



Draft Engineering Evaluation/Cost  
Analysis (EE/CA)

# US FOREST SERVICE ENGINEERING EVALUATION/ COST ANALYSIS (EE/CA)

## PHOENIX LAKE MILL SITE

Tahoe National Forest  
Nevada County, California

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**List of Acronyms**

ABA Acid Base Accounting  
ACZ ACZ Laboratories, Inc.  
AGP Acid Generation Potential  
ANP Acid Neutralization Potential  
ARAR Applicable or Relevant and Appropriate Requirements  
ARD Acid Rock Drainage  
AWQC Ambient Water Quality Criteria  
BLM United States Department of the Interior, Bureau of Land Management  
CAM California Administrative Manual  
CEQA California Environmental Quality Act  
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act  
CHHSL California Human Health Screening Level  
COCs Chemicals of Concern  
CSM Conceptual Site Model  
CY Cubic Yard  
DLM Designated Level Methodology  
DTSC Department of Toxic Substances Control  
EE/CA Engineering Evaluation/Cost Analysis  
EPA Unites States Environmental Protection Agency  
FS Forest Service  
Golder Golder Associates Inc.  
MCL Maximum Contaminant Level  
MEND Mine Environment Neutral Drainage





mg/kg	milligrams per kilogram
mg/L	Milligram per Liter
NCP	National Contingency Plan
NPAG	Net Potentially Acid Generating
NPR	Neutralization Potential Rates
OEHHA	Office of Environmental Health hazard Assessment
OMB	United States Office of Management and Budget
PA	Preliminary Assessment
PA/SI	Preliminary Assessment/Site Investigation
PAG	Potentially Acid Generating
RAO	Removal Action Objective
RCRA	Resource Conservation and Recovery Act
REMSAD	Regional Modeling System for Aerosols and Deposition
RMC	Risk Management Criteria
SDL	Soluble Designated Level
SRE	Streamline Risk Assessment
STLC	Soluble Threshold Limit Concentration
TBCs	To-Be-Considered
TDF	Tailings Disposal Facility
TF	Tailings Fan
TTLC	Total Threshold Limit Concentration
µg/L	Microgram per liter
USDA	United States Department of Agriculture
VECTOR	Vector Engineering, Inc.
WQC	Water Quality Criteria
WET	Waste Extraction Test
WESTON	Weston Solutions, Inc.



## 1.0 INTRODUCTION

As required by the Statement of Work, Golder Associates (Golder) has prepared this Engineering Evaluation/Cost Analysis (EE/CA) to provide the United States Department of Agriculture (USDA) Forest Service (FS) with a conceptual site model (CSM), a streamlined risk evaluation (SRE), and identify and analyze removal action alternatives for the Phoenix Lake Stamp Mill site (the Site) located on the eastern shore of Phoenix Lake (Figure 1). In accordance with Title 40 Code of Federal Regulations, Part 300, Section 415 (40 CFR 300.415), the following conditions indicate that removal action is warranted for the Site:

- Potential exposure to humans, animals, and the food chain from hazardous substances;
- High levels of hazardous substances in tailings largely at or near the surface, that may migrate; and
- Weather conditions that may cause hazardous substances to migrate or be released.

Phoenix Lake is located on the north side of Old Man Mountain within the Yuba River Ranger District of the Tahoe National Forest, in Nevada County, California. The United States Department of Agriculture Forest Service (FS) is the federal agency in charge of the Site. Investigations at the Site have identified conditions that indicate removal action is warranted to reduce or eliminate risks to human health and the environment.

The CSM for the Site provides information concerning primary and secondary sources of contamination, mechanisms of contaminant transport, and contaminated exposure media. The SRE discusses field sampling and analytical data, identifies contaminants of concern (COCs), and provides an evaluation of how and to what extent people might be exposed to these chemicals. On the basis of previous sampling and analysis performed by Weston and the recent sampling and analysis performed by Golder, the COCs associated with the mine waste materials are mercury, copper, and arsenic. The SRE also provides an assessment of the human health effects and ecological risks associated with the COCs. This memorandum concludes with a description of removal action alternatives and assesses the effectiveness, implementability, and cost of each alternative.

The scope of removal action addresses mining wastes deposited on the Site land surface from former mining and stamp mill operations that took place approximately 135 years ago (Figure 2). The waste material remains exposed at the surface, is in continuous contact with lake water, and is accessible to the public and ecological receptors. The waste material also has the potential to be acid generating.

This report is organized into six sections:

- Section 1 – Introduction.
- Section 2 – Previous Work



- Section 3 – Golder 2012 Site Investigation
- Section 4 – Conceptual Site Model.
- Section 5 - Streamlined Risk Evaluation.
- Section 6 –Removal Action Objectives
- Section 7 – Identification of Removal Action Alternatives
- Section 8 – Analysis of Removal Alternatives
- Section 9 – Preferred Alternative
- Section 10 - Closing
- Section 11 - References



## 2.0 PREVIOUS WORK

### 2.1 Vector Engineering Preliminary Assessment

Vector Engineering, Inc. (Vector) conducted a Preliminary Assessment (PA) of the Site in 1991 (Vector, 1992). Vector estimated that the waste rock and tailings at the Site consist of approximately 6,800 cubic yards of material. Vector did not differentiate between waste rock and tailings material in their report. The following samples were collected by Vector:

- One surface water sample
- One surface seep water sample
- Three composite samples containing waste rock and tailings
- Two lake bed sediment samples

The surface water sample had a pH of 7.65 and the surface seep water sample had a pH 7.50. These water samples were analyzed for general minerals and metals including copper, iron, manganese, zinc, lead, and molybdenum. Except for iron (38 micrograms per liter [ $\mu\text{g/L}$ ]) metals were not detected in the water samples.

The waste rock, tailings, and lake bed sediment samples were analyzed for lead, iron, copper and molybdenum using California Waste Extraction Test (WET). Lead and molybdenum were not detected; concentrations of iron ranged from 0.071 to 68 milligrams per liter (mg/L) and concentrations of copper ranged from 0.19 to 4.8 mg/L. Vector did not estimate the volume of materials in each source area. The PA report is included in Attachment 1.

### 2.2 Weston Preliminary Assessment/Site Investigation

Weston conducted sampling at the Site during a 2007 Preliminary Assessment/Site Investigation (PA/SI) (Weston, 2007). Weston estimated the waste rock volume located at the base of the adits to be approximately 3,000-4,000 cubic yards of material. Weston estimated that the debris fan near the stamp mill extending into the lake contains approximately 3,600 cubic yards (CY) of waste rock and mine tailings material. Additionally, Weston estimated that the tailings impoundment located between the stamp mill and lake contains approximately 90 to 150 cubic yards of tailings. The following samples were collected by Weston:

- Two surface water samples from Phoenix Lake (PL-SW-PL1 and PS-SW-DS1)
- Two samples from the tailings impoundment (PL-SS-PL1 and PL-SS-DS1)
- Three sediment samples from the tailings fan (PL-SD-PL1, PL-SD-PL2, and PL-SD-PL3)
- A sediment sample from the outlet of Phoenix Lake (PL-SD-DS1)
- Four background samples:



- One background surface water sample from a pond located 3,000 feet north of the Site PL-SW-BG1
- Two background sediment samples from a pond located 3,000 feet north of the Site (PL-SD-BG1 and PS-SD-BG10; PS-SD-BG10 is a duplicate of PL-SD-BG1)
- One background soil sample from 1,500 feet north of the Site (PL-SS-BG1).

All of the samples collected by Weston were analyzed for California Assessment Manual (CAM 17) metals. No metals were detected in the surface water samples. The concentration of mercury in the tailings fan samples ranged from 42.5 to 78.6 milligrams per kilogram (mg/kg). The concentration of copper ranged from 261 to 1,290 mg/kg. Weston identified the concentrations of mercury and copper to be greater than background concentrations and ecological risk management criteria levels. The concentration of arsenic (24.5 to 57.8 mg/kg), cobalt (51.0 to 354 mg/kg), lead (20.3 to 24.8 mg/kg), and selenium (4.1 to 9.9 mg/kg) were also greater than background concentrations.

The concentration of mercury in the samples from the tailings impoundment was 68.9 and 127 mg/kg. The concentration of copper in the samples was 202 and 546 mg/kg. Weston identified the concentrations of mercury and copper to be greater than background concentrations and ecological risk management criteria levels. The concentrations of arsenic (2.6 and 10 mg/kg) and lead (21 and 61.5 mg/kg) were also greater than background concentrations. Weston's analytical data is included in the attached tables and the PA/SI report is included in Attachment 1.



### 3.0 GOLDER 2012 SITE INVESTIGATION

Golder field personnel conducted a Site investigation for additional sampling and site characterization in support of the EE/CA on August 13 and 14, 2012. Golder's identification of tailings and waste rock materials and volumes at the site differed from that described by Weston (Weston 2007). The tailings and waste rock areas identified by Golder are shown on Figure 2 and include waste rock, the tailings disposal facility, the tailings debris fan, and boiler soil. In the Weston report, the tailings disposal facility was named the tailings impoundment. Golder's observations indicate the waste rock pile and the tailings debris fan on the shallow portion of shoreline within the lake are smaller than previously estimated by Weston. Golder also identified a pile of very fine, sandy sediments near the boiler that appeared to be tailings material that apparently had not been identified by Vector or Weston.

As shown on Figure 2, mineralized rock at this site is characterized by a very distinctive dark reddish-brown color with abundant pyrite and chalcopyrite veins and along joints. The mineralized zone at the site occurs within a near vertical, highly sheared and fractured zone in the granitic host rock. The mineralized rock contains several sets of quartz veins that indicate several stages of mineralization. The groundmass of the mineralized rock is also highly silicified. Un-mineralized rock at the site is a light colored granitic rock with abundant feldspar phenocrysts, which is visually distinct from the mineralized rock. The outline of the dark, reddish-brown waste rock as well as the mineralized zone can be observed on the aerial photo in Figure 2. The tailings debris fan on the shallow portion of the shoreline within the lake was also visually distinct compared to the surrounding, rocky shoreline due to the difference between the fine sand tailings and fractured granitic bedrock. The waste material volumes estimated by Golder are discussed in Section 4.0.

Golder collected samples from the following waste materials: tailings disposal facility (TDF), tailings fan (TF), boiler soil, and waste rock. Golder also collected samples from the following locations: chip samples from the adit, soil that forms a thin layer on the adit floor, background lake sediment, and surface water of Phoenix Lake. Golder's investigation included the following:

- Measured surface water quality using a field instrument at six locations along the shore of Phoenix Lake (Figure 3)
- Measured metals in tailings within the tailings disposal facility using a field based XRF. In-situ XRF analysis procedures were conducted at twelve locations and ex-situ XRF analysis procedures were conducted at 30 locations (Attachment 2).
- Collected twenty samples for analytical laboratory analysis from the following locations:
  - One surface water sample from Phoenix Lake (SW-DF-1) (Figure 3) and a duplicate sample from the same location (SW-DUP)
  - Six samples from the tailings fan including three discrete samples (TF-DISC-1-6, TF-DISC-2-4, and TF-DISC-3-7) and three composite samples (TF-COMP-1, TF-COMP-2, and TF-COMP-3)



- Six samples from the tailings disposal facility including three discrete samples (TDF-D-1, TDF-D-2, and TDF-D-3) and 3 composite samples (TDF-COMP-1, TDF-COMP-2, and TDF-COMP-3)
- Two composite chip samples from the waste rock pile (WRP-COMP-B-1 and WRP-COMP-T-1)
- One composite rock chip sample from the mine adit wall (ADIT CHIP 1)
- One soil sample from the floor of the mine adit (ADIT-1-S)
- One sample of tailings from an isolated pile near the boiler (Boiler-1-S)
- One background sediment sample from the shoreline opposite the mine workings (Background Soil)

### 3.1 Field Based XRF Analysis

Golder conducted XRF field analysis to delineate where mineralized rock and tailings were present and to optimize collection of samples. The complete results of the XRF analyses are presented in Attachment 2.

### 3.2 Laboratory Sample Analysis

Golder submitted the samples under chain of custody documentation to Accutest Laboratories of San Jose, California. Accutest subcontracted with ACZ Laboratories, Inc. of Steamboat Springs, Colorado (ACZ) for acid base accounting (ABA). Accutest performed metals analysis and soluble metals analysis. The sample analysis scheme is described in the following sections.

#### 3.2.1 Acid Base Accounting

ACZ performed ABA for the tailings and waste rock composite samples, the wall rock chip sample (ADIT CHIP 1), and the soil sample from the floor of the adit (ADIT-1-S). Acid base accounting is conducted to predict the acid generation characteristics of a material through determination of the acid neutralizing potential (ANP) and acid generation potential (AGP). The ABA analysis included determination of the following:

- Sulfur speciation [total sulfur – S (T); sulfide sulfur –  $S^{2-}$ ; and sulfate sulfur –  $SO_4^{2-}$ ] by Sobek et al. (1978); AGP is generally calculated from the sulfide sulfur determination.
- Bulk ANP by the modified Sobek (1978) method
- Paste pH

The principal neutralizing minerals in most geologic materials are calcium and magnesium carbonates. Additional neutralizing minerals accounted for in the determination of bulk ANP include basic silicates such as calcic feldspars, olivine, amphiboles, and biotite. However, due to their generally slower dissolution rates, their contribution to the overall ANP is generally considered to be small under ambient conditions. Felsic silicates, such as sodic and potassic feldspars, muscovite, most clay minerals, and quartz, do not contribute significantly to the ANP. Iron and manganese carbonates (e.g., siderite [ $FeCO_3$ ],



ankerite [ $\text{CaFe}(\text{CO}_3)_2$ ], and rhodochrosite [ $\text{MnCO}_3$ ]) do not contribute to buffering capacity since subsequent hydrolysis of the iron and manganese tends to increase acidity. Therefore, if iron and manganese carbonates are present, the ANP method overestimates the neutralizing capacity of a material. The potential for overestimation can be addressed explicitly through careful mineralogical evaluations and determination of ANP using methods specifically designed to isolate any potential effects from iron and manganese carbonates. The ANP is expressed in conventional units of tons of calcium carbonate equivalent per thousand tons of material (t  $\text{CaCO}_3$ /kt), representing the capacity of the solids to neutralize acid, but not necessarily implying that calcite ( $\text{CaCO}_3$ ) is present.

Paste pH provides information on the current conditions of a material. It is determined by mixing the solid with a fixed amount of distilled water, and measuring the pH of the resulting slurry. The paste pH reflects the balance of readily-soluble acid generating and acid neutralizing components and/or sorbed acidity and neutralization potential within a sample.

Sulfur content is measured by furnace heating a sample and quantifying the sulfur dioxide released. Sulfur fractions are determined by sequential extraction of components prior to furnace heating of sample splits. The AGP of a material is derived from a sulfur calculation. The most environmentally conservative approach to calculate AGP is to make the assumption that all sulfur in a sample is potentially reactive and therefore capable of generating acid. However, this ignores the fact that not all sulfur will contribute acidity (e.g., sulfur in gypsum, barite, or chalcocite). For this study, AGP was calculated using sulfide sulfur, and assuming that sulfide sulfur was equal to the difference between the measured total sulfur and sulfate sulfur. Similar to ANP, the AGP is expressed in t  $\text{CaCO}_3$ /kt. By convention in ABA studies, one assumes that the sulfide sulfur is present entirely as pyrite ( $\text{FeS}_2$ ), and the stoichiometry of pyrite oxidation is used to calculate a theoretical amount of sulfuric acid that could be generated, then requiring neutralization by a corresponding quantity of carbonate.

### 3.2.2 *Metal and Metal Leaching Analysis*

At Golder's request, Accutest analyzed the samples for the following parameters:

- Discrete and composite tailings, rock, and soil samples were analyzed for Title 22, California Administrative Manual (CAM) 17 metals (total metals) by EPA Method 6010B and 7470 A for mercury.
- Tailings composite samples and the soil sample from the floor of the adit (ADIT-1-S) were analyzed for metals leaching (ML) parameters using the California Waste Extraction Test (WET) with deionized water extractant (DI WET) and the extractant was then analyzed for CAM 17 metals by EPA Method 6010B and 7470 A for mercury. Because of lower total metals concentrations, ADIT CHIP 1, WRP-COMP-B-1, and WRP-COMP-T-1 were not analyzed for ML using DI WET.
- A subset of four samples (WRP-COMP-T-1, TDF-COMP-2, TDF-COMP-3, and TF-COMP-1) was also analyzed using WET with acidic extractant consistent with the WET method description (acid WET) and the extractant was then analyzed for CAM 17 metals



by EPA Method 6010B and 7470 A for mercury. The four samples analyzed using acid-WET were selected based on ABA results, total metals content, and to be representative of tailings and waste rock materials.

- The surface water and duplicate surface water sample were analyzed for CAM 17 metals by EPA Method 6010B and 7470 A for mercury.

### 3.3 Results Summary

The analytical results are summarized in the attached tables, complete tables are included in Attachment 2, and the certified analytical report is included as Attachment 3. Acid based accounting data is included in Table 1. Table 2 includes the metal results for the tailings, rock, sediment, and soil samples. Table 3 includes the ML results (DI WET and acid WET) for the selected samples and Table 4 includes the field water quality assessment results and the metals results for surface water samples. Only results for metals detected in one or more samples are included in the attached tables. Applicable screening thresholds are listed at the bottom of the tables and the selection of these screening thresholds is described in Section 5.0. The results are shaded to correspond to the specific threshold exceeded. The California hazardous waste criteria (California Code of Regulations Section 66261.24) Total Threshold Limit Concentration (TTL) is included at the bottom of Table 2 and the Soluble Threshold Limit Concentration (STLC) is included at the bottom of Table 3.

#### 3.3.1 Acid Base Accounting Results

A number of criteria have been proposed to characterize a sample as potentially acid generating (PAG) or not potentially acid generating (NPAG) based on AGP and ANP determinations. The most common criteria for PAG/NPAG assessment are those based on the use of the net potential ratio ( $NPR = ANP/AGP$ ) and the net neutralization potential ( $NNP = ANP - AGP$ ). No single method has universal applicability towards predicting acid generation potential. The actual threshold values for a particular solid are material-specific, and depend on many factors, including material texture, site-specific exposure conditions, amounts and types of acid generating and neutralizing minerals, their morphology, grain size, crystallinity, chemical composition, and paragenesis. Guidelines for the evaluation of acid generation potential of mine wastes are summarized as follows:

Sample potential	Criteria	Reference	Comments
PAG	$NPR < 1$	MEND (2009)	Potentially acid forming material, unless sulfide minerals are non-reactive, or ANP is preferentially exposed on surfaces.
	$NNP < -20 \text{ t CaCO}_3/\text{kt}$	White et al. (1999)	
Uncertain	$1 < NPR < 2$	MEND (2009)	Possibly PAG if ANP is insufficiently reactive or is depleted at a faster rate than sulfides
	$20 \text{ t CaCO}_3/\text{kt} > NNP > -20 \text{ t CaCO}_3/\text{kt}$	White et al. (1999)	
NPAG	$NPR > 2$	MEND (2009)	Non acid forming material, unless ANP is



Sample potential	Criteria	Reference	Comments
	NNP > 20 t CaCO <sub>3</sub> /kt	White et al. (1999)	insufficiently reactive, extremely reactive sulfides are present, or preferential exposure of sulfides is found in the material.

Golder has chosen the Mine Environment Neutral Drainage (MEND) Neutralization Potential Ratio (NPR) criteria to interpret acid rock drainage (ARD) potential for samples in this assessment. The screening level values are displayed with analytical results and ABA parameters in Table 1. Applying the MEND criteria towards the 10 samples selected for this study results in the following classifications:

- The three tailings disposal facility samples (TDF-COMP-1, TDF-COMP-2, and TDF-COMP-3) are potentially acid generating (PAG)
- The composite rock chip sample from the adit (ADIT CHIP 1) and one of the tailings debris fan samples (TF-COMP-2) are not potentially acid generating (NPAG)
- The remaining five samples are uncertain

The three composite samples from the tailings disposal facility are classified as PAG and are expected to generate acidic leachate. This classification is based on the high sulfide sulfur (3.45 to 7.01 weight %) content and negligible neutralizing potential (<0.1 to 0.6 kg CaCO<sub>3</sub>/kt) of the material. The lack of neutralizing potential suggests that the tailings material may be actively forming acid as sulfide minerals react with water that infiltrates through the impoundment. The paste pH values (pH 5.0 to 5.7) for the three composite samples indicate that the material was not reactive in the short timescale of the static test and did not produce significant acidity.

The three samples of tailings material collected from the debris fan were classified as either NPAG or uncertain; the material has negligible sulfide content and neutralizing potential. It is expected that the shallow water provides the necessary conditions for sulfide oxidation to occur, and therefore any pyrite that was present within the tailings at the time of deposition may have already oxidized. These materials do not have the potential to generate acid.

Rock chipped from the walls and soils gathered from the floor of the mine adit have low sulfide contents (0.02 to 0.08 weight %), but also very low neutralizing potentials (0.6 to 0.7 kg CaCO<sub>3</sub>/kt). By interpretation of NPR and NNP values these materials are classified as NPAG and uncertain with respect to acid generation potential (Table 1); however it is expected that they do not have the potential to generate acid.



A comparison of all results suggests that samples from the tailings disposal facility are the primary potential ARD contributors at the site, while none of the materials tested have the capacity to provide any significant acid neutralizing capacity. The tailings samples collected from the tailings disposal facility have elevated sulfide contents, which may be due to methods used to process the ore, and therefore significantly more concentrated than the host rock, or ore. The tailings material was ground to uniformly fine grained sand during processing, which provides a relatively large and potentially reactive surface area compared to other waste materials that were not processed as ore.

### **3.3.2 Metal and Metal Leaching Results**

As shown in Table 2, concentrations of total metals in rock, soil, tailings, and sediment samples exceeded one or more thresholds for arsenic, copper, and mercury. None of the metal concentrations exceeded the TTLC with the exception of mercury. Mercury exceeded the TTLC in all the tailings disposal facility samples and in all the tailings fan samples. As shown in Table 3, ML concentrations exceeded one or more thresholds for copper, lead, mercury, and zinc. The tailings fan composite sample, TF-COMP-1 exceeded the STLC for copper and mercury in the sample prepared by acid-WET. As described in section 3.3.1 however, the tailing debris material is not expected to generate acid and the DI-WET is the appropriate method to assess ML for this sample and the TF-COMP-1 sample prepared with DI WET did not exceed the STLC for any of the metals.

As shown in Table 4A, the field measurements in the lake water around the shore (Figure 3) showed low electrical conductivity and low pH (slight to moderate acidity). The dissolved oxygen concentrations were appropriate for near the lake surface. Copper and mercury were both detected above thresholds in the lake water sample.



## 4.0 CONCEPTUAL SITE MODEL

### 4.1 Likely Contaminant Source Areas

#### 4.1.1 Primary Sources

The primary sources of contamination at the Site are waste rock and tailings (Figure 2). The waste rock was sourced from adits located approximately 250 vertical feet above the stamp mill. The adits were used to mine ore from the north side of Old Man Mountain. The waste rock was distributed downslope from the adits above the stamp mill pad area. Based on Golder's field observations in August 2012 and review of aerial imagery the waste rock material covers an area of approximately 15,400 square feet with approximately 25% of this area piled to a thickness of 5 feet and the remainder of the area piled to about 1 foot. Based on these dimensions Golder estimates there is approximately 1,140 cubic yards (CY) of waste rock located downslope of the adits.

Based on the disposition and geometry of the tailings fan, Golder estimates there is approximately 80 CY of submerged tailings at the edge of Phoenix Lake. The tailings disposal facility measures approximately 40 feet long by 20 feet wide and contains an estimated 120 CY of tailings. The walls of the impoundment are not completely intact and tailings have spilled out along the shoreline and into the lake. The CSM summary is presented on Figure 5. Based on field observations, Golder estimates the boiler soil area contains approximately 50 CY of tailings.

#### 4.1.2 Secondary Sources

The potential secondary source of contamination at the Site is the surface water of Phoenix Lake. Surface water samples from the Site contain concentrations of copper and mercury that are higher than background samples collected by Weston (Tables 2 and 4B). The analytical data from surface water and its significance when compared to screening levels is discussed in Section 5.0.

### 4.2 Exposure Pathways

#### 4.2.1 Contaminant Transport Mechanisms

The COCs may be transported to the surface water of Phoenix Lake. The primary transport mechanisms are chemical and physical weathering, erosion, and meteoric water runoff. Golder collected samples of source material and submitted these samples to an analytical laboratory for ABA. Some of these samples indicate the sources materials are potentially acid generating. The weathering of sulfur-containing minerals causes the generation of sulfuric acid through oxidation reactions. The generated acid can further weather metal containing minerals and mobilize metals. These processes are potentially harmful to Phoenix Lake because they could lower the pH of the lake water and increase concentrations of metals in the lake.



#### **4.2.2 Contaminated Media**

The contaminated media at the Site are waste rock, tailings, soil, and surface water. Golder's 2012 site investigation and previous work by Weston confirmed that arsenic, copper, and mercury (COCs) are present in the contaminated media at concentrations greater than concentrations in background samples.

#### **4.3 Exposure Route and Potential Receptors**

Humans and wildlife may come in contact with the COCs via various routes of exposure. Specifically, humans may be exposed to the COCs by direct contact with the surface water and mine wastes at the Site during recreational activities. The direct contact may result in ingestion, inhalation, and dermal absorption of the COCs. Humans may also consume and digest fish and game that have been exposed to the COCs at the Site.

Fish that are introduced into Phoenix Lake may be exposed to COCs via ingestion of contaminated water and dermal absorption during contact with lake sediments. Wildlife may be exposed to COCs via ingestion of surface water and direct contact, ingestion, or inhalation of tailings. Furthermore, bioaccumulation of COCs may occur in certain wildlife that consumes other wildlife and biota that contain the COCs.



## 5.0 STREAMLINED RISK EVALUATION

The purpose of the streamlined risk evaluation (SRE) is to assess the current or potential contaminant exposures created by the Site's existing environmental conditions. The streamlined risk evaluation was conducted by comparing site-specific chemical concentration data to screening-level human and ecological risk-based criteria. Golder and Forest Service personnel have concluded that the Site could occasionally be accessed by campers as evidenced by the presence of a narrow trail extending along the eastern shore of Phoenix Lake and the presence of a campfire ring and some charcoal within the abandoned mill site. Camping primarily occurs in more open and accessible areas on the northern and western sides of the lake.

To assess potential risks to human health, the constituent concentrations are compared to background concentrations and human health Risk-Management Criteria (RMC) published by the Bureau of Land Management (BLM) (2004). The BLM (2004) has established human health RMC based on human exposure scenarios for different human activities. RMC values for campers exposed to soil and sediment are included in Table 2.

RMCs are not available for barium, chromium, cobalt, molybdenum, and vanadium (Table 2). For these metals, California Human Health Screening Levels (CHHSLs) for industrial/ commercial land use (OEHHA 2010) were used as screening criteria. RMC values for campers exposed to surface water are included in Table 3 and Table 4B along with Environmental Protection Agency (EPA) Ambient Water Quality Criteria (AWQC) for freshwater aquatic life chronic exposures (AWQC-aq) and EPA AWQC for human water and fish consumption (AWQC-hu) for comparison to ML results and surface water sample results. California maximum contaminant levels (MCLs) are also listed in Table 4B for reference only. BLM suggests that comparisons to the BLM RMC can indicate low risk if concentrations are below RMC, moderate risk if concentrations are one to ten times RMC, high risk if concentrations are 10 to 100 times RMC, and extremely high risk if concentrations are greater than 100 times RMC.

### 5.1 Soil, Sediment, and Rock

Soil sediment and rock analytical results are summarized in Table 2. Arsenic concentrations in background soil exceed the CHSSL for arsenic. None of the other background soil sample results exceed the screening levels. The following summarize the screening level exceedances in Table 2:

- Soil sample results exceed the camper soil RMC for arsenic (ADIT-1-S) and exceed the wildlife RMC median for copper (Boiler-1-S and ADIT-1-S) and mercury (ADIT-1-S). In all cases, the exceedances are equal to or lower than ten times their corresponding RMCs.
- Tailings disposal facility samples exceeded the camper soil RMC for arsenic in six out of eight samples, exceed the wildlife median soil RMC for copper in eight out of eight samples, and exceed both the camper soil RMC and wildlife median soil RMC for mercury. One sample (TDF-D-1) was more than ten times the wildlife median soil RMC for copper and six out of eight samples were more than ten times the wildlife median soil



- RMC for mercury. Sample TDF-D-1 was also slightly higher than ten times the camper soil RMC for mercury, but with rounding is equal to ten times the RMC. The remaining exceedances are equal to or lower than ten times their corresponding RMCs.
- Tailings fan samples exceeded the camper sediment RMC for arsenic in two out of ten samples, exceeded the wildlife median soil RMC for copper in ten out of ten samples, exceeded the camper sediment RMC for mercury in six out of ten samples, and exceeded the wildlife median soil RMC for mercury in ten out of ten samples. Sample TF-DISC-3-7 was higher than ten times the wildlife median soil RMC for copper. Sample TF-DISC-1-6 was slightly higher than ten times the wildlife median soil RMC for mercury but with rounding is equal to ten times the RMC. The remaining exceedances are equal to or lower than ten times their corresponding RMCs.
  - Rock samples exceed the camper soil RMC for arsenic in the sample from the adit (ADIT CHIP 1) and exceed the wildlife median RMC for copper in one out of the two waste rock samples (WRP-COMP-T-1). The exceedances are lower than ten times their corresponding RMCs.

Because none of the soil samples (including tailings near the boiler – Boiler-1-S) exceed RMC by more than 10 times, it can be concluded that metals detected pose a moderate risk to human and/or ecological receptors. The appropriate response to an assessment of moderate risk to human and/or ecological receptors is implementation of institutional controls (Figure 4).

Tailings disposal facility sample TDF-D-1 was more than ten times but less than 100 times the wildlife median soil RMC for copper; however, the average copper concentration indicated by the composite sample results was not greater than ten times the criterion. Six out of eight samples from the tailings disposal facility are more than ten times but less than 100 times the median wildlife soil RMC for mercury including the composite samples. Comparisons of the tailings disposal facility sample results to BLM RMC indicate moderate risk to campers and high risk to wildlife from the tailings disposal facility (Figure 4).

Tailings fan sample TF-DISC-3-7 was more than ten times the wildlife median soil RMC for copper; however, the average copper concentration indicated by the composite sample results was not greater than ten times the RMC. Comparisons of the tailings fan sample results to BLM RMC indicate moderate risk to campers and wildlife from the tailings fan (Figure 4).

The one rock sample from the adit exceeds the camper soil RMC for arsenic by only 0.3 mg/kg and with rounding would be equal to the criterion (20 mg/kg). The one soil sample from the adit that exceeds the camper soil RMC for arsenic and the wildlife median soil RMC for copper and mercury does not likely represent a risk to humans or wildlife. The vertical distance and lack of accessibility from the lakeshore prevents exposure of humans to the adit soil. The lack of vegetation inside the adit and no evidence of physical usage suggest that wildlife is also not exposed to the adit soil. The one out of two waste rock samples that exceed the wildlife median soil RMC for copper does not likely represent a risk to wildlife because the RMCs are calculated assuming exposure pathways including soil and sediment ingestion, vegetation ingestion, surface water ingestion, and airborne dust inhalation. The waste rock pile is comprised of large rock fragments (greater than 2 inches) that cannot be ingested or mobilized as dust



and plants do not grow in these rocks. Metal leaching and potential migration from the waste rock to surface water is discussed in the following section. There does not appear to be risks to campers or wildlife in these areas (Figure 4).

## 5.2 Metal Leaching

Metal leaching results are summarized in Table 3. The results include metal leaching analysis by DI-WET and acid-WET for select samples. As shown in Table 1 and discussed in Section 3.1.1, the composite samples from the tailings disposal facility are the primary potential ARD contributors at the site. The remaining samples, either from being classified as NPAG or because the material has negligible sulfide content do not have the potential to generate acid. Based on the ABA analysis, it is appropriate to compare ML acid-WET results for the tailings disposal facility to screening thresholds but not for the remaining samples. For the remaining samples, it is appropriate to compare the ML DI-WET results to the screening thresholds.

The analytical results for metals in the acid or deionized water extract from the WET procedure can be compared to soluble designated levels (SDL) to assess whether or not metals leaching from the solid materials pose a threat to water quality. SDLs are developed using State of California Designated Level Methodology (DLM) (Central Valley Regional Water Quality Control Board, 1989). The SDLs account for the concentration factor used in the WET procedure and the attenuation of leachable metals during migration. The most protective water quality criteria (WQC) are used to calculate SDLs. The equation for calculating the SDL is:

$$SDL = WQC \times \text{Environmental Attenuation Factor} \div \text{WET Concentration Factor}$$

The concentration factor for the WET procedure is 10 and an environmental attenuation factor of 10 should be used for tailings and waste rock near surface water. A relatively low attenuation factor is used for materials near surface water because of the short distance between the point of release and the surface water. Because of the relatively low attenuation factor, the SDL is simply equal to the WQC. Golder has included WQCs in Table 3 for comparison to the WET extract metals results.

The results from the DI-WET sample analysis are as follows:

- The DI-WET leachate from the adit soil sample (ADIT-1-S) exceeds the AWQC-aq for copper
- The DI-WET leachate from the tailings fan composite samples (TF-COMP-1, TF-COMP-2, and TF-COMP-3) exceed the AWQC-aq for copper

The results from the acid-WET sample analysis are as follows:



- The acid-WET leachate from the tailings disposal facility composite sample TDF-COMP-2 exceeds the AWQC-aq for copper, lead, mercury, the AWQC-hu for mercury, and the camper surface water RMC for lead and mercury.
- The acid-WET leachate from the tailings disposal facility composite sample TDF-COMP-3 exceeds the AWQC-aq for copper and mercury, the AWQC-hu for mercury, and the camper surface water RMC for mercury

The acid-WET analysis results for the waste rock sample WRP-COMP-T-1 exceeds the AWQC-aq for copper; however, as previously described, the results of the ABA testing indicate that none of the waste rock samples were classified as acid generating, with the samples having been classified as uncertain with respect to net acid generation or acid neutralization. Therefore, it is inappropriate to compare the acid-WET analysis results for the waste rock sample WRP-COMP-T-1 to the WQC. In addition, the WET method involves crushing rock samples to pass a 2 millimeter sieve before mixing the sample with the extractant. This crushing dramatically increases the surface area of the rock and the amount of exposure of copper-bearing minerals to the extractant. Because the waste rock pile is comprised of large rock fragments (greater than 2 inches), the WET method overestimates the solubility compared to in-place material. It is unlikely that sufficient sulfides such as chalcopyrite are exposed on rock faces to generate soluble copper.

### 5.3 Surface Water

Surface water sampling results are summarized in Tables 4A and 4B. The field water quality monitoring conducted around the lake (Figure 3) indicates the lake water is slight to moderately acidic and below the EPA AWQC range of 6.5 to 9 for freshwater aquatic life protection. The sources of lowered pH within the lake could be attributed to other environmental factors such as aerial deposition and ambient geologic conditions. As shown in the Table 1, paste pH of the composite samples from the tailings disposal facility and the tailings fan range from 5.0 to 5.7 indicating these materials may be contributing to the acidity of the lake.

As shown on Table 4B the only metals detected in the lake sample collected by Golder (SW-DF-1) were copper and mercury. Golder collected this sample along the northwestern shore of the lake (Figure 3). The sample result does not exceed the camper surface water RMC but exceeds the AWQC-aq for copper and the AWQC-aq and AWQC-hu for mercury. The lake sample also exceeded the California MCL for mercury. It should be noted that other investigations have found that Sierra Lakes receive atmospheric deposition of mercury (Central Valley Regional Water Quality Control Board, 2011). For example, Regional Modeling System for Aerosols and Deposition (REMSAD) results show that French Meadow Reservoir and Hell Hole Reservoir received 0.35 and 0.84 kg/yr of atmospheric mercury loading in 2001.

### 5.4 Risk Evaluation Results

Source materials described in Section 4 include waste rock and tailings. The previous screening-level risk assessment performed by Weston (2007) and recent assessment by Golder indicate that the material in



the tailings disposal facility could pose a moderate risk to campers and a potentially high risk to wildlife. The materials in the tailings debris fan could pose a moderate risk to campers and wildlife; however, the wildlife risk was assessed by comparing sample results to soil screening values and this material was underwater during Golder's site visit.

ABA analysis indicates the source materials, primarily the tailings disposal facility, are potentially acid generating. The water in the lake is slightly to moderately acidic and contains elevated concentrations of copper and mercury that are also found in the source materials. The results of the lake analysis indicate potential impacts from the source materials.

The exposure pathways identified in Section 4 include the concentrations of COCs in the tailings disposal facility, tailings fan, soil, and surface water exceed their corresponding RMCs by a factor of ten or less. These results indicate a moderate risk to human and ecological receptors as defined by the BLM. Mine waste materials at the Site, especially the tailings, pose a potential moderate risk to humans, wildlife, and plants that occupy Site grounds along the southeastern shoreline of Phoenix Lake. Acid rock drainage may release copper and mercury to soil and lake water that is in contact with the tailings. According to the BLM (2004), moderate risk may be addressed by management and or institutional controls, whereas high risk may require remediation.

It should be noted that the potential risks to human and ecological receptors that could be posed by barium, chromium, cobalt, molybdenum, and vanadium detected at the site have not been assessed. RMCs for these metals are not available from the BLM (2004). Thus, it is recommended that the potential risks to human health and ecological receptors from the cumulative exposures to all metals detected at the site be evaluated in a Baseline Risk Assessment.

In summary, results of the screening-level risk evaluation show that concentrations of copper and mercury are relatively high in samples from the tailings disposal facility, the tailings fan, the Site soil, and the surface water of Phoenix Lake. The ABA analysis and metals leaching analysis show that the tailings in the disposal facility and the tailings fan have the potential to release copper and mercury to the surrounding environment. The Site is accessible to wildlife and the tailings deposits are in direct contact with soil and lake water. Based on these conditions, the ecological risk at the Site should be considered moderate to potentially high.

According to the EPA (2001), screening-level ecological risk assessments are conservative assessments that incorporate uncertainty in a precautionary manner. Screening-level assessments are not designed, nor intended, to provide definitive estimates of actual risk (BLM, 2004 and EPA 2001) as in general, they are based on generic, "worst-case" exposure assumptions. For these reasons, the EPA (2001) and Department of Toxic Substances Control (DTSC) (1996) do not recommend risk management decisions



based on the results of screening-level risk evaluations. Rather, the EPA and DTSC have stated that the purpose of a screening-level assessment is to assess the need, and if required, the level of effort necessary, to conduct a detailed or “Baseline” Risk Assessment for a particular site. In a Baseline Risk Assessment, parameters used to estimate the risk to exposed biota are refined and validated by sampling and analysis, or site-specific laboratory and/or field-testing is performed to validate the conclusions of the screening-level assessment. Site-specific data gathering is conducted to assess the severity and extent of population and community effects as input to the evaluation of remedial alternatives and refinement of remediation goals.

The EPA has put forth eight removal action factors in 40 CFR Section 300.415 that are to be considered when determining the appropriateness of a removal action. The following four removal action factors are applicable to the Phoenix Lake site:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants. The tailings with elevated concentrations of COCs are well exposed at the surface and thus have the potential to impact humans and animals that visit the Site. Additionally, due to the acid generation and metals leaching potential of this material, it is possible that the COCs will enter Phoenix Lake and impact the food chain.
- Actual or potential contamination of drinking water supplies or sensitive ecosystems. Due to the acid generation and metals leaching potential of the tailings, it is possible that the COCs will enter Phoenix Lake and impact the food chain. There is a surface water outlet at the southwest corner of Phoenix Lake that may allow for the water to contribute to downstream drinking water supplies.
- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate. The tailings with elevated concentrations of COCs are well exposed at the surface. The acid generation and metals leaching potential of this material make it possible for the COCs to migrate out of the soil and into Phoenix Lake.
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released. Rainwater and runoff from snow melt at the Site may cause the tailings to be transported downslope into Phoenix Lake. Additionally, these water sources will aid in the generation of acid and metals leaching.



## 6.0 REMOVAL ACTION OBJECTIVES

Pursuant to 40 Code of Federal Regulations (CFR) 300.430, removal action objectives (RAOs) must be established as part of the alternatives selection process. The RAOs must specify the contaminants and media of concern, potential exposure pathways, and remediation goals. Initially, remediation goals must be developed based on readily available information, such as chemical specific Applicable or Relevant and Appropriate Requirements (ARARs) or other reliable information. Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering applicable or relevant and appropriate requirements under federal environmental, state environmental or facility siting laws, if available (USEPA 2009).

Site characterization activities have established that concentrations of copper and mercury are relatively high in samples from the tailings disposal facility, the tailings fan, the Site soil, and the surface water of Phoenix Lake. The ABA analysis and metals leaching analysis show that the tailings in the disposal facility and the tailings fan have the potential to release copper and mercury to the surrounding environment. Based on these results, the ecological risk at the evaluated areas is considered moderate to potentially high. According to the BLM (2004), moderate risk may be addressed by management and or institutional controls, whereas high risk may require remediation.

### 6.1 Overall Removal Action Objectives

The overall objective of a removal action is to protect human health, welfare, and environment. The specific objectives of the removal action alternatives for the Site are as follows:

- Reduce or eliminate the likelihood of release of metals from the mine waste materials at the Site to soils.
- Reduce or eliminate the likelihood of release of metals from the mine waste materials at the Site to surface water.
- Reduce or eliminate the potential for metals exposure to humans and wildlife from inhalation, ingestion, or direct contact with contaminated media.

### 6.2 Identification and selection of ARARS

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP) guide the cleanup process at sites under DTSC's jurisdiction. Section 121(d) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, requires compliance with ARARs (30 CFR Section 300.400(g)). The NCP describes the process identification and implementation of ARARs.

#### 6.2.1 Definition

ARARs are federal standards, requirements, criteria, limitations, or more stringent state standards determined to be legally applicable or relevant and appropriate to the circumstances at a given CERCLA



site. Under Section 121 of CERCLA and Section 300.400(g) of the NCP, actions undertaken under CERCLA Section 120 must attain ARARs.

**Applicable requirements** are promulgated under federal or state law and would be legally applicable to the site activities if the actions were not taken pursuant to Sections 104, 106, 120, 121 and 122 of CERCLA. These requirements directly and fully address on-site activities.

**Relevant and appropriate requirements** are federal or state requirements that, while not legally applicable to the Site, apply to sites or circumstances sufficiently similar to the subject site that their application is appropriate because they serve to further reduce the risk posed by the CERCLA site. In some cases, only a portion of the requirement may be relevant and appropriate. Only those requirements that are both relevant and appropriate must be addressed at CERCLA sites. The lead and support agencies have the discretion to determine which requirements are relevant and appropriate to the project.

Only the substantive requirements are considered when determining ARARs for on-site activities. Substantive requirements are requirements that pertain directly to action or conditions in the environment. Substantive requirements apply to on-site actions. "On-site" includes not only the areal extent of contamination, but also all areas in very close proximity to the contamination that are necessary for implementation of the response action.

**Administrative requirements** are mechanisms that facilitate the implementation of the substantive requirement of a statute or regulation. These are interpreted broadly by the USEPA to include all administrative provisions from other laws, such as record keeping, consultation, and reporting requirements. Compliance with administrative requirements or requirement permits from federal, state or local administrative bodies is not required for activities undertaken under CERCLA Sections 104, 106, 120, 121 or 122 (40 CFR Section 300.400(e), 42 United States Code Annotated [USCA] Section 9621).

Activities conducted off-site must meet both the substantive and administrative requirements that are determined to be applicable. ARAR evaluations should recognize that current conditions may be compliant, but that future conditions may not be compliant due to changes in land use or other changed conditions.

## **6.2.2 Types of Applicable or Relevant and Appropriate Requirements**

Potential ARARs to be reviewed for CERCLA sites fall into three broad categories, based on the contaminants of potential concern (COPCs), site location, site conditions, and the actions being considered. The three categories are:

1. Chemical-specific ARARs—usually health- or risk-based requirements that define acceptable concentrations of a chemical in the environment. An example of a



- chemical-specific ARAR is an ambient air quality standard or a maximum contaminant level (MCL) defined by section 1412 of the Public Health Service Act, as amended by the Safe Drinking Water Act (Pub. L. 93–523).
2. Location-specific ARARs—Requirements that restrict activities in certain environmentally sensitive areas such as flood plains, wetlands, endangered species habitat or historically significant areas.
  3. Action-specific ARARs—Requirements that are technology or activity based. These ARARs regulate discrete actions or the design and use of certain equipment. An example of an action-specific ARAR is Clean Water Act requirement to control the discharge of sediment into tributaries of navigable water ways.

Each of these three broad categories has federal, state, and local requirements, as well as to-be-considered guidelines.

#### 6.2.2.1 Local and Regional Applicable or Relevant and Appropriate Requirements

Remedial actions must comply with ARARs, which include local or regional requirements that are promulgated and legally enforceable. Promulgated environmental regulations that are state, local or regional regulations are more stringent than federal environmental requirements. To-be-considered “promulgated”, a requirement must be legally enforceable, based on specific enforcement provisions or the state’s or local agency’s legal authority, and must be generally applicable. The rules must also be identified in a timely manner in order to be considered as ARARs.

#### 6.2.2.2 To-Be-Considered Guidelines

When ARARs are not fully protective of human health and the environment, the NCP allows for other local ordinances, un-promulgated criteria, advisories or guidance documents to be identified to supplement the ARARs if they are helpful in achieving an acceptable level of risk (40 CFR §300). The identification of to-be-considered guidelines (TBCs) is not mandatory; however, it is recommended if it will assist in determining a level of cleanup that protects human health and the environment.

### **6.2.3 Chemical-Specific Requirements**

The following are chemical-specific ARARs and TBCs for the Park. These requirements are summarized in Appendix D, Table 5.

#### 6.2.3.1 Federal Requirements

Solid Waste Disposal Act, Resource Conservation and Recovery Act (RCRA), Identification and Listing of Hazardous Waste (42 United States Code [USC] §6921, 40 CFR Part 261) see below for exemption – need to determine if any waste is covered under RCRA and what is exempt.

Solid Waste Disposal Act, Resource Conservation and Recovery Act, Section 3001 (b)(3)(A)(ii) (Bevill exclusion), (42 USC §6921(a)(b)(ii), 40 CFR Part 261)

Clean Water Act (33 USCA 1251-1376; 40 CFR 122, 125 and 136) Pre-treatment standards under the Clean Water Act, (including Section 402, National Pollutant Discharge Elimination System (NPDES) 33 USC. 1342)



Safe Drinking Water Act (42 USCA 300; 40 CFR 141.11-16, 141.50-51)  
EPA Region 9 Preliminary Remediation Goals, October 2004  
Hazardous Air Pollutants; Section 112 of the Clean Air Act (40 CFR Part 61)

### 6.2.3.2 State and Local Requirement

Hazardous waste control law, California Health and Safety Code, Division 20, Chapter 6.5, Section 25100 et seq.

Criteria for Identifying Hazardous Wastes (California Code of Regulations [CCR], Title 22, 66261.21-33)

Land disposal restrictions, Title 22 CCR, Section 66268 et seq.

Non-RCRA Hazardous Waste Wastes (CCR, Title 22, 66261.101 (b)(2))

Porter-Cologne Water Quality Control Act (Generally, California Water Code, Div. 7, § 13000, et seq. and 23 CCR Chap. 15, 2510-2559, 2580-2601)

The Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), Division 20 of the California Health and Safety Code

California MCLs, Title 22 CCR, Division 4, Chapter 15, Section 64431 et seq.

State Water Board's regulations governing discharges of waste (Title 23 CCR, Division 3, Chapter 15, Section 2510 et seq.)

Consolidated Regulations for Treatment, Storage, Processing or Disposal of Solid Waste, (Title 27 CCR)

- General Requirements (Section 20080 *et seq.*)
- Applicability and Classification Criteria (Section 20200 (c))
- Designated Waste (Section 20210)
- Water Quality Monitoring and Response Programs for Solid Waste Management Units (Section 20385)
- Waste Classification and Management (Sections 20220, 20230)
- Water Quality Protection Standard, Water Quality Monitoring and Response Programs for Solid Waste Management Units (Water Standard Sections 20390, 20395, 20400, 20405, 20410, 20420, 20415, 20430)
- Closure and Post-Closure Maintenance Requirements for Solid Waste Landfills (Section 21090)

Nevada County Land Use Code XI, Hazardous Materials

Northern Sierra Air Quality Management District Rules

Central Valley Regional Water Quality Control Board Basin Plan, "Policy for Investigation and Cleanup of Contaminated Sites" and "Policy for Application of Water Quality Objectives"

State Water Resources Control Board Resolution 68-16, "Anti-Degradation Policy"

State Water Resources Control Board Resolution 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304" (as amended April 21, 1994)

State Water Resources Control Board Resolution 88-63, "Sources of Drinking Water Policy"

Staff Report of the RWQCB Central Valley Region, "The Designated Level Methodology for Waste Cleanup Level Determination"



Staff Report of the RWQCB Central Valley Region, "A Compilation of Water Quality Goals," August 2003, with updates through May 25, 2004

Use of CHHSLs in Evaluation of Contaminated Properties, January 2005, California Environmental Protection Agency

#### **6.2.4 Location-Specific Requirements**

The following are location-specific ARARs and TBCs for the Park. These requirements are summarized in Appendix D, Table 6.

##### 6.2.4.1 Federal Requirements

Endangered Species Act of 1973 (16 USC Section 1531 et seq.; 50 CFR Parts 10, 11, 17, 200, 402, & 424 and 40 CFR 257.3)

National Historic Preservation Act of 1966 (16 USC 470 et seq.; Public Law 89-665 and amendments of 1980; Public Law 96-515, 36 CFR 800)

Fish and Wildlife Coordination Act (16 USC 661-666)

The Clean Water Act Section 404 and General Regulatory Policies for the United States Army Corps of Engineers (USACE)

##### 6.2.4.2 State and Local Requirements

California Endangered Species Act (California Fish and Game Code §2050-2068)

#### **6.2.5 Action-Specific Requirements**

The following are action-specific ARARs and TBCs for the Park. These requirements are summarized in Appendix D, Table 7.

##### 6.2.5.1 Federal Requirements

Clean Water Act Section 404 (33 USC 1344, 33 CFR 328 and 40 CFR 230)

NPDES Requirements for Storm water Discharges Associated with Industrial and Construction Activity (40 CFR Parts 122, 123, 124, implemented by State Water Resources Control Board Order No. 92-08 DWQ)

National Emissions Standards for Hazardous Air Pollutants (42 USC 7401-7671; 40 CFR 61, Subpart H)

Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978 (40 CFR 204, 205, 211)

##### 6.2.5.2 State and Local Requirements

California Environmental Quality Act (CEQA), California Public Resources Code § 21000 et seq.

Prohibited Acts, Health and Safety Code, Chapter 3, Emissions Limitations Environment (California Health and Safety Code §41700)

Land Use Covenants, Title 22 CCR, Division 4.5, Chapter 39, Section 67391.1

Section 1600-1606 of California Fish and Game Code, Streambed Alteration Agreement

Nevada County General Plan Sec. 6 et seq.



Nevada County Land Use Code



## 7.0 IDENTIFICATION OF REMOVAL ACTION ALTERNATIVES

Alternatives for the removal of contamination have been selected based on the removal action objectives, ARARs, and EPA guidance (EPA 1993). The alternatives address specific site conditions and risks to human health and the environment as depicted in this report. EPA suggests that only the most qualified technologies that apply to the media or source of contamination should be discussed in the EE/CA (EPA 1993). Based on available site information, and in consultation with the FS, the following removal action alternatives have been identified for consideration. Additional details regarding the implementation of these alternatives are included in the cost estimates in Attachment 4. The Site features or areas included in this EE/CA, applicable waste volumes, risk evaluation summary, and potential removal action alternatives are summarized in Table 5.

### 7.1 Alternative 1 - Off-site Disposal of Mine Waste Material

This alternative includes dredging approximately 80 CY of tailings from the lakeshore. The dredged tailings would require dewatering and the resulting water would likely require treatment before discharge back into the lake. The dewatered material would then be placed into supersacks and airlifted by helicopter to a nearby staging area. Similarly, the approximately 120 CY of tailings in the tailings disposal facility and the approximately 50 CY of tailings near the boiler would be hand excavated, placed into supersacks, and airlifted by helicopter to a nearby staging area. At the staging area, the tailings from the lakeshore and the tailings from the tailings disposal facility would be loaded onto trucks and transported to a hazardous waste landfill. The tailings near the boiler would be loaded onto trucks and transported to a non-hazardous waste landfill. The former tailings and waste rock areas would be re-contoured and re-vegetated or covered with rip-rap for erosion control.

### 7.2 Alternative 2 - On-Site Repository

This alternative includes two options: 1) construct one repository in the tailings disposal facility and relocate the boiler sand into this repository or 2) construct one repository in the tailings disposal facility and one repository for tailings near the boiler. Option 2 eliminates the necessity to move the 50 CY of tailings near the boiler into the repository at the tailings disposal facility.

Both of these options include dredging approximately 80 cubic yards of tailings from the lakeshore. The dredged tailings would require dewatering and the resulting water would likely require treatment before discharge back into the lake. For Option 1, the dewatered tailings dredged from the lake, filter bags, and tailings near the boiler would be combined with the tailings located in the tailings disposal facility. The material would be graded to 2 to 1 slopes and covered with an 80 mil geosynthetic liner. The liner would be secured by a perimeter anchor trench and surface water would be directed around the repository through drains or a swale. The liner would then be covered with 1 foot of imported cover soil and armored with 1 foot of rock materials available at the site.



For Option 2, the dewatered tailings dredged from the lake would be combined with the tailings in the tailings disposal facility and the repository would be constructed as described above. Because the tailings near the boiler would not be combined in this repository, the liner, perimeter anchor trench, drain or swale, and cover soil and armoring would be smaller. The tailings near the boiler would also be covered by a liner as described for the tailings disposal facility repository including a perimeter anchor trench, drain or swale, cover soil, and armoring.

### **7.3 Alternative 3 - No Action**

This alternative is included in this report as a baseline for comparison with other removal action alternatives. This alternative does not require remediation or removal work. No effort would be made to actively reduce risks to human health or the environment. The Site would remain as it exists today or would further degrade due to outside influences.



## 8.0 ANALYSIS OF REMOVAL ALTERNATIVES

There are three types of criteria against which each alternative is evaluated. These criteria are derived from the Guidance on Conducting Non-Time-Critical Removal Actions under CERCLA (US EPA, 1993).

The criteria are:

1. Effectiveness
  - Overall protection of human health and the environment.
  - Compliance with Federal and State requirements.
  - Long-term effectiveness and permanence.
  - Reduction of toxicity, mobility, or volume through treatment.
  - Short-term effectiveness.
2. Implementability
  - Technical feasibility
  - Administrative feasibility
  - Availability of services and material
  - State and Community Acceptance
3. Cost
  - Capital
  - Post removal site control
  - Present value

The comparative analysis of the removal action alternatives is summarized in Table 6 and each of the criteria is discussed in relation to the removal action alternatives in the following sections.

### 8.1 Effectiveness

Alternative 3, no action, would not be effective because it would not be protective of public health and the environment and does not achieve the RAOs. The other alternatives, offsite disposal and onsite repositories, would all be effective because they are protective of public health and the environment and will achieve the RAOs.

### 8.2 Implementability

All of the removal action alternatives are technically and administratively feasible. The availability of services and materials is lower for Alternative 1, offsite disposal, because the availability of helicopters can be limited due to wildfires. Alternative 3, no action, is likely not acceptable to the State or community.

### 8.3 Cost

Golder estimated costs for implementing these alternatives consistent with EPA guidance (EPA 2000) using vendor quotes, contractor quotes, experience with similar projects, and engineering judgment. Due



to the remote site location and unique working conditions, Golder added 30 percent contingency to capital and post removal site control costs (scope and bid). Cost estimate details are included in Attachment 4. Golder calculated present value of post removal site control costs using an interest rate of 1.9% consistent with Office of Management and Budget (OMB) guidance (OMB 2013) and assumed a term of 30 years. The capital and present value costs of the alternatives are summarized in Table 6. Alternative 1, offsite disposal has the highest cost.



## 9.0 PREFERRED ALTERNATIVE

The recommended removal action alternative is construction of an on-site repository. Of the removal action alternatives discussed above, only off-site disposal and on-site repository alternatives are feasible, implementable, and have the potential to adequately meet the removal action objectives. Offsite disposal is technically feasible using somewhat unconventional excavation methods and transportation of the mine waste material to landfills. As shown in Attachment 4, offsite disposal is not cost effective compared to onsite repository. Construction of an onsite repository is likely acceptable to the State and community because it directly addresses the hazardous material on-site.



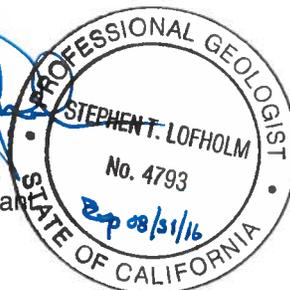
### 10.0 CLOSING

Please feel free to contact the undersigned at (916) 786-2424 should you have any questions or comments.

#### GOLDER ASSOCIATES INC.

Mark Naugle, P.E.  
Senior Consultant

Stephen T. Lofholm, P.G.  
Associate/Senior Consultant





## 11.0 REFERENCES

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# TABLES

Table 1: Metals Analysis

Sample	Sample Type	Analysis Type	Units	Date Sampled	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
SW-DF-1	Surface Water	Total Metals	µg/L	8/14/2012	<6.0	<10	<200	<5.0	<2.0	<10	<5.0	18.9	<10	3.2	<20	<5.0	<10	<5.0	<10	<10	<20
SW-DUP	Surface Water	Total Metals	µg/L	8/14/2012	<6.0	<10	<200	<5.0	<2.0	<10	<5.0	12.2	<10	<0.20	<20	<5.0	<10	<5.0	<10	<10	<20
Background Soil	Soil	Metals	mg/kg	8/14/2012	<1.8	2.6	47.7	<0.89	<0.89	10.1	5.4	62.0	26.4	0.079	<1.8	6.7	<1.8	<0.89	<3.6	33.5	37.6
Boiler-1-S	Soil	Metals	mg/kg	8/14/2012	<1.7	4.3	29.8	<0.87	<0.87	8.3	8.6	295	8.5	1.2	3.7	3.0	<1.7	<0.87	<1.7	27.3	19.1
ADIT-1-S	Soil	Metals	mg/kg	8/14/2012	<3.7	22.4	45.4	<1.8	<1.8	12.0	38.0	413.0	16.0	14.9	4.2	4.9	<3.7	2.4	<3.7	43.8	36.9
ADIT-1-S	Soil	Metals, STLC, CA WET	mg/L	8/14/2012	<0.0060	<0.010	<0.20	<0.0050	<0.0020	<0.010	0.046	0.39	<0.010	<0.00020	<0.020	<0.0050	<0.010	<0.0050	<0.010	<0.010	0.063
TDF-COMP-1	Soil	Metals	mg/kg	8/14/2012	<5.2	30.5	<52	<2.6	<2.6	3.8	192	1160	11.2	117	11.3	4.6	5.7	<2.6	<8.6	24.1	11.9
TDF-COMP-1	Soil	Metals, STLC, CA WET	mg/L	8/14/2012	<0.0060	<0.010	<0.20	<0.0050	<0.0020	<0.010	0.10	1.3	<0.010	<0.00020	<0.020	<0.0050	<0.010	<0.0050	<0.010	<0.010	<0.020
TDF-COMP-2	Soil	Metals	mg/kg	8/14/2012	<5.2	43	<52	<2.6	<2.6	4.4	301	1130	14.5	85.2	7.5	7.7	7.3	<2.6	<8.7	32.9	16.0
TDF-COMP-2	Soil	Metals, STLC, CA WET	mg/L	8/14/2012	<0.0060	<0.010	<0.20	<0.0050	<0.0020	<0.010	0.48	0.36	<0.010	<0.00020	<0.020	<0.0050	<0.010	<0.0050	<0.010	<0.010	<0.020
TDF-COMP-3	Soil	Metals	mg/kg	8/14/2012	<9.4	58.0	<94	<4.7	<4.7	<4.7	485	1340	13.0	113	<9.4	11.6	9.4	<4.7	<19	33.8	13.9
TDF-COMP-3	Soil	Metals, STLC, CA WET	mg/L	8/14/2012	<0.0060	<0.010	<0.20	<0.0050	<0.0020	<0.010	0.057	0.7	<0.010	<0.00020	<0.020	<0.0050	<0.010	<0.0050	<0.010	<0.010	0.036
TDF-D-1	Soil	Metals	mg/kg	8/14/2012	<5.2	48.7	<52	<2.6	<2.6	3.7	445	2180	11.6	404	6.6	12.3	8.5	5.6	<8.6	26.5	21.1
TDF-D-2	Soil	Metals	mg/kg	8/14/2012	<5.0	38.1	<50	<2.5	<2.5	4.6	486	1360	12.7	111	10.5	12.6	10.4	<2.5	<2.5	34.4	14.4
TDF-D-3	Soil	Metals	mg/kg	8/14/2012	<5.0	38.1	<50	<2.5	<2.5	3.3	255	1300	13.2	77.4	7.1	5.9	7.5	<2.5	<8.4	27.8	14.9
TF-COMP-1	Soil	Metals	mg/kg	8/14/2012	2.4	8.5	28.1	<0.93	<0.93	6.0	8.6	974	89.2	62.0	6.8	2.6	<1.9	0.95	<1.9	25.1	18.2
TF-COMP-1	Soil	Metals, STLC, CA WET	mg/L	8/14/2012	<0.0060	<0.010	<0.20	<0.0050	<0.0020	<0.010	0.017	0.23	<0.010	<0.00020	<0.020	<0.0050	<0.010	<0.0050	<0.010	<0.010	0.039
TF-COMP-2	Soil	Metals	mg/kg	8/14/2012	<1.7	6.7	25.8	<0.84	<0.84	8.8	9.9	713	40.4	33.4	7.5	5.2	<1.7	<0.84	<1.7	33.8	19.5
TF-COMP-2	Soil	Metals, STLC, CA WET	mg/L	8/14/2012	<0.0060	<0.010	<0.20	<0.0050	<0.0020	<0.010	0.0083	0.094	<0.010	<0.00020	<0.020	<0.0050	<0.010	<0.0050	<0.010	<0.010	<0.020
TF-COMP-3	Soil	Metals	mg/kg	8/14/2012	2.6	6.7	28.8	<0.88	<0.88	8.8	10.5	621	43.1	54.2	6.5	4.0	<1.8	1.0	<1.8	33.3	19.1
TF-COMP-3	Soil	Metals, STLC, CA WET	mg/L	8/14/2012	<0.0060	<0.010	<0.20	<0.0050	<0.0020	<0.010	0.0054	0.088	<0.010	<0.00020	<0.020	<0.0050	<0.010	<0.0050	<0.010	<0.010	0.031
TF-DISC-1-6	Soil	Metals	mg/kg	8/14/2012	3.0	10.7	29.5	<0.93	<0.93	8.8	8.9	556	122	84.8	7.8	3.3	<1.9	<0.93	<1.9	31.3	25.8
TF-DISC-2-4	Soil	Metals	mg/kg	8/14/2012	<1.8	12.5	28.6	<0.90	<0.90	7.1	9.2	842	68.4	56.8	10.6	3.0	<1.8	1.7	<1.8	30.3	19.6
TF-DISC-3-7	Soil	Metals	mg/kg	8/14/2012	<1.8	9.0	29.3	<0.92	<0.92	7.3	10.9	1640	98.9	54.4	10.7	2.8	<1.8	1.4	<1.8	25.8	17.1
ADIT CHIP 1	Solid	Metals	mg/kg	8/13/2012	<1.7	20.3	41.7	<0.85	<0.85	49.5	18.0	60.0	6.5	0.089	7.6	2.7	<1.7	<4.3	<1.7	34.7	20.9
WRP-COMP-B-1	Solid	Metals	mg/kg	8/14/2012	<1.9	8.6	36.9	<0.93	<0.93	61.8	19.2	111	4.9	0.074	2.2	3.1	2.2	<4.6	<9.3	31.5	25.1
WRP-COMP-T-1	Solid	Metals	mg/kg	8/14/2012	<1.8	13.2	40.3	<0.90	<0.90	68.5	57.1	353	5.6	0.091	3.8	6.8	<1.8	<0.90	<9.0	30.5	22.6
<b>Human Health Risk Management Criteria</b>																					
BLM Camper	Soils	Metals	mg/kg		50	20			70			5000	1000	40		2700	700	700			4000
BLM Boater	Soils	Metals	mg/kg		NA	NA			NA			NA	NA	NA		NA	NA	NA			NA
BLM Swimmer	Soils	Metals	mg/kg		NA	NA			NA			NA	NA	NA		NA	NA	NA			NA
BLM Camper	Sediments	Metals	mg/kg		62	46			155			5745	1000	46		3094	774	774			46455
BLM Boater	Sediments	Metals	mg/kg		221	166			553			20517	1000	166		11061	2765	2765			165909
BLM Swimmer	Sediments	Metals	mg/kg		96	72			239			8884	1000	72		4789	1197	1197			71839
BLM Human Health Minimum	Soil/Sediment	Metals	mg/kg		50	20			70			5000	1000	40		2700	700	700			4000
BLM Camper	Surface Water	Metals	µg/L		124	93			155			11490	50	93		6194	1548	1548			92909
BLM Boater	Surface Water	Metals	µg/L		442	81			553			41035	50	332		22121	5530	5530			331818
BLM Swimmer	Surface Water	Metals	µg/L		192	192			239			17768	50	144		9578	2395	2395			143677
BLM Human Health Minimum	Surface Water	Metals	µg/L		124	81			155			11490	50	93		6194	1548	1548			92909
CHHSL Residential Land Use	Soil	Metals	mg/kg		30	0.07	5200	150	1.7		660	3000	150	18	380	1600	380	380	5	530	23000
CHHSL Industrial Land Use	Soil	Metals	mg/kg		380	0.24	63000	1700	7.5		3200	38000	3500	180	4800	16000	4800	4800	63	6700	100000
EPA RSL Residential	Soil	Metals	mg/kg		31	0.39	15000	160	70		23	3100	400	10	390	3800	390	390	0.78	390	23000
EPA RSL Industrial	Soil	Metals	mg/kg		410	1.6	190000	2000	800		300	41000	800	43	5100	47000	5100	5100	10	5200	310000
<b>Ecological Risk Management Criteria</b>																					
BLM Wildlife Median	Soils	Metals	mg/kg			275			3			136	125	8							307
BLM Aquatic Life Acute Exposure	Surface Water	Metals	µg/L						2			13	65	1.4		470	NA	3.2			120
BLM Aquatic Life Chronic Exposure	Surface Water	Metals	µg/L						0.25			9	2.5	0.77		52	5	NA			120

Notes:  
1) Values in red exceed at least one Human and/or ecological risk management criteria.

**Table 2: Acid Base Accounting (ABA) Analysis**

Constituent	Units	ADIT CHIP 1 <sup>a</sup>	WRP-COMP-B-1 <sup>b</sup>	WRP-COMP-T-1 <sup>a</sup>	TDF-COMP-1 <sup>a</sup>	TDF-COMP-2 <sup>a</sup>	TDF-COMP-3 <sup>a</sup>	TF-COMP-1 <sup>a</sup>	TF-COMP-2	TF-COMP-3 <sup>a</sup>	ADIT-1-S <sup>a</sup>
Date Sampled	date	8/13/12	8/14/12	8/14/12	8/14/12	8/14/12	8/14/12	8/14/12	8/14/12	8/14/12	8/14/12
Acid Generation Potential	t CaCO <sub>3</sub> /kt	22	4	27	110	125	230	2	ND	6	8
Acid Neutralization Potential	t CaCO <sub>3</sub> /kt	6	7	12	2	0	6	0	5	0	7
Acid-Base Potential	t CaCO <sub>3</sub> /kt	-16	3	-15	-108	-125	-224	-2	5	-6	-1
Net Neutralization Potential (NNP)	t CaCO <sub>3</sub> /kt	-16	3	-15	-108	-125	-224	-2	ND	-6	-1
Neutralization Potential	%	0.6	0.7	1.2	0.2	ND	0.6	ND	0.5	ND	0.7
Net Potential Ratio (NPR)	unitless	0.27	1.75	0.44	0.02	0.00	0.03	0.00	ND	0.00	0.88
Paste pH	unitless	5.5	7.0	6.4	5.2	5.4	5.7	5.0	5.3	5.2	4.4
Sulfur HCl Residue	%	0.09	0.11	0.72	3.45	3.81	7.01	0.02	ND	0.02	0.08
Sulfur HNO <sub>3</sub> Residue	%	0.07	0.06	0.12	ND	ND	ND	ND	ND	ND	ND
Sulfur Organic Residual	%	0.07	0.06	0.12	ND	ND	ND	ND	ND	ND	ND
Sulfur Pyritic Sulfide	%	0.02	0.05	0.60	3.45	3.81	7.01	0.02	ND	0.02	0.08
Sulfur Sulfate	%	0.60	0.03	0.15	0.08	0.20	0.34	0.04	0.02	0.18	0.16
Sulfur Total	%	0.69	0.14	0.87	3.53	4.01	7.35	0.06	0.02	0.20	0.24
Total Sulfur minus Sulfate	%	0.09	0.11	0.72	3.45	3.81	7.01	0.02	ND	0.02	0.08

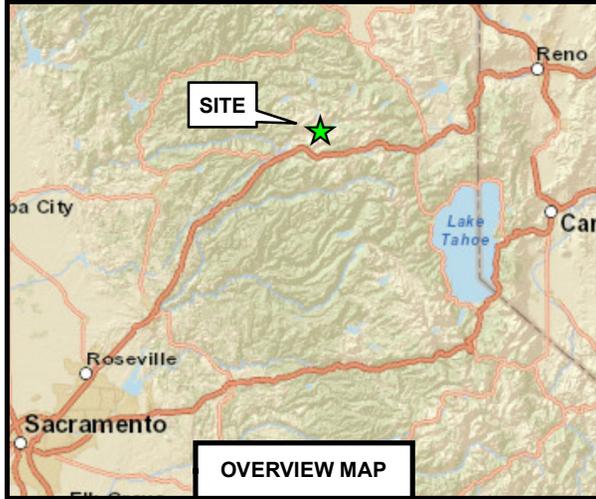
Notes:

a. A potentially acid generating (PAG) sample has NPR &lt; 1 and/or NNP &lt; -20

b. An uncertain PAG sample has 1 &lt; NPR &lt; 3 and/or 20 &gt; NNP &gt; -20

c. A non-PAG sample has NPR &gt; 3 and/or NNP &gt; -20

# FIGURES



### LEGEND

 Site Location (See Figure 2)

### REFERENCES

Projection: NAD 1983 StatePlane California II  
FIPS 0402 Feet

### NOTES

1. Overview map based on ESRI Basemap web service titled Streets provided by ESRI and others.
2. Main aerial imagery based on ESRI Basemap web service titled Bing Maps Hybrid provided by Microsoft Bing Maps.



PROJECT **PHOENIX LAKE  
EE/CA TECHNICAL  
MEMORANDUM  
PLACER COUNTY, CA**

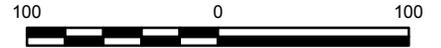
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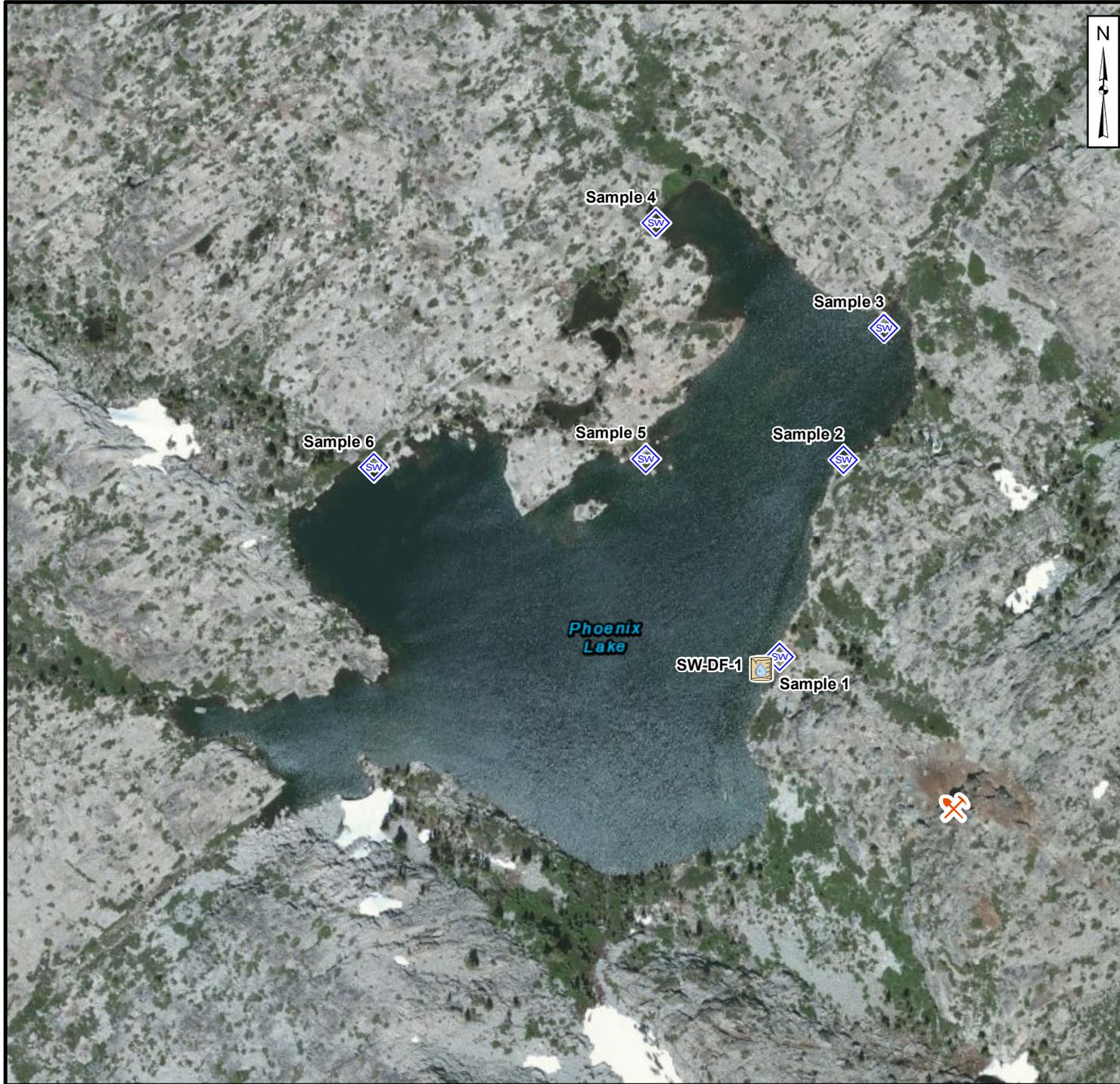


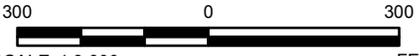
PROJECT No.  
123-97450

**FIGURE 1**



<b>LEGEND</b>	
	Mine Adit (Approximate)
	Stamp Mill
	Tailings Disposal Facility
	Tailings Fan in Phoenix Lake
	Boiler Soil
	Waste Rock
<b>REFERENCES</b>	
Projection: NAD 1983 StatePlane California II FIPS 0402 Feet	
<b>NOTES</b>	
1. Main aerial imagery based on ESRI Basemap web service titled Bing Maps Aerial provided by Microsoft Bing Maps, © 2013 Microsoft Corporation .	
 SCALE 1:1,200 FEET	
PROJECT	<b>PHOENIX LAKE EE/CA TECHNICAL MEMORANDUM PLACER COUNTY, CA</b>
TITLE	<b>SITE LAYOUT</b>
 Golder Associates Sacramento, CA	PROJECT No. 123-97450 <b>FIGURE 2</b>

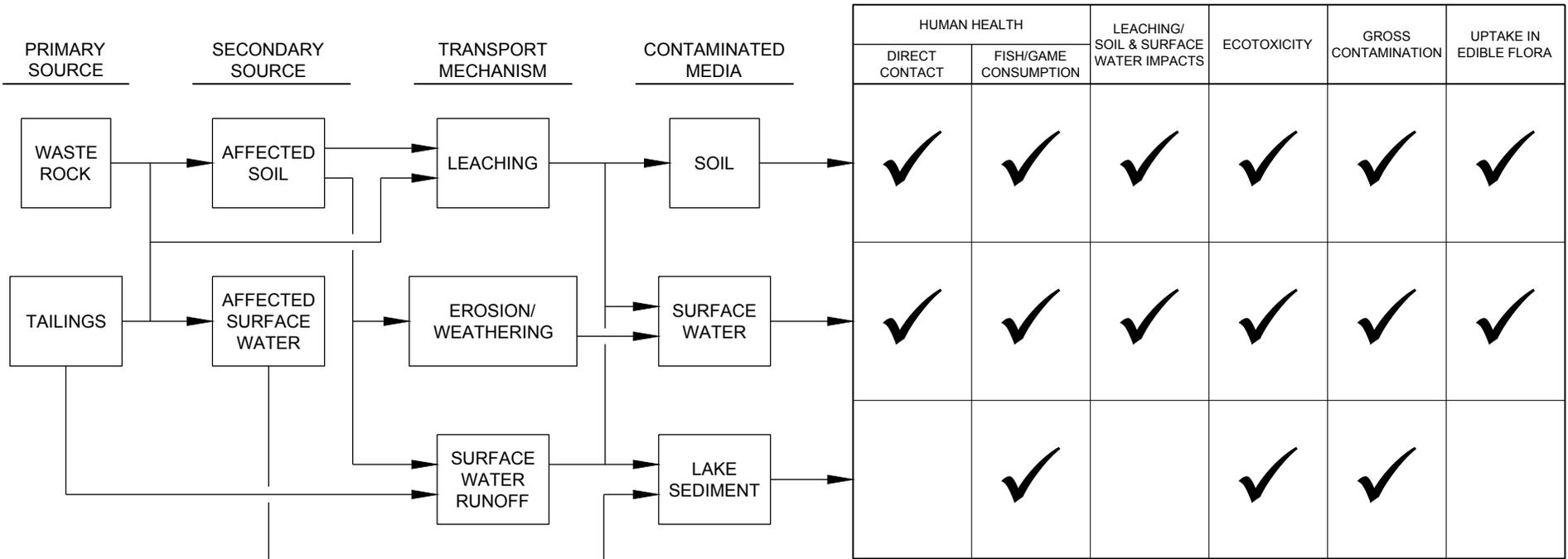


<b>LEGEND</b>	
	Mine Adit (Approximate)
<b>Surface Water Sample Location</b>	
	Field Sample
	Laboratory Sample
<b>REFERENCES</b>	
Projection: NAD 1983 StatePlane California II FIPS 0402 Feet	
<b>NOTES</b>	
1. Main aerial imagery based on ESRI Basemap web service titled World_Imagery. Basemap credits: Copyright:© 2013 Esri, DeLorme, NAVTEQ, TomTom Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community	
 SCALE 1:3,600 FEET	
PROJECT	<b>PHOENIX LAKE EE/CA TECHNICAL MEMORANDUM PLACER COUNTY, CA</b>
TITLE	<b>SURFACE WATER SAMPLE LOCATIONS</b>
	PROJECT No. 123-97450
<b>FIGURE 3</b>	



<b>LEGEND</b>	
	Mine Adit (Approximate)
	Stamp Mill
	Tailings Disposal Facility
	Debris Fan in Phoenix Lake
	Tailings and Debris Fan
	Waste Rock Piles
	Tailings Disposal Facility Samples (6)
	Tailings Fan Samples (6)
	Adit Chip (ADIT Chip 1) and Soil Sample (ADIT-1-S)
	Boiler-1-S
	WRP-Comp-T-1
	WRP-Comp-B-1
<b>NOTES</b>	
1. Main aerial imagery based on ESRI Basemap web service titled Bing Maps Aerial provided by Microsoft Bing Maps.	
 SCALE 1:1,250 FEET	
PROJECT	<b>PHOENIX LAKE EE/CA TECHNICAL MEMORANDUM PLACER COUNTY, CA</b>
TITLE	<b>WASTE ROCK, TAILINGS, AND SOIL SAMPLE LOCATIONS</b>
	PROJECT No. 123-97450
	<b>FIGURE 4</b>

### IDENTIFIED ENVIRONMENTAL CONCERNS



PROJECT						PHOENIX LAKE EE/CA TECHNICAL MEMORANDUM PLACER COUNTY, CA											
TITLE												CONCEPTUAL SITE MODEL					
PROJECT No.				123-97450				FILE No.12397450-F5-CS MODEL R1									
DESIGN		JDR		10/26/12		SCALE		AS SHOWN									
CADD		JDR		01/03/13													
CHECK																	
REVIEW																	



**FIGURE 5**

# ATTACHMENT 1

**Phoenix Lake Stamp Mill Site  
Tahoe National Forest, California  
Abandoned Mine Site Characterization  
Final Report**

**USDA Forest Service Contract Number: 53-91S8-03-PUF13**

**WESTON Work Order Number: 12238.024.001**

**July 2007**

**Prepared for:  
USDA Forest Service  
Tahoe National Forest  
Nevada City, California**

**Prepared by:  
Weston Solutions, Inc.  
1575 Treat Blvd., Suite 212  
Walnut Creek, California 94598**

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## LIST OF ACRONYMS

bgs	below ground surface
BLM	United States Department of the Interior, Bureau of Land Management
CAM	California Administrative Manual
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
GPS	Global Positioning System
mg/kg	Milligrams per kilogram
msl	Mean Sea Level
PA/SI	Preliminary Assessment/Site Inspection
PRG	USEPA Region 9 Preliminary Remediation Goal
RMC	Risk Management Criteria
SAP	Sampling and Analysis Plan
TTLC	State of California Total Threshold Limit Concentration
µg/L	Micrograms per liter
USDA	United States Department of Agriculture
EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WESTON	Weston Solutions, Inc.

## **1.0 INTRODUCTION**

The U.S. Department of Agriculture (USDA) Forest Service, Pacific Southwest Region, tasked Weston Solutions, Inc. (WESTON<sup>®</sup>) to conduct a Preliminary Assessment/Site Inspection (PA/SI) of the Phoenix Lake Stamp Mill (Site), under contract 53-91S8-03-PUF13. The site is located within the Yuba River Ranger District of the Tahoe National Forest, in Nevada County, California.

The objectives of this PA/SI are:

1. To identify sources of contamination at the Phoenix Lake Stamp Mill site.
2. To identify the presence of potential migration pathways of contamination at the Phoenix Lake Stamp Mill site.
3. To determine the exposure potential of contaminants at the Phoenix Lake Stamp Mill site.

This report summarizes the environmental data search and field activities conducted by WESTON on September 27, 2006. WESTON was accompanied by Rick Weaver of the USDA Forest Service during the sampling event. Sampling was conducted in accordance with WESTON's Sampling and Analysis Plan (SAP) for the Phoenix Lake Stamp Mill Site, dated September 2006.

## **2.0 BACKGROUND**

### **2.1 Phoenix Lake Stamp Mill Location and Description**

The Phoenix Lake Stamp Mill site is an abandoned ore mill located in a remote area at the north base of Old Man Mountain and along the southeast shore of Phoenix Lake in the Tahoe National Forest (Figures 1 and 2), the latitude and longitude of the Site are 39.374463 degrees north and 120.520630 degrees west. Phoenix Lake (the lake) is a relatively small, approximately 20 acre alpine lake that is approximately 5 straight-line miles northeast from the intersection of U.S. Interstate Highway 80 and California State Route 20. The lake is situated in a glacially carved granite bowl at an elevation of 6,990 feet above mean sea level (msl), and drains into Fordyce Creek. The lake is located in an area of the Tahoe National Forest that receives extensive recreational use by campers, hunters, off-road vehicle drivers, boaters, fishers, and hikers. The area contains numerous alpine lakes which have hundreds of drive-in camping sites. However, the lake is remote and is not accessible by vehicle. It is only accessible by foot, approximately one and a half to two miles from the nearest 4-wheel drive road.

The lake can be accessed by hiking from the north from the end of a 4-wheel drive road accessed from Meadow Lake, or from the east from a parking lot at the Fordyce Lake dam. Each route is approximately one and a half to two miles over steep, rough terrain (Weston did not encounter any foot trails to the lake during the field work).

The Site is sparsely vegetated with shrubs, grass, some trees and moss. Some parts of the original mill are still evident at the Site.

Gold was discovered in mineralized rock outcrops near the Site in 1863 and several mines were constructed by 1865. The claims listed on Old Man Mountain are Gold Run, Phoenix, New York, Pullman, and Mohawk. Ruins of the Mohawk mine are located on the Site. The Mohawk mine was operated by the Montreal Company, which used a steam powered stamp mill to crush gold ore. Parts of the stamp mill fell into the lake during the winter of 1872-73.

The Phoenix Lake Stamp Mill processed gold ore that was extracted from several adits located approximately 250 vertical feet directly above the mill. Waste rock has been distributed on the steep slope between the adits and the stamp mill pad. The stamp mill area is characterized by a steep, wedge-shaped debris fan approximately 150 feet across along the shoreline of Phoenix Lake and approximately 130 feet long, tapering to a slot in a cliff approximately 100 vertical feet above the lake. The debris fan is estimated to average approximately 10 feet thick, consisting of an estimated 3,600 cubic yards of waste rock and fine-grained crushed mine tailings situated on the shore of, and extending into, the lake. The mine tailings are in continuous, direct contact with Phoenix Lake water. Based on the shape, size and disposition of the waste rock and tailings debris fan on the steep shore of the lake, a considerable and unknown amount of waste rock and tailings are assumed to exist within the lake.

There is another estimated 3,000 to 4,000 cubic yards of waste rock and overburden generally 1 to 2 feet in diameter and smaller, located above the debris fan and extending approximately 350 feet up to the base of the adits, approximately 250 vertical feet above the lake (Figure 3).

There is a mine tailings impoundment located between the stamp mill pad and the lake, immediately adjacent to the lake, measuring approximately 40 feet long by 20 feet wide, and encompasses approximately 800 square feet. The rock wall of the tailings impoundment was not intact and the tailings appeared to spill out of the impoundment and were contiguous with the shore of the lake. It appeared that a significant amount of tailings exists along the shoreline and have spilled well into the lake. A fire ring inside the impoundment indicates that the site has been used by campers.

## **2.2 Previous Investigations**

Vector Engineering, Inc. (Vector) conducted a PA of the Site in 1991. Vector conducted field mapping, identified the locations of foundations, adits, waste, tailings piles, confirmed geologic maps, and conducted a sampling event.

Vector collected five solid samples in October 1991. Three of the samples were composite samples collected at mine waste rock/tailings. The other two samples were sediment samples collected from Phoenix Lake (see Figure 4).

The soil samples collected by Vector were analyzed for lead, iron, copper, and molybdenum using the California Waste Extraction Test WET, United States Environmental Protection Agency (EPA) Method 200.7. Three soil samples were analyzed for net acid generation potential (NAGP). The WET analysis is a test used to determine leaching potential of metals under ambient conditions. De-ionized (DI) water and citric acid were used in the analyses. DI water was used for the samples that had a NAGP less than 3.0 and citric acid was used for the sample that had a NAGP greater than 3.0.

Vector Waste Rock/Tailings and Sediment Sample Results  
(CCR WET, Citric Acid)  
(mg/L)

<b>Sample #</b>	<b>Lead</b>	<b>Iron</b>	<b>Copper</b>	<b>Molybdenum</b>	<b>NAGP</b>
S-1	ND	0.73	ND	ND	NA
S-2	ND	0.071	ND	ND	NA
S-3	ND	0.24	0.19	ND	6.8
S-4	ND	23	1.6	ND	1.8
S-5	ND	68	4.8	ND	-7.5
<b>STLC Reference</b>	<b>5.0</b>	<b>NA</b>	<b>25</b>	<b>350</b>	<b>NA</b>

Mg/L – milligrams per liter  
STLC – Solubility threshold limit concentration  
ND – Not detected  
NA – Not applicable  
NAGP – Net acid generation potential

Only iron and copper were detected in the soil/sediment samples and at relatively low levels. There is no STLC reference value for iron. Copper was detected at up to 4.8 mg/L

Vector also collected two water samples (W-1, W-2) in October 1991. The water samples were collected from Phoenix Lake and a seep (see Figure 4). The pH value of the water samples were relatively neutral at 7.65 and 7.5 respectively.

The water samples were analyzed for copper, iron, manganese, and zinc using EPA Method 200.7. Samples were analyzed for lead using EPA Method 239.2 and Molybdenum using EPA Method 246.2. Water samples were also analyzed for general minerals using EPA Methods 120.1, 130.2, 150.1, 160.1, 200.7, 258.1, 300.0, 310.1, and 425.1.

Vector Surface Water Sample Results  
(Metals, µg/L)

Sample #	Copper	Iron	Lead	Manganese	Molybdenum	Zinc
W-1	ND	38	ND	ND	ND	ND
W-2	ND	ND	ND	ND	ND	ND
<b>EPA AWQC</b>	12	1000	3.2	NA	NA	110

µg/L – micrograms per liter

ND – Not detected

NA – Not applicable

EPA AWQC – EPA Ambient Water Quality Criteria, freshwater aquatic life, chronic exposure

Iron was detected in the surface water samples collected by Vector at levels well below any regulatory or health-based benchmarks.

Vector did not observe any fish in the lake during their field work activities.

Additionally, the Forest Service has previously collected sediment samples at the Site with concentrations of arsenic as high as 238 milligrams per kilogram (mg/kg) and mercury as high as 104 mg/kg, levels above human and/or ecological benchmarks.

### 3.0 WESTON SITE CHARACTERIZATION ACTIVITIES

WESTON obtained a search of available environmental records of sites in the vicinity of Phoenix Lake from Environmental Data Resources Inc. (EDR). EDR found no sites within a 1-mile radius of Phoenix Lake from the available government and public records.

On September 27, WESTON conducted site characterization of the Phoenix Lake Stamp Mill Site. Sampling was conducted in accordance with WESTON’s Phoenix Lake Stamp Mill Site SAP, dated September 2006. A summary of sampling activities is presented below.

There is no vehicular access and no apparent trails to the lake. The lake is accessible by hiking approximately two miles overland through rough, steep, rocky terrain. Weston noted several mineralized zones in the rocky terrain that had been worked by miners between the lake and parking area. The stamp mill, the tailings, and waste rock are located on the shoreline of Phoenix Lake and are accessible to the public and wildlife/livestock. WESTON noted evidence of camping at the lake including campfire rings and footpaths. WESTON also noted footpaths at the mill Site and at the adits. WESTON personnel also interviewed hunters camping approximately 3 miles north of the lake. WESTON personnel did not observe any fish, minnows, or other aquatic life in the lake.

WESTON obtained information on the general water quality of Phoenix Lake from John Hiscox with the State of California Department of Fish and Game (DFG). According to Mr. Hiscox, the DFG considers Phoenix Lake to be unsuitable for continued stocking with fish due to poor water quality and low survivability. The DFG stocked the lake with rainbow trout in the 1950s and the mid 1990s, but the survivability was poor due to low pH and general poor water quality that they

assumed was caused by acidic runoff from the abandoned mines at the lake. The DFG has previously observed the pH of surface water near the lake to be between approximately 3.0 and 4.0.

### 3.1 Sampling

The data collected for this investigation is compared to U.S. Department of the Interior, Bureau of Land Management (BLM) Risk Management Criteria for Metals at BLM Mining Sites (RMC). The BLM developed the RMCs for metals of concern as they relate to recreational use and wildlife habitat on public lands. A range of possible exposure scenarios was examined by BLM to represent potential human and ecological exposures that might occur on public land. The RMCs are intended to be used by land managers as a cautionary signal that potential health hazards are present and whether natural resource management or remedial actions are indicated. Based on the relative remoteness of the Site, and the apparent infrequent visitation of hikers and campers to the Site, the data will primarily be compared to the ecological RMCs for metals in soils.

Wildlife may be exposed to metal contamination via several environmental pathways. The potential exposure pathways include soil and sediment ingestion, vegetation ingestion, surface water ingestion, and airborne dust inhalation. The BLM establishes ecological RMCs for metals in soil and sediments. The BLM refers to the EPA Ambient Water Quality Criteria for comparison with surface water samples.

Humans may be exposed to metal contamination via several environmental pathways. The potential exposure pathways at the site include dermal contact, surface water ingestion, airborne dust inhalation, and, to a lesser degree, soil and sediment ingestion.

The BLM suggests that exceedances of the criteria be interpreted as follows:

- Less than criteria: low risk
- 1-10 times the criteria: moderate risk
- 10-100 times the criteria: high risk
- >100 times: extremely high risk

The BLM also suggests that given the uncertainties associated with the ecological RMC and the values inherent in ecosystem management, moderate risk may be addressed by management and or institutional controls, whereas high risk may require remediation.

WESTON collected three shallow soil samples, six sediment samples, and three surface water samples in and around the Site and had them analyzed for EPA Method 6010B, Title 22, California Administrative Manual (CAM 17 Metals). Copper and mercury were detected in soil and sediment samples above the site action levels. No metals were detected in the water samples. The ecological RMCs (median) for wildlife and livestock in soil and sediment are as follows (in mg/kg);

	Arsenic	Cadmium	Copper	Lead	Mercury	Zinc
Median	275	3	136	125	8	307

### **3.1.1 Soil Samples**

A total of 3 soil samples were collected from the site. Two shallow soil samples were collected in a tailings impoundment at the Site and one background soil sample was collected approximately 1,500 feet north of the Site in an area assumed to be outside of any impact by the mining and milling operations at Phoenix Lake (Figures 2, and 5).

Copper was detected above the ecological RMCs in both soil samples collected in the tailings impoundment. Mercury was detected above the ecological (as well as human) RMCs in both samples that were collected from tailings impoundment (Figure 3, and Table 1). Mercury was detected in one of the samples from the tailings at a concentration more than ten times the ecological RMC value (and nearly 3 times the human RMC value). No metals were detected above RMCs in the background soil sample (Table 1).

### **3.1.2 Sediment Samples**

A total of 6 sediment samples were collected from the Site (including 1 duplicate, PL-SD-BG10, (duplicate of PL-SD-BG1)). Four sediment samples were collected at the shoreline of Phoenix Lake, (3 of them from immediately below the mill tailings impoundment area, and 1 from the outlet of the lake). One background sediment sample was collected from a shallow pond located approximately 3,000 feet north of Phoenix Lake outside of any impact by the mining and milling operations at Phoenix Lake (Figure 2).

Copper and mercury were detected above the ecological RMCs in all of the sediment samples collected at the shoreline of Phoenix Lake immediately below the stamp mill and downgradient at the outlet of the lake (arsenic was detected just above the human RMCs in the sediment samples). Copper was detected as high as 1290 mg/kg in sediments at the shoreline of the lake immediately below the tailings impoundment, and mercury was detected as high as 78.6 mg/kg in the same sample (both concentrations are approximately 10 times the RMC values). Copper was detected at 94 mg/kg in a background sediment sample, which is nearly as high as the RMC value of 136 mg/kg. No metals were detected above RMCs in the background soil sample (Table 1).

### **3.1.3 Water Samples**

A total of three surface water samples were collected from the Site. One sample from the shore line adjacent to the stamp mill Site, one from the outlet of the lake opposite of the stamp mill Site, and one background sample collected in a shallow pond approximately 3,000 feet north of Phoenix Lake outside of any impact by the mining and milling operations at the lake (Figures 2 and 5).

No metals were detected in any of the three surface water samples collected (Table 2).

**Table 1**  
**Phoenix Lake Stamp Mill**  
**September 2006 Sampling Results for Soil and Sediment Samples (mg/kg)**

Reported in mg/kg

Sample Location	Sample Type	Location Description	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
RMC Ecological Risk Management Criteria, (Median)			NA	275	NA	NA	3	NA	NA	<b>136</b>	125	NA	<b>8</b>	NA	NA	NA	NA	NA	307
<b>Background Sample</b>																			
PL-SD-BG1	Sediment	Background	ND (5.8)	ND (5.8)	31.6	ND (1.2)	ND (1.2)	5.1	2.6J	59	ND (5.8)	8.8J	0.13J	7.5	ND (5.8)	ND (2.9)	ND (5.8)	8.6	11.2J
PL-SD-BG10	Sediment	Background	ND (6.2)	ND (6.2)	40.1	ND (1.2)	ND (1.2)	9.2	4.3	94.1	11.1	16.3	0.24J	11.6	ND (6.2)	ND (3.1)	ND (6.2)	14.4	19.8
PL-SS-BG1	Soil	Background	ND (1.0)	2.7	55.2	0.30	ND (0.20)	10.5	5.3	29.1	5.9	1.5J	0.070	6.0	ND (1.0)	ND (0.51)	ND (1.0)	36.0	43.4
<b>Sediment Samples</b>																			
PL-SD-PL1	Sediment	Tailings on shore of lake	ND (1.3)	54.0	17.2	0.26	ND (0.25)	5.8	354	<b>1270</b>	20.3	11.2	<b>45.4</b>	13.8	9.9	3.4	ND (2.5)	38.3	24.9
PL-SD-PL2	Sediment	Tailings on shore of lake	ND (1.3)	57.8	14.0	0.17J	ND (0.26)	4.4	308	<b>1290</b>	24.8	8.1	<b>78.6</b>	12.4	8.6	3.4	ND (1.3)	28.6	20.0
PL-SD-PL3	Sediment	Tailings on shore of lake	ND (1.1)	24.5	20.5	0.11J	ND (0.22)	5.4	51.0	<b>261</b>	21.3	5.7	<b>42.5</b>	3.5	4.1	1.1	ND (1.1)	28.1	15.2
PL-SD-DS1	Sediment	Outlet of lake	ND (5.3)	ND (5.3)	9.4	ND (1.1)	ND (1.1)	2.5J	5.8	<b>296</b>	23.5	10.7	<b>25.8</b>	2.3J	ND (5.3)	ND (2.7)	ND (5.3)	8.0	7.6J
<b>Soil Samples</b>																			
PL-SS-PL1	Soil	Tailings in impoundment	ND (1.2)	10.0	25.2	0.3	ND (0.25)	6.6	7.6	<b>546</b>	61.5	7.0	<b>127.0</b>	3.2	2.2	1.4	ND (1.2)	26.1	17.4
PL-SS-DS1	Soil	Tailings in impoundment	ND (1.3)	2.6	7.6	ND (0.26)	ND (0.26)	2.7	1.9	<b>202</b>	21.0	1.8J	<b>68.9</b>	1.1J	ND (1.3)	0.28J	ND (1.3)	9.3	6.2

Notes:  
results above action levels are bolded

mg/kg = milligrams per kilogram

ND ( ) = Analyte not detected above the reported sample quantitation limit. The number in parentheses represents the associated contract required quantitation limit.

J = Estimated concentration. The result is less than the reporting limit.

RMC = Risk Management Criteria

**Table 2**  
**Phoenix Lake Stamp Mill**  
**September 2006 Sampling Results for Surface Water Samples (µg/L)**  
 Reported in µg/L

Sample Location	Location Description	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	
EPA AWQC		9,000	850	NA	NA	4	1,700	NA	18	82	NA	2.4	1,400	260	4.1	1,400	NA	120	
<b>Background Sample</b>																			
PL-SW-BG1	Nearby pond	ND (10)	ND (10)	ND (5.0)	ND (2.0)	ND (2.0)	ND (8.0)	ND (5.0)	ND (10)	ND (5.0)	ND (20)	ND (0.20)	ND (5.0)	ND (10)	ND (5.0)	ND (10)	ND (5.0)	ND (10)	
<b>Samples</b>																			
PL-SW-PL1	At the shore below the mill	ND (10)	ND (10)	ND (5.0)	ND (2.0)	ND (2.0)	ND (8.0)	ND (5.0)	ND (10)	ND (5.0)	ND (20)	ND (0.20)	ND (5.0)	ND (10)	ND (5.0)	ND (10)	ND (5.0)	ND (10)	
PL-SW-DS1	Outlet of lake	ND (10)	ND (10)	ND (5.0)	ND (2.0)	ND (2.0)	ND (8.0)	ND (5.0)	ND (10)	ND (5.0)	ND (20)	ND (0.20)	ND (5.0)	ND (10)	ND (5.0)	ND (10)	ND (5.0)	ND (10)	

Notes:

µg/L = micrograms per liter

EPA AWQC - EPA Ambient Water Quality Criteria, Freshwater, Aquatic Life, Chronic Exposure

ND ( ) = Analyte not detected above the reported sample quantitation limit. The number in parentheses represents the associated contract required quantitation limit.

## **3.2 Migration Pathways and Receptors**

### **3.2.1 Soil Pathway**

The Site has concentrations of copper and mercury above BLM ecological RMCs in surface soil. Mercury was detected at more than 10 times the ecological RMCs in site soils, and 3 times the human RMCs in soil collected from the tailings impoundment. Based on previous Forest Service data as well as the data collected for this investigation, there is an observed release to the soil pathway at the Site.

### **3.2.2 Surface Water Pathway**

Copper and mercury were detected as high as approximately 10 times the ecological RMCs in the sediments in the lake, and mercury was also detected above human RMCs in the sediments in the lake. Therefore, based on EPA Hazard Ranking System guidelines, there is an observed release to the surface water pathway based on chemical analyses of sediment samples as well as by direct observation of contaminated tailings in contact with the lake water.

### **3.2.3 Primary Receptors**

There is evidence of camping at the lake and even on the tailings within the tailings compound at the mill site. However, based on the remote location of the lake, and the relatively limited accessibility, the primary receptors at the Site appear to be ecological.

The BLM lists 12 animals and birds in the RMCs as the selected wildlife receptors that represent a range of the types, sizes, and habitats of birds and mammals representative of temperate BLM lands.

The selected wildlife receptors are the deer mouse, mountain cottontail, bighorn sheep, white-tailed deer, mule deer, cattle, sheep, elk, mallard, Canada goose, robin, and trumpeter swan. There is a different RMC value for each species on the list. Since it is unclear whether site contaminants would affect any one representative species more than another, the median RMC value is used as the reference value.

The DFG maintains the California Natural Diversity Database (CNDDDB). The CNDDDB is part of the Habitat Conservation Planning Division of the DFG, and is a source of highly accurate, quality checked data on the locations and status of the state's rare and endangered species and natural communities. The CNDDDB lists the following sensitive species that have been found to inhabit the area surrounding Phoenix Lake to approximately a 10-mile radius of the site. Although it is not clear whether these species can be found on the site soils or surface water, for the purposes of this Preliminary Assessment, they can be considered potential targets.

**California Department of Fish and Game  
CNDDDB Sensitive Species, Phoenix Lake Area**

<b>Common Name</b>	<b>Federal Status</b>	<b>State of California Status</b>
Mountain Yellow-Legged Frog	Endangered	None
Greater Sandhill Crane	None	Threatened
Willow Flycatcher	None	Endangered
Pacific Fisher	Candidate	None
Lahontan Cutthroat Trout	Threatened	None
California Wolverine	None	Threatened
Webber's Ivesia	Candidate	None

The Mountain Yellow-Legged Frog is of particular concern at the site. The Mountain Yellow Legged Frog population has been determined to be on the decline and is listed as endangered on the Federal Endangered Species list. This frog can thrive in water bodies where the predatory fish population is weak, such as at the site. The decline has been attributed to many factors including exposure to mining pollution, such as at the site.

**4.0 PHOENIX LAKE STAMP MILL SUMMARY AND RECOMMENDATIONS**

The Forest Service tasked WESTON to conduct a Preliminary Assessment/Site Inspection at the historic Phoenix Lake stamp mill to document concentrations of metals at the Site, sources of contamination, potential contaminant migration pathways, and potential human and ecological receptors.

The historic stamp mill is located on the shoreline of Phoenix Lake, directly down-slope from several open mine adits. Mine tailings and waste rock were produced and abandoned at the Site approximately 135 years ago and are still exposed at the surface, in continuous contact with the lake, and accessible to the public and ecological receptors.

WESTON collected soil, sediment, and surface water samples in and around the mine tailings. Analytical results indicate that the mine tailings inside, and outside of the tailings impoundment area are a source of contamination above ecological and human benchmarks at the Site.

Copper and mercury were detected at levels approximately 10 times higher than BLM RMCs (wildlife and livestock) in the soil and sediments at the Site. Based on BLM guidance on the RMCs, the level of contamination at the Site is between moderate to high levels. Based on chemical analyses and direct observation, there is an observed release to both the soil and surface water pathways at the Site.

Although there is evidence of occasional camping at Phoenix Lake and at the mill site, due to the remote location of the lake, and the relative limited accessibility, the primary receptors at the Site appear to be ecological.

Among potential receptors at the Site is the Mountain Yellow Legged Frog. The Mountain Yellow Legged Frog is listed as endangered on the Federal Endangered Species list, and the CNNDB places it as inhabiting the area of the Site. Considering the reported weak fishery at Phoenix Lake, the lake could be ideal habitat for the Mountain Yellow Legged Frog, and the documented contaminated mining wastes at the site could be a direct threat to the frog.

An estimated 3,600 cubic yards of mine waste and tailings exist in a debris fan located on the shore of the lake. There is an estimated 90 to 150 cubic yards of contaminated mine tailings within the tailings impoundment, and an unknown but possibly significant amount of tailings and waste rock in the lake. There is another estimated 3,000 to 4,000 cubic yards of waste rock and overburden located above the mill site, and extending up to the base of the adits.

Remedial activities at the site could include consolidating and covering the tailings (on the surface, near the shore of the lake) in order to reduce human and wildlife contact. Restoration options could include;

- Covering the exposed mine tailings with a geotechnical membrane, gravel, mulch or bark
- Place metal mesh fencing horizontally over the tailings in the impoundment
- Sealing the open mine adits
- Monitoring potential acid rock drainage entering the lake, as well as the pH of the lake.

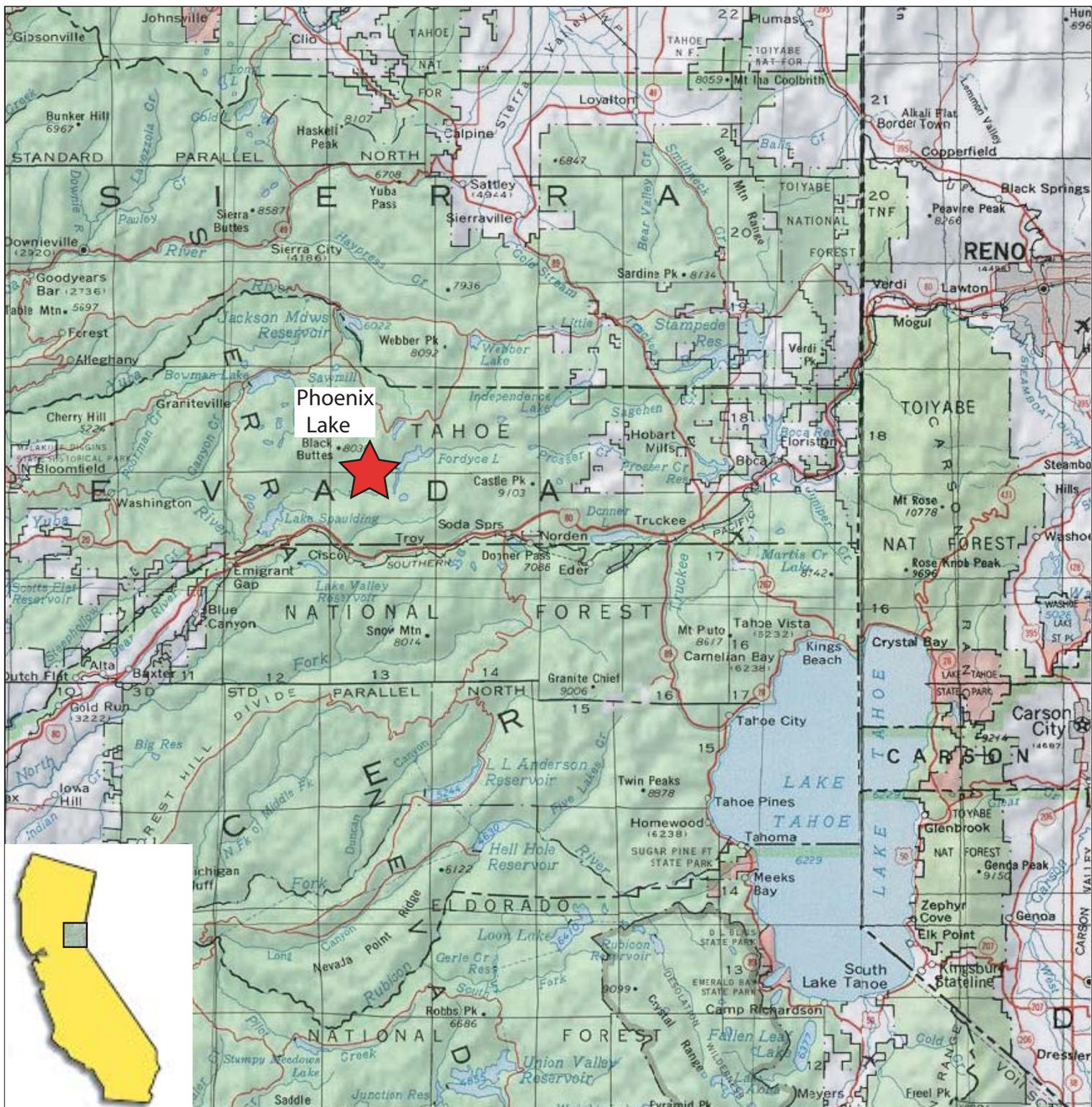
These restoration options would help minimize or prevent a continued release to the lake. However, they would not address the unknown quantity of tailings that are currently within the lake, below the shoreline.

This report concludes all tasks under this contract. If you have any questions regarding this report, please do not hesitate to contact us.

Respectfully submitted,

John Walter  
Project Manager

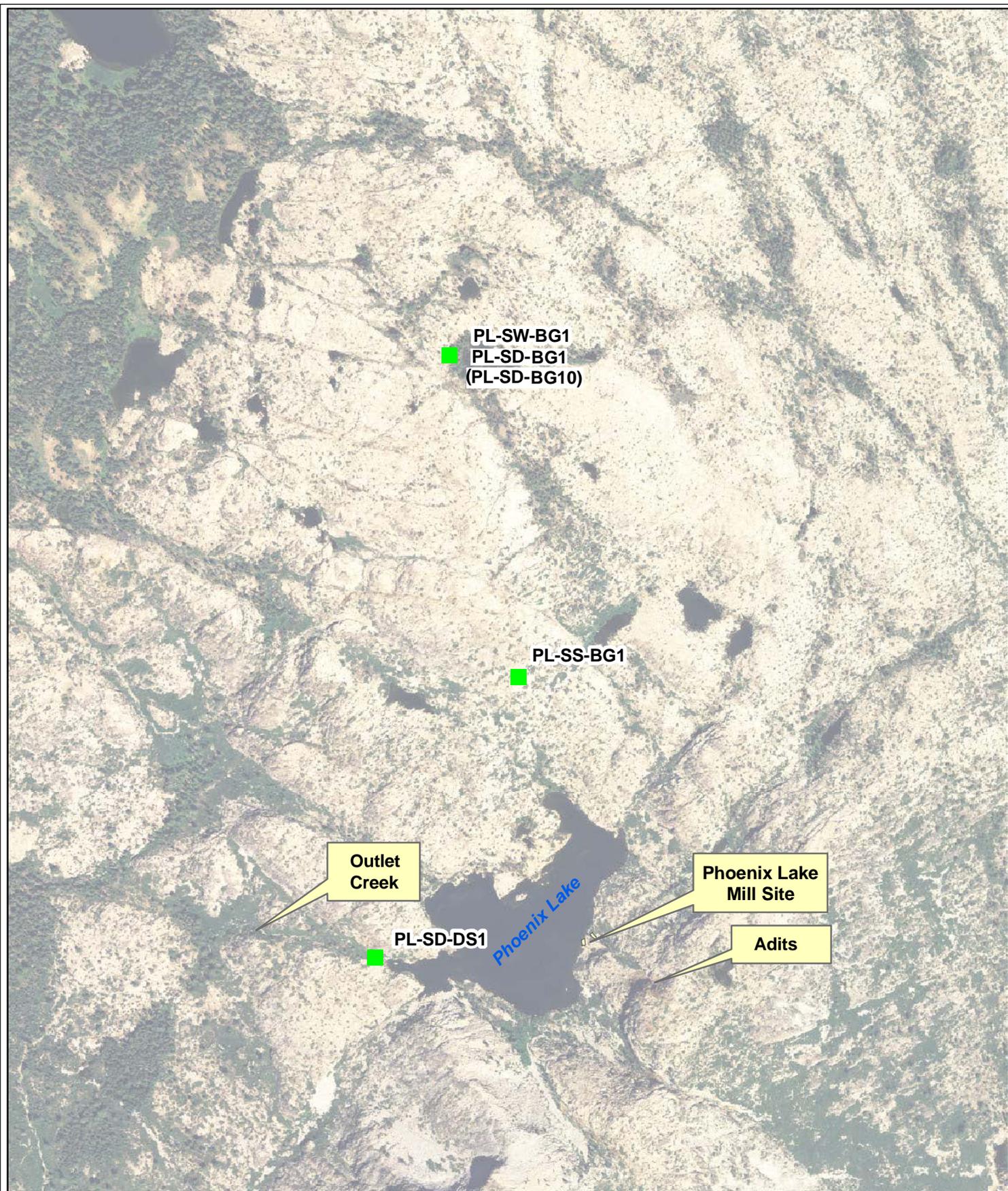
Claudette Altamirano  
Program Manager



Scale in Miles  
(approximate)

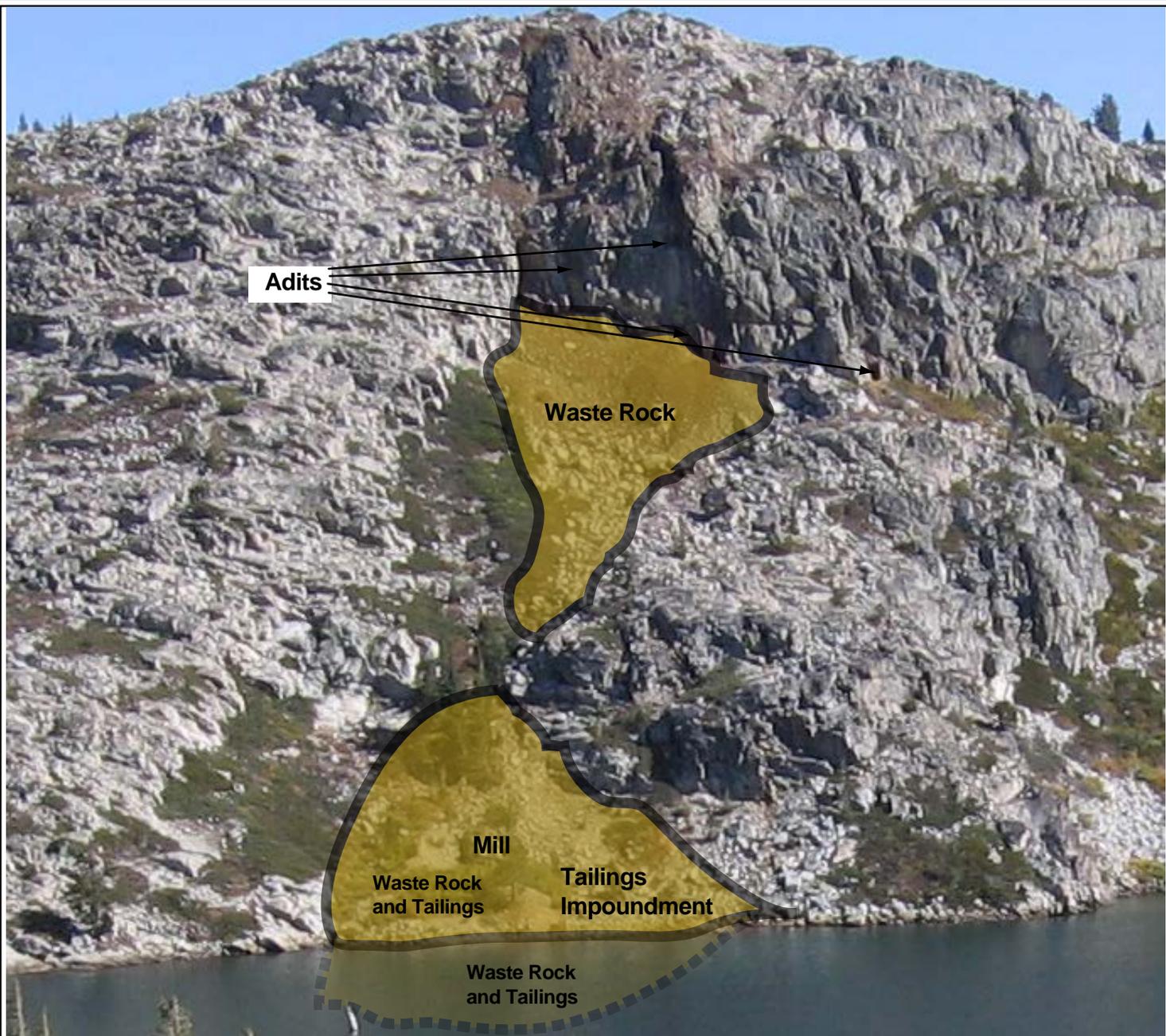


Phoenix Lake Area Map  
 Phoenix Lake Stamp Mill Site  
 Tahoe National Forest, California



Vicinity Map  
 with Background and Downstream Sample Locations  
 Phoenix Lake Stamp Mill  
 Tahoe National Forest, California

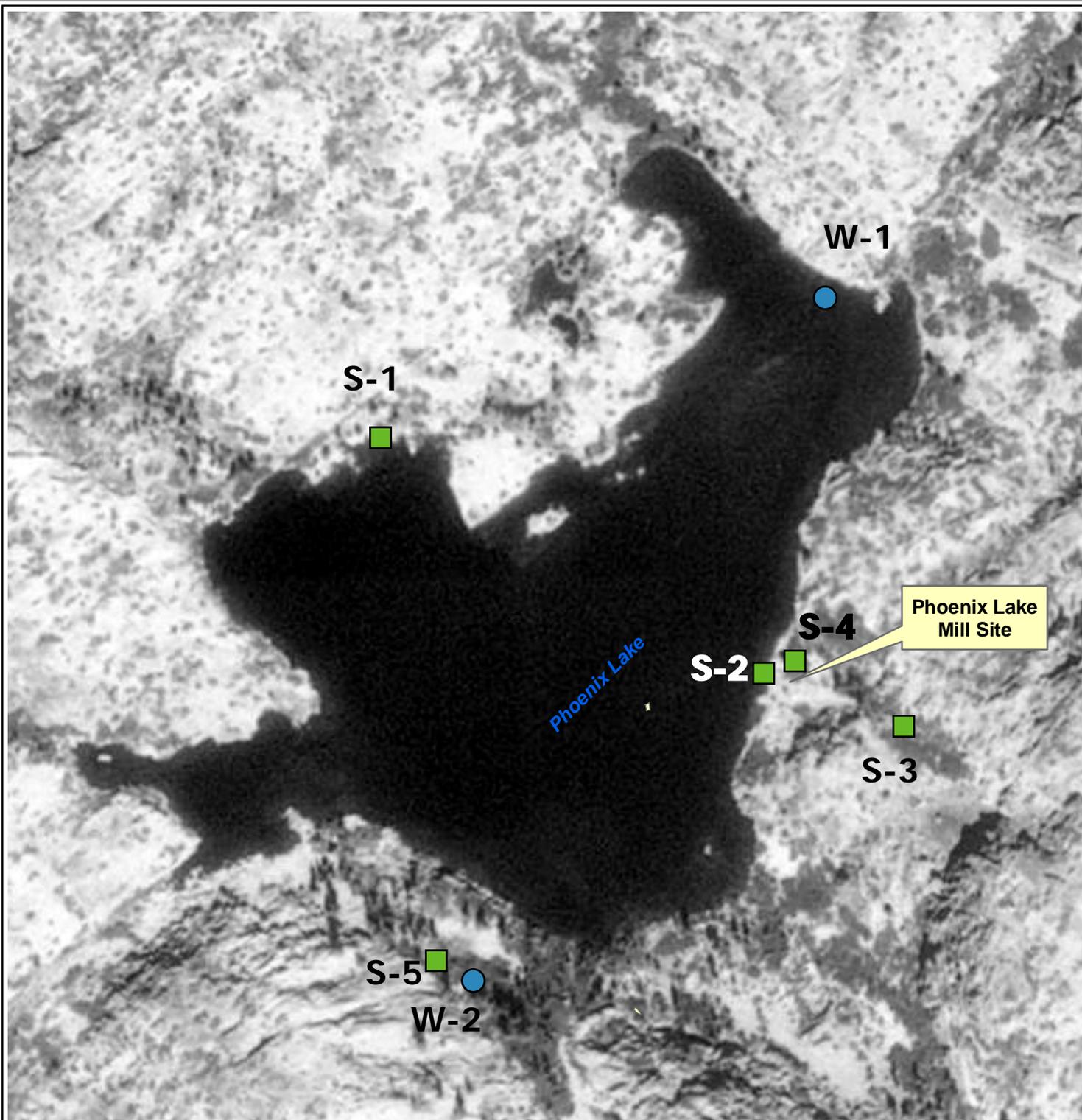




**Waste Rock and Tailings  
Phoenix Lake Stamp Mill  
Tahoe National Forest, California**



0 **Scale (at shoreline)  
Approximate** 50 Feet



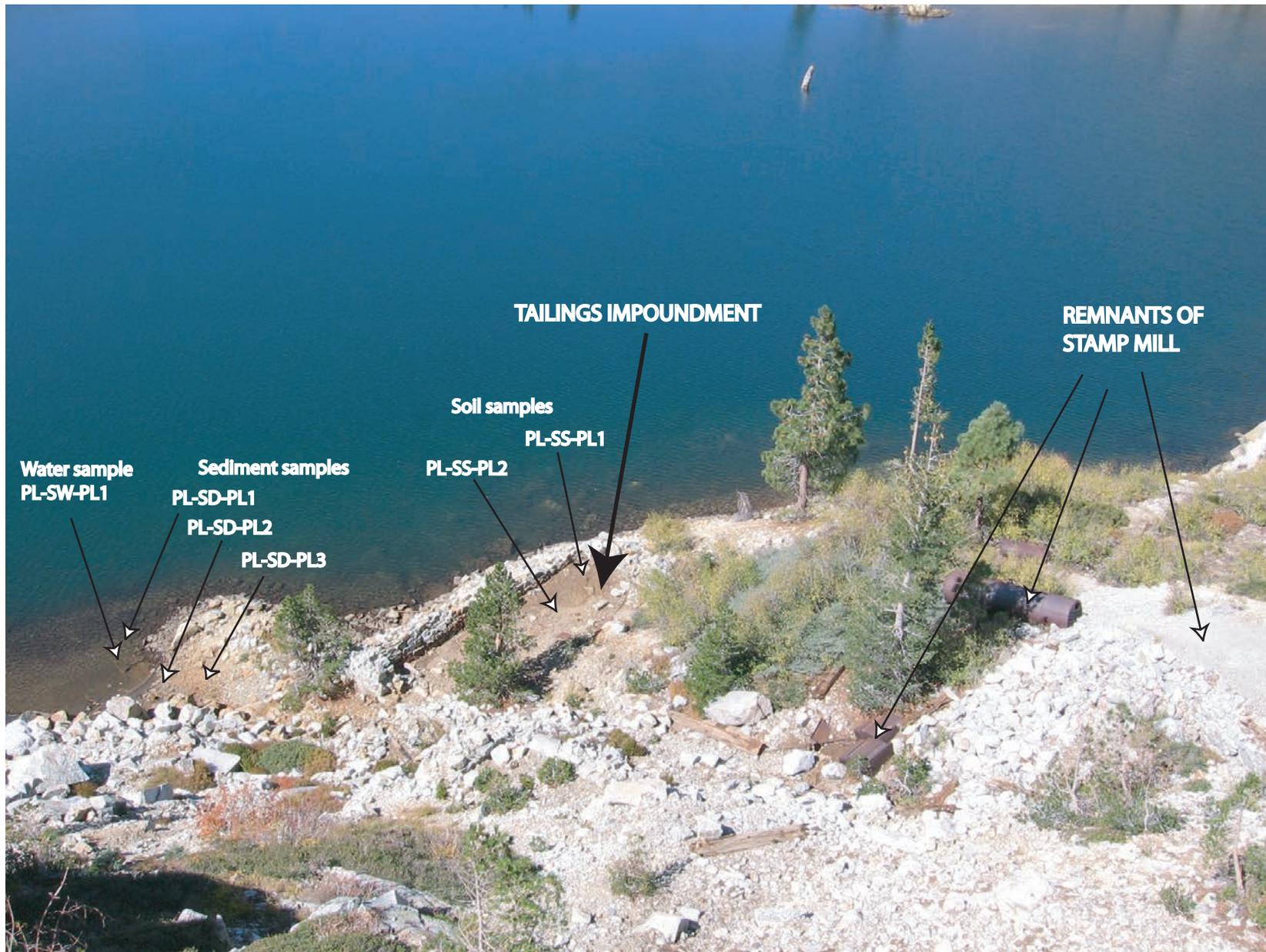
Vector

- Soil Samples
- Water Samples



Vector Engineering Inc. Sample Locations  
 Phoenix Lake Stamp Mill  
 Tahoe National Forest, California





Site Map with Sample Locations  
Phoenix Lake Stamp Mill Site  
Tahoe National Forest, California



FIGURE 5

## APPENDIX A: References

Bureau of Land Management, Risk Management Criteria for Metals at BLM Mining Site (Technical Note 390, rev.), 1996.

California Department of Fish and Game, California Natural Diversity Data Base.

WESTON Solutions, Inc., Sampling and Analysis Plan, Phoenix Lake Stamp Mill Site, September 2006.

## Appendix B

### Photographic Documentation

Phoenix Lake Stamp Mill  
Photographic Documentation



Phoenix Lake as seen from near the adits, above the stamp mill location.

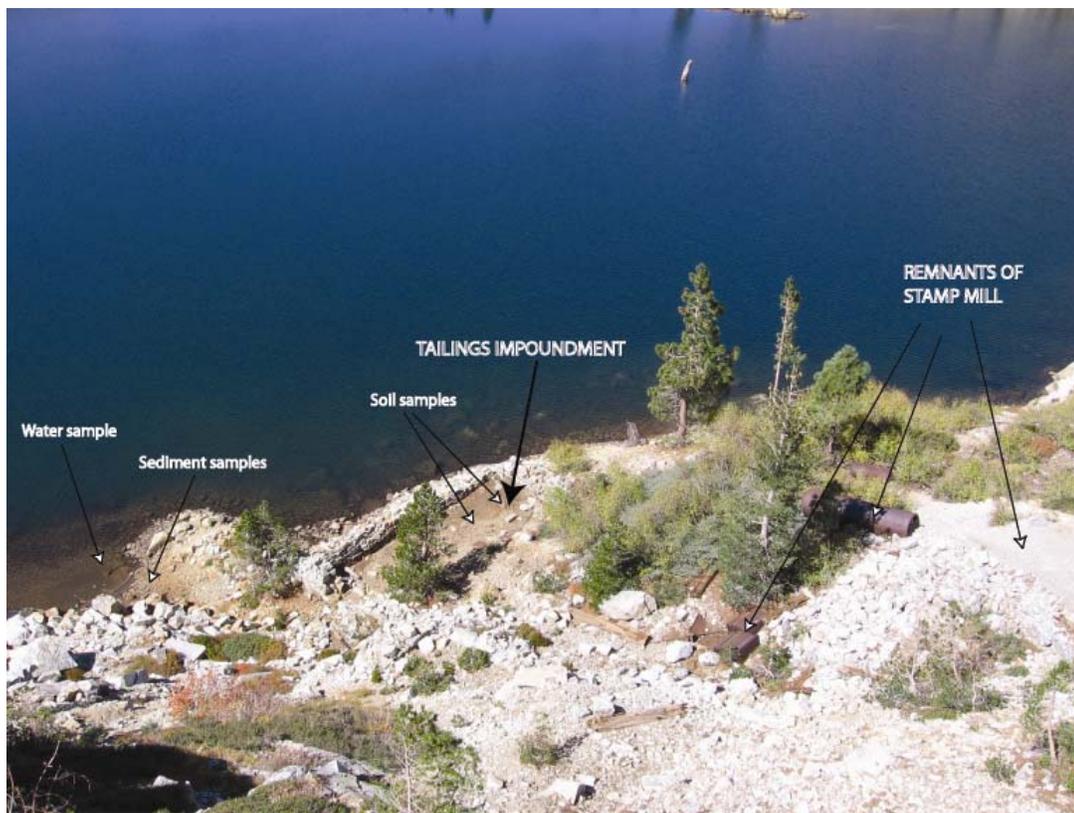


Soil sample collection, background sample.

Phoenix Lake Stamp Mill  
Photographic Documentation



Weston personnel collecting surface water samples where tailings contact lake water. (Photo: Rick Weaver)



Stamp mill and tailings impoundment area.

Phoenix Lake Stamp Mill  
Photographic Documentation



The tailings impoundment area is located adjacent to the lake.



A campfire ring exists within the tailings impoundment. The tailings impoundment is the only level spot near the site suitable for camping. (Photo: Rick Weaver)

Phoenix Lake Stamp Mill  
Photographic Documentation



Remnant parts of the stamp mill located near the tailings.



Outlet area of lake. Stamp mill and adits are directly across the lake in Background. Reddish waste rock can be seen below the vertical cliff (in shadow, upper middle right background).

Phoenix Lake Stamp Mill  
Photographic Documentation



One of several adits directly upgradient from the mill site.

*Report on Preliminary Investigations  
for  
Phoenix Lake, Tahoe National Forest*

prepared for:

U.S. Forest Service

prepared by:

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Job No. 91116.0  
January, 1992

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**Appendix A - Sampling Procedures**

**Appendix B - Analytical Copies**

## **Report on Preliminary Investigations for Phoenix Lake, Tahoe National Forest**

### **Introduction**

A preliminary investigation of the Phoenix Lake site, Tahoe National Forest was conducted by Vector Engineering, Inc. (Vector) for the USDA Forest Service, Tahoe National Forest in accordance with our proposal dated September 23, 1991 and subsequent addendum dated September 25, 1991. The basis of our proposal is Solicitation Number R5-17-91-68 issued by the USDA Forest Service, Tahoe National Forest dated July 23, 1991, and subsequent addendums. The purpose of this investigation is to provide an estimate of where the site would rank with respect to the EPA hazardous site priority ranking. This preliminary assessment will establish a ranking for more thorough investigation based on the estimated impact on the local environment. A review of historical records followed by field investigation was undertaken in order to provide as complete a picture as possible of the site history and current conditions.

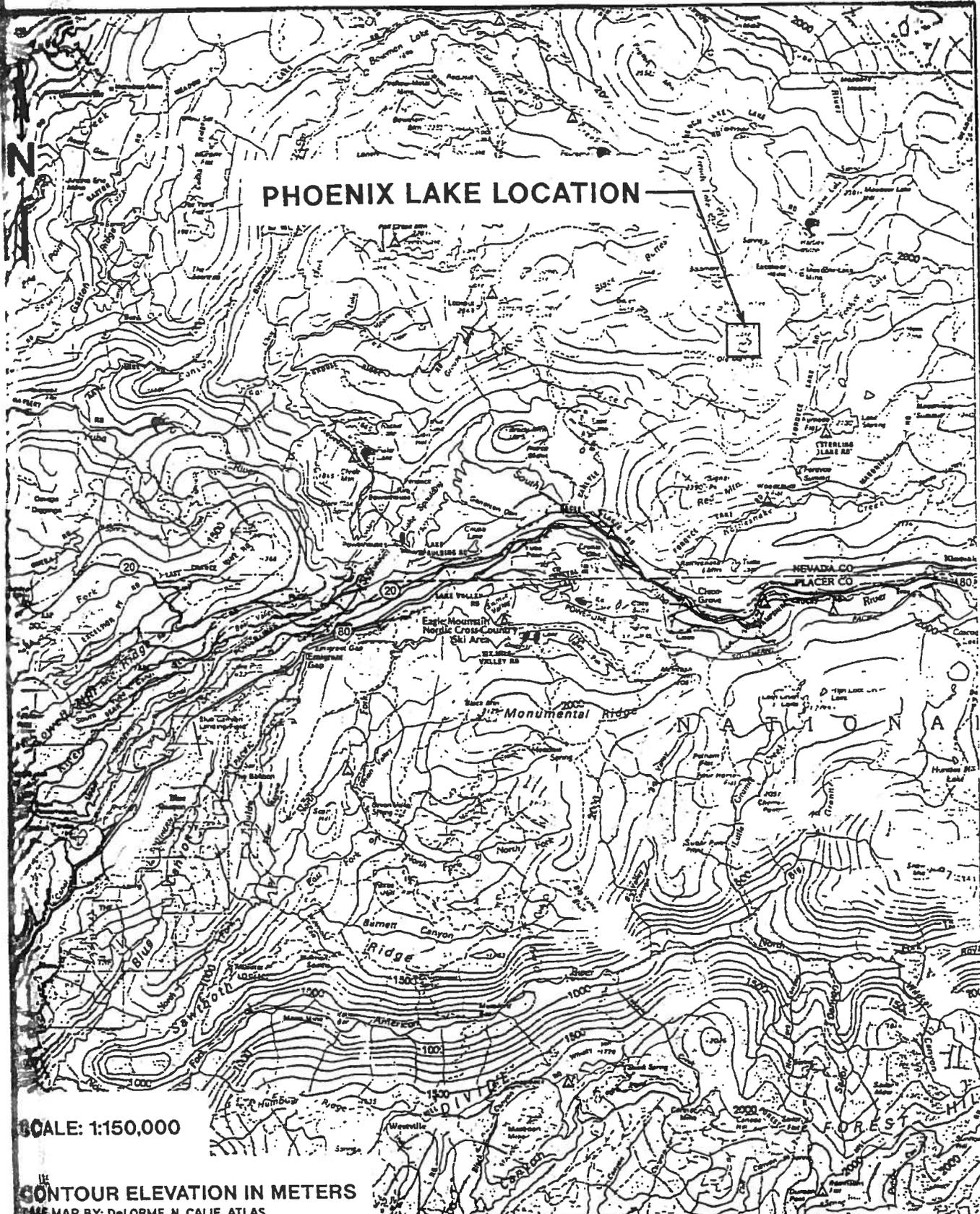
### **Background and Site History**

The Phoenix Lake site is located on the north side of Old Man Mountain and is situated in Township 17 North, Range 13 East, North 1/2 of Section 4, Mount Diablo Baseline and Meridian, Nevada County, California. The study area is approximately 50 acres (Plate 1), and includes only a portion of the 280 acres in the Phoenix Lake drainage basin. Elevations in the study area range from 6990 feet at lake level to 7520 feet above the highest adit. Most of the site is above tree line and the sparse vegetation consists primarily of shrubs, with some grass and moss near the lake. Annual precipitation averages over 60 inches per year, occurring primarily as snow from November through April. No figures were available on the 2 year 24 hour rainfall event (used for runoff calculations), but the 10 year 24 hour rainfall is 8.0 inches.

Vector investigated the history of the site to identify any past activities which could impact Phoenix Lake or the surrounding drainage. Included in our historical review were a literature search at the Tahoe National Forest Supervisor's Office, a literature search at the Searls Historical Library, Nevada City, and review of Tahoe National Forest aerial photos.

Historical records indicate that primary mining activities occurred near the south end of the lake at the Mohawk mine. Evidence of past mining activity includes several adits and waste rock piles located on the ridge above Phoenix Lake. Reportedly, the Forest Service has not stocked the lake, but has received reports of dead fish at the lake. Surface drainage feeds directly into Phoenix Lake from the tailings piles, which could create acid rock drainage (ARD). The Forest Service's concern is that ARD could lead to degradation of water quality and impact fish.

Phoenix Lake is located in a glacially carved bowl (cirque) on the north side of Old Man Mountain. Ledges of quartz with gold-bearing pyrites were first discovered in the nearby area of Meadow Lake in June 1863 by Henry H. Hartley. By 1865 a gold rush had started and several mining establishments developed in the area. These operations met with great difficulty due to the short summer season, harsh winters, remote location of the site, and complexity of



SCALE: 1:150,000

CONTOUR ELEVATION IN METERS  
 BASE MAP BY: DeLORME, N. CALIF. ATLAS

**VECTOR**  
 ENGINEERING, INC.

10438 Loma Rica Drive, Suite C, Grass Valley, CA 95945

NO. 91116.0 APPR. *PHS* DATE: 10/30/91

LOCATION MAP

PLATE

USFS PRELIMINARY ASSESSMENT  
 PHOENIX LAKE AREA  
 NEVADA COUNTY, CA

**1**

is probably the result of residual weathering of the sulfide ores. This weathering can naturally produce acidic conditions in the soil and potentially in the ground water, which can leach metals from the rocks.

On the south side of the lake, directly below the two main adits, is a large pile of waste rock/tailings measuring 100 feet across at the top and 50 feet near the toe, with a total length of 500 feet. With an estimated thickness of 15 feet at its deepest point, total volume of the waste rock/tailings is approximately 6,800 cubic yards (see Plate 2). We have not differentiated between waste rock (non-mineralized rock mined in order to reach the mineralized zone) and tailings (remains of processed ore material) in our mapping, because of the small volume. Located below this material, near the lake shore, are ruins of what may have been a steam quartz mill, at least two rock-pile structures, a 1,000 gallon steel-plate boiler, an empty 550 gallon storage tank, numerous pipes of several lengths, scattered cast iron fittings, and a few isolated one-inch thick iron plates. In addition, two man-made rock-pile dikes run from near the top of the waste rock/tailings down to near the lake shore. Photos of the equipment and structures are presented at the end of this report. Two composite samples were collected from the mine waste rock/tailings. These samples were analyzed to determine their metal content and their potential for generating acid. A copy of Vector's sampling protocol is included as Appendix A to this report. Sample locations are noted on Plate 2.

Two other small prospects were noted near the south and north-northwest ends of the lake. The residual tailings piles at these sites were less than eight cubic yards each. Several lengths of two inch PVC piping were observed along the east and south sides of the lake. One composite sample was collected from the waste rock below the prospect to the south of the lake, and analyzed for metal content and acid generation potential. Because the volume of material at the north-northwest prospect was so small, no sample was collected.

Two sediment samples were collected from the lake bed, one near the northern shoreline, and the other near the convergence of the main tailings pile and the lake. Metals may be leaching from waste piles into the lake, then precipitating out onto the lake bottom sediments. Thus, concentrations of metals in the lake water may be non-hazardous to aquatic life while sediments at the bottom of the lake may contain toxic levels. Shallow lakes such as Phoenix can become stratified by temperature with colder water remaining at the bottom. Twice a year, normally, seasonal changes in temperature cause these lakes to "turn over" or mix waters at all depths. This can cause metals-laden sediments to become entrained in the water column, releasing metals in concentrations high enough to adversely affect aquatic life.

Ground water was not observed flowing out of either of the two main adits during our investigation. Some seepage was observed flowing out of one of the smaller prospect holes on the south end of the lake at a rate of 0.1 gallons per minute. No other springs, seepages, or inflows were observed entering the lake. No water was observed flowing from the lake's outlet located in the southwest quadrant of the lake. The lake is recharged by local precipitation and snow melt, and perhaps by ground water entering the lake through joints and fractures in the

rock. Overflow exits the lake through its spillway, and the lake may lose water through joints and fractures as well. Determining actual direction of ground water flow is beyond the scope of this study.

Dissolved oxygen was measured in the water in Phoenix Lake. Readings taken at depths between six and twelve feet were consistent at 8.1 mg/L at 12.5° C. The lake's water level appeared to be at least four feet below the upper-most water level markings found on near-shore rock outcrops. A near-surface sample of the lake water was collected for laboratory analysis, including general minerals, selected heavy metals, and pH.

Our field representative also noted several dead trout in some of the upper-most smaller lakes/ponds that lie along the ridge top north of Phoenix Lake. No obvious causes were observed. No fish were observed in Phoenix Lake.

### Laboratory Test Results

Three composite, near-surface samples from mine waste rock/tailings and two sediment samples from Phoenix Lake were collected for laboratory analysis. To confirm the potential for acid generation, the three waste samples were tested for acid generation potential, neutralization potential, and net acid generation potential (NAGP) and for lead, iron, copper & molybdenum using the California Waste Extraction Test (WET). The lake sediment samples were also tested for lead, iron, copper and molybdenum using the WET analysis, but were not analyzed for NAGP. Laboratory test results are listed in Table I and copies of the analyses are included in Appendix B.

NAGP is composed of two tests, one of which determines the acid generation potential (AGP) of a solid material based on the amount of sulfides present, while the other determines the neutralization potential (NP) of the same material based on the amount of natural carbonates present. The ratio of AGP over NP gives the NAGP. The NAGP were utilized as a key index for determining the potential for acid generation, and are reported as the net tons of CaCO<sub>3</sub> needed to neutralize H<sup>+</sup>/1000 tons of material. NAGP ratios of three or more indicate strong potential for generation of acidic waters and subsequent leaching of heavy metals from waste material or soil.

The WET analysis is a California Department of Health Services (DOHS) test used to determine the leaching potential of solids under surface conditions. The test uses de-ionized water to mimic the effects of leaching by neutral rain water or citric acid to mimic the effects of acidic rain waters. Vector requested de-ionized water be used for NAGP less than 3.0 and citric acid be used for NAGP greater than 3.0 to mimic most closely actual conditions in the waste materials.

**TABLE I**  
**Results of Analyses of Solid Samples at Phoenix Lake**

Sample No.	Lead	Iron	Copper	Molybdenum	NAGP
1	ND*	0.73 <sup>+</sup>	ND	ND	NA**
2	ND	0.071	ND	ND	NA
3	ND	0.24	0.19	ND	6.8
4	ND	23	1.6	ND	1.8
5	ND	68	4.8	ND	-7.5
STLC <sup>++</sup>	5.0	(none)	25	350	(none)

\*ND = Non Detected

\*\*NA = Not Analyzed

+ Results reported in mg/L or ppm

++ = Soluble Threshold Limit Concentration

Title 22 of the California Administrative Code lists the Total Threshold Limit Concentration (TTLC) and the Soluble Threshold Limit Concentration (STLC) for toxic elements. A sample in which the element exceeds the TTLC is classified as hazardous, while one in which the element is present in levels below the STLC is regarded as non-hazardous. Soils with concentrations between the two levels are in a grey area, and are generally subjected to further analyses to evaluate the tendency of the metal to leach out of the soil under natural conditions. All the metals analyzed in the solid samples at Phoenix Lake fall in the non-hazardous category.

Two water samples were taken from the Phoenix Lake area, one from the lake (W-1) and one from a seep (W-2), as noted on Plate 2. Water was tested in the field for dissolved oxygen, pH, electroconductivity (EC), and temperature. The water samples were submitted to a state certified laboratory and analyzed for general minerals plus copper, iron, lead, manganese, molybdenum, and zinc. Of the constituents analyzed that have maximum contaminant levels (MCLs) listed, all were below the MCL, thus the water meets water quality goals for the protection of aquatic life. Laboratory pH was at 5.5 for W-1 and 5.8 for W-2, or at relatively acidic levels considerably lower than field measurements. Differences between field and laboratory results are probably due to temperature fluctuations during shipping and confined conditions of each sample that could create a decrease in pH or an increase in acidity. Field measurements are listed in Table II, and copies of the laboratory test results for general minerals and metals are included in Appendix B.

**TABLE II**  
**Field Analyses of Water Samples at Phoenix Lake**

Sample No.	Temperature (°F)	EC (umhos/cm)	pH
W-1	62.3	3.58	7.65
W-2	58.1	26.5	7.5

### Conclusions and Recommendations

Both lead and molybdenum were below detectable levels in all five solid samples. Copper was also below detectable levels in both of the lake sediment samples. Levels of copper in the three samples from the waste rock or tailings are at low levels and are not a detriment to sustaining normal aquatic life. The highest value of copper found in the solid samples is an order of magnitude less than the STLC. Levels of iron in all the solid samples are also at non-detrimental levels. There is no STLC for iron as a solid, and it is not considered a hazardous material.

The NAGP value for waste sample #4 is very low, thus the tailings are not considered to have a high potential for generating acidic conditions. Sample #5, from the small prospect south of the lake, suggests the possibility of generating alkaline conditions; however, this is also a relatively low value. Since there exists a minor amount of tailings in this location (approximately 15 cubic yards), the potential here for generating alkaline conditions is negligible. The NAGP value for sample #3 indicates that this material does have a slight potential for generating acidic conditions.

Water quality results appear to be within acceptable limits for protection of aquatic life. The temperature of 62°F may be too warm for the species of trout to breed in the lake. Trout prefer a temperature no higher than 70°F for survival and no higher than 54°F for breeding purposes, according to Mr. Fred Kopperbahl, California Department of Fish and Game. If temperatures rise too high in the summer, fish may be forced further down in the lake, perhaps deep enough to encounter anoxic (no oxygen) conditions. Seasonal changes may also lead to a complete turn-over of the water column in the lake, bringing anoxic water from depths to near surface, again impacting the fish population. Dissolved oxygen levels in the upper twelve feet of the lake are within tolerable ranges for fish, but we do not know what the values are at greater depths. We likewise do not know whether or not dissolved oxygen levels fluctuate with the season.

With the exception of iron at 38 ug/L or ppb (parts per billion) in W-1, all metals were below detectable limits. No MCL for iron has been established for the protection of freshwater

aquatic life. Water quality goals for the protection of freshwater aquatic life also do not contain a MCL for pH. The relatively acidic laboratory pH, dissolved oxygen content, and temperature results all warrant further investigation. Although temperature, dissolved oxygen and pH levels were all normal in October when we visited the site, they probably fluctuate seasonally. The Phoenix Lake area has been subjected to several years of below normal precipitation or drought conditions. This may have had a direct impact on the lake through irregular temperature fluctuations and freezing to deeper levels coupled with higher than normal organic decay gas build-up or other detrimental factors.

Further analyses, including long-term monitoring of the lake, may be required to explain why a trout population cannot be maintained in Phoenix Lake. We believe that further studies will need to center on biological and meteorological factors rather than on the soils and previous mining activities.

It does not appear that the historical mining activities in and around Phoenix Lake from the Mohawk Mine have had a significant impact on the lake. The laboratory and field analysis suggest at or near normal environmental conditions at Phoenix Lake at the time of our investigation. The incidence of dead fish at other nearby shallow lakes, coupled with the lack of any identified hazardous levels of metals or acidic conditions at Phoenix Lake leads us to estimate that this site would be given a low level priority using the criteria of the Environmental Protection Agency (EPA) Hazardous Waste Site Ranking System.

### **Risk Assessment**

The four potential pathways for hazardous material to follow are soil, air, ground water, and surface water. The EPA Hazardous Ranking System (HRS) evaluates each of these pathways, then combines their scores mathematically to determine an overall HRS site score between 0 and 100. Sources of observed or potential contamination from hazardous substances are identified, calculations of the likelihood of release or exposure to contamination are made, and waste characteristics (toxicity, mobility, persistence, etc.) are evaluated for each pathway.

For the soil exposure pathway, the HRS evaluates the likelihood of exposure to any residents at the site and to residents or students who attend school within one mile of the site. For the nearby population, the attractiveness and accessibility of the site is also considered. Within a one mile radius of the Phoenix Lake site, no residences or schools have been identified, and the site, though perhaps considered attractive to those seeking solitude, is relatively inaccessible. Copper is the only metal that appeared in our sampling, and in such small quantities and relatively low toxicity that the soil exposure score would be close to zero.

For the air exposure pathway, the HRS evaluates the likelihood of exposure to gaseous or particulate matter that is hazardous. There are no gaseous hazardous materials at the Phoenix Lake site. Metals are not usually a risk as airborne particles, and most of the particulate matter

at the Phoenix Lake site is too coarse to become airborne. The air exposure score would then also be close to zero.

For the surface and ground water pathways, the HRS evaluates the likelihood of hazardous materials being released by overland flow or by flood and affecting drinking water, the human food chain, and the environment in general, especially if the site is a designated sensitive environment (National Parks, wildlife refuge, endangered species habitat, etc.). The likelihood of release is determined by the net precipitation the site receives, the distance from the source of contaminants to surface water bodies or depth to aquifers, whether or not the site is in a floodplain, how long it would take for the contaminant to move through the soil and/or rock at the site, and the type of containment (if any) have been provided for the contaminants. Because the waste rock and tailings are not confined, the site is in the highest (worst) category. Net precipitation (precipitation minus evaporation) for the Phoenix Lake site is in excess of 30 inches per year, which is in the highest category in the HRS factoring scheme for precipitation data. Phoenix Lake itself is less than 100 feet from the source of the copper (the waste rock and tailings), so the runoff potential has a factor in the moderate zone. The site is not in a floodplain, so the potential to release contaminants by flood is zero. We have no data on depth to ground water at the Phoenix Lake site, but estimate that it is in excess of 100 feet. At this depth to ground water and with the small quantity and low mobility of the copper, contamination of ground water has a very low potential, probably less than a "1".

The targets for exposure are sensitive ecosystems and persons on-site or nearby who use surface or ground water from the site or who might consume animal or plant life from the site. There are no residents on the site. Meadow Lake, which is 2 1/2 miles to the northeast, is used for fishing and camping by approximately 2000 people each year. Because Phoenix Lake is not accessible even by four wheel drive vehicles, we would estimate that only about 20 people per year use the site.

As in the soil and air exposure pathways, the quantity and toxicity of the hazardous waste is a part of the equation, but for the pathways in which water is the means of conveyance, the mobility, solubility, persistence, and bioaccumulation potential of the hazardous material plays a part as well. Although elemental metals are very persistent in the environment, mobility and solubility vary with soil conditions, which is the reason for performing the NAGP tests. Tests results from Phoenix Lake indicate only slight potential for leaching; thus the mobility of the copper should be fairly low.

The HRS scores for surface water and ground water pathways should both be low, based on the very low factors for waste characteristics, low population, depth to ground water, and inaccessibility. No hazardous levels of any metals were found in our limited water sampling.

Because the HRS scores for all pathways are low, the composite score for the site would also be very low, perhaps even less than a "1", compared to the EPA cutoff score of 28.5. The

majority of sites with scores above this cutoff have been shown to present risks, while those with lower scores are considered less risky and therefore very low on their priority list.

We believe that the Phoenix Lake site does not need further assessment of its potential as a hazardous site, and that a copy of this report be kept in Forest Service offices where questions about the site may be received from members of the public. Likewise, you may wish to send a copy of this report to Fish and Game, who probably also receive questions about the fish mortality, and perhaps to the Nevada County Department of Environmental Health, for their files. The extra analyses of the lake conditions we recommended earlier are suggestions for furthering the study of why fish are not surviving in the lake, not a recommendation for a full environmental assessment.

### Limitations

This report was prepared in accordance with generally accepted engineering practices applicable at the time of preparation. The findings and conclusions presented in this report are based upon our field observations, results of selected sampling and laboratory analyses, and review of appropriate literature. They are specific for this site and for this client, and may not be expanded to include the greater areas beyond this site. Vector Engineering, Inc. makes no other warranties, expressed or implied, as to the professional advice provided in this report.

The work described herein  
was performed under the  
direct Supervision of a State  
of California Registered  
Professional Geologist:

  
Peggy A. Smith, R.G., R.E.A.  
Registered Geologist No. 5111

Date: 1/24/92

## REFERENCES

- Bean: "History & Directory of Nevada County, California", p. 309, dated 1867.
- California Administrative Code, Title 22.
- California Regional Water Quality Control Board - Central Valley Region: "A Compilation of Water Quality Goals", Sept. 1991.
- Department of Water Resources, State of California; well search data, open-file, Sacramento, California.
- Guddle, E.G.: "California Gold Camp", pp. 211 & 212, dated 1975.
- Lardner & Brock: "History of Nevada County", pp. 436 & 437, dated 1924.
- Loyd, R. & Clinkenbeard, J.: "Mineral Land Classification of Nevada County", C.D.M.G. Special Report 164, dated 1990.
- Nevada County Assessors Office, open-file mining claims, Nevada City, California.
- Report of the State Mineralogist, 8<sup>TH</sup> Annual Report, dated 1888.
- Thompson & West: "History of Nevada County", pp. 195 & 196, dated 1880.
- U.S.D.A. Forest Service aerial photographs, open-file at Nevada City, California: -#1572-175 & 176 (flight strip #39), both dated 8/2/72.
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration, "Precipitation-Frequency Atlas of the Western United States", vol. XI-California, dated 1973.

## VERBAL COMMUNICATION

- Baldrica, Michael; U.S.D.A. Forest Service, Sierraville, California.
- Becker, Sue; U.S.D.A. Forest Service, Central Sierra Snow Laboratory, California.
- Kopperbahl, Fred; California Department of Fish and Game, Folsom, California.
- Nelson, John; California Department of Fish and Game, Folsom, California.

## VECTOR ENGINEERING, INC. SAMPLING PROCEDURES

### INTRODUCTION

The following documents have been used as guidelines for the development of the sampling procedures:

- \* Procedures Manual for Ground Water Monitoring at Solid Waste Disposal Facilities, EPA-530/SW-611, August 1977
- \* RCRA Ground Water Monitoring Technical Enforcement Guidance Document, OSWER9950.1, September 1986
- \* Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA SW-846, 3rd edition, November 1986
- \* Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057, July 1982
- \* Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983

These procedures generally conform to the recommendations in the August 1988 State Water Resources Control Board document entitled Technical Guidance Manual.

### EQUIPMENT CLEANING AND CALIBRATION METHODS

The analytical laboratory chosen for the chemical analysis will be notified at least one (1) week prior to the proposed sampling date in order to give them sufficient time to send the appropriate sampling containers. Specify the number and nature of sampling sites and order extra containers if the site is remote and/or rugged. Also specify the type(s) of testing to be performed. Sample containers, caps, and septa will be stored in a clean environment, preferably the shipping container they arrived in. Sample bottles, bottle caps, and septa will be used only once and discarded after analysis is complete. Extras will be returned to the laboratory.

Brass tubes and sampling devices, whether hand held or drill rig mounted, used to collect soil samples for chemical analysis, will be cleaned twice with a solution of water and Alconox, rinsed in tap water, and double rinsed in deionized water. Brass tubes and hand samplers can be cleaned prior to going out to the sampling site and should be stored in a clean, dust-free environment. Sampling devices must be cleaned between each sample and clean tubes must be used for each sample collected. Sampling equipment can be cleaned either by the above method or by steam cleaning. Augers must be steam cleaned between each borehole.

The pH, specific conductance, and temperature meter will be calibrated before beginning field activities. The calibration will be checked once each day to verify performance. All field meter calibrations will be recorded on the back of the Water Quality Sampling Field Sheet.

## **GENERAL SAMPLE COLLECTION AND HANDLING PROCEDURES**

Proper collection and handling are essential to ensure the quality of a sample. Each sample will be collected in a suitable container, preserved correctly for the intended analysis, and stored prior to analysis for no longer than the maximum allowable holding time.

### **Surface Water Sampling**

If sufficient flow is observed, surface water samples will be collected with a dipper in accordance with the procedures listed in Section 9 of Test Methods for Evaluation of Solid Waste: Physical/Chemical Methods, SW-846, 3rd edition, November, 1986. If low-flow conditions are encountered, a stainless steel scoop will be used to collect samples. The flat bottom of the scoop will be pressed against the bank and the water will flow with little disturbance into the scoop. Samples with a dipper or scoop will be transferred into the appropriate sample containers.

### **Soil Sampling**

Soil sampling will be performed under the direction of a Vector engineer or geologist. Surface or near surface soil samples collected for analysis of acid generating potential or metal content will be collected with a shovel or hand trowel. Soil samples to be analyzed for total petroleum hydrocarbons will be collected with a hand-driven brass tube sampler. To reduce cross-contamination between samples, the sampling device will be washed in a soap solution and double-rinsed between each sampling event. Pertinent information regarding the sampling location, method, and analysis to be performed will be recorded in the field records. Soil samples collected in a brass tube sampler will be stored at approximately 4° C for transport to the analytical laboratory.

### **Sample Containers and Preservation**

Sample containers vary with each type of analytical parameter. Container types and materials will be selected by the analytical laboratory to be nonreactive with the particular analytical parameter tested.

## **SAMPLE IDENTIFICATION AND CHAIN-OF-CUSTODY PROCEDURES**

Sample identification and chain-of-custody procedures ensure sample integrity, and document sample possession from the time of collection to its ultimate disposal. Each sample container submitted for analysis will have a label affixed to identify the job number, date, and time of sample collection, and a sample number unique to that sample. This information, in addition to a description of the sample, field measurements made, sampling methodology, names of on-site personnel, and any other pertinent field observations will be recorded in the field records. All samples will be analyzed by a State-certified laboratory. Field records will be reviewed by the project manager after the sampling event is completed.

A chain-of-custody form will be used to record possession of the sample from time of collection to its arrival at the laboratory. When the samples are shipped, the person in custody of them will relinquish the samples by signing the chain-of-custody form and noting the time. The sample-control officer at the laboratory will verify sample integrity and confirm that it was collected in the proper container, preserved correctly, and that there is an adequate volume for analysis.

If these conditions are met, the sample will be assigned a unique log number for identification throughout analysis and reporting. The log number will be recorded on the chain-of-custody form and in the legally-required log book maintained by the laboratory in the laboratory. The sample description, date received, client's name and any other relevant information will also be recorded.

Custody transfers will be recorded for each individual sample. For example, if samples are split and sent to more than one laboratory, a chain-of-custody record sheet will accompany each sample. The number of custodians in the chain of possession will be minimized. A copy of the sampling and analysis chain-of-custody record will be returned to Vector Engineering, Inc., with the analytical results.

## **ANALYTICAL QUALITY ASSURANCE**

In addition to routine calibration of the analytical instruments with standards and blank, the analyst is required to run duplicates and spikes on 10 percent of the analysis to insure an added measure of precision and accuracy. Accuracy is also verified through the following:

- 1) U. S. Environmental Protection Agency (EPA) and State certification programs.
- 2) Participation on an interlaboratory or "round-robin" quality assurance program.
- 3) Verification of results with an alternative method. For example, calcium may be determined by atomic absorption, chromatography, or titrimetric methods. Volatile organics may be determined through either purge and trap or liquid-liquid extraction methods.

## MISCELLANEOUS CHECKS OF ACCURACY

Where trace analysis is involved, purity of the solvents, reagents and gases employed is of great concern. The laboratory maintains a service contract on all major instrumentation; gas chromatograph, atomic absorption, ion chromatography, and total organic carbon analyzers are all serviced and maintained regularly. The above program is more than sufficient for most needs. Additional quality assurance such as spikes and duplicates on all analyses, will be provided if requested.



1910 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946 • FAX 916-447-8321

RECEIVED  
DEC 02 1991  
Ans'd. Jan

November 21, 1991  
Sample Date: 10/17/91  
Date Sample Rec'd: 10/23/91  
Report #138581  
Page 1

Factor Engineering, Inc.  
438 Loma Rica Drive, Suite C  
Mass Valley, CA 95945

Attention: Jan Rutenbergs

Project Name: Phoenix Lake  
Project No: 91116.0

ANALYSES	SAMPLE #1	SAMPLE #2	SAMPLE #3	MDL	EPA METHOD #	DATE ANALYSIS COMPLETED
	GRAB 1115 HOURS 138581-1	GRAB 1215 HOURS 138581-2	GRAB 1400 HOURS 138581-3			

C.R. W.E.T. (DI Water) METALS:

Copper, mg/L	ND	ND	0.19*	0.02	200.7	10/30/91
Iron, mg/L	0.73	0.071	0.24*	0.03	200.7	10/30/91
Lead, mg/L	ND	ND	ND*	0.1	200.7	10/30/91
Tungsten, mg/L	ND	ND	ND*	0.1	200.7	10/30/91

ND = Not Detected

Date Analyzed: 11/13/91

Data Certified By Terry Glenn

Report Approved By Michael V. Lehto

ebmm



ANALYTICAL LABORATORY

1910 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2948 • FAX 916-447-8321

November 21, 1991  
Sample Date: 10/18/91  
Date Sample Rec'd: 10/23/91  
Report #138581  
Page 2

Factor Engineering, Inc.  
438 Loma Rica Drive, Suite C  
Mass Valley, CA 95945

Attention: Jan Rutenbergs

Project Name: Phoenix Lake  
Project No: 91116.0

ANALYSES	SAMPLE #4	SAMPLE #5	MDL	EPA METHOD #	DATE ANALYSIS COMPLETED
	GRAB 1120 HOURS <u>138581-4</u>	GRAB 1220 HOURS <u>138581-5</u>			
<b>C.R. W.E.T. (Citric Acid) METALS:</b>					
Copper, mg/L	1.6	4.8	0.2	200.7	11/13/91
Iron, mg/L	23	68	0.3	200.7	11/13/91
Lead, mg/L	ND	ND	1.0	200.7	11/13/91
Molybdenum, mg/L	ND	ND	1.0	200.7	11/13/91

ND = Not Detected

Data Certified By J. Glenn

Report Approved By M. [Signature]

bmm

November 21, 1991  
Sample Date: See Below  
Date Sample Rec'd: 10/23/91  
Report #138581  
Page 5

Vector Engineering, Inc.  
12438 Loma Rica Drive, Suite C  
Grass Valley, CA 95945  
Attention: Jan Rutenbergs  
Project Name: Phoenix Lake  
Project No: 91116.0

ANALYSES	W-1	W-2	MDL	EPA METHOD #	DATE ANALYSIS COMPLETED
	GRAB 10/17/91 138581-6	GRAB 10/18/91 138581-7			
<b>GENERAL MINERAL:</b>					
Laboratory pH	5.5	5.8		EPA 150.1	10/23/91
Bicarbonate as HCO <sub>3</sub> , mg/L	ND	5	2.4	EPA 310.1	10/28/91
Carbonate as CO <sub>3</sub> , mg/L	ND	ND	1.2	EPA 310.1	10/28/91
Hydroxide as OH, mg/L	ND	ND	0.2	EPA 310.1	10/28/91
Total Alkalinity as CaCO <sub>3</sub> , mg/L	ND	4	2	EPA 310.1	10/28/91
Total Dissolved Solids, mg/L	ND	15	15	EPA 160.1	10/24/91
Specific Conductance, umhos/cm	7	15	1	EPA 120.1	10/24/91
Hardness as CaCO <sub>3</sub> , mg/L	2	4	1	EPA 130.2	10/28/91
Chloride, mg/L	ND	ND	1	EPA 300.0	10/24/91
Sulfate, mg/L	ND	ND	2	EPA 300.0	10/24/91
Surfactants, mg/L as LAS	ND	ND	0.01	EPA 425.1	10/24/91
Calcium, mg/L	0.94	2.5	0.1	EPA 200.7	10/31/91
Magnesium, mg/L	ND	0.15	0.1	EPA 200.7	10/31/91
Potassium, mg/L	0.19	0.06	0.01	EPA 258.1	10/28/91
Sodium, mg/L	0.67	1.1	0.5	EPA 200.7	10/31/91
Total Anions, meq/L	0.1	0.2			
Total Cations, meq/L	0.1	0.2			

ND = Not Detected

Data Certified By 

Report Approved By 

:bmm

November 21, 1991  
Sample Date: See Below  
Date Sample Rec'd: 10/23/91  
Report #138581  
Page 3

Vector Engineering, Inc.  
12438 Loma Rica Drive, Suite C  
Grass Valley, CA 95945

Attention: Jan Rutenbergs

Project Name: Phoenix Lake  
Project No: 91116.0

ANALYSES	W-1	W-2	MDL	EPA METHOD #	DATE ANALYSIS COMPLETED
	GRAB 10/17/91 1130 HOURS 138581-6	GRAB 10/18/91 1330 HOURS 138581-7			

**METALS:**

Copper, ug/L	ND	ND	20	200.7	10/31/91
Iron, ug/L	38	ND	30	200.7	10/31/91
Lead, ug/L	ND	ND	1	239.2	10/31/91
Manganese, ug/L	ND	ND	10	200.7	10/31/91
Molybdenum, ug/L	ND	ND	5	246.2	11/07/91
Zinc, ug/L	ND	ND	10	200.7	10/31/91

ND = Not Detected

Data Certified By 

Report Approved By 

:bmm



ANALYTICAL LABORATORY

1910 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946 • FAX 916-447-8321

November 21, 1991  
Sample Date: See Below  
Date Sample Rec'd: 10/23/91  
Report #138581  
Page 4

Vector Engineering, Inc.  
12438 Loma Rica Drive, Suite C  
Grass Valley, CA 95945

Attention: Jan Rutenbergs

Project Name: Phoenix Lake  
Project No: 91116.0

ANALYSES	SAMPLE #3 GRAB 10/17/91 138581-3	SAMPLE #4 GRAB 10/18/91 138581-4	SAMPLE #5 GRAB 10/18/91 138581-5	DATE ANALYSIS COMPLETED
Acid Generation Potential, Tons CaCO, Required to Neutralize H+/1000 Tons Material	6.02	4.04	5.97	11/01/91
Neutralization Potential, as Tons CaCO, Equivalent/1000 Tons Material	-0.74	2.21	13.5	11/01/91
Net Acid Generation Potential (NAGP) as Net Tons CaCO, Needed to Neutralize H+/1000 Tons of Material	6.8	1.8	-7.5	11/01/91

Data Certified By 

Report Approved By 

:bmm

# PHOENIX LAKE

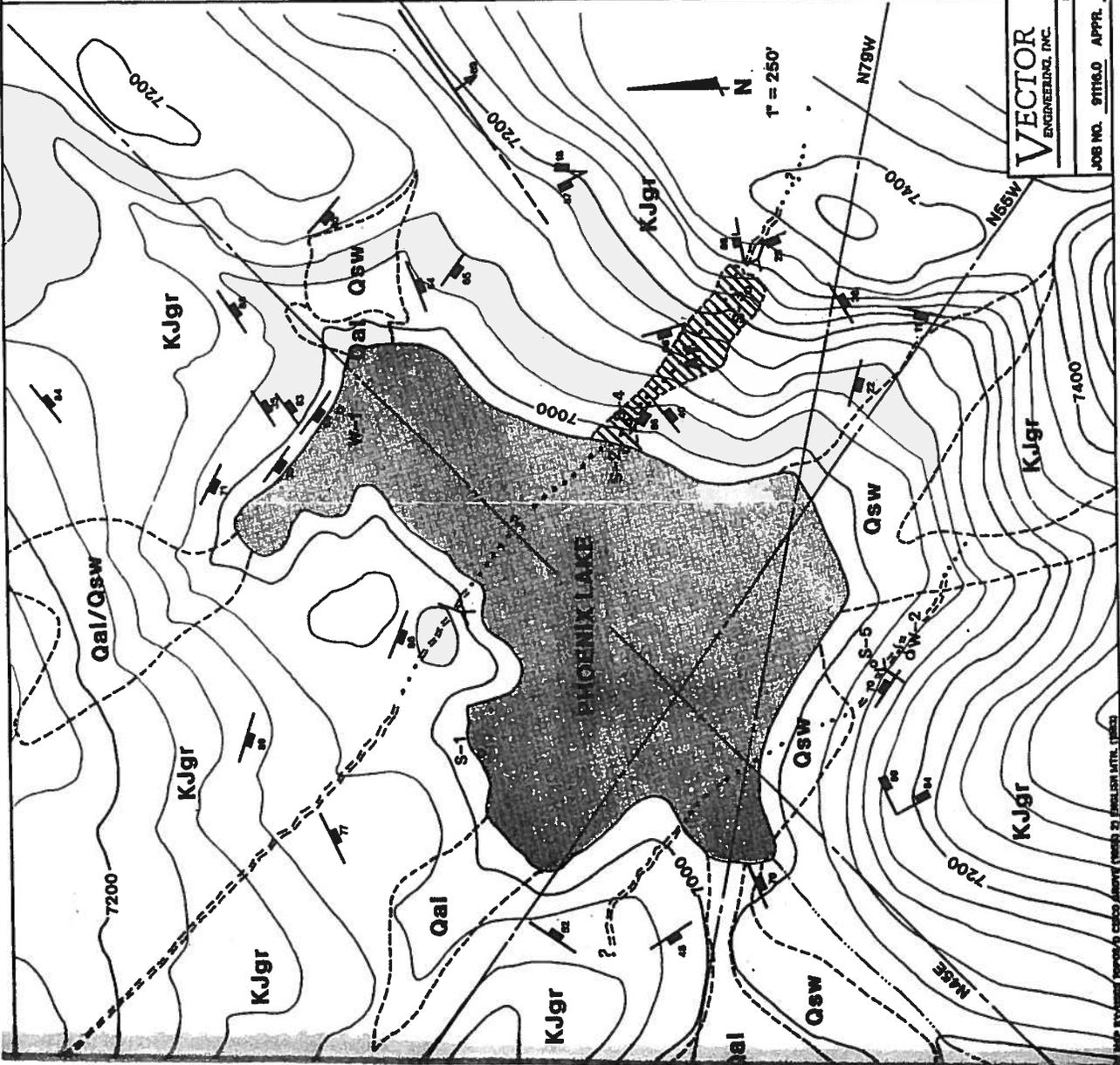
## GEOLOGY & STRUCTURE

### EXPLANATION

- Af:** Mine Tailings
- Qsw:** Late Pleistocene to recent alluvium; predominately unconsolidated rock fall via mass wasting
- Qal:** Pleistocene to recent alluvium; predominately sandy gravels with cobbles. Contains some remnants of past glacial activity.
- KJgr:** Cretaceous - Jurassic granodiorite. Slightly to non-weathered, moderately to highly jointed/fractured. Joints/fractures are mostly angular to subangular and continuous.

### SYMBOLS

- Strike and dip of joint
- Joint set
- Strike and dip of fault, dashed where approximate
- Approximate geologic contact
- Mineralized zone, dotted where concealed or hidden
- Adit
- Active spring
- Water sampling location
- oW-1 Composite (soil) sampling location
- o S-2
- Regional structural trend (as mapped from U.S.D.A.F.S. aerial photos)



**VECTOR**  
ENGINEERING, INC.

23488 Linn St. Dept. 3000, San Diego, CA 92130

JOB NO. 9116.0 APPR. PAS DATE 10/30/91

GEOLOGY & STRUCTURE MAP

USFS PRELIMINARY ASSESSMENT

PHOENIX LAKE AREA  
NEVADA COUNTY, CA

PLATE

2

# ATTACHMENT 2

Table 1: XRF Analytical Data

Sample	Sample Type	Units	Date Analyzed	Antimony	Variance (+/-)	Arsenic	Variance (+/-)	Cadmium	Variance (+/-)	Chromium	Variance (+/-)	Cobalt	Variance (+/-)	Copper	Variance (+/-)	Lead	Variance (+/-)	Mercury	Variance (+/-)	Molybdenum	Variance (+/-)	Nickel	Variance (+/-)	Silver	Variance (+/-)	Tin	Variance (+/-)	Zinc	Variance (+/-)
TF-1-1	In-situ	mg/kg	8/14/2012	ND	ND	20	2	ND	ND	ND	ND	374	30	1182	12	136	3	37	2	11.6	1.1	ND	ND	ND	ND	ND	ND	35	3
TF-1-2	In-situ	mg/kg	8/14/2012	ND	ND	18	2	ND	ND	ND	ND	375	30	1197	12	139	3	37	2	11.9	1.1	ND	ND	ND	ND	ND	ND	34	3
TF-1-3	In-situ	mg/kg	8/14/2012	ND	ND	19	2	ND	ND	ND	ND	381	30	1194	12	137	3	39	2	13.4	1.1	ND	ND	ND	ND	ND	ND	33	3
TF-2	In-situ	mg/kg	8/14/2012	ND	ND	16	2	ND	ND	ND	ND	587	41	873	10	83	3	57	2	11.5	1.0	ND	ND	ND	ND	ND	ND	35	3
TF-3	In-situ	mg/kg	8/14/2012	ND	ND	10	2	ND	ND	ND	ND	409	29	1115	11	48	2	43	2	7.6	1.1	ND	ND	ND	ND	ND	ND	35	3
TF-4	In-situ	mg/kg	8/14/2012	ND	ND	20	2	ND	ND	ND	ND	868	48	1070	12	137	4	99	3	18.1	1.3	ND	ND	ND	ND	ND	ND	40	3
TF-5	In-situ	mg/kg	8/14/2012	ND	ND	9	2	ND	ND	61	16	395	29	1489	13	69	2	62	2	11.4	1.0	ND	ND	ND	ND	ND	ND	31	3
TF-6	In-situ	mg/kg	8/14/2012	ND	ND	25	3	ND	ND	ND	ND	789	58	1095	13	227	4	260	5	10.8	1.3	ND	ND	ND	ND	ND	ND	41	3
TF-7	In-situ	mg/kg	8/14/2012	ND	ND	17	2	ND	ND	ND	ND	566	36	2145	16	108	3	107	3	17.7	1.1	ND	ND	ND	ND	ND	ND	36	3
TF-8	In-situ	mg/kg	8/14/2012	ND	ND	11	2	ND	ND	ND	ND	409	29	3473	22	178	3	52	2	14.7	1.1	ND	ND	ND	ND	29	8	39	4
TF-9	In-situ	mg/kg	8/14/2012	ND	ND	7	2	ND	ND	62	20	429	40	543	9	36	2	38	2	8.2	1.2	ND	ND	ND	ND	ND	ND	23	3
WRP-1	In-situ	mg/kg	8/14/2012	ND	ND	31	2	ND	ND	ND	ND	1548	85	389	8	13	3	53	3	9.0	1.3	ND	ND	ND	ND	ND	ND	37	3
MM-TRF-1(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	8	2	ND	ND	ND	ND	ND	ND	935	19	49	2	56	3	7.6	0.8	ND	ND	ND	ND	ND	ND	31	6
MM-TRF-1(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	6	2	ND	ND	ND	ND	173	34	896	18	52	2	57	3	8.6	0.8	ND	ND	ND	ND	ND	ND	32	5
MM-TRF-1(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	6	2	ND	ND	ND	ND	201	36	959	19	56	2	49	3	11.1	0.9	ND	ND	ND	ND	ND	ND	32	5
MM-TF-2(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	9	2	ND	ND	ND	ND	265	38	782	19	40	2	54	3	9.6	0.9	ND	ND	ND	ND	ND	ND	38	6
MM-TF-2(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	8	2	ND	ND	ND	ND	261	38	759	19	44	2	47	3	12.1	0.9	ND	ND	ND	ND	ND	ND	30	6
MM-TF-2(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	8	2	ND	ND	ND	ND	238	38	825	19	46	2	50	3	8.4	0.9	ND	ND	ND	ND	ND	ND	36	6
MM-TF-3(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	9	2	ND	ND	ND	ND	416	47	929	21	56	3	61	4	10.4	1.0	ND	ND	ND	ND	26	8	43	6
MM-TF-3(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	11	2	ND	ND	ND	ND	461	46	947	20	52	3	74	4	11.3	0.9	ND	ND	ND	ND	32	7	37	6
MM-TF-3(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	11	2	ND	ND	72	22	445	46	938	20	55	3	55	4	10.1	0.9	ND	ND	ND	ND	ND	ND	47	6
MM-TF-6(1)	Ex-situ	mg/kg	8/24/2012	30	9	19	3	ND	ND	ND	ND	363	51	817	20	144	4	108	5	11.2	0.9	ND	ND	ND	ND	57	8	30	6
MM-TF-6(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	18	3	ND	ND	ND	ND	322	50	822	20	146	4	112	5	9.3	0.9	ND	ND	ND	ND	57	8	26	6
MM-TF-6(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	20	3	ND	ND	ND	ND	323	51	847	20	151	4	118	5	9.0	0.9	ND	ND	ND	ND	58	8	32	6
MRF-Tailing-7(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	9	2	ND	ND	ND	ND	427	43	1569	24	88	3	95	4	15.3	0.9	ND	ND	ND	ND	ND	ND	51	6
MRF-Tailing-7(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	12	3	ND	ND	ND	ND	448	45	1607	24	92	3	96	4	18.6	0.9	ND	ND	ND	ND	ND	ND	47	6
MRF-Tailing-7(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	17	3	ND	ND	ND	ND	386	44	1583	24	84	3	101	4	15.5	0.9	ND	ND	ND	ND	ND	ND	33	6
MRF-Tailing-8(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	16	3	ND	ND	ND	ND	442	41	2517	13	94	3	104	4	14.0	0.9	ND	ND	ND	ND	ND	ND	57	6
MRF-Tailing-8(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	19	3	ND	ND	ND	ND	445	41	2563	31	93	3	93	4	13.6	0.9	ND	ND	ND	ND	ND	ND	58	6
MRF-Tailing-8(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	21	3	ND	ND	ND	ND	339	41	2590	32	87	3	102	4	14.9	0.9	ND	ND	ND	ND	ND	ND	66	7
MRF-Tailing-9(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	12	2	ND	ND	ND	ND	788	57	710	19	46	3	80	4	16.5	1.0	ND	ND	15	4	ND	ND	42	6
MRF-Tailing-9(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	9	2	ND	ND	ND	ND	783	57	696	19	50	3	90	4	16.6	1.0	ND	ND	ND	ND	ND	ND	36	6
MRF-Tailing-9(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	14	2	ND	ND	ND	ND	787	57	723	19	42	3	78	4	18.4	1.0	ND	ND	ND	ND	ND	ND	51	7
MRF-Tailing-10(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	14	4	ND	ND	ND	ND	467	52	1422	27	174	5	123	5	10.6	1.0	ND	ND	ND	ND	67	8	81	8
MRF-Tailing-10(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	24	4	ND	ND	ND	ND	527	53	1381	27	169	5	125	5	12.4	1.1	ND	ND	ND	ND	79	8	84	8
MRF-Tailing-10(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	18	4	ND	ND	ND	ND	397	52	1406	27	169	5	126	5	11.5	1.0	ND	ND	ND	ND	71	8	80	8
MM-Tailing-5A(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	12	2	ND	ND	ND	ND	255	39	794	18	51	2	65	4	12.5	0.9	ND	ND	ND	ND	36	7	28	6
MM-Tailing-5A(2)	Ex-situ	mg/kg	8/24/2012	ND	ND	10	2	ND	ND	ND	ND	316	40	779	18	56	2	65	4	10.3	0.9	ND	ND	ND	ND	ND	ND	50	6
MM-Tailing-5A(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	12	2	ND	ND	ND	ND	319	40	752	18	51	2	71	4	13.0	0.9	ND	ND	ND	ND	ND	ND	42	6
MM-Tailing-5B(1)	Ex-situ	mg/kg	8/24/2012	ND	ND	ND	ND	ND	ND	ND	ND	171	30	483	15	34	2	26	3	7.8	0.8	29	9	ND	ND	ND	ND	26	5
MM-Tailing-5B(2)	Ex-situ	mg/kg	8/24/2012	26	8	7	2	ND	ND	ND	ND	187	30	478	15	34	2	24	3	7.5	0.8	ND	ND	ND	ND	ND	ND	18	5
MM-Tailing-5B(3)	Ex-situ	mg/kg	8/24/2012	ND	ND	6	2	ND	ND	ND	ND	155	30	468	15	34	2	22	3	8.3	0.8	36	9	ND	ND	ND	ND	19	5

Notes:  
 1) ND - Constituent was non-detect in the sample  
 2) All analyzes were conducted using the XRF's Soil Mode.

# ATTACHMENT 3

**Technical Report for**

**Golder Associates, Inc. Roseville**

**Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA**

**123-97450**

**Accutest Job Number: C23243**

**Sampling Dates: 08/13/12 - 08/14/12**

**Report to:**

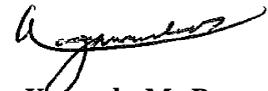
**Golder Associates  
1000 Enterprise Way Suite 190  
Roseville, CA 95678  
slofholm@golder.com**

**ATTN: Steve Lofholm**

**Total number of pages in report: 82**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.



**Kesavalu M. Bagawandoss,  
Ph.D., J.D., Lab Director**

**Client Service contact: Nutan Kabir 408-588-0200**

Certifications: CA (08258CA) AZ (AZ0762) DoD/ISO/IEC 17025:2005 (L2242)

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Test results relate only to samples analyzed.

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## Sample Summary

Golder Associates, Inc. Roseville

**Job No:** C23243

Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
 Project No: 123-97450

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
C23243-1	08/13/12	16:10 SL	08/17/12	SO	Solid	ADIT CHIP 1
C23243-2	08/14/12	13:20 SL	08/17/12	SO	Solid	WRP-COMP-B-1
C23243-3	08/14/12	13:10 SL	08/17/12	SO	Solid	WRP-COMP-T-1
C23243-4	08/14/12	11:35 SL	08/17/12	AQ	Surface Water	SW-DF-1
C23243-5	08/14/12	14:20 SL	08/17/12	AQ	Surface Water	SW-DUP
C23243-6	08/14/12	16:20 SL	08/17/12	SO	Soil	BACKGROUND SOIL
C23243-7	08/14/12	11:05 SL	08/17/12	SO	Soil	TDF-D-1
C23243-8	08/14/12	11:07 SL	08/17/12	SO	Soil	TDF-D-2
C23243-9	08/14/12	11:10 SL	08/17/12	SO	Soil	TDF-D-3
C23243-10	08/14/12	11:15 SL	08/17/12	SO	Soil	TDF-COMP-1
C23243-10W	08/14/12	11:15 SL	08/17/12	SO	Soil	TDF-COMP-1
C23243-11	08/14/12	11:20 SL	08/17/12	SO	Soil	TDF-COMP-2
C23243-11W	08/14/12	11:20 SL	08/17/12	SO	Soil	TDF-COMP-2

---

Soil samples reported on a dry weight basis unless otherwise indicated on result page.



## Sample Summary

(continued)

Golder Associates, Inc. Roseville

**Job No:** C23243

Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

Project No: 123-97450

Sample Number	Collected		Matrix	Received	Code	Type	Client Sample ID
	Date	Time By					
C23243-11W	08/14/12	11:20 SL	SO	08/17/12	SO	Soil	TDF-COMP-2
C23243-12	08/14/12	11:25 SL	SO	08/17/12	SO	Soil	TDF-COMP-3
C23243-12W	08/14/12	11:25 SL	SO	08/17/12	SO	Soil	TDF-COMP-3
C23243-12WW	08/14/12	11:25 SL	SO	08/17/12	SO	Soil	TDF-COMP-3
C23243-13	08/14/12	10:45 SL	SO	08/17/12	SO	Soil	TF-DISC-1-6
C23243-14	08/14/12	11:00 SL	SO	08/17/12	SO	Soil	TF-DISC-2-4
C23243-15	08/14/12	10:55 SL	SO	08/17/12	SO	Soil	TF-DISC-3-7
C23243-16	08/14/12	11:15 SL	SO	08/17/12	SO	Soil	TF-COMP-1
C23243-16W	08/14/12	11:15 SL	SO	08/17/12	SO	Soil	TF-COMP-1
C23243-16WW	08/14/12	11:15 SL	SO	08/17/12	SO	Soil	TF-COMP-1
C23243-17	08/14/12	11:20 SL	SO	08/17/12	SO	Soil	TF-COMP-2
C23243-17W	08/14/12	11:20 SL	SO	08/17/12	SO	Soil	TF-COMP-2
C23243-18	08/14/12	11:30 SL	SO	08/17/12	SO	Soil	TF-COMP-3

---

Soil samples reported on a dry weight basis unless otherwise indicated on result page.



## Sample Summary

(continued)

Golder Associates, Inc. Roseville

**Job No:** C23243

Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

Project No: 123-97450

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
C23243-18WW	08/14/12	11:30 SL	08/17/12	SO	Soil	TF-COMP-3
C23243-19	08/14/12	14:00 SL	08/17/12	SO	Soil	ADIT-1-S
C23243-19WW	08/14/12	14:00 SL	08/17/12	SO	Soil	ADIT-1-S
C23243-20	08/14/12	14:05 SL	08/17/12	SO	Soil	BOILER-1-S

---

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

## Summary of Hits

**Job Number:** C23243  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
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**C23243-4 SW-DF-1**

Copper	18.9	10		ug/l	SW846 6010B
Mercury	3.2	0.20		ug/l	SW846 7470A

**C23243-5 SW-DUP**

Copper	12.2	10		ug/l	SW846 6010B
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**C23243-6 BACKGROUND SOIL**

Arsenic	2.6	1.8		mg/kg	SW846 6010B
Barium	47.7	18		mg/kg	SW846 6010B
Chromium	10.1	0.89		mg/kg	SW846 6010B
Cobalt	5.4	0.89		mg/kg	SW846 6010B
Copper	62.0	2.2		mg/kg	SW846 6010B
Lead	26.4	1.8		mg/kg	SW846 6010B
Mercury	0.079	0.037		mg/kg	SW846 7471A
Nickel	6.7	0.89		mg/kg	SW846 6010B
Vanadium	33.5	0.89		mg/kg	SW846 6010B
Zinc	37.6	1.8		mg/kg	SW846 6010B

**C23243-7 TDF-D-1**

Arsenic <sup>a</sup>	48.7	5.2		mg/kg	SW846 6010B
Chromium <sup>a</sup>	3.7	2.6		mg/kg	SW846 6010B
Cobalt <sup>a</sup>	445	2.6		mg/kg	SW846 6010B
Copper <sup>a</sup>	2180	6.5		mg/kg	SW846 6010B
Lead <sup>a</sup>	11.6	5.2		mg/kg	SW846 6010B
Mercury	404	60		mg/kg	SW846 7471A
Molybdenum <sup>a</sup>	6.6	5.2		mg/kg	SW846 6010B
Nickel <sup>a</sup>	12.3	2.6		mg/kg	SW846 6010B
Selenium <sup>a</sup>	8.5	5.2		mg/kg	SW846 6010B
Silver <sup>a</sup>	5.6	2.6		mg/kg	SW846 6010B
Vanadium <sup>a</sup>	26.5	2.6		mg/kg	SW846 6010B
Zinc <sup>a</sup>	21.1	5.2		mg/kg	SW846 6010B

**C23243-8 TDF-D-2**

Arsenic <sup>a</sup>	56.8	5.0		mg/kg	SW846 6010B
Chromium <sup>a</sup>	4.6	2.5		mg/kg	SW846 6010B
Cobalt <sup>a</sup>	486	2.5		mg/kg	SW846 6010B
Copper <sup>a</sup>	1360	6.3		mg/kg	SW846 6010B
Lead <sup>a</sup>	12.7	5.0		mg/kg	SW846 6010B
Mercury	111	18		mg/kg	SW846 7471A

## Summary of Hits

**Job Number:** C23243  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
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Molybdenum <sup>a</sup>		10.5	5.0		mg/kg	SW846 6010B
Nickel <sup>a</sup>		12.6	2.5		mg/kg	SW846 6010B
Selenium <sup>a</sup>		10.4	5.0		mg/kg	SW846 6010B
Vanadium <sup>a</sup>		34.4	2.5		mg/kg	SW846 6010B
Zinc <sup>a</sup>		14.4	5.0		mg/kg	SW846 6010B

### C23243-9 TDF-D-3

Arsenic <sup>a</sup>		38.1	5.0		mg/kg	SW846 6010B
Chromium <sup>a</sup>		3.3	2.5		mg/kg	SW846 6010B
Cobalt <sup>a</sup>		255	2.5		mg/kg	SW846 6010B
Copper <sup>a</sup>		1300	6.3		mg/kg	SW846 6010B
Lead <sup>a</sup>		13.2	5.0		mg/kg	SW846 6010B
Mercury		77.4	18		mg/kg	SW846 7471A
Molybdenum <sup>a</sup>		7.1	5.0		mg/kg	SW846 6010B
Nickel <sup>a</sup>		5.9	2.5		mg/kg	SW846 6010B
Selenium <sup>a</sup>		7.5	5.0		mg/kg	SW846 6010B
Vanadium <sup>a</sup>		27.8	2.5		mg/kg	SW846 6010B
Zinc <sup>a</sup>		14.9	5.0		mg/kg	SW846 6010B

### C23243-10 TDF-COMP-1

Arsenic <sup>a</sup>		30.5	5.2		mg/kg	SW846 6010B
Chromium <sup>a</sup>		3.8	2.6		mg/kg	SW846 6010B
Cobalt <sup>a</sup>		192	2.6		mg/kg	SW846 6010B
Copper <sup>a</sup>		1160	6.5		mg/kg	SW846 6010B
Lead <sup>a</sup>		11.2	5.2		mg/kg	SW846 6010B
Mercury		117	20		mg/kg	SW846 7471A
Molybdenum <sup>a</sup>		11.3	5.2		mg/kg	SW846 6010B
Nickel <sup>a</sup>		4.6	2.6		mg/kg	SW846 6010B
Selenium <sup>a</sup>		5.7	5.2		mg/kg	SW846 6010B
Vanadium <sup>a</sup>		24.1	2.6		mg/kg	SW846 6010B
Zinc <sup>a</sup>		11.9	5.2		mg/kg	SW846 6010B

### C23243-10WW TDF-COMP-1

Cobalt <sup>b</sup>		0.10	0.0050		mg/l	SW846 6010B
Copper <sup>b</sup>		1.3	0.010		mg/l	SW846 6010B

### C23243-11 TDF-COMP-2

Arsenic <sup>a</sup>		43.0	5.2		mg/kg	SW846 6010B
Chromium <sup>a</sup>		4.4	2.6		mg/kg	SW846 6010B
Cobalt <sup>a</sup>		301	2.6		mg/kg	SW846 6010B
Copper <sup>a</sup>		1130	6.5		mg/kg	SW846 6010B

## Summary of Hits

**Job Number:** C23243  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Analyte	Qual	RL	MDL	Units	Method
Lead <sup>a</sup>		14.5		5.2		mg/kg	SW846 6010B
Mercury		85.2		20		mg/kg	SW846 7471A
Molybdenum <sup>a</sup>		7.5		5.2		mg/kg	SW846 6010B
Nickel <sup>a</sup>		7.7		2.6		mg/kg	SW846 6010B
Selenium <sup>a</sup>		7.3		5.2		mg/kg	SW846 6010B
Vanadium <sup>a</sup>		32.9		2.6		mg/kg	SW846 6010B
Zinc <sup>a</sup>		16.0		5.2		mg/kg	SW846 6010B
<b>C23243-11W</b>		<b>TDF-COMP-2</b>					
Cobalt		0.21		0.13		mg/l	SW846 6010B
Copper		8.7		0.25		mg/l	SW846 6010B
Lead		0.30		0.25		mg/l	SW846 6010B
Mercury		0.10		0.010		mg/l	SW846 7470A
Zinc		0.52		0.50		mg/l	SW846 6010B
<b>C23243-11WW</b>		<b>TDF-COMP-2</b>					
Cobalt <sup>b</sup>		0.048		0.0050		mg/l	SW846 6010B
Copper <sup>b</sup>		0.36		0.010		mg/l	SW846 6010B
<b>C23243-12</b>		<b>TDF-COMP-3</b>					
Arsenic <sup>a</sup>		58.0		9.4		mg/kg	SW846 6010B
Cobalt <sup>a</sup>		485		4.7		mg/kg	SW846 6010B
Copper <sup>a</sup>		1340		12		mg/kg	SW846 6010B
Lead <sup>a</sup>		13.0		9.4		mg/kg	SW846 6010B
Mercury		113		20		mg/kg	SW846 7471A
Nickel <sup>a</sup>		11.6		4.7		mg/kg	SW846 6010B
Selenium <sup>a</sup>		9.4		9.4		mg/kg	SW846 6010B
Vanadium <sup>a</sup>		33.8		4.7		mg/kg	SW846 6010B
Zinc <sup>a</sup>		13.9		9.4		mg/kg	SW846 6010B
<b>C23243-12W</b>		<b>TDF-COMP-3</b>					
Cobalt		0.19		0.13		mg/l	SW846 6010B
Copper		7.8		0.25		mg/l	SW846 6010B
Mercury		0.10		0.010		mg/l	SW846 7470A
<b>C23243-12WW</b>		<b>TDF-COMP-3</b>					
Cobalt <sup>b</sup>		0.057		0.0050		mg/l	SW846 6010B
Copper <sup>b</sup>		0.70		0.010		mg/l	SW846 6010B
Zinc <sup>b</sup>		0.036		0.020		mg/l	SW846 6010B

## Summary of Hits

**Job Number:** C23243  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
<b>C23243-13</b>	<b>TF-DISC-1-6</b>					
		Antimony	3.0	1.9	mg/kg	SW846 6010B
		Arsenic	10.7	1.9	mg/kg	SW846 6010B
		Barium	29.5	19	mg/kg	SW846 6010B
		Chromium	8.8	0.93	mg/kg	SW846 6010B
		Cobalt	8.9	0.93	mg/kg	SW846 6010B
		Copper	556	2.3	mg/kg	SW846 6010B
		Lead	122	1.9	mg/kg	SW846 6010B
		Mercury	84.8	19	mg/kg	SW846 7471A
		Molybdenum	7.8	1.9	mg/kg	SW846 6010B
		Nickel	3.3	0.93	mg/kg	SW846 6010B
		Vanadium	31.3	0.93	mg/kg	SW846 6010B
		Zinc	25.8	1.9	mg/kg	SW846 6010B
<b>C23243-14</b>	<b>TF-DISC-2-4</b>					
		Arsenic	12.5	1.8	mg/kg	SW846 6010B
		Barium	28.6	18	mg/kg	SW846 6010B
		Chromium	7.1	0.90	mg/kg	SW846 6010B
		Cobalt	9.2	0.90	mg/kg	SW846 6010B
		Copper	842	2.3	mg/kg	SW846 6010B
		Lead	68.4	1.8	mg/kg	SW846 6010B
		Mercury	56.8	19	mg/kg	SW846 7471A
		Molybdenum	10.6	1.8	mg/kg	SW846 6010B
		Nickel	3.0	0.90	mg/kg	SW846 6010B
		Silver	1.7	0.90	mg/kg	SW846 6010B
		Vanadium	30.3	0.90	mg/kg	SW846 6010B
		Zinc	19.6	1.8	mg/kg	SW846 6010B
<b>C23243-15</b>	<b>TF-DISC-3-7</b>					
		Arsenic	9.0	1.8	mg/kg	SW846 6010B
		Barium	29.3	18	mg/kg	SW846 6010B
		Chromium	7.3	0.92	mg/kg	SW846 6010B
		Cobalt	10.9	0.92	mg/kg	SW846 6010B
		Copper	1640	2.3	mg/kg	SW846 6010B
		Lead	98.9	1.8	mg/kg	SW846 6010B
		Mercury	54.4	20	mg/kg	SW846 7471A
		Molybdenum	10.7	1.8	mg/kg	SW846 6010B
		Nickel	2.8	0.92	mg/kg	SW846 6010B
		Silver	1.4	0.92	mg/kg	SW846 6010B
		Vanadium	25.8	0.92	mg/kg	SW846 6010B
		Zinc	17.1	1.8	mg/kg	SW846 6010B

## Summary of Hits

**Job Number:** C23243  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
<b>C23243-16</b>	<b>TF-COMP-1</b>					
Antimony		2.4	1.9		mg/kg	SW846 6010B
Arsenic		8.5	1.9		mg/kg	SW846 6010B
Barium		28.1	19		mg/kg	SW846 6010B
Chromium		6.0	0.93		mg/kg	SW846 6010B
Cobalt		8.6	0.93		mg/kg	SW846 6010B
Copper		974	2.3		mg/kg	SW846 6010B
Lead		89.2	1.9		mg/kg	SW846 6010B
Mercury		62.0	19		mg/kg	SW846 7471A
Molybdenum		6.8	1.9		mg/kg	SW846 6010B
Nickel		2.6	0.93		mg/kg	SW846 6010B
Silver		0.95	0.93		mg/kg	SW846 6010B
Vanadium		25.1	0.93		mg/kg	SW846 6010B
Zinc		18.2	1.9		mg/kg	SW846 6010B
<b>C23243-16W</b>	<b>TF-COMP-1</b>					
Cobalt		0.16	0.13		mg/l	SW846 6010B
Copper		33.2	0.25		mg/l	SW846 6010B
Lead		2.2	0.25		mg/l	SW846 6010B
Mercury		0.44	0.020		mg/l	SW846 7470A
<b>C23243-16WW</b>	<b>TF-COMP-1</b>					
Cobalt <sup>b</sup>		0.017	0.0050		mg/l	SW846 6010B
Copper <sup>b</sup>		0.23	0.010		mg/l	SW846 6010B
Zinc <sup>b</sup>		0.039	0.020		mg/l	SW846 6010B
<b>C23243-17</b>	<b>TF-COMP-2</b>					
Arsenic		6.7	1.7		mg/kg	SW846 6010B
Barium		25.8	17		mg/kg	SW846 6010B
Chromium		8.8	0.84		mg/kg	SW846 6010B
Cobalt		9.9	0.84		mg/kg	SW846 6010B
Copper		713	2.1		mg/kg	SW846 6010B
Lead		40.4	1.7		mg/kg	SW846 6010B
Mercury		33.4	10		mg/kg	SW846 7471A
Molybdenum		7.5	1.7		mg/kg	SW846 6010B
Nickel		5.2	0.84		mg/kg	SW846 6010B
Vanadium		33.8	0.84		mg/kg	SW846 6010B
Zinc		19.5	1.7		mg/kg	SW846 6010B

## Summary of Hits

**Job Number:** C23243  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
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**C23243-17WW TF-COMP-2**

Cobalt <sup>b</sup>	0.0083	0.0050		mg/l	SW846 6010B
Copper <sup>b</sup>	0.094	0.010		mg/l	SW846 6010B

**C23243-18 TF-COMP-3**

Antimony	2.6	1.8		mg/kg	SW846 6010B
Arsenic	6.7	1.8		mg/kg	SW846 6010B
Barium	28.8	18		mg/kg	SW846 6010B
Chromium	8.8	0.88		mg/kg	SW846 6010B
Cobalt	10.5	0.88		mg/kg	SW846 6010B
Copper	621	2.2		mg/kg	SW846 6010B
Lead	43.1	1.8		mg/kg	SW846 6010B
Mercury	54.2	21		mg/kg	SW846 7471A
Molybdenum	6.5	1.8		mg/kg	SW846 6010B
Nickel	4.0	0.88		mg/kg	SW846 6010B
Silver	1.0	0.88		mg/kg	SW846 6010B
Vanadium	33.3	0.88		mg/kg	SW846 6010B
Zinc	19.1	1.8		mg/kg	SW846 6010B

**C23243-18WW TF-COMP-3**

Cobalt <sup>b</sup>	0.0054	0.0050		mg/l	SW846 6010B
Copper <sup>b</sup>	0.088	0.010		mg/l	SW846 6010B
Zinc <sup>b</sup>	0.031	0.020		mg/l	SW846 6010B

**C23243-19 ADIT-1-S**

Arsenic	22.4	3.7		mg/kg	SW846 6010B
Barium	45.4	37		mg/kg	SW846 6010B
Chromium	12.0	1.8		mg/kg	SW846 6010B
Cobalt	38.0	1.8		mg/kg	SW846 6010B
Copper	413	4.6		mg/kg	SW846 6010B
Lead	16.0	3.7		mg/kg	SW846 6010B
Mercury	14.9	1.9		mg/kg	SW846 7471A
Molybdenum	4.2	3.7		mg/kg	SW846 6010B
Nickel	4.9	1.8		mg/kg	SW846 6010B
Silver	2.4	1.8		mg/kg	SW846 6010B
Vanadium	43.8	1.8		mg/kg	SW846 6010B
Zinc	36.9	3.7		mg/kg	SW846 6010B

**C23243-19WW ADIT-1-S**

Cobalt <sup>b</sup>	0.046	0.0050		mg/l	SW846 6010B
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## Summary of Hits

**Job Number:** C23243  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Copper <sup>b</sup>		0.39	0.010		mg/l	SW846 6010B
Zinc <sup>b</sup>		0.063	0.020		mg/l	SW846 6010B
<b>C23243-20</b>	<b>BOILER-1-S</b>					
Arsenic		4.3	1.7		mg/kg	SW846 6010B
Barium		29.8	17		mg/kg	SW846 6010B
Chromium		8.3	0.87		mg/kg	SW846 6010B
Cobalt		8.6	0.87		mg/kg	SW846 6010B
Copper		295	2.2		mg/kg	SW846 6010B
Lead		8.5	1.7		mg/kg	SW846 6010B
Mercury		1.2	0.12		mg/kg	SW846 7471A
Molybdenum		3.7	1.7		mg/kg	SW846 6010B
Nickel		3.0	0.87		mg/kg	SW846 6010B
Vanadium		27.3	0.87		mg/kg	SW846 6010B
Zinc		19.1	1.7		mg/kg	SW846 6010B

(a) Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

(b) Leaching fluid was DI water.

Sample Results

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Report of Analysis

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# Report of Analysis

<b>Client Sample ID:</b> SW-DF-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-4	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> AQ - Surface Water	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium	< 200	200	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium	< 5.0	5.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium	< 2.0	2.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt	< 5.0	5.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper	18.9	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury	3.2	0.20	ug/l	1	08/21/12	08/21/12 DQ	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum	< 20	20	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel	< 5.0	5.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver	< 5.0	5.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc	< 20	20	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2671
- (2) Instrument QC Batch: MA2673
- (3) Prep QC Batch: MP5217
- (4) Prep QC Batch: MP5222

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> SW-DUP	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-5	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> AQ - Surface Water	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Total Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 6.0	6.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium	< 200	200	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium	< 5.0	5.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium	< 2.0	2.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt	< 5.0	5.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper	12.2	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury	< 0.20	0.20	ug/l	1	08/21/12	08/21/12 DQ	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum	< 20	20	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel	< 5.0	5.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver	< 5.0	5.0	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium	< 10	10	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc	< 20	20	ug/l	1	08/20/12	08/20/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2671
- (2) Instrument QC Batch: MA2673
- (3) Prep QC Batch: MP5217
- (4) Prep QC Batch: MP5222

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> BACKGROUND SOIL	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-6	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	2.6	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	47.7	18	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 0.89	0.89	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 0.89	0.89	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	10.1	0.89	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	5.4	0.89	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	62.0	2.2	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	26.4	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	0.079	0.037	mg/kg	1	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	6.7	0.89	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	< 0.89	0.89	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium <sup>b</sup>	< 3.6	3.6	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	33.5	0.89	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	37.6	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

- (a) All results reported on a wet weight basis.
- (b) Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TDF-D-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-7	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>b</sup>	< 5.2	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic <sup>b</sup>	48.7	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium <sup>b</sup>	< 52	52	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium <sup>b</sup>	< 2.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium <sup>b</sup>	< 2.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium <sup>b</sup>	3.7	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt <sup>b</sup>	445	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper <sup>b</sup>	2180	6.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead <sup>b</sup>	11.6	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	404	60	mg/kg	1500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum <sup>b</sup>	6.6	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel <sup>b</sup>	12.3	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium <sup>b</sup>	8.5	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver <sup>b</sup>	5.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium <sup>b</sup>	< 8.6	8.6	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium <sup>b</sup>	26.5	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc <sup>b</sup>	21.1	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

- (a) All results reported on a wet weight basis.
- (b) Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TDF-D-2	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-8	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>b</sup>	< 5.0	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic <sup>b</sup>	56.8	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium <sup>b</sup>	< 50	50	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium <sup>b</sup>	< 2.5	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium <sup>b</sup>	< 2.5	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium <sup>b</sup>	4.6	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt <sup>b</sup>	486	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper <sup>b</sup>	1360	6.3	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead <sup>b</sup>	12.7	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	111	18	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum <sup>b</sup>	10.5	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel <sup>b</sup>	12.6	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium <sup>b</sup>	10.4	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver <sup>b</sup>	< 2.5	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium <sup>b</sup>	< 25	25	mg/kg	15	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium <sup>b</sup>	34.4	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc <sup>b</sup>	14.4	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

- (a) All results reported on a wet weight basis.
- (b) Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b> TDF-D-3	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-9	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>b</sup>	< 5.0	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic <sup>b</sup>	38.1	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium <sup>b</sup>	< 50	50	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium <sup>b</sup>	< 2.5	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium <sup>b</sup>	< 2.5	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium <sup>b</sup>	3.3	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt <sup>b</sup>	255	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper <sup>b</sup>	1300	6.3	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead <sup>b</sup>	13.2	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	77.4	18	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum <sup>b</sup>	7.1	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel <sup>b</sup>	5.9	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium <sup>b</sup>	7.5	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver <sup>b</sup>	< 2.5	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium <sup>b</sup>	< 8.4	8.4	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium <sup>b</sup>	27.8	2.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc <sup>b</sup>	14.9	5.0	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

(1) Instrument QC Batch: MA2681

(2) Instrument QC Batch: MA2694

(3) Prep QC Batch: MP5224

(4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

(b) Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TDF-COMP-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-10	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>b</sup>	< 5.2	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic <sup>b</sup>	30.5	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium <sup>b</sup>	< 52	52	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium <sup>b</sup>	< 2.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium <sup>b</sup>	< 2.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium <sup>b</sup>	3.8	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt <sup>b</sup>	192	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper <sup>b</sup>	1160	6.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead <sup>b</sup>	11.2	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	117	20	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum <sup>b</sup>	11.3	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel <sup>b</sup>	4.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium <sup>b</sup>	5.7	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver <sup>b</sup>	< 2.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium <sup>b</sup>	< 8.6	8.6	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium <sup>b</sup>	24.1	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc <sup>b</sup>	11.9	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

- (a) All results reported on a wet weight basis.
- (b) Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TDF-COMP-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-10WW	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>a</sup>	< 0.0060	0.0060		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium <sup>a</sup>	< 0.20	0.20		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium <sup>a</sup>	< 0.0020	0.0020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt <sup>a</sup>	0.10	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper <sup>a</sup>	1.3	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury <sup>a</sup>	< 0.00020	0.00020		mg/l	1	08/31/12	09/04/12 RW	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2685
- (2) Instrument QC Batch: MA2692
- (3) Prep QC Batch: MP5248
- (4) Prep QC Batch: MP5260

(a) Leaching fluid was DI water.

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

## Report of Analysis

**Client Sample ID:** TDF-COMP-2**Lab Sample ID:** C23243-11**Matrix:** SO - Soil**Date Sampled:** 08/14/12**Date Received:** 08/17/12**Percent Solids:** n/a <sup>a</sup>**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA**Metals Analysis**

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>b</sup>	< 5.2	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic <sup>b</sup>	43.0	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium <sup>b</sup>	< 52	52	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium <sup>b</sup>	< 2.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium <sup>b</sup>	< 2.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium <sup>b</sup>	4.4	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt <sup>b</sup>	301	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper <sup>b</sup>	1130	6.5	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead <sup>b</sup>	14.5	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	85.2	20	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum <sup>b</sup>	7.5	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel <sup>b</sup>	7.7	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium <sup>b</sup>	7.3	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver <sup>b</sup>	< 2.6	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium <sup>b</sup>	< 8.7	8.7	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium <sup>b</sup>	32.9	2.6	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc <sup>b</sup>	16.0	5.2	mg/kg	3	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

(1) Instrument QC Batch: MA2681

(2) Instrument QC Batch: MA2694

(3) Prep QC Batch: MP5224

(4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

(b) Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TDF-COMP-2	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-11W	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 0.15	0.15		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Arsenic	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Barium	< 5.0	5.0		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Beryllium	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Cadmium	< 0.050	0.050		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Chromium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Cobalt	0.21	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Copper	8.7	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Lead	0.30	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Mercury	0.10	0.010		mg/l	5	10/13/12	10/13/12 DQ	SW846 7470A <sup>1</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum	< 0.50	0.50		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Nickel	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Selenium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Silver	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Thallium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Vanadium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Zinc	0.52	0.50		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2780
- (2) Instrument QC Batch: MA2781
- (3) Prep QC Batch: MP5414
- (4) Prep QC Batch: MP5418

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b> TDF-COMP-2	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-11WW	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>a</sup>	< 0.0060	0.0060		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium <sup>a</sup>	< 0.20	0.20		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium <sup>a</sup>	< 0.0020	0.0020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt <sup>a</sup>	0.048	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper <sup>a</sup>	0.36	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury <sup>a</sup>	< 0.00020	0.00020		mg/l	1	08/31/12	09/04/12 RW	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

(1) Instrument QC Batch: MA2685

(2) Instrument QC Batch: MA2692

(3) Prep QC Batch: MP5248

(4) Prep QC Batch: MP5260

(a) Leaching fluid was DI water.

RL = Reporting Limit

MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b> TDF-COMP-3	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-12	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>b</sup>	< 9.4	9.4	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic <sup>b</sup>	58.0	9.4	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium <sup>b</sup>	< 94	94	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium <sup>b</sup>	< 4.7	4.7	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium <sup>b</sup>	< 4.7	4.7	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium <sup>b</sup>	< 4.7	4.7	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt <sup>b</sup>	485	4.7	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper <sup>b</sup>	1340	12	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead <sup>b</sup>	13.0	9.4	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	113	20	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum <sup>b</sup>	< 9.4	9.4	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel <sup>b</sup>	11.6	4.7	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium <sup>b</sup>	9.4	9.4	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver <sup>b</sup>	< 4.7	4.7	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium <sup>b</sup>	< 19	19	mg/kg	10	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium <sup>b</sup>	33.8	4.7	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc <sup>b</sup>	13.9	9.4	mg/kg	5	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

- (a) All results reported on a wet weight basis.
- (b) Elevated reporting limit(s) due to matrix interference and/or dilution required for high interfering element.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TDF-COMP-3	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-12W	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 0.15	0.15		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Arsenic	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Barium	< 5.0	5.0		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Beryllium	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Cadmium	< 0.050	0.050		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Chromium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Cobalt	0.19	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Copper	7.8	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Lead	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Mercury	0.10	0.010		mg/l	5	10/13/12	10/13/12 DQ	SW846 7470A <sup>1</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum	< 0.50	0.50		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Nickel	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Selenium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Silver	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Thallium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Vanadium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Zinc	< 0.50	0.50		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2780
- (2) Instrument QC Batch: MA2781
- (3) Prep QC Batch: MP5414
- (4) Prep QC Batch: MP5418

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b> TDF-COMP-3	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-12WW	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>a</sup>	< 0.0060	0.0060		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium <sup>a</sup>	< 0.20	0.20		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium <sup>a</sup>	< 0.0020	0.0020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt <sup>a</sup>	0.057	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper <sup>a</sup>	0.70	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury <sup>a</sup>	< 0.00020	0.00020		mg/l	1	08/31/12	09/04/12 RW	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc <sup>a</sup>	0.036	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2685
- (2) Instrument QC Batch: MA2692
- (3) Prep QC Batch: MP5248
- (4) Prep QC Batch: MP5260

(a) Leaching fluid was DI water.

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b> TF-DISC-1-6	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-13	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	3.0	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	10.7	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	29.5	19	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 0.93	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 0.93	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	8.8	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	8.9	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	556	2.3	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	122	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	84.8	19	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	7.8	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	3.3	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 1.9	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	< 0.93	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium	< 1.9	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	31.3	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	25.8	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TF-DISC-2-4	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-14	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	12.5	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	28.6	18	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 0.90	0.90	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 0.90	0.90	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	7.1	0.90	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	9.2	0.90	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	842	2.3	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	68.4	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	56.8	19	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	10.6	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	3.0	0.90	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	1.7	0.90	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	30.3	0.90	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	19.6	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TF-DISC-3-7	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-15	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	9.0	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	29.3	18	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 0.92	0.92	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 0.92	0.92	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	7.3	0.92	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	10.9	0.92	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	1640	2.3	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	98.9	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	54.4	20	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	10.7	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	2.8	0.92	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	1.4	0.92	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	25.8	0.92	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	17.1	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TF-COMP-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-16	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.4	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	8.5	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	28.1	19	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 0.93	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 0.93	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	6.0	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	8.6	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	974	2.3	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	89.2	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	62.0	19	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	6.8	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	2.6	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 1.9	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	0.95	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium	< 1.9	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	25.1	0.93	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	18.2	1.9	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TF-COMP-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-16W	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 0.15	0.15		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Arsenic	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Barium	< 5.0	5.0		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Beryllium	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Cadmium	< 0.050	0.050		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Chromium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Cobalt	0.16	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Copper	33.2	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Lead	2.2	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Mercury	0.44	0.020		mg/l	10	10/13/12	10/13/12 DQ	SW846 7470A <sup>1</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum	< 0.50	0.50		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Nickel	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Selenium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Silver	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Thallium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Vanadium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Zinc	< 0.50	0.50		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2780
- (2) Instrument QC Batch: MA2781
- (3) Prep QC Batch: MP5414
- (4) Prep QC Batch: MP5418

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b> TF-COMP-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-16WW	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>a</sup>	< 0.0060	0.0060		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium <sup>a</sup>	< 0.20	0.20		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium <sup>a</sup>	< 0.0020	0.0020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt <sup>a</sup>	0.017	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper <sup>a</sup>	0.23	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury <sup>a</sup>	< 0.00020	0.00020		mg/l	1	08/31/12	09/04/12 RW	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc <sup>a</sup>	0.039	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2685
- (2) Instrument QC Batch: MA2692
- (3) Prep QC Batch: MP5248
- (4) Prep QC Batch: MP5260

(a) Leaching fluid was DI water.

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b> TF-COMP-2	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-17	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.7	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	6.7	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	25.8	17	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 0.84	0.84	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 0.84	0.84	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	8.8	0.84	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	9.9	0.84	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	713	2.1	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	40.4	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	33.4	10	mg/kg	250	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	7.5	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	5.2	0.84	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 1.7	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	< 0.84	0.84	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium	< 1.7	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	33.8	0.84	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	19.5	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TF-COMP-2	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-17WW	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>a</sup>	< 0.0060	0.0060		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium <sup>a</sup>	< 0.20	0.20		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium <sup>a</sup>	< 0.0020	0.0020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt <sup>a</sup>	0.0083	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper <sup>a</sup>	0.094	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury <sup>a</sup>	< 0.00020	0.00020		mg/l	1	08/31/12	09/04/12 RW	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2685
- (2) Instrument QC Batch: MA2692
- (3) Prep QC Batch: MP5248
- (4) Prep QC Batch: MP5260

(a) Leaching fluid was DI water.

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b> TF-COMP-3	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-18	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	2.6	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	6.7	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	28.8	18	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 0.88	0.88	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 0.88	0.88	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	8.8	0.88	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	10.5	0.88	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	621	2.2	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	43.1	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	54.2	21	mg/kg	500	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	6.5	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	4.0	0.88	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	1.0	0.88	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium	< 1.8	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	33.3	0.88	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	19.1	1.8	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> TF-COMP-3	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-18WW	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>a</sup>	< 0.0060	0.0060		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium <sup>a</sup>	< 0.20	0.20		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium <sup>a</sup>	< 0.0020	0.0020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt <sup>a</sup>	0.0054	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper <sup>a</sup>	0.088	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury <sup>a</sup>	< 0.00020	0.00020		mg/l	1	08/31/12	09/04/12 RW	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc <sup>a</sup>	0.031	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2685
- (2) Instrument QC Batch: MA2692
- (3) Prep QC Batch: MP5248
- (4) Prep QC Batch: MP5260

(a) Leaching fluid was DI water.

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b> ADIT-1-S	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-19	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 3.7	3.7	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	22.4	3.7	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	45.4	37	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 1.8	1.8	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 1.8	1.8	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	12.0	1.8	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	38.0	1.8	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	413	4.6	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	16.0	3.7	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	14.9	1.9	mg/kg	50	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	4.2	3.7	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	4.9	1.8	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 3.7	3.7	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	2.4	1.8	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium	< 3.7	3.7	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	43.8	1.8	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	36.9	3.7	mg/kg	2	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> ADIT-1-S	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-19WW	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Soil	<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony <sup>a</sup>	< 0.0060	0.0060		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Arsenic <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Barium <sup>a</sup>	< 0.20	0.20		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Beryllium <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cadmium <sup>a</sup>	< 0.0020	0.0020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Chromium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Cobalt <sup>a</sup>	0.046	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Copper <sup>a</sup>	0.39	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Lead <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Mercury <sup>a</sup>	< 0.00020	0.00020		mg/l	1	08/31/12	09/04/12 RW	SW846 7470A <sup>2</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum <sup>a</sup>	< 0.020	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Nickel <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Selenium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Silver <sup>a</sup>	< 0.0050	0.0050		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Thallium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Vanadium <sup>a</sup>	< 0.010	0.010		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>
Zinc <sup>a</sup>	0.063	0.020		mg/l	1	08/29/12	08/29/12 RS	SW846 6010B <sup>1</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2685
- (2) Instrument QC Batch: MA2692
- (3) Prep QC Batch: MP5248
- (4) Prep QC Batch: MP5260

(a) Leaching fluid was DI water.

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

# Report of Analysis

<b>Client Sample ID:</b>	BOILER-1-S	<b>Date Sampled:</b>	08/14/12
<b>Lab Sample ID:</b>	C23243-20	<b>Date Received:</b>	08/17/12
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	n/a <sup>a</sup>
<b>Project:</b>	Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA		

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.7	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Arsenic	4.3	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Barium	29.8	17	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Beryllium	< 0.87	0.87	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cadmium	< 0.87	0.87	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Chromium	8.3	0.87	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Cobalt	8.6	0.87	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Copper	295	2.2	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Lead	8.5	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Mercury	1.2	0.12	mg/kg	3	08/27/12	08/31/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>3</sup>
Molybdenum	3.7	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Nickel	3.0	0.87	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Selenium	< 1.7	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Silver	< 0.87	0.87	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Thallium	< 1.7	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Vanadium	27.3	0.87	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>
Zinc	19.1	1.7	mg/kg	1	08/27/12	08/28/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>4</sup>

- (1) Instrument QC Batch: MA2681
- (2) Instrument QC Batch: MA2694
- (3) Prep QC Batch: MP5224
- (4) Prep QC Batch: MP5241

(a) All results reported on a wet weight basis.

RL = Reporting Limit

## Misc. Forms

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### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody









## Metals Analysis

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5

## QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5217  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 08/20/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	13	8.5		
Antimony	6.0	.7	.51	1.5	<6.0
Arsenic	10	.7	.65	-2.0	<10
Barium	200	.4	.35	0.0	<200
Beryllium	5.0	.2	.4	0.10	<5.0
Bismuth	20		2.9		
Boron	100	.9	.64		
Cadmium	2.0	.2	.15	-1.0	<2.0
Calcium	5000	7.1	12		
Chromium	10	.3	.41	-0.40	<10
Cobalt	5.0	.2	.3	0.30	<5.0
Copper	10	1.2	3	0.80	<10
Iron	200	6.4	12		
Lead	10	.7	.85	-1.7	<10
Lithium	50		2		
Magnesium	5000	27	36		
Manganese	15	.1	1.3		
Molybdenum	20	.2	.22	0.60	<20
Nickel	5.0	.2	.12	-0.40	<5.0
Potassium	10000	18	44		
Selenium	10	1.8	2.2	-2.1	<10
Silicon	100	1.2	6.9		
Silver	5.0	.3	.47	0.0	<5.0
Sodium	10000	15	13		
Strontium	10	.2	.24		
Thallium	10	.5	.54	5.0	<10
Tin	50	.2	.7		
Titanium	10	.4	.34		
Vanadium	10	.3	.3	-0.20	<10
Zinc	20	.3	4.2	0.90	<20

Associated samples MP5217: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5217  
 Matrix Type: AQUEOUS

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 08/20/12

Metal	C23185-10F Original MS		SpikeLot MPIR4	% Rec	QC Limits
Aluminum					
Antimony	1.7	451	500	89.9	75-125
Arsenic	47.2	501	500	90.8	75-125
Barium	78.9	519	500	88.0	75-125
Beryllium	0.0	445	500	89.0	75-125
Bismuth					
Boron					
Cadmium	0.30	449	500	89.7	75-125
Calcium					
Chromium	0.0	444	500	88.8	75-125
Cobalt	2.0	447	500	89.0	75-125
Copper	3.1	451	500	89.6	75-125
Iron					
Lead	0.0	445	500	89.0	75-125
Lithium					
Magnesium					
Manganese					
Molybdenum	3.8	461	500	91.4	75-125
Nickel	4.5	477	500	94.5	75-125
Potassium					
Selenium	3.8	461	500	91.4	75-125
Silicon					
Silver	0.0	454	500	90.8	75-125
Sodium	anr				
Strontium					
Thallium	3.3	471	500	93.5	75-125
Tin					
Titanium					
Vanadium	0.0	451	500	90.2	75-125
Zinc	5.5	450	500	88.9	75-125

Associated samples MP5217: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.1.2  
**5**

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5217  
 Matrix Type: AQUEOUS

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 08/20/12

Metal	C23185-10F Original MSD		Spike lot MPIR4	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	1.7	461	500	91.9	2.2	20
Arsenic	47.2	510	500	92.6	1.8	20
Barium	78.9	531	500	90.4	2.3	20
Beryllium	0.0	455	500	91.0	2.2	20
Bismuth						
Boron						
Cadmium	0.30	457	500	91.3	1.8	20
Calcium						
Chromium	0.0	450	500	90.0	1.3	20
Cobalt	2.0	455	500	90.6	1.8	20
Copper	3.1	458	500	91.0	1.5	20
Iron						
Lead	0.0	448	500	89.6	0.7	20
Lithium						
Magnesium						
Manganese						
Molybdenum	3.8	468	500	92.8	1.5	20
Nickel	4.5	482	500	95.5	1.0	20
Potassium						
Selenium	3.8	465	500	92.2	0.9	20
Silicon						
Silver	0.0	463	500	92.6	2.0	20
Sodium	anr					
Strontium						
Thallium	3.3	480	500	95.3	1.9	20
Tin						
Titanium						
Vanadium	0.0	460	500	92.0	2.0	20
Zinc	5.5	456	500	90.1	1.3	20

Associated samples MP5217: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.12  
**5**

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5217  
 Matrix Type: AQUEOUS

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 08/20/12 08/20/12

Metal	BSP Result	Spikelot MPIR4	% Rec	QC Limits	BSD Result	Spikelot MPIR4	% Rec	BSD RPD	QC Limit
Aluminum									
Antimony	449	500	89.8	80-120	448	500	89.6	0.2	
Arsenic	436	500	87.2	80-120	438	500	87.6	0.5	
Barium	449	500	89.8	80-120	448	500	89.6	0.2	
Beryllium	447	500	89.4	80-120	448	500	89.6	0.2	
Bismuth									
Boron									
Cadmium	445	500	89.0	80-120	446	500	89.2	0.2	
Calcium									
Chromium	454	500	90.8	80-120	454	500	90.8	0.0	
Cobalt	466	500	93.2	80-120	466	500	93.2	0.0	
Copper	456	500	91.2	80-120	457	500	91.4	0.2	
Iron									
Lead	443	500	88.6	80-120	438	500	87.6	1.1	
Lithium									
Magnesium									
Manganese									
Molybdenum	464	500	92.8	80-120	465	500	93.0	0.2	
Nickel	454	500	90.8	80-120	453	500	90.6	0.2	
Potassium									
Selenium	446	500	89.2	80-120	434	500	86.8	2.7	
Silicon									
Silver	449	500	89.8	80-120	448	500	89.6	0.2	
Sodium	anr								
Strontium									
Thallium	484	500	96.8	80-120	482	500	96.4	0.4	
Tin									
Titanium									
Vanadium	453	500	90.6	80-120	453	500	90.6	0.0	
Zinc	448	500	89.6	80-120	447	500	89.4	0.2	

Associated samples MP5217: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5217  
 Matrix Type: AQUEOUS

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 08/20/12

Metal	C23185-10F Original SDL 1:5		%DIF	QC Limits
Aluminum				
Antimony	1.70	0.00	100.0(a)	0-10
Arsenic	47.2	42.6	9.7	0-10
Barium	78.9	85.2	8.0	0-10
Beryllium	0.00	0.00	NC	0-10
Bismuth				
Boron				
Cadmium	0.300	0.00	100.0(a)	0-10
Calcium				
Chromium	0.00	0.00	NC	0-10
Cobalt	2.00	1.80	10.0	0-10
Copper	3.10	0.00	100.0(a)	0-10
Iron				
Lead	0.00	0.00	NC	0-10
Lithium				
Magnesium				
Manganese				
Molybdenum	3.80	9.10	139.5(a)	0-10
Nickel	4.50	6.10	35.6(a)	0-10
Potassium				
Selenium	3.80	0.00	100.0(a)	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium	anr			
Strontium				
Thallium	3.30	6.50	97.0(a)	0-10
Tin				
Titanium				
Vanadium	0.00	0.00	NC	0-10
Zinc	5.50	4.80	12.7(a)	0-10

Associated samples MP5217: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5222  
Matrix Type: AQUEOUS

Methods: SW846 7470A  
Units: ug/l

Prep Date: 08/21/12

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.20	.0042	.08	0.025	<0.20

Associated samples MP5222: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

5.2.1  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5222  
 Matrix Type: AQUEOUS

Methods: SW846 7470A  
 Units: ug/l

Prep Date: 08/21/12

Metal	C23259-1 Original MS	SpikeLot HGPWS1		% Rec	QC Limits
Mercury	0.021	4.2	4	104.5	75-125

Associated samples MP5222: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.2.2  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5222 Methods: SW846 7470A  
 Matrix Type: AQUEOUS Units: ug/l

Prep Date: 08/21/12

Metal	C23259-1 Original MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit
Mercury	0.021	4.1	4	102.0	2.4 30

Associated samples MP5222: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.2.2  
5

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243

Account: GAICAR - Golder Associates, Inc. Roseville

Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5222

Methods: SW846 7470A

Matrix Type: AQUEOUS

Units: ug/l

Prep Date: 08/21/12

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	2.0	2	100.0	85-115

Associated samples MP5222: C23243-4, C23243-5

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

5.2.3  
5

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5224  
Matrix Type: SOLID

Methods: SW846 7471A  
Units: mg/kg

Prep Date: 08/27/12

Metal	RL	IDL	MDL	MB	
				raw	final
Mercury	0.042	.00035	.0043	-0.0023	<0.042

Associated samples MP5224: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

5.3.1  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5224  
 Matrix Type: SOLID

Methods: SW846 7471A  
 Units: mg/kg

Prep Date: 08/27/12

Metal	C23243-6 Original MS	Spike HGPWS1	lot % Rec	QC Limits
Mercury	0.079	0.38	0.308	97.8 75-125

Associated samples MP5224: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.3.2  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5224  
 Matrix Type: SOLID

Methods: SW846 7471A  
 Units: mg/kg

Prep Date: 08/27/12

Metal	C23243-6 Original MSD	Spike HGPWSI	lot % Rec	MSD RPD	QC Limit
Mercury	0.079	0.42	0.308	110.8	10.0

Associated samples MP5224: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.3.2  
5

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5224  
 Matrix Type: SOLID

Methods: SW846 7471A  
 Units: mg/kg

Prep Date: 08/27/12

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.17	0.167	102.0	80-120

Associated samples MP5224: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

5.3.3  
5

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5241  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date: 08/27/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	20	1.3	2		
Antimony	2.0	.07	.087	0.080	<2.0
Arsenic	2.0	.07	.07	0.17	<2.0
Barium	20	.04	.035	0.090	<20
Beryllium	1.0	.02	.012	-0.010	<1.0
Boron	10	.09	.2		
Cadmium	1.0	.02	.015	0.010	<1.0
Calcium	500	.71	7.6		
Chromium	1.0	.03	.054	0.020	<1.0
Cobalt	1.0	.02	.022	0.0	<1.0
Copper	2.5	.12	.19	0.30	<2.5
Iron	20	.64	1.6		
Lead	2.0	.07	.054	0.030	<2.0
Magnesium	500	2.7	1.5		
Manganese	1.5	.01	.054		
Molybdenum	2.0	.02	.024	-0.040	<2.0
Nickel	1.0	.02	.024	0.010	<1.0
Potassium	1000	1.8	1.3		
Selenium	2.0	.18	.23	-0.11	<2.0
Silicon		.12			
Silver	1.0	.03	.044	-0.020	<1.0
Sodium	1000	1.5	4.8		
Strontium	1.0	.02	.017		
Thallium	2.0	.05	.073	0.030	<2.0
Tin	50	.02	.41		
Titanium	1.0	.04	.079		
Vanadium	1.0	.03	.025	-0.010	<1.0
Zinc	2.0	.03	.098	0.36	<2.0

Associated samples MP5241: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5241  
 Matrix Type: SOLID

Methods: SW846 6010B  
 Units: mg/kg

Prep Date: 08/27/12

Metal	C23243-6 Original MS		SpikeLot MPIR4A	% Rec	QC Limits
Aluminum					
Antimony	0.0	16.1	46.3	34.8N(a)	75-125
Arsenic	2.6	43.0	46.3	87.3	75-125
Barium	47.7	94.8	46.3	101.7	75-125
Beryllium	0.38	41.7	46.3	89.3	75-125
Boron					
Cadmium	0.071	41.0	46.3	88.4	75-125
Calcium					
Chromium	10.1	55.0	46.3	97.0	75-125
Cobalt	5.4	47.5	46.3	90.9	75-125
Copper	62.0	111	46.3	105.8	75-125
Iron					
Lead	26.4	71.5	46.3	97.4	75-125
Magnesium					
Manganese					
Molybdenum	1.1	42.0	46.3	88.3	75-125
Nickel	6.7	50.1	46.3	93.7	75-125
Potassium					
Selenium	0.50	41.0	46.3	87.5	75-125
Silicon					
Silver	0.054	44.3	46.3	95.6	75-125
Sodium					
Strontium					
Thallium	3.5	45.4	46.3	91.6	75-125
Tin					
Titanium					
Vanadium	33.5	79.5	46.3	99.4	75-125
Zinc	37.6	81.6	46.3	95.0	75-125

Associated samples MP5241: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested  
 (a) Spike recovery indicates possible matrix interference.

5.4.2  
**5**

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5241  
 Matrix Type: SOLID

Methods: SW846 6010B  
 Units: mg/kg

Prep Date: 08/27/12

Metal	C23243-6 Original MSD		Spike lot MPIR4A	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	0.0	14.4	44.6	32.3N(a)	11.1	20
Arsenic	2.6	41.3	44.6	86.7	4.0	20
Barium	47.7	101	44.6	119.4	6.3	20
Beryllium	0.38	40.1	44.6	89.0	3.9	20
Boron						
Cadmium	0.071	39.4	44.6	88.1	4.0	20
Calcium						
Chromium	10.1	53.7	44.6	97.7	2.4	20
Cobalt	5.4	45.6	44.6	90.0	4.1	20
Copper	62.0	102	44.6	89.6	8.5	20
Iron						
Lead	26.4	69.5	44.6	96.5	2.8	20
Magnesium						
Manganese						
Molybdenum	1.1	40.2	44.6	87.6	4.4	20
Nickel	6.7	48.5	44.6	93.6	3.2	20
Potassium						
Selenium	0.50	39.6	44.6	87.6	3.5	20
Silicon						
Silver	0.054	42.4	44.6	94.9	4.4	20
Sodium						
Strontium						
Thallium	3.5	44.0	44.6	91.8	3.1	20
Tin						
Titanium						
Vanadium	33.5	78.3	44.6	100.4	1.5	20
Zinc	37.6	79.9	44.6	94.8	2.1	20

Associated samples MP5241: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested  
 (a) Spike recovery indicates possible matrix interference.

5.4.2  
**5**

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5241  
 Matrix Type: SOLID

Methods: SW846 6010B  
 Units: mg/kg

Prep Date: 08/27/12

Metal	BSP Result	Spikelot MPIR4A	% Rec	QC Limits
Aluminum				
Antimony	44.3	50	88.6	80-120
Arsenic	43.2	50	86.4	80-120
Barium	43.9	50	87.8	80-120
Beryllium	44.0	50	88.0	80-120
Boron				
Cadmium	43.8	50	87.6	80-120
Calcium				
Chromium	47.9	50	95.8	80-120
Cobalt	47.3	50	94.6	80-120
Copper	48.0	50	96.0	80-120
Iron				
Lead	45.1	50	90.2	80-120
Magnesium				
Manganese				
Molybdenum	45.3	50	90.6	80-120
Nickel	44.0	50	88.0	80-120
Potassium				
Selenium	43.6	50	87.2	80-120
Silicon				
Silver	47.4	50	94.8	80-120
Sodium				
Strontium				
Thallium	45.1	50	90.2	80-120
Tin				
Titanium				
Vanadium	48.4	50	96.8	80-120
Zinc	47.6	50	95.2	80-120

Associated samples MP5241: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5241  
 Matrix Type: SOLID

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 08/27/12

Metal	C23243-6 Original SDL 1:5		%DIF	QC Limits
Aluminum				
Antimony	0.00	0.00	NC	0-10
Arsenic	27.8	41.5	41.6 (a)	0-10
Barium	534	572	7.1	0-10
Beryllium	4.30	4.60	7.0	0-10
Boron				
Cadmium	0.800	1.90	137.5(a)	0-10
Calcium				
Chromium	137	124	8.8	0-10
Cobalt	61.0	66.4	8.9	0-10
Copper	695	748	7.7	0-10
Iron				
Lead	296	306	3.3	0-10
Magnesium				
Manganese				
Molybdenum	12.2	9.40	23.0*(b)	0-10
Nickel	75.2	72.3	3.9	0-10
Potassium				
Selenium	6.20	0.00	100.0(a)	0-10
Silicon				
Silver	7.60	0.00	100.0(a)	0-10
Sodium				
Strontium				
Thallium	39.6	10.4	69.3*(b)	0-10
Tin				
Titanium				
Vanadium	376	401	6.7	0-10
Zinc	421	445	5.7	0-10

Associated samples MP5241: C23243-6, C23243-7, C23243-8, C23243-9, C23243-10, C23243-11, C23243-12, C23243-13, C23243-14, C23243-15, C23243-16, C23243-17, C23243-18, C23243-19, C23243-20

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

(b) Serial dilution indicates possible matrix interference.

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5248  
Matrix Type: LEACHATE

Methods: SW846 6010B  
Units: mg/l

Prep Date: 08/29/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	0.20	.013	.0085		
Antimony	0.0060	.0007	.00051	0.00010	<0.0060
Arsenic	0.010	.0007	.00065	0.00090	<0.010
Barium	0.20	.0004	.00035	0.00020	<0.20
Beryllium	0.0050	.0002	.0004	0.0	<0.0050
Boron	0.10	.0009	.00064		
Cadmium	0.0020	.0002	.00015	0.00010	<0.0020
Calcium	5.0	.0071	.012		
Chromium	0.010	.0003	.00041	0.00020	<0.010
Cobalt	0.0050	.0002	.0003	0.00010	<0.0050
Copper	0.010	.0012	.003	0.0013	<0.010
Iron	0.20	.0064	.012		
Lead	0.010	.0007	.00085	-0.0013	<0.010
Magnesium	5.0	.027	.036		
Manganese	0.015	.0001	.0013		
Molybdenum	0.020	.0002	.00022	0.0010	<0.020
Nickel	0.0050	.0002	.00012	-0.00010	<0.0050
Potassium	10	.018	.044		
Selenium	0.010	.0018	.0022	0.0018	<0.010
Silicon	0.10	.0012	.0069		
Silver	0.0050	.0003	.00047	-0.00040	<0.0050
Sodium	10	.015	.013		
Strontium	0.010	.0002	.00024		
Thallium	0.010	.0005	.00054	0.00080	<0.010
Tin	0.050	.0002	.0007		
Titanium	0.010	.0004	.00034		
Vanadium	0.010	.0003	.0003	-0.00010	<0.010
Zinc	0.020	.0003	.0042	0.0020	<0.020

Associated samples MP5248: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5248  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 08/29/12

Metal	C23243-10WW Original MS		Spike/lot MPIR4A	% Rec	QC Limits
Aluminum					
Antimony	0.00090	0.50	0.50	99.8	75-125
Arsenic	0.0010	0.46	0.50	91.8	75-125
Barium	0.031	0.54	0.50	101.8	75-125
Beryllium	0.0	0.50	0.50	100.0	75-125
Boron					
Cadmium	0.0	0.48	0.50	96.0	75-125
Calcium					
Chromium	0.0	0.52	0.50	104.0	75-125
Cobalt	0.10	0.59	0.50	98.0	75-125
Copper	1.3	1.8	0.50	100.0	75-125
Iron					
Lead	0.0015	0.47	0.50	93.7	75-125
Magnesium					
Manganese					
Molybdenum	0.00050	0.48	0.50	95.9	75-125
Nickel	0.0043	0.46	0.50	91.1	75-125
Potassium					
Selenium	0.0	0.46	0.50	92.0	75-125
Silicon					
Silver	0.0	0.51	0.50	102.0	75-125
Sodium					
Strontium					
Thallium	0.0	0.49	0.50	98.0	75-125
Tin					
Titanium					
Vanadium	0.0	0.50	0.50	100.0	75-125
Zinc	0.019	0.50	0.50	96.2	75-125

Associated samples MP5248: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.5.2  
**5**

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5248  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 08/29/12

Metal	C23243-10WW Original MSD		SpikeLot MPIR4A	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	0.00090	0.50	0.50	99.8	0.0	20
Arsenic	0.0010	0.46	0.50	91.8	0.0	20
Barium	0.031	0.53	0.50	99.8	1.9	20
Beryllium	0.0	0.50	0.50	100.0	0.0	20
Boron						
Cadmium	0.0	0.48	0.50	96.0	0.0	20
Calcium						
Chromium	0.0	0.51	0.50	102.0	1.9	20
Cobalt	0.10	0.60	0.50	100.0	1.7	20
Copper	1.3	1.8	0.50	100.0	0.0	20
Iron						
Lead	0.0015	0.47	0.50	93.7	0.0	20
Magnesium						
Manganese						
Molybdenum	0.00050	0.48	0.50	95.9	0.0	20
Nickel	0.0043	0.46	0.50	91.1	0.0	20
Potassium						
Selenium	0.0	0.47	0.50	94.0	2.2	20
Silicon						
Silver	0.0	0.52	0.50	104.0	1.9	20
Sodium						
Strontium						
Thallium	0.0	0.49	0.50	98.0	0.0	20
Tin						
Titanium						
Vanadium	0.0	0.50	0.50	100.0	0.0	20
Zinc	0.019	0.51	0.50	98.2	2.0	20

Associated samples MP5248: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.5.2  
 5

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5248  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 08/29/12

Metal	BSP Result	SpikeLot MPIR4A	% Rec	QC Limits
Aluminum				
Antimony	0.50	0.50	100.0	80-120
Arsenic	0.48	0.50	96.0	80-120
Barium	0.49	0.50	98.0	80-120
Beryllium	0.48	0.50	96.0	80-120
Boron				
Cadmium	0.49	0.50	98.0	80-120
Calcium				
Chromium	0.51	0.50	102.0	80-120
Cobalt	0.51	0.50	102.0	80-120
Copper	0.51	0.50	102.0	80-120
Iron				
Lead	0.47	0.50	94.0	80-120
Magnesium				
Manganese				
Molybdenum	0.49	0.50	98.0	80-120
Nickel	0.46	0.50	92.0	80-120
Potassium				
Selenium	0.48	0.50	96.0	80-120
Silicon				
Silver	0.50	0.50	100.0	80-120
Sodium				
Strontium				
Thallium	0.49	0.50	98.0	80-120
Tin				
Titanium				
Vanadium	0.50	0.50	100.0	80-120
Zinc	0.50	0.50	100.0	80-120

Associated samples MP5248: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

5.5.3  
 5

SERIAL DILUTION RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5248  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 08/29/12

Metal	C23243-10WW Original SDL 1:5		%DIF	QC Limits
Aluminum				
Antimony	0.900	0.00	100.0(a)	0-10
Arsenic	1.00	0.00	100.0(a)	0-10
Barium	31.3	38.2	22.0*(b)	0-10
Beryllium	0.00	0.00	NC	0-10
Boron				
Cadmium	0.00	1.20	NC	0-10
Calcium				
Chromium	0.00	0.00	NC	0-10
Cobalt	99.7	105	5.3	0-10
Copper	1270	1460	15.4*(b)	0-10
Iron				
Lead	1.50	0.00	100.0(a)	0-10
Magnesium				
Manganese				
Molybdenum	0.500	3.50	600.0(a)	0-10
Nickel	4.30	5.10	18.6(a)	0-10
Potassium				
Selenium	0.00	18.5	NC	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium	0.00	0.00	NC	0-10
Tin				
Titanium				
Vanadium	0.00	0.00	NC	0-10
Zinc	19.3	20.4	5.7	0-10

Associated samples MP5248: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

(b) Serial dilution indicates possible matrix interference.

5.5.4  
**5**

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5260  
Matrix Type: LEACHATE

Methods: SW846 7470A  
Units: mg/l

Prep Date: 08/31/12

Metal	RL	IDL	MDL	MB raw	final
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Mercury 0.00020 .0000042 .00008 0.00000030<0.00020

Associated samples MP5260: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

5.6.1  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5260  
 Matrix Type: LEACHATE

Methods: SW846 7470A  
 Units: mg/l

Prep Date: 08/31/12

Metal	C23243-11WW Original MS	Spike HGPWS1	% Rec	QC Limits
Mercury	0.000067	0.0040	98.3	75-125

Associated samples MP5260: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.6.2  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5260  
 Matrix Type: LEACHATE

Methods: SW846 7470A  
 Units: mg/l

Prep Date: 08/31/12

Metal	C23243-11WW Original MSD	SpikeLot HGPWSI	% Rec	MSD RPD	QC Limit
Mercury	0.000067 0.0040	0.0040	98.3	0.0	30

Associated samples MP5260: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.6.2  
5

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243

Account: GAICAR - Golder Associates, Inc. Roseville

Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5260  
Matrix Type: LEACHATE

Methods: SW846 7470A  
Units: mg/l

Prep Date: 08/31/12

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.0018	0.0020	90.0	85-115

Associated samples MP5260: C23243-10WW, C23243-11WW, C23243-12WW, C23243-16WW, C23243-17WW, C23243-18WW, C23243-19WW

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

5.6.3  
5

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
Matrix Type: LEACHATE

Methods: SW846 6010B  
Units: mg/l

Prep Date: 10/12/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	5.0	.34	.21		
Antimony	0.15	.018	.013	-0.035	<0.15
Arsenic	0.25	.018	.016	0.010	<0.25
Barium	5.0	.01	.0088	0.0025	<5.0
Beryllium	0.13	.005	.01	0.0	<0.13
Boron	2.5	.023	.016		
Cadmium	0.050	.005	.0038	0.0075	<0.050
Calcium	130	.18	.3		
Chromium	0.25	.0075	.01	-0.010	<0.25
Cobalt	0.13	.005	.0075	0.010	<0.13
Copper	0.25	.03	.075	0.078	<0.25
Iron	5.0	.16	.31		
Lead	0.25	.018	.021	-0.075	<0.25
Magnesium	130	.68	.91		
Manganese	0.38	.0025	.031		
Molybdenum	0.50	.005	.0055	0.0	<0.50
Nickel	0.13	.005	.003	0.030	<0.13
Potassium	250	.45	1.1		
Selenium	0.25	.045	.055	-0.053	<0.25
Silicon	2.5	.03	.17		
Silver	0.13	.0075	.012	-0.010	<0.13
Sodium	250	.37	.33		
Strontium	0.25	.005	.006		
Thallium	0.25	.013	.014	-0.12	<0.25
Tin	1.3	.005	.018		
Titanium	0.25	.01	.0085		
Vanadium	0.25	.0075	.0075	-0.010	<0.25
Zinc	0.50	.0075	.1	0.040	<0.50

Associated samples MP5414: C23243-11W, C23243-12W, C23243-16W

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 10/12/12

Metal	C23243-11W Original MS		Spike MPIR4A	% Rec	QC Limits
Aluminum					
Antimony	0.0	12.9	12.5	103.2	75-125
Arsenic	0.028	13.4	12.5	107.0	75-125
Barium	0.31	12.5	12.5	97.5	75-125
Beryllium	0.0	12.5	12.5	100.0	75-125
Boron					
Cadmium	0.010	12.9	12.5	103.1	75-125
Calcium					
Chromium	0.010	13.4	12.5	107.1	75-125
Cobalt	0.21	13.3	12.5	104.7	75-125
Copper	8.7	21.5	12.5	102.4	75-125
Iron					
Lead	0.30	12.9	12.5	100.8	75-125
Magnesium					
Manganese					
Molybdenum	0.028	13.2	12.5	105.4	75-125
Nickel	0.050	12.8	12.5	102.0	75-125
Potassium					
Selenium	0.0	13.3	12.5	106.4	75-125
Silicon					
Silver	0.0	12.8	12.5	102.4	75-125
Sodium					
Strontium					
Thallium	0.0	12.0	12.5	96.0	75-125
Tin					
Titanium					
Vanadium	0.045	13.4	12.5	106.8	75-125
Zinc	0.52	13.8	12.5	106.2	75-125

Associated samples MP5414: C23243-11W, C23243-12W, C23243-16W

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.7.2  
**5**

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 10/12/12

Metal	C23243-11W Original MSD		SpikeLot MPIR4A	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	0.0	12.7	12.5	101.6	1.6	20
Arsenic	0.028	13.4	12.5	107.0	0.0	20
Barium	0.31	12.5	12.5	97.5	0.0	20
Beryllium	0.0	12.5	12.5	100.0	0.0	20
Boron						
Cadmium	0.010	12.8	12.5	102.3	0.8	20
Calcium						
Chromium	0.010	13.3	12.5	106.3	0.7	20
Cobalt	0.21	13.2	12.5	103.9	0.8	20
Copper	8.7	21.6	12.5	103.2	0.5	20
Iron						
Lead	0.30	12.6	12.5	98.4	2.4	20
Magnesium						
Manganese						
Molybdenum	0.028	13.1	12.5	104.6	0.8	20
Nickel	0.050	12.7	12.5	101.2	0.8	20
Potassium						
Selenium	0.0	13.3	12.5	106.4	0.0	20
Silicon						
Silver	0.0	12.8	12.5	102.4	0.0	20
Sodium						
Strontium						
Thallium	0.0	11.8	12.5	94.4	1.7	20
Tin						
Titanium						
Vanadium	0.045	13.3	12.5	106.0	0.7	20
Zinc	0.52	13.7	12.5	105.4	0.7	20

Associated samples MP5414: C23243-11W, C23243-12W, C23243-16W

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.7.2  
**5**

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 10/12/12

Metal	BSP Result	Spikelot MPIR4A	% Rec	QC Limits
Aluminum				
Antimony	12.9	12.5	103.2	80-120
Arsenic	13.3	12.5	106.4	80-120
Barium	12.4	12.5	99.2	80-120
Beryllium	12.5	12.5	100.0	80-120
Boron				
Cadmium	12.9	12.5	103.2	80-120
Calcium				
Chromium	13.4	12.5	107.2	80-120
Cobalt	13.1	12.5	104.8	80-120
Copper	12.6	12.5	100.8	80-120
Iron				
Lead	12.5	12.5	100.0	80-120
Magnesium				
Manganese				
Molybdenum	13.2	12.5	105.6	80-120
Nickel	12.9	12.5	103.2	80-120
Potassium				
Selenium	13.5	12.5	108.0	80-120
Silicon				
Silver	12.9	12.5	103.2	80-120
Sodium				
Strontium				
Thallium	12.1	12.5	96.8	80-120
Tin				
Titanium				
Vanadium	13.4	12.5	107.2	80-120
Zinc	13.8	12.5	110.4	80-120

Associated samples MP5414: C23243-11W, C23243-12W, C23243-16W

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 10/12/12

Metal	C23243-11W Original SDL 1:5		%DIF	QC Limits
Aluminum				
Antimony	0.00	0.00	NC	0-10
Arsenic	1.10	0.00	100.0 (a)	0-10
Barium	12.3	12.5	1.6	0-10
Beryllium	0.00	0.00	NC	0-10
Boron				
Cadmium	0.400	1.90	375.0 (a)	0-10
Calcium				
Chromium	0.400	0.00	100.0 (a)	0-10
Cobalt	8.40	9.90	17.9 (a)	0-10
Copper	346	360	4.0	0-10
Iron				
Lead	11.9	7.30	38.7 (a)	0-10
Magnesium				
Manganese				
Molybdenum	1.10	2.50	127.3 (a)	0-10
Nickel	2.00	2.20	10.0	0-10
Potassium				
Selenium	0.00	0.00	NC	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium	0.00	0.00	NC	0-10
Tin				
Titanium				
Vanadium	1.80	0.00	100.0 (a)	0-10
Zinc	20.8	21.6	3.8	0-10

Associated samples MP5414: C23243-11W, C23243-12W, C23243-16W

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested  
 (a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

5.7.4  
**5**

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5418  
Matrix Type: LEACHATE

Methods: SW846 7470A  
Units: mg/l

Prep Date: 10/13/12

Metal	RL	IDL	MDL	MB	
				raw	final
Mercury	0.0020	.000042	.0008	0.000045	<0.0020

Associated samples MP5418: C23243-11W, C23243-12W, C23243-16W

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

5.8.1  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5418  
 Matrix Type: LEACHATE

Methods: SW846 7470A  
 Units: mg/l

Prep Date: 10/13/12

Metal	C23243-3AW Original MS	Spike HGPWS1	lot % Rec	QC Limits
Mercury	0.0	0.037	0.040 92.5	75-125

Associated samples MP5418: C23243-11W, C23243-12W, C23243-16W

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.8.2  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5418 Methods: SW846 7470A  
 Matrix Type: LEACHATE Units: mg/l

Prep Date: 10/13/12

Metal	C23243-3AW Original MSD	Spike HGPWS1	lot % Rec	MSD RPD	QC Limit
Mercury	0.0	0.036	0.040	90.0	2.7 30

Associated samples MP5418: C23243-11W, C23243-12W, C23243-16W

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.8.2  
5



Technical Report for

Golder Associates, Inc. Roseville

Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

123-97450

Accutest Job Number: C23243A

Sampling Dates: 08/13/12 - 08/14/12

Report to:

Golder Associates  
1000 Enterprise Way Suite 190  
Roseville, CA 95678  
slofholm@golder.com

ATTN: Steve Lofholm

Total number of pages in report: **34**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Kesavalu M. Bagawandoss,  
Ph.D., J.D., Lab Director

Client Service contact: Nutan Kabir 408-588-0200

Certifications: CA (08258CA) AZ (AZ0762) DoD/ISO/IEC 17025:2005 (L2242)

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Test results relate only to samples analyzed.

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## Sample Summary

Golder Associates, Inc. Roseville

**Job No:** C23243A

Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

Project No: 123-97450

Sample Number	Collected		Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
C23243-1A	08/13/12	16:10 SL	08/17/12	SO	Solid	ADIT CHIP 1
C23243-2A	08/14/12	13:20 SL	08/17/12	SO	Solid	WRP-COMP-B-1
C23243-3A	08/14/12	13:10 SL	08/17/12	SO	Solid	WRP-COMP-T-1
C23243-3AW	08/14/12	13:10 SL	08/17/12	SO	Solid	WRP-COMP-T-1

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Soil samples reported on a dry weight basis unless otherwise indicated on result page.

## Summary of Hits

**Job Number:** C23243A  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Analyte	Qual	RL	MDL	Units	Method
<b>C23243-1A</b>	<b>ADIT CHIP 1</b>						
		Arsenic	20.3	1.7		mg/kg	SW846 6010B
		Barium	41.7	17		mg/kg	SW846 6010B
		Chromium	49.5	0.85		mg/kg	SW846 6010B
		Cobalt	18.0	0.85		mg/kg	SW846 6010B
		Copper	60.0	2.1		mg/kg	SW846 6010B
		Lead	6.5	1.7		mg/kg	SW846 6010B
		Mercury	0.089	0.040		mg/kg	SW846 7471A
		Molybdenum	7.6	1.7		mg/kg	SW846 6010B
		Nickel	2.7	0.85		mg/kg	SW846 6010B
		Vanadium	34.7	0.85		mg/kg	SW846 6010B
		Zinc	20.9	1.7		mg/kg	SW846 6010B
<b>C23243-2A</b>	<b>WRP-COMP-B-1</b>						
		Arsenic	8.6	1.9		mg/kg	SW846 6010B
		Barium	36.9	19		mg/kg	SW846 6010B
		Chromium	61.8	0.93		mg/kg	SW846 6010B
		Cobalt	19.2	0.93		mg/kg	SW846 6010B
		Copper	111	2.3		mg/kg	SW846 6010B
		Lead	4.9	1.9		mg/kg	SW846 6010B
		Mercury	0.074	0.038		mg/kg	SW846 7471A
		Molybdenum	2.2	1.9		mg/kg	SW846 6010B
		Nickel	3.1	0.93		mg/kg	SW846 6010B
		Selenium	2.2	1.9		mg/kg	SW846 6010B
		Vanadium	31.5	0.93		mg/kg	SW846 6010B
		Zinc	25.1	1.9		mg/kg	SW846 6010B
<b>C23243-3A</b>	<b>WRP-COMP-T-1</b>						
		Arsenic	13.2	1.8		mg/kg	SW846 6010B
		Barium	40.3	18		mg/kg	SW846 6010B
		Chromium	68.5	0.90		mg/kg	SW846 6010B
		Cobalt	57.1	0.90		mg/kg	SW846 6010B
		Copper	353	2.3		mg/kg	SW846 6010B
		Lead	5.6	1.8		mg/kg	SW846 6010B
		Mercury	0.091	0.042		mg/kg	SW846 7471A
		Molybdenum	3.8	1.8		mg/kg	SW846 6010B
		Nickel	6.8	0.90		mg/kg	SW846 6010B
		Vanadium	30.5	0.90		mg/kg	SW846 6010B
		Zinc	22.6	1.8		mg/kg	SW846 6010B

## Summary of Hits

**Job Number:** C23243A  
**Account:** Golder Associates, Inc. Roseville  
**Project:** Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
**Collected:** 08/13/12 thru 08/14/12

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
C23243-3AW	WRP-COMP-T-1					
Chromium		2.4	0.25		mg/l	SW846 6010B
Copper		0.69	0.25		mg/l	SW846 6010B

Sample Results

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Report of Analysis

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## Report of Analysis

<b>Client Sample ID:</b> ADIT CHIP 1	<b>Date Sampled:</b> 08/13/12
<b>Lab Sample ID:</b> C23243-1A	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Solid	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.7	1.7	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Arsenic	20.3	1.7	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Barium	41.7	17	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Beryllium	< 0.85	0.85	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Cadmium	< 0.85	0.85	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Chromium	49.5	0.85	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Cobalt	18.0	0.85	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Copper	60.0	2.1	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Lead	6.5	1.7	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Mercury	0.089	0.040	mg/kg	1	09/11/12	09/11/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>4</sup>
Molybdenum	7.6	1.7	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Nickel	2.7	0.85	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Selenium	< 1.7	1.7	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Silver <sup>b</sup>	< 4.3	4.3	mg/kg	5	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Thallium	< 1.7	1.7	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Vanadium	34.7	0.85	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Zinc	20.9	1.7	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>

(1) Instrument QC Batch: MA2703

(2) Instrument QC Batch: MA2708

(3) Prep QC Batch: MP5280

(4) Prep QC Batch: MP5292

(a) All results reported on a wet weight basis.

(b) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> WRP-COMP-B-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-2A	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Solid	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.9	1.9	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Arsenic	8.6	1.9	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Barium	36.9	19	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Beryllium	< 0.93	0.93	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Cadmium	< 0.93	0.93	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Chromium	61.8	0.93	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Cobalt	19.2	0.93	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Copper	111	2.3	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Lead	4.9	1.9	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Mercury	0.074	0.038	mg/kg	1	09/11/12	09/11/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>4</sup>
Molybdenum	2.2	1.9	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Nickel	3.1	0.93	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Selenium	2.2	1.9	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Silver <sup>b</sup>	< 4.6	4.6	mg/kg	5	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Thallium <sup>b</sup>	< 9.3	9.3	mg/kg	5	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Vanadium	31.5	0.93	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Zinc	25.1	1.9	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>

- (1) Instrument QC Batch: MA2703
- (2) Instrument QC Batch: MA2708
- (3) Prep QC Batch: MP5280
- (4) Prep QC Batch: MP5292

- (a) All results reported on a wet weight basis.
- (b) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit

# Report of Analysis

<b>Client Sample ID:</b> WRP-COMP-T-1	<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-3A	<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Solid	<b>Percent Solids:</b> n/a <sup>a</sup>
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA	

## Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 1.8	1.8	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Arsenic	13.2	1.8	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Barium	40.3	18	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Beryllium	< 0.90	0.90	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Cadmium	< 0.90	0.90	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Chromium	68.5	0.90	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Cobalt	57.1	0.90	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Copper	353	2.3	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Lead	5.6	1.8	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Mercury	0.091	0.042	mg/kg	1	09/11/12	09/11/12 RW	SW846 7471A <sup>2</sup>	SW846 7471A <sup>4</sup>
Molybdenum	3.8	1.8	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Nickel	6.8	0.90	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Selenium	< 1.8	1.8	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Silver	< 0.90	0.90	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Thallium <sup>b</sup>	< 9.0	9.0	mg/kg	5	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Vanadium	30.5	0.90	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>
Zinc	22.6	1.8	mg/kg	1	09/07/12	09/07/12 RS	SW846 6010B <sup>1</sup>	SW846 3050B <sup>3</sup>

- (1) Instrument QC Batch: MA2703
- (2) Instrument QC Batch: MA2708
- (3) Prep QC Batch: MP5280
- (4) Prep QC Batch: MP5292

- (a) All results reported on a wet weight basis.
- (b) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit

## Report of Analysis

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3

<b>Client Sample ID:</b> WRP-COMP-T-1		<b>Date Sampled:</b> 08/14/12
<b>Lab Sample ID:</b> C23243-3AW		<b>Date Received:</b> 08/17/12
<b>Matrix:</b> SO - Solid		<b>Percent Solids:</b> n/a
<b>Project:</b> Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA		

### Metals Analysis, STLC Leachate CA WET

Analyte	Result	MCL	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Antimony	< 0.15	0.15		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Arsenic	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Barium	< 5.0	5.0		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Beryllium	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Cadmium	< 0.050	0.050		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Chromium	2.4	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Cobalt	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Copper	0.69	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Lead	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Mercury	< 0.0020	0.0020		mg/l	1	10/13/12	10/13/12 DQ	SW846 7470A <sup>1</sup>	EPA 245.1/SW7470A <sup>4</sup>
Molybdenum	< 0.50	0.50		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Nickel	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Selenium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Silver	< 0.13	0.13		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Thallium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Vanadium	< 0.25	0.25		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>
Zinc	< 0.50	0.50		mg/l	1	10/12/12	10/15/12 RS	SW846 6010B <sup>2</sup>	SW3010A <sup>3</sup>

- (1) Instrument QC Batch: MA2780
- (2) Instrument QC Batch: MA2781
- (3) Prep QC Batch: MP5414
- (4) Prep QC Batch: MP5418

RL = Reporting Limit  
MCL = Maximum Contamination Level (not available)

## Misc. Forms

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### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody









## Metals Analysis

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## QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243A  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5280  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date: 09/07/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	20	1.3	2		
Antimony	2.0	.07	.087	-0.080	<2.0
Arsenic	2.0	.07	.07	0.37	<2.0
Barium	20	.04	.035	0.26	<20
Beryllium	1.0	.02	.012	-0.010	<1.0
Boron	10	.09	.2		
Cadmium	1.0	.02	.015	-0.010	<1.0
Calcium	500	.71	7.6		
Chromium	1.0	.03	.054	0.070	<1.0
Cobalt	1.0	.02	.022	-0.030	<1.0
Copper	2.5	.12	.19	0.56	<2.5
Iron	20	.64	1.6		
Lead	2.0	.07	.054	0.050	<2.0
Magnesium	500	2.7	1.5		
Manganese	1.5	.01	.054		
Molybdenum	2.0	.02	.024	0.0	<2.0
Nickel	1.0	.02	.024	-0.010	<1.0
Potassium	1000	1.8	1.3		
Selenium	2.0	.18	.23	-0.060	<2.0
Silicon		.12			
Silver	1.0	.03	.044	0.090	<1.0
Sodium	1000	1.5	4.8		
Strontium	1.0	.02	.017		
Thallium	2.0	.05	.073	-0.45	<2.0
Tin	50	.02	.41		
Titanium	1.0	.04	.079		
Vanadium	1.0	.03	.025	0.0	<1.0
Zinc	2.0	.03	.098	0.62	<2.0

Associated samples MP5280: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5280  
 Matrix Type: SOLID

Methods: SW846 6010B  
 Units: mg/kg

Prep Date: 09/07/12

Metal	C23511-6 Original MS		SpikeLot MPIR4A	% Rec	QC Limits
Aluminum					
Antimony	0.0	12.9	45.5	28.4N(a)	75-125
Arsenic	9.5	48.8	45.5	86.5	75-125
Barium	120	163	45.5	94.6	75-125
Beryllium	0.55	42.2	45.5	91.6	75-125
Boron					
Cadmium	0.091	40.9	45.5	89.8	75-125
Calcium					
Chromium	45.9	83.7	45.5	83.2	75-125
Cobalt	9.8	50.5	45.5	89.5	75-125
Copper	42.4	85.8	45.5	95.5	75-125
Iron					
Lead	30.6	71.7	45.5	90.4	75-125
Magnesium					
Manganese					
Molybdenum	0.0	38.7	45.5	85.1	75-125
Nickel	42.4	86.7	45.5	97.5	75-125
Potassium					
Selenium	1.0	39.1	45.5	83.8	75-125
Silicon					
Silver	0.091	39.4	45.5	86.5	75-125
Sodium					
Strontium					
Thallium	0.43	42.8	45.5	93.2	75-125
Tin					
Titanium					
Vanadium	51.0	93.4	45.5	93.3	75-125
Zinc	52.0	94.7	45.5	93.9	75-125

Associated samples MP5280: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested  
 (a) Spike recovery indicates possible matrix interference.

5.12  
**5**

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5280  
 Matrix Type: SOLID

Methods: SW846 6010B  
 Units: mg/kg

Prep Date: 09/07/12

Metal	C23511-6 Original	MSD	Spike/lot MPIR4A	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	0.0	12.7	43.9	29.0N(a)	1.6	20
Arsenic	9.5	46.7	43.9	84.8	4.4	20
Barium	120	177	43.9	130.0N(a)	8.2	20
Beryllium	0.55	40.5	43.9	91.1	4.1	20
Boron						
Cadmium	0.091	39.2	43.9	89.2	4.2	20
Calcium						
Chromium	45.9	81.2	43.9	80.5	3.0	20
Cobalt	9.8	48.0	43.9	87.1	5.1	20
Copper	42.4	85.2	43.9	97.6	0.7	20
Iron						
Lead	30.6	69.2	43.9	88.0	3.5	20
Magnesium						
Manganese						
Molybdenum	0.0	37.1	43.9	84.6	4.2	20
Nickel	42.4	84.9	43.9	96.9	2.1	20
Potassium						
Selenium	1.0	36.9	43.9	81.9	5.8	20
Silicon						
Silver	0.091	37.9	43.9	86.2	3.9	20
Sodium						
Strontium						
Thallium	0.43	41.6	43.9	93.9	2.8	20
Tin						
Titanium						
Vanadium	51.0	88.8	43.9	86.2	5.0	20
Zinc	52.0	89.7	43.9	86.0	5.4	20

Associated samples MP5280: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested  
 (a) Spike recovery indicates possible matrix interference.

5.12  
**5**

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5280  
 Matrix Type: SOLID

Methods: SW846 6010B  
 Units: mg/kg

Prep Date: 09/07/12

Metal	BSP Result	Spikelot MPIR4A	% Rec	QC Limits
Aluminum				
Antimony	47.8	50	95.6	80-120
Arsenic	45.9	50	91.8	80-120
Barium	48.2	50	96.4	80-120
Beryllium	47.5	50	95.0	80-120
Boron				
Cadmium	47.3	50	94.6	80-120
Calcium				
Chromium	49.8	50	99.6	80-120
Cobalt	50.5	50	101.0	80-120
Copper	49.6	50	99.2	80-120
Iron				
Lead	46.1	50	92.2	80-120
Magnesium				
Manganese				
Molybdenum	49.0	50	98.0	80-120
Nickel	45.4	50	90.8	80-120
Potassium				
Selenium	45.4	50	90.8	80-120
Silicon				
Silver	46.2	50	92.4	80-120
Sodium				
Strontium				
Thallium	47.4	50	94.8	80-120
Tin				
Titanium				
Vanadium	48.5	50	97.0	80-120
Zinc	49.9	50	99.8	80-120

Associated samples MP5280: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

5.1.3  
5

SERIAL DILUTION RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5280  
 Matrix Type: SOLID

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 09/07/12

Metal	C23511-6 Original SDL 1:5		%DIF	QC Limits
Aluminum				
Antimony	0.00	0.00	NC	0-10
Arsenic	104	117	12.5*(a)	0-10
Barium	1320	1510	14.2*(a)	0-10
Beryllium	6.00	6.30	5.0	0-10
Boron				
Cadmium	1.00	0.00	100.0(b)	0-10
Calcium				
Chromium	504	571	13.2*(a)	0-10
Cobalt	108	120	10.8*(a)	0-10
Copper	467	523	12.2*(a)	0-10
Iron				
Lead	336	338	0.4	0-10
Magnesium				
Manganese				
Molybdenum	0.00	0.00	NC	0-10
Nickel	467	451	3.5	0-10
Potassium				
Selenium	11.3	0.00	100.0(b)	0-10
Silicon				
Silver	1.00	11.3	1030.0(b)	0-10
Sodium				
Strontium				
Thallium	4.70	0.00	100.0(b)	0-10
Tin				
Titanium				
Vanadium	561	628	12.1*(a)	0-10
Zinc	572	611	6.9	0-10

Associated samples MP5280: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

(a) Serial dilution indicates possible matrix interference.

(b) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243A  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5292  
Matrix Type: SOLID

Methods: SW846 7471A  
Units: mg/kg

Prep Date: 09/11/12

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.042	.00035	.0043	0.00038	<0.042

Associated samples MP5292: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

5.2.1  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5292  
 Matrix Type: SOLID

Methods: SW846 7471A  
 Units: mg/kg

Prep Date: 09/11/12

Metal	C23550-3 Original MS	SpikeLot HGPWS1	% Rec	QC Limits
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Mercury	0.16	0.43	0.328	82.4	75-125
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Associated samples MP5292: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.2.2  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5292  
 Matrix Type: SOLID

Methods: SW846 7471A  
 Units: mg/kg

Prep Date: 09/11/12

Metal	C23550-3 Original MSD	Spikelot HGPWS1	% Rec	MSD RPD	QC Limit	
Mercury	0.16	0.44	0.317	88.2	2.3	20

Associated samples MP5292: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.2.2  
5

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5292  
 Matrix Type: SOLID

Methods: SW846 7471A  
 Units: mg/kg

Prep Date: 09/11/12

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.18	0.167	108.0	80-120

Associated samples MP5292: C23243-1A, C23243-2A, C23243-3A

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

5.2.3  
5

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243A  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
Matrix Type: LEACHATE

Methods: SW846 6010B  
Units: mg/l

Prep Date: 10/12/12

Metal	RL	IDL	MDL	MB raw	final
Aluminum	5.0	.34	.21		
Antimony	0.15	.018	.013	-0.035	<0.15
Arsenic	0.25	.018	.016	0.010	<0.25
Barium	5.0	.01	.0088	0.0025	<5.0
Beryllium	0.13	.005	.01	0.0	<0.13
Boron	2.5	.023	.016		
Cadmium	0.050	.005	.0038	0.0075	<0.050
Calcium	130	.18	.3		
Chromium	0.25	.0075	.01	-0.010	<0.25
Cobalt	0.13	.005	.0075	0.010	<0.13
Copper	0.25	.03	.075	0.078	<0.25
Iron	5.0	.16	.31		
Lead	0.25	.018	.021	-0.075	<0.25
Magnesium	130	.68	.91		
Manganese	0.38	.0025	.031		
Molybdenum	0.50	.005	.0055	0.0	<0.50
Nickel	0.13	.005	.003	0.030	<0.13
Potassium	250	.45	1.1		
Selenium	0.25	.045	.055	-0.053	<0.25
Silicon	2.5	.03	.17		
Silver	0.13	.0075	.012	-0.010	<0.13
Sodium	250	.37	.33		
Strontium	0.25	.005	.006		
Thallium	0.25	.013	.014	-0.12	<0.25
Tin	1.3	.005	.018		
Titanium	0.25	.01	.0085		
Vanadium	0.25	.0075	.0075	-0.010	<0.25
Zinc	0.50	.0075	.1	0.040	<0.50

Associated samples MP5414: C23243-3AW

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 10/12/12

Metal	C23243-11W Original MS		SpikeLot MPIR4A	% Rec	QC Limits
Aluminum					
Antimony	0.0	12.9	12.5	103.2	75-125
Arsenic	0.028	13.4	12.5	107.0	75-125
Barium	0.31	12.5	12.5	97.5	75-125
Beryllium	0.0	12.5	12.5	100.0	75-125
Boron					
Cadmium	0.010	12.9	12.5	103.1	75-125
Calcium					
Chromium	0.010	13.4	12.5	107.1	75-125
Cobalt	0.21	13.3	12.5	104.7	75-125
Copper	8.7	21.5	12.5	102.4	75-125
Iron					
Lead	0.30	12.9	12.5	100.8	75-125
Magnesium					
Manganese					
Molybdenum	0.028	13.2	12.5	105.4	75-125
Nickel	0.050	12.8	12.5	102.0	75-125
Potassium					
Selenium	0.0	13.3	12.5	106.4	75-125
Silicon					
Silver	0.0	12.8	12.5	102.4	75-125
Sodium					
Strontium					
Thallium	0.0	12.0	12.5	96.0	75-125
Tin					
Titanium					
Vanadium	0.045	13.4	12.5	106.8	75-125
Zinc	0.52	13.8	12.5	106.2	75-125

Associated samples MP5414: C23243-3AW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.3.2  
**5**

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 10/12/12

Metal	C23243-11W Original MSD		SpikeLot MPIR4A	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony	0.0	12.7	12.5	101.6	1.6	20
Arsenic	0.028	13.4	12.5	107.0	0.0	20
Barium	0.31	12.5	12.5	97.5	0.0	20
Beryllium	0.0	12.5	12.5	100.0	0.0	20
Boron						
Cadmium	0.010	12.8	12.5	102.3	0.8	20
Calcium						
Chromium	0.010	13.3	12.5	106.3	0.7	20
Cobalt	0.21	13.2	12.5	103.9	0.8	20
Copper	8.7	21.6	12.5	103.2	0.5	20
Iron						
Lead	0.30	12.6	12.5	98.4	2.4	20
Magnesium						
Manganese						
Molybdenum	0.028	13.1	12.5	104.6	0.8	20
Nickel	0.050	12.7	12.5	101.2	0.8	20
Potassium						
Selenium	0.0	13.3	12.5	106.4	0.0	20
Silicon						
Silver	0.0	12.8	12.5	102.4	0.0	20
Sodium						
Strontium						
Thallium	0.0	11.8	12.5	94.4	1.7	20
Tin						
Titanium						
Vanadium	0.045	13.3	12.5	106.0	0.7	20
Zinc	0.52	13.7	12.5	105.4	0.7	20

Associated samples MP5414: C23243-3AW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.3.2  
**5**

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: mg/l

Prep Date: 10/12/12

Metal	BSP Result	Spikelot MPIR4A	% Rec	QC Limits
Aluminum				
Antimony	12.9	12.5	103.2	80-120
Arsenic	13.3	12.5	106.4	80-120
Barium	12.4	12.5	99.2	80-120
Beryllium	12.5	12.5	100.0	80-120
Boron				
Cadmium	12.9	12.5	103.2	80-120
Calcium				
Chromium	13.4	12.5	107.2	80-120
Cobalt	13.1	12.5	104.8	80-120
Copper	12.6	12.5	100.8	80-120
Iron				
Lead	12.5	12.5	100.0	80-120
Magnesium				
Manganese				
Molybdenum	13.2	12.5	105.6	80-120
Nickel	12.9	12.5	103.2	80-120
Potassium				
Selenium	13.5	12.5	108.0	80-120
Silicon				
Silver	12.9	12.5	103.2	80-120
Sodium				
Strontium				
Thallium	12.1	12.5	96.8	80-120
Tin				
Titanium				
Vanadium	13.4	12.5	107.2	80-120
Zinc	13.8	12.5	110.4	80-120

Associated samples MP5414: C23243-3AW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5414  
 Matrix Type: LEACHATE

Methods: SW846 6010B  
 Units: ug/l

Prep Date: 10/12/12

Metal	C23243-11W Original SDL 1:5		%DIF	QC Limits
Aluminum				
Antimony	0.00	0.00	NC	0-10
Arsenic	1.10	0.00	100.0 (a)	0-10
Barium	12.3	12.5	1.6	0-10
Beryllium	0.00	0.00	NC	0-10
Boron				
Cadmium	0.400	1.90	375.0 (a)	0-10
Calcium				
Chromium	0.400	0.00	100.0 (a)	0-10
Cobalt	8.40	9.90	17.9 (a)	0-10
Copper	346	360	4.0	0-10
Iron				
Lead	11.9	7.30	38.7 (a)	0-10
Magnesium				
Manganese				
Molybdenum	1.10	2.50	127.3 (a)	0-10
Nickel	2.00	2.20	10.0	0-10
Potassium				
Selenium	0.00	0.00	NC	0-10
Silicon				
Silver	0.00	0.00	NC	0-10
Sodium				
Strontium				
Thallium	0.00	0.00	NC	0-10
Tin				
Titanium				
Vanadium	1.80	0.00	100.0 (a)	0-10
Zinc	20.8	21.6	3.8	0-10

Associated samples MP5414: C23243-3AW

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: C23243A  
Account: GAICAR - Golder Associates, Inc. Roseville  
Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5418  
Matrix Type: LEACHATE

Methods: SW846 7470A  
Units: mg/l

Prep Date: 10/13/12

Metal	RL	IDL	MDL	MB	
				raw	final
Mercury	0.0020	.000042	.0008	0.000045	<0.0020

Associated samples MP5418: C23243-3AW

Results < IDL are shown as zero for calculation purposes  
(\* ) Outside of QC limits  
(anr) Analyte not requested

5.4.1  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5418  
 Matrix Type: LEACHATE

Methods: SW846 7470A  
 Units: mg/l

Prep Date: 10/13/12

Metal	C23243-3AW Original MS	Spike HGPWS1	lot % Rec	QC Limits
Mercury	0.0	0.037	0.040 92.5	75-125

Associated samples MP5418: C23243-3AW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.4.2  
5

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5418 Methods: SW846 7470A  
 Matrix Type: LEACHATE Units: mg/l

Prep Date: 10/13/12

Metal	C23243-3AW Original MSD	Spike HGPWS1	lot % Rec	MSD RPD	QC Limit
Mercury	0.0	0.036	0.040	90.0	2.7 30

Associated samples MP5418: C23243-3AW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (N) Matrix Spike Rec. outside of QC limits  
 (anr) Analyte not requested

5.4.2  
5

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: C23243A  
 Account: GAICAR - Golder Associates, Inc. Roseville  
 Project: Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

QC Batch ID: MP5418  
 Matrix Type: LEACHATE

Methods: SW846 7470A  
 Units: mg/l

Prep Date: 10/13/12

Metal	BSP Result	Spikelot HGPWS1	% Rec	QC Limits
Mercury	0.018	0.020	90.0	85-115

Associated samples MP5418: C23243-3AW

Results < IDL are shown as zero for calculation purposes  
 (\*) Outside of QC limits  
 (anr) Analyte not requested

5.4.3  
5

Technical Report for

Golder Associates, Inc. Roseville

Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA

123-97450

Accutest Job Number: C23243X

Sampling Dates: 08/13/12 - 08/14/12

Report to:

Golder Associates  
1000 Enterprise Way Suite 190  
Roseville, CA 95678  
slofholm@golder.com

ATTN: Steve Lofholm

Total number of pages in report:



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Kesavalu M. Bagawandoss,  
Ph.D., J.D., Lab Director

Client Service contact: Nutan Kabir 408-588-0200

Certifications: CA (08258CA) AZ (AZ0762) DoD/ISO/IEC 17025:2005 (L2242)

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.  
Test results relate only to samples analyzed.

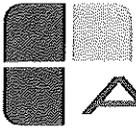
## Sample Summary

Golder Associates, Inc. Roseville

**Job No:** C23243X

Phoenix Lake Stamp Mill - Tahoe National Forest, Nevada County, CA  
 Project No: 123-97450

Sample Number	Collected		Matrix Received	Matrix		Client Sample ID
	Date	Time By		Code	Type	
C23243-1X	08/13/12	16:10 SL	08/17/12	SO	Solid	ADIT CHIP 1
C23243-2X	08/14/12	13:20 SL	08/17/12	SO	Solid	WRP-COMP-B-1
C23243-3X	08/14/12	13:10 SL	08/17/12	SO	Solid	WRP-COMP-T-1
C23243-10X	08/14/12	11:15 SL	08/17/12	SO	Soil	TDF-COMP-1
C23243-11X	08/14/12	11:20 SL	08/17/12	SO	Soil	TDF-COMP-2
C23243-12X	08/14/12	11:25 SL	08/17/12	SO	Soil	TDF-COMP-3
C23243-16X	08/14/12	11:15 SL	08/17/12	SO	Soil	TF-COMP-1
C23243-17X	08/14/12	11:20 SL	08/17/12	SO	Soil	TF-COMP-2
C23243-18X	08/14/12	11:30 SL	08/17/12	SO	Soil	TF-COMP-3
C23243-19X	08/14/12	14:00 SL	08/17/12	SO	Soil	ADIT-1-S



# ACCUTEST<sup>®</sup>

LABORATORIES

## CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131  
 (408) 588-0200 FAX: (408) 588-0201

GAICAR 4564

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest NC Job #: C <b>C23243</b>

Client / Reporting Information		Project Information	
Company Name <b>Golden Associates Inc</b>		Project Name: <b>Phoenix Lake Stamp Mill</b>	
Address <b>1000 Ester prize Way, Ste 190</b>		Street <b>Tahoe National Forest</b>	
City <b>Roseville, CA</b>	State <b>CA</b>	City <b>Nevada County, CA</b>	State
Zip <b>95678</b>			
Project Contact <b>Steve Lofholm</b>		Project # <b>123-97450</b>	
Phone # <b>(916) 275-3766</b>		EMAIL: <b>slofholm@golden.com</b>	
Sampler's Name <b>Steve Lofholm</b>		Client Purchase Order #	

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection		Sampled by	Matrix	# of bottles	Number of preserved Bottles													
		Date	Time				HC	NuOH	HNCO	H2SO4	NONE	NuH2SO4	MEOH	ENCORE						
1	Adit Chip 1	8/13/12	16:10	STL	Rock	bag														
2	WRP-COMP-B-1	8/14/12	13:20	SR	Rock	bag														
3	WRP-COMP-T-1	8/14/12	13:10	SR	Rock	bag														
4	SW-DF-1	8/14/12	11:35	STL	Water	1				1										
5	SW-DUP	8/14/12	14:20	STL	Water	1				1										
6	Background Soil	8/14/12	16:20	STL	Soil	bag														

Requested Analysis										Matrix Codes	
										WW- Wastewater	
										GW- Ground Water	
										SW- Surface Water	
										SO- Soil	
										OI-OI	
										WP-Wipe	
										LIO - Non-aqueous Liquid	
										AIR	
										GW- Drinking Water (Perchlorate Only)	
										LAB USE ONLY	
										Solid Rock Sample	
										↓	
										950ml HDPE (w/ HNO3)	
										↓	

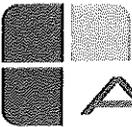
Turnaround Time (Business days)	Data Deliverable Information	Comments / Remarks
<input type="checkbox"/> 10 Day <input type="checkbox"/> 5 Day <input type="checkbox"/> 3 Day (125% markup) <input type="checkbox"/> 2 Day (150% markup) <input type="checkbox"/> 1 Day (200% markup) <input type="checkbox"/> Same Day (300% markup)	Approved By/ Date: _____ <input type="checkbox"/> Commercial "A" - Results only <input checked="" type="checkbox"/> Commercial "B" - Results with QC summaries <input type="checkbox"/> Commercial "B+" - Results, QC, and chromatograms <input type="checkbox"/> FULT1 - Level 4 data package <input type="checkbox"/> EDF for Geotracker <input type="checkbox"/> EDD Format Provide EDF Global ID: _____ Provide EDF Logcode: _____	standard     

Emergency T/A data available VIA Lablink

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by: <b>[Signature]</b>	Date Time: <b>8/17/12 16:32</b>	Received By: <b>[Signature]</b>	Relinquished By: <b>[Signature]</b>	Date Time: <b>8/17/12 1400</b>	Received By: <b>[Signature]</b>
Relinquished by:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
Relinquished by:	Date Time:	Received By:	Custody Seal #	Appropriate Bottle / Pres. Y/N	Headspace Y/N
5		5		Labels match Cod? <b>Y</b> N	Separate Receiving Check List used: <b>Y</b> N
				On Ice <b>Y</b> N	Cooler Temp. <b>7.8+0.1=7.9 °C</b>





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## CHAIN OF CUSTODY

2105 Lundy Ave, San Jose, CA 95131  
(408) 588-0200 FAX: (408) 588-0201

FED-EX Tracking #	Bottle Order Control #
Accutest Quote #	Accutest NC Job #: C <b>C23243</b>

Client / Reporting Information		Project Information	
Company Name: <b>Golden Associates Inc</b>		Project Name: <b>Phoenix Lake Stamp Mill</b>	
Address: <b>1000 Enterprise Way, Ste 190</b>		Street: <b>Tahoe National Forest</b>	
City: <b>Roseville, CA 95678</b>		City: <b>Nevada County, CA</b>	
Project Contact: <b>Steve Lofhdn</b>		Project #: <b>123-97450</b>	
Phone #: <b>916-275-3764</b>		EMAIL: <b>slofhdn@golden.com</b>	
Sampler's Name: <b>Steve Lofhdn</b>		Client Purchase Order #	

Requested Analysis	Matrix Codes
6010B (Cum 17 total Matrix)	WW- Wastewater
ABA (AGP/ANP) 60012-78-054	GW- Ground Water
DI - WET - EPA 6010B	SW- Surface Water
	SO- Soil
	OI-OI
	WP-Wipe
	LIQ - Non-aqueous Liquid
	AIR
	DW- Drinking Water (Perchlorate Only)
	LAB USE ONLY

Accutest Sample ID	Sample ID / Field Point / Point of Collection	Collection		Sampled by	Matrix	# of bottles	Number of preserved Bottles									
		Date	Time				TC	NH <sub>4</sub> N	PHOS	H <sub>2</sub> SO <sub>4</sub>	NO <sub>3</sub>	NH <sub>4</sub> SO <sub>4</sub>	MEOH	ENCORE		
13	TF-DISC-1-6	8/14/12	10:45	STL	Soil	bag										
14	TF-DISC-2-4	8/14/12	11:00	STL	Soil	bag										
15	TF-DISC-3-7	8/14/12	10:55	STL	Soil	bag										
16	TF-COMP-1	8/14/12	11:15	STL	Soil	bag										
17	TF-COMP-2	8/14/12	11:20	STL	Soil	bag	X	X	X	X	X	X	X	X	X	X
18	TF-COMP-3	8/14/12	11:30	STL	Soil	bag	X	X	X	X	X	X	X	X	X	X
19	Adit-1-S	8/14/12	14:00	STL	Soil	bag	X	X	X	X	X	X	X	X	X	X
20	Boiler-1-S	8/14/12	14:05	STL	Soil	bag	X	X	X	X	X	X	X	X	X	X

Turnaround Time (Business days)	Data Deliverable Information	Comments / Remarks
<input type="checkbox"/> 10 Day <b>standard</b> <input type="checkbox"/> 5 Day <input type="checkbox"/> 3 Day (125% markup) <input type="checkbox"/> 2 Day (150% markup) <input type="checkbox"/> 1 Day (200% markup) <input type="checkbox"/> Same Day (300% markup)	Approved By/ Date: _____ <input type="checkbox"/> Commercial "A" - Results only <input checked="" type="checkbox"/> Commercial "B" - Results with QC summaries <input type="checkbox"/> Commercial "B+" - Results, QC, and chromatograms <input type="checkbox"/> FULL1 - Level 4 data package <input type="checkbox"/> EDF for Geotracker <input type="checkbox"/> EDD Format Provide EDF Global ID: _____ Provide EDF Logcode: _____	

Emergency T/A data available VIA Lablink

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by: <b>[Signature]</b>	Date Time: <b>8/17/12 10:37</b>	Received By: <b>[Signature]</b>	Relinquished By: <b>[Signature]</b>	Date Time: <b>8/17/12 1400</b>	Received By: <b>[Signature]</b>
Relinquished by:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
Relinquished by:	Date Time:	Received By:	Custody Seal #	Appropriate Bottle/Pres. Y/N	Headspace Y/N
Relinquished by:	Date Time:	Received By:	Labels match Coc? Y/N	Separate Receiving Check List used: Y/N	Cooler Temp. <b>7.8 to 2.1 = 7.9c</b>



# Subcontract Data

September 17, 2012

## Report to:

Nutan Kabir

Accutest Mountain States, Inc.

2105 Lundy Avenue

San Jose, CA 95131

## Bill to:

Diane Theesen

Accutest Mountain States, Inc.

2105 Lundy Avenue

San Jose, CA 95131

Project ID: C23243

ACZ Project ID: L96413

Nutan Kabir:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 24, 2012. This project has been assigned to ACZ's project number, L96413. 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 L96413. 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 17, 2012. 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.



Tony Antalek has reviewed and approved this report.



Accutest Mountain States, Inc.

September 17, 2012

Project ID: C23243

ACZ Project ID: L96413

**Sample Receipt**

ACZ Laboratories, Inc. (ACZ) received 10 soil samples from Accutest Mountain States, Inc. on August 24, 2012. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L96413. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

**Holding Times**

All analyses were performed within EPA recommended holding times.

**Sample Analysis**

These samples were analyzed for inorganic parameters. The individual methods are referenced on both the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures. In addition the following has been noted with this specific project:

1. The Sulfur Sulfate determination was qualified with the ACZ 'R1' flag as the duplicate Relative Percent Difference was outside of method control limits. However, as the calculation was derived from values that were within method control limits, the data was accepted.

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: ADIT CHIP 1

ACZ Sample ID: **L96413-01**  
Date Sampled: 08/13/12 16:10  
Date Received: 08/24/12  
Sample Matrix: Soil

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	22			t CaCO3/Kt	1	5	09/14/12 16:57	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	09/14/12 16:57	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-16			t CaCO3/Kt	1	5	09/14/12 16:57	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.6		*	%	0.1	0.5	09/10/12 17:40	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.5		*	units	0.1	0.1	09/13/12 17:15	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.09	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue		0.07	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual		0.07	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.60		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		0.69		*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		0.09	B	*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:00	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 10:00	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:00	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: WRP-COMP-B-1

ACZ Sample ID: **L96413-02**  
Date Sampled: 08/14/12 13:20  
Date Received: 08/24/12  
Sample Matrix: Soil

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	4	B		t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	7			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	3			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.7		*	%	0.1	0.5	09/10/12 18:33	mss2
pH, Saturated Paste	USDA No. 60 (21A)	7.0		*	units	0.1	0.1	09/13/12 19:03	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.11		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue		0.06	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual		0.06	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		0.05	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.03	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		0.14		*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		0.11		*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:06	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 10:08	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:06	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: WRP-COMP-T-1

ACZ Sample ID: **L96413-03**  
Date Sampled: 08/14/12 13:10  
Date Received: 08/24/12  
Sample Matrix: Soil

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	27			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	12			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-15			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	1.2		*	%	0.1	0.5	09/10/12 19:00	mss2
pH, Saturated Paste	USDA No. 60 (21A)	6.4		*	units	0.1	0.1	09/13/12 20:52	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.72		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue		0.12		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual		0.12		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		0.60		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.15		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		0.87		*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		0.72		*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:13	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 10:16	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:12	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: TDF-COMP-1

ACZ Sample ID: **L96413-04**  
Date Sampled: 08/14/12 11:15  
Date Received: 08/24/12  
Sample Matrix: Soil

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	110			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	2			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-108			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.2	B	*	%	0.1	0.5	09/10/12 19:26	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.2		*	units	0.1	0.1	09/13/12 22:41	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		3.45		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		3.45		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.08	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		3.53		*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		3.45		*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:20	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 10:24	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:18	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: TDF-COMP-2

ACZ Sample ID: **L96413-05**  
Date Sampled: 08/14/12 11:20  
Date Received: 08/24/12  
Sample Matrix: Soil

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	125			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-125			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	09/10/12 19:53	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.4		*	units	0.1	0.1	09/14/12 0:30	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		3.81		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		3.81		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.20		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		4.01		*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		3.81		*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:26	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 10:32	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:24	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: TDF-COMP-3

ACZ Sample ID: **L96413-06**  
Date Sampled: 08/14/12 11:25  
Date Received: 08/24/12  
Sample Matrix: Soil

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	230			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	6			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-224			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.6		*	%	0.1	0.5	09/10/12 20:20	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.7		*	units	0.1	0.1	09/14/12 2:18	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		7.01		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		7.01		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.34		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		7.35		*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		7.01		*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:33	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 10:40	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:30	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: TF-COMP-1

ACZ Sample ID: **L96413-07**  
Date Sampled: 08/14/12 11:15  
Date Received: 08/24/12  
Sample Matrix: Soil

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	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-2			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	09/10/12 20:46	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.0		*	units	0.1	0.1	09/14/12 4:07	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.04	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		0.06	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:40	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 10:48	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:36	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: TF-COMP-2

ACZ Sample ID: **L96413-08**  
Date Sampled: 08/14/12 11:20  
Date Received: 08/24/12  
Sample Matrix: Soil

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	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	5			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	5			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.5	B	*	%	0.1	0.5	09/10/12 21:40	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.3		*	units	0.1	0.1	09/14/12 5:56	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate			U	*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:46	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 10:56	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:42	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: TF-COMP-3

ACZ Sample ID: **L96413-09**  
Date Sampled: 08/14/12 11:30  
Date Received: 08/24/12  
Sample Matrix: Soil

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	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	0.0			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-6			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3		U	*	%	0.1	0.5	09/10/12 22:06	mss2
pH, Saturated Paste	USDA No. 60 (21A)	5.2		*	units	0.1	0.1	09/14/12 7:45	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.18		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		0.20		*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		0.02	B	*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 12:53	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 11:04	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:48	nrc

**Accutest Mountain States, Inc.**

Project ID: C23243  
Sample ID: ADIT-1-S

ACZ Sample ID: **L96413-10**  
Date Sampled: 08/14/12 14:00  
Date Received: 08/24/12  
Sample Matrix: Soil

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	8			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid Neutralization Potential (calc)	M600/2-78-054 1.3	7			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Acid-Base Potential (calc on Sulfur total)	M600/2-78-054 1.3	-1			t CaCO3/Kt	1	5	09/14/12 16:58	calc
Neutralization Potential as CaCO3	M600/2-78-054 3.2.3	0.7		*	%	0.1	0.5	09/10/12 22:33	mss2
pH, Saturated Paste	USDA No. 60 (21A)	4.4		*	units	0.1	0.1	09/14/12 9:33	nrc
Sulfur Forms	M600/2-78-054 3.2.4-MOD								
Sulfur HCl Residue		0.08	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur HNO3 Residue			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Organic Residual			U	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Pyritic Sulfide		0.08	B	*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Sulfate		0.16		*	%	0.01	0.1	09/07/12 0:00	nrc
Sulfur Total		0.24		*	%	0.01	0.1	09/07/12 0:00	nrc
Total Sulfur minus Sulfate		0.08	B	*	%	0.01	0.1	09/07/12 0:00	nrc

Soil Preparation

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Air Dry at 34 Degrees C	USDA No. 1, 1972							09/05/12 13:00	brd
Crush and Pulverize (Ring & Puck)	EPA-600/2-78-054 3.1.3							09/06/12 11:12	nrc
Saturated Paste Extraction	USDA No. 60 (2)							09/13/12 8:54	nrc

**Report Header Explanations**

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

**QC Sample Types**

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

Accutest Mountain States, Inc.

ACZ Project ID: **L96413**

**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
<b>WG329854</b>													
WG329854PBS	PBS	09/10/12 16:46				U	%		-0.1	0.1			
WG329854LCSS	LCSS	09/10/12 17:13	PCN33453	100		99	%	99	80	120			
L96413-01DUP	DUP	09/10/12 18:06			.6	.55	%				8.7	20	RA

**pH, Saturated Paste** USDA No. 60 (21A)

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
<b>WG330147</b>													
WG330147ICV	ICV	09/13/12 15:26	PCN38642	4		4.03	units	100.8	97	103			
L96413-10DUP	DUP	09/14/12 13:11			4.4	4.47	units				1.6	20	

**Sulfur Organic Residual** M600/2-78-054 3.2.4-MOD

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
<b>WG329732</b>													
L96316-01DUP	DUP	09/07/12 10:16			.12	.13	%				8	20	

**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
<b>WG329732</b>													
L96316-01DUP	DUP	09/07/12 10:16			.25	.25	%				0	20	

**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
<b>WG329732</b>													
L96316-01DUP	DUP	09/07/12 10:16			.24	.19	%				23.3	20	R1

**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
<b>WG329732</b>													
WG329732PBS	PBS	09/07/12 10:00				U	%		-0.03	0.03			
WG329732LCSS	LCSS	09/07/12 10:05	PCN38838	4.07		4.24	%	104.2					
L96316-01DUP	DUP	09/07/12 10:16			.61	.57	%				6.8	20	

**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
<b>WG329732</b>													
L96316-01DUP	DUP	09/07/12 10:16			.37	.38	%				2.7	20	

Accutest Mountain States, Inc.

ACZ Project ID: **L96413**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
<b>L96413-01</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-02</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-03</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-04</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-05</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-06</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-07</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-08</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-09</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.
<b>L96413-10</b>	WG329854	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).
	WG329732	Sulfur Sulfate	M600/2-78-054 3.2.4-MOD	R1	RPD exceeded the method or laboratory acceptance limit. See Case Narrative.

**Accutest Mountain States, Inc.**

ACZ Project ID: **L96413**

Soil Analysis

The following parameters are not offered for certification or are not covered by NELAC certificate #ACZ.

Neutralization Potential as CaCO <sub>3</sub>	M600/2-78-054 3.2.3
pH, Saturated Paste	USDA No. 60 (21A)
Sulfur HCl Residue	M600/2-78-054 3.2.4-MOD
Sulfur HNO <sub>3</sub> Residue	M600/2-78-054 3.2.4-MOD
Sulfur Organic Residual	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

**Accutest Mountain States, Inc.**  
 C23243

ACZ Project ID: L96413  
 Date Received: 08/24/2012 10:30  
 Received By: ksj  
 Date Printed: 8/27/2012

**Receipt Verification**

	YES	NO	NA
1) Is a foreign soil permit included for applicable samples?			X
2) Is the Chain of Custody 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 complete and accurate?	X		
7) Were any changes made to the Chain of Custody prior to ACZ receiving the samples?		X	

**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 match for Sample ID, Date, and Time?	X		
11) For preserved bottle types, was the pH checked and within limits?			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		

**Chain of Custody Related Remarks**

**Client Contact Remarks**

**Shipping Containers**

Cooler Id	Temp (°C)	Rad (µR/Hr)	Custody Seal Intact?
NA16048	4.3	15	N/A

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

L96413

Accutest ID and PO#: C23243

2105 Lundy Avenue, San Jose, CA 95131 Phone: (408)588-0200 Fax: (408)588-0201

## Subcontract Chain of Custody

**Subcontract Lab: ACZ Laboratories**

**Date Sent: 08/23/12**

**Date Due: Standard TAT**

**Project Name: GAICAR4564**

**Project Location:**

Accutest Lab Number	Customer Sample Name/Field Point ID	Matrix	Method	Collect Date	Collect Time
C23243-1	Adit Chip 1	Solid/Rock	ABA (Acid/Base Accounting) *Pulverize/Sieve ~55 grams & send to Accutest*	08/13/12	16:10
C23243-2	WRP-COMP-B-1	Solid/Rock	ABA (Acid/Base Accounting) *Pulverize/Sieve ~55 grams & send to Accutest*	08/14/12	13:20
C23243-3	WRP-COMP-T-1	Solid/Rock	ABA (Acid/Base Accounting) *Pulverize/Sieve ~55 grams & send to Accutest*	08/14/12	13:10
C23243-10	TDF-COMP-1	Soil	ABA (Acid/Base Accounting)	08/14/12	11:15
C23243-11	TDF-COMP-2	Soil	ABA (Acid/Base Accounting)	08/14/12	11:20
C23243-12	TDF-COMP-3	Soil	ABA (Acid/Base Accounting)	08/14/12	11:25
C23243-16	TF-COMP-1	Soil	ABA (Acid/Base Accounting)	08/14/12	11:15
C23243-17	TF-COMP-2	Soil	ABA (Acid/Base Accounting)	08/14/12	11:20
C23243-18	TF-COMP-3	Soil	ABA (Acid/Base Accounting)	08/14/12	11:30
C23243-19	Adit-1-S	Soil	ABA (Acid/Base Accounting)	08/14/12	14:00

**Comments:** Please pulverize the "ROCK" Samples C23243-(1,2 & 3) and sent back ~55 grams to Accutest for STLC/Metals Analysis.

L96413 Chain of Custody

296413

Accutest ID and PO#: C23243

2105 Lundy Avenue, San Jose, CA 95131 Phone: (408)588-0200 Fax: (408)588-0201

## Subcontract Chain of Custody

**Subcontract Lab: ACZ Laboratories**

**Date Sent: 08/23/12**

**Date Due: Standard TAT**

Relinquished By: <i>ElvinK</i>	Received By: FedEx	Date: 08/23/12	Time: 15:00
Relinquished By: FedEx	Received By: <i>ALU</i>	Date: <i>8/24/12</i>	Time: <i>1000</i>
Relinquished By:	Received By:	Date:	Time:

L96413

Accutest ID and PO#: C23243

2105 Lundy Avenue, San Jose, CA 95131 Phone: (408)588-0200 Fax: (408)588-0201

## Subcontract Chain of Custody

**Subcontract Lab:** ACZ Laboratories

**Date Sent:** 08/23/12

**Date Due:** Standard TAT

**Project Name:** GAICAR4564

**Project Location:**

Accutest Lab Number	Customer Sample Name/Field Point ID	Matrix	Method	Collect Date	Collect Time
C23243-1	Adit Chip 1	Solid/Rock	ABA (Acid/Base Accounting) *Pulverize/Sieve ~55 grams & send to Accutest*	08/13/12	16:10
C23243-2	WRP-COMP-B-1	Solid/Rock	ABA (Acid/Base Accounting) *Pulverize/Sieve ~55 grams & send to Accutest*	08/14/12	13:20
C23243-3	WRP-COMP-T-1	Solid/Rock	ABA (Acid/Base Accounting) *Pulverize/Sieve ~55 grams & send to Accutest*	08/14/12	13:10
C23243-10	TDF-COMP-1	Soil	ABA (Acid/Base Accounting)	08/14/12	11:15
C23243-11	TDF-COMP-2	Soil	ABA (Acid/Base Accounting)	08/14/12	11:20
C23243-12	TDF-COMP-3	Soil	ABA (Acid/Base Accounting)	08/14/12	11:25
C23243-16	TF-COMP-1	Soil	ABA (Acid/Base Accounting)	08/14/12	11:15
C23243-17	TF-COMP-2	Soil	ABA (Acid/Base Accounting)	08/14/12	11:20
C23243-18	TF-COMP-3	Soil	ABA (Acid/Base Accounting)	08/14/12	11:30
C23243-19	Adit-1-S	Soil	ABA (Acid/Base Accounting)	08/14/12	14:00

**Comments:** Please pulverize the "ROCK" Samples C23243-(1,2 & 3) and sent back ~55 grams to Accutest for STLC/Metals Analysis.


 L96413 Chain of Custody



296413

Accutest ID and PO#: C23243

2105 Lundy Avenue, San Jose, CA 95131 Phone: (408)588-0200 Fax: (408)588-0201

## Subcontract Chain of Custody

**Subcontract Lab: ACZ Laboratories**

**Date Sent: 08/23/12**

**Date Due: Standard TAT**

Relinquished By: <i>ElvinK</i>	Received By: FedEx	Date: 08/23/12	Time: 15:00
Relinquished By: FedEx	Received By: <i>ALU</i>	Date: <i>8/24/12</i>	Time: <i>1000</i>
Relinquished By:	Received By:	Date:	Time:

# ATTACHMENT 4

TABLE 4-1A  
ALTERNATIVE 1 - OFFSITE DISPOSAL COST ESTIMATE SUMMARY  
PHOENIX LAKE MILL SITE  
TAHOE NATIONAL FOREST

ITEM	UNIT	UNIT COST	QUANTITY	EXTENDED COST	COMMENT/ REFERENCE
Submittals implementation plans	hr	\$120	200	\$24,000	Project experience
Coordination/ planning	hr	\$120	160	\$19,200	Project experience
Airlift equipment and materials to/ from the site	LS	\$66,000	1	\$66,000	See Airlift Details
Contractor non-airlift mob/demob	LS	\$20,000	1	\$20,000	Project experience
Excavate TDF material and place in super sacks	cy	\$1,332	120	\$159,882	See Offsite Disposal Details
Load boiler sand into super sacks	cy	\$1,332	50	\$66,618	See Offsite Disposal Details
Dredge sediment and dewater/filter	cy	\$1,718	80	\$137,450	See Dredge Details
Airlift tailings material to staging area	ton	\$290	375	\$108,750	See Airlift Details
Load tailings into trucks	ton	\$10	375	\$3,750	Project experience
Transport, non haz	ton	\$45	75	\$3,375	Assume boiler soil nonhaz, 1.5 ton per cubic yard, from project experience
Transport, non RCRA	ton	\$90	300	\$27,000	Impounded tailings and sediment in lake, 1.5 ton per yard, from project experience
Disposal fee, non haz	ton	\$20	75	\$1,500	Assume boiler soil nonhaz, 1.5 ton per cubic yard, from project experience
Disposal fee, non RCRA	ton	\$30	300	\$9,000	Impounded tailings and sediment in lake, 1.5 ton per yard, from project experience
Project management	%	6	\$646,525	\$38,792	USEPA 2000
Construction management	%	8	\$646,525	\$51,722	USEPA 2000
CAPITAL ESTIMATE TOTAL WITH 30% CONTINGENCY (SCOPE AND BID)				\$958,000	

Estimate includes 80 cy dredged tailings from lake, 50 cy tailings near boiler, and 120 cy impounded tailings.

hr hour

cy cubic yards

LS lump sum

EPA, 2000. "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study." OSWER Directive 9355.0-75. July. Available Online at:

<http://www.epa.gov/superfund/policy/remedy/costest.htm>

TABLE 4-1B  
ALTERNATIVE 1 - OFFSITE DISPOSAL COST ESTIMATE DETAILS  
PHOENIX LAKE MILL SITE  
TAHOE NATIONAL FOREST

ITEM	UNIT	RATE	WEIGHT (lb)	QUANTITY	TOTAL	COMMENT/ REFERENCE
Excavate TDF material by hand (4 person crew)	hr	\$210	na	240	\$50,400	5 days per week, 8 hours per day for 6 weeks - 1 cy per person-day (120 cy total) (Note 1)
Excavate Boiler soil by hand (4 person crew)	hr	\$210	na	100	\$21,000	5 days per week, 8 hours per day for 2.5 weeks - 1 cy per person-day (50 cy total) (Note 2)
Professional oversight/support (2 persons)	hr	\$240	na	240	\$57,600	
Conveyor, with generator	month	\$8,000	1,500	3	\$24,000	Scaled from contractor information 4/12/13 convo. Assume 100 feet total, 20 foot sections, 200 lbs per section, 500 lbs for generator
super sacks	ea	\$50	1,700	170	\$8,500	sacks for lake sediment included in dredge detail
hand tools	ls	\$5,000	500	1	\$5,000	
supplies (food water)	lb	\$20	2,500	2,500	\$50,000	total crew of 10 people for 10 weeks
personal protection equipment	day	\$25	2,000	400	\$10,000	total crew of 8 people for 10 weeks
TOTAL					\$226,500	
PER CUBIC YARD					\$1,332	
Helicopter soil transport	ton	\$290	na	375	\$108,750	See Airlift Details, Table 4-1D - total tonnage based on 80 cy sediment, 50 cy boiler soil, 120 cy tailings impounded = 250 x 1.5 tons per cy
Mob/Demob						
Contractor	ls	\$10,000	na	1	\$10,000	
Air lift	ls	\$66,000	na	1	\$66,000	See Airlift Details, Table 4-1D

Davis Bacon Wages:	Hourly rate	Quantity	Multiplier	Subtotal	
4 person digging crew labor rates					
laborer	\$14.35	3	3	\$129.15	
env technician	\$25.58	1	3	\$76.74	
TOTAL HOURLY RATE, 4 PERSON CREW				\$205.89	say \$210

## NOTES:

(1) Two conveyor lines moving dirt to open super sacks. Once filled, the sacks cannot be moved. Place super sacks on pontoon boats? At 120 cubic yards there will be 60, 2 yard super sacks staged onsite for heli air lift. Davis Bacon wage for trails maintenance worker is \$13.40 per hour. Multiplier of 3.0 applied to this wage.

(2) Manual digging production reference: Food and Agriculture Organization of the United Nations, accessed at:

[http://ftp.fao.org/fi/cdrom/fao\\_training/FAO\\_Training/General/x6708e/x6708e12.htm#60'a](http://ftp.fao.org/fi/cdrom/fao_training/FAO_Training/General/x6708e/x6708e12.htm#60'a)

TABLE 4-1C  
 ALTERNATIVE 1 - OFFSITE DISPOSAL COST ESTIMATE DETAILS (DREDGING)  
 PHOENIX LAKE MILL SITE  
 TAHOE NATIONAL FOREST

ITEM	UNIT	RATE	WEIGHT (lb)	QUANTITY	SUBTOTAL	COMMENT/ REFERENCE
Gas powered diaphragm pump	week	\$300	200	4	\$1,200	online rental rates
Sediment removal/ filter train with adsorber polishing	week	\$20,000	2,000	2	\$40,000	based on telecon with Rain for Rent 4/10/13 (Marty)
Water treatment media and disposal	pound	\$5	2,000	2,000	\$10,000	airlift transport included in mob/demob - daily minimum for helicopter
Geotubes, small	each	\$20	50	200	\$4,000	estimate 5% of total solids (4 cubic yards) filtered by geotube, remainder in larger filter train, 1/2 cubic foot per sock
Super sacks (air lift capable)	each	\$50	800	80	\$4,000	previous project experience
3 person crew	hr	\$200	na	320	\$64,000	See below
Supplies (food water)	lb	\$20	600	600	\$12,000	3 people for 8 weeks; 5 pounds per person per day
Sampling	each	\$150	na	15	\$2,250	assume half of the 5,000 batches must be sampled to prove water quality
SUBTOTAL					\$137,450	
PER CUBIC YARD					\$1,718	
MOB/Demob	Included in Excavation Detail or Repository Details					

SCHEDULE

Water treatment 5,000 gallons per day , 32 days or say 2 months (8 weeks)

THREE-PERSON DREDGING CREW, DAVIS BACON LABOR RATES ESTIMATE

THREE-PERSON DREDGING CREW, DAVIS BACON 3 pers	Hourly rate	quantity	multiplier	subtotal	
laborer	\$14.35	1	3	\$43.05	
env technician	\$25.58	1	3	\$76.74	
water treatment operator	\$26.17	1	3	\$78.51	
TOTAL HOURLY RATE, 3 PERSON CREW				\$198.30	say \$200

TABLE 4-1D  
ALTERNATIVE 1 - OFFSITE DISPOSAL COST ESTIMATE DETAILS (AIRLIFT)  
PHOENIX LAKE MILL SITE  
TAHOE NATIONAL FOREST

ITEM	QUANTITY / PRICE	COMMENT/ REFERENCE
Time per round trip (min)	15	Quote from Siller Helicopter, 4/10/13
Trips per hour	4	Calculated
Cubic yards per trip	4	two, 2-cy sacks
Tons per trip (1.5 ton per cy)	6	Calculated
Tons per hour	24	Calculated
Cost per hour	\$6,500	Quote from Siller Helicopter, 4/10/13
Total tons	275	Estimated from volumes
Total hours	11.5	Calculated
Subtotal	\$74,000	Calculated
Mob/ Demob	\$7,000	Quote from Siller Helicopter, 4/10/13
Total cost	\$81,000	Calculated
Tonnage cost	\$290	

## MOBILIZATION ESTIMATES - AIRLIFT

Item	Rate	Unit	Quantity	Subtotal
<b>Offsite Disposal Mobilization to lake</b>				
Heli mobilization	\$7,000	ls	1	\$7,000
Air time	\$6,500	hr	4	\$26,000
subtotal				\$33,000
<b>Demobilization</b>				
Heli mobilization	\$7,000	ls	1	\$7,000
Air time	\$6,500	hr	4	\$26,000
subtotal				\$33,000
<b>TOTAL MOB/ DEMOB</b>				<b>\$66,000</b>
<b>Maintenance scenario mob/demob</b>				
Mobilization				
Heli mobilization	\$7,000	ls	1	\$7,000
Air time	\$6,500	hr	1	\$6,500
				\$13,500
Demobilization				
Heli mobilization	\$7,000	ls	1	\$7,000
Air time	\$6,500	hr	1	\$6,500
				\$13,500
<b>TOTAL MAINTENANCE MOB/DEMOB</b>				<b>\$27,000</b>
<b>Maintenance scenario mob/demob - 30 year</b>				
Mobilization				
Heli mobilization	\$7,000	ls	1	\$7,000
Air time	\$6,500	hr	2	\$13,000
				\$20,000
Demobilization				
Heli mobilization	\$7,000	ls	1	\$7,000
Air time	\$6,500	hr	2	\$13,000
				\$20,000
<b>TOTAL 30-YEAR MAINTENANCE MOB/DEMOB</b>				<b>\$40,000</b>

TABLE 4-2A  
 ALTERNATIVE 2 - OPTION 1, ONE ONSITE REPOSITORY COST ESTIMATE SUMMARY  
 PHOENIX LAKE MILL SITE  
 TAHOE NATIONAL FOREST

ITEM	UNIT	UNIT COST	QUANTITY	EXTENDED COST	COMMENT
Submittals implementation plans	hr	\$120	120	\$14,400	Project experience
Airlift equipment and materials to/ from the site	LS	\$66,000	1	\$66,000	See Airlift Details, Table 4-1D
Contractor non-airlift mob/demob	LS	\$10,000	1	\$10,000	Project experience
Coordination	hr	\$120	120	\$14,400	Project experience
Dredge sediment and dewater/filter	cy	\$1,718	80	\$137,450	See Dredge Details, Table 4-1C
Load boiler sand onto tailings impoundment	cy	\$1,332	50	\$66,618	See Offsite Disposal Details, Table 4-1B
Install liner	SF	\$2	4000	\$8,000	Project experience; adjusted for small size and remote location
Intall anchor trench	LF	\$60	200	\$12,000	Project experience; adjusted for rocky conditions; assume liner base perimeter is 60 by 40
Install drain around liner	LF	\$80	200	\$16,000	Project experience; adjusted for rocky conditions; assume liner base perimeter is 60 by 40
Purchase cover soil and deliver to staging area	ton	\$30	225	\$6,750	Project experience; assume 1 feet thick over area of liner, 4,000 sf = 150 cy; 1.5 ton/cy == 225 ton
Airlift cover soil to site	ton	\$290	225	\$65,250	Project experience; impounded tailings and sediment in lake, 1.5 ton per yard
Place natural rock armoring on cover soil	cy	\$40	150	\$6,000	Rock available onsite
Project management	LS	8	\$422,868	\$33,800	USEPA 2000
Remedial Design	LS	--	--	\$45,000	Engineering judgment
Construction Management	LS	--	--	\$35,000	Engineering judgment
CAPITAL ESTIMATE TOTAL WITH 30% CONTINGENCY (SCOPE AND BID)				\$698,000	

EPA, 2000. "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study." OSWER Directive 9355.0-75. July. Available Online at:

<http://www.epa.gov/superfund/policy/remedy/costest.htm>

TABLE 4-2B  
ALTERNATIVE 2 - OPTION 2, TWO ONSITE REPOSITORIES COST ESTIMATE SUMMARY  
PHOENIX LAKE MILL SITE  
TAHOE NATIONAL FOREST

ITEM	UNIT	UNIT COST	QUANTITY	EXTENDED COST	COMMENT
Submittals implementation plans	hr	\$120	120	\$14,400	Project experience
Airlift equipment and materials to/ from the site	LS	\$66,000	1	\$66,000	See Airlift Details, Table 4-1D
Contractor non-airlift mob/demob	LS	\$10,000	1	\$10,000	Project experience
Coordination	hr	\$120	120	\$14,400	Project experience
Dredge sediment and dewater/filter	cy	\$1,718	80	\$137,450	See Dredge Details, Table 4-1C
Load boiler sand onto tailings impoundment	cy	\$1,332	0	\$0	Leave boiler soil and cap
Install liner tailing impoundment	SF	\$2	2,700	\$5,400	Project experience; adjusted for small size and remote location. Reduced by percentage of boiler soil
Intall anchor trench - impoundment	LF	\$60	160	\$9,600	Project experience
Install drain around liner - impoundment	LF	\$80	160	\$12,800	Project experience; adjusted for rocky conditions. Perimeter reduced by percentage of boiler soil
Install liner boiler soil	SF	\$2	1,300	\$2,600	Project experience; adjusted for small size and remote location.
Intall anchor trench - boiler soil	LF	\$60	150	\$9,000	Project experience; base of liner is 25 by 50 with overlap
Install drain around liner - boiler soil	LF	\$80	150	\$12,000	Project experience; adjusted for rocky conditions; base of liner is 25 by 50 with overlap
Purchase cover soil and deliver to staging area	ton	\$30	225	\$6,750	Assume 1 feet thick over area of liner, 4,000 sf = 150 cy; 1.5 ton/cy = 225 ton
Airlift cover soil to site	ton	\$290	225	\$65,250	Impounded tailings and sediment in lake, 1.5 ton per yard, see Airlift Details, Table 4-1D
Place natural rock armoring on cover soil	cy	\$40	150	\$6,000	Rock available onsite
Project management	%	8	371,650	\$29,700	USEPA 2000
Remedial design	%	15	371,650	\$55,700	USEPA 2000
Construction management	%	10	371,650	\$37,200	USEPA 2000
CAPITAL ESTIMATE TOTAL WITH 30% CONTINGENCY (SCOPE AND BID)				\$643,000	

EPA, 2000. "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study." OSWER Directive 9355.0-75. July. Available Online at:

<http://www.epa.gov/superfund/policy/remedy/costest.htm>

TABLE 4-2C  
 ALTERNATIVE 2 - ONSITE REPOSITORY O&M COST ESTIMATE DETAILS  
 PHOENIX LAKE MILL SITE  
 TAHOE NATIONAL FOREST

ITEM	UNIT	UNIT COST	QUANTITY	EXTENDED COST	SUBTOTAL	COMMENT
<b>O&amp;M AND MONITORING</b>						
<i>Periodic inspection, documentation</i>						
Environmental professional	hr	\$120	16	\$1,920		
Project management	%	10	\$1,920	\$192		Estimated at 10% of O&M cost element
Subtotal with 30% Contingency (scope and bid)					\$2,746	
<i>Periodic maintenance</i>						
Contractor mob/demob	LS	\$2,000	1	\$2,000		
4 person crew	hr	\$210	28	\$5,880		
Project management	%	10	\$7,880	\$788		Estimated at 10% of O&M cost element (USEPA 2000)
Construction management	%	15	\$7,880	\$1,182		Estimated at 15% of O&M cost element (USEPA 2000)
Subtotal with 30% contingency					\$12,805	
<b>ASSUMED MAINTENANCE:</b>						
Assume inspection and documentation performed in year 1 and every third year thereafter						
Assume periodic maintenance includes 2 days work for crew of 4 to repair cover soil and armoring (2, 8-hour days plus half day in half day out and half day prep). Performed in the fourth year and every sixth year thereafter.						

TABLE 4-2D  
 ALTERNATIVE 2 - ONSITE REPOSITORY O&M PRESENT VALUE  
 PHOENIX LAKE MILL SITE  
 TAHOE NATIONAL FOREST

YEAR	PERIODIC MAINTENANCE AND REPAIR	PERIODIC INSPECTION	DISCOUNT FACTOR (1)	ACTUAL MAINTENANCE AND REPAIR COST	ACTUAL INSPECTION COST
1	\$0	\$2,746	0.9814		\$2,694.41
4	\$12,805	\$2,746	0.9275	\$11,876	\$2,546.48
7	\$0	\$2,746	0.8766		\$2,406.68
10	\$12,805	\$2,746	0.8284	\$10,608	\$2,274.55
13	\$0	\$2,746	0.7830		\$2,149.68
16	\$12,805	\$2,746	0.7400	\$9,475	\$2,031.66
19	\$0	\$2,746	0.6993		\$1,920.12
22	\$12,805	\$2,746	0.6609	\$8,463	\$1,814.70
25	\$0	\$2,746	0.6247		\$1,715.07
28	\$12,805	\$2,746	0.5904	\$7,560	\$1,620.91
30	\$0	\$0	0.5686	\$0	\$0.00
TOTAL	\$64,000	\$27,500		\$48,000	\$21,200

Note

(1) Discount factor =  $1/(1+i)^n$  where  $i$  is the interest rate and  $n$  is the number of years. Calculated using interest rate of 1.9 percent consistent with United States Office of Management and Budget, Circular A-94 Appendix C, Discount Rates for Cost-effectiveness, Lease Purchase, and Related Analyses. Revised December 2013. Accessed at:

[http://www.whitehouse.gov/omb/circulars\\_a094/a94\\_appx-c](http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c)