

RECLAMATION INVESTIGATION REPORT

Forest Rose Mine Site

Prepared for

Montana Department of Environmental Quality

January 2011 Final

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Forest Rose Mine Site

Prepared for

Montana Department of Environmental Quality
Abandoned Mine Section
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Acronyms and Abbreviations

A	area
ABA	acid base accounting
ASA	American Society of Agronomy
ASTM	American Society for Testing and Materials
BW	body weight
CEC	cation exchange capacity
CLP	contract laboratory program
COC	contaminant of concern
COPC	contaminant of potential concern
DEQ/MWCB	Montana Department of Environmental Quality/Mine Waste Cleanup Bureau
DQO	data quality objective
EEE/CA	expanded engineering evaluation and cost analysis
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
FSP	field sampling plan
ft	foot
HHS	human health standards
HMI	hazardous materials inventory
in.	inch
IRI	integrated risk information
J	estimated quantity
LAP	laboratory analytical plan
lb	pound
LCS	laboratory control standard
MBMG	Montana Bureau of Mines and Geology
MCL	maximum contaminant level
µg/L	micrograms per liter
mg/m ³	milligrams per cubic meter
mg/kg	milligrams per kilogram
MS	matrix spike
oz	ounce
pcf	pound per cubic foot
ppm	parts per million
PRG	preliminary reclamation goal
QA	quality assurance
QC	quality control
RA	risk assessment
RAG	risk assessment guidance
RBCG	risk-based cleanup guidelines
RfD	reference dose
RI	reclamation investigation
RPD	relative percent difference
RSL	regional screening levels

RWP	reclamation work plan
SCR	soil consumption rate
TAL	target analyte level
TDS	total dissolved solids
TRL	target reporting level
U	undetected
USCS	unified soil classification system
USDA	United States Department of Agriculture
USFS	United States Forest Service
cy	cubic yard

1.0 Reclamation Investigation

This Reclamation Investigation (RI) report describes environmental conditions found at the Forest Rose Mine and Mill Complex (Forest Rose Mine). As requested by the Montana Department of Environmental Quality, Mine Waste Cleanup Bureau (DEQ/MWCB), under DEQ Contract No. 407032 Task Order No. 7, Herrera Environmental Consultants (Herrera) was responsible for preparing a reclamation work plan, collecting onsite field and laboratory data, and preparing an RI report for the Forest Rose Mine Site. The RI report delineates the nature and extent of wastes at the site, estimates risks that these wastes may pose to human health and the environment, and presents data pertinent to potential reclamation.

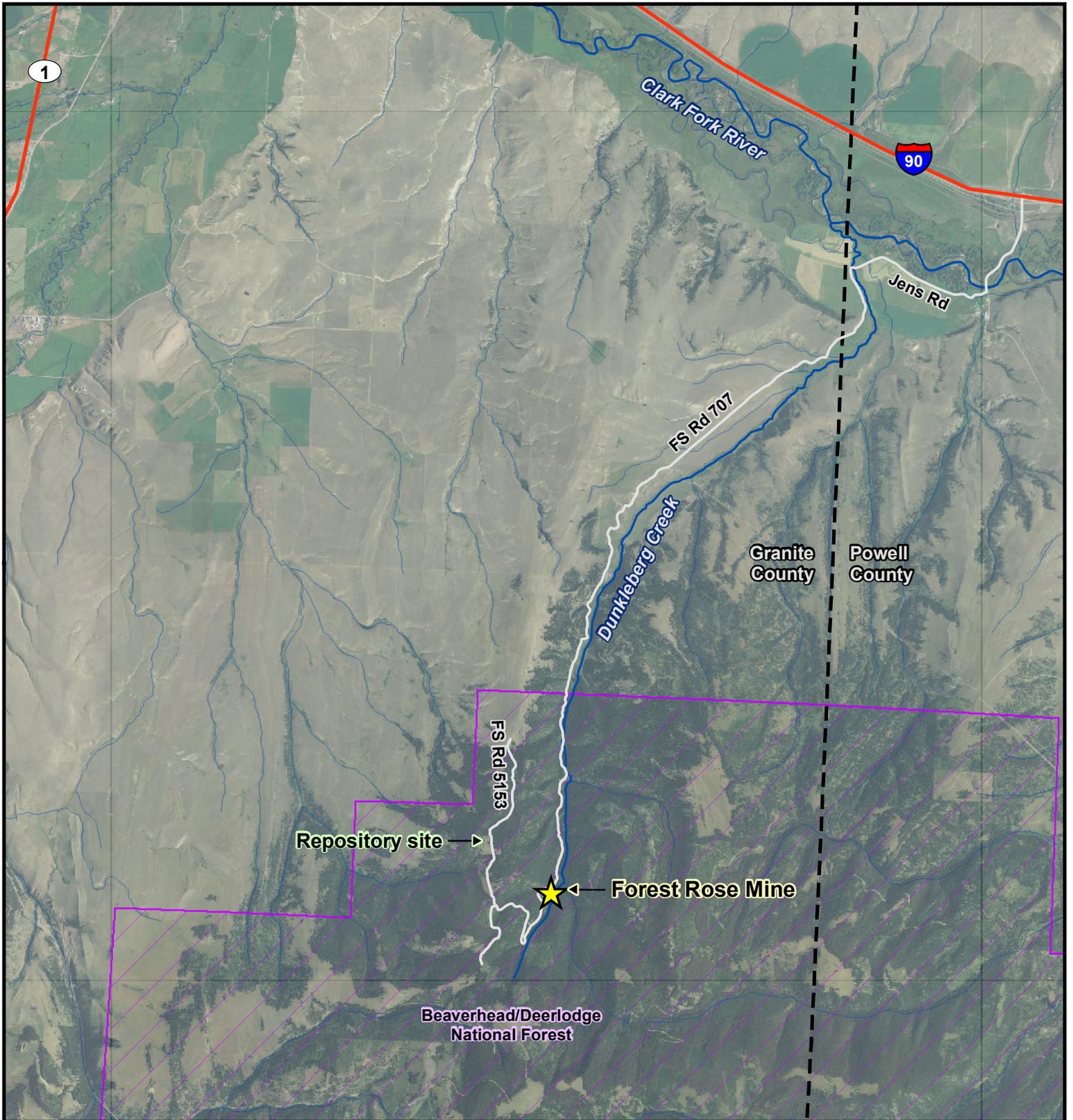
1.1 Introduction

The Forest Rose Mine is located in Granite County, within the Beaverhead-Deerlodge National Forest. The site is accessible from Interstate 90, approximately 8 miles east of Drummond, at Exit 162 (Jens Exit), then traveling south-southwest approximately 11 miles on Dunkleberg Creek Road (FDR 707) (Figure 1-1). The Forest Rose Mine is located on the east side of FDR 707. The legal description of the site is Section 22, Township 9 North, Range 12 West, Granite County, Montana (Latitude North 46° 30' 29"; Longitude West 113° 05' 21"). The Forest Rose Mine Site is comprised of approximately 4 acres of metal mining-impacted land along Dunkleberg Creek. The Dunkleberg Creek drainage flows north to the Clark Fork River. Surrounding areas consist of moderately steep to steep mountain slopes and hillsides (25 degrees). The mine is located at an elevation of approximately 5,500 feet above sea level.

The Forest Rose Mine is an abandoned hardrock mine that produced silver, lead, and zinc. Based on previous reports, four potentially contaminated media (soil/tailings/waste rock, surface water, groundwater, and sediment) are present at the Forest Mine Site. Elevated levels of arsenic, cadmium, copper, iron, mercury, lead, antimony, and zinc were found in tailings and waste rock samples. Surface water and groundwater samples showed elevated levels of arsenic, cadmium, copper, iron, lead, and zinc. Sediment samples showed elevated levels of arsenic, copper, iron and lead.

Three tailings impoundments and one waste rock area are located in the mining-impacted area. The tailings impoundments and waste rock cover Dunkleberg Creek, which runs south to north through the project area. The creek flows through and beneath the tailings and waste rock.

Climate information was obtained from the Drummond, Montana airport (WRCC 2010). Average monthly temperatures range from a high of 85°F to a low of 45°F in July and a high of 32°F to a low of 12°F in January. Average annual precipitation is 13 inches, with May and June being the wettest months of the year. Precipitation is mostly in the form of snow in the winter, snow and rain in the spring and fall, and rain in the summer.

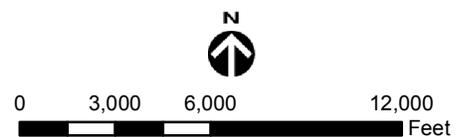


Legend

-  Highway
-  Road
-  County boundary
-  Stream
-  National forest



Figure 1-1. Vicinity Map, Forest Rose Mine.



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 Aerial photograph: USDA, 2009

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1.2 Environmental Setting

1.2.1 Geology and Soils

The Forest Rose Mine is located within heavily folded and intruded Cretaceous rocks in the northeast quarter of the Sapphire tectonic block. Gabbroic and dioritic sills, up to 1,000 feet or more in thickness, outcrop within a half-mile of the Forest Rose Mine Site. These sills are intruded at a higher stratigraphic level than the Forest Rose Mine Site and predate local folding. The Forest Rose Mine is located near the axial plane of the west limb of a northeast trending, northward plunging anticline, near a local marker bed of Lower Cretaceous Kootenai formation gastropod bearing limestone (MCS Environmental, Inc. 2004, Pardee 1917). Mineralization of the limestone produces ore that consists mainly of galena, sphalerite, pyrite, quartz, and calcite. Along Dunkleberg Ridge, most of the lodes containing lead, zinc, silver and other metals are simple quartz veins in fissures that follow bedding planes or cut across the sediments and diorite sills. The veins are usually narrow, but widen in places to flat lenses 3 or 4 feet thick.

The soil mapped at the Forest Rose Mine site is a combination of Lamellic Haplustepts and Typic Haplustalfs (USDA-NRCS 2010). Both types of soil are located on 10 to 35 percent slopes in elevations ranging from 4,500 to 6,000 feet. Lamellic Haplustepts are well drained soils that formed in glacial till and colluvium and are defined as gravelly loam. Typic Haplustalfs are well drained soils that formed in colluvium and till from mixed rock sources and are defined as gravelly loam (USDA-NRCS 2010).

1.2.2 Hydrogeology

Four piezometers (PZ-1, PZ-2, PZ-3, and PZ-4) were installed as part of the Forest Rose Mine and Mill Complex Draft Site Investigation performed by MCS Environmental, Inc. (MCS) in 2004. The piezometers were installed at depths of 31.5, 28.5, 60.5, and 43.5 feet, respectively. Water surface elevations in the piezometers varied from a depth of 2.0 to 16.0 feet below ground surface. The Montana Bureau of Mines and Geology Groundwater Information Center (GWIC) database only list two springs within a mile of the project area, identified as Forest Rose Mine-Upstream and Forest Rose Mine-Seep at Toe. No well information is available for either listing.

It is assumed that water exists along the bottom of the creek ravine above bedrock near the ground surface (the hyporheic zone).

1.2.3 Hydrology

The Forest Rose Mine Site is located within the Dunkleberg Creek sub-watershed of the Upper Clark Fork River watershed (HUC 17010201). Dunkleberg Creek flows 27.9 miles north through the Deerlodge National Forest and drains directly into the Clark Fork River. Winter snowmelt and stormwater runoff combined with spring and seep flows provide enough water to Dunkleberg Creek to qualify the creek at the mine site as a perennial stream.

Dunkleberg Creek flows onto the site from the south through a steep-sided ravine. The creek has been filled by waste rock and tailings to a depth of approximately 50 feet at its base. Water flows into the bottom of the waste deposits, with no apparent upstream ponding. Water has been found to be distributed throughout the waste rock and tailings deposits, with some ponding at the surface. Drains have been installed by the United States Forest Service (USFS) to facilitate movement of ponded water out of the tailings impoundments and back to the creek below the waste deposits.

1.2.4 Vegetation and Wildlife

The Forest Rose Mine site is characterized by native and introduced species of vegetation. These include plants growing on undisturbed areas around the site, while little or no vegetation is growing on the tailings impoundments. Dominant trees include lodge pole pine (*Pinus contorta*), Douglas fir (*Pseudotsuga menziesii*), and ponderosa pine (*Pinus ponderosa*). Shrubs and other vegetative species include grouse whortleberry (*Vaccinium scoparium*), snowberry (*Symphoricarpos alba*), and blue huckleberry (*Vaccinium globulare*) (MNHP 2010). There is regrowth of the forest on the T2 tailings impoundment dam face.

The habitat supports a variety of wildlife – deer, elk, black bear, bobcat, potentially lynx, and miscellaneous smaller mammals such as rabbits, squirrels, mice, and voles (MNHP 2010). Many species of bird are found around the site, including owls, eagles, and raptors. Dunkleberg Creek provides habitat for amphibians, fish, and other aquatic organisms and serves as water source for other wildlife. Brown trout and Westslope Cutthroat trout also reside in Dunkleberg Creek.

1.2.5 Land Use and Population

The Forest Rose Mine Site is located on private land and the Beaverhead-Deerlodge National Forest in Granite County. The primary land use in the vicinity of the site is recreational, with some residences located downstream along the creek. The population in Granite County is 2,879 people, with a density of 2 persons per square mile (USCB 2009).

1.2 Land Ownership

The current private property owners of the Forest Rose Mine site are the Forest Rose Mining Company and JoJamette Antonioli. The lower tailings impoundment (T1) is located on Beaverhead-Deerlodge National Forest.

2.0 Investigation Objectives

Herrera developed a reclamation work plan (RWP) on behalf of DEQ to support development of this RI report (Herrera 2010). The work plan included a field sampling plan detailing sampling objectives of the RI field work. Field sampling activities focused on collection of data to support human health and ecological risk assessments and to fill in data gaps from previous sampling efforts. Information required to support the risk assessments included the following:

- Magnitude and extent of soil contamination
- Magnitude and extent of waste rock contamination
- Levels of dissolved and total recoverable metals in surface water
- Concentration of metals in background soil

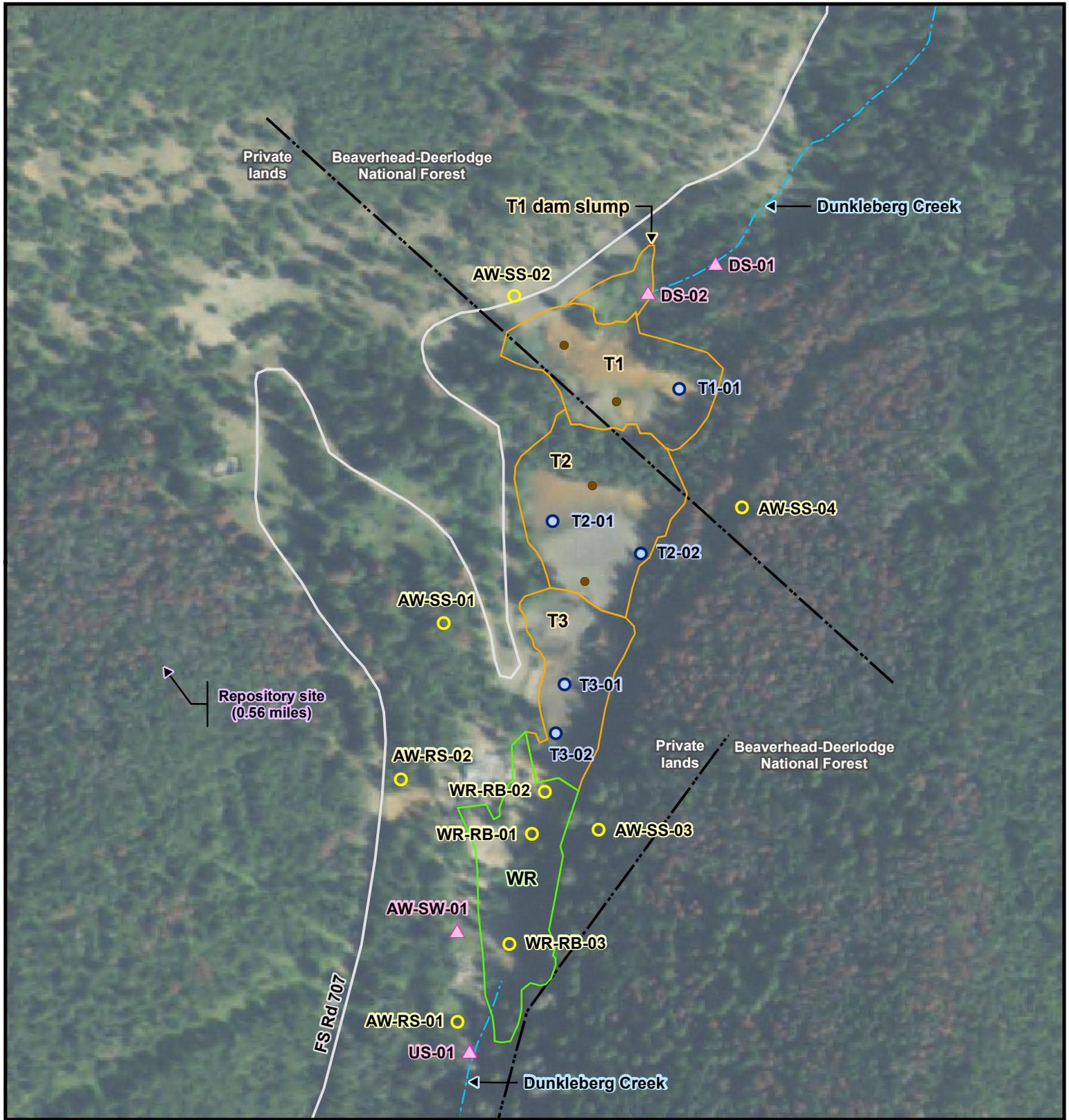
The following information was also necessary to support a detailed analysis of reclamation alternatives for the Forest Rose Mine Site:

- Estimates of area and volume of waste that requires reclamation
- Identifying reclamation requirements for disturbed areas associated with lime and fertilizer application, including soil texture and grain size, organic matter, and native plant species
- Identifying and characterizing potential repository sites
- Identifying potential borrow areas

2.1 Summary of Field Activities

Field sampling activities at the Forest Rose Mine Site were performed between July 26th and July 31st, 2010. Herrera accessed the Forest Rose Mine Site from forest service road 707. The access to the impacted mine area includes the crossing of four USFS bridges consisting of wooden decks built on top of gabion abutments. The bridges have guard rails and are approximately 14-foot wide and 10-foot long. Two flatbed trucks carrying the tracked drill rig and backhoe were unable to cross the bridges. This equipment was unloaded below the bridges and driven to the site individually.

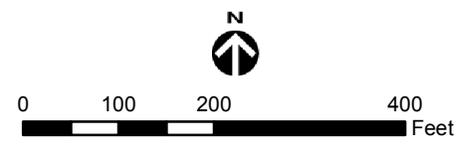
A total of 39 samples were collected, including waste rock, tailings, soil, sediment, and water (Figures 2-1 and 2-2). Two background samples were collected, and the sample locations are shown in Figure 2-3. Table 2-1 provides a summary of the samples collected during this field



Legend

- Surface soil sample
- Subsurface soil sample location (tailings, waste rock, or soil)
- ▲ Surface water/sediment sample
- Previous boring location
- - - - - Stream
- Road

Figure 2-1. Sample location map, Forest Rose Mine Site.



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 Aerial photograph: USDA, 2009

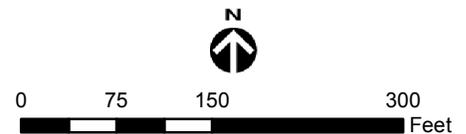
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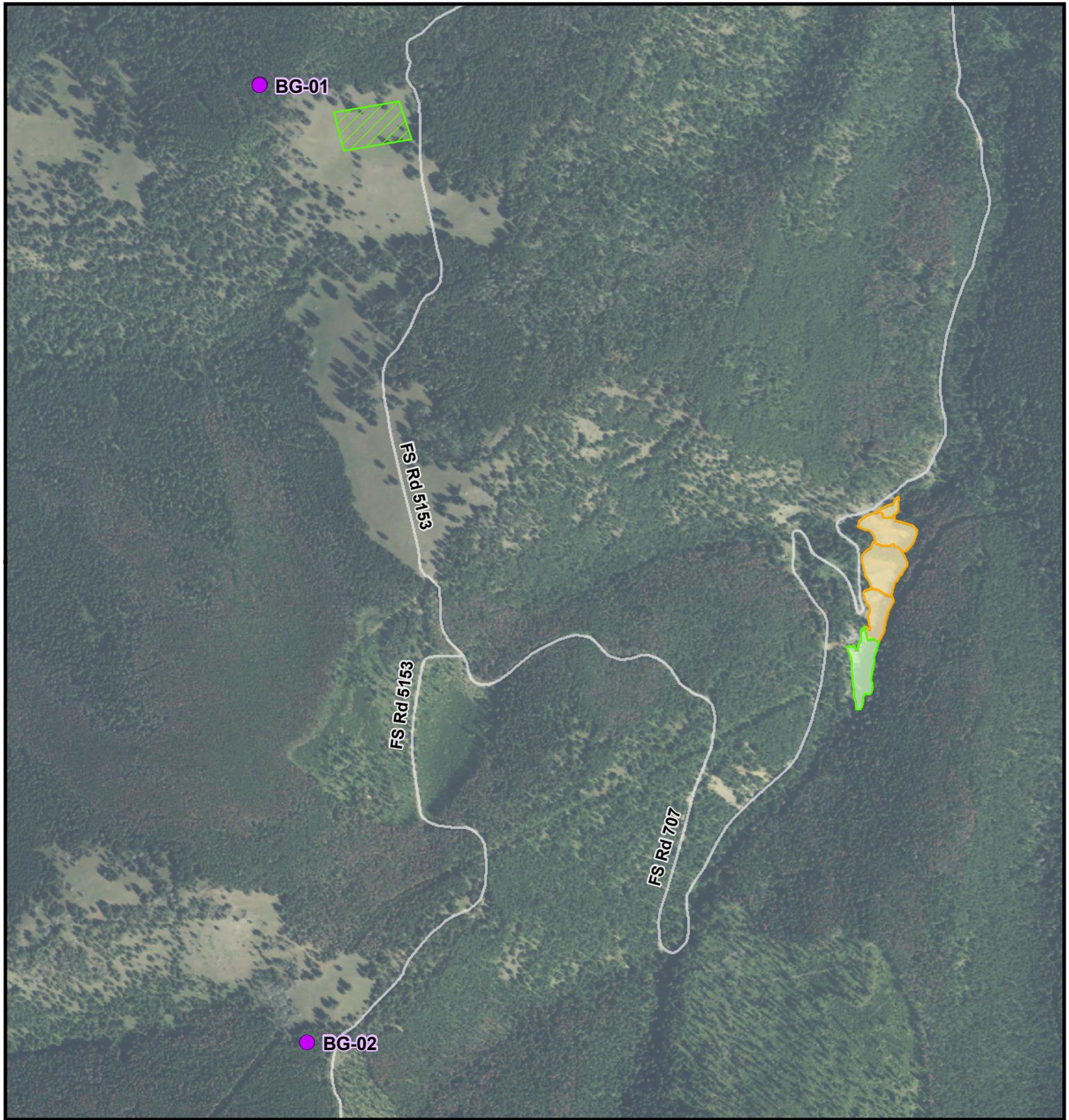
- Surface soil sample and test pit
- Monitoring well
- Approximate repository boundary
- Road

Figure 2-2. Sample location map, Forest Rose Mine Site repository.



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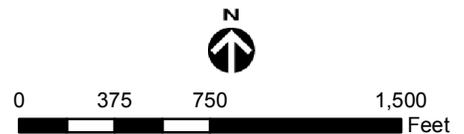
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Legend

- Background sample
- Waste Rock area
- Tailings impoundment
- Approximate repository boundary
- Road

Figure 2-3. Background sample location map, Forest Rose Mine Site



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 Aerial photograph: USDA, 2009

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Table 2-1. Sampling summary, Forest Rose Mine Site.

Sample Location	Matrix	Laboratory Analysis	Sample Number	Sample Depth (ft)	Rationale
Downstream (DS)					
200 feet downstream of T1 slump	Surface water	Total recoverable metals Field parameters	FR-DS-SW-T1	–	Downstream recovery conditions Compare conditions across site
		Dissolved metals (aluminum)	FR-DS-SW-D1	–	Downstream recovery conditions
	Sediment	Total recoverable metals	FR-DS-SD-01	0–3	Downstream recovery conditions
10 feet downstream of T1 slump	Surface water	Total recoverable metals Field parameters	FR-DS-SW-T2	–	Downstream recovery conditions Compare conditions across site
		Dissolved metals (aluminum)	FR-DS-SW-D2	–	Downstream recovery conditions
	Sediment	Total recoverable metals	FR-DS-SD-02	0–3	Measure conditions immediately downstream of site
Lower Tailings Impoundment (T1)					
East side	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T1-TB-01-00	0–3	Compare to previous composite sample Compare to previous composite sample Evaluate tailings consistency Compaction stability and settlement potential
	Soil	Total recoverable metals	FR-T1-SB-01-15	15	Compare to previous composite sample
Middle Tailings Impoundment (T2)					
West side	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T2-TB-01-00	0–3	Compare to previous composite sample Compare to previous composite sample Evaluate tailings consistency Compaction stability and settlement potential
	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T2-TB-01-10	10	Compare to previous subsurface sample Compare to previous subsurface sample Evaluate tailings consistency Compaction stability and settlement potential
	Soil	Total recoverable metals Particle size analysis Moisture content	FR-T2-SB-01-20	20	Compare to previous composite sample Evaluate soil consistency Evaluate soil consistency

Table 2-1 (continued). Sampling summary, Forest Rose Mine Site.

Sample Location	Matrix	Laboratory Analysis	Sample Number	Sample Depth (ft)	Rationale
Middle Tailings Impoundment (T2) (continues)					
East side	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T2-TB-02-00	0-3	Compare to previous composite sample Compare to previous composite sample Evaluate tailings consistency Compaction stability and settlement potential
	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T2-TB-02-10	10	Compare to previous subsurface sample Compare to previous subsurface sample Evaluate tailings consistency Compaction stability and settlement potential
	Soil	Total recoverable metals Particle size analysis Moisture content	FR-T1-SB-02-15	15	Compare to previous composite sample Evaluate soil consistency Evaluate soil consistency
Upper Tailings Impoundment (T3)					
North side	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T3-TB-01-00	0-3	Compare to previous composite sample Compare to previous composite sample Evaluate tailings consistency Compaction stability and settlement potential
	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T3-TB-01-10	10	Compare to previous subsurface sample Compare to previous subsurface sample Evaluate tailings consistency Compaction stability and settlement potential
	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T3-TB-01-20	20	Compare to previous subsurface sample Compare to previous subsurface sample Evaluate tailings consistency Compaction stability and settlement potential
	Soil	Total recoverable metals Particle size analysis Moisture content	FR-T3-SB-01-30	30	Compare to previous composite sample Evaluate soil consistency Evaluate soil consistency

Table 2-1 (continued). Sampling summary, Forest Rose Mine Site.

Sample Location	Matrix	Laboratory Analysis	Sample Number	Sample Depth (ft)	Rationale
Upper Tailings Impoundment (T3) (continued)					
South side	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T3-TB-02-00	0–3	Compare to previous composite sample Compare to previous composite sample Evaluate tailings consistency Compaction stability and settlement potential
	Tailings	Total recoverable metals ABA Particle size analysis Moisture content	FR-T3-TB-02-10	10	Compare to previous subsurface sample Compare to previous subsurface sample Evaluate tailings consistency Compaction stability and settlement potential
	Soil	Total recoverable metals Particle size analysis Moisture content	FR-T3-SB-02-20	20	Compare to previous composite sample Evaluate soil consistency Evaluate soil consistency
Waste Rock Impoundment (WR)					
Impoundment	Waste Rock	Total recoverable metals ABA Particle size analysis Moisture content	FR-WR-RB-01-00	0–3	Compare to previous composite sample Compare to previous composite sample Evaluate tailings consistency Compaction stability and settlement potential
Impoundment	Waste Rock	Total recoverable metals ABA Particle size analysis Moisture content	FR-WR-RB-03-00	0–3	Compare to previous composite sample Compare to previous composite sample Evaluate tailings consistency Compaction stability and settlement potential
Berm	Waste Rock	Total recoverable metals ABA Particle size analysis Moisture content	FR-WR-RB-02-00	0–3	Compare to previous composite sample Compare to previous composite sample Evaluate tailings consistency Compaction stability and settlement potential
Area-wide Condition (AW)					
West Slope Upgradient	Waste Rock	Total recoverable metals	FR-AW-RS-01-00	0–3	Residual contamination potentially left in place
West Slope Downgradient	Waste Rock	Total recoverable metals	FR-AW-RS-02-00	0–3	Residual contamination potentially left in place
West Slope Upgradient	Soil	Total recoverable metals	FR-AW-SS-01-00	0–3	Residual contamination potentially left in place
West Slope Downgradient	Soil	Total recoverable metals	FR-AW-SS-02-00	0–3	Residual contamination potentially left in place
East Slope Upgradient	Soil	Total recoverable metals	FR-AW-SS-03-00	0–3	Residual contamination potentially left in place

Table 2-1 (continued). Sampling summary, Forest Rose Mine Site.

Sample Location	Matrix	Laboratory Analysis	Sample Number	Sample Depth (ft)	Rationale
Area-wide Condition (AW) (continued)					
East Slope Downgradient	Soil	Total recoverable metals	FR-AW-SS-04-00	0–3	Residual contamination potentially left in place
West Slope Adit	Water	Total recoverable metals Field parameters	FR-AW-SW-T1	–	Measure conditions associated with adit drainage Compare conditions across site
		Dissolved metals (aluminum)	FR-AW-SW-D1	–	Measure conditions associated with adit drainage
Repository (RY)					
Repository	Soil	Total recoverable metals Agricultural Particle size analysis Standard Proctor Specific Gravity of Particles Moisture Content	FR-RY-SS-01-00	0–3	Background Revegetation viability Engineering properties Engineering properties Engineering properties Engineering properties
Repository	Soil	Total recoverable metals Agricultural Standard Proctor Specific Gravity of Particles Moisture Content	FR-RY-SS-02-00	0–3	Background Revegetation viability Engineering properties Engineering properties Engineering properties Engineering properties
Repository	Soil	Total recoverable metals Agricultural Standard Proctor Specific Gravity of Particles Moisture Content	FR-RY-SS-03-00	0–3	Background Revegetation viability Engineering properties Engineering properties Engineering properties Engineering properties
Repository	Soil	Total recoverable metals	FR-RY-WELL-01-00	0–3	Background
Background (BG)					
Upgradient West	Soil	Total recoverable metals	FR-BG-SS-01-00	0–3	Background
Upgradient East	Soil	Total recoverable metals	FR-BG-SS-02-00	0–3	Background

Table 2-1 (continued). Sampling summary, Forest Rose Mine Site.

Sample Location	Matrix	Laboratory Analysis	Sample Number	Sample Depth (ft)	Rationale
Upstream (US)					
100 feet upstream of waste rock berm	Surface water	Total recoverable metals Field parameters	FR-US-SW-T1	–	Upstream recovery conditions Compare conditions across site
		Dissolved metals (aluminum)	FR-US-SW-D1	–	Upstream recovery conditions
100 feet upstream of waste rock berm	Sediment	Total recoverable metals	FR-US-SD-01	0–.3	Measure conditions associated with downstream recovery
Quality Control (QC)					
10 feet downstream of slump	Surface water	Total recoverable metals	FR-DS-QC-T1 Duplicate of FR-DS-SW-T2	–	Measure field variability
		Dissolved metals (aluminum)	FR-DS-QC-D1 Duplicate of FR-DS-SW-D2	–	Measure field variability
Lower Tailings Impoundment	Water	Total recoverable metals	FR-QC-WT-T1	NA	Equipment Rinsate

Agricultural analyses includes: pH, cation exchange capacity, conductivity, nitrogen, phosphorus, potassium, organic matter, and lime including a fertilizer requirement.

Field parameters includes: pH, temperature, specific conductance, dissolved oxygen.

Total recoverable metals analysis for soil and sediment includes: antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc

Total recoverable metals analysis for water includes: antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc.

Dissolved metals analysis for water is for aluminum only.

ABA =Acid base accounting (total sulfur, sulfate sulfur, pyretic sulfur, and organic sulfur

NA= Not applicable

AW=Area wide

BG=Background

DS=Downstream

QC=quality control

RB=Rock boring (waste rock)

RS=Rock surface (waste rock)

RY=Repository

SW=Surface water

SB=Soil boring

SD=Sediment

SS=Soil surface

TS=Tailing surface

TB=Tailing boring

US=Upstream

effort, including laboratory analyses and sampling rationale. Sample locations also are shown on a topographic survey map completed for the site and provided in Appendix A.

2.1.1 Soil Borings

Borings were advanced using a track mounted auger drill rig equipped with 4.25-inch inside diameter hollow-stem auger. Discrete soil samples were collected using a drive split-spoon sampler for soil classification, field screening, and chemical analysis. The sampler used for the Repository Well (RY-Well-01) and Boring T-1 was 24-inches long with a 2-inch outside diameter. A larger sampler with a 3-inch outside diameter was used for Borings T2-01, T2-02, T3-01, and T3-02. The sampler was driven using a 140-pound downhole hammer with a drop of 30 inches. Following retrieval, each sample was logged by a geologist for soil lithology, including the presence of tailings versus native soil based on visual inspection. Soils encountered during drilling were visually inspected for staining and classified in accordance with the Unified Soil Classification System (USCS; American Society for Testing and Materials [ASTM] D2488-09a). The boring logs are provided in Appendix B.

The sample locations were field surveyed using a hand-held global positioning system (GPS) unit, and then staked or flagged with survey tape such that they could be field located during the formal site survey. The formal site survey was completed by DJ&A of Missoula, MT. The survey identified the extents of the impacted area at Forest Rose Mine site and was delivered to Herrera on October 13th, 2010.

2.2 Summary of Solid-Matrix Sampling

The following sections provide a synopsis of the samples collected and the in-field observations for soil and waste rock collected from the Forest Rose Mine Site during the July 2010 RI field sampling effort. Figures 2-1, 2-2, and 2-3 show the sampling locations, and Table 2-1 summarizes the sampling number, analysis, and rationale.

2.2.1 Downstream (DS)

Two downstream sediment samples were collected in accordance with the RWP. The first sample was collected approximately 200 feet downstream of the Tailings Impoundment 1 (T1) slump (at the DS-01 location), and the second sample was collected within 10 feet of the pipe outlet downstream of the T1 slump (at the DS-02 location). Both samples consisted of brown gravelly sand with silt. Each downstream soil sample was submitted for total recoverable metals.

2.2.2 Lower Tailings Impoundment (T1)

Two samples were collected from the T1 tailings impoundment (at the T1-01 location) to supplement the samples previously collected by MCS. One surface tailings sample was collected

to categorize the tailings material, and one subsurface soil sample was collected at a depth of 15 feet with a track mounted hollow-stem auger drilling rig to provide information on the geometry of the T1 tailings impoundment and categorize the soil material. The surface sample consisted of light to dark orange silt with gravel and was collected from a depth of 0 to four inches below ground surface (bgs). The surface tailings sample was submitted for total recoverable metals, acid base accounting (ABA), particle size, and moisture content. The subsurface soil sample was submitted for total recoverable metals.

2.2.3 Middle Tailings Impoundment (T2)

Six samples were collected from the T2 tailings impoundment to supplement the samples previously collected by MCS. Three samples were collected on the west side of the T2 tailings impoundment (at the T2-01 location) and three samples were collected from east side of the T2 tailings impoundment (at the T2-02 location). At each location, one surface tailings sample was collected and two subsurface samples were collected. The subsurface tailings samples were collected at a depth of 10 feet and the subsurface soil samples were collected at a depth of 20 feet on the west side and 15 feet on the east side. Both surface tailings samples were collected from 0 to four inches bgs. The surface tailings sample collected from the T2-01 location consisted of dark orange silt with a white and dark brown crust on the surface. Vegetation present at this location was removed from the surface to expose the tailings prior to sample collection. The surface tailing sample collected from T2-02 location consisted of brownish gray clayey silt with a gray crust on the surface. The tailings surface samples were submitted for total recoverable metals, ABA, particle size, and moisture content. The subsurface samples were submitted for total recoverable metals, particle size, and moisture content.

2.2.4 Upper Tailings Impoundment (T3)

Seven samples were collected from the T3 tailings impoundment to categorize the tailings and determine the geometry of the tailings impoundment. Four samples were collected on the north side of the T3 tailings impoundment (at the T3- 01 location) and three samples were collected from south side of the T3 tailings impoundment (at the T3-02 location). At each location, one surface tailings sample was collected and the remaining samples collected were subsurface. Both surface tailings samples were collected from 0 to four inches bgs. The surface tailings sample collected from the T3-01 location consisted of light gray silt with a light gray crust on the surface. Minimal vegetation was present at this location and was removed from the surface to expose the tailings prior to sample collection. The surface tailing sample collected from the T3-02 location consisted of brown to light gray silt with a gray crust on the surface. Some leafy vegetation was present at this location and was removed from the surface to expose the tailings prior to sample collection. The tailings surface samples were submitted for total recoverable metals, ABA, particle size, and moisture content. The subsurface samples were submitted for total recoverable metals, particle size, and moisture content.

2.2.5 Waste Rock Impoundment (WR)

Three surface samples were collected from the waste rock impoundment areas. The boring rig was not able to collect a subsurface sample due to the coarse rock (6-inch to 8-inch rock) located in the WR impoundment; therefore, a backhoe was used to excavate along the sidewalls of the WR impoundment to expose the bottom of the waste rock and allow the surveyors to delineate the geometry of the WR impoundment. This change from the RWP was discussed with DEQ's project manager on site on July 27th, 2010, and was approved by the DEQ project manager. The three surface samples were collected in the two WR impoundment areas as well as a berm that was built out of waste rock. The samples were collected by clearing rocks and collecting the soil material surrounding the rocks. All three surface soil samples were collected from 0 to four inches bgs. Surface soil samples consisted of light brown gravelly silt at location WR-RB-01 and orange silt with gravel at locations WR-RB-02 and WR-RB-03. The samples were submitted for total recoverable metals, ABA, particle size, and moisture content.

2.2.6 Area-wide Condition (AW)

Six area-wide samples were collected in accordance with the RWP. Two samples were collected on the west slope of the Dunkleberg Creek ravine both upgradient and downgradient of the waste rock impoundments (at the AW-RS-01 and AW-RS-02 locations). The four remaining samples were collected on the west slope and east slope of Dunkleberg Creek ravine. Two samples were collected on the west slope both upgradient and downgradient from the tailings impoundments (at the AW-SS-01 and AW-SS-02 locations), and two samples were collected on the east slope both upgradient and downgradient of the tailings impoundments (at the AW-SS-03 and AW-SS-04 locations). The soils generally consisted of gray to brown sandy silt with gravel and were sampled by scraping off duff/decomposing plant material from the surface to expose the soil. The samples were submitted for total recoverable metals.

2.2.7 Repository (RY)

Four surface samples were collected in the proposed repository location in accordance with the RWP. The samples were collected by scraping away grass and plant materials to expose the soil. Surface samples were collected from 0 to four inches bgs and soils generally consisted of brown sandy silt. The four surface samples were submitted for total recoverable metals. Additionally, three test pits were excavated at the RY-SS-01-00, RY-SS-02-00, and RY-SS-03-00 surface sample locations. The test pits were excavated with a backhoe and the soil samples collected from the test pits were submitted for agricultural, particle size, standard proctor, specific gravity of particles, and moisture content. More information related to the repository samples is provided in Section 7.0 - Repository Site Investigation. Finally, a well was drilled downgradient of the proposed repository with the hollow-stem auger rig to a depth of approximately 13 feet bgs, where it met with refusal due to encountering weathered bedrock. No water was encountered during drilling or after the well completion. The well was installed to allow monitoring of groundwater once when the repository has been constructed. The repository well log is provided in Appendix B.

2.2.8 Background (BG)

Two background surface soil samples were collected in accordance with the RWP. The two samples were collected in areas where native vegetation was present and there was no evidence of prior disturbance to the landscape. The soils consisted of light brown silty sand (BG-01) and brown gravelly sand (BG-02) and were sampled by scraping off duff/decomposing plant material from the surface to expose the soil. The samples were submitted for total recoverable metals.

2.2.9 Upstream (US)

One upstream sediment sample was collected 100 feet upstream of the mine impacted area in accordance with the RWP (at the US -01 location). Stream sediment was collected with a trowel from the bottom of the stream channel. The sample was submitted for total recoverable metals.

2.3 Summary of Water-Matrix Sampling

A total of six water samples were collected in accordance with the RWP. Figures 2-1 and 2-3 show the sampling locations and Table 2-1 summarizes the sampling location, sampling number, analysis, and rationale. Locations for water samples were selected to characterize the concentrations of metals in Dunkleberg Creek and surface water. Three water samples were collected in Dunkleberg Creek (at the DS-01, DS-02, and US-01 locations) with one duplicate sample collected at DS-02. An area wide surface water sample was also collected from an adit on the west slope of the Dunkleberg Creek ravine. Finally an equipment rinsate was collected. All water samples were submitted for total recoverable metals, and the stream samples and the area wide sample were also submitted for alkalinity/acidity tests. Water samples from Dunkleberg Creek were collected by dipping the sampling containers directly into the creek; samples for dissolved metals were collected by dipping the filtering flask in to the creek and then transferring to an appropriate sample container after filtration. The water sample from the adit was collected using a peristaltic pump and tubing due to low-flow and water depth.

Field parameters were collected to support the examination of water quality. The results of these measurements are presented in Table 2-2.

Table 2-2. Water field measurements, Forest Rose Mine Site.

Sample	Temperature (°C)	Specific conductivity (µs/cm)	Dissolved oxygen (mg/L)	pH (standard units)	Discharge (cfs)
DS-SW-01	6.38	457	11.4	7.91	0.269
DS-SW-02	7.11	430	10.3	7.37	0.180
US-SW-01	10.4	290	10.4	8.42	0.033
AW-SW-01	6.32	411	8.05	7.00	

°C degrees Celsius
 µs/cm microsiemens per centimeter
 mg/L milligrams per liter
 cfs cubic feet per second

2.4 Hazardous Materials Inventory

A hazardous materials inventory was performed to identify and document potential safety hazards. Thirteen buildings were located at the Forest Rose Mine Site in various states of disrepair. Two adits were identified on site; one collapsed and one partially open. In 2001, an Abandoned Mines Hazardous Materials Inventory was performed on Forest Rose and it identifies three adits located at the mine site (Renewable Technologies, Inc. [RTI], 2002). The original workings were shown to be at a depth of 160 feet while the main tunnel on the west bank of Dunkleberg Creek on the Acrobat lode was at the 330 foot level (RTI 2002). Soon after the mine closed down in 1945, a Bureau of Mines geologist surveyed the site and identified the main tunnel in 500 feet and 3,000 feet of winzes, drifts, and crosscut. The longest underground feature was a drift into the Monarch Mine property that was 1,800 feet long and a winze that sunk 400 feet below the main tunnel had flooded (RTI 2002). Herrera employees were only able to identify the two adits and could not locate the third adit. In addition to the buildings and adits, refuse on site that include a car body, 50-gallon drum, and several tires are located in a cut area between T3 and T2.

2.5 Post Sampling Activities

While in the field, both solid and water samples were logged in the field logbook and on the chain of custody forms. The samples were maintained on ice in sealed coolers, and were in the custody of Herrera samplers or secured in a locked vehicle. Soil, waste rock, and water samples were shipped to Pace Laboratories in Billings, MT for the analyses prescribed in the RWP. The repository geotechnical samples were delivered to Pioneer Technical Laboratories in Helena, MT by the DEQ project manager.

3.0 Site and Waste Characterization Results

This section describes the analytical results for the samples collected from the Forest Rose Mine site. Included in this section is information on the various waste types, their locations, and physical properties. Characterization of the waste types is used to assess (1) the potential risk to human health and the environment and (2) the specific waste material volumes associated with the reclamation alternatives for the site.

The solid matrix data were compared to both risk-based cleanup guidelines (RBCG) for abandoned mine sites (DEQ 1996) and to U.S. Environmental Protection Agency (EPA) Region 9 regional screening levels (RSLs) for residential soil (EPA 2010). The solid and water RBCG used for this site are receptors (composite, conservative for recreational visitors) exposed through a maximum use scenario (50-day gold panner/rock hound scenario).

The water matrix data were compared to both the RBCGs and both the acute and chronic aquatic life standards in the “Montana Numeric Water Quality Standards,” Circular DEQ-7 (DEQ 2010). The human health standards are also reported for information purposes only.

Physical and chemical wastes affecting the mine site include 13 buildings that are in disrepair, refuse from people dumping material on site, and the open and collapsed adits. The wastes and hazards were identified in Section 2.4 – Hazardous Materials Inventory and will be evaluated during the remediation design process.

3.1 Data Validation Summary

Summary data were validated according to the U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA 1994); raw data was not reviewed or provided by the laboratory. The complete data validation memorandums are presented in Appendix G. All data are considered acceptable, with some minor issues that required qualification of the data. Data quality issues identified for the Forest Rose Mine project that required data to be qualified as estimated (J) are as follows:

- All pH results for water samples due to holding time exceedance.
- Lead and manganese in water sample FR-DS-SW-T1 due to poor field duplicate precision.
- Mercury in sample FR-TI-SB-01-15 due to low recovery in the MSD and poor MS/MSD precision.
- Hot water extractable sulfur in sample FR-T2-TB-02-10 due to poor duplicate precision.
- Arsenic, barium, cadmium, chromium, copper, nickel, and silver in sample FR-DS-SD-01 due to high matrix spike recovery.

- Antimony, barium, manganese, and silver in sample FR-WR-RB-02-00 due to high matrix spike recovery.
- Antimony, arsenic, copper, and zinc in sample FR-RY-SS-03-00 due to low matrix spike recovery.
- Antimony and silver in sample FR-T3-TB-01-10 due to high matrix spike recovery.

3.2 Background Soil Samples

Two soil samples were collected to evaluate the background concentration of metals in surface soils at the Forest Rose mine site. Soil samples FR-BG-SS-01-00 and FR-BG-SS-02-00 were collected near the proposed repository site and further up the access road well above the site in naturally occurring soil. Table 3-1 presents the metals concentrations compared to EPA Regional 9 RSLs for residential soil (EPA 2010) and DEQ RBCG for composite, conservative soil cleanup guidelines for recreational visitors (DEQ 1996).

Table 3-1. Background soil concentrations (mg/kg) compared to EPA RSLs and DEQ RBCG, Forest Rose Mine Site.

Parameter	EPA RSL ^a	DEQ RBCG ^c	Mean Background	FR-BG-SS-01-00	FR-BG-SS-02-00
Antimony	31	293	0.39	0.49U	0.54
Arsenic	0.39 (40) ^b	0.7**	17.8	16.2	19.3
Barium	15,000	4,975	322.5	416	229
Cadmium	70	19.5**	1.8	0.5	3.1
Chromium	280	735,000	29.1	32.2	25.9
Copper	3,100	27,100	27	30.4	23.6
Iron	55,000	Not applicable	23,950	20,900	27,000
Lead	400	1,100	21	14.8	27.1
Manganese	Not applicable	665	1,605	1,780	1,430
Mercury	6.7	220	0.046	0.054	0.037
Nickel	14,000	14,650	39.8	50.7	28.9
Silver	390	Not applicable	0.22U	0.39U	0.49U
Zinc	23,000	220,000	141.9	76.8	207

^a EPA RSL = Regional Screening Level Table, Residential Soil Values (EPA 2010).

^b 0.39 is the arsenic residential soil RSL for the carcinogenic endpoint; Montana DEQ uses a soil screening value of 40 mg/kg for arsenic based on background arsenic values for Montana soils (DEQ 2005).

^c RBCG = Risk Based Cleanup Guidelines – Composite, Conservative Soil Cleanup Guidelines for Recreational Visitors, Tables 7-10 (DEQ 1996).

** - Concentrations shown for arsenic and cadmium are for a carcinogenic risk of 5E-07.

Bold – Value exceeds the RBCG.

U – The material was analyzed for but was not detected. The associated numerical value is the sample Practical Quantitation Limit (PQL).

Concentrations were calculated using ½ the detection limit for non-detects.

Metals in the background soils are below the EPA RSLs. The background samples arsenic values exceed the DEQ RBCG (0.7 mg/kg) as does the mean arsenic value. The background samples manganese values exceed the DEQ RBCG (665 mg/kg) as well as the mean manganese value.

3.3 Solid Matrix Samples

In 2010, 33 samples were collected from the Forest Rose mine site and proposed repository location. Samples were tested for total recoverable metals to characterize the waste, sediment, and soil. Additionally, soil and tailings borings were collected to supplement previous borings sampled in the 2004 investigation to establish spatial boundaries of contamination.

Analytical results for soil and waste rock samples are presented in Table 3-2. Metals concentrations are compared to EPA Region 9 RSLs for residential soil and DEQ RBCGs; mean background values are provided in Table 3-3. The following summarizes these comparisons:

- Antimony exceeds EPA RSLs in samples collected from Boring FR-T3-TB-01-10 at 10 feet bgs and Boring FR-T3-TB-02-10 at 10 feet bgs;
- Arsenic exceeds EPA RSLs in 14 samples: 1 tailings sample in T1, 4 tailings samples in T2, 5 tailings samples in T3 and 1 soil sample in T3, and 3 waste rock samples;
- Cadmium exceeds EPA RSLs in tailings sample FR-T3-TB-01-00;
- Iron exceeds EPA RSLs in 7 samples: 1 tailing sample in T1, 3 tailings samples in T2, 2 tailings samples in T3, and 1 waste rock sample;
- Lead exceeds EPA RSLs in 14 samples: 1 downstream sediment sample, 1 tailing sample in T1, 3 tailings samples in T2, 5 tailings samples in T3 and 1 soil sample in T3, and 3 waste rock samples;
- One soil sample exceeds EPA RSLs for arsenic, while the remaining soil samples, area wide samples, and repository samples did not exceed any EPA RSLs.
- Arsenic exceeds DEQ RBCG in every sample;
- Cadmium exceeds DEQ RBCG in 9 samples: 3 tailings samples in T2, 5 tailings samples in T3, and 1 waste rock sample;
- Lead exceeds DEQ RBCG in 9 samples: 1 tailing samples in T2, 5 tailings samples in T3, and 3 waste rock samples;

- Manganese exceeds DEQ RBCG in 22 samples: 1 downstream sediment sample, 1 tailing sample in T1, 3 tailings samples in T2, 5 tailings samples in T3 and 1 soil sample in T3, 3 waste rock samples, 6 area wide samples, 3 repository samples, and 1 upstream sediment sample; and
- All analytes except Barium exceed mean background concentrations.

Soil samples were also collected in 1993 and 2004 from the tailings impoundments and waste rock areas. In the 1993 sampling, antimony, arsenic, cadmium, iron, lead, and zinc exceed EPA RSLs, and antimony, arsenic, cadmium, manganese, and lead exceeded the DEQ RBCG. The 2004 tailings and waste rock samples were analyzed for arsenic, cadmium, copper lead, zinc, and mercury. Arsenic, cadmium, and lead exceeded both the EPA RSLs and the DEQ RBCG for the tailings and waste rock samples. The samples results are located in Appendix C. In general, a correlation exists between the samples collected in 2010 and the previous sampling events where the same analytes exceeded EPA and DEQ limits.

The soils samples collected in the borings beneath the tailings displayed lower concentrations of metals. Only one soil sample exceeds EPA RSLs for arsenic, while the remaining soil samples, area wide samples, and repository samples did not exceed any EPA RSLs. All of the samples exceed DEQ RBCG for arsenic, including the soil samples, area wide samples, and repository samples. One soil sample exceeds DEQ RBCG for manganese as well as all of the area wide samples and repository samples. No other DEQ RBCG was exceeded in the soil, area wide, or repository samples.

3.4 Water Matrix Samples

Dunkleberg Creek flows directly through the site, entering the waste rock pile from the south, flowing through waste rock and tailing impoundments, and leaving through a drain at the base of impoundment T1 to the north. Three water samples were collected in Dunkleberg Creek; two samples were collected downstream of the impacted site and one sample was collected upstream of the impacted site. The water was sampled for total recoverable metals as well as alkalinity/acidity.

An area-wide water sample was collected from the west slope adit. Flow from the adit is minimal; however, it contributes to the overall surface water chemistry at the site. The water was sampled for total recoverable metals and alkalinity/acidity.

Table 3-2. Solid matrix total recoverable metals analytical results (mg/kg) compared to EPA RSLs and DEQ RBCG, Forest Rose Mine Site.

Parameter (mg/kg)	EPA RSLs ^a	DEQ RBCG ^b	T1		T2						T3						
			T1-TB-01-00	T1-SB-01-15	T2-TB-01-00	T2-TB-01-10	T2-SB-01-20	T2-TB-02-00	T2-TB-02-10	T2-SB-02-15	T3-TB-01-00	T3-TB-01-10	T3-TB-01-20	T3-SB-01-30	T3-TB-02-00	T3-TB-02-10	T3-SB-02-20
Antimony	31	293	4.6	0.79	1.8	1.4	0.51 U	47.6	4.5	1.1	21.7	<u>49.5</u> J	20.7	2	13.8	<u>31.7</u>	0.81
Arsenic	0.39(40) ^b	0.7**	<u>445</u>	23.2	<u>239</u>	<u>264</u>	<u>10</u>	<u>456</u>	<u>300</u>	22	<u>355</u>	<u>331</u>	<u>330</u>	<u>41.6</u>	<u>370</u>	<u>555</u>	<u>18.3</u>
Barium	15,000	4,975	29.6	54.6	13.6	6.6	18.7	35.2	13.2	46.3	32.1	28.8	19.4	40.2	39.4	25.1	94.5
Cadmium	70	19.5**	1.4	4.1	3.1	<u>48</u>	1.1	<u>68</u>	<u>39.7</u>	1.8	<u>75.9</u>	<u>64.2</u>	<u>44.7</u>	3.6	<u>70.7</u>	<u>29.8</u>	1.3
Chromium	280	735,000	4	19.9	7.6	4.2	26.1	4	3.9	17.2	4.5	5.8	2.4	16.7	4.5	1.5	20.1
Copper	3,100	27,100	215	70.8	728	371	29.6	567	363	55.5	560	709	254	117	458	196	42.6
Iron	55,000	NA*	<u>137,000</u>	33,100	<u>164,000</u>	<u>113,000</u>	34,600	54,700	<u>78,800</u>	26,700	<u>59,200</u>	38,000	49,100	36,900	54,000	<u>71,200</u>	29,300
Lead	400	1,100	<u>657</u>	249	<u>768</u>	206	12.4	<u>7850</u>	<u>1090</u>	83.6	<u>4860</u>	<u>9500</u>	<u>4600</u>	<u>441</u>	<u>5140</u>	<u>9820</u>	57.7
Manganese	NA*	665	173	<u>740</u>	551	<u>1570</u>	277	<u>2210</u>	<u>1420</u>	506	<u>1860</u>	<u>2070</u>	<u>1890</u>	<u>1930</u>	<u>2290</u>	<u>4340</u>	577
Mercury	6.7	220	0.21	0.023 J	0.074	0.035	0.047	0.39	0.054	0.053	0.3	0.037	0.022 U	0.22 U	0.16	0.036	0.02 U
Nickel	14,000	14,650	12.6	24.9	14.7	24.7	32.6	7.5	13.8	25.7	10.2	7.3	9	29.4	21.2	4.9	27.3
Silver	390	NA*	8.7	0.53	6.4	4.3	0.51 U	30.7	9.9	1.5	19.1	68.7 J	13.8	1.6	16	16.5	0.79
Zinc	23,000	220,000	1600	282	1900	8300	174	7870	6610	145	7450	6910	7260	759	8130	8110	1100

Parameter (mg/kg)	EPA RSLs ^a	DEQ RBCG ^a	WR			Area Wide						Repository				Dunkleberg Creek		
			WR-RB-01-00	WR-RB-02-00	WR-RB-03-00	AW-RS-01	AW-RS-02	AW-SS-01	AW-SS-02	AW-SS-03	AW-SS-04	RY-SS-01-00	RY-SS-02-00	RY-SS-03-00	RY-WELL-01-00	US-SD-01	DS-SD-01	DS-SD-02
Antimony	31	293	9.4	27.9 J	10.3	2.1	0.89	1.3	0.53	2	1.7	0.56 U	0.46 U	0.53 UJ	0.54 U	29.6	1.2	0.68
Arsenic	0.39(40) ^b	0.7**	<u>101</u>	<u>486</u>	<u>319</u>	25.7	23.7	29	14.2	35.6	39.7	11.7	7	17.7 J	9.1	36.2	24.3 J	14.5
Barium	15,000	4,975	59.8	27.3 J	21.1	113	112	290	66.6	182	257	204	304	248	242	169	65.4 J	63
Cadmium	70	19.5**	5.2	5	<u>18.9</u>	2.5	4.2	2.7	1.2	1.9	4.1	0.42	0.27	0.25	0.39	<u>20.2</u>	6.6 J	2.7
Chromium	280	735,000	22.5	4.6	12.4	26.3	21.5	20.5	27.8	23.8	17.7	52.7	95.9	111	57.9	21	30.3 J	27.9
Copper	3,100	27,100	249	628	259	60.6	48.6	35.5	37.1	39.6	33.3	38.8	51.5	50.1 J	34.6	65.1	69 J	38.6
Iron	55,000	NA*	47,700	46,200	<u>123,000</u>	30,200	33,000	23,200	32,100	23,300	22,700	31,600	40,800	30,900	21,700	35,200	37,100	33,500
Lead	400	1,100	<u>4560</u>	<u>2640</u>	<u>2610</u>	141	76.9	79.8	26	123	146	12.1	8.2	8.2	6.5	389	<u>448</u>	120
Manganese	NA*	665	813	95.8 J	529	748	773	1300	796	1050	4170	831	717	674	599	1220	796	510
Mercury	6.7	220	0.23	0.9	0.42	0.13	0.038	0.045	0.026	0.076	0.13	0.058	0.02	0.026	0.036	0.053	0.023	0.02 U
Nickel	14,000	14,650	33.2	5.7	33.7	35	26.7	24.2	37.1	33.7	24.4	55.8	98.2	97.3	53.9	45.6	41.1 J	37.3
Silver	390	NA*	9.7	28.9 J	19.5	1	0.42 U	0.48	0.42 U	0.55	5.3	0.56 U	0.46 U	0.53 U	0.54 U	2.1	1.1 J	0.59
Zinc	23,000	220,000	1260	1070	2960	352	463	269	131	254	248	72.6	62.6	68 J	65.5	2210	1160	563

^aEPA RSL = Regional Screening Level Table, Residential Soil Values (EPA 2010)

^bRBCG = Risk Based Cleanup Guidelines – Composite, Conservative Soil Cleanup Guidelines for Recreational Visitors, Tables 7-10 (DEQ 1996)

** - concentrations shown for arsenic and cadmium are for a carcinogenic risk of 5E-07.

Underlined indicates the sample result or detection limit is greater than the EPA RSL limit

Shaded indicates the sample result or detection limit is greater than the DEQ RBCG limit.

J - The result is considered an estimated value due to data quality.

U – the material was analyzed for but was not detected. The associated numerical value is the sample Practical Quantitation Limit (PQL).

NA* - Not Applicable

Table 3-3. Solid matrix total recoverable metals mean background concentrations, Forest Rose Mine Site.

Parameter (mg/kg)	Mean Background
Antimony	0.39
Arsenic	17.8
Barium	323
Cadmium	1.8
Chromium	29
Copper	27
Iron	23,950
Lead	21
Manganese	1,605
Mercury	0.046
Nickel	40
Silver	0.22U
Zinc	142

The data are presented in a series of tables to provide context to the results. The following describes the data presentation:

- Table 3-4 presents the water total recoverable metals and a comparison to the DEQ RBCG
- Table 3-5 presents the water total recoverable metals and a comparison to the “Montana Numeric Water Quality Standards” Circular-7 for aquatic (chronic and acute levels) and human health values (surface water).

The following summarizes the findings of the water samples:

- Arsenic exceeds DEQ RBCG in upstream sample FR-US-SW-T1 and one downstream sample FR-DS-SW-T1. Arsenic was below the detection limit (0.50 ug/L) in the other three samples including the adit sample. Arsenic levels were higher in the upstream sample than the downstream sample;
- Manganese exceeds DEQ RBCG in one downstream sample FR-DS-SW-T1;
- Zinc exceeds DEQ RBCG in all five samples;
- Cadmium exceeds both Acute and Chronic Aquatic Life Standards in all five samples;

Table 3-4. Water total recoverable metals analytical results (µg/L) compared to DEQ RBCG, Forest Rose Mine Site.

Parameter	DEQ RBCG ^a	DS-SW-T1/D1	DS-SW-T2/D2	AW-SW-T1/D2	US-SW-T1/D1	DS-QC-T1/D1
pH at 25 Degrees C	NA*	7.9 J	7.6 J	7.4 J	8.3 J	NA*
Alkalinity, Total as CaCO ₃ (mg/L)	NA*	170	170	175	133	NA*
Acidity (mg/L)	NA*	5 U	5 U	5 U	5 U	NA*
Antimony (ug/L)	91.1	0.64	0.6	1.1	0.5 U	0.57
Arsenic (ug/L)	0.06**	0.59	0.5 U	0.5 U	0.68	0.5 U
Barium (ug/L)	17,474	16.3	16.5	20.5	10.5	16.3
Cadmium (ug/L)	66.5	0.72	0.65	6.1	0.98	0.65
Chromium (ug/L)	100,246	0.5 U				
Copper (ug/L)	472	1.7	1	1.1	0.79	0.99
Iron (ug/L)	NA*	67	57.4	50 U	117	50 U
Lead (ug/L)	47.1	10.2 J	5.9	0.46	2.1	5.8
Manganese (ug/L)	16.6	21.5 J	11.9	4.2	10.8	11.5
Mercury (ug/L)	0.15	0.000567	0.000505	0.000797	0.00112	0.000643
Nickel (ug/L)	931	0.5 U	0.5 U	2.1	0.68	0.5 U
Silver (ug/L)	NA*	0.5 U				
Zinc (ug/L)	17.2	91.7	76	1360	113	75.6
Aluminum, Dissolved (ug/L)	NA*	15.3	13.8	12	15.6	14.8

^a RBCG = Risk Based Cleanup Guidelines – Composite, Conservative Soil Cleanup Guidelines for Recreational Visitors, Tables 7-11 (DEQ 1996)

** - concentrations shown for arsenic are for a carcinogenic risk of 5E-07.

Shaded indicates the sample result or detection limit is greater than the DEQ RBCG limit.

U – the material was analyzed for but was not detected. The associated numerical value is the sample Practical Quantitation Limit (PQL).

NA* - Not Applicable

J - The result is considered an estimated value due to data quality

Table 3-5. Water total recoverable metals analytical results (µg/L) compared to Circular DEQ-7, Forest Rose Mine Site.

Parameter	Human Health Standards ^a	Acute Aquatic Life Standard	Chronic Aquatic Life Standard	FR-DS-SW-T1/D1	FR-DS-SW-T2/D2	FR-AW-SW-T1/D2	FR-US-SW-T1/D1	FR-DS-QC-T1/D1
<i>pH at 25 Degrees C</i>	NA*	NA*	NA*	7.9 J	7.6 J	7.4 J	8.3 J	NA*
<i>Alkalinity, Total as CaCO₃ (mg/L)</i>	NA*	NA*	NA*	170	170	175	133	NA*
<i>Acidity (mg/L)</i>	NA*	NA*	NA*	5 U	5 U	5 U	5 U	NA*
<i>Antimony (ug/L)</i>	5.6 ^b	None	None	0.64	0.6	1.1	0.5 U	0.57
<i>Arsenic (ug/L)</i>	10 ^b	340 ^b	150 ^b	0.59	0.5 U	0.5 U	0.68	0.5 U
<i>Barium (ug/L)</i>	1,000 ^g	None	None	16.3	16.5	20.5	10.5	16.3
<i>Cadmium (ug/L)</i>	5 ^c	0.52 ^e	0.097 ^e	<u>0.72</u>	<u>0.65</u>	6.1	<u>0.98</u>	<u>0.65</u>
<i>Chromium (ug/L)</i>	100 ^c	579 ^e	27.7 ^e	0.5 U				
<i>Copper (ug/L)</i>	1,300 ^b	3.79 ^e	2.85 ^e	1.7	1	1.1	0.79	0.99
<i>Iron (ug/L)</i>	300 ^d	None	1,000 ^g	67	57.4	50 U	117	50 U
<i>Lead (ug/L)</i>	15 ^b	13.98 ^e	0.545 ^e	10.2 J	5.9	0.46	2.1	5.8
<i>Manganese (ug/L)</i>	50 ^d	None	None	21.5 J	11.9	4.2	10.8	11.5
<i>Mercury (ug/L)</i>	0.05 ^b	1.7 ^b	0.91 ^b	0.000567	0.000505	0.000797	0.00112	0.000643
<i>Nickel (ug/L)</i>	100 ^f	145 ^e	16.1 ^e	0.5 U	0.5 U	2.1	0.68	0.5 U
<i>Silver (ug/L)</i>	100 ^f	0.374 ^e	None	0.5 U				
<i>Zinc (ug/L)</i>	2,000 ^f	37 ^e	37 ^e	<u>91.7</u>	<u>76</u>	<u>1360</u>	<u>113</u>	<u>75.6</u>
<i>Aluminum, Dissolved (ug/L)</i>	None	750 ^g	87 ^g	15.3	13.8	12	15.6	14.8

^aHuman Health Standards for Surface Water, Circular DEQ-7, "Montana Numeric Water Quality Standards" (MDEQ 2010).

^bPriority Pollutant, Circular DEQ-7, "Montana Numeric Water Quality Standards" (MDEQ 2010).

^cMaximum containment level (MDEQ 2010).

^dSecondary maximum contaminant level based on aesthetic properties (MDEQ 2010).

^e@25 mg/L hardness (MDEQ 2010).

^fHealth advisory (MDEQ 2010).

^gNon-priority pollutant (MDEQ 2010)

Bold - indicates the sample result or detection limit is greater than the Human Health Standard limit.

Underlined - indicates the sample result or detection limit is greater than the Acute Aquatic Life Standard limit.

Shaded indicates the sample result or detection limit is greater than the Chronic Aquatic Life Standard limit.

U – the material was analyzed for but was not detected. The associated numerical value is the sample Practical Quantitation Limit (PQL).

NA* - Not Applicable

J - The result is considered an estimated value due to data quality.

- Lead exceeds Chronic Aquatic Life Standards in all five samples;
- Zinc exceeds both Acute and Chronic Aquatic Life Standards in all five samples; and
- Cadmium exceeded the Human Health Standard in sample FR-AW-SW-T1, which is the adit sample.

3.5 Field Quality Assurance/Quality Control Samples

Three quality assurance/quality control (QA/QC) samples were collected during the RI:

- A field blank sample analyzed for low-level total mercury.
- An aqueous field duplicate sample (FR-DS-QC-T1) of sample FR-DS-SW-TI analyzed for total metals.
- An equipment rinsate sample (FR-QC-WT-T1) analyzed for total metals.

The water analyses results for the QA/QC samples are presented in Tables 3-4 and 3-5.

The low-level mercury field blank sample was collected by transferring laboratory provided water into a sample container in the field. The field blank did not have reportable levels of mercury above the adjusted reporting limit and no data were qualified.

The equipment rinsate blank was collected by pouring laboratory provided water over cleaned drilling equipment and collecting the water into a sample container. The equipment rinsate blank had low levels of barium, iron, lead, and manganese. However, no data were qualified because the levels found in the soil samples were well above the reporting limits and it was likely that results for these metals were not influenced by coming into contact with the drilling equipment.

Precision was calculated for sample FR-DS-SW-T1 and field duplicate sample FR-DS-QC-T1. Precision is the measure of variance occurring between two samples from the same location, undergoing the same analyses, and using the same analytical method(s). One measure of duplicate precision is relative percent difference (RPD). The EPA has established benchmarks for evaluating the levels of precision. These include +/- 20% RPD for waters (EPA 1994). While these benchmarks provide context to decision makers in evaluating the general quality of their data, field duplicates results aid in quantifying the uncertainty or the spread in the duplicate measurements. This spread should be evaluated by end data users to provide a sense of how well the results represent site conditions.

The water sample field duplicate RPD results were less than the 20 percent criterion with the exception of lead (55 percent) and manganese (61 percent). The reported values for lead and

manganese for sample FR-DS-SW-T1 and field duplicate sample FR-DS-QC-TI were qualified as estimated due to RPD exceedances.

4.0 Reclamation and Land Use Characterization Results

The physical, agricultural, and geochemical properties of soil and waste rock were evaluated by collecting samples during the RI. This information was gathered to support a better understanding of the condition of soil and waste rock materials at the site and to support the future decision making process. Tables 4-1, 4-2, and 4-3 provide summaries of the noted analyses for soil samples collected at the site.

4.1 Physical Analyses

Physical analyses included texture and moisture content. Texture is the relative proportions of the various soil separates (sand, silt, and clay) in soil. Naturally occurring soil at the site is sandy loam, which is a composite of sand, silt, and clay, the predominant soil is sand. Sandy loam is predominately coarse grained, provides good drainage, and typically has a lower moisture content. Six of the tailings samples were classified as silt loams, which are characterized as fine-grained soils that provide water storage capacity and slightly higher moisture content than the sandy loam. The physical analyses are shown in Table 4-1.

4.2 Agricultural Analyses

Agricultural analyses were performed on the proposed repository soil samples and included pH, conductivity, cation exchange capacity, nitrate, phosphorous, potassium, organic matter, and lime. Results are shown in Table 4-2. These analyses were performed on the repository samples because the soil could potentially be used as fill at the Forest Rose Mine Site and cover at the repository. The following provides a summary of the agricultural analyses and how they may affect current and future plant growth:

- pH is the measure of the acidity/alkalinity of soils and provides a general look at the ability of soils to establish and maintain vegetation. pH is considered neutral at 7.0 standard units (s.u.). The pH of the three repository samples ranges from 6.8 to 7.2. The soils are neutral and will provide a soil that is good for nutrients and plant establishment.
- Conductivity measures the salinity of soil. High conductivity concentrations can indicate when soil conditions may either limit existing plant growth or impede revegetation. The conductivity of the soils ranged from 0.19 to 0.38 mmhos/cm, which is within a good working range needed for establishing vegetation (Bohn 1979).

Table 4-1. Physical analysis of soil and waste rock, Forest Rose Mine Site.

Parameter	T1-TB-01-00	T2-TB-01-00	T2-TB-01-10	T2-SB-01-20	T2-TB-02-00
Soil Moisture Content %	10.9	15.9	20.3	4.8	23.3
Percent Silt % (w/w)	32.5	37.5	57.5	17.5	71.2
Percent Clay % (w/w)	17.5	15	7.5	22.5	13.8
Percent Sand % (w/w)	50	47.5	35	60	15
Texture	0	0	0	0	0

Parameter	T2-TB-02-10	T2-SB-02-15	T3-TB-01-00	T3-TB-01-10	T3-TB-01-20
Soil Moisture Content %	22.9	8.9	3.5	33.4	31
Percent Silt % (w/w)	68.7	26.2	67.5	67.5	41.2
Percent Clay % (w/w)	17.5	20	10	20	6.3
Percent Sand % (w/w)	13.8	53.8	22.5	12.5	52.5
Texture	0	0	0	0	0

Parameter	T3-SB-01-30	T3-TB-02-00	T3-TB-02-10	T3-SB-02-20	WR-RB-01-00
Soil Moisture Content %	11.9	26.3	27.3	13.9	9.8
Percent Silt % (w/w)	25	51.2	27.5	32.5	27.4
Percent Clay % (w/w)	17.5	11.3	10	20	18.8
Percent Sand % (w/w)	57.5	37.5	62.5	47.5	53.8
Texture	0	0	0	0	0

Parameter	WR-RB-02-00	WR-RB-03-00	RY-SS-01-00	RY-SS-02-00	RY-SS-03-00
Soil Moisture Content %	10.9	5.2	13.6	3.8	7.2
Percent Silt % (w/w)	35	16.2	27.5	17.5	19.9
Percent Clay % (w/w)	12.5	22.5	17.5	15	16.3
Percent Sand % (w/w)	52.5	61.3	55	67.5	63.8
Texture	0	0	0	0	0

Table 4-2. Agricultural analysis of soil and waste rock, Forest Rose Mine Site.

Parameter	FR-RY-SS-01-00	FR-RY-SS-02-00	FR-RY-SS-03-00
Soil Moisture Content (%)	13.6	3.8	7.2
pH, Saturated Paste (Std. Units)	6.8	6.9	7.2
Organic Matter % (w/w)	8.9	5.2	8
Percent Silt % (w/w)	27.5	17.5	19.9
Percent Clay % (w/w)	17.5	15	16.3
Percent Sand % (w/w)	55	67.5	63.8
Texture	0	0	0
Available Nitrate (mg/kg)	5.0 U	5.0 U	5.0 U
Available Phosphorus (mg/kg)	12.1	18.4	6.6
Potassium (mg/kg)	120.0 U	140.0	140.0
Cation Exchange Capacity (meq/100g)	49.7	35.6	47.5
Sp.Conductance Saturated Paste (mmhos/cm)	0.38	0.38	0.19
SMP Buffer pH (Std. Units)	6.2	6.8	6.2
SMP Lime Requirement (tons/1000)	5.3	1.0	5.3

U - The material was analyzed for, but was not detected. The associated numerical value is the detection limit (PQL).

Table 4-3. Acid Base Accounting (ABA) analysis of soil and waste rock, Forest Rose Mine Site.

Parameter	T1-TB-01-00	T2-TB-01-00	T2-TB-01-10	T2-TB-02-00	T2-TB-02-10	T3-TB-01-00	T3-TB-01-10	T3-TB-01-20
<i>SMP Buffer pH (Std. Units)</i>	4	5.3	7.5	7.6	7.5	7.6	7.6	7.6
<i>Sulfur, Hot Water Extractable % (w/w)</i>	2.21	2.92	2.58	1.61	4.9 J	2.04	1.08	1.37
<i>Sulfur, HNO3 Extractable % (w/w)</i>	0.13	0.15	6.33	4.84	7.87	4.6	1.85	5.66
<i>Sulfur, HCl Extractable % (w/w)</i>	0.741	0.435	1.45	0.05 U	0.05 U	0.05 U	0.248	0.05 U
<i>Total Sulfur % (w/w)</i>	3.09	3.51	10.4	3.69	9.92	3.76	3.19	4.83
<i>Sulfur, Residual % (w/w)</i>	0.05 U							
<i>Acid Potential (tons/1000)</i>	21	15	230	150	250	140	64	180
<i>Acid/Base Potential (tons/1000)</i>	-21	-15	-6.6	450	88	450	450	360
<i>Neutralization Potential (tons/1000)</i>	<0.5	<0.5	230	600	330	590	520	540
<i>Lime Requirement (tons/1000)</i>	46	33	290	190	310	180	80	220
<i>SMP Lime Requirement (tons/1000)</i>	> 15.5	12	0	0	0	0	0	0

Parameter	T3-TB-02-00	T3-TB-02-10	WR-RB-01-00	WR-RB-02-00	WR-RB-03-00
<i>SMP Buffer pH (Std. Units)</i>	7.5	7.6	6.2	3.8	6.6
<i>Sulfur, Hot Water Extractable % (w/w)</i>	1.52	0.895	0.09	3.11	1.14
<i>Sulfur, HNO3 Extractable % (w/w)</i>	4.75	6.54	0.114	0.861	1.32
<i>Sulfur, HCl Extractable % (w/w)</i>	0.05 U	0.05 U	0.05 U	1.17	0.05 U
<i>Total Sulfur % (w/w)</i>	3.03	5.43	0.253	5.14	2.34
<i>Sulfur, Residual % (w/w)</i>	0.05 U				
<i>Acid Potential (tons/1000)</i>	150	200	4.8	54	41
<i>Acid/Base Potential (tons/1000)</i>	380	370	-1.7	-54	-18
<i>Neutralization Potential (tons/1000)</i>	530	570	3	<0.5	23
<i>Lime Requirement (tons/1000)</i>	190	260	13	87	54
<i>SMP Lime Requirement (tons/1000)</i>	0	0	5.3	> 15.5	2.4

U - The material was analyzed for, but was not detected. The associated numerical value is the detection limit (PQL).

J - The result is considered an estimated value due to data quality.

- Cation exchange capacity (CEC) is the expression of cation adsorption per unit weight of soil. The higher the cation exchange rate the better plant nutrients are absorbed. Samples at the site had a CEC ranging from 35.6 to 49.7 meq/100 g. This places the CEC in the medium to high for loams (Munshower 1993).
- Nitrogen and nitrogen forms such as nitrate and nitrite are essential nutrients in establishing and maintaining vegetative cover. The nitrate levels in the soil samples were not detected (less than 5.0 mg/kg). With low levels of nitrogen available, it is likely that some nitrogen amendment in a slow release form will be needed during revegetation. It should be noted that grasses and trees are currently growing on the proposed repository site.
- Phosphorus is a key nutrient needed for maintaining existing vegetation and establishing new vegetation. Phosphorus as the phosphate ion is especially important during seedling growth (Munshower 1993). Phosphorus/phosphate levels range from 6.6 to 18.4 mg/kg, which is in the low to medium range for phosphorus/phosphate. The existing levels should be substantial enough to support revegetation (Munshower 1993).
- Potassium is another essential nutrient that facilitates vegetative growth. The potassium levels in the soil range from non-detect (>120 mg/kg) to 140 mg/kg. Soils containing potassium at or above 120 mg/kg will typically support vegetation (USDA 2009). The levels noted at the site should support revegetation.
- Organic matter stores anions, buffers the soil against rapid changes due to acidity or alkalinity, and increases the water-storage capacity of the soil. The organic matter ranged from 5.2 to 8.9%, which is in the high range (Munshower 1993). The organic matter will support revegetation.
- Natural lime in soils will buffer or neutralize acid-producing elements found in mine waste while facilitating plant uptake of nitrogen. Based on the near neutral soil pHs found at the proposed repository location, a small amount of lime may be needed.
- After analyzing the agricultural results from the samples collected at the proposed repository site, the following recommendations are proposed for fertilizer and lime:
 - Nitrate = 25 to 30 pounds per acre, based on a grass crop with a projected yield of 1.5 tons.

- Lime = 0 to 5 pounds per acre, based on a grass crop with a projected yield of 1.5 tons.

4.3 Acid Base Accounting Analyses

Acid base accounting (ABA) provides a more sophisticated means of examining the naturally occurring levels of basic material in soils (e.g. lime) versus the amount of acid generating materials it contains (e.g. sulfur) and how the two elements may interact over time. ABA analyses evaluate the amount of sulfur, pyritic sulfur, organic sulfur, sulfate sulfur to determine the potential of the soil/waste to generate acidity when it contacts water.

ABA also provides a value for the quantity of lime required to neutralize the overall acid potential produced by the waste. This is done by evaluating the acid potential versus the neutralization potential. Together, they provide a measure of whether the mine waste is likely to generate acid when exposed to water over time, or if the natural buffering capacity (e.g. lime) of the waste will offset its effects. Often, the sulfur contents of the mine waste exceed its buffering capacity due to weathering or leaching of the material. In these cases, excess lime is required to counteract the acid potential.

The ABA was analyzed using the static modified Sobek method. The results from the ABA analyses can be found in Table 4-3 and are summarized below:

- The sulfur levels in the samples ranged from 0.25% to 10.4%
- The acid potential ranged from 4.8 to 250 t/kt
- The neutralization potential ranged from >0.5 to 600 t/kt
- The lime requirements ranged from 13 to 310 t/kt

These results show that lime will likely need to be added to waste material to neutralize the acid potential. The application of soil amendments will be further examined in the expanded engineering evaluation/cost analysis (EEE/CA) for the Forest Rose Mine Site and will be contingent on upon the cleanup action identified for the site.

5.0 Human Health Risk Assessment

Previous site assessments of Forest Rose Abandoned Mine Site indicated the presence of contaminants with a potential to harm recreational users. It is therefore necessary to perform a human health risk assessment. If human health risks are present, contaminants of concern (COCs) will be identified and the associated clean-up goals for reclamation of the site will be determined.

This risk assessment contains the following sections: 1) hazard identification, 2) exposure assessment, 3) toxicity assessment, 4) risk characterization, and 5) risk-based clean-up goals.

Guidance for this risk assessment was obtained from several documents written by federal and state regulatory agencies, including EPA and Montana DEQ:

- Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (RAGS), Document EPA/540/R/99/005; accessible at: <http://www.epa.gov/oswer/riskassessment/ragsa/index.htm> (EPA 2004b)
- Risk-Based Clean-Up Guidelines for Abandoned Mine Sites, Final Report for the Montana Department of Environmental Quality (DEQ RBCG) (DEQ 1996)
- Circular DEQ-7, "Montana Numeric Water Quality Standards", Montana Department of Environmental Quality- Water Quality Standards Section, August 2010; accessible at: <http://deq.mt.gov/wqinfo/standards/default.mcp> (DEQ 2010)
- Montana Department of Environmental Quality's Recreational Risk Assessment Spreadsheet for Abandoned Mine Sites.

5.1 Hazard Identification

Contaminants of Potential Concern (COPCs) for the Forest Rose Mine Site were determined by comparing each inorganic chemical (heavy metals) identified at the site to criteria set by the US Environmental Protection Agency (EPA) in their Risk Assessment Guidance for Superfund (RAGS) (EPA 2004b). EPA criteria for COPCs include:

1. The contaminant is present at the site
2. The contaminant has a concentration significantly above background levels (generally 3 times higher)

3. The measured concentration of the contaminant is at least 20 percent greater than the detection limit
4. Analytical results have acceptable QA/QC results.

COPC determination also included screening the Recreational Clean-up Guidelines for soil and water (Tables 7-10 and 7-11 in DEQ RBCG) and the Water Quality Standards set by the Montana DEQ (DEQ 1996 and DEQ 2010).

5.1.1 Solid Matrix Samples

Inorganic analytical results for solid matrix samples (soil, tailings, waste rock, and sediment) were compared to the aforementioned criteria and the listed cleanup guidelines for soils (refer to Table 1 in Appendix D for more details on the COPC determination process). Based on this comparison, 10 COPCs were identified (COPCs exceeding Table 7-10 Cleanup Guidelines from DEQ RBCG are in bold):

- Antimony
- **Arsenic**
- **Cadmium**
- Copper
- Iron
- **Lead**
- **Manganese**
- Mercury
- Silver
- Zinc

Several metals concentrations were greater than DEQ cleanup guidelines for recreational visitors. Soil COPCs exceeding these guidelines are arsenic, cadmium, lead, and manganese.

5.1.2 Water Matrix Samples

Inorganic analytical results for water samples collected at were compared to the EPA criteria, the listed clean-up guidelines for water, and Montana water quality standards. Water samples were collected from Dunkleberg Creek; adit discharge was not evaluated, per the DEQ Recreational Risk Assessment Spreadsheets for Abandoned Mine Sites (refer to Table 2 in Appendix D for more details on the COPC determination process). Based on these comparisons, eight COPCs were identified (COPCs exceeding Table 7-11 Clean-up Guidelines from DEQ RBCG are in bold):

- Antimony
- **Arsenic**
- Barium

- **Cadmium**
- Copper
- Lead
- **Manganese**
- **Zinc**

None of these COPCs exceeded the Human Health Standard for Surface Water, Circular DEQ-7, or "Montana Numeric Water Quality Standards" (DEQ 2010); however, cadmium, lead, and zinc exceed the Chronic Aquatic Life Standard and cadmium and zinc exceed the Acute Aquatic Life Standard. Four metal concentrations were greater than DEQ clean-up guidelines for recreational visitors for water, including arsenic, cadmium, manganese, and zinc.

5.1.3 Exposure Assessment

The exposure assessment identifies potential human receptors, exposure routes through which receptors may come into contact with COPCs, and the parameters used to quantify exposure to COPCs identified in the previous section.

The gold panner/rock hound was selected as the primary exposure scenario for recreational use at the Forest Rose Mine Site. Because Dunkleberg Creek is a tributary to the Clark Fork River, fish consumption was also considered. The DEQ RBCG (DEQ 1996) does not list angler use for Dunkleberg Creek, but does list 16,120 angler days for the Clark Fork River. There are also a few cabins along Dunkleberg Creek, downstream of the mine site.

Although hunting and all terrain vehicle (ATV) recreational use may be plausible at the Forest Rose Mine Site, the gold panner/rock hound scenario was chosen because it is the most conservative scenario in the DEQ RBCG (DEQ 1996) and most protective of human health. Additional exposures analyzed produce a more conservative risk assessment and incorporates possible exposure pathways for a recreational fisherman through fish consumption (the only exposure not considered in the gold panner/rock hound scenario). Inhalation exposure was determined using solid matrix concentrations (mg/kg) in samples collected from the site, with the exposure calculation modified for particulate inhalation (air monitoring data were not collected). The exposure routes and associated exposure parameters used in this risk assessment include:

- Incidental soil ingestion (gold panner/rock hound – adult and child)
- Dermal exposure to soil (gold panner/rock hound – adult and child)
- Inhalation of particulate matter (gold panner/rock hound – adult and child)
- Incidental water ingestion (gold panner/rock hound – adult and child)
- Dermal contact with water (gold panner/rock hound – adult and child)
- Incidental sediment ingestion (gold panner/rock hound – adult and child)
- Fish ingestion (fisherman – adult)

Conservative exposure parameters were used in this risk assessment, due to the presence of cabins downstream of the mine site. This decision was also based on the fact that Dunkleberg

Creek is a tributary to the Clark Fork River and has the potential to provide trout habitat. Therefore, the conservative fish consumption exposure pathway option listed in the DEQ RBCG (DEQ 1996) of 42 meals per year was used in the exposure calculations. For the gold panner/rock hound scenario, the exposure frequency of 50 days per year was used in the associated exposure calculations (DEQ 1996).

It is recommended in both EPA RAGS (2004b) and the DEQ RBCG (DEQ 1996) guidance to utilize the 95 percent upper confidence limit (UCL) of the mean for each COPC exposure point concentration within a media; however, if this statistic cannot be calculated based on sample size, the maximum COPC concentration found at the site should be used. A total of 24 solid matrix samples were collected from the site, including nine soil, five waste rock, and 10 tailings samples; however, only three surface water and one adit discharge samples were collected. To be consistent among media (solids and water), maximum concentrations for each COPC were used as exposure point concentrations (EPCs) in the exposure calculations (Table 5-1). In addition, the higher sediment concentration of the two samples collected was used as the ECP in the associated exposure calculations. There are some uncertainties associated with using the maximum concentration versus the 95 percent UCL, which are outlined later within this risk assessment.

Table 5-1. Maximum exposure point concentrations (EPCs) for each media used in exposure calculations, Forest Rose Mine Site.

COPCs	Solids ^a (mg/kg)	Water ^b (µg/L)	Sediment (mg/kg)
Antimony	47.6	1.10	1.20
Arsenic	486.0	0.59	24.30
Barium	NA	20.50	NA
Cadmium	75.9	6.10	6.60
Copper	728.0	1.70	69.00
Iron	164,000.0	NA	37100.00
Lead	7,850.0	10.20	448.00
Manganese	4,170.0	21.50	796.00
Mercury	0.9	NA	0.02
Silver	30.7	NA	1.10
Zinc	8,130.0	1,360.00	1160.00

^a Solids include soils, tailings, and waste rock

^b Water includes surface water and adit discharge

NA indicates that that chemical is not a COPC for the specific medium

Guidance for COPC exposure calculations and exposure pathways, and exposure parameters used in the calculations was obtained from Figure 4-2 in the DEQ RBCG (DEQ 1996). Calculations for this risk assessment can be found in Appendix D, Tables 3 through 9.

Exposures for the Estimated Lifetime Cancer Risk (ELCR) incorporates a lifetime exposure duration of 70 years to obtain the lifetime exposure for the given exposure pathway. Guidance for these calculations was provided in DEQ RBCG (DEQ 1996). Calculations for this risk assessment can be found in Appendix D, Tables 10 through 13.

5.1.4 Toxicity Assessment

Toxic thresholds used in this risk assessment can be found in Appendix D, Tables 3 through 9. Chronic oral reference dose (RfD) values obtained from EPA's Integrated Risk Information System (IRIS) for antimony, arsenic, barium, cadmium, iron, manganese, silver, and zinc were used as toxic thresholds in this risk assessment. Cadmium has specific RfD values for food (solids and fish) versus water, used accordingly in the Hazard Quotient (HQ) calculations. The chronic oral RfD for a specific substance is determined using the equation:

$$\text{RfD} = \text{NOAEL} \div (\text{UF} \times \text{MF})$$

where NOAEL is the no observed adverse effects level

UF is the uncertainty factor, ranging from 1 to 1,000

MF is the modifying factor, determined by EPA professional judgment (EPA 1993).

For copper, the oral RfD was obtained from EPA's Health Effects Assessment Summary Tables (HEAST) (EPA 1997). The RfD and inhalation reference concentration (RfC) for lead were obtained by back-calculation methods from DEQ RBCG (DEQ 1996). Chronic inhalation RfC values were obtained from IRIS for manganese and mercury. The RfC for barium was obtained from HEAST (EPA 1997a).

Dermal toxic thresholds were calculated using oral RfD values for each COPC using the Gastrointestinal Absorption percentages (GI ABS %) obtained from RAGS Part E, exhibit 4-1 (EPA 2004b). The following equation was used to determine the dermal RfD:

$$\text{Dermal RfD} = \text{Oral RfD} \times \text{GI ABS \%}$$

When no GI ABS % was available, the oral RfD was extrapolated to the Dermal RfD. GI ABS % were available for antimony, barium, cadmium, manganese, and silver.

Cancer Slope Factor (SF) values were obtained from (IRIS) for arsenic (oral) and cadmium (inhalation). These can be found in Appendix D, Tables 10 through 13.

5.2 Risk Characterization

Risk characterization combines exposure and toxicity evaluations to calculate quantitative carcinogenic risk and non-carcinogenic hazards for the exposure scenario. The following sections detail the quantitative human health risk assessment.

5.2.1 Risk Calculations

A Hazard Quotient (HQ) was calculated to compare exposure to toxic thresholds (oral or dermal RfD or RfC) for each COPC and exposure route. This HQ helps quantify non-carcinogenic human health hazards for each COPC present on site. The equation used was:

$$\text{HQ} = \text{Exposure} \div \text{Toxic Threshold Value.}$$

A HQ greater than 1.0 indicates an exposure value higher than the given threshold value and that the COPC is a COC for the Forest Rose Mine Site. The EPA HQ benchmark of 1.0 has been established to protect human health from these contaminants. An HQ greater than 1.0 indicates the need for an exposure reduction. HQs for adult and child receptors were calculated for each COPC within each media (solids, sediment, and water), with an exposure duration of 30 years for the gold panner/rock hound recreational scenario (adult exposure duration of 24 years and child exposure duration of 6 years). A HQ for adult fish consumption was also calculated by comparing fish ingestion exposure to the oral RfD. Calculations for this risk assessment can be found in Appendix D, Tables 3 through 9.

HQs were summed across exposures (oral, dermal, and inhalation) for each COPC within each media (solids, water, sediments, and fish). The HQs for each COPC were then combined for an overall COPC HQ. The Total HQ represents the Total Hazard Quotient among all COPC present in solids, sediment, water, and fish for an adult (Table 5-2) and child (Table 5-3). The relative contribution of each individual COPC HQ to the Total HQ is also calculated to determine which COPCs are of greater concern.

Carcinogenic risk was calculated for arsenic and cadmium using the following equation:

$$\text{ELCR} = \text{Slope Factor} \times \text{Lifetime Exposure}$$

Carcinogenic exposures for arsenic and cadmium were calculated in the same manner as the non-carcinogenic exposure, except the Average Time for pathway-specific exposure period was adjusted to 365 days for 70 years (lifetime).

EPA considers an ELCR greater than 1.0E-06 as unacceptable (EPA 2004b). This benchmark indicates that one person in a population of 1,000,000 will be at risk for developing cancer from the given COPC. ELCRs were determined for both adult and child, and then exposures were combined for a true lifetime estimated cancer risk. Calculations for ELCRs can be found in Appendix D, Tables 10 through 13.

Table 5-2. Adult non-carcinogenic hazard summary, Forest Rose Mine Site.

COPC	Talings/Waste Rock/Soil HQ	Surface and Adit Water HQ	Sediment HQ	Fish Consumption HQ ^a	Combined HQ ^b	Percent Contribution ^c
Antimony	1.46E-01	5.92E-03	1.41E-03	2.97E-04	0.15	2.93%
Arsenic^f	1.31E+00	3.91E-03	3.80E-02	1.61E-02	1.37	26.17%
Barium	NA ^d	2.44E-04	NA ^d	NA ^c	0.0002	0.00%
Cadmium	7.01E-02	3.10E-02	3.10E-03	1.08E-02	0.12	2.20%
Copper	1.06E-02	8.44E-05	8.10E-04	1.58E-03	0.01	0.25%
Iron	1.37E-01	NAd	2.49E-02	NAd	0.16	3.08%
Lead^f	3.05E+00	1.35E-02	1.40E-01	6.19E-02	3.27	62.40%
Manganese	9.88E-02	4.13E-04	2.67E-03	1.37E-03	0.10	1.97%
Mercury	1.75E-03	NAd	3.13E-05	NAd	0.002	0.03%
Silver	2.03E-02	NAd	1.03E-04	NAd	0.02	0.39%
Zinc	1.58E-02	8.95E-03	1.82E-03	2.67E-03	0.03	0.56%
TOTAL HQ					5.24	

^a The more conservative exposure frequency of 42 meals per year was used in the fisherman exposure scenario for this exposure pathway

^b The sum of all exposure routes at Forest Rose Mine Site for each COPC and values over 1

^c Percentage of each COPC HQ of the Total HQ

^d NA indicates that the chemical is not a COPC for the associated media

^e No available Bioconcentration Factor for Barium for fish ingestion exposure calculation

^f Contaminant of Concern (COC) for Forest Rose Mine Site are in bold

Table 5-3. Child non-carcinogenic hazard summary, Forest Rose Mine Site.

COPC	Talings/Waste Rock/Soil HQ	Surface and Adit Water HQ	Sediment HQ	Combined HQ ^a	Percent Contribution ^b
Antimony	2.39E-01	2.59E-02	2.74E-03	0.27	2.83%
Arsenic^d	2.28E+00	1.80E-02	7.40E-02	2.37	25.09%
Barium	NA ^c	9.96E-04	NA ^c	0.001	0.01%
Cadmium	1.19E-01	1.21E-01	6.03E-03	0.25	2.61%
Copper	1.96E-02	3.90E-04	1.58E-03	0.02	0.23%
Iron	2.52E-01	NA ^c	4.84E-02	0.30	3.18%
Lead^d	5.64E+00	6.24E-02	2.73E-01	5.97	63.23%
Manganese	1.51E-01	1.56E-03	5.19E-03	0.16	1.67%
Mercury	3.23E-03	NA ^c	6.09E-05	0.003	0.03%
Silver	3.08E-02	NA ^c	2.01E-04	0.03	0.33%
Zinc	2.92E-02	4.15E-02	3.53E-03	0.07	0.79%
TOTAL HQ				9.45	

^a The sum of all exposure routes at Forest Rose Mine Site for each COPC

^b Percentage of each COPC HQ of the Total HQ

^c NA indicates that the chemical is not a COPC for the associated media

^d Contaminant of Concern (COC) for Forest Rose Mine Site are in bold

Combined adult and child ELCRs for each COPC within each media are summed across exposure pathways for a total media ELCR and then combined for a total COPC ELCR (Table 5-4).

Table 5-4. Combined adult and child carcinogenic risk summary, Forest Rose Mine Site.

Carcinogen COPC	Tailings/Waste Rock/Soil ELCR ^a	Surface and Adit Water ELCR ^a	Sediment ELCR ^a	Fish Consumption ELCR ^b	Combined ELCR ^c	Percentage of ELCR ^d
Arsenic^f	3.47E-04	1.30E-06	8.72E-06	3.10E-06	3.61E-04	100.00%
Cadmium	1.07E-08	NA ^e	NA ^e	NA ^e	1.07E-08	0.00%
TOTAL ELCR					3.61E-04	

^a Combined adult and child estimated lifetime cancer risk across all specific media exposure pathways

^b Adult exposure only used in the fish ingestion ELCR

^c The sum of all exposure pathways for each COPC

^d Percentage of the Total ELCR at Forest Rose Mine Site

^e NA indicates inhalation route not appropriate for associated media

^f Carcinogenic Contaminant of Concern (COC) are in bold

The non-carcinogen COCs for the Forest Rose Mine Site are arsenic and lead for both the adult and child recreational gold panner/rock hound scenario. The overall adult arsenic combined HQ was 1.37 and the overall child arsenic combined HQ was 2.37, contributing 26 percent and 25 percent of the Total HQs, respectively. The overall adult lead combined HQ was 3.27 and the overall child lead combined HQ was 5.97, contributing 62 percent and 63 percent of the Total HQs, respectively. The Total Adult HQ for all COPCs was 5.24 and the Total Child HQ for all COPCs was 9.45. The majority of the arsenic and lead exposure results from ingestion, contact with, or inhalation of tailings, waste rock, and soil.

Arsenic is a carcinogen COC with an Estimated Lifetime Cancer Risk of 3.61E-04 through all exposure routes for a recreationalist at the Forest Rose Mine Site. This indicates an estimated three to four persons in every 10,000 would be at risk for developing cancer from arsenic exposure through recreational activities at the site.

5.2.2 Risk-Based Clean-up Goals

The risk-based clean-up goals for the Forest Rose Mine Site are derived from Tables 7-10 and 7-11 in the DEQ RCBG (DEQ 1996). The cleanup guidelines for arsenic in soil are 0.7 mg/kg and 0.06 ug/L in surface water. The mean background soil concentration is 25 times the soil cleanup guideline level, indicating a relatively high naturally occurring level of arsenic in the vicinity. DEQ RCBG allows for use of the background soil UCL concentration as an alternative cleanup concentration (DEQ 1996). Similarly, the upstream water sample arsenic level is 11 times greater than the water cleanup guideline level. DEQ RCBG states that health protective levels may be assumed if the maximum contaminant level (MCL) for arsenic is set as the water reclamation goal. The background samples for lead are not higher than the RCBG; therefore, the RCBG shall be used for lead. Using the aforementioned information for arsenic and lead, Table 5-5 summarizes the cleanup guidelines for arsenic and lead.

Table 5-5. Risk-based clean-up guidelines for recreational users, Forest Rose Mine Site.

COC	Soil Cleanup Guideline (mg/kg)	Surface Water Cleanup Guideline (ug/L)
Arsenic	44 ^a	10 ^b
Lead	1,100	47.1

^a UCL = 95th Upper confidence limit on the mean concentration

^b MCL = State of Montana drinking water standard, maximum contaminant level (August 2010)

5.2.3 Uncertainty Assessment

Uncertainty in this human health risk assessment is potentially associated with the use of maximum concentrations in a given media, based on the small number of water samples collected. RAGS (EPA 2004b) and DEQ RBCG (DEQ 1996) guidance documents recommend using the 95 percent UCL of the mean for each medium analyzed in a site specific risk assessment. EPA indicates that using the maximum concentration can result in an over-estimate of the human health recreational risk. A conservative approach was used in this case to account for recreational users at and below the mine site and to address water flowing into the Clark Fork River. Uncertainty also can be attributed to the dermal toxic thresholds extrapolated from the oral RfD, as this is not an accurate representation of the exposure route; however, this represents the best available option for calculating risk.

In addition, back calculations are not a reliable method for determining toxic thresholds for lead, as the concentration of lead considered to be "safe" has not yet been determined (EPA 2004a).

There is also uncertainty associated with inhalation exposures calculated that relied on soil concentrations instead of air particulate concentrations (no air monitoring was performed).

5.2.4 Risk Characterization Summary

This risk assessment reveals Total HQs of 5.2 for adults and 9.5 for children, indicating the potential for adverse health effects among recreational users at the Forest Rose Mine Site. COCs are arsenic and lead present in tailings and waste rock of the mine workings. Arsenic is a carcinogen COC associated with all exposure pathways and media analyzed in this risk assessment for recreational users exposed to soil, tailings, waste rock, surface waters, sediment, and fish. Due to the level of these toxic substances present at the Forest Rose Mine Site, corrective measures to reduce human health risks and hazards are recommended. Reclamation should focus on removing arsenic from human exposure pathways associated with soil, tailings, waste rock, sediment, and surface waters, as well as removing lead from exposure pathways associated with soil, tailings, and waste rock.

6.0 Ecological Risk Assessment

This ecological risk assessment identifies contaminants of concern and presents estimated risks to ecological receptors associated with aquatic life, terrestrial plant, and terrestrial wildlife communities at the Forest Rose Mine Site. Of particular note, the Westslope Cutthroat Trout (*Oncorhynchus Clarkii Lewisi*) found in Dunkleberg Creek, is a Montana Fish of Special Concern (Westslope Cutthroat Trout is the Montana State Fish).

This risk assessment contains the following sections: 1) hazard identification of ecological threats and habitats, 2) exposure assessment, 3) ecological effects assessment (toxicity assessment), and 4) risk characterization.

Guidance for this risk assessment was obtained from several documents written by federal and state regulatory agencies, including EPA and Montana DEQ:

- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Document EPA 540-R-97-006last; accessible at: <http://www.epa.gov/oswer/riskassessment/ecorisk/ecorisk.htm> (EPA 1997b)
- Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual, Interim Final (RAGS), Document EPA/540/1-89/001; accessible at: <http://nepis.epa.gov/Adobe/PDF/10001FP2.PDF> (EPA 1989)
- Estimating Exposure of Terrestrial Wildlife to Contaminants, Draft (Sample, B.E. and G.W. Suter II; Document ES/ER/TM-125; Prepared for U.S. Department of Energy, Office of Environmental Restoration and Waste Management by Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee;; accessed at: <http://www.esd.ornl.gov/programs/ecorisk/documents/tm125.pdf> (Sample et al. 1994)
- Toxicological Benchmarks for Wildlife: 1996 Revision (Sample, B.E., D.M. Opresko, and G.W. Suter II; Document ES/ER/TM-86/R3; Prepared for U.S. Department of Energy Office of Environmental Management by Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, Tennessee; Accessed at: <http://www.esd.ornl.gov/programs/ecorisk/documents/tm86r3.pdf> (Sample et al. 1996)
- Circular DEQ-7 Montana Numeric Water Quality Standards (WQB-7), Montana Department of Environmental Quality- Water Quality Standards

Section; accessed at: <http://deq.mt.gov/wqinfo/standards/default.mcp>
(MDEQ 2010)

- Montana Department of Environmental Quality's Ecological Risk Assessment Spreadsheet for Abandoned Mine Sites.

This assessment is classified as Step 2 in the guidance document Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (EPA 1989). This is a preliminary, qualitative screening-level ecological risk assessment providing: "exposure estimates based on conservative assumptions and maximum concentrations present; and hazard quotients indicating which (if any) contaminants and exposure pathways might pose ecological threats." Cleanup decisions should not be solely based on a screening-level ecological risk assessment, but rather in combination with conclusions from the human health risk assessment and other supporting factors.

6.1 Hazard Identification for Ecological Effects and Habitats

Analytical results from samples collected at the Forest Rose Mine Site during the summer of 2010 were used in this risk assessment. Results for total recoverable metals were used to determine COPCs. COPC determination was completed in the human health recreational risk assessment, presented in Chapter 5. The same COPCs are evaluated for threats to ecological receptors in this risk assessment. COPCs for soil are antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury, silver, and zinc. COPCs for water are antimony, arsenic, barium, cadmium, copper, lead, manganese, and zinc. In addition, aluminum and nickel were also evaluated for ecological risk. Of these COPCs, none exceeded the DEQ Circular-7 Water Quality Human Health Standards for surface water. Aquatic Life Standards from DEQ are adjusted for water hardness before comparing the concentrations (this process is discussed further in Section 6.3).

6.1.1 Ecological Receptors of Concern

There are three communities classified as ecological receptors of concern in this risk assessment: terrestrial plants, terrestrial wildlife, and aquatic life communities.

The Forest Rose Mine Site covers an area approximately 2 miles wide and 5 miles long with a surface impacted area of approximately 4 acres. Native forest land surrounds the disturbed mine site. Little vegetation grows on the tailings and waste rock, likely due to the physical and chemical properties such as pH, metals concentrations, texture, and possible lack of soil nutrients and beneficial organisms. The terrestrial plant community is one of the ecological receptors of concern evaluated in this ecological risk assessment.

The mine site provides habitat for several species of terrestrial wildlife, as described in Section 1.2.4. Despite the lack of vegetation on the tailings, wildlife are exposed to metals through

consumption of soil, salt precipitates, surface water, and adit drainage. The whitetail deer will represent the terrestrial wildlife community as an ecological receptor of concern evaluated in this risk assessment.

Both Brown trout and Westslope Cutthroat trout have been identified in Dunkleberg Creek, which flows through the mine site and is a tributary to the Clark Fork River. This creek provides habitat to these and other forms of aquatic life as ecological receptors. Tailings, waste rock, and soils from surrounding areas, and adit discharge provide input to the creek. The aquatic life community is also evaluated as an ecological receptor in this risk assessment.

6.2 Exposure Assessment

Exposures to COPCs present at the Forest Rose Mine site are determined for each scenario through the processes described below. The maximum surface concentration for each COPC (listed above) from solid matrix samples taken from soil, tailings, and waste rock were used as the EPC for the associated solid exposure pathways. The maximum surface water concentration for each COPC was used as the EPC for the associated water exposure pathways. Adit discharge COPC concentrations were incorporated as specified in the individual scenario. The maximum COPC concentrations used in the exposure calculations are listed in Table 5-1.

Three ecological scenarios were used in this risk assessment, each to evaluate the three ecological receptor communities identified previously for the site. Because this is a screening-level risk assessment, and in consideration of the available investigation data, these three communities and related scenarios are the most practical for this risk analysis. Exposure calculations are provided in Appendix E, Tables 1 through 3.

6.2.1 Exposures for Aquatic Life Communities

This scenario evaluates the threat to fish and other aquatic life health from COPCs in Dunkleberg Creek water and sediment. Adit discharge flows into the creek, but was not included as a possible exposure route for aquatic life, as it is not considered suitable habitat. Maximum creek water and sediment concentrations for each COPC were used to evaluate the two exposure pathways, respectively.

6.2.2 Exposures for Terrestrial Wildlife Communities

This scenario evaluates the threat to wildlife health from COPCs for those species that include the Forest Rose Mine Site as part of their home range. The whitetail deer was chosen to represent the ecological receptor for the terrestrial wildlife community because of the availability of the exposure parameters and toxic thresholds in toxicology literature. It was assumed that deer using the site as part of their home range would be exposed to contaminants at the site through ingesting surface waters and soil or salt precipitates from tailings, waste rock, or exposed soil.

Exposure through vegetation consumption was not considered based on of the lack of vegetation growing on disturbed portions of the mine. Dermal or inhalation exposures were not considered, due to lack of exposure data.

Exposure parameters for whitetail deer were taken from Estimating Exposure of Terrestrial Wildlife to Contaminants by Sample, B.E. and G.W. Suter II (1994). Conservative estimates for body weight, soil consumption rate, water intake rate, and home range for a representative whitetail deer were used in the exposure calculations per the Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (EPA 1989) for screening-level ecological risk assessments. It was assumed that a whitetail deer's body weight (BW) is 68.0 kg (a male deer) (Sample and Suter II 1994). The following equation from Sample and Suter II (1989) was used to determine a water ingestion rate (WIR):

$$WIR = 0.099(BW)^{0.90}.$$

The resulting WIR is 4.41 liters per day (L/d). A soil consumption rate (SCR) was assumed based on the estimated soil in the diet of whitetail deer (<2 percent) (Beyer et al. 1994), resulting in a SCR of 0.0348 kilogram soil per day (kg/day).

The maximum concentration for each COPC from surface water and adit discharge was used in the following exposure calculation for water ingestion:

$$E_{\text{water}} = (WIR * [C_{\text{COPC}}*(1/1000)]) / BW.$$

The maximum concentration for each COPC from surface of tailings, waste rock, and soils was used in the following exposure calculation for soil consumption:

$$E_{\text{soil}} = (SCR * C_{\text{COPC}}) / BW.$$

The 4 acre impacted area (A) of the mine site is incorporated into the equation relative to the home range (HR) reported for a whitetail deer of 59 hectares (~146 acres) as the most conservative estimate (Sample and Suter II 1994). The exposure results for both exposure pathways for each COPC were added and then multiplied by the area ratio, based on the following equation:

$$ECOPC = ((A/HR) \left[\sum_{i=1}^m \left[\frac{(IR * C)}{BW} \right] \right])$$

6.2.3 Exposures for Terrestrial Plant Communities

This scenario evaluates threats to the health of terrestrial plants within the Forest Rose Mine Site, as well as investigates soil chemistry related to the lack of vegetation on disturbed areas and possible phytotoxic effects to plants. The exposure pathway to terrestrial plant communities is

through root to soil contact and the resulting uptake of COPCs. Maximum COPC concentrations from surface soil, tailings, and waste rock were used as the representative concentrations a plant or seed would be exposed to at the site.

6.3 Ecological Effects Assessment

6.3.1 Toxic Thresholds for Aquatic Life Communities

Water quality aquatic life standards from Montana's Department of Environmental Quality Water Numeric Water Quality Standards, Circular DEQ-7 were used as toxic thresholds for the aquatic life community scenario water exposure pathway (DEQ 2010). The standards for cadmium, copper, lead, nickel, silver, and zinc were first adjusted for water hardness measured in the sample chemical analysis (170 mg/L) using the equations given in Circular DEQ-7, before they were used in this risk assessment. Sediment quality guidelines developed by the National Oceanographic and Atmospheric Administration were used for toxic thresholds for the aquatic life community scenario's sediment exposure pathway (NOAA 1999). Toxic thresholds for both water and sediment are provided in Table 6-1 and Appendix E.

Table 6-1. Aquatic life community risk characterization for COPCs, Forest Rose Mine Site.

COPCs	Max. Surface Water Conc. (µg/L) ^a	Max. Sediment Conc. (mg/kg)	Acute Standards (µg/L) ^b	Chronic Standards (µg/L) ^b	Sediment Quality Guidelines (mg/kg) ^c	Acute Aquatic EQ	Chronic Aquatic EQ	Sediment EQ
Aluminum	15.3	NA ^e	750.0	87.0	NA ^e	0.02	0.18	NA ^e
Antimony	0.64	1.2	NA ^e	NA ^e	NA ^e	NA ^e	NA ^e	NA ^e
Arsenic	0.59	24.3	340.0	150.0	8.2	0.00	0.00	3.0
Cadmium^d	0.72	6.6	3.7	0.4	1.2	0.19	1.80	5.5
Copper^d	1.7	69	23.1	14.7	34.0	0.07	0.12	2.0
Iron	93.5	37100	NA ^e	1000.0	NA	NA	0.09	NA ^e
Lead^d	10.2	448	160.4	6.3	46.7	0.06	1.63	9.6
Maganese	21.5	796	NA ^e	NA ^e	NA ^e	NA ^e	NA ^e	NA ^e
Mercury	NA ^e	0.02	1.7	0.9	0.2	NA ^e	NA ^e	0.2
Nickel^d	NA ^e	41.1	145.2	16.1	20.9	NA ^e	NA ^e	2.0
Silver^d	NA ^e	1.1	0.4	NA ^e	1.0	NA ^e	NA ^e	1.1
Zinc^d	91.7	1160	187.8	187.8	150.0	0.49	0.49	7.7
TOTAL						0.834	4.303	31.030

^a Maximum surface water concentration excluding adit discharge

^b Aquatic Life Standards are from MTDEQ's Circular DEQ-7 Montana Numeric Water Quality Standards (WQB-7), 2008

^c Sediment Quality Guidelines from NOAA 1999; Most conservative range (Low) due to presence of Westslope Cutthroat Trout

^d Aquatic Life Standards are adjusted for the hardness value of 170 mg/L as measured in chemical analyses of surface water samples taken from Forest Rose Mine Site.

^e Not available because either not detected in samples or no standard/criteria are available
COCs for aquatic life communities are in bold

6.3.2 Toxic Thresholds for Terrestrial Wildlife Communities

COPC NOAELs for whitetail deer provided in the Toxicological Benchmarks for Wildlife: 1996 Revision by Sample, Opresko, and Suter II were used as toxic thresholds for the terrestrial wildlife community scenario. These NOAELs were adjusted from toxicological studies with rats. Toxic thresholds for deer ingestion are provided in Table 6-2 and in Appendix E.

Table 6-2. Terrestrial wildlife community risk characterization for COPCs, Forest Rose Mine Site.

COPCs	Max. Water Conc. (µg/L) ^a	Max. Solid Conc. (mg/kg) ^b	Deer Intake (mg/kg-day) ^c	NOAELs or Toxic Thresholds (mg/kg-day) ^d	Deer Ingestion EQ	Toxic Endpoint Source
Aluminum	15.6	NA ^e	0.001	0.294	0.003	Sample et. al, 1996
Antimony	1.1	47.6	0.001	0.019	0.039	Sample et. al, 1996
Arsenic	0.68	486	0.007	0.019	0.361	Sample et. al, 1996
Cadmium	6.1	75.9	0.001	0.271	0.005	Sample et. al, 1996
Chromium	NA ^e	27.8	0.000	768	0.000	Sample et. al, 1996
Copper	1.7	728	0.010	4.3	0.002	Sample et. al, 1996
Lead	10.2	9500	0.134	0.005	26.772	ATSDR, 1993
Manganese	21.5	4170	0.060	25	0.002	Sample et. al, 1996
Mercury	NA ^e	0.9	0.000	0.36	0.000	Sample et. al, 1996
Nickel	2.1	37.1	0.001	11.22	0.000	Sample et. al, 1996
Zinc	1360	8130	0.202	44.9	0.005	Sample et. al, 1996
TOTAL					27.194	

^a Maximum surface water concentrations including adit discharge

^b Maximum concentrations from soil, tailings, waste rock surface samples

^c Soil and water exposure; exposure Parameters were obtained from Sample and Suter II 1994

^d The most recent and most conservative estimated NOAELs are used for toxic threshold values

^e Not available because not detected in samples

COCs for aquatic life communities are in bold

6.3.3 Toxic Thresholds for Terrestrial Plant Communities

Literature-based phytotoxicity soil concentrations from several terrestrial plant toxicology studies were used as toxic thresholds for the terrestrial plants scenario. These concentrations are the most conservative estimates from a range of toxic reference values (TRVs) related to plant health acquired from these studies. The phytotoxic concentrations used in this risk assessment were summarized in the Clark Fork River Ecological Risk Assessment (ISSI Consulting Group 1999). The individual sources and associated phytotoxic concentrations used are provided in Table 6-3 and in Appendix E.

Table 6-3. Terrestrial plant community risk characterization COPCs at Forest Rose Mine Site.

COPCs	Max. Solid Conc. (mg/kg) ^a	Phytotoxic Soil Conc. (mg/kg) ^b	Phytotoxicity EQ	Toxic Threshold Source
Arsenic	486	10	48.6	Efroymson et al. 1997
Cadmium	75.9	3	25.3	Kabata-Pendias and Pendias 1992
Copper	728	60	12.1	Kabata-Pendias and Pendias 1992
Lead	9500	50	190.0	Efroymson et al. 1997
Mercury	0.9	5	0.2	CH2M Hill 1987
Zinc	8130	50	162.6	Efroymson et al. 1997
TOTAL			438.8	

^a Maximum concentrations from soil, tailings, waste rock surface samples

^b Most conservative estimated toxic reference value for phytotoxicity from several toxicology studies
COCs for aquatic life communities are in bold

6.4 Risk Characterization

6.4.1 Aquatic Life Communities

Water exposure concentrations were compared to both acute and chronic life standards to create a ratio of exposure to aquatic life standard for each COPC. This represents the ecological impact quotient (EQ) for aquatic life to contaminants in surface waters. Because long-term water quality sampling was not part of this investigation, only the acute EQ is incorporated into the Total EQ, discussed below.

Sediment exposure concentrations were compared to toxic thresholds to create a ratio of exposure to sediment quality guidelines for each COPC. This represents the sediment EQ for aquatic life to contaminants in surface water sediments. A water or sediment EQ greater than 1 for a specific COPC indicates a condition that possibly threatens the health of aquatic life. Table 6-1 provides acute aquatic life and sediment EQs for each COPC.

COCs for aquatic life communities at the Forest Rose Mine Site include arsenic, cadmium, copper, lead, nickel, silver, and zinc. All of these COCs originate through exposure to sediments present in Dunkleberg Creek. Contaminants in these sediments originate from erosion of mine tailings and waste rock.

6.4.2 Terrestrial Wildlife Communities

Whitetail deer exposures from soil and water ingestion were summed for each COPC and then compared to toxic thresholds to create a ratio of COPC exposure to NOAEL. This ratio represents the deer ingestion EQ for terrestrial wildlife to contaminants in surface waters, soil, tailings, and waste rock at the site. An EQ greater than 1 for a specific COPC indicates an

environmental concentration that possibly threatens the health of terrestrial wildlife. Table 6-2 provides the resulting deer ingestion EQs for each COPC.

Lead is the only COC for terrestrial wildlife communities at the Forest Rose Mine Site, with an EQ of 26.8.

6.4.3 Terrestrial Plant Communities

Terrestrial plant exposures were compared to TRVs to obtain a ratio of the exposure to phytotoxic threshold for each COPC. The resulting ratio represents the phytotoxic EQ. An EQ greater than 1 for a specific COPC indicates an environmental concentration that inhibits growth and/or is phytotoxic to the terrestrial plant community. Table 6-3 provides the resulting phytotoxic EQs for each COPC.

COCs for terrestrial plant communities at the Forest Rose Mine Site include arsenic, cadmium, copper, lead, and zinc, all resulting from contaminants in soil, tailings, and waste rock. These COCs are inhibiting vegetation growth on the impacted areas at Forest Rose Mine Site.

6.4.4 Risk Characterization Summary

All EQs from the evaluated scenarios in this risk assessment are summarized in Table 6-4. The COPC EQ is the sum of all of the ecological impact quotients across all ecological receptors and exposure pathways for that contaminant. The Total EQ represents the total ecological impact quotient across all contaminants present at the Forest Rose Mine Site.

Table 6-4. Summary of all EQs for all ecological receptors, exposure pathways, and COPCs, Forest Rose Mine Site.

COPCs	Aquatic Life- Surface Water (Acute) EQ	Aquatic Life- Sediment EQ	Deer Ingestion EQ	Plant Phytotoxicity EQ	COPC EQ
Aluminum	0.020	NA	0.003	NA	0.024
Antimony	NA	NA	0.039	NA	0.039
Arsenic	0.002	2.96	0.361	48.6	51.926
Cadmium	0.197	5.50	0.005	25.3	31.002
Copper	0.074	2.03	0.002	12.1	14.239
Iron	NA	NA	NA	NA	NA
Lead	0.064	9.59	26.772	190.0	226.429
Manganese	NA	NA	0.002	NA	0.002
Mercury	NA	0.15	0.000	0.2	0.333
Nickel	NA	1.97	0.000	NA	1.967
Silver	NA	1.10	NA	NA	1.100
Zinc	0.488	7.73	0.005	162.6	170.826
TOTAL EQ	0.844	31.41	27.194	438.8	497.891

All EQs greater than 1.0 are considered COCs and are in bold

This risk assessment qualitatively presents potential threats to the health of terrestrial plants and wildlife, as well as aquatic life communities that may use Forest Rose Mine Site for habitat. This ecological risk assessment is a conservative screening-level assessment and provides conservative EQs. Results indicate several contaminants present at the site threaten the health of its ecosystem. Contaminants present in Dunkleberg Creek sediments pose a significant risk to the health of aquatic life (COCs include arsenic, cadmium, copper, lead, nickel, silver, and zinc, with EQs ranging between 1.1 and 9.6). Special consideration during reclamation should be made due to the presence of Westslope Cutthroat Trout in the creek (e.g. implementation of erosion control measures at the downstream boundary of the site to minimize sediment transport and sediment monitoring downstream of the site) . In addition, creek water quality and sediment loads should be monitored during reclamation procedures.

A majority of the COPCs evaluated in the terrestrial plant scenario for phytotoxicity resulted in EQs greater than 1.0. COCs for terrestrial plant communities include arsenic, cadmium, copper, lead, and zinc, with EQs ranging between 12 and 190. Concentrations of these contaminants are a contributing factor in the lack of vegetation growth on impacted areas of the mine site. In addition, lead poses a threat to the health of terrestrial wildlife, with an EQ of 26.8.

7.0 Repository Site Investigation

This geotechnical site investigation was performed to support siting of a mine waste repository on USFS property near the Forest Rose Mine Site. The proposed repository is located on USFS land and can be accessed off of USFS road 5153 and is approximately 2 miles from the mine site. The proposed repository is located on an east facing hillside in the Dunkleberg drainage basin. The area is an open park that leads up to a ridge line. The location was selected based on the relatively flat open slope and because it is located in the same drainage basin (Dunkleberg basin) as the mine site. Figure 2-3 shows the location of the proposed repository relative to the Forest Rose Mine Site.

An estimated 90,000 cubic yards of tailings and 8,000 cubic yards of waste rock exist at the mine site, based on a site survey, borehole data, and estimates of surface topography existing prior to site development.

7.1 Field Methods, Procedures, and Observations

Field investigations were conducted at the proposed repository location on July 26 and 27, 2010, including a site reconnaissance, excavating exploratory test pits, drilling one boring, installing a groundwater observation well, collecting representative surface soil samples, and photographing the site.

7.1.1 Site Reconnaissance

A visual site reconnaissance was performed at the site to document topographic features, site vegetation, surficial soil, and bedrock exposures. Test pits, borings, and surficial soil sampling locations were selected to assess conditions across the entire area. The well location at the repository site was selected at a topographically low elevation, with the expectation to encounter shallow groundwater, if it exists.

7.1.2 Surface Soil Sampling

Surficial topsoil layer samples were obtained at three locations for total metal and agricultural-related analytes, and physical properties such as gradation and plasticity. Grass and plant materials were first scraped to expose the underlying soil. Surface samples were collected from 0 to 4 inches deep; soils generally consisted of brown sandy silt.

7.1.3 Test Pit Sampling

Three test pits were excavated on July 26, 2010 using a Case 580K excavator provided by Bolland Drilling Co. (Bolland). The 2-1/2 foot-wide test pits were excavated to refusal in

bedrock, which varied in depth from 7 to 10 feet deep. A geotechnical engineer was on site throughout the fieldwork program to observe the test pit excavations, obtain representative soil samples, and prepare descriptive logs of the materials encountered. Soil samples were placed in plastic bags and in 5-gallon lidded plastic buckets.

The soils were classified in accordance with the Unified Soil Classification System (ASTM D2488). A summary of subsurface conditions encountered in each test pit is presented in Table 7-1 and logs of the test pits are included in Appendix B.

Table 7-1. Test pit data summary, Forest Rose Mine Site repository.

Test Pit	Location	Total Depth (feet)	Depth Interval (feet) / Material Description	
RY-SS-01	NW area of repository	7.0	0.0 – 0.5	Silty sand with organics [Topsoil]
			0.5 – 4.0	Silty to clayey gravel with sand [Residuum]
			4.0 – 7.0	Gravelly sand with angular cobbles [Residuum]
			Bedrock at 7.0 ft	
RY-SS-02	SE area of repository	10.0	0.0 – 0.5	Silty sand with organics [Topsoil]
			0.5 – 8.0	Silty sand and sand [Residuum]
			8.0 – 10.0	Gravelly sand with angular cobbles [Residuum]
			Bedrock at 10.0 ft	
RY-SS-03	NE area of repository	9.0	0.0 – 0.3	Silty sand with organics [Topsoil]
			0.3 – 5.5	Sand and silty sand with gravel [Residuum]
			5.5 – 9.0	Gravelly sand with angular cobbles [Residuum]
			Bedrock at 9.0 ft	

7.1.4 Borehole Sampling

The well (RY-Well-01) was drilled to refusal at a depth of 12.5 feet by Boland on July 27, 2010. The borehole was advanced using a track-mounted, hollow stem auger drill rig. Soil samples were obtained at 5 foot intervals using standard penetration test methods (ASTM D1586). A standard split spoon sampler was driven into the soil a distance of 18 inches with a 140-pound safety hammer, free-falling from a height of 30 inches, using a cathead and winch system. Recorded blows for each 6 inches of penetration are shown on the boring logs. The number of blows required to drive the sampler the last 12 inches is the Standard Penetration Resistance (N-value). This resistance, or blow count, provides a qualitative measure of the relative density of cohesionless soils and consistency of cohesive soils. Samples were placed in moisture-tight plastic bags.

A geologist was on site throughout the fieldwork program to observe the boring, assist in sampling, and prepare a descriptive log of the material encountered. Soils were classified in general accordance with ASTM D-2488, “Standard Recommended Practice for Description of Soils (Visual-Manual Procedure)” as described in the “Key to Log of Borings” included in Appendix B. The final exploration log presented in Appendix B represents our interpretation of the contents of the field logs and the results of laboratory testing. A summary of subsurface conditions is presented in Table 7-2.

Table 7-2. RY-Well-01 boring data summary, Forest Rose Mine Site repository.

Location	Total Depth (ft)	Depth Interval (ft) / Material Description / SPT(*)
SW area of repository	12.5	0.0 – 0.5 Topsoil
		0.5 – 3.0 Sandy silt [Residuum] / 14
		3.0 – 7.5 Silty sand [Residuum] / 48
		7.5 – 11.5 Gravelly sand with angular cobbles / 100 blows for 9 inches
		[Residuum] Bedrock at 11.5 ft

(*) SPT = Standard penetration test blows per foot of sampler penetration.

A groundwater observation well was installed in the boring. The well consists of a 1-inch diameter, slotted PVC pipe (10-slot) from 8 to 13 feet deep surrounded by a sand filter pack. Well construction details are provided on the boring log. No groundwater was observed at the time of well installation on July 27, 2010.

7.2 Subsurface Conditions

7.2.1 General Observations Pertaining to Soils

The site is generally underlain by topsoil over residual soil over bedrock, except for bedrock exposed along the ridge at the northern edge of the repository area. Residual soil is derived from completely weathered-in-place bedrock. The transition from soil to bedrock is gradual and may be difficult to distinguish. For purposes of this report, the depth to bedrock was defined as backhoe or drilling refusal. The estimated soil thickness varied from about 7 feet to 11.5 feet.

Residuum generally consisted of medium dense to dense silty, fine to coarse sand with varying amounts of gravel. At depth, residual soil is less weathered, resembling the parent bedrock, but easily degrades to gravelly sand with angular cobbles when excavated. These in-situ soils have relatively high shear strength, low compressibility, and moderate to high permeability.

7.2.2 Groundwater

Groundwater or seeps were not encountered within the test pits or in the boring. Groundwater levels will fluctuate according to seasonal precipitation, infiltration, and percolation of surface water; however, saturated soils or oxidized soil zones indicative of seasonally high groundwater were not observed in the test pits or samples taken from the boring, and the subsurface soils appeared well-drained. Based on this preliminary information, it is expected that groundwater levels are consistently deeper than the exploration depths.

7.2.3 Bedrock

Highly weathered and fractured bedrock was encountered in all of the test pits, as well as the boring. Bedrock that refused backhoe excavation in the test pits was encountered at depths

varying from 7 to 10 ft. Hollow-stem auger refusal was encountered at a depth of 12.5 feet in the boring.

7.3 Laboratory Testing Summary

Representative portions of the samples from surficial soils, test pits, and the boring were placed in plastic bags. Larger bulk samples from each test pit were placed in 5-gallon plastic buckets and transported to Pioneer Technical Services, Inc laboratory for classification and testing. Index tests were performed to develop parameters for use in evaluating subsurface conditions and estimating soil engineering properties. The tests included visual classification, moisture content, #200 sieve wash, and moisture/density relationships. The laboratory test data sheets are included in Appendix C.

Total recoverable metals and agronomic soil testing was performed by Pace Laboratories, Inc. The results are included in Appendix C.

7.3.1 Soil Classification

Soils were classified in accordance with the USCS, as specified in the ASTM D2487. Grain size distribution analyses (ASTM D422) and Atterberg limit tests (ASTM D4318) were performed on selected samples. Soil particle sizes larger than 3 inches (cobbles and boulders) were discarded and only the soil fraction passing the 3-inch sieve was used for laboratory analysis. Table 7-3 summarizes soil classification test results. Soil classification test results for the topsoil material are included in “Agronomic Tests,” Section 7.3.3 of this report and include the USCS classification.

USCS soil classification information provides a general indication of engineering soil properties, such as soil strength, hydraulic conductivity (permeability), compressibility, and susceptibility to frost or erosion. Useful empirical relationships can be used for estimating engineering soil properties and for designing soil filter criteria for drainage materials. A USCS chart is included in Appendix B.

7.3.2 Soil Moisture/Density Relationship

Three representative soil samples were tested to determine the soil moisture/density relationship for the standard Proctor compaction method (ASTM D698 and D4718). Specific gravities were determined for estimating void ratios (volume of voids/total sample volume) of soil compacted to a specified density. Natural moisture contents were also determined. A comparison of the natural water content and the optimum moisture content of the compacted soil specimen provides an indication of moisture conditioning required when placing and compacting this material. Natural moisture contents and Moisture/Density test results are summarized in Table 7-4.

Table 7-3. Summary of soil classification tests, Forest Rose Mine Site repository.

Lab I.D. No.	Location	Depth (ft)	Particle Size Distribution ^(a)			Atterberg Limits ^(b)	Natural Moisture Content, % ^(c)	USCS Symbol ^(d)
			% Gravel	% Sand	% Fines			
9481	RY-SS-01/S1	0 – 0.5					11.1	SM
	RY-SS-01/S2	3.0					7.3	SM
	RY-SS-01/S3	2.0 – 4.0	42	29	29	LL=24 PL=17	9.8	GC-GM
9485	RYSS-02/S1	2.5					9.8	SM
	RY-SS-02/S2	4.0					6.0	SP-SM
	RY-SS-02/S3	5.0 – 6.0	0	83	17	NP	6.0	SM
9487	RY-SS-02/S4	8.5 – 9.0	2	83	15	NP	5.6	SM
9491	RY-SS-03/S1	1.5					5.4	SM
	RY-SS-03/S2	3.0					5.0	SM
	RY-SS-03/S3	3.0 – 5.0	3	79	18	NP	5.9	SM

^a Percent by weight

^b Atterberg limits: LL=liquid limit; PL=plastic limit; NP=non-plastic

^c Weight of water as a percentage of the weight of solids.

^d USCS Symbols: GC=clayey gravels; GM=silty gravels; SP=poorly graded sands; SM=silty sands

Table 7-4. Standard proctor moisture/density test results, Forest Rose Mine Site repository.

Lab I.D. No.	Location (Depth in ft)	Material Description	Specific Gravity	Maximum Dry Density (pcf)	Optimum Moisture Content (%) ^(a)	Natural Moisture Content (%) ^(a)
9481	RY-SS-01/S-3 (2.0-4.0)	Silty to clayey gravel with sand (GC-GM)	2.75	126.5	11.5	11.1
9485	RY-SS-02/S-3 (5.0-6.0)	Silty sand (SM)	2.85	115.7	13.8	6.0
9487	RY-SS-02/S-4 (8.5-9.0)	Silty sand (SM)	2.89	112.9	16.6	5.6
9491	RY-SS-03/S-3 (3.0-5.0)	Silty sand (SM)	2.88	117.7	14.1	5.4

^a Weight of water as a percentage of the weight of solids

7.3.3 Agronomic Tests

Agronomic tests were performed on three topsoil samples (the topsoil layer varied in thickness from 4 to 12 inches) to evaluate suitability for reuse as topsoil during site reclamation. The agronomic tests included USDA soil classification, grain size distribution, soil pH, available nitrate, available phosphorus, potassium, percent organic matter, cation exchange capacity, and

lime requirements. A summary of the test results is shown in Tables 7-5 and 7-6. More information is provided in Section 4.2 – Agricultural Analyses.

Table 7-5. Topsoil classification test results, Forest Rose Mine Site repository.

Lab I.D. No.	Location/Depth (ft)	Grain Size Distribution ^(a)			Natural moisture content, % ^(b)	Organic Content, % ^(c)	USDA Classification
		% Sand	% Silt	% Clay			
	FR-RY-SS-01-00	55	27.5	17.5	13.6	8.9	Sandy loam
	FR-RY-SS-02-00	67.5	17.5	15	3.8	5.2	Sandy loam
	FR-RY-SS-03-00	63.8	19.9	16.3	7.2	8.0	Sandy loam

^a Percent by weight

^b Weight of water as a percentage of the weight of solids.

^c Weight of organics as a percentage of the weight of solids.

Table 7-6. Topsoil analytes test results, Forest Rose Mine Site repository.

Analyte	FR-RY-SS-01-00	FR-RY-SS-02-00	FR-RY-SS-03-00
pH, saturated paste (std units)	6.8	6.9	7.2
Available nitrate (mg/kg)	5.0	5.0	5.0
Available phosphorous (mg/kg)	12.1	18.4	6.6
Potassium (mg/kg)	120.0	140.0	140.0
Cation exchange capacity (meq/100g)	49.7	35.6	47.5
Specific conductance saturated paste (mmhos/cm)	0.38	0.38	0.19
SMP buffer Ph (std. units)	6.2	6.8	6.2
SMP lime requirement (tons/1000)	5.3	1.0	5.3

7.4 Conclusions and Recommendations

7.4.1 General

Site observations, subsurface data, and preliminary geotechnical engineering evaluations indicate that the proposed 2-acre repository site is suitable for mine waste storage. Potential geotechnical engineering concerns, such as groundwater seeps, boggy areas, peat deposits, hillside instability, and excessive erosion, were not encountered during the site investigation.

A hydrogeologic investigation was not performed as part of the current scope of work and groundwater level data is limited to observations made while boring RY-Well-01 in the summer. Since no groundwater was encountered in the test pits or boring, and no seasonal groundwater influence was evident in the explorations, it is expected that seasonal groundwater levels are below the depth of the current explorations. It is recommended that additional attempts at groundwater measurements at RY-Well-01 be conducted during spring thaw.

Depth to bedrock is variable, with bedrock observed at the ground surface along the higher ridges bordering the site and up to 12.5 feet deep at the lower site elevations. The volume of tailings and waste rock is estimated at 98,000 cy. The available repository acreage and depth to bedrock will dictate the height of the mounding required to accommodate the volume of mine waste. An initial volume calculation was performed at the site. The volume calculation determined the void space left by excavating down 10 feet across the entire proposed repository location. A volume of 35,000 cy was estimated as volume available below ground surface. The waste would have to be mounded approximately 20 feet high to provide space for the entire 98,000 cy of waste. Since the mine waste will be placed and compacted on the underlying bedrock surface, settlement of the repository will be negligible.

Native soils are moderately permeable and the bedrock will transmit groundwater through existing fractures; therefore, a hydrogeologic barrier may be required for the repository liner and cover.

7.4.2 Site Preparation

The few trees present on the site should be removed, along with the large root balls. Topsoil should be stripped from ground surface to a depth ranging from 4 to 12 inches (average 8 inches) bgs from the site and stockpiled for later use.

7.4.3 Excavation and Backfill

Residual soils can be excavated with conventional excavation and earth moving equipment. Excavators and dozers equipped with ripper teeth could achieve some additional penetration into the bedrock layer, depending on the degree of bedrock weathering and fracturing (rock quality). Temporary excavation slopes for the repository should be cut at 1.5H:1V (horizontal to vertical), or flatter.

Native soils with less than 3-inch particle size could be used to construct containment berms. These soils are moisture sensitive due to a high percentage of fines and would be difficult to compact in wet weather conditions. The fill should be placed in 8-inch loose lifts within 2 percent of optimum moisture content and compacted to 95 percent of maximum dry density (ASTM D698).

7.4.4 Hydrologic Barrier Materials

Fine-grained soils, such as silt or clay or clayey sand, considered suitable for use as a hydrologic barrier were not found at the site. The native silty sand could be used if amended with bentonite to produce the desired hydraulic properties. Native soils should be screened to remove particles larger than ¼ inch.

Alternatively, a geosynthetic membrane could be used as a repository liner and cover. The subgrade should be smoothed to remove angular cobbles and then covered with a 12-inch thick layer of bedding sand prior to placing the liner.

7.4.5 Dewatering and Stormwater Management

Based on the observed subsurface soil and groundwater conditions, the need for dewatering during repository construction is not anticipated. Stormwater best management practices should be implemented during construction and while new vegetation is established.

7.4.6 Additional Geotechnical Engineering Services

Additional groundwater measurements should be made in the observation well at boring RY-Well-01. The readings should be made during the spring thaw.

During construction, on-site oversight is recommended to confirm that the conditions encountered are consistent with those identified during the RI. Such activities would include: (1) observation of the subgrade preparation; (2) observation and testing of containment berm fill; and (3) observation and testing of the cap.

7.5 Report Limitations

This report was prepared for the exclusive use of the Owner for specific application to the design of the project at this site as it relates to the geotechnical aspects discussed herein. The data and report should be provided to prospective contractors for their information; however, the report, conclusions, and interpretations should not be construed as a warranty of subsurface conditions described in this report.

If there is a substantial lapse of time between the submission of this report and the start of construction at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, or appear to be different from those described in our report, it is recommended that the report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

8.0 Reclamation Objectives and Goals

The overall objective of Forest Rose Mine Site reclamation is to protect human and ecological health in accordance with the guidelines set forth by the MDEQ/MWCB. Specifically, site reclamation must limit human and ecological exposure to mine-related contaminants and reduce the mobility of those contaminants through associated solid media and surface water exposure pathways.

DEQ has developed a conservative set of RBCGs for contaminants using a recreational visitor exposure pathway scenario. The guidelines take into account the possibility of exposure through various exposure routes, and action levels have been determined for the Forest Rose Mine Site based on the RBCG.

The results provided in this RI report are to be used as a tool as part of the risk mitigation decision making process. Data users should use the human health and ecological risk assessments to determine whether remedial action is needed to reduce risks in the Dunkleberg Creek drainage basin. The following sections provide additional interpretation of project data in the context of observed site conditions and the regulatory framework under which future site actions may take place.

9.0 Preliminary Applicable or Relevant and Appropriate Requirements

Applicable or relevant and appropriate requirements (ARARs) are categorized as either contaminant-specific requirements that define acceptable exposure limits, as location-specific requirements that may set restriction activities at a location, or as action-specific requirements that may set controls or restrictions for a particular treatment or disposal activity for the proposed response. ARARs assist in the development and selection of reclamation remedies. The State of Montana has the authority, delegated by the U.S. Office of Surface Mining, Reclamation and Enforcement, to administer the Abandoned Mines Reclamation Program in accordance with the State of Montana's Reclamation Plan.

The State of Montana has two agencies that oversee reclamation of hard rock mine sites. They are:

- MDEQ/Hazardous Waste Site Cleanup Bureau that operates under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 6901 et seq.) and the state Comprehensive Environmental Cleanup and Responsibility Act (Montana Code Annotated 75-10-705 through 724)
- MDEQ/MWCB that operates under the Federal Abandoned Mined Lands Reclamation program.

CERCLA statute requires that on-site remedial actions must attain (or waive) Federal and more stringent State ARARs of environmental laws during and upon completion of remedial actions. Although the MDEQ/MWCB is not governed by CERCLA, MDEQ/MWCB applies ARARs and incorporates both federal and state cleanup requirements.

Applicable requirements address a specific hazardous substance, pollutant, or contaminant; remedial action; location; or other circumstances. Relevant and appropriate requirements address problems or situations sufficiently similar to those encountered at another site. The MDEQ/MWCB has developed a summary of federal and state ARARs for reclamation projects that apply to the Forest Rose Mine Site. Table 9-1 presents a list of these ARARs and indicates whether the ARAR is likely to be applicable, possibly applicable, or not likely applicable to the reclamation project.

ARARs listed below are generic and will be looked at more in depth during the Expanded Engineering Evaluation/Cost Analysis (EEE/CA) process. In addition, the preamble to the National Oil and Hazardous Substances Pollution Contingency Plan (more commonly known as the National Contingency Plan (NCP) [40 CFR 300]) provides a procedure and a list titled "To be Considered" for evaluating alternative cleanup methods for hazardous wastes. The NCP is located in 55 Federal Register 8765 (March 8, 1990). Those documents will also be considered during the reclamation design and construction.

Table 9-1. Preliminary Applicable or Relevant and Appropriate Requirements (ARARs), Forest Rose Mine Site.

ARARs	Likely ARAR	Possible ARAR	Not Likely ARAR
Federal Contaminant-Specific ARARs			
Safe Drinking Water Act, 42 USC 300f et seq.			X
Clean Water Act, 33 USC 1251 et seq. (applicable)	X		
National Ambient Air Quality Standards, 40 CFR 50.6 (applicable)	X		
State Contaminant-Specific ARARs			
Groundwater Protection, ARM 17.301005, 1006, 1011 (applicable)		X	
Montana Water Quality Act, MCA 75-5-10116 et seq. (applicable)	X		
Montana Ambient Air Quality Regulations, ARM 17.8, 206, 220, 222, 233 (applicable)	X		
Federal Location-Specific ARARs			
National Historic Preservation, 16 USC 470 et seq. (applicable)			X
Archaeological and Historic Preservation Act, 16 USC 469 et seq. (applicable)	X		
Historic Sites Act of 1935, 16 USC 461 et seq. (applicable)	X		
Protection and Enhancement of the Cultural Environment, 16 USC 470 et seq. (applicable)	X		
The Archeological Resources Protection Act of 1979, 16 USC 47 et seq. (applicable)	X		
American Indian Religious Freedom Act, 42 USC 1996 (applicable)		X	
Native American Graves Protection and Repatriation Act, 25 USC 3001 et seq. (applicable)		X	
Fish and Wildlife Coordination Act, 16 USC 661 et seq. (applicable)		X	
Endangered Species Act, 16 USC 1531 -1544 (applicable)		X	
Floodplain Management Act, 40 CFR Part 6 Appendix A; Executive Order No. 11988 (applicable)		X	
Protection of Wetlands Regulation 40 CFR 6, Appendix A; Executive Order 11990 (applicable)	X		
Clean Water Act, 33 USC 121 et seq. (applicable)	X		
Migratory Bird Treaty Act, 16 USC 703 et seq. (applicable)		X	
Bald Eagle Protection Act, 16 USC 668 et seq. (applicable)		X	
Resource Conservation and Recovery Act, 42 USC 6901-6991	X		
State Location-Specific ARARs			
Montana Antiquities Act, 22-3-421 et seq., MCA		X	
Montana Human Skeletal Remains and Burial Site Protection Act, 22-3-801 et seq., MCA (applicable)	X		
Montana Floodplain and Floodway Management Act, Section 76-5-401 et seq., MCA (applicable)	X		
Montana Stream Protection Requirements, 75-7-101 et seq., MCA (applicable)	X		

Table 9-1. Preliminary Applicable or Relevant and Appropriate Requirements (ARARs), Forest Rose Mine Site.

ARARs	Likely ARAR	Possible ARAR	Not Likely ARAR
State Location-Specific ARARs (continued)			
Montana Solid Waste Management Act, 75-10-201 et seq., MCA (applicable)	X		
Endangered Species and Wildlife Act, 36.2240 et seq., ARM (applicable)		X	
Action-Specific ARARs			
Federal and State Water Protection Requirements			
Clean Water Act, 33 USC 1342 et seq. (applicable)	X		
Montana Pollutant Discharge Elimination System Requirements, ARM 17.30.1342-1344 and 1203 and 1344 (applicable)		X	
Water Quality Statutes and Regulations, MCA 75-5-303, 605, 637, 705 (applicable)	X		
Stormwater Runoff Control Requirements, ARM 17.24.633 (applicable)	X		
Federal and State RCRA Subtitle C Requirements, 42 USC 6921 et seq. and 40 CFR 264			
	X		
Federal and State RCRA Subtitle D and Solid Waste Management Requirements, 40 CFR 257			
	X		
Federal Requirements, 40 CFR 257 (applicable)		X	
State of Montana Solid Waste Requirements, ARM 17.50.505, 506, 511, 523, 503, 531 (applicable)	X		
Federal and State Mine Reclamation Requirements			
Surface Mining Control and Reclamation Act, 30 USC 1201-1326	X		
Montana Statutory and Regulatory Requirements, MCA 82-4-201, 231, 233, 336 et seq. and ARM 17.24.501, 519, 631, 633-641, 643-646, 701-703, 711, 713, 714, 716-718, 721, 723, 724, 726, 731, 751, 824	X		
Air Requirements, ARM 17.8.304, 308, 604, 761 (applicable)	X		
Noxious Weeds, MCA 7-22-210	X		

10.0 Preliminary Identification of Reclamation Alternatives

Reclamation alternatives are evaluated with respect to the overall site objective, as well as specific reclamation goals. The evaluation will be completed through an alternative screening process under the framework of an EEE/CA. The EEE/CA process explores multiple feasible reclamation alternatives and evaluates each alternative in terms of effectiveness, constructability, and cost. Likely alternatives for the EEE/CA and possible future reclamation actions for the Forest Rose Mine Site could include the following:

- No action (evaluated as a baseline for other alternatives)
- Institutional controls with hazardous mine opening (HMO) mitigation
- Stabilize waste in place and Dunkleberg Creek channel reconstruction
- Partial removal and stabilization of remaining waste and Dunkleberg Creek channel reconstruction
- Complete removal and Dunkleberg Creek channel reconstruction, with
 - Transport all waste to a nearby repository
 - Transport some waste to a nearby repository and some waste to an offsite disposal facility
 - Transport all waste to an offsite disposal facility.

All removal actions (except the no action alternative) would include the HMO mitigation and management of surface water. Stabilization, partial removal, and total removal alternatives include regrading, amending topsoil as needed, and establishing a vegetative cover.

The total estimated tailings volume for the Forest Rose Mine Site is 90,000 cy. The total estimated waste rock volume for the site is 8,000 cy. The tailings volume was calculated using the land survey and extent of contamination based on boring logs generated from this and past studies (MCS 2004). The waste rock volume was calculated using the land survey and extent of contamination based on test pits dug along the edge of the waste rock. Waste material volumes were estimated from the topography survey map, comparing the existing surface to the inferred original ground surface elevation. The estimated volume of below grade capacity at the proposed repository is 35,000 cy. Based on the total volume of tailings and waste rock, the repository will have to be mounded up 20 feet high or a second repository location may have to be identified.

Groundwater discharge from the Forest Rose Mine Site adit may require corrective action, based on comparisons with water quality standards and human health and ecological benchmarks. A possible remedy includes closing the adit to prevent access to the discharge. A bio-swale could be utilized to buffer the adit water.

Alternatives for waste placement, HMOs, and controlling adit discharge will be explored in greater detail in the EEE/CA.

11.0 Summary and Conclusions

11.1 Chemical Hazards

A total of 33 solid matrix samples were collected from the Forest Rose Mine Site and proposed repository. Sample locations were selected to represent downstream sediment, tailings, waste rock, area-wide soils surrounding the active mine area, and upstream sediment. Additional sample locations were selected to characterize background conditions and conditions at the repository.

The human health risk assessment indicates that tailings and waste rock exceed an HQ of 1 for arsenic and lead, identifying them as COCs. Additionally, the Estimated Lifetime Cancer Risk for arsenic exceeds EPA guidelines in all human exposure pathways.

Contaminants present in Dunkleberg Creek sediments pose a significant risk (EQs greater than 1) to the health of aquatic life (COCs for aquatic life communities include arsenic, cadmium, copper, lead, nickel, silver, and zinc). Contaminants present in tailings and waste rock are a contributing factor to the lack of vegetative growth on impacted areas of the mine site (COCs for terrestrial plant communities include arsenic, cadmium, copper, lead, and zinc). In addition, lead in tailings and waste rock poses a threat to the health of terrestrial wildlife.

Arsenic and manganese were identified as COPCs in area-wide soil samples collected from hillsides surrounding the tailings impoundments. Although arsenic concentrations exceeded the DEQ RBCG, all six samples were below the calculated cleanup goal of 44 mg/kg. No cleanup goal has been established for manganese; however, the mean background concentration is approximately 2 ½ times the DEQ RBCG. Only one area-wide sample exceeded the mean background concentration.

Remedial actions for the waste rock, tailings, and creek sediment will be required to reduce human and ecological risks at the site. Sampling results indicate that no remedial action is required for soil surrounding the tailings impoundments.

A total of five water samples were collected from the Forest Rose Mine Site. The samples were collected from upstream of the mine site in Dunkleberg Creek, the west slope adit, and downstream of the mine site in Dunkleberg Creek.

Sampling results indicate that the upstream sample had higher concentrations of Arsenic, Cadmium, Iron, Nickel, and Aluminum than the two downstream samples, including the downstream duplicate. This may be a legacy of historic mining activities located near the top of the Dunkleberg Creek drainage.

The results of the human health risk assessment show the Estimated Lifetime Cancer Risk for arsenic exceeds EPA guidelines for surface and adit water, so remedial action will be required to reduce the risk to human health.

The ecological health risk assessment indicates that surface water EQs are less than 1, although creek sediment EQs do exceed 1 for multiple contaminants. Restoration of Dunkleberg Creek to natural grades should include a surface water pollution prevention plan for implementation prior to construction to ensure that contaminated sediment is not transported downstream.

11.2 Physical Hazards

There are 13 buildings onsite that pose multiple potential hazards. An archaeological assessment should be performed to determine how the structures should be managed during and following site remediation. If the buildings are to be demolished, a location for the refuse must be identified.

The adits pose a potential risk of caving in. Sealing off the adits will be further explored as part of the EEE/CA.

Refuse located in the T3 cut will have to be disposed of properly.

12.0 References

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APPENDIX A

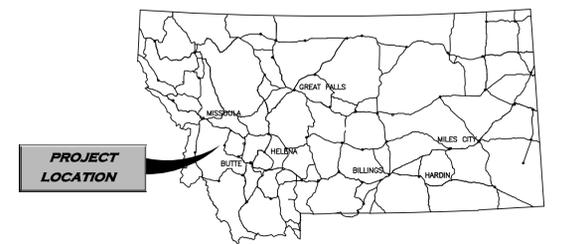
Forest Rose Drawings



MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

FOREST ROSE MINE AND MILL SITE

DUNKLEBERG CREEK GRANITE COUNTY, MONTANA

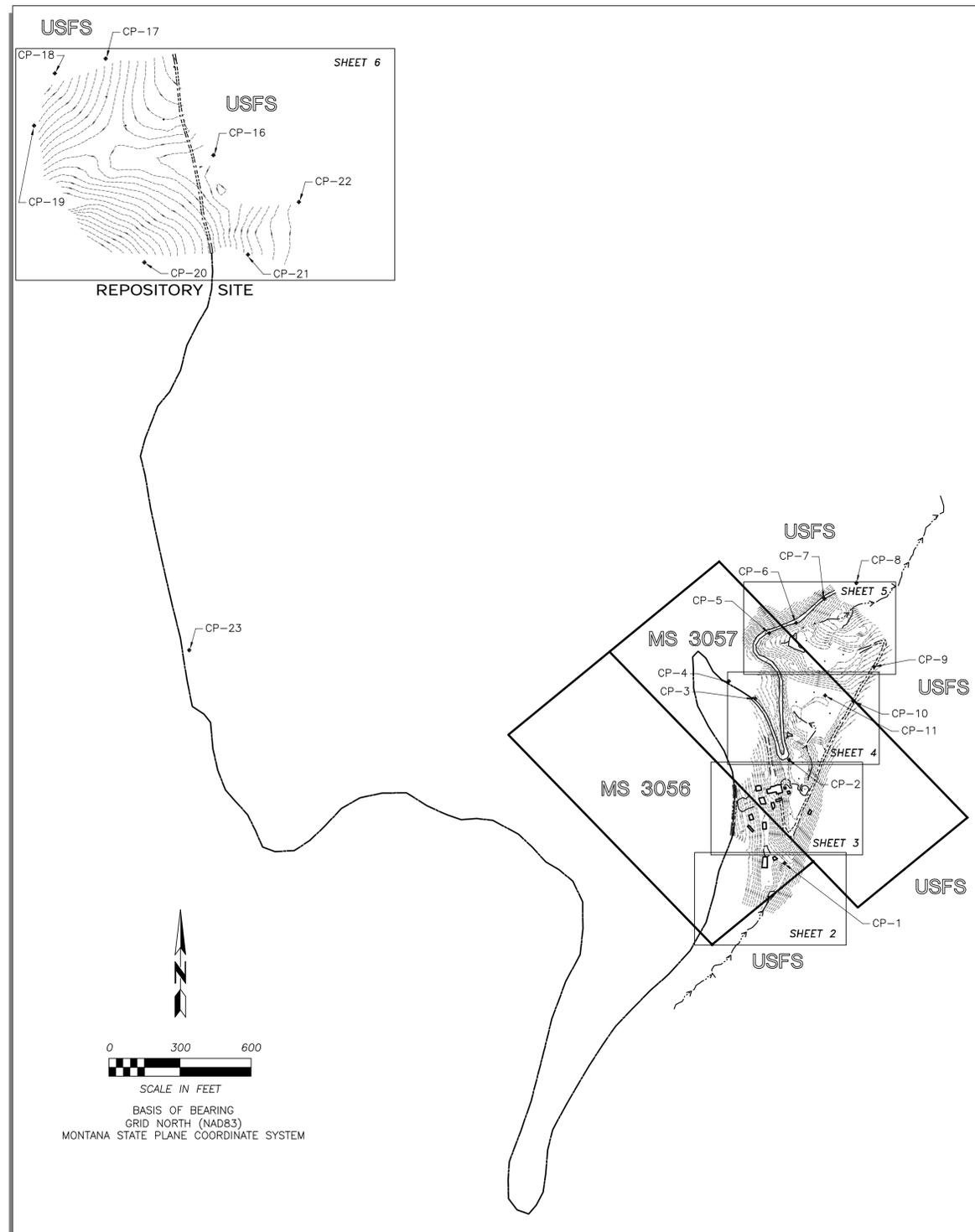


VICINITY MAP

SURVEYORS REPORT

- SURVEYING AND MAPPING CONDUCTED BY DJ&A, P.C. CONSULTING ENGINEERS AND LAND SURVEYORS, MISSOULA, MONTANA IN THE MONTHS OF AUGUST, SEPTEMBER AND OCTOBER 2010. MAPPING WAS CONDUCTED USING CONVENTIONAL MAPPING EQUIPMENT.
- PROJECT CONTROL WAS ESTABLISHED BY DJ&A, P.C. FINAL MAPPING WAS PREPARED BY DJ&A, P.C.
- VERTICAL AND HORIZONTAL CONTROL IS BASED ON THE FOLLOWING CRITERIA:
 - HORIZONTAL CONTROL - MONTANA 2500 STATE PLANE COORDINATE SYSTEM IN INTERNATIONAL FEET.
 - VERTICAL CONTROL - NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) IN U.S. SURVEY FEET.
 - SURVEY PROJECT COORDINATES AND MAPPING ARE BASED ON MONTANA 2500 STATE PLANE COORDINATE SYSTEM. TO TRANSFORM TO GROUND FROM THE NAD83(CORS96)(EPOCH:2002.0000) MONTANA STATE PLANE COORDINATE SYSTEM, SCALE MAPPING AND POINTS AT CONTROL POINT #3 USING A SCALE FACTOR OF 1/1.00086, OR 0.99914.
 - BASIS OF BEARING IS NAD83 MONTANA STATE PLANE GRID NORTH. THE CONVERGENCE ANGLE FROM NAD83 MONTANA STATE PLANE GRID NORTH TO TRUE (GEODETIC) NORTH AT CONTROL POINT #3 IS $-2^{\circ}37'27''$. TO ROTATE FROM GRID NORTH TO TRUE NORTH, ROTATE THE MAPPING AND POINTS ABOUT CONTROL POINT #3 COUNTERCLOCKWISE $-2^{\circ}37'27''$.
- PROPERTY BOUNDARY PROVIDED IS BASED UPON SURVEYED CORNER POSITIONS AND THE RECORD INFORMATION FROM MINERAL SURVEY NUMBERS 3056 AND 3057.
- TOPOGRAPHIC MAPPING CONTOUR INTERVAL IS ONE FOOT. CONTOURS WERE GENERATED USING AUTOCAD LAND DESKTOP COMPANION 2008 SOFTWARE. PLANIMETRIC AND TOPOGRAPHIC DRAWINGS WERE DEVELOPED USING AUTOCAD LAND DESKTOP COMPANION 2008.

DEQ FOREST ROSE MINE (GRANITE, MT).
 HORIZONTAL DATUM: MONTANA 2500 STATE PLANE COORDINATE SYSTEM (NAD 83)
 UNITS: INTERNATIONAL FEET
 VERTICAL DATUM: NAVD88
 UNITS: U.S. SURVEY FEET
 SURVEY NOTE: All horizontal and vertical mapping positions are by GPS and Conventional instrumentation, calculated from ground control which have GPS observations based on ties to three National Geodetic Survey Continuously Operating Reference Stations (CORS) utilizing the Geoid09 model.



OVERALL SITE MAP

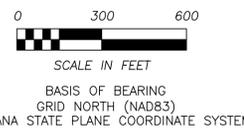
SHEET INDEX	
DESCRIPTION	
COVER, CONTROL SHEET	
SHEETS 2-6 TOPOGRAPHIC MAP	
SHEETS 7-8 STREAM PROFILE AND SECTIONS	

SURVEYED AND PREPARED FOR:
 MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
 CONTRACT NO. 407028 TASK ORDER NO. 27

LEGEND

- CONTROL POINT
- MINE ADIT
- SOIL TEST (TYPE & DIMENSIONS IN DESCRIPTION)
- MONITOR WELL
- STORM DRAIN MAN HOLE
- CULVERT (TYPE & DIMENSIONS IN DESCRIPTION)
- MAJOR CONTOUR
- MINOR CONTOUR
- PROPERTY LINE
- EDGE OF ROAD
- BUILDING LINE
- STREAM
- DITCH
- APPROXIMATE CENTERLINE OF EXISTING ROAD
- PHOTO TAKEN

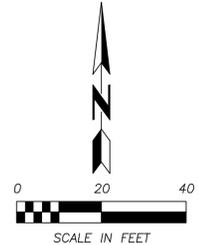
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CP-2	846754.99	1066302.61	46°30'57.23207"N	113°05'12.11206"W	5333.47	SET 2" ALUM CAP MARKED DJA CP
CP-3	847011.76	1066160.18	46°30'59.70100"N	113°05'14.31644"W	5353.17	SET 2" ALUM CAP MARKED DJA CP
CP-4	847084.90	1066048.38	46°31'00.37176"N	113°05'15.96277"W	5363.77	SET 1" RED PLASTIC CAP MARKED DJA CP
CP-5	847287.01	1066218.61	46°31'02.44276"N	113°05'13.66301"W	5288.41	SET 2" ALUM CAP MARKED DJA CP
CP-6	847329.91	1066332.81	46°31'02.91785"N	113°05'12.06885"W	5276.47	SET 2" ALUM CAP MARKED DJA CP
CP-7	847431.40	1066451.39	46°31'03.91273"N	113°05'10.42978"W	5260.05	SET 1" RED PLASTIC CAP MARKED DJA CP
CP-8	847497.49	1066586.65	46°31'04.68594"N	113°05'08.53989"W	5243.09	SET 1" RED PLASTIC CAP MARKED DJA CP
CP-9	847145.93	1066660.32	46°31'01.25059"N	113°05'07.25684"W	5285.89	SET 1" RED PLASTIC CAP MARKED DJA CP
CP-10	847001.46	1066573.39	46°30'59.78590"N	113°05'08.40459"W	5306.95	SET 1" RED PLASTIC CAP MARKED DJA CP
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CP-17	849700.96	1063418.76	46°31'24.99154"N	113°05'55.26404"W	5884.95	SET 1" RED PLASTIC CAP MARKED DJA CP
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CP-21	848877.61	1064019.22	46°31'17.14046"N	113°05'46.14059"W	5897.64	SET 1" RED PLASTIC CAP MARKED DJA CP
CP-22	849098.66	1064233.91	46°31'19.41872"N	113°05'43.21710"W	5917.60	SET 1" RED PLASTIC CAP MARKED DJA CP
CP-23	847215.52	1063771.37	46°31'00.62940"N	113°05'48.59136"W	5940.92	SET 1" RED PLASTIC CAP MARKED DJA CP



This map has been prepared under the direct supervision of a registered professional land surveyor.

SIGNED: KURT A. LUEBKE, P.L.S. DATE: _____
 DJ&A, P.C. MONTANA REGISTRATION NO. 132375
 MISSOULA, MT.

SHEET	
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BY	DATE	REVISION DESCRIPTION

DESIGN _____ PROJ. NO. 5759.2Z
 DRAWN KE DATE 09/30/2010
 CHECKED KL SURVEYED DJ&A, P.C.

Dj&A, P.C.
 CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-6891
 Phone 406/721-4320 Fax 406/549-6371

MONTANA
 DEPT OF ENVIRONMENTAL QUALITY
 GRANITE COUNTY, MONTANA

DUNKELBERG CREEK
 SITE & TOPOGRAPHIC MAP

SHEET	
OF	
2	8

10/20/21 10:02 PM C:\Users\jcl\OneDrive\Documents\5759.2Z.dwg 10/20/21 10:47 AM 30x



PHOTO #1



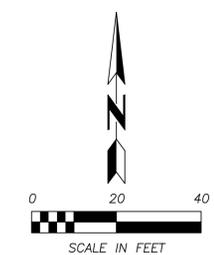
PHOTO #2



PHOTO #3



PHOTO #4



BY	DATE	REVISION	DESCRIPTION

DESIGN	_____	PROJ. NO.	5759.2Z
DRAWN	KE	DATE	09/30/2010
CHECKED	KL	SURVEYED	DJ&A, P.C.

DJ&A, P.C.
 CONSULTING ENGINEERS & LAND SURVEYORS
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 GRANITE COUNTY, MONTANA

DUNKELBERG CREEK
 SITE & TOPOGRAPHIC MAP

SHEET	
3	OF 8

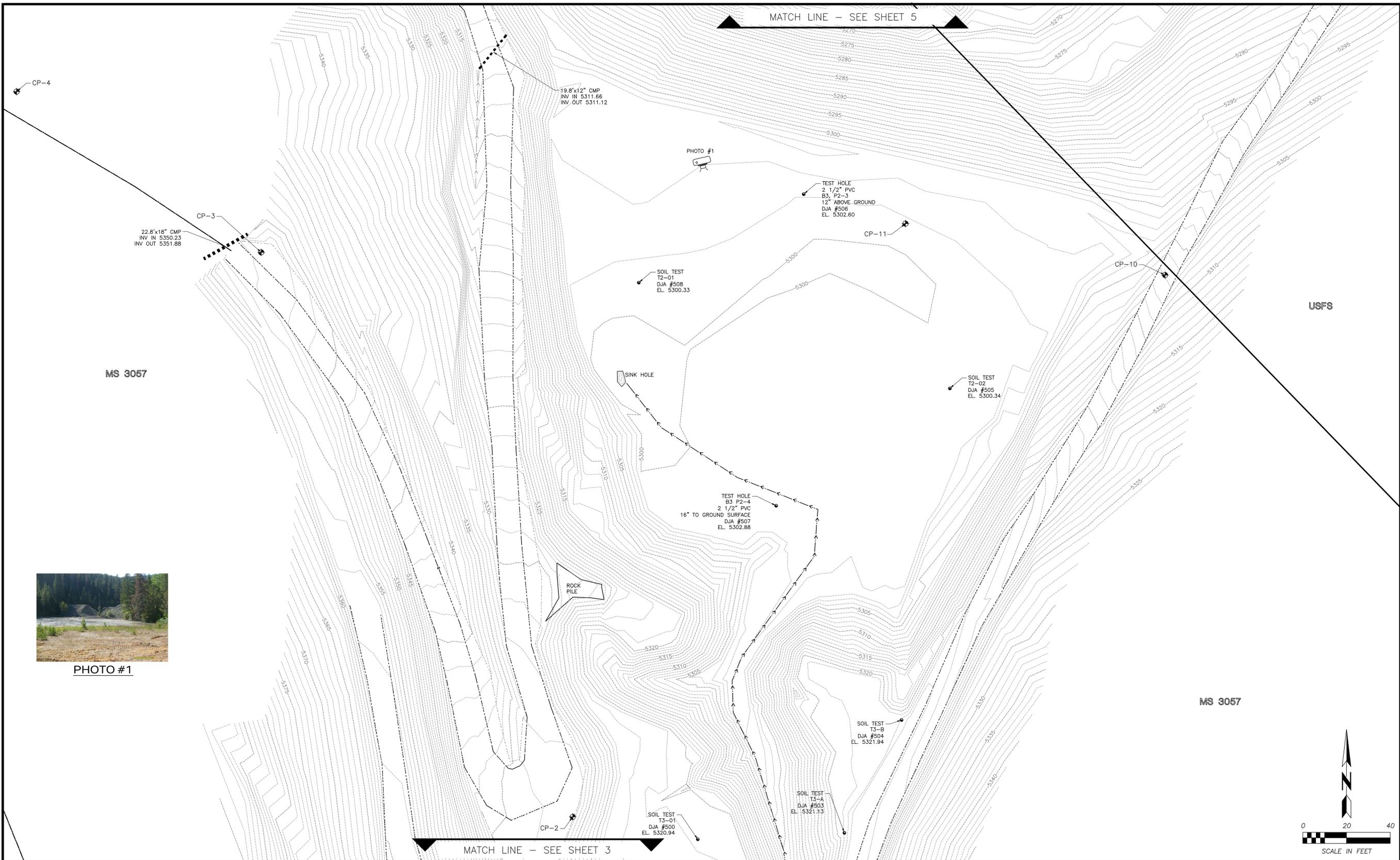


PHOTO #1

BY	DATE	REVISION DESCRIPTION

DESIGN	_____	PROJ. NO.	5759.27
DRAWN	KE	DATE	09/30/2010
CHECKED	KL	SURVEYED	DJA&A, P.C.

DJA, P.C.
 CONSULTING ENGINEERS & LAND SURVEYORS
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 Phone 406/721-4320 Fax 406/549-6371

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 DEPT OF ENVIRONMENTAL QUALITY
 GRANITE COUNTY, MONTANA

DUNKELBERG CREEK
 SITE & TOPOGRAPHIC MAP

SHEET	
OF	
4	8



PHOTO #1



PHOTO #2



PHOTO #3

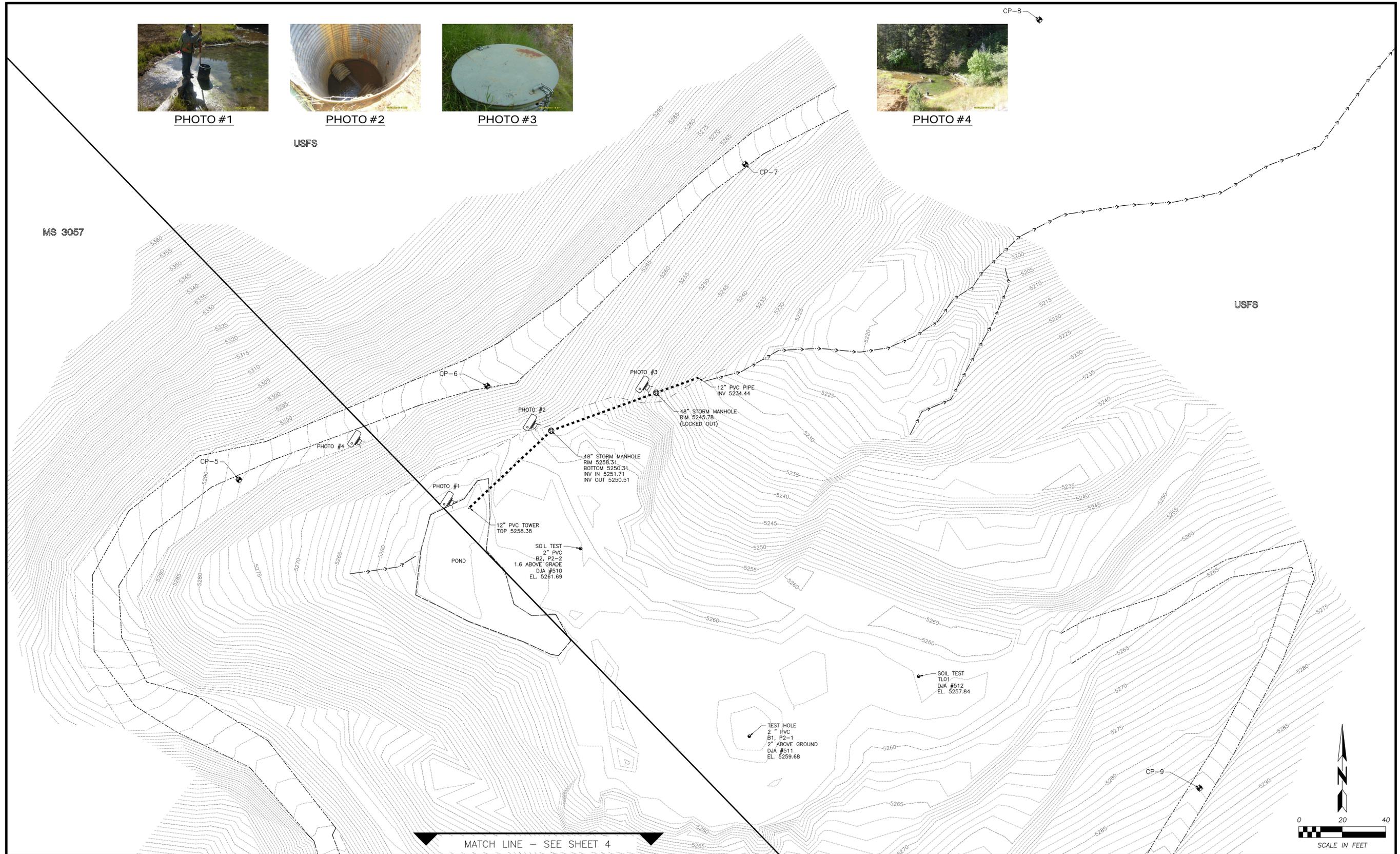


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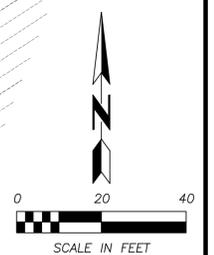
USFS

USFS

MS 3057



MATCH LINE - SEE SHEET 4



BY	DATE	REVISION DESCRIPTION

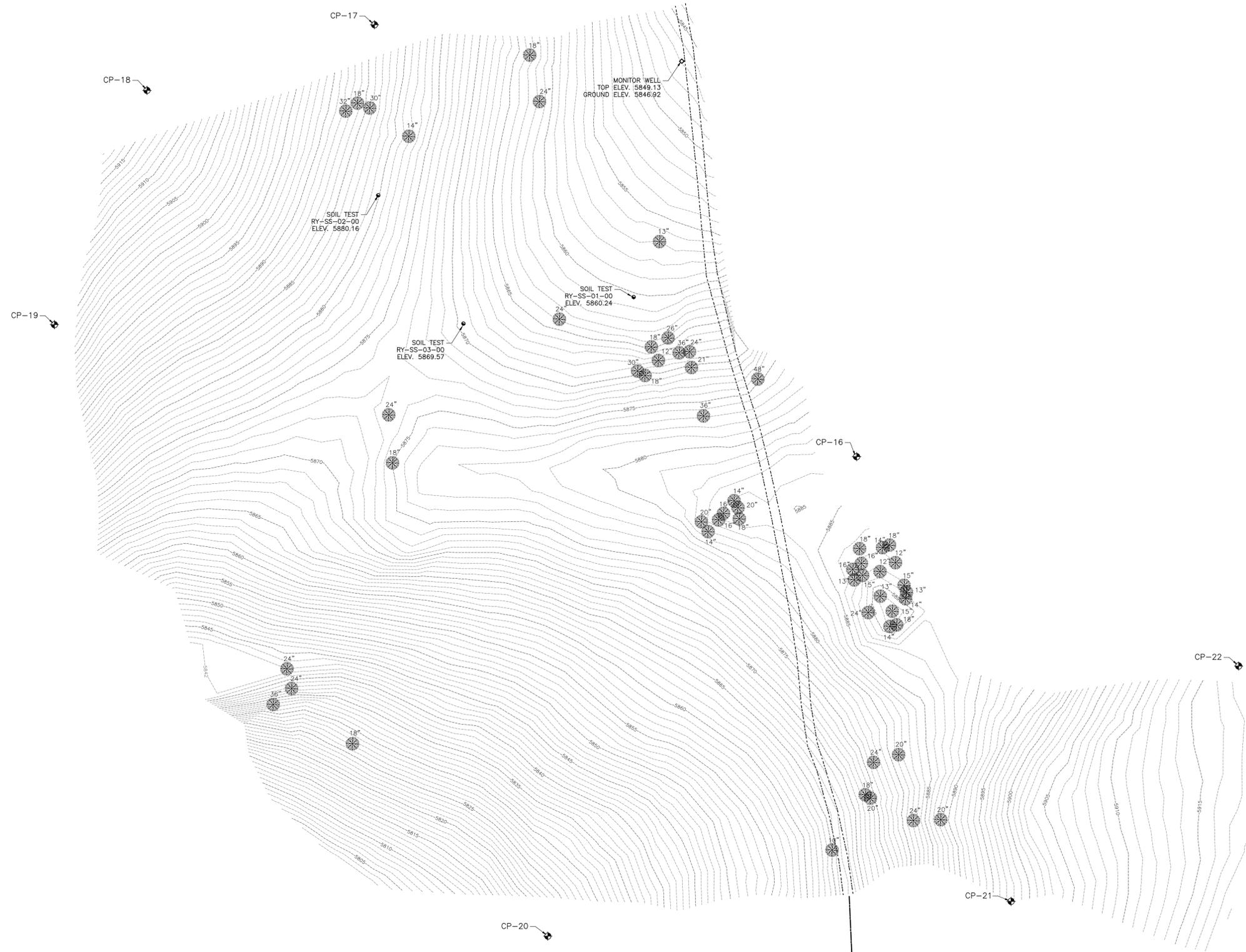
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DRAWN	KE	DATE	09/30/2010
CHECKED	KL	SURVEYED	DJ&A, P.C.


DJ&A, P.C.
 CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-6891
 Phone 406/721-4320 Fax 406/549-6371

MONTANA
DEPT OF ENVIRONMENTAL QUALITY
GRANITE COUNTY, MONTANA

SITE & TOPOGRAPHIC MAP

SHEET	OF
5	8



BY	DATE	REVISION DESCRIPTION

DESIGN	_____	PROJ. NO.	5759.2Z
DRAWN	KE	DATE	09/30/2010
CHECKED	KL	SURVEYED	DJA&A, P.C.

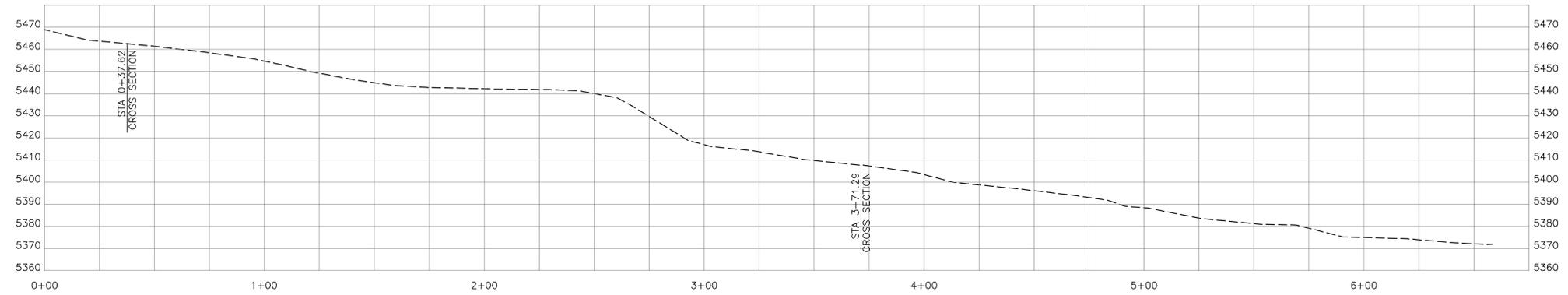

DJA&A, P.C.
 CONSULTING ENGINEERS & LAND SURVEYORS
3203 Russell Street, Missoula, Montana 59801-6891
 Phone 406/721-4320 Fax 406/549-6371

MONTANA
DEPT OF ENVIRONMENTAL QUALITY
GRANITE COUNTY, MONTANA

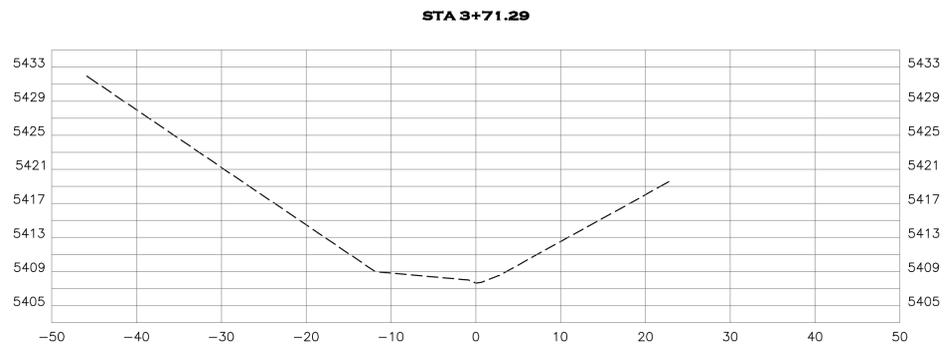
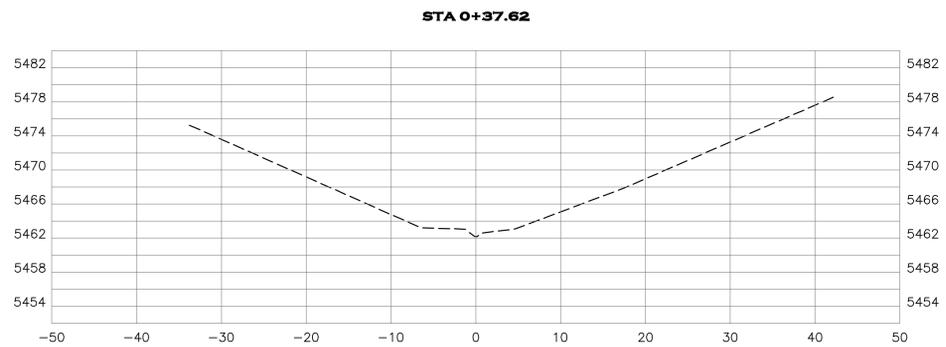
REPOSITORY SITE
& TOPOGRAPHIC MAP

SHEET	
OF	
6	8

10/20/10 1:00 PM C:\Users\jke\Documents\5759.2Z.dwg 10/20/10 1:00:00 PM



STREAM PROFILE
Scale: 1" = 30'



STREAM CROSS-SECTIONS
Scale: 1" = 10'

BY	DATE	REVISION DESCRIPTION

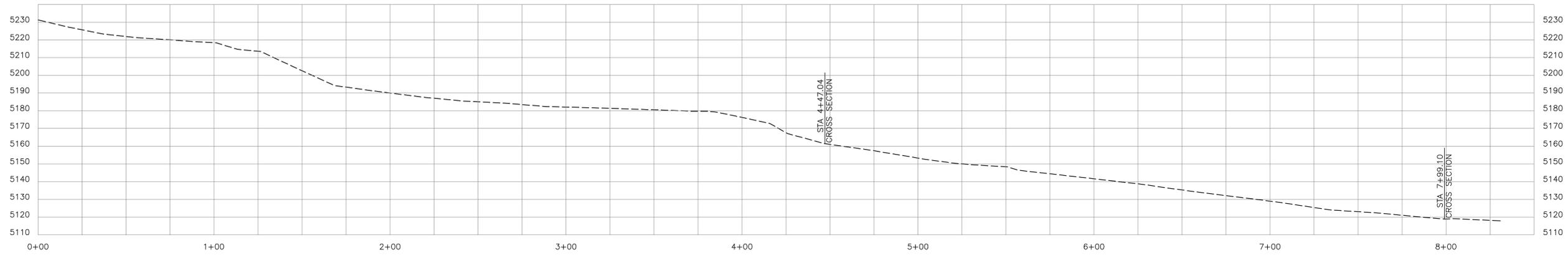
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CHECKED	KL	SURVEYED	DJ&A, P.C.



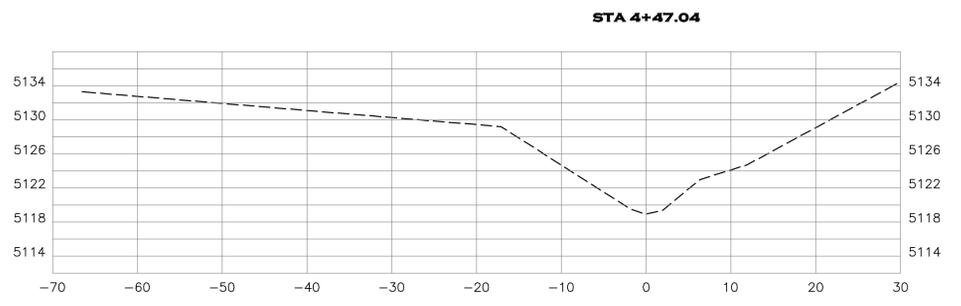
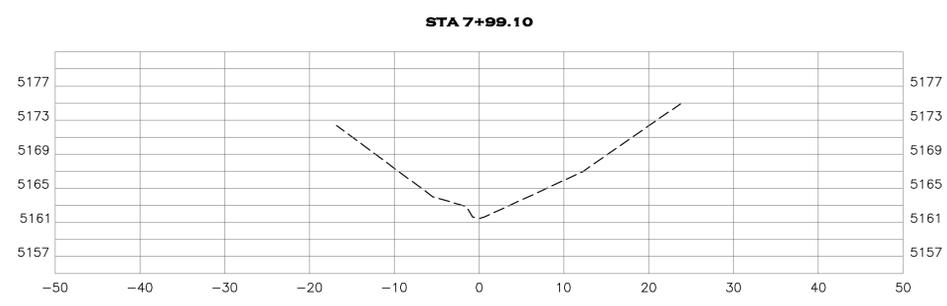
MONTANA
DEPT OF ENVIRONMENTAL QUALITY
GRANITE COUNTY, MONTANA

DUNKELBERG CREEK
UPSTREAM PROFILE
AND SECTIONS

SHEET	
OF	
7	8



STREAM PROFILE
Scale: 1" = 30'



STREAM CROSS-SECTIONS
Scale: 1" = 10'

BY	DATE	REVISION DESCRIPTION

DESIGN	_____	PROJ. NO.	5759.2Z
DRAWN	KE	DATE	09/30/2010
CHECKED	KL	SURVEYED	D&A, P.C.



MONTANA
DEPT OF ENVIRONMENTAL QUALITY
GRANITE COUNTY, MONTANA

DUNKELBERG CREEK
DOWNSTREAM PROFILE
AND SECTIONS

SHEET	
OF	
8	8

APPENDIX B

Boring Logs and Test Pits

Repository Test Pits



Key to Log of Boring / Test Pit

Project: Forest Rose Mine
Granite County, Montana

UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOL CHART			
MAJOR DIVISIONS		SYMBOLS	DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS LITTLE OR NO FINES	GW Well-graded gravels, gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES APPRECIABLE AMOUNT OF FINES	GP Poorly graded gravels, gravel-sand mixtures, little or no fines
			GM Silty gravels, gravel-sand-silt mixtures
	SAND AND SANDY SOILS	CLEAN SANDS LITTLE OR NO FINES	SW Well-graded sands, gravelly sands, little or no fines
		SANDS WITH FINES APPRECIABLE AMOUNT OF FINES	SP Poorly graded sands, gravelly sands, little or no fines
			SM Silty sands, sand-silt mixtures
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML Inorganic silts, very fine sands, rock flour, silty/clayey fine sands or clayey silts of slight plasticity
			CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silt
			CH Inorganic clays of high plasticity, fat clays
			OH Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT Peat, humus, swamp soils with high organic content	

NOTE: DUAL SYMBOLS USED FOR BORDERLINE CLASSIFICATIONS

Abbreviations

AL	Atterberg Limits
C	Consolidation
DS	Direct Shear
HA	Hydrometer Analysis
LL	Liquid Limit
LV	Laboratory Vane Shear
N	Number of hammer blows for last 12 inches driven
OVA	Organic Vapor Analyzer
Pc	Constant Head Permeability
Pf	Falling Head Permeability
PI	Plasticity Index
PP	Pocket Penetrometer
SA	Sieve Analysis
SG	Specific Gravity
TV	Torvane Shear
TX	Triaxial Shear

Sampler Symbols

	2-inch-O.D. Split Spoon Sampler Driven with 140-lb Auto Hammer and 30-inch Drop (SPT)
	3-inch-O.D. Split Spoon Sampler with Brass Rings Driven with 300-lb Hammer and 30-inch Drop
	Non-Standard Penetration Test
	Bulk Sample
	3-inch-O.D. Shelby Tube Sampler
	3-inch-O.D. Pitcher Tube Sampler

DCPT= Dynamic Cone Penetrometer Test Blowcounts

Groundwater Level Symbol

Water level at time of drilling or excavation

Relative Density and Consistency Relationships

Coarse-Grained Soils			Fine-Grained Soils		
Relative Density	N - SPT (blows/ft)	Manual Field Test	Relative Consistency	N, SPT (blows/ft)	Manual Penetration Test
Very loose	0 - 4	Easily penetrated by 1/2-inch rod pushed by hand	Very soft	<2	Easy several inches by fist
Loose	5 - 10	Easily penetrated by 1/2-inch rod pushed by hand	Soft	2 - 4	Easy several inches by thumb
Medium dense	11 - 30	Penetrated 1 foot by 1/2-inch rod driven by 5-lb hammer	Medium stiff	5 - 8	Moderate several inches by thumb
Dense	31 - 50	Penetrated 1 foot by 1/2-inch rod driven by 5-lb hammer	Stiff	9 - 15	Readily indented by thumb
Very dense	>50	Penetrated only few inches by 1/2-inch rod driven by 5-lb hammer	Very Stiff	16 - 30	Readily indented by thumbnail
			Hard	>30	Difficult by thumbnail

Minor Descriptors

Trace clay, silt, sand, gravel	<5%
Few clay, silt, sand, gravel	5 - 10%
Little clay, silt, sand, gravel	15 - 25%
Some clay, silt, sand, gravel	30 - 45%

Moisture Content

Dry	Absence of moisture, dusty
Moist	Damp but no visible water
Wet	Visible free water, from below the water table

General Notes

- Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on these logs apply only at the specific test pit locations and at the time the test pits were excavated; they are not warranted to be representative of subsurface conditions at other locations or times.
- Soil descriptions are recorded in the following order: SOIL CLASSIFICATION (USCS Symbol), relative density or consistency, color, moisture, plasticity or gradation, angularity, minor constituents, additional comments (organics, odor, etc.) [GEOLOGIC UNIT].
- Soil relative density or consistency was estimated based on manual inspection and/or ease or difficulty of excavation by the backhoe.

Figure [#]

Key to Log of Boring/Test Pit

November 2010

HERRERA ENVIRONMENTAL CONSULTANTS, INC
Project No. [*****]

Forest Rose Mine
for Montana DEQ



TEST PIT SOIL LOG RY-SS-01

Test Pit # RY-SS-01
 Total depth 7.0 ft.
 Sheet 1 of 1

Project name Forest Rose Mine Excav. Contractor Boland Drilling Equipment Case 580K
 Project number 06-03425-070 Location Repository Sampling method Bulk
 Client MDEQ Ground elevation _____
 HEC rep. Vinnie Perrone Start date July 26, 2010 Air monitoring (Y/N) N
 Compl. date July 26, 2010 Instrument(s) None

Depth (feet, BGS)	Soil group	Soil description
	SM	Dark brown, moist, silty sand with organics [TOPSOIL]
1 2 3 4	GM-GC	Orange-brown, dense, moist, silty to clayey gravel with sand, fine to coarse sand, angular gravel, occasional angular cobble and small roots. [RESIDUUM]
5 6 7	SM	Light brown, dense, moist, gravelly sand with angular cobbles, fine to coarse sand [RESIDUUM]
8 9 10 11 12 13 14 15 16 17 18 19 20		Backhoe refusal at 7.0 ft. No groundwater observed. Trench walls vertical and stable. Sample 1 @ 0 to 0.5 ft Sample 2 @ 3.0 ft Sample 3 @ 2.0 to 4.0 ft



TEST PIT SOIL LOG RY-SS-02

Test Pit # RY-SS-02
 Total depth 10.0 ft
 Sheet 1 of 1

Project name Forest Rose Mine Excav. Contractor Boland Drilling Equipment Case 580K
 Project number 06-03425-070 Location Repository Sampling method Bulk
 Client MDEQ Ground elevation _____
 HEC rep. Vinnie Perrone Start date July 26, 2010 Air monitoring (Y/N) N
 Compl. date July 26, 2010 Instrument(s) None

Depth (feet, BGS)	Soil group	Soil description
	SM	Dark brown, moist, silty sand with organics [TOPSOIL]
1 2 3	SM	Brownish gray, medium dense to dense, moist, silty sand with gravel, occasional angular cobble, small roots [RESIDUUM]
4	SP-SM	Gray, dense, moist, sand with trace to few silt, fine to coarse sand [RESIDUUM]
5 6 7 8 9 10	SM	Gray dense, moist silty sand, fine to coarse sand, trace to few angular gravel [RESIDUUM] Grades with angular gravel and cobbles
11 12 13 14 15 16 17 18 19 20		Backhoe refusal at 10 ft. Groundwater not observed. Trench walls vertical and stable. Sample 1 @ 2.5 ft Sample 2 @ 4.0 ft Sample 3 @ 5.0 to 6.0 ft Sample 4 @ 8.5 to 9.0 ft



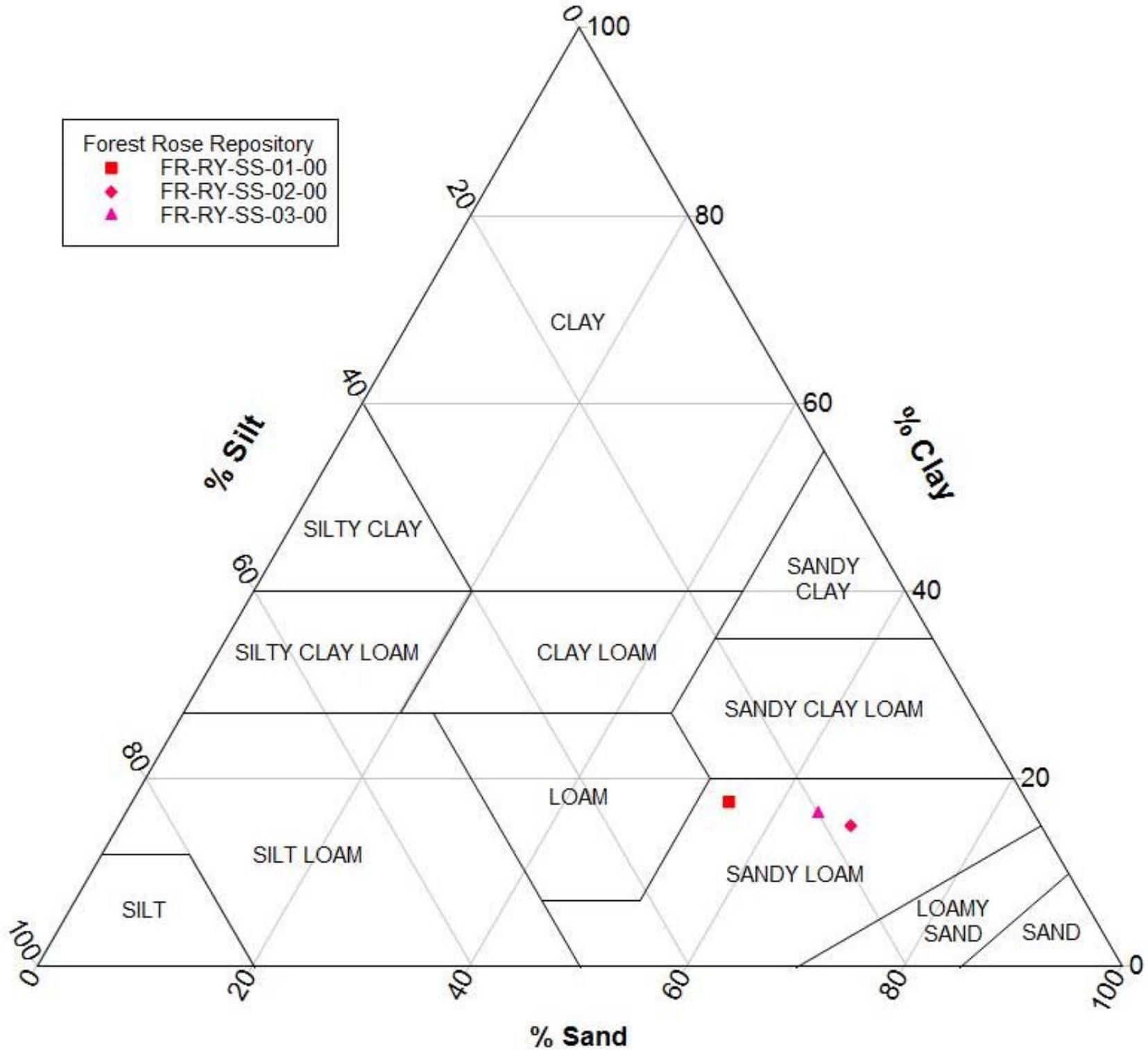
TEST PIT SOIL LOG RY-SS-03

Test Pit # RY-SS-03
 Total depth 9.0 ft
 Sheet 1 of 1

Project name Forest Rose Mine Excav. Contractor Boland Drilling Equipment Case 580K
 Project number 06-03425-070 Location Repository Sampling method Bulk
 Client MDEQ Ground elevation _____
 HEC rep. Vinnie Perrone Start date July 26, 2010 Air monitoring (Y/N) N
 Compl. date July 26, 2010 Instrument(s) None

Depth (feet, BGS)	Soil group	Soil description
	SM	Dark brown, silty sand with organics [TOPSOIL]
1	SM	Orange-brown, medium dense to dense, moist, silty sand with angular gravel, fine to coarse sand, Occasional fine roots [RESIDUUM]
3	SM	Gray, dense, moist, silty sand with few angular gravel, fine to coarse sand [RESIDUUM] Grades with angular cobbles below 5.5 ft
4		
5		
6		
7		
8		
9		
10		Backhoe refusal at 9.0 ft. No groundwater observed. Trench walls vertical and stable. Sample 1 @ 1.5 to 2.0 ft Sample 2 @ 3.0 ft Sample 3 @ 3.0 to 5.0 ft
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

FOREST ROSE MINE REPOSITORY



Soil Boring Logs



SOIL BORING LOG

Boring # T1-01
 Total depth 17 feet
 Sheet 1 of 1

Project name	<u>Forest Rose Mine</u>	Drilling Contractor	<u>Boland Drilling</u>	Drilling method	<u>Hollow-stem auger</u>
Project number	<u>06-03425-070</u>	Location	<u>T1 (Tailings Area)</u>	Sampling method	<u>Split spoon sampler</u>
Client	<u>MDEQ</u>	Herrera rep.	<u>Bruce Carpenter</u>	Date	<u>July 29, 2010</u>

Sample type, interval	% recovery	Blow Counts	Water level (feet)	Depth (feet, BGS)	Soil group	Soil description
				1	SM	Orange-Brown silty SAND, dry (tailings)
				2		
				3		
4ft SSS	15	4 2 8 6		4	ML	Gray sandy SILT, damp (tailings), piece of wood stuck in tip of sampler
				5		
				6		
				7		
				8		
4ft SSS	<5	7 4 4 7		9		No recovery, rock in tip of sampler, (native soil)
				10		
4ft SSS	<5	6 15 50/1 inch		11		Poor recovery, rock in tip of sampler
				12		
				13		
				14		
				15		FR-T1-SB-01-15@16:15
4ft SSS	20	7 10 13 14		16	ML	Brown-Gray sandy SILT with gravel, slate rock fragments, damp
				17		
				18		
				19		
				20		



SOIL BORING LOG

Boring # T2-01
 Total depth 20 feet
 Sheet 1 of 2

Project name Forest Rose Mine Drilling Contractor Boland Drilling Drilling method Hollow-stem auger
 Project number 06-03425-070 Location T2 (Tailings Area – West End) Sampling method Split spoon sampler
 Client MDEQ Herrera rep. Bruce Carpenter Date July 31, 2010

Sample type, interval	% recovery	Blow Counts	Water level (feet)	Depth (feet, BGS)	Soil group	Soil description
				1	SM	Orange-Brown silty SAND, dry (tailings)
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		FR-T2-TB-01-10@10:25
4ft SSS	100	2		11	SM	Gray silty SAND, wet (tailings)
		3		12		
		4		13		
		4		14		
				15		
				16		
				17		
				18		
				19		Changes to native soil
				20		



SOIL BORING LOG

Boring # T2-02
 Total depth 16 feet
 Sheet 1 of 1

Project name	<u> Forest Rose Mine </u>	Drilling Contractor	<u> Boland Drilling </u>	Drilling method	<u> Hollow-stem auger </u>
Project number	<u> 06-03425-070 </u>	Location	<u> T2 (Tailings Area – East End) </u>	Sampling method	<u> Split spoon sampler </u>
Client	<u> MDEQ </u>	Herrera rep.	<u> Bruce Carpenter </u>	Date	<u> July 31, 2010 </u>

Sample type, interval	% recovery	Blow Counts	Water level (feet)	Depth (feet, BGS)	Soil group	Soil description
				1	ML	Gray sandy SILT, dry (tailings)
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		FR-T2-TB-02-10@11:55
4ft SSS	50	2 4 6 10		11	ML	Gray sandy SILT, wood fragments, organic material, wet (tailings)
				12	ML	Light Brown clayey SILT, with sand, gravel, angular rock fragments (slate), damp to wet (native soil)
				13		
				14		
				15		FR-T2-SB-02-15@12:10
4ft SSS	50	15 30 18 15		16	SM	Brown silty SAND, with angular rock fragments, pieces of slate, damp
				17	Bedrock	Auger refusal at 16 feet
				18		
				19		
				20		



SOIL BORING LOG

Boring # T3-01
 Total depth 35 feet
 Sheet 1 of 2

Project name Forest Rose Mine Drilling Contractor Boland Drilling Drilling method Hollow-stem auger
 Project number 06-03425-070 Location T3 (Tailings Area – North End) Sampling method split spoon sampler
 Client MDEQ Herrera rep. Bruce Carpenter Date July 31, 2010

Sample type, interval	% recovery	Blow Counts	Water level (feet)	Depth (feet, BGS)	Soil group	Soil description
				1	SM	Gray silty SAND, damp (tailings)
				2		
				3		
				4		
				5		
				6		
				7		
				8		
				9		
				10		
4ft SSS	100	0 0 1 3		11	CH	FR-T3-TB-01-10@7:35 Gray silty CLAY, wet (tailings)
				12		
				13		
				14		
				15		
				16		
				17		
				18		
				19		
				20		



SOIL BORING LOG

Boring # T3-01
 Total depth 35 feet
 Sheet 2 of 2

Project name Forest Rose Mine Drilling Contractor Boland Drilling Drilling method Hollow-stem auger
 Project number 06-03425-070 Location T3 (Tailings Area – North End) Sampling method Split spoon sampler
 Client MDEQ Herrera rep. Bruce Carpenter Date July 31, 2010

Sample type, interval	% recovery	Blow Counts	Water level (feet)	Depth (feet, BGS)	Soil group	Soil description
4ft SSS	100	1		21	ML	FR-T3-TB-01-20@8:05 Gray silty SAND, wet (tailings)
		0		22		
1	23					
0	24					
	25					
	26					
	27	ML		Changes to native soil		
	28					
	29					
	30					
4ft SSS	50		19			
			32			
	32					
	32					
	33					
	34					
	35	Bedrock	Refusal, Weathered Black Slate			
4ft SSS	50			18		
		24	36			
	50/6 inches		37			



SOIL BORING LOG

Boring # T3-02
 Total depth 25 feet
 Sheet 1 of 2

Project name Forest Rose Mine Drilling Contractor Boland Drilling Drilling method Hollow-stem auger
 Project number 06-03425-070 Location T3 (Tailings Area – North End) Sampling method split spoon sampler
 Client MDEQ Herrera rep. Bruce Carpenter Date July 30, 2010

Sample type, interval	% recovery	Blow Counts	Water level (feet)	Depth (feet, BGS)	Soil group	Soil description
				1	SM	Orange-Brown silty SAND, dry (tailings)
				2		
				3		
				4		
				5		
4ft SSS	75	4		6	ML	Gray silty SAND, damp (tailings)
		8		7		
		7		8		
		6		9		
				10		
4ft SSS	100	12		11	ML	FR-T3-TB-02-10@17:00 Gray silty SAND, wet (tailings)
		12		12		
		10		13		
		10		14		
				15		
				16		
				17		
				18		Changes to native soil
				19		
				20		



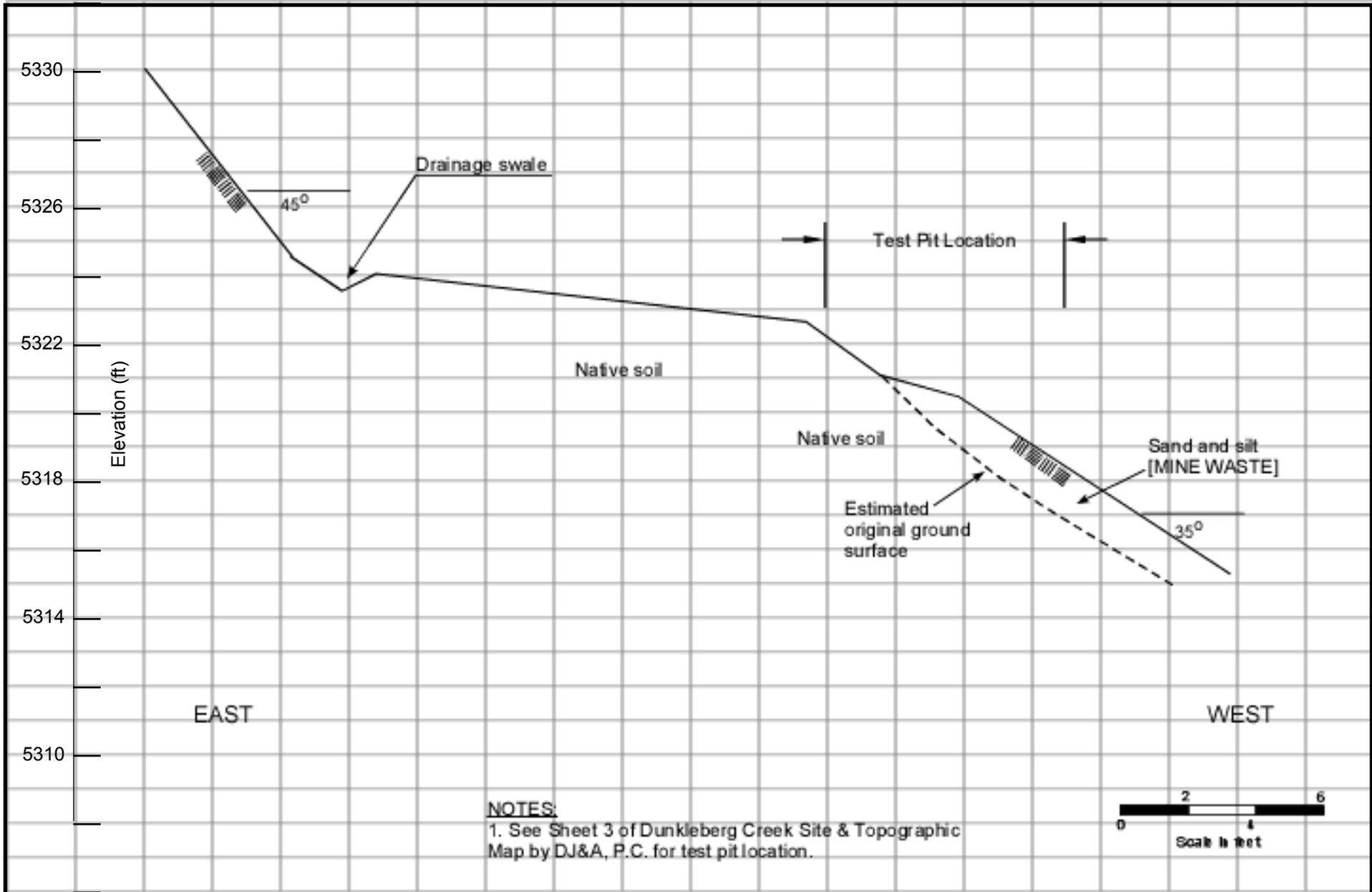
SOIL BORING LOG

Boring # T3-02
 Total depth 25 feet
 Sheet 2 of 2

Project name Forest Rose Mine Drilling Contractor Boland Drilling Drilling method Hollow-stem auger
 Project number 06-03425-070 Location T3 (Tailings Area) Sampling method Split spoon sampler
 Client MDEQ Herrera rep. Bruce Carpenter Date July 30, 2010

Sample type, interval	% recovery	Blow Counts	Water level (feet)	Depth (feet, BGS)	Soil group	Soil description
4ft SSS	50	1		21	ML	FR-T3-SB-02-20@ 17:30 Brown-Gray sandy SILT, with gravel, angular rock pieces, slate, wet
		3		22		
2	23					
4	24					
	25					
	26	Bedrock		Auger refusal, split spoon bounces on bedrock		
	No Recovery					

Waste Exploration Pits



November 2010

HERRERA ENVIRONMENTAL CONSULTANTS, INC
 Project No. [*****]

Figure [#]
Test Pit T3-A

Forest Rose Mine]
 for Montana DEQ

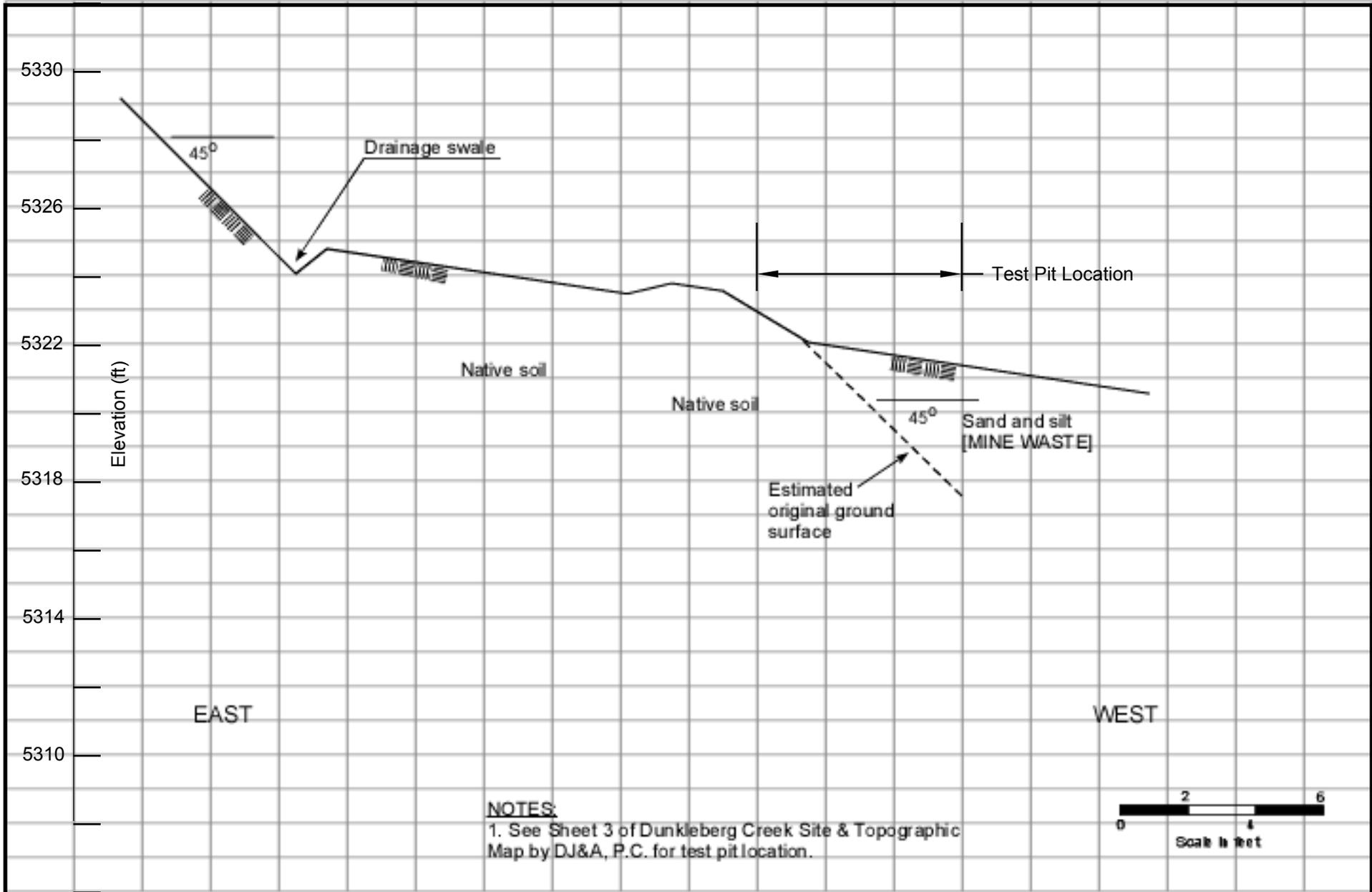


Figure [#]
Test Pit T3-B

November 2010

HERRERA ENVIRONMENTAL CONSULTANTS, INC
 Project No. [*****]

Forest Rose Mine]
 for Montana DEQ

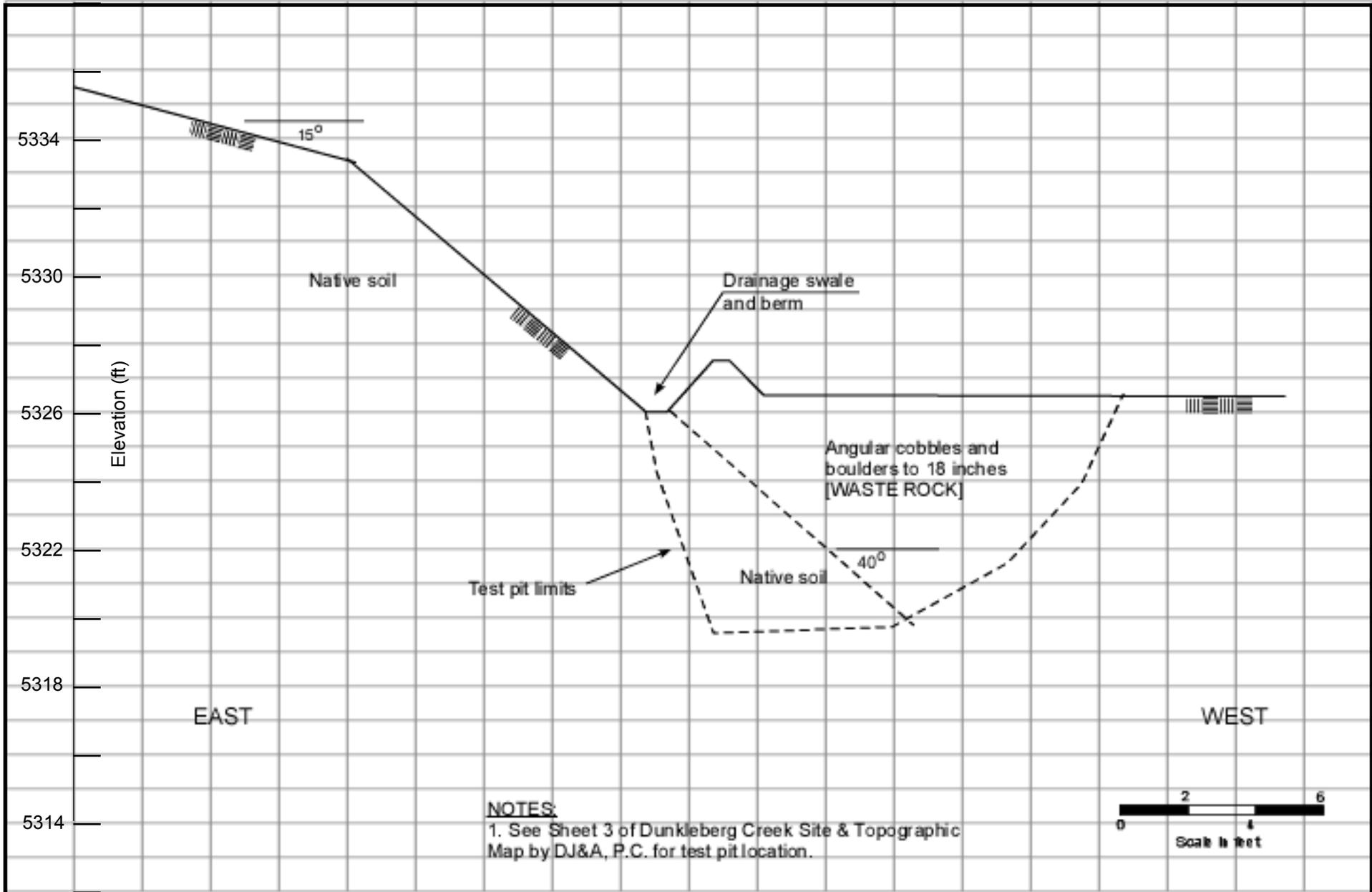


Figure [#]
 Test Pit WR-TP-01

November 2010

HERRERA ENVIRONMENTAL CONSULTANTS, INC
 Project No. [*****]

Forest Rose Mine]
 for Montana DEQ

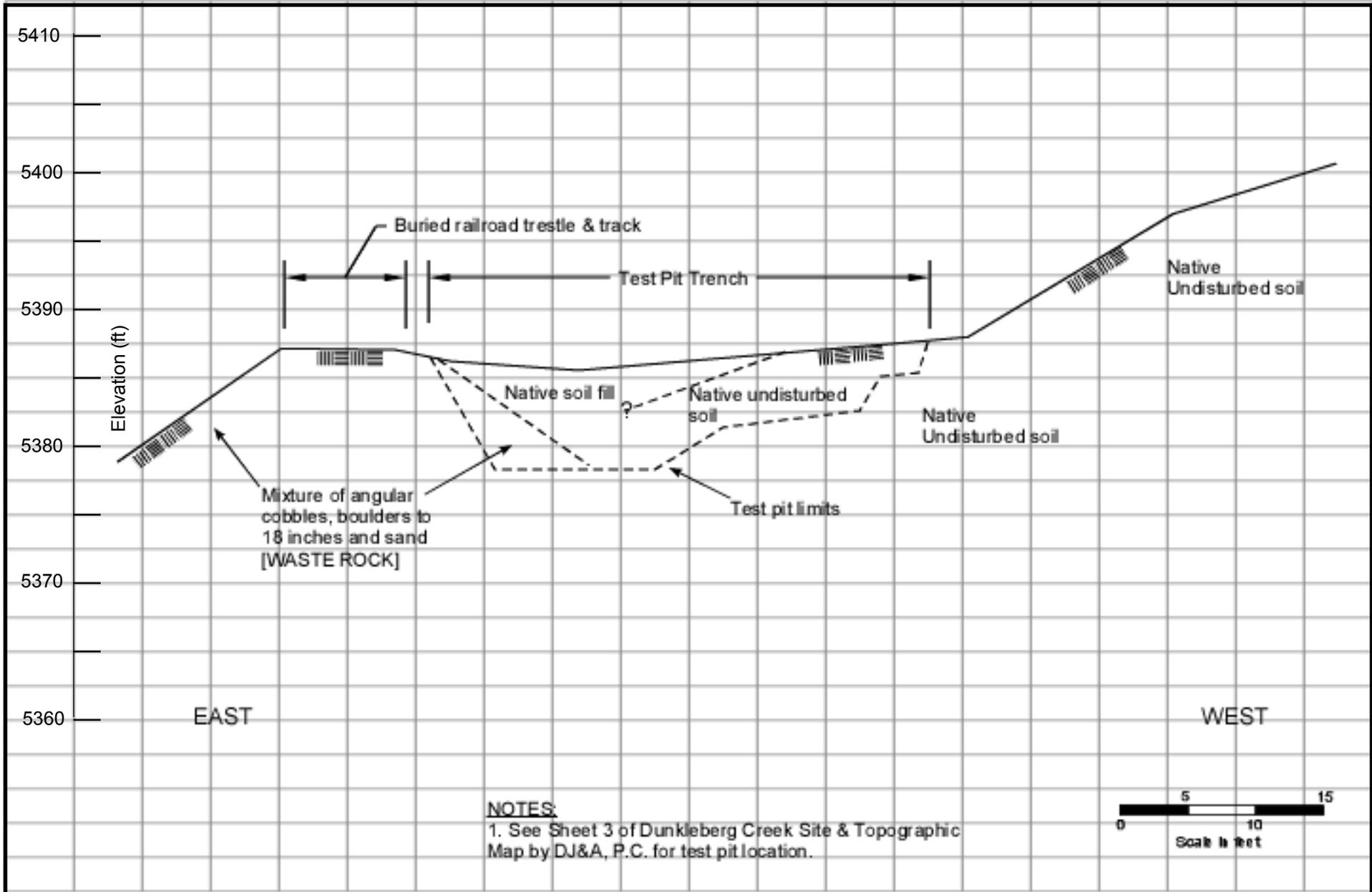


Figure [#]
 Test Pit WR-TP-02

November 2010

HERRERA ENVIRONMENTAL CONSULTANTS, INC
 Project No. [*****]

Forest Rose Mine]
 for Montana DEQ

Well Logs

APPENDIX C

Sample Results

1993 Results

1993 DEQ/MWCB Soil and Water Sampling.

SOLID MATRIX ANALYSES														
FIELD ID	Metals in Soils		Results per dry weight basis											
	As (mg/Kg)	Ba (mg/Kg)	Cd (mg/Kg)	Co (mg/Kg)	Cr (mg/Kg)	Cu (mg/Kg)	Fe (mg/Kg)	Hg (mg/Kg)	Mn (mg/Kg)	Ni (mg/Kg)	Pb (mg/Kg)	Sb (mg/Kg)	Zn (mg/Kg)	CYANIDE (mg/Kg)
20-004-SE-1	116 JX	65.8	14.8 J	11.1 J	19.9 J	125	45600 J	0.13	1370 J	34 J	1010 J	4 U	2040 J	NR
20-004-SE-2	51 JX	25.6	22 J	3 J	3.3 J	53.7	13700 J	0.1	1310 J	17 J	428 J	4 U	1270 J	NR
20-004-SE-3	67 JX	11.8	13.5 J	9.5 J	16.2 J	41.7	43200 J	0.049	819 J	34 J	2820 J	6 J	2230 J	NR
20-004-TP-1	336 JX	37.6	58.2 J	2 J	3.8 J	444	38800 J	0.342	2090 J	15 J	6810 J	49 J	7430 J	NR
20-004-TP-2	444 JX	15	143 J	11.2 J	4.4 J	563	109000 J	0.377	1720 J	28 J	1820 J	28 J	16800 J	NR
20-004-TP-3	330 JX	12.2	65.1 J	14.3 J	3.4 J	404	113000 J	0.052	1730 J	29 J	690 J	9 J	6590 J	NR
20-004-WR-1	227	13.1	40.9	8.6	2.9	208	39200	0.648 J	1110	29	4570	24 J	5660	NR
20-004-WR-2	801 JX	31.2	477 J	3.5 J	4 J	1770	75700 J	2.93	1760 J	15 J	60400 J	470 J	51500 J	NR
20-004-WR-3	350 JX	23.1	3.2 J	4 J	3 J	526	164000 J	0.934	165 J	16 J	242 J	7 J	2840 J	NR
BACKGROUND	17 JX	122	0.8 J	10.4 J	34.2 J	34.6	23500 J	0.06	1040 J	36 J	38 J	5 U	106 J	NR
WATER MATRIX ANALYSES														
FIELD ID	Metals in Water		Results in ug/L											HARDNESS CALC. (mg CaCO3/L)
	As	Ba	Cd	Co	Cr	Cu	Fe	Hg	Mn	Ni	Pb	Sb	Zn	
20-004-GW-1	3 J	22.6 JX	4.1 J	9.7 U	6.83 U	4.1 J	113	0.038 U	35.5	12.7 U	3.86	30.7 U	1700	258
20-004-SW-1	6.45	82.2	3.7 J	7.63 JX	17.9	31.9	16100	0.038 U	453	24.2	68.7	23.8	474	358
20-004-SW-2	1.92	13.3	2.55 U	5.99 UX	8.83	1.43	104	0.038 U	7.47	9	9.13	18.3 U	374	199
20-004-SW-3	1.41	11.3	3.3 J	5.99 UX	5.27	5.7	54.5	0.038 U	6.07	8.78 U	1.73	19.4	346	175

LEGEND

U - Not Detected	SE-1 Downstream of breached dam on tailing pond 3.	WR-4 Composite of subsamples WR4A and 4B.
J - Rational Quantity	SE-2 At toe of wast rock dump 1.	BACKGROUND - From the Jackson Park Mine (20-027-SS-1).
X - Outlier for Accuracy or Precision	SE-3 Approx. 400' upstream of end of waste rock dump 2.	TP2DUP - Duplicate of sample 20-004-TP-2.
NR - Not Requested	TP-1 Composite of subsamples TP1A-A, 1A-B, 1A-C, 1A-D, 1B-A, 1B-B, 1B-C, 1B-D, 1B-E, and 1B-F.	TP3DUP - Duplicate of sample 20-004-TP-3.
	TP-2 Composite of subsamples TP2A-A, 2A-B, 2A-C, 2B-A, 2B-B, and 2B-C.	GW-1 Discharge from adit #1.
	TP-3 Composite of subsamples TP3A-A, 3A-B, 3B-A, 3B-B, and 3B-C.	SW-1 Same as sample SE1.
	WR-1 Composite of subsamples WR1A, 1B, 2C, 2A, and 2B.	SW-2 Same as sample SE2.
	WR-3 Composite of subsamples WR3A, 3B, and 3C.	SW-3 Same as sample SE3.

2004 Results

2004 MCS Environmental Water Survey.

Sample Description	Sample ID	Temp (°C)	Sp. Cond. (mS/cm2)	Cond. (mS/cm)	DO (mg/L)	Alkalinity (mg/L CaCO3)	Arsenic (mg/L)	Cadmium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Zinc (mg/L)	Calcium (mg/L)	Chloride (mg/L)	Magnesium (mg/L)	Sulfate (mg/L)	Hardness (mg/L)	Lab pH
Dunkleberg Creek below T1 Area slide mass	STR-01-0-SW (Total)	6.68	0.529	0.344	10.58	135	<0.010	<0.0020	<0.0030	<0.0050	<0.00020	0.0641	98.9	0.69	12.1	140	297	7.89
	STR-01-0-SW (Dissolved)						<0.010	<0.0020	<0.0030	<0.00020	<0.0050	0.0655						
Channel water near west edge of T1 Area slide mass	SP-03-0-SW (Total)	5.57	0.641	0.403	6.98	144	<0.010	<0.0020	<0.0030	<0.0050	<0.00020	0.0229	126	0.64	11.2	200	361	7.22
	SP-03-0-SW (Dissolved)						<0.010	NA	NA	NA	NA	NA						
Groundwater discharge from T1 Area failure surface	TS-07-0-SW (Total)	16.54	1.1413	1.184	1.26	NM	0.033	0.0422	0.217	0.0859	<0.00020	6.13	267	1.03	123	854	1,170	5.48
	TS-07-0-SW (Dissolved)						NA	NA	NA	NA	NA	NA						
Pond water from T1 Area	DT-08-0-SW (Total)	18.3	0.423	0.368	4.6	145	<0.010	0.0025	0.011	0.0571	<0.00020	0.234	79.4	0.76	9.01	66.5	235	7.66
	DT-08-0-SW (Dissolved)						<0.010	NA	NA	NA	NA	NA						
Decant water discharge at base of T2 impoundment	DTD-09-0-0-SW (Total)	18.95	0.388	0.343	5.17	97	<0.010	0.0021	0.0091	0.0402	<0.00020	0.268	75.6	0.74	5.53	97.1	211	8.22
	DTD-09-0-0-SW (Dissolved)						<0.010	NA	NA	NA	NA	NA						
Wood pipe discharge at NE corner of mill building area	AD-12-0-SW (Total)	7.93	0.472	0.318	8.58	111	<0.010	<0.0020	0.0049	0.0087	<0.00020	0.0808	90.2	0.7	8.94	102	262	7.91
	AD-12-0-SW (Dissolved)						<0.010	NA	NA	NA	NA	NA						
Groundwater discharge from head cut of T3 Area incised channel	STR-11-0-SW (Total)	7.26	0.325	0.215	10.51	80	<0.010	0.0049	0.0106	0.187	<0.00020	0.595	69.1	0.68	4.18	49.9	190	7.83
	STR-11-0-SW (Dissolved)						<0.010	NA	NA	NA	NA	NA						
Dunkleberg Creek above waste rock dump	STR-13-0-SW (Total)	13.82	0.312	0.245	9.11	108	<0.010	<0.0020	<0.0030	<0.0050	<0.00020	0.108	6.1	0.69	2.91	40.6	167	8.3
	STR-13-0-SW (Dissolved)						<0.010	<0.0020	<0.0030	<0.00020	<0.0050	0.112						

NA = Not Analyzed for specified analyte

Bold = Exceeds one or more water quality standard

2004 MCS Environmental Soil Sampling.

Sample ID	Arsenic	Cadmium	Copper	Lead	Zinc	Mercury
All results in mg/kg						
Near Surface Tailings Composite Soil Samples						
T1-04-1.2-T	295	19.6	304	365	2,390	0.176
T2-05-1.5-T	302	3.47	204	633	940	NA
T2-06-1.5-T	311	43.8	412	5,870	4,440	NA
T3-10-1.5-T	539	63.1	584	5,830	5,950	0.2
Subsurface Tailings and Soil Grab Samples from Borings						
B1-17-10-T	139	65.8	639	506	7,030	NA
B1-18-20-T	231	40.5	664	4,790	4,140	NA
B1-19-30-S	38.1	6.58	99.4	353	1,110	NA
B3-22-10-T	540	70.4	573	853	7,930	NA
B3-23-20-T	266	36.2	391	2,300	4,460	NA
B3-24-40-T	367	50.9	449	3,780	5,420	NA
B3-25-50.5-S	44.0	8.49	333	700	1,030	NA
B3-29-49-T	243	32.3	428	6,000	3,320	NA
Waste Rock Dump Composite Soil Sample						
WRD1-16-1-WR	436	51.5	366	5,630	5,710	1.49
Stream Sediment Soil Samples						
STR-02-0.1-S	138	5.73	63.9	299	563	NA
STR-15-0.1-S	33.0	11.2	38.8	201	2,170	<0.0333

2010 Results

August 11, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine
Pace Project No.: 10134755

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on July 30, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine

Pace Project No.: 10134755

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302

California Certification #: 09268CA

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 11888

New York Certification #: 11888

North Carolina Certification #: 503

North Dakota Certification #: R-150

South Carolina Certification #: 83006001

US Dept of Agriculture #: S-76505

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

SAMPLE SUMMARY

Project: Forest Rose Mine

Pace Project No.: 10134755

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134755001	FR-DS-SW-T1	Water	07/28/10 09:50	07/30/10 10:05
10134755002	FR-DS-SW-T2	Water	07/28/10 11:00	07/30/10 10:05
10134755003	FR-DS-QC-T1	Water	07/28/10 11:00	07/30/10 10:05
10134755004	FR-AW-SW-T1	Water	07/28/10 12:00	07/30/10 10:05
10134755005	FIELD BLANK	Water	07/28/10 12:20	07/30/10 10:05
10134755006	FR-US-SW-T1	Water	07/28/10 13:20	07/30/10 10:05

REPORT OF LABORATORY ANALYSIS

Page 3 of 14

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SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134755

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134755001	FR-DS-SW-T1	EPA 1631E	GMW	1	PASI-G
10134755002	FR-DS-SW-T2	EPA 1631E	GMW	1	PASI-G
10134755003	FR-DS-QC-T1	EPA 1631E	GMW	1	PASI-G
10134755004	FR-AW-SW-T1	EPA 1631E	GMW	1	PASI-G
10134755005	FIELD BLANK	EPA 1631E	GMW	1	PASI-G
10134755006	FR-US-SW-T1	EPA 1631E	GMW	1	PASI-G

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine
Pace Project No.: 10134755

Method: EPA 1631E
Description: 1631E Mercury, Low Level
Client: Herrera Environmental Consultants
Date: August 11, 2010

General Information:

6 samples were analyzed for EPA 1631E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-DS-SW-T1		Lab ID: 10134755001	Collected: 07/28/10 09:50	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.00000056	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:19	7439-97-6	
	7							

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-DS-SW-T2	Lab ID: 10134755002	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.00000050 5	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:24	7439-97-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-DS-QC-T1		Lab ID: 10134755003	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.0000064 3	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:28	7439-97-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-AW-SW-T1		Lab ID: 10134755004	Collected: 07/28/10 12:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.0000079	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:55	7439-97-6	
	7							

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FIELD BLANK	Lab ID: 10134755005	Collected: 07/28/10 12:20	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.00000013 7J	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:11	7439-97-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-US-SW-T1		Lab ID: 10134755006	Collected: 07/28/10 13:20	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.00000112	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:59	7439-97-6	

QUALITY CONTROL DATA

Project: Forest Rose Mine
Pace Project No.: 10134755

QC Batch: CVFS/2146 Analysis Method: EPA 1631E
QC Batch Method: EPA 1631E Analysis Description: 1631E Mercury
Associated Lab Samples: 10134755001, 10134755002, 10134755003, 10134755004, 10134755005, 10134755006

METHOD BLANK: 338893 Matrix: Water
Associated Lab Samples: 10134755001, 10134755002, 10134755003, 10134755004, 10134755005, 10134755006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00000050	08/10/10 07:25	

METHOD BLANK: 338894 Matrix: Water
Associated Lab Samples: 10134755001, 10134755002, 10134755003, 10134755004, 10134755005, 10134755006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00000050	08/10/10 08:50	

METHOD BLANK: 338895 Matrix: Water
Associated Lab Samples: 10134755001, 10134755002, 10134755003, 10134755004, 10134755005, 10134755006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000000153J	0.00000050	08/10/10 10:14	

LABORATORY CONTROL SAMPLE & LCSD: 338896 338897

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Mercury	mg/L	.000005	0.000004	0.000004	98	99	79-121	2	24	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 338898 338899

Parameter	Units	4035003001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	2.02 ng/L	.00001	.00001	0.000012	0.000010	102	85	75-125	15	24	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 338900 338901

Parameter	Units	3515168001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00331 ug/L	.000005	.000005	0.000008	0.000007	96	93	75-125	2	24	

QUALIFIERS

Project: Forest Rose Mine

Pace Project No.: 10134755

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine

Pace Project No.: 10134755

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134755001	FR-DS-SW-T1	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755002	FR-DS-SW-T2	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755003	FR-DS-QC-T1	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755004	FR-AW-SW-T1	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755005	FIELD BLANK	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755006	FR-US-SW-T1	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147

August 12, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine
Pace Project No.: 10134832

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on July 30, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine

Pace Project No.: 10134832

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Idaho Certification #: MN00064

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nebraska Certification #: Pace

Nevada Certification #: MN_00064

New Jersey Certification #: MN-002

New Mexico Certification #: Pace

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: D9921

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Washington Certification #: C754

Wisconsin Certification #: 999407970

Montana Certification IDs

602 South 25th Street, Billings, MT 59101

EPA Region 8 Certification #: 8TMS-Q

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

NVLAP Certification #: 101292-0

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: Forest Rose Mine

Pace Project No.: 10134832

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134832001	FR-DS-SW-T1	Water	07/28/10 09:50	07/30/10 10:05
10134832002	FR-DS-SW-D1	Water	07/28/10 09:50	07/30/10 10:05
10134832003	FR-DS-SD-01	Solid	07/28/10 10:10	07/30/10 10:05
10134832004	FR-DS-SW-T2	Water	07/28/10 11:00	07/30/10 10:05
10134832005	FR-DS-SW-D2	Water	07/28/10 11:00	07/30/10 10:05
10134832006	FR-DS-SD-02	Solid	07/28/10 11:20	07/30/10 10:05
10134832007	FR-DS-QC-T1	Water	07/28/10 11:00	07/30/10 10:05
10134832008	FR-AW-SW-T1	Water	07/28/10 12:00	07/30/10 10:05
10134832009	FR-AW-SW-D1	Water	07/28/10 12:00	07/30/10 10:05
10134832010	FR-US-SW-T1	Water	07/28/10 13:20	07/30/10 10:05
10134832011	FR-US-SW-D1	Water	07/28/10 13:20	07/30/10 10:05
10134832012	FR-US-SD-01	Solid	07/28/10 13:30	07/30/10 10:05
10134832013	FR-BG-SS-02-00	Solid	07/28/10 14:25	07/30/10 10:05
10134832014	FR-DS-QC-D1	Water	07/28/10 11:00	07/30/10 10:05

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134832

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134832001	FR-DS-SW-T1	EPA 200.8	RJS	12	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
		SM 2320B	ACH	1	PASI-M
10134832002	FR-DS-SW-D1	EPA 200.8	RJS	1	PASI-M
10134832003	FR-DS-SD-01	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134832004	FR-DS-SW-T2	EPA 200.8	RJS	12	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
		SM 2320B	ACH	1	PASI-M
10134832005	FR-DS-SW-D2	EPA 200.8	RJS	1	PASI-M
10134832006	FR-DS-SD-02	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134832007	FR-DS-QC-T1	EPA 200.8	RJS	12	PASI-M
10134832008	FR-AW-SW-T1	EPA 200.8	RJS	12	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
		SM 2320B	ACH	1	PASI-M
10134832009	FR-AW-SW-D1	EPA 200.8	RJS	1	PASI-M
10134832010	FR-US-SW-T1	EPA 200.8	RJS	12	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
		SM 2320B	ACH	1	PASI-M
10134832011	FR-US-SW-D1	EPA 200.8	RJS	1	PASI-M
10134832012	FR-US-SD-01	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134832013	FR-BG-SS-02-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134832014	FR-DS-QC-D1	EPA 200.8	RJS	1	PASI-M

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

5 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 200.8

Description: 200.8 MET ICPMS, Dissolved

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

5 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21683

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134832003,10134857007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 832978)
 - Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Copper
 - Iron
 - Lead
 - Manganese
 - Nickel
 - Silver
 - Zinc
- MS (Lab ID: 832980)
 - Antimony

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 12, 2010

QC Batch: MPRP/21683

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134832003,10134857007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Arsenic
- Barium
- Copper
- Iron
- Lead
- Manganese
- Silver
- Zinc
- MSD (Lab ID: 832979)
 - Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Copper
 - Iron
 - Lead
 - Manganese
 - Nickel
 - Silver
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21683

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 832978)
 - Iron
 - Manganese
 - Zinc
 - Copper
 - Iron
 - Lead
 - Zinc
- MSD (Lab ID: 832979)
 - Iron
 - Manganese
 - Lead
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 7471

Description: 7471 Mercury

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: % Moisture

Description: Dry Weight

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: SM 2310

Description: 2310 Acidity

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for SM 2310. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated more than 15 minutes after sample collection.

- FR-AW-SW-T1 (Lab ID: 10134832008)
- FR-DS-SW-T1 (Lab ID: 10134832001)
- FR-DS-SW-T2 (Lab ID: 10134832004)
- FR-US-SW-T1 (Lab ID: 10134832010)

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: SM 2320B

Description: 2320B Alkalinity

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/19850

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134719003,10134736009

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 836276)
 - Alkalinity, Total as CaCO₃
- MSD (Lab ID: 836277)
 - Alkalinity, Total as CaCO₃

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SW-T1		Lab ID: 10134832001	Collected: 07/28/10 09:50	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	0.64 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-36-0	
Arsenic	0.59 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-38-2	
Barium	16.3 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:11	7440-39-3	
Cadmium	0.72 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:11	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-47-3	
Copper	1.7 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-50-8	
Iron	67.0 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:11	7439-89-6	
Lead	10.2 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:11	7439-92-1	
Manganese	21.5 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7439-96-5	
Nickel	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-22-4	
Zinc	91.7 ug/L		5.0	1	08/04/10 06:16	08/05/10 10:11	7440-66-6	
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		08/09/10 16:00		
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.9 Std. Units		0.10	1		08/03/10 10:00		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Total as CaCO3	170 mg/L		5.0	1		08/11/10 17:14		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SW-D1	Lab ID: 10134832002	Collected: 07/28/10 09:50	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	15.3	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:40	7429-90-5	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SD-01 **Lab ID: 10134832003** Collected: 07/28/10 10:10 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.2	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-36-0	
Arsenic	24.3	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-38-2	M1
Barium	65.4	mg/kg	0.32	20	08/06/10 15:22	08/10/10 15:59	7440-39-3	M1
Cadmium	6.6	mg/kg	0.085	20	08/06/10 15:22	08/10/10 15:59	7440-43-9	M1
Chromium	30.3	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-47-3	M1
Copper	69.0	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-50-8	M1
Iron	37100	mg/kg	267	100	08/06/10 15:22	08/10/10 16:12	7439-89-6	
Lead	448	mg/kg	2.7	100	08/06/10 15:22	08/10/10 16:12	7439-92-1	M1
Manganese	796	mg/kg	2.7	100	08/06/10 15:22	08/10/10 16:12	7439-96-5	
Nickel	41.1	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-02-0	M1
Silver	1.1	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-22-4	M1
Zinc	1160	mg/kg	26.7	100	08/06/10 15:22	08/10/10 16:12	7440-66-6	M1
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.023	mg/kg	0.022	1	08/04/10 16:29	08/06/10 08:06	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	18.6	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SW-T2	Lab ID: 10134832004	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	0.60 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:15	7440-36-0	
Arsenic	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:15	7440-38-2	
Barium	16.5 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:15	7440-39-3	
Cadmium	0.65 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:15	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:15	7440-47-3	
Copper	1.0 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:15	7440-50-8	
Iron	57.4 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:15	7439-89-6	
Lead	5.9 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:15	7439-92-1	
Manganese	11.9 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:15	7439-96-5	
Nickel	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:15	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:15	7440-22-4	
Zinc	76.0 ug/L		5.0	1	08/04/10 06:16	08/05/10 10:15	7440-66-6	
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		08/09/10 16:00		
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.6 Std. Units		0.10	1		08/03/10 10:00		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Total as CaCO3	170 mg/L		5.0	1		08/11/10 17:18		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SW-D2	Lab ID: 10134832005	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved					Analytical Method: EPA 200.8 Preparation Method: EPA 200.8			
Aluminum, Dissolved	13.8	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:57	7429-90-5	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SD-02 **Lab ID: 10134832006** Collected: 07/28/10 11:20 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.68	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-36-0	
Arsenic	14.5	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-38-2	
Barium	63.0	mg/kg	0.25	20	08/06/10 15:22	08/10/10 16:17	7440-39-3	
Cadmium	2.7	mg/kg	0.067	20	08/06/10 15:22	08/10/10 16:17	7440-43-9	
Chromium	27.9	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-47-3	
Copper	38.6	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-50-8	
Iron	33500	mg/kg	209	100	08/06/10 15:22	08/10/10 16:21	7439-89-6	
Lead	120	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7439-92-1	
Manganese	510	mg/kg	2.1	100	08/06/10 15:22	08/10/10 16:21	7439-96-5	
Nickel	37.3	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-02-0	
Silver	0.59	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-22-4	
Zinc	563	mg/kg	20.9	100	08/06/10 15:22	08/10/10 16:21	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	<0.020	mg/kg	0.020	1	08/04/10 16:29	08/06/10 08:13	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	15.6	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-QC-T1		Lab ID: 10134832007	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	0.57 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-36-0	
Arsenic	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-38-2	
Barium	16.3 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:20	7440-39-3	
Cadmium	0.65 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:20	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-47-3	
Copper	0.99 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-50-8	
Iron	<50.0 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:20	7439-89-6	
Lead	5.8 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:20	7439-92-1	
Manganese	11.5 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7439-96-5	
Nickel	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-22-4	
Zinc	75.6 ug/L		5.0	1	08/04/10 06:16	08/05/10 10:20	7440-66-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-AW-SW-T1		Lab ID: 10134832008	Collected: 07/28/10 12:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	1.1 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-36-0	
Arsenic	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-38-2	
Barium	20.5 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:24	7440-39-3	
Cadmium	6.1 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:24	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-47-3	
Copper	1.1 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-50-8	
Iron	<50.0 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:24	7439-89-6	
Lead	0.46 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:24	7439-92-1	
Manganese	4.2 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7439-96-5	
Nickel	2.1 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-22-4	
Zinc	1360 ug/L		50.0	10	08/04/10 06:16	08/09/10 12:21	7440-66-6	
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		08/09/10 16:00		
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.4 Std. Units		0.10	1		08/03/10 10:00		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Total as CaCO3	175 mg/L		5.0	1		08/11/10 17:22		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-AW-SW-D1	Lab ID: 10134832009	Collected: 07/28/10 12:00	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved								
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	12.0	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:44	7429-90-5	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-US-SW-T1	Lab ID: 10134832010	Collected: 07/28/10 13:20	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-36-0	
Arsenic	0.68 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-38-2	
Barium	10.5 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:28	7440-39-3	
Cadmium	0.98 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:28	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-47-3	
Copper	0.79 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-50-8	
Iron	117 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:28	7439-89-6	
Lead	2.1 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:28	7439-92-1	
Manganese	10.8 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7439-96-5	
Nickel	0.68 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-22-4	
Zinc	113 ug/L		5.0	1	08/04/10 06:16	08/05/10 10:28	7440-66-6	
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		08/09/10 16:00		
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.3 Std. Units		0.10	1		08/03/10 10:00		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Total as CaCO3	133 mg/L		5.0	1		08/11/10 17:34		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-US-SW-D1		Lab ID: 10134832011	Collected: 07/28/10 13:20	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	15.6	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:48	7429-90-5	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-US-SD-01 **Lab ID: 10134832012** Collected: 07/28/10 13:30 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	29.6	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-36-0	
Arsenic	36.2	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-38-2	
Barium	169	mg/kg	0.53	20	08/06/10 15:22	08/10/10 16:25	7440-39-3	
Cadmium	20.2	mg/kg	0.14	20	08/06/10 15:22	08/10/10 16:25	7440-43-9	
Chromium	21.0	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-47-3	
Copper	65.1	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-50-8	
Iron	35200	mg/kg	88.1	20	08/06/10 15:22	08/10/10 16:25	7439-89-6	
Lead	389	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7439-92-1	
Manganese	1220	mg/kg	4.4	100	08/06/10 15:22	08/10/10 16:30	7439-96-5	
Nickel	45.6	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-02-0	
Silver	2.1	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-22-4	
Zinc	2210	mg/kg	44.1	100	08/06/10 15:22	08/10/10 16:30	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.053	mg/kg	0.037	1	08/04/10 16:29	08/06/10 08:43	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	53.5	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-BG-SS-02-00 **Lab ID: 10134832013** Collected: 07/28/10 14:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.54	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-36-0	
Arsenic	19.3	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-38-2	
Barium	229	mg/kg	0.23	20	08/06/10 15:22	08/10/10 16:47	7440-39-3	
Cadmium	3.1	mg/kg	0.062	20	08/06/10 15:22	08/10/10 16:47	7440-43-9	
Chromium	25.9	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-47-3	
Copper	23.6	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-50-8	
Iron	27000	mg/kg	193	100	08/06/10 15:22	08/10/10 16:52	7439-89-6	
Lead	27.1	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7439-92-1	
Manganese	1430	mg/kg	1.9	100	08/06/10 15:22	08/10/10 16:52	7439-96-5	
Nickel	28.9	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-02-0	
Silver	<0.39	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-22-4	
Zinc	207	mg/kg	3.9	20	08/06/10 15:22	08/10/10 16:47	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.037	mg/kg	0.020	1	08/04/10 16:29	08/06/10 08:44	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	4.1	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-QC-D1	Lab ID: 10134832014	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved								
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	14.8	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:53	7429-90-5	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MPRP/21668

Analysis Method: EPA 200.8

QC Batch Method: EPA 200.8

Analysis Description: 200.8 MET

Associated Lab Samples: 10134832001, 10134832004, 10134832007, 10134832008, 10134832010

METHOD BLANK: 832225

Matrix: Water

Associated Lab Samples: 10134832001, 10134832004, 10134832007, 10134832008, 10134832010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.50	0.50	08/05/10 09:03	
Arsenic	ug/L	<0.50	0.50	08/05/10 09:03	
Barium	ug/L	<0.30	0.30	08/05/10 09:03	
Cadmium	ug/L	<0.080	0.080	08/05/10 09:03	
Chromium	ug/L	<0.50	0.50	08/05/10 09:03	
Copper	ug/L	<0.50	0.50	08/05/10 09:03	
Iron	ug/L	<50.0	50.0	08/05/10 09:03	
Lead	ug/L	<0.10	0.10	08/05/10 09:03	
Manganese	ug/L	<0.50	0.50	08/05/10 09:03	
Nickel	ug/L	<0.50	0.50	08/05/10 09:03	
Silver	ug/L	<0.50	0.50	08/05/10 09:03	
Zinc	ug/L	<5.0	5.0	08/05/10 09:03	

LABORATORY CONTROL SAMPLE: 832226

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	80	78.0	98	85-115	
Arsenic	ug/L	80	78.4	98	85-115	
Barium	ug/L	80	77.2	96	85-115	
Cadmium	ug/L	80	80.2	100	85-115	
Chromium	ug/L	80	79.7	100	85-115	
Copper	ug/L	80	82.4	103	85-115	
Iron	ug/L	1000	993	99	85-115	
Lead	ug/L	80	80.0	100	85-115	
Manganese	ug/L	80	78.6	98	85-115	
Nickel	ug/L	80	81.8	102	85-115	
Silver	ug/L	80	80.1	100	85-115	
Zinc	ug/L	80	81.0	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832227

832228

Parameter	Units	10134731001		MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	MS Result	MSD Result	MSD Result						
Antimony	ug/L	ND	80	80	81.0	85.0	101	106	70-130	5	20		
Arsenic	ug/L	4.0	80	80	86.1	90.0	103	107	70-130	4	20		
Barium	ug/L	34.5	80	80	116	120	102	107	70-130	4	20		
Cadmium	ug/L	1.2	80	80	84.3	87.1	104	107	70-130	3	20		
Chromium	ug/L	ND	80	80	83.8	85.6	104	106	70-130	2	20		
Copper	ug/L	0.054 mg/L	80	80	140	143	108	111	70-130	2	20		

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832227												832228	
Parameter	Units	10134731001		MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual	
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Iron	ug/L	111J	1000	1000	1140	1210	103	110	70-130	6	20		
Lead	ug/L	1.2	80	80	84.2	87.0	104	107	70-130	3	20		
Manganese	ug/L	159	80	80	247	254	110	119	70-130	3	20		
Nickel	ug/L	ND	80	80	85.6	86.8	107	108	70-130	1	20		
Silver	ug/L	ND	80	80	78.6	83.2	98	104	70-130	6	20		
Zinc	ug/L	309	80	80	401	411	115	128	70-130	3	20		

MATRIX SPIKE SAMPLE: 832229											
Parameter	Units	9274487001		Spike	MS	MS	% Rec	Qualifiers			
		Result	Conc.	Conc.	Result	% Rec	Limits				
Antimony	ug/L		ND	80	91.2	114	70-130				
Arsenic	ug/L		1.0	80	93.0	115	70-130				
Barium	ug/L		17.4	80	112	118	70-130				
Cadmium	ug/L		ND	80	95.6	120	70-130				
Chromium	ug/L		0.63	80	95.6	119	70-130				
Copper	ug/L		1.2	80	99.7	123	70-130				
Iron	ug/L		ND	1000	1230	120	70-130				
Lead	ug/L		ND	80	92.6	116	70-130				
Manganese	ug/L		12.9	80	108	118	70-130				
Nickel	ug/L		ND	80	98.0	122	70-130				
Silver	ug/L		ND	80	91.7	115	70-130				
Zinc	ug/L		ND	80	103	127	70-130				

QUALITY CONTROL DATA

Project: Forest Rose Mine
Pace Project No.: 10134832

QC Batch: MPRP/21702 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
Associated Lab Samples: 10134832002, 10134832005, 10134832009, 10134832011, 10134832014

METHOD BLANK: 833516 Matrix: Water
Associated Lab Samples: 10134832002, 10134832005, 10134832009, 10134832011, 10134832014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	<4.0	4.0	08/06/10 14:35	

LABORATORY CONTROL SAMPLE: 833517

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	80	79.0	99	85-115	

MATRIX SPIKE SAMPLE: 833518

Parameter	Units	10134832005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	13.8	80	102	110	70-130	

MATRIX SPIKE SAMPLE: 833519

Parameter	Units	3031732007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	ND	80	83.4	99	70-130	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MPRP/21683 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

METHOD BLANK: 832976 Matrix: Solid

Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	<0.42	0.42	08/11/10 09:13	
Arsenic	mg/kg	<0.42	0.42	08/11/10 09:13	
Barium	mg/kg	<0.25	0.25	08/11/10 09:13	
Cadmium	mg/kg	<0.068	0.068	08/11/10 09:13	
Chromium	mg/kg	<0.42	0.42	08/11/10 09:13	
Copper	mg/kg	<0.42	0.42	08/11/10 09:13	
Iron	mg/kg	<42.4	42.4	08/11/10 09:13	
Lead	mg/kg	<0.42	0.42	08/11/10 09:13	
Manganese	mg/kg	<0.42	0.42	08/11/10 09:13	
Nickel	mg/kg	<0.42	0.42	08/11/10 09:13	
Silver	mg/kg	<0.42	0.42	08/11/10 09:13	
Zinc	mg/kg	<4.2	4.2	08/11/10 09:13	

LABORATORY CONTROL SAMPLE: 832977

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	18.3	17.2	94	75-125	
Arsenic	mg/kg	18.3	16.9	92	75-125	
Barium	mg/kg	18.3	18.5	101	75-125	
Cadmium	mg/kg	18.3	17.2	94	75-125	
Chromium	mg/kg	18.3	17.6	96	75-125	
Copper	mg/kg	18.3	17.7	97	75-125	
Iron	mg/kg	229	224	98	75-125	
Lead	mg/kg	18.3	17.9	97	75-125	
Manganese	mg/kg	18.3	18.0	98	75-125	
Nickel	mg/kg	18.3	17.8	97	75-125	
Silver	mg/kg	18.3	18.0	98	75-125	
Zinc	mg/kg	18.3	17.7	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832978 832979

Parameter	Units	10134832003		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Antimony	mg/kg	1.2	21.5	19.3	22.7	20.9	100	102	75-125	8	20		
Arsenic	mg/kg	24.3	21.5	19.3	73.7	68.2	229	226	75-125	8	20	M1	
Barium	mg/kg	65.4	21.5	19.3	146	135	374	359	75-125	8	20	M1	
Cadmium	mg/kg	6.6	21.5	19.3	41.8	39.0	163	167	75-125	7	20	M1	
Chromium	mg/kg	30.3	21.5	19.3	68.5	64.2	177	175	75-125	7	20	M1	
Copper	mg/kg	69.0	21.5	19.3	141	129	332	309	75-125	9	20	M1	
Iron	mg/kg	37100	269	242	60700	56900	8750	8180	75-125	6	20	E,M1	

Date: 08/12/2010 04:41 PM

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832978												832979			
Parameter	Units	10134832003 Result	MS		MSD		MS		MSD		% Rec Limits	Max RPD	Qual		
			Spike Conc.	MSD Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec							
Lead	mg/kg	448	21.5	19.3	948	874	2320	2200	75-125	8	20	E,M1			
Manganese	mg/kg	796	21.5	19.3	1800	1680	4650	4570	75-125	7	20	E,M1			
Nickel	mg/kg	41.1	21.5	19.3	81.9	75.9	189	180	75-125	8	20	M1			
Silver	mg/kg	1.1	21.5	19.3	33.0	30.7	148	153	75-125	7	20	M1			
Zinc	mg/kg	1160	21.5	19.3	2160	1990	4650	4310	75-125	8	20	E,M1			

MATRIX SPIKE SAMPLE: 832980											
Parameter	Units	10134857007		Spike Conc.	MS		% Rec Limits	Qualifiers			
		Result	MSD Conc.		MS Result	MS % Rec					
Antimony	mg/kg		27.9	15.8	56.1	179	75-125	M1			
Arsenic	mg/kg		486	15.8	677	1210	75-125	M1			
Barium	mg/kg		27.3	15.8	69.2	266	75-125	M1			
Cadmium	mg/kg		5.0	15.8	22.2	110	75-125				
Chromium	mg/kg		4.6	15.8	20.7	102	75-125				
Copper	mg/kg		628	15.8	842	1360	75-125	E,M1			
Iron	mg/kg		46200	196	130000	42400	75-125	E,M1			
Lead	mg/kg		2640	15.8	8580	37800	75-125	E,M1			
Manganese	mg/kg		95.8	15.8	105	57	75-125	M1			
Nickel	mg/kg		5.7	15.8	21.6	101	75-125				
Silver	mg/kg		28.9	15.8	64.2	224	75-125	M1			
Zinc	mg/kg		1070	15.8	1180	655	75-125	E,M1			

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MERP/4688 Analysis Method: EPA 7471
 QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury
 Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

METHOD BLANK: 833324 Matrix: Solid
 Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.019	0.019	08/06/10 08:03	

LABORATORY CONTROL SAMPLE: 833325

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.43	0.44	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833326 833327

Parameter	Units	10134832003		833326		833327		% Rec Limits	Max RPD	Qual
		MS Result	MS Spike Conc.	MS Result	MS Spike Conc.	MS Result	MS Spike Conc.			
Mercury	mg/kg	0.023	.59	.53	0.61	0.54	99	98	80-120	12 20

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MPRP/21678

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

SAMPLE DUPLICATE: 832549

Parameter	Units	10134832003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	18.6	19.6	5	30	

SAMPLE DUPLICATE: 832550

Parameter	Units	10134857011 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	2.3	2.2	3	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MT/4653

Analysis Method: SM 2310

QC Batch Method: SM 2310

Analysis Description: 2310 Acidity

Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

METHOD BLANK: 835115

Matrix: Water

Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acidity	mg/L	<5.0	5.0	08/09/10 16:00	

SAMPLE DUPLICATE: 835116

Parameter	Units	10134832001 Result	Dup Result	RPD	Max RPD	Qualifiers
Acidity	mg/L	<5.0	<5.0		20	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MT/4618 Analysis Method: SM 4500-H+B

QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

LABORATORY CONTROL SAMPLE: 832020

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.1	102	98-102	H6

SAMPLE DUPLICATE: 832019

Parameter	Units	10134832001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.9	7.9	.1	3	H6

QUALITY CONTROL DATA

Project: Forest Rose Mine
Pace Project No.: 10134832

QC Batch: WET/19850 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

METHOD BLANK: 836271 Matrix: Water
Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<5.0	5.0	08/11/10 14:56	

LABORATORY CONTROL SAMPLE & LCSD: 836272 836273

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	43.0	43.1	107	108	90-110	.3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 836276 836277

Parameter	Units	10134736009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	226	40	40	257	252	78	64	80-120	2	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 836496 836497

Parameter	Units	10134719003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	8.1	40	40	42.2	48.8	85	102	80-120	15	30	

QUALIFIERS

Project: Forest Rose Mine

Pace Project No.: 10134832

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

H6 Analysis initiated more than 15 minutes after sample collection.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine
Pace Project No.: 10134832

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134832001	FR-DS-SW-T1	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832004	FR-DS-SW-T2	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832007	FR-DS-QC-T1	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832008	FR-AW-SW-T1	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832010	FR-US-SW-T1	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832002	FR-DS-SW-D1	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832005	FR-DS-SW-D2	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832009	FR-AW-SW-D1	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832011	FR-US-SW-D1	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832014	FR-DS-QC-D1	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832003	FR-DS-SD-01	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134832006	FR-DS-SD-02	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134832012	FR-US-SD-01	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134832013	FR-BG-SS-02-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134832003	FR-DS-SD-01	EPA 7471	MERP/4688	EPA 7471	MERC/5528
10134832006	FR-DS-SD-02	EPA 7471	MERP/4688	EPA 7471	MERC/5528
10134832012	FR-US-SD-01	EPA 7471	MERP/4688	EPA 7471	MERC/5528
10134832013	FR-BG-SS-02-00	EPA 7471	MERP/4688	EPA 7471	MERC/5528
10134832003	FR-DS-SD-01	% Moisture	MPRP/21678		
10134832006	FR-DS-SD-02	% Moisture	MPRP/21678		
10134832012	FR-US-SD-01	% Moisture	MPRP/21678		
10134832013	FR-BG-SS-02-00	% Moisture	MPRP/21678		
10134832001	FR-DS-SW-T1	SM 2310	MT/4653		
10134832004	FR-DS-SW-T2	SM 2310	MT/4653		
10134832008	FR-AW-SW-T1	SM 2310	MT/4653		
10134832010	FR-US-SW-T1	SM 2310	MT/4653		
10134832001	FR-DS-SW-T1	SM 4500-H+B	MT/4618		
10134832004	FR-DS-SW-T2	SM 4500-H+B	MT/4618		
10134832008	FR-AW-SW-T1	SM 4500-H+B	MT/4618		
10134832010	FR-US-SW-T1	SM 4500-H+B	MT/4618		
10134832001	FR-DS-SW-T1	SM 2320B	WET/19850		
10134832004	FR-DS-SW-T2	SM 2320B	WET/19850		
10134832008	FR-AW-SW-T1	SM 2320B	WET/19850		
10134832010	FR-US-SW-T1	SM 2320B	WET/19850		

August 25, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine
Pace Project No.: 10134857

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on July 30, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

Page 1 of 50

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CERTIFICATIONS

Project: Forest Rose Mine

Pace Project No.: 10134857

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Idaho Certification #: MN00064

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nebraska Certification #: Pace

Nevada Certification #: MN_00064

New Jersey Certification #: MN-002

New Mexico Certification #: Pace

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: D9921

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Washington Certification #: C754

Wisconsin Certification #: 999407970

Montana Certification IDs

602 South 25th Street, Billings, MT 59101

EPA Region 8 Certification #: 8TMS-Q

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

NVLAP Certification #: 101292-0

SAMPLE SUMMARY

Project: Forest Rose Mine

Pace Project No.: 10134857

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134857001	FR-T1-TB-01-00	Solid	07/27/10 09:20	07/30/10 10:05
10134857002	FR-T2-TB-01-00	Solid	07/27/10 09:45	07/30/10 10:05
10134857003	FR-T2-TB-02-00	Solid	07/27/10 10:05	07/30/10 10:05
10134857004	FR-T3-TB-01-00	Solid	07/27/10 10:15	07/30/10 10:05
10134857005	FR-T3-TB-02-00	Solid	07/27/10 10:30	07/30/10 10:05
10134857006	FR-WR-RB-01-00	Solid	07/27/10 12:10	07/30/10 10:05
10134857007	FR-WR-RB-02-00	Solid	07/27/10 12:25	07/30/10 10:05
10134857008	FR-AW-SS-04	Solid	07/27/10 12:55	07/30/10 10:05
10134857009	FR-AW-SS-03	Solid	07/27/10 13:15	07/30/10 10:05
10134857010	FR-AW-SS-01	Solid	07/27/10 13:35	07/30/10 10:05
10134857011	FR-AW-SS-02	Solid	07/27/10 13:50	07/30/10 10:05
10134857012	FR-AW-RS-02	Solid	07/27/10 14:20	07/30/10 10:05
10134857013	FR-AW-RS-01	Solid	07/27/10 15:30	07/30/10 10:05
10134857014	FR-WR-RB-03-00	Solid	07/27/10 15:50	07/30/10 10:05

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134857

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134857001	FR-T1-TB-01-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
10134857002	FR-T2-TB-01-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
10134857003	FR-T2-TB-02-00	USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
10134857004	FR-T3-TB-01-00	Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
10134857005	FR-T3-TB-02-00	Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine
Pace Project No.: 10134857

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
10134857006	FR-WR-RB-01-00	% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		Modified Sobek 7	KS1	1	PASI-MT		
		Modified Sobek 7	KS1	5	PASI-MT		
		Modified Sobek 7	KS1	4	PASI-MT		
		Modified Sobek 7	SC1	1	PASI-MT		
		USDA 26	KS1	1	PASI-MT		
		EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		Modified Sobek 7	KS1	1	PASI-MT		
		Modified Sobek 7	KS1	5	PASI-MT		
		Modified Sobek 7	KS1	4	PASI-MT		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	SC1	1	PASI-MT		
		USDA 26	KS1	1	PASI-MT		
		EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		Modified Sobek 7	KS1	1	PASI-MT		
		Modified Sobek 7	KS1	5	PASI-MT		
		Modified Sobek 7	KS1	4	PASI-MT		
		Modified Sobek 7	SC1	1	PASI-MT		
		10134857008	FR-AW-SS-04	USDA 26	KS1	1	PASI-MT
				EPA 6020	RJS	12	PASI-M
				EPA 7471	TEM	1	PASI-M
				% Moisture	JDL	1	PASI-M
10134857009	FR-AW-SS-03	EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
10134857010	FR-AW-SS-01	EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
10134857011	FR-AW-SS-02	EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134857

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134857012	FR-AW-RS-02	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134857013	FR-AW-RS-01	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134857014	FR-WR-RB-03-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

14 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21683

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134832003,10134857007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 832978)
 - Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Copper
 - Iron
 - Lead
 - Manganese
 - Nickel
 - Silver
 - Zinc
- MS (Lab ID: 832980)
 - Antimony

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

QC Batch: MPRP/21683

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134832003,10134857007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Arsenic
- Barium
- Copper
- Iron
- Lead
- Manganese
- Silver
- Zinc
- MSD (Lab ID: 832979)
 - Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Copper
 - Iron
 - Lead
 - Manganese
 - Nickel
 - Silver
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21683

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 832978)
 - Iron
 - Manganese
 - Zinc
 - Copper
 - Iron
 - Lead
 - Zinc
- MSD (Lab ID: 832979)
 - Iron
 - Manganese
 - Lead
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: EPA 7471

Description: 7471 Mercury

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

14 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/4702

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134857001,10134865005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 834879)
 - Mercury
- MSD (Lab ID: 834880)
 - Mercury

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: % Moisture

Description: Dry Weight

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

14 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: ASA 15-5 mod

Description: PSA Percent Sand,Silt,Clay

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for ASA 15-5 mod. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/4680

R1: RPD value was outside control limits.

- DUP (Lab ID: 836822)
- Sulfur, Hot Water Extractable

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: USDA 26

Description: Soil Moisture Content

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

7 samples were analyzed for USDA 26. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T1-TB-01-00 **Lab ID: 10134857001** Collected: 07/27/10 09:20 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	4.6	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-36-0	
Arsenic	445	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:00	7440-38-2	
Barium	29.6	mg/kg	0.29	20	08/06/10 15:22	08/10/10 16:56	7440-39-3	
Cadmium	1.4	mg/kg	0.077	20	08/06/10 15:22	08/10/10 16:56	7440-43-9	
Chromium	4.0	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-47-3	
Copper	215	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-50-8	
Iron	137000	mg/kg	478	200	08/06/10 15:22	08/11/10 09:21	7439-89-6	
Lead	657	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:00	7439-92-1	
Manganese	173	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7439-96-5	
Nickel	12.6	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-02-0	
Silver	8.7	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-22-4	
Zinc	1600	mg/kg	23.9	100	08/06/10 15:22	08/10/10 17:00	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.21	mg/kg	0.021	1	08/16/10 19:25	08/18/10 08:50	7439-97-6	M1
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	9.9	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	17.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	50	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	32.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	<0.5	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	0.741	% (w/w)	0.050	1		08/17/10 09:21		
Sulfur, HNO3 Extractable	0.130	% (w/w)	0.050	1		08/17/10 09:21		
Sulfur, Hot Water Extractable	2.21	% (w/w)	0.050	1		08/17/10 09:21		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 09:21		
Total Sulfur	3.09	% (w/w)	0.050	1		08/17/10 09:21		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-21	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	21	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	46	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	> 15.5	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	4.0	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T1-TB-01-00 **Lab ID: 10134857001** Collected: 07/27/10 09:20 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Analytical Method: USDA 26								
Soil Moisture Content	10.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T2-TB-01-00 **Lab ID: 10134857002** Collected: 07/27/10 09:45 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.8	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-36-0	
Arsenic	239	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-38-2	
Barium	13.6	mg/kg	0.29	20	08/06/10 15:22	08/10/10 17:05	7440-39-3	
Cadmium	3.1	mg/kg	0.077	20	08/06/10 15:22	08/10/10 17:05	7440-43-9	
Chromium	7.6	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-47-3	
Copper	728	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:09	7440-50-8	
Iron	164000	mg/kg	479	200	08/06/10 15:22	08/11/10 09:26	7439-89-6	
Lead	768	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:09	7439-92-1	
Manganese	551	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:09	7439-96-5	
Nickel	14.7	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-02-0	
Silver	6.4	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-22-4	
Zinc	1900	mg/kg	23.9	100	08/06/10 15:22	08/10/10 17:09	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.074	mg/kg	0.022	1	08/16/10 19:25	08/18/10 08:54	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	13.7	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	15	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	47.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	37.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	<0.5	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	0.435	% (w/w)	0.050	1		08/17/10 09:52		
Sulfur, HNO3 Extractable	0.150	% (w/w)	0.050	1		08/17/10 09:52		
Sulfur, Hot Water Extractable	2.92	% (w/w)	0.050	1		08/17/10 09:52		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 09:52		
Total Sulfur	3.51	% (w/w)	0.050	1		08/17/10 09:52		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-15	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	15	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	33	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	12	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	5.3	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T2-TB-01-00 **Lab ID: 10134857002** Collected: 07/27/10 09:45 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	15.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T2-TB-02-00 **Lab ID: 10134857003** Collected: 07/27/10 10:05 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	47.6	mg/kg	0.46	20	08/06/10 15:22	08/10/10 17:13	7440-36-0	
Arsenic	456	mg/kg	2.3	100	08/06/10 15:22	08/10/10 17:18	7440-38-2	
Barium	35.2	mg/kg	0.27	20	08/06/10 15:22	08/10/10 17:13	7440-39-3	
Cadmium	68.0	mg/kg	0.073	20	08/06/10 15:22	08/10/10 17:13	7440-43-9	
Chromium	4.0	mg/kg	0.46	20	08/06/10 15:22	08/10/10 17:13	7440-47-3	
Copper	567	mg/kg	2.3	100	08/06/10 15:22	08/10/10 17:18	7440-50-8	
Iron	54700	mg/kg	228	100	08/06/10 15:22	08/10/10 17:18	7439-89-6	
Lead	7850	mg/kg	22.8	1000	08/06/10 15:22	08/11/10 09:30	7439-92-1	
Manganese	2210	mg/kg	22.8	1000	08/06/10 15:22	08/11/10 09:30	7439-96-5	
Nickel	7.5	mg/kg	0.46	20	08/06/10 15:22	08/10/10 17:13	7440-02-0	
Silver	30.7	mg/kg	0.46	20	08/06/10 15:22	08/10/10 17:13	7440-22-4	
Zinc	7870	mg/kg	228	1000	08/06/10 15:22	08/11/10 09:30	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.39	mg/kg	0.022	1	08/16/10 19:25	08/18/10 08:55	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	18.9	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	13.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	15	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	71.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	600	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	4.84	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	1.61	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	3.69	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	450	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	150	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	190	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T2-TB-02-00 **Lab ID: 10134857003** Collected: 07/27/10 10:05 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	23.3	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T3-TB-01-00 **Lab ID: 10134857004** Collected: 07/27/10 10:15 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	21.7	mg/kg	0.38	20	08/06/10 15:22	08/10/10 17:22	7440-36-0	
Arsenic	355	mg/kg	1.9	100	08/06/10 15:22	08/10/10 17:26	7440-38-2	
Barium	32.1	mg/kg	0.23	20	08/06/10 15:22	08/10/10 17:22	7440-39-3	
Cadmium	75.9	mg/kg	0.061	20	08/06/10 15:22	08/10/10 17:22	7440-43-9	
Chromium	4.5	mg/kg	0.38	20	08/06/10 15:22	08/10/10 17:22	7440-47-3	
Copper	560	mg/kg	1.9	100	08/06/10 15:22	08/10/10 17:26	7440-50-8	
Iron	59200	mg/kg	192	100	08/06/10 15:22	08/10/10 17:26	7439-89-6	
Lead	4860	mg/kg	19.2	1000	08/06/10 15:22	08/11/10 09:34	7439-92-1	
Manganese	1860	mg/kg	19.2	1000	08/06/10 15:22	08/11/10 09:34	7439-96-5	
Nickel	10.2	mg/kg	0.38	20	08/06/10 15:22	08/10/10 17:22	7440-02-0	
Silver	19.1	mg/kg	0.38	20	08/06/10 15:22	08/10/10 17:22	7440-22-4	
Zinc	7450	mg/kg	192	1000	08/06/10 15:22	08/11/10 09:34	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.30	mg/kg	0.020	1	08/16/10 19:25	08/18/10 08:59	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	3.4	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	10	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	22.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	67.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	590	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	4.60	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	2.04	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	3.76	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	450	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	140	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	180	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T3-TB-01-00 **Lab ID: 10134857004** Collected: 07/27/10 10:15 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	3.5	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T3-TB-02-00 **Lab ID: 10134857005** Collected: 07/27/10 10:30 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	13.8	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-36-0	
Arsenic	370	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-38-2	
Barium	39.4	mg/kg	0.34	20	08/06/10 15:22	08/10/10 17:44	7440-39-3	
Cadmium	70.7	mg/kg	0.090	20	08/06/10 15:22	08/10/10 17:44	7440-43-9	
Chromium	4.5	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-47-3	
Copper	458	mg/kg	2.8	100	08/06/10 15:22	08/10/10 17:48	7440-50-8	
Iron	54000	mg/kg	282	100	08/06/10 15:22	08/10/10 17:48	7439-89-6	
Lead	5140	mg/kg	14.1	500	08/06/10 15:22	08/12/10 02:14	7439-92-1	
Manganese	2290	mg/kg	2.8	100	08/06/10 15:22	08/10/10 17:48	7439-96-5	
Nickel	21.2	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-02-0	
Silver	16.0	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-22-4	
Zinc	8130	mg/kg	141	500	08/06/10 15:22	08/12/10 02:14	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.16	mg/kg	0.023	1	08/16/10 19:25	08/18/10 09:01	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	20.8	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	11.3	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	37.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	51.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	530	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	4.75	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	1.52	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	3.03	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	380	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	150	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	190	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.5	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T3-TB-02-00 **Lab ID: 10134857005** Collected: 07/27/10 10:30 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	26.3	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-01-00 **Lab ID:** 10134857006 Collected: 07/27/10 12:10 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	9.4	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-36-0	
Arsenic	101	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-38-2	
Barium	59.8	mg/kg	0.30	20	08/06/10 15:22	08/10/10 17:52	7440-39-3	
Cadmium	5.2	mg/kg	0.080	20	08/06/10 15:22	08/10/10 17:52	7440-43-9	
Chromium	22.5	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-47-3	
Copper	249	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-50-8	
Iron	47700	mg/kg	250	100	08/06/10 15:22	08/10/10 17:57	7439-89-6	
Lead	4560	mg/kg	12.5	500	08/06/10 15:22	08/12/10 02:34	7439-92-1	
Manganese	813	mg/kg	2.5	100	08/06/10 15:22	08/10/10 17:57	7439-96-5	
Nickel	33.2	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-02-0	
Silver	9.7	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-22-4	
Zinc	1260	mg/kg	25.0	100	08/06/10 15:22	08/10/10 17:57	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.23	mg/kg	0.021	1	08/16/10 19:25	08/18/10 09:02	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	8.9	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	18.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	53.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	27.4	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	3.0	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/17/10 13:32		
Sulfur, HNO3 Extractable	0.114	% (w/w)	0.050	1		08/17/10 13:32		
Sulfur, Hot Water Extractable	0.0900	% (w/w)	0.050	1		08/17/10 13:32		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 13:32		
Total Sulfur	0.253	% (w/w)	0.050	1		08/17/10 13:32		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-1.7	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	4.8	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	13	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	5.3	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.2	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-01-00 **Lab ID: 10134857006** Collected: 07/27/10 12:10 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	9.8	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-02-00 **Lab ID: 10134857007** Collected: 07/27/10 12:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	27.9	mg/kg	2.1	100	08/06/10 15:22	08/11/10 10:05	7440-36-0	
Arsenic	486	mg/kg	2.1	100	08/06/10 15:22	08/11/10 10:05	7440-38-2	M1
Barium	27.3	mg/kg	1.2	100	08/06/10 15:22	08/11/10 10:05	7440-39-3	M1
Cadmium	5.0	mg/kg	0.33	100	08/06/10 15:22	08/11/10 10:05	7440-43-9	
Chromium	4.6	mg/kg	0.41	20	08/06/10 15:22	08/10/10 18:01	7440-47-3	
Copper	628	mg/kg	2.1	100	08/06/10 15:22	08/11/10 10:05	7440-50-8	
Iron	46200	mg/kg	1030	500	08/06/10 15:22	08/11/10 10:13	7439-89-6	
Lead	2640	mg/kg	10.3	500	08/06/10 15:22	08/11/10 10:13	7439-92-1	M1
Manganese	95.8	mg/kg	0.41	20	08/06/10 15:22	08/10/10 18:01	7439-96-5	M1
Nickel	5.7	mg/kg	0.41	20	08/06/10 15:22	08/10/10 18:01	7440-02-0	
Silver	28.9	mg/kg	2.1	100	08/06/10 15:22	08/11/10 10:05	7440-22-4	M1
Zinc	1070	mg/kg	20.5	100	08/06/10 15:22	08/11/10 10:05	7440-66-6	M1
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.90	mg/kg	0.021	1	08/16/10 19:25	08/18/10 09:03	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	9.8	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	12.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	52.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	35	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	<0.5	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	1.17	% (w/w)	0.050	1		08/17/10 13:51		
Sulfur, HNO3 Extractable	0.861	% (w/w)	0.050	1		08/17/10 13:51		
Sulfur, Hot Water Extractable	3.11	% (w/w)	0.050	1		08/17/10 13:51		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 13:51		
Total Sulfur	5.14	% (w/w)	0.050	1		08/17/10 13:51		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-54	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	54	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	87	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	> 15.5	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	3.8	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-02-00 **Lab ID: 10134857007** Collected: 07/27/10 12:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	10.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-SS-04 **Lab ID: 10134857008** Collected: 07/27/10 12:55 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.7	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-36-0	
Arsenic	39.7	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-38-2	
Barium	257	mg/kg	0.33	20	08/06/10 15:22	08/10/10 18:14	7440-39-3	
Cadmium	4.1	mg/kg	0.088	20	08/06/10 15:22	08/10/10 18:14	7440-43-9	
Chromium	17.7	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-47-3	
Copper	33.3	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-50-8	
Iron	22700	mg/kg	54.9	20	08/06/10 15:22	08/10/10 18:14	7439-89-6	
Lead	146	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7439-92-1	
Manganese	4170	mg/kg	5.5	200	08/06/10 15:22	08/11/10 09:47	7439-96-5	
Nickel	24.4	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-02-0	
Silver	5.3	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-22-4	
Zinc	248	mg/kg	5.5	20	08/06/10 15:22	08/10/10 18:14	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.13	mg/kg	0.024	1	08/16/10 19:25	08/18/10 09:05	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	22.8	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-SS-03 **Lab ID: 10134857009** Collected: 07/27/10 13:15 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	2.0	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-36-0	
Arsenic	35.6	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-38-2	
Barium	182	mg/kg	0.25	20	08/06/10 15:22	08/10/10 18:36	7440-39-3	
Cadmium	1.9	mg/kg	0.067	20	08/06/10 15:22	08/10/10 18:36	7440-43-9	
Chromium	23.8	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-47-3	
Copper	39.6	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-50-8	
Iron	23300	mg/kg	210	100	08/06/10 15:22	08/10/10 18:40	7439-89-6	
Lead	123	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7439-92-1	
Manganese	1050	mg/kg	2.1	100	08/06/10 15:22	08/10/10 18:40	7439-96-5	
Nickel	33.7	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-02-0	
Silver	0.55	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-22-4	
Zinc	254	mg/kg	4.2	20	08/06/10 15:22	08/10/10 18:36	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.076	mg/kg	0.021	1	08/16/10 19:25	08/18/10 09:06	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	6.2	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-SS-01 **Lab ID: 10134857010** Collected: 07/27/10 13:35 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.3	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-36-0	
Arsenic	29.0	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-38-2	
Barium	290	mg/kg	0.26	20	08/06/10 15:22	08/10/10 18:45	7440-39-3	
Cadmium	2.7	mg/kg	0.070	20	08/06/10 15:22	08/10/10 18:45	7440-43-9	
Chromium	20.5	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-47-3	
Copper	35.5	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-50-8	
Iron	23200	mg/kg	220	100	08/06/10 15:22	08/10/10 18:49	7439-89-6	
Lead	79.8	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7439-92-1	
Manganese	1300	mg/kg	2.2	100	08/06/10 15:22	08/10/10 18:49	7439-96-5	
Nickel	24.2	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-02-0	
Silver	0.48	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-22-4	
Zinc	269	mg/kg	4.4	20	08/06/10 15:22	08/10/10 18:45	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.045	mg/kg	0.021	1	08/16/10 19:25	08/18/10 09:08	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	8.4	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-SS-02 **Lab ID: 10134857011** Collected: 07/27/10 13:50 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.53	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-36-0	
Arsenic	14.2	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-38-2	
Barium	66.6	mg/kg	0.25	20	08/06/10 15:22	08/10/10 18:53	7440-39-3	
Cadmium	1.2	mg/kg	0.067	20	08/06/10 15:22	08/10/10 18:53	7440-43-9	
Chromium	27.8	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-47-3	
Copper	37.1	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-50-8	
Iron	32100	mg/kg	210	100	08/06/10 15:22	08/10/10 18:58	7439-89-6	
Lead	26.0	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7439-92-1	
Manganese	796	mg/kg	2.1	100	08/06/10 15:22	08/10/10 18:58	7439-96-5	
Nickel	37.1	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-02-0	
Silver	<0.42	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-22-4	
Zinc	131	mg/kg	4.2	20	08/06/10 15:22	08/10/10 18:53	7440-66-6	

7471 Mercury

Analytical Method: EPA 7471 Preparation Method: EPA 7471

Mercury	0.026	mg/kg	0.020	1	08/16/10 19:25	08/18/10 09:12	7439-97-6	
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Dry Weight

Analytical Method: % Moisture

Percent Moisture	2.3	%	0.10	1		08/03/10 00:00		
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ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-RS-02 **Lab ID: 10134857012** Collected: 07/27/10 14:20 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.89	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-36-0	
Arsenic	23.7	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-38-2	
Barium	112	mg/kg	0.25	20	08/06/10 15:22	08/10/10 19:02	7440-39-3	
Cadmium	4.2	mg/kg	0.067	20	08/06/10 15:22	08/10/10 19:02	7440-43-9	
Chromium	21.5	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-47-3	
Copper	48.6	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-50-8	
Iron	33000	mg/kg	209	100	08/06/10 15:22	08/10/10 19:06	7439-89-6	
Lead	76.9	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7439-92-1	
Manganese	773	mg/kg	2.1	100	08/06/10 15:22	08/10/10 19:06	7439-96-5	
Nickel	26.7	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-02-0	
Silver	<0.42	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-22-4	
Zinc	463	mg/kg	20.9	100	08/06/10 15:22	08/10/10 19:06	7440-66-6	

7471 Mercury

Analytical Method: EPA 7471 Preparation Method: EPA 7471

Mercury	0.038	mg/kg	0.019	1	08/16/10 19:25	08/18/10 09:13	7439-97-6	
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Dry Weight

Analytical Method: % Moisture

Percent Moisture	8.6	%	0.10	1		08/03/10 00:00		
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ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-RS-01 **Lab ID: 10134857013** Collected: 07/27/10 15:30 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	2.1	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-36-0	
Arsenic	25.7	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-38-2	
Barium	113	mg/kg	0.29	20	08/06/10 15:22	08/10/10 19:24	7440-39-3	
Cadmium	2.5	mg/kg	0.077	20	08/06/10 15:22	08/10/10 19:24	7440-43-9	
Chromium	26.3	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-47-3	
Copper	60.6	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-50-8	
Iron	30200	mg/kg	241	100	08/06/10 15:22	08/10/10 19:28	7439-89-6	
Lead	141	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7439-92-1	
Manganese	748	mg/kg	2.4	100	08/06/10 15:22	08/10/10 19:28	7439-96-5	
Nickel	35.0	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-02-0	
Silver	1.0	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-22-4	
Zinc	352	mg/kg	4.8	20	08/06/10 15:22	08/10/10 19:24	7440-66-6	

7471 Mercury

Analytical Method: EPA 7471 Preparation Method: EPA 7471

Mercury	0.13	mg/kg	0.019	1	08/16/10 19:25	08/18/10 09:15	7439-97-6	
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Dry Weight

Analytical Method: % Moisture

Percent Moisture	9.8	%	0.10	1		08/03/10 00:00		
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ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-03-00 **Lab ID: 10134857014** Collected: 07/27/10 15:50 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	10.3	mg/kg	2.0	100	08/06/10 15:22	08/10/10 19:37	7440-36-0	
Arsenic	319	mg/kg	2.0	100	08/06/10 15:22	08/10/10 19:37	7440-38-2	
Barium	21.1	mg/kg	1.2	100	08/06/10 15:22	08/10/10 19:37	7440-39-3	
Cadmium	18.9	mg/kg	0.32	100	08/06/10 15:22	08/10/10 19:37	7440-43-9	
Chromium	12.4	mg/kg	0.40	20	08/06/10 15:22	08/10/10 19:32	7440-47-3	
Copper	259	mg/kg	0.40	20	08/06/10 15:22	08/10/10 19:32	7440-50-8	
Iron	123000	mg/kg	997	500	08/06/10 15:22	08/12/10 02:38	7439-89-6	
Lead	2610	mg/kg	10	500	08/06/10 15:22	08/12/10 02:38	7439-92-1	
Manganese	529	mg/kg	2.0	100	08/06/10 15:22	08/10/10 19:37	7439-96-5	
Nickel	33.7	mg/kg	0.40	20	08/06/10 15:22	08/10/10 19:32	7440-02-0	
Silver	19.5	mg/kg	2.0	100	08/06/10 15:22	08/10/10 19:37	7440-22-4	
Zinc	2960	mg/kg	99.7	500	08/06/10 15:22	08/12/10 02:38	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.42	mg/kg	0.020	1	08/16/10 19:25	08/18/10 09:16	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	5.0	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	22.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	61.3	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	16.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy clay loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	23	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/17/10 14:06		
Sulfur, HNO3 Extractable	1.32	% (w/w)	0.050	1		08/17/10 14:06		
Sulfur, Hot Water Extractable	1.14	% (w/w)	0.050	1		08/17/10 14:06		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 14:06		
Total Sulfur	2.34	% (w/w)	0.050	1		08/17/10 14:06		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-18	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	41	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	54	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	2.4	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-03-00 **Lab ID: 10134857014** Collected: 07/27/10 15:50 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	5.2	%	0.10	1		08/17/10 09:45		

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch: MPRP/21683 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857008

METHOD BLANK: 832976 Matrix: Solid
 Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857008, 10134857009, 10134857010, 10134857011, 10134857012, 10134857013, 10134857014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	<0.42	0.42	08/11/10 09:13	
Arsenic	mg/kg	<0.42	0.42	08/11/10 09:13	
Barium	mg/kg	<0.25	0.25	08/11/10 09:13	
Cadmium	mg/kg	<0.068	0.068	08/11/10 09:13	
Chromium	mg/kg	<0.42	0.42	08/11/10 09:13	
Copper	mg/kg	<0.42	0.42	08/11/10 09:13	
Iron	mg/kg	<42.4	42.4	08/11/10 09:13	
Lead	mg/kg	<0.42	0.42	08/11/10 09:13	
Manganese	mg/kg	<0.42	0.42	08/11/10 09:13	
Nickel	mg/kg	<0.42	0.42	08/11/10 09:13	
Silver	mg/kg	<0.42	0.42	08/11/10 09:13	
Zinc	mg/kg	<4.2	4.2	08/11/10 09:13	

LABORATORY CONTROL SAMPLE: 832977

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	18.3	17.2	94	75-125	
Arsenic	mg/kg	18.3	16.9	92	75-125	
Barium	mg/kg	18.3	18.5	101	75-125	
Cadmium	mg/kg	18.3	17.2	94	75-125	
Chromium	mg/kg	18.3	17.6	96	75-125	
Copper	mg/kg	18.3	17.7	97	75-125	
Iron	mg/kg	229	224	98	75-125	
Lead	mg/kg	18.3	17.9	97	75-125	
Manganese	mg/kg	18.3	18.0	98	75-125	
Nickel	mg/kg	18.3	17.8	97	75-125	
Silver	mg/kg	18.3	18.0	98	75-125	
Zinc	mg/kg	18.3	17.7	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832978 832979

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		10134832003 Result	Spike Conc.	Spike Conc.	MS Result							MSD Result
Antimony	mg/kg	1.2	21.5	19.3	22.7	20.9	100	102	75-125	8	20	
Arsenic	mg/kg	24.3	21.5	19.3	73.7	68.2	229	226	75-125	8	20	M1
Barium	mg/kg	65.4	21.5	19.3	146	135	374	359	75-125	8	20	M1
Cadmium	mg/kg	6.6	21.5	19.3	41.8	39.0	163	167	75-125	7	20	M1
Chromium	mg/kg	30.3	21.5	19.3	68.5	64.2	177	175	75-125	7	20	M1

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832978												832979			
Parameter	Units	10134832003 Result	MS		MSD		MS		MSD		% Rec Limits	Max RPD	Qual		
			Spike Conc.	MS Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec							
Copper	mg/kg	69.0	21.5	19.3	141	129	332	309	75-125	9	20	M1			
Iron	mg/kg	37100	269	242	60700	56900	8750	8180	75-125	6	20	E,M1			
Lead	mg/kg	448	21.5	19.3	948	874	2320	2200	75-125	8	20	E,M1			
Manganese	mg/kg	796	21.5	19.3	1800	1680	4650	4570	75-125	7	20	E,M1			
Nickel	mg/kg	41.1	21.5	19.3	81.9	75.9	189	180	75-125	8	20	M1			
Silver	mg/kg	1.1	21.5	19.3	33.0	30.7	148	153	75-125	7	20	M1			
Zinc	mg/kg	1160	21.5	19.3	2160	1990	4650	4310	75-125	8	20	E,M1			

MATRIX SPIKE SAMPLE: 832980											
Parameter	Units	10134857007		Spike Conc.	MS		% Rec Limits	Qualifiers			
		Result	MS Conc.		MS Result	MS % Rec					
Antimony	mg/kg		27.9	15.8	56.1	179	75-125	M1			
Arsenic	mg/kg		486	15.8	677	1210	75-125	M1			
Barium	mg/kg		27.3	15.8	69.2	266	75-125	M1			
Cadmium	mg/kg		5.0	15.8	22.2	110	75-125				
Chromium	mg/kg		4.6	15.8	20.7	102	75-125				
Copper	mg/kg		628	15.8	842	1360	75-125	E,M1			
Iron	mg/kg		46200	196	130000	42400	75-125	E,M1			
Lead	mg/kg		2640	15.8	8580	37800	75-125	E,M1			
Manganese	mg/kg		95.8	15.8	105	57	75-125	M1			
Nickel	mg/kg		5.7	15.8	21.6	101	75-125				
Silver	mg/kg		28.9	15.8	64.2	224	75-125	M1			
Zinc	mg/kg		1070	15.8	1180	655	75-125	E,M1			

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch: MERP/4702 Analysis Method: EPA 7471
 QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury
 Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857008, 10134857009, 10134857010, 10134857011, 10134857012, 10134857013, 10134857014

METHOD BLANK: 834877 Matrix: Solid
 Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857008, 10134857009, 10134857010, 10134857011, 10134857012, 10134857013, 10134857014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.017	0.017	08/18/10 08:47	

LABORATORY CONTROL SAMPLE: 834878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.43	0.46	108	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 834879 834880

Parameter	Units	10134857001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.21	.52	.5	0.86	0.85	124	125	80-120	2	20	M1

MATRIX SPIKE SAMPLE: 838021

Parameter	Units	10134865005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.054	.52	0.67	117	80-120	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch: MPRP/21679

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10134857012, 10134857013, 10134857014

SAMPLE DUPLICATE: 832646

Parameter	Units	10134857012 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	8.6	10.0	16	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch:	MT/4692	Analysis Method:	Modified Sobek 7
QC Batch Method:	Modified Sobek 7	Analysis Description:	Sobek Acid Base Potential
Associated Lab Samples:	10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857014		

SAMPLE DUPLICATE: 838119

Parameter	Units	10134857002 Result	Dup Result	RPD	Max RPD	Qualifiers
Neutralization Potential	tons/1000	<0.5	<0.5			

SAMPLE DUPLICATE: 838120

Parameter	Units	10134984010 Result	Dup Result	RPD	Max RPD	Qualifiers
Neutralization Potential	tons/1000	330	330			

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch: MTPR/1490

Analysis Method: USDA 26

QC Batch Method: USDA 26

Analysis Description: Soil Moisture Content

Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857014

SAMPLE DUPLICATE: 838624

Parameter	Units	10134984011 Result	Dup Result	RPD	Max RPD	Qualifiers
Soil Moisture Content	%	8.9	9.7	9	30	

QUALIFIERS

Project: Forest Rose Mine

Pace Project No.: 10134857

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

R1 RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine

Pace Project No.: 10134857

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134857001	FR-T1-TB-01-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857002	FR-T2-TB-01-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857003	FR-T2-TB-02-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857004	FR-T3-TB-01-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857005	FR-T3-TB-02-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857006	FR-WR-RB-01-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857007	FR-WR-RB-02-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857008	FR-AW-SS-04	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857009	FR-AW-SS-03	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857010	FR-AW-SS-01	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857011	FR-AW-SS-02	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857012	FR-AW-RS-02	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857013	FR-AW-RS-01	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857014	FR-WR-RB-03-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857001	FR-T1-TB-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857002	FR-T2-TB-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857003	FR-T2-TB-02-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857004	FR-T3-TB-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857005	FR-T3-TB-02-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857006	FR-WR-RB-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857007	FR-WR-RB-02-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857008	FR-AW-SS-04	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857009	FR-AW-SS-03	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857010	FR-AW-SS-01	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857011	FR-AW-SS-02	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857012	FR-AW-RS-02	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857013	FR-AW-RS-01	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857014	FR-WR-RB-03-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857001	FR-T1-TB-01-00	% Moisture	MPRP/21678		
10134857002	FR-T2-TB-01-00	% Moisture	MPRP/21678		
10134857003	FR-T2-TB-02-00	% Moisture	MPRP/21678		
10134857004	FR-T3-TB-01-00	% Moisture	MPRP/21678		
10134857005	FR-T3-TB-02-00	% Moisture	MPRP/21678		
10134857006	FR-WR-RB-01-00	% Moisture	MPRP/21678		
10134857007	FR-WR-RB-02-00	% Moisture	MPRP/21678		
10134857008	FR-AW-SS-04	% Moisture	MPRP/21678		
10134857009	FR-AW-SS-03	% Moisture	MPRP/21678		
10134857010	FR-AW-SS-01	% Moisture	MPRP/21678		
10134857011	FR-AW-SS-02	% Moisture	MPRP/21678		
10134857012	FR-AW-RS-02	% Moisture	MPRP/21679		
10134857013	FR-AW-RS-01	% Moisture	MPRP/21679		
10134857014	FR-WR-RB-03-00	% Moisture	MPRP/21679		
10134857001	FR-T1-TB-01-00	ASA 15-5 mod	MT/4669		
10134857002	FR-T2-TB-01-00	ASA 15-5 mod	MT/4669		
10134857003	FR-T2-TB-02-00	ASA 15-5 mod	MT/4669		
10134857004	FR-T3-TB-01-00	ASA 15-5 mod	MT/4669		
10134857005	FR-T3-TB-02-00	ASA 15-5 mod	MT/4669		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine
Pace Project No.: 10134857

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134857006	FR-WR-RB-01-00	ASA 15-5 mod	MT/4669		
10134857007	FR-WR-RB-02-00	ASA 15-5 mod	MT/4669		
10134857014	FR-WR-RB-03-00	ASA 15-5 mod	MT/4669		
10134857001	FR-T1-TB-01-00	Modified Sobek 7	MT/4692		
10134857002	FR-T2-TB-01-00	Modified Sobek 7	MT/4692		
10134857003	FR-T2-TB-02-00	Modified Sobek 7	MT/4692		
10134857004	FR-T3-TB-01-00	Modified Sobek 7	MT/4692		
10134857005	FR-T3-TB-02-00	Modified Sobek 7	MT/4692		
10134857006	FR-WR-RB-01-00	Modified Sobek 7	MT/4692		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	MT/4692		
10134857014	FR-WR-RB-03-00	Modified Sobek 7	MT/4692		
10134857001	FR-T1-TB-01-00	Modified Sobek 7	MT/4680		
10134857002	FR-T2-TB-01-00	Modified Sobek 7	MT/4680		
10134857003	FR-T2-TB-02-00	Modified Sobek 7	MT/4680		
10134857004	FR-T3-TB-01-00	Modified Sobek 7	MT/4680		
10134857005	FR-T3-TB-02-00	Modified Sobek 7	MT/4680		
10134857006	FR-WR-RB-01-00	Modified Sobek 7	MT/4680		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	MT/4680		
10134857014	FR-WR-RB-03-00	Modified Sobek 7	MT/4680		
10134857001	FR-T1-TB-01-00	Modified Sobek 7	MT/4722		
10134857002	FR-T2-TB-01-00	Modified Sobek 7	MT/4722		
10134857003	FR-T2-TB-02-00	Modified Sobek 7	MT/4722		
10134857004	FR-T3-TB-01-00	Modified Sobek 7	MT/4722		
10134857005	FR-T3-TB-02-00	Modified Sobek 7	MT/4722		
10134857006	FR-WR-RB-01-00	Modified Sobek 7	MT/4722		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	MT/4722		
10134857014	FR-WR-RB-03-00	Modified Sobek 7	MT/4722		
10134857001	FR-T1-TB-01-00	Modified Sobek 7	MT/4633		
10134857002	FR-T2-TB-01-00	Modified Sobek 7	MT/4633		
10134857003	FR-T2-TB-02-00	Modified Sobek 7	MT/4633		
10134857004	FR-T3-TB-01-00	Modified Sobek 7	MT/4633		
10134857005	FR-T3-TB-02-00	Modified Sobek 7	MT/4633		
10134857006	FR-WR-RB-01-00	Modified Sobek 7	MT/4633		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	MT/4633		
10134857014	FR-WR-RB-03-00	Modified Sobek 7	MT/4633		
10134857002	FR-T2-TB-01-00	USDA 26	MTPR/1490		
10134857003	FR-T2-TB-02-00	USDA 26	MTPR/1490		
10134857004	FR-T3-TB-01-00	USDA 26	MTPR/1490		
10134857005	FR-T3-TB-02-00	USDA 26	MTPR/1490		
10134857006	FR-WR-RB-01-00	USDA 26	MTPR/1490		
10134857007	FR-WR-RB-02-00	USDA 26	MTPR/1490		
10134857014	FR-WR-RB-03-00	USDA 26	MTPR/1490		

August 23, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine
Pace Project No.: 10134865

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on July 30, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine

Pace Project No.: 10134865

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Idaho Certification #: MN00064

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nebraska Certification #: Pace

Nevada Certification #: MN_00064

New Jersey Certification #: MN-002

New Mexico Certification #: Pace

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: D9921

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Washington Certification #: C754

Wisconsin Certification #: 999407970

Montana Certification IDs

602 South 25th Street, Billings, MT 59101

EPA Region 8 Certification #: 8TMS-Q

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

NVLAP Certification #: 101292-0

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

A2LA Certification #: 2456.01

Arkansas Certification #: 05-008-0

Illinois Certification #: 001191

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407-08-TX

Utah Certification #: 9135995665

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134865001	FR-RY-SS-03-00	Solid	07/26/10 14:00	07/30/10 10:05
10134865002	FR-RY-SS-02-00	Solid	07/26/10 14:25	07/30/10 10:05
10134865003	FR-RY-SS-01-00	Solid	07/26/10 14:55	07/30/10 10:05
10134865004	FR-RY-WELL-01-00	Solid	07/26/10 15:40	07/30/10 10:05
10134865005	FR-BG-SS-01-00	Solid	07/26/10 16:40	07/30/10 10:05

REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, Inc..

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
10134865001	FR-RY-SS-03-00	CLPICPAES	IP	1	PASI-M		
		EPA 9081	JDH	1	PASI-K		
		EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 33-3.2/EPA 353.2	CAC	1	PASI-MT		
		ASA 29-3.5.2	KS1	1	PASI-MT		
		ASA 10-3.2	SC1	1	PASI-MT		
		ASA 15-5 mod	KS1	4	PASI-MT		
		ASA 24-5.4/SM4500	JH1	1	PASI-MT		
		Modified Sobek 7	SA1	1	PASI-MT		
		Modified Sobek 7	SC1	1	PASI-MT		
		ASA 10-3.3	CAC	1	PASI-MT		
		USDA 26	KS1	1	PASI-MT		
		10134865002	FR-RY-SS-02-00	CLPICPAES	IP	1	PASI-M
				EPA 9081	JDH	1	PASI-K
EPA 6020	RJS			12	PASI-M		
EPA 7471	TEM			1	PASI-M		
% Moisture	JDL			1	PASI-M		
ASA 33-3.2/EPA 353.2	CAC			1	PASI-MT		
ASA 29-3.5.2	KS1			1	PASI-MT		
ASA 10-3.2	SC1			1	PASI-MT		
ASA 15-5 mod	KS1			4	PASI-MT		
ASA 24-5.4/SM4500	JH1			1	PASI-MT		
Modified Sobek 7	SA1			1	PASI-MT		
Modified Sobek 7	SC1			1	PASI-MT		
ASA 10-3.3	CAC			1	PASI-MT		
USDA 26	KS1			1	PASI-MT		
10134865003	FR-RY-SS-01-00			CLPICPAES	IP	1	PASI-M
				EPA 9081	JDH	1	PASI-K
		EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 33-3.2/EPA 353.2	CAC	1	PASI-MT		
		ASA 29-3.5.2	KS1	1	PASI-MT		
		ASA 10-3.2	SC1	1	PASI-MT		
		ASA 15-5 mod	KS1	4	PASI-MT		

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASA 24-5.4/SM4500	JH1	1	PASI-MT
		Modified Sobek 7	SA1	1	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		ASA 10-3.3	CAC	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
10134865004	FR-RY-WELL-01-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134865005	FR-BG-SS-01-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: CLPICPAES

Description: 6010 MET ICP, MDEQ Potassium

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for CLPICPAES. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with ASA 13-3.5.2.2 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: EPA 9081

Description: Cation Exchange Capacity

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for EPA 9081. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

5 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21704

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134865001,10134984007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 833527)
 - Antimony
 - Arsenic
 - Barium
 - Chromium
 - Copper
 - Iron
 - Manganese
 - Nickel
 - Zinc
- MS (Lab ID: 833529)
 - Antimony
 - Arsenic
 - Copper

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 23, 2010

QC Batch: MPRP/21704

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134865001,10134984007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Iron
- Lead
- Manganese
- Silver
- Zinc
- MSD (Lab ID: 833528)
 - Antimony
 - Arsenic
 - Barium
 - Chromium
 - Copper
 - Iron
 - Manganese
 - Nickel
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21704

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 833529)
 - Manganese
 - Lead
 - Zinc

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: EPA 7471

Description: 7471 Mercury

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

5 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/4702

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134857001,10134865005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 834879)
 - Mercury
- MSD (Lab ID: 834880)
 - Mercury

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: % Moisture

Description: Dry Weight

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

5 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 33-3.2/EPA 353.2

Description: 353.2 Nitrate + Nitrite pres.

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 33-3.2/EPA 353.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 29-3.5.2

Description: Organic Matter MT ASA 29

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 29-3.5.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 10-3.2

Description: ASA 10-3.2 pH

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 10-3.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 15-5 mod

Description: PSA Percent Sand,Silt,Clay

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 15-5 mod. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 24-5.4/SM4500

Description: SM4500P-E, Total Phosphorus

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 24-5.4/SM4500. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 10-3.3

Description: ASA10-3.3 Specific Conductance

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 10-3.3. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: USDA 26

Description: Soil Moisture Content

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for USDA 26. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-03-00 **Lab ID: 10134865001** Collected: 07/26/10 14:00 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, MDEQ Potassium Analytical Method: CLPICPAES Preparation Method: ASA 13-3.5.2.2								
Potassium	140	mg/kg		124	5	08/17/10 12:43	08/17/10 14:57	7440-09-7
Cation Exchange Capacity Analytical Method: EPA 9081								
Cation Exchange Capacity	47.5	meq/100g		0.99	10	08/13/10 13:30	08/17/10 13:28	
6020 MET ICPMS Analytical Method: EPA 6020 Preparation Method: EPA 3050								
Antimony	<0.53	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-36-0 M1
Arsenic	17.7	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-38-2 M1
Barium	248	mg/kg		0.32	20	08/11/10 13:15	08/16/10 21:14	7440-39-3 M1
Cadmium	0.25	mg/kg		0.084	20	08/11/10 13:15	08/16/10 21:14	7440-43-9
Chromium	111	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-47-3 M1
Copper	50.1	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-50-8 M1
Iron	30900	mg/kg		263	100	08/11/10 13:15	08/16/10 21:27	7439-89-6 M1
Lead	8.2	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7439-92-1
Manganese	674	mg/kg		2.6	100	08/11/10 13:15	08/16/10 21:27	7439-96-5 M1
Nickel	97.3	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-02-0 M1
Silver	<0.53	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-22-4
Zinc	68.0	mg/kg		5.3	20	08/11/10 13:15	08/16/10 21:14	7440-66-6 M1
7471 Mercury Analytical Method: EPA 7471 Preparation Method: EPA 7471								
Mercury	0.026	mg/kg		0.020	1	08/16/10 19:25	08/18/10 09:17	7439-97-6
Dry Weight Analytical Method: % Moisture								
Percent Moisture	6.7	%		0.10	1		08/03/10 00:00	
353.2 Nitrate + Nitrite pres. Analytical Method: ASA 33-3.2/EPA 353.2								
Available Nitrate	<5.0	mg/kg		5.0	1		08/19/10 14:26	
Organic Matter MT ASA 29 Analytical Method: ASA 29-3.5.2								
Organic Matter	8.0	% (w/w)		0.10	1		08/20/10 15:00	
ASA 10-3.2 pH Analytical Method: ASA 10-3.2								
pH, Saturated Paste	7.2	Std. Units		0.10	1		08/11/10 13:00	
PSA Percent Sand,Silt,Clay Analytical Method: ASA 15-5 mod								
Percent Clay	16.3	% (w/w)		0.10	1		08/12/10 08:29	
Percent Sand	63.8	% (w/w)		0.10	1		08/12/10 08:29	
Percent Silt	19.9	% (w/w)		0.10	1		08/12/10 08:29	
Texture	sandy loam				1		08/12/10 08:29	
SM4500P-E, Total Phosphorus Analytical Method: ASA 24-5.4/SM4500								
Available Phosphorus	6.6	mg/kg		4.0	4		08/19/10 15:00	7723-14-0

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-03-00 **Lab ID: 10134865001** Collected: 07/26/10 14:00 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sobek Calculations		Analytical Method: Modified Sobek 7						
SMP Lime Requirement	5.3	tons/1000	0.0	1		08/10/10 11:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.2	Std. Units	0.10	1		08/10/10 11:30		
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3						
Sp. Conductance Saturated Paste	0.19	mmhos/cm	0.010	1		08/19/10 19:46		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	7.2	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-02-00 **Lab ID: 10134865002** Collected: 07/26/10 14:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, MDEQ Potassium Analytical Method: CLPICPAES Preparation Method: ASA 13-3.5.2.2								
Potassium	140	mg/kg		123	5	08/17/10 12:43	08/17/10 15:07	7440-09-7
Cation Exchange Capacity Analytical Method: EPA 9081								
Cation Exchange Capacity	35.6	meq/100g		1.0	10	08/13/10 13:30	08/17/10 13:35	
6020 MET ICPMS Analytical Method: EPA 6020 Preparation Method: EPA 3050								
Antimony	<0.46	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-36-0
Arsenic	7.0	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-38-2
Barium	304	mg/kg		0.28	20	08/11/10 13:15	08/16/10 21:32	7440-39-3
Cadmium	0.27	mg/kg		0.073	20	08/11/10 13:15	08/16/10 21:32	7440-43-9
Chromium	95.9	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-47-3
Copper	51.5	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-50-8
Iron	40800	mg/kg		230	100	08/11/10 13:15	08/16/10 21:36	7439-89-6
Lead	8.2	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7439-92-1
Manganese	717	mg/kg		2.3	100	08/11/10 13:15	08/16/10 21:36	7439-96-5
Nickel	98.2	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-02-0
Silver	<0.46	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-22-4
Zinc	62.6	mg/kg		4.6	20	08/11/10 13:15	08/16/10 21:32	7440-66-6
7471 Mercury Analytical Method: EPA 7471 Preparation Method: EPA 7471								
Mercury	0.020	mg/kg		0.019	1	08/16/10 19:25	08/18/10 09:19	7439-97-6
Dry Weight Analytical Method: % Moisture								
Percent Moisture	3.7	%		0.10	1		08/03/10 00:00	
353.2 Nitrate + Nitrite pres. Analytical Method: ASA 33-3.2/EPA 353.2								
Available Nitrate	<5.0	mg/kg		5.0	1		08/19/10 14:29	
Organic Matter MT ASA 29 Analytical Method: ASA 29-3.5.2								
Organic Matter	5.2	% (w/w)		0.10	1		08/20/10 15:00	
ASA 10-3.2 pH Analytical Method: ASA 10-3.2								
pH, Saturated Paste	6.9	Std. Units		0.10	1		08/11/10 13:00	
PSA Percent Sand,Silt,Clay Analytical Method: ASA 15-5 mod								
Percent Clay	15	% (w/w)		0.10	1		08/12/10 08:29	
Percent Sand	67.5	% (w/w)		0.10	1		08/12/10 08:29	
Percent Silt	17.5	% (w/w)		0.10	1		08/12/10 08:29	
Texture	sandy loam				1		08/12/10 08:29	
SM4500P-E, Total Phosphorus Analytical Method: ASA 24-5.4/SM4500								
Available Phosphorus	18.4	mg/kg		4.0	4		08/19/10 15:00	7723-14-0

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-02-00 **Lab ID: 10134865002** Collected: 07/26/10 14:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sobek Calculations		Analytical Method: Modified Sobek 7						
SMP Lime Requirement	1.0	tons/1000	0.0	1		08/10/10 11:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.8	Std. Units	0.10	1		08/10/10 11:30		
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3						
Sp. Conductance Saturated Paste	0.38	mmhos/cm	0.010	1		08/19/10 19:46		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	3.8	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine
Pace Project No.: 10134865

Sample: FR-RY-SS-01-00 **Lab ID: 10134865003** Collected: 07/26/10 14:55 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, MDEQ Potassium								
Analytical Method: CLPICPAES Preparation Method: ASA 13-3.5.2.2								
Potassium	<120	mg/kg		120	5	08/17/10 12:43	08/17/10 15:12	7440-09-7
Cation Exchange Capacity								
Analytical Method: EPA 9081								
Cation Exchange Capacity	49.7	meq/100g		0.99	10	08/13/10 13:30	08/17/10 13:39	
6020 MET ICPMS								
Analytical Method: EPA 6020 Preparation Method: EPA 3050								
Antimony	<0.56	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-36-0
Arsenic	11.7	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-38-2
Barium	204	mg/kg		0.33	20	08/11/10 13:15	08/16/10 21:54	7440-39-3
Cadmium	0.42	mg/kg		0.089	20	08/11/10 13:15	08/16/10 21:54	7440-43-9
Chromium	52.7	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-47-3
Copper	38.8	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-50-8
Iron	31600	mg/kg		279	100	08/11/10 13:15	08/16/10 21:58	7439-89-6
Lead	12.1	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7439-92-1
Manganese	831	mg/kg		2.8	100	08/11/10 13:15	08/16/10 21:58	7439-96-5
Nickel	55.8	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-02-0
Silver	<0.56	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-22-4
Zinc	72.6	mg/kg		5.6	20	08/11/10 13:15	08/16/10 21:54	7440-66-6
7471 Mercury								
Analytical Method: EPA 7471 Preparation Method: EPA 7471								
Mercury	0.058	mg/kg		0.021	1	08/16/10 19:25	08/18/10 09:23	7439-97-6
Dry Weight								
Analytical Method: % Moisture								
Percent Moisture	12.0	%		0.10	1		08/03/10 00:00	
353.2 Nitrate + Nitrite pres.								
Analytical Method: ASA 33-3.2/EPA 353.2								
Available Nitrate	<5.0	mg/kg		5.0	1		08/19/10 14:30	
Organic Matter MT ASA 29								
Analytical Method: ASA 29-3.5.2								
Organic Matter	8.9	% (w/w)		0.10	1		08/20/10 15:00	
ASA 10-3.2 pH								
Analytical Method: ASA 10-3.2								
pH, Saturated Paste	6.8	Std. Units		0.10	1		08/11/10 13:00	
PSA Percent Sand,Silt,Clay								
Analytical Method: ASA 15-5 mod								
Percent Clay	17.5	% (w/w)		0.10	1		08/12/10 08:29	
Percent Sand	55	% (w/w)		0.10	1		08/12/10 08:29	
Percent Silt	27.5	% (w/w)		0.10	1		08/12/10 08:29	
Texture	sandy loam				1		08/12/10 08:29	
SM4500P-E, Total Phosphorus								
Analytical Method: ASA 24-5.4/SM4500								
Available Phosphorus	12.1	mg/kg		4.0	4		08/19/10 15:00	7723-14-0

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-01-00 **Lab ID: 10134865003** Collected: 07/26/10 14:55 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sobek Calculations		Analytical Method: Modified Sobek 7						
SMP Lime Requirement	5.3	tons/1000	0.0	1		08/10/10 11:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.2	Std. Units	0.10	1		08/10/10 11:30		
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3						
Sp. Conductance Saturated Paste	0.38	mmhos/cm	0.010	1		08/19/10 19:46		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	13.6	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-WELL-01-00 **Lab ID: 10134865004** Collected: 07/26/10 15:40 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	<0.54	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-36-0	
Arsenic	9.1	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-38-2	
Barium	242	mg/kg	0.32	20	08/11/10 13:15	08/16/10 22:02	7440-39-3	
Cadmium	0.39	mg/kg	0.086	20	08/11/10 13:15	08/16/10 22:02	7440-43-9	
Chromium	57.9	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-47-3	
Copper	34.6	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-50-8	
Iron	21700	mg/kg	53.6	20	08/11/10 13:15	08/16/10 22:02	7439-89-6	
Lead	6.5	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7439-92-1	
Manganese	599	mg/kg	2.7	100	08/11/10 13:15	08/16/10 22:07	7439-96-5	
Nickel	53.9	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-02-0	
Silver	<0.54	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-22-4	
Zinc	65.5	mg/kg	5.4	20	08/11/10 13:15	08/16/10 22:02	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.036	mg/kg	0.022	1	08/16/10 19:25	08/18/10 09:24	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	14.4	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-BG-SS-01-00 **Lab ID: 10134865005** Collected: 07/26/10 16:40 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	<0.49	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-36-0	
Arsenic	16.2	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-38-2	
Barium	416	mg/kg	0.29	20	08/11/10 13:15	08/16/10 22:11	7440-39-3	
Cadmium	0.49	mg/kg	0.078	20	08/11/10 13:15	08/16/10 22:11	7440-43-9	
Chromium	32.2	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-47-3	
Copper	30.4	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-50-8	
Iron	20900	mg/kg	48.9	20	08/11/10 13:15	08/16/10 22:11	7439-89-6	
Lead	14.8	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7439-92-1	
Manganese	1780	mg/kg	2.4	100	08/11/10 13:15	08/16/10 22:15	7439-96-5	
Nickel	50.7	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-02-0	
Silver	<0.49	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-22-4	
Zinc	76.8	mg/kg	4.9	20	08/11/10 13:15	08/16/10 22:11	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.054	mg/kg	0.020	1	08/16/10 19:25	08/18/10 09:26	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	7.9	%	0.10	1		08/03/10 00:00		

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MPRP/21859

Analysis Method: CLPICPAES

QC Batch Method: ASA 13-3.5.2.2

Analysis Description: CLPICPAES MET

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 838216

Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Potassium	mg/kg	<125	125	08/17/10 14:47	

LABORATORY CONTROL SAMPLE: 838217

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Potassium	mg/kg	312	271	87	80-120	

SAMPLE DUPLICATE: 838220

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Potassium	mg/kg	140	132	6	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MPRP/21704 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

METHOD BLANK: 833525 Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	<0.50	0.50	08/16/10 21:06	
Arsenic	mg/kg	<0.50	0.50	08/16/10 21:06	
Barium	mg/kg	<0.30	0.30	08/16/10 21:06	
Cadmium	mg/kg	<0.079	0.079	08/16/10 21:06	
Chromium	mg/kg	<0.50	0.50	08/16/10 21:06	
Copper	mg/kg	<0.50	0.50	08/16/10 21:06	
Iron	mg/kg	<49.5	49.5	08/16/10 21:06	
Lead	mg/kg	<0.50	0.50	08/16/10 21:06	
Manganese	mg/kg	<0.50	0.50	08/16/10 21:06	
Nickel	mg/kg	<0.50	0.50	08/16/10 21:06	
Silver	mg/kg	<0.50	0.50	08/16/10 21:06	
Zinc	mg/kg	<5.0	5.0	08/16/10 21:06	

LABORATORY CONTROL SAMPLE: 833526

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	18.7	18.5	99	75-125	
Arsenic	mg/kg	18.7	19.0	101	75-125	
Barium	mg/kg	18.7	19.1	102	75-125	
Cadmium	mg/kg	18.7	19.3	103	75-125	
Chromium	mg/kg	18.7	19.3	103	75-125	
Copper	mg/kg	18.7	19.7	105	75-125	
Iron	mg/kg	234	245	105	75-125	
Lead	mg/kg	18.7	20.4	109	75-125	
Manganese	mg/kg	18.7	19.1	102	75-125	
Nickel	mg/kg	18.7	19.6	105	75-125	
Silver	mg/kg	18.7	19.6	105	75-125	
Zinc	mg/kg	18.7	22.3	119	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833527 833528

Parameter	Units	10134865001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Antimony	mg/kg	<0.53	20.3	18.1	4.9	4.3	23	23	75-125	11	20	M1	
Arsenic	mg/kg	17.7	20.3	18.1	27.5	30.0	48	67	75-125	9	20	M1	
Barium	mg/kg	248	20.3	18.1	193	216	-271	-172	75-125	11	20	M1	
Cadmium	mg/kg	0.25	20.3	18.1	17.5	16.6	85	90	75-125	6	20		
Chromium	mg/kg	111	20.3	18.1	99.1	111	-58	-2	75-125	11	20	M1	
Copper	mg/kg	50.1	20.3	18.1	54.6	56.9	22	37	75-125	4	20	M1	
Iron	mg/kg	30900	253	227	27600	29500	-1310	-614	75-125	7	20	M1	

Date: 08/23/2010 12:06 PM

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833527												833528	
Parameter	Units	10134865001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual		
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Lead	mg/kg	8.2	20.3	18.1	24.4	23.7	80	85	75-125	3	20		
Manganese	mg/kg	674	20.3	18.1	577	637	-479	-206	75-125	10	20 M1		
Nickel	mg/kg	97.3	20.3	18.1	90.3	94.1	-35	-18	75-125	4	20 M1		
Silver	mg/kg	<0.53	20.3	18.1	18.5	17.2	90	93	75-125	7	20		
Zinc	mg/kg	68.0	20.3	18.1	72.6	76.8	23	48	75-125	6	20 M1		

MATRIX SPIKE SAMPLE: 833529											
Parameter	Units	10134984007 Result	Spike	MS	MS	% Rec	Qualifiers				
			Conc.	Result	% Rec	Limits					
Antimony	mg/kg	49.5	21.2	79.5	142	75-125	M1				
Arsenic	mg/kg	331	21.2	335	23	75-125	M1				
Barium	mg/kg	28.8	21.2	55.4	125	75-125					
Cadmium	mg/kg	64.2	21.2	83.4	91	75-125					
Chromium	mg/kg	5.8	21.2	23.8	85	75-125					
Copper	mg/kg	709	21.2	707	-9	75-125	M1				
Iron	mg/kg	38000	264	34000	-1510	75-125	M1				
Lead	mg/kg	9500	21.2	11800	10800	75-125	E,M1				
Manganese	mg/kg	2070	21.2	1850	-1010	75-125	E,M1				
Nickel	mg/kg	7.3	21.2	23.3	76	75-125					
Silver	mg/kg	68.7	21.2	96.9	133	75-125	M1				
Zinc	mg/kg	6910	21.2	7810	4240	75-125	E,M1				

QUALITY CONTROL DATA

Project: Forest Rose Mine
Pace Project No.: 10134865

QC Batch: MERP/4702 Analysis Method: EPA 7471
QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury
Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

METHOD BLANK: 834877 Matrix: Solid
Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.017	0.017	08/18/10 08:47	

LABORATORY CONTROL SAMPLE: 834878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.43	0.46	108	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 834879 834880

Parameter	Units	10134857001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec				
Mercury	mg/kg	0.21	.52	.5	.5	0.86	0.85	124	125	80-120	2	20	M1

MATRIX SPIKE SAMPLE: 838021

Parameter	Units	10134865005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.054	.52	0.67	117	80-120	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MPRP/21679

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

SAMPLE DUPLICATE: 832646

Parameter	Units	10134857012 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	8.6	10.0	16	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4658 Analysis Method: ASA 33-3.2/EPA 353.2

QC Batch Method: ASA 33-3.2/EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 835440 Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Available Nitrate	mg/kg	<5.0	5.0	08/19/10 14:22	

LABORATORY CONTROL SAMPLE: 835441

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Available Nitrate	mg/kg	25	25.0	100	76-124	

SAMPLE DUPLICATE: 835442

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Available Nitrate	mg/kg	<5.0	<5.0		30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4657

Analysis Method: ASA 29-3.5.2

QC Batch Method: ASA 29-3.5.2

Analysis Description: Organic Matter ASA 29

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 835437

Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Organic Matter	% (w/w)	<0.10	0.10	08/20/10 15:00	

LABORATORY CONTROL SAMPLE: 835438

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Organic Matter	% (w/w)	3.1	3.5	114	69-131	

SAMPLE DUPLICATE: 835439

Parameter	Units	10134865002 Result	Dup Result	RPD	Max RPD	Qualifiers
Organic Matter	% (w/w)	5.2	5.4	3	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4619

Analysis Method: ASA 10-3.2

QC Batch Method: ASA 10-3.2

Analysis Description: ASA 10-3.2 pH saturated paste

Associated Lab Samples: 10134865001, 10134865002, 10134865003

SAMPLE DUPLICATE: 832023

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH, Saturated Paste	Std. Units	7.2	7.2	.3	20	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4721

Analysis Method: ASA 24-5.4/SM4500

QC Batch Method: ASA 24-5.4/SM4500

Analysis Description: SM4500P-E, Total Phosphorus

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 839402

Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Available Phosphorus	mg/kg	<4.0	4.0	08/19/10 15:00	

LABORATORY CONTROL SAMPLE: 839403

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Available Phosphorus	mg/kg	10.1	11.4	112	56-144	

SAMPLE DUPLICATE: 839404

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Available Phosphorus	mg/kg	6.6	5.9	10	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4716

Analysis Method: ASA 10-3.3

QC Batch Method: ASA 10-3.3

Analysis Description: ASA 10-3.3 Specific Conductance

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 840259

Matrix: Water

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	<0.010	0.010	08/19/10 19:46	

LABORATORY CONTROL SAMPLE: 840260

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	.85	1.1	128	53-147	

SAMPLE DUPLICATE: 840261

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp.Conductance Saturated Paste	mmhos/cm	0.19	0.16	15	20	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MTPR/1490

Analysis Method: USDA 26

QC Batch Method: USDA 26

Analysis Description: Soil Moisture Content

Associated Lab Samples: 10134865001, 10134865002, 10134865003

SAMPLE DUPLICATE: 838624

Parameter	Units	10134984011 Result	Dup Result	RPD	Max RPD	Qualifiers
Soil Moisture Content	%	8.9	9.7	9	30	

QUALIFIERS

Project: Forest Rose Mine

Pace Project No.: 10134865

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134865001	FR-RY-SS-03-00	ASA 13-3.5.2.2	MPRP/21859	CLPICPAES	ICP/9578
10134865002	FR-RY-SS-02-00	ASA 13-3.5.2.2	MPRP/21859	CLPICPAES	ICP/9578
10134865003	FR-RY-SS-01-00	ASA 13-3.5.2.2	MPRP/21859	CLPICPAES	ICP/9578
10134865001	FR-RY-SS-03-00	EPA 9081	ICP/11973	EPA 9081	ICP/10475
10134865002	FR-RY-SS-02-00	EPA 9081	ICP/11973	EPA 9081	ICP/10475
10134865003	FR-RY-SS-01-00	EPA 9081	ICP/11973	EPA 9081	ICP/10475
10134865001	FR-RY-SS-03-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865002	FR-RY-SS-02-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865003	FR-RY-SS-01-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865004	FR-RY-WELL-01-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865005	FR-BG-SS-01-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865001	FR-RY-SS-03-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865002	FR-RY-SS-02-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865003	FR-RY-SS-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865004	FR-RY-WELL-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865005	FR-BG-SS-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865001	FR-RY-SS-03-00	% Moisture	MPRP/21679		
10134865002	FR-RY-SS-02-00	% Moisture	MPRP/21679		
10134865003	FR-RY-SS-01-00	% Moisture	MPRP/21679		
10134865004	FR-RY-WELL-01-00	% Moisture	MPRP/21679		
10134865005	FR-BG-SS-01-00	% Moisture	MPRP/21679		
10134865001	FR-RY-SS-03-00	ASA 33-3.2/EPA 353.2	MT/4658		
10134865002	FR-RY-SS-02-00	ASA 33-3.2/EPA 353.2	MT/4658		
10134865003	FR-RY-SS-01-00	ASA 33-3.2/EPA 353.2	MT/4658		
10134865001	FR-RY-SS-03-00	ASA 29-3.5.2	MT/4657		
10134865002	FR-RY-SS-02-00	ASA 29-3.5.2	MT/4657		
10134865003	FR-RY-SS-01-00	ASA 29-3.5.2	MT/4657		
10134865001	FR-RY-SS-03-00	ASA 10-3.2	MT/4619		
10134865002	FR-RY-SS-02-00	ASA 10-3.2	MT/4619		
10134865003	FR-RY-SS-01-00	ASA 10-3.2	MT/4619		
10134865001	FR-RY-SS-03-00	ASA 15-5 mod	MT/4669		
10134865002	FR-RY-SS-02-00	ASA 15-5 mod	MT/4669		
10134865003	FR-RY-SS-01-00	ASA 15-5 mod	MT/4669		
10134865001	FR-RY-SS-03-00	ASA 24-5.4/SM4500	MT/4721		
10134865002	FR-RY-SS-02-00	ASA 24-5.4/SM4500	MT/4721		
10134865003	FR-RY-SS-01-00	ASA 24-5.4/SM4500	MT/4721		
10134865001	FR-RY-SS-03-00	Modified Sobek 7	MT/4723		
10134865002	FR-RY-SS-02-00	Modified Sobek 7	MT/4723		
10134865003	FR-RY-SS-01-00	Modified Sobek 7	MT/4723		
10134865001	FR-RY-SS-03-00	Modified Sobek 7	MT/4633		
10134865002	FR-RY-SS-02-00	Modified Sobek 7	MT/4633		
10134865003	FR-RY-SS-01-00	Modified Sobek 7	MT/4633		
10134865001	FR-RY-SS-03-00	ASA 10-3.3	MT/4716		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134865002	FR-RY-SS-02-00	ASA 10-3.3	MT/4716		
10134865003	FR-RY-SS-01-00	ASA 10-3.3	MT/4716		
10134865001	FR-RY-SS-03-00	USDA 26	MTPR/1490		
10134865002	FR-RY-SS-02-00	USDA 26	MTPR/1490		
10134865003	FR-RY-SS-01-00	USDA 26	MTPR/1490		

August 25, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine 06-03425-070
Pace Project No.: 10134984

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on August 03, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Idaho Certification #: MN00064

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nebraska Certification #: Pace

Nevada Certification #: MN_00064

New Jersey Certification #: MN-002

New Mexico Certification #: Pace

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: D9921

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Washington Certification #: C754

Wisconsin Certification #: 999407970

Montana Certification IDs

602 South 25th Street, Billings, MT 59101

EPA Region 8 Certification #: 8TMS-Q

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

NVLAP Certification #: 101292-0

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134984001	FR-T1-SB-01-15	Solid	07/29/10 16:15	08/03/10 11:00
10134984002	FR-QC-WT-T1	Water	07/30/10 16:20	08/03/10 11:00
10134984003	FR-T3-TB-02-10	Solid	07/30/10 17:00	08/03/10 11:00
10134984004	FR-T3-SB-02-20	Solid	07/30/10 17:30	08/03/10 11:00
10134984005	FR-T3-SB-01-30	Solid	07/31/10 08:30	08/03/10 11:00
10134984006	FR-T3-TB-01-20	Solid	07/31/10 08:05	08/03/10 11:00
10134984007	FR-T3-TB-01-10	Solid	07/31/10 07:35	08/03/10 11:00
10134984008	FR-T2-TB-01-10	Solid	07/31/10 10:25	08/03/10 11:00
10134984009	FR-T2-SB-01-20	Solid	07/31/10 10:40	08/03/10 11:00
10134984010	FR-T2-TB-02-10	Solid	07/31/10 11:55	08/03/10 11:00
10134984011	FR-T2-SB-02-15	Solid	07/31/10 12:10	08/03/10 11:00

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
10134984001	FR-T1-SB-01-15	EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
10134984002	FR-QC-WT-T1	EPA 200.8	RJS	12	PASI-M		
10134984003	FR-T3-TB-02-10	EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		Modified Sobek 7	KS1	1	PASI-MT		
		Modified Sobek 7	KS1	5	PASI-MT		
		Modified Sobek 7	KS1	4	PASI-MT		
		Modified Sobek 7	SC1	1	PASI-MT		
		USDA 26	KS1	1	PASI-MT		
		10134984004	FR-T3-SB-02-20	EPA 6020	RJS	12	PASI-M
10134984005	FR-T3-SB-01-30	EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		USDA 26	KS1	1	PASI-MT		
		EPA 6020	RJS	12	PASI-M		
10134984006	FR-T3-TB-01-20	EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		Modified Sobek 7	KS1	1	PASI-MT		
		Modified Sobek 7	KS1	5	PASI-MT		
		Modified Sobek 7	KS1	4	PASI-MT		
		Modified Sobek 7	SC1	1	PASI-MT		
		USDA 26	KS1	1	PASI-MT		
		10134984007	FR-T3-TB-01-10	EPA 6020	RJS	12	PASI-M
		10134984007	FR-T3-TB-01-10	EPA 7471	TEM	1	PASI-M
% Moisture	JDL			1	PASI-M		
ASA 15-5 mod	KS1			4	PASI-MT		
Modified Sobek 7	KS1			1	PASI-MT		

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134984008	FR-T2-TB-01-10	Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
10134984009	FR-T2-SB-01-20	USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
10134984010	FR-T2-TB-02-10	USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
10134984011	FR-T2-SB-02-15	Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		USDA 26	KS1	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070
Pace Project No.: 10134984

Method: EPA 200.8
Description: 200.8 MET ICPMS
Client: Herrera Environmental Consultants
Date: August 25, 2010

General Information:

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

10 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

QC Batch: MPRP/21704

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- FR-T2-SB-01-20 (Lab ID: 10134984009)

- Silver

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21704

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134865001,10134984007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 833527)

- Antimony

- Arsenic

- Barium

- Chromium

- Copper

- Iron

- Manganese

- Nickel

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

QC Batch: MPRP/21704

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134865001,10134984007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Zinc
- MS (Lab ID: 833529)
 - Antimony
 - Arsenic
 - Copper
 - Iron
 - Lead
 - Manganese
 - Silver
 - Zinc
- MSD (Lab ID: 833528)
 - Antimony
 - Arsenic
 - Barium
 - Chromium
 - Copper
 - Iron
 - Manganese
 - Nickel
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21704

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 833529)
 - Manganese
 - Lead
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: EPA 7471

Description: 7471 Mercury

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

10 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/4714

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134984001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 836709)
- Mercury

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: % Moisture

Description: Dry Weight

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

10 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: ASA 15-5 mod

Description: PSA Percent Sand,Silt,Clay

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

9 samples were analyzed for ASA 15-5 mod. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/4680

R1: RPD value was outside control limits.

- DUP (Lab ID: 836822)
- Sulfur, Hot Water Extractable

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: USDA 26

Description: Soil Moisture Content

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

9 samples were analyzed for USDA 26. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T1-SB-01-15 **Lab ID: 10134984001** Collected: 07/29/10 16:15 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.79	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-36-0	
Arsenic	23.2	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-38-2	
Barium	54.6	mg/kg	0.28	20	08/11/10 13:15	08/16/10 22:20	7440-39-3	
Cadmium	4.1	mg/kg	0.076	20	08/11/10 13:15	08/16/10 22:20	7440-43-9	
Chromium	19.9	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-47-3	
Copper	70.8	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-50-8	
Iron	33100	mg/kg	237	100	08/11/10 13:15	08/16/10 22:24	7439-89-6	
Lead	249	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7439-92-1	
Manganese	740	mg/kg	2.4	100	08/11/10 13:15	08/16/10 22:24	7439-96-5	
Nickel	24.9	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-02-0	
Silver	0.53	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-22-4	
Zinc	282	mg/kg	4.7	20	08/11/10 13:15	08/16/10 22:20	7440-66-6	

7471 Mercury

Analytical Method: EPA 7471 Preparation Method: EPA 7471

Mercury	0.023	mg/kg	0.021	1	08/17/10 18:20	08/18/10 14:08	7439-97-6	M1
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Dry Weight

Analytical Method: % Moisture

Percent Moisture	10.6	%	0.10	1		08/04/10 00:00		
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ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-QC-WT-T1		Lab ID: 10134984002	Collected: 07/30/10 16:20	Received: 08/03/10 11:00	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-36-0	
Arsenic	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-38-2	
Barium	0.67 ug/L		0.30	1	08/06/10 10:57	08/10/10 10:03	7440-39-3	
Cadmium	<0.080 ug/L		0.080	1	08/06/10 10:57	08/10/10 10:03	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-47-3	
Copper	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-50-8	
Iron	93.5 ug/L		50.0	1	08/06/10 10:57	08/10/10 10:03	7439-89-6	
Lead	0.39 ug/L		0.10	1	08/06/10 10:57	08/10/10 10:03	7439-92-1	
Manganese	1.5 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7439-96-5	
Nickel	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-22-4	
Zinc	<5.0 ug/L		5.0	1	08/06/10 10:57	08/10/10 10:03	7440-66-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-02-10 **Lab ID:** 10134984003 Collected: 07/30/10 17:00 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	31.7	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-36-0	
Arsenic	555	mg/kg	2.5	100	08/11/10 13:15	08/17/10 08:12	7440-38-2	
Barium	25.1	mg/kg	0.31	20	08/11/10 13:15	08/17/10 08:08	7440-39-3	
Cadmium	29.8	mg/kg	0.081	20	08/11/10 13:15	08/17/10 08:08	7440-43-9	
Chromium	1.5	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-47-3	
Copper	196	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-50-8	
Iron	71200	mg/kg	255	100	08/11/10 13:15	08/17/10 08:12	7439-89-6	
Lead	9820	mg/kg	12.7	500	08/11/10 13:15	08/18/10 03:18	7439-92-1	
Manganese	4340	mg/kg	12.7	500	08/11/10 13:15	08/18/10 03:18	7439-96-5	
Nickel	4.9	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-02-0	
Silver	16.5	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-22-4	
Zinc	8110	mg/kg	127	500	08/11/10 13:15	08/18/10 03:18	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.036	mg/kg	0.025	1	08/17/10 18:20	08/18/10 14:15	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	21.4	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	10	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	62.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	27.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	570	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	6.54	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	0.895	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	5.43	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	370	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	200	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	260	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-02-10 **Lab ID: 10134984003** Collected: 07/30/10 17:00 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	27.3	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-SB-02-20 **Lab ID: 10134984004** Collected: 07/30/10 17:30 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.81	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-36-0	
Arsenic	18.3	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-38-2	
Barium	94.5	mg/kg	0.27	20	08/11/10 13:15	08/17/10 08:17	7440-39-3	
Cadmium	1.3	mg/kg	0.071	20	08/11/10 13:15	08/17/10 08:17	7440-43-9	
Chromium	20.1	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-47-3	
Copper	42.6	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-50-8	
Iron	29300	mg/kg	222	100	08/11/10 13:15	08/17/10 08:21	7439-89-6	
Lead	57.7	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7439-92-1	
Manganese	577	mg/kg	2.2	100	08/11/10 13:15	08/17/10 08:21	7439-96-5	
Nickel	27.3	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-02-0	
Silver	0.79	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-22-4	
Zinc	1100	mg/kg	22.2	100	08/11/10 13:15	08/17/10 08:21	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	<0.020	mg/kg	0.020	1	08/17/10 18:20	08/18/10 14:17	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	12.2	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	20	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	47.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	32.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	loam			1		08/12/10 08:29		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	13.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-SB-01-30 **Lab ID: 10134984005** Collected: 07/31/10 08:30 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	2.0	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-36-0	
Arsenic	41.6	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-38-2	
Barium	40.2	mg/kg	0.23	20	08/11/10 13:15	08/17/10 08:26	7440-39-3	
Cadmium	3.6	mg/kg	0.061	20	08/11/10 13:15	08/17/10 08:26	7440-43-9	
Chromium	16.7	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-47-3	
Copper	117	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-50-8	
Iron	36900	mg/kg	192	100	08/11/10 13:15	08/17/10 08:30	7439-89-6	
Lead	441	mg/kg	1.9	100	08/11/10 13:15	08/17/10 08:30	7439-92-1	
Manganese	1930	mg/kg	1.9	100	08/11/10 13:15	08/17/10 08:30	7439-96-5	
Nickel	29.4	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-02-0	
Silver	1.6	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-22-4	
Zinc	759	mg/kg	19.2	100	08/11/10 13:15	08/17/10 08:30	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	<0.022	mg/kg	0.022	1	08/17/10 18:20	08/18/10 14:18	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	10.6	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	17.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	57.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	25	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	11.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-01-20 **Lab ID:** 10134984006 Collected: 07/31/10 08:05 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	20.7	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-36-0	
Arsenic	330	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-38-2	
Barium	19.4	mg/kg	0.28	20	08/11/10 13:15	08/17/10 08:35	7440-39-3	
Cadmium	44.7	mg/kg	0.076	20	08/11/10 13:15	08/17/10 08:35	7440-43-9	
Chromium	2.4	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-47-3	
Copper	254	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-50-8	
Iron	49100	mg/kg	237	100	08/11/10 13:15	08/17/10 08:39	7439-89-6	
Lead	4600	mg/kg	11.9	500	08/11/10 13:15	08/18/10 03:27	7439-92-1	
Manganese	1890	mg/kg	2.4	100	08/11/10 13:15	08/17/10 08:39	7439-96-5	
Nickel	9.0	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-02-0	
Silver	13.8	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-22-4	
Zinc	7260	mg/kg	119	500	08/11/10 13:15	08/18/10 03:27	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	<0.022	mg/kg	0.022	1	08/17/10 18:20	08/18/10 14:19	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	23.7	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	6.3	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	52.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	41.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	540	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	5.66	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	1.37	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	4.83	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	360	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	180	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	220	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-01-20 **Lab ID: 10134984006** Collected: 07/31/10 08:05 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	31.0	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-01-10 **Lab ID: 10134984007** Collected: 07/31/10 07:35 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	49.5	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:57	7440-36-0	M1
Arsenic	331	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:57	7440-38-2	M1
Barium	28.8	mg/kg	0.31	20	08/11/10 13:15	08/17/10 08:57	7440-39-3	
Cadmium	64.2	mg/kg	0.081	20	08/11/10 13:15	08/17/10 08:57	7440-43-9	
Chromium	5.8	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:57	7440-47-3	
Copper	709	mg/kg	2.5	100	08/11/10 13:15	08/17/10 09:06	7440-50-8	M1
Iron	38000	mg/kg	254	100	08/11/10 13:15	08/17/10 09:06	7439-89-6	M1
Lead	9500	mg/kg	25.4	1000	08/11/10 13:15	08/18/10 02:57	7439-92-1	M1
Manganese	2070	mg/kg	2.5	100	08/11/10 13:15	08/17/10 09:06	7439-96-5	M1
Nickel	7.3	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:57	7440-02-0	
Silver	68.7	mg/kg	1.0	40	08/11/10 13:15	08/18/10 02:48	7440-22-4	M1
Zinc	6910	mg/kg	254	1000	08/11/10 13:15	08/18/10 02:57	7440-66-6	M1
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.037	mg/kg	0.024	1	08/17/10 18:20	08/18/10 14:21	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	25.0	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	20	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	12.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	67.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	520	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	0.248	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	1.85	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	1.08	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	3.19	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	450	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	64	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	80	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-01-10 **Lab ID: 10134984007** Collected: 07/31/10 07:35 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	33.4	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-TB-01-10 **Lab ID: 10134984008** Collected: 07/31/10 10:25 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.4	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-36-0	
Arsenic	264	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-38-2	
Barium	6.6	mg/kg	0.28	20	08/11/10 13:15	08/17/10 09:11	7440-39-3	
Cadmium	48.0	mg/kg	0.074	20	08/11/10 13:15	08/17/10 09:11	7440-43-9	
Chromium	4.2	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-47-3	
Copper	371	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-50-8	
Iron	113000	mg/kg	1160	500	08/11/10 13:15	08/18/10 03:05	7439-89-6	
Lead	206	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7439-92-1	
Manganese	1570	mg/kg	2.3	100	08/11/10 13:15	08/17/10 09:15	7439-96-5	
Nickel	24.7	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-02-0	
Silver	4.3	mg/kg	0.93	40	08/11/10 13:15	08/18/10 03:01	7440-22-4	
Zinc	8300	mg/kg	116	500	08/11/10 13:15	08/18/10 03:05	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.035	mg/kg	0.023	1	08/17/10 18:20	08/18/10 14:22	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	16.9	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	7.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	35	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	57.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	230	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	1.45	% (w/w)	0.050	1		08/17/10 16:15		
Sulfur, HNO3 Extractable	6.33	% (w/w)	0.050	1		08/17/10 16:15		
Sulfur, Hot Water Extractable	2.58	% (w/w)	0.050	1		08/17/10 16:15		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 16:15		
Total Sulfur	10.4	% (w/w)	0.050	1		08/17/10 16:15		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-6.6	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	230	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	290	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.5	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-TB-01-10 **Lab ID: 10134984008** Collected: 07/31/10 10:25 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	20.3	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: **FR-T2-SB-01-20** Lab ID: **10134984009** Collected: 07/31/10 10:40 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	<0.51	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-36-0	
Arsenic	10	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-38-2	
Barium	18.7	mg/kg	0.31	20	08/11/10 13:15	08/17/10 09:20	7440-39-3	
Cadmium	1.1	mg/kg	0.082	20	08/11/10 13:15	08/17/10 09:20	7440-43-9	
Chromium	26.1	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-47-3	
Copper	29.6	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-50-8	
Iron	34600	mg/kg	257	100	08/11/10 13:15	08/17/10 09:24	7439-89-6	
Lead	12.4	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7439-92-1	
Manganese	277	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7439-96-5	
Nickel	32.6	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-02-0	
Silver	<0.51	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-22-4	CH
Zinc	174	mg/kg	5.1	20	08/11/10 13:15	08/17/10 09:20	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.047	mg/kg	0.018	1	08/17/10 18:20	08/18/10 14:26	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	4.6	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	22.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	60	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	17.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy clay loam			1		08/12/10 08:29		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	4.8	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-TB-02-10 **Lab ID: 10134984010** Collected: 07/31/10 11:55 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	4.5	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-36-0	
Arsenic	300	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-38-2	
Barium	13.2	mg/kg	0.36	20	08/11/10 13:15	08/17/10 09:29	7440-39-3	
Cadmium	39.7	mg/kg	0.096	20	08/11/10 13:15	08/17/10 09:29	7440-43-9	
Chromium	3.9	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-47-3	
Copper	363	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-50-8	
Iron	78800	mg/kg	301	100	08/11/10 13:15	08/17/10 09:33	7439-89-6	
Lead	1090	mg/kg	3.0	100	08/11/10 13:15	08/17/10 09:33	7439-92-1	
Manganese	1420	mg/kg	3.0	100	08/11/10 13:15	08/17/10 09:33	7439-96-5	
Nickel	13.8	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-02-0	
Silver	9.9	mg/kg	1.2	40	08/11/10 13:15	08/18/10 03:10	7440-22-4	
Zinc	6610	mg/kg	151	500	08/11/10 13:15	08/18/10 04:43	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.054	mg/kg	0.021	1	08/17/10 18:20	08/18/10 14:28	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	18.6	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	17.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	13.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	68.7	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	330	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	7.87	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	4.90	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	9.92	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	88	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	250	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	310	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.5	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-TB-02-10 **Lab ID: 10134984010** Collected: 07/31/10 11:55 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	22.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-SB-02-15 **Lab ID: 10134984011** Collected: 07/31/10 12:10 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.1	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-36-0	
Arsenic	22.0	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-38-2	
Barium	46.3	mg/kg	0.23	20	08/11/10 13:15	08/17/10 09:51	7440-39-3	
Cadmium	1.8	mg/kg	0.062	20	08/11/10 13:15	08/17/10 09:51	7440-43-9	
Chromium	17.2	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-47-3	
Copper	55.5	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-50-8	
Iron	26700	mg/kg	193	100	08/11/10 13:15	08/17/10 09:56	7439-89-6	
Lead	83.6	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7439-92-1	
Manganese	506	mg/kg	1.9	100	08/11/10 13:15	08/17/10 09:56	7439-96-5	
Nickel	25.7	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-02-0	
Silver	1.5	mg/kg	0.39	20	08/11/10 13:15	08/18/10 03:14	7440-22-4	
Zinc	145	mg/kg	3.9	20	08/11/10 13:15	08/17/10 09:51	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.053	mg/kg	0.022	1	08/17/10 18:20	08/18/10 14:29	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	8.1	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	20	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	53.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	26.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam/sand y clay loam			1		08/12/10 08:29		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	8.9	%	0.10	1		08/17/10 09:45		

QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

QC Batch: MPRP/21721 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 10134984002

METHOD BLANK: 834170 Matrix: Water

Associated Lab Samples: 10134984002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.50	0.50	08/11/10 05:15	
Arsenic	ug/L	<0.50	0.50	08/11/10 05:15	
Barium	ug/L	<0.30	0.30	08/11/10 05:15	
Cadmium	ug/L	<0.080	0.080	08/11/10 05:15	
Chromium	ug/L	<0.50	0.50	08/11/10 05:15	
Copper	ug/L	<0.50	0.50	08/11/10 05:15	
Iron	ug/L	<50.0	50.0	08/11/10 05:15	
Lead	ug/L	<0.10	0.10	08/11/10 05:15	
Manganese	ug/L	<0.50	0.50	08/11/10 05:15	
Nickel	ug/L	<0.50	0.50	08/11/10 05:15	
Silver	ug/L	<0.50	0.50	08/11/10 05:15	
Zinc	ug/L	<5.0	5.0	08/11/10 05:15	

LABORATORY CONTROL SAMPLE: 834171

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	80	77.2	96	85-115	
Arsenic	ug/L	80	80.0	100	85-115	
Barium	ug/L	80	78.2	98	85-115	
Cadmium	ug/L	80	82.2	103	85-115	
Chromium	ug/L	80	79.3	99	85-115	
Copper	ug/L	80	79.9	100	85-115	
Iron	ug/L	1000	1010	101	85-115	
Lead	ug/L	80	78.7	98	85-115	
Manganese	ug/L	80	80.7	101	85-115	
Nickel	ug/L	80	80.3	100	85-115	
Silver	ug/L	80	80.4	100	85-115	
Zinc	ug/L	80	88.2	110	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 834172 834173

Parameter	Units	6083045001		MS		MSD		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	MS Result	MSD Result							
Antimony	ug/L	ND	80	80	80	85.7	83.0	107	104	70-130	3	20		
Arsenic	ug/L	0.76	80	80	80	89.4	86.0	111	107	70-130	4	20		
Barium	ug/L	3.4	80	80	80	91.2	90.6	110	109	70-130	.7	20		
Cadmium	ug/L	ND	80	80	80	86.0	84.0	108	105	70-130	2	20		
Chromium	ug/L	1.9	80	80	80	91.8	87.6	112	107	70-130	5	20		
Copper	ug/L	0.88	80	80	80	85.1	81.3	105	101	70-130	5	20		
Iron	ug/L	186	1000	1000	1000	1280	1240	110	105	70-130	3	20		

Date: 08/25/2010 04:07 PM

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 834172												834173	
Parameter	Units	6083045001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual		
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Lead	ug/L	0.35	80	80	81.4	78.9	101	98	70-130	3	20		
Manganese	ug/L	44.3	80	80	133	128	110	105	70-130	3	20		
Nickel	ug/L	10.9	80	80	98.3	94.2	109	104	70-130	4	20		
Silver	ug/L	ND	80	80	62.8	61.6	78	77	70-130	2	20		
Zinc	ug/L	6.7	80	80	91.8	90.2	106	104	70-130	2	20		

MATRIX SPIKE SAMPLE: 834174											
Parameter	Units	10134984002		Spike Conc.	MS	MS	% Rec	Qualifiers			
		Result	Result		Result	% Rec	Limits				
Antimony	ug/L	<0.50		80	78.2	98	70-130				
Arsenic	ug/L	<0.50		80	79.6	99	70-130				
Barium	ug/L	0.67		80	82.3	102	70-130				
Cadmium	ug/L	<0.080		80	84.2	105	70-130				
Chromium	ug/L	<0.50		80	81.0	101	70-130				
Copper	ug/L	<0.50		80	80.0	100	70-130				
Iron	ug/L	93.5	1000	1110	102	70-130					
Lead	ug/L	0.39		80	80.6	100	70-130				
Manganese	ug/L	1.5		80	81.8	100	70-130				
Nickel	ug/L	<0.50		80	80.0	100	70-130				
Silver	ug/L	<0.50		80	79.2	99	70-130				
Zinc	ug/L	<5.0		80	80.8	98	70-130				

QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

QC Batch: MPRP/21704 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10134984001, 10134984003, 10134984004, 10134984005, 10134984006, 10134984007, 10134984008, 10134984009, 10134984010

METHOD BLANK: 833525 Matrix: Solid
 Associated Lab Samples: 10134984001, 10134984003, 10134984004, 10134984005, 10134984006, 10134984007, 10134984008, 10134984009, 10134984010, 10134984011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	<0.50	0.50	08/16/10 21:06	
Arsenic	mg/kg	<0.50	0.50	08/16/10 21:06	
Barium	mg/kg	<0.30	0.30	08/16/10 21:06	
Cadmium	mg/kg	<0.079	0.079	08/16/10 21:06	
Chromium	mg/kg	<0.50	0.50	08/16/10 21:06	
Copper	mg/kg	<0.50	0.50	08/16/10 21:06	
Iron	mg/kg	<49.5	49.5	08/16/10 21:06	
Lead	mg/kg	<0.50	0.50	08/16/10 21:06	
Manganese	mg/kg	<0.50	0.50	08/16/10 21:06	
Nickel	mg/kg	<0.50	0.50	08/16/10 21:06	
Silver	mg/kg	<0.50	0.50	08/16/10 21:06	
Zinc	mg/kg	<5.0	5.0	08/16/10 21:06	

LABORATORY CONTROL SAMPLE: 833526

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	18.7	18.5	99	75-125	
Arsenic	mg/kg	18.7	19.0	101	75-125	
Barium	mg/kg	18.7	19.1	102	75-125	
Cadmium	mg/kg	18.7	19.3	103	75-125	
Chromium	mg/kg	18.7	19.3	103	75-125	
Copper	mg/kg	18.7	19.7	105	75-125	
Iron	mg/kg	234	245	105	75-125	
Lead	mg/kg	18.7	20.4	109	75-125	
Manganese	mg/kg	18.7	19.1	102	75-125	
Nickel	mg/kg	18.7	19.6	105	75-125	
Silver	mg/kg	18.7	19.6	105	75-125	
Zinc	mg/kg	18.7	22.3	119	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833527 833528

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Spike Conc.	Result	Spike Conc.	Result						
Antimony	mg/kg	<0.53	20.3	18.1	4.9	4.3	23	23	75-125	11	20 M1
Arsenic	mg/kg	17.7	20.3	18.1	27.5	30.0	48	67	75-125	9	20 M1
Barium	mg/kg	248	20.3	18.1	193	216	-271	-172	75-125	11	20 M1
Cadmium	mg/kg	0.25	20.3	18.1	17.5	16.6	85	90	75-125	6	20
Chromium	mg/kg	111	20.3	18.1	99.1	111	-58	-2	75-125	11	20 M1

QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833527												833528			
Parameter	Units	10134865001 Result	MS		MSD		MS		MSD		% Rec Limits	Max RPD	Qual		
			Spike Conc.	MSD Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec							
Copper	mg/kg	50.1	20.3	18.1	54.6	56.9	22	37	75-125	4	20	M1			
Iron	mg/kg	30900	253	227	27600	29500	-1310	-614	75-125	7	20	M1			
Lead	mg/kg	8.2	20.3	18.1	24.4	23.7	80	85	75-125	3	20				
Manganese	mg/kg	674	20.3	18.1	577	637	-479	-206	75-125	10	20	M1			
Nickel	mg/kg	97.3	20.3	18.1	90.3	94.1	-35	-18	75-125	4	20	M1			
Silver	mg/kg	<0.53	20.3	18.1	18.5	17.2	90	93	75-125	7	20				
Zinc	mg/kg	68.0	20.3	18.1	72.6	76.8	23	48	75-125	6	20	M1			

MATRIX SPIKE SAMPLE: 833529											
Parameter	Units	10134984007		Spike Conc.	MS		% Rec Limits	Qualifiers			
		Result	MSD Conc.		MS Result	MS % Rec					
Antimony	mg/kg		49.5	21.2	79.5	142	75-125	M1			
Arsenic	mg/kg		331	21.2	335	23	75-125	M1			
Barium	mg/kg		28.8	21.2	55.4	125	75-125				
Cadmium	mg/kg		64.2	21.2	83.4	91	75-125				
Chromium	mg/kg		5.8	21.2	23.8	85	75-125				
Copper	mg/kg		709	21.2	707	-9	75-125	M1			
Iron	mg/kg		38000	264	34000	-1510	75-125	M1			
Lead	mg/kg		9500	21.2	11800	10800	75-125	E,M1			
Manganese	mg/kg		2070	21.2	1850	-1010	75-125	E,M1			
Nickel	mg/kg		7.3	21.2	23.3	76	75-125				
Silver	mg/kg		68.7	21.2	96.9	133	75-125	M1			
Zinc	mg/kg		6910	21.2	7810	4240	75-125	E,M1			

QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

QC Batch: MTPR/1490

Analysis Method: USDA 26

QC Batch Method: USDA 26

Analysis Description: Soil Moisture Content

Associated Lab Samples: 10134984003, 10134984004, 10134984005, 10134984006, 10134984007, 10134984008, 10134984009, 10134984010, 10134984011

SAMPLE DUPLICATE: 838624

Parameter	Units	10134984011 Result	Dup Result	RPD	Max RPD	Qualifiers
Soil Moisture Content	%	8.9	9.7	9	30	

QUALIFIERS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

CH The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

D6 The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

R1 RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134984002	FR-QC-WT-T1	EPA 200.8	MPRP/21721	EPA 200.8	ICPM/8900
10134984001	FR-T1-SB-01-15	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984003	FR-T3-TB-02-10	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984004	FR-T3-SB-02-20	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984005	FR-T3-SB-01-30	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984006	FR-T3-TB-01-20	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984007	FR-T3-TB-01-10	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984008	FR-T2-TB-01-10	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984009	FR-T2-SB-01-20	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984010	FR-T2-TB-02-10	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984011	FR-T2-SB-02-15	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984001	FR-T1-SB-01-15	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984003	FR-T3-TB-02-10	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984004	FR-T3-SB-02-20	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984005	FR-T3-SB-01-30	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984006	FR-T3-TB-01-20	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984007	FR-T3-TB-01-10	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984008	FR-T2-TB-01-10	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984009	FR-T2-SB-01-20	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984010	FR-T2-TB-02-10	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984011	FR-T2-SB-02-15	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984001	FR-T1-SB-01-15	% Moisture	MPRP/21693		
10134984003	FR-T3-TB-02-10	% Moisture	MPRP/21693		
10134984004	FR-T3-SB-02-20	% Moisture	MPRP/21693		
10134984005	FR-T3-SB-01-30	% Moisture	MPRP/21693		
10134984006	FR-T3-TB-01-20	% Moisture	MPRP/21693		
10134984007	FR-T3-TB-01-10	% Moisture	MPRP/21693		
10134984008	FR-T2-TB-01-10	% Moisture	MPRP/21693		
10134984009	FR-T2-SB-01-20	% Moisture	MPRP/21693		
10134984010	FR-T2-TB-02-10	% Moisture	MPRP/21693		
10134984011	FR-T2-SB-02-15	% Moisture	MPRP/21693		
10134984003	FR-T3-TB-02-10	ASA 15-5 mod	MT/4669		
10134984004	FR-T3-SB-02-20	ASA 15-5 mod	MT/4669		
10134984005	FR-T3-SB-01-30	ASA 15-5 mod	MT/4669		
10134984006	FR-T3-TB-01-20	ASA 15-5 mod	MT/4669		
10134984007	FR-T3-TB-01-10	ASA 15-5 mod	MT/4669		
10134984008	FR-T2-TB-01-10	ASA 15-5 mod	MT/4669		
10134984009	FR-T2-SB-01-20	ASA 15-5 mod	MT/4669		
10134984010	FR-T2-TB-02-10	ASA 15-5 mod	MT/4669		
10134984011	FR-T2-SB-02-15	ASA 15-5 mod	MT/4669		
10134984003	FR-T3-TB-02-10	Modified Sobek 7	MT/4692		
10134984006	FR-T3-TB-01-20	Modified Sobek 7	MT/4692		
10134984007	FR-T3-TB-01-10	Modified Sobek 7	MT/4692		
10134984008	FR-T2-TB-01-10	Modified Sobek 7	MT/4692		
10134984010	FR-T2-TB-02-10	Modified Sobek 7	MT/4692		
10134984003	FR-T3-TB-02-10	Modified Sobek 7	MT/4680		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134984006	FR-T3-TB-01-20	Modified Sobek 7	MT/4680		
10134984007	FR-T3-TB-01-10	Modified Sobek 7	MT/4680		
10134984008	FR-T2-TB-01-10	Modified Sobek 7	MT/4680		
10134984010	FR-T2-TB-02-10	Modified Sobek 7	MT/4680		
10134984003	FR-T3-TB-02-10	Modified Sobek 7	MT/4722		
10134984006	FR-T3-TB-01-20	Modified Sobek 7	MT/4722		
10134984007	FR-T3-TB-01-10	Modified Sobek 7	MT/4722		
10134984008	FR-T2-TB-01-10	Modified Sobek 7	MT/4722		
10134984010	FR-T2-TB-02-10	Modified Sobek 7	MT/4722		
10134984003	FR-T3-TB-02-10	Modified Sobek 7	MT/4633		
10134984006	FR-T3-TB-01-20	Modified Sobek 7	MT/4633		
10134984007	FR-T3-TB-01-10	Modified Sobek 7	MT/4633		
10134984008	FR-T2-TB-01-10	Modified Sobek 7	MT/4633		
10134984010	FR-T2-TB-02-10	Modified Sobek 7	MT/4633		
10134984003	FR-T3-TB-02-10	USDA 26	MTPR/1490		
10134984004	FR-T3-SB-02-20	USDA 26	MTPR/1490		
10134984005	FR-T3-SB-01-30	USDA 26	MTPR/1490		
10134984006	FR-T3-TB-01-20	USDA 26	MTPR/1490		
10134984007	FR-T3-TB-01-10	USDA 26	MTPR/1490		
10134984008	FR-T2-TB-01-10	USDA 26	MTPR/1490		
10134984009	FR-T2-SB-01-20	USDA 26	MTPR/1490		
10134984010	FR-T2-TB-02-10	USDA 26	MTPR/1490		
10134984011	FR-T2-SB-02-15	USDA 26	MTPR/1490		



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August 11, 2010

Mr. Kevin Houck P.E.
Herrera Environmental Consulting
101 East Broadway, Suite 610
Missoula, MT 59802

**RE: Forest Rose Repository
Pioneer Technical Services Project No. 14695**

Dear Mr. Houck,

On July 27th, Ms. Devin Clary of the Montana Department of Environmental Quality delivered thirteen samples from the Forest Rose Repository project to our ASTM/AASHTO/USACOE accredited materials testing laboratory. The samples were collected from three test pits and included nine 1-gallon zip-top baggies and four 5-gallon lidded bucket bulk samples. The testing request for the baggie samples consisted of:

- Moisture Content of Soil and Rock by Mass (ASTM D2216).

The testing request for the bulk samples consisted of:

- Particle Size Analysis of Soils (ASTM D422);
- Atterberg Liquid and Plastic Limits Testing (ASTM D4318); and,
- Standard Proctor Moisture/Density Relationships (ASTM D698).

The results of moisture content testing are presented on the attached Summary of Laboratory Results. The remaining testing results are summarized in the following four tables.

Table 1 – Particle Analysis

	RYSS-01	RYSS-02	RYSS-02	RYSS-03
	S-1	S-3	S-4	S-3
Lab No.	9481	9485	9487	9491
Sieve Size	Percent Passing			
3" 75 mm	100			
2" 50 mm	98			
1.5" 37.5 mm	91			
1" 25 mm	84			
3/4" 19 mm	77			100
1/2" 12.5 mm	70			99
3/8" 9.5 mm	66		100	99
# 4 4.75 mm	58	100	98	97
# 10 2.0 mm	57	98	96	93
# 20 0.85 mm	51	94	90	76
# 40 0.425 mm	45	70	65	54
# 60 0.250 mm	41	47	44	39
# 100 0.150 mm	36	30	29	28
# 200 0.075 mm	29	17	15	18

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HELENA
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Helena, MT 59601
Phone (406) 457-8252
Fax (406) 442-1158

The Proctor values for Lab No. 9481 were corrected for oversized particles (+3/4") using the 2.75 value from the soil specific gravity as the coarse particle specific gravity.

Table 2 – Proctor Moisture/Density Relationships, Atterberg Limits, Specific Gravity

Lab No.	Sample Location	Proctor Values			Atterberg Limits			Specific Gravity (-2mm)
		Corrected Max. Dry Density (lb/ft ³)	Corrected Opt. Moisture (%)	Oversized Material (%)	Liquid Limit	Plastic Limit	Plasticity Index	
9481	RYSS-01, S-1	126.5	11.5	22.9	24	17	7	2.75

Table 3 – Proctor Moisture/Density Relationships, Atterberg Limits, Specific Gravity

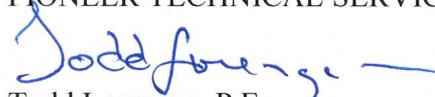
Lab No.	Sample Location	Proctor Values			Atterberg Limits			Specific Gravity (-2mm)
		Max. Dry Density (lb/ft ³)	Opt. Moisture (%)	Oversized Material (%)	Liquid Limit	Plastic Limit	Plasticity Index	
9485	RYSS-02, S-3	115.7	13.8	0.4	NP	NP	NP	2.85
9487	RYSS-02, S-4	112.9	16.6	1.7	NP	NP	NP	2.89
9491	RYSS-03, S-3	117.7	14.1	3.2	NP	NP	NP	2.88

Table 4 – Soil Classifications

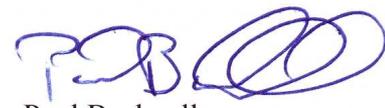
Lab No.	Sample Location	USCS Classification	AASHTO Classification	USDA Textural Classification
9481	RYSS-01 S-3	Silty, Clayey Gravel w/ Sand (GC-GM)	A-2-4 (0)	Very Gravelly Sandy Loam
9485	RYSS-02 S-3	Silty Sand (SM)	A-2-4 (0)	Loamy Sand
9487	RYSS-02 S-4	Silty Sand (SM)	A-2-4 (0)	Loamy Sand
9491	RYSS-03 S-3	Silty Sand (SM)	A-2-4 (0)	Loamy Sand

The Summary of Laboratory Results, grain size distribution curves, USDA Textural Classification chart with fractions normalized to 100% passing 2mm, and the Proctor curves are included with this report. We thank you for using Pioneer Technical Services for your geotechnical and materials testing requirements. If you have any questions regarding these results, please contact Todd Lorenzen or Paul Bushnell at (406) 443-6053.

Sincerely,
PIONEER TECHNICAL SERVICES, INC.



Todd Lorenzen, P.E.
Senior Geotechnical Engineer



Paul Bushnell
Materials Testing Supervisor

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Saturation (%)	Void Ratio
RYSS-01	0.1							11.1			
RYSS-01	0.2							7.3			
RYSS-01	0.3	24	17	7	75	29	A-2-4	9.8			
RYSS-02	0.1							7.8			
RYSS-02	0.2							6.0			
RYSS-02	0.3	NP	NP	NP	19	17	A-2-4	6.0			
RYSS-02	0.4	NP	NP	NP	12.5	15	A-2-4	5.6			
RYSS-03	0.1							5.4			
RYSS-03	0.2							5.0			
RYSS-03	0.3	NP	NP	NP	37.5	18	A-2-4	5.9			

Summary of Laboratory Results

Project: Forest Rose

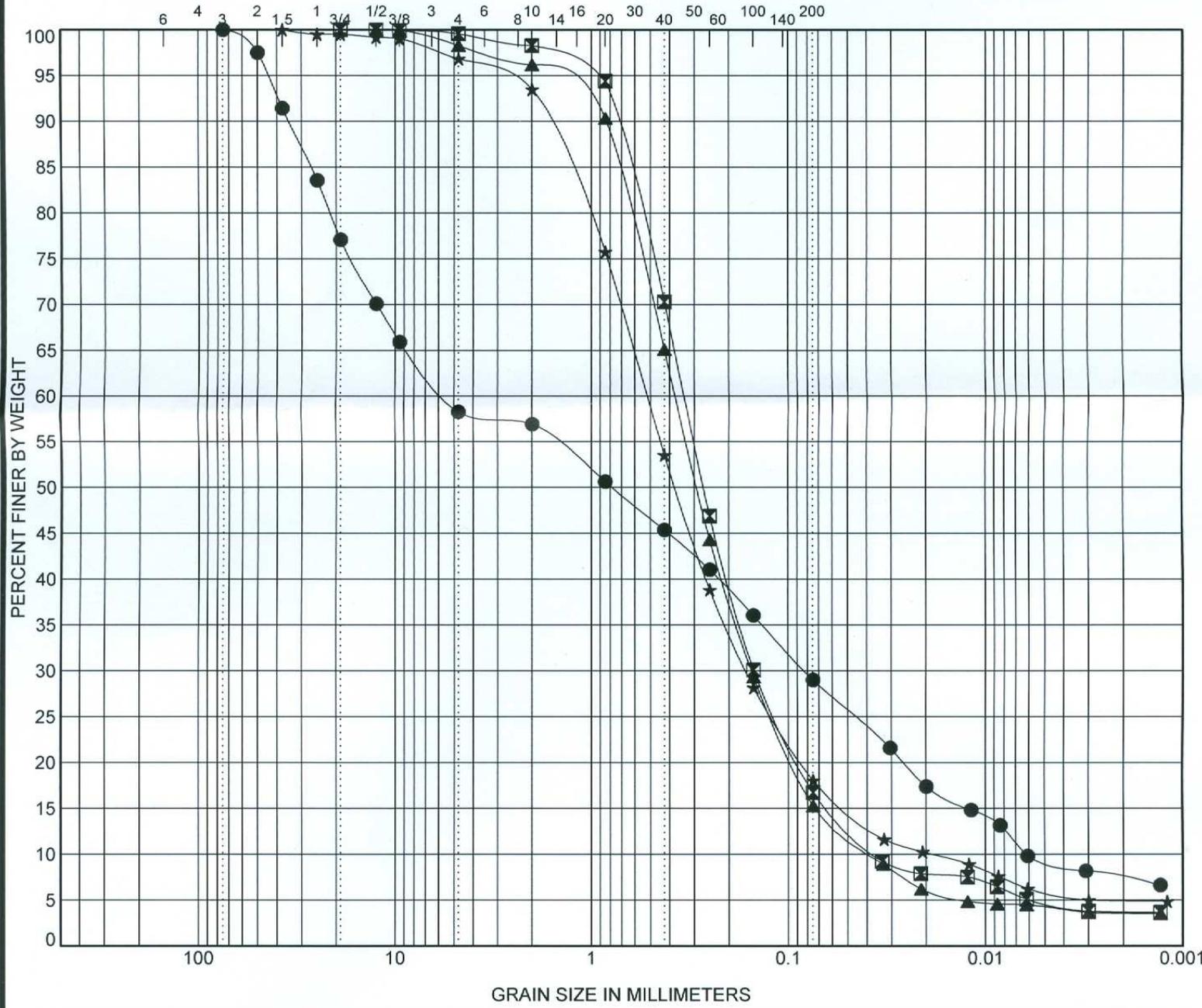
Number: 14695



U.S. SIEVE OPENING IN INCHES

U.S. SIEVE NUMBERS

HYDROMETER



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● RYSS-01 0.3	SILTY, CLAYEY GRAVEL with SAND(GC-GM)	24	17	7	0.20	893.46
▣ RYSS-02 0.3	SILTY SAND(SM)	NP	NP	NP	1.82	9.25
▲ RYSS-02 0.4	SILTY SAND(SM)	NP	NP	NP	1.66	9.79
★ RYSS-03 0.3	SILTY SAND(SM)	NP	NP	NP	2.75	27.68

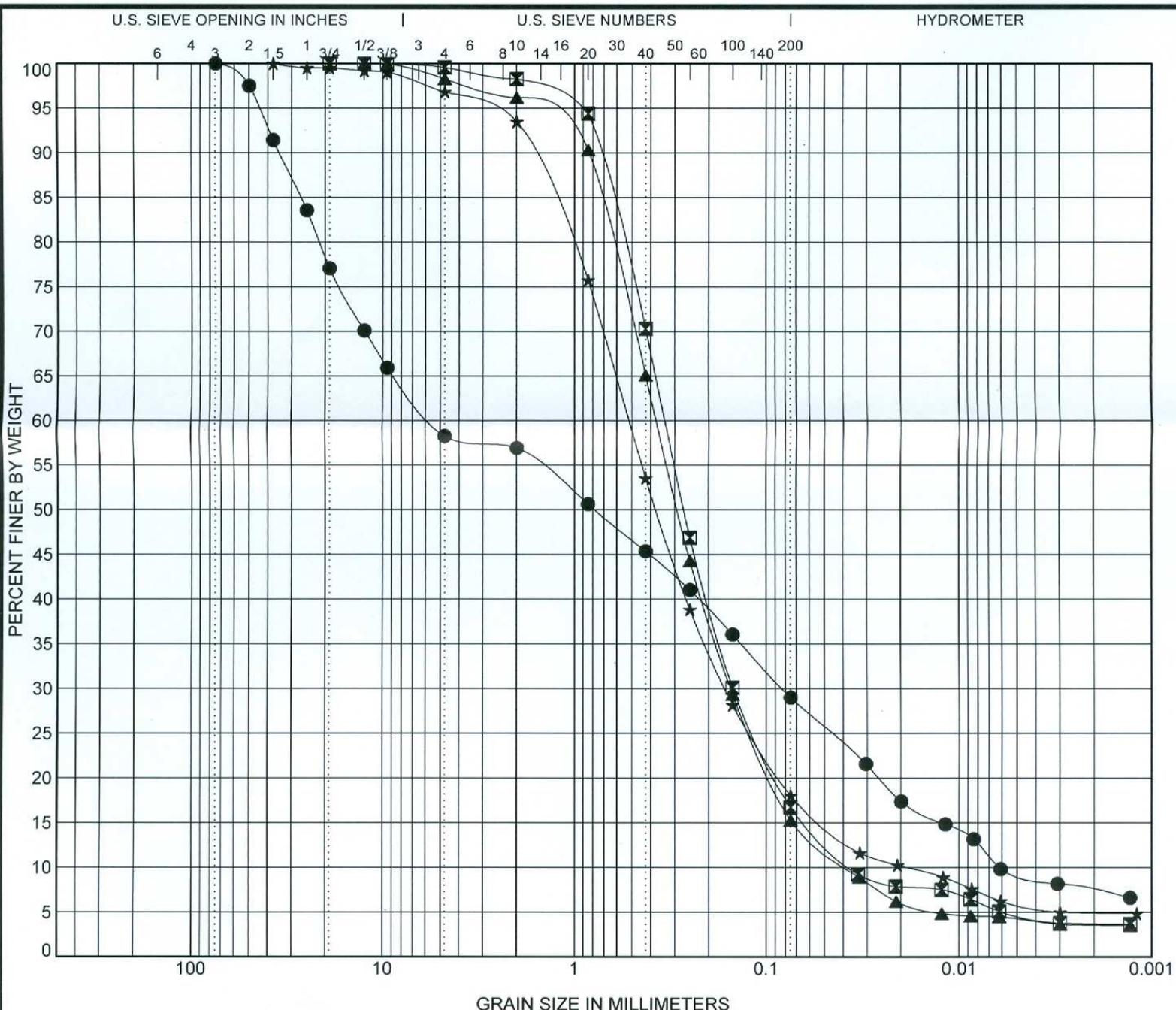
Specimen Identification	D100	D50	D15	D10	%Gravel	%Sand	%Silt	%Clay
● RYSS-01 0.3	75	0.783	0.012	0.006	41.7	29.3	21.6	7.4
▣ RYSS-02 0.3	19	0.268	0.062	0.036	0.4	82.8	13.0	3.7
▲ RYSS-02 0.4	12.5	0.289	0.072	0.038	1.7	83.0	11.7	3.6
★ RYSS-03 0.3	37.5	0.374	0.051	0.019	3.2	78.8	13.1	4.9

GRAIN SIZE DISTRIBUTION

Project: Forest Rose
 Number: 14695



S. GRAIN SIZE ASTM FOREST ROSE - 14695.GPJ PIONEER.GDT 8/11/10



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● RYSS-01 0.3	(A-2-4)	24	17	7	0.20	893.46
▣ RYSS-02 0.3	(A-2-4)	NP	NP	NP	1.82	9.25
▲ RYSS-02 0.4	(A-2-4)	NP	NP	NP	1.66	9.79
★ RYSS-03 0.3	(A-2-4)	NP	NP	NP	2.75	27.68

Specimen Identification	D100	D50	D15	D10	%Gravel	%Sand	%Silt	%Clay
● RYSS-01 0.3	75	0.783	0.012	0.006	41.7	29.3	21.6	7.4
▣ RYSS-02 0.3	19	0.268	0.062	0.036	0.4	82.8	13.0	3.7
▲ RYSS-02 0.4	12.5	0.289	0.072	0.038	1.7	83.0	11.7	3.6
★ RYSS-03 0.3	37.5	0.374	0.051	0.019	3.2	78.8	13.1	4.9

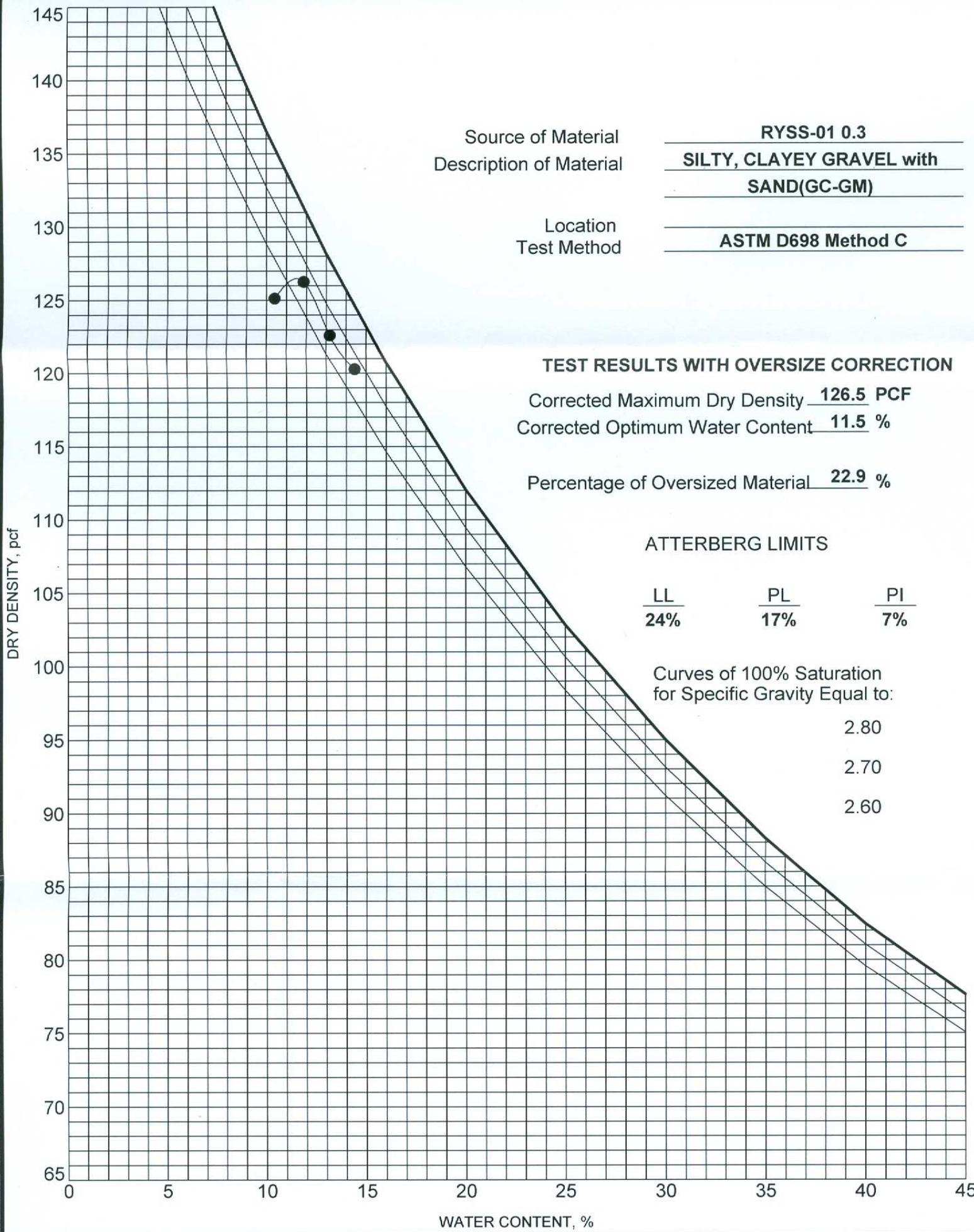


GRAIN SIZE DISTRIBUTION

Project: Forest Rose
 Number: 14695

U.S. GRAIN SIZE AASHTO FOREST ROSE - 14695.GPJ - PIONEER.GPJ 01/17/10

COMPACTION ROCK CORRECTION ASTM FOREST ROSE - 14695.GPJ COMPACTION ROCK CORRECTION.GDT 8/12/10



Source of Material
 Description of Material
 Location
 Test Method

RYSS-01 0.3
SILTY, CLAYEY GRAVEL with
SAND(GC-GM)
ASTM D698 Method C

TEST RESULTS WITH OVERSIZE CORRECTION
 Corrected Maximum Dry Density 126.5 PCF
 Corrected Optimum Water Content 11.5 %
 Percentage of Oversized Material 22.9 %

ATTERBERG LIMITS

LL	PL	PI
24%	17%	7%

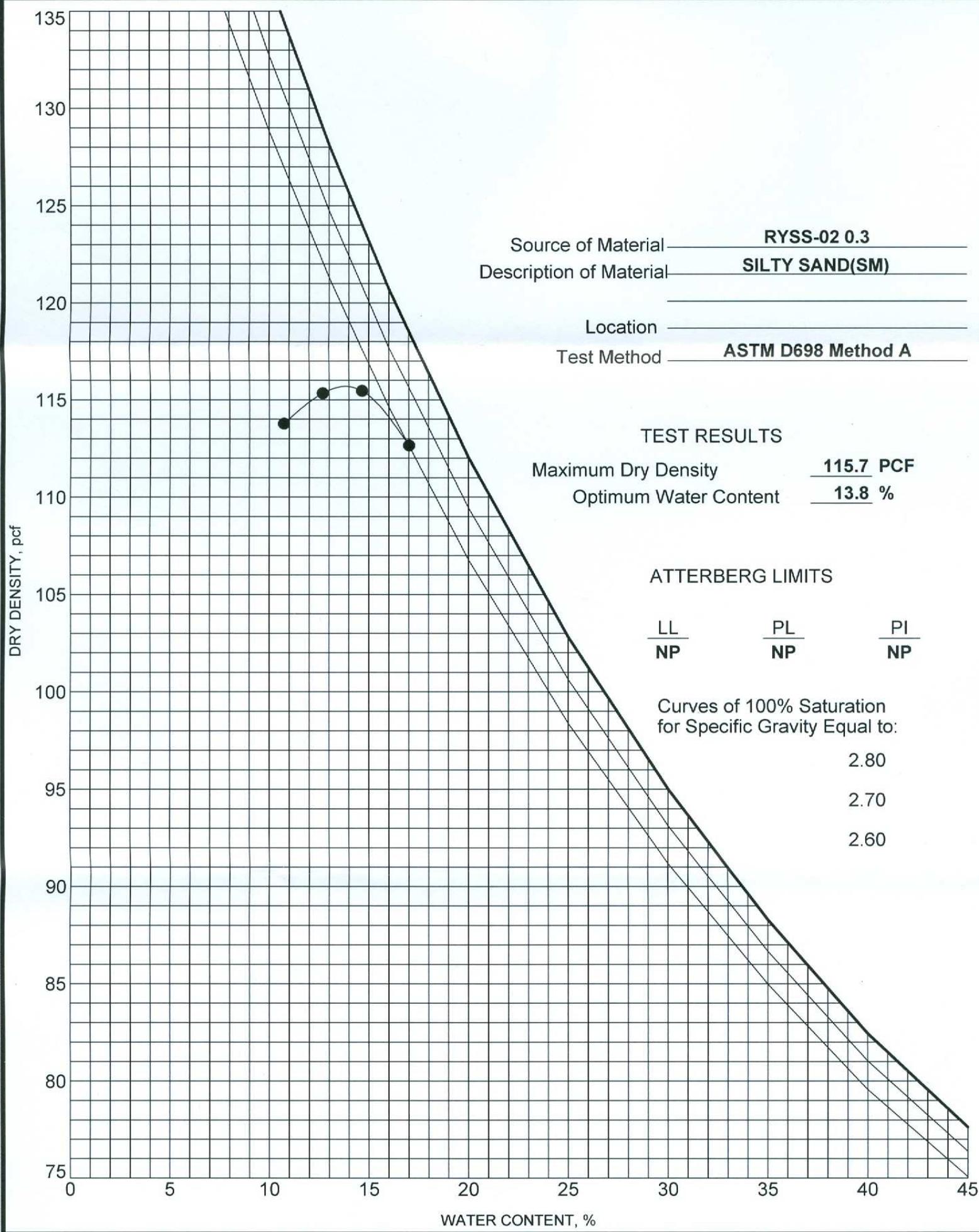
Curves of 100% Saturation
 for Specific Gravity Equal to:
 2.80
 2.70
 2.60



MOISTURE-DENSITY RELATIONSHIP

Project: Forest Rose
 Number: 14695

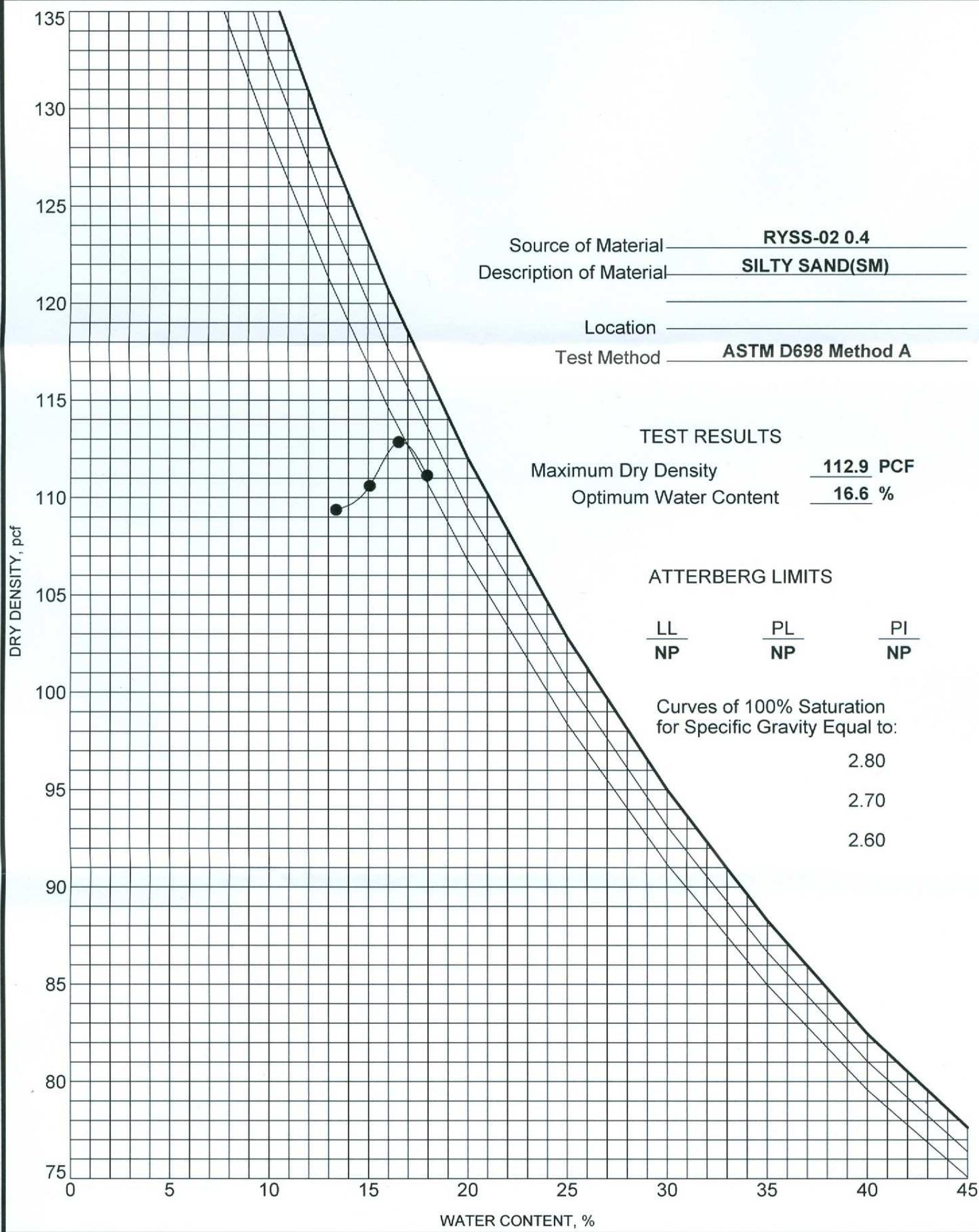
S:\COMPACTON_ASTM_FOREST ROSE - 14695.GPJ_PIONEER.GDT_8/11/10



MOISTURE-DENSITY RELATIONSHIP

Project: Forest Rose
 Number: 14695

S:\COMPACTON_ASTM_FOREST ROSE - 14695.GPJ PIONEER.GDT 8/11/10



Source of Material RYSS-02 0.4
 Description of Material SILTY SAND(SM)
 Location _____
 Test Method ASTM D698 Method A

TEST RESULTS
 Maximum Dry Density 112.9 PCF
 Optimum Water Content 16.6 %

ATTERBERG LIMITS

LL	PL	PI
NP	NP	NP

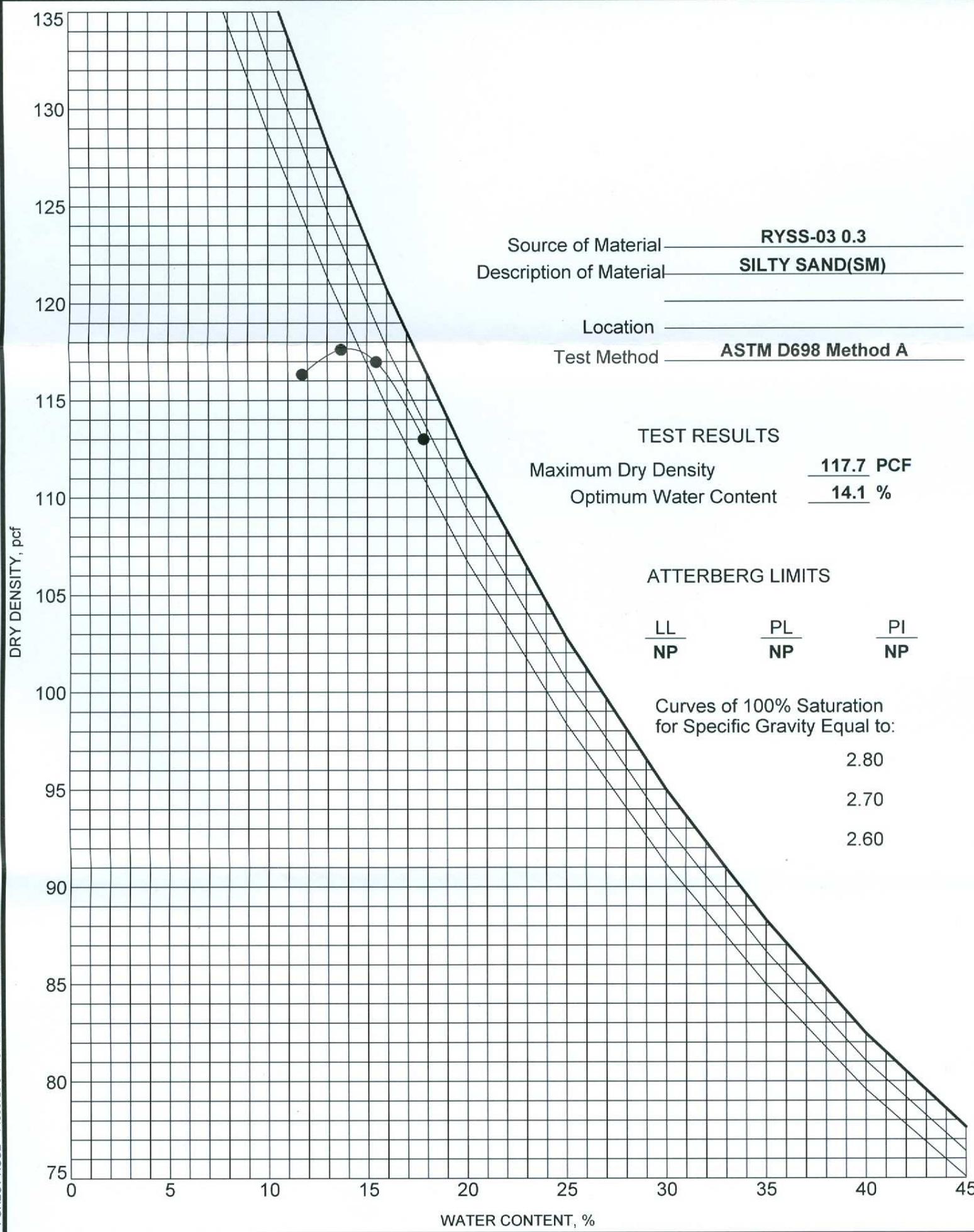
Curves of 100% Saturation
 for Specific Gravity Equal to:
 2.80
 2.70
 2.60



MOISTURE-DENSITY RELATIONSHIP

Project: Forest Rose
 Number: 14695

S: COMPACTION ASTM FOREST ROSE - 14695.GPJ PIONEER.GDT 8/11/10

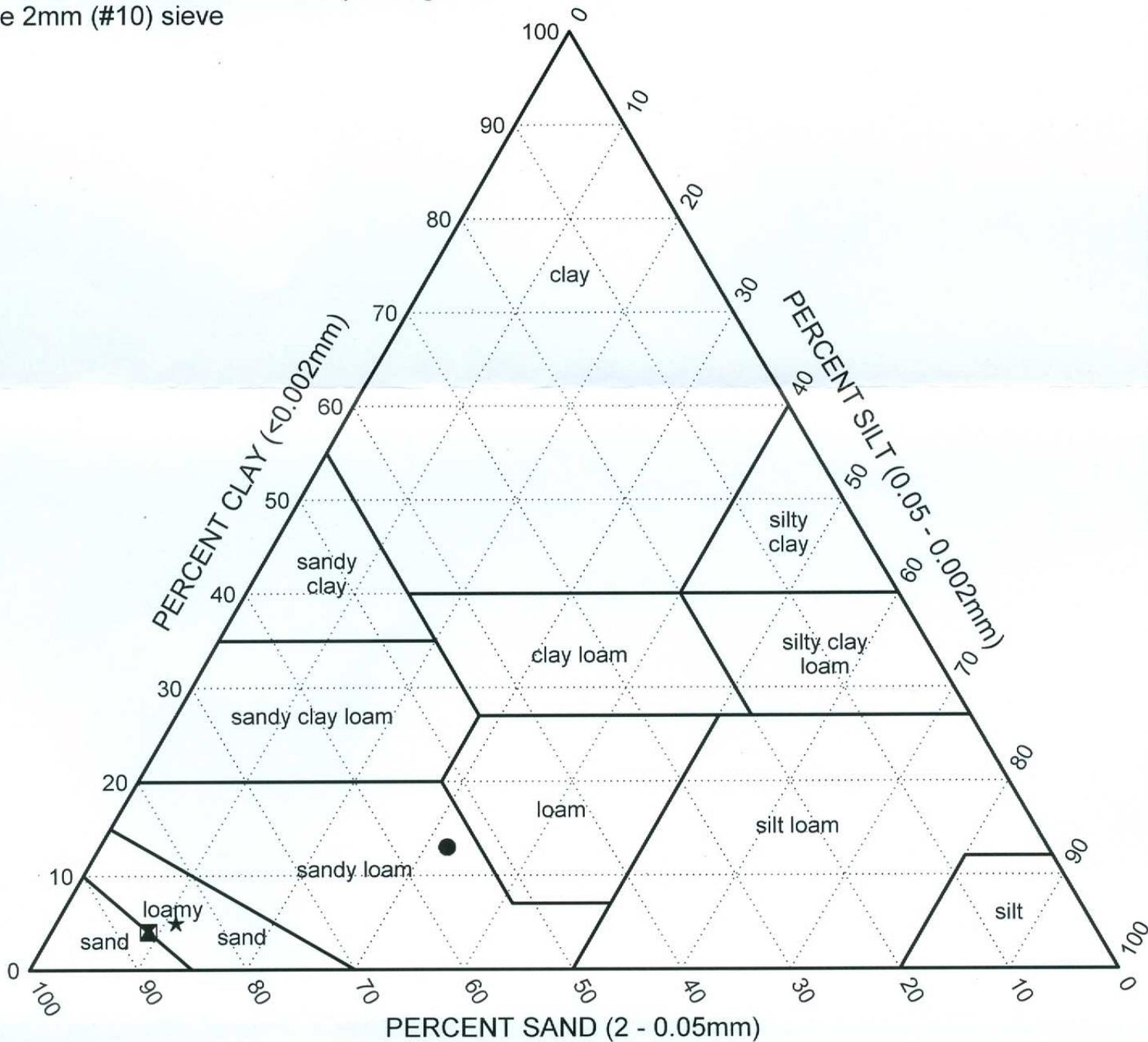


MOISTURE-DENSITY RELATIONSHIP

Project: Forest Rose

Number: 14695

Fractions normalized to 100% passing the 2mm (#10) sieve



	Borehole	Depth (ft)	USDA Classification	Sand (%)	Silt (%)	Clay (%)
●	RYSS-01	0.3	SANDY LOAM	54.9	32.1	13.0
☒	RYSS-02	0.3	LOAMY SAND	86.8	9.4	3.8
▲	RYSS-02	0.4	LOAMY SAND	87.4	8.9	3.7
★	RYSS-03	0.3	LOAMY SAND	84.1	10.6	5.3



USDA Textural Classification Chart

Project: Forest Rose

Number: 14695

SDA TEXTURAL CLASSIFICATION FOREST ROSE - 14695.GPJ PIONEER.GDT 8/11/10



HERRERA
ENVIRONMENTAL
CONSULTANTS

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring # RY-Well-01
Total depth 12.8 feet
Sheet 1 of 1

Project name: <u>Forest Rose Mine</u>	Drilling Contractor: <u>Boland Drilling</u>	Well installed (y/n): <u>Yes</u>
Project number: <u>06-03425-070</u>	Drilling method: <u>Hollow Stem Auger</u>	Casing material: <u>PVC Sch 40</u>
Client: <u>MDEQ</u>	Sampling method: <u>Split Spoon</u>	Casing diameter: <u>2-inch</u>
Location: <u>Repository</u>	Measuring point elev.: <u>N/A</u>	Screen slot width: <u>10 slot</u>
	Ground elevation: <u>N/A</u>	Casing joint type: <u>Flush-threaded</u>
HEC rep.: <u>Bruce Carpenter</u>	Air monitoring (y/n): <u>No</u>	Filter pack: <u>Colorado #10-20 sand</u>
Start Date: <u>07/27/10</u>	Instrument(s): <u>N/A</u>	Annular seal: <u>Bentonite chips</u>
Compl. Date: <u>07/27/10</u>		Monument type: <u>Stickup with Steel</u>

Depth to water	Dry Hole		
Reference point	TOC		
Date	7/27/10		

Monitoring well details

Cement	Filterpack
Bentonite	Well screen

Sample type, interval	% recovery	Blow Counts	Depth (feet, BGS)	Soil group	Soil description	Well details		
			1	SM	Grass/Dark Brown silty SAND with organics, dry [RESIDIUM]			
			2	ML	Dark Brown medium dense Sandy SILT, dry to moist			
			3					
			4					
Split spoon	50	3 6 8	5	SM	Brown medium dense silty SAND, trace gravel, moist [RESIDIUM]			
			6		Granite, rock fragments			
			7					
			8					
			9					
Split spoon	65	15 20 28	10	SW	Brown-tan dense to very dense SAND, moist [RESIDIUM]			
			11					
			12					
Split spoon	50	50/6" 50/3"	13		BEDROCK (Auger Refusal at 12.5')			
			14		Bottom of Boring at 12.8 ft.			
			15					
			16					
			17					

APPENDIX D

Human Health Risk Assessment Calculations

Appendix 4
Human Health Risk Assessment

Table 1. Determination of the Soil Contaminants of Potential Concern (COPC) at the Forest Rose Mine Site using the MTDEQ Recreational Risk Assessment Spreadsheets for Abandoned Mine Sites. COPCs for Forest Rose Mine Site are in bold.

Possible Soil Contaminants of Potential Concern	Surface Waste Rock Conc. ^a (mg/kg)	Surface Tailings Conc. ^a mg/kg	COPC Criteria from USEPA RAGS (2004b)				Above Clean-up Guidelines Tables 7-10 and 7-11 MTDEQ RBCG	COPC? ^b	Reasoning
			Contaminant present on site?	Conc. significantly above background?	Above the detection limit (20%)?	Accept. QA/QC results?			
Antimony	27.9	47.6	Y	Y	Y		N	Y	Above background
Arsenic	486.0	456.0	Y	Y	Y		Y	Y	Above Clean-up
Barium	112.0	39.4	Y	N	Y		N	N	
Cadmium	18.9	75.9	Y	Y	Y		Y	Y	Above cleanup
Chromium III	22.5	7.6	Y	N	Y		N	N	
Cobalt	NA	NA	Unknown	Unknown	Unknown		-	-	
Copper	628.0	728.0	Y	Y	Y		N	Y	Above background
Cyanide	NA	NA	Unknown	Unknown	Unknown		-	-	
Iron	123,000.0	164,000.0	Y	Y	Y		None	Y	Above background
Lead	4,560.0	7,850.0	Y	Y	Y		Y	Y	Above cleanup
Manganese	813.0	2,290.0	Y	Y	Y		Y	Y	Above cleanup
Mercury	0.9	0.4	Y	Y	Y		N	Y	Above background
Nickel	33.7	21.2	Y	N	Y		N	N	
Silver	28.9	30.7	Y	Y	Y		None	Y	Above background
Zinc	2,960.0	8,130.0	Y	Y	Y		N	Y	Above background

^aMaximum Point Concentrations for each from Forest Rose Mine Site samples

^bBased on MTDEQ RBCG Conservative Clean-up Guidelines for Recreationalist, Tables 7-10 and 7-11 (Tetra Tech 1996) and the four COPC criteria established by the USEPA RAGS (2004b)

^c NA indicates no samples taken for that specific chemical

Table 2. Determination of the Water Contaminants of Potential Concern (COPC) at the Forest Rose Mine Site using the MTDEQ Recreational Risk Assessment Spreadsheets for Abandoned Mine Sites. COPCs for Forest Rose Mine Site are in bold.

Possible Water Contaminants of Potential Concern	Surface Water Conc. ^{a%} (µg/L)	Contaminant present on site?	Conc. significantly above background?	Above the detection limit (20%)?	Accept. QA/QC results?	Above Clean-up Guidelines Tables 7-10 and 7-11 MTDEQ RBCG	Above MT WQB-7 Standard (MTDEQ 2008)	COPC? ^b	Reasoning
Antimony	0.64	Y	Y	N		N	N	Y	Above background
Arsenic	0.59	Y	N	N		Y	N	Y	Above Clean-up
Barium	16.50	Y	Y	Y		N	N	Y	Above background
Cadmium	0.72	Y	N	Y		N	N	Y	Above acute aquatic standards
Chromium III	ND ^d	Y	N	N		N	N	N	
Cobalt	NA ^c	Unknown	Unknown	Unknown		-	N	-	
Copper	1.70	Y	Y	Y		N	N	Y	Above background
Cyanide	NA ^c	Unknown	Unknown	Unknown		-	N	-	
Iron	93.50	Y	N	Y		None	N	N	
Lead	10.20	Y	Y	Y		N	N	Y	Above background
Manganese	21.50	Y	Y	Y		Y	N	Y	Above cleanup
Mercury	ND ^d	Y	N	N		N	N	N	
Nickel	ND ^d	Y	N	N		N	N	N	
Silver	ND ^d	Y	N	N		None	N	N	
Zinc	91.70	Y	N	Y		Y	N	Y	Above cleanup

^aMaximum Point Concentrations from Forest Rose Mine Site surface water samples excluding adit discharge

^bBased on MTDEQ RBCG Conservative Clean-up Guidelines for Recreationalist, Tables 7-10 and 7-11 (Tetra Tech 1996) and the four COPC criteria established by the USEPA RAGS (2004b)

^c NA indicates no samples taken for that specific chemical.

^d ND indicates chemical not detected in chemical analysis of samples.

Soil Exposure

Table 3. Recreational gold panner/ rock hound adult exposure to tailings, waste rock, and soils present on the Forest Rose Mine Site and the resulting Hazard Quotients. COCs for Forest Rose Mine are in bold.

COPC	Exposure point conc. ^a (EPCs) (mg/kg)	Chronic Exposure (mg/kg-day)			Chronic RfD (mg/kg-day)		RfC (mg/m3)	Hazard Quotient (HQ) ^b					Source for Toxic Thresholds
		Ingestion	Dermal	Inhalation	Oral	Dermal	Inhalation	Oral	Dermal	Inhalation	Sum of HQs	% of Total HQ	
Antimony	47.6	2.24E-05	5.40E-06	1.56E-10	4.00E-04	6.00E-05	NA	5.59E-02	9.00E-02		1.46E-01	3.0	USEPA 1991
Arsenic	486.0	2.28E-04	1.65E-04	1.60E-09	3.00E-04	3.00E-04	NA	7.61E-01	5.52E-01		1.31E+00	26.9	USEPA 1998
Cadmium ^c	75.9	3.56E-05	8.61E-07	2.49E-10	1.00E-03	2.50E-05	NA	3.56E-02	3.45E-02		7.01E-02	1.4	USEPA 1994
Copper	728.0	3.42E-04	8.26E-05	2.39E-09	4.00E-02	4.00E-02	NA	8.55E-03	2.07E-03		1.06E-02	0.2	HEAST
Iron	164,000.0	7.70E-02	1.86E-02	5.39E-07	7.00E-01	7.00E-01	NA	1.10E-01	2.66E-02		1.37E-01	2.8	Portage 2009 Tetra Tech 1996
Lead	7,850.0	3.69E-03	8.91E-04	2.58E-08	1.50E-03	1.50E-03	4.30E-04	2.46E+0	5.94E-01	6.00E-05	3.05E+00	62.7	
Manganese	4,170.0	1.96E-03	4.73E-04	1.37E-08	1.40E-01	5.60E-03	5.00E-05	1.40E-02	8.45E-02	2.74E-04	9.88E-02	2.0	USEPA 1997
Mercury	0.9	4.23E-07	1.02E-07	2.96E-12	3.00E-04	3.00E-04	3.00E-04	1.41E-03	3.41E-04	9.86E-09	1.75E-03	0.04	USEPA 1995
Silver	30.7	1.44E-05	3.48E-06	1.01E-10	5.00E-03	2.00E-04	NA	2.88E-03	1.74E-02		2.03E-02	0.4	USEPA 1996
Zinc	8,130.0	3.82E-03	9.23E-04	2.67E-08	3.00E-01	3.00E-01	NA	1.27E-02	3.08E-03		1.58E-02	0.3	USEPA 2005b
^a Max Exposure Point Concentration in Soil, WR, and Tailings					Total HQ			3.46E+0	1.40E+0	3.34E-04	4.86E+00		
^b HQ = Chronic Exposure/Chronic Reference Dose (RfD)					Percentage of Total Exposure HQ			71.13%	28.87%	0.01%			
^c Cadmium oral RfD is specific to food (solid) intake													

Table 4. Recreational gold panner/ rock hound child exposure to tailings, waste rock, and soils present on the Forest Rose Mine Site and the resulting Hazard Quotients. COCs for Forest Rose Mine are in bold.

COPC	Exposure point conc. ^a (EPCs) (mg/kg)	Chronic Exposure (mg/kg-day)			Chronic RfD (mg/kg-day)		RfC (mg/m3)	Hazard Quotient (HQ) ^b				% of Total HQ	Source for Toxic Thresholds	
		Ingestion	Dermal	Inhalation	Oral	Dermal	Inhalation	Oral	Dermal	Inhalation	Sum of HQs			
Antimony	47.6	4.35E-05	7.82E-06	6.15E-10	4.00E-04	6.00E-05	NA	1.09E-01	1.30E-01		2.39E-01	2.72	USEPA 1991	
Arsenic	486.0	4.44E-04	2.40E-04	6.28E-09	3.00E-04	3.00E-04	NA	1.48E+00	7.99E-01		2.28E+00	26.0	USEPA 1998	
Cadmium ^c	75.9	6.93E-05	1.25E-06	9.80E-10	1.00E-03	2.50E-05	NA	6.93E-02	4.99E-02		1.19E-01	1.36	USEPA 1994	
Copper	728.0	6.65E-04	1.20E-04	9.40E-09	4.00E-02	4.00E-02	NA	1.66E-02	2.99E-03		1.96E-02	0.22	HEAST	
Iron	164,000.0	1.50E-01	2.70E-02	2.12E-06	7.00E-01	7.00E-01	NA	2.14E-01	3.85E-02		2.52E-01	2.88	Portage 2009 Tetra Tech	
Lead	7,850.0	7.17E-03	1.29E-03	1.01E-07	1.50E-03	1.50E-03	4.30E-04	4.78E+00	8.60E-01	2.36E-04	5.64E+00	64.36	1996	
Manganese	4,170.0	3.81E-03	6.85E-04	5.39E-08	1.40E-01	5.60E-03	5.00E-05	2.72E-02	1.22E-01	1.08E-03	1.51E-01	1.72	USEPA 1997	
Mercury	0.9	8.22E-07	1.48E-07	1.16E-11	3.00E-04	3.00E-04	3.00E-04	2.74E-03	4.93E-04	3.87E-08	3.23E-03	0.04	USEPA 1995	
Silver	30.7	2.80E-05	5.05E-06	3.96E-10	5.00E-03	2.00E-04	NA	5.61E-03	2.52E-02		3.08E-02	0.35	USEPA 1996	
Zinc	8,130.0	7.42E-03	1.34E-03	1.05E-07	3.00E-01	3.00E-01	NA	2.47E-02	4.45E-03		2.92E-02	0.33	USEPA 2005b	
^a Max Exposure Point Concentration in Soil, WR, and Tailings							Total HQs	6.73E+0	2.03E+0	1.31E-03	8.76E+00			
^b HQ = Chronic Exposure/Chronic Reference Dose (RfD)							% of Total HQ	76.78%	23.21%	0.01%				
^c Cadmium oral RfD is for specific to food (solid) intake														

Table 5. Recreational gold panner/ rock hound adult exposure to surface water and adit discharge present on the Forest Rose Mine Site and the resulting Hazard Quotients.

COPC	Exposure point concentration (EPCs) ^a (µg/L)	Chronic Exposure (mg/kg-day)		Chronic RfD (mg/kg-day)		Hazard Quotient (HQ) ^b				Source for Toxic Thresholds
		Ingestion	Dermal	Oral	Dermal	Oral	Dermal	Sum of HQs	% of Total HQ	
Antimony	1.10	2.15E-06	3.23E-08	4.00E-04	6.00E-05	5.38E-03	5.38E-04	5.92E-03	9.24%	USEPA 1991
Arsenic	0.59	1.15E-06	1.73E-08	3.00E-04	3.00E-04	3.85E-03	5.77E-05	3.91E-03	6.10%	USEPA 1998 USEPA 2005;
Barium	20.50	4.01E-05	6.02E-07	2.00E-01	1.40E-02	2.01E-04	4.30E-05	2.44E-04	0.38%	HEAST 1997
Cadmium ^c	6.10	1.19E-05	1.79E-07	5.00E-04	2.50E-05	2.39E-02	7.16E-03	3.10E-02	48.45%	USEPA 1994
Copper	1.70	3.33E-06	4.99E-08	4.00E-02	4.00E-02	8.32E-05	1.25E-06	8.44E-05	0.13%	HEAST
Lead	10.20	2.00E-05	2.99E-07	1.50E-03	1.50E-03	1.33E-02	2.00E-04	1.35E-02	21.08%	Tetra Tech 1996
Manganese	21.50	4.21E-05	6.31E-07	1.40E-01	5.60E-03	3.01E-04	1.13E-04	4.13E-04	0.65%	USEPA 1997
Zinc	1,360.00	2.66E-03	2.40E-05	3.00E-01	3.00E-01	8.87E-03	7.98E-05	8.95E-03	13.97%	USEPA 2005b
^a Maximum exposure point concentration in surface water and adit discharge					Total HQ	5.59E-02	8.19E-03	6.41E-02		
					% of Total	87.21%	12.79%			
^b HQ = Chronic Exposure/Chronic Reference Dose (RfD)										
^c Cadmium oral RfD is specific to water intake										

Table 6. Recreational gold panner/ rock hound child exposure to surface water and adit discharge present on the Forest Rose Mine Site and the resulting Hazard Quotients.

COPC	Exposure point conc. ^a (EPCs) (µg/L)	Chronic Exposure (mg/kg-day)		Chronic RfD (mg/kg-day)		Hazard Quotient (HQ) ^b			% of Total HQ	Source for Toxic Thresholds
		Ingestion	Dermal	Oral	Dermal	Oral	Dermal	Sum of HQs		
Antimony	1.1	1.0E-05	4.5E-08	4.00E-04	6.00E-05	2.51E-02	7.53E-04	2.59E-02	9.50	USEPA 1991
Arsenic	0.6	5.4E-06	2.4E-08	3.00E-04	3.00E-04	1.80E-02	8.08E-05	1.80E-02	6.63	USEPA 1998
Barium	20.5	1.9E-04	8.4E-07	2.00E-01	1.40E-02	9.36E-04	6.02E-05	9.96E-04	0.37	USEPA 2005; HEAST 1997
Cadmium ^c	6.1	5.6E-05	2.5E-07	5.00E-04	2.50E-05	1.11E-01	1.00E-02	1.21E-01	44.62	USEPA 1994
Copper	1.7	1.6E-05	7.0E-08	4.00E-02	4.00E-02	3.88E-04	1.75E-06	3.90E-04	0.14	HEAST
Lead	10.2	9.3E-05	4.2E-07	1.50E-03	1.50E-03	6.21E-02	2.79E-04	6.24E-02	22.92	Tetra Tech 1996
Manganese	21.5	2.0E-04	8.8E-07	1.40E-01	5.60E-03	1.40E-03	1.58E-04	1.56E-03	0.57	USEPA 1997
Zinc	1,360.0	1.2E-02	3.4E-05	3.00E-01	3.00E-01	4.14E-02	1.12E-04	4.15E-02	15.25	USEPA 2005b
^a Max Exposure Point Concentration in surface water and adit discharge				Total HQs		2.61E-01	1.15E-02	2.72E-01		
^b HQ = Chronic Exposure/Chronic Reference Dose (RfD)				% of Total HQ		95.79%	4.21%			
^c Cadmium oral RfD is specific to water intake										

Table 7. Recreational gold panner/ rock hound adult exposure to sediment present on the Forest Rose Mine Site and the resulting Hazard Quotients.

COPC	Exposure point concentration in sediment ^a (EPCs) (mg/kg)	Chronic Exposure ^b (mg/kg-day)	Chronic RfD (mg/kg-day)	Hazard Quotient (HQ) ^c	Source for Toxic Thresholds
		Ingestion	Oral	Oral	
Antimony	1.2	5.64E-07	4.00E-04	1.41E-03	USEPA 1991
Arsenic	24.3	1.14E-05	3.00E-04	3.80E-02	USEPA 1998
Cadmium ^d	6.6	3.10E-06	1.00E-03	3.10E-03	USEPA 1994
Copper	69.0	3.24E-05	4.00E-02	8.10E-04	HEAST
Iron	37100.0	1.74E-02	7.00E-01	2.49E-02	Portage 2009
Lead	448.0	2.10E-04	1.50E-03	1.40E-01	Tetra Tech 1996
Manganese	796.0	3.74E-04	1.40E-01	2.67E-03	USEPA 1997
Mercury	0.02	9.39E-09	3.00E-04	3.13E-05	USEPA 1995
Silver	1.1	5.17E-07	5.00E-03	1.03E-04	USEPA 1996
Zinc	1160.0	5.45E-04	3.00E-01	1.82E-03	USEPA 2005b
^a Maximum exposure point concentration in sediment ^b Exposure calculations use Gold Panner/ Rock Hound Exposure Parameters ^c HQ = Chronic Exposure/Chronic Reference Dose (RfD) ^d Cadmium oral RfD is specific to food (solid) intake					

Table 8. Recreational gold panner/ rock hound child exposure to sediment present on the Forest Rose Mine Site and the resulting Hazard Quotients.

COPC	Exposure point concentration in sediment ^a (EPCs) (mg/kg)	Chronic Exposure ^b (mg/kg-day)	Chronic RfD (mg/kg-day)	Hazard Quotient (HQ) ^c	Source for Toxic Thresholds
		Ingestion	Oral	Oral	
Antimony	1.2	1.10E-06	4.00E-04	2.74E-03	USEPA 1991
Arsenic	24.3	2.22E-05	3.00E-04	7.40E-02	USEPA 1998
Cadmium ^d	6.6	6.03E-06	1.00E-03	6.03E-03	USEPA 1994
Copper	69.0	6.30E-05	4.00E-02	1.58E-03	HEAST
Iron	37100.0	3.39E-02	7.00E-01	4.84E-02	Portage 2009
Lead	448.0	4.09E-04	1.50E-03	2.73E-01	Tetra Tech 1996
Manganese	796.0	7.27E-04	1.40E-01	5.19E-03	USEPA 1997
Mercury	0.02	1.83E-08	3.00E-04	6.09E-05	USEPA 1995
Silver	1.1	1.00E-06	5.00E-03	2.01E-04	USEPA 1996
Zinc	1160.0	1.06E-03	3.00E-01	3.53E-03	USEPA 2005b
^a Maximum exposure point concentration in sediment ^b Exposure calculations use Gold Panner/ Rock Hound Exposure Parameters ^c HQ = Chronic Exposure/Chronic Reference Dose (RfD) ^d Cadmium oral RfD is specific to food (solid) intake					

Table 9. Recreational Fisherman adult exposure to fish consumption on the Forest Rose Mine Site and the resulting Hazard Quotients.

COPC	Exposure point concentration in water ^a (EPCs) (µg/L)	Chronic Exposure ^b (mg/kg-day) Ingestion	Chronic RfD (mg/kg-day) Oral	Hazard Quotient (HQ) ^c Oral	Source for Toxic Thresholds
Antimony	0.64	1.19E-07	4.00E-04	2.97E-04	USEPA 1991
Arsenic	0.59	4.82E-06	3.00E-04	1.61E-02	USEPA 1998
Cadmium ^d	0.72	1.08E-05	1.00E-03	1.08E-02	USEPA 1994
Copper	1.70	6.32E-05	4.00E-02	1.58E-03	HEAST
Lead	10.20	9.28E-05	1.50E-03	6.19E-02	Tetra Tech 1996
Manganese	21.50	1.92E-04	1.40E-01	1.37E-03	USEPA 1997
Zinc	91.70	8.01E-04	3.00E-01	2.67E-03	USEPA 2005b
^a Maximum exposure point concentration in surface waters excluding adit discharge ^b Exposure calculations use the Fisherman scenario Exposure Parameters ^c HQ = Chronic Exposure/Chronic Reference Dose (RfD) ^d Cadmium oral RfD is specific to food (solid) intake					

Table 10. Estimated Lifetime Cancer Risks for gold panner/rock hound recreationalist from tailings, waste rock, and soils at the Forest Rose Mine Site. Sources for Slope Factors are USEPA 1998 and USEPA 1994. Carcinogen COCs for Forest Rose Mine are in bold.

Carcinogen COCs	Exposure Point Concentration ^a (mg/kg)	Lifetime Exposure (mg/kg-day)			Slope Factor (mg/kg-d) ⁻¹ or (µg/cu.m)			Estimated Lifetime Cancer Risk ^b			
		Ingestion	Dermal	Inhalation	Oral	Dermal	Inhalation	Oral	Dermal	Inhalation	Total ELCR
Arsenic	486.0	1.16E-04	7.73E-05	3.80E-05	1.50E+00	1.50E+00	1.50E+00	1.74E-04	1.16E-04	5.71E-05	3.47E-04
Cadmium	75.90	1.82E-05	4.02E-07	5.94E-06	NA	NA	1.80E-03	NA	NA	1.07E-08	1.07E-08

^a Max Chemical Concentration in Soil, WR, and Tailings

^b Estimated Lifetime Cancer Risk = Lifetime Exposure * Slope Factor; Cancer Risk greater than 1x10⁻⁶ is unacceptable (USEPA 2004b)

Table 11. Estimated Lifetime Cancer Risks for gold panner/rock hound recreationalist from surface waters and adit discharge at the Forest Rose Mine Site. Carcinogen COCs are for Forest Rose Mine Site are in bold.

Carcinogen COCs	Exposure Point Concentration ^a (µg/L)	Lifetime Exposure (mg/kg-day)		Slope Factor (mg/kg-d) ⁻¹		Estimated Lifetime Cancer Risk ^b			Source
		Ingestion	Dermal	Oral	Dermal	Oral	Dermal	Total ELCR	
Arsenic	0.59	8.58E-07	8.02E-09	1.50E+00	1.50E+00	1.29E-06	1.20E-08	1.30E-06	USEPA 1998; Tetra Tech 1996
Cadmium	6.1	8.87E-06	8.29E-08	NA	NA	NA	NA	0.00E+00	USEPA 1994

^a Maximum sample point concentration including surface water and adit discharge

^b Estimated Lifetime Cancer Risk = Lifetime Exposure * Slope Factor; Cancer Risk greater than 1x10⁻⁶ is unacceptable (USEPA 2004b)

Table 12. Estimated Lifetime Cancer Risks for gold panner/rock hound recreationalist from sediment at the Forest Rose Mine Site. Carcinogen COCs are for Forest Rose Mine Site are in bold.

Carcinogen COCs	Exposure Point Concentration ^a (mg/kg)	Lifetime Exposure (mg/kg-day) Ingestion	Slope Factor (mg/kg-d) ⁻¹ Oral	Estimated Lifetime Cancer Risk ^b Oral	Source
Arsenic	24.30	5.82E-06	1.50E+00	8.72E-06	USEPA 1998; Tetra Tech1996
Cadmium	6.60	1.58E-06	NA	NA	USEPA 1994

^a Maximum exposure point concentration in sediment

^b Estimated Lifetime Cancer Risk = Lifetime Exposure * Slope Factor; Cancer Risk greater than 1x10⁻⁶ is unacceptable (USEPA 2004b)

Table 13. Estimated Lifetime Cancer Risks for gold panner/rock hound recreationalist from fish from the Forest Rose Mine Site. Carcinogen COCs are for Forest Rose Mine Site are in bold.

Carcinogen COCs	Exposure Point Concentration ^a (µg/kL)	Lifetime Exposure (mg/kg-day) Ingestion	Slope Factor (mg/kg-d) ⁻¹ Oral	Estimated Lifetime Cancer Risk ^b	Source
Arsenic	0.59	2.07E-06	1.50E+00	3.10E-06	USEPA 1998; Tetra Tech1996
Cadmium	0.72	4.64E-06	NA		USEPA 1994

^a Maximum exposure point concentration in surface waters excluding adit discharge
^b Estimated Lifetime Cancer Risk = Lifetime Exposure * Slope Factor; Cancer Risk greater than 1x10⁻⁶ is unacceptable (USEPA 2004b)

APPENDIX E

Ecological Health Risk Assessment Calculations

ECOLOGICAL RISK ASSESSMENT SPREADSHEET FOR ABANDONED MINE SITES

PAGE 1 - SITE SPECIFIC INFORMATION

SITE NAME: Forest Rose Mine Site

COPCs	Aquatic Life Maximum Surface Water Conc. µg/L	Assoc. Surface Water Hardness* mg/L	Maximum Sediment Conc. mg/kg	Deer Ingestion Water Conc. µg/L	Deer Ingestion/ Phytotoxicity Surface Conc. mg/kg	Contaminant of Concern?
Aluminum	15.3	170	-	15.6	-	N
Antimony	0.64	170	1.20	1.10	47.60	N
Arsenic	0.59	170	24.30	0.68	486.00	Y
Barium	16.50	170	65.40	20.50	290.00	N
Cadmium	0.72	170	6.60	6.10	75.90	Y
Chromium III	-	25	30.3	-	27.80	N
Copper	1.70	170	69.00	1.70	728.00	Y
Iron	93.50	170	37100.00	117.00	164000.00	N
Lead	10.20	170	448.00	10.20	9500.00	Y
Manganese	21.50	170	796.00	21.50	4170.00	N
Mercury	-	25	0.02	-	0.90	N
Nickel	-	25	41.10	2.10	37.10	Y
Silver	-	25	1.10	-	30.70	Y
Zinc	91.70	170	1160.00	1360.00	8130.00	Y

Note: Minimum hardness=25 mg/L; Maximum=400 mg/L

All site specific data are entered on page 1; pages 2 through 5 are lookup tables and page 6 presents the resultant EQs.

Enter media concentrations for the site, either areal averages or site maximum concentrations. If a contaminant does not meet the criteria for "contaminant of concern", enter 0 as the concentration or leave it blank (don't leave hardness blank). These criteria are listed below:

- 1) contaminants associated with and present at the site;
- 2) contaminants with concentrations significantly above background (generally 3 times higher);
- 3) contaminants with at least 20% of the measured concentrations above the detection limit; and,
- 4) contaminants with acceptable QA/QC results applied to the data.

Column B are surface water concentrations for comparison to aquatic life standards. Enter the maximum concentration measured in "real" surface water at the site (i.e. not adit discharges or intermittent water) that aquatic life might live in.

Column C are hardness measurements for the corresponding surface water concentration in column B in mg/L. Note that the minimum hardness for AWQC calculation is 25 mg/L and the maximum is 400 mg/L. Don't leave blank.

Column D are the maximum sediment concentrations measured at the site in "real" surface water (not adit discharges or intermittent drainages) for aquatic life impacts.

Column E are surface water concentrations that deer might drink at the site. This includes adit discharges, intermittent drainages, and ponded water, as long as it is accessible by deer.

Column F are surface waste concentrations for both the deer ingestion (salt) scenario and the phytotoxicity scenario. Enter the mean surface concentration of the highest concentration source at the site (generally tailings).

ECOLOGICAL RISK ASSESSMENT SPREADSHEET FOR ABANDONED MINE SITES

PAGE 2 - AQUATIC LIFE CRITERIA EQ

SITE NAME: Forest Rose Mine Site

COPCs	Acute Criteria* µg/L	Chronic Criteria* µg/L	Acute EQ	Chronic EQ
Aluminum	750.0	87.0	0.020	0.176
Arsenic	340.0	150.0	0.002	0.004
Cadmium**	3.7	0.4	0.197	1.796
Chromium III**	579.3	27.7	NA	NA
Copper**	23.1	14.7	0.074	0.116
Iron	NA	1000.0	NA	0.094
Lead**	160.4	6.3	0.064	1.632
Mercury	1.7	0.9	NA	NA
Nickel**	145.2	16.1	NA	NA
Silver**	0.4		NA	NA
Zinc**	187.8	187.8	0.488	0.488
TOTAL			0.844	4.129
*Aquatic Life Standards are from MTDEQ's Circular DEQ-7 Montana Numeric Water Quality Standards (WQB-7), 2008				
**Aquatic Life Standards are adjusted for the hardness value of 170 mg/L as measured in chemical analyses of surface water samples taken from Forest Rose Mine Site.				

Both chronic and acute are calculated in the table;

However, the chronic values are for reference only. Chronic criteria are not applicable unless surface water has been sampled over the entire range of hydrologic conditions at the site, and a statistically significant number of samples at each station are averaged to determine the chronic concentrations over time.

ECOLOGICAL RISK ASSESSMENT SPREADSHEET FOR ABANDONED MINE SITES

PAGE 3 - SEDIMENT QUALITY CRITERIA EQ

SITE NAME: Forest Rose Mine Site

COPCs	SQG Effect Range- Low* mg/kg	Sediment EQ
Arsenic	8.2	2.96
Cadmium	1.2	5.50
Chromium III	81.0	0.37
Copper	34.0	2.03
Lead	46.7	9.59
Mercury	0.2	0.15
Nickel	20.9	1.97
Silver	1.0	1.10
Zinc	150.0	7.73
TOTAL		31.41

*From NOAA, 1999; Most conservative range (Low) due to presence of Westslope Cutthroat Trout

ECOLOGICAL RISK ASSESSMENT SPREADSHEET FOR ABANDONED MINE SITES

PAGE 4 - DEER INGESTION EQ

SITE NAME: Forest Rose Mine Site

COPCs	Deer Intake Dose Est. Soil + Water* mg/kg-day	NOAELs or Toxic Thresholds for Deer** mg/kg-day	Deer Ingestion EQ	Toxic Endpoint Source
Aluminum	0.001	0.294	0.003	Sample et. al, 1996
Antimony	0.001	0.019	0.039	Sample et. al, 1996
Arsenic	0.007	0.019	0.361	Sample et. al, 1996
Barium	0.005	1.5	0.004	Sample et. al, 1996
Cadmium	0.001	0.271	0.005	Sample et. al, 1996
Chromium	0.000	768	0.000	Sample et. al, 1996
Copper	0.010	4.3	0.002	Sample et. al, 1996
Lead	0.134	0.005	26.772	ATSDR, 1993
Manganese	0.060	25	0.002	Sample et. al, 1996
Mercury	0.000	0.36	0.000	Sample et. al, 1996
Nickel	0.001	11.22	0.000	Sample et. al, 1996
Zinc	0.202	44.9	0.005	Sample et. al, 1996
TOTAL			27.1938	
<p>*Exposure Parameters were obtained from Sample and Suter II 1994 **The most recent and most conservative estimated NOAELs are used for toxic threshold values</p>				

ECOLOGICAL RISK ASSESSMENT SPREADSHEET FOR ABANDONED MINE SITES

PAGE 5 - PHYTOTOXICITY EQ

SITE NAME: Forest Rose Mine Site

COPCs	Phytotoxic Soil Conc.* mg/kg	Phytotoxicity EQ
Arsenic	10	48.60
Cadmium	3	25.30
Copper	60	12.13
Lead	50	190.00
Mercury	5	0.18
Zinc	50	162.60
TOTAL		438.81
<p>*Most conservative phytotoxic concentrations in soils from CH2MHill (1987); Rice and Ray (1984); Efromyson et al. (1997); and Kabata-Pemdias (1992)</p>		

**ECOLOGICAL RISK ASSESSMENT SPREADSHEET FOR ABANDONED MINE SITES
PAGE 6 - COMBINATION OF ECOLOGIC IMPACT QUOTIENTS
(EQs)**

SITE NAME: Forest Rose Mine Site

COPCs	Aquatic Life-Surface Water EQ (Acute)	Aquatic Life-Sediment EQ	Deer Ingestion EQ	Plant Phytotoxicity EQ	Total EQ by COPC
Aluminum	0.02	NA	0.003	NA	0.02
Antimony	NA	NA	0.039	NA	0.04
Arsenic	0.00	3.0	0.361	48.6	51.93
Barium	NA	NA	0.004	NA	0.00
Cadmium	0.20	5.5	0.005	25.3	31.00
Chromium III	NA	0.4	0.000	NA	NA
Copper	0.07	2.0	0.002	12.1	14.24
Iron	NA	NA	NA	NA	NA
Lead	0.06	9.6	26.772	190.0	226.43
Manganese	NA	NA	0.002	NA	0.00
Mercury	NA	0.2	0.000	0.2	0.33
Nickel	NA	2.0	0.000	NA	1.97
Silver	NA	1.1	NA	NA	1.10
Zinc	0.49	7.7	0.005	162.6	170.83
TOTAL	0.844	31.41	27.19	438.81	497.89

APPENDIX F

Photo Log

APPENDIX F

Photo Log

Forest Rose Mine Site Photographic Log

Photo Number	Photo Description
1	T3 looking north at T2
2	Waste rock area looking north at T3
3	Leaning building
4	Building in disrepair
5	Looking west from lower waste rock area
6	Car body in cut between T3 and T2
7	Looking south from T2 to cut in T3
8	Looking west onto T1
9	T1 slump area looking south
10	Overview of tailings and waste rock areas
11	Collapsed adit
12	Upper waste rock area looking southeast
13	Bottom of waste rock area
14	Looking east on top of upper waste rock area
15	Proposed repository looking west
16	Proposed repository looking southwest
17	Proposed repository looking south
18	Proposed repository looking southeast
19	Test pit at proposed repository
20	Test pit at proposed repository
21	Test pit in waste rock to determine depth
22	Collecting a sample in T2













Forest Rose Mine Site Photographic Log

Photo Number	Photo Description
1	T3 looking north at T2
2	Waste rock area looking north at T3
3	Leaning building
4	Building in disrepair
5	Looking west from lower waste rock area
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10	Overview of tailings and waste rock areas
11	Collapsed adit
12	Upper waste rock area looking southeast
13	Bottom of waste rock area
14	Looking east on top of upper waste rock area
15	Proposed repository looking west
16	Proposed repository looking southwest
17	Proposed repository looking south
18	Proposed repository looking southeast
19	Test pit at proposed repository
20	Test pit at proposed repository
21	Test pit in waste rock to determine depth
22	Collecting a sample in T2













APPENDIX G

Data Validation Results

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 06-03425-070
From Gina Catarra, Herrera Environmental Consultants
Date November 12, 2010
Subject Data Quality Assurance Review of Forest Rose Mine Site Data

This memorandum presents a review of data quality for six surface water samples collected from the Forest Rose Mine site on July 28, 2010. Pace Analytical of Billings, Montana analyzed the samples for:

- Low-level mercury by EPA method 1631E

Results for the following samples were validated.

Sample ID	Matrix	Laboratory Job	Date/Time Sampled	Analyses Requested
FR-DS-SW-T1	Water	10134755	7/28/2010 / 09:50	Low-level mercury
FR-DS-SW-T2	Water	10134755	7/28/2010 / 11:00	Low-level mercury
FR-DS-QC-T1 ^a	Water	10134755	7/28/2010 / 11:00	Low-level mercury
FR-AW-SW-T1	Water	10134755	7/28/2010 / 12:00	Low-level mercury
Field Blank ^b	Water	10134755	7/28/2010 / 12:20	Low-level mercury
FR-US-SW-T1	Water	10134755	7/28/2010 / 13:20	Low-level mercury

^a Field duplicate of sample FR-DS-SW-T1.

^b Field blank sample.

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Forest Rose Mine Site Reclamation Work Plan* (Herrera 2010).

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. All samples were analyzed within the required holding time of 90 days from sample collection. The laboratory reports were complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Laboratory Reporting Limits—Acceptable

The laboratory reporting limits met the work plan specified reporting limits for mercury (1 µg/L). No data were qualified based on laboratory reporting limits.

Blank Analysis—Acceptable

Method Blanks

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Field Blank

A field blank was collected along with the project samples. The field blank did not contain levels of mercury above the laboratory reporting limits.

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples (LCS) were analyzed at the required frequency. The percent recovery values (98 and pp percent) met the work plan criteria (80 to 120).

Matrix Spike Analysis—Acceptable

Matrix spike (MS) samples were analyzed at the required frequency. The percent recovery values (ranging from 85 to 102 percent) for the MS analyses met the control limits (75 to 125 percent) established by the work plan.

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates were analyzed as matrix spike/matrix spike duplicate (MS/MSD) samples and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) at the required frequency. The relative percent difference (RPD) was calculated for each sample where both duplicate values were greater than five times the reporting limit (RL). A control limit of less than 20 percent RPD was established in the work plan. The relative percent difference (RPD) values met the control limits established by the QAPP.

Field Duplicates—Acceptable

A field duplicate was analyzed for low-level mercury. Field duplicate precision met the work plan specified criterion of a difference less than 2 times the reporting limit. Difference between the sample and field duplicate was evaluated because the sample concentration was less than 5 times the reporting limit.

Data Quality Assessment Summary

The data quality for total mercury was found to be acceptable based on holding time, reporting limit, method blank, control standard, matrix spike, laboratory duplicate, and field duplicate criteria.

Usability of the data is based on the guidance documents previously noted. Upon consideration of the information presented here, the data are acceptable as reported.

Definition of Data Qualifiers

The following data qualifier definitions are taken from *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2002).

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

References

Herrera. 2010. Forest Rose Mine Site Reclamation Work Plan. Prepared for Montana Department of Environmental Quality by Herrera Environmental Consultants, Seattle, Washington. June 2010.

USEPA. 2002. Contract laboratory program national functional guidelines for inorganic data review. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C. (EPA-540/R-01/008).

August 11, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine
Pace Project No.: 10134755

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on July 30, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine

Pace Project No.: 10134755

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302

California Certification #: 09268CA

Florida/NELAP Certification #: E87948

Illinois Certification #: 200050

Kentucky Certification #: 82

Louisiana Certification #: 04168

Minnesota Certification #: 055-999-334

New York Certification #: 11888

New York Certification #: 11888

North Carolina Certification #: 503

North Dakota Certification #: R-150

South Carolina Certification #: 83006001

US Dept of Agriculture #: S-76505

Wisconsin Certification #: 405132750

Wisconsin DATCP Certification #: 105-444

SAMPLE SUMMARY

Project: Forest Rose Mine

Pace Project No.: 10134755

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134755001	FR-DS-SW-T1	Water	07/28/10 09:50	07/30/10 10:05
10134755002	FR-DS-SW-T2	Water	07/28/10 11:00	07/30/10 10:05
10134755003	FR-DS-QC-T1	Water	07/28/10 11:00	07/30/10 10:05
10134755004	FR-AW-SW-T1	Water	07/28/10 12:00	07/30/10 10:05
10134755005	FIELD BLANK	Water	07/28/10 12:20	07/30/10 10:05
10134755006	FR-US-SW-T1	Water	07/28/10 13:20	07/30/10 10:05

REPORT OF LABORATORY ANALYSIS

Page 3 of 14

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SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134755

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134755001	FR-DS-SW-T1	EPA 1631E	GMW	1	PASI-G
10134755002	FR-DS-SW-T2	EPA 1631E	GMW	1	PASI-G
10134755003	FR-DS-QC-T1	EPA 1631E	GMW	1	PASI-G
10134755004	FR-AW-SW-T1	EPA 1631E	GMW	1	PASI-G
10134755005	FIELD BLANK	EPA 1631E	GMW	1	PASI-G
10134755006	FR-US-SW-T1	EPA 1631E	GMW	1	PASI-G

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine
Pace Project No.: 10134755

Method: EPA 1631E
Description: 1631E Mercury, Low Level
Client: Herrera Environmental Consultants
Date: August 11, 2010

General Information:

6 samples were analyzed for EPA 1631E. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-DS-SW-T1		Lab ID: 10134755001	Collected: 07/28/10 09:50	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.0000056	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:19	7439-97-6	
	7							

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-DS-SW-T2		Lab ID: 10134755002	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.00000050 5	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:24	7439-97-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-DS-QC-T1		Lab ID: 10134755003	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.0000064 3	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:28	7439-97-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-AW-SW-T1		Lab ID: 10134755004	Collected: 07/28/10 12:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.0000079	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:55	7439-97-6	
	7							

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FIELD BLANK	Lab ID: 10134755005	Collected: 07/28/10 12:20	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.00000013 7J	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:11	7439-97-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134755

Sample: FR-US-SW-T1		Lab ID: 10134755006	Collected: 07/28/10 13:20	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
1631E Mercury, Low Level		Analytical Method: EPA 1631E						
Mercury	0.00000112	mg/L	0.00000050	1	08/02/10 08:30	08/10/10 08:59	7439-97-6	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134755

QC Batch: CVFS/2146 Analysis Method: EPA 1631E
 QC Batch Method: EPA 1631E Analysis Description: 1631E Mercury
 Associated Lab Samples: 10134755001, 10134755002, 10134755003, 10134755004, 10134755005, 10134755006

METHOD BLANK: 338893 Matrix: Water
 Associated Lab Samples: 10134755001, 10134755002, 10134755003, 10134755004, 10134755005, 10134755006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00000050	08/10/10 07:25	

METHOD BLANK: 338894 Matrix: Water
 Associated Lab Samples: 10134755001, 10134755002, 10134755003, 10134755004, 10134755005, 10134755006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00000050	08/10/10 08:50	

METHOD BLANK: 338895 Matrix: Water
 Associated Lab Samples: 10134755001, 10134755002, 10134755003, 10134755004, 10134755005, 10134755006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	0.000000153J	0.00000050	08/10/10 10:14	

LABORATORY CONTROL SAMPLE & LCSD: 338896 338897

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Mercury	mg/L	.000005	0.000004	0.000004	98	99	79-121	2	24	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 338898 338899

Parameter	Units	4035003001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	2.02 ng/L	.00001	.00001	0.000012	0.000010	102	85	75-125	15	24	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 338900 338901

Parameter	Units	3515168001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	0.00331 ug/L	.000005	.000005	0.000008	0.000007	96	93	75-125	2	24	

QUALIFIERS

Project: Forest Rose Mine

Pace Project No.: 10134755

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine

Pace Project No.: 10134755

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134755001	FR-DS-SW-T1	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755002	FR-DS-SW-T2	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755003	FR-DS-QC-T1	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755004	FR-AW-SW-T1	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755005	FIELD BLANK	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147
10134755006	FR-US-SW-T1	EPA 1631E	CVFS/2146	EPA 1631E	CVFS/2147

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 06-03425-070
From Gina Catarra, Herrera Environmental Consultants
Date November 19, 2010
Subject Data Quality Assurance Review of Forest Rose Mine Site Data

This memorandum presents a review of data quality for 10 surface water samples (including two field duplicates), three sediment samples, and one soil sample collected from the Forest Rose Mine site on July 28, 2010. Pace Analytical of Billings, Montana analyzed the samples for:

- Total recoverable metals by EPA methods 6020/7471 and 200.8 (water sample)
- Acidity by Standard Method 2310
- pH by Standard Method 4500-H+B
- Alkalinity by Standard Method 2320B

Results for the following samples were validated.

Sample ID	Matrix	Laboratory Job	Date/Time Sampled	Analyses Requested
FR-DS-SW-T1	Water	10134832	7/28/2010 / 09:50	All analyses
FR-DS-SW-D1	Water	10134832	7/28/2010 / 09:50	All analyses
FR-DS-SD-01	Sediment	10134832	7/28/2010 / 10:10	Metals
FR-DS-SW-T2	Water	10134832	7/28/2010 / 11:00	All analyses
FR-DS-SW-D2	Water	10134832	7/28/2010 / 11:00	All analyses
FR-DS-SD-02	Sediment	10134832	7/28/2010 / 11:20	Metals
FR-DS-QC-T1 ^a	Water	10134832	7/28/2010 / 11:00	Metals
FR-AW-SW-T1	Water	10134832	7/28/2010 / 12:00	All analyses
FR-AW-SW-D1	Water	10134832	7/28/2010 / 12:00	All analyses
FR-US-SW-T1	Water	10134832	7/28/2010 / 13:20	All analyses
FR-US-SW-D1	Water	10134832	7/28/2010 / 13:20	All analyses
FR-US-SD-01	Sediment	10134832	7/28/2010 / 13:30	All analyses
FR-BG-SS-02-00	Soil	10134832	7/28/2010 / 14:25	All analyses
FR-DS-QC-D1 ^b	Water	10134832	7/28/2010 / 11:00	Metals

^a Field duplicate of sample FR-DS-SW-T1

^b Field duplicate of sample FR-DS-SW-D1

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Forest Rose Mine Site Reclamation Work Plan* (Herrera 2010).

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data quality assurance worksheets summarizing the quality assurance and quality control (QA/QC) review were completed for each sampling event and are included with the data. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable with Qualification

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. With one exception, all samples were analyzed within the required holding times (Table 1). The laboratory reports were complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Table 1. Summary of sample collection requirements.

Parameter	Analytical Method	Bottle	Preservative	Holding Time
Total/dissolved metals	EPA 6020/7471 or 200.8	8-oz jar or 500 mL bottle	Preserve with nitric acid (water samples), cool to 4°C	180 days, 28 days for mercury
Acidity	SM 2310B	100-mL bottle	Cool to 4°C	14 days
pH	SM 4500H+B	100-mL bottle	Cool to 4°C	15 minutes
Alkalinity	SM 2320B	100-mL bottle	Cool to 4°C	14 days

Samples for pH analysis were analyzed outside of the 15 minute holding time. All results for pH have been qualified as estimated (J), as shown in Table 2.

Table 2. Summary of samples qualified due to holding time exceedances.

Sample ID	Parameter	Reason for Qualification	Qualifier
FR-DS-SW-T1	pH	Holding time exceedance	J
FR-DS-SW-T2	pH	Holding time exceedance	J
FR-AW-SW-T1	pH	Holding time exceedance	J
FR-US-SW-T1	pH	Holding time exceedance	J

Laboratory Reporting Limits—Acceptable with Discussion

The laboratory reporting limits and QAPP specified reporting limits are provided in Table 3. In general, the laboratory reporting limits met the QAPP specified reporting limits for all analyses. Some laboratory reporting limits were elevated due to necessary dilutions performed on some samples. No data were qualified based on laboratory reporting limits.

Table 3. Summary of QAPP and laboratory reporting limits.

Parameter	QAPP Reporting Limit	Laboratory Reporting Limit
Total/dissolved metals – solid	0.1 to 1 mg/kg	0.068 to 42.4 mg/kg
Total/dissolved metals – water	1 to 10 µg/L	0.5 to 50 µg/L
Acidity	1 mg/L	5 mg/L
pH	0.01 std. units	0.01 std. units
Alkalinity	1 mg/L	5 mg/L

Blank Analysis—Acceptable

Method Blanks

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples (LCS) were analyzed at the required frequency. The percent recovery values for all analyses met the criteria.

Matrix Spike Analysis—Acceptable with Qualification

Matrix spike (MS) samples were analyzed for metals at the required frequency. With one exception, the percent recovery values for the MS analyses met the control limits (80 to 120 percent for mercury, 75 to 125 percent for all other metals for solid matrix sample, and 70 to 130 percent for all water matrix samples) established by the methods.

Sample FR-DS-SD-01 was analyzed as the MS/MSD with the solid matrix samples for the total metals analysis. The percent recovery values for arsenic (229 and 226 percent), barium (374 and 359 percent), cadmium (163 and 167 percent), chromium (177 and 175 percent), copper (332 and 309 percent), nickel (189 and 180 percent), and silver (148 and 153 percent) exceeded the 75 to 125 percent criteria. Because all other criteria were met, only results for sample FR-DS-SD-01 were qualified as estimated (J), as shown in Table 4.

Table 4. Summary of samples qualified due to matrix spike exceedances.

Sample ID	Analyte	Reason for Qualification	Qualifier
FR-DS-SD-01	Arsenic	MS exceedance	J
FR-DS-SD-01	Barium	MS exceedance	J
FR-DS-SD-01	Cadmium	MS exceedance	J
FR-DS-SD-01	Chromium	MS exceedance	J
FR-DS-SD-01	Copper	MS exceedance	J
FR-DS-SD-01	Nickel	MS exceedance	J
FR-DS-SD-01	Silver	MS exceedance	J

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates or laboratory control sample duplicates were analyzed at the required frequency. The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. A control limit of less than 20 percent RPD was established in the work plan and a control limit of two times the RL was used to evaluate difference values. With one exception, the relative percent difference (RPD) values met the control limits established by the work plan, and all difference values were less than two times the RL.

Field Duplicates—Acceptable with Qualification

Samples FR-DS-SW-T1 and FR-DS-QC-D1 were collected as field duplicates of samples FR-DS-SW-T1 and FR-DS-SW-D1, respectively. With the exceptions noted below, field duplicate precision met the work plan specified criterion of a difference less than 2 times the reporting limit. Difference between the sample and field duplicate was evaluated because the sample concentration was less than 5 times the reporting limit.

The RPD values for lead (55 percent) and manganese (61 percent) exceeded the less than 20 percent criterion. As shown in Table 5, results for lead and manganese for sample FR-DS-SW-T1 were qualified as estimated (J).

Table 5. Summary of samples qualified due to field duplicate exceedances.

Sample ID	Analyte	Reason for Qualification	Qualifier
FR-DS-SW-T1	Lead	Field duplicate exceedance	J
FR-DS-SW-T1	Manganese	Field duplicate exceedance	J

Data Quality Assessment Summary

In general, the data quality for all parameters was found to be acceptable based on holding time, reporting limit, method blank, control standard, matrix spike, laboratory duplicate, and field duplicate criteria. Due to holding time exceedances, results for pH were qualified as estimated. Due to matrix spike exceedances and field duplicate exceedances, some metals sample results were qualified as estimated (J).

Usability of the data is based on the guidance documents previously noted. Upon consideration of the information presented here, the data are acceptable as qualified.

Definition of Data Qualifiers

The following data qualifier definitions are taken from *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2002).

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

References

Herrera. 2010. Forest Rose Mine Site Reclamation Work Plan. Prepared for Montana Department of Environmental Quality by Herrera Environmental Consultants, Seattle, Washington. June 2010.

USEPA. 2002. Contract laboratory program national functional guidelines for inorganic data review. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C. (EPA-540/R-01/008).

August 12, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine
Pace Project No.: 10134832

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on July 30, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine

Pace Project No.: 10134832

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Idaho Certification #: MN00064
Illinois Certification #: 200011
Iowa Certification #: 368
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace

Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New Mexico Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
North Dakota Certification #: R-036A
Ohio VAP Certification #: CL101
Oklahoma Certification #: D9921
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Washington Certification #: C754
Wisconsin Certification #: 999407970

Montana Certification IDs

602 South 25th Street, Billings, MT 59101
EPA Region 8 Certification #: 8TMS-Q
Idaho Certification #: MT00012

Montana Certification #: MT CERT0040
NVLAP Certification #: 101292-0

SAMPLE SUMMARY

Project: Forest Rose Mine

Pace Project No.: 10134832

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134832001	FR-DS-SW-T1	Water	07/28/10 09:50	07/30/10 10:05
10134832002	FR-DS-SW-D1	Water	07/28/10 09:50	07/30/10 10:05
10134832003	FR-DS-SD-01	Solid	07/28/10 10:10	07/30/10 10:05
10134832004	FR-DS-SW-T2	Water	07/28/10 11:00	07/30/10 10:05
10134832005	FR-DS-SW-D2	Water	07/28/10 11:00	07/30/10 10:05
10134832006	FR-DS-SD-02	Solid	07/28/10 11:20	07/30/10 10:05
10134832007	FR-DS-QC-T1	Water	07/28/10 11:00	07/30/10 10:05
10134832008	FR-AW-SW-T1	Water	07/28/10 12:00	07/30/10 10:05
10134832009	FR-AW-SW-D1	Water	07/28/10 12:00	07/30/10 10:05
10134832010	FR-US-SW-T1	Water	07/28/10 13:20	07/30/10 10:05
10134832011	FR-US-SW-D1	Water	07/28/10 13:20	07/30/10 10:05
10134832012	FR-US-SD-01	Solid	07/28/10 13:30	07/30/10 10:05
10134832013	FR-BG-SS-02-00	Solid	07/28/10 14:25	07/30/10 10:05
10134832014	FR-DS-QC-D1	Water	07/28/10 11:00	07/30/10 10:05

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134832

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134832001	FR-DS-SW-T1	EPA 200.8	RJS	12	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
		SM 2320B	ACH	1	PASI-M
10134832002	FR-DS-SW-D1	EPA 200.8	RJS	1	PASI-M
10134832003	FR-DS-SD-01	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134832004	FR-DS-SW-T2	EPA 200.8	RJS	12	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
		SM 2320B	ACH	1	PASI-M
10134832005	FR-DS-SW-D2	EPA 200.8	RJS	1	PASI-M
10134832006	FR-DS-SD-02	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134832007	FR-DS-QC-T1	EPA 200.8	RJS	12	PASI-M
10134832008	FR-AW-SW-T1	EPA 200.8	RJS	12	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
		SM 2320B	ACH	1	PASI-M
10134832009	FR-AW-SW-D1	EPA 200.8	RJS	1	PASI-M
10134832010	FR-US-SW-T1	EPA 200.8	RJS	12	PASI-M
		SM 2310	CAC	1	PASI-MT
		SM 4500-H+B	SC1	1	PASI-MT
		SM 2320B	ACH	1	PASI-M
10134832011	FR-US-SW-D1	EPA 200.8	RJS	1	PASI-M
10134832012	FR-US-SD-01	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134832013	FR-BG-SS-02-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134832014	FR-DS-QC-D1	EPA 200.8	RJS	1	PASI-M

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

5 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 200.8

Description: 200.8 MET ICPMS, Dissolved

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

5 samples were analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21683

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134832003,10134857007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 832978)
 - Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Copper
 - Iron
 - Lead
 - Manganese
 - Nickel
 - Silver
 - Zinc
- MS (Lab ID: 832980)
 - Antimony

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 12, 2010

QC Batch: MPRP/21683

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134832003,10134857007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Arsenic
- Barium
- Copper
- Iron
- Lead
- Manganese
- Silver
- Zinc
- MSD (Lab ID: 832979)
 - Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Copper
 - Iron
 - Lead
 - Manganese
 - Nickel
 - Silver
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21683

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 832978)
 - Iron
 - Manganese
 - Zinc
 - Copper
 - Iron
 - Lead
 - Zinc
- MSD (Lab ID: 832979)
 - Iron
 - Manganese
 - Lead
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: EPA 7471

Description: 7471 Mercury

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: % Moisture

Description: Dry Weight

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: SM 2310

Description: 2310 Acidity

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for SM 2310. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: SM 4500-H+B

Description: 4500H+ pH, Electrometric

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for SM 4500-H+B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H6: Analysis initiated more than 15 minutes after sample collection.

- FR-AW-SW-T1 (Lab ID: 10134832008)
- FR-DS-SW-T1 (Lab ID: 10134832001)
- FR-DS-SW-T2 (Lab ID: 10134832004)
- FR-US-SW-T1 (Lab ID: 10134832010)

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134832

Method: SM 2320B

Description: 2320B Alkalinity

Client: Herrera Environmental Consultants

Date: August 12, 2010

General Information:

4 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: WET/19850

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134719003,10134736009

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 836276)
 - Alkalinity, Total as CaCO₃
- MSD (Lab ID: 836277)
 - Alkalinity, Total as CaCO₃

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SW-T1	Lab ID: 10134832001	Collected: 07/28/10 09:50	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	0.64 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-36-0	
Arsenic	0.59 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-38-2	
Barium	16.3 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:11	7440-39-3	
Cadmium	0.72 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:11	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-47-3	
Copper	1.7 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-50-8	
Iron	67.0 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:11	7439-89-6	
Lead	10.2 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:11	7439-92-1	
Manganese	21.5 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7439-96-5	
Nickel	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:11	7440-22-4	
Zinc	91.7 ug/L		5.0	1	08/04/10 06:16	08/05/10 10:11	7440-66-6	
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		08/09/10 16:00		
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.9 Std. Units		0.10	1		08/03/10 10:00		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Total as CaCO3	170 mg/L		5.0	1		08/11/10 17:14		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SW-D1	Lab ID: 10134832002	Collected: 07/28/10 09:50	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved								
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	15.3	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:40	7429-90-5	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SD-01 **Lab ID: 10134832003** Collected: 07/28/10 10:10 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.2	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-36-0	
Arsenic	24.3	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-38-2	M1
Barium	65.4	mg/kg	0.32	20	08/06/10 15:22	08/10/10 15:59	7440-39-3	M1
Cadmium	6.6	mg/kg	0.085	20	08/06/10 15:22	08/10/10 15:59	7440-43-9	M1
Chromium	30.3	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-47-3	M1
Copper	69.0	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-50-8	M1
Iron	37100	mg/kg	267	100	08/06/10 15:22	08/10/10 16:12	7439-89-6	
Lead	448	mg/kg	2.7	100	08/06/10 15:22	08/10/10 16:12	7439-92-1	M1
Manganese	796	mg/kg	2.7	100	08/06/10 15:22	08/10/10 16:12	7439-96-5	
Nickel	41.1	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-02-0	M1
Silver	1.1	mg/kg	0.53	20	08/06/10 15:22	08/10/10 15:59	7440-22-4	M1
Zinc	1160	mg/kg	26.7	100	08/06/10 15:22	08/10/10 16:12	7440-66-6	M1

7471 Mercury

Analytical Method: EPA 7471 Preparation Method: EPA 7471

Mercury	0.023	mg/kg	0.022	1	08/04/10 16:29	08/06/10 08:06	7439-97-6	
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Dry Weight

Analytical Method: % Moisture

Percent Moisture	18.6	%	0.10	1		08/03/10 00:00		
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ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: FR-DS-SW-T2 Lab ID: 10134832004 Collected: 07/28/10 11:00 Received: 07/30/10 10:05 Matrix: Water								
200.8 MET ICPMS Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Antimony	0.60	ug/L	0.50	1	08/04/10 06:16	08/05/10 10:15	7440-36-0	
Arsenic	<0.50	ug/L	0.50	1	08/04/10 06:16	08/05/10 10:15	7440-38-2	
Barium	16.5	ug/L	0.30	1	08/04/10 06:16	08/05/10 10:15	7440-39-3	
Cadmium	0.65	ug/L	0.080	1	08/04/10 06:16	08/05/10 10:15	7440-43-9	
Chromium	<0.50	ug/L	0.50	1	08/04/10 06:16	08/05/10 10:15	7440-47-3	
Copper	1.0	ug/L	0.50	1	08/04/10 06:16	08/05/10 10:15	7440-50-8	
Iron	57.4	ug/L	50.0	1	08/04/10 06:16	08/05/10 10:15	7439-89-6	
Lead	5.9	ug/L	0.10	1	08/04/10 06:16	08/05/10 10:15	7439-92-1	
Manganese	11.9	ug/L	0.50	1	08/04/10 06:16	08/05/10 10:15	7439-96-5	
Nickel	<0.50	ug/L	0.50	1	08/04/10 06:16	08/05/10 10:15	7440-02-0	
Silver	<0.50	ug/L	0.50	1	08/04/10 06:16	08/05/10 10:15	7440-22-4	
Zinc	76.0	ug/L	5.0	1	08/04/10 06:16	08/05/10 10:15	7440-66-6	
2310 Acidity Analytical Method: SM 2310								
Acidity	<5.0	mg/L	5.0	1		08/09/10 16:00		
4500H+ pH, Electrometric Analytical Method: SM 4500-H+B								
pH at 25 Degrees C	7.6	Std. Units	0.10	1		08/03/10 10:00		H6
2320B Alkalinity Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	170	mg/L	5.0	1		08/11/10 17:18		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SW-D2	Lab ID: 10134832005	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved								
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	13.8	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:57	7429-90-5	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-SD-02 **Lab ID: 10134832006** Collected: 07/28/10 11:20 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.68	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-36-0	
Arsenic	14.5	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-38-2	
Barium	63.0	mg/kg	0.25	20	08/06/10 15:22	08/10/10 16:17	7440-39-3	
Cadmium	2.7	mg/kg	0.067	20	08/06/10 15:22	08/10/10 16:17	7440-43-9	
Chromium	27.9	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-47-3	
Copper	38.6	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-50-8	
Iron	33500	mg/kg	209	100	08/06/10 15:22	08/10/10 16:21	7439-89-6	
Lead	120	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7439-92-1	
Manganese	510	mg/kg	2.1	100	08/06/10 15:22	08/10/10 16:21	7439-96-5	
Nickel	37.3	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-02-0	
Silver	0.59	mg/kg	0.42	20	08/06/10 15:22	08/10/10 16:17	7440-22-4	
Zinc	563	mg/kg	20.9	100	08/06/10 15:22	08/10/10 16:21	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	<0.020	mg/kg	0.020	1	08/04/10 16:29	08/06/10 08:13	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	15.6	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-QC-T1		Lab ID: 10134832007	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	0.57 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-36-0	
Arsenic	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-38-2	
Barium	16.3 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:20	7440-39-3	
Cadmium	0.65 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:20	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-47-3	
Copper	0.99 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-50-8	
Iron	<50.0 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:20	7439-89-6	
Lead	5.8 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:20	7439-92-1	
Manganese	11.5 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7439-96-5	
Nickel	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:20	7440-22-4	
Zinc	75.6 ug/L		5.0	1	08/04/10 06:16	08/05/10 10:20	7440-66-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-AW-SW-T1		Lab ID: 10134832008	Collected: 07/28/10 12:00	Received: 07/30/10 10:05	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	1.1 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-36-0	
Arsenic	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-38-2	
Barium	20.5 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:24	7440-39-3	
Cadmium	6.1 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:24	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-47-3	
Copper	1.1 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-50-8	
Iron	<50.0 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:24	7439-89-6	
Lead	0.46 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:24	7439-92-1	
Manganese	4.2 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7439-96-5	
Nickel	2.1 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:24	7440-22-4	
Zinc	1360 ug/L		50.0	10	08/04/10 06:16	08/09/10 12:21	7440-66-6	
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		08/09/10 16:00		
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	7.4 Std. Units		0.10	1		08/03/10 10:00		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Total as CaCO3	175 mg/L		5.0	1		08/11/10 17:22		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sample: FR-AW-SW-D1								
Lab ID: 10134832009								
Collected: 07/28/10 12:00 Received: 07/30/10 10:05 Matrix: Water								
200.8 MET ICPMS, Dissolved								
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	12.0	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:44	7429-90-5	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-US-SW-T1	Lab ID: 10134832010	Collected: 07/28/10 13:20	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-36-0	
Arsenic	0.68 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-38-2	
Barium	10.5 ug/L		0.30	1	08/04/10 06:16	08/05/10 10:28	7440-39-3	
Cadmium	0.98 ug/L		0.080	1	08/04/10 06:16	08/05/10 10:28	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-47-3	
Copper	0.79 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-50-8	
Iron	117 ug/L		50.0	1	08/04/10 06:16	08/05/10 10:28	7439-89-6	
Lead	2.1 ug/L		0.10	1	08/04/10 06:16	08/05/10 10:28	7439-92-1	
Manganese	10.8 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7439-96-5	
Nickel	0.68 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/04/10 06:16	08/05/10 10:28	7440-22-4	
Zinc	113 ug/L		5.0	1	08/04/10 06:16	08/05/10 10:28	7440-66-6	
2310 Acidity		Analytical Method: SM 2310						
Acidity	<5.0 mg/L		5.0	1		08/09/10 16:00		
4500H+ pH, Electrometric		Analytical Method: SM 4500-H+B						
pH at 25 Degrees C	8.3 Std. Units		0.10	1		08/03/10 10:00		H6
2320B Alkalinity		Analytical Method: SM 2320B						
Alkalinity, Total as CaCO3	133 mg/L		5.0	1		08/11/10 17:34		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-US-SW-D1	Lab ID: 10134832011	Collected: 07/28/10 13:20	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved								
Analytical Method: EPA 200.8 Preparation Method: EPA 200.8								
Aluminum, Dissolved	15.6	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:48	7429-90-5	

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-US-SD-01 **Lab ID: 10134832012** Collected: 07/28/10 13:30 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	29.6	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-36-0	
Arsenic	36.2	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-38-2	
Barium	169	mg/kg	0.53	20	08/06/10 15:22	08/10/10 16:25	7440-39-3	
Cadmium	20.2	mg/kg	0.14	20	08/06/10 15:22	08/10/10 16:25	7440-43-9	
Chromium	21.0	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-47-3	
Copper	65.1	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-50-8	
Iron	35200	mg/kg	88.1	20	08/06/10 15:22	08/10/10 16:25	7439-89-6	
Lead	389	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7439-92-1	
Manganese	1220	mg/kg	4.4	100	08/06/10 15:22	08/10/10 16:30	7439-96-5	
Nickel	45.6	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-02-0	
Silver	2.1	mg/kg	0.88	20	08/06/10 15:22	08/10/10 16:25	7440-22-4	
Zinc	2210	mg/kg	44.1	100	08/06/10 15:22	08/10/10 16:30	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.053	mg/kg	0.037	1	08/04/10 16:29	08/06/10 08:43	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	53.5	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-BG-SS-02-00 **Lab ID: 10134832013** Collected: 07/28/10 14:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.54	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-36-0	
Arsenic	19.3	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-38-2	
Barium	229	mg/kg	0.23	20	08/06/10 15:22	08/10/10 16:47	7440-39-3	
Cadmium	3.1	mg/kg	0.062	20	08/06/10 15:22	08/10/10 16:47	7440-43-9	
Chromium	25.9	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-47-3	
Copper	23.6	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-50-8	
Iron	27000	mg/kg	193	100	08/06/10 15:22	08/10/10 16:52	7439-89-6	
Lead	27.1	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7439-92-1	
Manganese	1430	mg/kg	1.9	100	08/06/10 15:22	08/10/10 16:52	7439-96-5	
Nickel	28.9	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-02-0	
Silver	<0.39	mg/kg	0.39	20	08/06/10 15:22	08/10/10 16:47	7440-22-4	
Zinc	207	mg/kg	3.9	20	08/06/10 15:22	08/10/10 16:47	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.037	mg/kg	0.020	1	08/04/10 16:29	08/06/10 08:44	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	4.1	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134832

Sample: FR-DS-QC-D1	Lab ID: 10134832014	Collected: 07/28/10 11:00	Received: 07/30/10 10:05	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS, Dissolved		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Aluminum, Dissolved	14.8	ug/L	4.0	1	08/05/10 15:29	08/06/10 14:53	7429-90-5	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MPRP/21668 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
 Associated Lab Samples: 10134832001, 10134832004, 10134832007, 10134832008, 10134832010

METHOD BLANK: 832225 Matrix: Water
 Associated Lab Samples: 10134832001, 10134832004, 10134832007, 10134832008, 10134832010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.50	0.50	08/05/10 09:03	
Arsenic	ug/L	<0.50	0.50	08/05/10 09:03	
Barium	ug/L	<0.30	0.30	08/05/10 09:03	
Cadmium	ug/L	<0.080	0.080	08/05/10 09:03	
Chromium	ug/L	<0.50	0.50	08/05/10 09:03	
Copper	ug/L	<0.50	0.50	08/05/10 09:03	
Iron	ug/L	<50.0	50.0	08/05/10 09:03	
Lead	ug/L	<0.10	0.10	08/05/10 09:03	
Manganese	ug/L	<0.50	0.50	08/05/10 09:03	
Nickel	ug/L	<0.50	0.50	08/05/10 09:03	
Silver	ug/L	<0.50	0.50	08/05/10 09:03	
Zinc	ug/L	<5.0	5.0	08/05/10 09:03	

LABORATORY CONTROL SAMPLE: 832226

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	80	78.0	98	85-115	
Arsenic	ug/L	80	78.4	98	85-115	
Barium	ug/L	80	77.2	96	85-115	
Cadmium	ug/L	80	80.2	100	85-115	
Chromium	ug/L	80	79.7	100	85-115	
Copper	ug/L	80	82.4	103	85-115	
Iron	ug/L	1000	993	99	85-115	
Lead	ug/L	80	80.0	100	85-115	
Manganese	ug/L	80	78.6	98	85-115	
Nickel	ug/L	80	81.8	102	85-115	
Silver	ug/L	80	80.1	100	85-115	
Zinc	ug/L	80	81.0	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832227 832228

Parameter	Units	10134731001		MS		MSD		% Rec	% Rec	% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	MS Result	MSD Result						
Antimony	ug/L	ND	80	80	81.0	85.0	101	106	70-130	5	20		
Arsenic	ug/L	4.0	80	80	86.1	90.0	103	107	70-130	4	20		
Barium	ug/L	34.5	80	80	116	120	102	107	70-130	4	20		
Cadmium	ug/L	1.2	80	80	84.3	87.1	104	107	70-130	3	20		
Chromium	ug/L	ND	80	80	83.8	85.6	104	106	70-130	2	20		
Copper	ug/L	0.054 mg/L	80	80	140	143	108	111	70-130	2	20		

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832227												832228	
Parameter	Units	10134731001		MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual	
		Result	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Iron	ug/L	111J	1000	1000	1140	1210	103	110	70-130	6	20		
Lead	ug/L	1.2	80	80	84.2	87.0	104	107	70-130	3	20		
Manganese	ug/L	159	80	80	247	254	110	119	70-130	3	20		
Nickel	ug/L	ND	80	80	85.6	86.8	107	108	70-130	1	20		
Silver	ug/L	ND	80	80	78.6	83.2	98	104	70-130	6	20		
Zinc	ug/L	309	80	80	401	411	115	128	70-130	3	20		

MATRIX SPIKE SAMPLE: 832229											
Parameter	Units	9274487001		Spike	MS	MS	% Rec	Qualifiers			
		Result	Conc.	Conc.	Result	% Rec	Limits				
Antimony	ug/L		ND	80	91.2	114	70-130				
Arsenic	ug/L		1.0	80	93.0	115	70-130				
Barium	ug/L		17.4	80	112	118	70-130				
Cadmium	ug/L		ND	80	95.6	120	70-130				
Chromium	ug/L		0.63	80	95.6	119	70-130				
Copper	ug/L		1.2	80	99.7	123	70-130				
Iron	ug/L		ND	1000	1230	120	70-130				
Lead	ug/L		ND	80	92.6	116	70-130				
Manganese	ug/L		12.9	80	108	118	70-130				
Nickel	ug/L		ND	80	98.0	122	70-130				
Silver	ug/L		ND	80	91.7	115	70-130				
Zinc	ug/L		ND	80	103	127	70-130				

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MPRP/21702 Analysis Method: EPA 200.8
 QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET Dissolved
 Associated Lab Samples: 10134832002, 10134832005, 10134832009, 10134832011, 10134832014

METHOD BLANK: 833516 Matrix: Water
 Associated Lab Samples: 10134832002, 10134832005, 10134832009, 10134832011, 10134832014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Aluminum, Dissolved	ug/L	<4.0	4.0	08/06/10 14:35	

LABORATORY CONTROL SAMPLE: 833517

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	80	79.0	99	85-115	

MATRIX SPIKE SAMPLE: 833518

Parameter	Units	10134832005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	13.8	80	102	110	70-130	

MATRIX SPIKE SAMPLE: 833519

Parameter	Units	3031732007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Aluminum, Dissolved	ug/L	ND	80	83.4	99	70-130	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MPRP/21683 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

METHOD BLANK: 832976 Matrix: Solid

Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	<0.42	0.42	08/11/10 09:13	
Arsenic	mg/kg	<0.42	0.42	08/11/10 09:13	
Barium	mg/kg	<0.25	0.25	08/11/10 09:13	
Cadmium	mg/kg	<0.068	0.068	08/11/10 09:13	
Chromium	mg/kg	<0.42	0.42	08/11/10 09:13	
Copper	mg/kg	<0.42	0.42	08/11/10 09:13	
Iron	mg/kg	<42.4	42.4	08/11/10 09:13	
Lead	mg/kg	<0.42	0.42	08/11/10 09:13	
Manganese	mg/kg	<0.42	0.42	08/11/10 09:13	
Nickel	mg/kg	<0.42	0.42	08/11/10 09:13	
Silver	mg/kg	<0.42	0.42	08/11/10 09:13	
Zinc	mg/kg	<4.2	4.2	08/11/10 09:13	

LABORATORY CONTROL SAMPLE: 832977

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	18.3	17.2	94	75-125	
Arsenic	mg/kg	18.3	16.9	92	75-125	
Barium	mg/kg	18.3	18.5	101	75-125	
Cadmium	mg/kg	18.3	17.2	94	75-125	
Chromium	mg/kg	18.3	17.6	96	75-125	
Copper	mg/kg	18.3	17.7	97	75-125	
Iron	mg/kg	229	224	98	75-125	
Lead	mg/kg	18.3	17.9	97	75-125	
Manganese	mg/kg	18.3	18.0	98	75-125	
Nickel	mg/kg	18.3	17.8	97	75-125	
Silver	mg/kg	18.3	18.0	98	75-125	
Zinc	mg/kg	18.3	17.7	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832978 832979

Parameter	Units	10134832003		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Antimony	mg/kg	1.2	21.5	19.3	22.7	20.9	100	102	75-125	8	20		
Arsenic	mg/kg	24.3	21.5	19.3	73.7	68.2	229	226	75-125	8	20	M1	
Barium	mg/kg	65.4	21.5	19.3	146	135	374	359	75-125	8	20	M1	
Cadmium	mg/kg	6.6	21.5	19.3	41.8	39.0	163	167	75-125	7	20	M1	
Chromium	mg/kg	30.3	21.5	19.3	68.5	64.2	177	175	75-125	7	20	M1	
Copper	mg/kg	69.0	21.5	19.3	141	129	332	309	75-125	9	20	M1	
Iron	mg/kg	37100	269	242	60700	56900	8750	8180	75-125	6	20	E,M1	

Date: 08/12/2010 04:41 PM

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832978												832979			
Parameter	Units	10134832003 Result	MS		MSD		MS		MSD		% Rec Limits	Max RPD	Qual		
			Spike Conc.	MSD Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec							
Lead	mg/kg	448	21.5	19.3	948	874	2320	2200	75-125	8	20	E,M1			
Manganese	mg/kg	796	21.5	19.3	1800	1680	4650	4570	75-125	7	20	E,M1			
Nickel	mg/kg	41.1	21.5	19.3	81.9	75.9	189	180	75-125	8	20	M1			
Silver	mg/kg	1.1	21.5	19.3	33.0	30.7	148	153	75-125	7	20	M1			
Zinc	mg/kg	1160	21.5	19.3	2160	1990	4650	4310	75-125	8	20	E,M1			

MATRIX SPIKE SAMPLE: 832980											
Parameter	Units	10134857007		Spike Conc.	MS		% Rec Limits	Qualifiers			
		Result	Conc.		MS Result	MS % Rec					
Antimony	mg/kg		27.9	15.8	56.1	179	75-125	M1			
Arsenic	mg/kg		486	15.8	677	1210	75-125	M1			
Barium	mg/kg		27.3	15.8	69.2	266	75-125	M1			
Cadmium	mg/kg		5.0	15.8	22.2	110	75-125				
Chromium	mg/kg		4.6	15.8	20.7	102	75-125				
Copper	mg/kg		628	15.8	842	1360	75-125	E,M1			
Iron	mg/kg		46200	196	130000	42400	75-125	E,M1			
Lead	mg/kg		2640	15.8	8580	37800	75-125	E,M1			
Manganese	mg/kg		95.8	15.8	105	57	75-125	M1			
Nickel	mg/kg		5.7	15.8	21.6	101	75-125				
Silver	mg/kg		28.9	15.8	64.2	224	75-125	M1			
Zinc	mg/kg		1070	15.8	1180	655	75-125	E,M1			

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MERP/4688 Analysis Method: EPA 7471
 QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury
 Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

METHOD BLANK: 833324 Matrix: Solid
 Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.019	0.019	08/06/10 08:03	

LABORATORY CONTROL SAMPLE: 833325

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.43	0.44	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833326 833327

Parameter	Units	10134832003		833326		833327		% Rec Limits	Max RPD	Qual	
		MS Result	MS Spike Conc.	MS Result	MS Spike Conc.	MS Result	MS Spike Conc.				
Mercury	mg/kg	0.023	.59	0.61	.53	0.54	99	98	80-120	12	20

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MPRP/21678

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10134832003, 10134832006, 10134832012, 10134832013

SAMPLE DUPLICATE: 832549

Parameter	Units	10134832003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	18.6	19.6	5	30	

SAMPLE DUPLICATE: 832550

Parameter	Units	10134857011 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	2.3	2.2	3	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MT/4653

Analysis Method: SM 2310

QC Batch Method: SM 2310

Analysis Description: 2310 Acidity

Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

METHOD BLANK: 835115

Matrix: Water

Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acidity	mg/L	<5.0	5.0	08/09/10 16:00	

SAMPLE DUPLICATE: 835116

Parameter	Units	10134832001 Result	Dup Result	RPD	Max RPD	Qualifiers
Acidity	mg/L	<5.0	<5.0		20	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134832

QC Batch: MT/4618 Analysis Method: SM 4500-H+B

QC Batch Method: SM 4500-H+B Analysis Description: 4500H+B pH

Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

LABORATORY CONTROL SAMPLE: 832020

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.1	102	98-102	H6

SAMPLE DUPLICATE: 832019

Parameter	Units	10134832001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	7.9	7.9	.1	3	H6

QUALITY CONTROL DATA

Project: Forest Rose Mine
Pace Project No.: 10134832

QC Batch: WET/19850 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

METHOD BLANK: 836271 Matrix: Water
Associated Lab Samples: 10134832001, 10134832004, 10134832008, 10134832010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<5.0	5.0	08/11/10 14:56	

LABORATORY CONTROL SAMPLE & LCSD: 836272 836273

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	40	43.0	43.1	107	108	90-110	.3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 836276 836277

Parameter	Units	10134736009 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	226	40	40	257	252	78	64	80-120	2	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 836496 836497

Parameter	Units	10134719003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity, Total as CaCO3	mg/L	8.1	40	40	42.2	48.8	85	102	80-120	15	30	

QUALIFIERS

Project: Forest Rose Mine

Pace Project No.: 10134832

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

H6 Analysis initiated more than 15 minutes after sample collection.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine
Pace Project No.: 10134832

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134832001	FR-DS-SW-T1	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832004	FR-DS-SW-T2	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832007	FR-DS-QC-T1	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832008	FR-AW-SW-T1	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832010	FR-US-SW-T1	EPA 200.8	MPRP/21668	EPA 200.8	ICPM/8873
10134832002	FR-DS-SW-D1	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832005	FR-DS-SW-D2	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832009	FR-AW-SW-D1	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832011	FR-US-SW-D1	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832014	FR-DS-QC-D1	EPA 200.8	MPRP/21702	EPA 200.8	ICPM/8884
10134832003	FR-DS-SD-01	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134832006	FR-DS-SD-02	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134832012	FR-US-SD-01	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134832013	FR-BG-SS-02-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134832003	FR-DS-SD-01	EPA 7471	MERP/4688	EPA 7471	MERC/5528
10134832006	FR-DS-SD-02	EPA 7471	MERP/4688	EPA 7471	MERC/5528
10134832012	FR-US-SD-01	EPA 7471	MERP/4688	EPA 7471	MERC/5528
10134832013	FR-BG-SS-02-00	EPA 7471	MERP/4688	EPA 7471	MERC/5528
10134832003	FR-DS-SD-01	% Moisture	MPRP/21678		
10134832006	FR-DS-SD-02	% Moisture	MPRP/21678		
10134832012	FR-US-SD-01	% Moisture	MPRP/21678		
10134832013	FR-BG-SS-02-00	% Moisture	MPRP/21678		
10134832001	FR-DS-SW-T1	SM 2310	MT/4653		
10134832004	FR-DS-SW-T2	SM 2310	MT/4653		
10134832008	FR-AW-SW-T1	SM 2310	MT/4653		
10134832010	FR-US-SW-T1	SM 2310	MT/4653		
10134832001	FR-DS-SW-T1	SM 4500-H+B	MT/4618		
10134832004	FR-DS-SW-T2	SM 4500-H+B	MT/4618		
10134832008	FR-AW-SW-T1	SM 4500-H+B	MT/4618		
10134832010	FR-US-SW-T1	SM 4500-H+B	MT/4618		
10134832001	FR-DS-SW-T1	SM 2320B	WET/19850		
10134832004	FR-DS-SW-T2	SM 2320B	WET/19850		
10134832008	FR-AW-SW-T1	SM 2320B	WET/19850		
10134832010	FR-US-SW-T1	SM 2320B	WET/19850		

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 06-03425-070
From Gina Catarra, Herrera Environmental Consultants
Date November 19, 2010
Subject Data Quality Assurance Review of Forest Rose Mine Site Data

This memorandum presents a review of data quality for 14 surface soil samples collected from the Forest Rose Mine site on July 27, 2010. Pace Analytical of Billings, Montana analyzed the samples for:

- Total recoverable metals by EPA methods 6020/7471 and 200.8 (rinsate sample)
- Particle size analysis (PSA) by method ASA 15-5 modified
- Acid base potential by modified Sobek method
- Extractable sulfur by modified Sobek method
- Moisture content by USDA 26

Results for the following samples were validated.

Sample ID	Matrix	Laboratory Job	Date/Time Sampled	Analyses Requested
FR-T1-TB-01-00	Soil	10134857	7/27/2010 / 09:20	All analyses
FR-T2-TB-01-00	Soil	10134857	7/27/2010 / 09:45	All analyses
FR-T1-TB-02-00	Soil	10134857	7/27/2010 / 10:05	All analyses
FR-T3-TB-01-00	Soil	10134857	7/27/2010 / 10:15	All analyses
FR-T3-TB-02-00	Soil	10134857	7/27/2010 / 10:30	All analyses
FR-WR-RB-01-00	Soil	10134857	7/27/2010 / 12:10	All analyses
FR-WR-RB-02-00	Soil	10134857	7/27/2010 / 12:25	All analyses
FR-AW-SS-04	Soil	10134857	7/27/2010 / 12:55	Metals
FR-AW-SS-03	Soil	10134857	7/27/2010 / 13:15	Metals
FR-AW-SS-01	Soil	10134857	7/27/2010 / 13:35	Metals
FR-AW-SS-02	Soil	10134857	7/27/2010 / 13:50	Metals
FR-AW-RS-02	Soil	10134857	7/27/2010 / 14:20	Metals
FR-AW-RS-01	Soil	10134857	7/27/2010 / 15:30	Metals
FR-WR-RB-03-00	Soil	10134857	7/27/2010 / 15:50	All analyses

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Forest Rose Mine Site Reclamation Work Plan* (Herrera 2010).

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data quality assurance worksheets summarizing the quality assurance and quality control (QA/QC) review were completed for each sampling event and are included with the data. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. All samples were analyzed within the required holding times (Table 1). The laboratory reports were complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Table 1. Summary of sample collection requirements.

Parameter	Analytical Method	Bottle	Preservative	Holding Time
Total recoverable metals	EPA 6020/7471	8-oz jar	Cool to 4°C	180 days
Acid-base accounting	Mod Sobek	8-oz jar	Cool to 4°C	None
Particle size analysis	ASA 15-5	Gallon plastic	Cool to 4°C	None
Extractable sulfur	Mod Sobek	8-oz jar	Cool to 4°C	None
Moisture content	USDA 26	Gallon plastic	Cool to 4°C	None

Laboratory Reporting Limits—Acceptable with Discussion

The laboratory reporting limits and QAPP specified reporting limits are provided in Table 2. In general, the laboratory reporting limits met the QAPP specified reporting limits for all analyses. Some laboratory reporting limits were elevated due to necessary dilutions performed on some samples. No data were qualified based on laboratory reporting limits.

Table 2. Summary of QAPP and laboratory reporting limits.

Parameter	QAPP Reporting Limit	Laboratory Reporting Limit
Total recoverable metals	0.1 to 1 mg/kg	0.068 to 42.4 mg/kg
Acid-base accounting	1 tons/1000	0.50 tons/1000
Particle size analysis	1 percent	1 percent
Extractable sulfur	Not specified	0.050 percent
Moisture content	0.1 percent	0.1 percent

Blank Analysis—Acceptable

Method Blanks

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples (LCS) were analyzed at the required frequency. The percent recovery values for all analyses met the criteria.

Matrix Spike Analysis—Acceptable with Qualification

Matrix spike (MS) samples were analyzed for total metals at the required frequency. With one exception, the percent recovery values for the MS analyses met the control limits (80 to 120 percent for mercury, 75 to 125 percent for all other metals) established by the method.

Sample FR-WR-RB-02-00 was analyzed as the MS with the samples for the total metals analysis. The percent recovery values for antimony (179 percent), barium (266 percent), manganese (57 percent), and silver (224 percent) exceeded the 75 to 125 percent criteria. Because all other criteria were met, only the antimony, barium, manganese, and silver result for sample FR-WR-RB-02-00 were qualified as estimated (J), as shown in Table 3.

Table 3. Summary of samples qualified due to matrix spike exceedances.

Sample ID	Analyte	Reason for Qualification	Qualifier
FR-WR-RB-02-00	Antimony	MS exceedance	J
FR-WR-RB-02-00	Barium	MS exceedance	J
FR-WR-RB-02-00	Manganese	MS exceedance	J
FR-WR-RB-02-00	Silver	MS exceedance	J

Laboratory Duplicate Analysis—Acceptable with Discussion

Laboratory duplicates or laboratory control sample duplicates were analyzed at the required frequency. The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. A control limit of less than 20 percent RPD was established in the work plan and a control limit of two times the RL was used to evaluate

difference values. With one exception, the relative percent difference (RPD) values met the control limits established by the work plan, and all difference values were less than two times the RL.

Sample FR-T2-TB-02-10 (batch 10134984) was analyzed as the laboratory duplicate with the samples for the sulfur analyses. The RPD value for hot water extractable sulfur (36 percent) did not meet the method criterion of less than 20 percent. Because all other criteria were met, no samples from this batch were qualified.

Field Duplicates—Not Collected

Data Quality Assessment Summary

In general, the data quality for all parameters was found to be acceptable based on holding time, reporting limit, method blank, control standard, matrix spike, laboratory duplicate, and field duplicate criteria. Due to matrix spike exceedances, one silver, barium, manganese, and antimony value were qualified as estimated (J).

Usability of the data is based on the guidance documents previously noted. Upon consideration of the information presented here, the data are acceptable as qualified.

Definition of Data Qualifiers

The following data qualifier definitions are taken from *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2002).

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

References

Herrera. 2010. Forest Rose Mine Site Reclamation Work Plan. Prepared for Montana Department of Environmental Quality by Herrera Environmental Consultants, Seattle, Washington. June 2010.

USEPA. 2002. Contract laboratory program national functional guidelines for inorganic data review. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C. (EPA-540/R-01/008).

August 25, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine
Pace Project No.: 10134857

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on July 30, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine

Pace Project No.: 10134857

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Idaho Certification #: MN00064

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nebraska Certification #: Pace

Nevada Certification #: MN_00064

New Jersey Certification #: MN-002

New Mexico Certification #: Pace

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: D9921

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Washington Certification #: C754

Wisconsin Certification #: 999407970

Montana Certification IDs

602 South 25th Street, Billings, MT 59101

EPA Region 8 Certification #: 8TMS-Q

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

NVLAP Certification #: 101292-0

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: Forest Rose Mine

Pace Project No.: 10134857

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134857001	FR-T1-TB-01-00	Solid	07/27/10 09:20	07/30/10 10:05
10134857002	FR-T2-TB-01-00	Solid	07/27/10 09:45	07/30/10 10:05
10134857003	FR-T2-TB-02-00	Solid	07/27/10 10:05	07/30/10 10:05
10134857004	FR-T3-TB-01-00	Solid	07/27/10 10:15	07/30/10 10:05
10134857005	FR-T3-TB-02-00	Solid	07/27/10 10:30	07/30/10 10:05
10134857006	FR-WR-RB-01-00	Solid	07/27/10 12:10	07/30/10 10:05
10134857007	FR-WR-RB-02-00	Solid	07/27/10 12:25	07/30/10 10:05
10134857008	FR-AW-SS-04	Solid	07/27/10 12:55	07/30/10 10:05
10134857009	FR-AW-SS-03	Solid	07/27/10 13:15	07/30/10 10:05
10134857010	FR-AW-SS-01	Solid	07/27/10 13:35	07/30/10 10:05
10134857011	FR-AW-SS-02	Solid	07/27/10 13:50	07/30/10 10:05
10134857012	FR-AW-RS-02	Solid	07/27/10 14:20	07/30/10 10:05
10134857013	FR-AW-RS-01	Solid	07/27/10 15:30	07/30/10 10:05
10134857014	FR-WR-RB-03-00	Solid	07/27/10 15:50	07/30/10 10:05

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine
Pace Project No.: 10134857

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134857001	FR-T1-TB-01-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
10134857002	FR-T2-TB-01-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
10134857003	FR-T2-TB-02-00	USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
10134857004	FR-T3-TB-01-00	Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
10134857005	FR-T3-TB-02-00	Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine
Pace Project No.: 10134857

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory		
10134857006	FR-WR-RB-01-00	% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		Modified Sobek 7	KS1	1	PASI-MT		
		Modified Sobek 7	KS1	5	PASI-MT		
		Modified Sobek 7	KS1	4	PASI-MT		
		Modified Sobek 7	SC1	1	PASI-MT		
		USDA 26	KS1	1	PASI-MT		
		EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		Modified Sobek 7	KS1	1	PASI-MT		
		Modified Sobek 7	KS1	5	PASI-MT		
		Modified Sobek 7	KS1	4	PASI-MT		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	SC1	1	PASI-MT		
		USDA 26	KS1	1	PASI-MT		
		EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
		ASA 15-5 mod	KS1	4	PASI-MT		
		Modified Sobek 7	KS1	1	PASI-MT		
		Modified Sobek 7	KS1	5	PASI-MT		
		Modified Sobek 7	KS1	4	PASI-MT		
		Modified Sobek 7	SC1	1	PASI-MT		
		10134857008	FR-AW-SS-04	USDA 26	KS1	1	PASI-MT
				EPA 6020	RJS	12	PASI-M
				EPA 7471	TEM	1	PASI-M
				% Moisture	JDL	1	PASI-M
10134857009	FR-AW-SS-03	EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
10134857010	FR-AW-SS-01	EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		
10134857011	FR-AW-SS-02	EPA 6020	RJS	12	PASI-M		
		EPA 7471	TEM	1	PASI-M		
		% Moisture	JDL	1	PASI-M		

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134857

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134857012	FR-AW-RS-02	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134857013	FR-AW-RS-01	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134857014	FR-WR-RB-03-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

14 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21683

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134832003,10134857007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 832978)
 - Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Copper
 - Iron
 - Lead
 - Manganese
 - Nickel
 - Silver
 - Zinc
- MS (Lab ID: 832980)
 - Antimony

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

QC Batch: MPRP/21683

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134832003,10134857007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Arsenic
- Barium
- Copper
- Iron
- Lead
- Manganese
- Silver
- Zinc
- MSD (Lab ID: 832979)
 - Arsenic
 - Barium
 - Cadmium
 - Chromium
 - Copper
 - Iron
 - Lead
 - Manganese
 - Nickel
 - Silver
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21683

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 832978)
 - Iron
 - Manganese
 - Zinc
 - Copper
 - Iron
 - Lead
 - Zinc
- MSD (Lab ID: 832979)
 - Iron
 - Manganese
 - Lead
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: EPA 7471

Description: 7471 Mercury

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

14 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/4702

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134857001,10134865005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 834879)
 - Mercury
- MSD (Lab ID: 834880)
 - Mercury

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: % Moisture

Description: Dry Weight

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

14 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: ASA 15-5 mod

Description: PSA Percent Sand,Silt,Clay

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for ASA 15-5 mod. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/4680

R1: RPD value was outside control limits.

- DUP (Lab ID: 836822)
- Sulfur, Hot Water Extractable

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

8 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134857

Method: USDA 26

Description: Soil Moisture Content

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

7 samples were analyzed for USDA 26. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T1-TB-01-00 **Lab ID: 10134857001** Collected: 07/27/10 09:20 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	4.6	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-36-0	
Arsenic	445	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:00	7440-38-2	
Barium	29.6	mg/kg	0.29	20	08/06/10 15:22	08/10/10 16:56	7440-39-3	
Cadmium	1.4	mg/kg	0.077	20	08/06/10 15:22	08/10/10 16:56	7440-43-9	
Chromium	4.0	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-47-3	
Copper	215	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-50-8	
Iron	137000	mg/kg	478	200	08/06/10 15:22	08/11/10 09:21	7439-89-6	
Lead	657	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:00	7439-92-1	
Manganese	173	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7439-96-5	
Nickel	12.6	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-02-0	
Silver	8.7	mg/kg	0.48	20	08/06/10 15:22	08/10/10 16:56	7440-22-4	
Zinc	1600	mg/kg	23.9	100	08/06/10 15:22	08/10/10 17:00	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.21	mg/kg	0.021	1	08/16/10 19:25	08/18/10 08:50	7439-97-6	M1
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	9.9	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	17.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	50	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	32.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	<0.5	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	0.741	% (w/w)	0.050	1		08/17/10 09:21		
Sulfur, HNO3 Extractable	0.130	% (w/w)	0.050	1		08/17/10 09:21		
Sulfur, Hot Water Extractable	2.21	% (w/w)	0.050	1		08/17/10 09:21		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 09:21		
Total Sulfur	3.09	% (w/w)	0.050	1		08/17/10 09:21		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-21	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	21	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	46	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	> 15.5	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	4.0	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T1-TB-01-00 **Lab ID: 10134857001** Collected: 07/27/10 09:20 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Analytical Method: USDA 26								
Soil Moisture Content	10.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T2-TB-01-00 **Lab ID: 10134857002** Collected: 07/27/10 09:45 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.8	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-36-0	
Arsenic	239	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-38-2	
Barium	13.6	mg/kg	0.29	20	08/06/10 15:22	08/10/10 17:05	7440-39-3	
Cadmium	3.1	mg/kg	0.077	20	08/06/10 15:22	08/10/10 17:05	7440-43-9	
Chromium	7.6	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-47-3	
Copper	728	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:09	7440-50-8	
Iron	164000	mg/kg	479	200	08/06/10 15:22	08/11/10 09:26	7439-89-6	
Lead	768	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:09	7439-92-1	
Manganese	551	mg/kg	2.4	100	08/06/10 15:22	08/10/10 17:09	7439-96-5	
Nickel	14.7	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-02-0	
Silver	6.4	mg/kg	0.48	20	08/06/10 15:22	08/10/10 17:05	7440-22-4	
Zinc	1900	mg/kg	23.9	100	08/06/10 15:22	08/10/10 17:09	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.074	mg/kg	0.022	1	08/16/10 19:25	08/18/10 08:54	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	13.7	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	15	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	47.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	37.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	<0.5	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	0.435	% (w/w)	0.050	1		08/17/10 09:52		
Sulfur, HNO3 Extractable	0.150	% (w/w)	0.050	1		08/17/10 09:52		
Sulfur, Hot Water Extractable	2.92	% (w/w)	0.050	1		08/17/10 09:52		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 09:52		
Total Sulfur	3.51	% (w/w)	0.050	1		08/17/10 09:52		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-15	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	15	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	33	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	12	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	5.3	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T2-TB-01-00 **Lab ID: 10134857002** Collected: 07/27/10 09:45 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	15.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T2-TB-02-00 **Lab ID: 10134857003** Collected: 07/27/10 10:05 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	47.6	mg/kg	0.46	20	08/06/10 15:22	08/10/10 17:13	7440-36-0	
Arsenic	456	mg/kg	2.3	100	08/06/10 15:22	08/10/10 17:18	7440-38-2	
Barium	35.2	mg/kg	0.27	20	08/06/10 15:22	08/10/10 17:13	7440-39-3	
Cadmium	68.0	mg/kg	0.073	20	08/06/10 15:22	08/10/10 17:13	7440-43-9	
Chromium	4.0	mg/kg	0.46	20	08/06/10 15:22	08/10/10 17:13	7440-47-3	
Copper	567	mg/kg	2.3	100	08/06/10 15:22	08/10/10 17:18	7440-50-8	
Iron	54700	mg/kg	228	100	08/06/10 15:22	08/10/10 17:18	7439-89-6	
Lead	7850	mg/kg	22.8	1000	08/06/10 15:22	08/11/10 09:30	7439-92-1	
Manganese	2210	mg/kg	22.8	1000	08/06/10 15:22	08/11/10 09:30	7439-96-5	
Nickel	7.5	mg/kg	0.46	20	08/06/10 15:22	08/10/10 17:13	7440-02-0	
Silver	30.7	mg/kg	0.46	20	08/06/10 15:22	08/10/10 17:13	7440-22-4	
Zinc	7870	mg/kg	228	1000	08/06/10 15:22	08/11/10 09:30	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.39	mg/kg	0.022	1	08/16/10 19:25	08/18/10 08:55	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	18.9	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	13.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	15	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	71.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	600	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	4.84	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	1.61	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	3.69	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	450	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	150	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	190	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T2-TB-02-00 **Lab ID: 10134857003** Collected: 07/27/10 10:05 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	23.3	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T3-TB-01-00 **Lab ID: 10134857004** Collected: 07/27/10 10:15 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	21.7	mg/kg	0.38	20	08/06/10 15:22	08/10/10 17:22	7440-36-0	
Arsenic	355	mg/kg	1.9	100	08/06/10 15:22	08/10/10 17:26	7440-38-2	
Barium	32.1	mg/kg	0.23	20	08/06/10 15:22	08/10/10 17:22	7440-39-3	
Cadmium	75.9	mg/kg	0.061	20	08/06/10 15:22	08/10/10 17:22	7440-43-9	
Chromium	4.5	mg/kg	0.38	20	08/06/10 15:22	08/10/10 17:22	7440-47-3	
Copper	560	mg/kg	1.9	100	08/06/10 15:22	08/10/10 17:26	7440-50-8	
Iron	59200	mg/kg	192	100	08/06/10 15:22	08/10/10 17:26	7439-89-6	
Lead	4860	mg/kg	19.2	1000	08/06/10 15:22	08/11/10 09:34	7439-92-1	
Manganese	1860	mg/kg	19.2	1000	08/06/10 15:22	08/11/10 09:34	7439-96-5	
Nickel	10.2	mg/kg	0.38	20	08/06/10 15:22	08/10/10 17:22	7440-02-0	
Silver	19.1	mg/kg	0.38	20	08/06/10 15:22	08/10/10 17:22	7440-22-4	
Zinc	7450	mg/kg	192	1000	08/06/10 15:22	08/11/10 09:34	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.30	mg/kg	0.020	1	08/16/10 19:25	08/18/10 08:59	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	3.4	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	10	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	22.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	67.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	590	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	4.60	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	2.04	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	3.76	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	450	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	140	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	180	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T3-TB-01-00 **Lab ID: 10134857004** Collected: 07/27/10 10:15 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	3.5	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T3-TB-02-00 **Lab ID: 10134857005** Collected: 07/27/10 10:30 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	13.8	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-36-0	
Arsenic	370	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-38-2	
Barium	39.4	mg/kg	0.34	20	08/06/10 15:22	08/10/10 17:44	7440-39-3	
Cadmium	70.7	mg/kg	0.090	20	08/06/10 15:22	08/10/10 17:44	7440-43-9	
Chromium	4.5	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-47-3	
Copper	458	mg/kg	2.8	100	08/06/10 15:22	08/10/10 17:48	7440-50-8	
Iron	54000	mg/kg	282	100	08/06/10 15:22	08/10/10 17:48	7439-89-6	
Lead	5140	mg/kg	14.1	500	08/06/10 15:22	08/12/10 02:14	7439-92-1	
Manganese	2290	mg/kg	2.8	100	08/06/10 15:22	08/10/10 17:48	7439-96-5	
Nickel	21.2	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-02-0	
Silver	16.0	mg/kg	0.56	20	08/06/10 15:22	08/10/10 17:44	7440-22-4	
Zinc	8130	mg/kg	141	500	08/06/10 15:22	08/12/10 02:14	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.16	mg/kg	0.023	1	08/16/10 19:25	08/18/10 09:01	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	20.8	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	11.3	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	37.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	51.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	530	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	4.75	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	1.52	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	3.03	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	380	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	150	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	190	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.5	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-T3-TB-02-00 **Lab ID: 10134857005** Collected: 07/27/10 10:30 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	26.3	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-01-00 **Lab ID: 10134857006** Collected: 07/27/10 12:10 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	9.4	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-36-0	
Arsenic	101	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-38-2	
Barium	59.8	mg/kg	0.30	20	08/06/10 15:22	08/10/10 17:52	7440-39-3	
Cadmium	5.2	mg/kg	0.080	20	08/06/10 15:22	08/10/10 17:52	7440-43-9	
Chromium	22.5	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-47-3	
Copper	249	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-50-8	
Iron	47700	mg/kg	250	100	08/06/10 15:22	08/10/10 17:57	7439-89-6	
Lead	4560	mg/kg	12.5	500	08/06/10 15:22	08/12/10 02:34	7439-92-1	
Manganese	813	mg/kg	2.5	100	08/06/10 15:22	08/10/10 17:57	7439-96-5	
Nickel	33.2	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-02-0	
Silver	9.7	mg/kg	0.50	20	08/06/10 15:22	08/10/10 17:52	7440-22-4	
Zinc	1260	mg/kg	25.0	100	08/06/10 15:22	08/10/10 17:57	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.23	mg/kg	0.021	1	08/16/10 19:25	08/18/10 09:02	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	8.9	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	18.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	53.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	27.4	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	3.0	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/17/10 13:32		
Sulfur, HNO3 Extractable	0.114	% (w/w)	0.050	1		08/17/10 13:32		
Sulfur, Hot Water Extractable	0.0900	% (w/w)	0.050	1		08/17/10 13:32		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 13:32		
Total Sulfur	0.253	% (w/w)	0.050	1		08/17/10 13:32		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-1.7	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	4.8	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	13	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	5.3	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.2	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-01-00 **Lab ID: 10134857006** Collected: 07/27/10 12:10 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	9.8	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-02-00 **Lab ID: 10134857007** Collected: 07/27/10 12:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	27.9	mg/kg	2.1	100	08/06/10 15:22	08/11/10 10:05	7440-36-0	
Arsenic	486	mg/kg	2.1	100	08/06/10 15:22	08/11/10 10:05	7440-38-2	M1
Barium	27.3	mg/kg	1.2	100	08/06/10 15:22	08/11/10 10:05	7440-39-3	M1
Cadmium	5.0	mg/kg	0.33	100	08/06/10 15:22	08/11/10 10:05	7440-43-9	
Chromium	4.6	mg/kg	0.41	20	08/06/10 15:22	08/10/10 18:01	7440-47-3	
Copper	628	mg/kg	2.1	100	08/06/10 15:22	08/11/10 10:05	7440-50-8	
Iron	46200	mg/kg	1030	500	08/06/10 15:22	08/11/10 10:13	7439-89-6	
Lead	2640	mg/kg	10.3	500	08/06/10 15:22	08/11/10 10:13	7439-92-1	M1
Manganese	95.8	mg/kg	0.41	20	08/06/10 15:22	08/10/10 18:01	7439-96-5	M1
Nickel	5.7	mg/kg	0.41	20	08/06/10 15:22	08/10/10 18:01	7440-02-0	
Silver	28.9	mg/kg	2.1	100	08/06/10 15:22	08/11/10 10:05	7440-22-4	M1
Zinc	1070	mg/kg	20.5	100	08/06/10 15:22	08/11/10 10:05	7440-66-6	M1
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.90	mg/kg	0.021	1	08/16/10 19:25	08/18/10 09:03	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	9.8	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	12.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	52.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	35	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	<0.5	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	1.17	% (w/w)	0.050	1		08/17/10 13:51		
Sulfur, HNO3 Extractable	0.861	% (w/w)	0.050	1		08/17/10 13:51		
Sulfur, Hot Water Extractable	3.11	% (w/w)	0.050	1		08/17/10 13:51		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 13:51		
Total Sulfur	5.14	% (w/w)	0.050	1		08/17/10 13:51		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-54	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	54	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	87	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	> 15.5	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	3.8	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-02-00 **Lab ID: 10134857007** Collected: 07/27/10 12:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	10.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-SS-04 **Lab ID: 10134857008** Collected: 07/27/10 12:55 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.7	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-36-0	
Arsenic	39.7	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-38-2	
Barium	257	mg/kg	0.33	20	08/06/10 15:22	08/10/10 18:14	7440-39-3	
Cadmium	4.1	mg/kg	0.088	20	08/06/10 15:22	08/10/10 18:14	7440-43-9	
Chromium	17.7	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-47-3	
Copper	33.3	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-50-8	
Iron	22700	mg/kg	54.9	20	08/06/10 15:22	08/10/10 18:14	7439-89-6	
Lead	146	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7439-92-1	
Manganese	4170	mg/kg	5.5	200	08/06/10 15:22	08/11/10 09:47	7439-96-5	
Nickel	24.4	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-02-0	
Silver	5.3	mg/kg	0.55	20	08/06/10 15:22	08/10/10 18:14	7440-22-4	
Zinc	248	mg/kg	5.5	20	08/06/10 15:22	08/10/10 18:14	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.13	mg/kg	0.024	1	08/16/10 19:25	08/18/10 09:05	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	22.8	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-SS-03 **Lab ID: 10134857009** Collected: 07/27/10 13:15 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	2.0	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-36-0	
Arsenic	35.6	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-38-2	
Barium	182	mg/kg	0.25	20	08/06/10 15:22	08/10/10 18:36	7440-39-3	
Cadmium	1.9	mg/kg	0.067	20	08/06/10 15:22	08/10/10 18:36	7440-43-9	
Chromium	23.8	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-47-3	
Copper	39.6	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-50-8	
Iron	23300	mg/kg	210	100	08/06/10 15:22	08/10/10 18:40	7439-89-6	
Lead	123	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7439-92-1	
Manganese	1050	mg/kg	2.1	100	08/06/10 15:22	08/10/10 18:40	7439-96-5	
Nickel	33.7	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-02-0	
Silver	0.55	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:36	7440-22-4	
Zinc	254	mg/kg	4.2	20	08/06/10 15:22	08/10/10 18:36	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.076	mg/kg	0.021	1	08/16/10 19:25	08/18/10 09:06	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	6.2	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-SS-01 **Lab ID: 10134857010** Collected: 07/27/10 13:35 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.3	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-36-0	
Arsenic	29.0	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-38-2	
Barium	290	mg/kg	0.26	20	08/06/10 15:22	08/10/10 18:45	7440-39-3	
Cadmium	2.7	mg/kg	0.070	20	08/06/10 15:22	08/10/10 18:45	7440-43-9	
Chromium	20.5	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-47-3	
Copper	35.5	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-50-8	
Iron	23200	mg/kg	220	100	08/06/10 15:22	08/10/10 18:49	7439-89-6	
Lead	79.8	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7439-92-1	
Manganese	1300	mg/kg	2.2	100	08/06/10 15:22	08/10/10 18:49	7439-96-5	
Nickel	24.2	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-02-0	
Silver	0.48	mg/kg	0.44	20	08/06/10 15:22	08/10/10 18:45	7440-22-4	
Zinc	269	mg/kg	4.4	20	08/06/10 15:22	08/10/10 18:45	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.045	mg/kg	0.021	1	08/16/10 19:25	08/18/10 09:08	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	8.4	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-SS-02 **Lab ID: 10134857011** Collected: 07/27/10 13:50 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.53	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-36-0	
Arsenic	14.2	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-38-2	
Barium	66.6	mg/kg	0.25	20	08/06/10 15:22	08/10/10 18:53	7440-39-3	
Cadmium	1.2	mg/kg	0.067	20	08/06/10 15:22	08/10/10 18:53	7440-43-9	
Chromium	27.8	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-47-3	
Copper	37.1	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-50-8	
Iron	32100	mg/kg	210	100	08/06/10 15:22	08/10/10 18:58	7439-89-6	
Lead	26.0	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7439-92-1	
Manganese	796	mg/kg	2.1	100	08/06/10 15:22	08/10/10 18:58	7439-96-5	
Nickel	37.1	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-02-0	
Silver	<0.42	mg/kg	0.42	20	08/06/10 15:22	08/10/10 18:53	7440-22-4	
Zinc	131	mg/kg	4.2	20	08/06/10 15:22	08/10/10 18:53	7440-66-6	

7471 Mercury

Analytical Method: EPA 7471 Preparation Method: EPA 7471

Mercury	0.026	mg/kg	0.020	1	08/16/10 19:25	08/18/10 09:12	7439-97-6	
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Dry Weight

Analytical Method: % Moisture

Percent Moisture	2.3	%	0.10	1		08/03/10 00:00		
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ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-RS-02 **Lab ID: 10134857012** Collected: 07/27/10 14:20 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.89	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-36-0	
Arsenic	23.7	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-38-2	
Barium	112	mg/kg	0.25	20	08/06/10 15:22	08/10/10 19:02	7440-39-3	
Cadmium	4.2	mg/kg	0.067	20	08/06/10 15:22	08/10/10 19:02	7440-43-9	
Chromium	21.5	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-47-3	
Copper	48.6	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-50-8	
Iron	33000	mg/kg	209	100	08/06/10 15:22	08/10/10 19:06	7439-89-6	
Lead	76.9	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7439-92-1	
Manganese	773	mg/kg	2.1	100	08/06/10 15:22	08/10/10 19:06	7439-96-5	
Nickel	26.7	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-02-0	
Silver	<0.42	mg/kg	0.42	20	08/06/10 15:22	08/10/10 19:02	7440-22-4	
Zinc	463	mg/kg	20.9	100	08/06/10 15:22	08/10/10 19:06	7440-66-6	

7471 Mercury

Analytical Method: EPA 7471 Preparation Method: EPA 7471

Mercury	0.038	mg/kg	0.019	1	08/16/10 19:25	08/18/10 09:13	7439-97-6	
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Dry Weight

Analytical Method: % Moisture

Percent Moisture	8.6	%	0.10	1		08/03/10 00:00		
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ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-AW-RS-01 **Lab ID: 10134857013** Collected: 07/27/10 15:30 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	2.1	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-36-0	
Arsenic	25.7	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-38-2	
Barium	113	mg/kg	0.29	20	08/06/10 15:22	08/10/10 19:24	7440-39-3	
Cadmium	2.5	mg/kg	0.077	20	08/06/10 15:22	08/10/10 19:24	7440-43-9	
Chromium	26.3	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-47-3	
Copper	60.6	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-50-8	
Iron	30200	mg/kg	241	100	08/06/10 15:22	08/10/10 19:28	7439-89-6	
Lead	141	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7439-92-1	
Manganese	748	mg/kg	2.4	100	08/06/10 15:22	08/10/10 19:28	7439-96-5	
Nickel	35.0	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-02-0	
Silver	1.0	mg/kg	0.48	20	08/06/10 15:22	08/10/10 19:24	7440-22-4	
Zinc	352	mg/kg	4.8	20	08/06/10 15:22	08/10/10 19:24	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.13	mg/kg	0.019	1	08/16/10 19:25	08/18/10 09:15	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	9.8	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-03-00 **Lab ID: 10134857014** Collected: 07/27/10 15:50 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	10.3	mg/kg	2.0	100	08/06/10 15:22	08/10/10 19:37	7440-36-0	
Arsenic	319	mg/kg	2.0	100	08/06/10 15:22	08/10/10 19:37	7440-38-2	
Barium	21.1	mg/kg	1.2	100	08/06/10 15:22	08/10/10 19:37	7440-39-3	
Cadmium	18.9	mg/kg	0.32	100	08/06/10 15:22	08/10/10 19:37	7440-43-9	
Chromium	12.4	mg/kg	0.40	20	08/06/10 15:22	08/10/10 19:32	7440-47-3	
Copper	259	mg/kg	0.40	20	08/06/10 15:22	08/10/10 19:32	7440-50-8	
Iron	123000	mg/kg	997	500	08/06/10 15:22	08/12/10 02:38	7439-89-6	
Lead	2610	mg/kg	10	500	08/06/10 15:22	08/12/10 02:38	7439-92-1	
Manganese	529	mg/kg	2.0	100	08/06/10 15:22	08/10/10 19:37	7439-96-5	
Nickel	33.7	mg/kg	0.40	20	08/06/10 15:22	08/10/10 19:32	7440-02-0	
Silver	19.5	mg/kg	2.0	100	08/06/10 15:22	08/10/10 19:37	7440-22-4	
Zinc	2960	mg/kg	99.7	500	08/06/10 15:22	08/12/10 02:38	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.42	mg/kg	0.020	1	08/16/10 19:25	08/18/10 09:16	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	5.0	%	0.10	1		08/03/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	22.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	61.3	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	16.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy clay loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	23	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/17/10 14:06		
Sulfur, HNO3 Extractable	1.32	% (w/w)	0.050	1		08/17/10 14:06		
Sulfur, Hot Water Extractable	1.14	% (w/w)	0.050	1		08/17/10 14:06		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 14:06		
Total Sulfur	2.34	% (w/w)	0.050	1		08/17/10 14:06		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-18	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	41	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	54	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	2.4	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134857

Sample: FR-WR-RB-03-00 **Lab ID: 10134857014** Collected: 07/27/10 15:50 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	5.2	%	0.10	1		08/17/10 09:45		

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch: MPRP/21683 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857008

METHOD BLANK: 832976 Matrix: Solid
 Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857008, 10134857009, 10134857010, 10134857011, 10134857012, 10134857013, 10134857014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	<0.42	0.42	08/11/10 09:13	
Arsenic	mg/kg	<0.42	0.42	08/11/10 09:13	
Barium	mg/kg	<0.25	0.25	08/11/10 09:13	
Cadmium	mg/kg	<0.068	0.068	08/11/10 09:13	
Chromium	mg/kg	<0.42	0.42	08/11/10 09:13	
Copper	mg/kg	<0.42	0.42	08/11/10 09:13	
Iron	mg/kg	<42.4	42.4	08/11/10 09:13	
Lead	mg/kg	<0.42	0.42	08/11/10 09:13	
Manganese	mg/kg	<0.42	0.42	08/11/10 09:13	
Nickel	mg/kg	<0.42	0.42	08/11/10 09:13	
Silver	mg/kg	<0.42	0.42	08/11/10 09:13	
Zinc	mg/kg	<4.2	4.2	08/11/10 09:13	

LABORATORY CONTROL SAMPLE: 832977

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	18.3	17.2	94	75-125	
Arsenic	mg/kg	18.3	16.9	92	75-125	
Barium	mg/kg	18.3	18.5	101	75-125	
Cadmium	mg/kg	18.3	17.2	94	75-125	
Chromium	mg/kg	18.3	17.6	96	75-125	
Copper	mg/kg	18.3	17.7	97	75-125	
Iron	mg/kg	229	224	98	75-125	
Lead	mg/kg	18.3	17.9	97	75-125	
Manganese	mg/kg	18.3	18.0	98	75-125	
Nickel	mg/kg	18.3	17.8	97	75-125	
Silver	mg/kg	18.3	18.0	98	75-125	
Zinc	mg/kg	18.3	17.7	97	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832978 832979

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual	
		10134832003 Result	Spike Conc.	Spike Conc.	MS Result							MSD Result
Antimony	mg/kg	1.2	21.5	19.3	22.7	20.9	100	102	75-125	8	20	
Arsenic	mg/kg	24.3	21.5	19.3	73.7	68.2	229	226	75-125	8	20	M1
Barium	mg/kg	65.4	21.5	19.3	146	135	374	359	75-125	8	20	M1
Cadmium	mg/kg	6.6	21.5	19.3	41.8	39.0	163	167	75-125	7	20	M1
Chromium	mg/kg	30.3	21.5	19.3	68.5	64.2	177	175	75-125	7	20	M1

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 832978												832979			
Parameter	Units	10134832003 Result	MS		MSD		MS		MSD		% Rec Limits	Max RPD	Qual		
			Spike Conc.	MSD Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec							
Copper	mg/kg	69.0	21.5	19.3	141	129	332	309	75-125	9	20	M1			
Iron	mg/kg	37100	269	242	60700	56900	8750	8180	75-125	6	20	E,M1			
Lead	mg/kg	448	21.5	19.3	948	874	2320	2200	75-125	8	20	E,M1			
Manganese	mg/kg	796	21.5	19.3	1800	1680	4650	4570	75-125	7	20	E,M1			
Nickel	mg/kg	41.1	21.5	19.3	81.9	75.9	189	180	75-125	8	20	M1			
Silver	mg/kg	1.1	21.5	19.3	33.0	30.7	148	153	75-125	7	20	M1			
Zinc	mg/kg	1160	21.5	19.3	2160	1990	4650	4310	75-125	8	20	E,M1			

MATRIX SPIKE SAMPLE: 832980											
Parameter	Units	10134857007		Spike Conc.	MS		% Rec Limits	Qualifiers			
		Result	MSD Conc.		MS Result	MS % Rec					
Antimony	mg/kg		27.9	15.8	56.1	179	75-125	M1			
Arsenic	mg/kg		486	15.8	677	1210	75-125	M1			
Barium	mg/kg		27.3	15.8	69.2	266	75-125	M1			
Cadmium	mg/kg		5.0	15.8	22.2	110	75-125				
Chromium	mg/kg		4.6	15.8	20.7	102	75-125				
Copper	mg/kg		628	15.8	842	1360	75-125	E,M1			
Iron	mg/kg		46200	196	130000	42400	75-125	E,M1			
Lead	mg/kg		2640	15.8	8580	37800	75-125	E,M1			
Manganese	mg/kg		95.8	15.8	105	57	75-125	M1			
Nickel	mg/kg		5.7	15.8	21.6	101	75-125				
Silver	mg/kg		28.9	15.8	64.2	224	75-125	M1			
Zinc	mg/kg		1070	15.8	1180	655	75-125	E,M1			

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch: MERP/4702 Analysis Method: EPA 7471
 QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury
 Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857008, 10134857009, 10134857010, 10134857011, 10134857012, 10134857013, 10134857014

METHOD BLANK: 834877 Matrix: Solid
 Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857008, 10134857009, 10134857010, 10134857011, 10134857012, 10134857013, 10134857014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.017	0.017	08/18/10 08:47	

LABORATORY CONTROL SAMPLE: 834878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.43	0.46	108	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 834879 834880

Parameter	Units	10134857001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.21	.52	.5	0.86	0.85	124	125	80-120	2	20	M1

MATRIX SPIKE SAMPLE: 838021

Parameter	Units	10134865005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.054	.52	0.67	117	80-120	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch: MPRP/21679

Analysis Method: % Moisture

QC Batch Method: % Moisture

Analysis Description: Dry Weight/Percent Moisture

Associated Lab Samples: 10134857012, 10134857013, 10134857014

SAMPLE DUPLICATE: 832646

Parameter	Units	10134857012 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	8.6	10.0	16	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch:	MT/4692	Analysis Method:	Modified Sobek 7
QC Batch Method:	Modified Sobek 7	Analysis Description:	Sobek Acid Base Potential
Associated Lab Samples:	10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857014		

SAMPLE DUPLICATE: 838119

Parameter	Units	10134857002 Result	Dup Result	RPD	Max RPD	Qualifiers
Neutralization Potential	tons/1000	<0.5	<0.5			

SAMPLE DUPLICATE: 838120

Parameter	Units	10134984010 Result	Dup Result	RPD	Max RPD	Qualifiers
Neutralization Potential	tons/1000	330	330			

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch:	MT/4633	Analysis Method:	Modified Sobek 7
QC Batch Method:	Modified Sobek 7	Analysis Description:	Sobek SMP Buffer pH
Associated Lab Samples:	10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857014		

SAMPLE DUPLICATE: 833903

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.2	6.2	.2	20	

SAMPLE DUPLICATE: 835073

Parameter	Units	10134857002 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	5.3	5.4	.6	20	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134857

QC Batch: MTPR/1490

Analysis Method: USDA 26

QC Batch Method: USDA 26

Analysis Description: Soil Moisture Content

Associated Lab Samples: 10134857001, 10134857002, 10134857003, 10134857004, 10134857005, 10134857006, 10134857007, 10134857014

SAMPLE DUPLICATE: 838624

Parameter	Units	10134984011 Result	Dup Result	RPD	Max RPD	Qualifiers
Soil Moisture Content	%	8.9	9.7	9	30	

QUALIFIERS

Project: Forest Rose Mine

Pace Project No.: 10134857

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

R1 RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine
Pace Project No.: 10134857

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134857001	FR-T1-TB-01-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857002	FR-T2-TB-01-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857003	FR-T2-TB-02-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857004	FR-T3-TB-01-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857005	FR-T3-TB-02-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857006	FR-WR-RB-01-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857007	FR-WR-RB-02-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857008	FR-AW-SS-04	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857009	FR-AW-SS-03	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857010	FR-AW-SS-01	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857011	FR-AW-SS-02	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857012	FR-AW-RS-02	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857013	FR-AW-RS-01	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857014	FR-WR-RB-03-00	EPA 3050	MPRP/21683	EPA 6020	ICPM/8899
10134857001	FR-T1-TB-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857002	FR-T2-TB-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857003	FR-T2-TB-02-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857004	FR-T3-TB-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857005	FR-T3-TB-02-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857006	FR-WR-RB-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857007	FR-WR-RB-02-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857008	FR-AW-SS-04	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857009	FR-AW-SS-03	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857010	FR-AW-SS-01	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857011	FR-AW-SS-02	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857012	FR-AW-RS-02	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857013	FR-AW-RS-01	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857014	FR-WR-RB-03-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134857001	FR-T1-TB-01-00	% Moisture	MPRP/21678		
10134857002	FR-T2-TB-01-00	% Moisture	MPRP/21678		
10134857003	FR-T2-TB-02-00	% Moisture	MPRP/21678		
10134857004	FR-T3-TB-01-00	% Moisture	MPRP/21678		
10134857005	FR-T3-TB-02-00	% Moisture	MPRP/21678		
10134857006	FR-WR-RB-01-00	% Moisture	MPRP/21678		
10134857007	FR-WR-RB-02-00	% Moisture	MPRP/21678		
10134857008	FR-AW-SS-04	% Moisture	MPRP/21678		
10134857009	FR-AW-SS-03	% Moisture	MPRP/21678		
10134857010	FR-AW-SS-01	% Moisture	MPRP/21678		
10134857011	FR-AW-SS-02	% Moisture	MPRP/21678		
10134857012	FR-AW-RS-02	% Moisture	MPRP/21679		
10134857013	FR-AW-RS-01	% Moisture	MPRP/21679		
10134857014	FR-WR-RB-03-00	% Moisture	MPRP/21679		
10134857001	FR-T1-TB-01-00	ASA 15-5 mod	MT/4669		
10134857002	FR-T2-TB-01-00	ASA 15-5 mod	MT/4669		
10134857003	FR-T2-TB-02-00	ASA 15-5 mod	MT/4669		
10134857004	FR-T3-TB-01-00	ASA 15-5 mod	MT/4669		
10134857005	FR-T3-TB-02-00	ASA 15-5 mod	MT/4669		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine

Pace Project No.: 10134857

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134857006	FR-WR-RB-01-00	ASA 15-5 mod	MT/4669		
10134857007	FR-WR-RB-02-00	ASA 15-5 mod	MT/4669		
10134857014	FR-WR-RB-03-00	ASA 15-5 mod	MT/4669		
10134857001	FR-T1-TB-01-00	Modified Sobek 7	MT/4692		
10134857002	FR-T2-TB-01-00	Modified Sobek 7	MT/4692		
10134857003	FR-T2-TB-02-00	Modified Sobek 7	MT/4692		
10134857004	FR-T3-TB-01-00	Modified Sobek 7	MT/4692		
10134857005	FR-T3-TB-02-00	Modified Sobek 7	MT/4692		
10134857006	FR-WR-RB-01-00	Modified Sobek 7	MT/4692		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	MT/4692		
10134857014	FR-WR-RB-03-00	Modified Sobek 7	MT/4692		
10134857001	FR-T1-TB-01-00	Modified Sobek 7	MT/4680		
10134857002	FR-T2-TB-01-00	Modified Sobek 7	MT/4680		
10134857003	FR-T2-TB-02-00	Modified Sobek 7	MT/4680		
10134857004	FR-T3-TB-01-00	Modified Sobek 7	MT/4680		
10134857005	FR-T3-TB-02-00	Modified Sobek 7	MT/4680		
10134857006	FR-WR-RB-01-00	Modified Sobek 7	MT/4680		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	MT/4680		
10134857014	FR-WR-RB-03-00	Modified Sobek 7	MT/4680		
10134857001	FR-T1-TB-01-00	Modified Sobek 7	MT/4722		
10134857002	FR-T2-TB-01-00	Modified Sobek 7	MT/4722		
10134857003	FR-T2-TB-02-00	Modified Sobek 7	MT/4722		
10134857004	FR-T3-TB-01-00	Modified Sobek 7	MT/4722		
10134857005	FR-T3-TB-02-00	Modified Sobek 7	MT/4722		
10134857006	FR-WR-RB-01-00	Modified Sobek 7	MT/4722		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	MT/4722		
10134857014	FR-WR-RB-03-00	Modified Sobek 7	MT/4722		
10134857001	FR-T1-TB-01-00	Modified Sobek 7	MT/4633		
10134857002	FR-T2-TB-01-00	Modified Sobek 7	MT/4633		
10134857003	FR-T2-TB-02-00	Modified Sobek 7	MT/4633		
10134857004	FR-T3-TB-01-00	Modified Sobek 7	MT/4633		
10134857005	FR-T3-TB-02-00	Modified Sobek 7	MT/4633		
10134857006	FR-WR-RB-01-00	Modified Sobek 7	MT/4633		
10134857007	FR-WR-RB-02-00	Modified Sobek 7	MT/4633		
10134857014	FR-WR-RB-03-00	Modified Sobek 7	MT/4633		
10134857002	FR-T2-TB-01-00	USDA 26	MTPR/1490		
10134857003	FR-T2-TB-02-00	USDA 26	MTPR/1490		
10134857004	FR-T3-TB-01-00	USDA 26	MTPR/1490		
10134857005	FR-T3-TB-02-00	USDA 26	MTPR/1490		
10134857006	FR-WR-RB-01-00	USDA 26	MTPR/1490		
10134857007	FR-WR-RB-02-00	USDA 26	MTPR/1490		
10134857014	FR-WR-RB-03-00	USDA 26	MTPR/1490		

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 06-03425-070
From Gina Catarra, Herrera Environmental Consultants
Date November 19, 2010
Subject Data Quality Assurance Review of Forest Rose Mine Site Data

This memorandum presents a review of data quality for 5 surface soil samples collected from the Forest Rose Mine site on July 26, 2010. Pace Analytical of Billings, Montana analyzed the samples for:

- Total recoverable metals by EPA methods 6020/7471
- SPLP metals by EPA methods 1312/6010
- Cation exchange capacity by EPA method 9081
- Potassium by EPA method 6010
- Nitrate+nitrite by EPA method 353.2
- Organic matter by ASA29-3.5.2
- pH by ASA 10-3.2
- Particle size analysis by ASA 15-5 modified
- Total phosphorus by ASA 24-5.4
- Acid base accounting by modified Sobek method
- Lime Requirement by ASA 12-3.4.4
- Specific conductance by ASA 10-3.3
- Moisture content by USDA 26

Results for the following samples were validated.

Sample ID	Matrix	Laboratory Job	Date/Time Sampled	Analyses Requested
FR-RY-SS-03-00	Soil	10134865	7/26/2010 / 14:00	All analyses
FR-RY-SS-02-00	Soil	10134865	7/26/2010 / 14:25	All analyses
FR-RY-SS-01-00	Soil	10134865	7/26/2010 / 14:55	All analyses
FR-RY-WELL-01-00	Soil	10134865	7/26/2010 / 15:40	Metals
FR-BG-SS-01-00	Soil	10134865	7/26/2010 / 16:40	Metals

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Forest Rose Mine Site Reclamation Work Plan* (Herrera 2010).

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data quality assurance worksheets summarizing the quality assurance and quality control (QA/QC) review were completed for each sampling event and are

included with the data. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. All samples were analyzed within the required holding times (Table 1). The laboratory reports were complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Table 1. Summary of sample collection requirements.

Parameter	Analytical Method	Bottle	Preservative	Holding Time
Total recoverable metals	EPA 6020/7471	8-oz jar	Cool to 4°C	180 days
SPLP metals	EPA methods 1312/6010	8-oz jar	Cool to 4°C	180 days
Acid-base accounting	Mod Sobek	8-oz jar	Cool to 4°C	None
Particle size analysis	ASA 15-5	Gallon plastic	Cool to 4°C	None
Moisture content	USDA 26	Gallon plastic	Cool to 4°C	None
Cation exchange capacity	Mod Sobek	8-oz jar	Cool to 4°C	None
pH	ASA 10-3.2	8-oz jar	Cool to 4°C	None
Conductivity	ASA 10-3.3	8-oz jar	Cool to 4°C	None
Nitrate as nitrogen	EPA 353.2	8-oz jar	Cool to 4°C	None
Total phosphorus	EPA 365.1	8-oz jar	Cool to 4°C	None
Total potassium	EPA 6010	8-oz jar	Cool to 4°C	None
Organic matter	ASA 29-3.5.2	8-oz jar	Cool to 4°C	None
Lime requirement	ASA 12-3.4.4	8-oz jar	Cool to 4°C	None

Laboratory Reporting Limits—Acceptable with Discussion

The laboratory reporting limits and QAPP specified reporting limits are provided in Table 2. In general, the laboratory reporting limits met the QAPP specified reporting limits for all analyses. Some laboratory reporting limits were elevated due to necessary dilutions performed on some samples. No data were qualified based on laboratory reporting limits.

Table 2. Summary of QAPP and laboratory reporting limits.

Parameter	QAPP Reporting Limit	Laboratory Reporting Limit
Total recoverable metals	0.1 to 1 mg/kg	0.017 to 49.5 mg/kg
Acid-base accounting	1 T CaCO ₃ /1000T	1 T CaCO ₃ /1000T
SPLP metals	0.02 to 5 mg/L	0.02 to 5 mg/L
Particle size analysis	1 percent	1 percent
Moisture content	0.1 percent	0.1 percent
Cation exchange capacity	1 meq /100 g	1 meq /100 g
pH	0.01 std. units	0.01 std. units
Conductivity	0.01 mmhos/cm	0.01 mmhos/cm
Nitrate as nitrogen	1 mg/kg	5.0 mg/kg
Total phosphorus	1 mg/kg	4.0 mg/kg
Total potassium	1 mg/kg	125 mg/kg
Organic matter	0.1 percent	0.1 percent
Lime requirement	1 T CaCO ₃ /1000T	1 T CaCO ₃ /1000T

Blank Analysis—Acceptable

Method Blanks

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples (LCS) were analyzed at the required frequency. The percent recovery values for all analyses met the criteria.

Matrix Spike Analysis—Acceptable with Qualification

Matrix spike (MS) samples were analyzed for total metals at the required frequency. With two exceptions, the percent recovery values for the MS analyses met the control limits (80 to 120 percent for mercury, 75 to 125 percent for all other metals) established by the method.

Sample FR-RY-SS-03-00 was analyzed as the MS/MSD with the samples for the total metals analysis. The percent recovery values for antimony (23 and 23 percent), arsenic (48 and 67 percent), copper (22 and 37 percent), and zinc (23 and 48 percent) exceeded the 75 to 125 percent criteria. Because all other criteria were met, only results for these metals for sample FR-RY-SS-03-00 were qualified as estimated (J), as shown in Table 3.

Table 3. Summary of samples qualified due to matrix spike exceedances.

Sample ID	Analyte	Reason for Qualification	Qualifier
FR-RY-SS-03-00	Antimony	MS exceedance	J
FR-RY-SS-03-00	Arsenic	MS exceedance	J
FR-RY-SS-03-00	Copper	MS exceedance	J
FR-RY-SS-03-00	Zinc	MS exceedance	J

Laboratory Duplicate Analysis—Acceptable

Laboratory duplicates or laboratory control sample duplicates were analyzed at the required frequency. The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. A control limit of less than 20 percent RPD was established in the work plan and a control limit of two times the RL was used to evaluate difference values. The relative percent difference (RPD) values met the control limits established by the work plan, and all difference values were less than two times the RL.

Field Duplicates—Not Collected

Data Quality Assessment Summary

In general, the data quality for all parameters was found to be acceptable based on holding time, reporting limit, method blank, control standard, matrix spike, laboratory duplicate, and field duplicate criteria. Due to matrix spike exceedances, several metals were qualified as estimated (J). Laboratory duplicate precision exceeded criteria for one sulfur value.

Usability of the data is based on the guidance documents previously noted. Upon consideration of the information presented here, the data are acceptable as qualified.

Definition of Data Qualifiers

The following data qualifier definitions are taken from *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2002).

- U** The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

- J** The associated value is an estimated quantity.
- UJ** The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
- R** The data are unusable. (Note: analyte may or may not be present.)

References

Herrera. 2010. Forest Rose Mine Site Reclamation Work Plan. Prepared for Montana Department of Environmental Quality by Herrera Environmental Consultants, Seattle, Washington. June 2010.

USEPA. 2002. Contract laboratory program national functional guidelines for inorganic data review. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C. (EPA-540/R-01/008).

August 23, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine
Pace Project No.: 10134865

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on July 30, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine

Pace Project No.: 10134865

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Idaho Certification #: MN00064

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nebraska Certification #: Pace

Nevada Certification #: MN_00064

New Jersey Certification #: MN-002

New Mexico Certification #: Pace

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: D9921

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Washington Certification #: C754

Wisconsin Certification #: 999407970

Montana Certification IDs

602 South 25th Street, Billings, MT 59101

EPA Region 8 Certification #: 8TMS-Q

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

NVLAP Certification #: 101292-0

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219

A2LA Certification #: 2456.01

Arkansas Certification #: 05-008-0

Illinois Certification #: 001191

Iowa Certification #: 118

Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055

Nevada Certification #: KS000212008A

Oklahoma Certification #: 9205/9935

Texas Certification #: T104704407-08-TX

Utah Certification #: 9135995665

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134865001	FR-RY-SS-03-00	Solid	07/26/10 14:00	07/30/10 10:05
10134865002	FR-RY-SS-02-00	Solid	07/26/10 14:25	07/30/10 10:05
10134865003	FR-RY-SS-01-00	Solid	07/26/10 14:55	07/30/10 10:05
10134865004	FR-RY-WELL-01-00	Solid	07/26/10 15:40	07/30/10 10:05
10134865005	FR-BG-SS-01-00	Solid	07/26/10 16:40	07/30/10 10:05

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134865001	FR-RY-SS-03-00	CLPICPAES	IP	1	PASI-M
		EPA 9081	JDH	1	PASI-K
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 33-3.2/EPA 353.2	CAC	1	PASI-MT
		ASA 29-3.5.2	KS1	1	PASI-MT
		ASA 10-3.2	SC1	1	PASI-MT
		ASA 15-5 mod	KS1	4	PASI-MT
		ASA 24-5.4/SM4500	JH1	1	PASI-MT
		Modified Sobek 7	SA1	1	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		ASA 10-3.3	CAC	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		10134865002	FR-RY-SS-02-00	CLPICPAES	IP
EPA 9081	JDH			1	PASI-K
EPA 6020	RJS			12	PASI-M
EPA 7471	TEM			1	PASI-M
% Moisture	JDL			1	PASI-M
ASA 33-3.2/EPA 353.2	CAC			1	PASI-MT
ASA 29-3.5.2	KS1			1	PASI-MT
ASA 10-3.2	SC1			1	PASI-MT
ASA 15-5 mod	KS1			4	PASI-MT
ASA 24-5.4/SM4500	JH1			1	PASI-MT
Modified Sobek 7	SA1			1	PASI-MT
Modified Sobek 7	SC1			1	PASI-MT
ASA 10-3.3	CAC			1	PASI-MT
USDA 26	KS1			1	PASI-MT
10134865003	FR-RY-SS-01-00			CLPICPAES	IP
		EPA 9081	JDH	1	PASI-K
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 33-3.2/EPA 353.2	CAC	1	PASI-MT
		ASA 29-3.5.2	KS1	1	PASI-MT
		ASA 10-3.2	SC1	1	PASI-MT
		ASA 15-5 mod	KS1	4	PASI-MT

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASA 24-5.4/SM4500	JH1	1	PASI-MT
		Modified Sobek 7	SA1	1	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		ASA 10-3.3	CAC	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
10134865004	FR-RY-WELL-01-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134865005	FR-BG-SS-01-00	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: CLPICPAES

Description: 6010 MET ICP, MDEQ Potassium

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for CLPICPAES. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with ASA 13-3.5.2.2 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: EPA 9081

Description: Cation Exchange Capacity

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for EPA 9081. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

5 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21704

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134865001,10134984007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 833527)
 - Antimony
 - Arsenic
 - Barium
 - Chromium
 - Copper
 - Iron
 - Manganese
 - Nickel
 - Zinc
- MS (Lab ID: 833529)
 - Antimony
 - Arsenic
 - Copper

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 23, 2010

QC Batch: MPRP/21704

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134865001,10134984007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Iron
- Lead
- Manganese
- Silver
- Zinc
- MSD (Lab ID: 833528)
 - Antimony
 - Arsenic
 - Barium
 - Chromium
 - Copper
 - Iron
 - Manganese
 - Nickel
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21704

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 833529)
 - Manganese
 - Lead
 - Zinc

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: EPA 7471

Description: 7471 Mercury

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

5 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/4702

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134857001,10134865005

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 834879)
 - Mercury
- MSD (Lab ID: 834880)
 - Mercury

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: % Moisture

Description: Dry Weight

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

5 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 33-3.2/EPA 353.2

Description: 353.2 Nitrate + Nitrite pres.

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 33-3.2/EPA 353.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 29-3.5.2

Description: Organic Matter MT ASA 29

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 29-3.5.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 10-3.2

Description: ASA 10-3.2 pH

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 10-3.2. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 15-5 mod

Description: PSA Percent Sand,Silt,Clay

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 15-5 mod. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 24-5.4/SM4500

Description: SM4500P-E, Total Phosphorus

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 24-5.4/SM4500. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: ASA 10-3.3

Description: ASA10-3.3 Specific Conductance

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for ASA 10-3.3. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine

Pace Project No.: 10134865

Method: USDA 26

Description: Soil Moisture Content

Client: Herrera Environmental Consultants

Date: August 23, 2010

General Information:

3 samples were analyzed for USDA 26. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-03-00 **Lab ID: 10134865001** Collected: 07/26/10 14:00 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, MDEQ Potassium Analytical Method: CLPICPAES Preparation Method: ASA 13-3.5.2.2								
Potassium	140	mg/kg		124	5	08/17/10 12:43	08/17/10 14:57	7440-09-7
Cation Exchange Capacity Analytical Method: EPA 9081								
Cation Exchange Capacity	47.5	meq/100g		0.99	10	08/13/10 13:30	08/17/10 13:28	
6020 MET ICPMS Analytical Method: EPA 6020 Preparation Method: EPA 3050								
Antimony	<0.53	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-36-0 M1
Arsenic	17.7	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-38-2 M1
Barium	248	mg/kg		0.32	20	08/11/10 13:15	08/16/10 21:14	7440-39-3 M1
Cadmium	0.25	mg/kg		0.084	20	08/11/10 13:15	08/16/10 21:14	7440-43-9
Chromium	111	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-47-3 M1
Copper	50.1	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-50-8 M1
Iron	30900	mg/kg		263	100	08/11/10 13:15	08/16/10 21:27	7439-89-6 M1
Lead	8.2	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7439-92-1
Manganese	674	mg/kg		2.6	100	08/11/10 13:15	08/16/10 21:27	7439-96-5 M1
Nickel	97.3	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-02-0 M1
Silver	<0.53	mg/kg		0.53	20	08/11/10 13:15	08/16/10 21:14	7440-22-4
Zinc	68.0	mg/kg		5.3	20	08/11/10 13:15	08/16/10 21:14	7440-66-6 M1
7471 Mercury Analytical Method: EPA 7471 Preparation Method: EPA 7471								
Mercury	0.026	mg/kg		0.020	1	08/16/10 19:25	08/18/10 09:17	7439-97-6
Dry Weight Analytical Method: % Moisture								
Percent Moisture	6.7	%		0.10	1		08/03/10 00:00	
353.2 Nitrate + Nitrite pres. Analytical Method: ASA 33-3.2/EPA 353.2								
Available Nitrate	<5.0	mg/kg		5.0	1		08/19/10 14:26	
Organic Matter MT ASA 29 Analytical Method: ASA 29-3.5.2								
Organic Matter	8.0	% (w/w)		0.10	1		08/20/10 15:00	
ASA 10-3.2 pH Analytical Method: ASA 10-3.2								
pH, Saturated Paste	7.2	Std. Units		0.10	1		08/11/10 13:00	
PSA Percent Sand,Silt,Clay Analytical Method: ASA 15-5 mod								
Percent Clay	16.3	% (w/w)		0.10	1		08/12/10 08:29	
Percent Sand	63.8	% (w/w)		0.10	1		08/12/10 08:29	
Percent Silt	19.9	% (w/w)		0.10	1		08/12/10 08:29	
Texture	sandy loam				1		08/12/10 08:29	
SM4500P-E, Total Phosphorus Analytical Method: ASA 24-5.4/SM4500								
Available Phosphorus	6.6	mg/kg		4.0	4		08/19/10 15:00	7723-14-0

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-03-00 **Lab ID: 10134865001** Collected: 07/26/10 14:00 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sobek Calculations		Analytical Method: Modified Sobek 7						
SMP Lime Requirement	5.3	tons/1000	0.0	1		08/10/10 11:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.2	Std. Units	0.10	1		08/10/10 11:30		
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3						
Sp. Conductance Saturated Paste	0.19	mmhos/cm	0.010	1		08/19/10 19:46		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	7.2	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-02-00 **Lab ID: 10134865002** Collected: 07/26/10 14:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, MDEQ Potassium								
Analytical Method: CLPICPAES Preparation Method: ASA 13-3.5.2.2								
Potassium	140	mg/kg		123	5	08/17/10 12:43	08/17/10 15:07	7440-09-7
Cation Exchange Capacity								
Analytical Method: EPA 9081								
Cation Exchange Capacity	35.6	meq/100g		1.0	10	08/13/10 13:30	08/17/10 13:35	
6020 MET ICPMS								
Analytical Method: EPA 6020 Preparation Method: EPA 3050								
Antimony	<0.46	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-36-0
Arsenic	7.0	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-38-2
Barium	304	mg/kg		0.28	20	08/11/10 13:15	08/16/10 21:32	7440-39-3
Cadmium	0.27	mg/kg		0.073	20	08/11/10 13:15	08/16/10 21:32	7440-43-9
Chromium	95.9	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-47-3
Copper	51.5	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-50-8
Iron	40800	mg/kg		230	100	08/11/10 13:15	08/16/10 21:36	7439-89-6
Lead	8.2	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7439-92-1
Manganese	717	mg/kg		2.3	100	08/11/10 13:15	08/16/10 21:36	7439-96-5
Nickel	98.2	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-02-0
Silver	<0.46	mg/kg		0.46	20	08/11/10 13:15	08/16/10 21:32	7440-22-4
Zinc	62.6	mg/kg		4.6	20	08/11/10 13:15	08/16/10 21:32	7440-66-6
7471 Mercury								
Analytical Method: EPA 7471 Preparation Method: EPA 7471								
Mercury	0.020	mg/kg		0.019	1	08/16/10 19:25	08/18/10 09:19	7439-97-6
Dry Weight								
Analytical Method: % Moisture								
Percent Moisture	3.7	%		0.10	1		08/03/10 00:00	
353.2 Nitrate + Nitrite pres.								
Analytical Method: ASA 33-3.2/EPA 353.2								
Available Nitrate	<5.0	mg/kg		5.0	1		08/19/10 14:29	
Organic Matter MT ASA 29								
Analytical Method: ASA 29-3.5.2								
Organic Matter	5.2	% (w/w)		0.10	1		08/20/10 15:00	
ASA 10-3.2 pH								
Analytical Method: ASA 10-3.2								
pH, Saturated Paste	6.9	Std. Units		0.10	1		08/11/10 13:00	
PSA Percent Sand,Silt,Clay								
Analytical Method: ASA 15-5 mod								
Percent Clay	15	% (w/w)		0.10	1		08/12/10 08:29	
Percent Sand	67.5	% (w/w)		0.10	1		08/12/10 08:29	
Percent Silt	17.5	% (w/w)		0.10	1		08/12/10 08:29	
Texture	sandy loam				1		08/12/10 08:29	
SM4500P-E, Total Phosphorus								
Analytical Method: ASA 24-5.4/SM4500								
Available Phosphorus	18.4	mg/kg		4.0	4		08/19/10 15:00	7723-14-0

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-02-00 **Lab ID: 10134865002** Collected: 07/26/10 14:25 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sobek Calculations		Analytical Method: Modified Sobek 7						
SMP Lime Requirement	1.0	tons/1000	0.0	1		08/10/10 11:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.8	Std. Units	0.10	1		08/10/10 11:30		
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3						
Sp. Conductance Saturated Paste	0.38	mmhos/cm	0.010	1		08/19/10 19:46		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	3.8	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-01-00 **Lab ID: 10134865003** Collected: 07/26/10 14:55 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, MDEQ Potassium Analytical Method: CLPICPAES Preparation Method: ASA 13-3.5.2.2								
Potassium	<120	mg/kg		120	5	08/17/10 12:43	08/17/10 15:12	7440-09-7
Cation Exchange Capacity Analytical Method: EPA 9081								
Cation Exchange Capacity	49.7	meq/100g		0.99	10	08/13/10 13:30	08/17/10 13:39	
6020 MET ICPMS Analytical Method: EPA 6020 Preparation Method: EPA 3050								
Antimony	<0.56	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-36-0
Arsenic	11.7	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-38-2
Barium	204	mg/kg		0.33	20	08/11/10 13:15	08/16/10 21:54	7440-39-3
Cadmium	0.42	mg/kg		0.089	20	08/11/10 13:15	08/16/10 21:54	7440-43-9
Chromium	52.7	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-47-3
Copper	38.8	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-50-8
Iron	31600	mg/kg		279	100	08/11/10 13:15	08/16/10 21:58	7439-89-6
Lead	12.1	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7439-92-1
Manganese	831	mg/kg		2.8	100	08/11/10 13:15	08/16/10 21:58	7439-96-5
Nickel	55.8	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-02-0
Silver	<0.56	mg/kg		0.56	20	08/11/10 13:15	08/16/10 21:54	7440-22-4
Zinc	72.6	mg/kg		5.6	20	08/11/10 13:15	08/16/10 21:54	7440-66-6
7471 Mercury Analytical Method: EPA 7471 Preparation Method: EPA 7471								
Mercury	0.058	mg/kg		0.021	1	08/16/10 19:25	08/18/10 09:23	7439-97-6
Dry Weight Analytical Method: % Moisture								
Percent Moisture	12.0	%		0.10	1		08/03/10 00:00	
353.2 Nitrate + Nitrite pres. Analytical Method: ASA 33-3.2/EPA 353.2								
Available Nitrate	<5.0	mg/kg		5.0	1		08/19/10 14:30	
Organic Matter MT ASA 29 Analytical Method: ASA 29-3.5.2								
Organic Matter	8.9	% (w/w)		0.10	1		08/20/10 15:00	
ASA 10-3.2 pH Analytical Method: ASA 10-3.2								
pH, Saturated Paste	6.8	Std. Units		0.10	1		08/11/10 13:00	
PSA Percent Sand,Silt,Clay Analytical Method: ASA 15-5 mod								
Percent Clay	17.5	% (w/w)		0.10	1		08/12/10 08:29	
Percent Sand	55	% (w/w)		0.10	1		08/12/10 08:29	
Percent Silt	27.5	% (w/w)		0.10	1		08/12/10 08:29	
Texture	sandy loam				1		08/12/10 08:29	
SM4500P-E, Total Phosphorus Analytical Method: ASA 24-5.4/SM4500								
Available Phosphorus	12.1	mg/kg		4.0	4		08/19/10 15:00	7723-14-0

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-SS-01-00 **Lab ID: 10134865003** Collected: 07/26/10 14:55 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Sobek Calculations		Analytical Method: Modified Sobek 7						
SMP Lime Requirement	5.3	tons/1000	0.0	1		08/10/10 11:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	6.2	Std. Units	0.10	1		08/10/10 11:30		
ASA10-3.3 Specific Conductance		Analytical Method: ASA 10-3.3						
Sp. Conductance Saturated Paste	0.38	mmhos/cm	0.010	1		08/19/10 19:46		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	13.6	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-RY-WELL-01-00 **Lab ID: 10134865004** Collected: 07/26/10 15:40 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	<0.54	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-36-0	
Arsenic	9.1	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-38-2	
Barium	242	mg/kg	0.32	20	08/11/10 13:15	08/16/10 22:02	7440-39-3	
Cadmium	0.39	mg/kg	0.086	20	08/11/10 13:15	08/16/10 22:02	7440-43-9	
Chromium	57.9	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-47-3	
Copper	34.6	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-50-8	
Iron	21700	mg/kg	53.6	20	08/11/10 13:15	08/16/10 22:02	7439-89-6	
Lead	6.5	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7439-92-1	
Manganese	599	mg/kg	2.7	100	08/11/10 13:15	08/16/10 22:07	7439-96-5	
Nickel	53.9	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-02-0	
Silver	<0.54	mg/kg	0.54	20	08/11/10 13:15	08/16/10 22:02	7440-22-4	
Zinc	65.5	mg/kg	5.4	20	08/11/10 13:15	08/16/10 22:02	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.036	mg/kg	0.022	1	08/16/10 19:25	08/18/10 09:24	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	14.4	%	0.10	1		08/03/10 00:00		

ANALYTICAL RESULTS

Project: Forest Rose Mine

Pace Project No.: 10134865

Sample: FR-BG-SS-01-00 **Lab ID: 10134865005** Collected: 07/26/10 16:40 Received: 07/30/10 10:05 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	<0.49	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-36-0	
Arsenic	16.2	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-38-2	
Barium	416	mg/kg	0.29	20	08/11/10 13:15	08/16/10 22:11	7440-39-3	
Cadmium	0.49	mg/kg	0.078	20	08/11/10 13:15	08/16/10 22:11	7440-43-9	
Chromium	32.2	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-47-3	
Copper	30.4	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-50-8	
Iron	20900	mg/kg	48.9	20	08/11/10 13:15	08/16/10 22:11	7439-89-6	
Lead	14.8	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7439-92-1	
Manganese	1780	mg/kg	2.4	100	08/11/10 13:15	08/16/10 22:15	7439-96-5	
Nickel	50.7	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-02-0	
Silver	<0.49	mg/kg	0.49	20	08/11/10 13:15	08/16/10 22:11	7440-22-4	
Zinc	76.8	mg/kg	4.9	20	08/11/10 13:15	08/16/10 22:11	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.054	mg/kg	0.020	1	08/16/10 19:25	08/18/10 09:26	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	7.9	%	0.10	1		08/03/10 00:00		

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MPRP/21859

Analysis Method: CLPICPAES

QC Batch Method: ASA 13-3.5.2.2

Analysis Description: CLPICPAES MET

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 838216

Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Potassium	mg/kg	<125	125	08/17/10 14:47	

LABORATORY CONTROL SAMPLE: 838217

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Potassium	mg/kg	312	271	87	80-120	

SAMPLE DUPLICATE: 838220

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Potassium	mg/kg	140	132	6	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: ICP/11973

Analysis Method: EPA 9081

QC Batch Method: EPA 9081

Analysis Description: Cation Exchange Capacity

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 685177

Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Cation Exchange Capacity	meq/100g	<1.0	1.0	08/17/10 13:21	

LABORATORY CONTROL SAMPLE: 685178

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Cation Exchange Capacity	meq/100g	53	55.5	105	60-140	

SAMPLE DUPLICATE: 685179

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Cation Exchange Capacity	meq/100g	47.5	47.7	1	47	

QUALITY CONTROL DATA

Project: Forest Rose Mine
Pace Project No.: 10134865

QC Batch: MPRP/21704 Analysis Method: EPA 6020
QC Batch Method: EPA 3050 Analysis Description: 6020 MET
Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

METHOD BLANK: 833525 Matrix: Solid
Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	<0.50	0.50	08/16/10 21:06	
Arsenic	mg/kg	<0.50	0.50	08/16/10 21:06	
Barium	mg/kg	<0.30	0.30	08/16/10 21:06	
Cadmium	mg/kg	<0.079	0.079	08/16/10 21:06	
Chromium	mg/kg	<0.50	0.50	08/16/10 21:06	
Copper	mg/kg	<0.50	0.50	08/16/10 21:06	
Iron	mg/kg	<49.5	49.5	08/16/10 21:06	
Lead	mg/kg	<0.50	0.50	08/16/10 21:06	
Manganese	mg/kg	<0.50	0.50	08/16/10 21:06	
Nickel	mg/kg	<0.50	0.50	08/16/10 21:06	
Silver	mg/kg	<0.50	0.50	08/16/10 21:06	
Zinc	mg/kg	<5.0	5.0	08/16/10 21:06	

LABORATORY CONTROL SAMPLE: 833526

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	18.7	18.5	99	75-125	
Arsenic	mg/kg	18.7	19.0	101	75-125	
Barium	mg/kg	18.7	19.1	102	75-125	
Cadmium	mg/kg	18.7	19.3	103	75-125	
Chromium	mg/kg	18.7	19.3	103	75-125	
Copper	mg/kg	18.7	19.7	105	75-125	
Iron	mg/kg	234	245	105	75-125	
Lead	mg/kg	18.7	20.4	109	75-125	
Manganese	mg/kg	18.7	19.1	102	75-125	
Nickel	mg/kg	18.7	19.6	105	75-125	
Silver	mg/kg	18.7	19.6	105	75-125	
Zinc	mg/kg	18.7	22.3	119	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833527 833528

Parameter	Units	10134865001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec					
Antimony	mg/kg	<0.53	20.3	18.1	4.9	4.3	23	23	75-125	11	20	M1	
Arsenic	mg/kg	17.7	20.3	18.1	27.5	30.0	48	67	75-125	9	20	M1	
Barium	mg/kg	248	20.3	18.1	193	216	-271	-172	75-125	11	20	M1	
Cadmium	mg/kg	0.25	20.3	18.1	17.5	16.6	85	90	75-125	6	20		
Chromium	mg/kg	111	20.3	18.1	99.1	111	-58	-2	75-125	11	20	M1	
Copper	mg/kg	50.1	20.3	18.1	54.6	56.9	22	37	75-125	4	20	M1	
Iron	mg/kg	30900	253	227	27600	29500	-1310	-614	75-125	7	20	M1	

Date: 08/23/2010 12:06 PM

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833527												833528	
Parameter	Units	10134865001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual		
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Lead	mg/kg	8.2	20.3	18.1	24.4	23.7	80	85	75-125	3	20		
Manganese	mg/kg	674	20.3	18.1	577	637	-479	-206	75-125	10	20 M1		
Nickel	mg/kg	97.3	20.3	18.1	90.3	94.1	-35	-18	75-125	4	20 M1		
Silver	mg/kg	<0.53	20.3	18.1	18.5	17.2	90	93	75-125	7	20		
Zinc	mg/kg	68.0	20.3	18.1	72.6	76.8	23	48	75-125	6	20 M1		

MATRIX SPIKE SAMPLE: 833529											
Parameter	Units	10134984007		Spike Conc.	MS	MS	% Rec	Qualifiers			
		Result	Result		Result	% Rec	Limits				
Antimony	mg/kg		49.5	21.2	79.5	142	75-125	M1			
Arsenic	mg/kg		331	21.2	335	23	75-125	M1			
Barium	mg/kg		28.8	21.2	55.4	125	75-125				
Cadmium	mg/kg		64.2	21.2	83.4	91	75-125				
Chromium	mg/kg		5.8	21.2	23.8	85	75-125				
Copper	mg/kg		709	21.2	707	-9	75-125	M1			
Iron	mg/kg		38000	264	34000	-1510	75-125	M1			
Lead	mg/kg		9500	21.2	11800	10800	75-125	E,M1			
Manganese	mg/kg		2070	21.2	1850	-1010	75-125	E,M1			
Nickel	mg/kg		7.3	21.2	23.3	76	75-125				
Silver	mg/kg		68.7	21.2	96.9	133	75-125	M1			
Zinc	mg/kg		6910	21.2	7810	4240	75-125	E,M1			

QUALITY CONTROL DATA

Project: Forest Rose Mine
Pace Project No.: 10134865

QC Batch: MERP/4702 Analysis Method: EPA 7471
QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury
Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

METHOD BLANK: 834877 Matrix: Solid
Associated Lab Samples: 10134865001, 10134865002, 10134865003, 10134865004, 10134865005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.017	0.017	08/18/10 08:47	

LABORATORY CONTROL SAMPLE: 834878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.43	0.46	108	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 834879 834880

Parameter	Units	10134857001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec				
Mercury	mg/kg	0.21	.52	.5	.5	0.86	0.85	124	125	80-120	2	20	M1

MATRIX SPIKE SAMPLE: 838021

Parameter	Units	10134865005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.054	.52	0.67	117	80-120	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4658 Analysis Method: ASA 33-3.2/EPA 353.2

QC Batch Method: ASA 33-3.2/EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 835440 Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Available Nitrate	mg/kg	<5.0	5.0	08/19/10 14:22	

LABORATORY CONTROL SAMPLE: 835441

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Available Nitrate	mg/kg	25	25.0	100	76-124	

SAMPLE DUPLICATE: 835442

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Available Nitrate	mg/kg	<5.0	<5.0		30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4657

Analysis Method: ASA 29-3.5.2

QC Batch Method: ASA 29-3.5.2

Analysis Description: Organic Matter ASA 29

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 835437

Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Organic Matter	% (w/w)	<0.10	0.10	08/20/10 15:00	

LABORATORY CONTROL SAMPLE: 835438

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Organic Matter	% (w/w)	3.1	3.5	114	69-131	

SAMPLE DUPLICATE: 835439

Parameter	Units	10134865002 Result	Dup Result	RPD	Max RPD	Qualifiers
Organic Matter	% (w/w)	5.2	5.4	3	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4619

Analysis Method: ASA 10-3.2

QC Batch Method: ASA 10-3.2

Analysis Description: ASA 10-3.2 pH saturated paste

Associated Lab Samples: 10134865001, 10134865002, 10134865003

SAMPLE DUPLICATE: 832023

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH, Saturated Paste	Std. Units	7.2	7.2	.3	20	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4721

Analysis Method: ASA 24-5.4/SM4500

QC Batch Method: ASA 24-5.4/SM4500

Analysis Description: SM4500P-E, Total Phosphorus

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 839402

Matrix: Solid

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Available Phosphorus	mg/kg	<4.0	4.0	08/19/10 15:00	

LABORATORY CONTROL SAMPLE: 839403

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Available Phosphorus	mg/kg	10.1	11.4	112	56-144	

SAMPLE DUPLICATE: 839404

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Available Phosphorus	mg/kg	6.6	5.9	10	30	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4633 Analysis Method: Modified Sobek 7

QC Batch Method: Modified Sobek 7 Analysis Description: Sobek SMP Buffer pH

Associated Lab Samples: 10134865001, 10134865002, 10134865003

SAMPLE DUPLICATE: 833903

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	6.2	6.2	.2	20	

SAMPLE DUPLICATE: 835073

Parameter	Units	10134857002 Result	Dup Result	RPD	Max RPD	Qualifiers
SMP Buffer pH	Std. Units	5.3	5.4	.6	20	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MT/4716

Analysis Method: ASA 10-3.3

QC Batch Method: ASA 10-3.3

Analysis Description: ASA 10-3.3 Specific Conductance

Associated Lab Samples: 10134865001, 10134865002, 10134865003

METHOD BLANK: 840259

Matrix: Water

Associated Lab Samples: 10134865001, 10134865002, 10134865003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sp. Conductance Saturated Paste	mmhos/cm	<0.010	0.010	08/19/10 19:46	

LABORATORY CONTROL SAMPLE: 840260

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sp. Conductance Saturated Paste	mmhos/cm	.85	1.1	128	53-147	

SAMPLE DUPLICATE: 840261

Parameter	Units	10134865001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sp. Conductance Saturated Paste	mmhos/cm	0.19	0.16	15	20	

QUALITY CONTROL DATA

Project: Forest Rose Mine

Pace Project No.: 10134865

QC Batch: MTPR/1490

Analysis Method: USDA 26

QC Batch Method: USDA 26

Analysis Description: Soil Moisture Content

Associated Lab Samples: 10134865001, 10134865002, 10134865003

SAMPLE DUPLICATE: 838624

Parameter	Units	10134984011 Result	Dup Result	RPD	Max RPD	Qualifiers
Soil Moisture Content	%	8.9	9.7	9	30	

QUALIFIERS

Project: Forest Rose Mine

Pace Project No.: 10134865

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134865001	FR-RY-SS-03-00	ASA 13-3.5.2.2	MPRP/21859	CLPICPAES	ICP/9578
10134865002	FR-RY-SS-02-00	ASA 13-3.5.2.2	MPRP/21859	CLPICPAES	ICP/9578
10134865003	FR-RY-SS-01-00	ASA 13-3.5.2.2	MPRP/21859	CLPICPAES	ICP/9578
10134865001	FR-RY-SS-03-00	EPA 9081	ICP/11973	EPA 9081	ICP/10475
10134865002	FR-RY-SS-02-00	EPA 9081	ICP/11973	EPA 9081	ICP/10475
10134865003	FR-RY-SS-01-00	EPA 9081	ICP/11973	EPA 9081	ICP/10475
10134865001	FR-RY-SS-03-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865002	FR-RY-SS-02-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865003	FR-RY-SS-01-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865004	FR-RY-WELL-01-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865005	FR-BG-SS-01-00	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134865001	FR-RY-SS-03-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865002	FR-RY-SS-02-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865003	FR-RY-SS-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865004	FR-RY-WELL-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865005	FR-BG-SS-01-00	EPA 7471	MERP/4702	EPA 7471	MERC/5556
10134865001	FR-RY-SS-03-00	% Moisture	MPRP/21679		
10134865002	FR-RY-SS-02-00	% Moisture	MPRP/21679		
10134865003	FR-RY-SS-01-00	% Moisture	MPRP/21679		
10134865004	FR-RY-WELL-01-00	% Moisture	MPRP/21679		
10134865005	FR-BG-SS-01-00	% Moisture	MPRP/21679		
10134865001	FR-RY-SS-03-00	ASA 33-3.2/EPA 353.2	MT/4658		
10134865002	FR-RY-SS-02-00	ASA 33-3.2/EPA 353.2	MT/4658		
10134865003	FR-RY-SS-01-00	ASA 33-3.2/EPA 353.2	MT/4658		
10134865001	FR-RY-SS-03-00	ASA 29-3.5.2	MT/4657		
10134865002	FR-RY-SS-02-00	ASA 29-3.5.2	MT/4657		
10134865003	FR-RY-SS-01-00	ASA 29-3.5.2	MT/4657		
10134865001	FR-RY-SS-03-00	ASA 10-3.2	MT/4619		
10134865002	FR-RY-SS-02-00	ASA 10-3.2	MT/4619		
10134865003	FR-RY-SS-01-00	ASA 10-3.2	MT/4619		
10134865001	FR-RY-SS-03-00	ASA 15-5 mod	MT/4669		
10134865002	FR-RY-SS-02-00	ASA 15-5 mod	MT/4669		
10134865003	FR-RY-SS-01-00	ASA 15-5 mod	MT/4669		
10134865001	FR-RY-SS-03-00	ASA 24-5.4/SM4500	MT/4721		
10134865002	FR-RY-SS-02-00	ASA 24-5.4/SM4500	MT/4721		
10134865003	FR-RY-SS-01-00	ASA 24-5.4/SM4500	MT/4721		
10134865001	FR-RY-SS-03-00	Modified Sobek 7	MT/4723		
10134865002	FR-RY-SS-02-00	Modified Sobek 7	MT/4723		
10134865003	FR-RY-SS-01-00	Modified Sobek 7	MT/4723		
10134865001	FR-RY-SS-03-00	Modified Sobek 7	MT/4633		
10134865002	FR-RY-SS-02-00	Modified Sobek 7	MT/4633		
10134865003	FR-RY-SS-01-00	Modified Sobek 7	MT/4633		
10134865001	FR-RY-SS-03-00	ASA 10-3.3	MT/4716		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine

Pace Project No.: 10134865

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134865002	FR-RY-SS-02-00	ASA 10-3.3	MT/4716		
10134865003	FR-RY-SS-01-00	ASA 10-3.3	MT/4716		
10134865001	FR-RY-SS-03-00	USDA 26	MTPR/1490		
10134865002	FR-RY-SS-02-00	USDA 26	MTPR/1490		
10134865003	FR-RY-SS-01-00	USDA 26	MTPR/1490		

Herrera Environmental Consultants, Inc.

Memorandum

To Project File 06-03425-070
From Gina Catarra, Herrera Environmental Consultants
Date November 12, 2010
Subject Data Quality Assurance Review of Forest Rose Mine Site Data

This memorandum presents a review of data quality for 10 soil samples and one rinsate blank sample collected from the Forest Rose Mine site between July 29 and 31, 2010. Pace Analytical of Billings, Montana analyzed the samples for:

- Total recoverable metals by EPA methods 6020/7471 and 200.8 (rinsate sample)
- Particle size analysis (PSA) by method ASA 15-5 modified
- Acid base potential by modified Sobek method
- Extractable sulfur by modified Sobek method
- Moisture content by USDA 26

Results for the following samples were validated.

Sample ID	Matrix	Laboratory Job	Date/Time Sampled	Analyses Requested
FR-T1-SB-01-15	Soil	10134984	7/29/2010 / 16:15	Metals
FR-QC-WT-T1 ^a	Water	10134984	7/30/2010 / 16:20	Metals
FR-T3-TB-02-10	Soil	10134984	7/30/2010 / 17:00	All analyses
FR-T3-SB-02-20	Soil	10134984	7/30/2010 / 17:30	Metals, moisture, PSA
FR-T3-SB-01-30	Soil	10134984	7/31/2010 / 08:30	Metals, moisture, PSA
FR-T3-TB-01-20	Soil	10134984	7/31/2010 / 08:05	All analyses
FR-T3-TB-01-10	Soil	10134984	7/31/2010 / 07:35	All analyses
FR-T2-TB-01-10	Soil	10134984	7/31/2010 / 10:25	All analyses
FR-T2-SB-01-20	Soil	10134984	7/31/2020 / 10:40	Metals, moisture, PSA
FR-T2-TB-02-10	Soil	10134984	7/31/2010 / 12:10	All analyses
FR-T2-SB-02-15	Soil	10134984	7/31/2010 / 12:10	Metals, moisture, PSA

^a Equipment rinsate blank.

The laboratory's performance was reviewed in accordance with quality control (QC) criteria outlined in the *Forest Rose Mine Site Reclamation Work Plan* (Herrera 2010).

Quality control data summaries submitted by the laboratories were reviewed; raw data were not submitted by the laboratories. Data quality assurance worksheets summarizing the quality assurance and quality control (QA/QC) review were completed for each sampling event and are

included with the data. Data qualifiers (flags) were added to the sample results in the laboratory reports. Data validation results are summarized below followed by definitions of data qualifiers.

Custody, Preservation, Holding Times, and Completeness—Acceptable

The samples were properly preserved and sample custody was maintained from sample collection to receipt at the laboratories. All samples were analyzed within the required holding times (Table 1). The laboratory reports were complete and contained results for all samples and tests requested on the chain-of-custody (COC) forms.

Table 1. Summary of sample collection requirements.

Parameter	Analytical Method	Bottle	Preservative	Holding Time
Total recoverable metals	EPA 6020/7471	8-oz jar	Cool to 4°C	180 days
Acid-base accounting	Mod Sobek	8-oz jar	Cool to 4°C	None
Particle size analysis	ASA 15-5	Gallon plastic	Cool to 4°C	None
Extractable sulfur	Mod Sobek	8-oz jar	Cool to 4°C	None
Moisture content	USDA 26	Gallon plastic	Cool to 4°C	None

Laboratory Reporting Limits—Acceptable with Discussion

The laboratory reporting limits and QAPP specified reporting limits are provided in Table 2. In general, the laboratory reporting limits met the QAPP specified reporting limits for all analyses. Some laboratory reporting limits were elevated due to necessary dilutions performed on some samples. No data were qualified based on laboratory reporting limits.

Table 2. Summary of QAPP and laboratory reporting limits.

Parameter	QAPP Reporting Limit	Laboratory Reporting Limit
Total recoverable metals	0.1 to 1 mg/kg	0.079 to 49.5 mg/kg
Acid-base accounting	1 tons/1000	0.50 tons/1000
Particle size analysis	1 percent	1 percent
Extractable sulfur	Not specified	0.050 percent
Moisture content	0.1 percent	0.1 percent

Blank Analysis—Acceptable with Discussion

Method Blanks

Method blanks were analyzed at the required frequency. Method blanks did not contain levels of target analytes above the laboratory reporting limits.

Rinsate Blanks

A rinsate blank sample was collected on July 30, 2010. The sample was collected by running clean water over the cleaned push probe equipment. The sample was analyzed for total metals in accordance with the work plan. Barium, iron, lead, and manganese were detected above the reporting limits (see Table 3).

Table 3. Summary of sample equipment rinsate blank criterion exceedances.

Sample ID	Sample Date	Parameter	Blank Result	Reporting Limit
FR-QC-WT-T1	7/30/2010	Barium	0.67 µg/L	0.50 µg/L
FR-QC-WT-T1	7/30/2010	Iron	95.3 µg/L	50 µg/L
FR-QC-WT-T1	7/30/2010	Lead	0.39 µg/L	0.10 µg/L
FR-QC-WT-T1	7/30/2010	Manganese	1.5 µg/L	0.50 µg/L

Detected values were less than 5 times the reporting limit for all metals. No results for total metals in soil samples were qualified because all soil results were greater than 5 times the reporting limit.

Laboratory Control Sample Analysis—Acceptable

Laboratory control samples (LCS) were analyzed at the required frequency. The percent recovery values for all analyses met the criteria.

Matrix Spike Analysis—Acceptable with Qualification

Matrix spike (MS) samples were analyzed for total metals at the required frequency. With two exceptions, the percent recovery values for the MS analyses met the control limits (80 to 120 percent for mercury, 75 to 125 percent for all other metals) established by the method.

Sample FR-T3-TB-01-10 was analyzed as the MS with the samples for the total metals analysis. The percent recovery values for antimony (142 percent) and silver (133 percent) exceeded the 75 to 125 percent criteria. Because all other criteria were met, only antimony and silver results for sample FR-T3-TB-01-10 were qualified as estimated (J), as shown in Table 4.

Sample FR-T1-SB-01-15 was analyzed as the MS/MSD with the samples for the mercury analysis. The percent recovery value for the MSD (33 percent) did not meet the method criteria of 80 to 120 percent. Because all other criteria were met, only the mercury result for sample FR-T1-SB-01-15 was qualified as estimated (J), as shown in Table 4.

Table 4. Summary of samples qualified due to matrix spike exceedances.

Sample ID	Analyte	Reason for Qualification	Qualifier
FR-T3-TB-01-10	Antimony	MS exceedance	J
FR-T3-TB-01-10	Silver	MS exceedance	J
FR-T1-SB-01-15	Mercury	MS exceedance	J

Laboratory Duplicate Analysis—Acceptable with Qualification

Laboratory duplicates or laboratory control sample duplicates were analyzed at the required frequency. The relative percent difference (RPD) was calculated for each analyte where both duplicate values were greater than five times the reporting limit (RL). The difference between duplicate values was calculated if the detected compound concentration was less than five times the RL in either the sample or the field duplicate. A control limit of less than 20 percent RPD was established in the work plan and a control limit of two times the RL was used to evaluate difference values. With one exception, the relative percent difference (RPD) values met the control limits established by the work plan, and all difference values were less than two times the RL.

Sample FR-T2-TB-02-10 was analyzed as the laboratory duplicate with the samples for the sulfur analyses. The RPD value for hot water extractable sulfur (36 percent) did not meet the method criterion of less than 20 percent. Because all other criteria were met, only the hot water extractable sulfur result for sample FR-T2-TB-02-10 was qualified as estimated (J), as shown in Table 5.

Table 5. Summary of samples qualified due to laboratory duplicate exceedances.

Sample ID	Analyte	Reason for Qualification	Qualifier
FR-T2-TB-02-10	Hot water extractable sulfur	Laboratory duplicate exceedance	J

Field Duplicates—Not Collected

Data Quality Assessment Summary

In general, the data quality for all parameters was found to be acceptable based on holding time, reporting limit, method blank, control standard, matrix spike, laboratory duplicate, and field duplicate criteria. Due to matrix spike exceedances, one silver, one antimony and one mercury

value were qualified as estimated (J). Laboratory duplicate precision exceeded criteria for one sulfur value.

Usability of the data is based on the guidance documents previously noted. Upon consideration of the information presented here, the data are acceptable as qualified.

Definition of Data Qualifiers

The following data qualifier definitions are taken from *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 2002).

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

References

Herrera. 2010. Forest Rose Mine Site Reclamation Work Plan. Prepared for Montana Department of Environmental Quality by Herrera Environmental Consultants, Seattle, Washington. June 2010.

USEPA. 2002. Contract laboratory program national functional guidelines for inorganic data review. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, D.C. (EPA-540/R-01/008).

August 25, 2010

Kevin Houck
Herrera Environmental Consultants
101 East Broadway, Suite 610
Missoula, MT 59802

RE: Project: Forest Rose Mine 06-03425-070
Pace Project No.: 10134984

Dear Kevin Houck:

Enclosed are the analytical results for sample(s) received by the laboratory on August 03, 2010. The results relate only to the samples included in this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Denise Jensen

denise.jensen@pacelabs.com
Project Manager

Enclosures

cc: Devin Clary, Montana Dept. of Environmental Quality

REPORT OF LABORATORY ANALYSIS

CERTIFICATIONS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Idaho Certification #: MN00064

Illinois Certification #: 200011

Iowa Certification #: 368

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nebraska Certification #: Pace

Nevada Certification #: MN_00064

New Jersey Certification #: MN-002

New Mexico Certification #: Pace

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: D9921

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Washington Certification #: C754

Wisconsin Certification #: 999407970

Montana Certification IDs

602 South 25th Street, Billings, MT 59101

EPA Region 8 Certification #: 8TMS-Q

Idaho Certification #: MT00012

Montana Certification #: MT CERT0040

NVLAP Certification #: 101292-0

REPORT OF LABORATORY ANALYSIS

SAMPLE SUMMARY

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10134984001	FR-T1-SB-01-15	Solid	07/29/10 16:15	08/03/10 11:00
10134984002	FR-QC-WT-T1	Water	07/30/10 16:20	08/03/10 11:00
10134984003	FR-T3-TB-02-10	Solid	07/30/10 17:00	08/03/10 11:00
10134984004	FR-T3-SB-02-20	Solid	07/30/10 17:30	08/03/10 11:00
10134984005	FR-T3-SB-01-30	Solid	07/31/10 08:30	08/03/10 11:00
10134984006	FR-T3-TB-01-20	Solid	07/31/10 08:05	08/03/10 11:00
10134984007	FR-T3-TB-01-10	Solid	07/31/10 07:35	08/03/10 11:00
10134984008	FR-T2-TB-01-10	Solid	07/31/10 10:25	08/03/10 11:00
10134984009	FR-T2-SB-01-20	Solid	07/31/10 10:40	08/03/10 11:00
10134984010	FR-T2-TB-02-10	Solid	07/31/10 11:55	08/03/10 11:00
10134984011	FR-T2-SB-02-15	Solid	07/31/10 12:10	08/03/10 11:00

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134984001	FR-T1-SB-01-15	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
10134984002	FR-QC-WT-T1	EPA 200.8	RJS	12	PASI-M
10134984003	FR-T3-TB-02-10	EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		10134984004	FR-T3-SB-02-20	EPA 6020	RJS
10134984005	FR-T3-SB-01-30	EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
10134984006	FR-T3-TB-01-20	EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
10134984007	FR-T3-TB-01-10	Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

SAMPLE ANALYTE COUNT

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10134984008	FR-T2-TB-01-10	Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
		Modified Sobek 7	SC1	1	PASI-MT
10134984009	FR-T2-SB-01-20	USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
10134984010	FR-T2-TB-02-10	USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		Modified Sobek 7	KS1	1	PASI-MT
		Modified Sobek 7	KS1	5	PASI-MT
		Modified Sobek 7	KS1	4	PASI-MT
10134984011	FR-T2-SB-02-15	Modified Sobek 7	SC1	1	PASI-MT
		USDA 26	KS1	1	PASI-MT
		EPA 6020	RJS	12	PASI-M
		EPA 7471	TEM	1	PASI-M
		% Moisture	JDL	1	PASI-M
		ASA 15-5 mod	KS1	4	PASI-MT
		USDA 26	KS1	1	PASI-MT

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: EPA 200.8

Description: 200.8 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

1 sample was analyzed for EPA 200.8. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 200.8 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

10 samples were analyzed for EPA 6020. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 3050 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

QC Batch: MPRP/21704

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- FR-T2-SB-01-20 (Lab ID: 10134984009)

- Silver

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MPRP/21704

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134865001,10134984007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 833527)

- Antimony

- Arsenic

- Barium

- Chromium

- Copper

- Iron

- Manganese

- Nickel

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: EPA 6020

Description: 6020 MET ICPMS

Client: Herrera Environmental Consultants

Date: August 25, 2010

QC Batch: MPRP/21704

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134865001,10134984007

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Zinc
- MS (Lab ID: 833529)
 - Antimony
 - Arsenic
 - Copper
 - Iron
 - Lead
 - Manganese
 - Silver
 - Zinc
- MSD (Lab ID: 833528)
 - Antimony
 - Arsenic
 - Barium
 - Chromium
 - Copper
 - Iron
 - Manganese
 - Nickel
 - Zinc

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MPRP/21704

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 833529)
 - Manganese
 - Lead
 - Zinc

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: EPA 7471

Description: 7471 Mercury

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

10 samples were analyzed for EPA 7471. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:

The samples were prepared in accordance with EPA 7471 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MERP/4714

A matrix spike and matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10134984001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 836709)
- Mercury

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: % Moisture

Description: Dry Weight

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

10 samples were analyzed for % Moisture. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: ASA 15-5 mod

Description: PSA Percent Sand,Silt,Clay

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

9 samples were analyzed for ASA 15-5 mod. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: Modified Sobek 7

Description: Sobek Acid Base Potential

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: Modified Sobek 7

Description: Sobek Extractable Sulfur

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: MT/4680

R1: RPD value was outside control limits.

- DUP (Lab ID: 836822)
- Sulfur, Hot Water Extractable

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: Modified Sobek 7

Description: Sobek Calculations

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: Modified Sobek 7

Description: Sobek SMP Buffer pH

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

5 samples were analyzed for Modified Sobek 7. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

PROJECT NARRATIVE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Method: USDA 26

Description: Soil Moisture Content

Client: Herrera Environmental Consultants

Date: August 25, 2010

General Information:

9 samples were analyzed for USDA 26. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:

All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T1-SB-01-15 **Lab ID: 10134984001** Collected: 07/29/10 16:15 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.79	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-36-0	
Arsenic	23.2	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-38-2	
Barium	54.6	mg/kg	0.28	20	08/11/10 13:15	08/16/10 22:20	7440-39-3	
Cadmium	4.1	mg/kg	0.076	20	08/11/10 13:15	08/16/10 22:20	7440-43-9	
Chromium	19.9	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-47-3	
Copper	70.8	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-50-8	
Iron	33100	mg/kg	237	100	08/11/10 13:15	08/16/10 22:24	7439-89-6	
Lead	249	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7439-92-1	
Manganese	740	mg/kg	2.4	100	08/11/10 13:15	08/16/10 22:24	7439-96-5	
Nickel	24.9	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-02-0	
Silver	0.53	mg/kg	0.47	20	08/11/10 13:15	08/16/10 22:20	7440-22-4	
Zinc	282	mg/kg	4.7	20	08/11/10 13:15	08/16/10 22:20	7440-66-6	

7471 Mercury

Analytical Method: EPA 7471 Preparation Method: EPA 7471

Mercury	0.023	mg/kg	0.021	1	08/17/10 18:20	08/18/10 14:08	7439-97-6	M1
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Dry Weight

Analytical Method: % Moisture

Percent Moisture	10.6	%	0.10	1		08/04/10 00:00		
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ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-QC-WT-T1		Lab ID: 10134984002	Collected: 07/30/10 16:20	Received: 08/03/10 11:00	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.8 MET ICPMS		Analytical Method: EPA 200.8 Preparation Method: EPA 200.8						
Antimony	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-36-0	
Arsenic	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-38-2	
Barium	0.67 ug/L		0.30	1	08/06/10 10:57	08/10/10 10:03	7440-39-3	
Cadmium	<0.080 ug/L		0.080	1	08/06/10 10:57	08/10/10 10:03	7440-43-9	
Chromium	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-47-3	
Copper	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-50-8	
Iron	93.5 ug/L		50.0	1	08/06/10 10:57	08/10/10 10:03	7439-89-6	
Lead	0.39 ug/L		0.10	1	08/06/10 10:57	08/10/10 10:03	7439-92-1	
Manganese	1.5 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7439-96-5	
Nickel	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-02-0	
Silver	<0.50 ug/L		0.50	1	08/06/10 10:57	08/10/10 10:03	7440-22-4	
Zinc	<5.0 ug/L		5.0	1	08/06/10 10:57	08/10/10 10:03	7440-66-6	

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-02-10 **Lab ID: 10134984003** Collected: 07/30/10 17:00 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	31.7	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-36-0	
Arsenic	555	mg/kg	2.5	100	08/11/10 13:15	08/17/10 08:12	7440-38-2	
Barium	25.1	mg/kg	0.31	20	08/11/10 13:15	08/17/10 08:08	7440-39-3	
Cadmium	29.8	mg/kg	0.081	20	08/11/10 13:15	08/17/10 08:08	7440-43-9	
Chromium	1.5	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-47-3	
Copper	196	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-50-8	
Iron	71200	mg/kg	255	100	08/11/10 13:15	08/17/10 08:12	7439-89-6	
Lead	9820	mg/kg	12.7	500	08/11/10 13:15	08/18/10 03:18	7439-92-1	
Manganese	4340	mg/kg	12.7	500	08/11/10 13:15	08/18/10 03:18	7439-96-5	
Nickel	4.9	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-02-0	
Silver	16.5	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:08	7440-22-4	
Zinc	8110	mg/kg	127	500	08/11/10 13:15	08/18/10 03:18	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.036	mg/kg	0.025	1	08/17/10 18:20	08/18/10 14:15	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	21.4	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	10	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	62.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	27.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	570	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	6.54	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	0.895	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	5.43	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	370	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	200	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	260	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-02-10 **Lab ID: 10134984003** Collected: 07/30/10 17:00 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	27.3	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-SB-02-20 **Lab ID: 10134984004** Collected: 07/30/10 17:30 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	0.81	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-36-0	
Arsenic	18.3	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-38-2	
Barium	94.5	mg/kg	0.27	20	08/11/10 13:15	08/17/10 08:17	7440-39-3	
Cadmium	1.3	mg/kg	0.071	20	08/11/10 13:15	08/17/10 08:17	7440-43-9	
Chromium	20.1	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-47-3	
Copper	42.6	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-50-8	
Iron	29300	mg/kg	222	100	08/11/10 13:15	08/17/10 08:21	7439-89-6	
Lead	57.7	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7439-92-1	
Manganese	577	mg/kg	2.2	100	08/11/10 13:15	08/17/10 08:21	7439-96-5	
Nickel	27.3	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-02-0	
Silver	0.79	mg/kg	0.44	20	08/11/10 13:15	08/17/10 08:17	7440-22-4	
Zinc	1100	mg/kg	22.2	100	08/11/10 13:15	08/17/10 08:21	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	<0.020	mg/kg	0.020	1	08/17/10 18:20	08/18/10 14:17	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	12.2	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	20	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	47.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	32.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	loam			1		08/12/10 08:29		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	13.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-SB-01-30 **Lab ID: 10134984005** Collected: 07/31/10 08:30 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	2.0	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-36-0	
Arsenic	41.6	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-38-2	
Barium	40.2	mg/kg	0.23	20	08/11/10 13:15	08/17/10 08:26	7440-39-3	
Cadmium	3.6	mg/kg	0.061	20	08/11/10 13:15	08/17/10 08:26	7440-43-9	
Chromium	16.7	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-47-3	
Copper	117	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-50-8	
Iron	36900	mg/kg	192	100	08/11/10 13:15	08/17/10 08:30	7439-89-6	
Lead	441	mg/kg	1.9	100	08/11/10 13:15	08/17/10 08:30	7439-92-1	
Manganese	1930	mg/kg	1.9	100	08/11/10 13:15	08/17/10 08:30	7439-96-5	
Nickel	29.4	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-02-0	
Silver	1.6	mg/kg	0.38	20	08/11/10 13:15	08/17/10 08:26	7440-22-4	
Zinc	759	mg/kg	19.2	100	08/11/10 13:15	08/17/10 08:30	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	<0.022	mg/kg	0.022	1	08/17/10 18:20	08/18/10 14:18	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	10.6	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	17.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	57.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	25	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	11.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-01-20 **Lab ID: 10134984006** Collected: 07/31/10 08:05 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	20.7	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-36-0	
Arsenic	330	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-38-2	
Barium	19.4	mg/kg	0.28	20	08/11/10 13:15	08/17/10 08:35	7440-39-3	
Cadmium	44.7	mg/kg	0.076	20	08/11/10 13:15	08/17/10 08:35	7440-43-9	
Chromium	2.4	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-47-3	
Copper	254	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-50-8	
Iron	49100	mg/kg	237	100	08/11/10 13:15	08/17/10 08:39	7439-89-6	
Lead	4600	mg/kg	11.9	500	08/11/10 13:15	08/18/10 03:27	7439-92-1	
Manganese	1890	mg/kg	2.4	100	08/11/10 13:15	08/17/10 08:39	7439-96-5	
Nickel	9.0	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-02-0	
Silver	13.8	mg/kg	0.47	20	08/11/10 13:15	08/17/10 08:35	7440-22-4	
Zinc	7260	mg/kg	119	500	08/11/10 13:15	08/18/10 03:27	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	<0.022	mg/kg	0.022	1	08/17/10 18:20	08/18/10 14:19	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	23.7	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	6.3	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	52.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	41.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	540	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	5.66	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	1.37	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	4.83	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	360	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	180	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	220	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-01-20 **Lab ID: 10134984006** Collected: 07/31/10 08:05 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	31.0	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-01-10 **Lab ID: 10134984007** Collected: 07/31/10 07:35 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	49.5	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:57	7440-36-0	M1
Arsenic	331	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:57	7440-38-2	M1
Barium	28.8	mg/kg	0.31	20	08/11/10 13:15	08/17/10 08:57	7440-39-3	
Cadmium	64.2	mg/kg	0.081	20	08/11/10 13:15	08/17/10 08:57	7440-43-9	
Chromium	5.8	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:57	7440-47-3	
Copper	709	mg/kg	2.5	100	08/11/10 13:15	08/17/10 09:06	7440-50-8	M1
Iron	38000	mg/kg	254	100	08/11/10 13:15	08/17/10 09:06	7439-89-6	M1
Lead	9500	mg/kg	25.4	1000	08/11/10 13:15	08/18/10 02:57	7439-92-1	M1
Manganese	2070	mg/kg	2.5	100	08/11/10 13:15	08/17/10 09:06	7439-96-5	M1
Nickel	7.3	mg/kg	0.51	20	08/11/10 13:15	08/17/10 08:57	7440-02-0	
Silver	68.7	mg/kg	1.0	40	08/11/10 13:15	08/18/10 02:48	7440-22-4	M1
Zinc	6910	mg/kg	254	1000	08/11/10 13:15	08/18/10 02:57	7440-66-6	M1
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.037	mg/kg	0.024	1	08/17/10 18:20	08/18/10 14:21	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	25.0	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	20	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	12.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	67.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	520	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	0.248	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	1.85	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	1.08	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	3.19	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	450	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	64	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	80	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.6	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T3-TB-01-10 **Lab ID: 10134984007** Collected: 07/31/10 07:35 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	33.4	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-TB-01-10 **Lab ID: 10134984008** Collected: 07/31/10 10:25 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.4	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-36-0	
Arsenic	264	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-38-2	
Barium	6.6	mg/kg	0.28	20	08/11/10 13:15	08/17/10 09:11	7440-39-3	
Cadmium	48.0	mg/kg	0.074	20	08/11/10 13:15	08/17/10 09:11	7440-43-9	
Chromium	4.2	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-47-3	
Copper	371	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-50-8	
Iron	113000	mg/kg	1160	500	08/11/10 13:15	08/18/10 03:05	7439-89-6	
Lead	206	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7439-92-1	
Manganese	1570	mg/kg	2.3	100	08/11/10 13:15	08/17/10 09:15	7439-96-5	
Nickel	24.7	mg/kg	0.46	20	08/11/10 13:15	08/17/10 09:11	7440-02-0	
Silver	4.3	mg/kg	0.93	40	08/11/10 13:15	08/18/10 03:01	7440-22-4	
Zinc	8300	mg/kg	116	500	08/11/10 13:15	08/18/10 03:05	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.035	mg/kg	0.023	1	08/17/10 18:20	08/18/10 14:22	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	16.9	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	7.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	35	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	57.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	230	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	1.45	% (w/w)	0.050	1		08/17/10 16:15		
Sulfur, HNO3 Extractable	6.33	% (w/w)	0.050	1		08/17/10 16:15		
Sulfur, Hot Water Extractable	2.58	% (w/w)	0.050	1		08/17/10 16:15		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/17/10 16:15		
Total Sulfur	10.4	% (w/w)	0.050	1		08/17/10 16:15		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	-6.6	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	230	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	290	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.5	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-TB-01-10 **Lab ID: 10134984008** Collected: 07/31/10 10:25 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	20.3	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-SB-01-20 **Lab ID: 10134984009** Collected: 07/31/10 10:40 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	<0.51	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-36-0	
Arsenic	10	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-38-2	
Barium	18.7	mg/kg	0.31	20	08/11/10 13:15	08/17/10 09:20	7440-39-3	
Cadmium	1.1	mg/kg	0.082	20	08/11/10 13:15	08/17/10 09:20	7440-43-9	
Chromium	26.1	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-47-3	
Copper	29.6	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-50-8	
Iron	34600	mg/kg	257	100	08/11/10 13:15	08/17/10 09:24	7439-89-6	
Lead	12.4	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7439-92-1	
Manganese	277	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7439-96-5	
Nickel	32.6	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-02-0	
Silver	<0.51	mg/kg	0.51	20	08/11/10 13:15	08/17/10 09:20	7440-22-4	CH
Zinc	174	mg/kg	5.1	20	08/11/10 13:15	08/17/10 09:20	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.047	mg/kg	0.018	1	08/17/10 18:20	08/18/10 14:26	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	4.6	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	22.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	60	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	17.5	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy clay loam			1		08/12/10 08:29		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	4.8	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-TB-02-10 **Lab ID: 10134984010** Collected: 07/31/10 11:55 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	4.5	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-36-0	
Arsenic	300	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-38-2	
Barium	13.2	mg/kg	0.36	20	08/11/10 13:15	08/17/10 09:29	7440-39-3	
Cadmium	39.7	mg/kg	0.096	20	08/11/10 13:15	08/17/10 09:29	7440-43-9	
Chromium	3.9	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-47-3	
Copper	363	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-50-8	
Iron	78800	mg/kg	301	100	08/11/10 13:15	08/17/10 09:33	7439-89-6	
Lead	1090	mg/kg	3.0	100	08/11/10 13:15	08/17/10 09:33	7439-92-1	
Manganese	1420	mg/kg	3.0	100	08/11/10 13:15	08/17/10 09:33	7439-96-5	
Nickel	13.8	mg/kg	0.60	20	08/11/10 13:15	08/17/10 09:29	7440-02-0	
Silver	9.9	mg/kg	1.2	40	08/11/10 13:15	08/18/10 03:10	7440-22-4	
Zinc	6610	mg/kg	151	500	08/11/10 13:15	08/18/10 04:43	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.054	mg/kg	0.021	1	08/17/10 18:20	08/18/10 14:28	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	18.6	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	17.5	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	13.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	68.7	% (w/w)	0.10	1		08/12/10 08:29		
Texture	silt loam			1		08/12/10 08:29		
Sobek Acid Base Potential		Analytical Method: Modified Sobek 7						
Neutralization Potential	330	tons/1000	0.50	1		08/18/10 14:30		
Sobek Extractable Sulfur		Analytical Method: Modified Sobek 7						
Sulfur, HCl Extractable	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, HNO3 Extractable	7.87	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Hot Water Extractable	4.90	% (w/w)	0.050	1		08/24/10 10:00		
Sulfur, Residual	<0.050	% (w/w)	0.050	1		08/24/10 10:00		
Total Sulfur	9.92	% (w/w)	0.050	1		08/24/10 10:00		
Sobek Calculations		Analytical Method: Modified Sobek 7						
Acid/Base Potential	88	tons/1000	0.0	1		08/18/10 14:30		
Acid Potential	250	tons/1000	0.50	1		08/18/10 14:30		
Lime Requirement	310	tons/1000	0.0	1		08/18/10 14:30		
SMP Lime Requirement	0	tons/1000	0.0	1		08/18/10 14:30		
Sobek SMP Buffer pH		Analytical Method: Modified Sobek 7						
SMP Buffer pH	7.5	Std. Units	0.10	1		08/10/10 11:30		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-TB-02-10 **Lab ID: 10134984010** Collected: 07/31/10 11:55 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	22.9	%	0.10	1		08/17/10 09:45		

ANALYTICAL RESULTS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Sample: FR-T2-SB-02-15 **Lab ID: 10134984011** Collected: 07/31/10 12:10 Received: 08/03/10 11:00 Matrix: Solid

Results reported on a "dry-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020 MET ICPMS		Analytical Method: EPA 6020 Preparation Method: EPA 3050						
Antimony	1.1	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-36-0	
Arsenic	22.0	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-38-2	
Barium	46.3	mg/kg	0.23	20	08/11/10 13:15	08/17/10 09:51	7440-39-3	
Cadmium	1.8	mg/kg	0.062	20	08/11/10 13:15	08/17/10 09:51	7440-43-9	
Chromium	17.2	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-47-3	
Copper	55.5	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-50-8	
Iron	26700	mg/kg	193	100	08/11/10 13:15	08/17/10 09:56	7439-89-6	
Lead	83.6	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7439-92-1	
Manganese	506	mg/kg	1.9	100	08/11/10 13:15	08/17/10 09:56	7439-96-5	
Nickel	25.7	mg/kg	0.39	20	08/11/10 13:15	08/17/10 09:51	7440-02-0	
Silver	1.5	mg/kg	0.39	20	08/11/10 13:15	08/18/10 03:14	7440-22-4	
Zinc	145	mg/kg	3.9	20	08/11/10 13:15	08/17/10 09:51	7440-66-6	
7471 Mercury		Analytical Method: EPA 7471 Preparation Method: EPA 7471						
Mercury	0.053	mg/kg	0.022	1	08/17/10 18:20	08/18/10 14:29	7439-97-6	
Dry Weight		Analytical Method: % Moisture						
Percent Moisture	8.1	%	0.10	1		08/04/10 00:00		
PSA Percent Sand,Silt,Clay		Analytical Method: ASA 15-5 mod						
Percent Clay	20	% (w/w)	0.10	1		08/12/10 08:29		
Percent Sand	53.8	% (w/w)	0.10	1		08/12/10 08:29		
Percent Silt	26.2	% (w/w)	0.10	1		08/12/10 08:29		
Texture	sandy loam/sandy clay loam			1		08/12/10 08:29		
Soil Moisture Content		Analytical Method: USDA 26						
Soil Moisture Content	8.9	%	0.10	1		08/17/10 09:45		

QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070
Pace Project No.: 10134984

QC Batch: MPRP/21721 Analysis Method: EPA 200.8
QC Batch Method: EPA 200.8 Analysis Description: 200.8 MET
Associated Lab Samples: 10134984002

METHOD BLANK: 834170 Matrix: Water

Associated Lab Samples: 10134984002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	ug/L	<0.50	0.50	08/11/10 05:15	
Arsenic	ug/L	<0.50	0.50	08/11/10 05:15	
Barium	ug/L	<0.30	0.30	08/11/10 05:15	
Cadmium	ug/L	<0.080	0.080	08/11/10 05:15	
Chromium	ug/L	<0.50	0.50	08/11/10 05:15	
Copper	ug/L	<0.50	0.50	08/11/10 05:15	
Iron	ug/L	<50.0	50.0	08/11/10 05:15	
Lead	ug/L	<0.10	0.10	08/11/10 05:15	
Manganese	ug/L	<0.50	0.50	08/11/10 05:15	
Nickel	ug/L	<0.50	0.50	08/11/10 05:15	
Silver	ug/L	<0.50	0.50	08/11/10 05:15	
Zinc	ug/L	<5.0	5.0	08/11/10 05:15	

LABORATORY CONTROL SAMPLE: 834171

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	ug/L	80	77.2	96	85-115	
Arsenic	ug/L	80	80.0	100	85-115	
Barium	ug/L	80	78.2	98	85-115	
Cadmium	ug/L	80	82.2	103	85-115	
Chromium	ug/L	80	79.3	99	85-115	
Copper	ug/L	80	79.9	100	85-115	
Iron	ug/L	1000	1010	101	85-115	
Lead	ug/L	80	78.7	98	85-115	
Manganese	ug/L	80	80.7	101	85-115	
Nickel	ug/L	80	80.3	100	85-115	
Silver	ug/L	80	80.4	100	85-115	
Zinc	ug/L	80	88.2	110	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 834172 834173

Parameter	Units	6083045001		MS		MSD		% Rec	% Rec	% Rec	Limits	RPD	Max RPD	Qual
		Result	Conc.	Spike Conc.	Spike Conc.	Result	Result							
Antimony	ug/L	ND	80	80	85.7	83.0	107	104	70-130	3	20			
Arsenic	ug/L	0.76	80	80	89.4	86.0	111	107	70-130	4	20			
Barium	ug/L	3.4	80	80	91.2	90.6	110	109	70-130	.7	20			
Cadmium	ug/L	ND	80	80	86.0	84.0	108	105	70-130	2	20			
Chromium	ug/L	1.9	80	80	91.8	87.6	112	107	70-130	5	20			
Copper	ug/L	0.88	80	80	85.1	81.3	105	101	70-130	5	20			
Iron	ug/L	186	1000	1000	1280	1240	110	105	70-130	3	20			

Date: 08/25/2010 04:07 PM

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 834172												834173	
Parameter	Units	6083045001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual		
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD			
Lead	ug/L	0.35	80	80	81.4	78.9	101	98	70-130	3	20		
Manganese	ug/L	44.3	80	80	133	128	110	105	70-130	3	20		
Nickel	ug/L	10.9	80	80	98.3	94.2	109	104	70-130	4	20		
Silver	ug/L	ND	80	80	62.8	61.6	78	77	70-130	2	20		
Zinc	ug/L	6.7	80	80	91.8	90.2	106	104	70-130	2	20		

MATRIX SPIKE SAMPLE: 834174											
Parameter	Units	10134984002		Spike Conc.	MS	MS	% Rec	Qualifiers			
		Result	Result		Result	% Rec	Limits				
Antimony	ug/L	<0.50		80	78.2	98	70-130				
Arsenic	ug/L	<0.50		80	79.6	99	70-130				
Barium	ug/L	0.67		80	82.3	102	70-130				
Cadmium	ug/L	<0.080		80	84.2	105	70-130				
Chromium	ug/L	<0.50		80	81.0	101	70-130				
Copper	ug/L	<0.50		80	80.0	100	70-130				
Iron	ug/L	93.5	1000	1110	102	70-130					
Lead	ug/L	0.39		80	80.6	100	70-130				
Manganese	ug/L	1.5		80	81.8	100	70-130				
Nickel	ug/L	<0.50		80	80.0	100	70-130				
Silver	ug/L	<0.50		80	79.2	99	70-130				
Zinc	ug/L	<5.0		80	80.8	98	70-130				

QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

QC Batch: MPRP/21704 Analysis Method: EPA 6020
 QC Batch Method: EPA 3050 Analysis Description: 6020 MET
 Associated Lab Samples: 10134984001, 10134984003, 10134984004, 10134984005, 10134984006, 10134984007, 10134984008, 10134984009, 10134984010

METHOD BLANK: 833525 Matrix: Solid
 Associated Lab Samples: 10134984001, 10134984003, 10134984004, 10134984005, 10134984006, 10134984007, 10134984008, 10134984009, 10134984010, 10134984011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	<0.50	0.50	08/16/10 21:06	
Arsenic	mg/kg	<0.50	0.50	08/16/10 21:06	
Barium	mg/kg	<0.30	0.30	08/16/10 21:06	
Cadmium	mg/kg	<0.079	0.079	08/16/10 21:06	
Chromium	mg/kg	<0.50	0.50	08/16/10 21:06	
Copper	mg/kg	<0.50	0.50	08/16/10 21:06	
Iron	mg/kg	<49.5	49.5	08/16/10 21:06	
Lead	mg/kg	<0.50	0.50	08/16/10 21:06	
Manganese	mg/kg	<0.50	0.50	08/16/10 21:06	
Nickel	mg/kg	<0.50	0.50	08/16/10 21:06	
Silver	mg/kg	<0.50	0.50	08/16/10 21:06	
Zinc	mg/kg	<5.0	5.0	08/16/10 21:06	

LABORATORY CONTROL SAMPLE: 833526

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	18.7	18.5	99	75-125	
Arsenic	mg/kg	18.7	19.0	101	75-125	
Barium	mg/kg	18.7	19.1	102	75-125	
Cadmium	mg/kg	18.7	19.3	103	75-125	
Chromium	mg/kg	18.7	19.3	103	75-125	
Copper	mg/kg	18.7	19.7	105	75-125	
Iron	mg/kg	234	245	105	75-125	
Lead	mg/kg	18.7	20.4	109	75-125	
Manganese	mg/kg	18.7	19.1	102	75-125	
Nickel	mg/kg	18.7	19.6	105	75-125	
Silver	mg/kg	18.7	19.6	105	75-125	
Zinc	mg/kg	18.7	22.3	119	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833527 833528

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		Spike Conc.	Result	Spike Conc.	Result						
Antimony	mg/kg	<0.53	20.3	18.1	4.9	4.3	23	23	75-125	11	20 M1
Arsenic	mg/kg	17.7	20.3	18.1	27.5	30.0	48	67	75-125	9	20 M1
Barium	mg/kg	248	20.3	18.1	193	216	-271	-172	75-125	11	20 M1
Cadmium	mg/kg	0.25	20.3	18.1	17.5	16.6	85	90	75-125	6	20
Chromium	mg/kg	111	20.3	18.1	99.1	111	-58	-2	75-125	11	20 M1

QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 833527 833528											
Parameter	Units	10134865001 Result	MS	MSD	MS	MSD	MS	MSD	% Rec	Max	Qual
			Spike Conc.	Spike Conc.	Result	Result	% Rec	% Rec	Limits	RPD	
Copper	mg/kg	50.1	20.3	18.1	54.6	56.9	22	37	75-125	4	20 M1
Iron	mg/kg	30900	253	227	27600	29500	-1310	-614	75-125	7	20 M1
Lead	mg/kg	8.2	20.3	18.1	24.4	23.7	80	85	75-125	3	20
Manganese	mg/kg	674	20.3	18.1	577	637	-479	-206	75-125	10	20 M1
Nickel	mg/kg	97.3	20.3	18.1	90.3	94.1	-35	-18	75-125	4	20 M1
Silver	mg/kg	<0.53	20.3	18.1	18.5	17.2	90	93	75-125	7	20
Zinc	mg/kg	68.0	20.3	18.1	72.6	76.8	23	48	75-125	6	20 M1

MATRIX SPIKE SAMPLE: 833529								
Parameter	Units	10134984007 Result	Spike	MS	MS	% Rec	Qualifiers	
			Conc.	Result	% Rec	Limits		
Antimony	mg/kg		49.5	21.2	79.5	142	75-125 M1	
Arsenic	mg/kg		331	21.2	335	23	75-125 M1	
Barium	mg/kg		28.8	21.2	55.4	125	75-125	
Cadmium	mg/kg		64.2	21.2	83.4	91	75-125	
Chromium	mg/kg		5.8	21.2	23.8	85	75-125	
Copper	mg/kg		709	21.2	707	-9	75-125 M1	
Iron	mg/kg		38000	264	34000	-1510	75-125 M1	
Lead	mg/kg		9500	21.2	11800	10800	75-125 E,M1	
Manganese	mg/kg		2070	21.2	1850	-1010	75-125 E,M1	
Nickel	mg/kg		7.3	21.2	23.3	76	75-125	
Silver	mg/kg		68.7	21.2	96.9	133	75-125 M1	
Zinc	mg/kg		6910	21.2	7810	4240	75-125 E,M1	

QUALITY CONTROL DATA

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

QC Batch: MTPR/1490

Analysis Method: USDA 26

QC Batch Method: USDA 26

Analysis Description: Soil Moisture Content

Associated Lab Samples: 10134984003, 10134984004, 10134984005, 10134984006, 10134984007, 10134984008, 10134984009, 10134984010, 10134984011

SAMPLE DUPLICATE: 838624

Parameter	Units	10134984011 Result	Dup Result	RPD	Max RPD	Qualifiers
Soil Moisture Content	%	8.9	9.7	9	30	

QUALIFIERS

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

LABORATORIES

PASI-M Pace Analytical Services - Minneapolis

PASI-MT Pace Analytical Services - Montana

ANALYTE QUALIFIERS

CH The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

D6 The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

R1 RPD value was outside control limits.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine 06-03425-070

Pace Project No.: 10134984

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134984002	FR-QC-WT-T1	EPA 200.8	MPRP/21721	EPA 200.8	ICPM/8900
10134984001	FR-T1-SB-01-15	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984003	FR-T3-TB-02-10	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984004	FR-T3-SB-02-20	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984005	FR-T3-SB-01-30	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984006	FR-T3-TB-01-20	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984007	FR-T3-TB-01-10	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984008	FR-T2-TB-01-10	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984009	FR-T2-SB-01-20	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984010	FR-T2-TB-02-10	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984011	FR-T2-SB-02-15	EPA 3050	MPRP/21704	EPA 6020	ICPM/8928
10134984001	FR-T1-SB-01-15	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984003	FR-T3-TB-02-10	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984004	FR-T3-SB-02-20	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984005	FR-T3-SB-01-30	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984006	FR-T3-TB-01-20	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984007	FR-T3-TB-01-10	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984008	FR-T2-TB-01-10	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984009	FR-T2-SB-01-20	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984010	FR-T2-TB-02-10	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984011	FR-T2-SB-02-15	EPA 7471	MERP/4714	EPA 7471	MERC/5562
10134984001	FR-T1-SB-01-15	% Moisture	MPRP/21693		
10134984003	FR-T3-TB-02-10	% Moisture	MPRP/21693		
10134984004	FR-T3-SB-02-20	% Moisture	MPRP/21693		
10134984005	FR-T3-SB-01-30	% Moisture	MPRP/21693		
10134984006	FR-T3-TB-01-20	% Moisture	MPRP/21693		
10134984007	FR-T3-TB-01-10	% Moisture	MPRP/21693		
10134984008	FR-T2-TB-01-10	% Moisture	MPRP/21693		
10134984009	FR-T2-SB-01-20	% Moisture	MPRP/21693		
10134984010	FR-T2-TB-02-10	% Moisture	MPRP/21693		
10134984011	FR-T2-SB-02-15	% Moisture	MPRP/21693		
10134984003	FR-T3-TB-02-10	ASA 15-5 mod	MT/4669		
10134984004	FR-T3-SB-02-20	ASA 15-5 mod	MT/4669		
10134984005	FR-T3-SB-01-30	ASA 15-5 mod	MT/4669		
10134984006	FR-T3-TB-01-20	ASA 15-5 mod	MT/4669		
10134984007	FR-T3-TB-01-10	ASA 15-5 mod	MT/4669		
10134984008	FR-T2-TB-01-10	ASA 15-5 mod	MT/4669		
10134984009	FR-T2-SB-01-20	ASA 15-5 mod	MT/4669		
10134984010	FR-T2-TB-02-10	ASA 15-5 mod	MT/4669		
10134984011	FR-T2-SB-02-15	ASA 15-5 mod	MT/4669		
10134984003	FR-T3-TB-02-10	Modified Sobek 7	MT/4692		
10134984006	FR-T3-TB-01-20	Modified Sobek 7	MT/4692		
10134984007	FR-T3-TB-01-10	Modified Sobek 7	MT/4692		
10134984008	FR-T2-TB-01-10	Modified Sobek 7	MT/4692		
10134984010	FR-T2-TB-02-10	Modified Sobek 7	MT/4692		
10134984003	FR-T3-TB-02-10	Modified Sobek 7	MT/4680		

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Forest Rose Mine 06-03425-070
Pace Project No.: 10134984

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10134984006	FR-T3-TB-01-20	Modified Sobek 7	MT/4680		
10134984007	FR-T3-TB-01-10	Modified Sobek 7	MT/4680		
10134984008	FR-T2-TB-01-10	Modified Sobek 7	MT/4680		
10134984010	FR-T2-TB-02-10	Modified Sobek 7	MT/4680		
10134984003	FR-T3-TB-02-10	Modified Sobek 7	MT/4722		
10134984006	FR-T3-TB-01-20	Modified Sobek 7	MT/4722		
10134984007	FR-T3-TB-01-10	Modified Sobek 7	MT/4722		
10134984008	FR-T2-TB-01-10	Modified Sobek 7	MT/4722		
10134984010	FR-T2-TB-02-10	Modified Sobek 7	MT/4722		
10134984003	FR-T3-TB-02-10	Modified Sobek 7	MT/4633		
10134984006	FR-T3-TB-01-20	Modified Sobek 7	MT/4633		
10134984007	FR-T3-TB-01-10	Modified Sobek 7	MT/4633		
10134984008	FR-T2-TB-01-10	Modified Sobek 7	MT/4633		
10134984010	FR-T2-TB-02-10	Modified Sobek 7	MT/4633		
10134984003	FR-T3-TB-02-10	USDA 26	MTPR/1490		
10134984004	FR-T3-SB-02-20	USDA 26	MTPR/1490		
10134984005	FR-T3-SB-01-30	USDA 26	MTPR/1490		
10134984006	FR-T3-TB-01-20	USDA 26	MTPR/1490		
10134984007	FR-T3-TB-01-10	USDA 26	MTPR/1490		
10134984008	FR-T2-TB-01-10	USDA 26	MTPR/1490		
10134984009	FR-T2-SB-01-20	USDA 26	MTPR/1490		
10134984010	FR-T2-TB-02-10	USDA 26	MTPR/1490		
10134984011	FR-T2-SB-02-15	USDA 26	MTPR/1490		