, Percent	CLPSOW390, PART F, D-98	95.8		*	%	0.1	0.5	11/30/11 2:39	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:20	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 7:20	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:15	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 7:20	mfm/thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: DUP10

ACZ Sample ID: ***L91526-15***
Date Sampled: *10/19/11 00:00*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	248			mg/Kg	1	5	11/28/11 22:43	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.9		*	%	0.1	0.5	11/30/11 3:42	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:22	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 8:37	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:32	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 8:37	mfm/thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91526-16***
Sample ID:	STS-CG-2011-44	Date Sampled:	*10/20/11 11:25*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	761			mg/Kg	1	5	11/28/11 22:46	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.6		*	%	0.1	0.5	11/30/11 4:45	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:23	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 9:53	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:50	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 9:53	mfm/thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-47

ACZ Sample ID:	***L91526-17***
Date Sampled:	*10/20/11 14:30*
Date Received:	*10/26/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	472			mg/Kg	1	5	11/28/11 22:49	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.3		*	%	0.1	0.5	11/30/11 5:48	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:25	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 11:10	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:07	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 11:10	mfm/thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-48

ACZ Sample ID: ***L91526-18***
Date Sampled: *10/20/11 09:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1260			mg/Kg	1	5	11/28/11 22:52	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.8		*	%	0.1	0.5	11/30/11 6:51	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:26	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 12:26	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:25	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 12:26	mfm/thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-16
ACZ Sample ID:	***L91526-19***
Date Sampled:	*10/19/11 17:40*
Date Received:	*10/26/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	949			mg/Kg	1	5	11/28/11 22:55	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	92.6		*	%	0.1	0.5	11/30/11 7:54	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:28	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 13:43	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:42	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 13:43	mfm/thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-7

ACZ Sample ID: ***L91526-20***
Date Sampled: *10/19/11 15:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	627			mg/Kg	1	5	11/28/11 22:58	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.2		*	%	0.1	0.5	11/30/11 8:57	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:30	ndj
Crush and Pulverize	USDA No. 1, 1972							11/22/11 15:00	mfm/thf
Digestion - Hot Plate	M3050B ICP							11/23/11 17:00	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 15:00	mfm/thf

** Please refer to Qualifier Reports for details.*

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Inorganic Reference

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8

ACZ Project ID: ***L91526***

Copper, total (3050) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314273													
WG314273ICV	ICV	11/28/11 21:16	II111012-2	2		1.944	mg/L	97.2	90	110			
WG314273ICB	ICB	11/28/11 21:19				U	mg/L		-0.03	0.03			
WG314273PQV	PQV	11/28/11 21:22	II111128-2	.05		.051	mg/L	102	70	130			
WG314273ICSAB	ICSAB	11/28/11 21:25	II110922-1	.255		.261	mg/L	102.4	80	120			
WG314166PBS	PBS	11/28/11 21:31				U	mg/Kg		-3	3			
WG314166LCSS	LCSS	11/28/11 21:34	PCN38811	82.8		89.6	mg/Kg		64.2	101			
WG314166LCSSD	LCSSD	11/28/11 21:37	PCN38811	82.8		84.4	mg/Kg		64.2	101	6	20	
L91526-01MS	MS	11/28/11 21:43	II111115-2	50.5	438	496	mg/Kg	114.9	75	125			
L91526-01MSD	MSD	11/28/11 21:46	II111115-2	50.5	438	484.2	mg/Kg	91.5	75	125	2.41	20	
L91526-04SDL	SDL	11/28/11 21:58			458	498	mg/Kg				8.7	10	
WG314273CCV1	CCV	11/28/11 22:01	II111031-1	1		.991	mg/L	99.1	90	110			
WG314273CCB1	CCB	11/28/11 22:04				U	mg/L		-0.03	0.03			
WG314273CCV2	CCV	11/28/11 22:37	II111031-1	1		.997	mg/L	99.7	90	110			
WG314273CCB2	CCB	11/28/11 22:40				U	mg/L		-0.03	0.03			
WG314273CCV3	CCV	11/28/11 23:01	II111031-1	1		1.018	mg/L	101.8	90	110			
WG314273CCB3	CCB	11/28/11 23:04				.023	mg/L		-0.03	0.03			

Neutralization Potential as CaCO3 M600/2-78-054 3.2.3 - Modified (No Heat)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314242													
WG314242PBS	PBS	11/29/11 4:42				U	%		-0.1	0.1			
WG314242LCSS	LCSS	11/29/11 6:15	PCN33453	100		100.04	%	100	80	120			
L91526-09DUP	DUP	11/29/11 9:21			U	U	%				0	20	RA

Ph M9045D/M9040C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314357													
WG314357ICV	ICV	11/29/11 16:18	PCN37501	4		4.06	units	101.5	97	103			
L91526-01DUP	DUP	11/29/11 16:30			6.9	6.89	units				0.1	20	
WG314357CCV1	CCV	11/29/11 17:24	PCN37501	4		4.04	units	101	97	103			
WG314357CCV2	CCV	11/29/11 18:00	PCN37501	4		4.03	units	100.8	97	103			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314188													
WG314188PBS	PBS	11/29/11 12:00				U	%		99.9	100.1			
L91526-20DUP	DUP	11/30/11 9:59			95.2	95.64	%				0.5	20	

Sulfur Organic Residual Mod M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314230													
L91526-09DUP	DUP	11/29/11 0:19			.03	.01	%				100	20	RA

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8

ACZ Project ID: ***L91526***

Sulfur Pyritic Sulfide M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314230													
L91526-09DUP	DUP	11/29/11 0:19			U	.03	%				200	20	RA

Sulfur Sulfate M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314230													
L91526-09DUP	DUP	11/29/11 0:19			.01	.01	%				0	20	RA

Sulfur Total M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314230													
WG314230PBS	PBS	11/28/11 12:00				U	%		-0.03	0.03			
WG314230LCSS	LCSS	11/28/11 16:06	PCN38175	4.07		3.98	%	97.8					
L91526-09DUP	DUP	11/29/11 0:19			.04	.05	%				22.2	20	RA

Total Sulfur Minus Sulfate M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314230													
L91526-09DUP	DUP	11/29/11 0:19			.03	.04	%				28.6	20	RA

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91526-09	WG314242	Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG314230	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Neutralization Potential as CaCO3	M600/2-78-054 3.2.3 - Modified (No Heat)
Solids, Percent	CLPSOW390, PART F, D-98
Sulfur HCl Residue	M600/2-78-054 3.2.4-MOD
Sulfur HNO3 Residue	M600/2-78-054 3.2.4-MOD
Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD
Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD
Sulfur Sulfate	M600/2-78-054 3.2.4-MOD
Sulfur Total	M600/2-78-054 3.2.4-MOD
Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91526
Date Received: 10/26/2011 09:47
Received By: ksj
Date Printed: 10/27/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3139		6.4	20
2638		8.5	23
3325		8.4	19

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91526
Date Received: 10/26/2011 09:47
Received By: ksj
Date Printed: 10/27/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91526-01	STS-PCUG-2011-27									X		
L91526-02	STS-PCUG-2011-31									X		
L91526-03	DUP4									X		
L91526-04	STS-PCUG-2011-5									X		
L91526-05	STS-PCUG-2011-6									X		
L91526-06	STS-PCUG-2011-8									X		
L91526-07	STS-PCUG-2011-9									X		
L91526-08	STS-PCUG-2011-15									X		
L91526-09	STS-PH-2011-FID106									X		
L91526-10	STS-PCUG-2011-32									X		
L91526-11	STS-PCUG-2011-34									X		
L91526-12	STS-PCUG-2011-35									X		
L91526-13	STS-PCUG-2011-36									X		
L91526-14	STS-PCUG-2011-37									X		
L91526-15	DUP10									X		
L91526-16	STS-CG-2011-44									X		
L91526-17	STS-CG-2011-47									X		
L91526-18	STS-CG-2011-48									X		
L91526-19	STS-CG-2011-16									X		
L91526-20	STS-CG-2011-7									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L91526

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]
If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]
If yes, please include state forms. Results will be reported to PQL.

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	pH	Total CU					
STS-PCUG-2011-27	10.20.11 - 16:05'	SO	1	x	x	x					
STS-PCUG-2011-31	10.19.11 - 10:50'	SO	1	x	x	x					
DUP4	10.19.11 - ---'	SO	1	x	x	x					
STS-PCUG-2011-5	10.20.11 - 13:25'	SO	1	x	x	x					
STS-PCUG-2011-6	10.18.11 - 10:55'	SO	1	x	x	x					
STS-PCUG-2011-8	10.20.11 - 12:15'	SO	1	x	x	x					
STS-PCUG-2011-9	10.18.11 - 14:05'	SO	1	x	x	x					
STS-PCUG-2011-15	10.18.11 - 10:15'	SO	1	x	x	x					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
pH - 9045C and Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10-24-11 1500		
		[signature]	10-26-11 9:49

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L91526 Chain of Custody

ACZ Laboratories, Inc. L91526

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Copy of Report to:

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Invoice to:

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]
If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]
If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION — **ANALYSES REQUESTED**

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	soil sieved to < 2mm	pH	Total CU	ABA				
STS-PH-2011-FID106	10.18.11 - 12:05'	SO	1	x	x	x	x				
STS-PCUG-2011-32	10.19.11 - 11:25'	SO	1	x	x	x					
STS-PCUG-2011-34	10.19.11 - 12:00'	SO	1	x	x	x					
STS-PCUG-2011-35	10.18.11 - 13:30'	SO	1	x	x	x					
STS-PCUG-2011-36	10.18.11 - 12:40'	SO	1	x	x	x					
STS-PCUG-2011-37	10.19.11 - 10:05'	SO	1	x	x	x					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
pH - 9045C and Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY	DATE:TIME	RECEIVED BY	DATE:TIME
[signature] 10.24.11	1500	[signature] 10.26.11	9:47

2

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc. L91526

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
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Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]

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Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]

If yes, please include state forms. Results will be reported to PQL.

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	Total Copper						
DUP10	10.19.11 - ---'	SO	1	x	x						
STS-CG-2011-44	10.20.11 - 11:25'	SO	1	x	x						
STS-CG-2011-47	10.20.11 - 14:30'	SO	1	x	x						
STS-CG-2011-48	10.20.11 - 09:30'	SO	1	x	x						
STS-CG-2011-16	10.19.11 - 17:40'	SO	1	x	x						
STS-CG-2011-7	10.19.11 - 15:30'	SO	1	x	x						

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10-24-11 1600	[signature]	10-26-11 9:40

3

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

December 02, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L91527

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 26, 2011. This project has been assigned to ACZ's project number, L91527. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L91527. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 02, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-51

ACZ Sample ID: ***L91527-01***
Date Sampled: *10/20/11 14:50*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	463		*	mg/Kg	1	5	11/28/11 23:44	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.5		*	%	0.1	0.5	11/29/11 16:51	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:00	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:00	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 11:52	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:00	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-52

ACZ Sample ID: ***L91527-02***

Date Sampled: *10/20/11 10:00*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	780		*	mg/Kg	1	5	11/28/11 23:53	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.8		*	%	0.1	0.5	11/29/11 17:42	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:03	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:03	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 12:45	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:03	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-03***
Sample ID:	STS-CG-2011-53	Date Sampled:	*10/20/11 15:20*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	426		*	mg/Kg	1	5	11/28/11 23:56	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.6		*	%	0.1	0.5	11/29/11 18:34	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:06	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:06	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:02	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:06	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-54

ACZ Sample ID: ***L91527-04***
Date Sampled: *10/20/11 16:40*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1100		*	mg/Kg	1	5	11/28/11 23:59	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.9		*	%	0.1	0.5	11/29/11 19:25	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:09	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:09	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:20	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:09	thf

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-55

ACZ Sample ID: ***L91527-05***

Date Sampled: *10/20/11 15:40*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	633		*	mg/Kg	1	5	11/29/11 0:11	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.5		*	%	0.1	0.5	11/29/11 20:17	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:12	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:12	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:37	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:12	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-CG-2011-56
ACZ Sample ID:	***L91527-06***
Date Sampled:	*10/20/11 16:55*
Date Received:	*10/26/11*
Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	177		*	mg/Kg	1	5	11/29/11 0:14	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	97.6		*	%	0.1	0.5	11/29/11 21:08	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:15	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:15	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 13:55	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:15	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-07***
Sample ID:	STS-CG-2011-57	Date Sampled:	*10/20/11 17:10*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	434		*	mg/Kg	1	5	11/29/11 0:17	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.7		*	%	0.1	0.5	11/29/11 22:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:18	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:18	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:12	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:18	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-32

ACZ Sample ID: ***L91527-08***
Date Sampled: *10/20/11 10:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1500		*	mg/Kg	1	5	11/29/11 0:20	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.9		*	%	0.1	0.5	11/29/11 22:51	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:22	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:22	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:30	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:22	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-37

ACZ Sample ID: ***L91527-09***
Date Sampled: *10/20/11 11:00*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1560		*	mg/Kg	1	5	11/29/11 0:23	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.4		*	%	0.1	0.5	11/29/11 23:42	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:25	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:25	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 14:47	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:25	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-10***
Sample ID:	STS-CG-2011-41	Date Sampled:	*10/20/11 14:15*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	321		*	mg/Kg	1	5	11/29/11 0:26	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.9		*	%	0.1	0.5	11/30/11 0:34	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:28	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:28	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:05	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:28	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-11***
Sample ID:	STS-CG-2011-1	Date Sampled:	*10/19/11 14:40*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	274		*	mg/Kg	1	5	11/29/11 0:29	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.9		*	%	0.1	0.5	11/30/11 1:25	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:31	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:31	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:22	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:31	thf

** Please refer to Qualifier Reports for details.*

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-2

ACZ Sample ID: ***L91527-12***
Date Sampled: *10/19/11 14:15*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	288		*	mg/Kg	1	5	11/29/11 0:32	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.9		*	%	0.1	0.5	11/30/11 2:17	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:34	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:34	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:40	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:34	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-13***
Sample ID:	STS-CG-2011-3	Date Sampled:	*10/19/11 13:20*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	573		*	mg/Kg	1	5	11/29/11 0:35	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.6		*	%	0.1	0.5	11/30/11 3:08	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:37	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:37	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 15:57	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:37	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-4

ACZ Sample ID: ***L91527-14***
Date Sampled: *10/19/11 13:35*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	337		*	mg/Kg	1	5	11/29/11 0:38	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.1		*	%	0.1	0.5	11/30/11 4:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:40	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:40	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:15	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:40	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-15***
Sample ID:	STS-CG-2011-5	Date Sampled:	*10/19/11 16:05*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	309		*	mg/Kg	1	5	11/29/11 0:47	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.4		*	%	0.1	0.5	11/30/11 4:51	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:44	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:44	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:32	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:44	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L91527-16***
Sample ID:	STS-CG-2011-6	Date Sampled:	*10/19/11 15:45*
		Date Received:	*10/26/11*
		Sample Matrix:	*Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	316		*	mg/Kg	1	5	11/29/11 0:50	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.7		*	%	0.1	0.5	11/30/11 5:42	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:47	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:47	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 16:50	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:47	thf

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-18

ACZ Sample ID: ***L91527-17***
Date Sampled: *10/20/11 08:30*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1640		*	mg/Kg	1	5	11/29/11 0:53	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	93.7		*	%	0.1	0.5	11/30/11 6:34	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:50	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:50	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 17:07	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:50	thf

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-8

ACZ Sample ID: ***L91527-18***
Date Sampled: *10/19/11 15:10*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	490		*	mg/Kg	1	5	11/29/11 0:56	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	95.5		*	%	0.1	0.5	11/30/11 7:25	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:53	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:53	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 17:25	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:53	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-CG-2011-22

ACZ Sample ID: ***L91527-19***

Date Sampled: *10/20/11 08:05*

Date Received: *10/26/11*

Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	1560		*	mg/Kg	1	5	11/29/11 0:59	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	94.4		*	%	0.1	0.5	11/30/11 8:17	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:56	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:56	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 17:42	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:56	thf

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-CG-2011-23

ACZ Sample ID: ***L91527-20***
Date Sampled: *10/19/11 18:20*
Date Received: *10/26/11*
Sample Matrix: *Soil*

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Copper, total (3050)	M6010B ICP	2070		*	mg/Kg	1	5	11/29/11 1:02	jjc

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Solids, Percent	CLPSOW390, PART F, D-98	96.3		*	%	0.1	0.5	11/30/11 9:08	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							11/15/11 16:59	nrc
Crush and Pulverize	USDA No. 1, 1972							11/22/11 14:59	thf
Digestion - Hot Plate	M3050B ICP							11/23/11 18:00	nrc
Sieve-2000 um (2.0mm)	ASA No.9, 15-4.2.2							11/22/11 14:59	thf

** Please refer to Qualifier Reports for details.*

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)	*LCSWD*	Laboratory Control Sample - Water Duplicate
ASD	Analytical Spike (Post Digestion) Duplicate	*LFB*	Laboratory Fortified Blank
CCB	Continuing Calibration Blank	*LFM*	Laboratory Fortified Matrix
CCV	Continuing Calibration Verification standard	*LFMD*	Laboratory Fortified Matrix Duplicate
DUP	Sample Duplicate	*LRB*	Laboratory Reagent Blank
ICB	Initial Calibration Blank	*MS*	Matrix Spike
ICV	Initial Calibration Verification standard	*MSD*	Matrix Spike Duplicate
ICSAB	Inter-element Correction Standard - A plus B solutions	*PBS*	Prep Blank - Soil
LCSS	Laboratory Control Sample - Soil	*PBW*	Prep Blank - Water
LCSSD	Laboratory Control Sample - Soil Duplicate	*PQV*	Practical Quantitation Verification standard
LCSW	Laboratory Control Sample - Water	*SDL*	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4)	An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company ACZ Project ID: ***L91527***
Project ID: ZN000000J8

Copper, total (3050) M6010B ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314276													
WG314276ICV	ICV	11/28/11 23:19	II111012-2	2		1.947	mg/L	97.4	90	110			
WG314276ICB	ICB	11/28/11 23:22				U	mg/L		-0.03	0.03			
WG314276PQV	PQV	11/28/11 23:25	II111128-2	.05		.043	mg/L	86	70	130			
WG314276ICSAB	ICSAB	11/28/11 23:28	II110922-1	.255		.249	mg/L	97.6	80	120			
WG314176PBS	PBS	11/28/11 23:35				U	mg/Kg		-3	3			
WG314176LCSS	LCSS	11/28/11 23:38	PCN38811	82.8		90.5	mg/Kg		64.2	101			
WG314176LCSSD	LCSSD	11/28/11 23:41	PCN38811	82.8		91.2	mg/Kg		64.2	101	0.8	20	
L91527-01MS	MS	11/28/11 23:47	II111115-2	50.5	463	500.5	mg/Kg	74.3	75	125			M3
L91527-01MSD	MSD	11/28/11 23:50	II111115-2	50.5	463	470.3	mg/Kg	14.5	75	125	6.22	20	M3
L91527-04SDL	SDL	11/29/11 0:02			1100	1155	mg/Kg				5	10	
WG314276CCV1	CCV	11/29/11 0:05	II111031-1	1		.979	mg/L	97.9	90	110			
WG314276CCB1	CCB	11/29/11 0:08				U	mg/L		-0.03	0.03			
WG314276CCV2	CCV	11/29/11 0:41	II111031-1	1		.982	mg/L	98.2	90	110			
WG314276CCB2	CCB	11/29/11 0:44				.013	mg/L		-0.03	0.03			
WG314276CCV3	CCV	11/29/11 1:05	II111031-1	1		1.023	mg/L	102.3	90	110			
WG314276CCB3	CCB	11/29/11 1:08				.027	mg/L		-0.03	0.03			

Solids, Percent CLPSOW390, PART F, D-98

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG314345													
WG314345PBS	PBS	11/29/11 16:00				U	%		99.9	100.1			
L91527-20DUP	DUP	11/30/11 10:00			96.3	96.29	%				0	20	

Freeport-McMoRan - Chino Mines Company ACZ Project ID: ***L91527***

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91527-01	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-02	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-03	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-04	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-05	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-06	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-07	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-08	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-09	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-10	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-11	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-12	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-13	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-14	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L91527-15	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-16	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-17	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-18	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-19	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.
L91527-20	WG314276	Copper, total (3050)	M6010B ICP	M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The recovery of the associated control sample (LCS or LFB) was acceptable.

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.	
Solids, Percent	CLPSOW390, PART F, D-98

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91527
Date Received: 10/26/2011 09:46
Received By: ksj
Date Printed: 10/27/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3139		6.4	20
2638		8.5	23
3325		8.4	19

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91527
Date Received: 10/26/2011 09:46
Received By: ksj
Date Printed: 10/27/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91527-01	STS-CG-2011-51									X		
L91527-02	STS-CG-2011-52									X		
L91527-03	STS-CG-2011-53									X		
L91527-04	STS-CG-2011-54									X		
L91527-05	STS-CG-2011-55									X		
L91527-06	STS-CG-2011-56									X		
L91527-07	STS-CG-2011-57									X		
L91527-08	STS-CG-2011-32									X		
L91527-09	STS-CG-2011-37									X		
L91527-10	STS-CG-2011-41									X		
L91527-11	STS-CG-2011-1									X		
L91527-12	STS-CG-2011-2									X		
L91527-13	STS-CG-2011-3									X		
L91527-14	STS-CG-2011-4									X		
L91527-15	STS-CG-2011-5									X		
L91527-16	STS-CG-2011-6									X		
L91527-17	STS-CG-2011-18									X		
L91527-18	STS-CG-2011-8									X		
L91527-19	STS-CG-2011-22									X		
L91527-20	STS-CG-2011-23									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

ACZ Laboratories, Inc. L91527

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]
If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [X]
If yes, please include state forms. Results will be reported to PQL.

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	Total Copper						
STS-CG-2011-51	10.20.11 - 14:50'	SO	1	X	X						
STS-CG-2011-52	10.20.11 - 10:00'	SO	1	X	X						
STS-CG-2011-53	10.20.11 - 15:20'	SO	1	X	X						
STS-CG-2011-54	10.20.11 - 16:40'	SO	1	X	X						
STS-CG-2011-55	10.20.11 - 15:40'	SO	1	X	X						
STS-CG-2011-56	10.20.11 - 16:55'	SO	1	X	X						
STS-CG-2011-57	10.20.11 - 17:10'	SO	1	X	X						
STS-CG-2011-32	10.20.11 - 10:30'	SO	1	X	X						
STS-CG-2011-37	10.20.11 - 11:00'	SO	1	X	X						
STS-CG-2011-41	10.20.11 - 14:15'	SO	1	X	X						

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10.24.11 1500		
		[signature] 10/26/11 9:47	

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L91527 Chain of Custody

ACZ Laboratories, Inc. L91527

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [X] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [X]

If yes, please include state forms. Results will be reported to PQL.

PROJECT INFORMATION

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	Total Copper					
STS-CG-2011-1	10.19.11 - 14:40'	SO	1	X	X					
STS-CG-2011-2	10.19.11 - 14:15'	SO	1	X	X					
STS-CG-2011-3	10.19.11 - 13:20'	SO	1	X	X					
STS-CG-2011-4	10.19.11 - 13:35'	SO	1	X	X					
STS-CG-2011-5	10.19.11 - 16:05'	SO	1	X	X					
STS-CG-2011-6	10.19.11 - 15:45'	SO	1	X	X					
STS-CG-2011-18	10.20.11 - 08:30'	SO	1	X	X					
STS-CG-2011-8	10.19.11 - 15:10'	SO	1	X	X					
STS-CG-2011-22	10.20.11 - 08:05'	SO	1	X	X					
STS-CG-2011-23	10.19.11 - 18:20'	SO	1	X	X					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10.24.11 1500		
		[signature]	

2

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Analytical Report

December 15, 2011

Report to:
Pam Pinson
Freeport-McMoRan - Chino Mines Company
PO Box 10
Bayard, NM 88023

Bill to:
Accounts Payable
Freeport-McMoRan - Chino Mines Company
P.O. Box 13308
Phoenix, AZ 85002-3308

cc: Matthew Barkley, Sheri Fling

Project ID: ZN000000J8
ACZ Project ID: L92172

Pam Pinson:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on December 02, 2011. This project has been assigned to ACZ's project number, L92172. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan. The enclosed results relate only to the samples received under L92172. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after January 15, 2012. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than $10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.

S. Habermehl

Scott Habermehl has reviewed
and approved this report.

ACCREDITED IN ACCORDANCE WITH nelac

ACIL

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L92172-01***
Sample ID:	STS-PH-2011-FID37	Date Sampled:	*10/11/11 09:45*
		Date Received:	*12/02/11*
		Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.05	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.03	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Sulfate			U	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Total		0.05	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.05	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID101

ACZ Sample ID: ***L92172-02***
Date Sampled: *10/12/11 16:45*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.15		*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.13		*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Sulfate		0.06	B	*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Sulfur Total		0.21		*	%	0.01	0.1	12/12/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.15		*	%	0.01	0.1	12/12/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-PH-2011-REFPLOT3
ACZ Sample ID:	***L92172-03***
Date Sampled:	*10/07/11 11:50*
Date Received:	*12/02/11*
Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.07	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.07	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.16		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L92172-04***
Sample ID:	STS-PH-2011-REFPLOT4	Date Sampled:	*10/06/11 10:39*
		Date Received:	*12/02/11*
		Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.18		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.14		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.23		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.18		*	%	0.01	0.1	12/13/11 0:00	bsu/brd

ACZ Laboratories, Inc.
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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID105

ACZ Sample ID: ***L92172-05***

Date Sampled: *10/06/11 13:30*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.10		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-REFPLOT1

ACZ Sample ID: ***L92172-06***
Date Sampled: *10/04/11 11:09*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.03	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.04	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L92172-07***
Sample ID:	STS-PH-2011-REFPLOT2	Date Sampled:	*10/05/11 12:30*
		Date Received:	*12/02/11*
		Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate			U	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L92172-08***
Sample ID:	STS-PH-2011-FID22	Date Sampled:	*10/13/11 16:40*
		Date Received:	*12/02/11*
		Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.23		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.03	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.03	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.20		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.05	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.28		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.23		*	%	0.01	0.1	12/13/11 0:00	bsu/brd

Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8
Sample ID:	STS-PH-2011-FID10
ACZ Sample ID:	***L92172-09***
Date Sampled:	*10/07/11 14:35*
Date Received:	*12/02/11*
Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.07	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.11		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.09	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd

* *Please refer to Qualifier Reports for details.*

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L92172-10***
Sample ID:	STS-PH-2011-FID15	Date Sampled:	*10/10/11 11:50*
		Date Received:	*12/02/11*
		Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.19		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.17		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.21		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.19		*	%	0.01	0.1	12/13/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID16

ACZ Sample ID: ***L92172-11***
Date Sampled: *10/10/11 12:30*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.13		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.14		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.14		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Sulfate		0.13		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Sulfur Total		0.26		*	%	0.01	0.1	12/13/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	12/13/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID17

ACZ Sample ID: ***L92172-12***
Date Sampled: *10/11/11 17:35*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.43		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.05	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.05	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.38		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.05	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.48		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.43		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID18

ACZ Sample ID: ***L92172-13***
Date Sampled: *10/12/11 15:55*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.13		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.11		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.03	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.16		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.13		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID106

ACZ Sample ID: ***L92172-14***

Date Sampled: *10/18/11 12:05*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.04	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.02	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.05	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.04	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID102

ACZ Sample ID: ***L92172-15***

Date Sampled: *10/19/11 09:15*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.56		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.50		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.36		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.92		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.56		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8
Sample ID: STS-PH-2011-FID7

ACZ Sample ID: ***L92172-16***
Date Sampled: *10/18/11 11:45*
Date Received: *12/02/11*
Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.03	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.03	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.03	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.01	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.07	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID:	ZN000000J8	ACZ Sample ID:	***L92172-17***
Sample ID:	STS-PH-2011-FID8	Date Sampled:	*10/19/11 17:00*
		Date Received:	*12/02/11*
		Sample Matrix:	*Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.32		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.06	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.26		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.27		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.59		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.32		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

ACZ Laboratories, Inc.

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Inorganic Analytical Results

Freeport-McMoRan - Chino Mines Company

Project ID: ZN000000J8

Sample ID: STS-PH-2011-FID28

ACZ Sample ID: ***L92172-18***

Date Sampled: *10/18/11 15:35*

Date Received: *12/02/11*

Sample Matrix: *Soil*

Soil Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.12		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur HNO3 Residue		0.04	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Organic Residual Mod		0.04	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Pyritic Sulfide		0.08	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Sulfate		0.07	B	*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Sulfur Total		0.19		*	%	0.01	0.1	12/14/11 0:00	bsu/brd
Total Sulfur minus Sulfate		0.12		*	%	0.01	0.1	12/14/11 0:00	bsu/brd

** Please refer to Qualifier Reports for details.*

Report Header Explanations

Batch	A distinct set of samples analyzed at a specific time
Found	Value of the QC Type of interest
Limit	Upper limit for RPD, in %.
Lower	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
MDL	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
PCN/SCN	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
PQL	Practical Quantitation Limit, typically 5 times the MDL.
QC	True Value of the Control Sample or the amount added to the Spike
Rec	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
RPD	Relative Percent Difference, calculation used for Duplicate QC Types
Upper	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
Sample	Value of the Sample of interest

QC Sample Types

AS	Analytical Spike (Post Digestion)
ASD	Analytical Spike (Post Digestion) Duplicate
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification standard
DUP	Sample Duplicate
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification standard
ICSAB	Inter-element Correction Standard - A plus B solutions
LCSS	Laboratory Control Sample - Soil
LCSSD	Laboratory Control Sample - Soil Duplicate
LCSW	Laboratory Control Sample - Water
LCSWD	Laboratory Control Sample - Water Duplicate
LFB	Laboratory Fortified Blank
LFM	Laboratory Fortified Matrix
LFMD	Laboratory Fortified Matrix Duplicate
LRB	Laboratory Reagent Blank
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PBS	Prep Blank - Soil
PBW	Prep Blank - Water
PQV	Practical Quantitation Verification standard
SDL	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
L	Target analyte response was below the laboratory defined negative threshold.
U	The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

Method References

(1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(4) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(5) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995 & 20th edition (1998).

Comments

(1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3) Animal matrices for Inorganic analyses are reported on an "as received" basis.
(4) An asterisk in the "XQ" column indicates there is an extended qualifier and/or certification qualifier associated with the result.

For a complete list of ACZ's Extended Qualifiers, please click: http://www.acz.com/public/extquallist.pdf

Freeport-McMoRan - Chino Mines Company
Project ID: ZN000000J8

ACZ Project ID: ***L92172***

Sulfur Organic Residual Mod M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG315136													
L92172-01DUP	DUP	12/12/11 19:20			.02	.03	%				40	20	RA

Sulfur Pyritic Sulfide M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG315136													
L92172-01DUP	DUP	12/12/11 19:20			.03	.04	%				28.6	20	RA

Sulfur Sulfate M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG315136													
L92172-01DUP	DUP	12/12/11 19:20			U	U	%				0	20	RA

Sulfur Total M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG315136													
WG315136PBS	PBS	12/12/11 10:45				U	%		-0.03	0.03			
WG315136LCSS	LCSS	12/12/11 13:36	PCN38175	4.07		3.93	%	96.6					
L92172-01DUP	DUP	12/12/11 19:20			.05	.05	%				0	20	RA

Total Sulfur Minus Sulfate M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG315136													
L92172-01DUP	DUP	12/12/11 19:20			.05	.05	%				0	20	RA

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92172-01	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-02	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-03	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-04	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92172-05	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-06	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-07	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-08	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92172-09	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-10	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-11	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-12	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92172-13	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-14	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-15	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-16	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L92172-17	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L92172-18	WG315136	Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Sulfur Total	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Freeport-McMoRan - Chino Mines Company ACZ Project ID: ***L92172***

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Sulfur HCl Residue	M600/2-78-054 3.2.4-MOD
Sulfur HNO3 Residue	M600/2-78-054 3.2.4-MOD
Sulfur Organic Residual Mod	M600/2-78-054 3.2.4-MOD
Sulfur Pyritic Sulfide	M600/2-78-054 3.2.4-MOD
Sulfur Sulfate	M600/2-78-054 3.2.4-MOD
Sulfur Total	M600/2-78-054 3.2.4-MOD
Total Sulfur minus Sulfate	M600/2-78-054 3.2.4-MOD

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID:	L91358
Date Received:	10/18/2011 09:23
Received By:	ksj
Date Printed:	10/19/2011

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
3282		9.2	18
3164		10.4	18
3045		13.6	20

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

ACZ Laboratories, Inc.
2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Sample Receipt

Freeport-McMoRan - Chino Mines Company
ZN000000J8

ACZ Project ID: L91358
Date Received: 10/18/2011 09:23
Received By: ksj
Date Printed: 10/19/2011

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y< 2	YG< 2	B< 2	O < 2	T >12	N/A	RAD	ID
L91358-01	STS-PH-2011-FID37									X		
L91358-02	STS-PCUG-2011-40									X		
L91358-03	STS-PH-2011-FID101									X		
L91358-04	STS-PH-2011-REFPLOT3									X		
L91358-05	STS-PH-2011-REFPLOT4									X		
L91358-06	DUP11									X		
L91358-07	STS-PH-2011-FID105									X		
L91358-08	DUP12									X		
L91358-09	STS-PH-2011-REFPLOT1									X		
L91358-10	STS-PH-2011-REFPLOT2									X		
L91358-11	STS-PH-2011-FID22									X		
L91358-12	STS-PH-2011-FID10									X		
L91358-13	STS-PH-2011-FID15									X		
L91358-14	STS-PH-2011-FID16									X		
L91358-15	STS-PH-2011-FID17									X		
L91358-16	STS-PH-2011-FID18									X		

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: ksj

L92172-Reloq.

ACZ Laboratories, Inc. L91358 L92172 12.2.11

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]

If yes, please include state forms. Results will be reported to PQL.

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	pH	Total CU	ABA	
STS-PH-2011-FID37	10.11.11 : 09:45"	SO	1	x	x	x	x	L91358-01
STS-PCUG-2011-40	10.13.11 : 13:55"	SO	1	x	x	x		
STS-PH-2011-FID101	10.12.11 : 16:45"	SO	1	x	x	x	x	L91358-~~02~~03
STS-PH-2011-REFPLOT3	10.7.11 : 11:50"	SO	1	x	x	x	x	L91358-~~03~~04
STS-PH-2011-REFPLOT4	10.6.11 : 10:39"	SO	1	x	x	x	x	L91358-05
DUP11	10.12.11 : ---"	SO	1	x	x	x	x	
STS-PH-2011-FID105	10.6.11 : 13:30"	SO	1	x	x	x	x	L91358-07
DUP12	10.13.11 : ---"	SO	1	x	x	x	x	
STS-PH-2011-REFPLOT1	10.4.11 : 11:09"	SO	1	x	x	x	x	L91358-~~08~~09
STS-PH-2011-REFPLOT2	10.5.11 : 12:30"	SO	1	x	x	x	x	L91358-10

LEO 12.2.11

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.

Methods:

pH - 9045C, Total Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10.14.11 10:50	[signature]	10-14 9:22

(1)

L92172 Chain of Custody

~~L91358 Chain of Custody~~

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc. L91358

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified. YES X NO

Are samples for CO DW Compliance Monitoring? If yes, please include state forms. Results will be reported to PQL. YES NO X

Quote #:
Project/PO #:
Reporting state for compliance testing:
Sampler's Name: Carolyn Meyer
Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	pH	Total CU	ABA				
STS-PH-2011-FID22	10.13.11 : 16:40	SO	1	X	X	X	X	L91358-11			
~~STS-PH-2011-FID8~~ nb	~~10.12.11 : 15:35~~	~~SO~~	~~1~~	~~X~~	~~X~~	~~X~~	~~X~~				
STS-PH-2011-FID10	10.7.11 : 14:35	SO	1	X	X	X	X	L91358-12			
STS-PH-2011-FID15	10.10.11 : 11:50	SO	1	X	X	X	X	-13			
STS-PH-2011-FID16	10.10.11 : 12:30	SO	1	X	X	X	X	-14			
STS-PH-2011-FID17	10.11.11 : 17:35	SO	1	X	X	X	X	-15			
STS-PH-2011-FID18	10.12.11 : 15:55	SO	1	X	X	X	X	-16			

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
pH - 9045C, Total Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10.14.11 10:50	[signature]	10-18-11 9:12

2

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc. L91526 L9152·2[illegible]

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
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Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES ☒ NO ☐

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES ☐ NO ☒

If yes, please include state forms. Results will be reported to PQL.

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	pH	Total CU	ABA				
STS-PH-2011-FID106	10.18.11 - 12:05'	SO	1	x	x	x	x	L91526-09			
STS-PCUG-2011-32	10.19.11 - 11:25'	SO	1	x	x	x					
STS-PCUG-2011-34	10.19.11 - 12:00'	SO	1	x	x	x					
STS-PCUG-2011-35	10.18.11 - 13:30'	SO	1	x	x	x					
STS-PCUG-2011-36	10.18.11 - 12:40'	SO	1	x	x	x					
STS-PCUG-2011-37	10.19.11 - 10:05'	SO	1	x	x	x					

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.
Methods:
pH - 9045C and Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10.24.11	1500	[signature] 10.26.11	9:47

2

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

ACZ Laboratories, Inc. L91528

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

Name: Matthew Barkley	E-mail: Matthew.Barkley@arcadis-us.com
Company: ARCADIS	Telephone: 303-231-9115 ext 157

Name: Pam Pinson	Address: P.O. Box 10
Company: Chino Mines Company	Bayard, NM 88023
E-mail: Pamela_Pinson@FMI.com	Telephone: 575-912-5213

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses? YES [x] NO [ ]

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO" is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

Are samples for CO DW Compliance Monitoring? YES [ ] NO [x]

If yes, please include state forms. Results will be reported to PQL.

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name: Carolyn Meyer

Are any samples NRC licensable material? Yes No

			# of Containers	soil sieved to < 2mm	pH	Total CU	ABA				
STS-PH-2011-FID102	10.19.11 - 09:15'	SO	1	x	x	x	x	L91528-01			
STS-PH-2011-FID7	10.18.11 - 11:45'	SO	1	x	x	x	x				-02
STS-PH-2011-FID8	10.19.11 - 17:00'	SO	1	x	x	x	x				-03
STS-PH-2011-FID28	10.18.11 - 15:35'	SO	1	x	x	x	x				-04

Matrix: SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

Please send to Sheri Fling at URS for validation. Sieve all soil samples to <2 mm prior to analysis. Soil should be reported on a dry weight basis.

Methods:

pH - 9045C, Total Copper - 6010B

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

[signature]	10.24.11 15:00	[signature]	10-26-11

FRMAD050.01.15.09 White - Return with sample. Yellow - Retain for your records.

L91528 Chain of Custody

Attachment F

Feasibility Study Work Plan

APPENDIX A – FIELD SAMPLING PLAN: UPLAND SOIL

Tables

Figures

A.1 Introduction

The purpose of this Field Sampling Plan (FSP) is to document the tasks and methodology by which sampling activities will be conducted to fulfill the upland data needs identified in the Smelter/Tailing Soils Unit (STSIU) Feasibility Study (FS) Proposal. This FSP is designed to generate data necessary to evaluate the area affected by Pre-FS remedial action criteria (RAC) issued by New Mexico Environment Department (NMED) on March 3, 2011. This FSP describes the objectives of the proposed investigation, and defines the sampling, analysis, and data gathering methods to be used in the field investigation. The FSP also references the policy, functional activities and quality assurance/quality control (QA/QC) protocols to be used in the investigation, which are specifically stated in the RI Quality Assurance Plan (QAP) (Chino, 1997a).

The QAP defines how site-wide QA/QC activities will be implemented during the RI sampling and analysis. The objective of the QAP is to ensure that data are of adequate quality for their intended use. Standard Operating Procedures (SOPs) have been developed as part of the QAP and are incorporated by reference in this FSP.

A site-wide Health and Safety Plan (HASP) (Chino, 1997b, ARCADIS, 2006) has also been developed for the Chino field activities. Personnel performing the field tasks outlined in this FSP will review the HASP prior to initiating on-site work. The sampling activities are to be conducted in accordance with both the QAP and HASP.

Chino will collect splits or duplicates of samples collected as part of this FSP. Chino will provide NMED with at least seven working days advance notice of intended sample collection dates whenever possible, and in no case less than 72 hours prior to sample collection.

A.2 Site Background

The NMED has established pre-FS RAC for the STSIU for arsenic, copper, iron, and cupric ion activity (pCu^{2+}, herein referred to as “pCu”). The criteria for remedial action are:

- Arsenic concentrations greater than 27 mg/kg in 0-1 inch depth soils to protect humans;
- 95 upper confidence limit (UCL) on copper concentrations > 1,600 mg/kg in 0-6” depth soils for small ground-feeding birds (SGFB) in an exposure unit;
- Monitoring of exposure units where the 95 UCL on copper concentrations > 1,100 mg/kg but < 1,600 mg/kg in 0-6” depth soils for SGFB;
- Copper concentrations > 5,000 mg/kg in 0-1 inch depth soils to protect humans;

- pCu ≥ 5 in exposure units with total copper > 327 mg/kg copper in 0-6 inch depth soils to protect vegetated habitat, and

- Iron concentrations > 100,000 mg/kg in 0-1 inch depth soils to protect humans (NMED, 2011).

The FS and Record of Decision (ROD) will be completed consistent with the National Contingency Plan (NCP). Pre-FS RAC are consistent with the use of preliminary remediation goals (PRG) by EPA in the NCP; therefore, new information can be used to refine the Pre-FS RAC and selection of alternatives (§300.430(e)(2)(i) NCP). Final remediation goals will be determined when the remedy is selected.

The FS Proposal provided an evaluation of each criteria, the available data, and recommended additional sampling for copper and pCu. The constituents of concern (COC), copper and pCu, have been sampled across the Chino Mine site to characterize the concentrations for risk assessment purposes (SRK, 2008). Cupric ion activity, calculated as pCu (-log[Cu]), was measured empirically and also estimated by regressing total copper and pH on measured cupric ion activity in upland sites, with the upland regression equation provided in the Site-wide Ecological Risk Assessment (ERA; Newfields 2006). The upland regression equation was used to estimate pCu on all upland soil samples on the site.

The copper SGFB Pre-FS RAC value of 1,600 mg/kg is intended as a 95UCL area-weighted average concentration within an exposure unit, and the exposure unit should be delineated based on habitat as requested by NMED (NMED, 2011). The term “habitat unit” has not been defined for the AOC; therefore, we propose to use the existing Alliance Level vegetation maps in the site wide ERA. We believe that this mapping intensity is appropriate for the evaluation of population-level wildlife habitat for non-critical species for upland exposure units NMED specifically highlighted their concern about exposure units related to drainages, especially those drainages with valued ecological habitat. Therefore, this work plan also addresses application of the Pre-FS RAC for birds to these exposure units.

The ERA discusses protection of the vegetation community for its function as wildlife habitat and range for livestock. Thus, range condition for livestock and wildlife habitat quality will be assessed in areas averaging pCu less than 5 within rangeland polygons used as exposure units (Figure 1). Because destruction of vegetation and reduction in soil stability associated with remediation may do more harm than good in areas with good range and wildlife habitat conditions, the area with pCu less than 5 will be evaluated for these characteristics.

Range condition was assessed at Chino using a variety of methods within polygons of unique soil and vegetation combinations in 1997 (Woodward Clyde, 1997 and unpublished data). Species richness and vegetation cover were assessed to represent wildlife habitat quality in 1999

(Newfields, 2006). The white rain in 2008 increased pCu and possibly improved these vegetation indices (ARCADIS, 2011a). The soil pCu, vegetation, and range assessments proposed herein will be compared to evaluate changes from the results of these earlier studies.

A.3 Sampling Objectives

The soil sampling program is intended to address the following specific sampling objectives:

- Fill in the data gaps in the distribution of total copper and pCu in the STSIU, estimating, as precisely as needed, concentration throughout the STSIU in areas where the levels of constituents are changing from safe levels to potential levels of ecological (total copper and pCu) or human health (copper) concern;

- Develop exposure units whereby the copper SGFB Pre-FS RAC value of 1,600 mg/kg is intended as a 95UCL area-weighted average concentration within an exposure unit, and the exposure unit is delineated based on habitat as requested by NMED (NMED, 2011);

- Determine where upland and drainage habitat differs to the extent where drainage habitat exposure units are necessary to evaluate risk to the small ground feeding bird;

- Fill in data gaps in range condition, cover, and richness to determine if low pCu is affecting vegetation attributes; and

- Collect field quality control samples as specified in the QAP.

The soil sampling and exposure unit field verification program is described in detail in Section A.4 through A.9.

A.4 Data Quality Objectives: Soil Sampling

The data quality objectives (DQO) process was used to define the data needed to meet these five objectives. This section describes the purpose and identifies the steps of the DQO process.

According to the USEPA, the DQO process is a series of planning steps based on the scientific method that is designed to ensure that the type, quantity, and quality of environmental data used in decision-making are appropriate for the intended application (USEPA, 2000). The DQO process includes the following seven steps, which are addressed in this plan:

1) State the problem

2) Identify the decisions

3) Identify the inputs to the decisions

4) Define the study boundaries

5) Develop a decision rule

6) Specify limits on decision errors

7) Optimize the design for obtaining data

A4.1 Problem Statement and Decision Criteria Identification

The problem statement is to spatially define the areas requiring remedial action in the STSIU based upon NMED Pre-FS RAC. The Pre-FS RAC are based upon two COCs, copper and pCu that have been sampled across the site (Figures 1 and 2). Specifically these Pre-FS RAC are (1) 95UCL of copper concentrations across an exposure unit with greater than 1,600 mg/kg in 0-6 inch depth soils, (2) copper concentrations greater than 5,000 mg/kg in 0-1 inch soils, and (3) pCu less than 5 in areas with greater than 327 mg/kg copper in 0-6 inch depth soils (NMED, 2011). The boundaries of areas potentially requiring remedial action are based upon these remedial action decision criteria. The challenge is to spatially define the extent of these concentrations of COCs at the pre-FS RAC criteria and at levels just above and below the criteria. A change in a concentration of greater than 300 mg/kg copper or 0.5 pCu can have a large impact on the area that must be evaluated for remediation. Thus, the precision of the data must be high enough to differentiate such changes.

Copper

The pre-FS criteria for copper for protection of the SGFB will be applied to the spatially-weighted 95 UCL concentrations in exposure units. Habitat polygons represented by the vegetation alliance map developed by DBS&A (1999) (and referenced by NewFields (2006)) will serve as habitat units for upland areas (Figure 2). Based upon previous discussion with NMED, however, those habitat polygons do not differentiate high quality habitat along drainage banks which may require different remedial actions than upland habitat. The ephemeral drainage banks are potentially of high value to SGFB because they may have denser woody vegetation than adjacent upland areas. A vegetation map of the STSIU (Figure 2.1-2 in Newfields, 2006,) identifies woodland vegetation alliances that frequently occur in drainages having higher woody density than the other grassland/shrubland alliances, specifically the (1) fluvial forest and shrubland alliance and the (2) alligator-juniper oak woodland alliance. For portions of drainages in the STSIU that fall within these alliances, an evaluation of the woody cover is needed to determine if the banks of these drainages have higher quality habitat than adjacent upland areas. If so, the banks within the woodland alliance will be delineated as a separate exposure unit. Except for one drainage requested to be sampled by NMED (discussed below), portions of drainages that are outside these alliances, falling in grassland or a shrub-grassland mix upland alliances, and drainages with similar woody density as adjacent upland, will be considered to have habitat the same quality as upland areas and will be part of the adjacent upland exposure unit.

The copper human health RAC will be applied on a point by point basis similar to sampling methods implemented in the STSIU Interim Action Work Plan (IRAWP) (ARCADIS, 2006). Remedial options for the exceedances of the human health RACs will be discussed in more detail in the FS.

pCu

The exposure unit for pCu was not defined by NMED. Chino proposes the exposure unit be the polygon boundaries defined by combinations of different soil and vegetation types. These boundaries were used for rangeland condition analysis in Woodward Clyde (1997) and thus are referred to as "rangeland polygons" (Figure 1). Thirty polygons were preliminarily identified to contain soils with a pCu less than 5 (Figure 1, after removing facility areas or land in other investigation units). The polygons ranged from less than one acre to greater than 859 acres. The polygons boundaries may need to be further split into smaller polygons to account for sharp changes in rangeland condition, particularly in areas not classified for rangeland condition.

A challenge with defining areas for remediation based upon pCu Pre-FS RAC criteria is that in many areas that may have pCu < 5, good rangeland conditions may exist. Soil surface pCu appears to be a poor predictor of rangeland condition based upon previous work, in which large northern areas of fair and good rangeland condition based upon an Observed Apparent Trend (OAT) score were identified where pCu was less than 5 (Figure 3). The OAT score is one quantified measure of rangeland condition measured on the STSIU in 1997 by Woodward Clyde (1997) and will be used to assess rangeland conditions in areas with pCu < 5. The OAT method is a rapid assessment technique promoted by the Bureau of Land Management (BLM) and Nation Resources Conservation Service (NRCS) whereby the investigator walks through a defined area and visually estimates scores. The method was used to estimate "apparent" trend in rangeland condition without sampling more than one time period. Woodward Clyde (1997) prepared a sampling plan but not a report summarizing their results. However, the datasheets with their results are available. OAT scores were measured in the rangeland polygons, shown in Figure 1 and 3 in 1997 using criteria in Table 1. A high score represents good rangeland condition. The cutoff for fair to good rangeland (referred to as static to upward in observed trend scores) varies depending on the area. For example, BLM Environmental Impact Statement, Drewsey Resource (BLM, 1984) Area in Oregon used 17 as the cutoff, which was also used by NRCS in Wyoming. The cutoff was determined for Chino by evaluating other rangeland condition sampling results measured on soil stability and plant distribution in 1997 in these same areas (see worksheet in Appendix B of Woodward Clyde 1997) which produced preliminary rangeland classifications ranging from Excellent, Good, Fair, to

Poor. Comparing the OAT score to these classifications for rangeland polygons that potentially have pCu < 5 in Table 2 suggested $\geq$ 22 is mostly fair to good rangeland condition.

The sampling effort of the 1997 study was too low at too coarse of a resolution to assess effects to rangeland condition within the pCu < 5 contour. Therefore, additional sampling is proposed in this document.

The destruction of the existing vegetation and inevitable increase in soil erosion associated with remediation of good condition rangeland could lead to a loss of environmental benefit. The assumption of loss of environmental benefit is based on the likely amount of time required for the ecosystem to recover after remedial disturbance. For fair to good range, Chino expect these systems to require 1 to 2 decades to regain an equivalent level of function assuming that soil loss is minimal. The inherent climatic variability in this region complicates the predictability of the response and likelihood of near term success. Furthermore, we anticipate that range conditions have improved since 1997 following cessation of smelter activities in 2003 and the white rain event in 2008. Therefore, Chino proposes the decision to remediate areas with pCu < 5 be based upon consideration of the current range condition and habitat quality.

Past grazing management affects the amount and composition of vegetation independent of chemical stressors due to historical mineral processing. In New Mexico, grazing can depress vegetation cover levels by up to 39% (Gamougoun et al., 1984, Weltz and Wood, 1986) which can result in poor to fair rangeland condition. The impacts of past grazing practices are compounded on soils with inherent productivity limitations. Many of the soils in the STSIU have limitations associated with high clay contents and restricted thickness over bedrock or indurated caliche layers (SCS, 1983). The combined effects of these conditions are seen at Chino on the rangeland to the east of the tailing impoundments. Some of these areas had OAT scores < 22 where pCu was > 5 (Figure 3), a result of moderate to heavy grazing over the last 100 years on areas with marginal soils. A "fair" rangeland condition, which is 25 to 50 percent of theoretical optimum for the soil type and slope, is consistent with what would be expected of a system exposed to over 100 years of grazing without other stressors such as copper and is consistent with the range of foliar cover observed within the area with pCu < 5 (SCS, 1976). Similarly, wildlife habitat is classified as fair to poor throughout Grant County (SCS, 1983).

Areas with pCu < 5 and an OAT score of less than 22 would be evaluated for remedial alternatives. In contrast, areas with pCu < 5 and an OAT score of greater than or equal to 22 would not be further evaluated for remedial alternatives because an OAT score of 22 or greater represents a rangeland condition of mostly fair to good. The map of OAT scores (Figure 3) will be updated, using the methodology in Section A6.4 and A8.3, to confirm current conditions to assess trends from 1997. Evaluation of rangeland using OAT scores is proposed but other rangeland measures may be proposed if they can be detected more easily using remote sensing.

While there are a number of 1997 rangeland condition polygons that cover the pCu < 5 area, little is known of the wildlife habitat quality in this area based upon the indicators relied upon in the ERA (NewFields, 2006). Currently, only one ERA sample falls within the current estimated pCu < 5 contour zone (Figure 3). Therefore, in addition to evaluating OAT scores, Chino proposes to create percent cover and richness maps in the pCu < 5 area to update knowledge of wildlife habitat quality in this area. Remediation for pCu also will be assessed against the reclamation requirements of New Mexico Energy, Mineral and Natural Resources Department's Mining and Minerals Division (MMD), which provides for slightly different thresholds for richness and cover compared to the ERA but are more appropriate for an analysis of remedial alternatives in the FS (DBS&A, 1999). The adequacy of wildlife habitat in ungrazed areas will be defined as acceptable if cover is ≥ 32%, and richness is ≥ 8, in accordance with MMD guidance and revegetation success guidelines developed for Chino, when climatic conditions are relatively similar to conditions of the reference plots used to assign these criteria (DBS&A, 1999). Areas with a substantial amount of rock outcrop would be required to meet the total canopy cover only after first removing the rock outcrop. Because grazing is excluded from the reference areas used to demonstrate reclamation success, a grazed reference area east of Lampbright Draw with little impact from the smelter will be found to represent reference areas for cover and richness of grazed areas.

The decision criteria for remediation would be to identify rangeland polygons with poor (OAT < 22) rangeland condition or that have poor richness and cover (as defined above) and a pCu < 5. These polygons will be evaluated for a remedial alternative to comply with the pCu Pre-FS RAC.

A4.2 Decision Inputs

Based upon the discussion presented above under Section A4.1, there are three decisions that will be addressed by the FSP:

1. Are the existing data sufficient to define the current nature and extent of the COCs of surface soil in the general range of the pre-FS RAC criteria?

   Figures 1 and 2 show the locations of the samples used to develop the current understanding for pCu and copper distributions in the STSIU. The pCu map (Figure 1) shows locations and concentration classes of soil data collected in 2009 and 2010 to evaluate and monitor pH and pCu changes in the soil following the white rain event in January 2008 (ARCADIS US, Inc. 2011a). The map also includes locations where pCu was sampled during the insect bioaccumulation study (ARCADIS, 2010b). This map only includes data collected after the white rain event because that event altered the soil pH and thus changed the pCu. In contrast, the copper map (Figure 2) is not limited to recent data as the white rain is not expected to have changed the copper concentrations. That map is based upon soil data collected from 1995 to 2010 and includes data from the following reports: Chino, 1995; ARCADIS, 2001; NewFields, 2006, 2008; SRK, 2008; ARCADIS, 2009; ARCADIS, 2010a; ARCADIS, 2010b; ARCADIS, 2011a; ARCADIS, 2011b.

Not all samples were collected at 0-6 inch bgs. The concentrations of samples at 0-1 inch bgs were multiplied by 0.7 to represent the 0-6 inch bgs based upon the finding that the ratio of 0-6 inch to 0-1 inch depth strata for copper is 0.7 (median of 37 co-located samples, Table 3) in soils without deposits of windblown tailings. For soils in areas with windblown tailings, the multiplier was 1.5 (median of 7 co-located samples, Table 3). These median ratios were chosen after the average and median ratio, and slope of the regression of a plot of 0-1 inch data against 0-6 inch data (where the slope is essentially a ratio) were compared (Figure 4). The slope of the regression had the lowest value and the median and average ratios for copper were very similar. The median was selected as best because, unlike the regression slope, it was not strongly influenced by the two highest data values, was more conservative than the regression slope, and best represented central tendency because the ratio data were not normally distributed (Shapiro Wilk test, $P < 0.01$). For sites in windblown tailings, where the tailings have low copper, the ratio flips so that the 0-1 inch stratum has lower copper than the 0-6 inch stratum on average. The median was the most conservative method for these data and was selected to be consistent with the method chosen for areas outside the tailings.

The two maps (Figures 1 and 2) show that in some areas sampling was quite dense and the data are sufficient to spatially model the extent of the COCs with the precision desired, but in other areas, data gaps exist, making the extent uncertain. Soil samples will be taken in these data gap areas to ensure good sample coverage across the area of uncertainty (Figures 5 and 6) and will be analyzed using methods discussed in Section A8.

2. Are the existing data sufficient to define the exposure units?

The vegetation alliance map, developed by DSB&A (2000) using > 350 sampled areas and 1:18000 black and white aerial photo interpretation (section 3 in DSB&A, 2000), is considered adequate for defining general vegetation boundaries and for defining habitat units for SGFB exposure in the upland area. Table 4 shows the polygons that currently have at least one sample with copper exceeding the pre-FS RAC. The ephemeral drainage exposure units for copper are not yet defined. Maps of woody cover classes will be developed using aerial photographs and remote sensing with field verification along drainages in woodland alliances to define these exposure units. Exposure units with significantly higher woody vegetation than adjacent upland will be delineated.

As discussed above, the exposure units for pCu are proposed to be the rangeland polygons. These polygons are shown on Figure 1. The adequacy of the polygon boundaries will be assessed through review of aerial photos, remote sensing and field verification and they will be updated and modified as necessary. Specifically, any sharp changes in range or wildlife condition observed on the images that can be delineated as an obvious boundary will be identified and the polygon further split based upon that boundary.

3. Are the existing data sufficient to define the current nature and extent of rangeland condition and wildlife habitat quality in areas with pCu <5?

   Figure 3 shows the polygons classified for rangeland condition (Woodward Clyde, 1997, and unpublished 1997 data) and the one ERA location where richness and cover were sampled on a 50-m transect (Newfields, 2006) within the current estimated contour with pCu < 5. Based upon these figures, there are data gaps in rangeland condition, cover, and richness in key areas. Sampling to address these areas is discussed further below.

A4.3 Boundary, Decision Rule, and Limits on Decision Errors

The boundary for defining the spatial extent of the COCs is the STSIU boundary. Other operational areas, private property, or investigation units are not included. At the conclusion of these sampling efforts, contours for the COCs of 0.5 pCu intervals and 300 mg/kg total copper intervals will be developed within the STSIU using an interpolation routine in ARCGIS.

For total copper, if an exposure unit contains copper concentrations greater than or equal to the pre-FS RAC for SGFB (1,100 mg/kg), a spatially-weighted 95UCL of the copper concentrations will be calculated for the given exposure unit. All exposure units with a spatially-weighted 95 UCL greater than the RAC criteria will evaluated for remedial alternatives in the FS Report. If an exposure unit does not contain a copper result greater than the 1,100 mg/kg RAC, it will not be considered further in the FS. Exposure units exceeding the 1,600 mg/kg RAC will be further evaluated in the FS. If there are exposure units with copper 95UCLs greater than 1,100 mg/kg but less than 1,600 mg/kg, those areas will have biotic and/or abiotic media monitored to evaluate if risk to small ground feeding birds as requested by NMED (2011).

For total copper, if a given area contains copper greater than the 5,000 mg/kg human health RAC, and does not overlap with proposed borrow areas, this area will be evaluated using the methods outlined in the STSIU IRAWP (ARCADIS, 2005). An engineered drawing for borrow areas will be submitted with the FS Report. Any samples that exceed the 5,000 mg/kg RAC will be considered for remediation in the FS report.

For pCu, if an area’s rangeland condition is determined to be fair to good (OAT $\geq$ 22) and wildlife habitat is acceptable, the area will not be considered for remediation and will not be discussed in the FS Report. Acceptable wildlife habitat for ungrazed areas will be defined as having cover $\geq$ 32% and plant species richness $\geq$ 8, in accordance with MMD guidance and revegetation success guidelines developed for Chino (DBS&A, 1999), assuming climatic conditions are relatively similar to conditions of the reference plots used to assign these criteria (DBS&A 1999). Grazed areas will be defined as having at least as much cover and as good or better species richness as the reference plot to the east of Lampbright Draw, which will be a grazed reference plot that was not impacted by mining operations. All areas with rangeland or wildlife habitat condition as described above will be identified, using the methods in Section A8.3, and their respective pCu values will be compared to the RAC. If an area with poor rangeland/wildlife condition and contains a pCu contour < 5 based on a pCu kriged map, it will be retained for assessment of remedial alternatives in the FS Report. For areas with pCu < 5 that are classified as good to fair or have acceptable wildlife habitat, Chino will propose monitoring or validation to confirm the rangeland classification.

The concentrations on the site range from 1 to 10 s.u. for pCu and from 30 to 25,000 mg/kg for total copper. The consequences of decision errors (incorrect classification of an area) of the magnitude of one contour interval are low at pCu concentrations <4 and >7, and at copper concentrations <800 and >1,900 mg/kg. Consequences of errors at concentrations between these values that encompass the RAC threshold are of more concern. When differentiating between an area at the RAC threshold and above, the acceptable error of identifying an area to be remediated that did not need to be (false positive, Type I error) is 10% (90% confidence different from safe area) and for omitting an area that needs to be remediated (false negative, Type II error) is 20% (80% power to detect a difference).

Accuracy of the remote sensing maps delineating good and poor condition rangeland and acceptable and unacceptable wildlife habitat will be set to 70% correct classification using jackknife cross-validation (sample being predicted is removed from calibration dataset to develop the model). A level of 80% is desirable for well-defined remote sensing methods (ESRI, 1994) but may not be attainable given the high, often undetectable small-scale variability that affects rangeland condition. For rangeland condition and species richness/cover mapping, the variables mapped (for example, fair-good = OAT $\geq$ 22, and poor = OAT < 22 for rangeland map) have two classes that will be evaluated for accuracy. Errors of omission will be instances where a “fair-good” condition is classified as “poor” and errors of commission are where “poor” is classified as “fair-good”. In general, it is desirable to make the rates of these errors approximately equal. But to be conservative, the focus will be on finding all areas of poor condition even at the expense of missing some areas of fair-good condition. The goal will be to attain no more than 15% errors of commission. If the remote sensing data are inadequate at differentiating these two classes for OAT scores and species diversity, then the two classes of vegetation cover (e.g., good if $\geq$32%, poor if <32% for ungrazed areas), may be the main criteria used to screen areas with pCu < 5 for remediation. Vegetation cover may be easier to identify using remote sensing.

A4.4 Optimal Design for Obtaining Data

Below are sampling designs for pCu for plants (Figure 5) and total copper for SGFB (Figure 6) and human receptors.

Plant RAC Sampling

pCu Sampling Design

The Site Wide BERA indicated that when pCu < 5, there is a significant reduction in richness and canopy cover, and key uncertainties were noted in the report including potential affects of grazing. Figure 5 shows the post-white rain (2009 and 2010) locations that have pCu of 4, 5, and 6 that bound this threshold. A zone of uncertainty was established around these points. The delineation of the zone was made large enough to include areas within the pre-white rain contour of pCu <5 (ARCADIS, 2010a)). Additionally, the spatial extent of the 2009 and 2010 data was expanded outward in areas potentially near the threshold RAC criteria, which was in the northwestern edge of the STSIU. The area of uncertainty selected is large given the spatial (range of 0.02 to 0.9 in 30 x 30 m plot), temporal (range of 0.3 to 2.3 from 2009 to 2010 plus changes from pre- to post-white rain), and laboratory (0.2 to 0.4 error on duplicates) variability in estimating pCu. Thirty-seven samples already exist within the area of uncertainty with a standard deviation in pCu of 1.07. The minimum detectable change of interest (delta) between sets of locations to differentiate the pCu 5 and 6 zones was set to 0.5 pCu units. The confidence was set to 90% and the power to 80%. The pCu values in the area of uncertainty were normally distributed (Shapiro-Wilk test, P = 0.65). However, because the cupric ion concentrations are not normally distributed, a non-parametric method was used for differentiating pCu zones. The minimum number of samples required (N) was estimated based on guidance in USEPA (2010) using the following one-sided 2-sample Wilcoxon Mann-Whitney test sample size equation:

$$N \geq 1.16\ [2\ (Z_{1-a} + Z_{1-B})^2\ (SD/\Delta)^2 + Z_{1-a}{}^2/4]$$

Where:

Z_{1-a} = 1.282 corresponding to a confidence level of 90%

Z_{1-B} = 0.842 corresponding to a power of 80%

SD = standard deviation

Δ = 0.5 = minimum detectable difference between two medians

The minimum sample size needed to discern a difference of 0.5 within the area of uncertainty is 48, or, an additional 11 randomly placed samples, given 37 samples are already in the zone (Table 4). However, this estimate ignores the gradient in copper across the site. Given there is a gradient, an additional requirement of the study design is to have good spatial coverage of the area. Good spatial coverage cannot be obtained with 11 samples because some of the existing 37 samples are clustered and do not cover the large data gaps. Analyzing the available data, it appears that pCu can vary by one s.u. within an interval as narrow as 1,000 m in width (Figure 1) and should have at least two samples across the zone width (with 500 m spacing) to be able to delineate the pCu zone. Thus, to obtain good coverage of the areas with sampling gaps, this number was increased to 40 samples. An additional 40 samples (blue triangles in Figure 5) were located randomly throughout the area of uncertainty in locations that avoided slopes too steep to sample (>22%, Figure 7) and avoided being placed too close to another sample (within 250 m). To ensure good coverage across the area of uncertainty, the samples were stratified such that40 samples increased coverage with in the area of concern. The proposed sample locations are shown in Figure 5. Each of the samples at the 40 locations will be a composite of 5 subsamples taken within a 50 m by 50 m area at the corners and center (sieved at < 2mm). The soil sample depth will be 0-6 inches below ground surface (bgs). The coordinates for the pCu sample locations will be summarized in Table 6 upon NMED approval and finalization of the STSIU FS Proposal.

Vegetation Sampling Design

The threshold of concern for rangeland condition was selected as an OAT score of < 22. OAT scores were collected in the STSIU in 1997 (Woodward Clyde, 1997) and incorporate ratings for plant characteristics (vigor of desirable plants, seedling establishment, and litter) and soil characteristics (pedestals, crusting, and gullying, Table 1) relative to a nearby reference area that has similar soil type, slope, and management history.

Figure 3 shows the current locations of 30 polygons with estimated OAT scores and at least one sample with pCu < 5 in the STSIU or a potential for <5 pCu and Table 2 lists the OAT scores estimated for each polygon. As discussed above, for remediation purposes, an OAT score of < 22 is considered poor rangeland (classified as poor relative to a reference area) that should be remediated and ≥ 22 is good rangeland that should be protected from remediation. The scores for these polygons need to be verified in the field by walking a 200-m field transect placed in a representative location in each rangeland polygon and recording the OAT score using the criteria in Table 1.

New data will be collected at 15 locations in rangeland polygons that potentially have soils with pCu < 5 (Figure 3) and represent a range of OAT scores (based upon 1997 data) across the current mapped polygons. These 15 locations provide good representation of the areas near the decision boundary of 22. The data will be collected to develop a correlation with the 1997 data. If the correlation is strong (r ≥ 0.8), the current OAT map will be used, although some polygons may be split if sharp boundaries in rangeland or wildlife condition are observed within polygons on aerial photos or spectral images.

If the 1997 OAT scores cannot be correlated directly to the new OAT scores (correlation < 0.8), the 1997 OAT score data will be updated using remote sensing, calibrated to the data from new locations. The relationship between spectral image data (from a remotely sensed image) and the OAT score will be calibrated using the 15 sampling points discussed above. To update the map, the field transects will be located on a satellite image taken over the site in August or September 2011. The map will be developed by using the relationship between image data and OAT scores to predict OAT scores for every 200 m section in areas with pCu < 5. These pixel values will be averaged within each rangeland polygon to obtain final OAT score estimates. Then each polygon will be classified as good-fair ($\geq$ 22 OAT score) or poor.

An effort will be made to ensure ends of the OAT spectrum (very poor and excellent) are captured. If a first sampling session produces high standard errors or root mean square errors that lead to poor predictions relative to observed data, or if the area with pCu < 5 and soil copper >327 mg/kg turns out to be larger or distributed differently than current data supports, then a second sampling event may be required to adequately capture the range of OAT scores in areas with low pCu on the site.

The approach to developing remotely sensed maps of wildlife habitat quality will be similar to the rangeland condition mapping process. The same polygons and field locations sampled for OAT scores will be sampled for plant species richness and percent cover (Figure 3), following methods used in the amendment plots (ARCADIS 2011b) and DBS&A (1999) to evaluate revegetation success. A relationship between cover and richness with spectral data will be developed, if possible, and verified with a subset of the field data. That relationship will be used to classify the cover and richness of the entire area of rangeland polygons with pCu < 5. Just as the rangeland map will be binned into good-fair versus poor rangeland condition, the final map for cover and richness will be binned into acceptable and unacceptable wildlife habitat quality (e.g., using $\geq$ 32% for cover and > 8 species for richness for ungrazed areas and reference criteria for grazed areas) as the thresholds for remediation decisions. In addition to the above computational measures, the boundaries of polygons of acceptable versus unacceptable wildlife habitat are tentatively the rangeland polygons but will be evaluated for adequacy in classifying cover and richness by discerning if any sharp changes in cover or richness are visually obvious on photos or images. If such changes can be delineated, the polygons will be split into smaller polygons along such delineated boundaries. Additionally, once the boundaries between fair-good and poor are delineated, three or four of these boundaries will be driven or walked to verify that the rangeland difference is visible between the units.

Small Ground Feeding Bird RAC Sampling

Upland Copper Sampling Design

Unlike pCu for which STSIU had only had 61 samples representing current conditions (post-white rain), 294 copper samples were available to estimate copper distributions and, thus, the sampling design focuses on filling gaps in the spatial data in the current copper dataset needed for a good interpolation model. The area of uncertainty (red polygon in Figure 6) includes locations with concentrations ranging from 800 to 2,700 mg/kg. There are 88 existing samples within this area, with a standard deviation of 1,088. The minimum detectable change of interest (delta) was set to 300 mg/kg because the width of Cu contour bands averages about 300 m band, which is a narrow and higher resolution is unlikely given the spatial variability of Cu. Also, a 300 mg/kg increase on the pre-FS RAC has a small effect on the risk to SGFB (shown by a hazard quotient increase from 1 to 1.02). . The confidence for detecting this difference was set to 90% and the power to 80%. Because copper was not normally distributed (Shapiro-Wilk test, $P < 0.001$), the one-sided 2-sample Wilcoxon Mann-Whitney test sample size equation was used to determine sample size. When applied to copper parameters, a minimum sample size of 139 was required, or an additional 41 samples if the copper gradient across the site is ignored (Table 4). However, a gradient of copper from the smelter emissions exists and thus good spatial coverage across the gradient in the area of uncertainty is required, which can be accomplished with transects if XRF sampling is used.

Nine transects perpendicular to the estimated copper gradient are proposed in areas where samples are few and terrain not too steep (<22% slope) and will be driven or walked, sampling the surface soil (sieved to < 2 mm) every 200 m using XRF in a direction outward from the smelter (Figure 6). Assuming samples will be spaced every 200 m on each transect, a total of 57 samples will be collected over all transects (blue and purple triangles in Figure 6), more than the 41 minimum sample number required. Some southern areas with data gaps in the area of uncertainty soon will have copper distribution characterized by XRF as part of the reclamation program or will become borrow areas for reclamation work and thus will not be sampled again for this plan.

For confirmation of the XRF results, nine 0-6 inch bgs samples in areas estimated to range from low to high copper concentrations (purple triangles in Figure 6) will be sent to the laboratory to estimate copper concentration. Nine samples were selected for joint analysis as this number more than satisfies the required sample size to provide a significant relationship ($p<0.05$) between laboratory and XRF results when the coefficient of determination is defined as a $r^2 > 0.8$ The XRF results at the same locations as these samples will be regressed on the laboratory results to create a regression equation to convert XRF data to 0-6 inch bgs data. The relationship between laboratory and XRF results will be determined using USEPA Method 6200. The confirmation samples will be composites of 5 subsamples in a 50 x 50 m area. The coordinates for the sample locations for copper are in Table 5.

Drainage Copper Sampling Design

The type of remediation required may differ along the banks of ephemeral drainages as compared to upland areas because of the possibility of denser woody vegetation providing higher-quality bird habitat. An evaluation of the woody cover is needed to determine if the banks of STSIU drainages in woodland alliances (Figure 8) have higher quality habitat than adjacent upland areas. Percent cover of woody vegetation can be assessed using remote sensing data. For example, the normalized difference vegetation index (NDVI) is high in dense, healthy, growing vegetation and previous work has shown NDVI has a unique signature for dense woody versus non-woody vegetation. A relationship developed between NDVI or near-infrared spectrum data and ground-collected data on woody vegetation percent cover in areas of interest will be used to estimate percent cover by woody plants.

Figure 8 shows locations of banks and adjacent upland areas that will be assessed and compared for woody cover. These drainage banks are within vegetation alliances that have bottomland woody cover. Because of NMED’s request, an additional drainage was added that is in an upland vegetation alliance (Figure 8).

The field data collected to calibrate the relationship between spectral signatures or NDVI and woody cover, will consist of estimates of percent woody cover taken along one 100-m transect along the bank parallel to the drainage and one 100-m transect in the nearby upland (at least 500 m away) at each sampling point in Figure 8. The line intercept method will be used, measuring the percent of the transect intersecting woody vegetation canopy. The upland transect will be parallel to the bank transect.

Because field cover probably can generally only be estimated to within 10% accuracy with consistency for line intercept methods, cover modeled to within about 10 percentage points of ground reference will be considered “correct” in the accuracy assessment. The accuracy requirement must be at least 70% of the transects are correctly classified to use the remotely sensed results to compare upland and drainage vegetation (using jackknife cross-validation). If such accuracy is obtained, the average cover of the drainage area must be at least 25 percentage points different from the upland to be considered different. If the map does not meet the accuracy requirement, the field data will be statistically compared or supplemented with more field work if the field sample sizes are inadequate.

The canopy cover will be evaluated for at least a 25% difference between the upland and bank habitats quantified by remote sensing. If they differ by that amount, the banks will become exposure units separate from upland exposure units.

During the field sampling of locations shown in Figure 8, Chino will take 12 soil samples from the same locations sampled for vegetation on the banks (composite of 3 on a 50-m transect parallel to the channel). The soil samples will be taken from the start, middle, and end of the transect at a depth of 0-6 inches bgs and sieved to > 2 mm. These bank samples will be used to determine a spatially weighted 95UCL on copper concentrations for a given drainage area. If the 95UCL for the drainage area is > 1,600 mg/kg the area will be evaluated further for remedial alternatives in the FS. If the 95UCL is greater than 1100, the area will be monitored. The coordinates for these sample locations are shown on Table 6

Human Health RAC Sampling

Copper Sampling Design

As seen in Figure 2, the copper concentrations greater than 5,000 mg/kg are concentrated to the east and southeast of the former smelter. This area, is currently proposed to serve as a source of borrow material for closure of Lake One. After closure of Lake One, Chino will identify the extent of excavation area and document that copper in soil at a concentration greater than 5,000 mg/kg was removed. As stated in the STSIU IRAWP, the nature of the historical distribution of copper in these areas was via air dispersion in a predictable pattern decreasing in concentration from the source. Due to the nature of the disposition, a grid sample pattern is appropriate for the confirmation sampling. The grid size will be determined by calculating the needed sample size using the equation in IRAWP and the overall excavation area.

A.5 Sample Designation

In addition to location codes, individual samples are to be designated by a unique sample number in accordance with the site-wide sample numbering scheme specified in SOP-1, Field Document Control. Sampling information, field measurements, and other field data will be recorded in a field notebook in accordance with the procedures specified in SOP-1 and in SOP-2, “Field Logbook” and “Field Data Sheets”, respectively.

A.6 Sample Equipment and Procedures

In accordance with the objectives of the QAP, SOPs will be implemented during field activities to maximize consistency in field activities. The SOPs are in Appendix B of the RI QAP (Chino, 1997).

A6.1 General SOPs

The following general SOPs will be implemented during this FSP:

- Field Document Control (SOP-1) – Presents the sample numbering scheme to be implemented for samples collected in the STSIU. SOP-1 also presents procedures for recording information that is relevant to field operations;

- Field Logbook and Field Sample Data Sheets (SOP-2) – Identifies minimum entries to be included in field logbook or field sample data sheets. Includes procedures for taking photographs and labeling them;

- Field Quality Control (SOP-3) – Describes field QC measures and QC samples, including sample preparation and collection frequency;

- Sample Custody Procedures (SOP-4) – Establishes Chain-of-Custody procedures to be followed during field sample collection and transfer to the laboratory. Included are examples of a sample label, field sample data sheets, and a Chain-of-Custody record;

- Packaging and Shipping of Environmental Sample Containers (SOP-5) – Lists procedures for preparation and shipment of field samples sent to the analytical laboratory. Included is an example of a custody seal to be attached to each shipment;

- Decontamination of Equipment Used to Sample Soil and Water (SOP-6) – Presents the decontamination requirements for non-disposable sampling equipment. Included is a list of recommended equipment to be used for decontamination. Disposable equipment will be used to the extent possible to reduce opportunities for cross-contamination and decrease the level of effort for decontamination. For reusable field equipment, decontamination is required to prevent cross-contamination of samples from different sampling locations;

- Requesting Environmental Laboratory Services (SOP-7) –Provided in this SOP is a form for requesting analyses by the contracted laboratory, including number of samples, proposed schedule and designated contact; and

- Sampling, Preservation and Containerization (SOP-14) – Summarizes the required sample volume, container type, preservation and holding time.

A6.2 Soil SOPs

SOP-22 “Surface Soil Sampling” will be followed for field sampling procedures. Each soil sample will be a composite of five sub-samples taken over a sample interval of six inches in sample depth as measured from the ground surface. The five sub-samples will be sampled over a 50 x 50 m area (rather than 20 feet in the SOP) to reduce microscale variability and the locations will be representative of the area.

A description of the composition of each soil sample and other relevant information will be noted in the field logbook and/or field sample data sheets. In accordance with SOP-3 “Field Quality Control”, field QC samples (one per 10 samples) and rinsate blanks (one per 20 samples) will be collected as part of the sampling program. These blind field duplicate samples and rinsate blanks will be submitted for laboratory analyses.

SOP-23 and -23a “XRF on Site Measurement” will be followed for field XRF calibration and sampling procedures.

A6.3 Survey of Sample Locations

All sample locations will be surveyed for coordinate position and elevation using the Global Positioning System (GPS).

A6.4 Vegetation SOPs

Procedures for sampling vegetation for rangeland condition will follow the OAT score protocol outlined in Section A4.4, pCu sampling design. Methods for sampling vegetation for richness and cover will follow those used for the amendment plots (ARCADIS 2011b) using DBS&A (1999) sampling protocol. Methods for sampling woody cover will follow the protocol outlined in Section 4.4, drainage copper sampling design. Photographs will be taken at all sample locations.

At all 15 sampling points shown on Figure 3, each within one of 15 rangeland polygons and within the approximate pCu <5 contour, a 200-m transect will be walked and an OAT score recorded using the worksheet in Table 1. Before sampling the transect, the polygon will be walked as they did in 1997 to evaluate the criteria used in developing the OAT score for the entire polygon. The score on the 200-m transect will only be used to correlate to the corresponding pixel on the remote sensing map. The field investigators from NMED and Chino will jointly decide on the scores and will not be able to refer to the 1997 results to avoid biasing their results.

A.7 Sample Handling and Analysis

Sample bottle requirements for rinsate, holding times, and preservation techniques are listed in SOP-14 “Sampling, Containerization and Preservation”, and are consistent with the laboratory requirements. Rinsate samples for chemical analysis will be placed into media-appropriate bottles and stored in ice filled coolers until delivery to the laboratory. Soil samples will be sealed in plastic bags and shipped in coolers. Samples will be handled and shipped in accordance with SOP-4 “Sample Custody Procedures” and SOP-5 “Packaging and Shipping of Environmental Sample Containers.”

Table 4-2 in Section 4.2 of the RI Proposal presents the analytical program for soils. Metals will be analyzed using Contract Laboratory Program (CLP) analytical methods and pH by EPA Method 9045A as specified in Table 4-1 of the Quality Assurance Plan. Analytical data will be obtained in accordance with the QA/QC provisions and using the laboratory QC samples specified in the QAP.

Each soil sample will be made up of five sub-samples taken on a 50 m by 50 m area. All 30 composited soil samples collected to estimate pCu will be tested for pH and total copper after the soils have been sieved to <2 mm. The soil samples will be sent to the laboratory for pH paste analysis using deionized water and total copper analysis by dry weight using ICP (EPA 6010) with a method detection limit of 1 mg/kg. Two rinsate samples and three soil duplicate samples will be collected and analyzed for Copper and pH. The five sets of five subsamples (grab samples) will be analyzed for Copper and pH in the same manner.

For copper, the 9 composite samples collected to obtain a conversion factor for the surface soil XRF concentrations to 0-6 inch soil concentrations of copper will be sent to the laboratory for copper analysis by dry weight after sieving to < 2 mm. Analysis will use ICP (EPA 6010) with a method detection limit of 1 mg/kg. One duplicate and one rinsate sample will be analyzed for total copper.

A.8 Processing of Results

A8.1 Spatial Interpolation of pCu

Samples collected as part of this effort will be added to existing point samples representative of current conditions to create an updated, more precise understanding of pCu concentration and potential exceedances of the Pre-FS RAC. After field sampling and laboratory analysis, the data will be input into ARCGIS and Kriging will be used to create a continuous pixel surface of concentrations to predict pCu in unsampled areas. The more nearby sampling points available to inform the estimated concentration of a given pixel, the less uncertainty is associated with the final interpolated map. The estimated pCu concentration represented by the area within the Kriged boundary of pCu < 5 contour line will be used to screen exposure unit polygons. Polygons that intersect the pCu < 5 contour will be evaluated for rangeland and wildlife habitat condition and addressed in the FS. If they are screened out based on good-fair rangeland or acceptable wildlife habitat conditions, an evaluation of the sampling adequacy for pCu and rangeland in the polygons will be made to ensure this conclusion is statistically supported (considering the kriging model error and remote sensing accuracy in that area). If sampling is inadequate, additional sampling may be required. Similarly, some polygons that were not screened out may require additional sampling for the same reasons.

A8.2 Spatial Interpolation to Define 95 UCL Copper in Exposure Units

Figure 8 provides the decision tree that will be used to select the appropriate spatially-weighted averaging method to calculate a 95 UCL of total copper concentration in the exposure units. The interpolation techniques in Figure 8 are discussed in greater detail in USEPA (2004). The spatial interpolation/estimation choices include Thiessen polygons, IDW, or kriging. Factors that will affect the decision include frequency of detections, spatial autocorrelation, relationship between polygon weights and concentration, exposure concentration relative to RAC, and semivariogram fit. Once the method is selected, the average and 95% confidence interval will be calculated using the method that is appropriate to the distribution of the data (normal, log-normal, gamma, or non-parametric distribution) and spatial averaging method.

A8.3 Evaluation of Remote Sensing for Rangeland and Wildlife Habitat Quality in areas with low pCu

There are several challenges to using remote sensing for rangeland assessment (Freidel et al. 2000). Many of the variables used to assess rangeland such as pedestals and leaf litter may occur at such a microscale they cannot be observed in a remotely sensed pixel. Available imagery includes a pan-sharpened Quickbird satellite image collected in four bands (three visible and near-infrared), with a spatial resolution of half a meter. While this image should provide the necessary spatial resolution, there may still be factors visible on the ground that are not discernible in the imagery. The evaluation, however, will focus on accurate estimate of the binary classification of good-fair vs. poor using sample data to calibrate the classification process. In addition to identifying spectral reflectance differences in species and growth forms, NDVI and its standard deviation, multi-date imagery, and distance from water (stockponds heavily used by cattle) sometimes are good predictors of rangeland condition that can be evaluated to refine the rangeland classification (Hutchinson and Warren, 1983; Pickup et al., 1994; Freidel et al., 2000; Richie et al,. 2008; Mohamed et al., 2011; Vanderpost et al., 2011) and such methods are used in New Mexico (Richie et al., 2008; Mohamed et al., 2011). Remote sensing may provide a better basis for detecting the actual sharp boundaries in rangeland condition through the resolution of reflectance intensity for spectral signatures associated with fair-good versus poor rangeland condition.

The data will be collected to develop a relationship between spectral data on remotely sensed imagery and the OAT score classes of good-fair and poor (Table 2). The spectral relationship will be used to classify the rangeland classes of the entire area of interest. The boundary of polygons will be evaluated, and if necessary, re-defined to the extent practicable using sharp boundaries observed in photos and images. Image segmentation of the pixel data into similar “objects” can also help identify sharp boundaries.

For wildlife habitat quality, a relationship between cover and richness with spectral data will be developed, if possible. That relationship will be used to classify the cover and richness of the exposure units with predicted pCu < 5. The final map for each will be binned into acceptable and unacceptable wildlife habitat using aforementioned criteria for cover and richness as the thresholds for acceptable quality habitat. Boundaries of polygons of acceptable verses unacceptable wildlife habitat (rangeland polygons) for cover and richness will be evaluated for adequacy by identifying sharp boundaries on the images.

Unlike percent cover, species richness is a complex problem for remote sensing analysis and may not be feasible. Depending on the species composition present, it may be possible to perform a species-level classification using remote sensing that can be used to assess richness. This classification would be object-based and use Quickbird imagery with high spatial resolution to divide an area into segments. Each segment will represent a single cluster of like species identifiable based upon ground-collected data. The number of such different clusters may provide an index correlated to species richness. If remote sensing is not feasible for species richness, the evaluation will rely upon percent cover.

A8.4 Delineation of Ephemeral Drainage Exposure Units for Copper

Remote sensing of bank vegetation along ephemeral drainages (25’ on either side) will focus on the near-infrared portion of the electromagnetic spectrum to assess percent woody cover. A relationship developed between NDVI or near-infrared spectrum data and ground-collected data on woody cover will be used to estimate percent woody cover in unsampled areas (if the two remote sensing and field observations are accurate within 10% cover). The canopy cover from the created remote sensing map of woody cover will be estimated for the entire area of the banks and adjacent uplands, rather than just for a sample (a complete census if the remote sensing map is considered accurate, that is, it passes the 70% accuracy test discussed in Section A.4 under drainage copper sampling).. Thus, a minimum detectable difference must be defined and was set at 25% between upland and banks as a reasonable amount to differentiate bird habitat, given measurement errors. . Banks significantly different from upland will become exposure units separate from upland exposure units.

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Table 1
Criteria used to score Observed Apparent Trend (OAT)
Freeport-Mcmoran Chino Mines Company
Vanadium, New Mexico
Smelter/Tailings Soils Feasibility Study Proposal

Check appropriate box in each category which best fits area being observed. Points may vary within each category.

☐ **VIGOR** (10 points)	Desirable grasses, forbs and shrubs are vigorous, showing good health. These plants have good size, color, and produce abundant herbage.
☐ (6 points)	Desirable grasses, forbs and shrubs have moderate vigor. They are medium size with fair color, and produce moderate amounts of herbage. Some seed stalks and seed heads are present.
☐ (2 points)	Desirable grasses, forbs and shrubs have low vigor. They appear unhealthy with small size and poor color. Portions of clumps or entire plants are dead or dying. Seed stalks and seed heads are non-existent, except in protected areas.
☐ **SEEDLINGS** (10 points)	There is seedling establishment of desirable grasses, forbs and shrubs. Seedlings are present in open spaces between plants and along edges of soil pedestals. Few seedlings of invader or undesirable plants are present.
☐ (6 points)	Some seedlings of desirable grasses, forbs and shrubs may or may not be present in open spaces between plants. Some seedlings of invader or undesirable plant species may or may not be present.
☐ (2 points)	Few if any seedlings of desirable grasses, forbs and shrubs are being established. Seedlings of invader or undesirable plants are present in open spaces between plants.
☐ **SURFACE LITTER** (5 points)	Surface litter is accumulating in place.
☐ (3 points)	Moderate movement of surface litter is apparent and deposited against obstacles.
☐ (1 point)	Very little surface litter is remaining.
☐ **PEDESTALS** (5 points)	There is little visual evidence of pedestalling. Those pedestals present are sloping or rounding and accumulating litter. Desirable forage grasses may be found along edges of pedestals.
☐ (3 points)	There is moderate pedestalling with no visual evidence of healing or deterioration. Small rock and plant pedestals may be occurring in flow patterns.
☐ (1 point)	Most rocks and plants are pedestalled. Pedestals are sharp-sided and eroding, often exposing grass roots.

☐ **SURFACE CRUSTING** (5 points)	There is little visual evidence of surface crusting.
☐ (3 points)	There is moderate surface crusting, with no visual evidence of healing or deterioration. (Note reason for cause)
☐ (1 point)	Severe surface crusting. (Note reason for cause)
☐ **RILLS AND GULLIES** (5 points)	Gullies (including rills) may be present in stable condition, with moderate sloping or rounded sides. Perennials are establishing themselves on bottom and sides of channel.
☐ (3 points)	Gullies are well developed, with small amounts of active erosion. Some vegetation may be present.
☐ (1 point)	Sharply incised V-shaped gullies cover most of the area, with most of the gullies actively eroding. Gullies are mostly devoid of perennial plants. They have fresh cutting on the bottom.
TOTAL: _________ **FIELD NOTES:**	

Table 2
Rangeland condition indices and acres measured in rangeland polygons with OAT scores potentially with pCu < 5

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILING SOILS IU FEASIBILITY STUDY PROPOSAL

Polygon ID	OAT Score[2]	Preliminary Condition[1]	OAT Score Class	Acres
HE393/394	12	Poor	Poor	69.2
HE216	13	Poor	Poor	121.6
HE390	14	Poor	Poor	54.3
HE314	18	Fair-Poor	Poor	36.7
HE291	21	Fair	Poor	288.7
HE292	21	Fair	Poor	279.4
HE316	22	Fair-Poor	Fair-Good	122.8
HE315	22	Fair	Fair-Good	22.9
HE320	22	Poor	Fair-Good	25.1
HE321	22	Fair	Fair-Good	60.4
HE395	22	Fair-Poor	Fair-Good	209.3
HE205	22	Fair	Fair-Good	858.5
HE187	24	Poor	Fair-Good	52.7
HE308	24	Fair	Fair-Good	187.5
HE317	24	Fair	Fair-Good	43.0
HW112/163	26-34	Fair	Fair-Good	267.9
HW111/165	26-34	Good-Fair	Fair-Good	519.2
HW155/160	26-34	Good-Fair	Fair-Good	349.0
HE533A, HE203/204/205/206	27	NA	Fair-Good	652.4
HE193	27	Good	Fair-Good	533.1
HE196B	27	Good	Fair-Good	107.5
HE309	27	Good-Fair	Fair-Good	42.8
HE186	28	Fair	Fair-Good	71.4
HE189/191	30	Fair	Fair-Good	46.0
HE190	30	Fair	Fair-Good	41.5
HE193B	32	Good	Fair-Good	48.6
HE45A	32	Fair	Fair-Good	133.0
HE196	33	Good	Fair-Good	89.6
HE192	33	Fair	Fair-Good	320.4
HE32A	34	Good	Fair-Good	90.7

[1]Preliminary condition is average of good, fair, and poor rankings for five soil stability criteria, three plant distribution criteria, and three plant recovery criteria (Woodward Clyde, 1997) and is independent of OAT score.
[2]OAT score is calculated using criteria in Table 1
NA = not available

Table 3
Copper Results Comparison of 0-1 inch and 0-6 inch Samples

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILING SOILS IU FEASIBILITY STUDY PROPOSAL

Sample ID	Copper 0-1 inch	Copper 0-6 inch	Ratio of Copper in Site Soil	Ratio of Copper in Tailings Soil
FID 0	538	329	0.61	
FID 1	175	143	0.82	
FID 2	453	405	0.89	
FID 3	377	236	0.63	
FID 4	676	599	0.89	
FID 6	650	182	0.28	
FID 7	192	242	1.26	
FID 8	328	430		1.31
FID 10	1050	1020	0.97	
FID 12	5580	4260	0.76	
FID 13	1280	1970		1.54
FID 15	1530	1360	0.89	
FID 16	362	512		1.41
FID 17	9150	4680	0.51	
FID 18	215	326		1.52
FID 20	755	790		1.05
FID 21	153	131	0.86	
FID 22	347	285	0.82	
FID 23	168	252		1.50
FID 24	222	121	0.55	
FID 25	89	66	0.74	
FID 26	134	75	0.56	
FID 27	322	206	0.64	
FID 28	426	348	0.82	
FID 30	291	90	0.31	
FID 31	294	187	0.64	
FID 32	2250	2120	0.94	
FID 33	785	308	0.39	
FID 34	682	209	0.31	
FID 35	219	210	0.96	
FID 39	590	414	0.70	
FID 43	229	466	2.03	2.03
S77/SS147	379	267	0.70	
S76/SS144	449	278	0.62	
S75/SS140	1180	940	0.80	
S74/SS136	783	529	0.68	
S73/SS133	1500	1290	0.86	
SS131D/SS131S	454	444	0.98	
SS129D/SS129S	315	337	1.07	
S72/SS126	1400	1160	0.83	
SS124D/SS124S	1150	523	0.45	
SS125D/SS125S	398	166	0.42	
SS118D/SS118S	640	259	0.40	
SS119D/SS119S	338	125	0.37	
median	437.5	327.5	0.72	1.50
average	897.6818	665.6818	0.74	1.48
sample size (n)	44	44	38	7
slope of Cu regression			0.61	1.41

Note: median ratio chosen as most valid--not influenced by outliers, median is close to 1.0 for pH, so no ratio adjustment required for pH

Table 4
Acreages of vegetation polygons with samples that have Cu > 1600 mg/kg

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILING SOILS IU FEASIBILITY STUDY PROPOSAL

			Copper	
Polygon	**Number of Samples**	**Area**	**Min**	**Max**
	(in given polygon)	(acres)	(mg/kg)	(mg/kg)
26	43	762.2	224	5593
32	54	586.2	129	7350
120	28	878.9	385.7	4046
6	7	23.2	385.7	3115
100	7	33.7	798	5817
141	7	9.8	798	5593
23	26	226.1	34.1	5593
1	3	226.1	1160	3038
142	63	5908.1	34.1	5350
128	2	0.3	2737	4669
9	48	359.1	62.6333	2527
105	10	107.4	259	1764

Notes:
mg/kg = milligram per kilogram

Table 5
Statistics calculated on pCu samples within area of uncertainty to estimate sample size (N)

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILING SOILS IU FEASIBILITY STUDY PROPOSAL

Statistic	pCu	Copper
Count	37	88
Mean	5.166	1736.16
StDev	1.066	1094.2
Delta	0.5	300
N >=	48	139

OFFICE: LAKEWOOD DB: MLM TM: MB
FREEPORT-MCMORAN, CHINO MINES (B0063543.0000)
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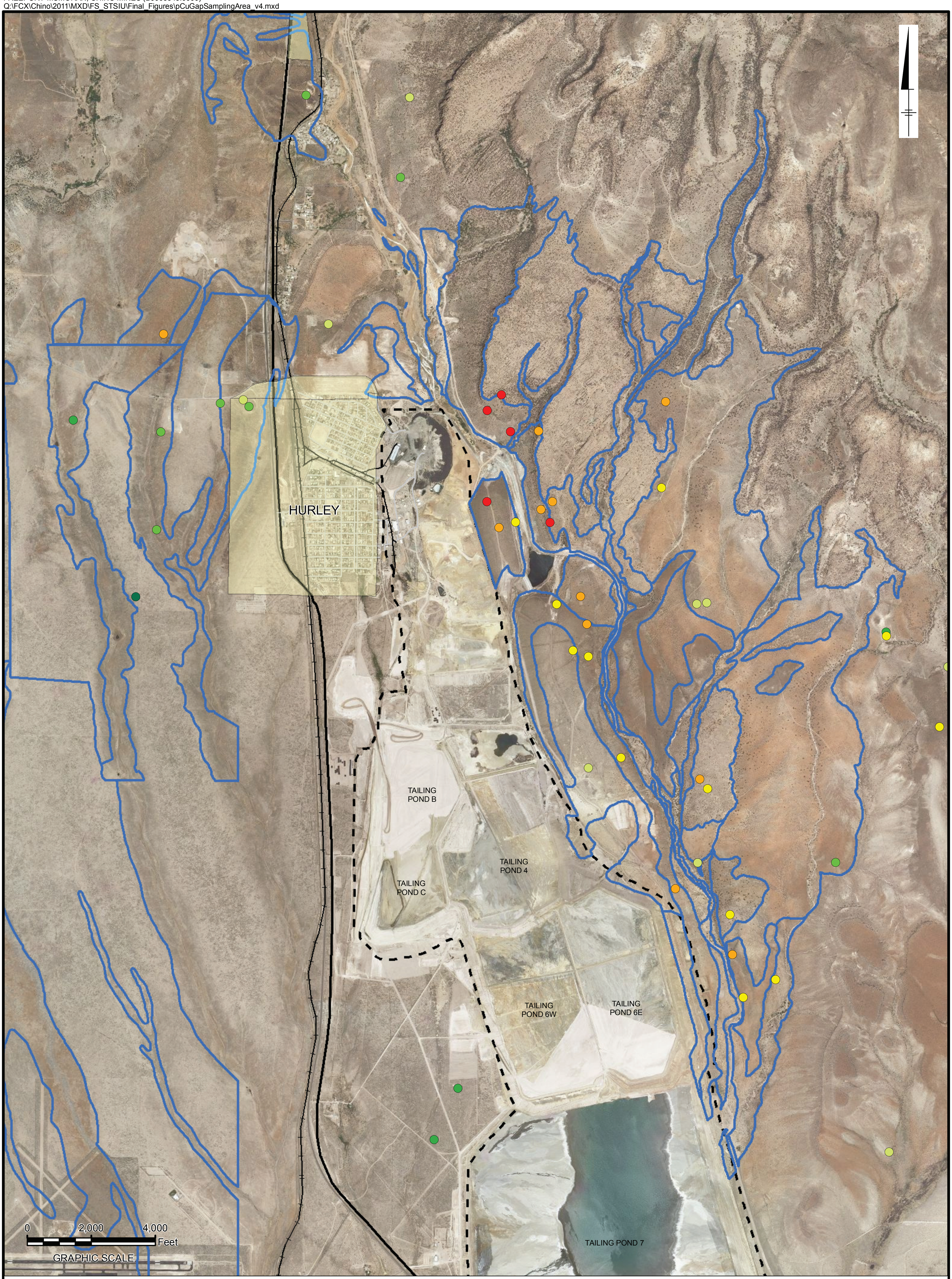

LEGEND:

pCu

- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- >10

- Rangeland Polygons (Exposure Unit for pCu)
- Town Roads
- Major Roads
- Smelter Tailing Boundary
- City Areas

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS PROPOSAL

EXISTING pCu SAMPLE LOCATIONS AND RANGELAND POLYGONS

ARCADIS

FIGURE
1

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
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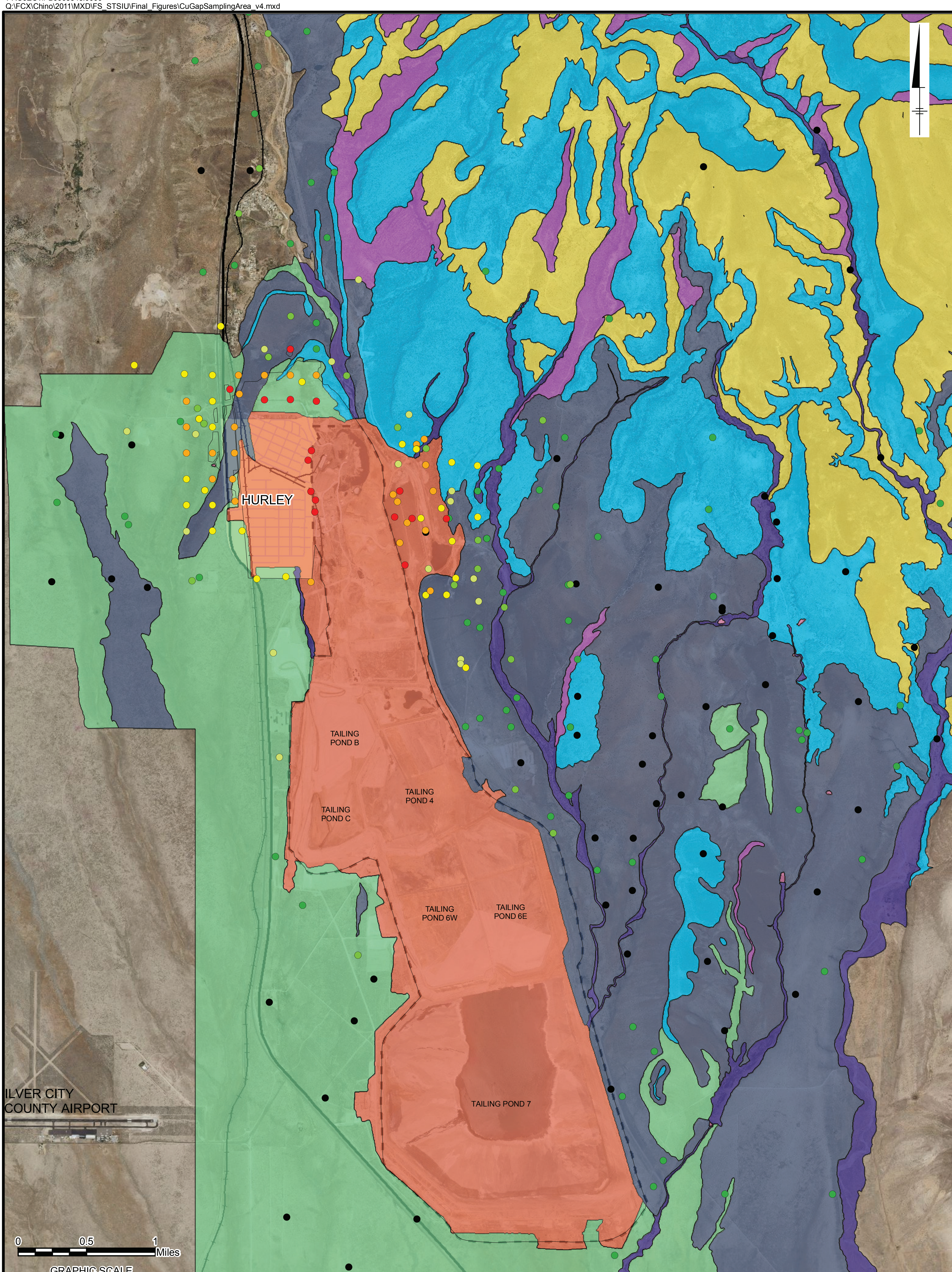

LEGEND:

Copper Concentration (mg/kg)

- <327
- 327 - 800
- 800 - 1,100
- 1,100 - 1,600
- 1,600 - 2,700
- 2,700 - 5,000
- >5,000

Vegetation

- Fluvial Forest and Shrubland Alliance
- Mesquite/Mixed Grama Shrubland Alliance
- Mine Facilities/Urban
- Ponderosa Pine-Oak Forest Alliance
- Alligator Juniper-Oak Woodland Alliance
- Mountain Mahogany Shrubland Alliance
- Not Classified
- Mixed-Grama Herbacious Alliance
- Alligator Juniper-Oak/Grama Woodland Alliance

Note: Vegetaion alliances will be used as the exposure unit for the SGFB.

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS PROPOSAL

EXISTING COPPER SAMPLE LOCATIONS AND VEGETATION POLYGONS

ARCADIS

FIGURE
2

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
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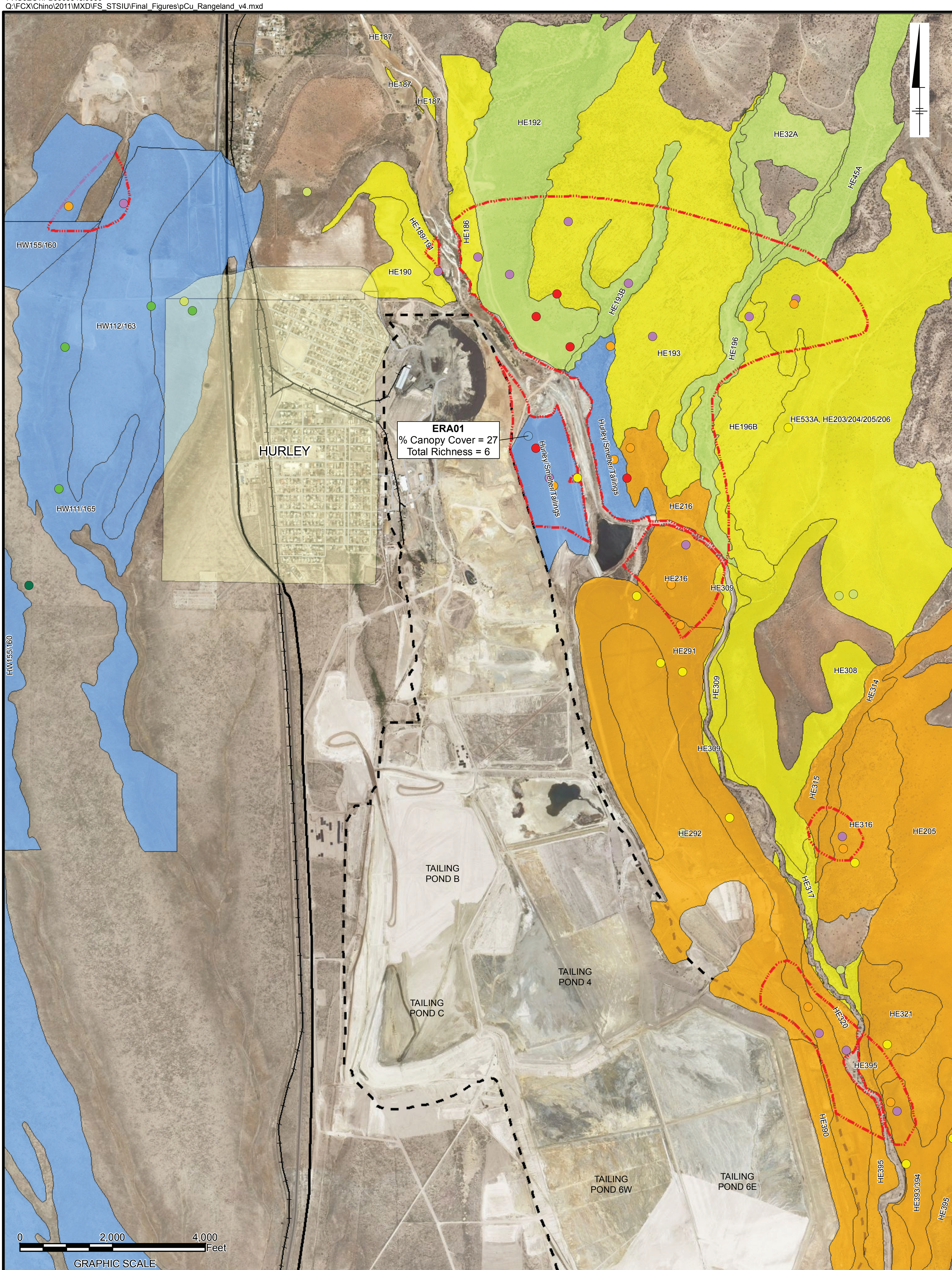


LEGEND:

Existing ERA Sample Location
Proposed Sample Location

pCu
3 - 4
4 - 5
5 - 6
6 - 7
7 - 8
8 - 9
9 - 10
>10

pCu <5 Contour

Rangland Condition OAT Score
NA
11 - 22
23 - 30
31 - 34

Railroad
Town Roads
Major Roads
Smelter Tailings Boundary
City Areas

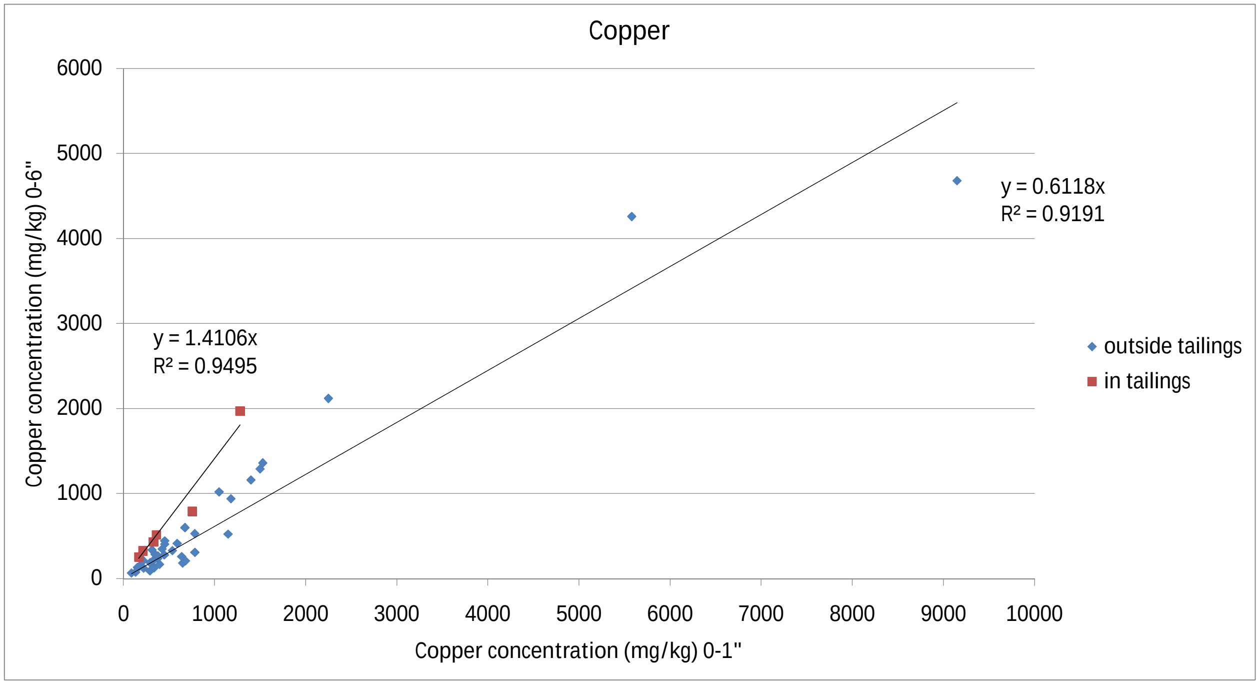
FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS PROPOSAL

OAT SCORE OF RANGELAND POLYGONS AND PROPOSED RANGELAND CONDITION SAMPLE LOCATIONS

ARCADIS

FIGURE
3



FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILING SOILS IU FS REPORT

Regression Model for Copper in 0-1inch verses Copper in 0-6 inch Samples

ARCADIS
Infrastructure, environment, facilities

FIGURE 4

OFFICE: LAKEWOOD DB: MLM TM: MB
FREEPORT-MCMORAN, CHINO MINES (B0063543.0000)
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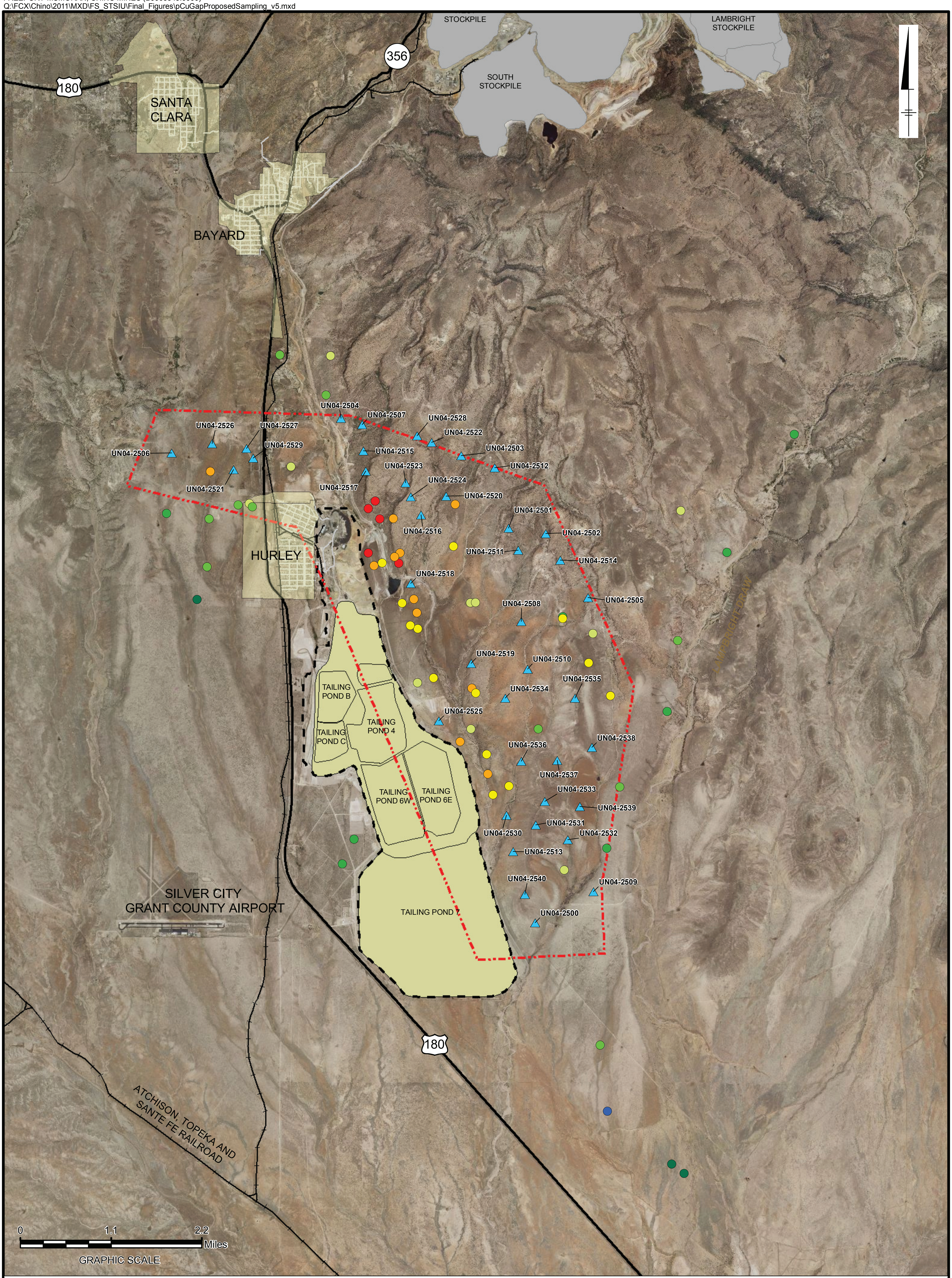

LEGEND:

- Sample Location
- pCu Area of Uncertainty
- Railroad
- Town_Roads
- Major Roads
- City Areas
- Stockpiles
- Tailing Ponds
- Smelter Taililng Boundary

pCu

- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- >10

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS PROPOSAL

PROPOSED SAMPLING LOCATIONS FOR pCu GAP CHARACTERIZATION

ARCADIS

FIGURE
5

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
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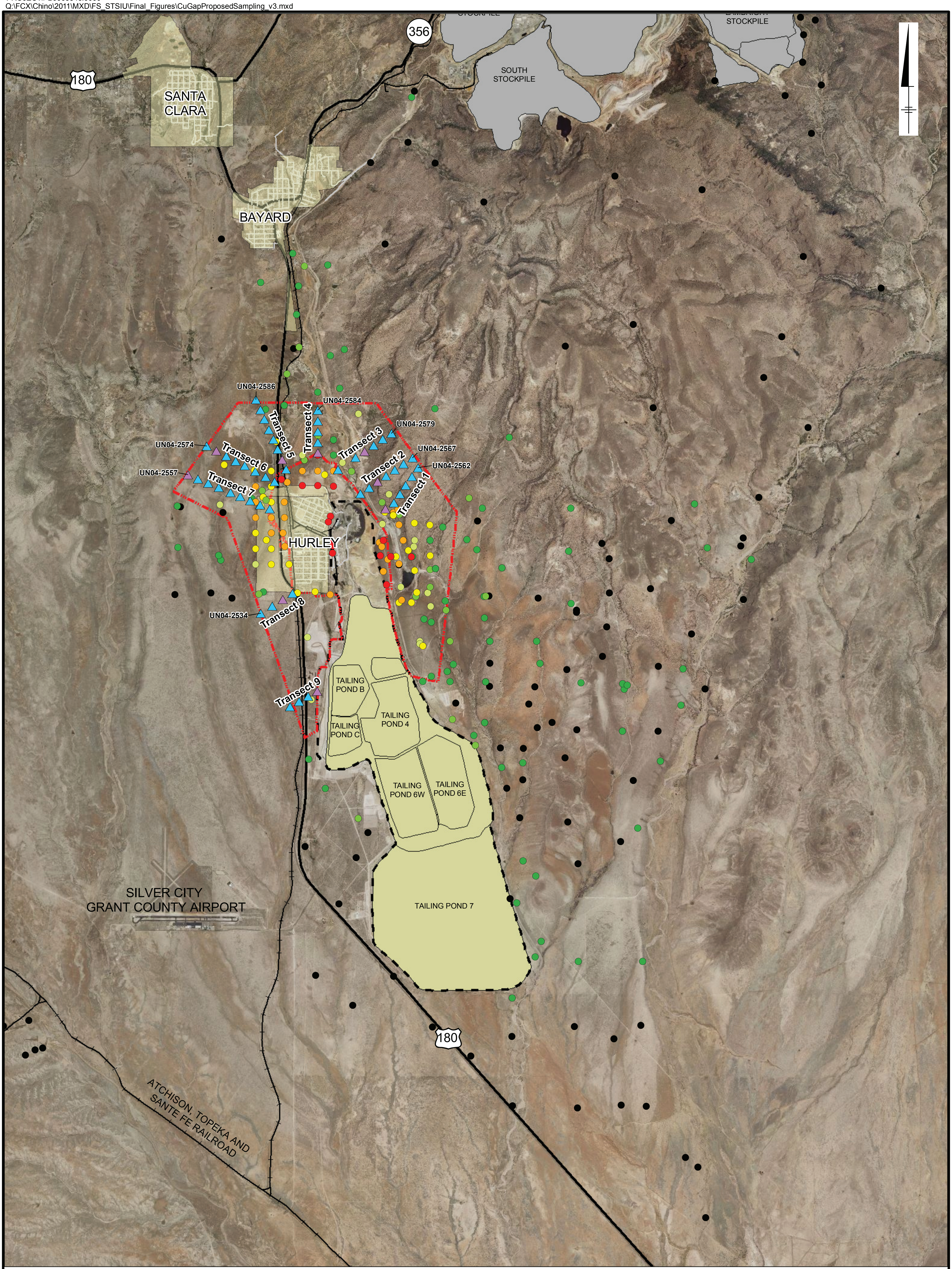

LEGEND:

Cu Area of Uncertainty

Proposed Woody Cover Sample Locations

Sample Location

Lab Confirmation Sample Location

Copper Concentration (mg/kg)

<327

327 - 800

800 - 1,100

1,100 - 1,600

1,600 - 2,700

2,700 - 5,000

>5,000

City Areas

Stockpiles

TailingPondsAll

0 1 2 Miles

GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS PROPOSAL

PROPOSED SAMPLING LOCATIONS FOR Cu GAP CHARACTERIZATION

ARCADIS

FIGURE
6

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
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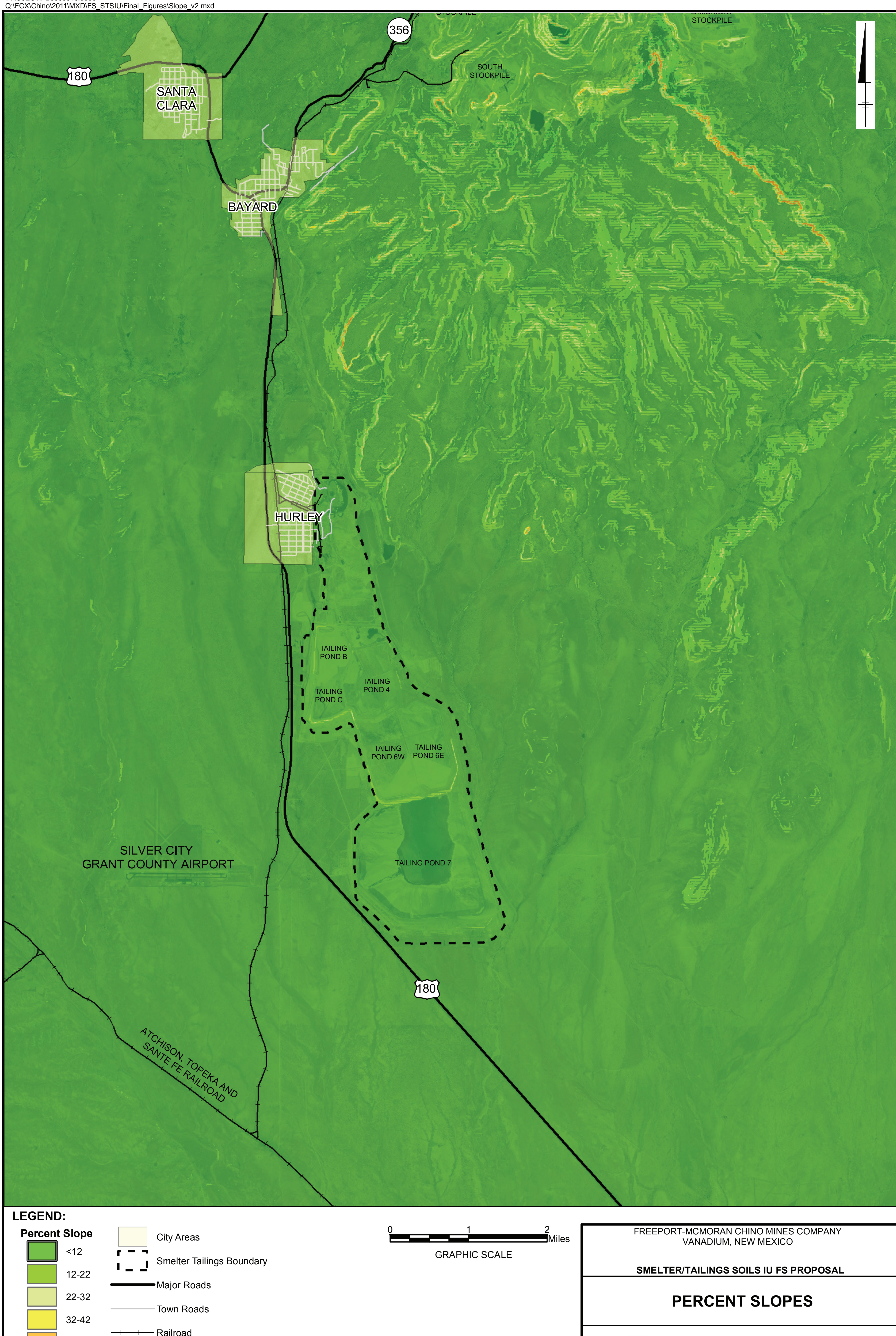

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS PROPOSAL

PERCENT SLOPES

ARCADIS

FIGURE
7

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
PROJECT# B0063543.0000
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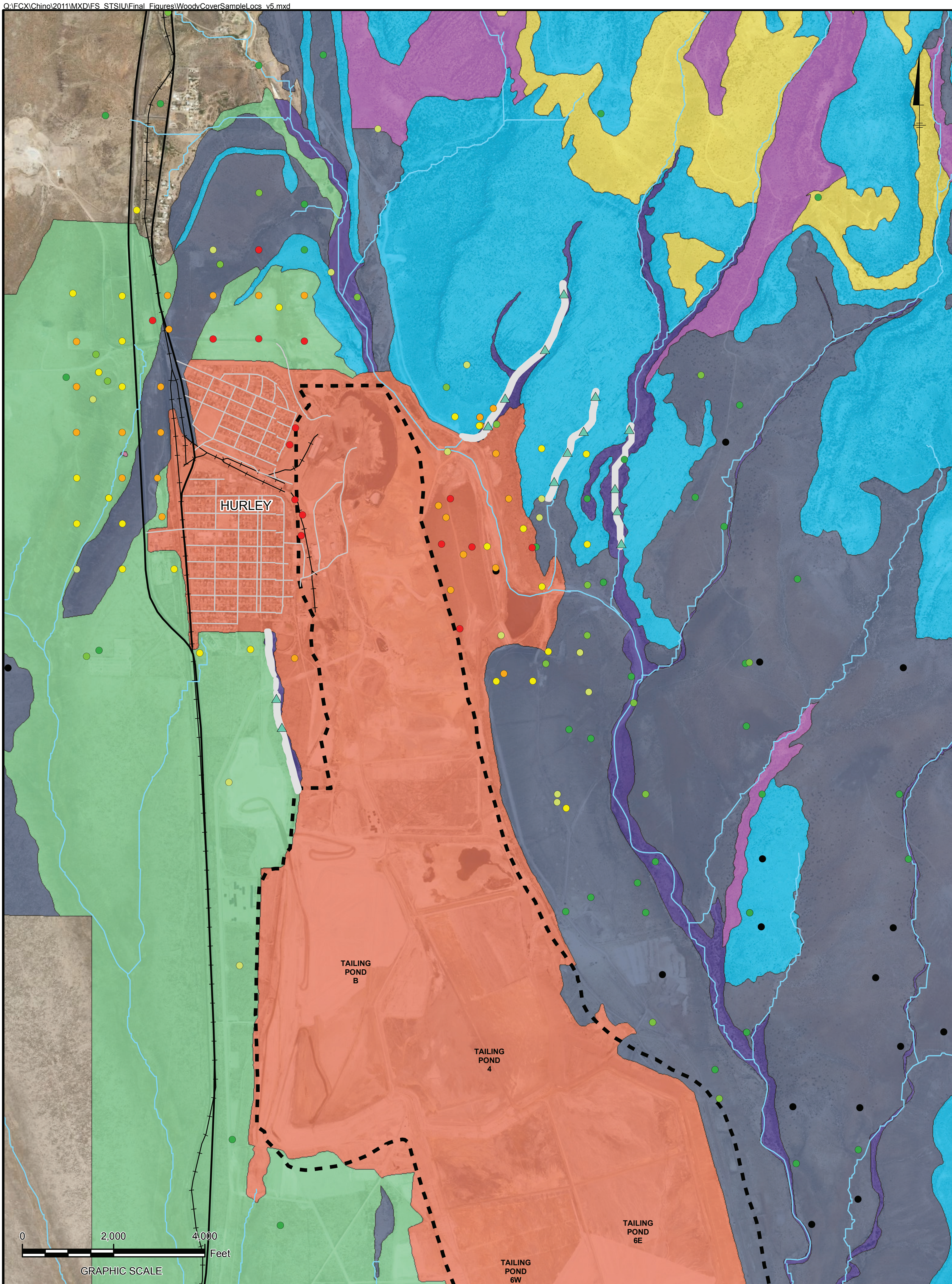


LEGEND

- Proposed Sample Location
- Drainage Banks Sampled
- Drainages
- Town Roads
- Smelter Tailing Boundary
- Major Roads
- Railroad
- Fluvial Forest and Shrubland Alliance
- Mesquite/Mixed Grama Shrubland Alliance
- Mine Facilities/Urban
- Pondrosa Pine-Oak Forest Alliance
- Alligator Juniper-Oak Woodland Alliance
- Mountain Mahogany Shrubland Alliance
- Not Classified
- Mixed-Grama Herbacious Alliance
- Alligator Juniper-Oak/Grama Woodland Alliance

Copper Concentration

- <327 mg/kg
- 327 - 800 mg/kg
- 800 - 1,100 mg/kg
- 1,100 - 1,600 mg/kg
- 1,600 - 2,700 mg/kg
- 2,700 - 5,000 mg/kg
- >5,000 mg/kg

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS PROPOSAL

PROPOSED WOODY COVER SAMPLE LOCATIONS ON DRAINAGE BANKS

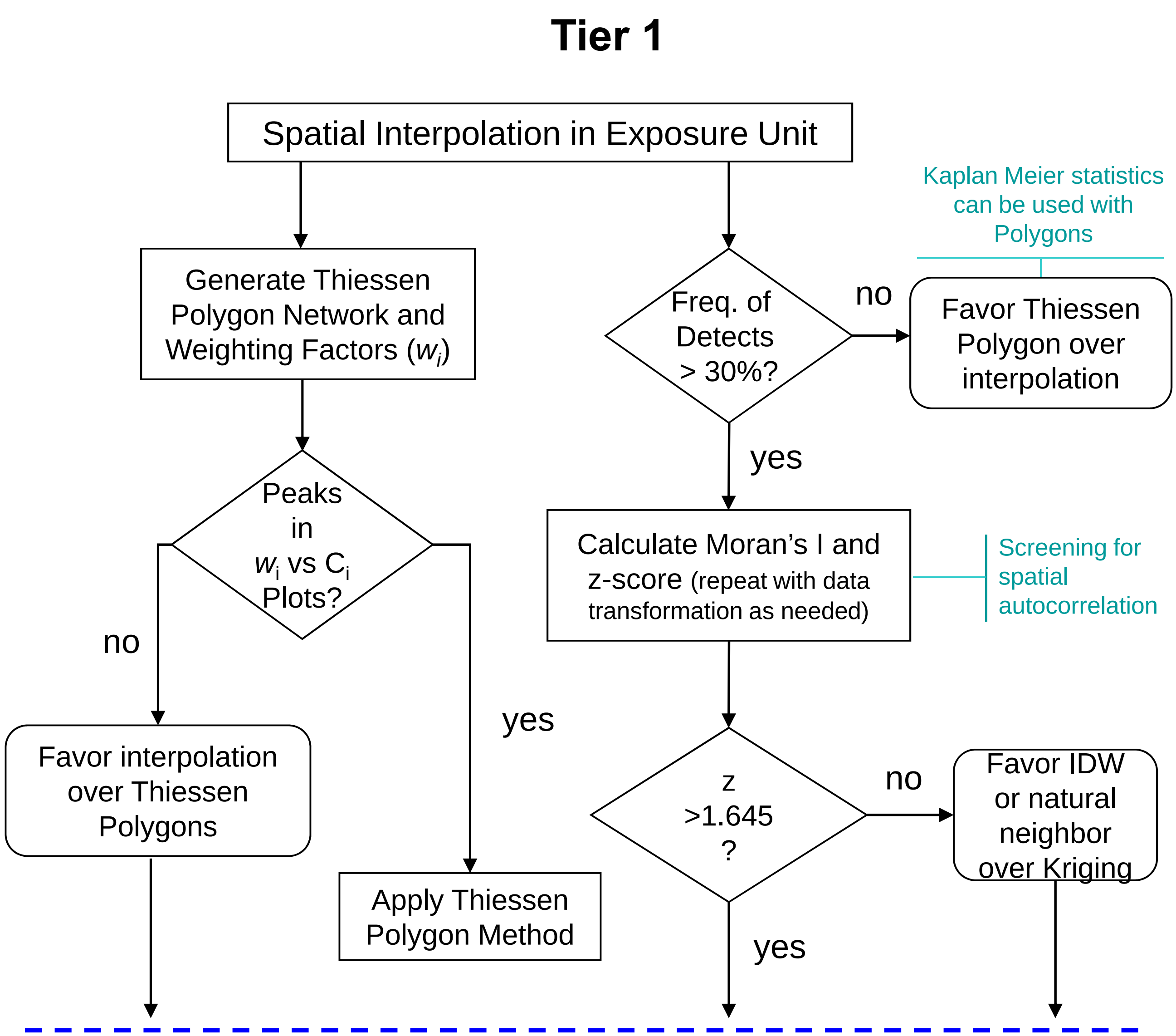
ARCADIS

FIGURE 8

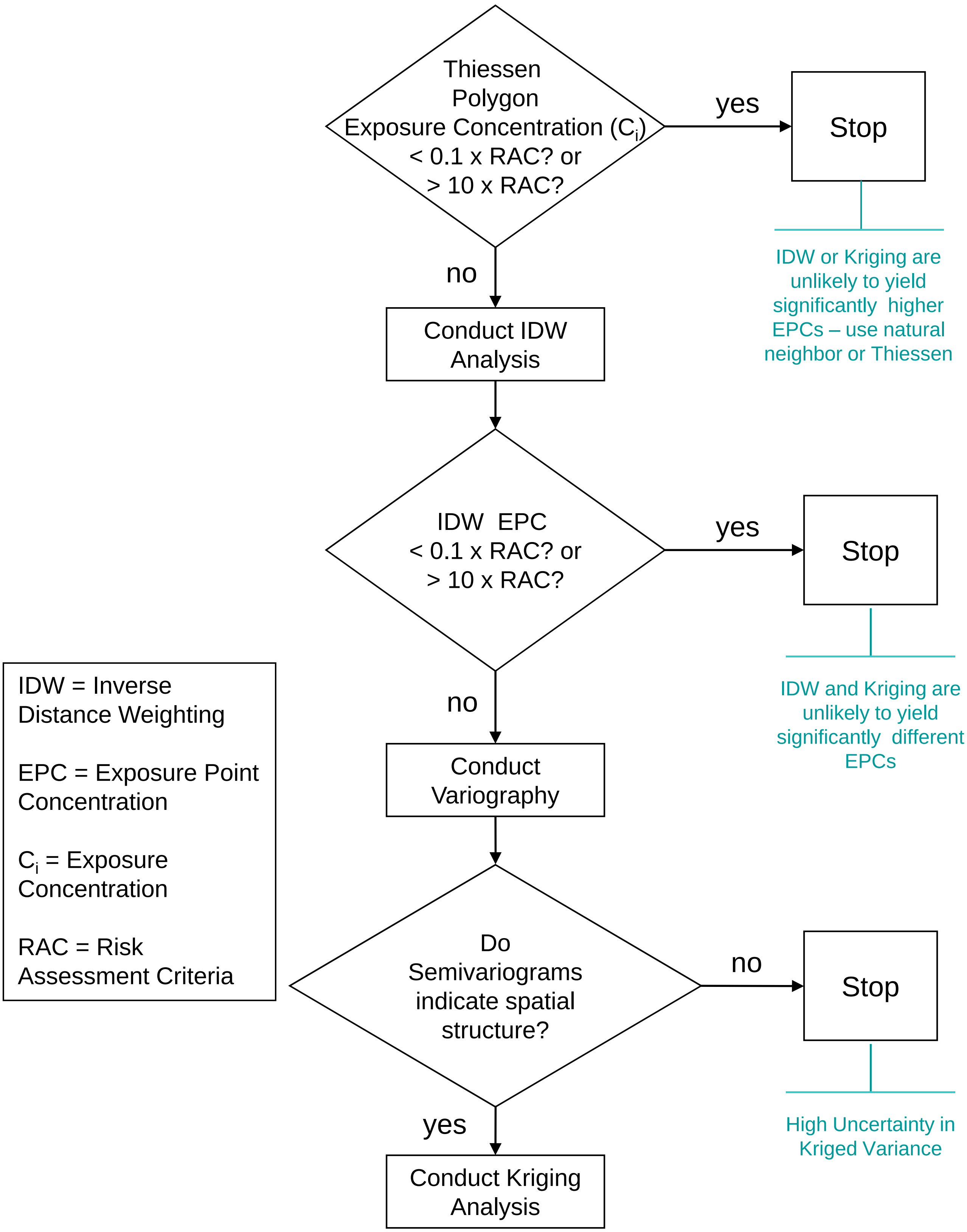
FIGURE 9

DECISION TREE FOR INTERPOLATION METHOD USED TO DERIVE THE 95 UCL IN AN EXPOSURE UNIT

Smelter/Tailings Soils IU FS Proposal
Freeport-McMoran Chino Mines Company
Vanadium, New Mexico



Tier 2



Thiessen Polygon Exposure Concentration (C_i) < 0.1 x RAC? or > 10 x RAC?
yes
Stop
IDW or Kriging are unlikely to yield significantly higher EPCs – use natural neighbor or Thiessen
no
Conduct IDW Analysis
IDW EPC < 0.1 x RAC? or > 10 x RAC?
yes
Stop
IDW and Kriging are unlikely to yield significantly different EPCs
no
Conduct Variography
Do Semivariograms indicate spatial structure?
no
Stop
High Uncertainty in Kriged Variance
yes
Conduct Kriging Analysis
IDW = Inverse Distance Weighting
EPC = Exposure Point Concentration
C_i = Exposure Concentration
RAC = Risk Assessment Criteria

Attachment G

R Code for Calculating 95UCL Bootstrap Datasets

Attachment G: R Code for Calculating 95UCL Bootstrap Datasets

For assessing areas that might need remediation for birds, a spatially-weighted 95 percent upper confidence limit (95UCL) of the mean copper concentration was calculated for exposure units using a bootstrapping dataset method that accounts for skewed datasets. The approach for calculating spatially-weighted 95UCLs using Thiessen polygons involves producing bootstrapped datasets for the original dataset (with replacement) using the statistical software program R version 4.3.2. These bootstrapped datasets are then entered into ProUCL 5.2 to have the ProUCL program recommend the best 95UCL based on the best statistical distribution of the individual dataset. The recommended 95UCLs from 500 iterations of the bootstrapped datasets were averaged to produce the final 95UCL for each alliance polygon, using arithmetic mean if the distribution of 95UCLs was symmetric or geometric mean if the distribution was asymmetric. The R code used to produce the bootstrapped datasets with replacement is provided below.

```
# Clear any existing variables from memory
rm(list = ls())

# Openxlsx library required
# Use/uncomment this to install if not already on user's computer:
# install.packages("openxlsx")

library(openxlsx)

# Set random number seed to match results.
# Seed 1111 used to generate report results
seed_param = 1111


### Set up File Paths ###

# Path to working directory on user's computer. Use forward slashes.
ws = 'C:/Enter/Some/folder/path/here/'
setwd(ws)

output_folder = 'Output'

out_ws = file.path(ws, output_folder)
if (!file.exists(out_ws)) {
  dir.create(out_ws)
}

xl_name = 'Combine_CU_Data.xlsx'
xl_path = file.path(ws, xl_name)

out_xl_name = 'Output_CU_Bootstraps.xlsx'
out_xl_path = file.path(ws, out_xl_name)


### Read Input Data ###
```

```
# Open combined workbook data tab as dataframe
in_df = openxlsx::read.xlsx(xl_path, 'Data')

# Clean rows to be removed
xl_df = in_df[!in_df$Remove, ]


### Set up data for bootstrap analysis ###


# Set Bootstrap runs
n_bootstraps = 500
bs_headers = paste('BS_', formatC(1:n_bootstraps,
                                  digits = 3,
                                  flag = "0"),
                   sep = '')

# Get unique set of polygon areas names to run
u_polys = unique(xl_df$Tab_Name)

# If wanted, can use this option set to TRUE to run only a subset.
# Otherwise, leave set to FALSE to run all.
use_subset = FALSE
poly_subset = c(
    "FFSA3_", # Add more sites as needed
    "FFSA4_",
    "FFSA5_"
)

if (use_subset) {
  u_polys = u_polys[u_polys %in% poly_subset]
}


### Bootstrapping ###

# Loop through each site and generate the bootstrap data

for (poly in u_polys) {
  # Set seed for each polygon, so if re-run in
  # a different order each is still matching
  set.seed(seed_param)

  print(poly)

  # Get data for taht site
  poly_mask = xl_df$Tab_Name == poly
  poly_data = xl_df[poly_mask, ]
  n_poly_data = nrow(poly_data)

  # Generate Bootstrap data, add new column for each new
  # bootstrap set as name bs_header
  for (bs in 1:n_bootstraps) {
```

```
    bs_sample = sample(poly_data$Cu_Conc,
                       size = n_poly_data,
                       replace = T,
                       prob = poly_data$Acres_Weighted)

    bs_header = bs_headers[bs]
    xl_df[poly_mask, bs_header] = as.numeric(bs_sample)

  }

  # Export Excel Workbook with bootstrap data per site
  poly_data = xl_df[poly_mask, ]
  xl_poly_name = paste('Output_', poly, '.xlsx', sep = '')
  xl_poly_path = file.path(out_ws, xl_poly_name)

  openxlsx::write.xlsx(poly_data,
                       file = xl_poly_path,
                       sheetName ='Output_BS')

}

# Export Full Excel workbook with all data
openxlsx::write.xlsx(xl_df,
                     file = out_xl_path,
                     asTable=TRUE,
                     sheetName ='Output_BS')
```

Appendix E

Methods for Surface Water Analysis

Freeport McMoRan Chino Mines Company

APPENDIX E – SURFACE WATER RUNOFF QUALITY AND DURATION REPORT

SMELTER/TAILING SOILS INVESTIGATION UNIT FEASIBILITY STUDY

March 2023

Contents

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1. Introduction

This Report documents the collection and analysis of surface water runoff samples for the Smelter/Tailing Soils Unit (STSIU) Feasibility Study (FS) Proposal (FS Proposal; Arcadis 2011). The FS Proposal was designed to generate data necessary to evaluate the area affected by pre-FS remedial action criteria (RAC) issued by New Mexico Environment Department (NMED) on March 3, 2011. The purpose of the investigation presented in this Report was to refine the site conceptual model for surface water in STSIU drainage channels during precipitation runoff events and to monitor the depth and duration of flow in the drainage channels during and following precipitation events. Surface water samples have historically been collected from stock tanks and rainfall pools within the STSIU shortly after precipitation events (Newfields, 2005; Chino, 2008; SRK, 2008); however, until the implementation of the work described in this Report, surface water samples had not been collected during the period of runoff initially generated by precipitation events. This Report presents the objectives of the surface water investigation, and describes the sampling, analysis, and data gathering methods used in the investigation.

The objectives of data collection efforts included:

- Provide additional surface water quality data to support refinement of the surface water conceptual site model and to support the STSIU FS;
- Gain additional insight into the potential variability of surface water quality during precipitation runoff events and to compare surface water quality for several separate runoff events during a single monsoon season;
- Define the duration of flow and presence of water to support classification of drainage channels in the STSIU (i.e., perennial, intermittent, or ephemeral).

Section 4 of the STSIU FS provides an updated site conceptual model for surface water based on the data included in this Report and thus the model is not discussed further. Additionally, as described in Section 2 of the FS, Arcadis conducted an expedited Use Attainability Analysis (UAA) based on NMED Surface Water Quality Board's (SWQB's) Hydrology Protocol and established revised drainage classifications (Arcadis, 2012). Because these data were already reported through the UAA process, the water level and water duration monitoring data are not discussed further in this Report.

This Report references the policy, functional activities, and quality assurance/quality control (QA/QC) protocols used in the investigation, which are specifically stated in the RI Quality Assurance Project Plan (QAPP) (Chino/SRK, 1997). The QAPP defines how site-wide QA/QC activities will be implemented during the RI sampling and analysis. The objective of the QAPP is to ensure that data are of adequate quality for its intended use. Standard Operating Procedures (SOPs) have been developed as part of the QAPP and are incorporated by reference in this Report.

2. Site Background

The NMED pre-FS RAC for metals in surface waters was based on NMAC §20.6.4, including all the tools and approaches listed in the Code which provide for site specific application. At the time the surface water investigation was completed, the 2010 – 2011 State of New Mexico Clean Water Act 303(d)/305(b) Integrated Report applied NM Water Quality Standards (WQS) to Whitewater Creek.

In 2011, Arcadis conducted a copper WER study for the STSIU surface waters and results from the WER study were described in the Development of Site-Specific Copper Criteria Interim Report submitted to NMED in March 2013 (Arcadis 2013a). A site-specific copper WER model was subsequently developed to derive adjusted copper criteria in STSIU surface waters in the Revised Site-Specific Copper Toxicity Model Report submitted to NMED in October 2013 (Arcadis 2013b, Fulton and Meyer 2013). The site-specific criteria for STSIU surface waters were adopted by NMED and are contained in NMAC §20.6.4.809.

In 2011, Arcadis also conducted an expedited UAA based on NMED SWQB's Hydrology Protocol to determine the appropriate hydrologic regime of STSIU surface water drainages. Hydrologic classifications of STSIU drainages were proposed in the Application of the Hydrology Protocol to STSIU Drainages report submitted in October 2012 (Arcadis, 2012). The revised hydrologic classifications were accepted by the New Mexico Water Quality Control Commission without comment. Non-ephemeral drainages include Rustler Canyon, Martin Canyon, Bolton Canyon, and immediately downstream of Ash Springs. All other STSIU drainage areas are now designated as ephemeral.

3. Data Quality Objectives

This section describes the Data Quality Objectives (DQO) process that was intended to be used to address the potential impacts to surface water from leaching of soil and sediments in STSIU drainages. The primary objective of this pathway was to assess whether leaching of sediment or soil effects surface water quality. The primary objective was supported by the following decision and criteria:

Decision: Are constituent concentrations in STSIU surface water runoff greater than decision criteria?

Criteria: Site Specific Surface Water Quality Standards in accordance with §20.6.4.809 NMAC.

Per the FS Proposal (Arcadis 2011), a direct numerical comparison of surface water runoff constituent concentration to decision criteria was to be performed on the data. In addition, all data were to be used to allocate metals load in surface water to upgradient sources, soil sources, or legacy sediment sources. However, most samplers contained substantial quantities of sediment entrained within the samplers and the sample bottles at the time of sample retrieval and the presence of these sediments may have resulted in elevated concentrations of total metals in the stormwater samples. These sediments coupled with the uncertainty regarding the amount of time samples were in the sample bottles prior to retrieval introduced uncertainty in the quality of the data. Because of this, the data in this Report were evaluated qualitatively to refine the conceptual site model and the water quality data were not compared to surface water criteria.

4. Sample Collection and Laboratory Analysis

The surface water runoff quality and duration sampling program was intended to address the following specific sampling objectives:

- assess quality of surface water in STSIU drainages during precipitation runoff events at select locations within the STSIU with the greatest potential for exceeding site-specific water quality standards;
- measure the depth and duration of flow in STSIU drainages during precipitation runoff events at select locations within the STSIU with the greatest potential for exceeding site-specific water quality standards; and
- measure the duration of flow in drainage channels at additional STSIU locations with lower potential for exceeding site-specific water quality standards.

As described in Section 2 of the FS, Arcadis conducted an expedited Use Attainability Analysis (UAA) based on NMED Surface Water Quality Board's (SWQB's) Hydrology Protocol and established revised drainage classifications (Arcadis, 2012). Because these data were already reported through the UAA process, the water level and water duration monitoring data are not discussed further in this Report.

Collection of surface water samples and data quality assessment followed SOPs included as part the AOC Quality Assurance Project Plan (QAPP) (Chino/SRK, 1997) adopted by Chino. This section provides specific details associated with the sampling.

Surface water runoff samples were collected from a total of nine proposed drainage channel locations within the STISU boundary (Figure 1). Drainage channels upgradient of stock ponds and other drainage locations with previous elevated detections of copper were targeted for proposed surface water sampling locations. Surface water samplers were installed at two to three different heights above the channel at each location, depending upon channel geometry, to collect samples from different portions of the precipitation runoff hydrograph. Surface water samples were to be collected during three separate precipitation events at each location for a total of 24 samples (maximum number), plus two field duplicate samples, and one MS/MSD sample per sampling event); however, dry weather conditions prevented this at all locations except for location C-5, where samples were collected for two separate precipitation events. Two surface water samplers were placed at two heights in all locations except C-1 (Table 1), where only one sampler could be installed.

The initial surface water sampler installation involved setting up surface water sampler mounting kits at the nine surface water sampling locations. One mounting kit was installed for each sampler. Each mounting kit contained a reusable mounting tube that was secured to a post in the water channel. Once the mounting kits were in place, the surface water samplers were inserted in the mounting tubes prior to each sampling event. Surface water samplers were sent directly to the lab for processing, as there was no need to transfer the sample to another sample container.

Following a significant rain event, surface water samplers were retrieved from each sample location and shipped on ice to ACZ Laboratory, Inc. (ACZ) in Steamboat Springs, CO for analysis following appropriate chain of custody SOPs provided in the AOC QAPP (SRK, 1997). All sample preservation (other than shipment of samples on ice) and filtration was conducted at the lab. Surface water samples were analyzed for analytes listed in Table 2.

Table 2. Surface Water Analyses

Analyte	Method
Inorganic Constituents	
Aluminum, Total and Dissolved	M200.8 ICP-MS
Cadmium, Total and Dissolved	M200.8 ICP-MS
Calcium, Total and Dissolved	M200.7 ICP
Copper, Total and Dissolved	M200.8 ICP-MS
Lead, Total and Dissolved	M200.8 ICP-MS
Magnesium, Total and Dissolved	M200.7 ICP
Zinc, Total and Dissolved	M200.8 ICP-MS
Sulfate	D516-02 - Turbidimetric
Alkalinity as CaCO3	SM2320B - Titration
Organic Constituents	
Carbon, Dissolved Organic (DOC)	SM5310B

5. Surface Water Quality Results

5.1 Results

This section presents results of analyses conducted for surface water as part of this investigation. Analytical results for total and dissolved (0.45 micron) metals are summarized in Table 1 and discussed below.

Total aluminum concentrations ranged from 6.92 mg/L to 563 mg/L and dissolved (0.45-micron size fraction) aluminum concentrations ranged from 0.013 mg/L to 0.187 mg/L. Dissolved aluminum concentrations were less than total aluminum concentrations with 0.45-micron concentrations averaging 0.2% of total aluminum concentrations (Table 1).

Total cadmium concentrations ranged from an estimated concentration of 0.0004 mg/L to 0.017 mg/L and dissolved cadmium concentrations ranged from less than the laboratory detection limit of 0.0001 mg/L to 0.0008 mg/L. Dissolved cadmium concentrations were less than total cadmium concentrations with 0.45-micron concentrations averaging 10.5% of total cadmium concentrations (Table 1).

Total copper concentrations ranged from 0.143 mg/L to 6.9 mg/L and dissolved copper concentrations ranged from 0.0233 mg/L to 0.2046 mg/L. Dissolved copper concentrations were less than total copper concentrations with 0.45-micron concentrations averaging 6.9% of total copper concentrations (Table 1).

Total lead concentrations ranged from 0.0069 mg/L to 0.342 mg/L and dissolved lead concentrations ranged from less than the laboratory detection limit of 0.0001 mg/L to 0.001 mg/L. Dissolved lead concentrations were less than total lead concentrations with 0.45-micron concentrations averaging 0.9% of total lead concentrations (Table 1).

Total zinc concentrations ranged from 0.055 mg/L to 1.14 mg/L and dissolved zinc concentrations ranged from 0.007 mg/L to 0.374 mg/L (Table 1). Dissolved zinc concentrations were generally less than total zinc concentrations with 0.45-micron concentrations averaging 85% of total zinc concentrations (Table 1).

Total calcium concentrations ranged from 3.3 mg/L to 148 mg/L and dissolved calcium concentrations ranged from 1.7 mg/L to 23.4 mg/L. Dissolved calcium concentrations were less than total calcium concentrations with 0.45-micron concentrations averaging 41.3% of total calcium concentrations (Table 1).

Total magnesium concentrations ranged from 2.1 mg/L to 112 mg/L and dissolved magnesium concentrations ranged from an estimated concentration of 0.3 mg/L to 4.3 mg/L. Dissolved magnesium concentrations were less than total magnesium concentrations with 0.45-micron concentrations averaging 14.8% of total magnesium concentrations (Table 1).

5.1 Discussion

The objectives of the surface water runoff investigation included providing additional surface water quality data to support refinement of the conceptual site model and to support the STSIU FS. The objectives of the sampling also included defining the duration of flow and presence of water and temperature to support classification of drainage channels in the STSIU. However, the data associated with this classification was used in the expedited UAA described above and is thus not included in in this Report.

Both dissolved and total concentrations of metals in stormwater samples were typically higher in samples collected from stormwater samplers installed at higher elevations above the creek channel (Table 1). This may be due to a longer contact time between runoff and COC-containing soil and sediment or may be due to greater entrainment of COC-containing sediments at higher flows. Concentrations of total metals were generally substantially higher than concentrations of dissolved metals. Most samplers contained substantial quantities of sediment entrained within the samplers and the sample bottles at the time of sample retrieval and the presence of these sediments may have resulted in elevated concentrations of total metals in the stormwater samples. These sediments coupled with the uncertainty regarding the amount of time samples were in the sample bottles prior to retrieval introduced uncertainty in the quality of the data. Because of this, the data in this Report were evaluated qualitatively to refine the conceptual site model and the water quality data were not compared to surface water criteria. The current site conceptual model for STSIU surface water is described in Section 4.1 of the FS.

6. References

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TABLE 1
STSIU STORM WATER SAMPLE DATA

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO
SMELTER/TAILING SOILS IU FEASIBILITY STUDY

Sample Name and Height Above Channel	Storm-A-2A 0.5"	Storm-A-2A 2"	Storm-A-2B 0.5"	Storm-A-2B 2"	Storm-A-3A 2"	Storm-A-3A 4"	Storm-A-3A-DUP 4"	Storm-B-1 0.5"	Storm-B-1 1.5"	Storm-B-3 0.5"	Storm-B-3 2"	Storm-C-1 2"	Storm-C-3 0.5"	Storm-C-3 2"	Storm C-5 2"	Storm C-5 0.5"	Storm-C-5 2"	Storm CDW-1 0.5"	Storm-CDW-1 2"
Sample Collection Date	8/8/11	8/8/11	8/8/11	8/8/11	8/31/2011	8/31/2011	8/31/2011	8/16/2011	8/16/2011	8/16/2011	8/16/2011	8/16/2011	8/16/2011	8/16/2011	8/8/2011	8/16/2011	8/16/2011	8/8/11	8/8/11
Analyte																			
Aluminum, dissolved	*0.12*	0.079	0.187	0.046	0.013	0.154	0.025	0.053	0.09	*0.083*	*0.165*	*0.061*	0.106	0.042	0.147	0.036	0.057	0.064	0.073
Aluminum, total	146	18.7	67.3	77.1	333	563	118	68.7	110	114	119	11	87.4	25.5	317	107	35	6.92	15
Cadmium, dissolved	0.0001 U	0.0001 B	0.0001 U	0.0001 U	0.0001 B	0.0001 B	0.0001 U	**0.0007**	**0.0008**	0.0001 B	*0.0002* B	0.0001 U	*0.0002* B	0.0001 B	*0.0004* B	0.0001 U	0.0001 B	**0.0005**	*0.0005* B
Cadmium, total	0.0041	0.0005 B	0.0021 B	0.0026 B	0.01	0.017	0.0028 B	0.0066	0.0097	0.0038	0.0042	0.0004 B	0.0024 B	0.0009 B	0.011	0.0039	0.001	0.001	0.0019
Calcium, dissolved	4.8	12.8	12.9	19.2	23.4	15.5	10.8	7.3	7.6	4.1	4.4	1.7	4.5	2.8	9.2	7.6	7.3	6.9	7.9
Calcium, total	28	14.5	25.2	35.9	108	148	29.9	16.3	20.8	21.9	21.2	3.3	17	6.9	49.7	27	14.1	7.5	10.4
Copper, dissolved	**0.0651**	**0.079**	**0.0327**	**0.0475**	**0.0481**	**0.0361**	**0.0241**	**0.1861**	**0.1813**	**0.0468**	**0.0549**	**0.0233**	**0.0384**	**0.0342**	**0.1737**	**0.036**	**0.0379**	**0.1778**	**0.2046**
Copper, total	2.4	0.299	1.5	1.76	2.79	4.09	0.752	4.68	6.9	1.9	1.81	0.143	0.654	0.339	4.47	1.89	0.582	0.741	1.77
Lead, dissolved	0.0001 B	0.0003 B	0.0005 B	0.0003 B	0.0004 B	0.0009	0.0004 B	0.0005 B	*0.0008*	*0.0006*	*0.001*	0.0001 U	*0.0006*	0.0006	0.0002 B	0.0001 U	0.0005	0.0001 U	0.0002 B
Lead, total	0.1032	0.0109	0.0554	0.0712	0.199	0.342	0.0506	0.0983	0.1425	0.0975	0.099	0.0069	0.0445	0.0181	0.163	0.0979	0.0281	0.0168	0.0428
Magnesium, dissolved	0.8 B	2.1	1.3	1.3	4.3	2.7	1.8	1.3	1.4	0.7 B	0.9 B	0.3 B	1	0.7 B	1.9	1.7	1.6	1.6	1.7
Magnesium, total	22.2	4.7	11	14.1	82	112	21.1	12.2	18	20.6	21.2	2.1	14.2	5.1	42	17.2	7.7	2.6	4.4
Zinc, dissolved	**0.205**	**0.173**	**0.137**	**0.145**	0.007	0.011	0.007	**0.199**	**0.342**	**0.332**	**0.335**	**0.221**	**0.374**	**0.191**	**0.28**	0.014	**0.23**	**0.085**	**0.047**
Zinc, total	0.39	0.055	0.25	0.29	0.71	1.14	0.23	0.28	0.35	0.33	0.43	0.407	0.214	0.088	0.67	0.28	0.126	0.1	0.15
Carbon, dissolved organic (DOC)	9	9	9	7	4.4 B	3.1 B	3.4	5	6	7	7	3 B	9	NA	9	10	8	11	12
Sulfate	28	22	4 B	3 B	14	10	10	24	31	14	13	2 B	8	5 B	40	22	20	21	25
Bicarbonate as CaCO3	8 B	23	37	46	81	59	41	5 B	6 B	8 B	6 B	2 B	11 B	5 B	29	14 B	12 B	5 B	7 B
Carbonate as CaCO3	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Hydroxide as CaCO3	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Total Alkalinity	8 B	23	37	46	81	59	41	5 B	6 B	8 B	6 B	2 B	11 B	5 B	29	14 B	12 B	5 B	7 B
Hardness as CaCO3	15	41	38	53	76	50	34	24	25	13	15	5	15	10	31	26	25	24	27

Notes:

All concentrations are in units of milligram per liter (mg/L)

B = Analyte concentration detected at a value between MDL and PQL. The associated value is an estimated quantity.

MDL = method detection limit

NA - not analyzed, bottle in sampler was broken

PQL = practical quantitation limit, typical 5 times the MDL.

U = The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

OFFICE: LAKEWOOD DB: MLM TM: MB PM: AT
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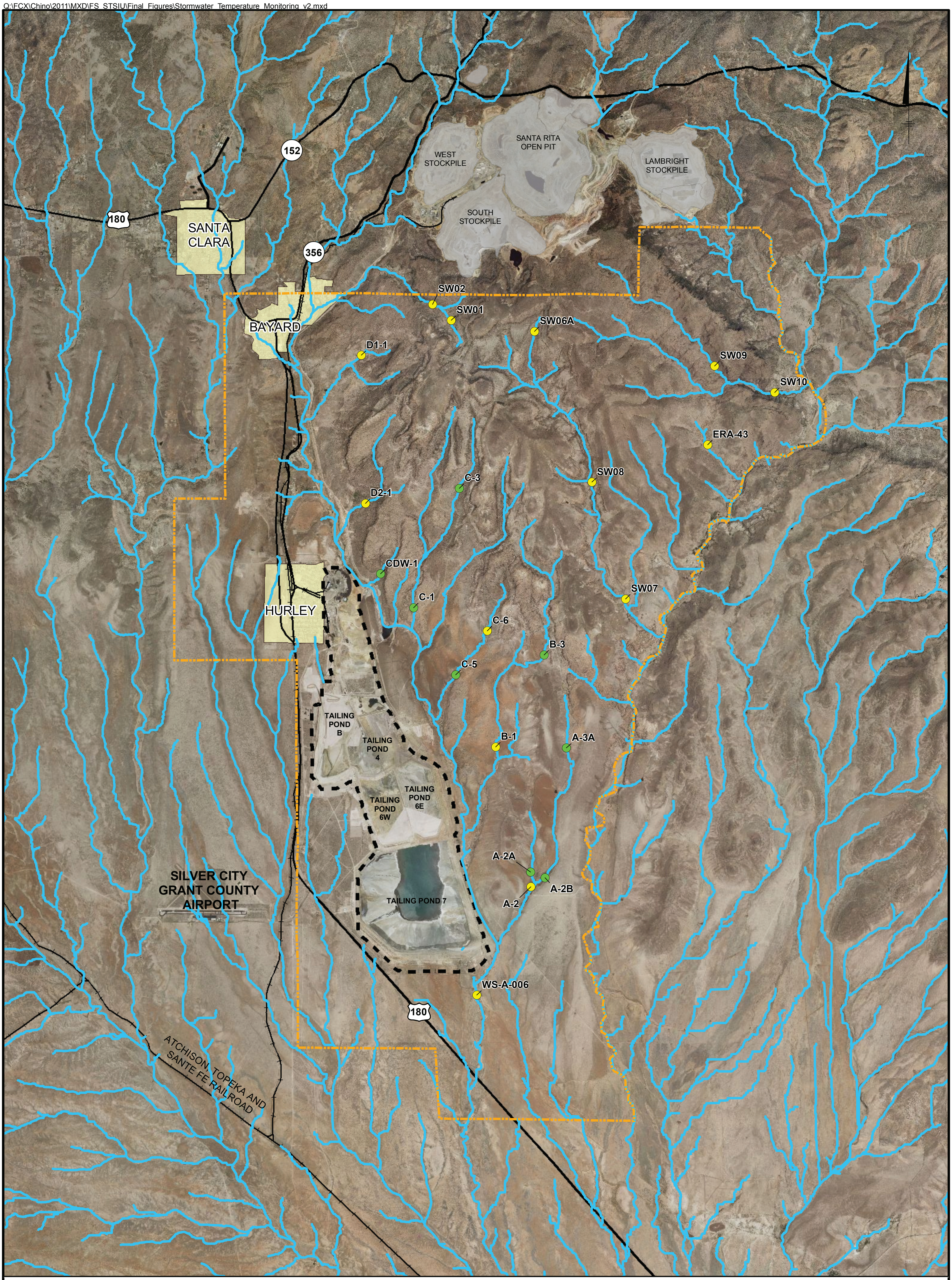

LEGEND

- Temperature Monitoring Location
- Stormwater Temperature and Pressure Monitoring Location
- STSIU Boundary
- Smelter Tailing boundary
- Highway
- Railroad
- Stockpiles
- Local Cities

0 7,000 14,000 Feet

GRAPHIC SCALE

FREEPORT-MCMORAN CHINO MINES COMPANY
VANADIUM, NEW MEXICO

SMELTER/TAILINGS SOILS IU FS PROPOSAL

STORM WATER AND TEMPERATURE MONITORING LOCATIONS

ARCADIS

FIGURE
1

Appendix F

Remedial Alternative Cost Estimates

Freeport McMoRan Chino Mines Company

APPENDIX F – REMEDIAL ALTERNATIVE COST ESTIMATES

SMELTER/TAILING SOILS INVESTIGATION UNIT FEASIBILITY STUDY

November 2024

Detailed Cost of Remedial Alternative - Soils (Total Metals)
Alternative 2: Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST (Initial Sampling Event):

DESCRIPTION	UNITS	QUANTITY	UNIT COST	SUBTOTALS	TOTALS	Notes/Assumptions
Area to be Remediated	AC	140				
Direct Costs						
Sampling & Analysis						
Soil Sampling (assumes 1 hand dug sample collected per acre)	EA	1	$ 54,440.00	$ 54,440.00		Sampling performed in one event; 2 samplers, production rate of 1 ac/hr.
Insect Tissue Sampling (assumes 1 sample collected per 10 acres)	EA	1	$ 8,280.00	$ 8,280.00		Sampling performed in one event; 2 samplers, production rate of 5 ac/hr.
Laboratory Analysis	sample	154	$ 200.00	$ 30,800.00		1 soil sample collected per acre for pH, Cu, and other analytes as needed, and 1 insect sample collected per 10 acres for the same analytes.
Direct Costs Subtotal					**$ 93,520.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 5,611.20		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 5,611.20		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 9,352.00		
Health, Safety and Environmental		5%		$ 4,676.00		
Indirect Costs Subtotal					**$ 25,250.40**	
Total Direct and Indirect Costs					**$ 118,770.40**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 29,692.60*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 148,463.00**	

MONITORING COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Soil Sampling (assumes 1 hand dug sample collected per acre)	EA	1	$ 54,440.00	$ 54,440.00		
Insect Tissue Sampling (assumes 1 sample collected per 10 acres)	EA	1	$ 8,280.00	$ 8,280.00		
Laboratory Analysis	sample	154	$ 200.00	$ 30,800.00		
Direct Costs Subtotal					**$ 93,520.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 5,611.20		
Project Administration (Contractor/Owner/Oversight)		6%		$ 5,611.20		
Health, Safety and Environmental		5%		$ 4,676.00		
Data Management and Technical Support		10%		$ 9,352.00		Update and maintain database.
Indirect Costs Subtotal					**$ 25,250.40**	
Total Direct and Indirect Costs					**$ 118,770.40**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 35,631.12*	*10% scope + 20% bid*
				TOTAL MONITORING COST:	**$ 154,401.52**	

PERIODIC COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL	
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00	
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00	
				TOTAL PERIODIC COST:	**$ 33,000.00**

NET PRESENT VALUE:

COST TYPE	Net Present Value		Notes
			Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analusis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023)
Capital Cost	**$ 148,463.00**		See Total Capital Cost above, spent in Year 0
Monitoring and Periodic Costs	**$ 893,179.91**		Monitoring (Year 2 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30)
		TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 1,041,642.91**

TOTAL ACREAGE	**140**
TOTAL COST PER ACRE	**$ 7,440.31**

Date Published: September 2024

Detailed Cost of Remedial Alternative - Soils (Total Metals)
Alternative 2: Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1		0.98	$ -	$ -	
2	$ 154,402	0.95	$ 146,962	$ 146,962	Sampling
3		0.93	$ -	$ 146,962	
4		0.91	$ -	$ 146,962	
5	$ 187,402	0.88	$ 165,636	$ 312,597	Sampling + 5 year Report
6		0.86	$ -	$ 312,597	
7		0.84	$ -	$ 312,597	
8		0.82	$ -	$ 312,597	
9		0.80	$ -	$ 312,597	
10	$ 187,402	0.78	$ 146,398	$ 458,995	Sampling + 5 year Report
11		0.76	$ -	$ 458,995	
12		0.74	$ -	$ 458,995	
13		0.73	$ -	$ 458,995	
14		0.71	$ -	$ 458,995	
15	$ 187,402	0.69	$ 129,394	$ 588,389	Sampling + 5 year Report
16		0.67	$ -	$ 588,389	
17		0.66	$ -	$ 588,389	
18		0.64	$ -	$ 588,389	
19		0.63	$ -	$ 588,389	
20	$ 187,402	0.61	$ 114,366	$ 702,755	Sampling + 5 year Report
21		0.60	$ -	$ 702,755	
22		0.58	$ -	$ 702,755	
23		0.57	$ -	$ 702,755	
24		0.55	$ -	$ 702,755	
25	$ 187,402	0.54	$ 101,083	$ 803,838	Sampling + 5 year Report
26		0.53	$ -	$ 803,838	
27		0.51	$ -	$ 803,838	
28		0.50	$ -	$ 803,838	
29		0.49	$ -	$ 803,838	
30	$ 187,402	0.48	$ 89,342	**$ 893,180**	Sampling + 5 year Report

Date Published: September 2024

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 2: Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST (Initial Sampling Event):						
DESCRIPTION	UNITS	QUANTITY	UNIT COST	SUBTOTALS	TOTALS	Notes/Assumptions
Area to be Remediated	AC	313.0				
Direct Costs						
Sampling & Analysis						
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		Sampling performed in one event; 2 samplers, production rate of 1 acre per hour.
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		1 hand dug samples collected per acre for pH, Cu, and other analytes as needed.
Direct Costs Subtotal					**$ 176,550.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 10,593.00		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 10,593.00		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 17,655.00		
Health, Safety and Environmental		5%		$ 8,827.50		
Indirect Costs Subtotal					**$ 47,668.50**	
Total Direct and Indirect Costs					**$ 224,218.50**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 56,054.63*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 280,273.13**	

MONITORING COST:						
DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		
Direct Costs Subtotal					**$ 176,550.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 10,593.00		
Project Administration (Contractor/Owner/Oversight)		6%		$ 10,593.00		
Health, Safety and Environmental		5%		$ 8,827.50		
Data Management and Technical Support		10%		$ 17,655.00		Update and maintain database.
Indirect Costs Subtotal					**$ 47,668.50**	
Total Direct and Indirect Costs					**$ 224,218.50**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 67,265.55*	*10% scope + 20% bid*
				TOTAL MONITORING COST:	**$ 291,484.05**	

PERIODIC COST:					
DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL	
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00	
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00	
				TOTAL PERIODIC COST:	**$ 33,000.00**

NET PRESENT VALUE:			
COST TYPE	Net Present Value		Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 280,273.13**		See Total Capital Cost above, spent in Year 0.
Monitoring and Periodic Costs	**$ 1,569,509.04**		Monitoring (Year 2 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
	TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 1,849,782.17**	

TOTAL ACREAGE	**313.0**
TOTAL COST PER ACRE	**$ 5,909.85**

Date Published: September 2024

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 2: Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1		0.98	$ -	$ -	
2	$ 291,484	0.95	$ 277,439	$ 277,439	Sampling
3		0.93	$ -	$ 277,439	
4		0.91	$ -	$ 277,439	
5	$ 324,484	0.88	$ 286,797	$ 564,235	Sampling + 5 year Report
6		0.86	$ -	$ 564,235	
7		0.84	$ -	$ 564,235	
8		0.82	$ -	$ 564,235	
9		0.80	$ -	$ 564,235	
10	$ 324,484	0.78	$ 253,486	$ 817,722	Sampling + 5 year Report
11		0.76	$ -	$ 817,722	
12		0.74	$ -	$ 817,722	
13		0.73	$ -	$ 817,722	
14		0.71	$ -	$ 817,722	
15	$ 324,484	0.69	$ 224,045	$ 1,041,767	Sampling + 5 year Report
16		0.67	$ -	$ 1,041,767	
17		0.66	$ -	$ 1,041,767	
18		0.64	$ -	$ 1,041,767	
19		0.63	$ -	$ 1,041,767	
20	$ 324,484	0.61	$ 198,023	$ 1,239,790	Sampling + 5 year Report
21		0.60	$ -	$ 1,239,790	
22		0.58	$ -	$ 1,239,790	
23		0.57	$ -	$ 1,239,790	
24		0.55	$ -	$ 1,239,790	
25	$ 324,484	0.54	$ 175,024	$ 1,414,814	Sampling + 5 year Report
26		0.53	$ -	$ 1,414,814	
27		0.51	$ -	$ 1,414,814	
28		0.50	$ -	$ 1,414,814	
29		0.49	$ -	$ 1,414,814	
30	$ 324,484	0.48	$ 154,695	**$ 1,569,509**	Sampling + 5 year Report

Date Published: September 2024

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 3: Excavation (Reuse or Disposal) and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	SUBTOTALS	TOTALS	Notes/Assumptions
Area to be Remediated	AC	313.0				
Direct Costs						
Sampling & Analysis						
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		Sampling performed in one event; 2 samplers, production rate of 1 acre per hour.
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		1 hand dug samples collected per acre for pH, Cu, and other analytes as needed.
Clearing and Grubbing (80% of Total Area)	AC	250	$ 2,000.00	$ 500,800.00		Same unit cost as tilling. D9 Dozer, Production Rate 0.1 ac/hr; Total Hourly Cost based on WY LQD Guideline No. 12, 2023.
Excavation, Load, Haul, and Placement	CY	328,233	$ 10.00	$ 3,282,326.67		Unit cost based on similar project costs (i.e., 2x borrow excavation, load, haul, and placement).
Removal Area Restoration						
Borrow Excavation, Load, Haul, and Placement	CY	82,058	$ 5.00	$ 410,290.83		Unit cost based on similar project costs. Assume 25% would need to be regraded. Assumes borrow material average of 2 miles away.
Revegetation and Planting	AC	313.0	$ 2,700.00	$ 845,100.00		Unit cost based on similar project costs.
Direct Costs Subtotal					**$ 5,215,067.50**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 312,904.05		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 312,904.05		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 521,506.75		
Health, Safety and Environmental		5%		$ 260,753.38		
Stormwater and Erosion Control		3%		$ 156,452.03		
Construction QA/QC		5%		$ 260,753.38		
Surveying		2%		$ 104,301.35		
Indirect Costs Subtotal					**$ 1,929,574.98**	
Total Direct and Indirect Costs					**$ 7,144,642.48**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 1,786,160.62*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 8,930,803.09**	

MONITORING AND MAINTENANCE COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL		Notes/Assumptions
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		
Maintenance						
Revegetation and Planting	AC	16	$ 2,700.00	$ 42,255.00		Assume 5% acreage.
Erosion Repairs	AC	16	$ 2,000.00	$ 31,300.00		Assume 5% acreage.
Direct Costs Subtotal					**$ 250,105.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 15,006.30		
Project Administration (Contractor/Owner/Oversight)		6%		$ 15,006.30		
Health, Safety and Environmental		5%		$ 12,505.25		
Data Management and Technical Support		10%		$ 25,010.50		Update and maintain database.
Indirect Costs Subtotal					**$ 67,528.35**	
Total Direct and Indirect Costs					**$ 317,633.35**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 95,290.01*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 412,923.36**	

PERIODIC COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL	
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00	
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00	
				TOTAL PERIODIC COST:	**$ 33,000.00**

NET PRESENT VALUE:

COST TYPE	Net Present Value		Notes/Assumptions
			Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 8,930,803.09**		See Total Capital Cost above, spent in Year 0.
Monitoring and Maintenance and Periodic Costs	**$ 2,168,658.62**		Monitoring & Maintenance (Year 2 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
	TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 11,099,461.71**	

TOTAL ACREAGE	**313.0**
TOTAL COST PER ACRE	**$ 35,461.54**

Date Published: September 2024

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 3: Excavation (Reuse or Disposal) and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1		0.98	$ -	$ -	
2	$ 412,923	0.95	$ 393,026	$ 393,026	Sampling + Maintenance
3		0.93	$ -	$ 393,026	
4		0.91	$ -	$ 393,026	
5	$ 445,923	0.88	$ 394,131	$ 787,158	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 787,158	
7		0.84	$ -	$ 787,158	
8		0.82	$ -	$ 787,158	
9		0.80	$ -	$ 787,158	
10	$ 445,923	0.78	$ 348,355	$ 1,135,512	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 1,135,512	
12		0.74	$ -	$ 1,135,512	
13		0.73	$ -	$ 1,135,512	
14		0.71	$ -	$ 1,135,512	
15	$ 445,923	0.69	$ 307,895	$ 1,443,407	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 1,443,407	
17		0.66	$ -	$ 1,443,407	
18		0.64	$ -	$ 1,443,407	
19		0.63	$ -	$ 1,443,407	
20	$ 445,923	0.61	$ 272,134	$ 1,715,541	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 1,715,541	
22		0.58	$ -	$ 1,715,541	
23		0.57	$ -	$ 1,715,541	
24		0.55	$ -	$ 1,715,541	
25	$ 445,923	0.54	$ 240,527	$ 1,956,068	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 1,956,068	
27		0.51	$ -	$ 1,956,068	
28		0.50	$ -	$ 1,956,068	
29		0.49	$ -	$ 1,956,068	
30	$ 445,923	0.48	$ 212,591	**$ 2,168,659**	Sampling + Maintenance + 5 year Report

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 4: Soil Amendments (Lime), Tilling and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**SUBTOTALS**	**TOTALS**	**Notes/Assumptions**
Area to be Remediated	AC	313.0				
Direct Costs						
Sampling & Analysis						
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		Sampling performed in one event; 2 samplers, production rate of 1 acre per hour.
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		1 hand dug samples collected per acre for pH, Cu, and other analytes as needed.
Clearing and Grubbing (80% of Total Area)	AC	250	$ 2,000.00	$ 500,800.00		Same unit cost as tilling. D9 Dozer, Production Rate 0.1 ac/hr; Total Hourly Cost based on WY LQD Guideline No. 12, 2023.
Lime Treatment	AC	313.0	$ 3,064.22	$ 959,099.48		Includes purchase/delivery and application of 1.3 tons of lime per acre. Unit costs sourced from RSMeans (2024) via the CostWorks database.
Revegetation and Planting	AC	313.0	$ 2,700.00	$ 845,100.00		Unit cost based on similar project costs.
Direct Costs Subtotal					**$ 2,481,549.48**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 148,892.97		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 148,892.97		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 248,154.95		
Health, Safety and Environmental		5%		$ 124,077.47		
Stormwater and Erosion Control		3%		$ 74,446.48		
Construction QA/QC		5%		$ 124,077.47		
Surveying		2%		$ 49,630.99		
Indirect Costs Subtotal					**$ 918,173.31**	
Total Direct and Indirect Costs					**$ 3,399,722.79**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 849,930.70*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 4,249,653.49**	

MONITORING AND MAINTENANCE COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		
Maintenance						
Revegetation and Planting	AC	16	$ 2,700.00	$ 42,255.00		Assume 5% acreage.
Erosion repairs	AC	16	$ 2,000.00	$ 31,300.00		Assume 5% acreage.
Direct Costs Subtotal					**$ 250,105.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 15,006.30		
Project Administration (Contractor/Owner/Oversight)		6%		$ 15,006.30		
Health, Safety and Environmental		5%		$ 12,505.25		
Data Management and Technical Support		10%		$ 25,010.50		Update and maintain database.
Indirect Costs Subtotal					**$ 67,528.35**	
Total Direct and Indirect Costs					**$ 317,633.35**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 95,290.01*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 412,923.36**	

PERIODIC COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00		
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00		
				TOTAL PERIODIC COST:	**$ 33,000.00**	

NET PRESENT VALUE:			
COST TYPE	**Net Present Value**		Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023)
Capital Cost	**$ 4,249,653.49**		See Total Capital Cost above, spent in Year 0
Monitoring and Maintenance and Periodic Costs	**$ 2,168,658.62**		Monitoring & Maintenance (Year 2 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
		TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 6,418,312.11**

TOTAL ACREAGE	**313.0**
TOTAL COST PER ACRE	**$ 20,505.79**

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Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 4: Soil Amendments (Lime), Tilling and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1		0.98	$ -	$ -	
2	$ 412,923	0.95	$ 393,026	$ 393,026	Sampling + Maintenance
3		0.93	$ -	$ 393,026	
4		0.91	$ -	$ 393,026	
5	$ 445,923	0.88	$ 394,131	$ 787,158	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 787,158	
7		0.84	$ -	$ 787,158	
8		0.82	$ -	$ 787,158	
9		0.80	$ -	$ 787,158	
10	$ 445,923	0.78	$ 348,355	$ 1,135,512	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 1,135,512	
12		0.74	$ -	$ 1,135,512	
13		0.73	$ -	$ 1,135,512	
14		0.71	$ -	$ 1,135,512	
15	$ 445,923	0.69	$ 307,895	$ 1,443,407	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 1,443,407	
17		0.66	$ -	$ 1,443,407	
18		0.64	$ -	$ 1,443,407	
19		0.63	$ -	$ 1,443,407	
20	$ 445,923	0.61	$ 272,134	$ 1,715,541	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 1,715,541	
22		0.58	$ -	$ 1,715,541	
23		0.57	$ -	$ 1,715,541	
24		0.55	$ -	$ 1,715,541	
25	$ 445,923	0.54	$ 240,527	$ 1,956,068	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 1,956,068	
27		0.51	$ -	$ 1,956,068	
28		0.50	$ -	$ 1,956,068	
29		0.49	$ -	$ 1,956,068	
30	$ 445,923	0.48	$ 212,591	**$ 2,168,659**	Sampling + Maintenance + 5 year Report

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 5: Tilling and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY						
CAPITAL COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**SUBTOTALS**	**TOTALS**	**Notes/Assumptions**
Area to be Remediated	AC	313.0				
Direct Costs						
Sampling & Analysis						
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		Sampling performed in one event; 2 samplers, production rate of 1 acre per hour.
Laboratory Analysis	sample	313	$ 200.00	$ 62,600.00		1 hand dug samples collected per acre for pH, Cu, and other analytes as needed.
Clearing and Grubbing (80% of Total Area)	AC	250	$ 2,000.00	$ 500,800.00		Same unit cost as tilling.
Tilling (100 Percent Slopes <13%)	AC	313.0	$ 2,000.00	$ 626,000.00		D9 Dozer, Production Rate 0.1 ac/hr; Total Hourly Cost based on WY LQD Guideline No. 12, 2023.
Revegetation and Planting	AC	313.0	$ 2,700.00	$ 845,100.00		Unit cost based on similar project costs.
Direct Costs Subtotal					**$ 2,148,270.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 128,896.20		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 128,896.20		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 214,827.00		
Health, Safety and Environmental		5%		$ 107,413.50		
Stormwater and Erosion Control		3%		$ 64,448.10		
Construction QA/QC		5%		$ 107,413.50		
Surveying		2%		$ 42,965.40		
Indirect Costs Subtotal					**$ 794,859.90**	
Total Direct and Indirect Costs					**$ 2,943,129.90**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 735,782.48*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 3,678,912.38**	
MONITORING AND MAINTENANCE COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
Direct Costs						
Sampling & Analysis						Same Unit Costs as above
Soil Sampling (assumes 5 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		
Laboratory Analysis	sample	313	$ 200.00	$ 62,600.00		
Maintenance						
Revegetation and Planting	AC	16	$ 2,700.00	$ 42,255.00		Assume 5% acreage
Tilling repairs	AC	16	$ 2,000.00	$ 31,300.00		Assume 5% acreage
Direct Costs Subtotal					**$ 249,925.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 14,995.50		
Project Administration (Contractor/Owner/Oversight)		6%		$ 14,995.50		
Health, Safety and Environmental		5%		$ 12,496.25		
Data Management and Technical Support		10%		$ 24,992.50		Update and Maintain database
Indirect Costs Subtotal					**$ 67,479.75**	
Total Direct and Indirect Costs					**$ 317,404.75**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 95,221.43*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 412,626.18**	
PERIODIC COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00		
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00		
				TOTAL PERIODIC COST:	**$ 33,000.00**	
NET PRESENT VALUE:						
COST TYPE	**Net Present Value**					Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023)
Capital Cost	**$ 3,678,912.38**					See Total Capital Cost above, spent in Year 0
Monitoring and Maintenance and Periodic Costs	**$ 2,167,192.41**					Monitoring & Maintenance (Year 2 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
				TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 5,846,104.79**	
				TOTAL ACREAGE	**313.0**	
				TOTAL COST PER ACRE	**$ 18,677.65**	

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Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 5: Tilling and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1		0.98	$ -	$ -	
2	$ 412,626	0.95	$ 392,744	$ 392,744	Sampling + Maintenance
3		0.93	$ -	$ 392,744	
4		0.91	$ -	$ 392,744	
5	$ 445,626	0.88	$ 393,869	$ 786,612	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 786,612	
7		0.84	$ -	$ 786,612	
8		0.82	$ -	$ 786,612	
9		0.80	$ -	$ 786,612	
10	$ 445,626	0.78	$ 348,122	$ 1,134,735	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 1,134,735	
12		0.74	$ -	$ 1,134,735	
13		0.73	$ -	$ 1,134,735	
14		0.71	$ -	$ 1,134,735	
15	$ 445,626	0.69	$ 307,690	$ 1,442,424	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 1,442,424	
17		0.66	$ -	$ 1,442,424	
18		0.64	$ -	$ 1,442,424	
19		0.63	$ -	$ 1,442,424	
20	$ 445,626	0.61	$ 271,953	$ 1,714,377	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 1,714,377	
22		0.58	$ -	$ 1,714,377	
23		0.57	$ -	$ 1,714,377	
24		0.55	$ -	$ 1,714,377	
25	$ 445,626	0.54	$ 240,367	$ 1,954,743	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 1,954,743	
27		0.51	$ -	$ 1,954,743	
28		0.50	$ -	$ 1,954,743	
29		0.49	$ -	$ 1,954,743	
30	$ 445,626	0.48	$ 212,449	**$ 2,167,192**	Sampling + Maintenance + 5 year Report

Date Published: September 2024

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 6: Soil Amendments (Ferrihydrite), Tilling and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	SUBTOTALS	TOTALS	Notes/Assumptions
Area to be Remediated	AC	313.0				
Direct Costs						
Sampling & Analysis						
Soil Sampling (assumes 1 hand dug samples collected per acre)	each	1	$ 113,770.00	$ 113,770.00		Sampling performed in one event; 2 samplers, production rate of 1 acre per hour.
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		1 hand dug samples collected per acre for pH, Cu, and other analytes as needed.
Clearing and Grubbing (80% of Total Area)	AC	250	$ 2,000.00	$ 500,800.00		Same unit cost as tilling. D9 Dozer, Production Rate 0.1 ac/hr; Total Hourly Cost based on WY LQD Guideline No. 12, 2023.
Ferrihydrite Treatment	AC	313.0	$ 3,064.22	$ 959,099.48		Includes purchase/delivery and application of 1.3 tons of ferrihydrite per acre. Unit costs sourced from RSMeans (2024) via the CostWorks database.
Site Restoration						
Revegetation and Planting	AC	313.0	$ 2,700.00	$ 845,100.00		Unit cost based on similar project costs.
Direct Costs Subtotal					**$ 2,481,549.48**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 148,892.97		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 148,892.97		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 248,154.95		
Health, Safety and Environmental		5%		$ 124,077.47		
Stormwater and Erosion Control		3%		$ 74,446.48		
Construction QA/QC		5%		$ 124,077.47		
Surveying		2%		$ 49,630.99		
Indirect Costs Subtotal					**$ 918,173.31**	
Total Direct and Indirect Costs					**$ 3,399,722.79**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 849,930.70*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 4,249,653.49**	

MONITORING AND MAINTENANCE COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL		Notes/Assumptions
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Soil Sampling (assumes 1 hand dug samples collected per acre)	each	1	$ 113,770.00	$ 113,770.00		
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		
Maintenance						
Revegetation and Planting	AC	16	$ 2,700.00	$ 42,255.00		Assume 5% acreage.
Erosion repairs	AC	16	$ 2,000.00	$ 31,300.00		Assume 5% acreage.
Direct Costs Subtotal					**$ 250,105.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 15,006.30		
Project Administration (Contractor/Owner/Oversight)		6%		$ 15,006.30		
Health, Safety and Environmental		5%		$ 12,505.25		
Data Management and Technical Support		10%		$ 25,010.50		Update and maintain database.
Indirect Costs Subtotal					**$ 67,528.35**	
Total Direct and Indirect Costs					**$ 317,633.35**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 95,290.01*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 412,923.36**	

PERIODIC COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL	
5-Yr Inspection	each	1	$ 8,000.00	$ 8,000.00	
5-Yr Report	each	1	$ 25,000.00	$ 25,000.00	
				TOTAL PERIODIC COST:	**$ 33,000.00**

NET PRESENT VALUE:

COST TYPE	Net Present Value		Notes/Assumptions
			Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 4,249,653.49**		See Total Capital Cost above, spent in Year 0.
Monitoring and Maintenance and Periodic Costs	**$ 2,168,658.62**		Monitoring & Maintenance (Year 2 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
	TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 6,418,312.11**	

TOTAL ACREAGE	**313.0**
TOTAL COST PER ACRE	**$ 20,505.79**

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Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 6: Soil Amendments (Ferrihydrite), Tilling and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1		0.98	$ -	$ -	
2	$ 412,923	0.95	$ 393,026	$ 393,026	Sampling + Maintenance
3		0.93	$ -	$ 393,026	
4		0.91	$ -	$ 393,026	
5	$ 445,923	0.88	$ 394,131	$ 787,158	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 787,158	
7		0.84	$ -	$ 787,158	
8		0.82	$ -	$ 787,158	
9		0.80	$ -	$ 787,158	
10	$ 445,923	0.78	$ 348,355	$ 1,135,512	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 1,135,512	
12		0.74	$ -	$ 1,135,512	
13		0.73	$ -	$ 1,135,512	
14		0.71	$ -	$ 1,135,512	
15	$ 445,923	0.69	$ 307,895	$ 1,443,407	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 1,443,407	
17		0.66	$ -	$ 1,443,407	
18		0.64	$ -	$ 1,443,407	
19		0.63	$ -	$ 1,443,407	
20	$ 445,923	0.61	$ 272,134	$ 1,715,541	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 1,715,541	
22		0.58	$ -	$ 1,715,541	
23		0.57	$ -	$ 1,715,541	
24		0.55	$ -	$ 1,715,541	
25	$ 445,923	0.54	$ 240,527	$ 1,956,068	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 1,956,068	
27		0.51	$ -	$ 1,956,068	
28		0.50	$ -	$ 1,956,068	
29		0.49	$ -	$ 1,956,068	
30	$ 445,923	0.48	$ 212,591	**$ 2,168,659**	Sampling + Maintenance + 5 year Report

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Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 7: Soil Cover and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY						
CAPITAL COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**SUBTOTALS**	**TOTALS**	**Notes/Assumptions**
Area to be Remediated	AC	313.0				
Direct Costs						
Sampling & Analysis						
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		Sampling performed in one event; 2 samplers, production rate of 1 acre per hour.
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		1 hand dug samples collected per acre for pH, Cu, and other analytes as needed.
Clearing and Grubbing (80% of Total Area)	AC	250	$ 2,000.00	$ 500,800.00		Same unit cost as tilling. D9 Dozer, Production Rate 0.1 ac/hr; Total Hourly Cost based on WY LQD Guideline No. 12, 2023.
Containment						
Borrow Excavation, Load, Haul, and Placement of Protective Soil Laye	CY	656,465	$ 5.00	$ 3,282,326.67		Unit cost based on similar project costs. Assume 1-foot protective soil layer.
Borrow Excavation, Load, Haul, and Placement of Topsoil	CY	328,233	$ 5.00	$ 1,641,163.33		Unit cost based on similar project costs. Assume 6-inch topsoil layer.
Site Restoration						
Revegetation and Planting	AC	313.0	$ 2,700.00	$ 845,100.00		Unit cost based on similar project costs.
Direct Costs Subtotal					**$ 6,445,940.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 386,756.40		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 386,756.40		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 644,594.00		
Health, Safety and Environmental		5%		$ 322,297.00		
Stormwater and Erosion Control		3%		$ 193,378.20		
Construction QA/QC		5%		$ 322,297.00		
Surveying		2%		$ 128,918.80		
Indirect Costs Subtotal					**$ 2,384,997.80**	
Total Direct and Indirect Costs					**$ 8,830,937.80**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 2,207,734.45*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 11,038,672.25**	
MONITORING AND MAINTENANCE COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Soil Sampling (assumes 1 hand dug samples collected per acre)	EA	1	$ 113,770.00	$ 113,770.00		
Laboratory Analysis	sample	314	$ 200.00	$ 62,780.00		
Maintenance						
Revegetation and Planting	AC	16	$ 2,700.00	$ 42,255.00		Assume 5% acreage
Cap Repairs	AC	16	$ 2,000.00	$ 31,300.00		Assume 5% acreage
Direct Costs Subtotal					**$ 250,105.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 15,006.30		
Project Administration (Contractor/Owner/Oversight)		6%		$ 15,006.30		
Health, Safety and Environmental		5%		$ 12,505.25		
Data Management and Technical Support		10%		$ 25,010.50		Update and maintain database.
Indirect Costs Subtotal					**$ 67,528.35**	
Total Direct and Indirect Costs					**$ 317,633.35**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 95,290.01*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 412,923.36**	
PERIODIC COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00		
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00		
				TOTAL PERIODIC COST:	**$ 33,000.00**	
NET PRESENT VALUE:						
COST TYPE	**Net Present Value**					Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023)
Capital Cost	**$ 11,038,672.25**					See Total Capital Cost above, spent in Year 0
Monitoring and Maintenance and Periodic Costs	**$ 2,168,658.62**					Monitoring & Maintenance (Year 2 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
				TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 13,207,330.87**	
				TOTAL ACREAGE	**313.0**	
				TOTAL COST PER ACRE	**$ 42,195.95**	

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Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 7: Soil Cover and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1		0.98	$ -	$ -	
2	$ 412,923	0.95	$ 393,026	$ 393,026	Sampling + Maintenance
3		0.93	$ -	$ 393,026	
4		0.91	$ -	$ 393,026	
5	$ 445,923	0.88	$ 394,131	$ 787,158	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 787,158	
7		0.84	$ -	$ 787,158	
8		0.82	$ -	$ 787,158	
9		0.80	$ -	$ 787,158	
10	$ 445,923	0.78	$ 348,355	$ 1,135,512	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 1,135,512	
12		0.74	$ -	$ 1,135,512	
13		0.73	$ -	$ 1,135,512	
14		0.71	$ -	$ 1,135,512	
15	$ 445,923	0.69	$ 307,895	$ 1,443,407	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 1,443,407	
17		0.66	$ -	$ 1,443,407	
18		0.64	$ -	$ 1,443,407	
19		0.63	$ -	$ 1,443,407	
20	$ 445,923	0.61	$ 272,134	$ 1,715,541	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 1,715,541	
22		0.58	$ -	$ 1,715,541	
23		0.57	$ -	$ 1,715,541	
24		0.55	$ -	$ 1,715,541	
25	$ 445,923	0.54	$ 240,527	$ 1,956,068	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 1,956,068	
27		0.51	$ -	$ 1,956,068	
28		0.50	$ -	$ 1,956,068	
29		0.49	$ -	$ 1,956,068	
30	$ 445,923	0.48	$ 212,591	**$ 2,168,659**	Sampling + Maintenance + 5 year Report

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Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 8: Surface Soil Controls – Phytostabilization
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**SUBTOTALS**	**TOTALS**	**Notes/Assumptions**
Area to be Remediated	AC	313.0				
Direct Costs						
Sampling & Analysis						
Soil Sampling (assumes 1 hand dug samples collected per acre)	each	1	$ 113,770.00	$ 113,770.00		Sampling performed in one event; 2 samplers, production rate of 1 acre per hour.
Laboratory Analysis	sample	313	$ 200.00	$ 62,600.00		1 hand dug samples collected per acre for pH, Cu, and other analytes as needed.
Clearing and Grubbing (80% of Total Area)	AC	250	$ 2,000.00	$ 500,800.00		Same unit cost as tilling. D9 Dozer, Production Rate 0.1 ac/hr; Total Hourly Cost based on WY LQD Guideline No. 12, 2023.
Phytostabilization Treatment	AC	313.0	$ 5,400.00	$ 1,690,200.00		Assume 2x revegation costs for phytostabilization seeding.
Direct Costs Subtotal					**$ 2,367,370.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 142,042.20		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 142,042.20		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 236,737.00		
Health, Safety and Environmental		5%		$ 118,368.50		
Stormwater and Erosion Control		3%		$ 71,021.10		
Construction QA/QC		5%		$ 118,368.50		
Surveying		2%		$ 47,347.40		
Indirect Costs Subtotal					**$ 875,926.90**	
Total Direct and Indirect Costs					**$ 3,243,296.90**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 810,824.23*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 4,054,121.13**	
MONITORING AND MAINTENANCE COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Soil Sampling (assumes 1 hand dug samples collected per acre)	each	1	$ 113,770.00	$ 113,770.00		
Laboratory Analysis	sample	313	$ 200.00	$ 62,600.00		
Maintenance						
Phytostabilization Maintenance	AC	16	$ 5,400.00	$ 84,510.00		Assume 5% acreage.
Erosion Repairs	AC	16	$ 2,000.00	$ 31,300.00		Assume 5% acreage.
Direct Costs Subtotal					**$ 292,180.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 17,530.80		
Project Administration (Contractor/Owner/Oversight)		6%		$ 17,530.80		
Health, Safety and Environmental		5%		$ 14,609.00		
Data Management and Technical Support		10%		$ 29,218.00		Update and maintain database.
Indirect Costs Subtotal					**$ 78,888.60**	
Total Direct and Indirect Costs					**$ 371,068.60**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 111,320.58*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 482,389.18**	
PERIODIC COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
5-Yr Inspection	each	1	$ 8,000.00	$ 8,000.00		
5-Yr Report	each	1	$ 25,000.00	$ 25,000.00		
				TOTAL PERIODIC COST:	**$ 33,000.00**	
NET PRESENT VALUE:						
COST TYPE	**Net Present Value**					Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 4,054,121.13**					See Total Capital Cost above, spent in Year 0.
Monitoring and Maintenance and Periodic Costs	**$ 2,511,384.72**					Monitoring & Maintenance (Year 2 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
				TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 6,565,505.84**	
				TOTAL ACREAGE	**313**	
				TOTAL COST PER ACRE	**$ 20,976.06**	

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Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 8: Surface Soil Controls – Phytostabilization
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1		0.98	$ -	$ -	
2	$ 482,389	0.95	$ 459,145	$ 459,145	Sampling + Maintenance
3		0.93	$ -	$ 459,145	
4		0.91	$ -	$ 459,145	
5	$ 515,389	0.88	$ 455,529	$ 914,674	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 914,674	
7		0.84	$ -	$ 914,674	
8		0.82	$ -	$ 914,674	
9		0.80	$ -	$ 914,674	
10	$ 515,389	0.78	$ 402,621	$ 1,317,295	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 1,317,295	
12		0.74	$ -	$ 1,317,295	
13		0.73	$ -	$ 1,317,295	
14		0.71	$ -	$ 1,317,295	
15	$ 515,389	0.69	$ 355,858	$ 1,673,154	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 1,673,154	
17		0.66	$ -	$ 1,673,154	
18		0.64	$ -	$ 1,673,154	
19		0.63	$ -	$ 1,673,154	
20	$ 515,389	0.61	$ 314,527	$ 1,987,681	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 1,987,681	
22		0.58	$ -	$ 1,987,681	
23		0.57	$ -	$ 1,987,681	
24		0.55	$ -	$ 1,987,681	
25	$ 515,389	0.54	$ 277,996	$ 2,265,677	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 2,265,677	
27		0.51	$ -	$ 2,265,677	
28		0.50	$ -	$ 2,265,677	
29		0.49	$ -	$ 2,265,677	
30	$ 515,389	0.48	$ 245,708	**$ 2,511,385**	Sampling + Maintenance + 5 year Report

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Detailed Cost of Remedial Alternative - Surface Water Stock Tanks
Alternative 2: Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY						
CAPITAL COST (Initial Sampling Event):						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**SUBTOTALS**	**TOTALS**	**Notes/Assumptions**
Direct Costs						
Sampling & Analysis						
Surface Water Sampling	EA	1	$ 7,100.00	$ 7,100.00		1 surface water sample collected per tank for pH, hardness, and total and dissolved metals. Sampling performed in one event; 2 samplers, production rate of 1 stock tank per hour.
Sediment Sampling	EA	1	$ 1,260.00	$ 1,260.00		1 sediment sample collected per tank for pH, Cu, and other analytes as needed. Sampling performed in one event; 2 samplers, production rate of 1 stock tank per hour. Travel costs (e.g., airfare, lodging, per diem, and truck rental) included under the surface water sampling event item.
Laboratory Analysis	sample	2	$ 200.00	$ 400.00		Per stock tank, 1 surface water sample analyzed for pH, hardness, and total and dissolved metals and 1 sediment sample analyzed for pH, Cu, and other analytes as needed.
Direct Costs Subtotal					**$ 8,760.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 525.60		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 525.60		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 876.00		
Health, Safety and Environmental		5%		$ 438.00		
Surveying		2%		$ 175.20		
Indirect Costs Subtotal					**$ 2,540.40**	
Total Direct and Indirect Costs					**$ 11,300.40**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 2,825.10*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 14,125.50**	
MONITORING COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Surface Water Sampling	EA	1	$ 7,100.00	$ 7,100.00		
Sediment Sampling	EA	1	$ 1,260.00	$ 1,260.00		Travel costs (e.g., airfare, lodging, per diem, and truck rental) included under the surface water sampling event item.
Laboratory Analysis	sample	2	$ 200.00	$ 400.00		
Direct Costs Subtotal					**$ 8,760.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 525.60		
Project Administration (Contractor/Owner/Oversight)		6%		$ 525.60		
Health, Safety and Environmental		5%		$ 438.00		
Data Management and Technical Support		10%		$ 876.00		Update and maintain database.
Indirect Costs Subtotal					**$ 2,365.20**	
Total Direct and Indirect Costs					**$ 11,125.20**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 3,337.56*	*10% scope + 20% bid*
				TOTAL MONITORING COST:	**$ 14,462.76**	
PERIODIC COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00		
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00		
				TOTAL PERIODIC COST:	**$ 33,000.00**	
NET PRESENT VALUE:						
COST TYPE	**Net Present Value**					Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 14,125.50**					See Total Capital Cost above, spent in Year 0.
Monitoring and Periodic Costs	**$ 243,401.56**					Monitoring (Year 1 through 5, every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
				TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 257,527.06**	

Date Published: September 2024

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 2: Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1	$ 14,463	0.98	$ 14,110	$ 14,110	Sampling
2	$ 14,463	0.95	$ 13,766	$ 27,876	Sampling
3	$ 14,463	0.93	$ 13,430	$ 41,306	Sampling
4	$ 14,463	0.91	$ 13,103	$ 54,409	Sampling
5	$ 47,463	0.88	$ 41,950	$ 96,359	Sampling + 5 year Report
6		0.86	$ -	$ 96,359	
7		0.84	$ -	$ 96,359	
8		0.82	$ -	$ 96,359	
9		0.80	$ -	$ 96,359	
10	$ 47,463	0.78	$ 37,078	$ 133,437	Sampling + 5 year Report
11		0.76	$ -	$ 133,437	
12		0.74	$ -	$ 133,437	
13		0.73	$ -	$ 133,437	
14		0.71	$ -	$ 133,437	
15	$ 47,463	0.69	$ 32,771	$ 166,208	Sampling + 5 year Report
16		0.67	$ -	$ 166,208	
17		0.66	$ -	$ 166,208	
18		0.64	$ -	$ 166,208	
19		0.63	$ -	$ 166,208	
20	$ 47,463	0.61	$ 28,965	$ 195,173	Sampling + 5 year Report
21		0.60	$ -	$ 195,173	
22		0.58	$ -	$ 195,173	
23		0.57	$ -	$ 195,173	
24		0.55	$ -	$ 195,173	
25	$ 47,463	0.54	$ 25,601	$ 220,774	Sampling + 5 year Report
26		0.53	$ -	$ 220,774	
27		0.51	$ -	$ 220,774	
28		0.50	$ -	$ 220,774	
29		0.49	$ -	$ 220,774	
30	$ 47,463	0.48	$ 22,628	**$ 243,402**	Sampling + 5 year Report

Date Published: September 2024

Detailed Cost of Remedial Alternative - Surface Water Stock Tanks
Alternative 3: Excavation and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	SUBTOTALS	TOTALS	Notes/Assumptions
Area to be remediated	AC	0.6				
Direct Costs						
Sampling & Analysis						
Surface Water Sampling	EA	1	$ 7,230.00	$ 7,230.00		1 surface water sample collected per tank for pH, hardness, and total and dissolved metals. Sampling performed in one event; 2 samplers, production rate of 1 stock tank per hour.
Sediment Sampling	EA	1	$ 1,260.00	$ 1,260.00		1 sediment sample collected per tank for pH, Cu, and other analytes as needed. Sampling performed in one event; 2 samplers, production rate of 1 stock tank per hour. Travel costs (e.g., airfare, lodging, per diem, and truck rental) included under the surface water sampling event item.
Laboratory Analysis	sample	2	$ 200.00	$ 400.00		Per stock tank, 1 surface water sample analyzed for pH, hardness, and total and dissolved metals and 1 sediment sample analyzed for pH, Cu, and other analytes as needed.
Excavation, Load, Haul, and Placement	CY	3,775	$ 10.00	$ 37,752.00		Unit cost based on similar project costs (i.e., 2x borrow excavation, load, haul, and placement). Assume placement near Tailing Pond 7.
Direct Costs Subtotal					**$ 46,642.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 2,798.52		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 2,798.52		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 4,664.20		
Health, Safety and Environmental		5%		$ 2,332.10		
Stormwater and Erosion Control		3%		$ 1,399.26		
Construction QA/QC		5%		$ 2,332.10		
Surveying		2%		$ 932.84		
Indirect Costs Subtotal					**$ 17,257.54**	
Total Direct and Indirect Costs					**$ 63,899.54**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 15,974.89*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 79,874.43**	

MONITORING COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL		Notes/Assumptions
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Surface Water Sampling	EA	1	$ 7,230.00	$ 7,230.00		
Sediment Sampling	EA	1	$ 1,260.00	$ 1,260.00		Travel costs (e.g., airfare, lodging, per diem, and truck rental) included under the surface water sampling event item.
Laboratory Analysis	sample	2	$ 200.00	$ 400.00		
Direct Costs Subtotal					**$ 8,890.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 533.40		
Project Administration (Contractor/Owner/Oversight)		6%		$ 533.40		
Health, Safety and Environmental		5%		$ 444.50		
Data Management and Technical Support		10%		$ 889.00		Update and maintain database.
Indirect Costs Subtotal					**$ 2,400.30**	
Total Direct and Indirect Costs					**$ 11,290.30**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 3,387.09*	*10% scope + 20% bid*
				TOTAL MONITORING COST:	**$ 14,677.39**	

PERIODIC COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL	
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00	
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00	
				TOTAL PERIODIC COST:	**$ 33,000.00**

NET PRESENT VALUE:

COST TYPE	Net Present Value		Notes/Assumptions
			Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 79,874.43**		See Total Capital Cost above, spent in Year 0.
Monitoring Periodic Costs	**$ 245,063.63**		Monitoring (year 1 through 5, every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
	TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 324,938.06**	

Detailed Cost of Remedial Alternative - Soils (pCu)
Alternative 3: Excavation and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1	$ 14,677	0.98	$ 14,319	$ 14,319	Sampling
2	$ 14,677	0.95	$ 13,970	$ 28,290	Sampling
3	$ 14,677	0.93	$ 13,629	$ 41,919	Sampling
4	$ 14,677	0.91	$ 13,297	$ 55,216	Sampling
5	$ 47,677	0.88	$ 42,140	$ 97,356	Sampling + 5 year Report
6		0.86	$ -	$ 97,356	
7		0.84	$ -	$ 97,356	
8		0.82	$ -	$ 97,356	
9		0.80	$ -	$ 97,356	
10	$ 47,677	0.78	$ 37,246	$ 134,601	Sampling + 5 year Report
11		0.76	$ -	$ 134,601	
12		0.74	$ -	$ 134,601	
13		0.73	$ -	$ 134,601	
14		0.71	$ -	$ 134,601	
15	$ 47,677	0.69	$ 32,920	$ 167,521	Sampling + 5 year Report
16		0.67	$ -	$ 167,521	
17		0.66	$ -	$ 167,521	
18		0.64	$ -	$ 167,521	
19		0.63	$ -	$ 167,521	
20	$ 47,677	0.61	$ 29,096	$ 196,617	Sampling + 5 year Report
21		0.60	$ -	$ 196,617	
22		0.58	$ -	$ 196,617	
23		0.57	$ -	$ 196,617	
24		0.55	$ -	$ 196,617	
25	$ 47,677	0.54	$ 25,717	$ 222,334	Sampling + 5 year Report
26		0.53	$ -	$ 222,334	
27		0.51	$ -	$ 222,334	
28		0.50	$ -	$ 222,334	
29		0.49	$ -	$ 222,334	
30	$ 47,677	0.48	$ 22,730	**$ 245,064**	Sampling + 5 year Report

Date Published: September 2024

Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 2: Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST (Initial Sampling Event):

DESCRIPTION	UNITS	QUANTITY	UNIT COST	SUBTOTALS	TOTALS	Notes/Assumptions
Area to be Remediated (Length)	MI	6.6				
Area to be Remediated (Width)	MI	0.01				
Area to be Remediated (Total)	AC	52				
Direct Costs						
Sampling & Analysis						
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		Sampling performed in one event; 2 samplers, production rate of 0.5 mile per hour.
Laboratory Analysis	sample	7	$ 200.00	$ 1,400.00		1 surface water sample collected per mile for pH, hardness, and total and dissolved metals.
Direct Costs Subtotal					**$ 12,622.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 757.32		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 757.32		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 1,262.20		
Health, Safety and Environmental		5%		$ 631.10		
Surveying		2%		$ 252.44		
Indirect Costs Subtotal					**$ 3,660.38**	
Total Direct and Indirect Costs					**$ 16,282.38**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 4,070.60*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 20,352.98**	

MONITORING COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL		Notes/Assumptions
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		
Laboratory Analysis	sample	7	$ 200.00	$ 1,400.00		
Direct Costs Subtotal					**$ 12,622.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 757.32		
Project Administration (Contractor/Owner/Oversight)		6%		$ 757.32		
Health, Safety and Environmental		5%		$ 631.10		
Data Management and Technical Support		10%		$ 1,262.20		Update and maintain database.
Indirect Costs Subtotal					**$ 3,407.94**	
Total Direct and Indirect Costs					**$ 16,029.94**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 4,808.98*	*10% scope + 20% bid*
				TOTAL MONITORING COST:	**$ 20,838.92**	

PERIODIC COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL	
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00	
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00	
				TOTAL PERIODIC COST:	**$ 33,000.00**

NET PRESENT VALUE:

COST TYPE	Net Present Value		Notes/Assumptions
			Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 20,352.98**		See Total Capital Cost above, spent in Year 0.
Monitoring and Periodic Costs	**$ 292,777.90**		Monitoring (Year 1 through 5 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
		TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 313,130.88**

LENGTH OF DRAINAGE (MI)	**6.6**
TOTAL COST PER MILE	**$ 47,444.07**

Date Published: September 2024

Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 2: Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1	$ 20,839	0.98	$ 20,331	$ 20,331	Sampling
2	$ 20,839	0.95	$ 19,835	$ 40,165	Sampling
3	$ 20,839	0.93	$ 19,351	$ 59,516	Sampling
4	$ 20,839	0.91	$ 18,879	$ 78,395	Sampling
5	$ 53,839	0.88	$ 47,586	$ 125,981	Sampling + 5 year Report
6		0.86	$ -	$ 125,981	
7		0.84	$ -	$ 125,981	
8		0.82	$ -	$ 125,981	
9		0.80	$ -	$ 125,981	
10	$ 53,839	0.78	$ 42,059	$ 168,040	Sampling + 5 year Report
11		0.76	$ -	$ 168,040	
12		0.74	$ -	$ 168,040	
13		0.73	$ -	$ 168,040	
14		0.71	$ -	$ 168,040	
15	$ 53,839	0.69	$ 37,174	$ 205,214	Sampling + 5 year Report
16		0.67	$ -	$ 205,214	
17		0.66	$ -	$ 205,214	
18		0.64	$ -	$ 205,214	
19		0.63	$ -	$ 205,214	
20	$ 53,839	0.61	$ 32,856	$ 238,070	Sampling + 5 year Report
21		0.60	$ -	$ 238,070	
22		0.58	$ -	$ 238,070	
23		0.57	$ -	$ 238,070	
24		0.55	$ -	$ 238,070	
25	$ 53,839	0.54	$ 29,040	$ 267,111	Sampling + 5 year Report
26		0.53	$ -	$ 267,111	
27		0.51	$ -	$ 267,111	
28		0.50	$ -	$ 267,111	
29		0.49	$ -	$ 267,111	
30	$ 53,839	0.48	$ 25,667	**$ 292,778**	Sampling + 5 year Report

Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 3: Excavation and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	SUBTOTALS	TOTALS	Notes/Assumptions
Area to be Remediated (Length)	MI	6.6				
Area to be Remediated (Width)	MI	0.01				
Area to be Remediated (Total)	AC	52				
Direct Costs						
Sampling & Analysis						
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		Sampling performed in one event; 2 samplers, production rate of 0.5 miles per hour.
Sediment Sampling	EA	1	$ 858.00	$ 858.00		1 sediment sample collected per mile during initial monitoring event prior to excavation. Sampling performed in same event as initial surface water monitoring; 2 samplers, production rate of 0.5 miles per hour. Travel costs (e.g., airfare, lodging, per diem, and truck rental) included under the surface water sampling event item.
Laboratory Analysis	sample	14	$ 200.00	$ 2,800.00		1 surface water sample for pH, hardness, and total and dissolved metals, and 1 sediment sample collected per mile for pH, Cu, and other analytes as needed.
Clearing and Grubbing (80% of Total Area)	AC	42	$ 2,000.00	$ 83,989.48		Same unit cost as tilling.
Excavation, Load, Haul, and Placement	CY	9,175	$ 10.00	$ 91,746.84		Unit cost based on similar project costs (i.e., 2x borrow excavation, load, haul, and placement). Assume placement near Tailing Pond 7.
Site Restoration						
Revegetation and Planting	AC	52	$ 2,700.00	$ 141,732.24		Unit cost based on similar project costs.
Direct Costs Subtotal					**$ 332,348.55**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 19,940.91		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 19,940.91		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 33,234.86		
Health, Safety and Environmental		5%		$ 16,617.43		
Stormwater and Erosion Control		3%		$ 9,970.46		
Construction QA/QC		5%		$ 16,617.43		
Surveying		2%		$ 6,646.97		
Indirect Costs Subtotal					**$ 122,968.96**	
Total Direct and Indirect Costs					**$ 455,317.52**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 113,829.38*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 569,146.89**	

MONITORING AND MAINTENANCE COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL		Notes/Assumptions
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		
Laboratory Analysis	sample	9	$ 200.00	$ 1,800.00		
Maintenance						
Revegetation and Planting	AC	3	$ 2,700.00	$ 7,086.61		Assume 5% acreage
Direct Costs Subtotal					**$ 20,108.61**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 1,206.52		
Project Administration (Contractor/Owner/Oversight)		6%		$ 1,206.52		
Health, Safety and Environmental		5%		$ 1,005.43		
Data Management and Technical Support		10%		$ 2,010.86		Update and maintain database.
Indirect Costs Subtotal					**$ 5,429.33**	
Total Direct and Indirect Costs					**$ 25,537.94**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 7,661.38*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 33,199.32**	

PERIODIC COST:

DESCRIPTION	UNITS	QUANTITY	UNIT COST	TOTAL	
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00	
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00	
				TOTAL PERIODIC COST:	**$ 33,000.00**

NET PRESENT VALUE:

COST TYPE	Net Present Value		Notes/Assumptions
			Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 569,146.89**		See Total Capital Cost above, spent in Year 0.
Monitoring and Maintenance and Periodic Costs	**$ 388,495.53**		Monitoring & Maintenance (Year 1 through 5 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
	TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 957,642.43**	

LENGTH OF DRAINAGE (MI)	**6.6**
TOTAL COST PER MILE	**$ 145,097.34**

Date Published: September 2024

Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 3: Excavation and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1	$ 33,199	0.98	$ 32,390	$ 32,390	Sampling + Maintenance
2	$ 33,199	0.95	$ 31,600	$ 63,989	Sampling + Maintenance
3	$ 33,199	0.93	$ 30,829	$ 94,818	Sampling + Maintenance
4	$ 33,199	0.91	$ 30,077	$ 124,895	Sampling + Maintenance
5	$ 66,199	0.88	$ 58,511	$ 183,406	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 183,406	
7		0.84	$ -	$ 183,406	
8		0.82	$ -	$ 183,406	
9		0.80	$ -	$ 183,406	
10	$ 66,199	0.78	$ 51,715	$ 235,120	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 235,120	
12		0.74	$ -	$ 235,120	
13		0.73	$ -	$ 235,120	
14		0.71	$ -	$ 235,120	
15	$ 66,199	0.69	$ 45,708	$ 280,829	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 280,829	
17		0.66	$ -	$ 280,829	
18		0.64	$ -	$ 280,829	
19		0.63	$ -	$ 280,829	
20	$ 66,199	0.61	$ 40,400	$ 321,228	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 321,228	
22		0.58	$ -	$ 321,228	
23		0.57	$ -	$ 321,228	
24		0.55	$ -	$ 321,228	
25	$ 66,199	0.54	$ 35,707	$ 356,935	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 356,935	
27		0.51	$ -	$ 356,935	
28		0.50	$ -	$ 356,935	
29		0.49	$ -	$ 356,935	
30	$ 66,199	0.48	$ 31,560	**$ 388,496**	Sampling + Maintenance + 5 year Report

Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 4: Instream Removal of Suspended Sediments and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY						
CAPITAL COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**SUBTOTALS**	**TOTALS**	**Notes/Assumptions**
Area to be Remediated (Length)	MI	6.6				
Area to be Remediated (Width)	MI	0.01				
Area to be Remediated (Total)	AC	52				
Direct Costs						
Sampling & Analysis						
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		Sampling performed in one event; 2 samplers, production rate of 0.5 miles per hour.
Sediment Sampling	EA	1	$ 858.00	$ 858.00		1 sediment samples collected per acre during initial monitoring event prior to excavation. Sampling performed in same event as initial surface water monitoring; 2 samplers, production rate of 0.5 mile/hr. Travel costs (e.g., airfare, lodging, per diem, and truck rental) included under the surface water sampling event item.
Laboratory Analysis	sample	14	$ 200.00	$ 2,800.00		1 surface water sample for pH, hardness, and total and dissolved metals, and 1 sediment sample collected per mile for pH, Cu, and other analytes as needed.
Clearing and Grubbing (80% of Total Area)	AC	42	$ 2,000.00	$ 83,989.48		Same unit cost as tilling.
Existing Sediment Excavation, Load, Haul, and Placement	CY	9,175	$ 10.00	$ 91,746.84		Unit cost based on similar project costs (i.e., 2x borrow excavation, load, haul, and placement). Assume placement near Tailing Pond 7.
Sedimentation Basin Gabion Construction	gabion	264	$ 4,000.00	$ 1,056,000.00		Assumes 20 gabions per sedimentation basin per half mile of drainage. Includes purchase, delivery, and installation of gabions and filling of rock from onsite source. Unit costs sourced from RSMeans (2024) via the CostWorks database.
Site Restoration						
Revegetation and Planting	AC	52	$ 2,700.00	$ 141,732.24		Unit cost based on similar project costs.
Direct Costs Subtotal					**$ 1,388,348.55**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 83,300.91		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 83,300.91		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 138,834.86		
Health, Safety and Environmental		5%		$ 69,417.43		
Stormwater and Erosion Control		3%		$ 41,650.46		
Construction QA/QC		5%		$ 69,417.43		
Surveying		2%		$ 27,766.97		
Indirect Costs Subtotal					**$ 513,688.96**	
Total Direct and Indirect Costs					**$ 1,902,037.52**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 475,509.38*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 2,377,546.89**	
MONITORING AND MAINTENANCE COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		
Laboratory Analysis	sample	9	$ 200.00	$ 1,800.00		
Maintenance						
Revegetation and Planting	AC	3	$ 2,700.00	$ 7,086.61		Assume 5% acreage.
Direct Costs Subtotal					**$ 20,108.61**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 1,206.52		
Project Administration (Contractor/Owner/Oversight)		6%		$ 1,206.52		
Health, Safety and Environmental		5%		$ 1,005.43		
Data Management and Technical Support		10%		$ 2,010.86		Update and maintain database.
Indirect Costs Subtotal					**$ 5,429.33**	
Total Direct and Indirect Costs					**$ 25,537.94**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 7,661.38*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 33,199.32**	
PERIODIC COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00		
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00		
				TOTAL PERIODIC COST:	**$ 33,000.00**	
NET PRESENT VALUE:						
COST TYPE	**Net Present Value**					Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 2,377,546.89**					See Total Capital Cost above, spent in Year 0.
Monitoring and Maintenance and Periodic Costs	**$ 388,495.53**					Monitoring & Maintenance (Year 1 through 5 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
				TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 2,766,042.43**	
				LENGTH OF DRAINAGE (MI)	**6.6**	
				TOTAL COST PER MILE	**$ 419,097.34**	

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Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 4: Instream Removal of Suspended Sediments and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1	$ 33,199	0.98	$ 32,390	$ 32,390	Sampling + Maintenance
2	$ 33,199	0.95	$ 31,600	$ 63,989	Sampling + Maintenance
3	$ 33,199	0.93	$ 30,829	$ 94,818	Sampling + Maintenance
4	$ 33,199	0.91	$ 30,077	$ 124,895	Sampling + Maintenance
5	$ 66,199	0.88	$ 58,511	$ 183,406	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 183,406	
7		0.84	$ -	$ 183,406	
8		0.82	$ -	$ 183,406	
9		0.80	$ -	$ 183,406	
10	$ 66,199	0.78	$ 51,715	$ 235,120	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 235,120	
12		0.74	$ -	$ 235,120	
13		0.73	$ -	$ 235,120	
14		0.71	$ -	$ 235,120	
15	$ 66,199	0.69	$ 45,708	$ 280,829	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 280,829	
17		0.66	$ -	$ 280,829	
18		0.64	$ -	$ 280,829	
19		0.63	$ -	$ 280,829	
20	$ 66,199	0.61	$ 40,400	$ 321,228	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 321,228	
22		0.58	$ -	$ 321,228	
23		0.57	$ -	$ 321,228	
24		0.55	$ -	$ 321,228	
25	$ 66,199	0.54	$ 35,707	$ 356,935	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 356,935	
27		0.51	$ -	$ 356,935	
28		0.50	$ -	$ 356,935	
29		0.49	$ -	$ 356,935	
30	$ 66,199	0.48	$ 31,560	**$ 388,496**	Sampling + Maintenance + 5 year Report

Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 5: Limestone Treatment and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY

CAPITAL COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**SUBTOTALS**	**TOTALS**	**Notes/Assumptions**
Area to be Remediated (Length)	MI	6.6				
Area to be Remediated (Width)	MI	0.01				
Area to be Remediated (Total)	AC	52				
Direct Costs						
Sampling & Analysis						
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		Sampling performed in one event; 2 samplers, production rate of 0.5 mile per hour.
Laboratory Analysis	sample	7	$ 200.00	$ 1,400.00		1 surface water sample collected per mile for pH, hardness, and total and dissolved metals.
Clearing and Grubbing (80% of Total Area)	AC	42	$ 2,000.00	$ 83,989.48		Same unit cost as tilling.
Supply and Placement of Limestone Rock Lining	tons	110,094	$ 45.35	$ 4,992,759.69		Conservative costs assume purchase and delivery from nearby source. Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped. Unit costs sourced from RSMeans (2024) via the CostWorks database.
Direct Costs Subtotal					**$ 5,089,371.16**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 305,362.27		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 305,362.27		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 508,937.12		
Health, Safety and Environmental		5%		$ 254,468.56		
Stormwater and Erosion Control		3%		$ 152,681.13		
Construction QA/QC		5%		$ 254,468.56		
Surveying		2%		$ 101,787.42		
Indirect Costs Subtotal					**$ 1,883,067.33**	
Total Direct and Indirect Costs					**$ 6,972,438.50**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 1,743,109.62*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 8,715,548.12**	

MONITORING AND MAINTENANCE COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		
Laboratory Analysis	sample	7	$ 200.00	$ 1,400.00		
Maintenance						
Rock Replacement	tons	1,101	$ 45.35	$ 49,930.35		Assume 1% rock replacement (by weight).
Direct Costs Subtotal					**$ 62,552.35**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 3,753.14		
Project Administration (Contractor/Owner/Oversight)		6%		$ 3,753.14		
Health, Safety and Environmental		5%		$ 3,127.62		
Data Management and Technical Support		10%		$ 6,255.24		Update and maintain database.
Indirect Costs Subtotal					**$ 16,889.13**	
Total Direct and Indirect Costs					**$ 79,441.48**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 23,832.45*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 103,273.93**	

PERIODIC COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00		
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00		
				TOTAL PERIODIC COST:	**$ 33,000.00**	

NET PRESENT VALUE:			
COST TYPE	**Net Present Value**		Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023).
Capital Cost	**$ 8,715,548.12**		See Total Capital Cost above, spent in Year 0.
Monitoring and Maintenance and Periodic Costs	**$ 931,146.08**		Monitoring & Maintenance (Year 1 through 5 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30).
		TOTAL NET PRESENT VALUE OF ALTERNATIVE: **$ 9,646,694.20**	

LENGTH OF DRAINAGE (MI)	**6.6**
TOTAL COST PER MILE	**$ 1,461,620.33**

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Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 5: Limestone Treatment and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1	$ 103,274	0.98	$ 100,755	$ 100,755	Sampling + Maintenance
2	$ 103,274	0.95	$ 98,298	$ 199,053	Sampling + Maintenance
3	$ 103,274	0.93	$ 95,900	$ 294,953	Sampling + Maintenance
4	$ 103,274	0.91	$ 93,561	$ 388,514	Sampling + Maintenance
5	$ 136,274	0.88	$ 120,446	$ 508,960	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 508,960	
7		0.84	$ -	$ 508,960	
8		0.82	$ -	$ 508,960	
9		0.80	$ -	$ 508,960	
10	$ 136,274	0.78	$ 106,457	$ 615,417	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 615,417	
12		0.74	$ -	$ 615,417	
13		0.73	$ -	$ 615,417	
14		0.71	$ -	$ 615,417	
15	$ 136,274	0.69	$ 94,092	$ 709,510	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 709,510	
17		0.66	$ -	$ 709,510	
18		0.64	$ -	$ 709,510	
19		0.63	$ -	$ 709,510	
20	$ 136,274	0.61	$ 83,164	$ 792,674	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 792,674	
22		0.58	$ -	$ 792,674	
23		0.57	$ -	$ 792,674	
24		0.55	$ -	$ 792,674	
25	$ 136,274	0.54	$ 73,505	$ 866,178	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 866,178	
27		0.51	$ -	$ 866,178	
28		0.50	$ -	$ 866,178	
29		0.49	$ -	$ 866,178	
30	$ 136,274	0.48	$ 64,968	**$ 931,146**	Sampling + Maintenance + 5 year Report

Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 6: Sediment Control, Erosion Control, and Monitoring
Smelter/Tailing Soils IU Feasibility Study

COST ESTIMATE SUMMARY						
CAPITAL COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**SUBTOTALS**	**TOTALS**	**Notes/Assumptions**
Area to be Remediated (Length)	MI	6.6				
Area to be Remediated (Width)	MI	0.01				
Area to be Remediated (Total)	AC	52				
Direct Costs						
Sampling & Analysis						
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		Sampling performed in one event; 2 samplers, production rate of 0.5 mile per hour.
Laboratory Analysis	sample	7	$ 200.00	$ 1,400.00		1 surface water sample collected per mile for pH, hardness, and total and dissolved metals.
BMP Construction	LF	69,696	$ 30.00	$ 2,090,880.00		Includes minor regrading; placement of gravel, stone, and/or riprap in select areas; and installation of silt fencing and straw wattles along both sides of entire length of drainages. Unit costs sourced from RSMeans (2024) via the CostWorks database.
Direct Costs Subtotal					**$ 2,103,502.00**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 126,210.12		Actual cost percentages based on similar projects.
Project Administration (Contractor/Owner/Oversight)		6%		$ 126,210.12		
Engineering Support (Submittals, Implementation Plans, Permitting)		10%		$ 210,350.20		
Health, Safety and Environmental		5%		$ 105,175.10		
Stormwater and Erosion Control		3%		$ 63,105.06		
Construction QA/QC		5%		$ 105,175.10		
Surveying		2%		$ 42,070.04		
Indirect Costs Subtotal					**$ 778,295.74**	
Total Direct and Indirect Costs					**$ 2,881,797.74**	
Contingency (25% of Direct and Indirect Cost)		*25%*			*$ 720,449.44*	*10% scope + 15% bid*
				TOTAL CAPITAL COST:	**$ 3,602,247.18**	
MONITORING AND MAINTENANCE COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
Direct Costs						
Sampling & Analysis						Same unit costs as above.
Surface Water Sampling	EA	1	$ 11,222.00	$ 11,222.00		
Laboratory Analysis	sample	7	$ 200.00	$ 1,400.00		
Maintenance						
BMP Repairs	LF	697	$ 30.00	$ 20,908.80		Assume 1% of drainage length
Direct Costs Subtotal					**$ 33,530.80**	
Indirect Costs (% of Direct Costs)						
Mobilization and Demobilization		6%		$ 2,011.85		
Project Administration (Contractor/Owner/Oversight)		6%		$ 2,011.85		
Health, Safety and Environmental		5%		$ 1,676.54		
Data Management and Technical Support		10%		$ 3,353.08		Update and Maintain database
Indirect Costs Subtotal					**$ 9,053.32**	
Total Direct and Indirect Costs					**$ 42,584.12**	
Contingency (30% of Direct and Indirect Cost)		*30%*			*$ 12,775.23*	*10% scope + 20% bid*
				TOTAL MONITORING AND MAINTENANCE COST:	**$ 55,359.35**	
PERIODIC COST:						
DESCRIPTION	**UNITS**	**QUANTITY**	**UNIT COST**	**TOTAL**		
5-Yr Inspection	EA	1	$ 8,000.00	$ 8,000.00		
5-Yr Report	EA	1	$ 25,000.00	$ 25,000.00		
				TOTAL PERIODIC COST:	**$ 33,000.00**	
NET PRESENT VALUE:						
COST TYPE	**Net Present Value**					Calculated using Real Discount Rate for 30-Year (2.5%) published by Office of Management and Budget, Revised Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs" (OMB Circular No. A-94, Appendix C, Revised Dec 28, 2023)
Capital Cost	**$ 3,602,247.18**					See Total Capital Cost above, spent in Year 0
Monitoring and Maintenance and Periodic Costs	**$ 560,100.53**					Monitoring & Maintenance (Year 1 through 5 and every 5 yrs through Year 30); Periodic Costs (every 5 yrs through Year 30)
				TOTAL NET PRESENT VALUE OF ALTERNATIVE:	**$ 4,162,347.71**	
				LENGTH OF DRAINAGE (MI)	**6.6**	
				TOTAL COST PER MILE	**$ 630,658.74**	

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Detailed Cost of Remedial Alternative - Surface Water Drainages
Alternative 7: Sediment Control, Erosion Control, and Monitoring
Smelter/Tailing Soils IU Feasibility Study

NET PRESENT VALUE CALCULATION:

Real Discount Rate 2.5%

Year	Total Annual Payment	Present Value Factor	Payment Present Value	Cumulative NPV	Notes
0		1.00	$ -	$ -	
1	$ 55,359	0.98	$ 54,009	$ 54,009	Sampling + Maintenance
2	$ 55,359	0.95	$ 52,692	$ 106,701	Sampling + Maintenance
3	$ 55,359	0.93	$ 51,407	$ 158,108	Sampling + Maintenance
4	$ 55,359	0.91	$ 50,153	$ 208,260	Sampling + Maintenance
5	$ 88,359	0.88	$ 78,097	$ 286,357	Sampling + Maintenance + 5 year Report
6		0.86	$ -	$ 286,357	
7		0.84	$ -	$ 286,357	
8		0.82	$ -	$ 286,357	
9		0.80	$ -	$ 286,357	
10	$ 88,359	0.78	$ 69,026	$ 355,383	Sampling + Maintenance + 5 year Report
11		0.76	$ -	$ 355,383	
12		0.74	$ -	$ 355,383	
13		0.73	$ -	$ 355,383	
14		0.71	$ -	$ 355,383	
15	$ 88,359	0.69	$ 61,009	$ 416,393	Sampling + Maintenance + 5 year Report
16		0.67	$ -	$ 416,393	
17		0.66	$ -	$ 416,393	
18		0.64	$ -	$ 416,393	
19		0.63	$ -	$ 416,393	
20	$ 88,359	0.61	$ 53,923	$ 470,316	Sampling + Maintenance + 5 year Report
21		0.60	$ -	$ 470,316	
22		0.58	$ -	$ 470,316	
23		0.57	$ -	$ 470,316	
24		0.55	$ -	$ 470,316	
25	$ 88,359	0.54	$ 47,660	$ 517,976	Sampling + Maintenance + 5 year Report
26		0.53	$ -	$ 517,976	
27		0.51	$ -	$ 517,976	
28		0.50	$ -	$ 517,976	
29		0.49	$ -	$ 517,976	
30	$ 88,359	0.48	$ 42,125	**$ 560,101**	Sampling + Maintenance + 5 year Report

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