SUNSET MINE & MILL SITE

Mt. Baker-Snoqualmie National Forest
Snohomish County, Washington

PRE-REMOVAL ACTION INSPECTION & MONITORING REPORT

July 2011

Prepared For:
U.S. Forest Service

MSE
Millennium Science & Engineering, Inc.

PRE-REMOVAL ACTION INSPECTION & MONITORING REPORT

Sunset Mine and Mill Site
Mt. Baker-Snoqualmie National Forest, Washington **July 2011**

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1.0 INTRODUCTION

Millennium Science and Engineering, Inc. (MSE) was contracted by the United States Department of Agriculture, Forest Service (Forest Service) to conduct pre-removal sampling and data gathering activities at the Sunset Mine in the Mt. Baker-Snoqualmie National Forest. The pre-removal inspection and data gathering activities consisted of two site inspections and sampling events in June and October 2010. Field activities consisted of:

- Inspecting the Site and gathering data;
- Completing a limited topographical survey; and
- Collecting surface water, sediment, waste rock, concrete, and soil samples.

This report presents results of pre-removal inspection and sample results.

- Photographs are provided in Attachment A.
- Field forms are provided in Attachment B.
- Laboratory results are provided in Attachment C.

1.1 Purpose and Objectives

The purpose of the pre-removal inspection and monitoring was to: (1) evaluate current Site conditions, (2) augment data collected during the Site Inspection (SI) performed by Cascade Earth Sciences (CES 2005), and (3) address data gaps that were identified in the Sunset Mine Engineering Evaluation/Cost Analysis (EE/CA) prepared by MSE in February 2008, and are summarized in Table 1. Objectives of the pre-removal inspection and data gathering activities were to:

- Establish statistically valid background soil concentrations for key analytes.
- More adequately characterize waste rock pile WR-5 and soil around the mill site.
- Characterize the concrete mill foundation to determine the proper method of disposal.
- Characterize soil in the proposed alternate repository location to determine whether it is consistent with background soil and suitable for use as cover borrow material.
- Collect additional topographic data to identify the 100-year and 500-year flood plain extents at the mill site.
- Collect additional surface water and sediment samples during: (1) high-flow conditions in the spring and (2) low-flow conditions in the fall.

1.2 Site Description

The Sunset Mine is an inactive copper mine located about 5 miles northeast of Index, Washington, in the Mount Baker-Snoqualmie National Forest (Figure 1). Site features include:

- One open ventilation raise;
- Two large caved stopes;
- One open adit (Adit 1) with discharge;
- Two collapsed adits (Adits 2 and 3), including one with discharge (Adit 2);
- Six waste rock piles; and
- Concrete mill foundation and miscellaneous debris.

The project site is located along a moderate to steep, heavily forested slope adjacent to Trout Creek at an elevation of about 1,300 feet (Figure 2). Trout Creek is a perennial tributary stream to the North Fork Skykomish River (NFSR). Three waste rock piles (WR-1, WR-2, and WR-3) are located close to Trout

Creek near the mill foundation, and three other waste rock piles (WR-4, WR-5, and WR-6) are located about 600 to 900 feet up the above the mill site hillside. The total estimated volume of waste rock is about 1,970 cubic yards. Although the SI reported no tailings at the Site, it's likely that tailings from the mill were deposited in Trout Creek.

Adit 2 is about 300 feet east of the mill foundation, Adit 1 is located up the hill and adjacent to waste rock pile WR-6, and Adit 3 is near waste rock pile WR-4. Water discharges from Adit 2 at 150 to 450 gallons per minute (gpm) and flows west about 500 feet to Trout Creek. Water also discharges from Adit 1 but the rate was not reported in the SI and the flow was reported to infiltrate into the ground about 50 feet from the adit.

The open ventilation raise and west caved stope are about 150 feet north/northwest of waste rock pile WR-4, and the east caved stope is on the northern side of waste rock pile WR-5. The caved stopes and ventilation raise pose extreme physical hazards at the site.

CES conducted sampling at the Site in June 2004 and completed an SI of the Site in July 2005. Samples collected by CES included:

- Mine waste – 14 samples;
- Background soil – 3 samples;
- Surface water – 8 samples, including 1 background and 2 from the NFSR;
- Pore water – 4 samples co-located with 4 surface water sample locations, including 1 background and 1 from the NFSR;
- Sediment – 4 samples co-located with 4 surface water sample locations, including 1 background and 1 from the NFSR;
- Plant tissue – 6 samples co-located with soil and mine waste samples, including 3 background; and
- Benthic macroinvertebrates – samples collected from pool and riffle habitats along stream reaches at 4 locations.

Analytical results of the surface water samples indicated elevated concentrations of metals, particularly in the adit discharges. Surface water, pore water, and sediment samples from Trout Creek and the NFSR also contained slightly elevated concentrations of metals, most notably arsenic, barium, copper and nickel. However, there are reportedly several mines and associated disturbances upstream of the site within the Trout Creek watershed that may be contributing to the elevated metals concentrations. The SI recommended an additional surface water sampling event to evaluate water quality during low flow conditions. The mine waste samples also contained elevated concentrations of several metals and acid base accounting (ABA) results indicate a potential for acid generation.

MSE completed a streamlined human health and ecological risk assessment (SRA) of the Site in May 2006 (MSE 2006). Results of the SRA indicated significant risks to both human and ecological receptors, primarily from exposure to arsenic, copper, and other metals in mine waste, soil, sediment and surface water at the site. The highest risk is from exposure to the mine waste for terrestrial receptors. There is also risk to aquatic receptors from exposure to surface water and sediment, particularly from exposure to copper. Bull trout, Coho salmon, and Chinook salmon (federally threatened species) have been documented in Trout Creek and the NFSR, and some sensitive species, such as the Oregon spotted frog or western toad, may inhabit areas around the adit discharges.

MSE completed an EE/CA of the Site in February 2008 (MSE 2008). The EE/CA evaluated four Removal Action alternatives for the Site and identified a preferred alternative based on effectiveness,

implementability and cost. The preferred Removal Action alternative consists of excavating mine waste above a risk-based cleanup level and on-site disposal in a constructed repository, and conducting a pilot treatability study for passively treating the lower adit discharge.

2.0 PRE-REMOVAL INSPECTION & MONITORING ACTIVITIES

The pre-removal inspection activities and sampling methodology are described in the Sunset Mine and Mill Site Pre-removal Inspection Field Operations Plan (FOP, MSE 2010). The data gathering and pre-removal monitoring consisted of two field events:

- **Event 1** was conducted in early summer (June 15 & 16) to characterize high-flow conditions. Event 1 consisted of:
  - Inspecting access to the Site,
  - Inspecting the alternate ridge repository location,
  - Inspecting the general Site conditions, and
  - Collecting mill site soil, waste rock, concrete, surface water, sediment, background soil, and borrow soil samples.
- **Event 2** was conducted in early fall (October 12) to characterize low-flow conditions and consisted of:
  - Collecting surface water and sediment samples, and
  - Completing a limited topographical survey.

2.1 Access Road Inspection

MSE inspected the existing Site access road to determine improvements that will be required to provide temporary access to the Site for heavy equipment:

- The Index-Galena Road (County Road 63) is washed out and barricaded approximately 0.1 mile past the intersection with the access road leading to the Site (FR 6320). Limited space on both sides of the road may make it difficult for large trucks and equipment to turn around.
- FR 6320 appeared to have been recently graded from the intersection with the Index-Galena Road to the Site (~1.5 miles) and several rocked drain dips were installed.
  - The single lane road requires a high-clearance, 4-wheel drive vehicle.
  - There are several areas where vehicle turnouts could be constructed to accommodate heavy equipment.
  - There is an unlocked metal gate near the intersection with the Index-Galena Road that could be used to limit public access to the Site during a Removal Action.
- The spur road leading to the alternate ridge repository location (~1,000 feet) is blocked by several large boulders.
  - The road is heavily eroded and impassable by a 4-wheel drive vehicle.
  - Significant improvements would be required for vehicular access.

2.2 Alternate Repository Location Inspection

The field team inspected the proposed alternate repository location to assess access, ensure conditions are suitable for a repository, and determine whether there appears to be sufficient and suitable borrow soil available within the repository footprint.

- Access is heavily eroded and would require significant improvement to accommodate heavy equipment and haul trucks.

- The repository area consists of a relatively long (~600 feet) and narrow (~100 to 200 feet) ridge.
  - The area appears to have been cleared and worked within the last 20 to 30 years and there are very few old growth trees.
  - The area may be an old logging landing or possibly a mineral exploration trench.
  - There is evidence of a road cut in a knob on the west end of the ridge and rocky material characteristic of road base was observed under the forest duff in several areas.
  - The area is densely covered with brush and the ground is covered with a thick layer of duff. Soil under the duff consists of areas of: (1) gray, coarse, sandy gravel with some blue and green coloring (road base, possibly imported mine waste rock containing copper or local sulfidic exploration debris); (2) small pockets of highly plastic, brown clay; and (3) native brown, sandy silt loam.
  - Soil samples were collected from area and consisted of one sample of the gray, rocky material, and one sample of the native silty loam material. The samples and results are discussed below in Sections 2.4.6 and 3.6.
- The volume of borrow soil available within the repository footprint may be limited if much of the native material was stripped when the area was originally cleared.
- A second alternate repository location was identified northwest of the intersection of the spur road and FR 6320.
  - The area is on a gently sloping bench above FR 6320. The area appears to be undisturbed and is not visible from the road.
  - The available area is about 200 feet wide and 300 feet long, and would be easily accessible from FR 6320.
  - There are several old growth trees that would need to be removed to accommodate a repository.
  - The area is covered by downfall and a thick layer (3 to 12 inches) of duff.
  - Soil in the area consists of dark brown, sandy silt loam. A sample was collected as discussed below in Section 2.4.6.
  - There is no evidence of surface water flow or erosion in the area.

2.3 General Site Inspection

MSE inspected the overall Site to: (1) evaluate current Site conditions and identify any changes that may affect a Removal Action, and (2) indentify potential staging areas for equipment and materials.

- Site conditions were consistent with previous Site visits and descriptions provided in the SI report (CES 2005).
- There is evidence of significant Site use by the public.
  - The mill site is littered with cans, bottles, and other garbage, and clay pigeons and shell casings from target practice.
  - Multiple groups of people were encountered at the Site during both sampling events.
  - The trail to the upper working is marked and worn from heavy use.
- Potential staging areas for equipment and materials include: (1) along FR 6320 at the intersection with the Galena-Index Road, and (2) at the mill site.

2.4 Sample Collection and Analysis

MSE collected additional site characterization and baseline samples to augment data collected during the SI by CES in June 2004. The sampling methodology is described in the Sunset Mine and Mill Site Pre-removal Inspection FOP (MSE 2010). The samples collected and corresponding laboratory analyses are summarized in Tables 2 and 3. The sampling locations are shown on Figures 1 and 2. Only one field marker was found that identified an SI sampling location (TC-SW2); all other sampling locations were

selected based on the descriptions, photographs, and figures presented in the SI report (CES 2005). Global positioning system (GPS) coordinates of the sampling locations could not be obtained because of the narrow canyon and dense overhead canopy. The sample collection activities for each event are summarized below and described in the following sections.

- **Sampling Event 1 (June 15, 2010):**
  - Three surface water and sediment samples from the SI sampling locations on Trout Creek (TC-SW1, TC-SW2, and TC-SW3).
  - Three surface water samples from the SI sampling locations on the discharges from Adits 1 and 2 (SM-AS1, SM-AS2-1 and SM-AS2-2).
  - Three soil samples from the mill site between waste rock piles WR-1 and WR-3 (where the discharge from Adit 2 flows).
  - Two waste rock samples from waste rock pile WR-5 at the upper workings.
  - One composite bulk concrete sample from the mill foundation
  - Seven background soil samples from undisturbed areas around the Site.
  - Three borrow soil samples from the alternative repository/cover borrow source footprints.
- **Sampling Event 2 (October 12, 2010):**
  - Three surface water and sediment samples from locations on Trout Creek where samples were collected during the SI (TC-SW1, TC-SW2 & TC-SW3).
  - Three surface water samples from the two adit discharges where samples were collected during the SI (SM-AS1, SM-AS2-1 & SM-AS2-2).

2.4.1 Surface Water

Surface water samples were collected from the three locations on Trout Creek that were sampled during the SI (see Figures 1 and 2), and from the three adit discharge locations that were sampled during the SI (see Figure 2):

- The water samples were collected by submerging a laboratory supplied, 500-mL, wide-mouth, plastic bottle directly into the stream
- Sample volumes requiring dissolved analyses were filtered in the field using a portable hand pump, disposable Tygon tubing, and disposable 0.45-micron filters.
- Nitric acid was added to those samples requiring preservation.
- Field parameters were measured in-situ during sample collection and the flow was measured at each sampling location where possible. Hazardous flow conditions prevented measuring stream flows in Trout Creek during the sample collection. The lower adit discharge flow rates were measures using a timed-volumetric method and the upper adit flow discharge rate was visually estimated.
- The samples were submitted to SVL Analytical Laboratory (SVL) for the analyses summarized in Tables 2 and 3.
- At each sample location, the sample information and field parameters were documented on a Water Sample Collection Record (Appendix B) and the sample location was flagged and photographed.

2.4.2 Sediment

Sediment sampling consisted of collecting composite grab samples co-located with the three surface water sample locations on Trout Creek (Figures 1 and 2):

- At each sampling location, the sediment sample was collected immediately following collection of the surface water sample.

- The sediment samples consisted of a composite of material from the channel bottom and sides. Very little sediment was present in the rocky bottom of the stream channel.
- Gravel and organic media were removed and the samples were placed in laboratory supplied, 500-mL, wide-mouth glass jars. The samples were decanted so that the bottle was filled with as much sediment as possible.
- The samples were submitted to SVL for the analyses summarized in Tables 2 and 3.
- The samples were documented on a Sediment Sample Collection Record (Appendix B).

2.4.3 Mill Site Soil and Waste Rock

Soil samples were collected from three locations at the mill site between waste rock piles WR-1 and WR-3, and from two locations on waste rock pile WR-5 (Figure 2):

- At each sample location, one grab sample consisting of approximately 500 g of material was collected from a depth of 3 to 6 inches utilizing disposable, single-use hand trowels.
- The samples were placed in 1-gallon Ziploc bags and submitted to SVL for the analyses summarized in Table 2.
- The general soil characteristics were documented at time of sample collection and the sample location was flagged.
- Each sample was documented on a Soil Sample Collection Record (Appendix B).

2.4.4 Mill Foundation Concrete

One bulk concrete sample consisting of approximately 500 g of material composited from several locations was collected from the concrete mill foundation:

- The sample was placed into a 1-gallon Ziploc bag and submitted to SVL for the analyses summarized in Table 2.
- The sample was documented on a Sample Collection Record (Appendix B).

2.4.5 Background Soil

Background soil samples were collected from seven areas around the Site that do not appear to have been disturbed by mining or other activities:

- The samples were selected from areas believed to be representative of background conditions for the Site.
- At each sample location, one grab sample consisting of approximately 500 g of material was collected from a depth of 3 to 6 inches utilizing disposable, single-use hand trowels.
- The samples were placed in 1-gallon Ziploc bags and submitted to SVL for the analyses summarized in Table 2.
- The general soil characteristics were documented at time of sample collection and the sample location was flagged.
- Each sample was documented on a Soil Sample Collection Record (Appendix B).

2.4.6 Borrow Soil

Borrow soil samples were collected from two areas in the proposed alternate repository location on the ridge and one area in the second alternate repository location identified along FR 6320:

- The samples were collected from areas believed to be representative of potential borrow soil within the repository footprint.
- At each sample location, two grab samples were collected from a depth of 3 to 6 inches utilizing disposable, single-use hand trowels.
- Each sample consisted of approximately 500 g of material.
- One sample from each location was submitted to SVL for the metals analyses summarized in Table 2, and the other sample was submitted to Western Laboratories, Inc. (Western) for the agronomics analyses summarized in Table 2.
- The general soil characteristics were documented at time of sample collection and the sample location was flagged and photographed.
- Each sample was documented on a Soil Sample Collection Record (Appendix B).

2.5 Topographical Survey

A local surveying contractor (Harmsen and Associates, Inc.) completed a limited topographical survey of the mill site and Trout Creek to augment topographical data collected during the SI. The overall objective of the survey was to provide the topographical data needed to delineate the 100-year and 500-year flood plains in the general area of the mill site. Because of the extremely dense vegetation and relatively flat topography in the area around and upstream of the mill site, the survey focused on establishing accurate transects of the stream channel and flood plain at several key locations rather than generating a contour map of the general area.

- An established benchmark could not be located at the Site; therefore, a temporary benchmark was established at the mill site using a GPS instrument. The corners of the concrete mill foundation were surveyed to tie in with topographic data collected by CES during the SI.
- Six transects were established across Trout Creek and up both stream banks. The transect locations are shown on Figure 3 and cross-sections generated from the transects are shown on Figures 4 and 5.
- The transects extend up both stream banks above the flood plain.
- Some channel bottom elevations across Trout Creek were estimated in areas where the water depth and flow were too hazardous to wade.
- The transects identified the stream banks, water elevation, and location of the access road.
- The transect at the mill site extended to the top of the terraced concrete foundation.

3.0 SAMPLE RESULTS

Analytical results of samples collected during the pre-removal inspection and the corresponding field parameters are summarized in Tables 4 through 9 and discussed below by media type. Results of samples collected during by CES during the SI are included for comparison; however, the discussion is limited to results of the analytical parameters used for the samples collected by MSE. A more comprehensive discussion on results of the samples collected during the SI can be found in the SI Report (CES 2005). The laboratory reports are provided in Attachment C.

3.1 Surface Water

Analytical results of the surface water samples are discussed below and summarized in Table 4.

- The 6 surface water sample locations included 1 background sample location on Trout Creek upstream of the Site (TC-SW1). Because of limited data for characterizing background

conditions at the Site, the reported background concentrations should be considered representative of "apparent background" conditions.

- The background samples had pH values ranging from 6.8 to 7.1, and hardness values ranging from 5.9 to7.1 milligrams per liter (mg/L) calcium carbonate ($CaCO_3$).
- Barium was the only contaminant of interest (COI) detected in the background samples collected by MSE; iron and lead were detected in the single background sample collected by CES during the SI.
- Barium exceeded U.S. Environmental Protection Agency's (EPA) recommended chronic ambient water quality criteria for protection of aquatic life (4 micrograms per liter [µg/L]) in the Fall sample collected by MSE.
- Lead exceeded the Washington State and EPA ecological screening criteria of 0.12 µg/L in the sample collected by CES during the SI.
- Arsenic and lead were not detected in the background samples collected by MSE; however, the laboratory reporting limits (RL) were above some screening criteria. These constituents could be present at concentrations above the screening criteria but this cannot be verified using standard laboratory techniques.
- Results of the background samples collected by MSE were generally consistent results of samples collected by CES during the SI.
- The flow in Trout Creek could not be measured because of hazardous flow conditions.

- The highest concentration of most COIs were in samples of the adit discharges, particularly from the lower adit (Adit 2).
  - The adit discharge samples had pH values ranging from 7.3 to 7.9, and hardness values ranging from 24.4 to 71.7 mg/L $CaCO_3$.
  - Arsenic concentrations in samples from both adits exceeded the Washington State and EPA human health screening criteria of 0.018 µg/L. Iron in the lower adit discharge sample (SM-AS2-2) collected by CES during the SI also exceeded human health screening criteria.
  - Barium and copper in samples from both adit discharges exceeded ecological screening criteria. Lead in the lower adit discharge sample (SM-AS2-2) collected by CES during the SI also exceeded ecological screening criteria.
  - Lead was not detected in the samples collected by MSE; however, the laboratory RL was above the ecological screening criteria. Lead could be present at concentrations above the screening criteria but this cannot be verified using standard laboratory techniques.
  - Results of the adit discharge samples collected by MSE were generally consistent results of samples collected by CES during the SI.
  - Flow from the upper adit (SM-AS1) ranged from 0.01 to 0.06 cubic feet per second (cfs), and flow from the lower adit (SM-AS2) ranged from 0.43 to 0.71 cfs.
- Results of the downstream samples from Trout Creek (TC-SW2 & TC-SW3) were generally consistent with results of the upstream (i.e. background) samples (TC-SW1). There is no significant change in COI concentrations in Trout Creek downstream of the Site.
  - The samples had pH values ranging from 6.8 to 7.1 and hardness values ranging from 6 to 7.4 mg/L $CaCO_3$.
  - Arsenic in samples collected by CES during the SI at both locations exceeded the Washington State and EPA human health screening criteria of 0.018 µg/L.
  - Barium concentrations in samples collected by MSE in the Fall from both locations exceeded EPA's recommended chronic ambient water quality criteria for protection of aquatic life (84 mg/L).
  - Arsenic and lead were not detected in the samples collected by MSE; however, the laboratory RLs were above screening criteria. These COIs could be present at concentrations above the screening criteria but this cannot be verified using standard laboratory techniques.
  - Results of the samples collected by MSE were generally consistent results of samples collected by CES during the SI.

- The flow in Trout Creek could not be measured because of hazardous flow conditions.

3.2 Sediment

Analytical results of the sediment samples are discussed below and summarized in Table 5.

- Sediment samples were co-located with the three surface water sample locations on Trout Creek.
- Background samples were collected from only one sample location (TC-SS1); therefore, the reported background concentrations should be considered representative of "apparent background" conditions.
  - Arsenic was detected at concentrations exceeding human health and ecological screening criteria.
  - Copper and nickel were both detected at concentrations exceeding ecological screening criteria.
- Results of the downstream samples from Trout Creek (TC-SS2 & TC-SS3) were slightly elevated compare to results of the upstream (i.e. background) samples (TC-SS1).
  - Arsenic was detected at concentrations exceeding human health and ecological screening criteria.
  - Copper and nickel were both detected at concentrations exceeding ecological screening criteria.
  - The concentrations of all three COIs were slightly in the Fall samples compared to the Spring samples.

3.3 Mill Site Soil and Waste Rock

Analytical results of soil samples collected from the mill site and waste rock pile WR-5 are discussed below and summarized in Table 6.

- Several COIs in the mill site soil samples exceeded human health and/or ecological screening criteria:
  - Arsenic and vanadium concentrations in all three samples exceeded EPA Industrial Soil Regional Screening Levels (RSL, EPA 2009).
  - Aluminum, copper, mercury, lead and vanadium concentrations in all three samples exceeded ecological screening criteria. Zinc concentrations in two of the three samples also exceeded ecological screening criteria.
  - Cadmium, antimony and selenium were not detected in the three samples; however, the RLs for antimony and selenium were above some ecological screening criteria. These COIs could be present at concentrations above the screening criteria but this cannot be verified using standard laboratory techniques.
- Several COIs in the two soil samples from waste rock pile WR-5 exceeded human health and/or ecological screening criteria:
  - Arsenic, copper and vanadium concentrations exceeded EPA Industrial Soil RSLs (EPA 2009).
  - Aluminum, cobalt, copper, mercury, lead, silver, vanadium and zinc concentrations in both samples exceeded ecological screening criteria. Manganese concentrations in one of the two samples also exceeded ecological screening criteria.
  - Antimony and selenium were not detected in either sample; however, the RLs were above some ecological screening criteria; therefore, these COIs could be present at concentrations above the screening criteria but this cannot be verified using standard laboratory techniques.

3.4 Mill Foundation Concrete

Analytical results of the mill foundation concrete sample are discussed below and summarized in Table 7.

- The single sample consisted of a composite of concrete chips taken from several areas of the foundation.
- The sample was submitted for toxicity characteristic leaching procedure (TCLP) analysis of the eight Resource Conservation and Recovery Act (RCRA) metals: arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury.
- No COIs were detected in the sample.

3.5 Background Soil

Analytical results of the background soil samples are discussed below and summarized in Table 8. The results were combined with sample results of the three samples collected during the SI to calculate the 90 percent Upper Confidence Limits (UCL90) for background concentrations as required by the Washington Department of Ecology (WDOE) for determining closure criteria (WDOE .

- Several COIs in the background soil samples exceeded human health and/or ecological screening criteria
  - The arsenic UCL90 concentration exceeded the Washington Department of Ecology (WDOE) Model Toxics Control Act (MTCA) Method A Industrial Soil Cleanup Level (WDOE 2010b), as did one of ten samples. All ten samples and the UCL90 exceeded the EPA Industrial Soil RSL (EPA 2009). The UCL90 concentrations of vanadium also exceeded the EPA Industrial Soil RSLs (EPA 2009).
  - The UCL90 concentrations for aluminum, arsenic, barium, cadmium, copper, lead, vanadium and zinc also exceeded ecological screening criteria.

3.6 Borrow Soil

Analytical results of soil samples collected from the proposed alternate repository areas are discussed below and summarized in Table 9.

- Three samples were collected from the proposed alternate repository location (upper) and one sample was collected from the second alternate repository location (lower) discovered by MSE during the pre-removal inspection.
  - The three samples collected in the upper location consisted of two samples of the gray, rocky road base material (SM-BOR1 & SM-BOR2), and one sample of the native silt loam (SM-BOR3). All three samples were sent to SVL for metals analysis. However, only two samples (SM-BOR1 and SM-BOR3) were sent to Western for agronomics analysis because of the similarities in samples SM-BOR1 and SM-BOR2.
  - The sample collected from the lower area consisted of silty loam and was submitted to Western for agronomics analysis. Because the area appeared to be undisturbed by mining activities, a split sample was collected as a background soil sample (SM-BGS10) and submitted to SVL for metals analysis.
- Several COIs in the borrow soil samples exceeded human health and/or ecological screening criteria:
  - Arsenic and vanadium concentrations exceeded human health screening criteria.
  - Aluminum, arsenic, barium, copper, lead, vanadium and zinc concentrations exceeded ecological screening criteria.

  - Cadmium was not detected in the three samples.
  - Samples of the gray, rocky road base material contained the highest concentrations of most COIs, particularly arsenic, copper, and zinc. Most COI concentrations were well above average background values suggesting the material is either of mine waste used as road base or material remaining from exploration trenches in mineralized rock. The arsenic concentration (53.3 milligrams per kilogram [mg/kg]) in sample SM-BOR1 actually exceeded the proposed cleanup level of 41 mg/kg identified in the EE/CA (MSE 2008).
- Agronomics results, provided in Attachment C, indicate less than ideal soil conditions for promoting plant growth.
  - The soils range from moderately basic to moderately acidic.
  - The soils are notably deficient in potassium, magnesium and born.
  - Cation exchange capacity (CEC) values ranged from 13 to 15 milli-equivalents per 100 grams.
  - Suggested nutrient additions included lime, dolomite and magnesium.

4.0 FLOOD PLAIN DELINEATION

The Trout Creek 100- and 500-year flood plains were estimated for the Site using the stream channel cross-sections developed from the topographic survey transects and precipitation data for the area.

- Due to the proximity of the Site to the Pacific Ocean and location on the west side of the Cascades, a type-1A storm event was used as opposed to the standard type-2 event. The type-1A storm produces more intense precipitation at the beginning of the storm compared to the standard type-2 event and typically results in a more conservative (i.e. higher) estimate of peak flood flows.
- The 100-year precipitation amount was obtained from the National Oceanic and Atmospheric Administration (NOAA) precipitation frequency atlas, which shows the 100-year event precipitation amount to be 9 inches.
- The 500-year event precipitation amount was not on record for the Pacific Northwest region according to NOAA; therefore, the 500-year precipitation amount was estimated using data from the 2 to 100-year events and a logarithmic scale.
  - The 2, 4, 10, 25, 50, and 100-year events precipitation amounts were graphed and a logarithmic trend line was formed from the known data points. This trend line was then used to generate an equation to calculate the 500-year event precipitation amount.
  - Based on the logarithmic trend line, the 500-year event precipitation amount was calculated to be 10.5 inches.
- A hydrologic analysis was performed using AutoCAD Civil 3-D software. This program is based upon the Soil Conservation Service (SCS) method, otherwise known as “Technical Release 55” (TR-55). This method takes into account watershed size, precipitation amount, intensity, soil properties, vegetation, slope, slope length, and time of concentration.
  - Data obtained from the modeling software provided the volume of flows that could be expected in Trout Creek during the 100- and 500-year precipitation events. The 100-year and 500-year flows were estimated to be 12,100 cfs and 16,800 cfs, respectively.
  - Manning’s equation was used to determine to the flow depths and velocities at each transect based on the estimated flow volumes. A weighted Manning’s n-value was used assuming a value of 0.50 for the stream channel and a value of 0.80 for flow outside the stream bank (i.e. in the flood plain through brush and trees). The channel bed slope was estimated based on the elevations differences between each transect and ranged from 4.3 to 7.4 percent.
  - The estimated 100- and 500-year flood plain extents are shown on Figures 4 and 5.
    - Based on the results, during both the 100- and 500-year events, the stream would leave the channel the stream at the east end of the Site upstream of the old wooden bridge.

- As the stream channel deepens (cross-sections 3 & 4), the channel has the capacity to contain both events; however, a portion of the flow that exited the channel at cross-sections 1 and 2 may continue down the access road creating a new channel that converges back with the stream around the mill site.
- The south edge of the mill site appears to be in the 500-year flood plain; however, the mill foundation and proposed repository appear to be about 3 feet above the flood plain.
- The area between the mill site and Adit 2 also appears to be above the 500-year flood plain and should be a suitable area for a passive treatment system for the adit discharge.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions based on results of the pre-removal inspection and monitoring are summarized below, along with any relevant recommendations:

- Site conditions are generally consistent with those reported in the SI and EE/CA.
  - The access road leading to the Site (FR 6320) has been recently improved.
  - There is evidence of frequent public use of the Site.
- The analytical results of samples collected during the two pre-removal monitoring events provide a more comprehensive data set for the Site and a better understanding of key characteristics.
  - A background soil data set consisting of 10 samples now provides a more statistically valid representation of actual background concentrations for key analytes. The new UCL90 for arsenic was calculated to be 20.7 mg/kg, well below the proposed cleanup level of 41 mg/kg identified in the EE/CA (MSE 2008).
  - Results of the two soil samples collected from waste rock pile WR-5 are generally consistent with the other waste rock samples. Copper concentrations in the two samples were 12,300 mg/kg and 43,300 mg/kg, well below the concentration of 883,000 mg/kg reported for a single sample collected from WR-5 during the SI. This suggests that the previous result was an anomaly and should be disregarded; however, the maximum detected concentration of 43,300 mg/kg still exceeds the copper cleanup level of 36,573 mg/kg identified in the EE/CA.
  - Results of the three soil samples collected around the mill site indicate COI concentrations generally consistent with background values. None of the samples exceeded cleanup levels identified in the EE/CA (MSE 2008).
  - TCLP results of the mill foundation concrete did not exceed any RCRA disposal limits and the concrete is not considered to be a hazardous waste.
  - Results of surface water and sediment results augment data collected during the SI. Results of surface water samples collected during the Fall event indicate that hardness and most COI concentrations increase in the fall during low-flow conditions.
- The proposed alternate repository location appears to have been disturbed by earlier activities that may or may not have been associated with the mine.
  - Results of a soil sample from the area are generally consistent with mineralized rock either locally derived or possibly transported from the mine site; arsenic (53.3 mg/kg) exceeds the arsenic cleanup level of 41 mg/kg identified in the EE/CA (MSE 2008).
  - While the area appears to be suitable for constructing a repository, the quantity of suitable growth medium and cover borrow soil may be limited.
  - The access road would require significant work to repair erosion damage.
  - A second alternate location was identified on a gently sloping bench above FR 6320, near the intersection with the road leading to the proposed alternate repository location. The area is closer to the mill site and easily accessible. However, the area contains several old growth trees that would need to be removed.
  - Results of the borrow soil samples collected from the proposed alternate repository location identified one material with elevated COI concentrations that does not appear to be native and

my consist of mine waste, and one material consistent with background soil. The suspected mine waste material contains arsenic concentrations above the arsenic cleanup level proposed in the EE/CA (MSE 2008) and would not be suitable for use as a cover material. The other material is more suitable for use as cover borrow material and would require minimal amendments. A third sample collected from the second alternate repository location is also consistent with background soil and would be suitable for use as a cover borrow material.

- The topographic survey established six transects across Trout Creek and the Site.
  - Stream channel cross-sections developed from the transects were used in a hydrologic analysis to determine the approximate extents of the 100- and 500-year flood plains.
  - Based on the results of the analysis, during extreme events, Trout Creek is likely to overflow the bank upstream of the Site during both events. While the flood flows return to the defined channel before the stream reaches the mill site, some flow may continue down the access road creating a new channel.
  - The toe of the proposed repository at the mill site was determined to be about 3 feet above the 500-year flood plain.
- The EE/CA recommend using Viromine media to passively treat the discharge from Adit 2 (MSE 2008). However, the availability of Viromine media has recently come into question and it may no longer be manufactured. MSE recommends continuing to evaluate the adit discharge water quality and identifying other potentially viable media that could be used to passively treat the discharge. MSE also recommends pilot testing any treatment media before constructing a full-scale treatment system.

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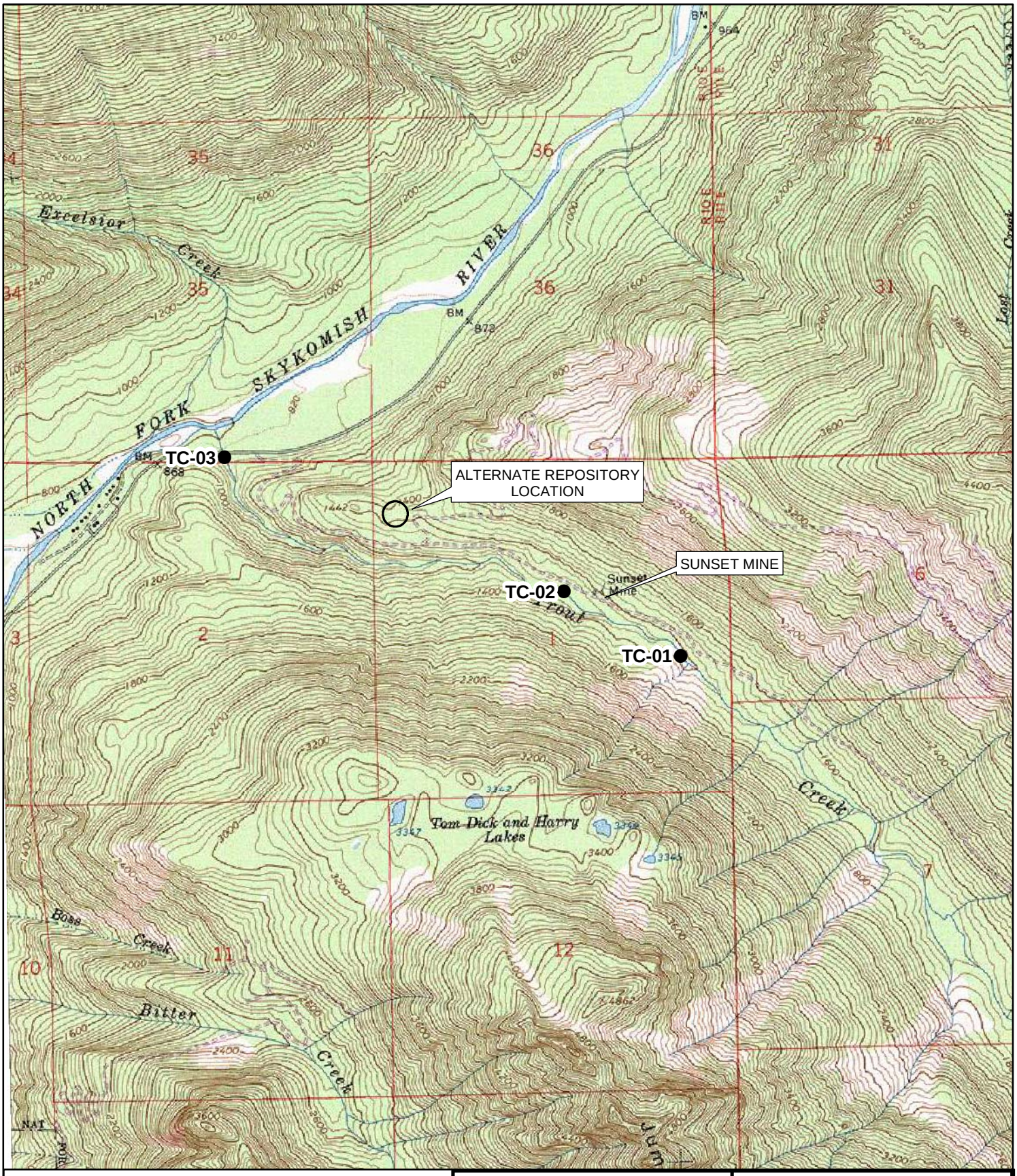
FIGURES



Legend

● Aquatic Sampling Station

REFERENCE: U.S.G.S. 7.5 MINUTE QUADRANGLE, BARING, WASHINGTON 1969

SCALE
0 500 1,000 2,000 3,000 4,000 Feet

N

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OVERALL SITE MAP

SUNSET MINE
MT. BAKER SNOQUALMIE NATIONAL FOREST, WASHINGTON

	05-19-10	MSE	FIGURE 1

:J\mse\puett\wash_mines\sunset_FIGURE1.mxd 05.19.10

LEGEND

- Estimated Contour Elevation
- Road/Trail - Location Approximate
- Stream
- Open Adit
- Collapsed Adit
- Mill Site Soil/Waste Rock Sample Location
- Background Soil Sample Location
- Surface Water & Sediment Sample Location
- Waste Rock Pile

100 0 100

SCALE: 1 unit = 100 feet

N

WEST STOPE
1704'

BGS-6

VENTILATION RAISE
1700'

EAST STOPE
1714'

ADIT 3
1619'

BGS-5

WR4

WR-4

WR5-3

WR5-2

WR-5

1700

1600

1500

1400

BGS-4

UPPER
WORKINGS

TRAIL

Conceptual Road to
Access Upper Workings

MAIN
WORKING AREA

ADIT 1
1559'

SM-AS1

ADIT 1 DRAINAGE

Estimated Contour Elevations
Based on USGS 7.5 Minute Quadrangle

WR-6

BGS-7

1430
1420
1410
1400
1390
1380
1370
1440

CONCRETE MILL
FOUNDATION

ADIT 2
1399'

BGS-8
BGS-9
BGS-10

~200 - 3000'

WR-2

SM-AS2-1

FR 6320
(LOCATION
APPROXIMATE)

WR-1

S4

S5

S6

ADIT 2 DISCHARGE

~1000'

TC-SW3

TC-SW2

SM-AS2-2

TOP OF BANK
TROUT CREEK

WR-3

Approximate
location

TC-SW1

Base Map Source: Site Inspection, Cascade Earth Sciences, 2005

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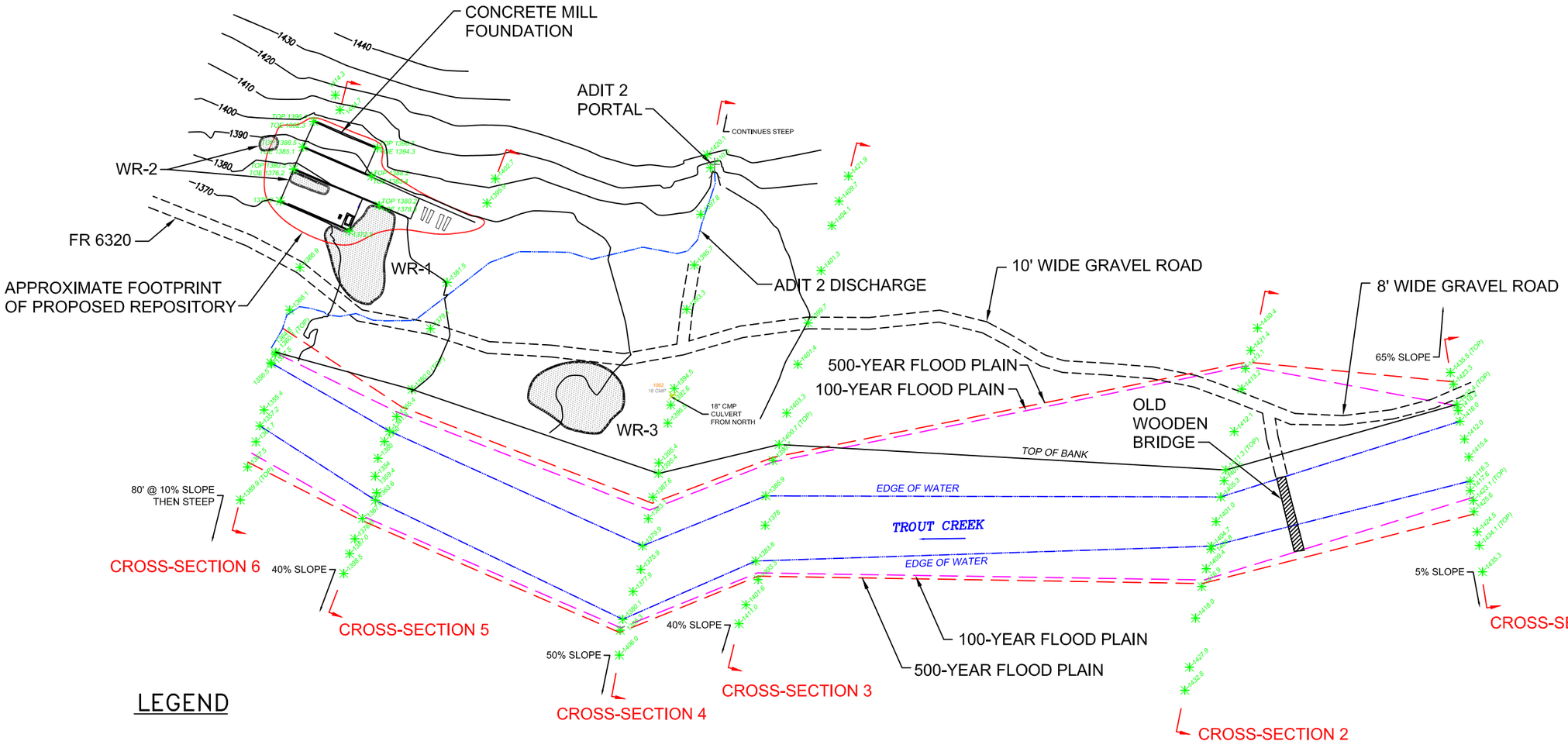
Sunset Mine
Mill Site Features & Sampling Locations

B2473G	figure2.dwg	Dec 2010	Figure 2



LEGEND

- Road
- Water
- Open Adit
- Waste Rock Pile
- Survey Point
- 100-Year Flood Plain Extent
- 500-Year Flood Plain Extent

APPROXIMATE FLOOD PLAIN EXTENTS

Scale: 1" = 100'

N

100 0 100

SCALE: 1 unit = 100 feet

Source: Base topo from Site Inspection, Cascade Earth Sciences, 2005; Survey data from Harmsen & Associates, Jim McDaniel, October 2010.

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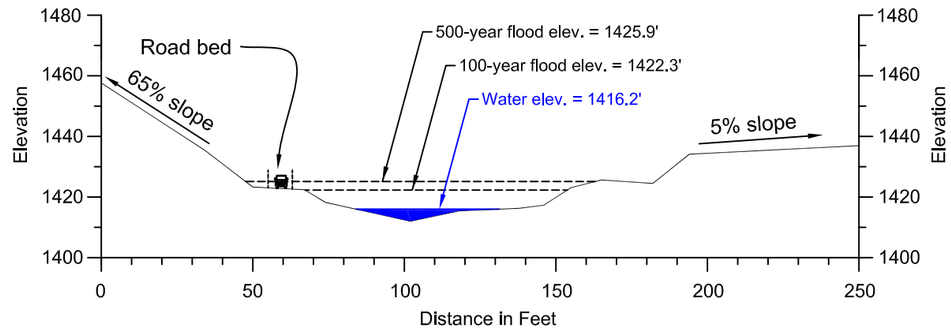
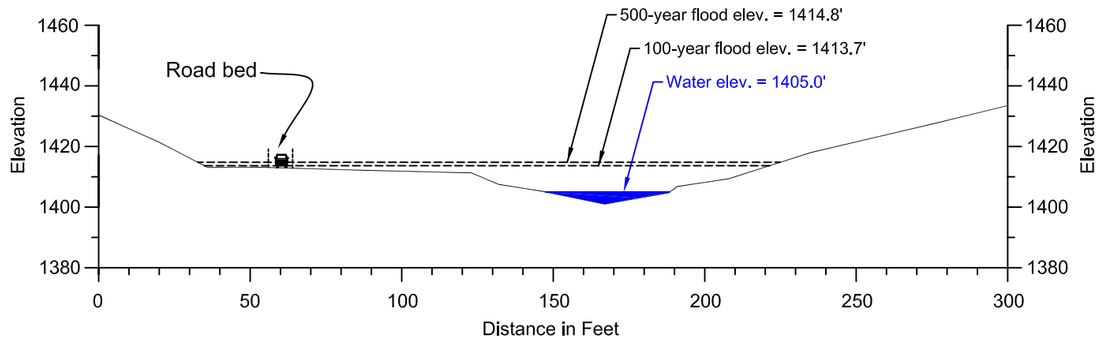
Sunset Mine
100-Year & 500-Year Flood Plain Extents

B2473G	figure3.dwg	Dec 2010	Figure 3



TROUT CREEK CROSS-SECTION 1

Scale: 1" = 50'



TROUT CREEK CROSS-SECTION 2

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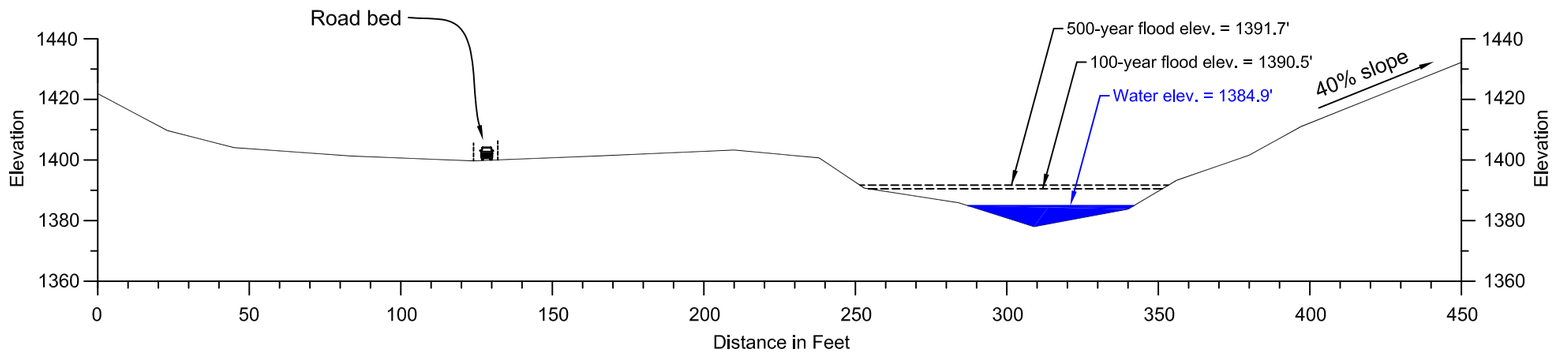

TROUT CREEK CROSS-SECTION 3

Scale: 1" = 50'

SOURCE: Survey data generated by Harmsen & Associates, Inc.,
James B. McDaniel, Professional Land Surveyor, WA# 21359, October 2010.

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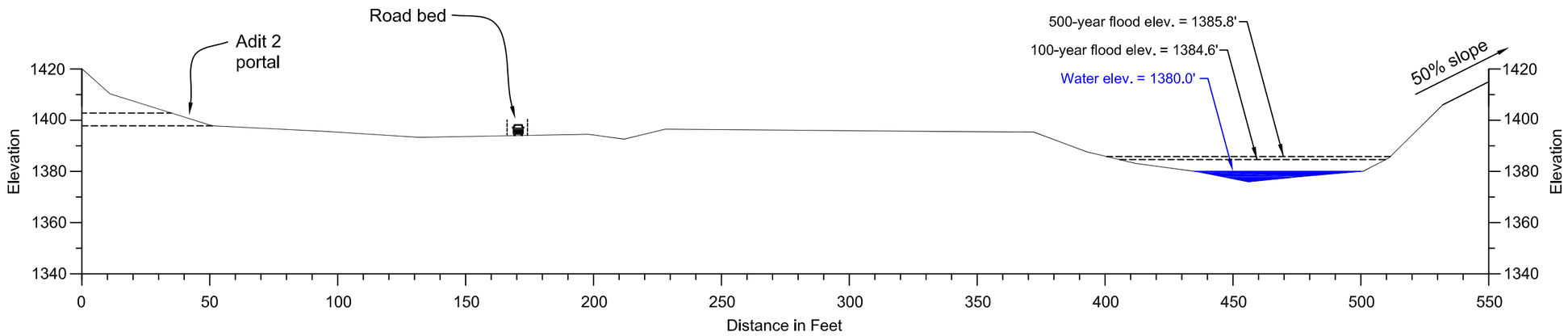
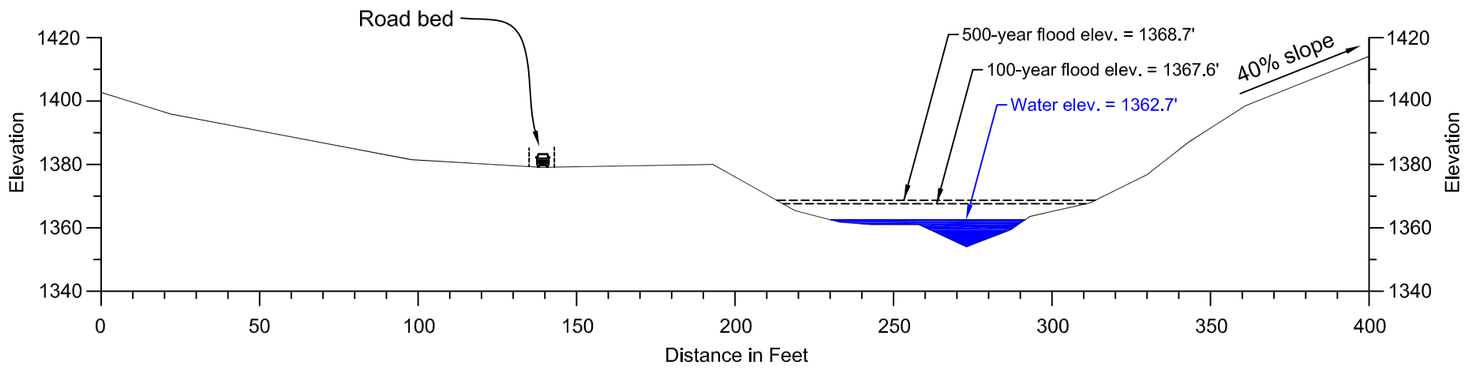
Sunset Mine
Trout Creek
Cross-Sections 1-3

B2473G	figure4.dwg	Dec 2010	Figure 4



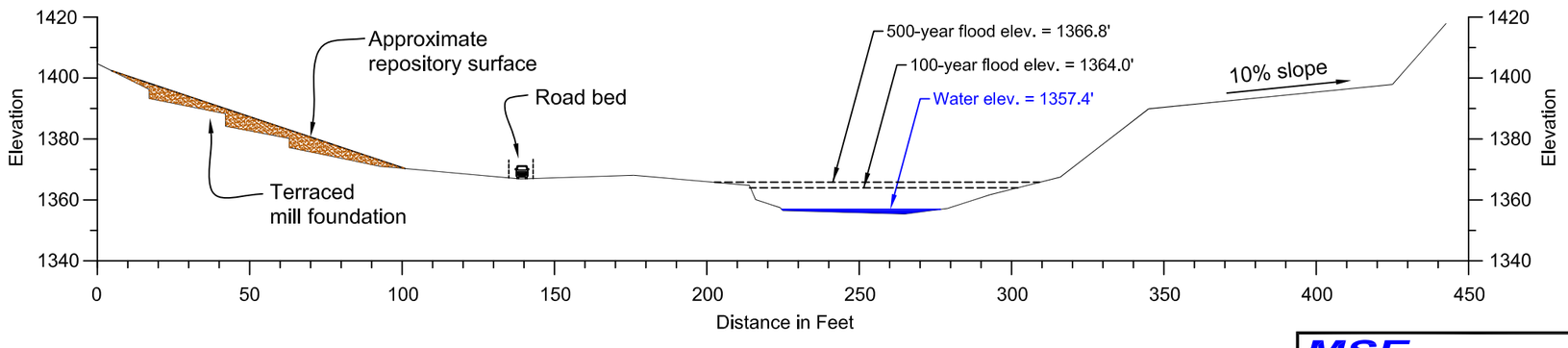
TROUT CREEK CROSS-SECTION 4

Scale: 1" = 50'



TROUT CREEK CROSS-SECTION 5

Scale: 1" = 50'



TROUT CREEK CROSS-SECTION 6

Scale: 1" = 50'

SOURCE: Survey data generated by Harmsen & Associates, Inc.,
James B. McDaniel, Professional Land Surveyor, WA# 21359, October 2010.

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Sunset Mine
Trout Creek
Cross-Sections 4-6

B2473G	figure5.dwg	Dec 2010	Figure 5

TABLES

Table 1. Data Gap Summary

Data Gap	Issue(s)
Lack of sufficient background soil samples	• Only three background soil samples were collected during the SI. Washington's Model Toxic Control Act (MTCA) recommends a minimum of 10 samples for establishing statistically valid background concentrations. • True background concentrations could exceed cleanup levels established in the streamlined risk assessment, which could thwart removal efforts.
Limited seasonal flow and surface water quality data	• Surface water sampling during the SI was limited to a single event during high flows in the spring. • A better understanding of the temporal flow variations and water quality characteristics of the adit discharges are critical to properly design and adequately size a water quality treatment system. • A better understanding of the temporal flow ranges for Trout Creek is also critical to determine peak flow elevations and delineate flood plain extents.
Only a single sample from waste rock pile WR-5	• Only one sample was collected from waste rock pile WR-5 during the SI. Results of the sample were consistent with copper ore (i.e., 88.3% copper). • The sample results are questionable and it's unlikely to be truly representative of the 300 cubic yards of waste rock in the pile.
Suspected contaminated soil near the mill site	• No soil samples were collected from the area between waste rock pile WR-1 and Trout Creek. • Metals in surface water flowing over this area increase significantly indicating exposure to mine waste or contaminated soil.
Concrete mill foundation not characterized	• No samples were collected from the mill foundation during the SI. • The concrete may contain elevated leachable concentrations of metals and be considered a hazardous waste.
Minimal topographic data	• Topography generated during the SI covers only a limited portion of the mill site and surrounding area. • Difficult to identify the floodplain extents and prepare accurate engineered designs for a Removal Action.
Potential presence of T&E amphibian species at the Site	• The SI report indicates threatened and endangered (T&E) amphibian species may be present around the adits and along flows discharging from the adits. • If present, may require special measures to accommodate the sensitive species during a Removal Action. • **To be addressed by the Forest Service.**

Table 2. Pre-removal Monitoring Samples and Analyses – Event 1

Medium	Description	Number of Samples	Laboratory Analysis[a]	Field Parameters
Background Soil	Single grab samples from seven different locations representative of background conditions	7	▪ Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Description
Borrow Soil	Two grab samples from the proposed alternate repository location and one from the second alternate repository location	3	▪ Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn ▪ Agronomics[b]	Description
Mill Site Soil	Three locations between waste rock piles WR-1 & WR-3	3	▪ Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se, V, Zn	Description
Waste Rock	Two locations on waste rock pile WR-5	2		
Concrete	Composite sample from concrete mill foundation	1	▪ TCLP metals: Ag, As, Ba, Cd, Cr, Hg, Pb, Se	None
Surface Water	Three locations on Trout Creek	3	▪ Total and dissolved metals: As, Ba, Cu, Fe, Pb ▪ Hardness (Ca & Mg), pH, TDS, TSS, Sulfate	pH, temp., DO, EC, ORP/E_h
	Three locations on the two adit discharges	3	▪ Total and dissolved metals: As, Ba, Cu, Fe, Pb; K, Na ▪ Hardness (Ca & Mg), pH, TDS, TSS, Sulfate, Chloride, Alkalinity	
Sediment	Co-located with the three surface water sample locations on Trout Creek	3	▪ Metals: As, Cu, Ni	Description
QA/QC	Field duplicate of background soil sample	1	▪ Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Description
	Field duplicate of surface water sample	1	▪ Total and dissolved metals: As, Ba, Cu, Fe, Pb ▪ Hardness, pH, TDS, TSS, Sulfate	
	Field duplicate of sediment sample	1	▪ Metals: As, Cu, Ni	
	Field blank	1	▪ Total and dissolved metals: As, Ba, Cu, Fe, Pb	

Notes:
DO = Dissolved oxygen
EC = Electrical conductivity
MS/MSD = Matrix spike/matrix spike duplicate
ORP = Oxygen reduction potential
QA/QC = Quality assurance/quality control
TDS = Total dissolved solids
Temp = Temperature
TSS = Total suspended solids

[a]Analytical parameters based on the results of samples collected during the Site Inspection (CES 2005) and the parameters that exceeded human health and ecological risk screening criteria.

[b]Agronomic parameters include pH, texture, soluble salts (ECe), cation exchange capacity (CEC), percent lime, percent organic matter, nitrates, ammonium, phosphorus, potassium, calcium, magnesium, sodium, zinc, iron, manganese, copper, sulfates, and boron.

Table 3. Pre-removal Monitoring Samples and Analyses – Event 2

Medium	Description	Number of Samples	Laboratory Analysis[(a)]	Field Parameters
Surface Water	Three locations on Trout Creek	3	▪ Total and dissolved metals: As, Ba, Cu, Fe, Pb ▪ Hardness (Ca & Mg) , pH, TDS, TSS, Sulfate	pH, temp., DO, EC, ORP/E_h
	Three locations on the two adit discharges	3	▪ Total and dissolved metals: As, Ba, Cu, Fe, Pb; K, Na ▪ Hardness (Ca & Mg), pH, TDS, TSS, Sulfate, Chloride, Alkalinity	
Sediment	Co-located with the three surface water sample locations on Trout Creek	3	▪ Metals: As, Cu, Ni	Description
QA/QC	Field duplicate of surface water sample	1	▪ Total and dissolved metals: As, Ba, Cu, Fe, Pb ▪ Hardness, pH, TDS, TSS, Sulfate	Description
	Field duplicate of sediment sample	1	▪ Metals: As, Cu, Ni	
	Field blank	1	▪ Total and dissolved metals: As, Ba, Cu, Fe, Pb	

Notes:
DO = Dissolved oxygen
EC = Electrical conductivity
MS/MSD = Matrix spike/matrix spike duplicate
ORP = Oxygen reduction potential
QA/QC = Quality assurance/quality control

[a]Analytical parameters based on the results of samples collected during the Site Inspection (CES 2005) and the parameters that exceeded human health and ecological risk screening criteria.

Table 4. Surface Water Sample Analytical Results Summary
Sunset Mine and Mill Site Pre-Removal Inspection and Monitoring

Sample Location		Date Collected	Hardness (mg/L)	Analyte Concentration (µg/L)									
				As		Ba		Cu		Fe		Pb	
				Tot	Diss	Tot	Diss	Tot	Diss	Tot	Diss	Tot	Diss
Background:													
Trout Creek	TC-SW1	6/22/2004	6	*0.2*	*0.2*	3	3	*0.50*	*0.50*	20	20	0.4	0.4
		6/16/2010	5.9	*1.50*	*1.50*	3.4	2.8	*0.50*	*0.50*	*30*	*30.0*	*1.50*	*1.50*
		10/12/2010	7.1	*1.50*	*1.50*	4.7	4.5	*0.50*	*0.50*	*30*	*30.0*	*1.50*	*1.50*
Site:													
Trout Creek	TC-SW2	6/22/2004	6	0.2	0.2	3	3	1	1	*5*	*5*	0.1	0.1
		6/16/2010	6.5	*1.50*	*1.50*	3.6	2.8	1.12	1.08	*30*	*30.0*	*1.50*	*1.50*
		10/12/2010	7.4	*1.50*	*1.50*	4.9	4.9	1.09	*0.50*	*30*	*30.0*	*1.50*	*1.50*
	TC-SW3	6/23/2004	6	0.2	0.2	3	3	0.8	0.8	10	10	*0.05*	*0.05*
		6/16/2010	6.3	*1.50*	*1.50*	3.6	3.0	1.02	*0.50*	*30*	*30.0*	*1.50*	*1.50*
		10/12/2010	7.4	*1.50*	*1.50*	4.8	4.9	1.13	1.04	*30*	*30*	*1.50*	*1.50*
Upper Adit Discharge	SM-AS1	6/22/2004	29	0.7	0.7	11	11	126	126	*5*	*5*	*0.05*	*0.05*
		6/15/2010	24.4	*1.50*	*1.50*	9.4	8.8	92.8	49.5	*30*	*30*	*1.50*	*1.50*
		10/12/2010	43.7	*1.50*	*1.50*	17.4	18.1	170	102	*30*	*30*	*1.50*	*1.50*
Lower Adit Discharge	SM-AS2-1 (at portal)	6/22/2004	61	3.1	3.1	18	18	90.7	90.7	10	10	*0.05*	*0.05*
		6/16/2010	56.5	3.12	*1.50*	15.4	15.0	101	67.5	*30*	*30.0*	*1.50*	*1.50*
		10/12/2010	69.2	3.96	3.32	19.8	20.6	111	73.3	*30*	*30.0*	*1.50*	*1.50*
	SM-AS2-2 (at Trout Creek)	6/22/2004	61	3.3	3.3	20	20	212	212	380	380	2.8	2.8
		6/16/2010	57.7	3.21	*1.50*	16.4	15	130	71.8	115	*30.0*	*1.50*	*1.50*
		10/12/2010	71.7	3.73	4.95	20.5	20.2	93.6	57.9	*30*	*30.0*	*1.50*	*1.50*
minimum (excluding background) =			6.0	0.2	*0.2*	3.0	2.8	*0.80*	*0.50*	*5*	*5*	*0.05*	*0.05*
maximum (excluding background) =			**71.7**	**3.96**	**4.95**	**20.5**	**20.6**	**212**	**212**	**380**	**380**	**2.8**	**2.8**
average (excluding background) =			34.3	2.03	1.85	11.4	11.2	75.6	57.0	53.0	47.3	1.2	1.2
Human Health Screening Criteria													
State of Washington ambient water quality criteria for protection of human health, TSDCALC.XLS spreadsheet, WDOE website, 2010			NS	0.018	NS	NS	NS	1000	NS	300	NS	NS	NS
State of Washington Drinking Water Criteria (MCLs) WAC 246-290-310 (WDOE 2010)			NS	10	NS	2000	NS	1300	NS	300	NS	15	NS
EPA recommended chronic ambient water quality criteria for human consumption of water and fish (2009)			NS	0.018	NS	1000	NS	1300	NS	300	NS	NS	NS
Ecological Screening Criteria[a]													
State of Washington Toxic Substances Criteria for Protection of Aquatic Life, Chronic Criterion, Table 240(3) - WAC 173-201A-240 (WDOE 2010)			NS	NS	190	NS	NS	NS	1.11	NS	1000	NS	0.12
EPA recommended chronic ambient water quality criteria for freshwater aquatic life (EPA 2009); if none existed then used Tier II secondary chronic values (NOAA 1999)			NS	NS	150	NS	4	NS	2.3	NS	1000	NS	0.12

Notes:

Samples in blue collected by Millennium Science and Engineering, Inc. (MSE), all other samples collected by Cascade Earth Sciences (CES) during the Site Inspection.

Italicized result below method detection limit, reported at 1/2 reporting limit.

Underlined result between method detection limit and practical quantitation limit, reported at detected concentration.

Detected result exceeding screening criteria.

[a]Criteria for hardness dependent metals are based on an average hardness of 6.6 in the receiving stream (Trout Creek at TC-02)

Diss = Dissolved concentration

EPA = U.S. Environmental Protection Agency

NOAA = National Oceanic and Atmospheric Administration

NS = No standard

Tot = Total recoverable concentration

WDOE = Washington Department of Ecology

µg/L = Microgram per liter

mg/L = Milligram per liter

Table 4. Surface Water Sample Analytical Results Summary (continued)
Sunset Mine and Mill Site Pre-Removal Inspection and Monitoring

Sample Location		Date Collected	Field Parameters: Flow (cfs)	Temp. (°C)	ORP (mV)	DO (mg/L)	EC (µS/cm)	pH (s.u.)	Total Recoverable Analyte Concentration (mg/L): Hard	TDS	TSS	SO_4	Alk	Chlor	Ca	Mg	Na	K
Background:																		
Trout Creek	TC-SW1	6/22/2004	120	9.1	185	14.08	20	6.8	6	*5*	*2.5*	*5*	NA	NA	1.8	0.3	0.7	*0.15*
		6/16/2010	NM	5.42	158.5	16.27	11	6.97	5.9	11	*2.5*	0.89	NA	NA	1.89	0.283	NA	NA
		10/12/2010	NM	7.82	139.2	12.43	14	7.09	7.1	13	8.0	0.98	NA	NA	2.22	0.363	NA	NA
Site:																		
Trout Creek	TC-SW2	6/22/2004	NM	10.6	173	12.69	20	6.8	6	*5*	*2.5*	*5*	NA	NA	1.8	0.3	0.6	*0.15*
		6/16/2010	NM	5.35	184.8	16.14	11	6.97	6.5	10	*2.5*	0.96	NA	NA	2.09	0.309	NA	NA
		10/12/2010	NM	7.72	168.3	12.8	14	7.07	7.4	*5*	*2.5*	1.05	NA	NA	2.33	0.377	NA	NA
	TC-SW3	6/23/2004	NM	16.9	191	14.09	20	6.8	6	*5*	*2.5*	*5*	NA	NA	1.8	0.3	0.6	*0.15*
		6/16/2010	NM	5.65	137.5	17.75	19	6.97	6.3	12	*2.5*	0.96	NA	NA	2.03	0.298	NA	NA
		10/12/2010	NM	7.78	233.2	13.13	15	7.04	7.4	29	*2.5*	1.07	NA	NA	2.34	0.382	NA	NA
Upper Adit Discharge	SM-AS1	6/22/2004	0.01	8.0	279	13.40	70	7.3	29	30	*2.5*	10	NA	NA	9.8	1.0	1.4	0.4
		6/15/2010	0.06	7.2	167.3	14.99	41	7.47	24.4	40	*2.5*	2.28	25.3	0.595	8.38	0.838	1.33	*0.25*
		10/12/2010	0.01	7.63	203.9	11.9	66	7.48	43.7	79	*2.5*	18.0	31.5	0.784	15.2	1.4	1.58	0.58
Lower Adit Discharge	SM-AS2-1 (at portal)	6/22/2004	0.71	7.5	169	13.61	130	7.6	61	70	*2.5*	20	NA	NA	20.4	2.5	2.8	0.7
		6/16/2010	0.69	7.28	168.1	13.56	93	7.73	56.5	78	*2.5*	7.41	54.9	0.978	19.1	2.17	2.28	0.70
		10/12/2010	0.43	7.66	185.7	11.12	99	7.82	69.2	95	*2.5*	12.1	66.0	1.40	22.9	2.90	3.24	0.77
	SM-AS2-2 (at Trout Creek)	6/22/2004	NM	15.0	156	10.7	130	7.6	61	70	8	20	NA	NA	20	2.6	2.7	0.8
		6/16/2010	0.64	7.64	176.2	13.96	94	7.89	57.7	77	*2.5*	7.39	55.1	0.921	19.4	2.27	2.28	0.73
		10/12/2010	0.63	8.15	188.6	12.07	100	7.91	71.7	87	6.0	12.1	66.7	1.32	23.7	3.02	3.19	0.81
minimum (excluding background) =			0.01	5.35	137.5	10.7	11	6.8	6	*5*	*2.5*	0.96	25.3	0.595	1.8	0.3	0.6	*0.15*
maximum (excluding background) =			**0.71**	**16.9**	**279**	**17.75**	**130**	**7.91**	**71.7**	**95**	**8**	**20**	**66.7**	**1.40**	**23.7**	**3.02**	**3.24**	**0.81**
average (excluding background) =			0.40	8.67	185	13.5	61.5	7.36	34.3	46.1	3.1	8.22	49.9	1.0	11.4	1.38	2.00	0.55
Human Health Screening Criteria																		
State of Washington ambient water quality criteria for protection of human health, TSDCALC.XLS spreadsheet, WDOE website, 2010								NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
State of Washington Drinking Water Criteria (MCLs) WAC 246-290-310 (WDOE 2010)								NS	NS	500000	NS	NS	NS	NS	NS	NS	NS	NS
EPA recommended chronic ambient water quality criteria for human consumption of water and fish (2009)								5-9	NS	250000	NS	250000	NS	250000	NS	NS	NS	NS
Ecological Screening Criteria[b]																		
State of Washington Toxic Substances Criteria for Protection of Aquatic Life, Chronic Criterion, Table 240(3) - WAC 173-201A-240 (WDOE 2010)								6.5-8.5	NS	NS	NS	NS	NS	230000	NS	NS	NS	NS
EPA recommended chronic ambient water quality criteria for freshwater aquatic life (EPA 2009); if none existed then used Tier II secondary chronic values (NOAA 1999)								6.5-9	NS	250000	NS	NS	20000	230000	NS	NS	NS	NS

Notes:

Samples in blue collected by Millennium Science and Engineering, Inc. (MSE); all other samples collected by Cascade Earth Sciences (CES) during the Site Inspection.

Italicized result below method detection limit, reported at 1/2 reporting limit.

Underlined result between method detection limit and practical quantitation limit, reported at detected concentration.

Detected result exceeding screening criteria.

[a]Dissolved concentrations for samples collected by MSE; total recoverable concentrations for samples collected by CES.

[b]Ecological screening criteria is for dissolved concentrations, unless noted; criteria for hardness dependent metals are based on an average hardness of 6.6 in the receiving stream (Trout Creek at TC-02)

Alk = Alkalinity

Chlor = Chloride

DO = Dissolved oxygen

EC = Electrical conductivity in microsiemens per centimeter (µs/cm)

EPA = U.S. Environmental Protection Agency

Hard = Hardness in mg/L calcium carbonate ($CaCO_3$)

NA = Not analyzed for

NOAA = National Oceanic and Atmospheric Administration

NS = No standard

ORP = Oxygen reduction potential in millivolts (mV)

SO_4 = Sulfate

TDS = Total dissolved solids

Temp = Temperature in degrees Centigrade

TSS = Total suspended solids

WDOE = Washington Department of Ecology

mg/L = Milligram per liter

Table 5. Sediment Sample Analytical Results Summary
Sunset Mine and Mill Site Pre-Removal Inspection and Monitoring

Sample ID		Date Collected	% Solids	Analyte Concentration (mg/kg) As	Cu	Ni
Background:						
Trout Creek	TC-SS1	6/22/2004	NA	7.7	83.6	17.4
		6/16/2010	NA	5.5	52.1	11.3
		10/12/2010	77.3	6.2	51.9	13.8
Site:						
Trout Creek	TC-SS2	6/22/2004	NA	7.8	109	27.8
		6/16/2010	NA	9.1	211	17.4
		10/12/2010	78.1	10.7	354	13.2
Trout Creek	TC-SS3	6/22/2004	NA	7.2	102	20.6
		6/16/2010	NA	3.0	93.2	10.4
		10/12/2010	80.3	24.7	103	15.0
minimum (excluding background) =			78.1	3.0	93.2	10.4
maximum (excluding background) =			**80.3**	**24.7**	**354**	**27.8**
average (excluding background) =			79.2	10.4	162	17.4
Human Health Screening Criteria						
Washington Method A Industrial Soil Cleanup Levels (Table 745-1) - Human Receptors, MTCA (WDOE 2010b)				20	NS	NS
EPA Regional Screening Levels, Industrial Soil (EPA 2009)				1.6	41000	20000
Ecological Screening Criteria						
Washington Development of Freshwater Sediment Quality Values (WDOE 2004) - recommended only				20	80	60
Washington Development of Freshwater Sediment Quality Values (WDOE 2002) - in development				5.9	16	16
EPA Threshold Effects Level (NOAA 1999)				5.9	35.7	18
EPA Freshwater Probable Effects Level (NOAA 1999)				17	197	35.9

Notes:

Samples in blue collected by Millennium Science and Engineering, Inc. (MSE); all other samples collected by Cascade Earth Sciences (CES) during the Site Inspection.

Detected result exceeding screening criteria.

EPA = U.S. Environmental Protection Agency

MTCA = Model Toxics Control Act

NA = Not analyzed for

NOAA = National Oceanic and Atmospheric Administration

NS = No standard

WDOE = Washington Department of Ecology

Table 6. Mill Site Soil and Mine Waste Sample Analytical Results Summary
Sunset Mine and Mill Site Pre-Removal Inspection and Monitoring

Sample ID	WR Pile	Date Collected	Analyte Concentration (mg/kg)															
			Ag	Al	As	Ba	Cd	Co	Cr_T	Cu	Fe	Hg	Mn	Pb	Sb	Se	V	Zn
Soil in front of mill	SM-S1	6/22/2004	24	10600	60	20.1	*2.5*	10	12	16500	35700	0.22	506	72	*5*	*25*	24.1	100
	SM-S2	6/22/2004	1.8	8220	9	40.5	*0.5*	7	13	2420	19200	*0.025*	319	18	*1*	*5*	26.1	60
	SM-S3	6/22/2004	47	11400	50	43.7	*5*	10	13	24500	40000	0.27	517	130	*10*	*50*	27.1	*100*
Soil between mill and lower adit	SM-S4	6/15/2010	2.0	9900	14.8	42.4	*0.1*	8.69	11.3	2830	21400	0.217	517	18	*1.0*	*2.0*	28.3	92.3
	SM-S5	6/15/2010	1.0	10600	19.4	43.4	*0.1*	8.81	11.7	2800	23400	0.255	530	16	*1.0*	*2.0*	30.2	104
	SM-S6	6/15/2010	0.61	6600	8.9	44.9	*0.1*	8.60	7.42	1320	14900	0.232	618	20.8	*1.0*	*2.0*	20.8	62.1
WR-1	SM-WR1-1	6/22/2004	18	14700	50	68	*5*	16	19	28100	54708	1.06	970	140	*10*	*50*	30.7	*100*
	SM-WR8	6/23/2004	24.0	14300	49.3	41.9	0.91	11	18	30900	40300	0.41	646	122	*10*	2.9	33.4	1078
	SM-WR9	6/23/2004	40	11600	59.7	82.1	1.0	11	13	3800	60000	0.17	634	512	*20*	3	22	128
WR-2	SM-WR2-1	6/23/2004	125	11300	280	36.7	*2.5*	9	19	6680	16700	2.34	380	131	10	*25*	41	*50*
	SM-WR2-2	6/23/2004	40	10800	110	67.8	*1.5*	10	21	6070	94500	0.95	312	57	*2.5*	*15*	37	*25*
	SM-WR7	6/23/2004	268	5630	1150	111	0.7	8	59	10500	226000	5.74	442	788	20	20	19	151
WR-3	SM-WR3-1	6/22/2004	6	18600	30	27.6	*2.5*	16	7	5520	46200	0.58	1190	16	*5*	*25*	16.2	200
	SM-WR3-2	6/22/2004	1.7	15100	5	30.7	*0.5*	13	7	2740	38500	1.34	1070	3	*1*	*5*	13.4	70
	SM-WR3-3	6/23/2004	*0.015*	12400	*0.15*	63.4	*0.025*	12	13	6240	37800	0.7	738	0.11	*2.5*	*0.25*	29.8	*0.5*
WR-4	SM-WR4	6/22/2004	6.3	22400	41	31.7	0.8	21	19	18500	61600	0.63	1400	248	*4*	*1*	44.5	189
WR-5	SM-WR5-1	6/21/2004	11.3	6200	133	16.1	1.6	26	7	883000	84000	0.44	884	84.2	*400*	3	17	152
	SM-WR5-2	6/15/2010	7.93	4960	84	17.4	0.34	26.1	4.39	43300	59800	0.283	1490	23.0	*1.0*	*2.0*	13.9	142
	SM-WR5-3	6/15/2010	1.11	19500	16	18.2	*0.1*	22.4	14.6	12300	46000	0.117	1030	73.6	*1.0*	*2.0*	29.5	106
WR-6	SM-WR6-1	6/21/2004	3.31	18200	27.4	26.7	0.3	21	16	10500	43800	0.4	966	14.2	*5*	*0.5*	35.9	94
	SM-WR6-2	6/22/2004	7.36	4170	62.8	8.4	0.37	*2.5*	5	6280	94000	1.41	92	29.0	7	1.9	8	30
	SM-WR6-3	6/22/2004	6.71	15500	28.5	31.0	0.6	16	14	12100	40000	0.28	708	14.8	*5*	*0.25*	29.2	79
		minimum =	*0.015*	4170	*0.15*	8.4	*0.025*	*2.5*	4.39	1320	14900	*0.025*	92	0.11	*1*	0.25	8.0	*0.5*
		maximum =	**268**	**22400**	**1150**	**111**	***5.0***	**26.1**	**59**	**883000**	**226000**	**5.7**	**1490**	**788**	***400***	**50**	**44.5**	**1078**
		average =	29	11940	104	41.5	1.2	13.4	14.7	51677	54478	0.8	725	115	24	11	26.2	141
Human Health Screening Criteria																		
Washington Method A Industrial Soil Cleanup Levels (Table 745-1) - Human Receptors, MTCA (WDOE 2010b)			NS	NS	20	NS	2	NS	NS	NS	NS	2	NS	1000	NS	NS	NS	NS
EPA Regional Screening Levels, Industrial Soil (EPA 2009)			5100	990000	1.6	190000	800	300	NS	41000	720000	34	23000	800	410	5100	7.2	310000
Ecological Screening Criteria																		
Washington Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3) (WDOE 2010c)			2	50	NS	102	4	20	42	50	NS	0.1	1100	50	5	0.3	2	86
EPA Ecological Soil Screening Levels (Eco-SSL) Values (EPA website 2005)			NS	NS	18	330	0.36	13	NS	NS	NS	NS	NS	11	0.27	NS	7.8	NS

Notes:
Samples in blue collected by Millennium Science and Engineering, Inc. (MSE); all other samples collected by Cascade Earth Sciences (CES) during the Site Inspection.
Italicized result below method detection limit, reported at 1/2 reporting limit.
Underlined result between method detection limit and practical quantitation limit, reported at detected concentration.
Detected result exceeding screening criteria.
EPA = U.S. Environmental Protection Agency
MTCA = Model Toxics Control Act
NS = No standard
WDOE = Washington Department of Ecology
mg/kg = Milligram per kilogram

Table 7. Mill Concrete Toxicity Characterization Leaching Procedure Analytical Results Summa
Sunset Mine and Mill Site Pre-Removal Inspection and Monitoring

Sample ID	Date Collected	pH	Ag	As_T	Ba	Cd	Cr_T	pB	Hg	Se
SM-CONC1	6/15/2010	9.42	<0.050	<0.05	<1.00	<0.010	<0.050	<0.0500	<0.0002	<0.05
RCRA TCLP Disposal Limit =			5	5	100	1	5	5	0.2	1

Notes:

Samples in blue collected by Millennium Science and Engineering, Inc. (MSE).

RCRA = Resource Conservation and Recovery Act

TCLP = Toxicity Characteristic Leaching Procedure

mg/L = Milligram per liter

Table 8. Background Soil Sample Analytical Results Summary
Sunset Mine and Mill Site Pre-Removal Inspection and Monitoring

Sample ID	Date Collected	Analyte Concentration (mg/kg)							
		Al	As	Ba	Cd	Cu	Pb	V	Zn
SM-BGS-1	6/21/2004	15400	12.4	52.1	0.4	291	7.5	38	114
SM-BGS-2	6/21/2004	16900	7.6	143	0.52	121	5.62	43.4	126
SM-BGS-3	6/21/2004	11600	13	53.6	0.7	631	13.1	31.7	70
SM-BGS-4	6/15/2010	8670	6.1	24.8	*0.1*	546	1.85	29.3	80.1
SM-BGS-5	6/15/2010	13000	15.7	60.3	0.32	992	5.27	31.5	106
SM-BGS-6	6/15/2010	8960	21.2	45.7	*0.1*	65200	50.2	42.2	106
SM-BGS-7	6/15/2010	20600	5.7	29.3	*0.1*	305	3.26	30	35
SM-BGS-8	6/15/2010	18800	15.1	41.1	*0.1*	394	5.93	32.1	116
SM-BGS-9	6/15/2010	21800	5.3	82.2	*0.1*	47.3	9.26	53.8	56.5
SM-BGS-10	6/15/2010	28600	3.5	79.1	*0.1*	29.7	8.57	58.5	53.9
minimum =		8670	3.5	24.8	0.1	29.7	1.9	29.3	35
maximum =		**28600**	**21.2**	**143**	**0.7**	**65200**	**50.2**	**58.5**	**126**
average =		16433	10.6	61.1	0.25	6856	11.1	39.1	86
MTCA 90 percent UCL =		26325	20.7	110	0.60	1638	25.5	54.2	131
# of samples = 10; Standard Deviation =		5936	5.5	32.5	0.2	19450	13.4	9.8	30
Frequency detected =		100%	100%	100%	40%	100%	100%	100%	100%
Human Health Screening Criteria									
Washington Method A Industrial Soil Cleanup Levels (Table 745-1) - Human Receptors, MTCA (WDOE 2010b)		NS	20	NS	2	NS	1000	NS	NS
EPA Regional Screening Levels, Industrial Soil (EPA 2009)		990000	1.6	190000	800	41000	800	7.2	310000
Ecological Screening Criteria									
Washington Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3) (WDOE 2010c)		50	NS	102	4	50	50	2	86
EPA Ecological Soil Screening Levels (Eco-SSL) Values (EPA website 2005)		NS	18	330	0.36	NS	11	7.8	NS

Notes:

Samples in blue collected by Millennium Science and Engineering, Inc. (MSE) all other samples collected by Cascade Earth Sciences (CES) during the Site Inspection.

Italicized result below method detection limit, reported at 1/2 reporting limit.

Underlined result between method detection limit and practical quantitation limit, reported at detected concentration.

Detected result exceeding screening criteria.

EPA = U.S. Environmental Protection Agency

MTCA = Model Toxics Control Act

NS = No standard

UCL = Upper confidence limit

WDOE = Washington Department of Ecology

mg/kg = Milligram per kilogram

Table 9. Borrow Soil Sample Analytical Results Summary
Sunset Mine and Mill Site Pre-Removal Inspection and Monitoring

Sample ID	Date Collected	Analyte Concentration (mg/kg)							
		Al	As	Ba	Cd	Cu	Pb	V	Zn
SM-BOR-1	6/15/2010	17000	53.3	43.1	*0.1*	14000	18.9	35.4	129
SM-BOR-2	6/15/2010	20700	12.8	36.9	*0.1*	14600	14.3	54.5	238
SM-BOR-3	6/15/2010	32800	5.4	106	*0.1*	45.3	10.3	73.2	69.8
SM-BGS-10	6/15/2010	28600	3.5	79.1	*0.1*	29.7	8.57	58.5	53.9
minimum =		17000	5.4	36.9	*0.1*	45.3	10.3	35.4	69.8
maximum =		**32800**	**53.3**	**106**	***0.1***	**14600**	**18.9**	**73.2**	**238**
average =		24775	23.8	62.0	0.1	9548	14.5	55.4	146
Human Health Screening Criteria									
Washington Method A Industrial Soil Cleanup Levels (Table 745-1) - Human Receptors, MTCA (WDOE 2010b)		NS	20	NS	2	NS	1000	NS	NS
EPA Regional Screening Levels, Industrial Soil (EPA 2009)		990000	1.6	190000	800	41000	800	7.2	310000
Ecological Screening Criteria									
Washington Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3) (WDOE 2010c)		50	NS	102	4	50	50	2	86
EPA Ecological Soil Screening Levels (Eco-SSL) Values (EPA website 2005)		NS	18	330	0.36	NS	11	7.8	NS

Notes:
Samples in blue collected by Millennium Science and Engineering, Inc. (MSE).
Italicized result below method detection limit, reported at 1/2 reporting limit.
Detected result exceeding screening criteria.
EPA = U.S. Environmental Protection Agency
MTCA = Model Toxics Control Act
NS = No standard
WDOE = Washington Department of Ecology
mg/kg = Milligram per kilogram

Table 10. Borrow Soil Sample Agronomic Results Summary
Sunset Mine and Mill Site Pre-Removal Inspection and Monitoring

Sample ID	Date Collected	Texture	Agronomic Parameter																
			pH (s.u.)	EC (mS/cm)	OM (%)	CEC (meq/100g)	NO_3 (ppm)	NO_4 (ppm)	P (ppm)	K (ppm)	S (ppm)	Ca (ppm)	Mg (ppm)	Na (ppm)	Zn (ppm)	Cu (ppm)	Mn (ppm)	Fe (ppm)	B (ppm)
SM-BOR-1	6/15/2010	Loam	8.0	0.22	1.63	14	29	8	6	64	17	1650	46	16	2.2	557.4	2	6	0.2
SM-BOR-3[a]	6/15/2010	Loam	5.9	0.08	2.48	13	8	9	7	74	7	168	34	16	0.4	5.1	6	79	0.2
SM-BOR-4[b]	6/15/2010	Loam	5.7	0.09	4.06	15	3	10	6	60	12	158	25	20	0.3	1.0	9	125	0.2
		minimum =	5.7	0.08	1.63	13	3	8	6	60	7	158	25	16	0.3	1.0	2	6	0.2
		maximum =	**8.0**	**0.22**	**4.06**	**15**	**29**	**10**	**7**	**74**	**17**	**1650**	**46**	**20**	**2.2**	**557.4**	**9**	**125**	**0.2**
		average =	6.5	0.13	2.72	14	13	9	6	66	12	659	35	17	1.0	188	6	70	0.2

Notes:

Samples in blue collected by Millennium Science and Engineering, Inc. (MSE).

[a]Corresponds to sample SM-BOR-2 sent to SVL for metals analysis.

[b]Corresponds to sample SM-BOR-3 sent to SVL for metals analysis.

mS/cm = Millisiemens per centimeter

meq/100g = Milliequivalent per 100 grams

mg/kg = Milligram per kilogram

ppm = Parts per million

s.u. = Standard units

ATTACHMENT A

PHOTOGRAPHS

Photo 1: Trout Creek sampling location TC-SW3, looking downstream, June 2010.

Photo 2: Trout Creek sampling location TC-SW3, looking downstream, October 2010.

Photo 3: Trout Creek sampling location TC-SW3, looking upstream, June 2010.

Photo 4: Trout Creek sampling location TC-SW3, looking upstream, October 2010.

Photo 5: Trout Creek sampling location TC-SW2, looking downstream, June 2010.

Photo 6: Trout Creek sampling location TC-SW2, looking downstream, October 2010.

Photo 7: Trout Creek sampling location TC-SW2, looking upstream, June 2010.

Photo 8: Trout Creek sampling location TC-SW2, looking upstream, October 2010.

Photo 9: Trout Creek at confluence with lower adit drainage, looking downstream, June 2010.

Photo 10: Trout Creek at confluence with lower adit drainage, looking downstream, October 2010.

Photo 11: Trout Creek at confluence with lower adit drainage, looking upstream, June 2010.

Photo 12: Trout Creek at confluence with lower adit drainage, looking upstream, October 2010.

Photo 13: Trout Creek at sampling location TC-SW1, looking downstream, wooden bridge in background, June 2010.

Photo 14: Trout Creek at sampling location TC-SW1, looking downstream, wooden bridge in background, October 2010.

Photo 15: Trout Creek at sampling location TC-SW1, looking upstream, June 2010.

Photo 16: Trout Creek at sampling location TC-SW1, looking upstream, October 2010.

Photo 17: Lower adit discharge at sampling location SM-AS2-2, looking downstream, June 2010.

Photo 18: Lower adit discharge at sampling location SMAS2-2, looking downstream, October 2010.

Photo 19: Lower adit discharge at sampling location SM-AS2-2, looking upstream, June 2010.

Photo 20: Lower adit discharge at sampling location SM-AS2-2, looking upstream, October 2010.

Photo 21: Lower adit discharge at sampling location SM-AS2-1, looking downstream, June 2010.

Photo 22: Lower adit discharge at sampling location SM-AS2-1, looking downstream, October 2010.

Photo 23: Lower adit discharge at sampling location SM-AS2-1, looking upstream, adit 2 portal in background, June 2010.

Photo 24: Lower adit discharge at sampling location SM-AS2-1, looking upstream, adit 2 portal in background, October 2010.

Photo 25: Upper adit discharge at sampling location SM-AS1-1, looking downstream, June 2010.

Photo 26: Upper adit discharge at sampling location SM-AS1-1, looking downstream, October 2010.

Photo 27: Upper adit discharge at sampling location SM-AS1-1, looking upstream, June 2010.

Photo 28: Upper adit discharge at sampling location SM-AS1-1, looking upstream, October 2010.

Photo 29: Trout Creek looking downstream from wooden bridge, October 2010.

Photo 30: Trout Creek looking upstream from wooden bridge, October 2010.

Photo 31: Looking across Trout Creek from south bank at cross-section 1, October 2010.

Photo 32: Looking in opposite direction along cross-section 1 from south bank of Trout Creek, October 2010.

Photo 33: Looking across Trout Creek from south bank at cross-section 2, October 2010.

Photo 34: Looking in opposite direction along cross-section 2 from south bank of Trout Creek, October 2010.

Photo 35: Looking across Trout Creek from south bank at cross-section 3, October 2010.

Photo 36: Looking in opposite direction along cross-section 3 from south bank of Trout Creek, October 2010.

Photo 37: Looking across Trout Creek from south bank at cross-section 4, October 2010.

Photo 38: Looking in opposite direction along cross-section 4 from south bank of Trout Creek, October 2010.

Photo 39: Looking across Trout Creek from south bank at cross-section 5, October 2010.

Photo 40: Looking in opposite direction along cross-section 5 from south bank of Trout Creek, October 2010.

Photo 41: Looking across Trout Creek from left bank at cross-section 6, October 2010.

Photo 42: Looking in opposite direction along cross-section 6 from left bank of Trout Creek, June 2010.

Photo 43: Discharge from lower adit flowing along road leading from mill site to adit 2, October 2010.

Photo 44: Road leading east from mill site, October 2010.

Photo 45: Road between mill site and wooden bridge, October 2010.

Photo 46: Road area at wooden bridge across Trout Creek, October 2010.

Photo 47: Mill site from top of concrete foundation, June 2010.

Photo 48: Waste rock pile WR-1 at the mill site, June 2010.

Photo 49: Waste rock pile WR-5, looking uphill from toe, June 2010.

Photo 50: Waste rock pile WR-5, looking downhill from top, June 2010.

Photo 51: Road leading to proposed alternate repository location, at junction with FR 6320, June 2010.

Photo 52: Road leading to proposed alternate repository location, lower section, June 2010.

Photo 53: Erosion in road leading to proposed alternate repository, June 2010.

Photo 54: Road leading to proposed alternate repository location, upper section, June 2010.

Photo 55: Proposed alternate repository area, June 2010.

Photo 56: Proposed alternate repository area, June 2010.

Photo 57: Proposed alternate repository area, June 2010.

Photo 58: Proposed alternate repository area, June 2010.

Photo 59: Gray, rocky, material suspected to be road base at borrow soil sample location SM-BOR-1, June 2010.

Photo 60: Light brown, native sandy silt loam at borrow soil sample location SM-BOR-2, June 2010.

Photo 61: Second proposed alternate repository area near FR 6320, June 2010.

Photo 62: Second proposed alternate repository area near FR 6320, June 2010.

Photo 63: Medium brown, sandy silt loam at borrow soil sample location SM-BOR-3, June 2010.

Photo 64: Access to second proposed alternate repository location from FR 6320, June 2010.

ATTACHMENT B

FIELD FORMS

MSE Daily Field Summary

Project:	**Sunset Mine Pre-removal Inspection & Monitoring**
Project Number:	B2473.G
Location:	Mt. Baker-Snoqualmie National Forest, Washington
Field Personnel:	M. Puett, G. Carson
USFS Personnel:	
Date:	6/15/2010

FIELD CONDITIONS

Weather: Sunny Partly cloudy Cloudy Rain-X Snow Temp:

Precipitation: Dry Recent Current-**X** Wind: 0-**X** <5 5-15 15-30 >30

VISITORS TO THE SITE

Name	Company:	Purpose of Visit:

FIELD WORK SUMMARY

Arrived onsite at 0915. Access road appears to have recently been repaired. Several deep, rocky, rolling drain dips require a high-clearance vehicle. Access road to alternate repository source is blocked with a couple of boulders and heavily eroded in placed. Inspected alternate repository location. Area is on a ridge with two distinct "fingers." The area appears to have been cleared and worked at one time. All growth is newer and no old growth trees. Evidence of road cut at the western tip of the southern finger. Duff is relatively thin and covers a rocky material that appears to have been imported (e.g. road base). A heavy gray clay was observed in a couple of small areas. Volume of suitable borrow soil is probably limited and excavation may be impeded by a rocky substrate. Collected one sample of the rocky "road-base" material and one sample of native silty loam from each finger.

Identified another potential repository area adjacent to the main road at the intersection with the road to the alternate repository. Large, gently sloping area with easy access, and no visible surface water flows. Some old growth would need

Arrived at mill site at 1310. Collected composite concrete sample from mill foundation. Evidence of heavy public use for t

Hiked to upper workings; trail heavily used. Collected surface water and sediment samples at upper adit discharge. Flow

Continued on to upper stope. Collected four background soil samples.

Left site at 1900.

MSE Daily Field Summary

Project:	**Sunset Mine Pre-removal Inspection & Monitoring**
Project Number:	B2473.G
Location:	Mt. Baker-Snoqualmie National Forest, Washington
Field Personnel:	M. Puett, G. Carson
USFS Personnel:	
Date:	6/16/2010

FIELD CONDITIONS

Weather:	Sunny	Partly cloudy	Cloudy-X	Rain	Snow	Temp:	
Precipitation:	Dry	Recent-**X**	Current			Wind: 0-**X**	<5 5-15 15-30 >30

VISITORS TO THE SITE

Name	Company:	Purpose of Visit:

FIELD WORK SUMMARY

Arrived onsite at 0830. Encountered two groups of people visiting the site to target practice.

Collected surface water and sediment samples from Trout Creek at TC-3. Flows too high to wade stream so no measurement. Could not find sample location marker from the Site Inspection. Collected surface water and sediment samples from Trout Creek at TC-2. Found a steel surveying rod marked TC-2 adjacent to the stream. Flow too high to wade, no measurement. Collected surface water and sediment samples from Trout Creek upstream of site, just past bridge. Could not find any sample location markers. Flow too high to wade, no measurement.

Collected surface water and sediment samples from the lower adit discharge just before it enters Trout Creek. Flow measured to be 0.64 cfs (289 gpm). Some of the flow appears to be infiltrating and re-emerging at the mill site. The flow continues down the main road and enters Trout Creek just upstream of TC-2.

Collected surface water and sediment samples from the lower adit discharge at the adit opening. Flow measured to be 0.69 cfs (308 gpm).

Collected QC samples and another background soil sample.

Packaged all up all of the samples and equipment for shipping.

Left site at 1445. Arrived in Monroe at 1545 and shipped out samples and equipment.

MSE Water Sample Collection Record

SAMPLE ID:	**SM-AS1-2**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Discharge from upper adit**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	7.2		
	pH (pH units)	6.38		
	SpCond (microS/cm)	41		
	Dissolved O_2 (mg/L)	14.99		
	ORP (mV)	167.3		

Method:	In-situ
Measurement START Time: 1535	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter: Flume: Timed Volumetric: **X**
Description:	Discharge from adit flows about 100 ft before infiltrating. Evidence of flow continuing down the hillside during high flows. Measured cross-section at 3-in intervals and time velocity.
Flow:	0.06 cfs/27 gpm

SAMPLE COLLECTION

Sample Method:	Bottle - **X** Pump Other:
Sample Collection Time:	1530

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

Channel was 18-inches wide, depth ranged from 1.0 to 1.7 inches. Velocity measured to be 0.53 fps.

MSE Water Sample Collection Record

SAMPLE ID:	**TC-SW3**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Trout Creek downstream of the site, immediately upstream of NFSR**
Date:	6/16/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	5.65		
	pH (pH units)	5.45 (?)		
	SpCond (microS/cm)	19		
	Dissolved O_2 (mg/L)	17.75		
	ORP (mV)	137.5		

Method:	In-situ
Measurement START Time: 0915	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	Flume:	Timed Volumetric:
Description:	Stream too high to wade, no flow measurement at this location.		
Flow:			

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	915		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Location is just downstream of bridge. No sample location marker from the SI could be found. Problem with multi-meter and pH reading. Checked with distilled water and appears to give the correct pH; however, pH value at this location should be near neutral and the recorded value is questionable. Other parameters seem to be correct.

MSE Water Sample Collection Record

SAMPLE ID:	**TC-SW2**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Trout Creek downstream of the site, approximately 1/4 mile from mill site**
Date:	6/16/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	5.35		
	pH (pH units)	3.75 (?)		
	SpCond (microS/cm)	11		
	Dissolved O_2 (mg/L)	16.14		
	ORP (mV)	184.8		

Method:	In-situ
Measurement START Time: 1010	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	Flume:	Timed Volumetric:
Description:	Stream too high to wade, no flow measurement at this location.		
Flow:			

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1010		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Location is at sample location marker TC-2 from the SI, about 1/4 mile downstream of mill site. Problem with multi-meter and pH reading. pH value at this location should be near neutral, reported value is questionable. Other parameters seem to be correct.

MSE Water Sample Collection Record

SAMPLE ID:	**TC-SW1**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Trout Creek upstream of the site, just past bridge**
Date:	6/16/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	5.42		
	pH (pH units)	5.10 (?)		
	SpCond (microS/cm)	11		
	Dissolved O_2 (mg/L)	16.27		
	ORP (mV)	158.5		

Method:	In-situ
Measurement START Time: 1115	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	Flume:	Timed Volumetric:
Description:	Stream too high to wade, no flow measurement at this location.		
Flow:			

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1115		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Sample location marker from the SI could not be found. Location is just upstream of wooden bridge. Problem with multi-meter and pH reading. pH value at this location should be near neutral, reported value is questionable. Other parameters seem to be correct.

MSE Water Sample Collection Record

SAMPLE ID:	**SM-AS2-2**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Discharge from lower adit, just before entering Trout Creek**
Date:	6/16/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	7.64		
	pH (pH units)	10.10 (?)		
	SpCond (microS/cm)	94		
	Dissolved O_2 (mg/L)	13.96		
	ORP (mV)	176.2		

Method:	In-situ
Measurement START Time: 1155	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter: **X**	Flume:	Timed Volumetric:
Description:	Stream 2-ft wide in established channel, depth ranged from 3.0 to 4.2 inches		
Flow:	0.64 cfs/289 gpm		

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1155		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Stream flows thorugh channel excavated into waste rock/soil from the mill site. Problem with multi-meter and pH reading. pH value at this location should be slightly acidic, reported value is questionable. Other parameters seem to be correct.

MSE Water Sample Collection Record

SAMPLE ID:	**SM-AS2-1**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Discharge from lower adit, just outside portal**
Date:	6/16/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	7.28		
	pH (pH units)	8.48 (?)		
	SpCond (microS/cm)	93		
	Dissolved O_2 (mg/L)	13.56		
	ORP (mV)	168.1		

Method:	In-situ
Measurement START Time: 1300	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	**X**	Flume:	Timed Volumetric:
Description:	Stream 4-ft wide, depth ranged from 1.5 to 4.4 inches			
Flow:	0.69 cfs/308 gpm			

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1300		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Stream flows from adit and continues down old road bed to mill site. Problem with multi-meter and pH reading. pH value at this location should be slightly acidic, reported value is questionable. Other parameters seem to be correct.

MSE Sediment Sample Collection Record

SAMPLE ID:	**TC-SS3**		
Sample Location:	Sunset Mine	Photo:	see surface water sample record
Description:	**Trout Creek downstream of site, just upstream of confluence with NFSR**		
Date:	6/16/2010		
Field Personnel:	M. Puett, G. Carson		
Conditions:		Weather:	Sunny Cloudy-**X** Rain

METHOD

Grab: **X (see note)** Depth:

Composite:	Habitat	Depth	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 0925

# Sample Containers	Size				Analysis								Other
	500-mL Bottle	12-oz glass jar	8-oz glass jar	Brass Sleeve	Metals: As, Cu, Ni								
1		**X**			**X**								

DESCRIPTION/COMMENTS

Sample location co-located with surface water sample. Sample consisted of sediment grabbed from pockets of shallow flow along the stream bank.

MSE Sediment Sample Collection Record

SAMPLE ID:	**TC-SS2**
Sample Location:	Sunset Mine — Photo: see surface water sample record
Description:	**Trout Creek downstream of site, 1/4 mile from mill site**
Date:	6/16/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X (see note)** Depth:

Composite:

Habitat	Depth	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1010

# Sample Containers	Size: 500-mL Bottle	Size: 12-oz glass jar	Size: 8-oz glass jar	Size: Brass Sleeve	Analysis: Metals: As, Cu, Ni	Analysis	Analysis	Analysis	Analysis	Analysis	Analysis	Analysis	Other
1		**X**			**X**								

DESCRIPTION/COMMENTS

Sample location co-located with surface water sample. Sample consisted of sediment grabbed from pockets of shallow flow along the stream bank.

MSE Sediment Sample Collection Record

SAMPLE ID:	**TC-SS1**		
Sample Location:	Sunset Mine	Photo:	see surface water sample record
Description:	**Trout Creek upstream of site, just past wooden bridge**		
Date:	6/16/2010		
Field Personnel:	M. Puett, G. Carson		
Conditions:		Weather:	Sunny Cloudy-**X** Rain

METHOD

Grab: **X (see note)** Depth:

Composite:	Habitat	Depth	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1115

	Size				Analysis								Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	Brass Sleeve	Metals: As, Cu, Ni								
1		**X**			**X**								

DESCRIPTION/COMMENTS

Sample location co-located with surface water sample. Sample consisted of sediment grabbed from pockets of shallow flow along the stream bank.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BOR-1**		
Sample Location:	Sunset Mine	Photo: yes	
Description:	**Alternate repository location, sample from north finger**		
Date:	6/15/2010		
Field Personnel:	M. Puett, G. Carson		
Conditions:	Cloudy	Weather: Sunny Cloudy-X Rain	

METHOD

Grab: X Depth: 4 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1050

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**		**X**				

DESCRIPTION/COMMENTS

Material appears to be imported road base material. Medium to light grey, very damp, rocky, visible green/blue green material (copper?), very clayey, 50-60% cobbles/angular rock, some sand. Covered with 1-3 inches of duff.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BOR-3**		
Sample Location:	Sunset Mine	Photo:	yes
Description:	**Alternate repository location, sample from area on south finger (undisturbed?)**		
Date:	6/15/2010		
Field Personnel:	M. Puett, G. Carson		
Conditions:	Cloudy	Weather:	Sunny Cloudy-X Rain

METHOD

Grab: X Depth: 3 to 4"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1140

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**		**X**				

DESCRIPTION/COMMENTS

Material appears to be native. Light to medium brown, damp, clayey, very little rock, some silt and sand, organic material. Covered with 2-3 inches of duff.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BOR-4/SM-BGS-10**		
Sample Location:	Sunset Mine	Photo:	yes
Description:	**Second alternate repository location along main access road**		
Date:	6/15/2010		
Field Personnel:	M. Puett, G. Carson		
Conditions:	Cloudy	Weather:	Sunny Cloudy-X Rain

METHOD

Grab: X Depth: 4 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1215

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**		**X**				

DESCRIPTION/COMMENTS

Material appears to be native. Medium brown, damp, sandy silt loam with some clay, very little rock, organic material. Covered with 3-4 inches of duff.

MSE Sample Collection Record

SAMPLE ID:	**SM-CONC-1**		
Sample Location:	Sunset Mine	Photo:	yes
Description:	Concrete mill foundation at mill site		
Date:	6/15/2010		
Field Personnel:	M. Puett, G. Carson		
Conditions:		Weather:	Sunny Cloudy-X Rain

METHOD

Grab: Depth:

Composite:	Container	Depth	Comments
1	1-gal, zip lock bag	0 to 0.5 inches	Collected pieces from several areas

SAMPLE COLLECTION

Equipment: Trowel Siphon Other: Rock hammer

Sample Collection Time: 1310

	Size				Analysis							Other
# Sample Containers	1000-mL glass bottle	8-oz glass jar	4-oz glass jar	1-gal zip lock bag	TCLP Metals: Ag, As, Ba, Cd, Cr, Hg, Pb, Se							
1				X	X							

DESCRIPTION/COMMENTS

Collected concrete fragments from several areas of the mill foundation and composited together in a single bag.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-S6**
Sample Location:	Sunset Mine Photo: yes
Description:	**Mill site area, near lower adit, area between roads**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-X Rain

METHOD

Grab: X Depth: 6 to 10"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1350

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**		**X**					

DESCRIPTION/COMMENTS

Area covered with young growth only, heavily vegetated. Soil covered with 6+ inches of duff. Dark brown, damp, abundant roots and organic matter, clay loam with coarse sand.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-S5**
Sample Location:	Sunset Mine Photo: yes
Description:	**Mill site area, toward lower adit, area between roads**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-X Rain

METHOD

Grab: X Depth: 4 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1410

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**		**X**					

DESCRIPTION/COMMENTS

Area covered with young growth only, heavily vegetated. Soil covered with 3+ inches of duff. Dark brown,/dark grey, damp, abundant roots and organic matter, sandy clay loam, increasing rock content with depth.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-S4**
Sample Location:	Sunset Mine Photo: yes
Description:	**Mill site area, close to concrete foundation covered in vegetation, fire ring in area**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X** Depth: 3 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1420

# Sample Containers	Size: 500-mL Bottle	Size: 12-oz glass jar	Size: 8-oz glass jar	Size: 1-gal Zip Lock bag	Analysis: Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Analysis: Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Analysis: Agronomics	Analysis	Analysis	Analysis	Other
1				**X**		**X**					

DESCRIPTION/COMMENTS

Fire ring in area, cleared from heavy public use. Soil covered with 1 to 2 inches of duff. Medium grey, damp, heavily rooted near surface, sandy silt, coarse sand, <10% clay.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-WR5-2**
Sample Location:	Sunset Mine Photo: yes
Description:	**Waste rock pile WR5, along upper slope of pile**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X** Depth: 1 to 3"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1610

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**		**X**					

DESCRIPTION/COMMENTS

On very steep slope, minimal duff, obvious waste rock material. Medium grey, very rocky, some roots at surface, sandy with some clay.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-WR5-3**
Sample Location:	Sunset Mine Photo: yes
Description:	**Waste rock pile WR5, along lower slope of pile**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X** Depth: 3 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1630

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**		**X**					

DESCRIPTION/COMMENTS

On opposite side of slope from sample WR5-2, and lower. No obvious indication of waste rock. Covered with 2-3 inches of duff, unconsolidate material with cobbles and rocks, some organic matter, medium brown to grey, coarse-grained sand with silt, very little clay, more organics at depth.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BGS-4**
Sample Location:	Sunset Mine Photo: yes
Description:	**Background soil, located on slope above lower adit, and below waste rock pile WR5**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X** Depth: 4 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1650

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**						

DESCRIPTION/COMMENTS

Medium brown, slightly damp, sandy silty loam, some coarse sand, few roots. Covered with 2-4" of duff.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BGS-5**
Sample Location:	Sunset Mine Photo: yes
Description:	**Background soil, located on slope between waste rock piles WR4 and WR5**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X** Depth: 4 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1700

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**						

DESCRIPTION/COMMENTS

Medium to dark brown, sandy silty loam, heavily rooted, coarse sand, little clay. Covered with 3-4" of duff.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BGS-6**
Sample Location:	Sunset Mine Photo: yes
Description:	**Background soil, located in highly mineralized zone near west stope**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X (see note)** Depth: 1 to 3"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1730

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**						

DESCRIPTION/COMMENTS

Highly mineralized with specks of green material (copper?). Light grey to medium brown. Unconsolidated silty sand. Little to now duff cover. Sample composited from several grabs of material from mineralized zone in close proximity.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BGS-7**
Sample Location:	Sunset Mine Photo: yes
Description:	**Background soil, located in undisturbed area upslope of trail from west stope**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X** Depth: 1 to 3"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1745

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**						

DESCRIPTION/COMMENTS

Orange brown, slightly damp, silty sand, little to no clay, few roots, well sorted. Covered with 1" of duff.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BGS-8**
Sample Location:	Sunset Mine Photo: yes
Description:	**Background soil, located along main road to site, upslope**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X** Depth: 4 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1845

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**						

DESCRIPTION/COMMENTS

Dark brown, poorly sorted, coarse sand, pebbles, silty sand with little clay. Covered with 3-4" of duff.

MSE Soil Sample Collection Record

SAMPLE ID:	**SM-BGS-9**
Sample Location:	Sunset Mine Photo: yes
Description:	**Background soil, located along main road to site, upslope**
Date:	6/15/2010
Field Personnel:	M. Puett, G. Carson
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X** Depth: 4 to 6"

Composite:	Depth:	Habitat	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1900

	Size				Analysis						Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	1-gal Zip Lock bag	Metals: Al, As, Ba, Cd, Cu, Pb, V, Zn	Metals: Ag, Al, As, Ba, Cd, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Se. V, Zn	Agronomics				
1				**X**	**X**						

DESCRIPTION/COMMENTS

Brown, coarse sand and gravel, silty sand with little clay. Covered with 3-6" of duff.

MSE Daily Field Summary

Project:	**Sunset Mine Pre-removal Monitoring**
Project Number:	B2473.G
Location:	Mt. Baker-Snoqualmie National Forest, Washington
Field Personnel:	M. Puett, D. Tibbets
USFS Personnel:	
Date:	10/12/2010

FIELD CONDITIONS

Weather: Sunny Partly cloudy Cloudy - **X** Rain - **X** Snow Temp:

Precipitation: Dry Recent - **X** Current Wind: 0-**X** <5 5-15 15-30 >30

VISITORS TO THE SITE

Name	Company:	Purpose of Visit:
Jim McDaniel & survey crew	Harmsen & Associates	Topographic survey

FIELD WORK SUMMARY

Arrived onsite at 0900. Five different vehicles with groups of people visited the Site during the day to target practice and search with metal detectors.

Met with surveyors to look at the Site and provide direction for the survey. After looking over the mill site and walking up and down Trout Creek, identified six areas to establish transects across the stream and up each bank far enough to include the 100-year and 500-year floods.

Collected surface water and sediment samples from Trout Creek at TC-3. Flows too high to wade stream so no measurement. Collected surface water and sediment samples from Trout Creek at TC-2. Found a steel surveying rod marked TC-2 adjacent to the stream. Flow too high to wade, no measurement. Collected surface water and sediment samples from Trout Creek upstream of site, just past bridge. Could not find any sample location markers. Flow too high to wade, no measurement.

Starting collecting surface water and sediment samples from the lower adit discharge just before it enters Trout Creek. During sample collection, a vehicle drove though the flow just upstream of where we were sampling. Sampling was stopped and what had been collected was discarded. Moved to the upstream sampling location at the adit portal (Adit 2) and collected surface water and sediment samples (AS2-1). Flow measured to be 0.43 cfs (200 gpm).

Hiked to upper adit (Adit 1) and collected surface water and sediment samples (AS1-1). The flow was estimated to be less than 5 gpm. Returned to the lower adit drainage and resumed sampling at AS2-2. Flow measured to be 0.63 cfs (284 gpm). The flow continues down the main road and enters Trout Creek just upstream of TC-2. Some of the flow appears to be infiltrating and re-emerging at the mill site.

Packaged all up all of the samples and equipment for shipping.

Left site at 1600. Arrived in Seattle at 1730. Shipped out the samples and equipment the following morning.

MSE Water Sample Collection Record

SAMPLE ID:	**TC-SW3**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Trout Creek downstream of the site, immediately upstream of NFSR**
Date:	10/13/2010
Field Personnel:	M. Puett, D. Tibbets
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	7.78		
	pH (pH units)	5.33		
	SpCond (microS/cm)	15		
	Dissolved O_2 (mg/L)	13.13		
	ORP (mV)	233.2		

Method:	In-situ
Measurement START Time: 930	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	Flume:	Timed Volumetric:
Description:	Stream too high to wade, no flow measurement at this location.		
Flow:			

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	930		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Location is just downstream of bridge. Problem with multi-meter and pH reading. Checked with pH 7 calibration fluid, instrument read 7.48. Recalibrated instrument but continued to have questionable pH readings. Other parameters seem to be correct.

MSE Water Sample Collection Record

SAMPLE ID:	**TC-SW2**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Trout Creek downstream of the site, approximately 1/4 mile from mill site**
Date:	10/12/2010
Field Personnel:	M. Puett, D. Tibbets
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	7.72		
	pH (pH units)	5.81 (?)		
	SpCond (microS/cm)	14		
	Dissolved O_2 (mg/L)	12.8		
	ORP (mV)	168.3		

Method:	In-situ
Measurement START Time: 1045	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	Flume:	Timed Volumetric:
Description:	Stream too high to wade, no flow measurement at this location.		
Flow:			

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1045		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Location is at sample location marker TC-2 from the SI, about 1/4 mile downstream of mill site. Problem with multi-meter and pH reading. Continued to have pH problems with multi-meter, reported value is questionable. Other parameters seem to be correct.

MSE Water Sample Collection Record

SAMPLE ID:	**TC-SW1**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Trout Creek upstream of the site, just past bridge**
Date:	10/12/2010
Field Personnel:	M. Puett, D. Tibbets
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	7.82		
	pH (pH units)	6.17 (?)		
	SpCond (microS/cm)	14		
	Dissolved O_2 (mg/L)	12.43		
	ORP (mV)	139.2		

Method:	In-situ
Measurement START Time: 1130	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	Flume:	Timed Volumetric:
Description:	Stream too high to wade, no flow measurement at this location.		
Flow:			

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1130		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Sampling location is just upstream of wooden bridge. Continued problem with multi-meter and pH reading; reported value is questionable. Other parameters seem to be correct.

MSE Water Sample Collection Record

SAMPLE ID:	**SM-AS1**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Discharge from upper adit**
Date:	10/12/2010
Field Personnel:	M. Puett, D. Tibbets
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	7.63		
	pH (pH units)	7.00		
	SpCond (microS/cm)	66		
	Dissolved O_2 (mg/L)	11.9		
	ORP (mV)	203.9		

Method:	In-situ
Measurement START Time: 1400	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	Flume:	Timed Volumetric:
Description:	Discharge from adit flows about 100 ft before infiltrating.		
Flow:	Estimated to be < 5 gpm		

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1400		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	X			X			X							X		
1	X				X	X								X		
1	X				X			X	X	X	X	X				X

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location

MSE Water Sample Collection Record

SAMPLE ID:	**SM-AS2-1**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Discharge from lower adit, just outside portal**
Date:	10/12/2010
Field Personnel:	M. Puett, D. Tibbets
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	7.66		
	pH (pH units)	7.41		
	SpCond (microS/cm)	99		
	Dissolved O_2 (mg/L)	11.12		
	ORP (mV)	185.7		

Method:	In-situ
Measurement START Time: 1300	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter:	Flume:	Timed Volumetric: **X**
Description:	Stream 2.5-ft wide, depth ranged from 1 to 4 inches		
Flow:	0.43 cfs/200 gpm		

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1300		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	**X**			**X**			**X**							**X**		
1	**X**				**X**	**X**								**X**		
1	**X**				**X**			**X**	**X**	**X**	**X**	**X**				**X**

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Stream flows from adit and continues down old road bed to mill site. Continued problem with multi-meter and pH reading; reported value is questionable. Other parameters seem to be correct.

MSE Water Sample Collection Record

SAMPLE ID:	**SM-AS2-2**
Sample Location:	Sunset Mine — Photo: yes
Description:	**Discharge from lower adit, just before entering Trout Creek**
Date:	10/12/2010
Field Personnel:	M. Puett, D. Tibbets
Conditions:	Weather: Sunny Cloudy-**X** Rain

FIELD PARAMETER MEASUREMENT

Field Meter:	Field Parameters:	Observation 1	Observation 2	Observation 3
YSI	Temperature (Celcius)	8.15		
	pH (pH units)	7.72		
	SpCond (microS/cm)	100		
	Dissolved O_2 (mg/L)	12.07		
	ORP (mV)	188.6		

Method:	In-situ
Measurement START Time: 1200	Measurement END Time:

FLOW MEASUREMENT

Method:	Flow Meter: **X**	Flume:	Timed Volumetric:
Description:	Stream 1.5-ft wide in established channel, depth ranged from 0.5 to 3.0 inches		
Flow:	0.63 cfs/283 gpm		

SAMPLE COLLECTION

Sample Method:	Bottle - **X**	Pump	Other:
Sample Collection Time:	1200		

	Size			Filtration		Analysis							Preservative			
# Sample Containers	500-mL plastic bottle	250-mL plastic bottle	1000-mL glass bottle	Filtered	Unfiltered	Total: As, Ba, Cu, Fe, Pb	Dissolved: As, Ba, Cu, Fe, Pb	TDS	TSS	pH	Hardness	Sulfate	HCl	HNO_3	NaOH	NONE
1	**X**			**X**			**X**							**X**		
1	**X**				**X**	**X**								**X**		
1	**X**				**X**			**X**	**X**	**X**	**X**	**X**				**X**

STREAM CROSS-SECTION/COMMENTS

See upstream and downstream photos taken at this location. Stream flows thorugh channel excavated into waste rock/soil from the mill site. Continued problem with multi-meter and pH reading; reported value is questionable. Other parameters seem to be correct.

First sampling attempt interupted when a vehicle drove through the stream immediately upstream of the sampling location. Stopped sampling and discarded what had been collected. Returned later to collect new samples and field parameters.

MSE Sediment Sample Collection Record

SAMPLE ID:	**TC-SS3**		
Sample Location:	Sunset Mine	Photo:	see surface water sample record
Description:	**Trout Creek downstream of site, just upstream of confluence with NFSR**		
Date:	10/12/2010		
Field Personnel:	M. Puett, D. Tibbets		
Conditions:		Weather:	Sunny Cloudy-**X** Rain

METHOD

Grab: **X (see note)** Depth:

Composite:	Habitat	Depth	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 935

	Size				Analysis								Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	Brass Sleeve	Metals: As, Cu, Ni								
1		**X**			**X**								

DESCRIPTION/COMMENTS

Sample location co-located with surface water sample. Sample consisted of sediment grabbed from pockets of shallow flow along the stream bank.

MSE Sediment Sample Collection Record

SAMPLE ID:	**TC-SS2**
Sample Location:	Sunset Mine — Photo: see surface water sample record
Description:	**Trout Creek downstream of site, 1/4 mile from mill site**
Date:	10/12/2010
Field Personnel:	M. Puett, D. Tibbets
Conditions:	Weather: Sunny Cloudy-**X** Rain

METHOD

Grab: **X (see note)** Depth:

Composite:	Habitat	Depth	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1050

	Size				Analysis								Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	Brass Sleeve	Metals: As, Cu, Ni								
1		**X**			**X**								

DESCRIPTION/COMMENTS

Sample location co-located with surface water sample. Sample consisted of sediment grabbed from pockets of shallow flow along the stream bank.

MSE Sediment Sample Collection Record

SAMPLE ID:	**TC-SS1**		
Sample Location:	Sunset Mine	Photo:	see surface water sample record
Description:	**Trout Creek upstream of site, just past wooden bridge**		
Date:	10/12/2010		
Field Personnel:	M. Puett, D. Tibbets		
Conditions:		Weather:	Sunny Cloudy-**X** Rain

METHOD

Grab: **X (see note)** Depth:

Composite:

Habitat	Depth	Comments

SAMPLE COLLECTION

Equipment: Trowel **X** Push Sampler Other:

Sample Collection Time: 1135

	Size				Analysis								Other
# Sample Containers	500-mL Bottle	12-oz glass jar	8-oz glass jar	Brass Sleeve	Metals: As, Cu, Ni								
1		**X**			**X**								

DESCRIPTION/COMMENTS

Sample location co-located with surface water sample. Sample consisted of sediment grabbed from pockets of shallow flow along the stream bank.

ATTACHMENT C

LAB RESULTS

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
SM-AS1-2	W0F0463-01	Surface Water	15-Jun-10 15:30	MP	17-Jun-2010
SM-AS2-1-2	W0F0463-02	Surface Water	16-Jun-10 12:56	MP	17-Jun-2010
SM-AS2-2-2	W0F0463-03	Surface Water	16-Jun-10 11:55	MP	17-Jun-2010
TC-SW3-2	W0F0463-04	Surface Water	16-Jun-10 09:14	MP	17-Jun-2010
TC-SW2-2	W0F0463-05	Surface Water	16-Jun-10 10:10	MP	17-Jun-2010
TC-SW1-2	W0F0463-06	Surface Water	16-Jun-10 11:16	MP	17-Jun-2010
QC-SW-X	W0F0463-07	Surface Water	16-Jun-10 12:15	MP	17-Jun-2010
QC-SW-Y	W0F0463-08	Surface Water	16-Jun-10 00:00	MP	17-Jun-2010

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.
Sample preparation is defined by the client as per their Data Quality Objectives.
This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.
The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Client Sample ID: **SM-AS1-2**
SVL Sample ID: **W0F0463-01 (Surface Water)**

Sampled: 15-Jun-10 15:30
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0094	mg/L	0.0020	0.0003		W026176	FEH	06/29/10 23:10	
EPA 200.7	**Calcium**	8.38	mg/L	0.040	0.006		W026176	FEH	06/29/10 23:09	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.009		W026176	FEH	06/29/10 23:09	
EPA 200.7	**Magnesium**	0.838	mg/L	0.060	0.006		W026176	DT	06/30/10 15:50	
EPA 200.7	Potassium	< 0.50	mg/L	0.50	0.03		W026176	FEH	06/29/10 23:09	
EPA 200.7	**Sodium**	1.33	mg/L	0.50	0.02		W026176	FEH	06/29/10 23:09	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W026071	DG	07/01/10 11:06	
EPA 200.8	**Copper**	0.0928	mg/L	0.00100	0.00009	2.5	W026071	DG	07/01/10 11:06	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W026071	DG	07/01/10 11:06	
SM 2340B	**Hardness (as CaCO3)**	24.4	mg/L	0.347	0.038		N/A		06/30/10 15:50	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0088	mg/L	0.0020	0.0007		W026177	FEH	06/30/10 20:40	
EPA 200.7	**Calcium**	7.36	mg/L	0.040	0.012		W026177	FEH	06/30/10 20:39	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.018		W026177	FEH	06/30/10 20:39	
EPA 200.7	**Magnesium**	0.811	mg/L	0.060	0.011		W026177	FEH	06/30/10 20:39	
EPA 200.7	Potassium	< 0.50	mg/L	0.50	0.06		W026177	FEH	06/30/10 20:39	
EPA 200.7	**Sodium**	1.27	mg/L	0.50	0.04		W026177	FEH	06/30/10 20:39	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W026068	DG	07/01/10 11:29	
EPA 200.8	**Copper**	0.0495	mg/L	0.00100	0.000072		W026068	DG	07/01/10 11:29	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W026068	DG	07/01/10 11:29	
Classical Chemistry Parameters										
SM 2320B/2310B	**Bicarbonate**	25.3	mg/L	1.0	0.3		W026086	DKS	06/22/10 12:56	
SM 2320B/2310B	Carbonate	< 1.0	mg/L	1.0	0.3		W026086	DKS	06/22/10 12:56	
SM 2320B/2310B	**Total Alkalinity**	25.3	mg/L	1.0	0.3		W026086	DKS	06/22/10 12:56	
SM 2540 C	**Total Diss. Solids**	40	mg/L	10	4		W026051	AGF	06/22/10 09:50	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0	4.2		W026050	AGF	06/22/10 09:50	
SM 4500 H B	**pH @25.0°C**	7.47	pH Units				W026086	DKS	06/22/10 12:56	
Anions by Ion Chromatography										
EPA 300.0	**Chloride**	0.595	mg/L	0.200	0.033		W026194	FEH	06/24/10 12:46	
EPA 300.0	**Sulfate as SO4**	2.28	mg/L	0.30	0.08		W026194	FEH	06/24/10 12:46	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.49 meq/L Anion Sum: 0.57 meq/L C/A Balance: -7.32 % Calculated TDS: 28 TDS/cTDS: 1.43

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

Kirby Gray
Technical Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Client Sample ID: **SM-AS2-1-2**
SVL Sample ID: **W0F0463-02 (Surface Water)**

Sampled: 16-Jun-10 12:56
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0154	mg/L	0.0020	0.0003		W026176	FEH	06/29/10 23:28	
EPA 200.7	**Calcium**	19.1	mg/L	0.040	0.006		W026176	FEH	06/29/10 23:26	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.009		W026176	FEH	06/29/10 23:26	
EPA 200.7	**Magnesium**	2.17	mg/L	0.060	0.006		W026176	DT	06/30/10 16:29	
EPA 200.7	**Potassium**	0.70	mg/L	0.50	0.03		W026176	FEH	06/29/10 23:26	
EPA 200.7	**Sodium**	2.28	mg/L	0.50	0.02		W026176	FEH	06/29/10 23:26	
EPA 200.8	**Arsenic**	0.00312	mg/L	0.00300	0.00054	2.5	W026071	DG	07/01/10 11:11	
EPA 200.8	**Copper**	0.101	mg/L	0.00100	0.00009	2.5	W026071	DG	07/01/10 11:11	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W026071	DG	07/01/10 11:11	
SM 2340B	**Hardness (as CaCO3)**	56.5	mg/L	0.347	0.038		N/A		06/30/10 16:29	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0150	mg/L	0.0020	0.0007		W026177	FEH	06/30/10 20:45	
EPA 200.7	**Calcium**	17.1	mg/L	0.040	0.012		W026177	FEH	06/30/10 20:44	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.018		W026177	FEH	06/30/10 20:44	
EPA 200.7	**Magnesium**	2.07	mg/L	0.060	0.011		W026177	FEH	06/30/10 20:44	
EPA 200.7	**Potassium**	0.64	mg/L	0.50	0.06		W026177	FEH	06/30/10 20:44	
EPA 200.7	**Sodium**	2.31	mg/L	0.50	0.04		W026177	FEH	06/30/10 20:44	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W026068	DG	07/01/10 11:37	
EPA 200.8	**Copper**	0.0675	mg/L	0.00100	0.000072		W026068	DG	07/01/10 11:37	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W026068	DG	07/01/10 11:37	
Classical Chemistry Parameters										
SM 2320B/2310B	**Bicarbonate**	54.9	mg/L	1.0	0.3		W026086	DKS	06/22/10 13:05	
SM 2320B/2310B	Carbonate	< 1.0	mg/L	1.0	0.3		W026086	DKS	06/22/10 13:05	
SM 2320B/2310B	**Total Alkalinity**	54.9	mg/L	1.0	0.3		W026086	DKS	06/22/10 13:05	
SM 2540 C	**Total Diss. Solids**	78	mg/L	10	4		W026051	AGF	06/22/10 09:50	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0	4.2		W026050	AGF	06/22/10 09:50	
SM 4500 H B	**pH @24.0°C**	7.73	pH Units				W026086	DKS	06/22/10 13:05	
Anions by Ion Chromatography										
EPA 300.0	**Chloride**	0.978	mg/L	0.200	0.033		W026194	FEH	06/24/10 13:16	
EPA 300.0	**Sulfate as SO4**	7.41	mg/L	0.30	0.08		W026194	FEH	06/24/10 13:16	
Cation/Anion Balance and TDS Ratios										

Cation Sum: 1.14 meq/L Anion Sum: 1.28 meq/L C/A Balance: -5.66 % Calculated TDS: 65 TDS/cTDS: 1.21

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

Kirby Gray
Technical Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Client Sample ID: **SM-AS2-2-2**
SVL Sample ID: **W0F0463-03 (Surface Water)**

Sampled: 16-Jun-10 11:55
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0164	mg/L	0.0020	0.0003		W026176	FEH	06/29/10 23:33	
EPA 200.7	**Calcium**	19.4	mg/L	0.040	0.006		W026176	FEH	06/29/10 23:32	
EPA 200.7	**Iron**	0.115	mg/L	0.060	0.009		W026176	FEH	06/29/10 23:32	
EPA 200.7	**Magnesium**	2.27	mg/L	0.060	0.006		W026176	DT	06/30/10 16:34	
EPA 200.7	**Potassium**	0.73	mg/L	0.50	0.03		W026176	FEH	06/29/10 23:32	
EPA 200.7	**Sodium**	2.28	mg/L	0.50	0.02		W026176	FEH	06/29/10 23:32	
EPA 200.8	**Arsenic**	0.00321	mg/L	0.00300	0.00054	2.5	W026071	DG	07/01/10 11:12	
EPA 200.8	**Copper**	0.130	mg/L	0.00100	0.00009	2.5	W026071	DG	07/01/10 11:12	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W026071	DG	07/01/10 11:12	
SM 2340B	**Hardness (as CaCO3)**	57.7	mg/L	0.347	0.038		N/A		06/30/10 16:34	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0150	mg/L	0.0020	0.0007		W026177	FEH	06/30/10 20:51	
EPA 200.7	**Calcium**	17.1	mg/L	0.040	0.012		W026177	FEH	06/30/10 20:49	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.018		W026177	FEH	06/30/10 20:50	
EPA 200.7	**Magnesium**	2.08	mg/L	0.060	0.011		W026177	FEH	06/30/10 20:50	
EPA 200.7	**Potassium**	0.66	mg/L	0.50	0.06		W026177	FEH	06/30/10 20:49	
EPA 200.7	**Sodium**	2.26	mg/L	0.50	0.04		W026177	FEH	06/30/10 20:49	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W026068	DG	07/01/10 11:38	
EPA 200.8	**Copper**	0.0718	mg/L	0.00100	0.000072		W026068	DG	07/01/10 11:38	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W026068	DG	07/01/10 11:38	
Classical Chemistry Parameters										
SM 2320B/2310B	**Bicarbonate**	55.1	mg/L	1.0	0.3		W026086	DKS	06/22/10 13:09	
SM 2320B/2310B	Carbonate	< 1.0	mg/L	1.0	0.3		W026086	DKS	06/22/10 13:09	
SM 2320B/2310B	**Total Alkalinity**	55.1	mg/L	1.0	0.3		W026086	DKS	06/22/10 13:09	
SM 2540 C	**Total Diss. Solids**	77	mg/L	10	4		W026051	AGF	06/22/10 09:50	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0	4.2		W026050	AGF	06/22/10 09:50	
SM 4500 H B	**pH @24.0°C**	7.89	pH Units				W026086	DKS	06/22/10 13:09	
Anions by Ion Chromatography										
EPA 300.0	**Chloride**	0.921	mg/L	0.200	0.033		W026194	FEH	06/24/10 13:46	
EPA 300.0	**Sulfate as SO4**	7.39	mg/L	0.30	0.08		W026194	FEH	06/24/10 13:46	
Cation/Anion Balance and TDS Ratios										

Cation Sum: 1.14 meq/L Anion Sum: 1.28 meq/L C/A Balance: -5.69 % Calculated TDS: 65 TDS/cTDS: 1.19

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

Kirby Gray
Technical Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Client Sample ID: **TC-SW3-2**
SVL Sample ID: **W0F0463-04 (Surface Water)**

Sampled: 16-Jun-10 09:14
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0036	mg/L	0.0020	0.0003		W026176	FEH	06/29/10 23:39	
EPA 200.7	**Calcium**	2.03	mg/L	0.040	0.006		W026176	FEH	06/29/10 23:37	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.009		W026176	FEH	06/29/10 23:38	
EPA 200.7	**Magnesium**	0.298	mg/L	0.060	0.006		W026176	DT	06/30/10 16:40	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W026071	DG	07/01/10 11:18	
EPA 200.8	**Copper**	0.00102	mg/L	0.00100	0.00009	2.5	W026071	DG	07/01/10 11:18	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W026071	DG	07/01/10 11:18	
SM 2340B	**Hardness (as CaCO3)**	6.29	mg/L	0.347	0.038		N/A		06/30/10 16:40	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0030	mg/L	0.0020	0.0007		W026177	FEH	06/30/10 20:56	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.018		W026177	FEH	06/30/10 20:55	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W026068	DG	07/01/10 11:40	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.000072		W026068	DG	07/01/10 11:40	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W026068	DG	07/01/10 11:40	
Classical Chemistry Parameters										
SM 2540 C	**Total Diss. Solids**	12	mg/L	10	4		W026051	AGF	06/22/10 09:50	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0	4.2		W026050	AGF	06/22/10 09:50	
SM 4500 H B	**pH @24.0°C**	6.97	pH Units				W026086	DKS	06/22/10 13:12	
Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	0.96	mg/L	0.30	0.08		W026194	FEH	06/24/10 13:56	

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Kirby Gray
Technical Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Client Sample ID: **TC-SW2-2**
SVL Sample ID: **W0F0463-05 (Surface Water)**

Sampled: 16-Jun-10 10:10
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0036	mg/L	0.0020	0.0003		W026176	FEH	06/29/10 23:45	
EPA 200.7	**Calcium**	2.09	mg/L	0.040	0.006		W026176	FEH	06/29/10 23:43	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.009		W026176	FEH	06/29/10 23:43	
EPA 200.7	**Magnesium**	0.309	mg/L	0.060	0.006		W026176	DT	06/30/10 16:45	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W026071	DG	07/01/10 11:19	
EPA 200.8	**Copper**	0.00112	mg/L	0.00100	0.00009	2.5	W026071	DG	07/01/10 11:19	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W026071	DG	07/01/10 11:19	
SM 2340B	**Hardness (as CaCO3)**	6.48	mg/L	0.347	0.038		N/A		06/30/10 16:45	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0028	mg/L	0.0020	0.0007		W026177	FEH	06/30/10 21:01	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.018		W026177	FEH	06/30/10 21:00	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W026068	DG	07/01/10 11:42	
EPA 200.8	**Copper**	0.00108	mg/L	0.00100	0.000072		W026068	DG	07/01/10 11:42	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W026068	DG	07/01/10 11:42	
Classical Chemistry Parameters										
SM 2540 C	**Total Diss. Solids**	10	mg/L	10	4		W026051	AGF	06/22/10 09:50	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0	4.2		W026050	AGF	06/22/10 09:50	
SM 4500 H B	**pH @24.0°C**	6.97	pH Units				W026086	DKS	06/22/10 13:14	
Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	0.96	mg/L	0.30	0.08		W026194	FEH	06/24/10 14:06	

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Kirby Gray
Technical Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Client Sample ID: **TC-SW1-2**
SVL Sample ID: **W0F0463-06 (Surface Water)**

Sampled: 16-Jun-10 11:16
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0034	mg/L	0.0020	0.0003		W026176	FEH	06/29/10 23:51	
EPA 200.7	**Calcium**	1.89	mg/L	0.040	0.006		W026176	FEH	06/29/10 23:49	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.009		W026176	FEH	06/29/10 23:49	
EPA 200.7	**Magnesium**	0.283	mg/L	0.060	0.006		W026176	DT	06/30/10 17:02	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W026071	DG	07/01/10 11:21	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.00009	2.5	W026071	DG	07/01/10 11:21	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W026071	DG	07/01/10 11:21	
SM 2340B	**Hardness (as CaCO3)**	5.89	mg/L	0.347	0.038		N/A		06/30/10 17:02	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0028	mg/L	0.0020	0.0007		W026177	FEH	06/30/10 21:07	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.018		W026177	FEH	06/30/10 21:06	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W026068	DG	07/01/10 11:43	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.000072		W026068	DG	07/01/10 11:43	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W026068	DG	07/01/10 11:43	
Classical Chemistry Parameters										
SM 2540 C	**Total Diss. Solids**	11	mg/L	10	4		W026051	AGF	06/22/10 09:50	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0	4.2		W026050	AGF	06/22/10 09:50	
SM 4500 H B	**pH @23.9°C**	6.97	pH Units				W026086	DKS	06/22/10 13:16	
Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	0.89	mg/L	0.30	0.08		W026194	FEH	06/24/10 14:16	

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

Kirby Gray
Technical Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Client Sample ID: **QC-SW-X**
SVL Sample ID: **W0F0463-07 (Surface Water)**

Sampled: 16-Jun-10 12:15
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0155	mg/L	0.0020	0.0003		W026176	FEH	06/30/10 00:08	
EPA 200.7	**Calcium**	18.9	mg/L	0.040	0.006		W026176	FEH	06/30/10 00:06	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.009		W026176	FEH	06/30/10 00:07	
EPA 200.7	**Magnesium**	2.18	mg/L	0.060	0.006		W026176	DT	06/30/10 17:07	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W026071	DG	07/01/10 11:22	
EPA 200.8	**Copper**	0.101	mg/L	0.00100	0.00009	2.5	W026071	DG	07/01/10 11:22	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W026071	DG	07/01/10 11:22	
SM 2340B	**Hardness (as CaCO3)**	56.1	mg/L	0.347	0.038		N/A		06/30/10 17:07	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0151	mg/L	0.0020	0.0007		W026177	FEH	06/30/10 21:12	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.018		W026177	FEH	06/30/10 21:11	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W026068	DG	07/01/10 11:45	
EPA 200.8	**Copper**	0.0627	mg/L	0.00100	0.000072		W026068	DG	07/01/10 11:45	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W026068	DG	07/01/10 11:45	
Classical Chemistry Parameters										
SM 2540 C	**Total Diss. Solids**	71	mg/L	10	4		W026051	AGF	06/22/10 09:50	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0	4.2		W026050	AGF	06/22/10 09:50	
SM 4500 H B	**pH @23.8°C**	7.92	pH Units				W026086	DKS	06/22/10 13:18	
Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	7.63	mg/L	0.30	0.08		W026194	FEH	06/24/10 14:36	

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

Kirby Gray
Technical Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Client Sample ID: **QC-SW-Y**
SVL Sample ID: **W0F0463-08 (Surface Water)**

Sampled: 16-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	Barium	< 0.0020	mg/L	0.0020	0.0003		W026176	FEH	06/30/10 00:14	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.009		W026176	FEH	06/30/10 00:12	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W026071	DG	07/01/10 11:24	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.00009	2.5	W026071	DG	07/01/10 11:24	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W026071	DG	07/01/10 11:24	
Metals (Dissolved)										
EPA 200.7	Barium	< 0.0020	mg/L	0.0020	0.0007		W026177	FEH	06/30/10 21:17	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.018		W026177	FEH	06/30/10 21:16	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W026068	DG	07/01/10 11:46	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.000072		W026068	DG	07/01/10 11:46	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W026068	DG	07/01/10 11:46	

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

Kirby Gray
Technical Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)								
EPA 200.7	Barium	mg/L	<0.0020	0.0003	0.0020	W026176	29-Jun-10	
EPA 200.7	Calcium	mg/L	0.073	0.006	0.040	W026176	29-Jun-10	B7
EPA 200.7	Iron	mg/L	<0.060	0.009	0.060	W026176	29-Jun-10	
EPA 200.7	Magnesium	mg/L	<0.060	0.006	0.060	W026176	30-Jun-10	
EPA 200.7	Potassium	mg/L	<0.50	0.03	0.50	W026176	29-Jun-10	
EPA 200.7	Sodium	mg/L	<0.50	0.02	0.50	W026176	29-Jun-10	
EPA 200.8	Arsenic	mg/L	<0.00300	0.00054	0.00300	W026071	01-Jul-10	
EPA 200.8	Copper	mg/L	<0.00100	0.00009	0.00100	W026071	01-Jul-10	
EPA 200.8	Lead	mg/L	<0.00300	0.000024	0.00300	W026071	01-Jul-10	
Metals (Dissolved)								
EPA 200.7	Barium	mg/L	<0.0020	0.0007	0.0020	W026177	30-Jun-10	
EPA 200.7	Calcium	mg/L	<0.040	0.012	0.040	W026177	30-Jun-10	
EPA 200.7	Iron	mg/L	<0.060	0.018	0.060	W026177	30-Jun-10	
EPA 200.7	Magnesium	mg/L	<0.060	0.011	0.060	W026177	30-Jun-10	
EPA 200.7	Potassium	mg/L	<0.50	0.06	0.50	W026177	30-Jun-10	
EPA 200.7	Sodium	mg/L	<0.50	0.04	0.50	W026177	30-Jun-10	
EPA 200.8	Arsenic	mg/L	<0.00300	0.00043	0.00300	W026068	01-Jul-10	
EPA 200.8	Copper	mg/L	<0.00100	0.000072	0.00100	W026068	01-Jul-10	
EPA 200.8	Lead	mg/L	<0.00300	0.000019	0.00300	W026068	01-Jul-10	
Anions by Ion Chromatography								
EPA 300.0	Chloride	mg/L	<0.200	0.033	0.200	W026194	24-Jun-10	
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.08	0.30	W026194	24-Jun-10	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)									
EPA 200.7	Barium	mg/L	0.936	1.00	93.6	85 - 115	W026176	29-Jun-10	
EPA 200.7	Calcium	mg/L	20.0	20.0	100	85 - 115	W026176	29-Jun-10	
EPA 200.7	Iron	mg/L	9.86	10.0	98.6	85 - 115	W026176	29-Jun-10	
EPA 200.7	Magnesium	mg/L	18.8	20.0	94.2	85 - 115	W026176	30-Jun-10	
EPA 200.7	Potassium	mg/L	20.5	20.0	102	85 - 115	W026176	29-Jun-10	
EPA 200.7	Sodium	mg/L	17.6	19.0	92.8	85 - 115	W026176	29-Jun-10	
EPA 200.8	Arsenic	mg/L	0.0243	0.0250	97.3	85 - 115	W026071	01-Jul-10	
EPA 200.8	Copper	mg/L	0.0249	0.0250	99.5	85 - 115	W026071	01-Jul-10	
EPA 200.8	Lead	mg/L	0.0255	0.0250	102	85 - 115	W026071	01-Jul-10	
Metals (Dissolved)									
EPA 200.7	Barium	mg/L	1.00	1.00	100	85 - 115	W026177	30-Jun-10	
EPA 200.7	Calcium	mg/L	18.6	20.0	92.8	85 - 115	W026177	30-Jun-10	
EPA 200.7	Iron	mg/L	9.28	10.0	92.8	85 - 115	W026177	30-Jun-10	
EPA 200.7	Magnesium	mg/L	18.5	20.0	92.4	85 - 115	W026177	30-Jun-10	
EPA 200.7	Potassium	mg/L	19.1	20.0	95.6	85 - 115	W026177	30-Jun-10	
EPA 200.7	Sodium	mg/L	18.3	19.0	96.5	85 - 115	W026177	30-Jun-10	
EPA 200.8	Arsenic	mg/L	0.0238	0.0250	95.3	85 - 115	W026068	01-Jul-10	
EPA 200.8	Copper	mg/L	0.0248	0.0250	99.0	85 - 115	W026068	01-Jul-10	
EPA 200.8	Lead	mg/L	0.0255	0.0250	102	85 - 115	W026068	01-Jul-10	
Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	3.04	3.00	101	90 - 110	W026194	24-Jun-10	
EPA 300.0	Sulfate as SO4	mg/L	10.4	10.0	104	90 - 110	W026194	24-Jun-10	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)									
EPA 200.7	Barium	mg/L	0.0092	0.0094	1.2	20	W026176	29-Jun-10	
EPA 200.7	Calcium	mg/L	8.33	8.38	0.7	20	W026176	29-Jun-10	
EPA 200.7	Iron	mg/L	<0.060	<0.060	UDL	20	W026176	29-Jun-10	
EPA 200.7	Magnesium	mg/L	0.829	0.838	1.1	20	W026176	30-Jun-10	
EPA 200.7	Potassium	mg/L	<0.50	<0.50	<RL	20	W026176	29-Jun-10	
EPA 200.7	Sodium	mg/L	1.31	1.33	1.9	20	W026176	29-Jun-10	
EPA 200.8	Arsenic	mg/L	<0.00300	<0.00300	<RL	20	W026071	01-Jul-10	
EPA 200.8	Copper	mg/L	0.0913	0.0928	1.6	20	W026071	01-Jul-10	
EPA 200.8	Lead	mg/L	<0.00300	<0.00300	UDL	20	W026071	01-Jul-10	
Metals (Dissolved)									
EPA 200.7	Barium	mg/L	0.0101	0.0102	1.2	20	W026177	30-Jun-10	
EPA 200.7	Calcium	mg/L	1.59	1.58	0.3	20	W026177	30-Jun-10	
EPA 200.7	Iron	mg/L	<0.060	<0.060	UDL	20	W026177	30-Jun-10	
EPA 200.7	Magnesium	mg/L	0.607	0.603	0.7	20	W026177	30-Jun-10	
EPA 200.7	Potassium	mg/L	<0.50	<0.50	<RL	20	W026177	30-Jun-10	
EPA 200.7	Sodium	mg/L	0.86	0.86	0.0	20	W026177	30-Jun-10	
EPA 200.8	Arsenic	mg/L	<0.00300	<0.00300	UDL	20	W026068	01-Jul-10	
EPA 200.8	Copper	mg/L	0.0490	0.0495	0.9	20	W026068	01-Jul-10	
EPA 200.8	Lead	mg/L	<0.00300	<0.00300	UDL	20	W026068	01-Jul-10	
Classical Chemistry Parameters									
SM 2320B/2310B	Total Alkalinity	mg/L	26.7	25.3	5.3	20	W026086	22-Jun-10	
SM 2320B/2310B	Bicarbonate	mg/L	26.7	25.3	5.3	20	W026086	22-Jun-10	
SM 2320B/2310B	Carbonate	mg/L	<1.0	<1.0	UDL	20	W026086	22-Jun-10	
SM 2540 C	Total Diss. Solids	mg/L	72	71	1.4	20	W026051	22-Jun-10	
SM 2540 D	Total Susp. Solids	mg/L	<5.0	<5.0	UDL	20	W026050	22-Jun-10	
SM 4500 H B	pH	pH Units	7.43	7.47	0.5	20	W026086	22-Jun-10	
Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	0.617	0.595	3.5	20	W026194	24-Jun-10	
EPA 300.0	Sulfate as SO4	mg/L	2.40	2.28	5.1	20	W026194	24-Jun-10	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	Barium	mg/L	0.920	0.0094	1.00	91.1	70 - 130	W026176	29-Jun-10	
EPA 200.7	Calcium	mg/L	27.3	8.38	20.0	94.8	70 - 130	W026176	29-Jun-10	
EPA 200.7	Iron	mg/L	9.67	<0.060	10.0	96.7	70 - 130	W026176	29-Jun-10	
EPA 200.7	Magnesium	mg/L	19.5	0.838	20.0	93.3	70 - 130	W026176	30-Jun-10	
EPA 200.7	Potassium	mg/L	20.5	<0.50	20.0	100	70 - 130	W026176	29-Jun-10	
EPA 200.7	Sodium	mg/L	18.5	1.33	19.0	90.3	70 - 130	W026176	29-Jun-10	
EPA 200.8	Arsenic	mg/L	0.0260	<0.00300	0.0250	101	70 - 130	W026071	01-Jul-10	
EPA 200.8	Copper	mg/L	0.113	0.0928	0.0250	81.1	70 - 130	W026071	01-Jul-10	
EPA 200.8	Lead	mg/L	0.0260	<0.00300	0.0250	104	70 - 130	W026071	01-Jul-10	
Metals (Dissolved)										
EPA 200.7	Barium	mg/L	1.13	0.0281	1.00	110	70 - 130	W026177	30-Jun-10	
EPA 200.7	Barium	mg/L	0.870	0.0102	1.00	86.0	70 - 130	W026177	30-Jun-10	
EPA 200.7	Calcium	mg/L	47.3	25.8	20.0	107	70 - 130	W026177	30-Jun-10	
EPA 200.7	Calcium	mg/L	19.8	1.58	20.0	91.3	70 - 130	W026177	30-Jun-10	
EPA 200.7	Iron	mg/L	10.7	<0.060	10.0	107	70 - 130	W026177	30-Jun-10	
EPA 200.7	Iron	mg/L	8.94	<0.060	10.0	89.4	70 - 130	W026177	30-Jun-10	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0463**
Reported: 02-Jul-10 15:45

Quality Control - MATRIX SPIKE Data (Continued)

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Dissolved) (Continued)										
EPA 200.7	Magnesium	mg/L	28.5	7.35	20.0	106	70 - 130	W026177	30-Jun-10	
EPA 200.7	Magnesium	mg/L	18.6	0.603	20.0	90.1	70 - 130	W026177	30-Jun-10	
EPA 200.7	Potassium	mg/L	24.9	1.92	20.0	115	70 - 130	W026177	30-Jun-10	
EPA 200.7	Potassium	mg/L	19.5	<0.50	20.0	96.6	70 - 130	W026177	30-Jun-10	
EPA 200.7	Sodium	mg/L	21.3	0.85	19.0	108	70 - 130	W026177	30-Jun-10	
EPA 200.7	Sodium	mg/L	17.6	0.86	19.0	88.3	70 - 130	W026177	30-Jun-10	
EPA 200.8	Arsenic	mg/L	0.0284	<0.00300	0.0250	114	70 - 130	W026068	01-Jul-10	
EPA 200.8	Copper	mg/L	0.0748	0.0495	0.0250	102	70 - 130	W026068	01-Jul-10	
EPA 200.8	Lead	mg/L	0.0277	<0.00300	0.0250	111	70 - 130	W026068	01-Jul-10	
Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	3.73	0.595	3.00	104	80 - 120	W026194	24-Jun-10	
EPA 300.0	Chloride	mg/L	3.52	0.424	3.00	103	80 - 120	W026194	24-Jun-10	
EPA 300.0	Sulfate as SO4	mg/L	12.9	2.28	10.0	106	80 - 120	W026194	24-Jun-10	
EPA 300.0	Sulfate as SO4	mg/L	11.2	0.89	10.0	103	80 - 120	W026194	24-Jun-10	

Notes and Definitions

B7	Target analyte in method blank exceeded method QC limits, but concentrations in samples were at least 10x the blank concentration.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
SM-BGS-4	W0F0473-01	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BGS-5	W0F0473-02	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BGS-6	W0F0473-03	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BGS-7	W0F0473-04	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BGS-8	W0F0473-05	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BGS-9	W0F0473-06	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BGS-10	W0F0473-07	Soil	15-Jun-10 00:00	MP	17-Jun-2010
QC-BGS-X	W0F0473-08	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BOR-1	W0F0473-09	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BOR-2	W0F0473-10	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-BOR-3	W0F0473-11	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-S4	W0F0473-12	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-S5	W0F0473-13	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-S6	W0F0473-14	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-CONC-1	W0F0473-15	Soil	15-Jun-10 00:00	MP	17-Jun-2010
SM-WR5-2	W0F0473-16	Soil	—	MP	17-Jun-2010
SM-WR5-3	W0F0473-17	Soil	—	MP	17-Jun-2010

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.
Sample preparation is defined by the client as per their Data Quality Objectives.
This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.
The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BGS-4**
SVL Sample ID: **W0F0473-01 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	8670	mg/kg	8.0	1.9		W026281	FEH	06/30/10 19:10	
EPA 6010B	**Arsenic**	6.1	mg/kg	2.5	0.5		W026281	FEH	06/30/10 19:11	
EPA 6010B	**Barium**	24.8	mg/kg	0.20	0.02		W026281	FEH	06/30/10 19:11	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 19:11	
EPA 6010B	**Copper**	546	mg/kg	1.00	0.21		W026281	FEH	06/30/10 19:11	
EPA 6010B	**Lead**	1.85	mg/kg	0.75	0.36		W026281	FEH	06/30/10 19:11	
EPA 6010B	**Vanadium**	29.3	mg/kg	0.50	0.06		W026281	FEH	06/30/10 19:11	
EPA 6010B	**Zinc**	80.1	mg/kg	1.00	0.22		W026281	FEH	06/30/10 19:11	
Percent Solids										
Percent Solids	**% Solids**	86.9	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BGS-5**
SVL Sample ID: **W0F0473-02 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	13000	mg/kg	8.0	1.9		W026281	FEH	06/30/10 19:15	
EPA 6010B	**Arsenic**	15.7	mg/kg	2.5	0.5		W026281	FEH	06/30/10 19:17	
EPA 6010B	**Barium**	60.3	mg/kg	0.20	0.02		W026281	FEH	06/30/10 19:17	
EPA 6010B	**Cadmium**	0.32	mg/kg	0.20	0.03		W026281	FEH	06/30/10 19:17	
EPA 6010B	**Copper**	992	mg/kg	1.00	0.21		W026281	FEH	06/30/10 19:17	
EPA 6010B	**Lead**	5.27	mg/kg	0.75	0.36		W026281	FEH	06/30/10 19:17	
EPA 6010B	**Vanadium**	31.5	mg/kg	0.50	0.06		W026281	FEH	06/30/10 19:17	
EPA 6010B	**Zinc**	106	mg/kg	1.00	0.22		W026281	FEH	06/30/10 19:17	
Percent Solids										
Percent Solids	**% Solids**	81.4	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BGS-6**
SVL Sample ID: **W0F0473-03 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	8960	mg/kg	8.0	1.9		W026281	FEH	06/30/10 19:33	
EPA 6010B	**Arsenic**	21.2	mg/kg	2.5	0.5		W026281	FEH	06/30/10 19:36	
EPA 6010B	**Barium**	45.7	mg/kg	0.20	0.02		W026281	FEH	06/30/10 19:35	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 19:35	
EPA 6010B	**Copper**	65200	mg/kg	100	21.0	100	W026281	AS	07/01/10 11:23	D2
EPA 6010B	**Lead**	50.2	mg/kg	0.75	0.36		W026281	FEH	06/30/10 19:36	
EPA 6010B	**Vanadium**	42.2	mg/kg	0.50	0.06		W026281	FEH	06/30/10 19:35	
EPA 6010B	**Zinc**	106	mg/kg	1.00	0.22		W026281	FEH	06/30/10 19:35	
Percent Solids										
Percent Solids	**% Solids**	86.1	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BGS-7**
SVL Sample ID: **W0F0473-04 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	20600	mg/kg	8.0	1.9		W026281	FEH	06/30/10 19:39	
EPA 6010B	**Arsenic**	5.7	mg/kg	2.5	0.5		W026281	FEH	06/30/10 19:41	
EPA 6010B	**Barium**	29.3	mg/kg	0.20	0.02		W026281	FEH	06/30/10 19:41	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 19:41	
EPA 6010B	**Copper**	305	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:23	
EPA 6010B	**Lead**	3.62	mg/kg	0.75	0.36		W026281	FEH	06/30/10 19:41	
EPA 6010B	**Vanadium**	30.0	mg/kg	0.50	0.06		W026281	FEH	06/30/10 19:41	
EPA 6010B	**Zinc**	35.0	mg/kg	1.00	0.22		W026281	FEH	06/30/10 19:41	
Percent Solids										
Percent Solids	**% Solids**	76.5	%	0.1			W026283	DP	06/25/10 09:26	

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John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BGS-8**
SVL Sample ID: **W0F0473-05 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	18800	mg/kg	8.0	1.9		W026281	FEH	06/30/10 19:45	
EPA 6010B	**Arsenic**	15.1	mg/kg	2.5	0.5		W026281	FEH	06/30/10 19:47	
EPA 6010B	**Barium**	41.1	mg/kg	0.20	0.02		W026281	FEH	06/30/10 19:46	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 19:46	
EPA 6010B	**Copper**	394	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:28	
EPA 6010B	**Lead**	5.93	mg/kg	0.75	0.36		W026281	FEH	06/30/10 19:47	
EPA 6010B	**Vanadium**	32.1	mg/kg	0.50	0.06		W026281	FEH	06/30/10 19:46	
EPA 6010B	**Zinc**	116	mg/kg	1.00	0.22		W026281	FEH	06/30/10 19:46	
Percent Solids										
Percent Solids	**% Solids**	70.7	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BGS-9**
SVL Sample ID: **W0F0473-06 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	21800	mg/kg	8.0	1.9		W026281	FEH	06/30/10 19:50	
EPA 6010B	**Arsenic**	5.3	mg/kg	2.5	0.5		W026281	FEH	06/30/10 19:52	
EPA 6010B	**Barium**	82.2	mg/kg	0.20	0.02		W026281	FEH	06/30/10 19:52	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 19:52	
EPA 6010B	**Copper**	47.3	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:34	
EPA 6010B	**Lead**	9.26	mg/kg	0.75	0.36		W026281	FEH	06/30/10 19:52	
EPA 6010B	**Vanadium**	53.8	mg/kg	0.50	0.06		W026281	FEH	06/30/10 19:52	
EPA 6010B	**Zinc**	56.5	mg/kg	1.00	0.22		W026281	FEH	06/30/10 19:52	
Percent Solids										
Percent Solids	**% Solids**	68.8	%	0.1			W026283	DP	06/25/10 09:26	

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John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BGS-10**
SVL Sample ID: **W0F0473-07 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	28600	mg/kg	8.0	1.9		W026281	FEH	06/30/10 19:56	
EPA 6010B	**Arsenic**	3.5	mg/kg	2.5	0.5		W026281	FEH	06/30/10 19:58	
EPA 6010B	**Barium**	79.1	mg/kg	0.20	0.02		W026281	FEH	06/30/10 19:57	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 19:57	
EPA 6010B	**Copper**	29.7	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:39	
EPA 6010B	**Lead**	8.57	mg/kg	0.75	0.36		W026281	FEH	06/30/10 19:58	
EPA 6010B	**Vanadium**	58.5	mg/kg	0.50	0.06		W026281	FEH	06/30/10 19:57	
EPA 6010B	**Zinc**	53.9	mg/kg	1.00	0.22		W026281	FEH	06/30/10 19:57	
Percent Solids										
Percent Solids	**% Solids**	68.3	%	0.1			W026283	DP	06/25/10 09:26	

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John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **QC-BGS-X**
SVL Sample ID: **W0F0473-08 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	18500	mg/kg	8.0	1.9		W026281	FEH	06/30/10 20:01	
EPA 6010B	**Arsenic**	14.6	mg/kg	2.5	0.5		W026281	FEH	06/30/10 20:03	
EPA 6010B	**Barium**	41.0	mg/kg	0.20	0.02		W026281	FEH	06/30/10 20:03	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 20:03	
EPA 6010B	**Copper**	461	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:44	
EPA 6010B	**Lead**	5.54	mg/kg	0.75	0.36		W026281	FEH	06/30/10 20:03	
EPA 6010B	**Vanadium**	33.9	mg/kg	0.50	0.06		W026281	FEH	06/30/10 20:03	
EPA 6010B	**Zinc**	101	mg/kg	1.00	0.22		W026281	FEH	06/30/10 20:03	
Percent Solids										
Percent Solids	**% Solids**	72.2	%	0.1			W026283	DP	06/25/10 09:26	

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John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BOR-1**
SVL Sample ID: **W0F0473-09 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	17000	mg/kg	8.0	1.9		W026281	FEH	06/30/10 20:07	
EPA 6010B	**Arsenic**	53.3	mg/kg	2.5	0.5		W026281	FEH	06/30/10 20:09	
EPA 6010B	**Barium**	43.1	mg/kg	0.20	0.02		W026281	FEH	06/30/10 20:09	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 20:09	
EPA 6010B	**Copper**	14000	mg/kg	100	21.0	100	W026281	AS	07/01/10 11:29	D2
EPA 6010B	**Lead**	18.9	mg/kg	0.75	0.36		W026281	FEH	06/30/10 20:09	
EPA 6010B	**Vanadium**	35.4	mg/kg	0.50	0.06		W026281	FEH	06/30/10 20:09	
EPA 6010B	**Zinc**	129	mg/kg	1.00	0.22		W026281	FEH	06/30/10 20:09	
Percent Solids										
Percent Solids	**% Solids**	88.8	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BOR-2**
SVL Sample ID: **W0F0473-10 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	20700	mg/kg	8.0	1.9		W026281	FEH	06/30/10 20:13	
EPA 6010B	**Arsenic**	12.8	mg/kg	2.5	0.5		W026281	FEH	06/30/10 20:16	
EPA 6010B	**Barium**	36.9	mg/kg	0.20	0.02		W026281	FEH	06/30/10 20:15	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 20:15	
EPA 6010B	**Copper**	14600	mg/kg	100	21.0	100	W026281	AS	07/01/10 11:35	D2
EPA 6010B	**Lead**	14.3	mg/kg	0.75	0.36		W026281	FEH	06/30/10 20:16	
EPA 6010B	**Vanadium**	54.5	mg/kg	0.50	0.06		W026281	FEH	06/30/10 20:15	
EPA 6010B	**Zinc**	238	mg/kg	1.00	0.22		W026281	FEH	06/30/10 20:15	
Percent Solids										
Percent Solids	**% Solids**	92.7	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-BOR-3**
SVL Sample ID: **W0F0473-11 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	32800	mg/kg	8.0	1.9		W026281	FEH	06/30/10 20:19	
EPA 6010B	**Arsenic**	5.4	mg/kg	2.5	0.5		W026281	FEH	06/30/10 20:21	
EPA 6010B	**Barium**	106	mg/kg	0.20	0.02		W026281	FEH	06/30/10 20:21	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 20:21	
EPA 6010B	**Copper**	45.3	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:50	
EPA 6010B	**Lead**	10.3	mg/kg	0.75	0.36		W026281	FEH	06/30/10 20:21	
EPA 6010B	**Vanadium**	73.2	mg/kg	0.50	0.06		W026281	FEH	06/30/10 20:21	
EPA 6010B	**Zinc**	69.8	mg/kg	1.00	0.22		W026281	FEH	06/30/10 20:21	
Percent Solids										
Percent Solids	**% Solids**	72.2	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-S4**
SVL Sample ID: **W0F0473-12 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	9900	mg/kg	8.0	1.9		W026281	FEH	06/30/10 20:25	
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.3		W026281	FEH	06/30/10 20:27	
EPA 6010B	**Arsenic**	14.8	mg/kg	2.5	0.5		W026281	FEH	06/30/10 20:27	
EPA 6010B	**Barium**	42.4	mg/kg	0.20	0.02		W026281	FEH	06/30/10 20:26	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 20:26	
EPA 6010B	**Chromium**	11.3	mg/kg	0.60	0.07		W026281	FEH	06/30/10 20:26	
EPA 6010B	**Cobalt**	8.69	mg/kg	0.60	0.06		W026281	FEH	06/30/10 20:27	
EPA 6010B	**Copper**	2830	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:07	
EPA 6010B	**Iron**	21400	mg/kg	6.0	1.0		W026281	FEH	06/30/10 20:25	
EPA 6010B	**Lead**	18.0	mg/kg	0.75	0.36		W026281	FEH	06/30/10 20:27	
EPA 6010B	**Manganese**	517	mg/kg	0.40	0.06		W026281	FEH	06/30/10 20:25	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.4		W026281	FEH	06/30/10 20:27	
EPA 6010B	**Silver**	1.46	mg/kg	0.50	0.04		W026281	FEH	06/30/10 20:26	
EPA 6010B	**Vanadium**	28.3	mg/kg	0.50	0.06		W026281	FEH	06/30/10 20:26	
EPA 6010B	**Zinc**	92.3	mg/kg	1.00	0.22		W026281	FEH	06/30/10 20:26	
EPA 7471A	**Mercury**	0.217	mg/kg	0.033	0.010		W027122	JAA	06/30/10 15:59	
Percent Solids										
Percent Solids	**% Solids**	72.6	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-S5**
SVL Sample ID: **W0F0473-13 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	10600	mg/kg	8.0	1.9		W026281	FEH	06/30/10 21:17	
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.3		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Arsenic**	19.4	mg/kg	2.5	0.5		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Barium**	43.4	mg/kg	0.20	0.02		W026281	FEH	06/30/10 21:18	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Chromium**	11.7	mg/kg	0.60	0.07		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Cobalt**	8.81	mg/kg	0.60	0.06		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Copper**	2800	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:13	
EPA 6010B	**Iron**	23400	mg/kg	6.0	1.0		W026281	FEH	06/30/10 21:17	
EPA 6010B	**Lead**	16.0	mg/kg	0.75	0.36		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Manganese**	530	mg/kg	0.40	0.06		W026281	FEH	06/30/10 21:17	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.4		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Silver**	1.00	mg/kg	0.50	0.04		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Vanadium**	30.2	mg/kg	0.50	0.06		W026281	FEH	06/30/10 21:18	
EPA 6010B	**Zinc**	104	mg/kg	1.00	0.22		W026281	FEH	06/30/10 21:18	
EPA 7471A	**Mercury**	0.255	mg/kg	0.033	0.010		W027122	JAA	06/30/10 16:04	
Percent Solids										
Percent Solids	**% Solids**	74.0	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-S6**
SVL Sample ID: **W0F0473-14 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	6600	mg/kg	8.0	1.9		W026281	FEH	06/30/10 21:22	
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.3		W026281	FEH	06/30/10 21:24	
EPA 6010B	**Arsenic**	8.9	mg/kg	2.5	0.5		W026281	FEH	06/30/10 21:24	
EPA 6010B	**Barium**	44.9	mg/kg	0.20	0.02		W026281	FEH	06/30/10 21:23	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 21:23	
EPA 6010B	**Chromium**	7.42	mg/kg	0.60	0.07		W026281	FEH	06/30/10 21:24	
EPA 6010B	**Cobalt**	8.60	mg/kg	0.60	0.06		W026281	FEH	06/30/10 21:24	
EPA 6010B	**Copper**	1320	mg/kg	1.00	0.21		W026281	AS	07/01/10 10:18	
EPA 6010B	**Iron**	14900	mg/kg	6.0	1.0		W026281	FEH	06/30/10 21:22	
EPA 6010B	**Lead**	20.8	mg/kg	0.75	0.36		W026281	FEH	06/30/10 21:24	
EPA 6010B	**Manganese**	618	mg/kg	0.40	0.06		W026281	FEH	06/30/10 21:22	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.4		W026281	FEH	06/30/10 21:24	
EPA 6010B	**Silver**	0.61	mg/kg	0.50	0.04		W026281	FEH	06/30/10 21:23	
EPA 6010B	**Vanadium**	20.8	mg/kg	0.50	0.06		W026281	FEH	06/30/10 21:23	
EPA 6010B	**Zinc**	62.1	mg/kg	1.00	0.22		W026281	FEH	06/30/10 21:23	
EPA 7471A	**Mercury**	0.232	mg/kg	0.033	0.010		W027122	JAA	06/30/10 16:06	
Percent Solids										
Percent Solids	**% Solids**	62.6	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-CONC-1**
SVL Sample ID: **W0F0473-15 (Soil)**

Sampled: 15-Jun-10 00:00
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
TCLP Extraction Parameters										
EPA 1311	**Final pH**	9.42	pH Units				W026103	BJF	06/25/10 14:25	
TCLP Leachates (Metals)										
EPA 6010B	Arsenic	< 0.05	mg/L Extract	0.05	0.005		W027030	AS	06/29/10 14:52	
EPA 6010B	Barium	< 1.00	mg/L Extract	1.00	0.0007		W027030	FEH	06/29/10 21:07	
EPA 6010B	Cadmium	< 0.010	mg/L Extract	0.010	0.0005		W027030	AS	06/29/10 14:52	
EPA 6010B	Chromium	< 0.050	mg/L Extract	0.050	0.0009		W027030	AS	06/29/10 14:52	
EPA 6010B	Lead	< 0.0500	mg/L Extract	0.0500	0.0040		W027030	AS	06/29/10 14:52	
EPA 6010B	Selenium	< 0.05	mg/L Extract	0.05	0.01		W027030	AS	06/29/10 14:52	
EPA 6010B	Silver	< 0.050	mg/L Extract	0.050	0.001		W027030	AS	06/29/10 14:52	
EPA 7470A	Mercury	< 0.0002	mg/L Extract	0.0002	0.00006		W027006	HB	06/29/10 12:14	M5

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John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-WR5-2**
SVL Sample ID: **W0F0473-16 (Soil)**

Sampled: —
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	4960	mg/kg	8.0	1.9		W026281	FEH	06/30/10 21:28	
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.3		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Arsenic**	84.2	mg/kg	2.5	0.5		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Barium**	17.4	mg/kg	0.20	0.02		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Cadmium**	0.34	mg/kg	0.20	0.03		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Chromium**	4.39	mg/kg	0.60	0.07		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Cobalt**	26.1	mg/kg	0.60	0.06		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Copper**	43300	mg/kg	100	21.0	100	W026281	AS	07/01/10 11:40	D2
EPA 6010B	**Iron**	59800	mg/kg	6.0	1.0		W026281	FEH	06/30/10 21:28	
EPA 6010B	**Lead**	23.0	mg/kg	0.75	0.36		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Manganese**	1490	mg/kg	0.40	0.06		W026281	FEH	06/30/10 21:28	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.4		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Silver**	7.93	mg/kg	0.50	0.04		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Vanadium**	13.9	mg/kg	0.50	0.06		W026281	FEH	06/30/10 21:31	
EPA 6010B	**Zinc**	142	mg/kg	1.00	0.22		W026281	FEH	06/30/10 21:31	
EPA 7471A	**Mercury**	0.283	mg/kg	0.033	0.010		W027122	JAA	06/30/10 16:07	
Percent Solids										
Percent Solids	**% Solids**	82.9	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Client Sample ID: **SM-WR5-3**
SVL Sample ID: **W0F0473-17 (Soil)**

Sampled: —
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Aluminum**	19500	mg/kg	8.0	1.9		W026281	FEH	06/30/10 21:35	
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.3		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Arsenic**	15.5	mg/kg	2.5	0.5		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Barium**	18.2	mg/kg	0.20	0.02		W026281	FEH	06/30/10 21:37	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.03		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Chromium**	14.6	mg/kg	0.60	0.07		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Cobalt**	22.4	mg/kg	0.60	0.06		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Copper**	12300	mg/kg	100	21.0	100	W026281	AS	07/01/10 11:46	D2
EPA 6010B	**Iron**	46000	mg/kg	6.0	1.0		W026281	FEH	06/30/10 21:35	
EPA 6010B	**Lead**	73.6	mg/kg	0.75	0.36		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Manganese**	1030	mg/kg	0.40	0.06		W026281	FEH	06/30/10 21:35	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.4		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Silver**	1.11	mg/kg	0.50	0.04		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Vanadium**	29.5	mg/kg	0.50	0.06		W026281	FEH	06/30/10 21:37	
EPA 6010B	**Zinc**	106	mg/kg	1.00	0.22		W026281	FEH	06/30/10 21:37	
EPA 7471A	**Mercury**	0.117	mg/kg	0.033	0.010		W027122	JAA	06/30/10 16:09	
Percent Solids										
Percent Solids	**% Solids**	82.7	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods								
EPA 6010B	Aluminum	mg/kg	<8.0	1.9	8.0	W026281	30-Jun-10	
EPA 6010B	Antimony	mg/kg	<2.0	0.3	2.0	W026281	30-Jun-10	
EPA 6010B	Arsenic	mg/kg	<2.5	0.5	2.5	W026281	30-Jun-10	
EPA 6010B	Barium	mg/kg	<0.20	0.02	0.20	W026281	30-Jun-10	
EPA 6010B	Cadmium	mg/kg	<0.20	0.03	0.20	W026281	30-Jun-10	
EPA 6010B	Chromium	mg/kg	<0.60	0.07	0.60	W026281	30-Jun-10	
EPA 6010B	Cobalt	mg/kg	<0.60	0.06	0.60	W026281	30-Jun-10	
EPA 6010B	Copper	mg/kg	<1.00	0.21	1.00	W026281	30-Jun-10	
EPA 6010B	Iron	mg/kg	<6.0	1.0	6.0	W026281	30-Jun-10	
EPA 6010B	Lead	mg/kg	<0.75	0.36	0.75	W026281	30-Jun-10	
EPA 6010B	Manganese	mg/kg	<0.40	0.06	0.40	W026281	30-Jun-10	
EPA 6010B	Selenium	mg/kg	<4.0	1.4	4.0	W026281	30-Jun-10	
EPA 6010B	Silver	mg/kg	<0.50	0.04	0.50	W026281	30-Jun-10	
EPA 6010B	Vanadium	mg/kg	<0.50	0.06	0.50	W026281	30-Jun-10	
EPA 6010B	Zinc	mg/kg	<1.00	0.22	1.00	W026281	30-Jun-10	
EPA 7471A	Mercury	mg/kg	<0.033	0.010	0.033	W027122	30-Jun-10	
TCLP Extraction Parameters								
EPA 1311	Final pH	pH Units	4.93			W026103	25-Jun-10	
TCLP Leachates (Metals)								
EPA 6010B	Arsenic	mg/L Extract	<0.05	0.005	0.05	W027030	29-Jun-10	
EPA 6010B	Barium	mg/L Extract	<1.00	0.0007	1.00	W027030	29-Jun-10	
EPA 6010B	Cadmium	mg/L Extract	<0.010	0.0005	0.010	W027030	29-Jun-10	
EPA 6010B	Chromium	mg/L Extract	<0.050	0.0009	0.050	W027030	29-Jun-10	
EPA 6010B	Lead	mg/L Extract	<0.0500	0.0040	0.0500	W027030	29-Jun-10	
EPA 6010B	Selenium	mg/L Extract	<0.05	0.01	0.05	W027030	29-Jun-10	
EPA 6010B	Silver	mg/L Extract	<0.050	0.001	0.050	W027030	29-Jun-10	
EPA 7470A	Mercury	mg/L Extract	<0.0002	0.00006	0.0002	W027006	29-Jun-10	M5

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods									
EPA 6010B	Aluminum	mg/kg	92.8	100	92.8	80 - 120	W026281	30-Jun-10	
EPA 6010B	Antimony	mg/kg	94.3	100	94.3	80 - 120	W026281	30-Jun-10	
EPA 6010B	Arsenic	mg/kg	93.3	100	93.3	80 - 120	W026281	30-Jun-10	
EPA 6010B	Barium	mg/kg	94.2	100	94.2	80 - 120	W026281	30-Jun-10	
EPA 6010B	Cadmium	mg/kg	94.7	100	94.7	80 - 120	W026281	30-Jun-10	
EPA 6010B	Chromium	mg/kg	98.1	100	98.1	80 - 120	W026281	30-Jun-10	
EPA 6010B	Cobalt	mg/kg	97.2	100	97.2	80 - 120	W026281	30-Jun-10	
EPA 6010B	Copper	mg/kg	100	100	100	80 - 120	W026281	30-Jun-10	
EPA 6010B	Iron	mg/kg	954	1000	95.4	80 - 120	W026281	30-Jun-10	
EPA 6010B	Lead	mg/kg	95.5	100	95.5	80 - 120	W026281	30-Jun-10	
EPA 6010B	Manganese	mg/kg	96.3	100	96.3	80 - 120	W026281	30-Jun-10	
EPA 6010B	Selenium	mg/kg	84.9	100	84.9	80 - 120	W026281	30-Jun-10	
EPA 6010B	Silver	mg/kg	4.63	5.00	92.7	80 - 120	W026281	30-Jun-10	
EPA 6010B	Vanadium	mg/kg	99.4	100	99.4	80 - 120	W026281	30-Jun-10	
EPA 6010B	Zinc	mg/kg	93.8	100	93.8	80 - 120	W026281	30-Jun-10	
EPA 7471A	Mercury	mg/kg	0.833	0.833	100	80 - 120	W027122	30-Jun-10	
TCLP Leachates (Metals)									
EPA 6010B	Arsenic	mg/L Extract	1.07	1.00	107	80 - 120	W027030	29-Jun-10	
EPA 6010B	Barium	mg/L Extract	19.9	20.0	99.7	80 - 120	W027030	29-Jun-10	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
TCLP Leachates (Metals) (Continued)									
EPA 6010B	Cadmium	mg/L Extract	0.201	0.200	100	80 - 120	W027030	29-Jun-10	
EPA 6010B	Chromium	mg/L Extract	0.952	1.00	95.2	80 - 120	W027030	29-Jun-10	
EPA 6010B	Lead	mg/L Extract	0.941	1.00	94.1	80 - 120	W027030	29-Jun-10	
EPA 6010B	Selenium	mg/L Extract	0.21	0.200	104	80 - 120	W027030	29-Jun-10	
EPA 6010B	Silver	mg/L Extract	1.07	1.00	107	80 - 120	W027030	29-Jun-10	
EPA 7470A	Mercury	mg/L Extract	0.0052	0.00500	104	80 - 120	W027006	29-Jun-10	M5

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Aluminum	mg/kg	8590	7490	100	R > 4S	75 - 125	W026281	30-Jun-10	M3
EPA 6010B	Antimony	mg/kg	75.8	<2.0	100	75.8	75 - 125	W026281	30-Jun-10	
EPA 6010B	Arsenic	mg/kg	97.6	3.0	100	94.6	75 - 125	W026281	30-Jun-10	
EPA 6010B	Barium	mg/kg	160	63.6	100	96.1	75 - 125	W026281	30-Jun-10	
EPA 6010B	Cadmium	mg/kg	94.4	<0.20	100	94.4	75 - 125	W026281	30-Jun-10	
EPA 6010B	Chromium	mg/kg	113	13.7	100	99.1	75 - 125	W026281	30-Jun-10	
EPA 6010B	Cobalt	mg/kg	99.4	4.79	100	94.6	75 - 125	W026281	30-Jun-10	
EPA 6010B	Copper	mg/kg	422	93.2	100	329	75 - 125	W026281	30-Jun-10	M1
EPA 6010B	Iron	mg/kg	14200	12500	1000	R > 4S	75 - 125	W026281	30-Jun-10	M3
EPA 6010B	Lead	mg/kg	110	4.71	100	105	75 - 125	W026281	30-Jun-10	
EPA 6010B	Manganese	mg/kg	417	296	100	122	75 - 125	W026281	30-Jun-10	
EPA 6010B	Selenium	mg/kg	82.3	<4.0	100	82.3	75 - 125	W026281	30-Jun-10	
EPA 6010B	Silver	mg/kg	4.88	<0.50	5.00	97.6	75 - 125	W026281	30-Jun-10	
EPA 6010B	Vanadium	mg/kg	129	29.2	100	99.3	75 - 125	W026281	30-Jun-10	
EPA 6010B	Zinc	mg/kg	151	52.0	100	99.3	75 - 125	W026281	30-Jun-10	
EPA 7471A	Mercury	mg/kg	0.172	<0.033	0.167	94.0	70 - 130	W027122	30-Jun-10	
TCLP Leachates (Metals)										
EPA 6010B	Arsenic	mg/L Extract	1.09	<0.05	1.00	109	75 - 125	W027030	29-Jun-10	
EPA 6010B	Barium	mg/L Extract	20.0	<1.00	20.0	97.3	75 - 125	W027030	29-Jun-10	
EPA 6010B	Cadmium	mg/L Extract	0.231	0.042	0.200	94.2	75 - 125	W027030	29-Jun-10	
EPA 6010B	Chromium	mg/L Extract	0.946	<0.050	1.00	94.4	75 - 125	W027030	29-Jun-10	
EPA 6010B	Lead	mg/L Extract	0.909	<0.0500	1.00	90.9	75 - 125	W027030	29-Jun-10	
EPA 6010B	Selenium	mg/L Extract	0.82	0.68	0.200	66.6	75 - 125	W027030	29-Jun-10	M2
EPA 6010B	Silver	mg/L Extract	1.12	<0.050	1.00	111	75 - 125	W027030	29-Jun-10	
EPA 7470A	Mercury	mg/L Extract	7.01	6.42	0.00100	R > 4S	70 - 130	W027006	29-Jun-10	D2,M3,M5

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Aluminum	mg/kg	8870	8590	100	3.1	20	W026281	30-Jun-10	
EPA 6010B	Antimony	mg/kg	76.7	75.8	100	1.2	20	W026281	30-Jun-10	
EPA 6010B	Arsenic	mg/kg	98.2	97.6	100	0.6	20	W026281	30-Jun-10	
EPA 6010B	Barium	mg/kg	146	160	100	8.6	20	W026281	30-Jun-10	
EPA 6010B	Cadmium	mg/kg	95.8	94.4	100	1.5	20	W026281	30-Jun-10	
EPA 6010B	Chromium	mg/kg	113	113	100	0.3	20	W026281	30-Jun-10	
EPA 6010B	Cobalt	mg/kg	102	99.4	100	2.3	20	W026281	30-Jun-10	
EPA 6010B	Copper	mg/kg	167	422	100	86.8	20	W026281	30-Jun-10	R1
EPA 6010B	Iron	mg/kg	13500	14200	1000	5.2	20	W026281	30-Jun-10	
EPA 6010B	Lead	mg/kg	102	110	100	7.1	20	W026281	30-Jun-10	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0473**
Reported: 01-Jul-10 13:44

Quality Control - MATRIX SPIKE DUPLICATE Data (Continued)

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods (Continued)										
EPA 6010B	Manganese	mg/kg	385	417	100	8.0	20	W026281	30-Jun-10	
EPA 6010B	Selenium	mg/kg	85.4	82.3	100	3.7	20	W026281	30-Jun-10	
EPA 6010B	Silver	mg/kg	4.62	4.88	5.00	5.5	20	W026281	30-Jun-10	
EPA 6010B	Vanadium	mg/kg	132	129	100	2.9	20	W026281	30-Jun-10	
EPA 6010B	Zinc	mg/kg	145	151	100	4.5	20	W026281	30-Jun-10	
EPA 7471A	Mercury	mg/kg	0.173	0.172	0.167	1.0	20	W027122	30-Jun-10	
TCLP Leachates (Metals)										
EPA 6010B	Arsenic	mg/L Extract	1.08	1.09	1.00	1.1	20	W027030	29-Jun-10	
EPA 6010B	Barium	mg/L Extract	20.0	20.0	20.0	0.1	20	W027030	29-Jun-10	
EPA 6010B	Cadmium	mg/L Extract	0.230	0.231	0.200	0.2	20	W027030	29-Jun-10	
EPA 6010B	Chromium	mg/L Extract	0.933	0.946	1.00	1.4	20	W027030	29-Jun-10	
EPA 6010B	Lead	mg/L Extract	0.895	0.909	1.00	1.6	20	W027030	29-Jun-10	
EPA 6010B	Selenium	mg/L Extract	0.80	0.82	0.200	1.7	20	W027030	29-Jun-10	
EPA 6010B	Silver	mg/L Extract	1.09	1.12	1.00	3.2	20	W027030	29-Jun-10	
EPA 7470A	Mercury	mg/L Extract	7.30	7.01	0.00100	4.0	20	W027006	29-Jun-10	D2,M5

Quality Control - POST DIGESTION SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
TCLP Leachates (Metals)										
EPA 6010B	Selenium	mg/L Extract	1.14	0.68	0.200	229	75 - 125	W027030	29-Jun-10	M1

Notes and Definitions

D2	Sample required dilution due to high concentration of target analyte.
M1	Matrix spike recovery was high, but the LCS recovery was acceptable.
M2	Matrix spike recovery was low, but the LCS recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
M5	Analyte concentration was determined by the method of standard addition (MSA).
R1	RPD exceeded the method acceptance limit.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0471**
Reported: 01-Jul-10 13:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
TC-SS1-2	W0F0471-01	Soil	16-Jun-10 11:16	MP	17-Jun-2010
TC-SS2-2	W0F0471-02	Soil	16-Jun-10 10:10	MP	17-Jun-2010
TC-SS3-2	W0F0471-03	Soil	16-Jun-10 09:14	MP	17-Jun-2010
QC-SED X	W0F0471-04	Soil	16-Jun-10 11:55	MP	17-Jun-2010

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.
Sample preparation is defined by the client as per their Data Quality Objectives.
This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.
The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0471**
Reported: 01-Jul-10 13:47

Client Sample ID: **TC-SS1-2**
SVL Sample ID: **W0F0471-01 (Soil)**

Sampled: 16-Jun-10 11:16
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Arsenic**	5.5	mg/kg	2.5	0.5		W026281	FEH	06/30/10 18:38	
EPA 6010B	**Copper**	52.1	mg/kg	1.00	0.21		W026281	FEH	06/30/10 18:38	
EPA 6010B	**Nickel**	11.3	mg/kg	1.00	0.25		W026281	FEH	06/30/10 18:38	
Percent Solids										
Percent Solids	**% Solids**	74.0	%	0.1			W026283	DP	06/25/10 09:26	

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

John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0471**
Reported: 01-Jul-10 13:47

Client Sample ID: **TC-SS2-2**
SVL Sample ID: **W0F0471-02 (Soil)**

Sampled: 16-Jun-10 10:10
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Arsenic**	9.1	mg/kg	2.5	0.5		W026281	FEH	06/30/10 18:44	
EPA 6010B	**Copper**	211	mg/kg	1.00	0.21		W026281	FEH	06/30/10 18:43	
EPA 6010B	**Nickel**	17.4	mg/kg	1.00	0.25		W026281	FEH	06/30/10 18:43	
Percent Solids										
Percent Solids	**% Solids**	77.4	%	0.1			W026283	DP	06/25/10 09:26	

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John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0471**
Reported: 01-Jul-10 13:47

Client Sample ID: **TC-SS3-2**
SVL Sample ID: **W0F0471-03 (Soil)**

Sampled: 16-Jun-10 09:14
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Arsenic**	3.0	mg/kg	2.5	0.5		W026281	FEH	06/30/10 18:49	
EPA 6010B	**Copper**	93.2	mg/kg	1.00	0.21		W026281	FEH	06/30/10 18:49	
EPA 6010B	**Nickel**	10.4	mg/kg	1.00	0.25		W026281	FEH	06/30/10 18:49	
Percent Solids										
Percent Solids	**% Solids**	74.8	%	0.1			W026283	DP	06/25/10 09:26	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0471**
Reported: 01-Jul-10 13:47

Client Sample ID: **QC-SED X**
SVL Sample ID: **W0F0471-04 (Soil)**

Sampled: 16-Jun-10 11:55
Received: 17-Jun-10
Sampled By: MP

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Arsenic**	6.9	mg/kg	2.5	0.5		W026281	FEH	06/30/10 19:06	
EPA 6010B	**Copper**	177	mg/kg	1.00	0.21		W026281	FEH	06/30/10 19:05	
EPA 6010B	**Nickel**	13.1	mg/kg	1.00	0.25		W026281	FEH	06/30/10 19:05	
Percent Solids										
Percent Solids	**% Solids**	77.1	%	0.1			W026283	DP	06/25/10 09:26	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0471**
Reported: 01-Jul-10 13:47

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods								
EPA 6010B	Arsenic	mg/kg	<2.5	0.5	2.5	W026281	30-Jun-10	
EPA 6010B	Copper	mg/kg	<1.00	0.21	1.00	W026281	30-Jun-10	
EPA 6010B	Nickel	mg/kg	<1.00	0.25	1.00	W026281	30-Jun-10	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods									
EPA 6010B	Arsenic	mg/kg	93.3	100	93.3	80 - 120	W026281	30-Jun-10	
EPA 6010B	Copper	mg/kg	100	100	100	80 - 120	W026281	30-Jun-10	
EPA 6010B	Nickel	mg/kg	92.8	100	92.8	80 - 120	W026281	30-Jun-10	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	mg/kg	97.6	3.0	100	94.6	75 - 125	W026281	30-Jun-10	
EPA 6010B	Copper	mg/kg	422	93.2	100	329	75 - 125	W026281	30-Jun-10	M1
EPA 6010B	Nickel	mg/kg	102	10.4	100	91.8	75 - 125	W026281	30-Jun-10	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	mg/kg	98.2	97.6	100	0.6	20	W026281	30-Jun-10	
EPA 6010B	Copper	mg/kg	167	422	100	86.8	20	W026281	30-Jun-10	R1
EPA 6010B	Nickel	mg/kg	106	102	100	3.7	20	W026281	30-Jun-10	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0F0471**
Reported: 01-Jul-10 13:47

Notes and Definitions

M1	Matrix spike recovery was high, but the LCS recovery was acceptable.
R1	RPD exceeded the method acceptance limit.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
TC-SW 3-2	W0J0324-01	Surface Water	12-Oct-10 09:30	DT	13-Oct-2010
TC-SSS 3-2	W0J0324-02	Soil	12-Oct-10 09:30	DT	13-Oct-2010
TC-SW 2-2	W0J0324-03	Surface Water	12-Oct-10 11:00	DT	13-Oct-2010
TC-SSS 2-2	W0J0324-04	Soil	12-Oct-10 11:00	DT	13-Oct-2010
TC-SW 1-2	W0J0324-05	Surface Water	12-Oct-10 11:30	DT	13-Oct-2010
TC-SSS 1-2	W0J0324-06	Soil	12-Oct-10 11:30	DT	13-Oct-2010
SM-AS 2-2	W0J0324-07	Surface Water	12-Oct-10 12:30	DT	13-Oct-2010
SM-AS 2-1	W0J0324-08	Surface Water	12-Oct-10 13:00	DT	13-Oct-2010
SM-AS 1-2	W0J0324-09	Surface Water	12-Oct-10 14:00	DT	13-Oct-2010
QC-SW-X	W0J0324-10	Surface Water	12-Oct-10 12:30	DT	13-Oct-2010
QC-SW-Y	W0J0324-11	Surface Water	12-Oct-10 15:00	DT	13-Oct-2010
QC-SED-X	W0J0324-12	Soil	12-Oct-10 15:00	DT	13-Oct-2010

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **TC-SW 3-2**
SVL Sample ID: **W0J0324-01 (Surface Water)**

Sampled: 12-Oct-10 09:30
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0048	mg/L	0.0020	0.0003		W042376	AS	10/28/10 17:36	
EPA 200.7	**Calcium**	2.34	mg/L	0.040	0.008		W042376	AS	10/28/10 17:34	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.014		W042376	AS	10/28/10 17:34	
EPA 200.7	**Magnesium**	0.382	mg/L	0.060	0.012		W042376	AS	10/28/10 17:34	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W042332	DG	10/26/10 16:51	
EPA 200.8	**Copper**	0.00113	mg/L	0.00100	0.00009	2.5	W042332	DG	10/26/10 16:51	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W042332	DG	10/26/10 16:51	
SM 2340B	**Hardness (as CaCO3)**	7.42	mg/L	0.347	0.069		N/A		10/28/10 17:34	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0049	mg/L	0.0020	0.0005		W042448	AS	10/28/10 16:25	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.027		W042448	AS	10/28/10 16:23	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W042331	KWH	10/27/10 07:03	
EPA 200.8	**Copper**	0.00104	mg/L	0.00100	0.000072		W042331	KWH	10/27/10 07:03	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W042331	KWH	10/27/10 07:03	
Classical Chemistry Parameters										
SM 2540 C	**Total Diss. Solids**	29	mg/L	10			W042411	JMS,	10/15/10 15:30	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0			W042414	JMS,	10/15/10 15:30	
SM 4500 H B	**pH @19.6°C**	7.04	pH Units				W042385	DKS	10/15/10 12:29	
Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	1.07	mg/L	0.30	0.05		W042355	FEH	10/18/10 21:01	

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

John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **TC-SSS 3-2**
SVL Sample ID: **W0J0324-02 (Soil)**

Sampled: 12-Oct-10 09:30
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Arsenic**	24.7	mg/kg	2.5	0.4		W043056	DT	10/28/10 11:45	
EPA 6010B	**Copper**	103	mg/kg	1.00	0.21		W043056	DT	10/28/10 11:45	
EPA 6010B	**Nickel**	15.0	mg/kg	1.00	0.25		W043056	DT	10/28/10 11:45	
Percent Solids										
Percent Solids	**% Solids**	80.3	%	0.1			W043057	DP	10/22/10 11:41	

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Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **TC-SW 2-2**
SVL Sample ID: **W0J0324-03 (Surface Water)**

Sampled: 12-Oct-10 11:00
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0049	mg/L	0.0020	0.0003		W042376	AS	10/28/10 17:42	
EPA 200.7	**Calcium**	2.33	mg/L	0.040	0.008		W042376	AS	10/28/10 17:40	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.014		W042376	AS	10/28/10 17:40	
EPA 200.7	**Magnesium**	0.377	mg/L	0.060	0.012		W042376	AS	10/28/10 17:40	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W042332	DG	10/26/10 16:55	
EPA 200.8	**Copper**	0.00109	mg/L	0.00100	0.00009	2.5	W042332	DG	10/26/10 16:55	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W042332	DG	10/26/10 16:55	
SM 2340B	**Hardness (as CaCO3)**	7.37	mg/L	0.347	0.069		N/A		10/28/10 17:40	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0049	mg/L	0.0020	0.0005		W042448	AS	10/28/10 16:35	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.027		W042448	AS	10/28/10 16:34	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W042331	KWH	10/27/10 07:08	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.000072		W042331	KWH	10/27/10 07:08	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W042331	KWH	10/27/10 07:08	
Classical Chemistry Parameters										
SM 2540 C	Total Diss. Solids	< 10	mg/L	10			W042411	JMS,	10/15/10 15:30	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0			W042414	JMS,	10/15/10 15:30	
SM 4500 H B	**pH @19.4°C**	7.07	pH Units				W042385	DKS	10/15/10 12:31	
Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	1.05	mg/L	0.30	0.05		W042355	FEH	10/18/10 21:34	

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

John Kern
Laboratory Director

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **TC-SSS 2-2**
SVL Sample ID: **W0J0324-04 (Soil)**

Sampled: 12-Oct-10 11:00
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Arsenic**	10.7	mg/kg	2.5	0.4		W043056	DT	10/28/10 11:51	
EPA 6010B	**Copper**	354	mg/kg	1.00	0.21		W043056	DT	10/28/10 11:50	
EPA 6010B	**Nickel**	13.2	mg/kg	1.00	0.25		W043056	DT	10/28/10 11:50	
Percent Solids										
Percent Solids	**% Solids**	78.1	%	0.1			W043057	DP	10/22/10 11:41	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **TC-SW 1-2**
SVL Sample ID: **W0J0324-05 (Surface Water)**

Sampled: 12-Oct-10 11:30
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0047	mg/L	0.0020	0.0003		W042376	AS	10/28/10 17:47	
EPA 200.7	**Calcium**	2.22	mg/L	0.040	0.008		W042376	AS	10/28/10 17:46	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.014		W042376	AS	10/28/10 17:46	
EPA 200.7	**Magnesium**	0.363	mg/L	0.060	0.012		W042376	AS	10/28/10 17:46	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W042332	DG	10/26/10 16:57	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.00009	2.5	W042332	DG	10/26/10 16:57	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W042332	DG	10/26/10 16:57	
SM 2340B	**Hardness (as CaCO3)**	7.05	mg/L	0.347	0.069		N/A		10/28/10 17:46	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0045	mg/L	0.0020	0.0005		W042448	AS	10/28/10 16:41	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.027		W042448	AS	10/28/10 16:39	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W042331	KWH	10/27/10 07:09	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.000072		W042331	KWH	10/27/10 07:09	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W042331	KWH	10/27/10 07:09	
Classical Chemistry Parameters										
SM 2540 C	**Total Diss. Solids**	13	mg/L	10			W042411	JMS,	10/15/10 15:30	
SM 2540 D	**Total Susp. Solids**	8.0	mg/L	5.0			W042414	JMS,	10/15/10 15:30	
SM 4500 H B	**pH @19.3°C**	7.09	pH Units				W042385	DKS	10/15/10 12:33	
Anions by Ion Chromatography										
EPA 300.0	**Sulfate as SO4**	0.98	mg/L	0.30	0.05		W042355	FEH	10/18/10 21:44	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **TC-SSS 1-2**
SVL Sample ID: **W0J0324-06 (Soil)**

Sampled: 12-Oct-10 11:30
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Arsenic**	6.2	mg/kg	2.5	0.4		W043056	DT	10/28/10 11:56	
EPA 6010B	**Copper**	51.9	mg/kg	1.00	0.21		W043056	DT	10/28/10 11:56	
EPA 6010B	**Nickel**	13.8	mg/kg	1.00	0.25		W043056	DT	10/28/10 11:56	
Percent Solids										
Percent Solids	**% Solids**	77.3	%	0.1			W043057	DP	10/22/10 11:41	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **SM-AS 2-2**
SVL Sample ID: **W0J0324-07 (Surface Water)**

Sampled: 12-Oct-10 12:30
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0205	mg/L	0.0020	0.0003		W042376	AS	10/28/10 17:53	
EPA 200.7	**Calcium**	23.7	mg/L	0.040	0.008		W042376	AS	10/28/10 17:51	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.014		W042376	AS	10/28/10 17:52	
EPA 200.7	**Magnesium**	3.02	mg/L	0.060	0.012		W042376	AS	10/28/10 17:52	
EPA 200.7	**Potassium**	0.81	mg/L	0.50	0.04		W042376	AS	10/28/10 17:51	
EPA 200.7	**Sodium**	3.19	mg/L	0.50	0.05		W042376	AS	10/28/10 17:51	
EPA 200.8	**Arsenic**	0.00373	mg/L	0.00300	0.00054	2.5	W042332	DG	10/26/10 16:59	
EPA 200.8	**Copper**	0.0936	mg/L	0.00100	0.00009	2.5	W042332	DG	10/26/10 16:59	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W042332	DG	10/26/10 16:59	
SM 2340B	**Hardness (as CaCO3)**	71.7	mg/L	0.347	0.069		N/A		10/28/10 17:52	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0202	mg/L	0.0020	0.0005		W042448	AS	10/28/10 16:46	
EPA 200.7	**Calcium**	23.8	mg/L	0.040	0.016		W042448	AS	10/28/10 16:44	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.027		W042448	AS	10/28/10 16:45	
EPA 200.7	**Magnesium**	3.09	mg/L	0.060	0.024		W042448	AS	10/28/10 16:45	
EPA 200.7	**Potassium**	0.77	mg/L	0.50	0.07		W042448	AS	10/28/10 16:44	
EPA 200.7	**Sodium**	3.50	mg/L	0.50	0.10		W042448	AS	10/28/10 16:44	
EPA 200.8	**Arsenic**	0.00495	mg/L	0.00300	0.00043		W042331	KWH	10/27/10 07:11	
EPA 200.8	**Copper**	0.0579	mg/L	0.00100	0.000072		W042331	KWH	10/27/10 07:11	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W042331	KWH	10/27/10 07:11	
Classical Chemistry Parameters										
SM 2320B/2310B	**Bicarbonate**	66.7	mg/L	1.0	0.5		W042451	DKS	10/18/10 11:56	
SM 2320B/2310B	Carbonate	< 1.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 11:56	
SM 2320B/2310B	**Total Alkalinity**	66.7	mg/L	1.0	0.5		W042451	DKS	10/18/10 11:56	
SM 2540 C	**Total Diss. Solids**	87	mg/L	10			W042411	JMS,	10/15/10 15:30	
SM 2540 D	**Total Susp. Solids**	6.0	mg/L	5.0			W042414	JMS,	10/15/10 15:30	
SM 4500 H B	**pH @19.5°C**	7.91	pH Units				W042385	DKS	10/15/10 12:34	
Anions by Ion Chromatography										
EPA 300.0	**Chloride**	1.32	mg/L	0.200	0.044		W042355	FEH	10/18/10 22:17	
EPA 300.0	**Sulfate as SO4**	12.1	mg/L	0.30	0.05		W042355	FEH	10/18/10 22:17	

Cation/Anion Balance and TDS Ratios

Cation Sum: 1.59 meq/L Anion Sum: 1.62 meq/L C/A Balance: -0.92 % Calculated TDS: 84 TDS/cTDS: 1.03

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **SM-AS 2-1**
SVL Sample ID: **W0J0324-08 (Surface Water)**

Sampled: 12-Oct-10 13:00
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0198	mg/L	0.0020	0.0003		W042376	AS	10/28/10 17:59	
EPA 200.7	**Calcium**	22.9	mg/L	0.040	0.008		W042376	AS	10/28/10 17:57	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.014		W042376	AS	10/28/10 17:57	
EPA 200.7	**Magnesium**	2.90	mg/L	0.060	0.012		W042376	AS	10/28/10 17:57	
EPA 200.7	**Potassium**	0.77	mg/L	0.50	0.04		W042376	AS	10/28/10 17:57	
EPA 200.7	**Sodium**	3.24	mg/L	0.50	0.05		W042376	AS	10/28/10 17:57	
EPA 200.8	**Arsenic**	0.00396	mg/L	0.00300	0.00054	2.5	W042332	DG	10/26/10 17:00	
EPA 200.8	**Copper**	0.111	mg/L	0.00100	0.00009	2.5	W042332	DG	10/26/10 17:00	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W042332	DG	10/26/10 17:00	
SM 2340B	**Hardness (as CaCO3)**	69.2	mg/L	0.347	0.069		N/A		10/28/10 17:57	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0206	mg/L	0.0020	0.0005		W042448	AS	10/28/10 17:02	
EPA 200.7	**Calcium**	24.3	mg/L	0.040	0.016		W042448	AS	10/28/10 17:01	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.027		W042448	AS	10/28/10 17:01	
EPA 200.7	**Magnesium**	3.02	mg/L	0.060	0.024		W042448	AS	10/28/10 17:01	
EPA 200.7	**Potassium**	0.75	mg/L	0.50	0.07		W042448	AS	10/28/10 17:01	
EPA 200.7	**Sodium**	3.37	mg/L	0.50	0.10		W042448	AS	10/28/10 17:01	
EPA 200.8	**Arsenic**	0.00332	mg/L	0.00300	0.00043		W042331	KWH	10/27/10 07:12	
EPA 200.8	**Copper**	0.0733	mg/L	0.00100	0.000072		W042331	KWH	10/27/10 07:12	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W042331	KWH	10/27/10 07:12	
Classical Chemistry Parameters										
SM 2320B/2310B	**Bicarbonate**	66.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:00	
SM 2320B/2310B	Carbonate	< 1.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:00	
SM 2320B/2310B	**Total Alkalinity**	66.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:00	
SM 2540 C	**Total Diss. Solids**	95	mg/L	10			W042411	JMS,	10/15/10 15:30	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0			W042414	JMS,	10/15/10 15:30	
SM 4500 H B	**pH @19.4°C**	7.82	pH Units				W042385	DKS	10/15/10 12:36	
Anions by Ion Chromatography										
EPA 300.0	**Chloride**	1.40	mg/L	0.200	0.044		W042355	FEH	10/18/10 22:28	
EPA 300.0	**Sulfate as SO4**	12.1	mg/L	0.30	0.05		W042355	FEH	10/18/10 22:28	

Cation/Anion Balance and TDS Ratios

Cation Sum: 1.54 meq/L Anion Sum: 1.61 meq/L C/A Balance: -2.08 % Calculated TDS: 84 TDS/cTDS: 1.13

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **SM-AS 1-2**
SVL Sample ID: **W0J0324-09 (Surface Water)**

Sampled: 12-Oct-10 14:00
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0174	mg/L	0.0020	0.0003		W042376	AS	10/28/10 18:05	
EPA 200.7	**Calcium**	15.2	mg/L	0.040	0.008		W042376	AS	10/28/10 18:03	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.014		W042376	AS	10/28/10 18:03	
EPA 200.7	**Magnesium**	1.41	mg/L	0.060	0.012		W042376	AS	10/28/10 18:03	
EPA 200.7	**Potassium**	0.58	mg/L	0.50	0.04		W042376	AS	10/28/10 18:03	
EPA 200.7	**Sodium**	1.58	mg/L	0.50	0.05		W042376	AS	10/28/10 18:03	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W042332	DG	10/26/10 17:02	
EPA 200.8	**Copper**	0.170	mg/L	0.00100	0.00009	2.5	W042332	DG	10/26/10 17:02	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W042332	DG	10/26/10 17:02	
SM 2340B	**Hardness (as CaCO3)**	43.7	mg/L	0.347	0.069		N/A		10/28/10 18:03	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0181	mg/L	0.0020	0.0005		W042448	AS	10/28/10 17:18	
EPA 200.7	**Calcium**	16.1	mg/L	0.040	0.016		W042448	AS	10/28/10 17:16	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.027		W042448	AS	10/28/10 17:17	
EPA 200.7	**Magnesium**	1.48	mg/L	0.060	0.024		W042448	AS	10/28/10 17:17	
EPA 200.7	**Potassium**	0.60	mg/L	0.50	0.07		W042448	AS	10/28/10 17:16	
EPA 200.7	**Sodium**	1.65	mg/L	0.50	0.10		W042448	AS	10/28/10 17:16	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W042331	KWH	10/27/10 07:14	
EPA 200.8	**Copper**	0.102	mg/L	0.00100	0.000072		W042331	KWH	10/27/10 07:14	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W042331	KWH	10/27/10 07:14	
Classical Chemistry Parameters										
SM 2320B/2310B	**Bicarbonate**	31.5	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:05	
SM 2320B/2310B	Carbonate	< 1.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:05	
SM 2320B/2310B	**Total Alkalinity**	31.5	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:05	
SM 2540 C	**Total Diss. Solids**	79	mg/L	10			W042411	JMS,	10/15/10 15:30	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0			W042414	JMS,	10/15/10 15:30	
SM 4500 H B	**pH @19.7°C**	7.48	pH Units				W042385	DKS	10/15/10 12:44	
Anions by Ion Chromatography										
EPA 300.0	**Chloride**	0.784	mg/L	0.200	0.044		W042355	FEH	10/18/10 22:39	
EPA 300.0	**Sulfate as SO4**	18.0	mg/L	0.30	0.05		W042355	FEH	10/18/10 22:39	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.96 meq/L Anion Sum: 1.03 meq/L C/A Balance: -3.23 % Calculated TDS: 57 TDS/cTDS: 1.39

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **QC-SW-X**
SVL Sample ID: **W0J0324-10 (Surface Water)**

Sampled: 12-Oct-10 12:30
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	**Barium**	0.0202	mg/L	0.0020	0.0003		W042376	AS	10/28/10 18:10	
EPA 200.7	**Calcium**	23.4	mg/L	0.040	0.008		W042376	AS	10/28/10 18:09	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.014		W042376	AS	10/28/10 18:09	
EPA 200.7	**Magnesium**	2.99	mg/L	0.060	0.012		W042376	AS	10/28/10 18:09	
EPA 200.7	**Potassium**	0.79	mg/L	0.50	0.04		W042376	AS	10/28/10 18:09	
EPA 200.7	**Sodium**	3.16	mg/L	0.50	0.05		W042376	AS	10/28/10 18:09	
EPA 200.8	**Arsenic**	0.00391	mg/L	0.00300	0.00054	2.5	W042332	DG	10/26/10 17:06	
EPA 200.8	**Copper**	0.0862	mg/L	0.00100	0.00009	2.5	W042332	DG	10/26/10 17:06	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W042332	DG	10/26/10 17:06	
SM 2340B	**Hardness (as CaCO3)**	70.9	mg/L	0.347	0.069		N/A		10/28/10 18:09	
Metals (Dissolved)										
EPA 200.7	**Barium**	0.0207	mg/L	0.0020	0.0005		W042448	AS	10/28/10 17:23	
EPA 200.7	**Calcium**	24.4	mg/L	0.040	0.016		W042448	AS	10/28/10 17:22	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.027		W042448	AS	10/28/10 17:22	
EPA 200.7	**Magnesium**	3.14	mg/L	0.060	0.024		W042448	AS	10/28/10 17:22	
EPA 200.7	**Potassium**	0.76	mg/L	0.50	0.07		W042448	AS	10/28/10 17:22	
EPA 200.7	**Sodium**	3.43	mg/L	0.50	0.10		W042448	AS	10/28/10 17:22	
EPA 200.8	**Arsenic**	0.00392	mg/L	0.00300	0.00043		W042331	KWH	10/27/10 07:18	
EPA 200.8	**Copper**	0.0549	mg/L	0.00100	0.000072		W042331	KWH	10/27/10 07:18	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W042331	KWH	10/27/10 07:18	
Classical Chemistry Parameters										
SM 2320B/2310B	**Bicarbonate**	66.4	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:09	
SM 2320B/2310B	Carbonate	< 1.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:09	
SM 2320B/2310B	**Total Alkalinity**	66.4	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:09	
SM 2540 C	**Total Diss. Solids**	101	mg/L	10			W042411	JMS,	10/15/10 15:30	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0			W042414	JMS,	10/15/10 15:30	
SM 4500 H B	**pH @19.5°C**	7.93	pH Units				W042385	DKS	10/15/10 12:46	
Anions by Ion Chromatography										
EPA 300.0	**Chloride**	1.33	mg/L	0.200	0.044		W042355	FEH	10/18/10 22:50	
EPA 300.0	**Sulfate as SO4**	12.2	mg/L	0.30	0.05		W042355	FEH	10/18/10 22:50	

Cation/Anion Balance and TDS Ratios

Cation Sum: 1.57 meq/L Anion Sum: 1.62 meq/L C/A Balance: -1.41 % Calculated TDS: 84 TDS/cTDS: 1.20

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **QC-SW-Y**
SVL Sample ID: **W0J0324-11 (Surface Water)**

Sampled: 12-Oct-10 15:00
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	Barium	< 0.0020	mg/L	0.0020	0.0003		W042376	AS	10/28/10 18:16	
EPA 200.7	Calcium	< 0.040	mg/L	0.040	0.008		W042376	AS	10/28/10 18:15	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.014		W042376	AS	10/28/10 18:15	
EPA 200.7	Magnesium	< 0.060	mg/L	0.060	0.012		W042376	AS	10/28/10 18:15	
EPA 200.7	Potassium	< 0.50	mg/L	0.50	0.04		W042376	AS	10/28/10 18:14	
EPA 200.7	Sodium	< 0.50	mg/L	0.50	0.05		W042376	AS	10/28/10 18:14	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00054	2.5	W042332	DG	10/26/10 17:08	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.00009	2.5	W042332	DG	10/26/10 17:08	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000024	2.5	W042332	DG	10/26/10 17:08	
SM 2340B	Hardness (as CaCO3)	< 0.347	mg/L	0.347	0.069		N/A		10/28/10 18:15	
Metals (Dissolved)										
EPA 200.7	Barium	< 0.0020	mg/L	0.0020	0.0005		W042448	AS	10/28/10 17:29	
EPA 200.7	**Calcium**	0.106	mg/L	0.040	0.016		W042448	AS	10/28/10 17:27	
EPA 200.7	Iron	< 0.060	mg/L	0.060	0.027		W042448	AS	10/28/10 17:27	
EPA 200.7	Magnesium	< 0.060	mg/L	0.060	0.024		W042448	AS	10/28/10 17:27	
EPA 200.7	Potassium	< 0.50	mg/L	0.50	0.07		W042448	AS	10/28/10 17:27	
EPA 200.7	Sodium	< 0.50	mg/L	0.50	0.10		W042448	AS	10/28/10 17:27	
EPA 200.8	Arsenic	< 0.00300	mg/L	0.00300	0.00043		W042331	KWH	10/27/10 07:20	
EPA 200.8	Copper	< 0.00100	mg/L	0.00100	0.000072		W042331	KWH	10/27/10 07:20	
EPA 200.8	Lead	< 0.00300	mg/L	0.00300	0.000019		W042331	KWH	10/27/10 07:20	
Classical Chemistry Parameters										
SM 2320B/2310B	Bicarbonate	< 1.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:13	
SM 2320B/2310B	Carbonate	< 1.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:13	
SM 2320B/2310B	Total Alkalinity	< 1.0	mg/L	1.0	0.5		W042451	DKS	10/18/10 12:13	
SM 2540 C	Total Diss. Solids	< 10	mg/L	10			W042411	JMS,	10/15/10 15:30	
SM 2540 D	Total Susp. Solids	< 5.0	mg/L	5.0			W042414	JMS,	10/15/10 15:30	
SM 4500 H B	**pH @19.9°C**	5.93	pH Units				W042385	DKS	10/15/10 12:51	
Anions by Ion Chromatography										
EPA 300.0	**Chloride**	0.247	mg/L	0.200	0.044		W042355	FEH	10/18/10 23:01	
EPA 300.0	Sulfate as SO4	< 0.30	mg/L	0.30	0.05		W042355	FEH	10/18/10 23:01	

Cation/Anion Balance and TDS Ratios

Cation Sum: 0.00 meq/L Anion Sum: 0.02 meq/L C/A Balance: -57.27 % Calculated TDS: 0 TDS/cTDS: 0.00

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Client Sample ID: **QC-SED-X**
SVL Sample ID: **W0J0324-12 (Soil)**

Sampled: 12-Oct-10 15:00
Received: 13-Oct-10
Sampled By: DT

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	**Arsenic**	10.0	mg/kg	2.5	0.4		W043056	DT	10/28/10 12:12	
EPA 6010B	**Copper**	61.3	mg/kg	1.00	0.21		W043056	DT	10/28/10 12:12	
EPA 6010B	**Nickel**	12.8	mg/kg	1.00	0.25		W043056	DT	10/28/10 12:12	
Percent Solids										
Percent Solids	**% Solids**	77.0	%	0.1			W043057	DP	10/22/10 11:41	

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

John Kern
Laboratory Director

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods								
EPA 6010B	Arsenic	mg/kg	<2.5	0.4	2.5	W043056	28-Oct-10	
EPA 6010B	Copper	mg/kg	<1.00	0.21	1.00	W043056	28-Oct-10	
EPA 6010B	Nickel	mg/kg	<1.00	0.25	1.00	W043056	28-Oct-10	
Metals (Total Recoverable--reportable as Total per 40 CFR 136)								
EPA 200.7	Barium	mg/L	<0.0020	0.0003	0.0020	W042376	28-Oct-10	
EPA 200.7	Calcium	mg/L	<0.040	0.008	0.040	W042376	28-Oct-10	
EPA 200.7	Iron	mg/L	<0.060	0.014	0.060	W042376	28-Oct-10	
EPA 200.7	Magnesium	mg/L	<0.060	0.012	0.060	W042376	28-Oct-10	
EPA 200.7	Potassium	mg/L	<0.50	0.04	0.50	W042376	28-Oct-10	
EPA 200.7	Sodium	mg/L	<0.50	0.05	0.50	W042376	28-Oct-10	
EPA 200.8	Arsenic	mg/L	<0.00300	0.00054	0.00300	W042332	26-Oct-10	
EPA 200.8	Copper	mg/L	<0.00100	0.00009	0.00100	W042332	26-Oct-10	
EPA 200.8	Lead	mg/L	<0.00300	0.000024	0.00300	W042332	26-Oct-10	
Metals (Dissolved)								
EPA 200.7	Barium	mg/L	<0.0020	0.0005	0.0020	W042448	28-Oct-10	
EPA 200.7	Calcium	mg/L	<0.040	0.016	0.040	W042448	28-Oct-10	
EPA 200.7	Iron	mg/L	<0.060	0.027	0.060	W042448	28-Oct-10	
EPA 200.7	Magnesium	mg/L	<0.060	0.024	0.060	W042448	28-Oct-10	
EPA 200.7	Potassium	mg/L	<0.50	0.07	0.50	W042448	28-Oct-10	
EPA 200.7	Sodium	mg/L	<0.50	0.10	0.50	W042448	28-Oct-10	
EPA 200.8	Arsenic	mg/L	<0.00300	0.00043	0.00300	W042331	27-Oct-10	
EPA 200.8	Copper	mg/L	<0.00100	0.000072	0.00100	W042331	27-Oct-10	
EPA 200.8	Lead	mg/L	<0.00300	0.000019	0.00300	W042331	27-Oct-10	
Anions by Ion Chromatography								
EPA 300.0	Chloride	mg/L	<0.200	0.044	0.200	W042355	18-Oct-10	
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.05	0.30	W042355	18-Oct-10	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods									
EPA 6010B	Arsenic	mg/kg	91.7	100	91.7	80 - 120	W043056	28-Oct-10	
EPA 6010B	Copper	mg/kg	97.3	100	97.3	80 - 120	W043056	28-Oct-10	
EPA 6010B	Nickel	mg/kg	94.9	100	94.9	80 - 120	W043056	28-Oct-10	
Metals (Total Recoverable--reportable as Total per 40 CFR 136)									
EPA 200.7	Barium	mg/L	1.07	1.00	107	85 - 115	W042376	28-Oct-10	
EPA 200.7	Calcium	mg/L	19.4	20.0	97.1	85 - 115	W042376	28-Oct-10	
EPA 200.7	Iron	mg/L	9.59	10.0	95.9	85 - 115	W042376	28-Oct-10	
EPA 200.7	Magnesium	mg/L	20.0	20.0	100	85 - 115	W042376	28-Oct-10	
EPA 200.7	Potassium	mg/L	21.0	20.0	105	85 - 115	W042376	28-Oct-10	
EPA 200.7	Sodium	mg/L	20.0	19.0	106	85 - 115	W042376	28-Oct-10	
EPA 200.8	Arsenic	mg/L	0.0252	0.0250	101	85 - 115	W042332	26-Oct-10	
EPA 200.8	Copper	mg/L	0.0246	0.0250	98.6	85 - 115	W042332	26-Oct-10	
EPA 200.8	Lead	mg/L	0.0255	0.0250	102	85 - 115	W042332	26-Oct-10	
Metals (Dissolved)									
EPA 200.7	Barium	mg/L	1.10	1.00	110	85 - 115	W042448	28-Oct-10	
EPA 200.7	Calcium	mg/L	20.5	20.0	102	85 - 115	W042448	28-Oct-10	
EPA 200.7	Iron	mg/L	10.5	10.0	105	85 - 115	W042448	28-Oct-10	
EPA 200.7	Magnesium	mg/L	20.5	20.0	102	85 - 115	W042448	28-Oct-10	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Dissolved) (Continued)									
EPA 200.7	Potassium	mg/L	20.9	20.0	104	85 - 115	W042448	28-Oct-10	
EPA 200.7	Sodium	mg/L	19.9	19.0	104	85 - 115	W042448	28-Oct-10	
EPA 200.8	Arsenic	mg/L	0.0271	0.0250	108	85 - 115	W042331	27-Oct-10	
EPA 200.8	Copper	mg/L	0.0284	0.0250	114	85 - 115	W042331	27-Oct-10	
EPA 200.8	Lead	mg/L	0.0252	0.0250	101	85 - 115	W042331	27-Oct-10	
Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	3.01	3.00	100	90 - 110	W042355	18-Oct-10	
EPA 300.0	Sulfate as SO4	mg/L	10.6	10.0	106	90 - 110	W042355	18-Oct-10	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total Recoverable--reportable as Total per 40 CFR 136)									
EPA 200.7	Barium	mg/L	0.0373	0.0378	1.3	20	W042376	28-Oct-10	
EPA 200.7	Calcium	mg/L	102	104	1.7	20	W042376	28-Oct-10	
EPA 200.7	Iron	mg/L	<0.060	<0.060	UDL	20	W042376	28-Oct-10	
EPA 200.7	Magnesium	mg/L	35.7	36.2	1.3	20	W042376	28-Oct-10	
EPA 200.7	Potassium	mg/L	18.5	18.7	1.1	20	W042376	28-Oct-10	
EPA 200.7	Sodium	mg/L	88.5	89.2	0.9	20	W042376	28-Oct-10	
EPA 200.8	Arsenic	mg/L	<0.00300	<0.00300	UDL	20	W042332	26-Oct-10	
EPA 200.8	Copper	mg/L	0.00117	0.00113	3.7	20	W042332	26-Oct-10	
EPA 200.8	Lead	mg/L	<0.00300	<0.00300	<RL	20	W042332	26-Oct-10	
Metals (Dissolved)									
EPA 200.7	Barium	mg/L	0.0203	0.0202	0.4	20	W042448	28-Oct-10	
EPA 200.7	Calcium	mg/L	23.9	23.8	0.3	20	W042448	28-Oct-10	
EPA 200.7	Iron	mg/L	<0.060	<0.060	UDL	20	W042448	28-Oct-10	
EPA 200.7	Magnesium	mg/L	3.12	3.09	1.0	20	W042448	28-Oct-10	
EPA 200.7	Potassium	mg/L	0.79	0.77	3.4	20	W042448	28-Oct-10	
EPA 200.7	Sodium	mg/L	3.63	3.50	3.8	20	W042448	28-Oct-10	
EPA 200.8	Arsenic	mg/L	<0.00300	<0.00300	UDL	20	W042331	27-Oct-10	
EPA 200.8	Copper	mg/L	0.00101	0.00104	3.4	20	W042331	27-Oct-10	
EPA 200.8	Lead	mg/L	<0.00300	<0.00300	UDL	20	W042331	27-Oct-10	
Classical Chemistry Parameters									
SM 2320B/2310B	Total Alkalinity	mg/L	266	269	1.2	20	W042451	18-Oct-10	
SM 2320B/2310B	Total Alkalinity	mg/L	68.8	66.7	3.1	20	W042451	18-Oct-10	
SM 2320B/2310B	Bicarbonate	mg/L	266	269	1.2	20	W042451	18-Oct-10	
SM 2320B/2310B	Bicarbonate	mg/L	68.8	66.7	3.1	20	W042451	18-Oct-10	
SM 2320B/2310B	Carbonate	mg/L	<1.0	<1.0	UDL	20	W042451	18-Oct-10	
SM 2320B/2310B	Carbonate	mg/L	<1.0	<1.0	UDL	20	W042451	18-Oct-10	
SM 2540 C	Total Diss. Solids	mg/L	26	<10	<RL	5	W042411	15-Oct-10	R13
SM 2540 C	Total Diss. Solids	mg/L	854	864	1.2	5	W042411	15-Oct-10	
SM 2540 D	Total Susp. Solids	mg/L	13.0	14.0	7.4	5	W042414	15-Oct-10	R1
SM 4500 H B	pH	pH Units	7.06	7.04	0.3	20	W042385	15-Oct-10	
SM 4500 H B	pH	pH Units	7.83	7.91	1.0	20	W042451	18-Oct-10	
SM 4500 H B	pH	pH Units	7.94	8.02	1.0	20	W042385	15-Oct-10	
Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	0.584	0.570	2.4	20	W042355	18-Oct-10	
EPA 300.0	Sulfate as SO4	mg/L	1.05	1.07	1.6	20	W042355	18-Oct-10	

One Government Gulch - PO Box 929 Kellogg ID 83837-0929 (208) 784-1258 Fax (208) 783-0891

MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	mg/kg	90.0	<2.5	100	90.0	75 - 125	W043056	28-Oct-10	
EPA 6010B	Copper	mg/kg	101	3.48	100	97.7	75 - 125	W043056	28-Oct-10	
EPA 6010B	Nickel	mg/kg	94.3	<1.00	100	93.8	75 - 125	W043056	28-Oct-10	
Metals (Total Recoverable--reportable as Total per 40 CFR 136)										
EPA 200.7	Barium	mg/L	1.06	0.0378	1.00	102	70 - 130	W042376	28-Oct-10	
EPA 200.7	Barium	mg/L	1.02	<0.0020	1.00	102	70 - 130	W042376	28-Oct-10	
EPA 200.7	Calcium	mg/L	120	104	20.0	83.0	70 - 130	W042376	28-Oct-10	
EPA 200.7	Calcium	mg/L	18.7	<0.040	20.0	93.6	70 - 130	W042376	28-Oct-10	
EPA 200.7	Iron	mg/L	9.38	<0.060	10.0	93.8	70 - 130	W042376	28-Oct-10	
EPA 200.7	Iron	mg/L	9.24	<0.060	10.0	92.4	70 - 130	W042376	28-Oct-10	
EPA 200.7	Magnesium	mg/L	55.8	36.2	20.0	97.8	70 - 130	W042376	28-Oct-10	
EPA 200.7	Magnesium	mg/L	19.3	<0.060	20.0	96.3	70 - 130	W042376	28-Oct-10	
EPA 200.7	Potassium	mg/L	40.4	18.7	20.0	109	70 - 130	W042376	28-Oct-10	
EPA 200.7	Potassium	mg/L	20.5	<0.50	20.0	102	70 - 130	W042376	28-Oct-10	
EPA 200.7	Sodium	mg/L	108	89.2	19.0	100	70 - 130	W042376	28-Oct-10	
EPA 200.7	Sodium	mg/L	19.8	<0.50	19.0	104	70 - 130	W042376	28-Oct-10	
EPA 200.8	Arsenic	mg/L	0.0264	<0.00300	0.0250	106	70 - 130	W042332	26-Oct-10	
EPA 200.8	Copper	mg/L	0.0270	0.00113	0.0250	103	70 - 130	W042332	26-Oct-10	
EPA 200.8	Lead	mg/L	0.0259	<0.00300	0.0250	103	70 - 130	W042332	26-Oct-10	
Metals (Dissolved)										
EPA 200.7	Barium	mg/L	1.14	0.0202	1.00	112	70 - 130	W042448	28-Oct-10	
EPA 200.7	Calcium	mg/L	44.9	23.8	20.0	106	70 - 130	W042448	28-Oct-10	
EPA 200.7	Iron	mg/L	10.8	<0.060	10.0	108	70 - 130	W042448	28-Oct-10	
EPA 200.7	Magnesium	mg/L	24.1	3.09	20.0	105	70 - 130	W042448	28-Oct-10	
EPA 200.7	Potassium	mg/L	22.2	0.77	20.0	107	70 - 130	W042448	28-Oct-10	
EPA 200.7	Sodium	mg/L	24.1	3.50	19.0	108	70 - 130	W042448	28-Oct-10	
EPA 200.8	Arsenic	mg/L	0.0305	<0.00300	0.0250	122	70 - 130	W042331	27-Oct-10	
EPA 200.8	Copper	mg/L	0.0304	0.00104	0.0250	117	70 - 130	W042331	27-Oct-10	
EPA 200.8	Lead	mg/L	0.0255	<0.00300	0.0250	102	70 - 130	W042331	27-Oct-10	
Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	3.80	0.570	3.00	108	90 - 110	W042355	18-Oct-10	
EPA 300.0	Sulfate as SO4	mg/L	12.0	1.07	10.0	109	90 - 110	W042355	18-Oct-10	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Arsenic	mg/kg	87.0	90.0	100	3.4	20	W043056	28-Oct-10	
EPA 6010B	Copper	mg/kg	97.1	101	100	4.1	20	W043056	28-Oct-10	
EPA 6010B	Nickel	mg/kg	91.1	94.3	100	3.5	20	W043056	28-Oct-10	

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MSE - Boise
1555 Shoreline Dr. #150
Boise, ID 83702

Project Name: Sunset Mine
Work Order: **W0J0324**
Reported: 29-Oct-10 12:49

Notes and Definitions

R1	RPD exceeded the method acceptance limit.
R13	The QC sample and duplicate sample are not within +/- a reporting limit of each other; therefore the RPD is outside of the laboratory acceptance limits.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable

Western Laboratories, Inc.

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800-658-3858 • FAX 208-722-6550
http://www.westernlaboratories.com

Dealer: 8-5 Mike Puett
Reported: 6-18-2010
Test #: 1
Grower: Millenium Science and
Field ID: SM-BOR-1

Lab #:
5991

SV #:

AGRICULTURAL SOIL REPORT

						PARTS PER MILLION-PPM				
pH WATER	pH $CaCl_2$	pH SMP BUFFER	SOLUBLE SALTS (EC)	LIME	% OM	NITRATE	AMMONIUM	PHOSPHORUS		
						NO3-N (PPM)	NH4-N (PPM)	P(PPM)	P BRAY	P INDEX
8.0	7.5		0.22	L	1.63	29	8	6		
EVALUATION										
Moderately Basic			Normal	Good	Low	Adequate	Adequate	Very Low		
POUNDS PER ACRE										
						87	24	18		

PARTS PER MILLION-PPM									
POTASSIUM K	SULFATE S	CALCIUM Ca	MAGNESIUM Mg	SODUIM Na	ZINC Zn	COPPER CU	MANGANESE Mn	IRON Fe	BORON B
64	17	1650	46	16	2.2	557.4	2	6	0.2
EVALUATION									
Very Low	Low	Low	Very Low	OK	Adequate	Very High	Very Low	Very Low	Very Low
POUNDS PER ACRE									
192	51	4950	138	48	6.6	1672.2	6	18	0.6
Meq/100 GRAMS SOIL							CEC by sum of cations		
0.2		8.3	0.4	0.1				8.9	

NUTRIENT SUGGESTIONS POUNDS PER ACRE

CROP			CROP		
YIELD GOAL			GYPSUM		
PAST CROP			LIME		
ACRES			DOLOMITE		
NITROGEN			MAGNESIUM	20	20
PHOSPHATE			ZINC		
Add Phoshate for P INDEX			IRON		
POTASH			MANGANESE		
SULFATE			COPPER		
ELEMENTAL SULFUR			BORON		

PAP-Accredited NAPT 2010

Grower: Millenium Science and

Field ID: SM-BOR-1

Lab #:	5991

Texture	Loam
Cation Exchange Capacity-CEC	14
Percent Base Saturation	63

BASES	IDEAL	YOURS
Calcium-% of CEC	65-80	59
Magnesium-% of CEC	10-20	3
Potassium-% of CEC	2-6	1.2
Sodium-% of CEC	< 5	.5
Hydrogen-% of CEC	< 15	37

Ideal Micronutrient Level		Yours
Zinc (Zn)	1.5 - 3	2.2
Manganese (Mn) pH >7	6 - 20	2.0
Manganese (Mn) pH <7	10 - 55	
Copper (Cu)	0.8 - 2.0	557.4
Iron (Fe) pH >7	5 - 35	6.0
Iron (Fe) pH <7	15 - 135	
Boron (B)	0.7 - 1.5	0.2

Balance	Ideal	Yours	Evaluation	Watch
N:S	10:1	2 :1	OK	
Ca:Mg	6-20:1	36 :1	High	Watch Mg
Ca:K pH >7	15:1	26 :1	Low	
Ca:K pH <7	10:1	:1		
Ca:P pH >7	100:1	275 :1	High	Watch P
Ca:P pH <7	40:1	:1		
P:Zn	15:1	3 :1	OK	
P:Mn	4:1	3 :1	OK	
P:Cu	25:1	0 :1	OK	
Zn:Cu	3:1	0 :1	OK	
Mn:Zn	3:1	1 :1	OK	
Mn:Cu	7:1	0 :1	OK	
K:B	200:1	320 :1	High	Watch B
Mg:K	2:1	1 :1	Low	Watch Mg

	NO3 ppm	NH4 ppm
1'	29	8
2'		
3'		
Total N PPM		37
Lbs N / Acre		111

WHEN PAST CROP IS:

Grain: Add 20 lbs. nitrogen per ton of stubble.

Field Corn Add 10 lbs. nitrogen per ton of stubble.

Alfalfa, Clover, Peas: Subtract 30 lbs. nitrogen from the nitrogen recommendations.

POTENTIAL CROP RESPONSE USING WESTERN LABS REPORTS

Soil Test	Crop Response	Recommends	Potential Response
Very Low	Highly Probable	Crop needs substantial soil build up	>90%
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Very High	Highly Unlikely	Maintenance	<5%

Methods: www.westernlaboratories.com/methods

- Split apply nitrogen. Tissue and soil test in-season gives the best results.
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- P Index - Compares the calcium fixing sites to plant available phosphorus.

Add Phosphate for P INDEX

60 lbs P_2O_5 = High Ca fixing capacity

40 lbs P_2O_5 = Medium Ca fixing capacity

20 lbs P_2O_5 = Low Ca fixing capacity

%LIME

L = 0.1 - 4.9

M = 5.0 - 10.0

H = 10.1 +

"Always practice the laws of Agronomy."

John P. Taberna, Soil Scientist

Western Laboratories, Inc.

211 Highway 95 • P.O. Box 1020 • Parma, ID 83660
800-658-3858 • FAX 208-722-6550
http://www.westernlaboratories.com

Dealer: 8-5 Mike Puett
Reported: 6-18-2010
Test #: 1
Grower: Millenium Science and
Field ID: SM-BOR-3

Lab #:
5992

SV #:

AGRICULTURAL SOIL REPORT

						PARTS PER MILLION-PPM				
pH WATER	pH $CaCl_2$	pH SMP BUFFER	SOLUBLE SALTS (EC)	LIME	% OM	NITRATE	AMMONIUM	PHOSPHORUS		
						NO3-N (PPM)	NH4-N (PPM)	P(PPM)	P BRAY	P INDEX
5.9	5.5	6.6	0.08	L	2.48	8	9	7		
EVALUATION										
Moderately Acidic			Normal	Good	Low	Low	Adequate	Very Low		
POUNDS PER ACRE										
						24	27	21		

PARTS PER MILLION-PPM									
POTASSIUM K	SULFATE S	CALCIUM Ca	MAGNESIUM Mg	SODUIM Na	ZINC Zn	COPPER CU	MANGANESE Mn	IRON Fe	BORON B
74	7	168	34	16	0.4	5.1	6	79	0.2
EVALUATION									
Very Low	Very Low	Very Low	Very Low	OK	Very Low	Very High	Low	Very High	Very Low
POUNDS PER ACRE									
222	21	504	102	48	1.2	15.3	18	237	0.6
Meq/100 GRAMS SOIL							CEC by sum of cations		
0.2		0.8	0.3	0.1				1.4	

NUTRIENT SUGGESTIONS POUNDS PER ACRE

CROP			CROP		
YIELD GOAL			GYPSUM		
PAST CROP			LIME	1500	
ACRES			DOLOMITE	1500	
NITROGEN			MAGNESIUM	10	10
PHOSPHATE			ZINC		
Add Phoshate for P INDEX			IRON		
POTASH			MANGANESE		
SULFATE			COPPER		
ELEMENTAL SULFUR			BORON		

Grower: Millenium Science and

Field ID: SM-BOR-3

Lab #: 5992

Texture	Loam
Cation Exchange Capacity-CEC	13
Percent Base Saturation	11

BASES	IDEAL	YOURS
Calcium-% of CEC	65-80	6
Magnesium-% of CEC	10-20	2
Potassium-% of CEC	2-6	1.4
Sodium-% of CEC	< 5	.5
Hydrogen-% of CEC	< 15	89

Ideal Micronutrient Level		Yours
Zinc (Zn)	1.5 - 3	0.4
Manganese (Mn) pH >7	6 - 20	6.0
Manganese (Mn) pH <7	10 - 55	
Copper (Cu)	0.8 - 2.0	5.1
Iron (Fe) pH >7	5 - 35	79.0
Iron (Fe) pH <7	15 - 135	
Boron (B)	0.7 - 1.5	0.2

Balance	Ideal	Yours	Evaluation	Watch
N:S	10:1	1 :1	OK	
Ca:Mg	6-20:1	5 :1	Low	Watch Ca
Ca:K pH >7	15:1	:1		
Ca:K pH <7	10:1	2 :1	OK	
Ca:P pH >7	100:1	:1		
Ca:P pH <7	40:1	24 :1	OK	
P:Zn	15:1	18 :1	High	Watch Zn
P:Mn	4:1	1 :1	OK	
P:Cu	25:1	1 :1	OK	
Zn:Cu	3:1	0 :1	OK	
Mn:Zn	3:1	15 :1	High	Watch Zn
Mn:Cu	7:1	1 :1	OK	
K:B	200:1	370 :1	High	Watch B
Mg:K	2:1	0 :1	Low	Watch Mg

	NO3 ppm	NH4 ppm
1'	8	9
2'		
3'		
Total N PPM		17
Lbs N / Acre		51

WHEN PAST CROP IS:

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Field Corn Add 10 lbs. nitrogen per ton of stubble.

Alfalfa, Clover, Peas: Subtract 30 lbs. nitrogen from the nitrogen recommendations.

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Dealer: 8-5 Mike Puett
Reported: 6-18-2010
Test #: 1
Grower: Millenium Science and
Field ID: SM-BOR-4

Lab #:
5993

SV #:

AGRICULTURAL SOIL REPORT

						PARTS PER MILLION-PPM				
pH WATER	pH $CaCl_2$	pH SMP BUFFER	SOLUBLE SALTS (EC)	LIME	% OM	NITRATE	AMMONIUM	PHOSPHORUS		
						NO3-N (PPM)	NH4-N (PPM)	P(PPM)	P BRAY	P INDEX
5.7	5.2	6.4	0.09	L	4.06	3	10	6		
EVALUATION										
Moderately Acidic			Normal	Good	Medium	Very Low	Adequate	Very Low		
POUNDS PER ACRE										
						9	30	18		

PARTS PER MILLION-PPM									
POTASSIUM K	SULFATE S	CALCIUM Ca	MAGNESIUM Mg	SODUIM Na	ZINC Zn	COPPER CU	MANGANESE Mn	IRON Fe	BORON B
60	12	158	25	20	0.3	1.0	9	125	0.2
EVALUATION									
Very Low	Low	Very Low	Very Low	OK	Very Low	Adequate	Adequate	Very High	Very Low
POUNDS PER ACRE									
180	36	474	75	60	0.9	3.0	27	375	0.6
Meq/100 GRAMS SOIL							CEC by sum of cations		
0.2		0.8	0.2	0.1				1.2	

NUTRIENT SUGGESTIONS POUNDS PER ACRE

CROP			CROP		
YIELD GOAL			GYPSUM		
PAST CROP			LIME	3100	
ACRES			DOLOMITE	1500	
NITROGEN			MAGNESIUM	10	10
PHOSPHATE			ZINC		
Add Phoshate for P INDEX			IRON		
POTASH			MANGANESE		
SULFATE			COPPER		
ELEMENTAL SULFUR			BORON		

Grower: Millenium Science and

Field ID: SM-BOR-4

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Texture	Loam
Cation Exchange Capacity-CEC	15
Percent Base Saturation	9

BASES	IDEAL	YOURS
Calcium-% of CEC	65-80	5
Magnesium-% of CEC	10-20	1
Potassium-% of CEC	2-6	1
Sodium-% of CEC	< 5	.6
Hydrogen-% of CEC	< 15	91

Ideal Micronutrient Level		Yours
Zinc (Zn)	1.5 - 3	0.3
Manganese (Mn) pH >7	6 - 20	9.0
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Iron (Fe) pH <7	15 - 135	
Boron (B)	0.7 - 1.5	0.2

Balance	Ideal	Yours	Evaluation	Watch
N:S	10:1	0 :1	OK	
Ca:Mg	6-20:1	6 :1	OK	
Ca:K pH >7	15:1	:1		
Ca:K pH <7	10:1	3 :1	OK	
Ca:P pH >7	100:1	:1		
Ca:P pH <7	40:1	26 :1	OK	
P:Zn	15:1	20 :1	High	Watch Zn
P:Mn	4:1	1 :1	OK	
P:Cu	25:1	6 :1	OK	
Zn:Cu	3:1	0 :1	OK	
Mn:Zn	3:1	30 :1	High	Watch Zn
Mn:Cu	7:1	9 :1	High	Watch Cu
K:B	200:1	300 :1	High	Watch B
Mg:K	2:1	0 :1	Low	Watch Mg

	NO3 ppm	NH4 ppm
1'	3	10
2'		
3'		
Total N PPM		13
Lbs N / Acre		39

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