Appendix A

Results of 2002 Sampling

Flat Creek IMM Superfund Site

OU1 Final Remedial Investigation Report

September 15, 2011

SDMS Document ID
1047967

START2

Superfund Technical Assessment and Response Team 2 - Region VIII

United States
Environmental Protection Agency

Contract No. 68-W-00-118

SAMPLING AND ANALYSIS REPORT

SUPERIOR WASTE ROCK
Superior, Mineral County, Montana

TDD No. 0203-0008

COPY

AUGUST 16, 2002

URS OPERATING SERVICES, INC.

In association with: Tetra Tech EM, Inc.
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TechLaw, Inc.

503604

URS OPERATING SERVICES

1099 18TH STREET
SUITE 710
DENVER, COLORADO 80202-1908
TEL: (303) 296-3523
FAX: (303) 291-8296

August 16, 2002

Mr. Tien Nguyen
On-Scene Coordinator
U.S. Environmental Protection Agency, Region VIII
999 18th Street, Suite 500, Mail Code: 8EPR-ER
Denver, Colorado 80202

SUBJECT: START, EPA Region VIII, Contract No. 68-W-00-118, TDD No. 0203-0008 Sampling and Analysis Report - Superior Waste Rock, Superior, Mineral County, Montana

Dear Tien:

Enclosed are two copies of the final Sampling Analysis Report for the Superior Waste Rock site, Superior, Mineral County, Montana. Sampling activities were completed June 3 through June 13, 2002. This document is submitted for your review and approval.

If you have any questions, please call me at 303-291-8229.

Very truly yours,

URS OPERATING SERVICES, INC.

Rebecca Laramie
Environmental Engineer

attachments

cc: T. F. Staible/UOS without attachments
File/UOS

SAMPLING AND ANALYSIS REPORT

SUPERIOR WASTE ROCK
Superior, Mineral County, Montana

EPA Contract No. 68-W-00-118
TDD No. 0203-0008

Prepared By:
Rebecca Laramie
Environmental Engineer

URS Operating Services, Inc.
1099 18th Street, Suite 710
Denver, CO 80202-1908

Approved: _____ Date: 9/4/2002
Tien Nguyen, On-Scene Coordinator, EPA, Region VIII

Approved: _____ FOR Date: Aug 15, 2002
T. F. Staible, START2 Program Manager, UOS

Approved: _____ FOR Date: AUG 15, 2002
Rebecca Laramie, Environmental Engineer, UOS

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Tien Nguyen (2 copies)	OSC, EPA Region VIII

URS OPERATING SERVICES, INC.

Rebecca Laramie	Environmental Engineer, Region VIII START2
File (2 copies)	START2, EPA Region VIII

SAMPLING AND ANALYSIS REPORT
Superior Waste Rock
Superior, Mineral County, Montana

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

FIGURES

TABLES

APPENDICES

1.0 INTRODUCTION

URS Operating Services, Inc. (UOS) has been tasked by the U.S. Environmental Protection Agency (EPA), Region VIII, under Technical Direction Document (TDD) #0203-0008, to conduct environmental sampling at Superior, Montana, as part of a Removal Assessment. The sampling was completed between June 3 and June 13, 2002. This report describes the field activities completed and the analytical results associated with the field activities.

Soil samples were collected from 64 residential properties, 20 right-of-ways, and 10 city/county and open space properties within and around Superior, Montana. A total of ten residential properties originally identified for sampling were not completed because of the distance from the town of Superior, later denial of access, or change in ownership. In addition, samples were not collected from 2 right of ways originally identified for sampling because concrete or asphalt covered the entire right of way. Access consents were obtained by the EPA and the Mineral County Environmental and Planning Department prior to sampling. The Superfund Technical Assessment and Response Team 2 (START2) used a Global Positioning System (GPS) to document sample locations and properties sampled. This information was used to produce Figure 1.

A total of 635 soil samples were collected in Superior, Montana, including 24 replicate samples and 4 rinsate blank samples. Soil samples were analyzed on site with an X-Ray Fluorescence Spectrometer (XRF) for metals. In addition, 26 duplicate samples were also prepared and analyzed using the XRF to determine the quality of sample preparation. Ten percent of the total number of soil samples collected for XRF analysis (64 samples) were sent to a commercial laboratory for Target Analyte List (TAL) metals analysis as confirmation of field XRF results. Four soil samples were also selected and sent to a commercial laboratory for Toxicity Characteristic Leaching Procedure (TCLP) analysis of TAL metals. Five samples were submitted for lead and arsenic speciation and in vitro bioavailability. Confirmation sample results and TCLP sample results were validated in accordance with the criteria contained in EPA guidance documents modified for the analytical method used (U.S. Environmental Protection Agency (EPA) 1994a). Data validation reports are filed with the data and describe the usability of the data for further technical interpretation.

2.0 OBJECTIVES

The goal of the assessment is to ensure that the data generated during this project are adequate to support removal decisions based on the human health effects associated with the possible exposure of metals to humans in Superior, Montana. A risk assessment will be conducted to determine an acceptable level of risk to humans and to establish an action level if a removal action is determined to be necessary.

3.0 SITE HISTORY AND PREVIOUS WORK

The Superior Waste Rock site includes areas that may be affected by tailings and waste rock from The Iron Mountain Mine and Mill. The Iron Mountain Mine and Mill is located approximately 3.5 miles north of Superior. The Iron Mountain Mine and Mill operated from 1909 to 1930 and again from 1947 to 1953 (Montana Department of Environmental Quality (Montana DEQ) 2001). A bulletin of unknown date cites E. C. Earl of New York as the owner (Montana Bureau of Mines and Geology (MBMG) date unknown). Federal Mining and Smelting Company acquired the property in 1915. The mine and mill were operated by lessees from 1925 to 1928 when they were abandoned because of the poor market for zinc. The present owner is ASARCO of Wallace, Idaho, that acquired the property around 1916. The mine has been abandoned since 1954 and foundations are all that remain of the mill and other mining buildings. The mill site covers less than one acre of property. When operating, the mill site consisted of a 200-ton mill and approximately 500 feet of tunnels (Montana Department of State Lands - Abandoned Mine Reclamation Bureau (MDSL-AMRB) 1993). Tunnels were developed at the 200-, 400-, 700-, and 1,600-foot levels, with the main haulage level at 1,600 feet. The mill operation processed silver, gold, lead, copper, and zinc ores (Montana DEQ 2001). The mill also accepted ore from the Dillon Mill and the Belle of the Hills Mine, which were located upgradient of the Iron Mountain Mill site (Figure 1). It is believed that the Iron Mountain Mill used flotation methods to separate the metals. Although the waste rock pile still exists on site, the majority of the tailings were washed down onto the Flat Creek floodplain (MDSL-AMRB 1993). Previous UOS sampling activities indicate that a portion of the tailings from the Iron Mountain Mill was used as fill in the town of Superior (URS Operating Services, Inc. (UOS) 2002a).

During 1993, the Montana Department of State Lands, Abandoned Mine Reclamation Bureau (MDSL-AMRB) conducted an abandoned mine investigation to determine the potential health and environmental risks associated with the Iron Mountain Mine and Mill site. The Abandoned Hardrock Mine Priority Sites Summary Report documents concentrations of arsenic, copper, mercury, lead, zinc, cadmium, manganese,

and antimony at the mill site at more than three times the background sample concentrations(MDSL-AMRB 1993).

In 1998, reclamation activities were conducted by ASARCO, the current owner of the mill site. These activities consisted of removing some tailings from Flat Creek and placing them on the ASARCO property (Iron Mountain Mine) in an impoundment. The impoundment was covered with topsoil and vegetated (ASARCO 1999). Additional tailings along Flat Creek were revegetated in place (UOS 2001b). No sampling data were available for Flat Creek following the removal activities. Sample results from the most recent and complete monitoring conducted in 1997 are included in the Preliminary Assessment (PA) report prepared by UOS (UOS 2001a).

During 2001, Region VIII EPA conducted a PA/Site Investigation at the Iron Mountain Mill site. START2 collected approximately 44 environmental samples as part of the SI during October 2001. Eleven soil samples were collected from the high school track and residential properties in Superior. Soil samples collected from the high school track were compared to the background sample collected in the town of Superior at a park. All or most of the samples had concentrations of the following analytes at least three times above the background sample: antimony; arsenic; cadmium; calcium; copper; lead; manganese; mercury; silver; and zinc. Specifically antimony had concentrations ranging from 34.4 parts per million (ppm) to 1,050 ppm, arsenic ranging from 79.4 ppm to 1,690 ppm, lead ranging from 423 ppm to 8,500 ppm, and mercury ranging from 0.32 ppm to 12.4 ppm.

The soil sample collected at 208 Main Avenue had the following analytes with at least three times the background concentrations: antimony (1,250 ppm), arsenic (1,570 ppm), cadmium (42 ppm), copper (73.9 ppm), iron (72,000 ppm), lead (11,300 ppm), manganese (3,200 ppm), mercury (9.9 ppm), silver (76.5 ppm), and zinc (7,620 ppm). The soil sample collected at Third and Spruce had the following analytes with three times the background concentrations: antimony (972 ppm), arsenic (1,540 ppm), cadmium (10.8 ppm), copper (41 ppm), iron (68,800 ppm), lead (7,930 ppm), manganese (2,570 ppm), mercury (5.7 ppm), silver (60 ppm), and zinc (2,580 ppm). Potential targets for the surface soil pathway include the local residents living where elevated metals were located. Potential targets for the high school track include the 383 elementary and high school students who attend school in the Superior School District. Because of these results, the Region VIII EPA had tasked START2 to collect additional samples from the town of Superior as part of a removal assessment.

4.0 SITE ACTIVITIES AND OBSERVATIONS

Field operations were conducted as described below, in accordance with the EPA Region VIII Residential Soil Lead Sampling Guidance Document, START2 Technical Standard Operating Procedures (TSOPs), the UOS Field Samplers Guide, and the site specific Health and Safety Plan (EPA 2000; UOS 2000; UOS 1998; UOS 2002b). Sampling activities were conducted in level D PPE.

4.1 SAMPLING ACTIVITIES

The sampling approach was judgmental and was based on the subjective selection of sampling locations where contamination was expected to occur. Professional judgement was based upon soil criteria such as the color, grain size, texture, and other physical characteristics. Vegetative cover was also used to determine sample locations. The majority of the right of ways and open spaces were sampled because persons residing in Superior suspected tailings were brought into those locations.

Samples were collected from 64 residential properties, 20 right-of-ways, and 10 city or county or open space properties (parks, vacant lots, parking lots, etc.) within and around Superior, Montana. Sample locations are depicted on Figure 1. At the time of sample collection, a sketch of each property was drawn on a field form and sample location information was recorded. The soil sample locations were also recorded with a GPS by START2 (Photo 1). Items of interest were photo documented. Soil samples were collected in accordance with procedures described in TSOP 4.16, "Surface and Shallow Depth Soil Sampling" (UOS 2000; EPA 2000). Sampling areas were divided into three groups: residential properties; road right of ways; and city or county properties or open spaces. Composite surface samples were collected between 0 and 3 inches below ground surface (bgs) at each location. Sample collection started by using a sharp shooter or pick to remove the top layer of soil, gravel, or organic matter (Photos 2 & 3). Soil samples were then collected using dedicated scoops. As directed by the EPA OSC, additional samples were collected if the concentrations of a surface sample were above 100 ppm arsenic and/or 500 ppm lead. The additional samples were used to delineate the area of elevated metals concentrations. A minimum of one depth sample was collected where elevated concentrations were determined. Depth samples were collected at a depth of 9 to 12 inches below ground surface using the same method as described for the surface samples. All additional samples were collected as grab samples, including the depth samples.

4.1.1 Residential Property Samples

Residential property samples were collected from properties that contain a structure where persons reside or business properties that contain areas that may be contaminated. Sample quantities were determined by the size of the property. For a standard size lot (5,000 square feet) or smaller, the total area was considered one sampling zone. A minimum of two composite surface samples were collected from each zone to determine if elevated metals concentrations exist. Additional samples were collected if children play areas were identified, if discolored soil material was visible, or if vegetation was stressed at a specific location. Because driveways were suspect areas, a sample was collected from the driveway at most properties. If elevated concentrations of lead (500 ppm or greater) or arsenic (100 ppm or greater) were detected, additional samples were collected to delineate the elevated concentrations. Large residential properties, were divided into zones that were no larger than a standard lot. Each zone was sampled in the same manner as zones from a standard sized lot.

4.1.2 Road Right of Way Samples

Road samples were collected from right-of-ways or alleys where elevated metals concentrations were suspected. Discrete surface samples between 0 and 3 inches were initially collected at 50-foot intervals on each side of the street or down the approximate center line of alleys. Sample locations were random unless discolored material or areas with stressed or no vegetation were observed. If elevated metals concentrations were detected in the initial surface samples, additional grab surface samples and depth samples were collected. These samples were used to delineate the area of elevated metals concentrations. Visual observations were also noted to help delineate the areas of high concentrations.

4.1.3 Open Space Samples

Open space samples were collected from large properties that are not used for residential purposes. This included parking lots, parks, city or county property, and vacant lots. For ease of description, these will all be referred to in this document as open spaces. Open space properties were divided into zones depending on the size of the original area and the

use of the property. One composite surface sample (0 to 3 inches bgs) was collected from each zone. If metals concentrations were elevated additional samples were collected to delineate the area with elevated concentrations. All surface and depth samples used to delineate areas with elevated metals concentrations were grab samples.

4.2 SAMPLE LOCATION IDENTIFICATION

Sample identifiers were written on the sample container with waterproof ink along with the date and time of sample collection. Sketches of each property were completed on field forms at the time of sample collection. Sample identifiers, sample locations, and sample date and time were also documented on the field form.

4.2.1 Residential Samples

Residential samples were identified based on sample location area. Samples were designated as follows:

- The first field is the letter "S" that designates the sampling event as Superior Waste Rock site.
- The second field is the four digit house number.
- The third field is two letters that represent the street on which the property is located (Appendix D).
- The fourth field is the section or zone number (most sample locations are considered zone 1).
- The fifth field is the sample depth or the composite surface sample indicator.

  S1 - Grab Surface sample from sample location 1.

  S2 - Grab Surface sample from sample location 2.

  D1 - Grab Depth sample from sample location 1.

- The last field indicates if the sample is a replicate, duplicate, or equipment blank sample. If the last field is null, the sample is not a field quality control sample.

  R - Replicate sample.

  D - Duplicate sample.

  B - Equipment Blank sample.

Example:

For a surface sample at the residential property at 110 Main Street.

S0110MN1S1

4.2.2 Open Space Samples

Open space samples were identified based on sample location area. All sample locations were designated on the respective field form. Samples were designated as follows:

- The first field is the letter "S" that designates the sampling event as Superior Waste Rock site.
- The second field is the four digit property address.
- The third field is two letters that represent the street on which the property was located or two letters that represented the property identification (Appendix D).
- The fourth field consists of two letters that define the area sampled. Many open space sample locations were designated by the directional location.

  NW - Northwest zone on the property

  CC - Center zone on the property

  SW - Southwest zone on the property

  If a directional location was not applicable each location was designated by a zone (1,2,3).
- The fifth field is a number defining the sample depth. Number 1 represents surface samples collected from 0 to 3 inches and an X represents depth samples collected from 9 inches to 12 inches. If a number was used in field four to represent the zone, the fifth field uses S1 and S2 as surface samples and D1 and D2 for depth samples.
- The last field indicates if the sample was a replicate, duplicate, or equipment blank sample. If the last field is null, the sample is not a field quality control sample.

- The last field indicates if the sample is a replicate, duplicate, or equipment blank sample. If the last field is null, the sample is not a field quality control sample.

  R - Replicate sample.

  D - Duplicate sample.

  B - Equipment Blank sample.

Example:

For a surface sample at the 600 block at 6th Avenue East, at 50 foot interval B on the south side of the road.

S06006ESB1

4.3 DERIVATIONS FROM FIELD SAMPLING PLAN

The field sampling plan designated that surface samples would be grab samples collected from a discrete location. The EPA OSC and EPA toxicologist later determined that surface composites would be collected from residential and open space areas. Discrete sample locations were still collected from the right of way surface locations. All depth samples were also discrete samples as described in the Sampling Activities Plan.

The right of ways on the 100 block of River Street and the 600 block of 4th Avenue East were not sampled because concrete and asphalt covered the entire right of way for each location. The following properties were originally identified for sampling, but were not addressed because of the distance from the town of Superior, later refusal of access, or change of ownership.

202 Riverbend Road

9 Robins Nest Lane

56 Sloway West

31 Spritis Walk Lane

24 Sunnyside Lane

41 Flat Creek Road

13 Country Lane

514 T16N R27W Lower Oregon Creek

421 Diamond Road

25 Shaw Gulch Lane

R - Replicate sample.

D - Duplicate sample.

B - Equipment Blank sample.

Example:

For a composite surface sample collected at the Little Park open space in the northwest zone.

S0202LPNW1

4.2.3 Right of Way Samples

Road Right of way samples were identified based on sample location area. Samples were designated as follows:

- The first field is the letter "S" that designates the sampling event as Superior Waste Rock site.
- The second field is the four digit number representing the block.
- The third field is two letters that represent the street on which the property is located.
- The fourth field represents the side of the road being sampled.

  N - North

  S- South

  M - Middle

  E - East

  W - West
- The fifth field is the 50 foot node designation. The node that is most east or south is designated as node A and increases as the distance increases moving west or north.
- The sixth field is the depth or surface sample indicator. The number one was used for the surface samples and the letter X represents a depth sample.

4.4 ANALYTICAL PARAMETERS

Soil samples were analyzed by START2 using a Spectrace 9000® Field Portable XRF. A minimum of 10 percent of the total number of samples collected for field XRF analysis were also sent to a commercial laboratory for TAL metals analysis as confirmation of field XRF results. Confirmation samples were dried at less then 100°F and sieved with a 60-mesh or 10-mesh screen before being sent to the commercial laboratory for TAL analysis (SW846 Method 6010B/7471). A total of four soil samples were selected and sent to an independent laboratory for TCLP analysis (SW846 Methods 1311/ 6010B/7471). The samples sent for TCLP analysis represented the samples with the higher concentrations of metals. The acceptable holding times for these samples are 28 days for mercury and six months for all other metals. The definitive data was validated using the QA/QC procedures associated with definitive data. Information pertaining to screening level and definitive data can be found in the Emergency Response Program (ERP) Generic Quality Assurance Project Plan (QAPP) (UOS 1999). Five selected samples were sent for arsenic and lead speciation to determine bio-availability.

4.4.1 XRF Sample Preparation

XRF sample preparation followed the general guidelines set forth below and in SOP 6 from the EPA Bioavailability Study (EPA 1994b).

- The samples were collected in a seal top poly bag, homogenized, labeled with the appropriate sample identification, and transported to the field laboratory work space for XRF analysis.

- A portion of the sample was placed in a container for drying on a griddle at temperatures not to exceed 100°F, or by air drying over night. All containers had identification tags containing a number that was cross-referenced to the sample number and documented in the XRF sample preparation logbook.

- Once the samples were dry, they were sieved using nylon lead-free sieves. A 60-mesh sieve (250 micrometers (μm)) was used for the residential surface samples. All other samples were sieved using a 10-mesh sieve. Samples placed on top of the

screen were shaken, swirled, tapped, and bumped until all the particles smaller than the mesh had fallen through the sieve. The samples were not ground or forced through the sieve.

- The collection tray was emptied into an XRF sample cup. The drying and sieving of additional sample material was repeated until the XRF sample cup was filled. The sample cup was covered with 0.2-mil Mylar® film and tapped on a table top to pack the sample against the window film.

- Samples were analyzed as stated in Section 5.2.1, "XRF Analysis."

- Non-dedicated sieves, collection trays and any other implements used were decontaminated according to SOPs.

If the sample was dry enough to flow through the mesh sieve easily, a dry decontamination was used. The pan was wiped with paper towel and the screen brushed with a brass brush. If the sample did not flow through the sieve easily, a wet decontamination was used. The screen and pan were washed with a Liquinox® solution; rinsed with potable water; and dried.

The XRF was operated as per ERT SOP 1713 and manufacturers specifications. Quality control for the instrument are discussed in Section 5.2 of this report. Samples were analyzed on the XRF using analysis times of 120 seconds for the source Cd-109, 30 seconds for the source Fe-55, and 30 seconds for the source Am-241.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

5.1 LABORATORY QUALITY CONTROL

Specific QC criteria have been developed to ensure that the Data Quality Objectives (DQOs) established in the SAP can be achieved. Analytical methods for sample analysis have been selected on the basis of the required detection limits, known contaminants existing in the study area, and the range of analytes to be determined. XRF data will be evaluated as screening. Laboratory data will be evaluated as definitive. The Draft ERP Generic QAPP, Section 10.2 "Laboratory Quality Control," contains more specific information related to laboratory QC requirements for definitive data (UOS 1999).

5.2 FIELD QUALITY CONTROL

5.2.1 XRF Analysis

XRF field analytical data was evaluated as screening data, with an additional ten percent of these samples being analyzed by an independent laboratory for definitive confirmation analysis. All XRF data generated for this project were evaluated for instrument calibration, detection limits, energy calibration checks, blank checks, and field replicates. The field XRF was operated per ERT SOP 1713 and per manufacturer's specifications.

High lead concentrations may mask arsenic concentrations when analyzed on an XRF. The arsenic detection limit for the XRF is either three times the standard deviation of the XRF standard, or one-tenth the lead result, whichever is greater.

5.2.2 Field Quality Control Samples

In addition to the samples collected to determine elevated concentrations of metals, samples were also collected and analyzed as part of the quality control process .

- A minimum of 1 per 20 soil samples collected for XRF analysis were collected in the field as replicate samples.

- A duplicate XRF sample was prepared in the lab for every 20 soil samples.

- A minimum of 1 per 10 soil samples collected for XRF analysis was analyzed by an independent laboratory for confirmation of XRF analytical results. The XRF sample cup was sent to the laboratory for analysis.

- Sand rinsate blanks were collected a minimum of 1 per day using decontaminated sampling equipment and a sieve to identify potential contamination from the sample collection and preparation implements.

6.0 ANALYTICAL DATA EVALUATION

All soil samples were analyzed with an XRF during field activities. The XRF field analytical data were evaluated as screening data according to the START Generic Quality Assurance Project Plan (QAPP) with an additional ten percent of these samples being analyzed by and independent laboratory (CompuChem) for definitive confirmation analyses. All XRF data generated for this project were evaluated to ensure that instrument calibration, detection limits, energy calibration checks, blank checks, and field replicates were within operational control limits. The XRF was operated as per ERT SOP 1713, and per manufacturer's specifications.

Detection limits were calculated for both the XRF instrument used and for all laboratory confirmation samples. Detection limits were established as a value three times the standard deviation of a low National Institute of Standards and Technology (NIST) certified standard run a minimum of seven times over a specified period of time. In the case of arsenic, the detection limit is as stated above or one-tenth of the lead concentration for that sample, whichever is greater.

Validation of the confirmation laboratory data was completed by TechLaw, Inc. of Lakewood, Colorado. All data are acceptable for use as qualified in the data validation reports (Appendix A). The laboratory forms and a Table containing the laboratory results are also in Appendix A. Qualifiers used by laboratory validators consisted of U and J. A qualifier of U signifies that the metal was not detected at or above the associated numerical value for that sample. A qualifier of J signifies that the associated numerical value was estimated based on one of many reasons pertaining to laboratory quality assurance. While the value

associated with the J qualifier is an estimate, the presence of the metal is reliable. Please refer to the data validation packages for specific criteria for all laboratory confirmation data.

The laboratory versus XRF metal concentration data were compared using relative percent difference (RPD). Relative percent difference is the difference between the lab and XRF data divided by the average of the two values. This method shows less variability for the larger concentration data because the average (divisor) is higher and the result shows a lower RPD. At lower concentrations, a small variation between the values shows a larger RPD because the average is lower. This method for XRF data evaluation is more specific to whatever range of data is of most interest (usually the "action level"). RPD calculations for arsenic, antimony, lead, and zinc are reported in Table 2. The RPD was not calculated for those results that were qualified as U or J. An RPD value of 35 percent or less suggests an acceptable concentration variance. Only one sample had an RPD calculated for the lead concentrations above 35 percent. Sample S0208MN1S3 had an RPD of 41%; however, this is probably due to the high concentrations of lead (greater than 10,000 ppm) in the sample and the variability of the XRF at this concentration.

7.0 SAMPLE RESULTS

A total of 635 soil samples were collected for XRF analysis. All XRF sample results are listed in Appendix B. Table 1 also lists the lead and arsenic concentrations for each sample. Although ten percent of the samples were sent to a commercial laboratory for definitive results, the discussion below only specifies XRF results. Laboratory results are compared to the XRF results in Table 2 and discussed in the previous section.

Five right of ways had concentrations of lead above 500 ppm or arsenic above 100 ppm. Table 3 describes each right of way with elevated metals concentrations along with sample results above the action levels. Each area is relatively small with estimated volumes of material ranging between 0.5 cubic yards and 35 cubic yards (Photo 4). One right of way location at the Pine Street Alley had a concentration of arsenic at 110 J ppm. Although this result is above the action level, all other results are not considered elevated and this location is not considered to have tailings material. The right of way originally identified during the 2001 sampling activities appeared to be cleaned up with a small amount of tailing material left (approximately 1.2 cubic yards).

A total of nine residential locations had samples above the action levels stated above (Table 3). These locations are also described in Table 3. The estimated volume of material ranges between 0.15 cubic yards

and 21 cubic yards for each property. Interviews with property owners indicated that the tailings material was generally used to minimize vegetative growth, reduce dust, or fill in low spots on the property (Photo 5). The property originally identified during 2001 field activities is included on this table with additional samples collected during the 2002 field activities. This property is owned by the United States Forest Service and will not be included in any remedial activity completed by the EPA.

Three open space properties were determined to have elevated concentrations of metals (Table 3). The high school track, the fairgrounds, and the city shop all have concentrations of lead above 500 ppm and the high school track also had concentrations of arsenic above 100 ppm. The fairgrounds has an estimated volume of 175 cubic yards of material. The high school track has an estimated volume of 3111 cubic yards. Finally, the city shop has an estimated volume of 120 cubic yards of material with elevated metals concentration.

A total of four samples were also sent to the laboratory for TCLP analysis. The samples were selected because of the high concentrations of lead and/or arsenic detected on the XRF. Sample results for this analysis are listed in Table 4. All samples had concentrations of lead above the regulatory limit (5 milligrams per liter (mg/L)). Five samples were submitted for lead and arsenic speciation and in vitro bioavailability. Samples were selected from the high school track, the fairgrounds, the residence at 106 3rd Avenue West, the residence at 407 Iron Mountain Heights, and the residence at 403 2nd Avenue West. These samples were also selected because of the high concentrations of lead and/or arsenic detected on the XRF. These results were not available at the time this report was written. The results will be included in the final Sampling Analysis Report.

8.0 SUMMARY

Sampling activities for the Superior Waste Rock site was completed between June 3 and June 13, 2002. A total of 635 samples were collected from 64 residential properties, 20 right-of-ways, and 10 city/county and open space properties within and around Superior, Montana. A total of ten residential properties originally identified for sampling were not completed because of the distance from the town of Superior, later denial of access, or change in ownership. In addition, samples were not collected from 2 right of ways originally identified for sampling because concrete or asphalt covered the entire right of way.

Soil samples were analyzed on site with an X-Ray Fluorescence Spectrometer (XRF) for metals. A total of 26 duplicate samples were also prepared and analyzed using the XRF to determine the quality of sample preparation. Ten percent of the total number of samples collected for XRF analysis (64 samples) were sent to a commercial laboratory for Target Analyte List (TAL) metals analysis as confirmation of field XRF results. Four soil samples were also selected and sent to a commercial laboratory for Toxicity Characteristic Leaching Procedure (TCLP) analysis of TAL metals. Five samples were submitted for lead and arsenic speciation and in vitro bioavailability.

Five right of ways had concentrations of lead above 500 ppm or arsenic above 100 ppm. These right of ways, XRF results, and a description of the area are described in Table 3. Each area is relatively small with estimated volumes of material ranging between 0.5 cubic yards and 35 cubic yards.

Nine residential locations had samples above the action levels stated above. These locations are also described in Table 3. The estimated volume of material ranges between 0.15 cubic yards and 21 cubic yards for each property. Generally, the tailings material was used to minimize vegetative growth, reduce dust, or fill in low spots on the property.

Three open space properties were determined to have elevated concentrations of metals. The high school track, the fairgrounds, and the city shop all have concentrations of lead above 500 ppm and the high school track also had concentrations of arsenic above 100 ppm. The fairgrounds has an estimated volume of 175 cubic yards of material. The high school track has an estimated volume of 3111 cubic yards. Finally, the city shop has an estimated volume of 120 cubic yards of material with elevated metals concentration.

A total of four samples were also sent to the laboratory for TCLP analysis. The samples were selected because of the high concentrations of lead and/or arsenic detected on the XRF. Sample results for this analysis are listed in Table 4. All samples had concentrations of lead above the regulatory limit (5 mg/L).

9.0 LIST OF REFERENCES

ASARCO. 1999. Letter from J. C. Pfahl, ASARCO, to Stephen Brown, Garlington, Lohn, and Robenson, PLLP. April 26, 1999.

Environmental Response Team (ERT). 1995. "Spectrace 9000 Field Portable X-Ray Fluorescence Operating Procedures." January 26, 1995.

Montana Bureau of Mines and Geology (MBMG). Date Unknown. Title unknown. Mineral County. Iron Mountain District. Bulletin No. 30. Page 31.

Montana Department of Environmental Quality (Montana DEQ). 2001. Mining History web site. <http://www.deq.state.mt.us>. March 2, 2001.

Montana Department of State Lands - Abandoned Mine Reclamation Bureau (MDSL-AMRB). 1993. Abandoned Mine Inventory, Iron Mountain Mine and Mill site. July 23, 1993.

U.S. Environmental Protection Agency (EPA). 1994a. U.S. Environmental Protection Agency CLP National Functional Guidelines for Inorganic Data Review, EPA 540/R - 94/013 (2/94).

U.S. Environmental Protection Agency (EPA). 1994b. U.S. Environmental Protection Agency Region VIII Bioavailability Study - Phase II Investigations - Standard Operating Procedures. September 1994.

U.S. Environmental Protection Agency (EPA). 2000. Region VIII Superfund Program Residential Soil Lead Sampling Guidance Document. Draft Final. April 2000.

URS Operating Services, Inc. (UOS). 1998. "Field Sampler's Guide for Sample Collection and Documentation." February 1998.

URS Operating Services, Inc. (UOS). 1999. "Emergency Response Program (ERP) Generic Quality Assurance Project Plan (QAPP) for the Superfund Technical Assessment and Response Team (START), EPA Region VIII." March 11, 1999.

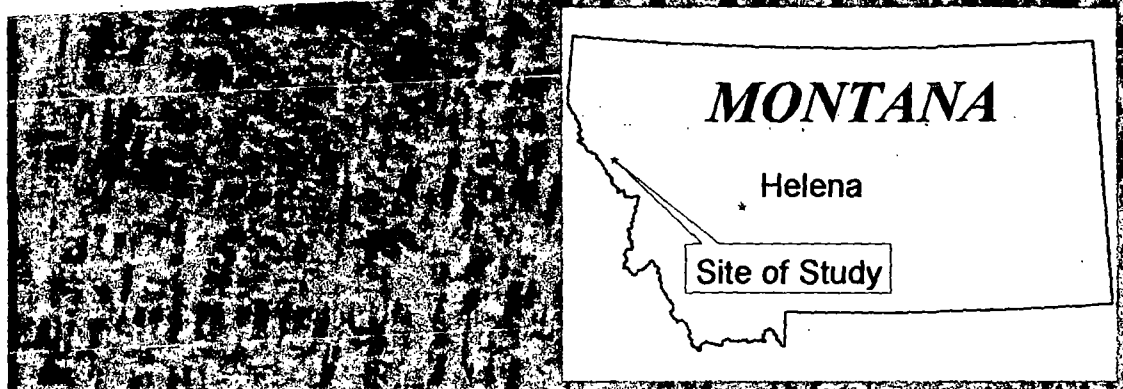
URS Operating Services, Inc. (UOS). 2000. START Standard Operating Procedures, Volume 4: Technical Standard Operating Procedures. September 2000.

URS Operating Services, Inc. (UOS). 2001a. Preliminary Assessment. Iron Mountain Mill, Superior, Mineral County, Montana. July 20, 2001.

URS Operating Services, Inc. (UOS). 2001b. Site visit/reconnaissance by Rebecca Laramie and Log Book #570. March 29, 2001.

URS Operating Services, Inc. (UOS). 2002a. Analytical Results Report for Focused Site Inspection, Iron Mountain Mill, Superior, Mineral County, Montana. January 24, 2002.

URS Operating Services, Inc. (UOS). 2002b. Site Health and Safety Plan for Superior Waste Rock. May 2002.



5228000

LEGEND

Concentration in ppm	Depth Sample	Surface Sample
As >= 100 and/or Pb >= 500	▲	●
As < 100 and Pb < 500	△	○

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

URS OPERATING SERVICES

SUPERIOR WASTE ROCK
MINERAL COUNTY, MONTANA

Figure 1: Sample Distribution and Hot Concentration Values on Superior

August 2002

UOS - START2
TDD No. 0203-0008

Source: USGS Aerial Photo
03-12-94
Northing & Easting Units: Meters

SCALE: 1:2,500

200 0 200 400 600 Feet

N

659000 659250

Oversize Map

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
100 block 1st Street	Right of Way	S01001SWA1	6/8/02	914	51 U	66 J
		S01001SWB1	6/8/02	918	51 U	22 J
		S01001SWC1	6/8/02	922	51 U	42 J
		S01001SWD1	6/8/02	927	51 U	25 J
		S01001SWE1	6/8/02	935	51 U	42 J
		S01001SWF1	6/8/02	939	51 U	180
		S01001SWF1D	6/8/02	943	51 U	160
300 block 2nd Avenue West	Right of Way	S03002WNF1	6/11/02	1446	46 U	99
		S03002WNG1	6/11/02	1450	46 U	41 J
		S03002WSF1	6/11/02	1435	46 U	23 U
		S03002WSG1	6/11/02	1440	46 U	39 J
400 block 2nd Avenue West	Right of Way	S04002WNA1	6/11/02	1521	46 U	350
		S04002WNB1	6/11/02	1526	46 U	50 J
		S04002WNC1	6/11/02	1531	46 U	33 J
		S04002WNC1R	6/11/02	1559	58 J	23 U
		S04002WND1	6/11/02	1540	46 U	48 J
		S04002WNE1	6/11/02	1553	60 J	23 U
		S04002WSA1	6/11/02	1457	46 U	27 J
		S04002WSB1	6/11/02	1502	46 U	68 J
		S04002WSC1	6/11/02	1506	46 U	23 U
		S04002WSD1	6/11/02	1511	100 J	770
		S04002WSE1	6/11/02	1516	46 U	85
500 block 2nd Avenue West	Right of Way	S05002WNA1	6/11/02	1625	46 U	23 U
		S05002WNB1	6/11/02	1629	46 U	23 U
		S05002WNC1	6/11/02	1634	46 U	160
		S05002WSA1	6/11/02	1605	46 U	53 J
		S05002WSB1	6/11/02	1615	46 U	60 J
		S05002WSC1	6/11/02	1620	46 U	61 J
200 block 3rd Avenue East	Right of Way	S02003ENA1	6/6/02	1558	36 U	36 J
		S02003ENB1	6/6/02	1602	36 U	53 J
		S02003ENC1	6/6/02	1606	36 U	70 J
		S02003END1	6/6/02	1610	47 J	36 U
		S02003ENE1	6/6/02	1614	36 U	36 U

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
200 block 3rd Avenue East (continued)	Right of Way	S02003ENF1	6/6/02	1619	36 U	36 U
		S02003ENG1	6/6/02	1623	36 U	40 J
		S02003ESA1	6/7/02	949	38 U	170
		S02003ESB1	6/7/02	956	38 U	140
		S02003ESC1	6/7/02	1001	38 U	58 J
		S02003ESD1	6/7/02	1005	38 U	24 U
		S02003ESE1	6/7/02	1009	38 U	44 J
		S02003ESF1	6/7/02	1013	38 U	56 J
		S02003ESG1	6/7/02	1017	38 U	24 U
		S02003ESG1R	6/7/02	1021	38 U	24 U
300 block 3rd Avenue East	Right of Way	S03003ENA1	6/6/02	1627	36 U	36 U
		S03003ENB1	6/6/02	1631	36 U	190
		S03003ENC1	6/6/02	1635	36 U	110 J
		S03003END1	6/6/02	1639	36 U	75 J
		S03003ENE1	6/6/02	1643	40 J	36 U
		S03003ENF1	6/6/02	1647	36 U	51 J
		S03003ENG1	6/6/02	1652	36 U	36 U
		S03003ESA1	6/6/02	1655	36 U	220
		S03003ESA1D	6/6/02	1659	36 U	220
		S03003ESB1	6/6/02	1704	36 U	270
		S03003ESC1	6/6/02	1708	36 U	180
		S03003ESD1	6/6/02	1711	54 J	44 J
		S03003ESE1	6/6/02	1716	36 U	81 J
		S03003ESF1	6/7/02	835	38 U	66 J
		S03003ESG1	6/7/02	839	38 U	43 J
400 block 3rd Avenue East	Right of Way	S04003ENA1	6/7/02	843	38 U	38 J
		S04003ENB1	6/7/02	847	38 U	24 U
		S04003ENC1	6/7/02	851	38 U	38 J
		S04003END1	6/7/02	855	38 U	24 U
		S04003ENE1	6/7/02	859	38 U	160
		S04003ENF1	6/7/02	903	38 U	32 J
		S04003ENG1	6/7/02	907	38 U	37 J
		S04003ESA1	6/7/02	911	38 U	78 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
400 block 3rd Avenue East (continued)	Right of Way	S04003ESB1	6/7/02	915	38 U	68 J
		S04003ESC1	6/7/02	919	38 U	43 J
		S04003ESD1	6/7/02	923	38 U	24 U
		S04003ESDX	6/12/02	837	34 U	23 U
		S04003ESE1	6/7/02	927	220 U	**2200**
		S04003ESF1	6/7/02	932	43 J	230
		S04003ESG1	6/7/02	936	38 U	100
		S04003ESG1D	6/7/02	940	38 U	110
		S04003ESG1R	6/7/02	944	38 U	110
300 block 3rd Street	Right of Way	S03003SEA1	6/11/02	1638	46 U	58 J
		S03003SEB1	6/11/02	1643	46 U	42 J
		S03003SEC1	6/11/02	1648	46 U	54 J
		S03003SEC1R	6/11/02	1653	46 U	33 J
		S03003SED1	6/11/02	1658	46 U	240
		S03003SWA1	6/11/02	1703	46 U	34 J
		S03003SWB1	6/11/02	1707	46 U	29 J
		S03003SWC1	6/11/02	1713	46 U	23 U
		S03003SWD1	6/11/02	1717	46 U	23 U
600 block alley between 4th & 5th Avenue	Right of Way	S06004AMA1	6/6/02	914	36 U	36 U
		S06004AMB1	6/6/02	919	36 U	36 U
		S06004AMC1	6/6/02	923	36 U	36 U
		S06004AMD1	6/6/02	931	36 U	36 U
		S06004AME1	6/6/02	935	51 J	36 U
		S06004AMF1	6/6/02	938	36 U	36 U
		S06004AMG1	6/6/02	943	36 U	36 U
		S06004AMH1	6/6/02	947	36 U	36 U
		S06004AMI1	6/6/02	956	36 U	36 U
		S06004AMJ1	6/6/02	959	40 J	36 U
		S06004AMK1	6/6/02	1004	36 U	36 U
		S06004AML1	6/6/02	1008	36 U	36 U
		S06004AMM1	6/6/02	1012	36 U	36 U
		S06004AMN1	6/6/02	1016	36 U	36 U
		S06004AMO1	6/6/02	1020	36 U	38 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
600 block alley between 4th & 5th Avenue (continued)	Right of Way	S06004AMP1	6/6/02	1024	41 J	36 U
		S06004AMQ1	6/6/02	1028	36 U	46 J
		S06004AMQ1D	6/6/02	1032	36 U	36 U
		S06004AMR1	6/6/02	1036	48 J	36 U
		S06004AMS1	6/6/02	1040	36 U	36 U
		S06004AMT1	6/6/02	1044	36 U	36 U
		S06004AMU1	6/6/02	1049	36 U	39 J
		S06004AMU1R	6/6/02	1056	36 U	36 U
		S06004AMV1	6/6/02	1100	42 J	36 U
100 block 4th Avenue East	Right of Way	S01004END1	6/8/02	1135	51 U	28 J
		S01004END1B	6/8/02	1140	51 U	21 U
200 block 4th Street	Right of Way	S02004SEA1	6/11/02	1722	46 U	44 J
		S02004SEB1	6/11/02	1726	46 U	23 U
		S02004SEC1	6/11/02	1731	46 U	89
		S02004SED1	6/11/02	1742	46 U	62 J
		S02004SWB1	6/11/02	1750	46 U	34 J
		S02004SWC1	6/11/02	1754	46 U	50 J
		S02004SWD1	6/11/02	1758	46 U	23 U
300 block 4th Street	Right of Way	S03004SEA1	6/11/02	1802	46 U	30 J
		S03004SEB1	6/11/02	1806	46 U	23 U
		S03004SEC1	6/11/02	1810	46 U	25 J
		S03004SEC1R	6/12/02	828	34 U	47 J
		S03004SED1	6/11/02	1814	46 U	84
		S03004SWA1	6/11/02	1818	59 J	74 J
		S03004SWB1	6/12/02	805	37 J	100
		S03004SWC1	6/12/02	809	34 U	69 J
		S03004SWD1	6/12/02	813	54 J	25 J
600 block alley between 5th & 6th Avenue	Right of Way	S06005AMA1	6/5/02	1352	31 J	19 U
		S06005AMB1	6/5/02	1356	45 J	19 U
		S06005AMC1	6/5/02	1401	26 J	26 J
		S06005AMD1	6/5/02	1404	23 U	39 J
		S06005AME1	6/5/02	1413	37 J	43 J
		S06005AMF1	6/5/02	1417	32 J	19 U

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
600 block alley between 5th & 6th Avenue (continued)	Right of Way	S06005AMG1	6/5/02	1421	23 U	39 J
		S06005AMH1	6/5/02	1527	51 J	19 U
		S06005AMH1R	6/5/02	1531	51 J	19 U
		S06005AMI1	6/5/02	1535	27 J	21 J
		S06005AMJ1	6/5/02	1539	40 J	41 J
		S06005AMK1	6/5/02	1543	24 J	27 J
		S06005AML1	6/5/02	1547	26 J	43 J
		S06005AML1D	6/5/02	1552	27 J	60 J
		S06005AMM1	6/5/02	1556	39 J	29 J
		S06005AMN1	6/5/02	1600	23 U	33 J
		S06005AMO1	6/5/02	1604	27 J	19 U
600 block 5th Avenue East	Right of Way	S06005ENA1	6/5/02	1608	31 J	63 J
		S06005ENB1	6/5/02	1613	23 U	67
		S06005ENC1	6/5/02	1617	23 U	67
		S06005END1	6/5/02	1621	73 J	160
		S06005ENE1	6/5/02	1629	23 U	43 J
		S06005ENE1R	6/5/02	1633	23 U	47 J
		S06005ENF1	6/5/02	1637	23 U	19 U
		S06005ENG1	6/5/02	1641	23 U	38 J
		S06005ENH1	6/5/02	1645	35 J	43 J
		S06005ENI1	6/5/02	1649	23 U	59 J
		S06005ENJ1	6/5/02	1653	23 U	56 J
		S06005ENK1	6/5/02	1657	23 U	19 J
		S06005ENL1	6/5/02	1701	23 U	20 J
		S06005ENM1	6/5/02	1705	23 U	27 J
		S06005ENN1	6/5/02	1710	23 U	39 J
		S06005ENO1	6/5/02	1713	23 U	39 J
		S06005ENP1	6/5/02	1717	23 U	28 J
		S06005ENP1D	6/5/02	1721	23 U	34 J
		S06005ENQ1	6/5/02	1725	34 J	58 J
		S06005ENR1	6/5/02	1729	32 J	110
		S06005ENS1	6/5/02	1733	23 U	19 U
		S06005ESA1	6/5/02	1737	26 J	49 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
600 block 5th Avenue East (continued)	Right of Way	S06005ESA1R	6/5/02	1741	39 J	56 J
		S06005ESB1	6/5/02	1745	23 U	38 J
		S06005ESC1	6/5/02	1749	28 J	160
		S06005ESD1	6/5/02	1753	49 J	19 U
		S06005ESE1	6/6/02	810	36 U	36 U
		S06005ESF1	6/6/02	814	36 U	36 U
		S06005ESG1	6/6/02	817	36 U	36 U
		S06005ESH1	6/6/02	822	36 U	36 U
		S06005ESI1	6/6/02	826	47 J	36 U
		S06005ESJ1	6/6/02	830	36 U	36 U
		S06005ESK1	6/6/02	834	36 U	36 U
		S06005ESL1	6/6/02	838	36 U	36 U
		S06005ESM1	6/6/02	842	36 U	36 U
		S06005ESN1	6/6/02	846	36 U	36 U
		S06005ESO1	6/6/02	850	36 U	36 U
		S06005ESP1	6/6/02	854	36 U	36 U
		S06005ESP1D	6/6/02	858	36 U	36 U
		S06005ESQ1	6/6/02	902	36 U	80 J
		S06005ESR1	6/6/02	907	36 U	54 J
		S06005ESS1	6/6/02	910	36 U	69 J
600 block 6th Avenue East	Right of Way	S06006ENA1	6/5/02	1252	23 J	34 J
		S06006ENB1	6/5/02	1255	29 J	21 J
		S06006ENC1	6/5/02	1259	23 U	19 U
		S06006END1	6/5/02	1304	36 J	130
		S06006ENE1	6/5/02	1308	23 U	52 J
		S06006ENF1	6/5/02	1312	26 J	65
		S06006ENF1D	6/5/02	1316	32 J	64 J
		S06006ENG1	6/5/02	1320	23 U	92
		S06006ENH1	6/5/02	1328	23 U	37 J
		S06006ENI1	6/5/02	1332	29 J	19 U
		S06006ENJ1	6/5/02	1336	23 U	56 J
		S06006ENM1	6/5/02	1340	23 U	31 J
		S06006ENN1	6/5/02	1344	23 U	41 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
600 block 6th Avenue East (continued)	Right of Way	S06006ENO1	6/5/02	1348	23 U	36 J
		S06006ESA1	6/5/02	1141	23 U	24 J
		S06006ESA1D	6/5/02	1145	23 U	19 U
		S06006ESB1	6/5/02	1149	23 U	19 U
		S06006ESC1	6/5/02	1153	44 J	19 U
		S06006ESD1	6/5/02	1158	23 U	19 U
		S06006ESE1	6/5/02	1202	23 U	19 U
		S06006ESF1	6/5/02	1207	23 U	82
		S06006ESG1	6/5/02	1211	29 J	26 J
		S06006ESH1	6/5/02	1215	23 U	43 J
		S06006ESI1	6/5/02	1219	23 U	20 J
		S06006ESJ1	6/5/02	1223	33 J	19 U
		S06006ESK1	6/5/02	1227	23 U	19 U
		S06006ESL1	6/5/02	1231	40 J	28 J
		S06006ESM1	6/5/02	1235	23 U	30 J
		S06006ESN1	6/5/02	1243	23 U	37 J
		S06006ESO1	6/5/02	1247	23 U	36 J
100 block 7th Street	Right of Way	S01007SWA1	6/8/02	1220	51 U	21 U
		S01007SWB1	6/8/02	1224	51 U	21 U
		S01007SWC1	6/8/02	1228	51 U	21 U
		S01007SWD1	6/8/02	1232	54 J	21 U
100 block of Cedar Street	Right of Way	S0100CEEA1	6/7/02	1154	38 U	24 U
		S0100CEEB1	6/7/02	1158	38 U	100
		S0100CEEC1	6/7/02	1202	38 U	50 J
		S0100CEED1	6/7/02	1207	38 U	100
		S0100CEEE1	6/7/02	1210	38 U	70 J
		S0100CEEF1	6/7/02	1214	43 J	67 J
		S0100CEEG1	6/7/02	1219	38 U	54 J
		S0100CEEG1R	6/7/02	1105	39 J	30 J
		S0100CEWA1	6/7/02	1226	38 U	29 J
		S0100CEWB1	6/7/02	1231	38 U	80
		S0100CEWC1	6/7/02	1236	38 U	62 J
		S0100CEWD1	6/7/02	1355	38 U	53 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
100 block of Cedar Street (continued)	Right of Way	S0100CEWE1	6/7/02	1358	38 U	160
		S0100CEWE1D	6/7/02	1410	38 U	190
		S0100CEWF1	6/7/02	1414	43 J	100
		S0100CEWG1	6/7/02	1419	38 U	82
200 block of Cedar Street	Right of Way	S0200CEEA1	6/7/02	1032	38 U	81
		S0200CEEA1B	6/7/02	1037	38 U	24 U
		S0200CEEB1	6/7/02	1040	38 U	65 J
		S0200CEEC1	6/7/02	1045	38 U	70 J
		S0200CEED1	6/7/02	1049	38 U	110
		S0200CEEE1	6/7/02	1053	38 U	83
		S0200CEEF1	6/7/02	1057	38 U	53 J
		S0200CEEG1	6/7/02	1101	38 U	270
		S0200CEWA1	6/7/02	1109	38 U	48 J
		S0200CEWB1	6/7/02	1113	38 U	24 U
		S0200CEWB1D	6/7/02	1121	38 U	24 U
		S0200CEWC1	6/7/02	1125	38 U	29 J
		S0200CEWD1	6/7/02	1129	38 U	25 J
		S0200CEWE1	6/7/02	1134	38 U	24 U
		S0200CEWF1	6/7/02	1138	38 U	46 J
		S0200CEWG1	6/7/02	1142	39 J	31 J
		S0200CEWG1R	6/7/02	1146	38 U	25 J
300 block of Cedar Street	Right of Way	S0300CEEE1	6/7/02	1423	38 U	44 J
		S0300CEEG1	6/7/02	1427	38 U	55 J
		S0300CEWG1	6/7/02	1150	38 U	75 J
300 block of Flat Creek Road	Right of Way	S0300FCEA1	6/8/02	1007	51 U	21 U
		S0300FCEB1	6/8/02	1011	51 U	21 U
		S0300FCEC1	6/8/02	15	51 U	43 J
		S0300FCED1	6/8/02	1019	51 U	35 J
		S0300FCWA1	6/8/02	1023	51 U	26 J
		S0300FCWB1	6/8/02	1027	51 U	60 J
		S0300FCWC1	6/8/02	1031	51 U	47 J
400 block of Illinois Avenue	Right of Way	S0400ILEA1	6/11/02	1255	46 U	34 J
		S0400ILEB1	6/11/02	1302	46 U	36 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
400 block of Illinois Avenue (continued)	Right of Way	S0400ILEC1	6/11/02	1307	46 U	29 J
		S0400ILED1	6/11/02	1310	46 U	30 J
		S0400ILEE1	6/11/02	1314	46 U	49 J
		S0400ILEF1	6/11/02	1319	46 U	55 J
		S0400ILEG1	6/11/02	1322	74 J	70 J
		S0400ILEG1D	6/11/02	1326	46 U	56 J
		S0400ILWA1	6/11/02	1208	46 U	23 U
		S0400ILWB1	6/11/02	1213	46 U	23 U
		S0400ILWC1	6/11/02	1218	46 U	23 U
		S0400ILWD1	6/11/02	1236	46 U	23 U
		S0400ILWE1	6/11/02	1222	46 U	23 U
		S0400ILWF1	6/11/02	1227	46 U	23 U
		S0400ILWG1	6/11/02	1232	46 U	27 J
		S0400ILWG1R	6/11/02	1241	46 U	38 J
400 block of Maple Street	Right of Way	S0400MAEA1	6/6/02	1249	36 U	36 U
		S0400MAEB1	6/6/02	1252	36 U	36 U
		S0400MAEC1	6/6/02	1257	36 U	54 J
		S0400MAED1	6/6/02	1301	36 U	70 J
		S0400MAEE1	6/6/02	1305	41 J	73 J
		S0400MAEF1	6/6/02	1325	36 U	110 J
		S0400MAWA1	6/6/02	1224	36 U	83 J
		S0400MAWB1	6/6/02	1228	36 U	150
		S0400MAWC1	6/6/02	1232	36 U	110 J
		S0400MAWD1	6/6/02	1236	36 U	80 J
		S0400MAWE1	6/6/02	1240	36 U	62 J
		S0400MAWF1	6/6/02	1244	36 U	36 U
200 block of Main Street	Right of Way	S0200MNNA1	6/7/02	1625	38 U	130
		S0200MNNB1	6/7/02	1629	38 U	150
		S0200MNNC1	6/7/02	1633	38 U	42 J
		S0200MNND1	6/7/02	1637	38 U	53 J
		S0200MNNE1	6/7/02	1645	38 U	59 J
		S0200MNNF1	6/7/02	1649	41 J	290
		S0200MNNG1	6/7/02	1653	38 U	130

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
200 block of Main Street (continued)	Right of Way	S0200MNNG1R	6/7/02	1657	38 U	110
		S0200MNSA1	6/7/02	1435	38 U	30 J
		S0200MNSB1	6/7/02	1439	38 U	100
		S0200MNSC1	6/7/02	1443	43 J	81
		S0200MNSD1	6/7/02	1447	38 U	93
		S0200MNSDX	6/12/02	950	34 U	53 J
		S0200MNSE1	6/7/02	1455	38 U	71 J
		S0200MNSF1	6/7/02	1459	38 U	61 J
		S0200MNSG1	6/7/02	1504	54 U	540
300 block of Main Street	Right of Way	S0300MNNA1	6/7/02	1701	43 J	150
		S0300MNNB1	6/7/02	1705	38 U	90
		S0300MNNC1	6/7/02	1709	38 U	110
		S0300MNNE1	6/7/02	1713	38 U	200
		S0300MNNF1	6/7/02	1717	38 U	130
		S0300MNNF1D	6/8/02	814	51 U	100
		S0300MNNG1	6/8/02	818	51 U	250
		S0300MNSA1	6/7/02	1508	38 U	28 J
		S0300MNSB1	6/7/02	1513	38 U	24 U
		S0300MNSC1	6/7/02	1516	38 U	24 U
		S0300MNSD1	6/7/02	1520	38 U	24 U
		S0300MNSF1	6/7/02	1528	44 J	31 J
		S0300MNSG1	6/7/02	1532	38 U	110
		S0300MNSG1R	6/7/02	1537	38 U	95
400 block of Main Street	Right of Way	S0400MNNA1	6/7/02	1605	38 U	24 U
		S0400MNNB1	6/7/02	1610	38 U	24 U
		S0400MNNC1	6/7/02	1617	38 U	41 J
		S0400MNND1	6/7/02	1622	38 U	24 U
		S0400MNSA1	6/7/02	1540	38 U	24 U
		S0400MNSA1D	6/7/02	1544	38 U	24 U
		S0400MNSB1	6/7/02	1553	50 J	24 U
		S0400MNSC1	6/7/02	1558	38 U	41 J
		S0400MNSD1	6/7/02	1601	51 J	69 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
400 block alley between Spruce & Pine Street	Right of Way	S0400PAMA1	6/6/02	1329	36 U	65 J
		S0400PAMB1	6/6/02	1334	**110 J**	230
		S0400PAMC1	6/6/02	1338	36 U	260
		S0400PAMD1	6/6/02	1342	36 U	74 J
		S0400PAMD1D	6/6/02	1346	36 U	71 J
		S0400PAME1	6/6/02	1400	41 J	160
		S0400PAMF1	6/6/02	1404	36 U	83 J
		S0400PAMG1	6/6/02	1408	36 U	140
		S0400PAMG1R	6/6/02	1412	36 U	190
500 block of Pike Street	Right of Way	S0500PDEA1	6/6/02	1104	36 U	36 U
		S0500PDEB1	6/6/02	1108	36 U	36 U
		S0500PDEC1	6/6/02	1113	36 U	36 U
		S0500PDED1	6/6/02	1116	36 U	36 U
		S0500PDEE1	6/6/02	1120	36 U	36 U
		S0500PDEF1	6/6/02	1125	36 U	36 U
		S0500PDEG1	6/6/02	1128	36 U	36 U
		S0500PDEH1	6/6/02	1132	46 J	90 J
		S0500PDEH1R	6/6/02	1137	36 U	38 J
		S0500PDWA1	6/6/02	1141	36 U	36 U
		S0500PDWB1	6/6/02	1144	39 J	42 J
		S0500PDWC1	6/6/02	1149	36 U	36 U
		S0500PDWD1	6/6/02	1153	36 J	36 U
		S0500PDWE1	6/6/02	1156	36 U	37 J
		S0500PDWE1D	6/6/02	1201	36 U	41 J
		S0500PDWF1	6/6/02	1204	36 U	47 J
		S0500PDWG1	6/6/02	1208	36 U	36 U
		S0500PDWH1	6/6/02	1216	36 U	36 U
		S0500PDWI1	6/6/02	1220	36 U	36 U
200 block Riverside Road West Alley	Right of Way	S0200RAMA1	6/8/02	822	51 U	56 J
		S0200RAMB1	6/8/02	826	51 U	21 U
		S0200RAMC1	6/8/02	830	51 U	21 U
		S0200RAMD1	6/8/02	834	51 U	39 J
		S0200RAME1	6/8/02	838	51 U	21 U

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
200 block Riverside Road West Alley (continued)	Right of Way	S0200RAMF1	6/8/02	841	51 U	32 J
		S0200RAMG1	6/8/02	846	51 U	63 J
		S0200RAMG1R	6/8/02	850	51 U	51 J
		S0200RAMH1	6/8/02	854	73 J	21 U
		S0200RAMI1	6/8/02	858	51 U	100
		S0200RAMJ1	6/8/02	902	51 U	130
		S0200RAMK1	6/8/02	906	51 U	110
		S0200RAML1	6/8/02	910	51 U	80
800 block Riverside Road	Right of Way	S0800RVSA1	6/8/02	1144	51 U	21 U
		S0800RVSB1	6/8/02	1148	51 U	21 U
		S0800RVSC1	6/8/02	1152	51 U	21 U
		S0800RVSD1	6/8/02	1156	51 U	22 J
		S0800RVSE1	6/8/02	1200	51 U	21 U
		S0800RVSF1	6/8/02	1204	51 U	21 U
		S0800RVSG1	6/8/02	1208	51 U	21 U
		S0800RVSG1R	6/8/02	1216	51 U	21 U
300 block Riverside Road	Right of Way	S0300RWSA1	6/8/02	947	51 U	44 J
		S0300RWSB1	6/8/02	951	51 U	26 J
		S0300RWSC1	6/8/02	955	56 J	21 U
		S0300RWSD1	6/8/02	959	51 U	49 J
		S0300RWSF1	6/8/02	1003	51 U	34 J
400 block alley between Spruce & Alder Street	Right of Way	S0400SAMA1	6/6/02	519	36 U	36 U
		S0400SAMB1	6/6/02	1523	36 U	42 J
		S0400SAMB1D	6/6/02	1527	36 U	39 J
		S0400SAMC1	6/6/02	1532	36 U	36 U
		S0400SAMD1	6/6/02	1537	36 U	36 U
		S0400SAME1	6/6/02	1540	39 J	36 U
		S0400SAMF1	6/6/02	1549	36 U	51 J
		S0400SAMG1	6/6/02	1553	36 U	36 U
		S0400SAMG1R	6/7/02	1025	38 U	29 J
500 block 5th Avenue East	Right of Way	S0500SESA1	6/8/02	1322	51 U	21 U
		S0500SESB1	6/8/02	1326	51 U	48 J
		S0500SESC1	6/8/02	1330	51 U	21 U

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
500 block 5th Avenue East	Right of Way	S0500SESD1	6/8/02	1334	51 U	21 U
300 block of Spruce Street	Right of Way	S0300SPEA1	6/8/02	1035	51 U	30 J
		S0300SPEB1	6/8/02	1039	51 U	54 J
		S0300SPEC1	6/8/02	1043	51 U	31 J
		S0300SPED1	6/8/02	1047	51 U	42 J
		S0300SPEE1	6/8/02	1055	51 U	81
		S0300SPEF1	6/8/02	1059	51 U	64 J
		S0300SPEG1	6/8/02	1103	51 U	110
		S0300SPEG1R	6/8/02	1107	51 U	100
400 block of Spruce Street	Right of Way	S0400SPEA1	6/6/02	1356	36 U	130
		S0400SPEB1	6/6/02	1422	36 U	120
		S0400SPEC1	6/6/02	1425	**400**	**1800**
		S0400SPED1	6/6/02	1429	68 J	300
		S0400SPEDX	6/12/02	902	34 U	23 U
		S0400SPEE1	6/6/02	1434	67 U	670
		S0400SPEF1	6/6/02	1438	170	270
		S0400SPEG1	6/6/02	1442	**150**	**1300**
		S0400SPWA1	6/6/02	1446	36 U	61 J
		S0400SPWB1	6/6/02	1450	36 U	60 J
		S0400SPWC1	6/6/02	1454	36 U	58 J
		S0400SPWD1	6/6/02	1458	36 U	45 J
		S0400SPWE1	6/6/02	1502	36 U	97 J
		S0400SPWF1	6/6/02	1507	44 U	440
		S0400SPWG1	6/6/02	1510	36 U	54 J
403 Illinois Avenue	Residential	S0403IL1S1	6/9/02	1628	51 U	35 U
		S0403IL1S2	6/9/02	1632	51 U	35 U
		S0403IL1S3	6/9/02	1635	51 U	35 U
307 Iron Mountain Heights	Residential	S0307IM1S1	6/10/02	1544	43 J	120
407 Iron Mountain Heights	Residential	S0407IH1D1	6/12/02	929	**110 J**	**820**
		S0407IH1S1	6/10/02	1553	170 U	**1700**
304 Maple Street	Residential	S0304MA1S1	6/9/02	1302	51 U	35 U
		S0304MA1S2	6/9/02	1306	51 U	35 U
		S0304MA1S3	6/9/02	1310	51 U	60 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
304 Maple Street (continued)	Residential	S0304MA1S4	6/9/02	1314	51 U	35 U
		S0304MA1S5	6/9/02	1318	51 U	89 J
		S0304MA1S5R	6/9/02	1322	51 U	120
306 Maple Street	Residential	S0306MA1S1	6/9/02	1250	51 U	35 U
		S0306MA1S2	6/9/02	1254	51 U	35 U
		S0306MA1S2D	6/9/02	1258	51 U	35 U
307 Maple Street	Residential	S0307MA1S1	6/9/02	1238	51 U	35 U
		S0307MA1S2	6/9/02	1242	51 U	35 U
		S0307MA1S3	6/9/02	1246	51 U	35 U
311 Maple Street	Residential	S0311MA1S1	6/9/02	1226	51 U	35 U
		S0311MA1S2	6/9/02	1230	51 U	36 J
		S0311MA1S3	6/9/02	1234	51 U	69 J
169 Diamond Road	Residential	S0169DI1S1	6/10/02	1559	43 U	16 U
		S0169DI1S2	6/10/02	1549	43 U	16 U
400 Diamond Road	Residential	S0400DI1S1	6/12/02	817	34 U	43 J
Flat Creek & Cemetery Road	Residential	S00FCCM1S1	6/10/02	1625	43 U	23 J
225 Flat Creek Road	Residential	S0225FC1S1	6/12/02	832	34 U	55 J
		S0225FC1S1D	6/12/02	844	34 U	130
		S0225FC1S2	6/12/02	849	**300**	**1600**
617 Cedar Street	Residential	S0617CE1S1	6/9/02	1413	51 U	82 J
		S0617CE1S2	6/9/02	1417	51 U	61 J
106 Cedar Street	Residential	S0106CE1S1	6/9/02	1402	51 U	64 J
		S0106CE1S2	6/9/02	1405	58 J	62 J
		S0106CE1S3	6/9/02	1410	51 U	35 U
202 Cedar Street	Residential	S0202CE1S1	6/9/02	1326	51 U	71 J
		S0202CE1S2	6/9/02	1334	51 U	35 U
208 Cedar Street	Residential	S0208CE1S1	6/9/02	1338	51 U	66 J
		S0208CE1S2	6/9/02	1341	51 U	49 J
		S0208CE1S3	6/9/02	1346	51 U	59 J
618 6th Avenue East	Residential	S06186E1S1	6/10/02	845	43 U	16 U
		S06186E1S2	6/10/02	849	52 J	16 U
205 Alder Street	Residential	S0205AL1S1	6/9/02	1159	51 U	35 U
		S0205AL1S2	6/9/02	1202	51 U	35 U

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
205 Alder St. (continued)	Residential	S0205AL1S3	6/9/02	1207	51 U	35 U
300 Alder Street	Residential	S0300AL1S1	6/9/02	1143	51 U	35 U
		S0300AL1S2	6/9/02	1147	51 U	35 U
		S0300AL1S3	6/9/02	1150	51 U	35 U
		S0300AL2S1	6/9/02	1155	51 U	36 J
404 Alder Street	Residential	S0404AL1S1	6/9/02	1214	51 U	35 U
		S0404AL1S2	6/9/02	1219	51 U	35 U
		S0404AL1S3	6/9/02	1222	51 U	78 J
306 Arizona Avenue	Residential	S0306AR1S1	6/9/02	1507	51 U	35 U
		S0306AR1S2	6/9/02	1511	51 U	35 U
		S0306AR1S3	6/9/02	1516	51 U	180
		S0306AR1S3R	6/9/02	1520	51 U	190
		S0306AR2S1	6/9/02	1559	51 U	35 U
404 Arizona Avenue	Residential	S0404AR1S1	6/9/02	1459	51 U	35 U
		S0404AR1S2	6/9/02	1503	51 U	35 U
615 4th Avenue East	Residential	S06154E1S1	6/9/02	1349	51 U	44 J
		S06154E1S2	6/9/02	1353	51 U	37 J
		S06154E1S3	6/9/02	1358	51 U	41 J
627 4th Avenue East	Residential	S06274E1S1	6/9/02	1423	51 U	35 U
		S06274E1S1D	6/9/02	1428	51 U	41 J
		S06274E1S2	6/9/02	1431	51 U	35 U
639 4th Avenue East	Residential	S06394E1S1	6/9/02	1435	51 U	35 U
		S06394E1S2	6/9/02	1439	51 U	35 U
801 4th Avenue East	Residential	S08014E1S1	6/9/02	1443	51 U	35 U
		S08014E1S2	6/9/02	1447	51 U	35 U
		S08014E1S3	6/9/02	1455	51 U	35 U
903 4th Avenue East	Residential	S09034E1S1	6/9/02	1548	51 U	35 U
		S09034E1S2	6/9/02	1552	51 U	35 U
203 5th Street	Residential	S02035L1S1	6/10/02	1038	43 U	25 J
		S02035L1S2	6/10/02	1046	43 U	16 U
311 Main Street	Residential	S0311MN1S1	6/10/02	901	43 U	36 J
		S0311MN1S2	6/10/02	905	45 J	16 U
400 Main Street	Residential	S0400MN1S1	6/10/02	908	43 U	16 U

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
400 Main St. (continued)	Residential	S0400MN1S2	6/10/02	913	43 U	27 J
205 Main Street	Residential	S0205MN1S1	6/10/02	853	43 U	54
		S0205MN1S2	6/10/02	857	43 U	31 J
208 Main Street	Residential	S0208MN1S1	6/11/02	833	46 U	53 J
		S0208MN1S2	6/11/02	838	81 U	820
		S0208MN1S3	6/11/02	843	**1400**	**1100**
500 Main Street	Residential	S0500MN1D1	6/12/02	954	34 U	38 J
		S0500MN1S1	6/10/02	917	100 U	1000
		S0500MN1S2	6/10/02	925	43 U	32 J
502 Main Street	Residential	S0502MN1S1	6/10/02	929	44 J	16 U
		S0502MN1S2	6/10/02	933	43 U	30 J
604 Main Street	Residential	S0604MN1S1	6/10/02	937	43 U	24 J
		S0604MN1S2	6/10/02	941	43 U	17 J
		S0604MN1S3	6/10/02	945	43 U	17 J
309 Montana Avenue	Residential	S0309MT1S1	6/9/02	1640	51 U	35 U
		S0309MT1S2	6/9/02	1652	51 U	35 U
		S0309MT1S3	6/9/02	1656	51 U	35 U
23 Mullan Road West	Residential	S0023MW1S1	6/10/02	1431	43 U	40 J
33 Mullan Road West	Residential	S0033MW1S1	6/10/02	1419	43 U	67
		S0033MW1S2	6/10/02	1346	43 U	22 J
43 Mullan Road West	Residential	S0043MW1D1	6/12/02	958	34 U	26 J
		S0043MW1S1	6/10/02	1423	43 U	140
		S0043MW1S2	6/10/02	1350	78 U	**780**
		S0043MW1S3	6/10/02	1355	43 U	54
106 Mullan Road East	Residential	S0106ME1S1	6/10/02	1405	51 J	24 J
146 Mullan Road West	Residential	S0146MW1S1	6/10/02	1629	43 U	29 J
		S0146MW1S2	6/10/02	1642	43 U	21 J
		S0146MW1S3	6/10/02	1652	43 U	16 U
319 Old Mullan Road	Residential	S0319OM1S1	6/10/02	1414	43 U	48 J
		S0319OM1S2	6/10/02	1427	43 U	55
		S0319OM1S3	6/10/02	1444	43 U	30 J
102 River Street North	Residential	S0102RN1S1	6/11/02	849	46 U	59 J
205 River Street North	Residential	S0205RN1S1	6/11/02	813	46 U	100

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
403 Riverside Road	Residential	S0403RW1S1	6/11/02	817	46 U	33 J
		S0403RW1S2	6/11/02	828	46 U	120
209 Riverside Road	Residential	S0209RW1S1	6/11/02	822	46 U	220
604 5th Avenue East	Residential	S0604SE1S1	6/10/02	837	44 J	29 J
		S0604SE1S2	6/10/02	841	43 U	42 J
612 5th Avenue East	Residential	S0612SE1S1	6/10/02	824	43 U	51 J
		S0612SE1S2	6/10/02	828	43 U	20 J
		S0612SE1S3	6/10/02	832	50 J	130
620 5th Avenue East	Residential	S0620SE1S1	6/10/02	816	43 U	16 U
		S0620SE1S2	6/10/02	820	43 U	83
628 5th Avenue East	Residential	S0628SE1S1	6/10/02	808	43 U	44 J
		S0628SE1S2	6/10/02	812	43 U	26 J
631 5th Avenue East	Residential	S0631SE1S1	6/9/02	1701	51 U	40 J
		S0631SE1S2	6/9/02	1704	51 U	35 U
		S0631SE1S3	6/10/02	804	43 U	340
201 Spruce Street	Residential	S0201SP1D1	6/12/02	910	46 J	110
		S0201SP1S1	6/8/02	1632	51 U	140
		S0201SP1S2	6/8/02	1636	51 U	26 J
		S0201SP1S2D	6/8/02	1640	51 U	41 J
		S0201SP1S3	6/8/02	1646	**180**	**1700**
210 Spruce Street	Residential	S0210SP1S1	6/12/02	853	34 U	53 J
		S0210SP1S2	6/12/02	858	34 U	39 J
211 Spruce Street	Residential	S0211SP1S1	6/8/02	1650	51 U	60 J
		S0211SP1S2	6/8/02	1655	51 U	170
213 Spruce Street	Residential	S0213SP1S1	6/8/02	1658	51 U	100
		S0213SP1S2	6/8/02	1702	51 U	89
403 2nd Avenue West	Residential	S04032W1D3	6/12/02	825	34 U	110
		S04032W1S1	6/10/02	949	43 U	20 J
		S04032W1S2	6/10/02	953	43 U	62
		S04032W1S3	6/10/02	957	**1200**	**8000**
		S04032W1S3R	6/10/02	1005	**1300**	**9400**
107 1st Street	Residential	S01071S1S1	6/8/02	1506	51 U	45 J
		S01071S1S2	6/8/02	1514	51 U	68 J

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
202 1st Street	Residential	S02021S1S1	6/1/02	1523	51 U	66 J
		S02021S1S2	6/1/02	1531	51 U	28 J
206 1st Street	Residential	S02061S1D1	6/1/02	942	34 U	43 J
		S02061S1S1	6/8/02	1543	51 U	21 J
		S02061S1S2	6/8/02	1551	51 U	**510**
		S02061S1S3	6/8/02	1559	51 U	100
211 1st Street	Residential	S02111S1S1	6/8/02	1607	51 U	110
		S02111S1S2	6/8/02	1616	51 U	40 J
310 2nd Avenue East	Residential	S03102E1S1	6/8/02	1619	51 U	59 J
405 3rd Avenue East	Residential	S04053E1S1	6/8/02	1623	51 U	27 J
		S04053E1S2	6/8/02	1628	51 U	43 J
500 3rd Avenue East	Residential	S05003E1S1	6/9/02	1118	51 U	35 U
		S05003E1S2	6/9/02	1122	51 U	42 J
		S05003E1S3	6/9/02	1126	51 U	35 U
		S05003E1S3D	6/9/02	1130	51 U	35 U
510 3rd Avenue East	Residential	S05103E1S1	6/9/02	1134	51 U	52 J
		S05103E1S2	6/9/02	1138	51 U	47 J
106 3rd Avenue West	Residential	S01063W1D1	6/12/02	938	34 U	29 J
		S01063W1S1	6/10/02	1026	43 U	50 J
		S01063W1S2	6/10/02	1029	43 U	26 J
		S01063W1S3	6/10/02	1034	400 U	**4000**
206 3rd Avenue West	Residential	S02063W1S1	6/10/02	1017	43 U	16 U
		S02063W1S2	6/10/02	1022	43 U	61
305 3rd Avenue West	Residential	S03053W1S1	6/10/02	1010	43 U	54
		S03053W1S2	6/10/02	1013	43 U	30 J
Eva Horning Park	Open Space	S0400EHCC1	6/8/02	1354	51 U	21 U
		S0500EHCC1	6/8/02	1338	51 U	21 U
		S0500EHSE1	6/8/02	1342	51 U	21 J
		S0500EHNE1	6/8/02	1346	51 U	21 U
Little Park Open Space	Open Space	S0202LPNE1	6/8/02	1128	51 U	21 U
		S0202LPNW1	6/8/02	1123	51 U	21 U
		S0202LPSE1	6/8/02	1111	51 U	21 U
		S0202LPSE1D	6/8/02	1115	51 U	21 U

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
Little Park Open Space (continued)	Open Space	S0202LPSW1	6/8/02	1119	51 U	21 U
		S0202LPTC1	6/8/02	1131	51 U	21 U
VFW Property	Open Space	S0VFWNW1	6/7/02	1431	38 U	130
Fairgrounds	Open Space	S700FGANE1	6/8/02	1358	51 U	22 J
		S700FGANW1	6/8/02	1402	51 U	21 U
		S700FGASE1	6/8/02	1411	51 U	36 J
		S700FGASW1	6/8/02	1407	51 U	21 J
		S700FGCSW1	6/8/02	1424	**1500**	**7700**
		S700FGCSWX	6/12/02	934	**790**	**4000**
		S700FGCWC1	6/8/02	1429	51 U	23 J
		S700FGCWC1D	6/8/02	1433	51 U	31 J
		S700FGECC1	6/8/02	1420	51 U	31 J
		S700FGGCC1	6/8/02	1446	51 U	41 J
		S700FGGCC1R	6/8/02	1450	51 U	35 J
		S700FGGNE1	6/8/02	1441	51 U	96
		S700FGGNW1	6/8/02	1453	51 U	34 J
		S700FGGSE1	6/8/02	1437	51 U	110
		S700FGGSW1	6/8/02	1458	51 U	24 J
Elementary School	Open Space	S0400EM1S1	6/11/02	1123	46 U	23 U
		S0400EM1S2	6/11/02	1128	47 J	23 U
		S0400EM1S3	6/11/02	1134	46 U	23 U
		S0400EM1S4	6/11/02	1138	46 U	30 J
		S0400EM1S5	6/11/02	1144	46 U	25 J
High School	Open Space	S0400HS1S1	6/11/02	1047	46 U	23 U
		S0400HS1S2	6/11/02	1052	48 J	29 J
		S0400HS1S3	6/11/02	1043	46 U	23 U
		S0400HS1S4	6/11/02	1058	46 U	27 J
		S0400HS1S5	6/11/02	1102	46 U	26 J
		S0400HS1S6	6/11/02	1119	46 U	38 J
High School Track	Open Space	S0400HT1S1	6/9/02	1556	51 U	35 U
		S0400HT2DC	6/9/02	1620	51 U	35 U
		S0400HT2DCB	6/10/02	1102	43 U	16 U
		S0400HT2S1	6/9/02	1604	51 U	35 U

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
High School Track (continued)	Open Space	S0400HT2S2	6/9/02	1608	51 U	46 J
		S0400HT2S3	6/9/02	1612	51 U	35 J
		S0400HT2S4	6/9/02	1616	51 U	35 U
		S0400HT3S1	6/9/02	1623	51 U	130
		S0400HT4D1	6/10/02	1050	190 U	**1900**
		S0400HT4D2	6/10/02	1054	**630**	**4400**
		S0400HT4D3	6/10/02	1058	**370**	**1100**
		S0400HT4S1	6/11/02	1149	**1700**	**9000**
		S0400HT4S1D	6/11/02	1200	**1800**	**9200**
Westside Field	Open Space	S0800WFBE1	6/8/02	1314	51 U	41 J
		S0800WFBW1	6/8/02	1318	51 U	21 U
		S0800WFNE1	6/8/02	1310	51 U	21 U
		S0800WFNW1	6/8/02	1305	51 U	21 U
		S0800WFSE1	6/8/02	1236	51 U	21 U
		S0800WFSW1	6/8/02	1302	51 U	21 U
		S0800WFSE1D	6/8/02	1240	51 U	21 U
City Shop	Open Space	S0CTYSH1D1	6/12/02	913	34 U	23 U
		S0CTYSH1S1	6/10/02	1440	50 U	**500**
		S0CTYSH1S2	6/10/02	1449	67 U	**670**
		S0CTYSH1S3	6/10/02	1452	43 U	250
		S0CTYSH1S4	6/12/02	922	34 U	110
		S0CTYSH1S5	6/12/02	917	34 U	84
East of River Street and Johnson Lane	Open Space	S1RSOSCCS1	6/8/02	1740	51 U	160
		S1RSOSNES1	6/8/02	1722	51 U	490
		S1RSOSNWS1	6/8/02	1710	58 J	120
		S1RSOSSES1	6/8/02	1719	51 U	47 J
		S1RSOSSSS1	6/8/02	1727	51 U	27 J
		S1RSOSSWS1	6/8/02	1707	51 U	74

TABLE 1
Lead and Arsenic XRF Results (ppm)

Location	Property Type	ID	Analysis Date	Analysis Time	As	Pb
SW Corner of River Street and Johnson Ave.	Open Space	S2RSOSCCS1	6/9/02	1105	51 U	150
		S2RSOSNES1	6/9/02	1053	95 J	200
		S2RSOSNWS1	6/9/02	1058	51 U	82 J
		S2RSOSSES1	6/9/02	1102	51 U	82 J
		S2RSOSSWS1	6/9/02	1110	51 U	35 U
		S2RSOSSWS1B	6/9/02	1114	51 U	35 U

TABLE 2
Laboratory and XRF Results (ppm)

Sample ID	Arsenic			Antimony			Lead			Zinc		
	Lab	XRF	RPD	Lab	XRF	RPD	Lab	XRF	RPD	Lab	XRF	RPD
S0200CEEA1B	0.41 U	38 U	NA	0.16 U	51 U	NA	0.38	24 U	NA	0.14 U	59 U	NA
S0201SP1S3	190	180	5	173	560	106	1620	1700	4.82	804	950	16.648
S02021S1S2	3.7	51 U	NA	0.99 U	45 U	NA	31.9	28 J	NA	69.6	130 J	NA
S0202CE1S1	5.7	51 U	NA	1.2	66 U	NA	54.8	71 J	NA	89.9	200	76
S0205AL1S2	6.6	51 U	NA	0.35 U	66 U	NA	14.6	35 U	NA	46.5	59 J	NA
S02061S1S2	5.7	51 U	NA	1.4	45 U	NA	523	510	3	1130	1200	6
S02063W1S2	6.5	43 U	NA	0.95 U	62 U	NA	59.7	61	2	99.9	180 J	NA
S0208CE1S1	5.4	51 U	NA	1.8	66 U	NA	47.1	66 J	NA	121	230	62
S0208MN1S2	127	81 U	NA	44.6	79 J	NA	959	820	16	443	420	5
S0208MN1S3	2620	1400	61	2360	2500	6	16700	11000	41	6170	3700	50
S0209RW1S1	26.3	46 U	NA	5.7	75 U	NA	216	220	2	267	330	21
S02111S1S1	6.9	51 U	NA	2.1	45 U	NA	89.1	110	21	141	270	63
S0213SP1S2	9.2	51 U	NA	2.5	45 U	NA	82.1	89	8	105	200	62
S0225FC1S2	362	300	19	63.5	160 J	NA	1680	1600	5	1470	950	43
S03003ESD1	10.6	54 J	NA	2.4	60 U	NA	48.1	44 J	NA	79	83 J	NA
S03003SED1	3.8	46 U	NA	1.2	75 U	NA	209	240	14	80.2	120 J	NA
S0300SPEC1	6.2	51 U	NA	0.68 U	45 U	NA	27.1	31 J	NA	35.3	100 J	NA
S0306AR1S3	22	51 U	NA	1.5	66 U	NA	179	180	1	123	130 J	NA
S0311MA1S2	5.7	51 U	NA	1 U	66 U	NA	31.1	36 J	NA	67.3	170	87
S0400EM1S1	4.6	46 U	NA	0.4 U	75 U	NA	11.3	23 U	NA	34.5	86 J	NA

TABLE 2
Laboratory and XRF Results (ppm)

Sample ID	Arsenic			Antimony			Lead			Zinc		
	Lab	XRF	RPD	Lab	XRF	RPD	Lab	XRF	RPD	Lab	XRF	RPD
S0400HT2DCB	0.43 U	43 U	NA	0.24 U	62 U	NA	2.4	16 U	NA	2.7	68 U	NA
S0400HT4D1	250	190 U	NA	136	310	78	2140	1900	12	1860	1700	9
S0400HT4D2	957	630	41	399	1000	86	5070	4400	14	2860	2400	17
S0400HT4D3	300	370	21	67.6	200 J	NA	1120	1100	2	348	410	16
S0407IH1D1	166	110 J	NA	63.6	85 J	NA	757	820	8	7040	9800	33
S0407IM1S1	296	170 U	NA	84.4	160 J	NA	1770	1700	4	910	1000	9
S05002WNC1	3.1	46 U	NA	0.47 U	75 U	NA	130	160	21	29.9	72 U	NA
S0500MN1S1	175	100 U	NA	48.6	110 J	NA	1020	1000	2	926	760	20
S06004AMD1	7.5	36 U	NA	0.74 U	60 U	NA	15.8	36 U	NA	33.8	40 J	NA
S06005AMD1	8.5	23 U	NA	0.6 U	50 U	NA	27.6	39 J	NA	42.6	92 J	NA
S06005ENR1	15.5	32 J	NA	5.3	50 U	NA	101	110	9	83	120 J	NA
S06005ESO1	4.6	36 U	NA	0.38 U	60 U	NA	7.6	36 U	NA	19.3	86 J	NA
S0612SE1S3	15.4	50 J	NA	4.5	62 U	NA	125	130	4	215	250	15
S06154E1S3	8.1	51 U	NA	1.1	66 U	NA	38	41 J	NA	57	130 J	NA
S0800RVSF1	2.8	51 U	NA	0.33 U	45 U	NA	12.3	21 U	NA	29.9	44 J	NA
S0CTYSH1S1	42.4	50 U	NA	24.1	77 J	NA	433	500	14	1010	1200	17
S0CTYSH1S2	54	67 U	NA	39.3	130 J	NA	689	670	3	698	760	9
S1RSOSNES1	91.9	51 U	NA	13.6	45 U	NA	534	490	9	1170	1200	3
S700FGCSW1	1910	1500	24	1160	1100	5	9360	7700	19	6790	4100	49

TABLE 2
Laboratory and XRF Results (ppm)

	Arsenic			Antimony			Lead			Zinc		
Sample ID	Lab	XRF	RPD	Lab	XRF	RPD	Lab	XRF	RPD	Lab	XRF	RPD
S700FGCSWX	918	790	15	289	720	85	4580	4000	14	7300	6600	10
S0319OM1S2	8.6	43 U	NA	0.91 U	62 U	NA	51	55	8	67.6	100 J	NA
S04002WNA1	3	46 U	NA	0.71 U	75 U	NA	323	350	8	84.3	100 J	NA
S04002WSD1	153	100 J	NA	47.5	130 J	NA	866	770	12	828	760	9
S04003ESE1	286	220 U	NA	108	250	79	2130	2200	3	2550	2800	9
S0043MW1S2	58.2	78 U	NA	27.7	120 J	NA	706	780	10	522	560	7
S01007SWB1	2.7	51 U	NA	[0.29]	45 U	NA	7.8	21 U	NA	38.5	92 J	NA
S01063W1D1	4.6	34 U	NA	1.1	62 U	NA	29.1	29 J	NA	71.9	130 J	NA
S0106CE1S3	6.3	51 U	NA	[0.39]	66 U	NA	12.4	35 U	NA	34.4	72 J	NA
S01071S1S1	4.2	51 U	NA	[0.92]	45 U	NA	46.3	45 J	NA	97.2	150	43
S02003ESD1	5.5	38 U	NA	1	51 U	NA	31.1	24 U	NA	40.7	100 J	NA
S0200CEEG1	32.9	38 U	NA	10.8	51 U	NA	258	270	5	189	170 J	NA
S0200MNSDX	9	34 U	NA	2.8	62 U	NA	47.7	53 J	NA	999	980	2
S0200MNSG1	61.8	54 U	NA	23.3	51 U	NA	587	540	8	724	720	1
S0400HT4S1	2110	1700	22	1450	1700	16	10700	9000	17	3820	3400	12
S0400ILEE1	5	46 U	NA	[0.93]	75 U	NA	44.5	49 J	NA	44.3	72 U	NA
S0400MNSC1	7.1	38 U	NA	0.99	51 U	NA	41.9	41 J	NA	66.2	120 J	NA
S0400SPEC1	582	400	37	145	280	64	2320	1800	25	2660	1700	44
S0400SPEDX	2.8	34 U	NA	[0.61]	62 U	NA	9.9	23 U	NA	29.2	94 U	NA

TABLE 2
Laboratory and XRF Results (ppm)

	Arsenic			Antimony			Lead			Zinc		
Sample ID	Lab	XRF	RPD	Lab	XRF	RPD	Lab	XRF	RPD	Lab	XRF	RPD
S0400SPEE1	157	67 U	NA	41.6	75 J	NA	767	670	14	909	820	10
S0400SPEF1	56.1	170	101	23.5	60 U	NA	352	270	26	1460	390	116
S0400SPEG1	207	150	32	53.8	160 J	NA	1150	1300	12	1010	1000	1
S0400SPWF1	68.1	44 U	NA	25.6	100 J	NA	468	440	6	693	780	12
S04032W1S3	1540	1200	25	955	1500	44	8530	8000	6	3040	2700	12
S0404AL1S3	3.6	51 U	NA	[0.91]	66 U	NA	55.8	78 J	NA	85.1	130 J	NA

U The analyte was not detected at reported concentrations
J The associated numerical value is an estimated quantity because quality control criteria were not met
[ ] The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate. Presence of compound is reliable
RPD Relative Percent Difference (%)

Table 3
Estimated Volume of Elevated Metals Material

Location	XRF Sample Results	Size/Volume Estimates	Comments
Residential Properties			
43 Mullan Road	Pb = 780 ppm As = 78 U ppm Sb = 120 J ppm	50' x 25' x 3" 11.5 cu.yds.	Area behind house has large rocks (waste rock) which are mixed with the soil. Appears to be slope stabilization (slope to the Clark Fork River). Removal of material would be difficult because of slope/stabilization.
106 3rd Avenue West	Pb = 4,000 ppm As = 400 U ppm Sb = 510 ppm	75' x 15' x 6" 21 cu. yds.	Driveway appears to have coarse grained tailings. Approximately 2" of topsoil covering tailings 4"-6" thick.
201 Spruce	Pb = 1,700 ppm As = 180 ppm Sb = 560 ppm	50' x 6" x 2" 0.15 cu.yds.	Very fine, powdery tailings material under the back fence line only. Homeowner specified tailings are 4-6" in width and approximately 2" in depth for grass suppression under the fence.
206 1st Street West	Pb = 510 ppm As = 45 U ppm Sb = 45 U ppm	NA	Side yard composite sample was initially 510 ppm for lead. Return trip did not locate any tailings. Depth sample collected was low for lead (43 J ppm) and arsenic (34 U ppm). Side yard is 4' x 25'.
208 Main Street	Pb = 11,000 ppm As = 1,400 ppm Sb = 2,500 ppm Pb = 820 ppm As = 81 U ppm Sb = 79 J ppm	NA	Forest Service house. Two locations on surface had high concentrations. Depth samples and volume estimates were not collected because the Forest Service will complete this location.
225 Flat Creek Road	Pb = 1,600 ppm As = 300 ppm Sb = 160 J ppm	10' x 10' x ?	Sample was located between the house and a shed. The tailings are covered by approximately 5" of topsoil. The depth of the tailings was never determined. The area of tailings is at most 10' by 10' and probably smaller.
403 2nd Avenue West	Pb = 8,000 ppm As = 1,200 ppm Sb = 1,500 ppm	75' x 15' x 6" 21 cu.yds.	Right of Way / Parking area in front of residence. The previous owner placed approximately 1 pick up load of tailings in a low spot to bring the parking area to grade.
407 Iron Mountain Height	Surface Pb = 1,700 ppm As = 170 U ppm Sb = 160 J ppm Depth Pb = 820 ppm As = 110 J ppm Sb = 85 J ppm	30' x 6' x 1.5' 10 cu.yds.	Tailings are located on a benched area behind the house. Tailings are covered by approximately 4" of topsoil. Visible tailings are approximately 2" thick; however, a sample collected at 1 foot bgs (depth results) are still elevated.

Table 3
Estimated Volume of Elevated Metals Material

Location	XRF Sample Results	Size/Volume Estimates	Comments
500 West Main Street	Surface: Pb = 1,000 ppm; As = 100 U ppm; Sb = 110 J ppm Depth: Pb = 38 J ppm; As = 34 U ppm; Sb = 62 U ppm	50' x 10' x 1' 19 cu.yds.	Tailings are mixed in with the soil in the side yard. Tailings were originally part of the driveway. Owner excavated the parking area and placed material on the side yard. Later rototilled into the existing soil. Tailings are not readily visible. Depth sample at 1' is clean.
City/County Properties			
High School Track Arizona Avenue	Pb = 423 ppm - 9,000 ppm As = 79 ppm - 1,700 ppm Sb = 35 ppm - 1,700 ppm	1400' x 40' x 1.5' 3,111 cu.yds.	Results are from this sampling event and last years sampling event. The surface collected west of the track had elevated concentrations All other samples in the vicinity of the track (and on the football field) were below 100ppm arsenic and 500 ppm lead. Volume of track material is based on the size of the track to a depth of 18 inches.
Fairground Between Pennsylvania Avenue and Arizona Avenue	Surface: Pb = 7,700 ppm; As = 1,500 ppm; Sb = 1,100 ppm Depth: Pb = 4,000 ppm; As = 790 ppm; Sb = 720 ppm	25' x 25' x 1.5' 150' x 50' x 6" Total: 175 cu.yds.	The fairground was split into two areas with elevated metals conc. These include the base of the stairs leading to the corals and the coral area. The coral area contained red material under the fence; however, the total area was used for volume estimates.
City Shop Mullan Road West	Surface 1: Pb = 500 ppm; As = 50 U ppm; Sb = 77 J ppm Surface 2: Pb = 670 ppm; As = 67 U ppm; Sb = 130 J ppm	8" x 250' x 15' 8" x 75' x 15' Total: 120 cu.yds.	Road base from both roads at the city shop had elevated results. Material appeared to be 6-8" thick. A depth sample collected from the road base had low conc.
Right of Way Locations			
200 block of Main Street	Pb = 540 ppm As = 54 U ppm Sb = 51 U ppm	15' x 5' x 2" 0.5 cu.yds	Tailings were localized and covered by approximately 4" of topsoil. The tailings were approximately 2" thick.
400 block of 2nd Avenue West	Surface: Pb = 8,000 ppm; As = 1,200 ppm; Sb = 1,500 ppm Depth: Pb = 770 ppm; As = 100 J ppm; Sb = 130 J ppm	25' x 25' x 1.5' 35 cu.yds.	Tailings were used to fill a low spot in the right of way (parking area).
400 block of 3rd Avenue East	Pb = 2,200 ppm As = 220 U ppm Sb = 250 ppm	25' x 5' x 3" 1.2 cu.yds.	Tailings were residual from fill used on right of way. Majority of the tailings have been removed since sampling that occurred last year.

Table 3
Estimated Volume of Elevated Metals Material

Location	XRF Sample Results	Size/Volume Estimates	Comments
400 block of Spruce Street	Pb = 270ppm - 1,800 ppm As = 67 U ppm - 400 ppm Sb = 60 U ppm - 280 ppm	200' x 5' x 2" 6 cu.yds.	Tailings were visible closer to the sidewalk than the road. The tailings appear to be a thin lense under a couple inches of clean fill.
Pine Street Alley	Pb = 230 ppm As = 110 J ppm Sb = 60 U ppm	NA	Although the arsenic is slightly elevated, the lead concentration is low and addition samples were not collected.
Total Volume Estimate:		**3,530 cu.yds. in place**	

TABLE 4
TCLP Results (mg/L)

Sample ID	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
Regulatory	5	1000	1	5	5	0.2	1	5
S0201SP	[0.0391]	[0.367]	[0.0339]	[0.006]	**140**	[0.0018]	0.0095 U	[0.0059]
S0208MN	[0.0023]	[0.301]	[0.253]	[0.125]	**107**	[0.0011]	0.0109 U	0.0005 U
S0400HT	[0.023]	[0.471]	[0.44]	[0.003]	**36.7**	0.0001 U	0.0124 U	0.0005 U
S0700FG	[0.126]	[0.161]	[0.377]	[0.004]	**483**	[0.00022]	0.0119 U	0.0005 U

U The analyte was not detected at reported concentrations
J The associated numerical value is an estimated quantity because quality control criteria were not met
[ ] The associated numerical value was detected below the CRDL, but greater than the method detection limit and is therefore an estimate. Presence of compound is reliable

APPENDIX A

Photolog

PHOTO 1
START2 personnel using the GPS to document sample location.

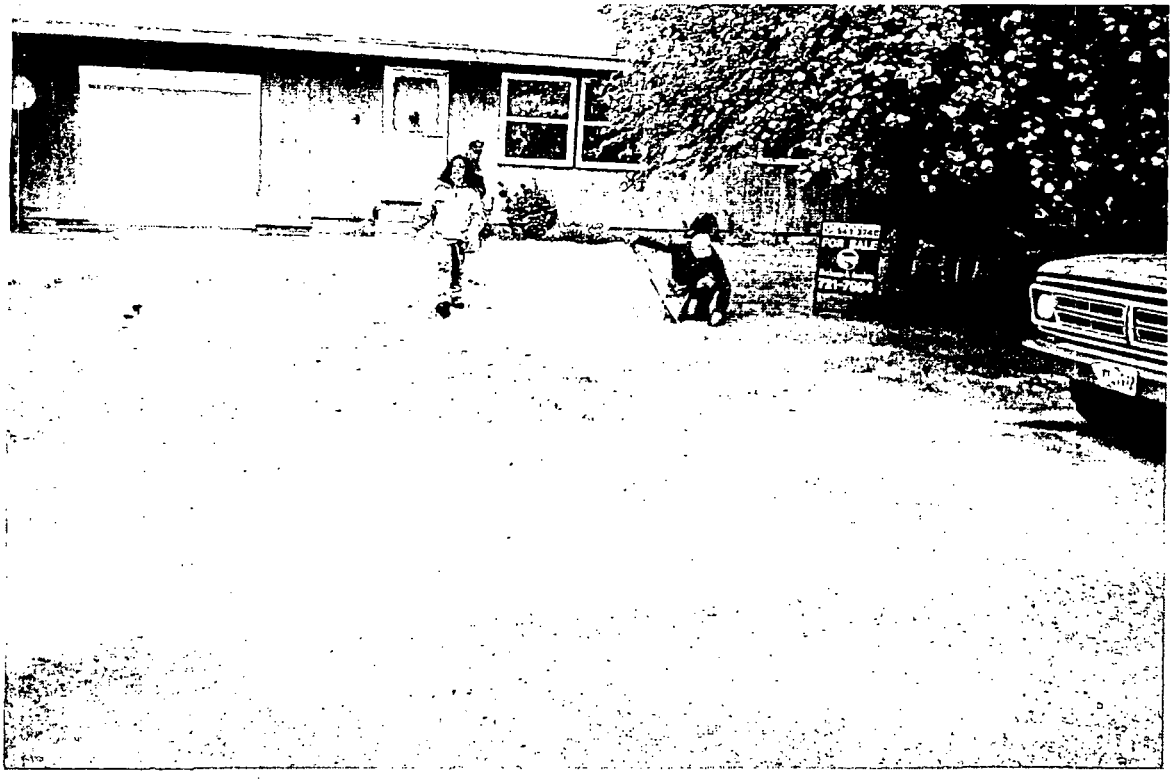


PHOTO 2
START2 personnel collecting a soil sample under the vegetative cover.

PHOTO 3
START2 personnel collecting a soil sample in a residential driveway.

PHOTO 4
Tailings material in the right of way at 2nd Avenue West.

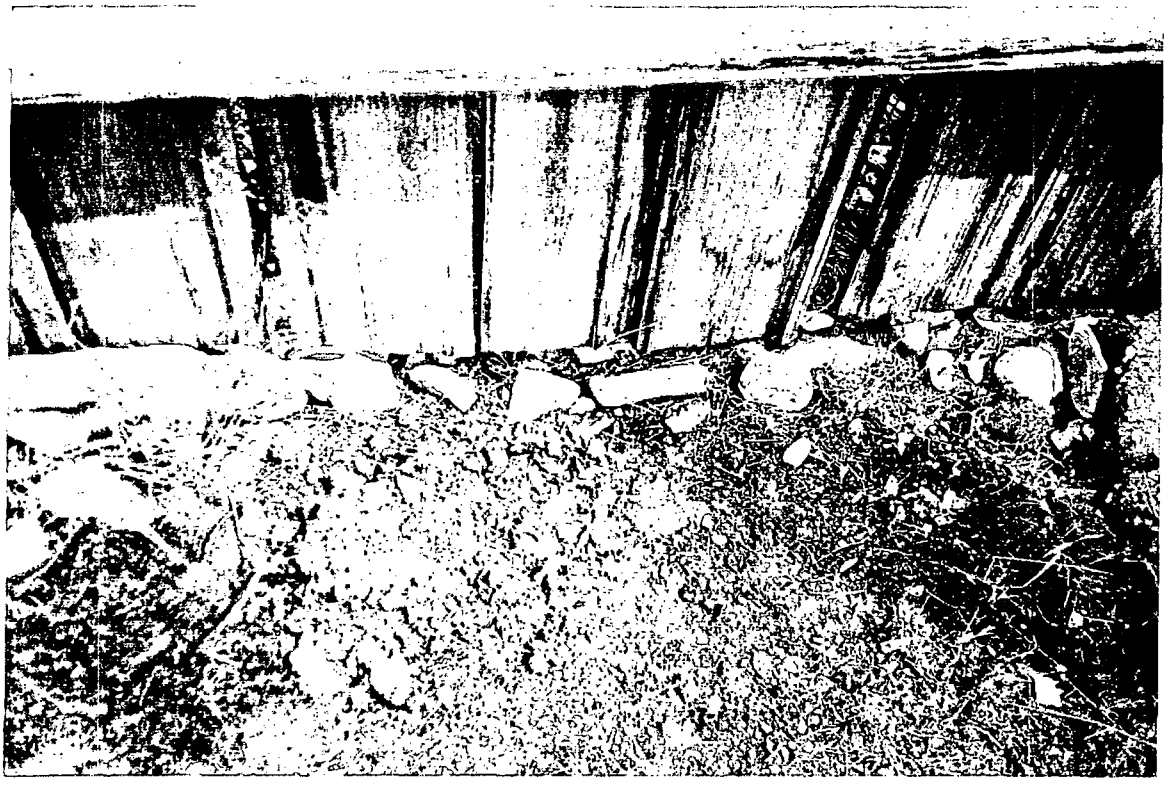


PHOTO 5
Tailings material under a fence at 201 Spruce Street.

APPENDIX B

Validation Reports and Laboratory Data

TABLE 1A
SUPERIOR WASTE ROCK
CONFIRMATION RESULTS (PPM)

ID	Sb	As	Ba	Cd	Ca	CrHI	Be	Co	Cu	Fe	Pb	Mn
S0200CEEA1B	0.16 U	0.41 U	0.28 U	0.03 U	29.4 J	0.18 U	0.02 U	0.06 U	0.3 B	56.1	0.38	1.2
S0201SP1S3	173	190	140	3.3	7330	7.3	0.34 U	3.6	27.3	11400	1620	364
S02021S1S2	0.99 U	3.7	115	0.42 B	1900	9.8	0.36 B	3.5	11.9	8860	31.9	222
S0202CE1S1	1.2	5.7	121	0.16 U	2850	7.9	0.41 B	4	13.7	11000	54.8	370
S0205AL1S2	0.35 U	6.6	106	0.03 U	3340	7.9	0.4 B	6.1	16.6	10100	14.6	297
S02061S1S2	1.4	5.7	259	2.2	1850	9.3	0.33 U	3.7	10.8	8660	523	297
S02063W1S2	0.95 U	6.5	72.5	0.3 B	6110	6.2	0.24 U	4.3	16	8800	59.7	217
S0208CE1S1	1.8	5.4	136	0.18 U	4040	7.1	0.35 U	3.6	12.1	9950	47.1	350
S0208MN1S2	44.6	127	103	2.6	2680	6.9	0.33 U	3.5	14.1	11200	959	348
S0208MN1S3	2360	2620	48.5	30.1	1070	3.4	0.2 U	3.6	85.4	63200	16700	1600
S0209RW1S1	5.7	26.3	176	1.2	12200	8.2	0.44 B	4.7	18.3	10900	216	355
S02111S1S1	2.1	6.9	485	0.17 U	6920	9.1	0.58	4.4	25.3	12800	89.1	274
S0213SP1S2	2.5	9.2	129	0.29 B	3770	7	0.36 B	3.7	18.9	9560	82.1	342
S0225FC1S2	63.5	362	126	9.6	3100	5.1	0.33 U	3.5	20.1	18900	1680	810
S03003ESD1	2.4	10.6	98.2	0.15 U	5470	6.3	0.31 U	3.3	10.3	8370	48.1	220
S03003SED1	1.2	3.8	101	0.12 U	2860	7	0.31 U	3.9	14.2	9210	209	244
S0300SPEC1	0.68 U	6.2	99.9	0.03 U	9400	7.2	0.23 U	3.5	10.4	7720	27.1	196
S0306AR1S3	1.5 U	22	97.5	0.05 U	5140	8.5	0.32 U	4.2	13.8	10400	179	372
S0311MA1S2	1	5.7	171	0.03 U	3620	8.3	0.48 B	5.6	17.2	13200	31.1	547
S0400EM1S1	0.4 U	4.6	113	0.03 U	2620	6.1	0.41 B	4.5	14.4	13200	11.3	393
S0400HT2DCB	0.24 U	0.43 B	0.25 U	0.03 U	30.1 U	0.19 U	0.02 U	0.06 U	0.24 B	63.7	2.4	2.1
S0400HT4D1	136	250	149	8.7	7280	6.3	0.36 B	4.4	26.3	20000	2140	1470
S0400HT4D2	399	957	102	14.5	8510	4.4	0.29 U	3.9	38.9	32600	5070	1870
S0400HT4D3	67.6	300	116	1.9	19900	5.3	0.29 U	3.9	19.5	15100	1120	591
S0407IH1D1	63.6	166	475	4	16700	7.7	0.68	3.8	33.1	19100	757	838
S0407IM1S1	84.4	296	413	5.1	7380	16.3	0.58	5.6	78.7	19700	1770	940
S05002WNC1	0.47 U	3.1	119	0.03 U	9490	34.3	0.29 U	4.1	10.2	7640	130	218
S0500MN1S1	48.6	175	103	5.3	4340	7.5	0.28 U	3.5	15.9	12200	1020	433
S06004AMD1	0.74 U	7.5	60.2	0.03 U	9710	7.3	0.33 U	4.1	12.4	10700	15.8	237
S06005AMD1	0.6 U	8.5	84.1	0.03 U	18400	5.4	0.29 U	4.6	16	10100	27.6	231
S06005ENR1	5.3	15.5	89.1	0.12 U	2610	7.5	0.35 U	3.8	14.1	12000	101	357
S06005ESO1	0.38 U	4.6	87.3	0.03 U	8100	6.1	0.32 U	4.1	12.1	9110	7.6	220
S0612SE1S3	4.5	15.4	217	0.34 B	2990	7.7	0.4 U	5.4	19.4	10400	125	301

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TABLE 1A

SUPERIOR WASTE ROCK

CONFIRMATION RESULTS (PPM)

ID	Sb	As	Ba	Cd	Ca	CrHI	Be	Co	Cu	Fe	Pb	Mn
S06154E1S3	1.1	8.1	88.1	0.03 U	16800	7.5	0.3 U	4.9	21	10100	38	222
S0800RVSF1	0.33 U	2.8	121	0.03 U	4810	6.3	0.31 U	4.3	9.8	8940	12.3	271
S0CTYSH1S1	24.1	42.4	189	3.4	4750	7.9	0.42 B	3.6	32.1	10300	433	355
S0CTYSH1S2	39.3	54	118	3.8	4190	6.9	0.4 U	4	28.2	11400	689	352
S1RSOSNES1	13.6	91.9	109	5.3	15500	9.7	0.37 U	5.1	32.1	15200	534	525
S700FGCSW1	1160	1910	29.5	40.4	2610	1.5	0.13 U	1.1 J	102	64800	9360	4250
S700FGCSWX	289	918	98.9	46.3	13200	5.8	0.32 U	3.8	39	30100	4580	2490
S0319OM1S2	0.91 U	8.6	114	0.24 B	8330	9	0.35 B	4.4	34.2	10200	51	298
S04002WNA1	0.71 U	3	116	0.08 B	7690	6.7	0.29 B	3.4	26.5	7950	323	276
S04002WSD1	47.5	153	91.4	4.8	2110	7.3	0.46 B	4.9	32.8	15000	866	501
S04003ESE1	108	286	110	16.2	3450	9.3	0.35 B	4.2	42.6	22000	2130	996
S0043MW1S2	27.7	58.2	108	4	4820	6.6	0.39 U	4	19.1	11700	706	354
S01007SWB1	0.29 B	2.7	104	0.03 U	3190	6.6	0.36 U	4.8	9.1	8980	7.8	206
S01063W1D1	1.1	4.6	176	0.03 U	2470	7.1	0.47 B	3.9	9.4	12600	29.1	516
S0106CE1S3	0.39 B	6.3	163	0.03 U	30100	8	0.55	5.6	26.1	12500	12.4	375
S01071S1S1	0.92 B	4.2	146	0.06 U	4240	7.3	0.35 U	3.6	14.9	9050	46.3	307
S02003ESD1	1	5.5	81.3	0.03 U	4000	6.6	0.31 U	3.5	9.3	9090	31.1	173
S0200CEEG1	10.8	32.9	88.5	0.74	4320	8.3	0.3 U	3.8	15	10200	258	261
S0200MNSDX	2.8	9	81.7	7.6	780	6.6	0.36 U	3.3	7.9	10800	47.7	213
S0200MNSG1	23.3	61.8	91.4	3.7	3480	8.1	0.3 U	3.7	18.4	12400	587	369
S0400HT4S1	1450	2110	30.5	27.4	1260	1.7	0.18 U	1.7	70.4	55500	10700	3060
S0400ILEE1	0.93 B	5	87.7	0.03 U	6930	10.5	0.35 U	3.5	14.8	9580	44.5	192
S0400MNSC1	0.99	7.1	85.3	0.03 U	4900	7.7	0.3 U	4.1	11.6	8590	41.9	317
S0400SPEC1	145	582	74	14.4	6920	7.2	0.29 U	3.5	28.6	27900	2320	1260
S0400SPEDX	0.61 B	2.8	94.8	0.03 U	1510	6.2	0.36 U	3.4	8.6	9240	9.9	188
S0400SPEE1	41.6	157	71.7	4.4	5840	8.3	0.41 U	4.6	20.6	19000	767	661
S0400SPEF1	23.5	56.1	80.3	7.6	12500	8.2	0.31 U	3.6	12.7	12000	352	370
S0400SPEG1	53.8	207	104	4.3	4700	13.3	0.45 B	4.6	22.4	17800	1150	651
S0400SPWF1	25.6	68.1	60.2	3.3	1610	5.8	0.33 U	3.4	12.1	10900	468	296
S04032W1S3	955	1540	70.3	20.4	3340	4.4	0.24 U	3.4	57.6	42100	8530	2680
S0404AL1S3	0.91 B	3.6	109	0.11 U	2340	7.9	0.35 U	3.6	14.5	9570	55.8	311

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TABLE 1B

SUPERIOR WASTE ROCK
CONFIRMATION RESULTS (PPM)

ID	Mg	Na	Ni	K	Se	Ag	Th	V	Zn
S0200CEEA1B	17.3 U	155 B	0.1 U	7.8 U	0.21 U	0.07 U	0.32 U	0.13 U	0.14 UJ
S0201SP1S3	2420	14.3 U	5.5	1220	0.37 B	7.6	0.32 U	12.2	804
S02021S1S2	2830	113 B	6	1780	0.3 B	0.07 U	0.33 U	10.6	69.6
S0202CE1S1	2880	128 B	7.1	1670	0.26 B	0.07 U	0.32 U	14.5	89.9
S0205AL1S2	3430	102 B	6.7	1380	0.49	0.07 U	0.32 U	9.8	46.5
S02061S1S2	2580	14.4 U	6.1	1200	0.48 B	0.12 B	0.33 U	12.3	1130
S02063W1S2	3400	163 B	7.3	1110	0.36 B	0.1 B	0.33 U	8.6	99.9
S0208CE1S1	2960	109 B	5.7	1260	0.46 B	0.36 B	0.33 U	12.9	121
S0208MN1S2	3290	14.3 U	5.7	1150	0.39 B	11.4	0.32 U	9.8	443
S0208MN1S3	1720	292 U	6.2	749	2.3	191	2.5 J	5	6170
S0209RW1S1	3610	162 B	7	1120	0.53	0.65	0.33 U	10	267
S02111S1S1	3810	392	10.2	1290	0.59	0.15 B	0.32 U	19.8	141
S0213SP1S2	3130	131 B	7	1310	0.4 B	0.29 B	0.33 U	10.8	105
S0225FC1S2	3020	14.6 U	6.3	1290	0.94	14.8	0.33 U	11.1	1470
S03003ESD1	3150	115 B	5.8	997	0.24 B	0.19 B	0.32 U	9.2	79
S03003SED1	3260	121 B	7.2	1570	0.23 B	0.07 U	0.32 U	11.1	80.2
S0300SPEC1	4070	98.9 B	6.5	992	0.21 U	0.07 U	0.32 U	7	35.3
S0306AR1S3	4750	111 B	7.5	1370	0.36 B	1.1	0.33 U	8.6	123
S0311MA1S2	3570	119 B	8.4	1250	0.66	0.07 U	0.32 U	17.5	67.3
S0400EM1S1	3390	120 B	7.3	1190	0.45 B	0.07 U	0.33 U	10.6	34.5
S0400HT2DCB	20.6 B	140 B	0.09 U	9.1 U	0.21 U	0.07 U	0.32 U	0.19 U	2.7
S0400HT4D1	3940	14.4 U	6.8	1250	1.1	25.7	0.33 U	10.5	1860
S0400HT4D2	4120	14.3 U	5.8	1050	1.5	43.3	0.32 U	7.8	2860
S0400HT4D3	6840	26.1 B	6.2	1040	0.55	9.5	0.32 U	10.2	348
S0407IH1D1	2880	286 U	8	1180	1.3	6.1	0.32 U	18	7040
S0407IM1S1	3320	165 B	12.7	1790	0.94	16.1	0.32 U	26	910

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TABLE 1B
SUPERIOR WASTE ROCK
CONFIRMATION RESULTS (PPM)

ID	Mg	Na	Ni	K	Se	Ag	Th	V	Zn
S05002WNC1	4570	104 B	7.1	964	0.21 U	0.07 U	0.32 U	6.6	29.9
S0500MN1S1	2760	14 U	5.9	966	0.5	8.2	0.32 U	8.9	926
S06004AMD1	6150	119 B	7.2	1180	0.22 U	0.07 U	0.32 U	7.4	33.8
S06005AMD1	5460	118 B	7.5	1230	0.21 U	0.07 U	0.32 U	7.8	42.6
S06005ENR1	4590	206	7.6	1410	0.41 B	0.62	0.33 U	8.6	83
S06005ESO1	4750	109 B	7.1	1080	0.32 B	0.07 U	0.33 U	8.6	19.3
S0612SE1S3	4220	157 B	6.8	1000	0.22 U	0.86	0.33 U	9.3	215
S06154E1S3	3790	154 B	8.4	1100	0.27 B	0.07 B	0.32 U	9.6	57
S0800RVSF1	4000	91.1 B	5.9	1380	0.25 B	0.07 U	0.32 U	9.5	29.9
S0CTYSH1S1	3360	14.3 U	6.4	1730	0.5	2	0.32 U	11	1010
S0CTYSH1S2	3500	14.4 U	6.6	1540	0.33 B	5.5	0.33 U	11.6	698
S1RSOSNES1	6480	14.3 U	9.1	1760	0.46 B	2.8	0.32 U	11.9	1170
S700FGCSW1	2610	289 U	3.4	522	3.1	79.9	6.4	2.5	6790
S700FGCSWX	6290	286 U	-7	1150	1.6	42	1.4 J	7.8	7300
S0319OM1S2	4430	176 B	7.5	1580	0.3 B	0.05 U	0.22 UJ	9.8	67.6
S04002WNA1	4220	190 B	6.2	1490	0.29 B	0.05 U	0.21 UJ	8.8	84.3
S04002WSD1	2770	1590	7.3	1230	0.37 B	7.6	0.21 UJ	9.4	828
S04003ESE1	4130	4110	9	1280	0.79	16.5	0.21 UJ	10.8	2550
S0043MW1S2	3240	14.3 U	6.5	1680	0.52 U	6.5	0.32 U	11.8	522
S01007SWB1	3560	95.6 U	6	1320	0.51 U	0.28 B	0.33 U	10.1	38.5
S01063W1D1	2710	104 U	6.3	1780	0.53 U	0.07 U	0.32 U	17.7	71.9
S0106CE1S3	9620	128 U	8.4	1970	0.21 U	0.07 U	0.32 U	12.7	34.4
S01071S1S1	2990	119 U	5.8	1800	0.42 U	0.07 U	0.32 U	11.3	97.2
S02003ESD1	3210	124 U	5.6	1140	0.35 U	0.07 U	0.33 U	11.7	40.7
S0200CEEG1	4020	142 U	7.4	1370	0.45 U	1.8	0.32 U	10.2	189
S0200MNSDX	2760	14.4 U	5.3	1250	0.47 U	0.24 B	0.33 U	17	999

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TABLE 1B
SUPERIOR WASTE ROCK
CONFIRMATION RESULTS (PPM)

ID	Mg	Na	Ni	K	Se	Ag	Th	V	Zn
S0200MNSG1	4100	14.2 U	8	1100	0.66 U	3.5	0.32 U	10.1	724
S0400HT4S1	1970	289 U	3.5	529	2.6	100	4.8	3.6	3820
S0400ILEE1	4700	105 B	6.9	1260	0.67	0.07 U	0.32 U	10.9	44.3
S0400MNSC1	4290	93.4 B	7.1	1090	0.34 U	0.07 U	0.32 U	8.7	66.2
S0400SPEC1	4420	14.4 U	7.6	1220	1.4 U	18.2	0.33 U	7.9	2660
S0400SPEDX	2730	107 B	5.6	1360	0.32 U	0.07 U	0.33 U	11.7	29.2
S0400SPEE1	4410	14.3 U	7.8	1240	0.86 U	4.2	0.32 U	9.9	909
S0400SPEF1	5470	14.2 U	7	1420	0.49 U	2	0.32 U	7.5	1460
S0400SPEG1	4970	468	9.3	1810	0.91 U	9.1	0.32 U	10.9	1010
S0400SPWF1	2640	14 U	5.5	982	0.52 U	2.7	0.32 U	8.3	693
S04032W1S3	2390	71.5 U	5	851	2.7	81.4	2.6	6.7	3040
S0404AL1S3	2760	76.7 U	6.5	1210	0.61 U	0.07 U	0.32 U	12.9	85.1

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REGION VIII
DATA VALIDATION REPORT
INORGANIC

TDD No.	Site Name		Operable Unit
0203-0008	Superior Waste Rock		
RPM/OSC Name			
Tien Nguyen			
Contractor Laboratory	**Contract No.**	**SDG No.**	**Laboratory DPO/Region**
CompuChem-Liberty	Not Indicated	R2589	

Review Assigned Date July 5, 2002 Data Validator Bill Fear
Review Completion Date July 19, 2002 Report Reviewer Ken Schroeder

Sample Number	Laboratory ID	Matrix	Analysis
S0407IH1D1	R2589-1	XRF Cups	Metals by SW-846 Method 6010
S0407IM1S1	R2589-2		
S05002WNC1	R2589-3		
S0500MN1S1	R2589-4		
S06004AMD1*	R2589-5		
S06005AMD1	R2589-6		
S06005ENR1	R2589-7		
S06005ESO1*	R2589-8		
S0612SE1S3	R2589-9		
S06154E1S3	R2589-10		
S0800RVSF1*	R2589-11		
S0CTYSH1S1	R2589-12		
S0CTYSH1S2	R2589-13		

Sample Number	Laboratory ID	Matrix	Analysis
S1RSOSNES1*	R2589-14	XRF Cups	Metals by SW-846 Method 6010
S700FGCSW1	R2589-15		
S700FGCSWX	R2589-16		
S0400HT2DCB	R2589-17		
S0400HT4D1	R2589-18		
S0400HT4D2	R2589-19		
S0400HT4D3	R2589-20		

* These sample numbers were incorrectly identified on the Form 1s.

DATA QUALITY STATEMENT

( ) Data are ACCEPTABLE according to EPA Functional guidelines with no qualifiers (flags) added by the reviewer.
( ) Data are UNACCEPTABLE according to EPA Functional Guidelines.
(X) Data are acceptable with QUALIFICATIONS noted in review.

Telephone/Communication Logs Enclosed? Yes ____ No __X__

TPO Attention Required? Yes__X____ No_____ If yes, list the items that require attention:

- Matrix spike, duplicate, and serial dilution analyses were not provided with this SDG. Although no qualification was taken, it should be noted that matrix specific effects could not be evaluated for these analyses.

INORGANIC DATA VALIDATION REPORT

REVIEW NARRATIVE SUMMARY

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, and modified for the method used.

Raw data were reviewed for completeness and transcription accuracy onto the summary forms. Approximately 10-20% of the results reported in each of the samples, calibrations, and QC analyses were recalculated and verified. If problems were identified during the recalculation of results, a more thorough calculation check was performed.

SDG No. R2589 consisted of 20 XRF cup samples for metals analyses by SW-846 Method 6010.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualifiers	Reason for Qualification	Review Section
S05002WNC1, S06004AMD1, S06005AMD1, S06005ESO1, S0800RVSF1, S0400HT2DCB	Antimony	U	Blank Contamination	VII
S05002WNC1, S0500MN1S1, S06004AMD1, S06005AMD1, S06005ENR1, S06005ESO1, S0612SE1S3, S06154E1S3, S0800RVSF1, S0CTYSH1S2, S1RSOSNES1, S700FGCSW1, S700FGCSWX, S0400HT4D2, S0400HT4D3	Beryllium			
S06005ENR1	Cadmium			
S0400HT2DCB	Barium Calcium Chromium Nickel Potassium Vanadium			
S700FGCSW1	Cobalt	J	ICSA solution result greater than the IDL and elevated iron sample level	VIII
S700FGCSWX	Thallium			

Method/SOW Number 6010/SW-846
Revision 0.0

Inorganic Deliverables Completeness Checklist

P Inorganic Cover Page
P Inorganic Analysis Data Sheets (Form I)
P Initial Calibration and Calibration Verification Results (Form II)
P Continuing Calibration Verification Results (Form II)
P CRDL Standard for ICP and AA (Form II, Part 2)
P Blank Analysis Results (Form III)
P ICP Interference Check Sample Results (Form IV)
NP Spiked Sample Results (Form V)
NP Post-digest Spiked Sample Analysis (Form V, Part 2)
NP Duplicate Sample Results (Form VI)
P Instrument Detection Limits (Form VII) or (Form X - Quarterly)
P Laboratory Control Sample results (Form VII)
NA Standard Addition Results (Form VIII)
NP ICP Serial Dilution Results (Form IX)
NA Holding Times Summary Sheet (Form X)
P ICP Interelement Correction Factors (Form XII - Quarterly, or Form XI - Annually)
P ICP Linear Ranges (Form XII (XII) - Quarterly)
P Raw Data

P Samples	P Calibration Standards	P Blanks	NA Spikes
NA Duplicates	P ICP QC (ICS and Serial Dilution	P LCS	
NA Furnace AA	NA Mercury Analysis	NA Cyanide Analysis	

NA *Percent Solids Calculations - (Solids Only)*
P Sample Prep/Digestion Logs (Form XIII)
P Analysis Run Log (Form XIV)
P Chain-of-Custody
P Sample Description
P Case Narrative
P Method References

KEY:
P = Provided in original data package, as required by the SOW
R = Provided as Resubmission
NP = Not provided in original data package or as resubmission
NR = Not required under the SOW
NA = Not applicable to this data package or analysis

I. DELIVERABLES

All deliverables were present.

Yes_X_ No___

Comments: None.

II. HOLDING TIMES AND PRESERVATION CRITERIA

All holding times and preservation criteria were met.

Yes_X_ No___

Comments: All samples were analyzed within required holding times. Chain-of-custody (COC), summary forms, and raw data were evaluated. The XRF cup samples were received outside temperature requirements. No action was taken because the Functional Guidelines do not provide specific guidance for temperature and the effect on the sample integrity is not known.

III. INSTRUMENT CALIBRATIONS: STANDARDS AND BLANKS

Initial instrument calibrations were performed according to method requirements.

Yes_X_ No___

Comments: None.

The instruments were calibrated daily and each time an analysis run was performed.

Yes_X_ No___

Comments: None.

The instruments were calibrated using one blank and the appropriate number of standards.

Yes_X_ No___

Comments: None.

IV. FORM 1 - SAMPLE ANALYSIS RESULTS

Sample analyses were entered correctly on Form Is.

Yes_X_ No___

Comments: Various sample results were reported from dilutions. Additionally the non-detected results for sodium in samples S0407IH1D1, S700FGCSW1 and S700FGCSWX were reported from dilutions because of negative interference.

V. FORM 2A - INITIAL AND CONTINUING CALIBRATION VERIFICATION

The initial and continuing calibration verification standards (ICV and CCV, respectively) met method requirements.

Yes_X_ No___

Comments: None.

The calibration verification results were within 90-110% recovery for metals, 85-115% for cyanide, and 80-120% for mercury.

Yes_X_ No___

Comments: None.

The continuing calibration standards were run at 10% frequency.

Yes_X_ No___

Comments: None.

VI. FORM 2B - CRDL STANDARD FOR ICP AND AA

ICP Analysis: Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were analyzed at the beginning and the end of each sample run, or at a minimum of twice per eight hours, whichever was more frequent.

Yes_X_ No___

Comments: None.

GFAA Analysis: Standards (CRA) at two times CRDL were analyzed at the beginning of each sample run.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

The CRI and/or the CRA were analyzed after the ICV.

Yes_X_ No___

Comments: None.

VII. FORM 3 - BLANKS

The initial and continuing calibration blanks (ICB and CCB, respectively) met method requirements.

Yes_X_ No___

Comments: None.

The continuing calibration blanks were run at 10% frequency.

Yes_X_ No___

Comments: None.

A laboratory/preparation blank was run at the frequency of one per twenty samples, or per sample delivery group (whichever is more frequent), and for each matrix analyzed.

Yes_X_ No___

Comments: None.

All analyzed blanks were free of contamination.

Yes___ No_X_

Comments: The following table lists the blanks with contamination that resulted in sample qualification, elements present, affected samples, and data qualifiers:

Blank ID	Contaminant	Concentration Found in Blank	Associated Samples	Concentration Found in Sample (mg/Kg)	Qualifier/ Adjustment
ICB	Antimony	1.6 ug/L	S05002WNC1	0.47	U
			S06004AMD1	0.74	
			S06005AMD1	0.60	
			S06005ESO1	0.38	
			S0800RVSF1	0.33	
			S0400HT2DCB	0.24	
CCB6	Barium	0.7 ug/L	S0400HT2DCB	0.25	
CCB5	Beryllium	0.8 ug/L	S05002WNC1	0.29	
CCB6		0.7 ug/L	S0500MN1S1	0.28	
			S06004AMD1	0.33	
			S06005AMD1	0.29	
			S06005ENR1	0.35	
			S06005ESO1	0.32	
			S0612SE1S3	0.40	
			S06154E1S3	0.30	
			S0800RVSF1	0.31	
			S0CTYSH1S2	0.40	
			S1RSOSNES1	0.37	
			S700FGCSW1	0.13	
			S700FGCSWX	0.32	
			S0400HT4D2	0.29	
			S0400HT4D3	0.29	
CCB5	Cadmium	0.4 ug/L	S06005ENR1	0.12	
CCB7	Chromium	0.5 ug/L	S0400HT2DCB	0.19	
PBS	Calcium	25.8 mg/Kg	S0400HT2DCB	30.1	
CCB7	Nickel	0.7 ug/L	S0400HT2DCB	0.09	
	Potassium	25.5 ug/L	S0400HT2DCB	9.1	
	Vanadium	0.7 ug/L	S0400HT2DCB	0.19	

The incorrect results for antimony and selenium were reported on the Form 3 for the ICB. The raw data value for selenium was less than the IDL rather than 2.2 as reported and the raw data value for antimony was 1.6 ug/L rather than 2.5 ug/L.

VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning and end of each sample set analysis sequence (whichever is more frequent).

Yes X No___

Comments: None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes_X_ No___

Comments: None.

Sample results for aluminum, calcium, iron, and magnesium were less than the ICSA values.

Yes___ No_X_

Comments: The following sample results were qualified because the iron result was greater than the ICSA value and the absolute value of the associated element was greater than the IDL in the ICSA analysis:

Element	ICSA Result (ug/L)	IDL (ug/L)	Samples Affected	Qualifiers
Cobalt	-4	0.6	S700FGCSW1	J
Thallium	7	3.3	S700FGCSWX	

IX. FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: A matrix spike sample was not analyzed with this SDG. Therefore, the effect of the sample matrix on the sample preparation procedures and the measurement methodology could not be evaluated.

The percent recoveries (%R) were calculated correctly.

$$\%\ Recovery = \frac{(SSR - SR)}{SA} \times 100$$

SSR = spiked sample result
SR = sample result
SA = spike added

Yes___ No___ NA_X_

Comments: A matrix spike sample was not analyzed with this SDG.

Spike recoveries were within 75-125% (an exception is granted where the sample concentration is four times the spike concentration).

Yes___ No___ NA_X_

Comments: A matrix spike sample was not analyzed with this SDG.

X. FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes___ No___ NA_X_

Comments: A post digestion spike was not analyzed with this SDG.

XI. FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: Duplicate sample analyses were not provided with this SDG. Therefore, precision could not be evaluated.

The RPDs were calculated correctly.

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

For sample concentrations greater than five times the CRDL, RPDs were within ±20% (limits of ±35% apply for soil/sediments/tailings samples).

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of ± CRDL (two times CRDL for soils).

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

XII. GFAA QC

Duplicate injections were performed on all GFAA samples and the RSD was within ± 20%.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

Analytical spikes were performed on all GFAA samples and the percent recovery was 85 - 115%.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

MSAs were analyzed when required and the correlation coefficient was > 0.995.

Yes___ No___ NA_X_

Comments: None.

XIII. FORM 7 - LABORATORY CONTROL SAMPLE

The laboratory control sample (LCS) was prepared and analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes_X_ No___

Comments: None.

All results were within control limits.

Yes_X_ No___

Comments: None.

XIV. FORM 8 - STANDARD ADDITION RESULTS

Results from graphite furnace standard additions were entered on Form VIII as directed in the SOW.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

XV. FORM 9 - ICP QC

A serial dilution was performed for ICP analysis with every twenty or fewer samples of a similar matrix, or one per sample delivery group, whichever is more frequent.

Yes___ No_X_

Comments: Serial dilutions were not provided with this SDG. Therefore, it could not be determined whether or not significant physical or chemical interferences exist due to sample matrix in ICP metals.

The serial dilution was without interference problems as defined by the method.

Yes___ No___ NA_X_

Comments: Serial dilutions were not provided with this SDG.

XVI. FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

IDLs were provided for all elements on the target analyte list.

Yes_X_ No___

Comments: None.

XVII. FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP

Interelement corrections for ICP were reported.

Yes_X_ No___

Comments: None.

XVIII. FORM 12 - ICP LINEAR RANGES

ICP linear ranges were reported.

Yes_X_ No___

Comments: None.

XIX. LINEAR RANGE VERIFICATION ANALYSIS

Linear Range Verification Analysis (LRA) was performed and results were within control limits of 5% of the true value.

Yes___ No___ NA_X_

Comments: None.

XX. FORM 13 - PREPARATION LOG

Information on the preparation of samples for analysis was reported.

Yes_X_ No___

Comments: None.

XXI. FORM 14 - ANALYSIS RUN LOG

The required information was filled out for each analysis run in the data package.

Yes_X_ No___

Comments: None.

XXII. Additional Comments or Problems/Resolutions Not Addressed Above

Yes___ No_X_

Comments: None.

INORGANIC DATA QUALITY ASSURANCE REVIEW

Region VIII

DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

R - Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.

J - The associated numerical value is an estimated quantity because the Quality Control criteria were not met.

U J - The reported amount is estimated because Quality Control criteria were not met. Element or compound was not detected.

N J - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.

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.

ACRONYMS

AA	Atomic Absorption
Ag	Silver
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CRA	CRDL standard required for AA
CRDL	Contract Required Detection Limit
CRI	CRDL standard required for ICP
CV	Cold Vapor
EPA	U.S. Environmental Protection Agency
GFAA	Graphite Furnace Atomic Absorption
Hg	Mercury
ICB	Initial Calibration Blank
ICP	Inductively Coupled Plasma
ICS	Interference Check Sample
ICSA	Interference Check Sample (Solution A)
ICSAB	Interference Check Sample (Solution AB)
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
LCS	Laboratory Control Sample
LRA	Linear Range Verification Analysis
MSA	Method of Standard Additions
PDS	Post Digestion Spike
QC	Quality Control
RPD	Relative Percent Difference
RPM	Regional Project Manager
RSD	Percent Relative Standard Deviation
SA	Spike Added
SAS	Special Analytical Services
SDG	Sample Delivery Group
SOW	Statement of Work
SR	Sample Result
SSR	Spiked Sample Result
TPO	Technical Project Officer

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0407IH1D1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-1

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12000			P
7440-38-2	Arsenic	166			P
7440-39-3	Barium	475			P
7440-36-0	Antimony	63.6			P
7440-41-7	Beryllium	0.68			P
7440-43-9	Cadmium	4.0			P
7440-70-2	Calcium	16700			P
7440-47-3	Chromium	7.7			P
7440-48-4	Cobalt	3.8			P
7440-50-8	Copper	33.1			P
7439-89-6	Iron	19100			P
7439-92-1	Lead	757			P
7439-95-4	Magnesium	2880			P
7439-96-5	Manganese	838			P
7440-02-0	Nickel	8.0			P
7440-09-7	Potassium	1180			P
7782-49-2	Selenium	1.3			P
7440-22-4	Silver	6.1			P
7440-23-5	Sodium	286	U		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	18.0			P
7440-66-6	Zinc	7040			P

Color Before: BLACK Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: 8 7b2b2

13

SW846-METALS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0407IM1S1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-2

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13400			P
7440-38-2	Arsenic	296			P
7440-39-3	Barium	413			P
7440-36-0	Antimony	84.4			P
7440-41-7	Beryllium	0.58			P
7440-43-9	Cadmium	5.1			P
7440-70-2	Calcium	7380			P
7440-47-3	Chromium	16.3			P
7440-48-4	Cobalt	5.6			P
7440-50-8	Copper	78.7			P
7439-89-6	Iron	19700			P
7439-92-1	Lead	1770			P
7439-95-4	Magnesium	3320			P
7439-96-5	Manganese	940			P
7440-02-0	Nickel	12.7			P
7440-09-7	Potassium	1790			P
7782-49-2	Selenium	0.94			P
7440-22-4	Silver	16.1			P
7440-23-5	Sodium	165	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	26.0			P
7440-66-6	Zinc	910			P

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/19/02

14

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S05002WNC1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-3

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4170			P	
7440-38-2	Arsenic	3.1			P	
7440-39-3	Barium	119			P	
7440-36-0	Antimony	0.47	B		P	U
7440-41-7	Beryllium	0.29	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	9490			P	
7440-47-3	Chromium	34.3			P	
7440-48-4	Cobalt	4.1			P	
7440-50-8	Copper	10.2			P	
7439-89-6	Iron	7640			P	
7439-92-1	Lead	130			P	
7439-95-4	Magnesium	4570			P	
7439-96-5	Manganese	218			P	
7440-02-0	Nickel	7.1			P	
7440-09-7	Potassium	964			P	
7782-49-2	Selenium	0.21	U		P	
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	104	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	6.6			P	
7440-66-6	Zinc	29.9			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: By 7/22/02

15

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0500MN1S1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-4

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5720			P	
7440-38-2	Arsenic	175			P	
7440-39-3	Barium	103			P	
7440-36-0	Antimony	48.6			P	
7440-41-7	Beryllium	0.28	B		P	U
7440-43-9	Cadmium	5.3			P	
7440-70-2	Calcium	4340			P	
7440-47-3	Chromium	7.5			P	
7440-48-4	Cobalt	3.5			P	
7440-50-8	Copper	15.9			P	
7439-89-6	Iron	12200			P	
7439-92-1	Lead	1020			P	
7439-95-4	Magnesium	2760			P	
7439-96-5	Manganese	433			P	
7440-02-0	Nickel	5.9			P	
7440-09-7	Potassium	966			P	
7782-49-2	Selenium	0.50			P	KJA 7/23/02
7440-22-4	Silver	8.2			P	
7440-23-5	Sodium	14.0	U		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	8.9			P	
7440-66-6	Zinc	926			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: TF 7/22/02

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S06004SMD1 A

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589 TF 7/19/02

Matrix (soil/water): SOIL Lab Sample ID: R2589-5

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5360			P	
7440-38-2	Arsenic	7.5			P	
7440-39-3	Barium	60.2			P	
7440-36-0	Antimony	0.74	B		P	U
7440-41-7	Beryllium	0.33	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	9710			P	
7440-47-3	Chromium	7.3			P	
7440-48-4	Cobalt	4.1			P	
7440-50-8	Copper	12.4			P	
7439-89-6	Iron	10700			P	
7439-92-1	Lead	15.8			P	
7439-95-4	Magnesium	6150			P	
7439-96-5	Manganese	237			P	
7440-02-0	Nickel	7.2			P	
7440-09-7	Potassium	1180			P	
7782-49-2	Selenium	0.22	U		P	
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	119	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	7.4			P	
7440-66-6	Zinc	33.8			P	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments: TF 7/22/02

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S06005AMD1

Lab Name: COMPUCHEM Contract: _____

Lab Code: LIBRTY Case No.: _____ SAS No.: _____ SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-6

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5020			P	
7440-38-2	Arsenic	8.5			P	
7440-39-3	Barium	84.1			P	
7440-36-0	Antimony	0.60	B		P	U
7440-41-7	Beryllium	0.29	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	18400			P	
7440-47-3	Chromium	5.4			P	
7440-48-4	Cobalt	4.6			P	
7440-50-8	Copper	16.0			P	
7439-89-6	Iron	10100			P	
7439-92-1	Lead	27.6			P	
7439-95-4	Magnesium	5460			P	
7439-96-5	Manganese	231			P	
7440-02-0	Nickel	7.5			P	
7440-09-7	Potassium	1230			P	
7782-49-2	Selenium	0.21	U		P	
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	118	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	7.8			P	
7440-66-6	Zinc	42.6			P	

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: YELLOW Clarity After: _____ Artifacts: _____

Comments: DF 7/22/02

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S06005ENR1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-7

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7110			P	
7440-38-2	Arsenic	15.5			P	
7440-39-3	Barium	89.1			P	
7440-36-0	Antimony	5.3			P	
7440-41-7	Beryllium	0.35	B		P	U
7440-43-9	Cadmium	0.12	B		P	U
7440-70-2	Calcium	2610			P	
7440-47-3	Chromium	7.5			P	
7440-48-4	Cobalt	3.8			P	
7440-50-8	Copper	14.1			P	
7439-89-6	Iron	12000			P	
7439-92-1	Lead	101			P	
7439-95-4	Magnesium	4590			P	
7439-96-5	Manganese	357			P	
7440-02-0	Nickel	7.6			P	
7440-09-7	Potassium	1410			P	
7782-49-2	Selenium	0.41	B		P	U Kgf 7/23/02
7440-22-4	Silver	0.62			P	
7440-23-5	Sodium	206			P	
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	8.6			P	
7440-66-6	Zinc	83.0			P	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/22/02

19

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. S06005ES01 0 KSA 7/23/02

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-8

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5370			P	
7440-38-2	Arsenic	4.6			P	
7440-39-3	Barium	87.3			P	
7440-36-0	Antimony	0.38	B		P	U
7440-41-7	Beryllium	0.32	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	8100			P	
7440-47-3	Chromium	6.1			P	
7440-48-4	Cobalt	4.1			P	
7440-50-8	Copper	12.1			P	
7439-89-6	Iron	9110			P	
7439-92-1	Lead	7.6			P	
7439-95-4	Magnesium	4750			P	
7439-96-5	Manganese	220			P	
7440-02-0	Nickel	7.1			P	
7440-09-7	Potassium	1080			P	
7782-49-2	Selenium	0.32	B		P	KSA 7/23/02
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	109	B		P	
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	8.6			P	
7440-66-6	Zinc	19.3			P	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments: RT 7/22/02

20

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0612SE1S3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-9

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7510			P	
7440-38-2	Arsenic	15.4			P	
7440-39-3	Barium	217			P	
7440-36-0	Antimony	4.5			P	
7440-41-7	Beryllium	0.40	B		P	U
7440-43-9	Cadmium	0.34	B		P	
7440-70-2	Calcium	2990			P	
7440-47-3	Chromium	7.7			P	
7440-48-4	Cobalt	5.4			P	
7440-50-8	Copper	19.4			P	
7439-89-6	Iron	10400			P	
7439-92-1	Lead	125			P	
7439-95-4	Magnesium	4220			P	
7439-96-5	Manganese	301			P	
7440-02-0	Nickel	6.8			P	
7440-09-7	Potassium	1000			P	
7782-49-2	Selenium	0.22	U		P	
7440-22-4	Silver	0.86			P	
7440-23-5	Sodium	157	B		P	
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	9.3			P	
7440-66-6	Zinc	215			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: BF 7/22/02

21

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.: S06154E1S3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-10

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5780			P
7440-38-2	Arsenic	8.1			P
7440-39-3	Barium	88.1			P
7440-36-0	Antimony	1.1			P
7440-41-7	Beryllium	0.30	B		P
7440-43-9	Cadmium	0.03	U		P
7440-70-2	Calcium	16800			P
7440-47-3	Chromium	7.5			P
7440-48-4	Cobalt	4.9			P
7440-50-8	Copper	21.0			P
7439-89-6	Iron	10100			P
7439-92-1	Lead	38.0			P
7439-95-4	Magnesium	3790			P
7439-96-5	Manganese	222			P
7440-02-0	Nickel	8.4			P
7440-09-7	Potassium	1100			P
7782-49-2	Selenium	0.27	B		P
7440-22-4	Silver	0.07	B		P
7440-23-5	Sodium	154	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	9.6			P
7440-66-6	Zinc	57.0			P

KSA 7/23/02

U

KSA 7/23/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

DF 7/22/02

22

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. S0800RUSF1 (SA 7/23/02)

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-11

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5870			P	
7440-38-2	Arsenic	2.8			P	
7440-39-3	Barium	121			P	
7440-36-0	Antimony	0.33	B		P	U
7440-41-7	Beryllium	0.31	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	4810			P	
7440-47-3	Chromium	6.3			P	
7440-48-4	Cobalt	4.3			P	
7440-50-8	Copper	9.8			P	
7439-89-6	Iron	8940			P	
7439-92-1	Lead	12.3			P	
7439-95-4	Magnesium	4000			P	
7439-96-5	Manganese	271			P	
7440-02-0	Nickel	5.9			P	
7440-09-7	Potassium	1380			P	
7782-49-2	Selenium	0.25	B		P	U (SA 7/23/02)
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	91.1	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	9.5			P	
7440-66-6	Zinc	29.9			P	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments: DF 7/22/02

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0CTYSH1S1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-12

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8040			P
7440-38-2	Arsenic	42.2			P
7440-39-3	Barium	189			P
7440-36-0	Antimony	24.1			P
7440-41-7	Beryllium	0.42	B		P
7440-43-9	Cadmium	3.4			P
7440-70-2	Calcium	4750			P
7440-47-3	Chromium	7.9			P
7440-48-4	Cobalt	3.6			P
7440-50-8	Copper	32.1			P
7439-89-6	Iron	10300			P
7439-92-1	Lead	433			P
7439-95-4	Magnesium	3360			P
7439-96-5	Manganese	355			P
7440-02-0	Nickel	6.4			P
7440-09-7	Potassium	1730			P
7782-49-2	Selenium	0.50			P
7440-22-4	Silver	2.0			P
7440-23-5	Sodium	14.3	U		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	11.0			P
7440-66-6	Zinc	1010			P

7/23/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: TF 7/22/02

24

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0CTYSH1S2

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-13

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7240			P	
7440-38-2	Arsenic	54.0			P	
7440-39-3	Barium	118			P	
7440-36-0	Antimony	39.3			P	
7440-41-7	Beryllium	0.40	B		P	U
7440-43-9	Cadmium	3.8			P	
7440-70-2	Calcium	4190			P	
7440-47-3	Chromium	6.9			P	
7440-48-4	Cobalt	4.0			P	
7440-50-8	Copper	28.2			P	
7439-89-6	Iron	11400			P	
7439-92-1	Lead	689			P	
7439-95-4	Magnesium	3500			P	
7439-96-5	Manganese	352			P	
7440-02-0	Nickel	6.6			P	
7440-09-7	Potassium	1540			P	
7782-49-2	Selenium	0.33	B		P	~~U~~ KSA 7/23/02
7440-22-4	Silver	5.5			P	
7440-23-5	Sodium	14.4	U		P	
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	11.6			P	
7440-66-6	Zinc	698			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: BK 7/22/02

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. KSA 7/23/02

S1RS0SNES1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-14

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7540			P	
7440-38-2	Arsenic	91.9			P	
7440-39-3	Barium	109			P	
7440-36-0	Antimony	13.6			P	
7440-41-7	Beryllium	0.37	B		P	U
7440-43-9	Cadmium	5.3			P	
7440-70-2	Calcium	15500			P	
7440-47-3	Chromium	9.7			P	
7440-48-4	Cobalt	5.1			P	
7440-50-8	Copper	32.1			P	
7439-89-6	Iron	15200			P	
7439-92-1	Lead	534			P	
7439-95-4	Magnesium	6480			P	
7439-96-5	Manganese	525			P	
7440-02-0	Nickel	9.1			P	
7440-09-7	Potassium	1760			P	
7782-49-2	Selenium	0.46	B		P	U KSA 7/23/02
7440-22-4	Silver	2.8			P	
7440-23-5	Sodium	14.3	U		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	11.9			P	
7440-66-6	Zinc	1170			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: KSA 7/22/02

SW846-METALS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S700FGCSW1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-15

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	1510			P	
7440-38-2	Arsenic	1910			P	
7440-39-3	Barium	29.5			P	
7440-36-0	Antimony	1160			P	
7440-41-7	Beryllium	0.13	B		P	U
7440-43-9	Cadmium	40.4			P	
7440-70-2	Calcium	2610			P	
7440-47-3	Chromium	1.5			P	
7440-48-4	Cobalt	1.1			P	J
7440-50-8	Copper	102			P	
7439-89-6	Iron	64800			P	
7439-92-1	Lead	9360			P	
7439-95-4	Magnesium	2610			P	
7439-96-5	Manganese	4250			P	
7440-02-0	Nickel	3.4			P	
7440-09-7	Potassium	522			P	
7782-49-2	Selenium	3.1			P	
7440-22-4	Silver	79.9			P	
7440-23-5	Sodium	289	U		P	
7440-28-0	Thallium	6.4			P	
7440-62-2	Vanadium	2.5			P	
7440-66-6	Zinc	6790			P	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments: B 7626

27

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S700FGCSWX

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-16

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4820			P	
7440-38-2	Arsenic	918			P	
7440-39-3	Barium	98.9			P	
7440-36-0	Antimony	289			P	
7440-41-7	Beryllium	0.32	B		P	U
7440-43-9	Cadmium	46.3			P	
7440-70-2	Calcium	13200			P	
7440-47-3	Chromium	5.8			P	
7440-48-4	Cobalt	3.8			P	
7440-50-8	Copper	39.0			P	
7439-89-6	Iron	30100			P	
7439-92-1	Lead	4580			P	
7439-95-4	Magnesium	6290			P	
7439-96-5	Manganese	2490			P	
7440-02-0	Nickel	7.0			P	
7440-09-7	Potassium	1150			P	
7782-49-2	Selenium	1.6			P	
7440-22-4	Silver	42.0			P	
7440-23-5	Sodium	286	U		P	
7440-28-0	Thallium	1.4			P	J
7440-62-2	Vanadium	7.8			P	
7440-66-6	Zinc	7300			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

D 7/22/02

Comments:

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400HT2DCB

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-17

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	83.8			P	
7440-38-2	Arsenic	0.43	B		P	
7440-39-3	Barium	0.25	B		P	U
7440-36-0	Antimony	0.24	B		P	U
7440-41-7	Beryllium	0.02	U		P	
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	30.1	B		P	U
7440-47-3	Chromium	0.19	B		P	U
7440-48-4	Cobalt	0.06	U		P	
7440-50-8	Copper	0.24	B		P	
7439-89-6	Iron	63.7			P	
7439-92-1	Lead	2.4			P	
7439-95-4	Magnesium	20.6	B		P	
7439-96-5	Manganese	2.1			P	
7440-02-0	Nickel	0.09	B		P	U
7440-09-7	Potassium	9.1	B		P	U
7782-49-2	Selenium	0.21	U		P	
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	140	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	0.19	B		P	U
7440-66-6	Zinc	2.7			P	

Color Before: WHITE Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: JF 7/22/02

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400HT4D1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-18

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8330			P
7440-38-2	Arsenic	250			P
7440-39-3	Barium	149			P
7440-36-0	Antimony	136			P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	8.7			P
7440-70-2	Calcium	7280			P
7440-47-3	Chromium	6.3			P
7440-48-4	Cobalt	4.4			P
7440-50-8	Copper	26.3			P
7439-89-6	Iron	20000			P
7439-92-1	Lead	2140			P
7439-95-4	Magnesium	3940			P
7439-96-5	Manganese	1470			P
7440-02-0	Nickel	6.8			P
7440-09-7	Potassium	1250			P
7782-49-2	Selenium	1.1			P
7440-22-4	Silver	25.7			P
7440-23-5	Sodium	14.4	U		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	10.5			P
7440-66-6	Zinc	1860			P

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

10

REGION VIII
DATA VALIDATION REPORT
INORGANIC

TDD No.	Site Name		Operable Unit
0203-0008	Superior Waste Rock		
RPM/OSC Name			
Tien Nguyen			
Contractor Laboratory	**Contract No.**	**SDG No.**	**Laboratory DPO/Region**
CompuChem - Liberty	Not Indicated	U2589	

Review Assigned Date July 5, 2002 Data Validator Bill Fear
Review Completion Date July 19, 2002 Report Reviewer Ken Schroeder

Sample ID	Laboratory ID	Matrix	Analysis
S0319OM1S2*	U2589-1	XRF Cups	Metals by SW-846 Method 6010
S04002WNA1	U2589-2		
S04002WSD1	U2589-3		
S04003ESE1	U2589-4		

* Sample S0319OM1S2 was incorrectly identified as S03190M1S2 on the Form 1.

DATA QUALITY STATEMENT

( ) Data are ACCEPTABLE according to EPA Functional guidelines with no qualifiers (flags) added by the reviewer.
( ) Data are UNACCEPTABLE according to EPA Functional Guidelines.
(X) Data are acceptable with QUALIFICATIONS noted in review.

Telephone/Communication Logs Enclosed? Yes _____ No ___X___

TPO Attention Required? Yes___X_____ No_____ If yes, list the items that require attention:

- Matrix spike, duplicate, and serial dilution analyses were not provided with this SDG. Although no qualification was taken, it should be noted that matrix specific effects could not be evaluated for these analyses.

INORGANIC DATA VALIDATION REPORT

REVIEW NARRATIVE SUMMARY

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, and modified for the method used.

Raw data were reviewed for completeness and transcription accuracy onto the summary forms. Approximately 10-20% of the results reported in each of the samples, calibrations, and QC analyses were recalculated and verified. If problems were identified during the recalculation of results, a more thorough calculation check was performed.

SDG No. U2589 consisted of 4 XRF cup samples for metals analyses by SW-846 Method 6010.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualifiers	Reason for Qualification	Review Section
S0319OM1S2, S04002WNA1	Antimony	U	Blank contamination	VII
All Samples	Thallium	UJ	Negative blank contamination	

Method/SOW Number 6010/SW-846
Revision 0.0

Inorganic Deliverables Completeness Checklist

P Inorganic Cover Page
P Inorganic Analysis Data Sheets (Form I)
P Initial Calibration and Calibration Verification Results (Form II)
P Continuing Calibration Verification Results (Form II)
P CRDL Standard for ICP and AA (Form II, Part 2)
P Blank Analysis Results (Form III)
P ICP Interference Check Sample Results (Form IV)
NP Spiked Sample Results (Form V)
NP Post-digest Spiked Sample Analysis (Form V, Part 2)
NP Duplicate Sample Results (Form VI)
P Instrument Detection Limits (Form VII) or (Form X - Quarterly)
P Laboratory Control Sample results (Form VII)
NA Standard Addition Results (Form VIII)
NP ICP Serial Dilution Results (Form IX)
NA Holding Times Summary Sheet (Form X)
P ICP Interelement Correction Factors (Form XII - Quarterly, or Form XI - Annually)
P ICP Linear Ranges (Form XII (XII) - Quarterly)
P Raw Data

P Samples	P Calibration Standards	P Blanks	NA Spikes
NA Duplicates	P ICP QC (ICS and Serial Dilution	P LCS	
NA Furnace AA	NA Mercury Analysis	NA Cyanide Analysis	

NA Percent Solids Calculations - (Solids Only)
P Sample Prep/Digestion Logs (Form XIII)
P Analysis Run Log (Form XIV)
P Chain-of-Custody
P Sample Description
P Case Narrative
P Method References

KEY:
P = Provided in original data package, as required by the SOW
R = Provided as Resubmission
NP = Not provided in original data package or as resubmission
NR = Not required under the SOW
NA = Not applicable to this data package or analysis

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400HT4D2

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-19

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5800			P	
7440-38-2	Arsenic	957			P	
7440-39-3	Barium	102			P	
7440-36-0	Antimony	399			P	
7440-41-7	Beryllium	0.29	B		P	U
7440-43-9	Cadmium	14.5			P	
7440-70-2	Calcium	8510			P	
7440-47-3	Chromium	4.4			P	
7440-48-4	Cobalt	3.9			P	
7440-50-8	Copper	38.9			P	
7439-89-6	Iron	32600			P	
7439-92-1	Lead	5070			P	
7439-95-4	Magnesium	4120			P	
7439-96-5	Manganese	1870			P	
7440-02-0	Nickel	5.8			P	
7440-09-7	Potassium	1050			P	
7782-49-2	Selenium	1.5			P	
7440-22-4	Silver	43.3			P	
7440-23-5	Sodium	14.3	U		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	7.8			P	
7440-66-6	Zinc	2860			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: TF 7/22/02

11

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.: S0400HT4D3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: R2589

Matrix (soil/water): SOIL Lab Sample ID: R2589-20

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4910			P
7440-38-2	Arsenic	300			P
7440-39-3	Barium	116			P
7440-36-0	Antimony	67.6			P
7440-41-7	Beryllium	0.29	B		P
7440-43-9	Cadmium	1.9			P
7440-70-2	Calcium	19900			P
7440-47-3	Chromium	5.3			P
7440-48-4	Cobalt	3.9			P
7440-50-8	Copper	19.5			P
7439-89-6	Iron	15100			P
7439-92-1	Lead	1120			P
7439-95-4	Magnesium	6840			P
7439-96-5	Manganese	591			P
7440-02-0	Nickel	6.2			P
7440-09-7	Potassium	1040			P
7782-49-2	Selenium	0.55			P
7440-22-4	Silver	9.5			P
7440-23-5	Sodium	26.1	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	10.2			P
7440-66-6	Zinc	348			P

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

12

I. *DELIVERABLES*

All deliverables were present as specified in the Statement of Work.

Yes_X_ No___

Comments: None.

II. HOLDING TIMES AND PRESERVATION CRITERIA

All method holding times were met.

Yes_X_ No___

Comments: None.

All technical holding times and preservation criteria were met.

Yes_X_ No___

Comments: *All samples were analyzed within required holding times. Chain-of-custody (COC), summary forms, and raw data were evaluated. The XRF cup samples were received outside temperature requirements. No action was taken because the Functional Guidelines do not provide specific guidance for temperature and the effect on the sample integrity is not known.*

III. INSTRUMENT CALIBRATIONS: STANDARDS AND BLANKS

Initial instrument calibrations were performed according to SOW requirements.

Yes_X_ No___

Comments: None.

The instruments were calibrated daily and each time an analysis run was performed.

Yes_X_ No___

Comments: None.

The instruments were calibrated using one blank and the appropriate number of standards.

Yes_X_ No___

Comments: None.

IV. FORM 1 - SAMPLE ANALYSIS RESULTS

Sample analyses were entered correctly on Form Is.

Yes_X_ No___

Comments: The zinc result was reported from dilution in sample S04003ESE1.

V. FORM 2A - INITIAL AND CONTINUING CALIBRATION VERIFICATION

The initial and continuing calibration verification standards (ICV and CCV, respectively) met SOW requirements.

Yes_X_ No___

Comments: None.

The calibration verification results were within 90-110% recovery for metals, 85-115% for cyanide, and 80-120% for mercury.

Yes_X_ No___

Comments: None.

The continuing calibration standards were run at 10% frequency.

Yes_X_ No___

Comments: None.

VI. FORM 2B - CRDL STANDARD FOR ICP AND AA

ICP Analysis: Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were analyzed at the beginning and the end of each sample run, or at a minimum of twice per eight hours, whichever was more frequent.

Yes_X_ No___

Comments: None.

GFAA Analysis: Standards (CRA) at two times CRDL were analyzed at the beginning of each sample run.

Yes___ No___ NA_X_

Comments: None.

The CRI and/or the CRA were analyzed after the ICV.

Yes_X_ No___

Comments: None.

VII. FORM 3 - BLANKS

The initial and continuing calibration blanks (ICB and CCB, respectively) met SOW requirements.

Yes_X_ No___

Comments: None.

The continuing calibration blanks were run at 10% frequency.

Yes_X_ No___

Comments: Continuing calibration blanks were run every 10 samples.

A laboratory/preparation blank was run at the frequency of one per twenty samples, or per sample delivery group (whichever is more frequent), and for each matrix analyzed.

Yes_X_ No___

Comments: None.

All analyzed blanks were free of contamination.

Yes___ No_X_

Comments: The following table lists the blanks with contamination that resulted in qualification, elements present, affected samples, and data qualifiers:

Blank Contaminants

Blank ID	Contaminant	Concentration Found in Blank	IDL (ug/L)	Associated Samples	Concentration Found in Sample (mg/Kg)	Qualifier/ Adjustment
CCB3	Antimony	2.3 ug/L	2.2	S0319OM1S2 S04002WNA1	0.91 0.71	U
CCB2	Thallium	-3.47	2.2	S0319OM1S2 S04002WNA1 S04002WSD1 S04003ESE1	0.22 U 0.21 U 0.21 U 0.21 U	UJ

The negative value for thallium was taken from the raw data as the laboratory was having problems reporting negative results on the Form 3. No other action was required for negative blank contamination found from the raw data as the sample results were greater than five times the blank values.

VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning and end of each sample set analysis sequence (whichever is more frequent).

Yes_X_ No___

Comments: None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes___ No_X_

Comments: The recovery for thallium exceeded 120% in the ICSAB analysis. However no action was required as thallium was non-detected in the samples.

Sample results for aluminum, calcium, iron, and magnesium were less than the ICSA values.

Yes___ No_X_

Comments: The iron result was greater than the ICSA value in sample S04003ESE1. However no action was required as interference was not noted in the sample.

IX. FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: A matrix spike sample was not analyzed with this SDG. Therefore, the effect of the sample matrix on the sample preparation procedures and the measurement methodology could not be evaluated.

Yes___ No___ NA_X_

Comments: A matrix spike sample was not analyzed with this SDG.

Spike recoveries were within 75-125% (an exception is granted where the sample concentration is four times the spike concentration).

Yes___ No___ NA_X_

Comments: A matrix spike sample was not analyzed with this SDG.

X. FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., Pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes___ No___ Not Required_X_

Comments: *None.*

XI. FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: Duplicate sample analyses were not provided with this SDG. Therefore, precision could not be evaluated.

The RPDs were calculated correctly.

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

For sample concentrations greater than five times the CRDL, RPDs were within ±20% (limits of ±35% apply for soil/sediments/tailings samples).

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of ± CRDL (two times CRDL for soils).

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

XII. GFAA QC

Duplicate injections were performed on all GFAA samples and the RSD was within ± 20%.

Yes___ No___ NA_X_

Comments: GFAA analyses were not performed on these samples.

Analytical spikes were performed on all GFAA samples and the percent recovery was 85 - 115%.

Yes___ No___ NA_X_

Comments: GFAA analyses were not performed on these samples.

MSAs were analyzed when required and the correlation coefficient was > 0.995.

Yes___ No___ NA_X_

Comments: None.

XIII. FORM 7 - LABORATORY CONTROL SAMPLE

The laboratory control sample (LCS) was prepared and analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes_X_ No___

Comments: None.

All results were within control limits.

Yes_X_ No___

Comments: All LCS results were within laboratory control limits.

XIV. FORM 8 - STANDARD ADDITION RESULTS

Results from graphite furnace standard additions were entered on Form VIII as directed in the SOW.

Yes___ No___ NA_X_

Comments: None.

XV. FORM 9 - ICP QC

A serial dilution was performed for ICP analysis with every twenty or fewer samples of a similar matrix, or one per sample delivery group, whichever is more frequent.

Yes___ No_X_

Comments: Serial dilutions were not provided with this SDG. Therefore, it could not be determined whether or not significant physical or chemical interferences exist due to sample matrix in ICP metals.

The serial dilution was without interference problems as defined by the method.

Yes___ No___ NA_X_

Comments: Serial dilutions were not provided with this SDG.

XVI. FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

IDLs were provided for all elements on the target analyte list.

Yes_X_ No___

Comments: None.

Reported IDLs met SOW requirements.

Yes_X_ No___

Comments: None.

XVII. FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP

Interelement corrections for ICP were reported.

Yes_X_ No___

Comments: None.

XVIII. FORM 12 - ICP LINEAR RANGES

ICP linear ranges were reported.

Yes_X_ No___

Comments: None.

XIX. LINEAR RANGE VERIFICATION ANALYSIS

Linear Range Verification Analysis (LRA) was performed and results were within control limits of ± 5% of the true value.

Yes___ No___ NA_X_

Comments: None.

XX. FORM 13 - PREPARATION LOG

Information on the preparation of samples for analysis was reported on Form XIII.

Yes_X_ No___

Comments: None.

XXI. FORM 14 - ANALYSIS RUN LOG

A Form XIV with the required information was filled out for each analysis run in the data package.

Yes_X_ No___

Comments: None.

XXII. Additional Comments or Problems/Resolutions Not Addressed Above

Yes___ No_X_

Comments: None.

INORGANIC DATA QUALITY ASSURANCE REVIEW

Region VIII

DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

R - Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.

J - The associated numerical value is an estimated quantity because the Quality Control criteria were not met.

U J - The reported quantitation limit is estimated because Quality Control criteria were not met. Element or compound was not detected.

N J - Estimated value of a tentatively identified compound. (Identified with a CAS number.) ORGANICS analysis only.

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.

ACRONYMS

AA	Atomic Absorption
Ag	Silver
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CRA	CRDL standard required for AA
CRDL	Contract Required Detection Limit
CRI	CRDL standard required for ICP
CV	Cold Vapor
EPA	U.S. Environmental Protection Agency
GFAA	Graphite Furnace Atomic Absorption
Hg	Mercury
ICB	Initial Calibration Blank
ICP	Inductively Coupled Plasma
ICS	Interference Check Sample
ICSA	Interference Check Sample (Solution A)
ICSAB	Interference Check Sample (Solution AB)
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
LCS	Laboratory Control Sample
LRA	Linear Range Verification Analysis
MSA	Method of Standard Additions
PDS	Post Digestion Spike
QC	Quality Control
RPD	Relative Percent Difference
RPM	Regional Project Manager
RSD	Percent Relative Standard Deviation
SA	Spike Added
SAS	Special Analytical Services
SDG	Sample Delivery Group
SOW	Statement of Work
SR	Sample Result
SSR	Spiked Sample Result
TPO	Technical Project Officer

SW846-METALS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.: S03190M1S2

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: U2589

Matrix (soil/water): SOIL Lab Sample ID: U2589-1

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6300			P	
7440-38-2	Arsenic	8.6			P	
7440-39-3	Barium	114			P	
7440-36-0	Antimony	0.91	B		P	U
7440-41-7	Beryllium	0.35	B		P	
7440-43-9	Cadmium	0.24	B		P	
7440-70-2	Calcium	8330			P	
7440-47-3	Chromium	9.0			P	
7440-48-4	Cobalt	4.4			P	
7440-50-8	Copper	34.2			P	
7439-89-6	Iron	10200			P	
7439-92-1	Lead	51.0			P	
7439-95-4	Magnesium	4430			P	
7439-96-5	Manganese	298			P	
7440-02-0	Nickel	7.5			P	
7440-09-7	Potassium	1580			P	
7782-49-2	Selenium	0.30	B		P	
7440-22-4	Silver	0.05	U		P	
7440-23-5	Sodium	176	B		P	
7440-28-0	Thallium	0.22	U		P	U
7440-62-2	Vanadium	9.8			P	
7440-66-6	Zinc	67.6			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: R 7/24/02

9

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S04002WNA1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: U2589

Matrix (soil/water): SOIL Lab Sample ID: U2589-2

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4990			P	
7440-38-2	Arsenic	3.0			P	
7440-39-3	Barium	116			P	
7440-36-0	Antimony	0.71	B		P	U
7440-41-7	Beryllium	0.29	B		P	
7440-43-9	Cadmium	0.08	B		P	
7440-70-2	Calcium	7690			P	
7440-47-3	Chromium	6.7			P	
7440-48-4	Cobalt	3.4			P	
7440-50-8	Copper	26.5			P	
7439-89-6	Iron	7950			P	
7439-92-1	Lead	323			P	
7439-95-4	Magnesium	4220			P	
7439-96-5	Manganese	276			P	
7440-02-0	Nickel	6.2			P	
7440-09-7	Potassium	1490			P	
7782-49-2	Selenium	0.29	B		P	
7440-22-4	Silver	0.05	U		P	
7440-23-5	Sodium	190	B		P	
7440-28-0	Thallium	0.21	U		P	UJ
7440-62-2	Vanadium	8.8			P	
7440-66-6	Zinc	84.3			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/11/02

10

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S04002WSD1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: U2589

Matrix (soil/water): SOIL Lab Sample ID: U2589-3

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7220			P
7440-38-2	Arsenic	153			P
7440-39-3	Barium	91.4			P
7440-36-0	Antimony	47.5			P
7440-41-7	Beryllium	0.46	B		P
7440-43-9	Cadmium	4.8			P
7440-70-2	Calcium	2110			P
7440-47-3	Chromium	7.3			P
7440-48-4	Cobalt	4.9			P
7440-50-8	Copper	32.8			P
7439-89-6	Iron	15000			P
7439-92-1	Lead	866			P
7439-95-4	Magnesium	2770			P
7439-96-5	Manganese	501			P
7440-02-0	Nickel	7.3			P
7440-09-7	Potassium	1230			P
7782-49-2	Selenium	0.37	B		P
7440-22-4	Silver	7.6			P
7440-23-5	Sodium	1590			P
7440-28-0	Thallium	0.21	U		P
7440-62-2	Vanadium	9.4			P
7440-66-6	Zinc	828			P

UJ

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: Re-Tested

11

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.: S04003ESE1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: U2589

Matrix (soil/water): SOIL Lab Sample ID: U2589-4

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6840			P	
7440-38-2	Arsenic	286			P	
7440-39-3	Barium	110			P	
7440-36-0	Antimony	108			P	
7440-41-7	Beryllium	0.35	B		P	
7440-43-9	Cadmium	16.2			P	
7440-70-2	Calcium	3450			P	
7440-47-3	Chromium	9.3			P	
7440-48-4	Cobalt	4.2			P	
7440-50-8	Copper	42.6			P	
7439-89-6	Iron	22000			P	
7439-92-1	Lead	2130			P	
7439-95-4	Magnesium	4130			P	
7439-96-5	Manganese	996			P	
7440-02-0	Nickel	9.0			P	
7440-09-7	Potassium	1280			P	
7782-49-2	Selenium	0.79			P	
7440-22-4	Silver	16.5			P	
7440-23-5	Sodium	4110			P	
7440-28-0	Thallium	0.21	U		P	UJ
7440-62-2	Vanadium	10.8			P	
7440-66-6	Zinc	2550			P	

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments: Rr 7/16/02

12

REGION VIII
DATA VALIDATION REPORT
INORGANIC

TDD No.	Site Name		Operable Unit
0203-0008	Superior Waste Rock		
RPM/OSC Name			
Tien Nguyen			
Contractor Laboratory	Contract No.	SDG No.	Laboratory DPO/Region
CompuChem - Liberty	Not Indicated	T2589	

Review Assigned Date July 5, 2002 Data Validator Lisa Tyson
Review Completion Date July 19, 2002 Report Reviewer Bill Fear

Sample Number	Laboratory ID	Matrix	Analysis
S0201SP1S3	T2589-1	XRF Cups	Metals by SW-846 Method 6010
S02021S1S2	T2589-2		
S0202CE1S1	T2589-3		
S0205AL1S2	T2589-4		
S02061S1S2	T2589-5		
S02063W1S2	T2589-6		
S0208CE1S1	T2589-7		
S0200CEEA1B	T2589-8		
S0208MN1S2	T2589-9		
S0208MN1S3	T2589-10		
S0209RW1S1	T2589-11		
S02111S1S1	T2589-12		
S0213SP1S2	T2589-13		

Sample Number	Laboratory ID	Matrix	Analysis
S0225FC1S2	T2589-14	XRF Cups	Metals by SW-846 Method 6010
S03003ESD1	T2589-15		
S03003SED1	T2589-16		
S0300SPEC1	T2589-17		
S0306AR1S3	T2589-18		
S0311MA1S2	T2589-19		
S0400EM1S1	T2589-20		

DATA QUALITY STATEMENT

( ) Data are ACCEPTABLE according to EPA Functional guidelines with no qualifiers (flags) added by the reviewer.
( ) Data are UNACCEPTABLE according to EPA Functional Guidelines.
(X) Data are acceptable with QUALIFICATIONS noted in review.

Telephone/Communication Logs Enclosed? Yes ____ No ___X__

TPO Attention Required? Yes__X_____ No_____ If yes, list the items that require attention:

- Matrix spike, duplicate, and serial dilution analyses were not provided with this SDG. Although no qualification was taken, it should be noted that matrix specific effects could not be evaluated for these analyses.

INORGANIC DATA VALIDATION REPORT

REVIEW NARRATIVE SUMMARY

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, and modified for the method used.

Raw data were reviewed for completeness and transcription accuracy onto the summary forms. Approximately 10-20% of the results reported in each of the samples, calibrations, and QC analyses were recalculated and verified. If problems were identified during the recalculation of results, a more thorough calculation check was performed.

SDG No. T2589 consisted of 20 XRF cup samples for metals analyses by SW-846 Method 6010.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualifiers	Reason for Qualification	Review Section
S0200CEEA1B	Calcium Zinc	J/UJ	Negative Blank Contamination	VII
S02021S1S2, S0205AL1S2, S02063W1S2, S0300SPEC1, S0311MA1S2, S0400EM1S1	Antimony	U	Blank Contamination	
S0201SP1S3, S02061S1S2, S02063W1S2, S0208CE1S1, S0208MN1S2, S0208MN1S3, S0225FC1S2, S03003ESD1, S03003SED1, S0300SPEC1, S0306AR1S3	Beryllium			
S0202CE1S1, S0208CE1S1, S02111S1S1, S03003ESD1, S03003SED1, S0306AR1S3	Cadmium			
S0200CEEA1B	Barium Chromium Magnesium Nickel Potassium Vanadium			
S0208MN1S3	Thallium	J	ICSA solution result greater than the IDL and elevated iron sample level	VIII

Method/SOW Number 6010/SW-846
Revision 0.0

Inorganic Deliverables Completeness Checklist

P Inorganic Cover Page
P Inorganic Analysis Data Sheets
P Initial Calibration and Calibration Verification Results
P Continuing Calibration Verification Results
P CRDL Standard for ICP and AA
P Blank Analysis Results
P ICP Interference Check Sample Results
NP Spiked Sample Results
P Post-digest Spiked Sample Analysis
NP Duplicate Sample Results
P Instrument Detection Limits
P Laboratory Control Sample results
NA Standard Addition Results
NP ICP Serial Dilution Results
NA Holding Times Summary Sheet
P ICP Interelement Correction Factors
P ICP Linear Ranges
R Raw Data

R Samples	P Calibration Standards	R Blanks	NA Spikes
NA Duplicates	R ICP QC (ICS and Serial Dilution)	P LCS	
NA Furnace AA	NA Mercury Analysis	NA Cyanide Analysis	

NA Percent Solids Calculations - Solids Only
P Sample Prep/Digestion Logs (Form XIII)
P Analysis Run Log (Form XIV)
P Chain-of-Custody
P Sample Description
P Case Narrative
P Method References

KEY:
P = Provided in original data package, as required by the SOW
R = Provided as Resubmission
NP = Not provided in original data package or as resubmission
NR = Not required under the SOW
NA = Not applicable to this data package or analysis

I. DELIVERABLES

All deliverables were present.

Yes___ No_X_

Comments: Raw data information was not provided for the 06/24/02 analytical run. This information was located and reviewed in another SDG associated with this project.

II. HOLDING TIMES AND PRESERVATION CRITERIA

All holding times and preservation criteria were met.

Yes_X_ No___

Comments: All samples were analyzed within required holding times. Chain-of-custody (COC), summary forms, and raw data were evaluated. The XRF cup samples were received outside temperature requirements. No action was taken because the Functional Guidelines do not provide specific guidance for temperature and the effect on the sample integrity is not known.

III. INSTRUMENT CALIBRATIONS: STANDARDS AND BLANKS

Initial instrument calibrations were performed according to method requirements.

Yes_X_ No___

Comments: None.

The instruments were calibrated daily and each time an analysis run was performed.

Yes_X_ No___

Comments: None.

The instruments were calibrated using one blank and the appropriate number of standards.

Yes_X_ No___

Comments: None.

IV. FORM 1 - SAMPLE ANALYSIS RESULTS

Sample analyses were entered correctly on Form Is.

Yes_X_ No___

Comments: None.

V. FORM 2A - INITIAL AND CONTINUING CALIBRATION VERIFICATION

The initial and continuing calibration verification standards (ICV and CCV, respectively) met method requirements.

Yes_X_ No___

Comments: None.

The calibration verification results were within 90-110% recovery for metals, 85-115% for cyanide, and 80-120% for mercury.

Yes_X_ No___

Comments: None.

The continuing calibration standards were run at 10% frequency.

Yes_X_ No___

Comments: None.

VI. FORM 2B - CRDL STANDARD FOR ICP AND AA

ICP Analysis: Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were analyzed at the beginning and the end of each sample run, or at a minimum of twice per eight hours, whichever was more frequent.

Yes_X_ No___

Comments: None.

GFAA Analysis: Standards (CRA) at two times CRDL were analyzed at the beginning of each sample run.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

The CRI and/or the CRA were analyzed after the ICV.

Yes_X_ No___

Comments: None.

VII. FORM 3 - BLANKS

The initial and continuing calibration blanks (ICB and CCB, respectively) met method requirements.

Yes_X_ No___

Comments: None.

The continuing calibration blanks were run at 10% frequency.

Yes_X_ No___

Comments: None.

A laboratory/preparation blank was run at the frequency of one per twenty samples, or per sample delivery group (whichever is more frequent), and for each matrix analyzed.

Yes_X_ No___

Comments: None.

All analyzed blanks were free of contamination.

Yes___ No_X_

Comments: The following table lists the blanks with contamination that resulted in sample qualification, elements present, affected samples, and data qualifiers:

Blank Contaminants

Blank ID	Contaminant	Concentration Found in Blank (mg/Kg)	Associated Samples	Concentration Found in Sample (mg/Kg)	Qualifier/ Adjustment
PB	Potassium	1.677	S0200CEEA1B	7.8	U
CCB	Antimony	0.2 0.22	S02021S1S2 S0205AL1S2 S02063W1S2 S0300SPEC1 S0311MA1S2 S0400EM1S1	0.99 0.35 0.95 0.68 1.0 0.40	
	Calcium	-6.17	S0200CEEA1B	29.4	J
ICB	Zinc	-0.47	S0200CEEA1B	0.14 U	UJ
CCB	Barium	0.09	S0200CEEA1B	0.28	U
CCB	Beryllium	0.07	S0201SP1S3 S02061S1S2 S02063W1S2 S0208CE1S1 S0208MN1S2 S0208MN1S3 S0225FC1S2 S03003ESD1 S03003SED1 S0300SPEC1 S0306AR1S3	0.34 0.33 0.24 0.35 0.33 0.20 0.33 0.31 0.31 0.23 0.32	
CCB	Cadmium	0.04	S0202CE1S1 S0208CE1S1 S02111S1S1 S03003ESD1 S03003SED1 S0306AR1S3	0.16 0.18 0.17 0.15 0.12 0.05	
CCB	Chromium	0.06	S0200CEEA1B	0.18	
CCB	Magnesium	3.94	S0200CEEA1B	17.3	
CCB	Nickel	0.12	S0200CEEA1B	0.10	
CCB	Vanadium	0.1	S0200CEEA1B	0.13	

The incorrect results for antimony and selenium were reported on the Form 3 for the ICB. The raw data value for selenium was less than the IDL rather than 2.2 as reported and the raw data value for antimony was 1.6 ug/L rather than 2.5 ug/L.

VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning and end of each sample set analysis sequence (whichever is more frequent).

Yes_X_ No___

Comments: None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes_X_ No___

Comments: None.

Sample results for aluminum, calcium, iron, and magnesium were less than the ICSA values.

Yes___ No_X_

Comments: The following sample results were qualified because the iron result was greater than the ICSA value and the absolute value of the associated element was greater than the IDL in the ICSA analysis:

Element	ICSA Result (ug/L)	IDL (ug/L)	Samples Affected	Qualifiers
Thallium	7	3.3	S0208MN1S3	J

IX. FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: A matrix spike sample was not analyzed with this SDG. Therefore, the effect of the sample matrix on the sample preparation procedures and the measurement methodology could not be evaluated.

The percent recoveries (%R) were calculated correctly.

$$\%\ Recovery = \frac{(SSR - SR)}{SA} \times 100$$

SSR = spiked sample result
SR = sample result
SA = spike added

Yes___ No___ NA_X_

Comments: A matrix spike sample was not analyzed with this SDG.

Spike recoveries were within 75-125% (an exception is granted where the sample concentration is four times the spike concentration).

Yes___ No___ NA_X_

Comments: A matrix spike sample was not analyzed with this SDG.

X. FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes___ No___ NA_X_

Comments: A post digestion spike was not analyzed with this SDG.

XI. FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: Duplicate sample analyses were not provided with this SDG. Therefore, precision could not be evaluated.

The RPDs were calculated correctly.

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

For sample concentrations greater than five times the CRDL, RPDs were within ±20% (limits of ±35% apply for soil/sediments/tailings samples).

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of ± CRDL (two times CRDL for soils).

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

XII. GFAA QC

Duplicate injections were performed on all GFAA samples and the RSD was within ± 20%.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

Analytical spikes were performed on all GFAA samples and the percent recovery was 85 - 115%.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

MSAs were analyzed when required and the correlation coefficient was > 0.995.

Yes___ No___ NA_X_

Comments: None.

XIII. FORM 7 - LABORATORY CONTROL SAMPLE

The laboratory control sample (LCS) was prepared and analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes_X_ No___

Comments: None.

All results were within control limits.

Yes_X_ No___

Comments: None.

XIV. FORM 8 - STANDARD ADDITION RESULTS

Results from graphite furnace standard additions were entered on Form VIII as directed in the SOW.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

XV. FORM 9 - ICP QC

A serial dilution was performed for ICP analysis with every twenty or fewer samples of a similar matrix, or one per sample delivery group, whichever is more frequent.

Yes___ No_X_

Comments: Serial dilutions were not provided with this SDG. Therefore, it could not be determined whether or not significant physical or chemical interferences exist due to sample matrix in ICP metals.

The serial dilution was without interference problems as defined by the method.

Yes___ No___ NA_X_

Comments: Serial dilutions were not provided with this SDG.

XVI. FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

IDLs were provided for all elements on the target analyte list.

Yes_X_ No___

Comments: None.

XVII. FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP

Interelement corrections for ICP were reported.

Yes_X_ No___

Comments: None.

XVIII. FORM 12 - ICP LINEAR RANGES

ICP linear ranges were reported.

Yes_X_ No___

Comments: None.

XIX. LINEAR RANGE VERIFICATION ANALYSIS

Linear Range Verification Analysis (LRA) was performed and results were within control limits of 5% of the true value.

Yes___ No___ NA_X_

Comments: None.

XX. FORM 13 - PREPARATION LOG

Information on the preparation of samples for analysis was reported.

Yes_X_ No___

Comments: None.

XXI. FORM 14 - ANALYSIS RUN LOG

The required information was filled out for each analysis run in the data package.

Yes_X_ No___

Comments: None.

XXII. Additional Comments or Problems/Resolutions Not Addressed Above

Yes___ No_X_

Comments: None.

INORGANIC DATA QUALITY ASSURANCE REVIEW

Region VIII

DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

R - Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.

J - The associated numerical value is an estimated quantity because the Quality Control criteria were not met.

U J - The reported amount is estimated because Quality Control criteria were not met. Element or compound was not detected.

N J - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.

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.

ACRONYMS

AA	Atomic Absorption
Ag	Silver
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CRA	CRDL standard required for AA
CRDL	Contract Required Detection Limit
CRI	CRDL standard required for ICP
CV	Cold Vapor
EPA	U.S. Environmental Protection Agency
GFAA	Graphite Furnace Atomic Absorption
Hg	Mercury
ICB	Initial Calibration Blank
ICP	Inductively Coupled Plasma
ICS	Interference Check Sample
ICSA	Interference Check Sample (Solution A)
ICSAB	Interference Check Sample (Solution AB)
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
LCS	Laboratory Control Sample
LRA	Linear Range Verification Analysis
MSA	Method of Standard Additions
PDS	Post Digestion Spike
QC	Quality Control
RPD	Relative Percent Difference
RPM	Regional Project Manager
RSD	Percent Relative Standard Deviation
SA	Spike Added
SAS	Special Analytical Services
SDG	Sample Delivery Group
SOW	Statement of Work
SR	Sample Result
SSR	Spiked Sample Result
TPO	Technical Project Officer

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0201SP1S3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-1

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7230			P
7440-38-2	Arsenic	190			P
7440-39-3	Barium	140			P
7440-36-0	Antimony	173			P
7440-41-7	Beryllium	0.34	B		P
7440-43-9	Cadmium	3.3			P
7440-70-2	Calcium	7330			P
7440-47-3	Chromium	7.3			P
7440-48-4	Cobalt	3.6			P
7440-50-8	Copper	27.3			P
7439-89-6	Iron	11400			P
7439-92-1	Lead	1620			P
7439-95-4	Magnesium	2420			P
7439-96-5	Manganese	364			P
7440-02-0	Nickel	5.5			P
7440-09-7	Potassium	1220			P
7782-49-2	Selenium	0.37	B		P
7440-22-4	Silver	7.6			P
7440-23-5	Sodium	14.3	U		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	12.2			P
7440-66-6	Zinc	804			P

LT Tan/Olive

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S02021S1S2

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-2

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6960			P
7440-38-2	Arsenic	3.7			P
7440-39-3	Barium	115			P
7440-36-0	Antimony	0.99	B		P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	0.42	B		P
7440-70-2	Calcium	1900			P
7440-47-3	Chromium	9.8			P
7440-48-4	Cobalt	3.5			P
7440-50-8	Copper	11.9			P
7439-89-6	Iron	8860			P
7439-92-1	Lead	31.9			P
7439-95-4	Magnesium	2830			P
7439-96-5	Manganese	222			P
7440-02-0	Nickel	6.0			P
7440-09-7	Potassium	1780			P
7782-49-2	Selenium	0.30	B		P
7440-22-4	Silver	0.07	U		P
7440-23-5	Sodium	113	B		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	10.6			P
7440-66-6	Zinc	69.6			P

U

7/10/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

11

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0202CE1S1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-3

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9360			P
7440-38-2	Arsenic	5.7			P
7440-39-3	Barium	121			P
7440-36-0	Antimony	1.2			P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	0.16	B		P
7440-70-2	Calcium	2850			P
7440-47-3	Chromium	7.9			P
7440-48-4	Cobalt	4.0			P
7440-50-8	Copper	13.7			P
7439-89-6	Iron	11000			P
7439-92-1	Lead	54.8			P
7439-95-4	Magnesium	2880			P
7439-96-5	Manganese	370			P
7440-02-0	Nickel	7.1			P
7440-09-7	Potassium	1670			P
7782-49-2	Selenium	0.26	B		P
7440-22-4	Silver	0.07	U		P
7440-23-5	Sodium	128	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	14.5			P
7440-66-6	Zinc	89.8			P

VT 7/19/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0205AL1S2

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-4

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6850			P
7440-38-2	Arsenic	6.6			P
7440-39-3	Barium	106			P
7440-36-0	Antimony	0.35	B		P
7440-41-7	Beryllium	0.40	B		P
7440-43-9	Cadmium	0.03	U		P
7440-70-2	Calcium	3340			P
7440-47-3	Chromium	7.9			P
7440-48-4	Cobalt	6.1			P
7440-50-8	Copper	16.6			P
7439-89-6	Iron	10100			P
7439-92-1	Lead	14.6			P
7439-95-4	Magnesium	3430			P
7439-96-5	Manganese	297			P
7440-02-0	Nickel	6.7			P
7440-09-7	Potassium	1380			P
7782-49-2	Selenium	0.49			P
7440-22-4	Silver	0.07	U		P
7440-23-5	Sodium	102	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	9.8			P
7440-66-6	Zinc	46.5			P

U

LT 7/19/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

SW846-METALS
-1-
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
S02061S1S2

Lab Name: COMPUCHEM Contract:
Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589
Matrix (soil/water): SOIL Lab Sample ID: T2589-5
Level (low/med): LOW Date Received: 6/19/02
% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6650			P
7440-38-2	Arsenic	5.7			P
7440-39-3	Barium	259			P
7440-36-0	Antimony	1.4			P
7440-41-7	Beryllium	0.33	B		P
7440-43-9	Cadmium	2.2			P
7440-70-2	Calcium	1850			P
7440-47-3	Chromium	9.3			P
7440-48-4	Cobalt	3.7			P
7440-50-8	Copper	10.8			P
7439-89-6	Iron	8660			P
7439-92-1	Lead	523			P
7439-95-4	Magnesium	2580			P
7439-96-5	Manganese	297			P
7440-02-0	Nickel	6.1			P
7440-09-7	Potassium	1200			P
7782-49-2	Selenium	0.48	B		P
7440-22-4	Silver	0.12	B		P
7440-23-5	Sodium	14.4	U		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	12.3			P
7440-66-6	Zinc	1130			P

UJ

UJ 7/19/02

Color Before: BROWN Clarity Before: Texture: FINE
Color After: YELLOW Clarity After: Artifacts:

Comments:

14

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S02063W1S2

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

atrix (soil/water): SOIL Lab Sample ID: T2589-6

evel (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4670			P
7440-38-2	Arsenic	6.5			P
7440-39-3	Barium	72.5			P
7440-36-0	Antimony	0.95	B		P
7440-41-7	Beryllium	0.24	B		P
7440-43-9	Cadmium	0.30	B		P
7440-70-2	Calcium	6110			P
7440-47-3	Chromium	6.2			P
7440-48-4	Cobalt	4.3			P
7440-50-8	Copper	16.0			P
7439-89-6	Iron	8800			P
7439-92-1	Lead	59.7			P
7439-95-4	Magnesium	3400			P
7439-96-5	Manganese	217			P
7440-02-0	Nickel	7.3			P
7440-09-7	Potassium	1110			P
7782-49-2	Selenium	0.36	B		P
7440-22-4	Silver	0.10	B		P
7440-23-5	Sodium	163	B		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	8.6			P
7440-66-6	Zinc	99.9			P

VT 7/15/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0208CE1S1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-7

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8300			P
7440-38-2	Arsenic	5.4			P
7440-39-3	Barium	136			P
7440-36-0	Antimony	1.8			P
7440-41-7	Beryllium	0.35	B		P
7440-43-9	Cadmium	0.18	B		P
7440-70-2	Calcium	4040			P
7440-47-3	Chromium	7.1			P
7440-48-4	Cobalt	3.6			P
7440-50-8	Copper	12.1			P
7439-89-6	Iron	9950			P
7439-92-1	Lead	47.1			P
7439-95-4	Magnesium	2960			P
7439-96-5	Manganese	350			P
7440-02-0	Nickel	5.7			P
7440-09-7	Potassium	1260			P
7782-49-2	Selenium	0.46	B		P
7440-22-4	Silver	0.36	B		P
7440-23-5	Sodium	109	B		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	12.9			P
7440-66-6	Zinc	121			P

UT 7/9/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

16

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0200CEEA1B

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-8

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	123			P	
7440-38-2	Arsenic	0.41	U		P	
7440-39-3	Barium	0.28	B		P	U
7440-36-0	Antimony	0.16	U		P	
7440-41-7	Beryllium	0.02	U		P	
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	29.4	B		P	J
7440-47-3	Chromium	0.18	B		P	U
7440-48-4	Cobalt	0.06	U		P	
7440-50-8	Copper	0.30	B		P	
7439-89-6	Iron	56.1			P	
7439-92-1	Lead	0.38			P	
7439-95-4	Magnesium	17.3	B		P	U
7439-96-5	Manganese	1.2			P	
7440-02-0	Nickel	0.10	B		P	U
7440-09-7	Potassium	7.8	B		P	U
7782-49-2	Selenium	0.21	U		P	
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	155	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	0.13	B		P	U
7440-66-6	Zinc	0.14	U		P	UJ

VT 7/19/02

Color Before: WHITE Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0208MN1S2

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-9

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6790			P
7440-38-2	Arsenic	127			P
7440-39-3	Barium	103			P
7440-36-0	Antimony	44.6			P
7440-41-7	Beryllium	0.33	B		P
7440-43-9	Cadmium	2.6			P
7440-70-2	Calcium	2680			P
7440-47-3	Chromium	6.9			P
7440-48-4	Cobalt	3.5			P
7440-50-8	Copper	14.1			P
7439-89-6	Iron	11200			P
7439-92-1	Lead	959			P
7439-95-4	Magnesium	3290			P
7439-96-5	Manganese	348			P
7440-02-0	Nickel	5.7			P
7440-09-7	Potassium	1150			P
7782-49-2	Selenium	0.39	B		P
7440-22-4	Silver	11.4			P
7440-23-5	Sodium	14.3	U		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	9.8			P
7440-66-6	Zinc	443			P

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

17

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0208MN1S3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-10

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	3080			P	
7440-38-2	Arsenic	2620			P	
7440-39-3	Barium	48.5			P	
7440-36-0	Antimony	2360			P	
7440-41-7	Beryllium	0.20	B		P	U
7440-43-9	Cadmium	30.1			P	
7440-70-2	Calcium	1070			P	
7440-47-3	Chromium	3.4			P	
7440-48-4	Cobalt	3.6			P	
7440-50-8	Copper	85.4			P	
7439-89-6	Iron	63200			P	
7439-92-1	Lead	16700			P	
7439-95-4	Magnesium	1720			P	
7439-96-5	Manganese	1600			P	
7440-02-0	Nickel	6.2			P	
7440-09-7	Potassium	749			P	
7782-49-2	Selenium	2.3			P	
7440-22-4	Silver	191			P	
7440-23-5	Sodium	292	U		P	
7440-28-0	Thallium	2.5			P	J
7440-62-2	Vanadium	5.0			P	
7440-66-6	Zinc	6170			P	

UJ 7/26/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0209RW1S1

Name: COMPUCHEM Contract:

Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-11

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6000			P
7440-38-2	Arsenic	26.3			P
7440-39-3	Barium	176			P
7440-36-0	Antimony	5.7			P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	12200			P
7440-47-3	Chromium	8.2			P
7440-48-4	Cobalt	4.7			P
7440-50-8	Copper	18.3			P
7439-89-6	Iron	10900			P
7439-92-1	Lead	216			P
7439-95-4	Magnesium	3610			P
7439-96-5	Manganese	355			P
7440-02-0	Nickel	7.0			P
7440-09-7	Potassium	1120			P
7782-49-2	Selenium	0.53			P
7440-22-4	Silver	0.65			P
7440-23-5	Sodium	162	B		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	10.0			P
7440-66-6	Zinc	267			P

6/19/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S02111S1S1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-12

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11400			P
7440-38-2	Arsenic	6.9			P
7440-39-3	Barium	485			P
7440-36-0	Antimony	2.1			P
7440-41-7	Beryllium	0.58			P
7440-43-9	Cadmium	0.17	B		P
7440-70-2	Calcium	6920			P
7440-47-3	Chromium	9.1			P
7440-48-4	Cobalt	4.4			P
7440-50-8	Copper	25.3			P
7439-89-6	Iron	12800			P
7439-92-1	Lead	89.1			P
7439-95-4	Magnesium	3810			P
7439-96-5	Manganese	274			P
7440-02-0	Nickel	10.2			P
7440-09-7	Potassium	1290			P
7782-49-2	Selenium	0.59			P
7440-22-4	Silver	0.15	B		P
7440-23-5	Sodium	392			P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	19.8			P
7440-66-6	Zinc	141			P

UJ 7/16/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

20

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0213SP1S2

b Name: COMPUCHEM Contract:

b Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

trix (soil/water): SOIL Lab Sample ID: T2589-13

vel (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7460			P
7440-38-2	Arsenic	9.2			P
7440-39-3	Barium	129			P
7440-36-0	Antimony	2.5			P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	0.29	B		P
7440-70-2	Calcium	3770			P
7440-47-3	Chromium	7.0			P
7440-48-4	Cobalt	3.7			P
7440-50-8	Copper	18.9			P
7439-89-6	Iron	9560			P
7439-92-1	Lead	82.1			P
7439-95-4	Magnesium	3130			P
7439-96-5	Manganese	342			P
7440-02-0	Nickel	7.0			P
7440-09-7	Potassium	1310			P
7782-49-2	Selenium	0.40	B		P
7440-22-4	Silver	0.29	B		P
7440-23-5	Sodium	131	B		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	10.8			P
7440-66-6	Zinc	105			P

LJ 7/19/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0225FC1S2

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-14

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8920			P
7440-38-2	Arsenic	362			P
7440-39-3	Barium	126			P
7440-36-0	Antimony	63.5			P
7440-41-7	Beryllium	0.33	B		P
7440-43-9	Cadmium	9.6			P
7440-70-2	Calcium	3100			P
7440-47-3	Chromium	5.1			P
7440-48-4	Cobalt	3.5			P
7440-50-8	Copper	20.1			P
7439-89-6	Iron	18900			P
7439-92-1	Lead	1680			P
7439-95-4	Magnesium	3020			P
7439-96-5	Manganese	810			P
7440-02-0	Nickel	6.3			P
7440-09-7	Potassium	1290			P
7782-49-2	Selenium	0.94			P
7440-22-4	Silver	14.8			P
7440-23-5	Sodium	14.6	U		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	11.1			P
7440-66-6	Zinc	1470			P

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LT 7/19

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S03003ESD1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-15

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5460			P	
7440-38-2	Arsenic	10.6			P	
7440-39-3	Barium	98.2			P	
7440-36-0	Antimony	2.4			P	
7440-41-7	Beryllium	0.31	B		P	U
7440-43-9	Cadmium	0.15	B		P	U
7440-70-2	Calcium	5470			P	
7440-47-3	Chromium	6.3			P	
7440-48-4	Cobalt	3.3			P	
7440-50-8	Copper	10.3			P	
7439-89-6	Iron	8370			P	
7439-92-1	Lead	48.1			P	
7439-95-4	Magnesium	3150			P	
7439-96-5	Manganese	220			P	
7440-02-0	Nickel	5.8			P	
7440-09-7	Potassium	997			P	
7782-49-2	Selenium	0.24	B		P	
7440-22-4	Silver	0.19	B		P	
7440-23-5	Sodium	115	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	9.2			P	
7440-66-6	Zinc	79.0			P	

6/19/02

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S03003SED1

› Name: COMPUCHEM Contract:

› Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

:rix (soil/water): SOIL Lab Sample ID: T2589-16

/el (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6830			P
7440-38-2	Arsenic	3.8			P
7440-39-3	Barium	101			P
7440-36-0	Antimony	1.2			P
7440-41-7	Beryllium	0.31	B		P
7440-43-9	Cadmium	0.12	B		P
7440-70-2	Calcium	2860			P
7440-47-3	Chromium	7.0			P
7440-48-4	Cobalt	3.9			P
7440-50-8	Copper	14.2			P
7439-89-6	Iron	9210			P
7439-92-1	Lead	209			P
7439-95-4	Magnesium	3260			P
7439-96-5	Manganese	244			P
7440-02-0	Nickel	7.2			P
7440-09-7	Potassium	1570			P
7782-49-2	Selenium	0.23	B		P
7440-22-4	Silver	0.07	U		P
7440-23-5	Sodium	121	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	11.1			P
7440-66-6	Zinc	80.2			P

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

SW846-METALS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0300SPEC1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-17

Level (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4110			P	
7440-38-2	Arsenic	6.2			P	
7440-39-3	Barium	99.9			P	
7440-36-0	Antimony	0.68	B		P	J
7440-41-7	Beryllium	0.23	B		P	J
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	9400			P	
7440-47-3	Chromium	7.2			P	
7440-48-4	Cobalt	3.5			P	
7440-50-8	Copper	10.4			P	
7439-89-6	Iron	7720			P	
7439-92-1	Lead	27.1			P	
7439-95-4	Magnesium	4070			P	
7439-96-5	Manganese	196			P	
7440-02-0	Nickel	6.5			P	
7440-09-7	Potassium	992			P	
7782-49-2	Selenium	0.21	U		P	
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	98.9	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	7.0			P	
7440-66-6	Zinc	35.3			P	

07/9/02

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0306AR1S3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

Matrix (soil/water): SOIL Lab Sample ID: T2589-18

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6450			P
7440-38-2	Arsenic	22.0			P
7440-39-3	Barium	97.5			P
7440-36-0	Antimony	1.5			P
7440-41-7	Beryllium	0.32	B		P
7440-43-9	Cadmium	0.05	B		P
7440-70-2	Calcium	5140			P
7440-47-3	Chromium	8.5			P
7440-48-4	Cobalt	4.2			P
7440-50-8	Copper	13.8			P
7439-89-6	Iron	10400			P
7439-92-1	Lead	179			P
7439-95-4	Magnesium	4750			P
7439-96-5	Manganese	372			P
7440-02-0	Nickel	7.5			P
7440-09-7	Potassium	1370			P
7782-49-2	Selenium	0.36	B		P
7440-22-4	Silver	1.1			P
7440-23-5	Sodium	111	B		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	8.6			P
7440-66-6	Zinc	123			P

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6/19/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0311MA1S2

b Name: COMPUCHEM Contract:

b Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

trix (soil/water): SOIL Lab Sample ID: T2589-19

vel (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13300			P
7440-38-2	Arsenic	5.7			P
7440-39-3	Barium	171			P
7440-36-0	Antimony	1.0			P
7440-41-7	Beryllium	0.48	B		P
7440-43-9	Cadmium	0.03	U		P
7440-70-2	Calcium	3620			P
7440-47-3	Chromium	8.3			P
7440-48-4	Cobalt	5.6			P
7440-50-8	Copper	17.2			P
7439-89-6	Iron	13200			P
7439-92-1	Lead	31.1			P
7439-95-4	Magnesium	3570			P
7439-96-5	Manganese	547			P
7440-02-0	Nickel	8.4			P
7440-09-7	Potassium	1250			P
7782-49-2	Selenium	0.66			P
7440-22-4	Silver	0.07	U		P
7440-23-5	Sodium	119	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	17.5			P
7440-66-6	Zinc	67.3			P

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6/19/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

27

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400EM1S1

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: SAS No.: SDG No.: T2589

atrix (soil/water): SOIL Lab Sample ID: T2589-20

evel (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10900			P
7440-38-2	Arsenic	4.6			P
7440-39-3	Barium	113			P
7440-36-0	Antimony	0.40	B		P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	0.03	U		P
7440-70-2	Calcium	2620			P
7440-47-3	Chromium	6.1			P
7440-48-4	Cobalt	4.5			P
7440-50-8	Copper	14.4			P
7439-89-6	Iron	13200			P
7439-92-1	Lead	11.3			P
7439-95-4	Magnesium	3390			P
7439-96-5	Manganese	393			P
7440-02-0	Nickel	7.3			P
7440-09-7	Potassium	1190			P
7782-49-2	Selenium	0.45	B		P
7440-22-4	Silver	0.07	U		P
7440-23-5	Sodium	120	B		P
7440-28-0	Thallium	0.33	U		P
7440-62-2	Vanadium	10.6			P
7440-66-6	Zinc	34.5			P

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6/19/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments:

REGION VIII
DATA VALIDATION REPORT
INORGANIC

TDD No.	Site Name		Operable Unit
0203-0008	Superior Waste Rock		
RPM/OSC Name			
Tien Nguyen			
Contractor Laboratory	**Contract No.**	**SDG No.**	**Laboratory DPO/Region**
CompuChem-Liberty	Not Indicated	S2589	

Review Assigned Date July 5, 2002 Data Validator Bill Fear
Review Completion Date July 19, 2002 Report Reviewer Ken Schroeder

Sample Number	Laboratory ID	Matrix	Analysis
S0400HT4S1	S2589-1	XRF Cups	Metals by SW-846 Method 6010
S0400ILEE1	S2589-2		
S0400MNSC1	S2589-3		
S0400SPEC1	S2589-4		
S0400SPEDX	S2589-5		
S0400SPEE1	S2589-6		
S0400SPEF1	S2589-7		
S0400SPEG1	S2589-8		
S0400SPWF1	S2589-9		
S04032W1S3	S2589-10		
S0404AL1S3	S2589-11		
S0043MW1S2	S2589-12		
S01007SWB1	S2589-13		

Sample Number	Laboratory ID	Matrix	Analysis
S01063W1D1	S2589-14	XRF Cups	Metals by SW-846 Method 6010
S0106CE1S3	S2589-15		
S01071S1S1	S2589-16		
S02003ESD1	S2589-17		
S0200CEEG1	S2589-18		
S0200MNSDX	S2589-19		
S0200MNSG1	S2589-20		

DATA QUALITY STATEMENT

( ) Data are ACCEPTABLE according to EPA Functional guidelines with no qualifiers (flags) added by the reviewer.
( ) Data are UNACCEPTABLE according to EPA Functional Guidelines.
(X) Data are acceptable with QUALIFICATIONS noted in review.

Telephone/Communication Logs Enclosed? Yes ____ No __X__

TPO Attention Required? Yes__X____ No_____ If yes, list the items that require attention:

- Matrix spike, duplicate, and serial dilution analyses were not provided with this SDG. Although no qualification was taken, it should be noted that matrix specific effects could not be evaluated for these analyses.

INORGANIC DATA VALIDATION REPORT

REVIEW NARRATIVE SUMMARY

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, and modified for the method used.

Raw data were reviewed for completeness and transcription accuracy onto the summary forms. Approximately 10-20% of the results reported in each of the samples, calibrations, and QC analyses were recalculated and verified. If problems were identified during the recalculation of results, a more thorough calculation check was performed.

SDG No. S2589 consisted of 20 XRF cup samples for metals analyses by SW-846 Method 6010.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualifiers	Reason for Qualification	Review Section
S04032W1S3	Sodium	71.5 U mg/Kg	Result not adjusted for dilution (5x)	IV
S0400HT4S1, S0400ILEE1, S0400MNSC1, S0400SPEC1, S0400SPEDX, S0400SPEE1, S0400SPEF1, S0400SPWF1, S04032W1S3, S0404AL1S3, S0043MW1S2, S01007SWB1, S01071S1S1, S02003ESD1, S0200CEEG1, S0200MNSDX, S0200MNSG1	Beryllium	U	Blank Contamination	VII
S0404AL1S3, S01071S1S1	Cadmium			
S0400ILEE1, S0400MNSC1, S0400SPEC1, S0400SPEDX, S0400SPEE1, S0400SPEF1, S0400SPEG1, S0400SPWF1, S0404AL1S3, S0043MW1S2, S01007SWB1, S01063W1D1, S01071S1S1, S02003ESD1, S0200CEEG1, S0200MNSDX, S0200MNSG1	Selenium			
S0404AL1S3, S01007SWB1, S01063W1D1, S0106CE1S3, S01071S1S1, S02003ESD1, S0200CEEG1	Sodium			

Method/SOW Number 6010/SW-846
Revision 0.0

Inorganic Deliverables Completeness Checklist

P Inorganic Cover Page
P Inorganic Analysis Data Sheets (Form I)
P Initial Calibration and Calibration Verification Results (Form II)
P Continuing Calibration Verification Results (Form II)
P CRDL Standard for ICP and AA (Form II, Part 2)
P Blank Analysis Results (Form III)
P ICP Interference Check Sample Results (Form IV)
NP Spiked Sample Results (Form V)
NP Post-digest Spiked Sample Analysis (Form V, Part 2)
NP Duplicate Sample Results (Form VI)
P Instrument Detection Limits (Form VII) or (Form X - Quarterly)
P Laboratory Control Sample results (Form VII)
NA Standard Addition Results (Form VIII)
NP ICP Serial Dilution Results (Form IX)
NA Holding Times Summary Sheet (Form X)
P ICP Interelement Correction Factors (Form XII - Quarterly, or Form XI - Annually)
P ICP Linear Ranges (Form XII (XII) - Quarterly)
P Raw Data

P Samples	P Calibration Standards	P Blanks	NA Spikes
NA Duplicates	P ICP QC (ICS and Serial Dilution	P LCS	
NA Furnace AA	NA Mercury Analysis	NA Cyanide Analysis	

NA Percent Solids Calculations - (Solids Only)
P Sample Prep/Digestion Logs (Form XIII)
P Analysis Run Log (Form XIV)
P Chain-of-Custody
P Sample Description
P Case Narrative
P Method References

KEY:
P = Provided in original data package, as required by the SOW
R = Provided as Resubmission
NP = Not provided in original data package or as resubmission
NR = Not required under the SOW
NA = Not applicable to this data package or analysis

I. DELIVERABLES

All deliverables were present.

Yes_X_ No___

Comments: None.

II. HOLDING TIMES AND PRESERVATION CRITERIA

All holding times and preservation criteria were met.

Yes_X_ No___

Comments: All samples were analyzed within required holding times. Chain-of-custody (COC), summary forms, and raw data were evaluated. The XRF cup samples were received outside temperature requirements. No action was taken because the Functional Guidelines do not provide specific guidance for temperature and the effect on the sample integrity is not known.

III. INSTRUMENT CALIBRATIONS: STANDARDS AND BLANKS

Initial instrument calibrations were performed according to method requirements.

Yes_X_ No___

Comments: None.

The instruments were calibrated daily and each time an analysis run was performed.

Yes_X_ No___

Comments: None.

The instruments were calibrated using one blank and the appropriate number of standards.

Yes_X_ No___

Comments: None.

IV. FORM 1 - SAMPLE ANALYSIS RESULTS

Sample analyses were entered correctly on Form Is.

Yes___ No_X_

Comments: Various sample results were reported from dilutions. Additionally the non-detected results for sodium in samples S0400HT4S1 and S04032W1S3 were reported from dilutions because of negative interference. However, the laboratory did not correct the sodium result in sample S04032W1S3 to reflect the five times dilution. The result should be 71.5 U mg/Kg rather than 14.3 U mg/Kg.

V. FORM 2A - INITIAL AND CONTINUING CALIBRATION VERIFICATION

The initial and continuing calibration verification standards (ICV and CCV, respectively) met method requirements.

Yes_X_ No___

Comments: None.

The calibration verification results were within 90-110% recovery for metals, 85-115% for cyanide, and 80-120% for mercury.

Yes_X_ No___

Comments: None.

The continuing calibration standards were run at 10% frequency.

Yes_X_ No___

Comments: None.

VI. FORM 2B - CRDL STANDARD FOR ICP AND AA

ICP Analysis: Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were analyzed at the beginning and the end of each sample run, or at a minimum of twice per eight hours, whichever was more frequent.

Yes_X_ No___

Comments: None.

GFAA Analysis: Standards (CRA) at two times CRDL were analyzed at the beginning of each sample run.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

The CRI and/or the CRA were analyzed after the ICV.

Yes_X_ No___

Comments: None.

VII. FORM 3 - BLANKS

The initial and continuing calibration blanks (ICB and CCB, respectively) met method requirements.

Yes_X_ No___

Comments: None.

The continuing calibration blanks were run at 10% frequency.

Yes_X_ No___

Comments: None.

A laboratory/preparation blank was run at the frequency of one per twenty samples, or per sample delivery group (whichever is more frequent), and for each matrix analyzed.

Yes_X_ No___

Comments: None.

All analyzed blanks were free of contamination.

Yes___ No_X_

Comments: The following table lists the blanks with contamination that resulted in sample qualification, elements present, affected samples, and data qualifiers:

Blank Contaminants

Blank ID	Contaminant	Concentration Found in Blank	IDL (ug/L)	Associated Samples	Concentration Found in Sample (mg/Kg)	Qualifier/ Adjustment
CCB11 CCB12	Beryllium	0.9 ug/L	0.2	S0400HT4S1 S0400ILEE1 S0400MNSC1 S0400SPEC1 S0400SPEDX S0400SPEE1 S0400SPEF1 S0400SPWF1 S04032W1S3 S0404AL1S3 S0043MW1S2 S01007SWB1 S01071S1S1 S02003ESD1 S0200CEEG1 S0200MNSDX S0200MNSG1	0.18 0.35 0.30 0.29 0.36 0.41 0.31 0.33 0.24 0.35 0.39 0.36 0.35 0.31 0.30 0.36 0.30	U
CCB12	Cadmium	0.8 ug/L	0.3	S0404AL1S3 S01071S1S1	0.11 0.06	
ICB	Selenium	3.3 ug/L	2.2	S0400ILEE1 S0400MNSC1 S0400SPEC1 S0400SPEDX S0400SPEE1 S0400SPEF1 S0400SPEG1 S0400SPWF1 S0404AL1S3 S0043MW1S2 S01007SWB1 S01063W1D1 S01071S1S1 S02003ESD1 S0200CEEG1 S0200MNSDX S0200MNSG1	0.67 0.34 1.4 0.32 0.86 0.49 0.91 0.52 0.61 0.52 0.51 0.53 0.42 0.35 0.45 0.47 0.66	
CCB12	Sodium	293.4 ug/L	145.8	S0404AL1S3 S01007SWB1 S01063W1D1 S0106CE1S3 S01071S1S1 S02003ESD1 S0200CEEG1	76.7 95.6 104 128 119 124 142	

The negative values for the blanks were taken from the raw data as the laboratory was having problems reporting negative results on the Form 3. No action was required for negative blank contamination found from the raw data as the sample results were greater than five times the blank values.

VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning and end of each sample set analysis sequence (whichever is more frequent).

Yes_X_ No___

Comments: None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes_X_ No___

Comments: None.

Sample results for aluminum, calcium, iron, and magnesium were less than the ICSA values.

Yes___ No_X_

Comments: The iron results were greater than the ICSA value in samples S0400HT4S1, S0400SPEC1, and S04032W1S3. However no action was required as interference was not noted in these samples.

IX. FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: A matrix spike sample was not analyzed with this SDG. Therefore, the effect of the sample matrix on the sample preparation procedures and the measurement methodology could not be evaluated.

The percent recoveries (%R) were calculated correctly.

$$\%\ Recovery = \frac{(SSR - SR)}{SA} \times 100$$

SSR = spiked sample result
SR = sample result
SA = spike added

Yes___ No___ NA_X_

Comments: A matrix spike sample was not analyzed with this SDG.

Spike recoveries were within 75-125% (an exception is granted where the sample concentration is four times the spike concentration).

Yes___ No___ NA_X_

Comments: A matrix spike sample was not analyzed with this SDG.

X. FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes___ No___ NA_X_

Comments: A post digestion spike was not analyzed with this SDG.

XI. FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes___ No_X_

Comments: Duplicate sample analyses were not provided with this SDG. Therefore, precision could not be evaluated.

The RPDs were calculated correctly.

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

For sample concentrations greater than five times the CRDL, RPDs were within ±20% (limits of ±35% apply for soil/sediments/tailings samples).

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of ± CRDL (two times CRDL for soils).

Yes___ No___ NA_X_

Comments: Duplicate sample analyses were not provided with this SDG.

XII. GFAA QC

Duplicate injections were performed on all GFAA samples and the RSD was within ± 20%.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

Analytical spikes were performed on all GFAA samples and the percent recovery was 85 - 115%.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

MSAs were analyzed when required and the correlation coefficient was > 0.995.

Yes___ No___ NA_X_

Comments: None.

XIII. FORM 7 - LABORATORY CONTROL SAMPLE

The laboratory control sample (LCS) was prepared and analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes_X_ No___

Comments: None.

All results were within control limits.

Yes_X_ No___

Comments: None.

XIV. FORM 8 - STANDARD ADDITION RESULTS

Results from graphite furnace standard additions were entered on Form VIII as directed in the SOW.

Yes___ No___ NA_X_

Comments: Samples were not analyzed by GFAA.

XV. FORM 9 - ICP QC

A serial dilution was performed for ICP analysis with every twenty or fewer samples of a similar matrix, or one per sample delivery group, whichever is more frequent.

Yes___ No_X_

Comments: Serial dilutions were not provided with this SDG. Therefore, it could not be determined whether or not significant physical or chemical interferences exist due to sample matrix in ICP metals.

The serial dilution was without interference problems as defined by the method.

Yes___ No___ NA_X_

Comments: Serial dilutions were not provided with this SDG.

XVI. FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

IDLs were provided for all elements on the target analyte list.

Yes_X_ No___

Comments: None.

XVII. FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP

Interelement corrections for ICP were reported.

Yes_X_ No___

Comments: None.

XVIII. FORM 12 - ICP LINEAR RANGES

ICP linear ranges were reported.

Yes_X_ No___

Comments: None.

XIX. LINEAR RANGE VERIFICATION ANALYSIS

Linear Range Verification Analysis (LRA) was performed and results were within control limits of 5% of the true value.

Yes___ No___ NA_X_

Comments: None.

XX. FORM 13 - PREPARATION LOG

Information on the preparation of samples for analysis was reported.

Yes_X_ No___

Comments: None.

XXI. FORM 14 - ANALYSIS RUN LOG

The required information was filled out for each analysis run in the data package.

Yes_X_ No___

Comments: None.

XXII. Additional Comments or Problems/Resolutions Not Addressed Above

Yes___ No_X_

Comments: None.

INORGANIC DATA QUALITY ASSURANCE REVIEW

Region VIII

DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

R - Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.

J - The associated numerical value is an estimated quantity because the Quality Control criteria were not met.

U J - The reported amount is estimated because Quality Control criteria were not met. Element or compound was not detected.

N J - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.

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.

ACRONYMS

AA	Atomic Absorption
Ag	Silver
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CRA	CRDL standard required for AA
CRDL	Contract Required Detection Limit
CRI	CRDL standard required for ICP
CV	Cold Vapor
EPA	U.S. Environmental Protection Agency
GFAA	Graphite Furnace Atomic Absorption
Hg	Mercury
ICB	Initial Calibration Blank
ICP	Inductively Coupled Plasma
ICS	Interference Check Sample
ICSA	Interference Check Sample (Solution A)
ICSAB	Interference Check Sample (Solution AB)
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
LCS	Laboratory Control Sample
LRA	Linear Range Verification Analysis
MSA	Method of Standard Additions
PDS	Post Digestion Spike
QC	Quality Control
RPD	Relative Percent Difference
RPM	Regional Project Manager
RSD	Percent Relative Standard Deviation
SA	Spike Added
SAS	Special Analytical Services
SDG	Sample Delivery Group
SOW	Statement of Work
SR	Sample Result
SSR	Spiked Sample Result
TPO	Technical Project Officer

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S01007SWB1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-13

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5760			P	
7440-38-2	Arsenic	2.7			P	
7440-39-3	Barium	104			P	
7440-36-0	Antimony	0.29	B		P	
7440-41-7	Beryllium	0.36	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	3190			P	
7440-47-3	Chromium	6.6			P	
7440-48-4	Cobalt	4.8			P	
7440-50-8	Copper	9.1			P	
7439-89-6	Iron	8980			P	
7439-92-1	Lead	7.8			P	
7439-95-4	Magnesium	3560			P	
7439-96-5	Manganese	206			P	
7440-02-0	Nickel	6.0			P	
7440-09-7	Potassium	1320			P	
7782-49-2	Selenium	0.51			P	U
7440-22-4	Silver	0.28	B		P	
7440-23-5	Sodium	95.6	B		P	U
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	10.1			P	
7440-66-6	Zinc	38.5			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/19/02

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S01063W1D1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-14

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	12800			P	
7440-38-2	Arsenic	4.6			P	
7440-39-3	Barium	176			P	
7440-36-0	Antimony	1.1			P	
7440-41-7	Beryllium	0.47	B		P	
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	2470			P	
7440-47-3	Chromium	7.1			P	
7440-48-4	Cobalt	3.9			P	
7440-50-8	Copper	9.4			P	
7439-89-6	Iron	12600			P	
7439-92-1	Lead	29.1			P	
7439-95-4	Magnesium	2710			P	
7439-96-5	Manganese	516			P	
7440-02-0	Nickel	6.3			P	
7440-09-7	Potassium	1780			P	
7782-49-2	Selenium	0.53			P	U
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	104	B		P	U
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	17.7			P	
7440-66-6	Zinc	71.9			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/18/02

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0106CE1S3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-15

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9370			P
7440-38-2	Arsenic	6.3			P
7440-39-3	Barium	163			P
7440-36-0	Antimony	0.39	B		P
7440-41-7	Beryllium	0.55			P
7440-43-9	Cadmium	0.03	U		P
7440-70-2	Calcium	30100			P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	5.6			P
7440-50-8	Copper	26.1			P
7439-89-6	Iron	12500			P
7439-92-1	Lead	12.4			P
7439-95-4	Magnesium	9620			P
7439-96-5	Manganese	375			P
7440-02-0	Nickel	8.4			P
7440-09-7	Potassium	1970			P
7782-49-2	Selenium	0.21	U		P
7440-22-4	Silver	0.07	U		P
7440-23-5	Sodium	128	B		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	12.7			P
7440-66-6	Zinc	34.4			P

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF7/19/02

12

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S01071S1S1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-16

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6910			P	
7440-38-2	Arsenic	4.2			P	
7440-39-3	Barium	146			P	
7440-36-0	Antimony	0.92	B		P	
7440-41-7	Beryllium	0.35	B		P	U
7440-43-9	Cadmium	0.06	B		P	U
7440-70-2	Calcium	4240			P	
7440-47-3	Chromium	7.3			P	
7440-48-4	Cobalt	3.6			P	
7440-50-8	Copper	14.9			P	
7439-89-6	Iron	9050			P	
7439-92-1	Lead	46.3			P	
7439-95-4	Magnesium	2990			P	
7439-96-5	Manganese	307			P	
7440-02-0	Nickel	5.8			P	
7440-09-7	Potassium	1800			P	
7782-49-2	Selenium	0.42	B		P	U
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	119	B		P	U
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	11.3			P	
7440-66-6	Zinc	97.2			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/19/02

13

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S02003ESD1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-17

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5710			P	
7440-38-2	Arsenic	5.5			P	
7440-39-3	Barium	81.3			P	
7440-36-0	Antimony	1.0			P	
7440-41-7	Beryllium	0.31	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	4000			P	
7440-47-3	Chromium	6.6			P	
7440-48-4	Cobalt	3.5			P	
7440-50-8	Copper	9.3			P	
7439-89-6	Iron	9090			P	
7439-92-1	Lead	31.1			P	
7439-95-4	Magnesium	3210			P	
7439-96-5	Manganese	173			P	
7440-02-0	Nickel	5.6			P	
7440-09-7	Potassium	1140			P	
7782-49-2	Selenium	0.35	B		P	U
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	124	B		P	U
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	11.7			P	
7440-66-6	Zinc	40.7			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/18/02

1.1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0200CEEG1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-18

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5610			P	
7440-38-2	Arsenic	32.9			P	
7440-39-3	Barium	88.5			P	
7440-36-0	Antimony	10.8			P	
7440-41-7	Beryllium	0.30	B		P	U
7440-43-9	Cadmium	0.74			P	
7440-70-2	Calcium	4320			P	
7440-47-3	Chromium	8.3			P	
7440-48-4	Cobalt	3.8			P	
7440-50-8	Copper	15.0			P	
7439-89-6	Iron	10200			P	
7439-92-1	Lead	258			P	
7439-95-4	Magnesium	4020			P	
7439-96-5	Manganese	261			P	
7440-02-0	Nickel	7.4			P	
7440-09-7	Potassium	1370			P	
7782-49-2	Selenium	0.45	B		P	U
7440-22-4	Silver	1.8			P	
7440-23-5	Sodium	142	B		P	U
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	10.2			P	
7440-66-6	Zinc	189			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: QF 7/18/02

SW846-METALS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0200MNSDX

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-19

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7290			P	
7440-38-2	Arsenic	9.0			P	
7440-39-3	Barium	81.7			P	
7440-36-0	Antimony	2.8			P	
7440-41-7	Beryllium	0.36	B		P	U
7440-43-9	Cadmium	7.6			P	
7440-70-2	Calcium	780			P	
7440-47-3	Chromium	6.6			P	
7440-48-4	Cobalt	3.3			P	
7440-50-8	Copper	7.9			P	
7439-89-6	Iron	10800			P	
7439-92-1	Lead	47.7			P	
7439-95-4	Magnesium	2760			P	
7439-96-5	Manganese	213			P	
7440-02-0	Nickel	5.3			P	
7440-09-7	Potassium	1250			P	
7782-49-2	Selenium	0.47	B		P	U
7440-22-4	Silver	0.24	B		P	
7440-23-5	Sodium	14.4	U		P	
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	17.0			P	
7440-66-6	Zinc	999			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/9/02

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0200MNSG1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-20

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5630			P	
7440-38-2	Arsenic	61.8			P	
7440-39-3	Barium	91.4			P	
7440-36-0	Antimony	23.3			P	
7440-41-7	Beryllium	0.30	B		P	U
7440-43-9	Cadmium	3.7			P	
7440-70-2	Calcium	3480			P	
7440-47-3	Chromium	8.1			P	
7440-48-4	Cobalt	3.7			P	
7440-50-8	Copper	18.4			P	
7439-89-6	Iron	12400			P	
7439-92-1	Lead	587			P	
7439-95-4	Magnesium	4100			P	
7439-96-5	Manganese	369			P	
7440-02-0	Nickel	8.0			P	
7440-09-7	Potassium	1100			P	
7782-49-2	Selenium	0.66			P	U
7440-22-4	Silver	3.5			P	
7440-23-5	Sodium	14.2	U		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	10.1			P	
7440-66-6	Zinc	724			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: AF 7/15/02

17

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400HT4S1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-1

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2400			P
7440-38-2	Arsenic	2110			P
7440-39-3	Barium	30.5			P
7440-36-0	Antimony	1450			P
7440-41-7	Beryllium	0.18	B		P
7440-43-9	Cadmium	27.4			P
7440-70-2	Calcium	1260			P
7440-47-3	Chromium	1.7			P
7440-48-4	Cobalt	1.7			P
7440-50-8	Copper	70.4			P
7439-89-6	Iron	55500			P
7439-92-1	Lead	10700			P
7439-95-4	Magnesium	1970			P
7439-96-5	Manganese	3060			P
7440-02-0	Nickel	3.5			P
7440-09-7	Potassium	529			P
7782-49-2	Selenium	2.6			P
7440-22-4	Silver	100			P
7440-23-5	Sodium	289	U		P
7440-28-0	Thallium	4.8			P
7440-62-2	Vanadium	3.6			P
7440-66-6	Zinc	3820			P

Color Before: ORANGE Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

DF 7/9/02

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400ILEE1

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

atrix (soil/water): SOIL Lab Sample ID: S2589-2

evel (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5970			P	
7440-38-2	Arsenic	5.0			P	
7440-39-3	Barium	87.8			P	
7440-36-0	Antimony	0.93	B		P	
7440-41-7	Beryllium	0.35	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	6930			P	
7440-47-3	Chromium	10.5			P	
7440-48-4	Cobalt	3.5			P	
7440-50-8	Copper	14.8			P	
7439-89-6	Iron	9580			P	
7439-92-1	Lead	44.5			P	
7439-95-4	Magnesium	4700			P	
7439-96-5	Manganese	192			P	
7440-02-0	Nickel	6.9			P	
7440-09-7	Potassium	1260			P	
7782-49-2	Selenium	0.67			P	U
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	105	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	10.9			P	
7440-66-6	Zinc	44.3			P	

7/23/02

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RC 7/11/02

19

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400MNSC1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-3

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4780			P	
7440-38-2	Arsenic	7.1			P	
7440-39-3	Barium	85.3			P	
7440-36-0	Antimony	0.99			P	
7440-41-7	Beryllium	0.30	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	4900			P	
7440-47-3	Chromium	7.7			P	
7440-48-4	Cobalt	4.1			P	
7440-50-8	Copper	11.6			P	
7439-89-6	Iron	8590			P	
7439-92-1	Lead	41.9			P	
7439-95-4	Magnesium	4290			P	
7439-96-5	Manganese	217			P	
7440-02-0	Nickel	7.1			P	
7440-09-7	Potassium	1090			P	
7782-49-2	Selenium	0.34	B		P	U
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	93.4	B		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	8.7			P	
7440-66-6	Zinc	66.2			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: R7/19/02

20

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400SPEC1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-4

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4710			P	
7440-38-2	Arsenic	582			P	
7440-39-3	Barium	74.0			P	
7440-36-0	Antimony	145			P	
7440-41-7	Beryllium	0.29	B		P	U
7440-43-9	Cadmium	14.4			P	
7440-70-2	Calcium	6920			P	
7440-47-3	Chromium	7.2			P	
7440-48-4	Cobalt	3.5			P	
7440-50-8	Copper	28.6			P	
7439-89-6	Iron	27900			P	
7439-92-1	Lead	2320			P	
7439-95-4	Magnesium	4420			P	
7439-96-5	Manganese	1260			P	
7440-02-0	Nickel	7.6			P	
7440-09-7	Potassium	1220			P	
7782-49-2	Selenium	1.4			P	U
7440-22-4	Silver	18.2			P	
7440-23-5	Sodium	14.4	U		P	
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	7.9			P	
7440-66-6	Zinc	2660			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RC 7/16/02

SW846-METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400SPEDX

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-5

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7420			P	
7440-38-2	Arsenic	2.8			P	
7440-39-3	Barium	94.8			P	
7440-36-0	Antimony	0.61	B		P	
7440-41-7	Beryllium	0.36	B		P	U
7440-43-9	Cadmium	0.03	U		P	
7440-70-2	Calcium	1510			P	
7440-47-3	Chromium	6.2			P	
7440-48-4	Cobalt	3.4			P	
7440-50-8	Copper	8.6			P	
7439-89-6	Iron	9240			P	
7439-92-1	Lead	9.9			P	
7439-95-4	Magnesium	2730			P	
7439-96-5	Manganese	188			P	
7440-02-0	Nickel	5.6			P	
7440-09-7	Potassium	1360			P	
7782-49-2	Selenium	0.32	B		P	U
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	107	B		P	
7440-28-0	Thallium	0.33	U		P	
7440-62-2	Vanadium	11.7			P	
7440-66-6	Zinc	29.2			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: BE 7/19/02

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400SPEE1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-6

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	6050			P	
7440-38-2	Arsenic	157			P	
7440-39-3	Barium	71.7			P	
7440-36-0	Antimony	41.6			P	
7440-41-7	Beryllium	0.41	B		P	U
7440-43-9	Cadmium	4.4			P	
7440-70-2	Calcium	5840			P	
7440-47-3	Chromium	8.3			P	
7440-48-4	Cobalt	4.6			P	
7440-50-8	Copper	20.6			P	
7439-89-6	Iron	19000			P	
7439-92-1	Lead	767			P	
7439-95-4	Magnesium	4410			P	
7439-96-5	Manganese	661			P	
7440-02-0	Nickel	7.8			P	
7440-09-7	Potassium	1240			P	
7782-49-2	Selenium	0.86			P	U
7440-22-4	Silver	4.2			P	
7440-23-5	Sodium	14.3	U		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	9.9			P	
7440-66-6	Zinc	909			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/19/02

23

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400SPEF1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-7

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4990			P	
7440-38-2	Arsenic	56.1			P	
7440-39-3	Barium	80.3			P	
7440-36-0	Antimony	23.5			P	
7440-41-7	Beryllium	0.31	B		P	U
7440-43-9	Cadmium	7.6			P	
7440-70-2	Calcium	12500			P	
7440-47-3	Chromium	8.2			P	
7440-48-4	Cobalt	3.6			P	
7440-50-8	Copper	12.7			P	
7439-89-6	Iron	12000			P	
7439-92-1	Lead	352			P	
7439-95-4	Magnesium	5470			P	
7439-96-5	Manganese	370			P	
7440-02-0	Nickel	7.0			P	
7440-09-7	Potassium	1420			P	
7782-49-2	Selenium	0.49			P	U
7440-22-4	Silver	2.0			P	
7440-23-5	Sodium	14.2	U		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	7.5			P	
7440-66-6	Zinc	1460			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/19/02

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400SPEG1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-8

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7870			P	
7440-38-2	Arsenic	207			P	
7440-39-3	Barium	104			P	
7440-36-0	Antimony	53.8			P	
7440-41-7	Beryllium	0.45	B		P	
7440-43-9	Cadmium	4.3			P	
7440-70-2	Calcium	4700			P	
7440-47-3	Chromium	13.3			P	
7440-48-4	Cobalt	4.6			P	
7440-50-8	Copper	22.4			P	
7439-89-6	Iron	17800			P	
7439-92-1	Lead	1150			P	
7439-95-4	Magnesium	4970			P	
7439-96-5	Manganese	651			P	
7440-02-0	Nickel	9.3			P	
7440-09-7	Potassium	1810			P	
7782-49-2	Selenium	0.91			P	U
7440-22-4	Silver	9.1			P	
7440-23-5	Sodium	468			P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	10.9			P	
7440-66-6	Zinc	1010			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/19/02

25

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400SPWF1

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-9

Level (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	5250			P	
7440-38-2	Arsenic	68.1			P	
7440-39-3	Barium	60.2			P	
7440-36-0	Antimony	25.6			P	
7440-41-7	Beryllium	0.33	B		P	U
7440-43-9	Cadmium	3.3			P	
7440-70-2	Calcium	1610			P	
7440-47-3	Chromium	5.8			P	
7440-48-4	Cobalt	3.4			P	
7440-50-8	Copper	12.1			P	
7439-89-6	Iron	10900			P	
7439-92-1	Lead	468			P	
7439-95-4	Magnesium	2640			P	
7439-96-5	Manganese	296			P	
7440-02-0	Nickel	5.5			P	
7440-09-7	Potassium	982			P	
7782-49-2	Selenium	0.52			P	U
7440-22-4	Silver	2.7			P	
7440-23-5	Sodium	14.0	U		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	8.3			P	
7440-66-6	Zinc	693			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: BF 7/16/02

28

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.: S04032W1S3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-10

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	4010			P	
7440-38-2	Arsenic	1540			P	
7440-39-3	Barium	70.3			P	
7440-36-0	Antimony	955			P	
7440-41-7	Beryllium	0.24	B		P	U
7440-43-9	Cadmium	20.4			P	
7440-70-2	Calcium	3340			P	
7440-47-3	Chromium	4.4			P	
7440-48-4	Cobalt	3.4			P	
7440-50-8	Copper	57.6			P	
7439-89-6	Iron	42100			P	
7439-92-1	Lead	8530			P	
7439-95-4	Magnesium	2390			P	
7439-96-5	Manganese	2680			P	
7440-02-0	Nickel	5.0			P	
7440-09-7	Potassium	851			P	
7782-49-2	Selenium	2.7			P	
7440-22-4	Silver	81.4			P	
7440-23-5	Sodium	14.3	U		P	71.5U
7440-28-0	Thallium	2.6			P	
7440-62-2	Vanadium	6.7			P	
7440-66-6	Zinc	3040			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RE 7/11/02

27

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0404AL1S3

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-11

Level (low/med): LOW Date Received: 6/19/02

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7180			P	
7440-38-2	Arsenic	3.6			P	
7440-39-3	Barium	109			P	
7440-36-0	Antimony	0.91	B		P	
7440-41-7	Beryllium	0.35	B		P	U
7440-43-9	Cadmium	0.11	B		P	U
7440-70-2	Calcium	2340			P	
7440-47-3	Chromium	7.9			P	
7440-48-4	Cobalt	3.6			P	
7440-50-8	Copper	14.5			P	
7439-89-6	Iron	9570			P	
7439-92-1	Lead	55.8			P	
7439-95-4	Magnesium	2760			P	
7439-96-5	Manganese	311			P	
7440-02-0	Nickel	6.5			P	
7440-09-7	Potassium	1210			P	
7782-49-2	Selenium	0.61			P	U
7440-22-4	Silver	0.07	U		P	
7440-23-5	Sodium	76.7	B		P	U
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	12.9			P	
7440-66-6	Zinc	85.1			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RF 7/16/02

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0043MW1S2

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: S2589

Matrix (soil/water): SOIL Lab Sample ID: S2589-12

Level (low/med): LOW Date Received: 6/19/02

Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M	
7429-90-5	Aluminum	7810			P	
7440-38-2	Arsenic	58.2			P	
7440-39-3	Barium	108			P	
7440-36-0	Antimony	27.7			P	
7440-41-7	Beryllium	0.39	B		P	U
7440-43-9	Cadmium	4.0			P	
7440-70-2	Calcium	4820			P	
7440-47-3	Chromium	6.6			P	
7440-48-4	Cobalt	4.0			P	
7440-50-8	Copper	19.1			P	
7439-89-6	Iron	11700			P	
7439-92-1	Lead	706			P	
7439-95-4	Magnesium	3240			P	
7439-96-5	Manganese	354			P	
7440-02-0	Nickel	6.5			P	
7440-09-7	Potassium	1680			P	
7782-49-2	Selenium	0.52			P	U
7440-22-4	Silver	6.5			P	
7440-23-5	Sodium	14.3	U		P	
7440-28-0	Thallium	0.32	U		P	
7440-62-2	Vanadium	11.8			P	
7440-66-6	Zinc	522			P	

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: Artifacts:

Comments: RE7/16/02

9

REGION VIII
DATA VALIDATION REPORT
INORGANIC

TDD No.	Site Name		Operable Unit
0203-0008	Superior Waste Rock		
RPM/OSC Name			
Tien Nguyen			
Contractor Laboratory	Contract No.	SDG No.	Laboratory DPO/Region
CompuChem - Liberty	Not Indicated	Q2589	

Review Assigned Date July 5, 2002 Data Validator Bill Fear
Review Completion Date July 19, 2002 Report Reviewer Ken Schroeder

Sample ID	Laboratory ID	Matrix	Analysis
S0400HT	Q2589-1	Soil/Sediment	TCLP - Metals
S0208MN	Q2589-2		
S0700FG	Q2589-3		
S0201SP	Q2589-4		

DATA QUALITY STATEMENT

( ) Data are ACCEPTABLE according to EPA Functional guidelines with no qualifiers (flags) added by the reviewer.
( ) Data are UNACCEPTABLE according to EPA Functional Guidelines.
(X) Data are acceptable with QUALIFICATIONS noted in review.

Telephone/Communication Logs Enclosed? Yes _____ No ___X____

TPO Attention Required? Yes _____ No ___X____ If yes, list the items that require attention:

INORGANIC DATA VALIDATION REPORT

REVIEW NARRATIVE SUMMARY

This data package was reviewed according to "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February 1994, and modified for the method used.

Raw data were reviewed for completeness and transcription accuracy onto the summary forms. Approximately 10-20% of the results reported in each of the samples, calibrations, and QC analyses were recalculated and verified. If problems were identified during the recalculation of results, a more thorough calculation check was performed.

The data package, TDD No. 0203-0008, SDG No. Q2589, consisted of 4 soil samples for TCLP metals.

The following table lists the data qualifiers added to the sample analyses. Please see Data Qualifier Definitions, attached to the end of this report.

Sample ID	Elements	Qualifiers	Reason for Qualification	Review Section
All samples	Selenium	U	Blank contamination	VII

Method/SOW Number 6010, 1311, 7470/SW-846
Revision 0.0

Inorganic Deliverables Completeness Checklist

P Inorganic Cover Page
P Inorganic Analysis Data Sheets (Form I)
P Initial Calibration and Calibration Verification Results (Form II)
P Continuing Calibration Verification Results (Form II)
P CRDL Standard for ICP and AA (Form II, Part 2)
P Blank Analysis Results (Form III)
P ICP Interference Check Sample Results (Form IV)
P Spiked Sample Results (Form V)
P Post-digest Spiked Sample Analysis (Form V, Part 2)
P Duplicate Sample Results (Form VI)
P Instrument Detection Limits (Form VII) or (Form X - Quarterly)
P Laboratory Control Sample results (Form VII)
NA Standard Addition Results (Form VIII)
P ICP Serial Dilution Results (Form IX)
NA Holding Times Summary Sheet (Form X)
P ICP Interelement Correction Factors (Form XII - Quarterly, or Form XI - Annually)
P ICP Linear Ranges (Form XII (XII) - Quarterly)
P Raw Data

P Samples	P Calibration Standards	P Blanks	P Spikes
P Duplicates	P ICP QC (ICS and Serial Dilution	P LCS	
NA Furnace AA	P Mercury Analysis	NA Cyanide Analysis	

NA Percent Solids Calculations - (Solids Only)
P Sample Prep/Digestion Logs (Form XIII)
P Analysis Run Log (Form XIV)
P Chain-of-Custody
P Sample Description
P Case Narrative
P Method References

KEY:
P = Provided in original data package, as required by the SOW
R = Provided as Resubmission
NP = Not provided in original data package or as resubmission
NR = Not required under the SOW
NA = Not applicable to this data package or analysis

I. DELIVERABLES

All deliverables were present as specified in the Statement of Work.

Yes X No___

Comments: None.

II. HOLDING TIMES AND PRESERVATION CRITERIA

All method holding times were met.

Yes X No___

Comments: None.

All technical holding times and preservation criteria were met.

Yes X No___

Comments: All samples were analyzed within required holding times. The samples were received by the laboratory with cooler temperature of 22°C. No action was taken because the Functional Guidelines do not provide specific guidance for temperature and the effect on the sample integrity is not known. No other shipping or receiving problems were noted.

III. INSTRUMENT CALIBRATIONS: STANDARDS AND BLANKS

Initial instrument calibrations were performed according to SOW requirements.

Yes X No___

Comments: None.

The instruments were calibrated daily and each time an analysis run was performed.

Yes X No___

Comments: None.

The instruments were calibrated using one blank and the appropriate number of standards.

Yes_X_ No___

Comments: The calibration correlation coefficient for mercury was greater than 0.995.

IV. FORM 1 - SAMPLE ANALYSIS RESULTS

Sample analyses were entered correctly on Form Is.

Yes_X_ No___

Comments: The lead results were reported from dilutions in samples S0208MN, S0700FG, and S0201SP.

V. FORM 2A - INITIAL AND CONTINUING CALIBRATION VERIFICATION

The initial and continuing calibration verification standards (ICV and CCV, respectively) met SOW requirements.

Yes_X_ No___

Comments: None.

The calibration verification results were within 90-110% recovery for metals, 85-115% for cyanide, and 80-120% for mercury.

Yes_X_ No___

Comments: None.

The continuing calibration standards were run at 10% frequency.

Yes_X_ No___

Comments: None.

VI. FORM 2B - CRDL STANDARD FOR ICP AND AA

ICP Analysis: Standards (CRI) at two times the CRDL or the IDL (whichever were greater) were analyzed at the beginning and the end of each sample run, or at a minimum of twice per eight hours, whichever was more frequent.

Yes_X_ No___

Comments: None.

GFAA Analysis: Standards (CRA) at two times CRDL were analyzed at the beginning of each sample run.

Yes___ No___ NA_X_

Comments: None.

The CRI and/or the CRA were analyzed after the ICV.

Yes_X_ No___

Comments: None.

VII. FORM 3 - BLANKS

The initial and continuing calibration blanks (ICB and CCB, respectively) met SOW requirements.

Yes_X_ No___

Comments: None.

The continuing calibration blanks were run at 10% frequency.

Yes_X_ No___

Comments: Continuing calibration blanks were run every 10 samples.

A laboratory/preparation blank was run at the frequency of one per twenty samples, or per sample delivery group (whichever is more frequent), and for each matrix analyzed.

Yes_X_ No___

Comments: None.

All analyzed blanks were free of contamination.

Yes___ No_X_

Comments: The following table lists the blanks with contamination that resulted in qualification, elements present, affected samples, and data qualifiers:

Blank Contaminants

Blank ID	Contaminant	Concentration Found in Blank	IDL (ug/L)	Associated Samples	Concentration Found in Sample (ug/L)	Qualifier/ Adjustment
Leachate Blank	Selenium	9.2 ug/L	2.1	S0400HT S0208MN S0700FG S0201SP	12.4 10.9 11.9 9.5	U

VIII. FORM 4 - ICP INTERFERENCE CHECK SAMPLE

The ICP interference check sample (ICS) was run twice per eight hour shift and/or at the beginning and end of each sample set analysis sequence (whichever is more frequent).

Yes_X_ No___

Comments: None.

Percent recovery of the analytes in solution ICSAB were within the range of 80-120%.

Yes_X_ No___

Comments: None.

Sample results for aluminum, calcium, iron, and magnesium were less than the ICSA values.

Yes_X_ No___

Comments: None.

IX. FORM 5A - MATRIX SPIKE SAMPLE ANALYSIS

A matrix spike sample was analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes_X_ No___

Comments: None.

The percent recoveries (%R) were calculated correctly.

$$\%\ Recovery = \frac{(SSR - SR)}{SA} X\ 100$$

SSR = spiked sample result
SR = sample result
SA = spike added

Yes_X_ No___

Comments: None.

Spike recoveries were within the range of 75-125% (an exception is granted where the sample concentration is four times the spike concentration).

Yes_X_ No___

Comments: None.

X. FORM 5B - POST DIGEST SPIKE RECOVERY

A post-digest spike was performed for those elements that did not meet the specified criteria (i.e., Pre-digestion/pre-distillation spike recovery falls outside of control limits and sample result is less than four times the spike amount added, exception: Ag, Hg).

Yes___ No___ Not Required_X_

Comments: None.

XI. FORM 6 - DUPLICATE SAMPLE ANALYSIS

Duplicate sample analysis was performed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes_X_ No___

Comments: None.

The RPDs were calculated correctly.

$$RPD = \frac{(S - D)}{(S + D)/2} X\ 100$$

S = sample
D = duplicate

Yes_X_ No___

Comments: None.

For sample concentrations greater than five times the CRDL, RPDs were within ±20% (limits of ±35% apply for soil/sediments/tailings samples).

Yes_X_ No____ NA___

Comments: None.

For sample concentrations less than five times the CRDL, duplicate analysis results were within the control window of ± CRDL (two times CRDL for soils).

Yes_X_ No___

Comments: None.

XII. GFAA QC

Duplicate injections were performed on all GFAA samples and the RSD was within ± 20%.

Yes___ No___ NA_X_

Comments: GFAA analyses were not performed on these samples.

Analytical spikes were performed on all GFAA samples and the percent recovery was 85 - 115%.

Yes___ No___ NA_X_

Comments: GFAA analyses were not performed on these samples.

MSAs were analyzed when required and the correlation coefficient was > 0.995.

Yes___ No___ NA_X_

Comments: None.

XIII. FORM 7 - LABORATORY CONTROL SAMPLE

The laboratory control sample (LCS) was prepared and analyzed with every twenty or fewer samples of a similar matrix, or one per sample delivery group (whichever is more frequent).

Yes_X_ No___

Comments: None.

All results were within control limits.

Yes_X_ No___

Comments: All LCS results were within 80-120%.

XIV. FORM 8 - STANDARD ADDITION RESULTS

Results from graphite furnace standard additions were entered on Form VIII as directed in the SOW.

Yes___ No___ NA_X_

Comments: None.

XV. FORM 9 - ICP QC

A serial dilution was performed for ICP analysis with every twenty or fewer samples of a similar matrix, or one per sample delivery group, whichever is more frequent.

Yes_X_ No___

Comments: None.

The serial dilution was without interference problems as defined by the SOW.

Yes_X_ No___

Comments: All serial dilution %Ds were less than 10% or the original sample result was less than 50* the IDL.

XVI. FORM 10 - QUARTERLY INSTRUMENT DETECTION LIMITS (IDL)

IDLs were provided for all elements on the target analyte list.

Yes_X_ No___

Comments: None.

Reported IDLs met SOW requirements.

Yes_X_ No___

Comments: None.

XVII. FORM 11 - INTERELEMENT CORRECTION FACTORS FOR ICP

Interelement corrections for ICP were reported.

Yes_X_ No___

Comments: None.

XVIII. FORM 12 - ICP LINEAR RANGES

ICP linear ranges were reported.

Yes_X_ No___

Comments: None.

XIX. LINEAR RANGE VERIFICATION ANALYSIS

Linear Range Verification Analysis (LRA) was performed and results were within control limits of ± 5% of the true value.

Yes___ No___ NA_X_

Comments: None.

XX. FORM 13 - PREPARATION LOG

Information on the preparation of samples for analysis was reported on Form XIII.

Yes_X_ No___

Comments: None.

XXI. FORM 14 - ANALYSIS RUN LOG

A Form XIV with the required information was filled out for each analysis run in the data package.

Yes_X_ No___

Comments: None.

XXII. Additional Comments or Problems/Resolutions Not Addressed Above

Yes___ No_X_

Comments: None.

INORGANIC DATA QUALITY ASSURANCE REVIEW

Region VIII

DATA QUALIFIER DEFINITIONS

For the purpose of Data Validation, the following code letters and associated definitions are provided for use by the data validator to summarize the data quality. Use of additional qualifiers should be carefully considered. Definitions for all qualifiers used should be provided with each report.

GENERAL QUALIFIERS for use with both INORGANIC and ORGANIC DATA

R - Reported value is "rejected." Resampling or reanalysis may be necessary to verify the presence or absence of the compound.

J - The associated numerical value is an estimated quantity because the Quality Control criteria were not met.

U J - The reported quantitation limit is estimated because Quality Control criteria were not met. Element or compound was not detected.

N J - Estimated value of a tentatively identified compound. (Identified with a CAS number.) ORGANICS analysis only.

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.

ACRONYMS

AA	Atomic Absorption
Ag	Silver
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CRA	CRDL standard required for AA
CRDL	Contract Required Detection Limit
CRI	CRDL standard required for ICP
CV	Cold Vapor
EPA	U.S. Environmental Protection Agency
GFAA	Graphite Furnace Atomic Absorption
Hg	Mercury
ICB	Initial Calibration Blank
ICP	Inductively Coupled Plasma
ICS	Interference Check Sample
ICSA	Interference Check Sample (Solution A)
ICSAB	Interference Check Sample (Solution AB)
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
LCS	Laboratory Control Sample
LRA	Linear Range Verification Analysis
MSA	Method of Standard Additions
PDS	Post Digestion Spike
QC	Quality Control
RPD	Relative Percent Difference
RPM	Regional Project Manager
RSD	Percent Relative Standard Deviation
SA	Spike Added
SAS	Special Analytical Services
SDG	Sample Delivery Group
SOW	Statement of Work
SR	Sample Result
SSR	Spiked Sample Result
TPO	Technical Project Officer

SW846 METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0400HT

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: SAS No.: SDG No.: Q2589

atrix (soil/water): WATER Lab Sample ID: Q2589-1

evel (low/med): LOW Date Received: 6/19/02

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	23.0	B		P
7440-39-3	Barium	471	B		P
7440-43-9	Cadmium	440	B		P
7440-47-3	Chromium	3.0	B		P
7439-92-1	Lead	36700			P
7439-97-6	Mercury	0.10	U		CV
7782-49-2	Selenium	12.4	B		P
7440-22-4	Silver	0.50	U		P

u

RF 7/8/02

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

12

SW846 METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0208MN

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: SAS No.: SDG No.: Q2589

atrix (soil/water): WATER Lab Sample ID: Q2589-2

evel (low/med): LOW Date Received: 6/19/02

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	2.3	B		P
7440-39-3	Barium	301	B		P
7440-43-9	Cadmium	253	B		P
7440-47-3	Chromium	125	B		P
7439-92-1	Lead	107000			P
7439-97-6	*Mercury*	*1.1*	B		*CV*
7782-49-2	Selenium	10.9	B		P
7440-22-4	Silver	0.50	U		P

U

BF 7/11/02

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

SW846 METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0700FG

ab Name: COMPUCHEM Contract:

ab Code: LIBRTY Case No.: SAS No.: SDG No.: Q2589

atrix (soil/water): WATER Lab Sample ID: Q2589-3

evel (low/med): LOW Date Received: 6/19/02

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	126	B		P
7440-39-3	Barium	161	B		P
7440-43-9	Cadmium	377	B		P
7440-47-3	Chromium	4.0	B		P
7439-92-1	Lead	48300			P
7439-97-6	Mercury	0.22	B		CV
7782-49-2	Selenium	11.9	B		P
7440-22-4	Silver	0.50	U		P

U

RF 7/18/02

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

13

SW846 METALS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

S0201SP

Lab Name: COMPUCHEM Contract:

Lab Code: LIBRTY Case No.: SAS No.: SDG No.: Q2589

Matrix (soil/water): WATER Lab Sample ID: Q2589-4

Level (low/med): LOW Date Received: 6/19/02

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	39.1	B		P
7440-39-3	Barium	367	B		P
7440-43-9	Cadmium	33.9	B		P
7440-47-3	Chromium	6.0	B		P
7439-92-1	Lead	140000			P
7439-97-6	Mercury	1.8	B		CV
7782-49-2	Selenium	9.5	B		P
7440-22-4	Silver	5.9	B		P

TK 7/08/02

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10

APPENDIX C

XRF Results

TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0023MW1S1	6/10/2002	1431	62 U	43 U	380	150 U	17000	720 J	500 U	330 U	50 U	18000	40 J	510 U
S0033MW1S1	6/10/2002	1419	62 U	43 U	410	150 U	11000	510 J	500 U	330 U	50 U	18000	67	510 U
S0033MW1S2	6/10/2002	1346	62 U	43 U	470	150 U	28000	710 J	500 U	330 U	50 U	21000	22 J	510 U
S0043MW1D1	6/12/2002	958	62 U	34 U	470	170 U	6600 J	610 J	670 U	510 U	120 U	13000	26 J	330 U
S0043MW1S1	6/10/2002	1423	62 U	43 U	430	150 U	16000	550 J	500 U	330 U	51 J	22000	140	570 J
S0043MW1S2	6/10/2002	1350	120 J	78 U	440	150 U	15000	360 U	500 U	350 J	50 U	18000	780	510 U
S0043MW1S3	6/10/2002	1355	62 U	43 U	460	150 U	30000	760 J	500 U	330 U	50 U	17000	54	510 U
S00FCCM1S1	6/10/2002	1625	62 U	43 U	360	150 U	39000	710 J	500 U	330 U	50 U	16000	23 J	510 U
S01001SWA1	6/8/2002	914	45 U	51 U	420	130 U	13000	490 U	610 U	630 U	76 U	15000	66 J	440 U
S01001SWB1	6/8/2002	918	45 U	51 U	480	130 U	20000	490 U	610 U	630 U	76 U	16000	22 J	440 U
S01001SWC1	6/8/2002	922	45 U	51 U	450	130 U	15000	490 U	610 U	630 U	76 U	16000	42 J	440 U
S01001SWD1	6/8/2002	927	45 U	51 U	440	130 U	8400 J	780 J	610 U	630 U	76 U	16000	25 J	440 U
S01001SWE1	6/8/2002	935	45 U	51 U	460	130 U	8900 J	490 U	610 U	630 U	76 U	16000	42 J	440 U
S01001SWF1	6/8/2002	939	45 U	51 U	410	130 U	18000	830 J	610 U	630 U	76 U	18000	180	440 U
S01001SWF1D	6/8/2002	943	45 U	51 U	370	130 U	16000	790 J	610 U	630 U	76 U	18000	160	470 J
S01004END1	6/8/2002	1135	45 U	51 U	510	130 U	13000	640 J	610 U	630 U	76 U	18000	28 J	440 U
S01004END1B	6/8/2002	1140	45 U	51 U	82 U	130 U	2900 U	490 U	610 U	630 U	76 U	1400 U	21 U	440 U
S01007SWA1	6/8/2002	1220	45 U	51 U	430	130 U	13000	620 J	610 U	630 U	76 U	16000	21 U	440 U
S01007SWB1	6/8/2002	1224	45 U	51 U	400	130 U	11000	680 J	610 U	630 U	76 U	17000	21 U	440 U
S01007SWC1	6/8/2002	1228	45 U	51 U	450	130 U	9500 J	690 J	610 U	630 U	76 U	13000	21 U	460 J
S01007SWD1	6/8/2002	1232	45 U	54 J	350	130 U	15000	590 J	610 U	630 U	76 U	15000	21 U	440 U
S0100CEEA1	6/7/2002	1154	51 U	38 U	440 J	130 U	11000	370 U	460 U	320 U	100 U	15000	24 U	400 U
S0100CEEB1	6/7/2002	1158	51 U	38 U	380 J	130 U	9800	440 J	460 U	320 U	100 U	17000	100	400 U
S0100CEEC1	6/7/2002	1202	51 U	38 U	430 J	130 U	11000	370 U	460 U	320 U	100 U	17000	50 J	400 U
S0100CEED1	6/7/2002	1207	51 U	38 U	430 J	130 U	15000	460 J	460 U	320 U	100 U	17000	100	400 U
S0100CEEE1	6/7/2002	1210	51 U	38 U	480	130 U	11000	370 U	460 U	320 U	100 U	17000	70 J	460 J
S0100CEEF1	6/7/2002	1214	51 U	43 J	320 J	130 U	14000	480 J	460 U	320 U	100 U	18000	67 J	400 U
S0100CEEG1	6/7/2002	1219	51 U	38 U	320 J	140 J	12000	690 J	520 J	320 U	100 U	16000	54 J	400 U
S0100CEEG1R	6/7/2002	1105	51 U	39 J	340 J	130 U	12000	700 J	460 U	320 U	100 U	16000	30 J	400 U
S0100CEWA1	6/7/2002	1226	51 U	38 U	440 J	130 U	8900	550 J	460 U	320 U	100 U	16000	29 J	400 U
S0100CEWB1	6/7/2002	1231	51 U	38 U	380 J	130 U	10000	430 J	460 U	320 U	100 U	16000	80	400 U
S0100CEWC1	6/7/2002	1236	51 U	38 U	380 J	130 U	14000	660 J	460 U	320 U	100 U	18000	62 J	400 U
S0100CEWD1	6/7/2002	1355	51 U	38 U	440	130 U	11000	560 J	460 U	320 U	100 U	16000	53 J	400 U
S0100CEWE1	6/7/2002	1358	51 U	38 U	410 J	130 U	10000	640 J	460 U	320 U	100 U	20000	160	530 J
S0100CEWE1D	6/7/2002	1410	51 U	38 U	350 J	130 U	8800	670 J	460 U	320 U	100 U	19000	190	490 J

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0100CEWF1	6/7/2002	1414	51 U	43 J	290 J	130 U	12000	610 J	460 U	320 U	100 U	20000	100	400 U
S0100CEWG1	6/7/2002	1419	51 U	38 U	370 J	130 U	8900	560 J	460 U	450 J	100 U	21000	82	720 J
S0102RN1S1	6/11/2002	849	75 U	46 U	450	180 U	21000	640 J	920 U	580 U	55 U	15000	59 J	420 U
S01063W1D1	6/12/2002	938	62 U	34 U	470	170 U	9500	630 J	670 U	510 U	120 U	20000	29 J	710 J
S01063W1S1	6/10/2002	1026	62 U	43 U	350	150 U	8900 J	1100 J	500 U	330 U	50 U	17000	50 J	510 U
S01063W1S2	6/10/2002	1029	62 U	43 U	320	150 U	8900 J	590 J	500 U	330 U	50 U	19000	26 J	510 U
S01063W1S3	6/10/2002	1034	510	400 U	350	150 U	13000	560 J	500 U	330 U	50 U	30000	4000	1200 J
S0106CE1S1	6/9/2002	1402	66 U	51 U	490	210 U	13000	680 J	500 U	540 U	41 U	18000	64 J	640 U
S0106CE1S2	6/9/2002	1405	66 U	58 J	420	210 U	14000	720 J	500 U	540 U	41 U	17000	62 J	640 U
S0106CE1S3	6/9/2002	1410	66 U	51 U	360	210 U	47000	470 J	500 U	540 U	41 U	19000	35 U	640 U
S0106ME1S1	6/10/2002	1405	62 U	51 J	620	150 U	4500 J	450 J	500 U	350 J	50 U	20000	24 J	510 U
S01071S1S1	6/8/2002	1506	45 U	51 U	450	130 U	13000	510 J	610 U	630 U	76 U	15000	45 J	440 U
S01071S1S2	6/8/2002	1514	45 U	51 U	450	130 U	9400 J	550 J	610 U	630 U	76 U	16000	68 J	440 U
S0146MW1S1	6/10/2002	1629	62 U	43 U	320	150 U	28000	510 J	500 U	330 U	50 U	19000	29 J	510 U
S0146MW1S2	6/10/2002	1642	62 U	43 U	310	150 U	12000	570 J	500 U	330 U	50 U	19000	21 J	510 U
S0146MW1S3	6/10/2002	1652	62 U	43 U	240	150 U	12000	830 J	500 U	330 U	50 U	21000	16 U	550 J
S0169DI1S1	6/10/2002	1559	62 U	43 U	370	150 U	13000	680 J	500 U	370 J	50 U	17000	16 U	800 J
S0169DI1S2	6/10/2002	1549	62 U	43 U	430	150 U	8200 J	460 J	500 U	330 U	50 U	18000	16 U	840 J
S02003ENA1	6/6/2002	1558	60 U	36 U	470	180 U	22000	720 U	840 U	530 U	100 U	17000	36 J	400 U
S02003ENB1	6/6/2002	1602	60 U	36 U	420 J	180 U	18000	720 U	840 U	530 U	100 U	16000	53 J	400 U
S02003ENC1	6/6/2002	1606	60 U	36 U	400 J	180 U	20000	720 U	840 U	530 U	100 U	15000	70 J	400 U
S02003END1	6/6/2002	1610	60 U	47 J	480	180 U	13000	720 U	840 U	530 U	100 U	15000	36 U	400 U
S02003ENE1	6/6/2002	1614	60 U	36 U	440	180 U	6900 J	720 U	840 U	530 U	100 U	15000	36 U	400 U
S02003ENF1	6/6/2002	1619	60 U	36 U	420 J	180 U	5400 J	720 U	840 U	530 U	100 U	14000	36 U	400 U
S02003ENG1	6/6/2002	1623	60 U	36 U	440	180 U	8500	720 U	840 U	530 U	100 U	15000	40 J	400 U
S02003ESA1	6/7/2002	949	51 U	38 U	350 J	130 U	9700	650 J	460 U	320 U	100 U	19000	170	400 U
S02003ESB1	6/7/2002	956	51 U	38 U	380 J	130 U	15000	650 J	460 U	320 U	100 U	16000	140	400 U
S02003ESC1	6/7/2002	1001	51 U	38 U	450	130 U	15000	370 U	460 U	320 U	100 U	16000	58 J	400 U
S02003ESD1	6/7/2002	1005	51 U	38 U	520	130 U	15000	400 J	460 U	320 U	100 U	16000	24 U	400 U
S02003ESE1	6/7/2002	1009	51 U	38 U	390 J	130 U	9200	730 J	460 U	320 U	100 U	18000	44 J	400 U
S02003ESF1	6/7/2002	1013	51 U	38 U	410 J	130 U	9200	440 J	460 U	350 J	100 U	18000	56 J	400 U
S02003ESG1	6/7/2002	1017	51 U	38 U	420 J	130 U	7300 J	500 J	460 U	320 U	100 U	14000	24 U	400 U
S02003ESG1R	6/7/2002	1021	51 U	38 U	390 J	130 U	8800	700 J	460 U	320 U	100 U	15000	24 U	400 U
S02004SEA1	6/11/2002	1722	75 U	46 U	500	180 U	23000	590 J	920 U	580 U	55 U	15000	44 J	420 U
S02004SEB1	6/11/2002	1726	75 U	46 U	450	180 U	11000	440 J	920 U	580 U	55 U	17000	23 U	420 U

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S02004SEC1	6/11/2002	1731	75 U	46 U	340	180 U	25000	720 J	920 U	580 U	55 U	20000	89	420 U
S02004SED1	6/11/2002	1742	75 U	46 U	390	180 U	14000	720 J	920 U	580 U	55 U	19000	62 J	420 U
S02004SWB1	6/11/2002	1750	75 U	46 U	390	180 U	9700 J	480 J	920 U	580 U	55 U	16000	34 J	420 U
S02004SWC1	6/11/2002	1754	75 U	46 U	420	180 U	10000	690 J	920 U	580 U	55 U	17000	50 J	420 U
S02004SWD1	6/11/2002	1758	75 U	46 U	480	180 U	13000	630 J	920 U	580 U	55 U	17000	23 U	420 U
S0200CEEA1	6/7/2002	1032	51 U	38 U	370 J	130 U	10000	570 J	460 U	320 J	100 U	17000	81	400 U
S0200CEEA1B	6/7/2002	1037	51 U	38 U	130 U	130 U	2300 U	380 J	460 U	320 U	100 U	1600 U	24 U	400 U
S0200CEEB1	6/7/2002	1040	51 U	38 U	540	130 U	8200	710 J	460 U	320 U	100 U	13000	65 J	400 U
S0200CEEC1	6/7/2002	1045	51 U	38 U	390 J	130 U	13000	370 U	460 U	320 U	100 U	16000	70 J	400 U
S0200CEED1	6/7/2002	1049	51 U	38 U	390 J	130 U	12000	660 J	460 U	320 U	100 U	16000	110	400 U
S0200CEEE1	6/7/2002	1053	51 U	38 U	440 J	130 U	9400	630 J	460 U	320 U	100 U	15000	83	400 U
S0200CEEF1	6/7/2002	1057	51 U	38 U	410 J	130 U	10000	490 J	460 U	320 U	100 U	15000	53 J	400 U
S0200CEEG1	6/7/2002	1101	51 U	38 U	300 J	130 U	11000	630 J	460 U	410 J	100 U	15000	270	400 U
S0200CEWA1	6/7/2002	1109	51 U	38 U	480	130 U	12000	370 U	460 U	320 U	100 U	17000	48 J	400 U
S0200CEWB1	6/7/2002	1113	51 U	38 U	360 J	130 U	17000	550 J	460 U	320 U	100 U	15000	24 U	400 U
S0200CEWB1D	6/7/2002	1121	51 U	38 U	420 J	130 U	17000	420 J	460 U	320 U	100 U	15000	24 U	400 U
S0200CEWC1	6/7/2002	1125	51 U	38 U	510	130 U	14000	510 J	460 U	320 U	100 U	15000	29 J	400 U
S0200CEWD1	6/7/2002	1129	51 U	38 U	440 J	130 U	10000	370 J	460 U	320 U	100 U	16000	25 J	400 U
S0200CEWE1	6/7/2002	1134	51 U	38 U	490	130 U	7500	380 J	460 U	320 U	100 U	18000	24 U	400 U
S0200CEWF1	6/7/2002	1138	51 U	38 U	450	130 U	9300	660 J	460 U	320 U	100 U	14000	46 J	400 U
S0200CEWG1	6/7/2002	1142	51 U	39 J	510	130 U	13000	480 J	460 U	320 J	100 U	17000	31 J	400 U
S0200CEWG1R	6/7/2002	1146	51 U	38 U	530	180 J	14000	370 U	460 U	320 U	100 U	19000	25 J	400 U
S0200MNNA1	6/7/2002	1625	51 U	38 U	350 J	130 U	9600	530 J	460 U	320 U	100 U	21000	130	400 U
S0200MNNB1	6/7/2002	1629	51 U	38 U	310 J	130 U	11000	510 J	460 U	320 U	100 U	19000	150	400 U
S0200MNNC1	6/7/2002	1633	51 U	38 U	410 J	130 U	8700	540 J	460 U	410 J	100 U	16000	42 J	400 U
S0200MNND1	6/7/2002	1637	51 U	38 U	360 J	130 U	7400 J	660 J	550 J	330 J	100 U	15000	53 J	400 U
S0200MNNE1	6/7/2002	1645	51 U	38 U	440	130 U	5100 J	780 J	460 U	490 J	100 U	22000	59 J	620 J
S0200MNNF1	6/7/2002	1649	61 J	41 J	360 J	130 U	8300	630 J	460 U	340 J	100 U	18000	290	400 U
S0200MNNG1	6/7/2002	1653	51 U	38 U	390 J	130 U	7400 J	640 J	460 U	320 U	100 U	17000	130	400 U
S0200MNNG1R	6/7/2002	1657	51 U	38 U	430 J	130 U	7700	370 U	460 U	320 U	100 U	17000	110	470 J
S0200MNSA1	6/7/2002	1435	51 U	38 U	430 J	130 U	16000	370 U	460 U	320 U	100 U	17000	30 J	400 U
S0200MNSB1	6/7/2002	1439	51 U	38 U	340 J	130 U	11000	740 J	460 U	320 U	100 U	19000	100	400 U
S0200MNSC1	6/7/2002	1443	51 U	43 J	360 J	130 U	11000	690 J	460 U	320 U	100 U	17000	81	400 U
S0200MNSD1	6/7/2002	1447	51 U	38 U	390 J	130 U	12000	750 J	460 U	320 U	100 U	16000	93	420 J
S0200MNSDX	6/12/2002	950	62 U	34 U	430	170 U	6800 J	440 U	670 U	510 U	120 U	16000	53 J	330 U

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TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0200MNSE1	6/7/2002	1455	51 U	38 U	460	130 U	13000	410 J	460 U	350 J	100 U	16000	71 J	400 U
S0200MNSF1	6/7/2002	1459	51 U	38 U	430 J	130 U	14000	620 J	500 J	320 U	100 U	15000	61 J	400 U
S0200MNSG1	6/7/2002	1504	51 U	54 U	310 J	130 U	13000	660 J	460 U	320 U	100 U	17000	540	400 U
S0200RAMA1	6/8/2002	822	45 U	51 U	410	130 U	21000	600 J	610 U	630 U	76 U	17000	56 J	440 U
S0200RAMB1	6/8/2002	826	45 U	51 U	420	130 U	23000	490 U	610 U	630 U	76 U	17000	21 U	440 U
S0200RAMC1	6/8/2002	830	45 U	51 U	430	130 U	22000	910 J	610 U	630 U	76 U	17000	21 U	440 U
S0200RAMD1	6/8/2002	834	45 U	51 U	540	130 U	12000	610 J	610 U	630 U	76 U	12000	39 J	440 U
S0200RAME1	6/8/2002	838	45 U	51 U	450	130 U	23000	490 U	610 U	630 U	76 U	20000	21 U	440 U
S0200RAMF1	6/8/2002	841	45 U	51 U	460	130 U	21000	490 U	610 U	630 U	76 U	18000	32 J	440 U
S0200RAMG1	6/8/2002	846	45 U	51 U	460	130 U	11000	560 J	610 U	630 U	76 U	20000	63 J	440 U
S0200RAMG1R	6/8/2002	850	45 U	51 U	390	130 U	13000	730 J	610 U	630 U	76 U	20000	51 J	440 U
S0200RAMH1	6/8/2002	854	45 U	73 J	420	130 U	14000	490 U	610 U	630 U	76 U	22000	21 U	440 U
S0200RAMI1	6/8/2002	858	45 U	51 U	440	130 U	15000	490 U	610 U	630 U	76 U	18000	100	440 U
S0200RAMJ1	6/8/2002	902	45 U	51 U	480	130 U	9000 J	630 J	610 U	630 U	76 U	18000	130	440 U
S0200RAMK1	6/8/2002	906	45 U	51 U	330	130 U	8700 J	490 U	610 U	630 U	76 U	17000	110	500 J
S0200RAML1	6/8/2002	910	45 U	51 U	410	130 U	6500 J	600 J	610 U	630 U	76 U	20000	80	440 U
S0201SP1D1	6/12/2002	910	62 U	46 J	360	170 U	5800 J	480 J	670 U	510 U	120 U	23000	110	510 J
S0201SP1S1	6/8/2002	1632	45 U	51 U	420	130 U	19000	540 J	610 U	630 U	76 U	20000	140	820 J
S0201SP1S2	6/8/2002	1636	45 U	51 U	390	130 U	11000	490 U	610 U	630 U	76 U	17000	26 J	440 U
S0201SP1S2D	6/8/2002	1640	45 U	51 U	410	130 U	12000	590 J	610 U	630 U	76 U	17000	41 J	440 U
S0201SP1S3	6/8/2002	1646	560	180	420	130 U	20000	610 J	610 U	630 U	76 U	22000	1700	440 U
S02021S1S1	6/8/2002	1523	45 U	51 U	350	130 U	11000	670 J	610 U	630 U	76 U	18000	66 J	440 U
S02021S1S2	6/8/2002	1531	45 U	51 U	360	130 U	9500 J	620 J	610 U	630 U	76 U	16000	28 J	440 U
S0202CE1S1	6/9/2002	1326	66 U	51 U	430	210 U	12000	560 J	500 U	540 U	41 U	20000	71 J	640 U
S0202CE1S2	6/9/2002	1334	66 U	51 U	370	210 U	13000	620 J	500 U	540 U	41 U	19000	35 U	770 J
S0202LPNE1	6/8/2002	1128	45 U	51 U	360	130 U	7900 J	780 J	610 U	630 U	76 U	16000	21 U	440 U
S0202LPNW1	6/8/2002	1123	45 U	51 U	330	130 U	8500 J	490 U	610 U	630 U	76 U	16000	21 U	560 J
S0202LPSE1	6/8/2002	1111	45 U	51 U	380	130 U	6400 J	490 U	610 U	630 U	76 U	15000	21 U	440 U
S0202LPSE1D	6/8/2002	1115	45 U	51 U	390	130 U	7700 J	490 U	610 U	630 U	76 U	15000	21 U	440 U
S0202LPSW1	6/8/2002	1119	45 U	51 U	370	130 U	6700 J	790 J	610 U	630 U	76 U	16000	21 U	440 U
S0202LPTC1	6/8/2002	1131	45 U	51 U	380	130 U	4200 J	490 U	610 U	630 U	76 U	18000	21 U	440 U
S02035L1S1	6/10/2002	1038	62 U	43 U	370	150 U	13000	640 J	500 U	330 U	50 U	15000	25 J	510 U
S02035L1S2	6/10/2002	1046	62 U	43 U	360	150 U	15000	650 J	500 U	330 U	50 U	15000	16 U	510 U
S0205AL1S1	6/9/2002	1159	66 U	51 U	390	210 U	11000	700 J	500 U	540 U	41 U	16000	35 U	640 U
S0205AL1S2	6/9/2002	1202	66 U	51 U	390	210 U	9500	630 J	500 U	540 U	41 U	18000	35 U	640 U

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TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0205AL1S3	6/9/2002	1207	66 U	51 U	420	210 U	14000	630 J	500 U	540 U	41 U	17000	35 U	640 U
S0205MN1S1	6/10/2002	853	62 U	43 U	350	150 U	13000	720 J	500 U	340 J	50 U	19000	54	510 U
S0205MN1S2	6/10/2002	857	62 U	43 U	300	150 U	9000 J	520 J	500 U	330 U	50 U	16000	31 J	510 U
S0205RN1S1	6/11/2002	813	75 U	46 U	320	180 U	10000	820 J	920 U	580 U	55 U	20000	100	420 U
S02061S1D1	6/12/2002	942	62 U	34 U	510	170 U	11000	680 J	670 U	510 U	120 U	16000	43 J	330 U
S02061S1S1	6/8/2002	1543	45 U	51 U	450	130 J	7300 J	610 J	610 U	630 U	76 U	17000	21 J	440 U
S02061S1S2	6/8/2002	1551	45 U	51 U	540	130 U	11000	580 J	610 U	630 U	76 U	17000	510	700 J
S02061S1S3	6/8/2002	1559	45 U	51 U	410	130 U	46000	610 J	610 U	630 U	76 U	19000	100	440 U
S02063W1S1	6/10/2002	1017	62 U	43 U	380	150 U	9000 J	630 J	500 U	330 U	50 U	13000	16 U	510 U
S02063W1S2	6/10/2002	1022	62 U	43 U	350	150 U	16000	530 J	500 U	470 J	50 U	16000	61	680 J
S0208CE1S1	6/9/2002	1338	66 U	51 U	400	210 U	14000	660 J	500 U	540 U	41 U	18000	66 J	640 U
S0208CE1S2	6/9/2002	1341	66 U	51 U	370	210 U	13000	650 J	500 U	540 U	41 U	18000	49 J	640 U
S0208CE1S3	6/9/2002	1346	66 U	51 U	410	210 U	14000	460 U	500 U	540 U	41 U	17000	59 J	640 U
S0208MN1S1	6/11/2002	833	75 U	46 U	460	180 U	8100 J	710 J	920 U	580 U	55 U	16000	53 J	420 U
S0208MN1S2	6/11/2002	838	79 J	81 U	410	180 U	10000	570 J	920 U	580 U	55 U	19000	820	420 U
S0208MN1S3	6/11/2002	843	2500	1400	310	180 U	5100 J	470 J	920 U	580 U	55 U	49000	11000	1100 J
S0209RW1S1	6/11/2002	822	75 U	46 U	380	180 U	26000	740 J	920 U	580 U	55 U	22000	220	420 U
S0210SP1S1	6/12/2002	853	62 U	34 U	390	170 U	11000	460 J	670 U	510 U	120 U	15000	53 J	330 U
S0210SP1S2	6/12/2002	858	62 U	34 U	380	170 U	12000	800 J	670 U	510 U	120 U	16000	39 J	720 J
S02111S1S1	6/8/2002	1607	45 U	51 U	580	130 U	17000	650 J	610 U	630 U	76 U	28000	110	470 J
S02111S1S2	6/8/2002	1616	45 U	51 U	330	130 U	9400 J	700 J	610 U	630 U	76 U	17000	40 J	440 U
S0211SP1S1	6/8/2002	1650	45 U	51 U	400	130 U	15000	490 U	610 U	630 U	76 U	18000	60 J	440 U
S0211SP1S2	6/8/2002	1655	45 U	51 U	520	130 U	13000	570 J	610 U	630 U	76 U	26000	170	440 U
S0213SP1S1	6/8/2002	1658	45 U	51 U	410	130 U	19000	620 J	610 U	630 U	76 U	16000	100	440 U
S0213SP1S2	6/8/2002	1702	45 U	51 U	370	130 U	13000	590 J	610 U	630 U	76 U	18000	89	440 U
S0225FC1S1	6/12/2002	832	62 U	34 U	340	170 U	21000	940 J	670 U	510 U	120 U	16000	55 J	330 U
S0225FC1S1D	6/12/2002	844	62 U	34 U	440	170 U	22000	680 J	670 U	510 U	120 U	17000	130	330 U
S0225FC1S2	6/12/2002	849	160 J	300	320 J	170 U	10000	760 J	670 U	510 U	120 U	24000	1600	840 J
S03002WNF1	6/11/2002	1446	75 U	46 U	440	180 U	13000	430 J	920 U	580 U	55 U	17000	99	430 J
S03002WNG1	6/11/2002	1450	75 U	46 U	320	180 U	15000	530 J	920 U	580 U	55 U	17000	41 J	420 U
S03002WSF1	6/11/2002	1435	75 U	46 U	430	180 U	25000	730 J	920 U	580 U	55 U	20000	23 U	420 U
S03002WSG1	6/11/2002	1440	75 U	46 U	390	180 U	27000	580 J	920 U	580 U	55 U	23000	39 J	420 U
S03003ENA1	6/6/2002	1627	60 U	36 U	370 J	180 U	15000	720 U	840 U	530 U	100 U	18000	36 U	520 J
S03003ENB1	6/6/2002	1631	60 U	36 U	410 J	180 U	10000	720 U	840 U	530 U	100 U	16000	190	400 U
S03003ENC1	6/6/2002	1635	60 U	36 U	450	180 U	10000	720 U	840 U	530 U	100 U	17000	110 J	400 U

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TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S03003END1	6/6/2002	1639	60 U	36 U	320 J	180 U	9800	820 J	840 U	530 U	100 U	16000	75 J	400 U
S03003ENE1	6/6/2002	1643	60 U	40 J	430 J	180 U	9100	720 U	840 U	530 U	100 U	16000	36 U	400 U
S03003ENF1	6/6/2002	1647	60 U	36 U	410 J	180 U	9800	720 U	840 U	530 U	100 U	17000	51 J	400 U
S03003ENG1	6/6/2002	1652	60 U	36 U	410 J	180 U	9600	720 U	840 U	530 U	100 U	16000	36 U	400 U
S03003ESA1	6/6/2002	1655	60 U	36 U	270 J	180 U	11000	840 J	840 U	530 U	100 U	19000	220	400 U
S03003ESA1D	6/6/2002	1659	60 U	36 U	330 J	180 U	12000	910 J	840 U	530 U	100 U	19000	220	400 U
S03003ESB1	6/6/2002	1704	60 U	36 U	330 J	180 U	13000	720 U	840 U	530 U	100 U	18000	270	510 J
S03003ESC1	6/6/2002	1708	60 U	36 U	400 J	180 U	12000	720 U	840 U	530 U	100 U	20000	180	400 U
S03003ESD1	6/6/2002	1711	60 U	54 J	480	180 U	13000	720 U	840 U	530 U	100 U	15000	44 J	400 U
S03003ESE1	6/6/2002	1716	60 U	36 U	470	180 U	17000	720 U	840 U	530 U	100 U	16000	81 J	400 U
S03003ESF1	6/7/2002	835	51 U	38 U	470	130 U	17000	390 J	460 U	320 U	100 U	18000	66 J	460 J
S03003ESG1	6/7/2002	839	51 U	38 U	550	130 U	9800	480 J	460 U	320 U	100 U	17000	43 J	550 J
S03003SEA1	6/11/2002	1638	75 U	46 U	380	180 U	14000	840	920 U	580 U	55 U	18000	58 J	420 U
S03003SEB1	6/11/2002	1643	75 U	46 U	370	180 U	20000	690 J	920 U	580 U	55 U	19000	42 J	740 J
S03003SEC1	6/11/2002	1648	75 U	46 U	410	180 U	14000	670 J	920 U	580 U	55 U	17000	54 J	420 U
S03003SEC1R	6/11/2002	1653	75 U	46 U	400	180 U	12000	490 J	920 U	580 U	55 U	17000	33 J	420 U
S03003SED1	6/11/2002	1658	75 U	46 U	450	180 U	10000	500 J	920 U	580 U	55 U	18000	240	480 J
S03003SWA1	6/11/2002	1703	75 U	46 U	300	180 U	18000	550 J	920 U	580 U	55 U	18000	34 J	420 U
S03003SWB1	6/11/2002	1707	75 U	46 U	440	180 U	11000	690 J	920 U	580 U	55 U	18000	29 J	420 U
S03003SWC1	6/11/2002	1713	75 U	46 U	420	180 U	8800 J	530 J	920 U	580 U	55 U	17000	23 U	420 U
S03003SWD1	6/11/2002	1717	75 U	46 U	380	180 U	39000	630 J	920 U	580 U	55 U	19000	23 U	520 J
S03004SEA1	6/11/2002	1802	75 U	46 U	390	180 U	14000	680 J	920 U	580 U	55 U	17000	30 J	420 U
S03004SEB1	6/11/2002	1806	75 U	46 U	450	180 U	6400 J	440 J	920 U	580 U	55 U	17000	23 U	460 J
S03004SEC1	6/11/2002	1810	75 U	46 U	380	180 U	14000	820 J	920 U	580 U	55 U	18000	25 J	460 J
S03004SEC1R	6/12/2002	828	62 U	34 U	340	170 U	11000	530 J	670 U	510 U	120 U	17000	47 J	490 J
S03004SED1	6/11/2002	1814	75 U	46 U	230 J	180 U	68000	620 J	920 U	580 U	55 U	19000	84	420 U
S03004SWA1	6/11/2002	1818	75 U	59 J	260	180 U	21000	690 J	920 U	580 U	55 U	19000	74 J	420 U
S03004SWB1	6/12/2002	805	62 U	37 J	420	170 U	20000	600 J	670 U	510 U	120 U	14000	100	330 U
S03004SWC1	6/12/2002	809	62 U	34 U	380	170 U	14000	440 U	670 U	510 U	120 U	17000	69 J	570 J
S03004SWD1	6/12/2002	813	62 U	54 J	290 J	170 U	9800	870 J	670 U	510 U	120 U	16000	25 J	330 U
S0300AL1S1	6/9/2002	1143	66 U	51 U	430	210 U	12000	730 J	500 U	540 U	41 U	18000	35 U	930 J
S0300AL1S2	6/9/2002	1147	66 U	51 U	390	210 U	11000	670 J	500 U	540 U	41 U	18000	35 U	640 U
S0300AL1S3	6/9/2002	1150	66 U	51 U	400	210 U	11000	630 J	500 U	540 U	41 U	18000	35 U	640 U
S0300AL2S1	6/9/2002	1155	66 U	51 U	380	210 U	12000	550 J	520 J	540 U	41 U	20000	36 J	640 U
S0300CEEE1	6/7/2002	1423	51 U	38 U	390 J	130 U	15000	470 J	460 U	320 U	100 U	15000	44 J	400 U

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1A
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0300CEEG1	6/7/2002	1427	51 U	38 U	360 J	130 U	8200	890 J	460 U	320 U	100 U	16000	55 J	400 U
S0300CEWG1	6/7/2002	1150	51 U	38 U	450	130 U	11000	490 J	460 U	320 U	100 U	16000	75 J	400 U
S0300FCEA1	6/8/2002	1007	45 U	51 U	380	130 U	85000	620 J	610 U	630 U	76 U	18000	21 U	440 U
S0300FCEB1	6/8/2002	1011	45 U	51 U	410	130 U	2900 U	490 U	610 U	630 U	76 U	11000	21 U	440 U
S0300FCEC1	6/8/2002	15	45 U	51 U	420	130 U	25000	490 U	610 U	630 U	76 U	17000	43 J	440 U
S0300FCED1	6/8/2002	1019	66 J	51 U	500	130 U	23000	670 J	610 U	630 U	76 U	16000	35 J	440 U
S0300FCWA1	6/8/2002	1023	47 J	51 U	520	130 U	34000	490 U	610 U	630 U	76 U	16000	26 J	440 U
S0300FCWB1	6/8/2002	1027	45 U	51 U	350	130 U	33000	710 J	610 U	630 U	76 U	20000	60 J	440 U
S0300FCWC1	6/8/2002	1031	45 U	51 U	420	130 U	28000	490 U	610 U	630 U	76 U	17000	47 J	440 U
S0300MNNA1	6/7/2002	1701	51 U	43 J	360 J	130 U	9500	630 J	460 U	410 J	100 U	16000	150	400 U
S0300MNNB1	6/7/2002	1705	51 U	38 U	430 J	130 U	9000	680 J	460 U	320 U	100 U	17000	90	400 U
S0300MNNC1	6/7/2002	1709	51 U	38 U	390 J	130 U	8600	600 J	460 U	360 J	100 U	17000	110	430 J
S0300MNNE1	6/7/2002	1713	51 U	38 U	300 J	130 U	10000	610 J	460 U	320 U	100 U	18000	200	510 J
S0300MNNF1	6/7/2002	1717	51 U	38 U	340 J	130 U	13000	820 J	590 J	320 U	100 U	16000	130	470 J
S0300MNNF1D	6/8/2002	814	45 U	51 U	330	130 U	12000	600 J	610 U	630 U	76 U	16000	100	440 U
S0300MNNG1	6/8/2002	818	50 J	51 U	360	130 U	9700	580 J	610 U	630 U	76 U	18000	250	590 J
S0300MNSA1	6/7/2002	1508	51 U	38 U	510	130 U	12000	910 J	460 U	320 U	100 U	21000	28 J	520 J
S0300MNSB1	6/7/2002	1513	51 U	38 U	530	130 U	12000	750 J	460 U	320 U	100 U	16000	24 U	400 U
S0300MNSC1	6/7/2002	1516	51 U	38 U	490	130 U	11000	540 J	460 U	320 U	100 U	17000	24 U	400 U
S0300MNSD1	6/7/2002	1520	53 J	38 U	1600	130 U	5600 J	800 J	460 U	320 U	100 U	23000	24 U	660 J
S0300MNSF1	6/7/2002	1528	51 U	44 J	340 J	130 U	5500 J	490 J	460 U	320 U	100 U	15000	31 J	400 U
S0300MNSG1	6/7/2002	1532	51 U	38 U	360 J	130 U	8900	550 J	460 U	390 J	100 U	17000	110	400 U
S0300MNSG1R	6/7/2002	1537	51 U	38 U	390 J	130 U	7800	460 J	460 U	320 U	100 U	17000	95	400 U
S0300RWSA1	6/8/2002	947	45 U	51 U	300	130 U	15000	560 J	610 U	630 U	76 U	18000	44 J	440 U
S0300RWSB1	6/8/2002	951	55 J	51 U	380	130 U	6900 J	860 J	610 U	630 U	76 U	21000	26 J	440 U
S0300RWSC1	6/8/2002	955	45 U	56 J	490	130 U	11000	600 J	610 U	630 U	76 U	19000	21 U	440 U
S0300RWSD1	6/8/2002	959	45 U	51 U	400	130 U	6100 J	510 J	610 U	630 U	76 U	17000	49 J	440 U
S0300RWSF1	6/8/2002	1003	45 U	51 U	450	130 U	7500 J	580 J	610 U	630 U	76 U	15000	34 J	440 U
S0300SPEA1	6/8/2002	1035	45 U	51 U	490	130 U	12000	640 J	610 U	630 U	76 U	16000	30 J	440 U
S0300SPEB1	6/8/2002	1039	45 U	51 U	450	130 U	12000	490 U	610 U	630 U	76 U	16000	54 J	440 U
S0300SPEC1	6/8/2002	1043	45 U	51 U	510	130 U	19000	490 U	610 U	630 U	76 U	16000	31 J	440 U
S0300SPED1	6/8/2002	1047	45 U	51 U	440	130 U	13000	560 J	610 U	630 U	76 U	15000	42 J	440 U
S0300SPEE1	6/8/2002	1055	45 U	51 U	500	130 U	11000	500 J	610 U	630 U	76 U	16000	81	440 U
S0300SPEF1	6/8/2002	1059	45 U	51 U	440	130 U	9500 J	640 J	610 U	630 U	76 U	18000	64 J	440 U
S0300SPEG1	6/8/2002	1103	45 U	51 U	410	130 U	9400 J	530 J	610 U	630 U	76 U	18000	110	510 J

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TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0300SPEG1R	6/8/2002	1107	45 U	51 U	390	130 U	8600 J	580 J	610 U	630 U	76 U	17000	100	440 U
S0304MA1S1	6/9/2002	1302	66 U	51 U	330	210 U	15000	910 J	500 U	540 U	41 U	24000	35 U	640 U
S0304MA1S2	6/9/2002	1306	66 U	51 U	370	210 U	12000	680 J	500 U	540 U	41 U	20000	35 U	640 U
S0304MA1S3	6/9/2002	1310	66 U	51 U	360	210 U	14000	480 J	500 U	540 U	41 U	20000	60 J	640 U
S0304MA1S4	6/9/2002	1314	66 U	51 U	480	210 U	10000	730 J	500 U	540 U	41 U	21000	35 U	640 U
S0304MA1S5	6/9/2002	1318	66 U	51 U	390	210 U	15000	690 J	500 U	540 U	41 U	20000	89 J	640 U
S0304MA1S5R	6/9/2002	1322	66 U	51 U	380	210 U	14000	730 J	500 U	540 U	41 U	19000	120	640 U
S03053W1S1	6/10/2002	1010	62 U	43 U	420	150 U	9100 J	670 J	500 U	330 U	50 U	17000	54	510 U
S03053W1S2	6/10/2002	1013	62 U	43 U	390	150 U	16000	600 J	500 U	350 J	50 U	21000	30 J	510 U
S0306AR1S1	6/9/2002	1507	66 U	51 U	400	210 U	11000	460 U	500 U	540 U	41 U	21000	35 U	640 U
S0306AR1S2	6/9/2002	1511	66 U	51 U	340	210 U	8900	800 J	500 U	540 U	41 U	18000	35 U	640 U
S0306AR1S3	6/9/2002	1516	66 U	51 U	300	210 U	9800	590 J	500 U	540 U	41 U	17000	180	640 U
S0306AR1S3R	6/9/2002	1520	66 U	51 U	390	210 U	11000	640 J	500 U	540 U	41 U	18000	190	640 U
S0306AR2S1	6/9/2002	1559	66 U	51 U	360	210 U	9300	690 J	500 U	540 U	41 U	19000	35 U	640 U
S0306MA1S1	6/9/2002	1250	66 U	51 U	370	210 U	16000	690 J	500 U	540 U	41 U	21000	35 U	800 J
S0306MA1S2	6/9/2002	1254	66 U	51 U	370	210 U	11000	460 J	500 U	540 U	41 U	22000	35 U	740 J
S0306MA1S2D	6/9/2002	1258	66 U	51 U	380	210 U	11000	570 J	500 U	540 U	41 U	23000	35 U	730 J
S0307IM1S1	6/10/2002	1544	62 U	43 J	440	150 U	24000	900 J	500 U	330 U	50 U	23000	120	1200 J
S0307MA1S1	6/9/2002	1238	66 U	51 U	300	210 U	16000	780 J	500 U	540 U	41 U	21000	35 U	820 J
S0307MA1S2	6/9/2002	1242	66 U	51 U	300	210 U	16000	590 J	500 U	540 U	41 U	22000	35 U	660 J
S0307MA1S3	6/9/2002	1246	66 U	51 U	390	210 U	14000	560 J	500 U	540 U	41 U	19000	35 U	640 U
S0309MT1S1	6/9/2002	1640	66 U	51 U	380	210 U	11000	680 J	500 U	540 U	41 U	20000	35 U	640 U
S0309MT1S2	6/9/2002	1652	66 U	51 U	380	210 U	10000	570 J	500 U	540 U	41 U	18000	35 U	640 U
S0309MT1S3	6/9/2002	1656	66 U	51 U	350	210 U	17000	720 J	500 U	540 U	41 U	19000	35 U	640 U
S03102E1S1	6/8/2002	1619	45 U	51 U	430	130 U	11000	580 J	610 U	630 U	76 U	17000	59 J	650 J
S0311MA1S1	6/9/2002	1226	66 U	51 U	560	210 U	11000	810 J	500 U	540 U	41 U	20000	35 U	640 U
S0311MA1S2	6/9/2002	1230	66 U	51 U	350	210 U	14000	670 J	500 U	540 U	41 U	22000	36 J	1100 J
S0311MA1S3	6/9/2002	1234	66 U	51 U	320	210 U	18000	890 J	500 U	540 U	41 U	22000	69 J	640 U
S0311MN1S1	6/10/2002	901	62 U	43 U	370	150 U	11000	510 J	500 U	330 U	50 U	18000	36 J	510 U
S0311MN1S2	6/10/2002	905	62 U	45 J	380	150 U	9000 J	450 J	500 U	330 U	50 U	17000	16 U	510 U
S0319OM1S1	6/10/2002	1414	62 U	43 U	420	150 U	18000	380 J	500 U	330 U	50 U	18000	48 J	510 J
S0319OM1S2	6/10/2002	1427	62 U	43 U	460	150 U	18000	690 J	500 U	330 U	50 U	18000	55	510 U
S0319OM1S3	6/10/2002	1444	62 U	43 U	480	150 U	14000	590 J	500 U	330 U	50 U	16000	30 J	510 U
S04002WNA1	6/11/2002	1521	75 U	46 U	450	180 U	17000	490 J	920 U	580 U	55 U	15000	350	420 U
S04002WNB1	6/11/2002	1526	75 U	46 U	230 J	180 U	13000	950	920 U	580 U	55 U	21000	50 J	420 U

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TABLE 1A
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S04002WNC1	6/11/2002	1531	75 U	46 U	430	180 U	8500 J	750 J	920 U	580 U	55 U	16000	33 J	420 U
S04002WNC1R	6/11/2002	1559	75 U	58 J	400	180 U	53000	480 J	920 U	580 U	55 U	16000	23 U	420 U
S04002WND1	6/11/2002	1540	75 U	46 U	390	180 U	9400 J	540 J	920 U	580 U	55 U	16000	48 J	420 U
S04002WNE1	6/11/2002	1553	75 U	60 J	430	180 U	47000	670 J	920 U	580 U	55 U	17000	23 U	420 U
S04002WSA1	6/11/2002	1457	75 U	46 U	370	180 U	35000	530 J	920 U	580 U	55 U	18000	27 J	690 J
S04002WSB1	6/11/2002	1502	75 U	46 U	430	180 U	12000	550 J	920 U	580 U	55 U	21000	68 J	420 U
S04002WSC1	6/11/2002	1506	75 U	46 U	440	180 U	9500 J	530 J	920 U	580 U	55 U	19000	23 U	420 U
S04002WSD1	6/11/2002	1511	130 J	100 J	360	180 U	6600 J	900	920 U	580 U	55 U	21000	770	600 J
S04002WSE1	6/11/2002	1516	75 U	46 U	400	180 U	11000	650 J	920 U	580 U	55 U	17000	85	420 U
S04003ENA1	6/7/2002	843	51 U	38 U	580	130 U	9700	590 J	460 U	320 U	100 U	14000	38 J	400 U
S04003ENB1	6/7/2002	847	51 U	38 U	510	130 U	7300 J	460 J	460 U	320 U	100 U	13000	24 U	400 U
S04003ENC1	6/7/2002	851	51 U	38 U	550	130 U	17000	470 J	460 U	320 U	100 U	17000	38 J	400 U
S04003END1	6/7/2002	855	51 U	38 U	500	130 U	17000	570 J	460 U	320 U	100 U	16000	24 U	400 U
S04003ENE1	6/7/2002	859	51 U	38 U	360 J	130 U	11000	820 J	460 U	320 U	100 U	16000	160	430 J
S04003ENF1	6/7/2002	903	51 U	38 U	460	130 U	7500 J	370 U	460 U	320 U	100 U	13000	32 J	400 U
S04003ENG1	6/7/2002	907	51 U	38 U	400 J	130 U	8800	800 J	460 U	320 U	100 U	14000	37 J	400 U
S04003ESA1	6/7/2002	911	51 U	38 U	380 J	130 U	9400	840 J	460 U	320 U	100 U	19000	78 J	400 U
S04003ESB1	6/7/2002	915	51 U	38 U	430 J	130 U	11000	630 J	460 U	320 U	100 U	16000	68 J	400 U
S04003ESC1	6/7/2002	919	51 U	38 U	490	130 U	17000	680 J	460 U	320 U	100 U	18000	43 J	400 U
S04003ESD1	6/7/2002	923	51 U	38 U	530	130 U	24000	480 J	460 U	350 J	100 U	16000	24 U	400 U
S04003ESDX	6/12/2002	837	62 U	34 U	390	170 U	7200 J	580 J	670 U	510 U	120 U	18000	23 U	330 U
S04003ESE1	6/7/2002	927	250	220 U	340 J	130 U	11000	600 J	460 U	460 J	100 U	26000	2200	840 J
S04003ESF1	6/7/2002	932	51 U	43 J	450	130 U	15000	370 U	460 U	320 U	100 U	15000	230	400 U
S04003ESG1	6/7/2002	936	51 U	38 U	390 J	130 U	12000	670 J	460 U	320 U	100 U	17000	100	400 U
S04003ESG1D	6/7/2002	940	51 U	38 U	450	130 U	9600	660 J	460 U	320 U	100 U	15000	110	400 U
S04003ESG1R	6/7/2002	944	51 U	38 U	380 J	130 U	11000	570 J	460 U	390 J	100 U	15000	110	400 U
S0400DI1S1	6/12/2002	817	62 U	34 U	440	170 U	15000	440 U	670 U	510 U	120 U	15000	43 J	350 J
S0400EHCC1	6/8/2002	1354	45 U	51 U	410	130 U	7000 J	580 J	610 U	630 U	76 U	15000	21 U	440 U
S0400EM1S1	6/11/2002	1123	75 U	46 U	360	180 U	8000 J	680 J	920 U	580 U	55 U	22000	23 U	420 U
S0400EM1S2	6/11/2002	1128	75 U	47 J	370	180 U	12000	530 J	920 U	580 U	55 U	21000	23 U	570 J
S0400EM1S3	6/11/2002	1134	75 U	46 U	370	180 U	21000	560 J	920 U	580 U	55 U	18000	23 U	420 U
S0400EM1S4	6/11/2002	1138	75 U	46 U	240	180 U	9200 J	650 J	920 U	580 U	55 U	22000	30 J	490 J
S0400EM1S5	6/11/2002	1144	75 U	46 U	470	180 U	12000	510 J	920 U	580 U	55 U	23000	25 J	420 U
S0400HS1S1	6/11/2002	1047	75 U	46 U	350	180 U	11000	620 J	920 U	580 U	55 U	19000	23 U	420 U
S0400HS1S2	6/11/2002	1052	75 U	48 J	290	180 U	14000	430 J	920 U	580 U	55 U	19000	29 J	420 U

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TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0400HS1S3	6/11/2002	1043	75 U	46 U	430	180 U	8500 J	780 J	920 U	580 U	55 U	16000	23 U	420 U
S0400HS1S4	6/11/2002	1058	75 U	46 U	420	180 U	7800 J	560 J	920 U	580 U	55 U	16000	27 J	420 U
S0400HS1S5	6/11/2002	1102	75 U	46 U	400	180 U	21000	720 J	920 U	580 U	55 U	18000	26 J	420 U
S0400HS1S6	6/11/2002	1119	75 U	46 U	400	180 U	7500 J	610 J	920 U	580 U	55 U	19000	38 J	560 J
S0400HT1S1	6/9/2002	1556	66 U	51 U	330	210 U	18000	620 J	500 U	540 U	41 U	14000	35 U	640 U
S0400HT2DC	6/9/2002	1620	66 U	51 U	410	210 U	18000	550 J	500 U	540 U	41 U	17000	35 U	640 U
S0400HT2DCB	6/10/2002	1102	62 U	43 U	53 U	150 U	2900 U	360 U	500 U	330 U	50 U	1600 U	16 U	510 U
S0400HT2S1	6/9/2002	1604	66 U	51 U	320	210 U	7500	460 U	500 U	540 U	41 U	15000	35 U	640 U
S0400HT2S2	6/9/2002	1608	66 U	51 U	350	210 U	10000	780 J	500 U	540 U	41 U	17000	46 J	640 U
S0400HT2S3	6/9/2002	1612	66 U	51 U	330	210 U	9900	460 U	500 U	540 U	41 U	16000	35 J	640 U
S0400HT2S4	6/9/2002	1616	66 U	51 U	350	210 U	15000	460 U	500 U	540 U	41 U	13000	35 U	640 U
S0400HT3S1	6/9/2002	1623	66 U	51 U	400	210 U	13000	460 U	500 U	540 U	41 U	19000	130	640 U
S0400HT4D1	6/10/2002	1050	310	190 U	370	150 U	15000	720 J	500 U	330 U	50 U	26000	1900	1500 J
S0400HT4D2	6/10/2002	1054	1000	630	340	150 U	14000	520 J	500 U	330 U	50 U	37000	4400	2100
S0400HT4D3	6/10/2002	1058	200 J	370	380	150 U	25000	500 J	500 U	330 U	50 U	22000	1100	1000 J
S0400HT4S1	6/11/2002	1149	1700	1700	230 J	180 U	3100 J	390 J	920 U	580 U	55 U	51000	9000	2700
S0400HT4S1D	6/11/2002	1200	1800	1800	220 J	180 U	3700 J	440 J	920 U	580 U	55 U	53000	9200	3000
S0400ILEA1	6/11/2002	1255	75 U	46 U	400	180 U	11000	460 J	920 U	580 U	55 U	17000	34 J	420 U
S0400ILEB1	6/11/2002	1302	75 U	46 U	380	180 U	9500 J	500 J	920 U	580 U	55 U	16000	36 J	420 U
S0400ILEC1	6/11/2002	1307	75 U	46 U	400	180 U	13000	580 J	920 U	580 U	55 U	16000	29 J	420 U
S0400ILED1	6/11/2002	1310	75 U	46 U	410	180 U	20000	760 J	920 U	580 U	55 U	16000	30 J	420 U
S0400ILEE1	6/11/2002	1314	75 U	46 U	340	180 U	13000	730 J	920 U	580 U	55 U	16000	49 J	420 U
S0400ILEF1	6/11/2002	1319	75 U	46 U	360	180 U	9900 J	390 J	920 U	580 U	55 U	18000	55 J	610 J
S0400ILEG1	6/11/2002	1322	75 U	74 J	430	180 U	16000	750 J	920 U	580 U	55 U	15000	70 J	420 U
S0400ILEG1D	6/11/2002	1326	75 U	46 U	380	180 U	15000	730 J	920 U	580 U	55 U	14000	56 J	420 U
S0400ILWA1	6/11/2002	1208	75 U	46 U	410	180 U	13000	580 J	920 U	580 U	55 U	20000	23 U	520 J
S0400ILWB1	6/11/2002	1213	75 U	46 U	410	180 U	12000	340 J	920 U	580 U	55 U	18000	23 U	480 J
S0400ILWC1	6/11/2002	1218	75 U	46 U	410	180 U	18000	450 J	920 U	580 U	55 U	17000	23 U	420 U
S0400ILWD1	6/11/2002	1236	75 U	46 U	280	180 U	13000	980	920 U	580 U	55 U	24000	23 U	420 U
S0400ILWE1	6/11/2002	1222	75 U	46 U	440	220 J	18000	310 J	920 U	580 U	55 U	18000	23 U	420 U
S0400ILWF1	6/11/2002	1227	75 U	46 U	370	180 U	23000	710 J	920 U	580 U	55 U	22000	23 U	420 U
S0400ILWG1	6/11/2002	1232	75 U	46 U	440	180 U	18000	590 J	920 U	580 U	55 U	17000	27 J	420 U
S0400ILWG1R	6/11/2002	1241	75 U	46 U	430	180 U	15000	480 J	920 U	580 U	55 U	16000	38 J	420 U
S0400MAEA1	6/6/2002	1249	60 U	36 U	440	180 U	18000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S0400MAEB1	6/6/2002	1252	60 U	36 U	440	180 U	23000	720 U	840 U	530 U	100 U	18000	36 U	400 U

U - The analyte was not detected above the detection limit. The detection limit is reported.

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TABLE 1A
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0400MAEC1	6/6/2002	1257	60 U	36 U	400 J	180 U	17000	720 U	840 U	530 U	100 U	14000	54 J	400 U
S0400MAED1	6/6/2002	1301	60 U	36 U	450	180 U	11000	720 U	840 U	530 U	100 U	16000	70 J	400 U
S0400MAEE1	6/6/2002	1305	60 U	41 J	300 J	180 U	9400	720 U	840 U	530 U	100 U	19000	73 J	400 U
S0400MAEF1	6/6/2002	1325	60 U	36 U	310 J	180 U	8500	950 J	840 U	530 U	100 U	19000	110 J	430 J
S0400MAWA1	6/6/2002	1224	60 U	36 U	440	180 U	9100	720 U	840 U	530 U	100 U	17000	83 J	580 J
S0400MAWB1	6/6/2002	1228	60 U	36 U	460	180 U	12000	720 U	840 U	530 U	100 U	18000	150	400 U
S0400MAWC1	6/6/2002	1232	60 U	36 U	510	180 U	6800 J	720 U	840 U	530 U	100 U	13000	110 J	400 U
S0400MAWD1	6/6/2002	1236	60 U	36 U	410 J	180 U	8000	900 J	840 U	530 U	100 U	20000	80 J	400 U
S0400MAWE1	6/6/2002	1240	60 U	36 U	370 J	200 J	23000	830 J	840 U	530 U	100 U	18000	62 J	400 U
S0400MAWF1	6/6/2002	1244	60 U	36 U	450	180 U	21000	720 U	840 U	530 U	100 U	18000	36 U	400 U
S0400MN1S1	6/10/2002	908	62 U	43 U	390	150 U	9700	810 J	500 U	330 U	50 U	15000	16 U	510 U
S0400MN1S2	6/10/2002	913	62 U	43 U	410	150 U	14000	570 J	500 U	330 U	50 U	16000	27 J	510 U
S0400MNNA1	6/7/2002	1605	51 U	38 U	440	130 U	7100 J	670 J	460 U	320 U	100 U	15000	24 U	400 U
S0400MNNB1	6/7/2002	1610	51 U	38 U	450	130 U	6900 J	650 J	460 U	320 U	100 U	15000	24 U	400 U
S0400MNNC1	6/7/2002	1617	51 U	38 U	450	130 U	9200	560 J	460 U	320 J	100 U	15000	41 J	400 U
S0400MNND1	6/7/2002	1622	51 U	38 U	520	130 U	6700 J	430 J	460 U	320 U	100 U	13000	24 U	400 U
S0400MNSA1	6/7/2002	1540	51 U	38 U	450	130 U	10000	500 J	460 U	320 U	100 U	16000	24 U	400 U
S0400MNSA1D	6/7/2002	1544	51 U	38 U	470	130 U	12000	440 J	460 U	320 U	100 U	16000	24 U	400 U
S0400MNSB1	6/7/2002	1553	51 U	50 J	480	130 U	7700	370 U	460 U	320 U	100 U	14000	24 U	400 U
S0400MNSC1	6/7/2002	1558	51 U	38 U	320 J	130 U	9800	430 J	460 U	320 U	100 U	14000	41 J	400 U
S0400MNSD1	6/7/2002	1601	51 U	51 J	410 J	130 U	9200	560 J	460 U	320 U	100 U	15000	69 J	400 U
S0400PAMA1	6/6/2002	1329	60 U	36 U	480	180 U	10000	720 U	840 U	530 U	100 U	15000	65 J	530 J
S0400PAMB1	6/6/2002	1334	60 U	110 J	520	180 U	10000	720 U	840 U	530 U	100 U	15000	230	410 J
S0400PAMC1	6/6/2002	1338	60 U	36 U	460	180 U	10000	720 U	840 U	530 U	100 U	17000	260	400 U
S0400PAMD1	6/6/2002	1342	60 U	36 U	640	180 U	16000	720 U	840 U	530 U	100 U	18000	74 J	400 U
S0400PAMD1D	6/6/2002	1346	60 U	36 U	570	180 U	15000	850 J	840 U	530 U	100 U	19000	71 J	400 U
S0400PAME1	6/6/2002	1400	60 U	41 J	440	180 U	15000	720 U	840 U	530 U	100 U	18000	160	400 U
S0400PAMF1	6/6/2002	1404	60 U	36 U	460	180 U	11000	720 U	840 U	530 U	100 U	19000	83 J	400 U
S0400PAMG1	6/6/2002	1408	60 U	36 U	430 J	180 U	15000	720 U	840 U	530 U	100 U	17000	140	400 U
S0400PAMG1R	6/6/2002	1412	60 U	36 U	430 J	180 U	16000	720 U	840 U	530 U	100 U	16000	190	400 U
S0400SAMA1	6/6/2002	519	60 U	36 U	530	180 U	11000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S0400SAMB1	6/6/2002	1523	60 U	36 U	450	180 U	14000	720 U	840 U	530 U	100 U	18000	42 J	400 U
S0400SAMB1D	6/6/2002	1527	60 U	36 U	440	180 U	14000	720 U	840 U	530 U	100 U	17000	39 J	400 U
S0400SAMC1	6/6/2002	1532	60 U	36 U	500	180 U	14000	720 U	840 U	530 U	100 U	16000	36 U	400 U
S0400SAMD1	6/6/2002	1537	60 U	36 U	520	180 U	11000	720 U	840 U	530 U	100 U	14000	36 U	400 U

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TABLE 1A
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0400SAME1	6/6/2002	1540	60 U	39 J	470	180 U	15000	720 U	840 U	530 U	100 U	18000	36 U	400 U
S0400SAMF1	6/6/2002	1549	60 U	36 U	410 J	180 U	10000	720 U	840 U	530 U	100 U	18000	51 J	400 U
S0400SAMG1	6/6/2002	1553	60 U	36 U	390 J	180 U	15000	720 U	840 U	530 U	100 U	14000	36 U	400 U
S0400SAMG1R	6/7/2002	1025	51 U	38 U	430 J	130 U	17000	610 J	460 U	320 U	100 U	14000	29 J	400 U
S0400SPEA1	6/6/2002	1356	60 U	36 U	450	180 U	14000	720 U	840 U	530 U	100 U	16000	130	400 U
S0400SPEB1	6/6/2002	1422	60 U	36 U	400 J	180 U	12000	720 U	840 U	530 U	100 U	15000	120	430 J
S0400SPEC1	6/6/2002	1425	280	400	380 J	180 U	11000	720 U	840 U	530 U	100 U	24000	1800	760 J
S0400SPED1	6/6/2002	1429	85 J	68 J	480	180 U	13000	720 U	840 U	530 U	100 U	21000	300	400 U
S0400SPEDX	6/12/2002	902	62 U	34 U	450	170 U	7900	440 U	670 U	510 U	120 U	15000	23 U	330 U
S0400SPEE1	6/6/2002	1434	75 J	67 U	410 J	180 U	11000	720 U	840 U	530 U	100 U	20000	670	600 J
S0400SPEF1	6/6/2002	1438	60 U	170	420 J	180 U	20000	720 U	840 U	530 U	100 U	17000	270	400 U
S0400SPEG1	6/6/2002	1442	160 J	150	450	180 U	10000	840 J	840 U	530 U	100 U	26000	1300	600 J
S0400SPWA1	6/6/2002	1446	60 U	36 U	390 J	180 U	8800	720 U	840 U	530 U	100 U	18000	61 J	400 U
S0400SPWB1	6/6/2002	1450	60 U	36 U	390 J	180 U	11000	720 U	840 U	530 U	100 U	16000	60 J	400 U
S0400SPWC1	6/6/2002	1454	60 U	36 U	450	180 U	11000	720 U	840 U	530 U	100 U	15000	58 J	510 J
S0400SPWD1	6/6/2002	1458	60 U	36 U	430 J	180 U	15000	720 U	840 U	530 U	100 U	15000	45 J	400 U
S0400SPWE1	6/6/2002	1502	60 U	36 U	450	180 U	7500	720 U	840 U	530 U	100 U	13000	97 J	400 U
S0400SPWF1	6/6/2002	1507	100 J	44 U	480	180 U	7200	720 U	840 U	530 U	100 U	15000	440	400 U
S0400SPWG1	6/6/2002	1510	60 U	36 U	410 J	180 U	11000	720 U	840 U	530 U	100 U	19000	54 J	400 U
S04032W1D3	6/12/2002	825	62 U	34 U	510	170 U	11000	520 J	670 U	510 U	120 U	17000	110	580 J
S04032W1S1	6/10/2002	949	62 U	43 U	390	150 U	12000	760 J	500 U	360 J	50 U	18000	20 J	530 J
S04032W1S2	6/10/2002	953	62 U	43 U	450	150 U	11000	620 J	500 J	330 U	50 U	16000	62	510 U
S04032W1S3	6/10/2002	957	1500	1200	290	150 U	7600 J	740 J	500 U	420 J	50 U	45000	8000	3600
S04032W1S3R	6/10/2002	1005	1800	1300	280	150 U	7300 J	590 J	500 U	510 J	50 U	49000	9400	2900
S0403IL1S1	6/9/2002	1628	66 U	51 U	320	210 U	14000	520 J	500 U	540 U	41 U	18000	35 U	640 U
S0403IL1S2	6/9/2002	1632	66 U	51 U	350	210 U	14000	590 J	500 U	540 U	41 U	18000	35 U	640 U
S0403IL1S3	6/9/2002	1635	66 U	51 U	370	210 U	33000	530 J	500 U	540 U	41 U	18000	35 U	640 U
S0403RW1S1	6/11/2002	817	75 U	46 U	370	180 U	10000	580 J	920 U	580 U	55 U	16000	33 J	420 U
S0403RW1S2	6/11/2002	828	75 U	46 U	460	180 U	14000	760 J	920 U	580 U	55 U	17000	120	420 U
S0404AL1S1	6/9/2002	1214	66 U	51 U	380	210 U	18000	970 J	500 U	540 U	41 U	22000	35 U	1200 J
S0404AL1S2	6/9/2002	1219	66 U	51 U	340	210 U	12000	590 J	500 U	540 U	41 U	16000	35 U	640 U
S0404AL1S3	6/9/2002	1222	66 U	51 U	470	210 U	12000	520 J	500 U	540 U	41 U	16000	78 J	640 U
S0404AR1S1	6/9/2002	1459	66 U	51 U	420	210 U	10000	810 J	500 U	540 U	41 U	16000	35 U	640 U
S0404AR1S2	6/9/2002	1503	66 U	51 U	390	210 U	10000	660 J	500 U	540 U	41 U	16000	35 U	640 U
S04053E1S1	6/8/2002	1623	45 U	51 U	460	130 U	19000	490 U	610 U	630 U	76 U	18000	27 J	440 U

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TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S04053E1S2	6/8/2002	1628	45 U	51 U	400	130 U	12000	500 J	610 U	630 U	76 U	17000	43 J	440 U
S0407IH1D1	6/12/2002	929	85 J	110 J	320	170 U	37000	990 J	670 U	510 U	120 U	30000	820	870 J
S0407IM1S1	6/10/2002	1553	160 J	170 U	430	150 J	19000	690 J	500 U	330 U	88 J	28000	1700	1300 J
S05002WNA1	6/11/2002	1625	75 U	46 U	440	180 U	31000	600 J	920 U	580 U	55 U	19000	23 U	420 U
S05002WNB1	6/11/2002	1629	75 U	46 U	400	180 U	24000	850	920 U	580 U	55 U	18000	23 U	420 U
S05002WNC1	6/11/2002	1634	75 U	46 U	490	180 U	17000	500 J	920 U	580 U	55 U	17000	160	420 U
S05002WSA1	6/11/2002	1605	75 U	46 U	400	180 U	14000	710 J	920 U	580 U	55 U	21000	53 J	420 U
S05002WSB1	6/11/2002	1615	75 U	46 U	440	180 U	15000	610 J	920 U	580 U	55 U	17000	60 J	430 J
S05002WSC1	6/11/2002	1620	75 U	46 U	410	180 U	12000	670 J	920 U	580 U	55 U	18000	61 J	420 U
S05003E1S1	6/9/2002	1118	66 U	51 U	480	210 U	13000	460 U	500 U	540 U	41 U	17000	35 U	640 U
S05003E1S2	6/9/2002	1122	66 U	51 U	440	210 U	14000	820 J	500 U	540 U	41 U	20000	42 J	640 U
S05003E1S3	6/9/2002	1126	66 U	51 U	440	210 U	14000	860 J	500 U	540 U	41 U	19000	35 U	640 U
S05003E1S3D	6/9/2002	1130	66 U	51 U	400	210 U	12000	840 J	500 U	540 U	41 U	19000	35 U	640 U
S0500EHCC1	6/8/2002	1338	45 U	51 U	460	130 U	7000 J	520 J	610 U	630 U	76 U	16000	21 U	440 U
S0500EHNE1	6/8/2002	1346	45 U	51 U	340	130 U	6000 J	490 U	610 U	630 U	76 U	8700	21 U	440 U
S0500EHSE1	6/8/2002	1342	45 U	51 U	380	130 U	8100 J	490 U	610 U	630 U	76 U	15000	21 J	440 U
S0500MN1D1	6/12/2002	954	62 U	34 U	430	170 U	9900	490 J	670 U	510 U	120 U	15000	38 J	330 U
S0500MN1S1	6/10/2002	917	110 J	100 U	360	150 U	15000	550 J	500 U	330 U	50 U	20000	1000	650 J
S0500MN1S2	6/10/2002	925	62 U	43 U	440	150 U	13000	560 J	500 U	330 U	50 U	17000	32 J	510 U
S0500PDEA1	6/6/2002	1104	60 U	36 U	330 J	180 U	8200	720 U	840 U	530 U	100 U	17000	36 U	420 J
S0500PDEB1	6/6/2002	1108	60 U	36 U	360 J	180 U	8600	720 U	840 U	530 U	100 U	16000	36 U	590 J
S0500PDEC1	6/6/2002	1113	60 U	36 U	360 J	180 U	9400	720 U	840 U	530 U	100 U	16000	36 U	400 U
S0500PDED1	6/6/2002	1116	60 U	36 U	320 J	180 U	34000	720 U	840 U	530 U	100 U	13000	36 U	400 U
S0500PDEE1	6/6/2002	1120	60 U	36 U	400 J	180 U	9100	720 U	840 U	530 U	100 U	16000	36 U	400 U
S0500PDEF1	6/6/2002	1125	60 U	36 U	360 J	180 U	8100	720 U	840 U	530 U	100 U	15000	36 U	400 U
S0500PDEG1	6/6/2002	1128	60 U	36 U	400 J	180 U	9300	720 U	840 U	530 U	100 U	16000	36 U	400 U
S0500PDEH1	6/6/2002	1132	60 U	46 J	400 J	180 U	8400	740 J	840 U	530 U	100 U	19000	90 J	400 U
S0500PDEH1R	6/6/2002	1137	60 U	36 U	340 J	180 U	7500	720 U	840 U	530 U	100 U	17000	38 J	420 J
S0500PDWA1	6/6/2002	1141	60 U	36 U	390 J	180 U	9400	720 U	840 U	530 U	100 U	14000	36 U	400 U
S0500PDWB1	6/6/2002	1144	60 U	39 J	310 J	180 U	16000	720 U	840 U	530 U	100 U	18000	42 J	400 U
S0500PDWC1	6/6/2002	1149	60 U	36 U	290 J	180 U	14000	740 J	840 U	530 U	100 U	17000	36 U	400 U
S0500PDWD1	6/6/2002	1153	60 U	36 J	400 J	180 U	9400	720 U	840 U	530 U	100 U	17000	36 U	400 U
S0500PDWE1	6/6/2002	1156	60 U	36 U	310 J	180 U	10000	720 U	840 U	530 U	100 U	16000	37 J	400 U
S0500PDWE1D	6/6/2002	1201	60 U	36 U	320 J	180 U	11000	720 U	840 U	530 U	100 U	17000	41 J	400 U
S0500PDWF1	6/6/2002	1204	60 U	36 U	330 J	180 U	11000	720 U	840 U	530 U	100 U	18000	47 J	400 U

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TABLE 1A
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0500PDWG1	6/6/2002	1208	60 U	36 U	350 J	180 U	11000	720 U	840 U	530 U	100 U	16000	36 U	490 J
S0500PDWH1	6/6/2002	1216	60 U	36 U	330 J	180 U	12000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S0500PDWI1	6/6/2002	1220	60 U	36 U	360 J	180 U	11000	720 U	840 U	530 U	100 U	15000	36 U	400 U
S0500SESA1	6/8/2002	1322	45 U	51 U	420	130 U	8300 J	490 U	610 U	630 U	76 U	13000	21 U	440 U
S0500SESB1	6/8/2002	1326	45 U	51 U	370	130 U	10000	610 J	610 U	630 U	76 U	15000	48 J	440 U
S0500SESC1	6/8/2002	1330	45 U	51 U	450	130 U	7300 J	490 U	610 U	630 U	76 U	16000	21 U	440 U
S0500SESD1	6/8/2002	1334	45 U	51 U	440	130 U	8900 J	610 J	610 U	630 U	76 U	15000	21 U	440 U
S0502MN1S1	6/10/2002	929	62 U	44 J	420	150 U	13000	440 J	500 U	330 U	50 U	17000	16 U	510 U
S0502MN1S2	6/10/2002	933	62 U	43 U	420	150 U	9600 J	560 J	500 U	330 U	50 U	16000	30 J	510 U
S05103E1S1	6/9/2002	1134	66 U	51 U	420	210 U	22000	730 J	500 U	540 U	41 U	20000	52 J	640 U
S05103E1S2	6/9/2002	1138	66 U	51 U	320	210 U	14000	900 J	500 U	540 U	41 U	20000	47 J	640 U
S06004AMA1	6/6/2002	914	60 U	36 U	390 J	180 U	16000	720 U	840 U	530 U	100 U	16000	36 U	400 U
S06004AMB1	6/6/2002	919	60 U	36 U	400 J	180 U	29000	720 U	840 U	530 U	100 U	19000	36 U	400 U
S06004AMC1	6/6/2002	923	60 U	36 U	390 J	180 U	22000	720 U	840 U	530 U	100 U	18000	36 U	400 U
S06004AMD1	6/6/2002	931	60 U	36 U	430 J	180 U	17000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S06004AME1	6/6/2002	935	60 U	51 J	490	180 U	12000	720 U	840 U	530 U	100 U	19000	36 U	400 U
S06004AMF1	6/6/2002	938	60 U	36 U	430 J	180 U	23000	720 U	840 U	530 U	100 U	18000	36 U	400 U
S06004AMG1	6/6/2002	943	60 U	36 U	420 J	180 U	22000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S06004AMH1	6/6/2002	947	60 U	36 U	470	180 U	21000	720 U	840 U	530 U	100 U	18000	36 U	400 U
S06004AMI1	6/6/2002	956	60 U	36 U	370 J	180 U	20000	720 J	840 U	530 U	100 U	16000	36 U	410 J
S06004AMJ1	6/6/2002	959	60 U	40 J	400 J	180 U	21000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S06004AMK1	6/6/2002	1004	60 U	36 U	430 J	180 U	15000	720 U	840 U	530 U	100 U	16000	36 U	400 U
S06004AML1	6/6/2002	1008	60 U	36 U	460	180 U	17000	720 U	840 U	530 U	100 U	18000	36 U	400 U
S06004AMM1	6/6/2002	1012	60 U	36 U	420 J	180 U	16000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S06004AMN1	6/6/2002	1016	60 U	36 U	440	180 U	18000	740 J	840 U	530 U	100 U	17000	36 U	400 U
S06004AMO1	6/6/2002	1020	60 U	36 U	490	180 U	18000	720 U	840 U	530 U	100 U	16000	38 J	400 U
S06004AMP1	6/6/2002	1024	60 U	41 J	420 J	180 U	16000	720 U	840 U	530 U	100 U	16000	36 U	400 U
S06004AMQ1	6/6/2002	1028	60 U	36 U	480	180 U	25000	720 U	840 U	530 U	100 U	17000	46 J	530 J
S06004AMQ1D	6/6/2002	1032	60 U	36 U	470	180 U	25000	720 U	840 U	530 U	100 U	16000	36 U	440 J
S06004AMR1	6/6/2002	1036	60 U	48 J	460	180 U	22000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S06004AMS1	6/6/2002	1040	60 U	36 U	460	180 U	22000	720 U	840 U	530 U	100 U	15000	36 U	400 U
S06004AMT1	6/6/2002	1044	60 U	36 U	390 J	180 U	18000	720 U	840 U	530 U	100 U	16000	36 U	400 U
S06004AMU1	6/6/2002	1049	60 U	36 U	430 J	180 U	21000	720 U	840 U	530 U	100 U	16000	39 J	400 U
S06004AMU1R	6/6/2002	1056	60 U	36 U	390 J	180 U	20000	720 U	840 U	530 U	100 U	15000	36 U	400 U
S06004AMV1	6/6/2002	1100	60 U	42 J	410 J	180 U	14000	720 U	840 U	530 U	100 U	15000	36 U	400 U

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S06005AMA1	6/5/2002	1352	50 U	31 J	410	140 U	33000	470 J	800 U	500 U	89 U	14000	19 U	360 U
S06005AMB1	6/5/2002	1356	50 U	45 J	420	140 U	45000	590 J	800 U	500 U	89 U	15000	19 U	360 U
S06005AMC1	6/5/2002	1401	50 U	26 J	420	140 U	29000	730 J	800 U	500 U	89 U	19000	26 J	360 U
S06005AMD1	6/5/2002	1404	50 U	23 U	440	140 U	28000	530 J	800 U	500 U	89 U	15000	39 J	360 U
S06005AME1	6/5/2002	1413	50 U	37 J	390	140 U	40000	690 J	800 U	500 U	89 U	18000	43 J	530 J
S06005AMF1	6/5/2002	1417	50 U	32 J	370	140 U	78000	540 J	800 U	500 U	89 U	18000	19 U	360 U
S06005AMG1	6/5/2002	1421	50 U	23 U	420	140 U	22000	370 J	800 U	500 U	89 U	15000	39 J	380 J
S06005AMH1	6/5/2002	1527	50 U	51 J	410	140 U	40000	410 J	800 U	500 U	89 U	16000	19 U	360 U
S06005AMH1R	6/5/2002	1531	50 U	51 J	400	140 U	55000	630 J	800 U	500 U	89 U	17000	19 U	360 U
S06005AMI1	6/5/2002	1535	50 U	27 J	500	140 U	20000	630 J	800 U	500 U	89 U	16000	21 J	360 U
S06005AMJ1	6/5/2002	1539	50 U	40 J	400	140 U	74000	490 J	800 U	500 U	89 U	18000	41 J	360 U
S06005AMK1	6/5/2002	1543	50 U	24 J	440	140 U	26000	440 J	800 U	500 U	89 U	18000	27 J	360 U
S06005AML1	6/5/2002	1547	50 U	26 J	410	140 U	28000	370 J	800 U	500 U	89 U	17000	43 J	370 J
S06005AML1D	6/5/2002	1552	50 U	27 J	380	140 U	27000	830 J	800 U	500 U	89 U	18000	60 J	360 U
S06005AMM1	6/5/2002	1556	50 U	39 J	460	140 U	21000	760 J	800 U	500 U	89 U	18000	29 J	360 U
S06005AMN1	6/5/2002	1600	50 U	23 U	410	200 J	28000	600 J	800 U	500 U	89 U	17000	33 J	360 U
S06005AMO1	6/5/2002	1604	50 U	27 J	320	140 U	71000	500 J	800 U	500 U	89 U	17000	19 U	360 J
S06005ENA1	6/5/2002	1608	50 U	31 J	430	140 U	45000	600 J	800 U	500 U	89 U	20000	63 J	360 U
S06005ENB1	6/5/2002	1613	50 U	23 U	450	140 U	33000	590 J	800 U	500 U	89 U	19000	67	410 J
S06005ENC1	6/5/2002	1617	50 U	23 U	570	140 U	9800	650 J	800 U	500 U	89 U	17000	67	360 U
S06005END1	6/5/2002	1621	50 U	73 J	440	140 U	17000	630 J	800 U	500 U	89 U	19000	160	360 U
S06005ENE1	6/5/2002	1629	50 U	23 U	450	140 U	11000	580 J	800 U	500 U	89 U	15000	43 J	360 U
S06005ENE1R	6/5/2002	1633	50 U	23 U	480	140 U	10000	470 J	800 U	500 U	89 U	15000	47 J	360 U
S06005ENF1	6/5/2002	1637	50 U	23 U	510	140 U	8100	350 J	800 U	500 U	89 U	14000	19 U	360 U
S06005ENG1	6/5/2002	1641	50 U	23 U	430	140 U	16000	560 J	800 U	500 U	89 U	17000	38 J	360 U
S06005ENH1	6/5/2002	1645	50 U	35 J	380	140 U	14000	440 J	800 U	500 U	89 U	14000	43 J	360 U
S06005ENI1	6/5/2002	1649	50 U	23 U	410	140 U	17000	600 J	800 U	500 U	89 U	16000	59 J	360 U
S06005ENJ1	6/5/2002	1653	50 U	23 U	410	140 U	18000	600 J	800 U	500 U	89 U	19000	56 J	360 U
S06005ENK1	6/5/2002	1657	50 U	23 U	400	140 U	10000	660 J	800 U	500 U	89 U	15000	19 J	360 U
S06005ENL1	6/5/2002	1701	50 U	23 U	460	140 U	15000	560 J	800 U	500 U	89 U	15000	20 J	360 U
S06005ENM1	6/5/2002	1705	50 U	23 U	460	140 U	11000	540 J	800 U	500 U	89 U	18000	27 J	360 U
S06005ENN1	6/5/2002	1710	50 U	23 U	450	140 U	14000	500 J	800 U	500 U	89 U	16000	39 J	360 U
S06005ENO1	6/5/2002	1713	50 U	23 U	430	140 U	22000	750 J	800 U	500 U	89 U	17000	39 J	360 U
S06005ENP1	6/5/2002	1717	50 U	23 U	380	140 U	9900	530 J	800 U	500 U	89 U	18000	28 J	360 U
S06005ENP1D	6/5/2002	1721	50 U	23 U	320	140 U	8900	730 J	800 U	500 U	89 U	17000	34 J	360 U

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1A
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S06005ENQ1	6/5/2002	1725	50 U	34 J	440	140 U	20000	740 J	800 U	500 U	89 U	17000	58 J	360 U
S06005ENR1	6/5/2002	1729	50 U	32 J	350	140 U	7700	370 J	800 U	500 U	89 U	19000	110	400 J
S06005ENS1	6/5/2002	1733	50 U	23 U	420	140 U	15000	500 J	800 U	500 U	89 U	16000	19 U	360 U
S06005ESA1	6/5/2002	1737	50 U	26 J	470	140 U	10000	460 J	800 U	500 U	89 U	19000	49 J	390 J
S06005ESA1R	6/5/2002	1741	50 U	39 J	380	140 U	8900	750 J	800 U	500 U	89 U	19000	56 J	360 U
S06005ESB1	6/5/2002	1745	50 U	23 U	470	140 U	14000	460 J	800 U	500 U	89 U	17000	38 J	360 U
S06005ESC1	6/5/2002	1749	50 U	28 J	470	140 U	14000	390 J	800 U	500 U	89 U	18000	160	360 U
S06005ESD1	6/5/2002	1753	50 U	49 J	510	140 U	20000	640 J	800 U	500 U	89 U	20000	19 U	360 U
S06005ESE1	6/6/2002	810	60 U	36 U	500	180 U	10000	720 U	840 U	530 U	100 U	14000	36 U	400 U
S06005ESF1	6/6/2002	814	60 U	36 U	460	180 U	13000	720 U	840 U	530 U	100 U	16000	36 U	400 U
S06005ESG1	6/6/2002	817	60 U	36 U	530	180 U	30000	720 U	840 U	530 U	100 U	20000	36 U	400 U
S06005ESH1	6/6/2002	822	60 U	36 U	540	180 U	12000	720 U	840 U	530 U	100 U	13000	36 U	400 U
S06005ESI1	6/6/2002	826	60 U	47 J	460	180 U	26000	720 U	840 U	530 U	100 U	19000	36 U	400 U
S06005ESJ1	6/6/2002	830	60 U	36 U	390 J	180 U	15000	810 J	840 U	530 U	100 U	14000	36 U	400 U
S06005ESK1	6/6/2002	834	60 U	36 U	440 J	180 U	17000	720 U	840 U	530 U	100 U	16000	36 U	400 U
S06005ESL1	6/6/2002	838	60 U	36 U	490	180 U	17000	720 U	840 U	530 U	100 U	17000	36 U	400 U
S06005ESM1	6/6/2002	842	60 U	36 U	460	180 U	28000	720 U	840 U	530 U	100 U	20000	36 U	400 U
S06005ESN1	6/6/2002	846	60 U	36 U	470	180 U	10000	720 U	840 U	530 U	100 U	15000	36 U	400 U
S06005ESO1	6/6/2002	850	60 U	36 U	510	180 U	14000	720 U	840 U	530 U	100 U	18000	36 U	400 U
S06005ESP1	6/6/2002	854	60 U	36 U	410 J	180 U	14000	720 U	840 U	530 U	100 U	14000	36 U	400 U
S06005ESP1D	6/6/2002	858	60 U	36 U	430 J	180 U	16000	720 U	840 U	530 U	100 U	15000	36 U	400 U
S06005ESQ1	6/6/2002	902	60 U	36 U	390 J	180 U	13000	720 U	840 U	530 U	100 U	17000	80 J	400 U
S06005ESR1	6/6/2002	907	60 U	36 U	440	180 U	11000	720 U	840 U	530 U	100 U	15000	54 J	400 U
S06005ESS1	6/6/2002	910	60 U	36 U	490	180 U	16000	750 J	840 U	530 U	100 U	21000	69 J	620 J
S06006ENA1	6/5/2002	1252	50 U	23 J	480	140 U	12000	310 U	800 U	500 U	89 U	17000	34 J	360 U
S06006ENB1	6/5/2002	1255	50 U	29 J	750	140 U	9900	730 J	800 U	500 U	89 U	20000	21 J	360 U
S06006ENC1	6/5/2002	1259	50 U	23 U	950	140 U	15000	610 J	800 U	500 U	89 U	21000	19 U	360 U
S06006END1	6/5/2002	1304	50 U	36 J	350	140 U	17000	580 J	800 U	500 U	89 U	15000	130	360 U
S06006ENE1	6/5/2002	1308	50 U	23 U	360	140 U	18000	560 J	800 U	500 U	89 U	15000	52 J	440 J
S06006ENF1	6/5/2002	1312	50 U	26 J	370	140 U	15000	520 J	800 U	500 U	89 U	16000	65	360 U
S06006ENF1D	6/5/2002	1316	50 U	32 J	360	140 U	15000	720 J	800 U	500 U	89 U	16000	64 J	360 U
S06006ENG1	6/5/2002	1320	50 U	23 U	300	140 U	22000	370 J	800 U	500 U	89 U	18000	92	360 U
S06006ENH1	6/5/2002	1328	50 U	23 U	310	140 U	15000	420 J	800 U	500 U	89 U	15000	37 J	440 J
S06006ENI1	6/5/2002	1332	50 U	29 J	340	140 U	11000	830 J	800 U	500 U	89 U	15000	19 U	610 J
S06006ENJ1	6/5/2002	1336	50 U	23 U	390	140 U	8200	740 J	800 U	500 U	89 U	16000	56 J	360 U

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1A

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S06006ENM1	6/5/2002	1340	50 U	23 U	380	140 U	9400	360 J	800 U	500 U	89 U	16000	31 J	380 J
S06006ENN1	6/5/2002	1344	50 U	23 U	250	140 U	14000	650 J	800 U	500 U	89 U	17000	41 J	360 U
S06006ENO1	6/5/2002	1348	50 U	23 U	350	140 U	7700	660 J	800 U	500 U	89 U	17000	36 J	360 U
S06006ESA1	6/5/2002	1141	50 U	23 U	490	140 U	9700	620 J	800 U	500 U	89 U	14000	24 J	560 J
S06006ESA1D	6/5/2002	1145	50 U	23 U	530	140 U	10000	780 J	800 U	500 U	89 U	14000	19 U	360 U
S06006ESB1	6/5/2002	1149	50 U	23 U	480	140 U	8700	410 J	800 U	500 U	89 U	16000	19 U	430 J
S06006ESC1	6/5/2002	1153	50 U	44 J	500	140 U	8500	440 J	800 U	500 U	89 U	15000	19 U	360 U
S06006ESD1	6/5/2002	1158	50 U	23 U	570	140 U	8900	500 J	800 U	500 U	89 U	16000	19 U	460 J
S06006ESE1	6/5/2002	1202	50 U	23 U	430	140 U	7900	530 J	800 U	500 U	89 U	15000	19 U	360 U
S06006ESF1	6/5/2002	1207	50 U	23 U	320	140 U	14000	450 J	800 U	500 U	89 U	15000	82	360 U
S06006ESG1	6/5/2002	1211	50 U	29 J	330	140 U	10000	700 J	800 U	500 U	89 U	15000	26 J	360 U
S06006ESH1	6/5/2002	1215	50 U	23 U	390	140 U	7700	470 J	800 U	500 U	89 U	15000	43 J	920 J
S06006ESI1	6/5/2002	1219	50 U	23 U	370	140 U	9400	410 J	800 U	500 U	89 U	16000	20 J	570 J
S06006ESJ1	6/5/2002	1223	50 U	33 J	370	140 U	8900	470 J	800 U	500 U	89 U	15000	19 U	630 J
S06006ESK1	6/5/2002	1227	50 U	23 U	380	140 U	6300 J	640 J	800 U	500 U	89 U	15000	19 U	360 U
S06006ESL1	6/5/2002	1231	50 U	40 J	310	140 U	10000	630 J	800 U	500 U	89 U	15000	28 J	360 U
S06006ESM1	6/5/2002	1235	50 U	23 U	380	140 U	8500	560 J	800 U	500 U	89 U	16000	30 J	360 U
S06006ESN1	6/5/2002	1243	50 U	23 U	340	140 U	8800	730 J	800 U	500 U	89 U	15000	37 J	360 U
S06006ESO1	6/5/2002	1247	50 U	23 U	250	140 U	20000	750 J	800 U	500 U	89 U	18000	36 J	360 U
S06045E1S1	6/10/2002	837	62 U	44 J	360	150 U	14000	650 J	500 U	330 U	50 U	16000	29 J	510 U
S06045E1S2	6/10/2002	841	62 U	43 U	350	150 U	12000	570 J	500 U	330 U	50 U	18000	42 J	510 U
S0604MN1S1	6/10/2002	937	62 U	43 U	420	150 U	7300 J	430 J	500 U	330 U	50 U	15000	24 J	510 U
S0604MN1S2	6/10/2002	941	62 U	43 U	450	150 U	8400 J	520 J	500 U	330 U	50 U	15000	17 J	510 U
S0604MN1S3	6/10/2002	945	62 U	43 U	460	150 U	9200 J	560 J	500 U	330 U	50 U	14000	17 J	510 U
S06125E1S1	6/10/2002	824	62 U	43 U	410	150 U	13000	660 J	500 U	330 U	50 U	18000	51 J	510 U
S06125E1S2	6/10/2002	828	62 U	43 U	370	150 U	9200 J	690 J	500 U	330 U	50 U	18000	20 J	510 U
S06125E1S3	6/10/2002	832	62 U	50 J	480	150 U	8300 J	400 J	500 U	330 U	50 U	19000	130	600 J
S06154E1S1	6/9/2002	1349	66 U	51 U	340	210 U	13000	470 J	500 U	540 U	41 U	20000	44 J	640 U
S06154E1S2	6/9/2002	1353	66 U	51 U	350	210 U	12000	730 J	500 U	540 U	41 U	18000	37 J	640 U
S06154E1S3	6/9/2002	1358	66 U	51 U	300	210 U	34000	610 J	500 U	540 U	41 U	19000	41 J	640 U
S06174E1S1	6/9/2002	1413	66 U	51 U	340	210 U	11000	490 J	500 U	540 U	41 U	19000	82 J	640 U
S06174E1S2	6/9/2002	1417	66 U	51 U	350	210 U	8400	800 J	500 U	540 U	41 U	18000	61 J	640 U
S06186E1S1	6/10/2002	845	62 U	43 U	390	150 U	10000	560 J	500 U	330 U	50 U	17000	16 U	670 J
S06186E1S2	6/10/2002	849	62 U	52 J	430	150 U	8900 J	680 J	500 U	380 J	50 U	16000	16 U	510 U
S06205E1S1	6/10/2002	816	62 U	43 U	340	150 U	8700 J	790 J	500 U	330 U	50 U	17000	16 U	510 U

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1A
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S06205E1S2	6/10/2002	820	62 U	43 U	310	150 U	22000	590 J	500 U	330 U	50 U	17000	83	510 U
S06274E1S1	6/9/2002	1423	66 U	51 U	330	210 U	13000	650 J	500 U	540 U	41 U	18000	35 U	640 U
S06274E1S1D	6/9/2002	1428	66 U	51 U	340	210 U	15000	460 J	500 U	540 U	41 U	20000	41 J	640 U
S06274E1S2	6/9/2002	1431	66 U	51 U	340	210 U	15000	610 J	500 U	540 U	41 U	19000	35 U	930 J
S06285E1S1	6/10/2002	808	62 U	43 U	310	150 U	13000	610 J	500 U	330 U	50 U	21000	44 J	510 J
S06285E1S2	6/10/2002	812	62 U	43 U	300	150 U	14000	580 J	500 U	330 U	50 U	19000	26 J	510 U
S06315E1S1	6/9/2002	1701	66 U	51 U	350	210 U	10000	700 J	500 U	540 U	41 U	17000	40 J	650 J
S06315E1S2	6/9/2002	1704	66 U	51 U	360	210 U	9100	670 J	500 U	540 U	41 U	17000	35 U	640 U
S06315E1S3	6/10/2002	804	62 U	43 U	310	150 U	13000	620 J	500 U	330 U	50 U	17000	340	510 U
S06394E1S1	6/9/2002	1435	66 U	51 U	360	210 U	13000	500 J	500 U	540 U	41 U	21000	35 U	640 U
S06394E1S2	6/9/2002	1439	66 U	51 U	390	210 U	13000	640 J	500 U	540 U	41 U	21000	35 U	640 U
S0800RVSA1	6/8/2002	1144	45 U	51 U	460	130 U	12000	490 U	610 U	630 U	76 U	14000	21 U	440 U
S0800RVSB1	6/8/2002	1148	45 U	51 U	380	130 U	10000	890 J	610 U	630 U	76 U	15000	21 U	440 U
S0800RVSC1	6/8/2002	1152	45 U	51 U	310	130 U	17000	500 J	610 U	630 U	76 U	17000	21 U	620 J
S0800RVSD1	6/8/2002	1156	52 J	51 U	410	130 U	12000	500 J	610 U	630 U	76 U	15000	22 J	440 U
S0800RVSE1	6/8/2002	1200	45 U	51 U	510	130 U	9500 J	490 U	610 U	630 U	76 U	14000	21 U	1000 J
S0800RVSF1	6/8/2002	1204	45 U	51 U	430	130 U	12000	550 J	610 U	630 U	76 U	16000	21 U	440 U
S0800RVSG1	6/8/2002	1208	45 U	51 U	450	130 U	21000	490 U	610 U	630 U	76 U	16000	21 U	440 U
S0800RVSG1R	6/8/2002	1216	45 U	51 U	430	130 U	21000	940 J	610 U	630 U	76 U	16000	21 U	440 U
S0800WFBE1	6/8/2002	1314	45 U	51 U	540	130 U	18000	490 U	610 U	630 U	76 U	16000	41 J	440 U
S0800WFBW1	6/8/2002	1318	45 U	51 U	520	130 U	17000	490 U	610 U	630 U	76 U	16000	21 U	440 U
S0800WFNE1	6/8/2002	1310	48 J	51 U	480	130 U	5800 J	580 J	610 U	630 U	76 U	12000	21 U	440 U
S0800WFNW1	6/8/2002	1305	45 U	51 U	550	130 U	9800	490 U	610 U	630 U	76 U	13000	21 U	830 J
S0800WFSE1	6/8/2002	1236	45 U	51 U	420	130 U	7500 J	590 J	610 U	630 U	76 U	14000	21 U	440 U
S0800WFSE1D	6/8/2002	1240	45 U	51 U	390	130 U	7300 J	550 J	610 U	630 U	76 U	14000	21 U	440 U
S0800WFSW1	6/8/2002	1302	45 U	51 U	450	130 U	7500 J	490 U	610 U	630 U	76 U	13000	21 U	440 U
S08014E1S1	6/9/2002	1443	66 U	51 U	380	210 U	9600	490 J	500 U	540 U	41 U	18000	35 U	640 U
S08014E1S2	6/9/2002	1447	66 U	51 U	380	210 U	21000	600 J	500 U	540 U	41 U	15000	35 U	640 U
S08014E1S3	6/9/2002	1455	66 U	51 U	350	210 U	10000	460 U	500 U	540 U	41 U	17000	35 U	640 U
S09034E1S1	6/9/2002	1548	66 U	51 U	310	210 U	15000	690 J	500 U	540 U	41 U	21000	35 U	640 U
S09034E1S2	6/9/2002	1552	66 U	51 U	360	210 U	14000	1000 J	500 U	540 U	41 U	23000	35 U	640 U
S0CTYSH1D1	6/12/2002	913	62 U	34 U	390	170 U	9000	710 J	670 U	510 U	120 U	19000	23 U	330 U
S0CTYSH1S1	6/10/2002	1440	77 J	50 U	490	150 U	16000	610 J	700 J	330 U	50 U	19000	500	570 J
S0CTYSH1S2	6/10/2002	1449	130 J	67 U	430	150 U	13000	590 J	500 U	330 U	50 U	20000	670	510 U
S0CTYSH1S3	6/10/2002	1452	62 U	43 U	650	150 U	17000	540 J	500 U	330 U	55 J	28000	250	2100

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1A
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	DATE	TIME	Sb	As	Ba	Cd	Ca	CrHI	CrLO	Co	Cu	Fe	Pb	Mn
S0CTYSH1S4	6/12/2002	922	62 U	34 U	440	170 U	23000	520 J	670 U	510 U	120 U	16000	110	330 U
S0CTYSH1S5	6/12/2002	917	62 U	34 U	390	170 U	12000	440 U	670 U	510 U	120 U	16000	84	330 U
S0VFWNW1	6/7/2002	1431	51 U	38 U	480	130 U	7500	450 J	460 U	320 U	100 U	16000	130	400 U
S1RSOSCCS1	6/8/2002	1714	45 U	51 U	390	130 U	46000	790 J	610 U	630 U	76 U	18000	160	440 U
S1RSOSNES1	6/8/2002	1722	45 U	51 U	350	130 U	27000	570 J	610 U	630 U	76 U	23000	490	500 J
S1RSOSNWS1	6/8/2002	1710	45 U	58 J	370	130 U	39000	880 J	610 U	630 U	76 U	17000	120	440 U
S1RSOSSES1	6/8/2002	1719	45 U	51 U	380	130 U	32000	690 J	610 U	630 U	76 U	20000	47 J	440 U
S1RSOSSSS1	6/8/2002	1727	45 U	51 U	340	130 U	26000	680 J	610 U	630 U	76 U	17000	27 J	440 U
S1RSOSSWS1	6/8/2002	1707	45 U	51 U	370	130 U	40000	490 U	610 U	630 U	76 U	18000	74	440 U
S2RSOSCCS1	6/9/2002	1105	66 U	51 U	470	210 U	32000	460 U	500 U	540 U	41 U	21000	150	640 U
S2RSOSNES1	6/9/2002	1053	66 U	95 J	360	210 U	46000	890 J	500 U	540 U	41 U	19000	200	640 U
S2RSOSNWS1	6/9/2002	1058	66 U	51 U	470	210 U	28000	460 J	500 U	540 U	41 U	19000	82 J	640 U
S2RSOSSES1	6/9/2002	1102	66 U	51 U	400	210 U	21000	480 J	500 U	540 U	41 U	20000	82 J	640 U
S2RSOSSWS1	6/9/2002	1110	66 U	51 U	400	210 U	29000	670 J	500 U	540 U	41 U	20000	35 U	640 U
S2RSOSSWS1B	6/9/2002	1114	66 U	51 U	65 U	210 U	1500 U	460 U	500 U	540 U	41 U	2200 U	35 U	640 U
S700FGANE1	6/8/2002	1358	45 U	51 U	450	130 U	6700 J	490 U	610 U	630 U	76 U	14000	22 J	440 U
S700FGANW1	6/8/2002	1402	45 U	51 U	500	130 U	5900 J	490 U	610 U	630 U	76 U	14000	21 U	440 U
S700FGASE1	6/8/2002	1411	45 U	51 U	470	130 U	6900 J	490 U	610 U	630 U	76 U	14000	36 J	440 U
S700FGASW1	6/8/2002	1407	45 U	51 U	460	130 U	6400 J	640 J	610 U	630 U	76 U	13000	21 J	440 U
S700FGCSW1	6/8/2002	1424	1100	1500	180 J	130 U	4800 J	620 J	610 U	630 U	76 U	52000	7700	3900
S700FGCSWX	6/12/2002	934	720	790	350	170 U	20000	860 J	670 U	510 U	120 U	38000	4000	3200
S700FGCWC1	6/8/2002	1429	45 U	51 U	450	130 U	21000	490 U	610 U	630 U	76 U	20000	23 J	470 J
S700FGCWC1D	6/8/2002	1433	45 U	51 U	440	130 U	20000	580 J	610 U	630 U	76 U	21000	31 J	440 U
S700FGECC1	6/8/2002	1420	45 U	51 U	420	130 U	11000	490 U	610 U	630 U	76 U	19000	31 J	440 U
S700FGGCC1	6/8/2002	1446	45 U	51 U	360	130 U	24000	610 J	610 U	630 U	76 U	19000	41 J	440 U
S700FGGCC1R	6/8/2002	1450	45 U	51 U	380	130 U	20000	490 U	610 U	630 U	76 U	19000	35 J	440 U
S700FGGNE1	6/8/2002	1441	45 U	51 U	330	130 U	13000	710 J	610 U	630 U	76 U	24000	96	700 J
S700FGGNW1	6/8/2002	1453	45 U	51 U	470	130 U	11000	490 U	610 U	630 U	76 U	16000	34 J	440 U
S700FGGSE1	6/8/2002	1437	45 U	51 U	320	130 U	14000	500 J	610 U	630 U	76 U	22000	110	600 J
S700FGGSW1	6/8/2002	1458	45 U	51 U	250 J	130 U	46000	730 J	610 U	630 U	76 U	22000	24 J	440 U

U - The analyte was not detected above the detection limit. The detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0023MW1S1	54 U	5.5 U	170 U	24000	81 J	20 U	86 U	190	8.5 U	160 U	2400	16 J	110 J	260
S0033MW1S1	54 U	5.5 U	170 U	21000	88 J	20 U	110 J	200	8.5 U	160 U	2200 J	10 U	150 J	260
S0033MW1S2	54 U	5.5 U	170 U	30000	110	20 U	86 U	180	11 J	160 U	2900	10 U	130 J	250
S0043MW1D1	75 U	6.7 U	170 U	25000	77	18 U	120 U	280	14 J	59 U	2200 J	15 J	94 U	210
S0043MW1S1	54 U	5.5 U	170 U	26000	83 J	20 U	95 J	240	9.4 J	160 U	1800 J	10 U	480	260
S0043MW1S2	54 U	5.5 U	170 U	29000	100	20 U	86 U	220	8.5 U	160 U	2200 J	10 U	560	240
S0043MW1S3	54 U	5.5 U	170 U	33000	100	20 U	86 U	180	8.5 U	160 U	2500	10 U	75 J	280
S00FCCM1S1	54 U	5.5 U	170 U	25000	92 J	20 U	86 U	160	8.5 U	160 U	1700 J	12 J	88 J	230
S01001SWA1	19 U	5.4 U	87 U	26000	96	24 U	150 U	140	14 U	140 U	2300 J	9.9 U	110 J	250
S01001SWB1	20 J	5.4 U	87 U	28000	120	24 U	150 U	110	14 U	140 U	2200 J	11 J	53 J	230
S01001SWC1	22 J	5.4 U	87 U	28000	110	24 U	150 U	130	14 U	140 U	1600 J	17 J	59 J	230
S01001SWD1	19 U	5.4 U	87 U	22000	99	24 U	150 U	210	14 U	140 U	1900 J	9.9 U	54 J	270
S01001SWE1	19 U	5.4 U	87 U	24000	110	24 U	150 U	210	14 U	140 U	2000 J	9.9 U	68 J	300
S01001SWF1	19 U	5.4 U	87 U	25000	98	24 U	150 U	150	14 U	140 U	1700 J	9.9 U	500	250
S01001SWF1D	19 U	5.4 U	87 U	23000	91	24 U	150 U	140	14 U	140 U	2400 J	10 J	470	240
S01004END1	19 U	5.4 U	87 U	29000	110	24 U	150 U	120	14 U	140 U	1700 J	9.9 U	160	290
S01004END1B	19 U	5.4 U	87 U	4200 U	15 U	24 U	150 U	32 U	14 U	140 U	1000 U	9.9 U	41 U	17 J
S01007SWA1	19 U	5.4 U	87 U	22000	93	24 U	150 U	210	14 U	140 U	1700 J	9.9 U	47 J	240
S01007SWB1	32 J	5.4 U	87 U	29000	100	24 U	150 U	210	14 U	140 U	1800 J	9.9 U	92 J	260
S01007SWC1	19 U	5.4 U	87 U	25000	89	24 U	150 U	250	14 U	140 U	1700 J	9.9 U	79 J	190
S01007SWD1	19 U	5.4 U	87 U	26000	88	24 U	150 U	210	14 U	140 U	1700 J	9.9 U	41 U	210
S0100CEEA1	58 U	7.9 U	160 U	28000	89	27 U	130 U	140	8.8 U	88 U	1900 J	19 U	66 J	250
S0100CEEB1	58 U	7.9 U	160 U	24000	86	27 U	130 U	180	8.8 U	88 U	1300 J	19 U	200	230
S0100CEEC1	58 U	7.9 U	160 U	30000	97	27 U	130 U	120	8.8 U	88 U	2300 J	19 U	99 J	220
S0100CEED1	58 U	7.9 U	160 U	25000	97	27 U	130 U	180	8.8 U	88 U	2400 J	19 U	190 J	260
S0100CEEE1	58 U	7.9 U	160 U	25000	94	27 U	130 U	210	9 J	88 U	1700 J	19 U	230	230
S0100CEEF1	58 U	7.9 U	160 U	23000	91	27 U	130 U	190	8.8 U	88 U	2300 J	19 U	210	210
S0100CEEG1	58 U	7.9 U	160 U	22000	83 J	27 U	130 U	170	8.8 U	88 U	1900 J	19 U	140 J	210
S0100CEEG1R	58 U	7.9 U	160 U	23000	85 J	27 U	130 U	180	8.8 U	88 U	1400 J	19 U	120 J	230
S0100CEWA1	58 U	7.9 U	160 U	26000	110	27 U	130 U	170	8.8 U	88 U	1600 J	19 U	100 J	250
S0100CEWB1	58 U	7.9 U	160 U	24000	110	27 U	130 U	130	8.8 U	88 U	1400 J	19 U	99 J	230
S0100CEWC1	58 U	7.9 U	160 U	22000	87	27 U	130 U	210	13 J	88 U	2000 J	19 U	79 J	230
S0100CEWD1	58 U	7.9 U	160 U	20000	68 J	27 U	130 U	220	8.8 U	88 U	1400 J	19 U	130 J	230
S0100CEWE1	58 U	7.9 U	160 U	25000	98	27 U	130 U	180	8.8 U	88 U	2200 J	19 U	240	220
S0100CEWE1D	58 U	7.9 U	160 U	21000	100	27 U	130 U	150	8.8 U	88 U	2100 J	19 U	260	210

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0100CEWF1	58 U	7.9 U	160 U	20000	74 J	27 U	130 U	150	8.8 U	88 U	2100 J	19 U	240	220
S0100CEWG1	58 U	7.9 U	160 U	27000	100	27 U	130 U	150	8.8 U	88 U	2400 J	19 U	190 J	230
S0102RN1S1	78 U	7.1 U	59 U	27000	94	24 U	130 U	180	11 U	75 U	2100 J	12 U	100 J	250
S01063W1D1	75 U	6.7 U	170 U	25000	90	18 U	120 U	230	12 U	59 U	2200 J	11 J	130 J	450
S01063W1S1	54 U	5.5 U	170 U	22000	89 J	20 U	86 U	190	8.5 U	160 U	2100 J	16 J	130 J	290
S01063W1S2	54 U	5.5 U	170 U	21000	80 J	20 U	86 U	180	8.5 U	160 U	2200 J	10 U	77 J	270
S01063W1S3	54 U	5.5 U	170 U	25000	92 J	20 U	96 J	150	8.5 U	160 U	2200 J	10 U	3100	270
S0106CE1S1	44 U	5.3 U	170 U	22000	85	23 U	110 U	250	11 U	63 U	2200 J	8.8 U	180	290
S0106CE1S2	44 U	5.3 U	170 U	22000	87	23 U	110 U	240	12 J	63 U	2100 J	9.6 J	210	240
S0106CE1S3	44 U	5.3 U	170 U	29000	100	23 U	110 U	110	16 J	63 U	2000 J	8.8 U	72 J	210
S0106ME1S1	54 U	5.5 U	170 U	32000	120	20 U	100 J	75 J	12 J	160 U	2000 J	10 U	160 J	290
S01071S1S1	19 U	5.4 U	87 U	26000	91	24 U	150 U	250	15 J	140 U	2400 J	9.9 U	150	200
S01071S1S2	19 U	5.4 U	87 U	28000	96	24 U	150 U	260	14 U	140 U	2300 J	9.9 U	110 J	250
S0146MW1S1	54 U	5.5 U	170 U	26000	100	20 U	86 U	120	9.5 J	160 U	2400	14 J	99 J	220
S0146MW1S2	54 U	5.5 U	170 U	23000	93 J	20 U	86 U	150	8.5 U	160 U	2700	10 U	120 J	260
S0146MW1S3	54 U	5.5 U	170 U	20000	85 J	20 U	86 U	170	9.1 J	160 U	2800	12 J	88 J	230
S0169DI1S1	54 U	5.5 U	170 U	22000	93 J	20 U	86 U	240	10 J	160 U	2000 J	10 U	68 U	240
S0169DI1S2	54 U	5.5 U	170 U	26000	88 J	20 U	91 J	240	8.5 U	160 U	2400	10 U	110 J	280
S02003ENA1	37 U	9.4 U	130 U	29000	110	22 U	77 J	150	9.8 U	110 U	2300 J	19 J	71 J	220
S02003ENB1	37 U	9.4 U	130 U	25000	92 J	22 U	73 U	140	9.8 U	110 U	2300 J	15 U	110	240
S02003ENC1	37 U	9.4 U	130 U	25000	98	22 U	78 J	150	9.8 U	110 U	1700 J	15 U	120	260
S02003END1	37 U	9.4 U	130 U	27000	100	22 U	73 U	240	9.8 U	110 U	1900 J	15 U	55 J	210
S02003ENE1	37 U	9.4 U	130 U	23000	100	22 U	73 U	190	9.8 U	110 U	1800 J	15 U	74 J	210
S02003ENF1	37 U	9.4 U	130 U	25000	84 J	22 U	73 U	210	9.8 U	110 U	1700 J	15 U	94	200
S02003ENG1	37 U	9.4 U	130 U	23000	97	22 U	73 U	200	9.8 U	110 U	1500 J	15 U	83 J	200
S02003ESA1	58 U	7.9 U	160 U	24000	99	27 U	130 U	180	8.8 U	88 U	2400 J	19 U	240	220
S02003ESB1	58 U	7.9 U	160 U	20000	82 J	27 U	130 U	260	8.8 U	88 U	1900 J	19 U	190 J	200
S02003ESC1	58 U	7.9 U	160 U	25000	100	27 U	130 U	200	9.2 J	88 U	2100 J	19 U	150 J	190
S02003ESD1	58 U	7.9 U	160 U	26000	95	27 U	130 U	230	8.8 U	88 U	2000 J	19 U	100 J	220
S02003ESE1	58 U	7.9 U	160 U	23000	110	27 U	130 U	130	8.8 U	88 U	1900 J	19 U	85 J	260
S02003ESF1	58 U	7.9 U	160 U	24000	110	27 U	130 U	120	8.8 U	88 U	1900 J	19 J	100 J	260
S02003ESG1	58 U	7.9 U	160 U	24000	93	27 U	130 U	230	12 J	88 U	1300 J	19 U	110 J	210
S02003ESG1R	58 U	7.9 U	160 U	21000	84 J	27 U	130 U	240	13 J	88 U	1600 J	19 U	110 J	210
S02004SEA1	78 U	7.1 U	59 U	32000	94	24 U	130 U	180	11 U	75 U	2200 J	12 U	80 J	240
S02004SEB1	78 U	7.1 U	59 U	27000	99	24 U	130 U	220	11 J	75 U	2600 J	16 J	100 J	360

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S02004SEC1	78 U	7.1 U	59 U	27000	100	24 U	130 U	130	11 U	75 U	2400 J	12 U	250	230
S02004SED1	78 U	7.1 U	59 U	31000	120	24 U	130 U	190	11 U	75 U	2000 J	13 J	130 J	240
S02004SWB1	78 U	7.1 U	59 U	26000	100	24 U	130 U	210	11 U	75 U	1900 J	12 U	110 J	250
S02004SWC1	78 U	7.1 U	59 U	29000	95	24 U	130 U	190	11 U	75 U	2000 J	12 U	140 J	250
S02004SWD1	78 U	7.1 U	59 U	34000	98	24 U	130 U	170	11 U	83 J	2300 J	12 U	72 U	240
S0200CEEA1	58 U	7.9 U	160 U	22000	91	27 U	130 U	170	8.8 U	88 U	1500 J	19 U	100 J	190
S0200CEEA1B	58 U	7.9 U	160 U	3500 U	26 U	27 U	130 U	22 U	8.8 U	88 U	780 U	19 U	59 U	21 U
S0200CEEB1	58 U	7.9 U	160 U	26000	97	27 U	130 U	230	8.8 U	88 U	2200 J	19 U	67 J	190
S0200CEEC1	58 U	7.9 U	160 U	22000	100	27 U	130 U	170	8.8 U	88 U	1400 J	19 U	110 J	220
S0200CEED1	58 U	7.9 U	160 U	24000	96	27 U	130 U	210	8.8 U	88 U	1900 J	19 U	110 J	210
S0200CEEE1	58 U	7.9 U	160 U	23000	91	27 U	130 U	200	11 J	88 U	1500 J	19 U	95 J	230
S0200CEEF1	58 U	7.9 U	160 U	21000	83 J	27 U	130 U	150	8.8 U	88 U	1800 J	19 U	69 J	260
S0200CEEG1	58 U	7.9 U	160 U	20000	88	27 U	130 U	140	8.8 U	88 U	1400 J	19 U	170 J	190
S0200CEWA1	58 U	7.9 U	160 U	29000	92	27 U	130 U	210	8.8 U	88 U	2100 J	20 J	67 J	250
S0200CEWB1	58 U	7.9 U	160 U	22000	85 J	27 U	130 U	110	8.8 U	88 U	1200 J	19 U	81 J	220
S0200CEWB1D	58 U	7.9 U	160 U	26000	96	27 U	130 U	130	8.8 U	88 U	1800 J	19 U	97 J	240
S0200CEWC1	58 U	7.9 U	160 U	26000	93	27 U	130 U	130	8.8 U	88 U	1700 J	19 U	76 J	210
S0200CEWD1	58 U	7.9 U	160 U	28000	110	27 U	130 U	160	8.8 U	88 U	1700 J	19 U	64 J	240
S0200CEWE1	58 U	7.9 U	160 U	27000	93	27 U	130 U	190	8.8 U	88 U	2200 J	19 U	62 J	190
S0200CEWF1	58 U	7.9 U	160 U	23000	87	27 U	130 U	230	8.8 U	88 U	1700 J	19 U	62 J	220
S0200CEWG1	58 U	7.9 U	160 U	30000	110	27 U	130 U	180	12 J	88 U	2400 J	19 U	59 U	270
S0200CEWG1R	58 U	7.9 U	160 U	30000	80 J	27 U	130 U	190	11 J	88 U	2100 J	19 U	89 J	280
S0200MNNA1	58 U	7.9 U	160 U	28000	110	27 U	130 U	100	12 J	88 U	1800 J	21 J	190 J	220
S0200MNNB1	58 U	7.9 U	160 U	23000	87	27 U	130 U	180	11 J	88 U	1900 J	19 U	210	240
S0200MNNC1	58 U	7.9 U	160 U	24000	88	27 U	130 U	210	12 J	88 U	1600 J	19 U	130 J	230
S0200MNND1	58 U	7.9 U	160 U	21000	90	27 U	130 U	220	8.8 U	88 U	2100 J	19 U	76 J	230
S0200MNNE1	58 U	7.9 U	160 U	31000	150	27 U	130 U	110	11 J	88 U	2000 J	19 U	130 J	270
S0200MNNF1	58 U	7.9 U	160 U	22000	100	27 U	130 U	200	8.8 U	88 U	1700 J	19 U	400	250
S0200MNNG1	58 U	7.9 U	160 U	23000	95	27 U	130 U	210	11 J	88 U	2000 J	19 U	180 J	280
S0200MNNG1R	58 U	7.9 U	160 U	26000	95	27 U	130 U	210	8.8 U	88 U	1500 J	19 U	230	240
S0200MNSA1	58 U	7.9 U	160 U	25000	92	27 U	130 U	160	11 J	88 U	2300 J	19 U	110 J	270
S0200MNSB1	58 U	7.9 U	160 U	24000	86	27 U	130 U	190	8.8 U	88 U	2000 J	19 U	170 J	250
S0200MNSC1	58 U	7.9 U	160 U	23000	93	27 U	130 U	130	8.8 U	88 U	1900 J	19 U	130 J	230
S0200MNSD1	58 U	7.9 U	160 U	27000	100	27 U	130 U	130	8.8 U	88 U	1500 J	19 U	180 J	240
S0200MNSDX	75 U	6.7 U	170 U	26000	87	18 U	120 U	250	12 U	59 U	2000 J	21 J	980	330

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0200MNSE1	58 U	7.9 U	160 U	28000	110	27 U	130 U	130	8.8 U	88 U	2100 J	19 U	69 J	240
S0200MNSF1	58 U	7.9 U	160 U	26000	96	27 U	130 U	150	8.8 U	88 U	2200 J	19 U	140 J	270
S0200MNSG1	58 U	7.9 U	160 U	22000	82 J	27 U	130 U	190	8.8 U	88 U	1400 J	19 U	720	210
S0200RAMA1	22 J	5.4 U	87 U	25000	100	24 U	150 U	130	14 U	140 U	1900 J	9.9 U	64 J	270
S0200RAMB1	19 U	5.4 U	87 U	24000	100	24 U	150 U	240	15 J	140 U	2100 J	9.9 U	120 J	270
S0200RAMC1	19 U	5.4 U	87 U	27000	98	24 U	150 U	140	14 U	140 U	1700 J	21 J	57 J	220
S0200RAMD1	19 U	5.4 U	87 U	26000	82	24 U	150 U	260	14 U	140 U	1500 J	9.9 U	56 J	180
S0200RAME1	19 U	5.4 U	87 U	27000	97	24 U	150 U	140	14 J	140 U	2500 J	9.9 U	41 U	210
S0200RAMF1	19 U	5.4 U	87 U	25000	100	24 U	150 U	130	14 U	140 U	2000 J	9.9 U	79 J	200
S0200RAMG1	19 U	5.4 U	87 U	26000	110	24 U	150 U	130	14 U	140 U	2400 J	12 J	150	220
S0200RAMG1R	19 U	5.4 U	87 U	25000	120	24 U	150 U	120	14 U	140 U	1900 J	9.9 U	140	220
S0200RAMH1	19 U	5.4 U	87 U	27000	110	24 U	150 U	84 J	14 U	140 U	2300 J	17 J	77 J	240
S0200RAMI1	19 U	5.4 U	87 U	28000	100	24 U	150 U	150	14 U	140 U	1600 J	9.9 U	170	210
S0200RAMJ1	19 U	5.4 U	87 U	22000	100	24 U	150 U	170	14 U	140 U	2100 J	9.9 U	250	250
S0200RAMK1	19 U	5.4 U	87 U	24000	86	24 U	150 U	93 J	14 U	140 U	1600 J	14 J	280	240
S0200RAML1	19 U	5.4 U	87 U	28000	120	24 U	150 U	110	14 U	140 U	2000 J	15 J	160	250
S0201SP1D1	75 U	6.7 U	170 U	25000	83	18 U	120 U	230	19 J	59 U	2300 J	12 J	1300	420
S0201SP1S1	19 U	5.4 U	87 U	22000	90	24 U	150 U	250	14 U	140 U	2900 J	9.9 U	320	260
S0201SP1S2	19 U	5.4 U	87 U	24000	97	24 U	150 U	240	14 U	140 U	1800 J	11 J	85 J	220
S0201SP1S2D	19 U	5.4 U	87 U	22000	100	24 U	150 U	240	14 U	140 U	2300 J	9.9 U	140	250
S0201SP1S3	19 U	5.4 U	87 U	20000	68	24 U	150 U	200	14 U	140 U	2600 J	15 J	950	290
S02021S1S1	19 U	5.4 U	87 U	23000	94	24 U	150 U	210	14 U	140 U	2300 J	18 J	150	280
S02021S1S2	19 U	5.4 U	87 U	26000	87	24 U	150 U	240	14 U	140 U	1700 J	15 J	130 J	330
S0202CE1S1	44 U	5.3 U	170 U	25000	86	23 U	110 U	210	11 U	63 U	2900 J	12 J	200	270
S0202CE1S2	44 U	5.3 U	170 U	19000	94	23 U	110 U	250	11 U	63 U	2700 J	8.8 U	110 J	250
S0202LPNE1	19 U	5.4 U	87 U	21000	77	24 U	150 U	210	14 U	140 U	2100 J	13 J	97 J	240
S0202LPNW1	19 U	5.4 U	87 U	21000	85	24 U	150 U	200	14 U	140 U	1800 J	9.9 U	110 J	230
S0202LPSE1	19 U	5.4 U	87 U	24000	92	24 U	150 U	210	14 U	140 U	1500 J	9.9 U	94 J	240
S0202LPSE1D	19 U	5.4 U	87 U	21000	98	24 U	150 U	210	14 U	140 U	1800 J	9.9 U	120 J	270
S0202LPSW1	19 U	5.4 U	87 U	23000	98	24 U	150 U	200	14 U	140 U	2300 J	9.9 U	120 J	240
S0202LPTC1	19 U	5.4 U	87 U	27000	97	24 U	150 U	110	14 U	140 U	2100 J	9.9 U	64 J	210
S02035L1S1	54 U	5.5 U	170 U	23000	100	20 U	86 U	150	8.5 U	160 U	2200 J	10 U	68 U	340
S02035L1S2	54 U	5.5 U	170 U	24000	78 J	20 U	86 U	180	8.5 U	160 U	2600	10 U	68 U	300
S0205AL1S1	44 U	5.3 U	170 U	21000	95	23 U	110 U	200	11 U	63 U	1700 J	8.8 U	160	310
S0205AL1S2	44 U	5.3 U	170 U	27000	110	23 U	110 U	210	11 U	63 U	1600 J	8.8 U	59 J	260

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0205AL1S3	44 U	5.3 U	170 U	25000	86	23 U	110 U	200	11 U	63 U	2500 J	13 J	110 J	280
S0205MN1S1	54 U	5.5 U	170 U	25000	95 J	20 U	86 U	170	8.5 U	160 U	2500	10 U	73 J	280
S0205MN1S2	54 U	5.5 U	170 U	23000	90 J	20 U	86 U	210	8.5 U	160 U	2500	14 J	140 J	270
S0205RN1S1	78 U	7.1 U	59 U	28000	100	24 U	130 U	100 J	11 U	75 U	2600 J	16 J	310	250
S02061S1D1	75 U	6.7 U	170 U	22000	92	18 U	120 U	260	12 U	59 U	1900 J	8.2 J	150 J	290
S02061S1S1	19 U	5.4 U	87 U	28000	100	24 U	150 U	100 J	14 U	140 U	1800 J	13 J	130 J	280
S02061S1S2	19 U	5.4 U	87 U	25000	90	24 U	150 U	230	14 U	140 U	2300 J	9.9 U	1200	330
S02061S1S3	19 U	5.4 U	87 U	23000	89	24 U	150 U	210	14 U	140 U	2600 J	17 J	360	310
S02063W1S1	54 U	5.5 U	170 U	21000	93 J	20 U	86 U	270	9.1 J	160 U	1500 J	10 U	68 U	250
S02063W1S2	54 U	5.5 U	170 U	24000	86 J	20 U	100 J	180	8.5 U	160 U	1700 J	10 U	180 J	220
S0208CE1S1	44 U	5.3 U	170 U	21000	82	23 U	110 U	230	11 U	63 U	2500 J	8.8 U	230	270
S0208CE1S2	44 U	5.3 U	170 U	20000	93	23 U	110 U	240	11 U	63 U	1700 J	9.2 J	150	250
S0208CE1S3	44 U	5.3 U	170 U	23000	91	23 U	110 U	250	15 J	63 U	2100 J	9.9 J	200	220
S0208MN1S1	78 U	7.1 U	59 U	25000	97	24 U	130 U	250	11 U	75 U	1900 J	12 U	140 J	270
S0208MN1S2	78 U	7.1 U	59 U	26000	95	24 U	130 U	220	13 J	75 U	2400 J	12 U	420	260
S0208MN1S3	78 U	7.1 U	59 U	26000	88	24 U	130 U	140	11 U	75 U	1800 J	12 U	3700	220
S0209RW1S1	78 U	8 J	59 U	27000	96	24 U	130 U	230	11 U	75 U	2800 J	12 U	330	370
S0210SP1S1	75 U	6.7 U	170 U	23000	89	18 U	120 U	240	12 U	59 U	2200 J	7.3 U	110 J	210
S0210SP1S2	75 U	6.7 U	170 U	22000	77	18 U	120 U	230	12 J	59 U	2000 J	15 J	150 J	220
S02111S1S1	19 U	5.4 U	87 U	21000	71	24 U	150 U	400	14 U	140 U	3500	16 J	270	370
S02111S1S2	19 U	5.4 U	87 U	24000	110	24 U	150 U	210	14 U	140 U	2200 J	9.9 U	120 J	270
S0211SP1S1	19 U	5.4 U	87 U	24000	100	24 U	150 U	180	14 U	140 U	2700 J	9.9 U	140 J	250
S0211SP1S2	19 U	5.4 U	87 U	29000	100	24 U	150 U	120	14 U	140 U	2800 J	9.9 U	250	210
S0213SP1S1	19 U	5.4 U	87 U	25000	88	24 U	150 U	140	14 U	140 U	2500 J	14 J	59 J	290
S0213SP1S2	19 U	5.4 U	87 U	25000	86	24 U	150 U	220	14 U	140 U	2200 J	9.9 U	200	250
S0225FC1S1	75 U	6.7 U	170 U	27000	100	18 U	120 U	130	12 U	59 U	2000 J	7.8 J	110 J	250
S0225FC1S1D	75 U	6.7 U	170 U	27000	110	18 U	120 J	130	12 U	59 U	2400 J	10 J	190 J	260
S0225FC1S2	75 U	6.7 U	170 U	22000	78	18 U	120 U	170	12 U	59 U	2100 J	15 J	950	260
S03002WNF1	78 U	7.1 U	59 U	29000	94	24 U	130 U	220	11 U	75 U	1900 J	12 U	110 J	290
S03002WNG1	78 U	7.1 U	59 U	27000	100	24 U	130 U	170	11 U	75 U	1600 J	12 U	140 J	190
S03002WSF1	78 U	7.1 U	59 U	28000	95	24 U	130 U	150	11 U	75 U	2100 J	12 U	72 J	310
S03002WSG1	78 U	7.1 U	59 U	27000	98	24 U	130 U	190	11 U	75 U	2500 J	12 U	90 J	250
S03003ENA1	37 U	9.4 U	130 U	28000	100	22 U	73 U	120	9.8 U	110 U	1600 J	18 J	88 J	200
S03003ENB1	37 U	9.4 U	130 U	26000	110	22 U	73 U	190	9.8 U	110 U	1900 J	15 U	160	210
S03003ENC1	37 U	9.4 U	130 U	26000	99	22 U	73 U	210	9.8 U	110 U	1800 J	15 U	160	220

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S03003END1	37 U	9.4 U	130 U	22000	91 J	22 U	73 U	200	9.8 U	110 U	1700 J	15 U	130	210
S03003ENE1	37 U	9.4 U	130 U	22000	85 J	22 U	87 J	240	9.8 U	110 U	1300 J	15 U	76 J	220
S03003ENF1	37 U	9.4 U	130 U	22000	98	22 U	73 U	210	9.8 U	110 U	1600 J	15 U	110	220
S03003ENG1	37 U	9.4 U	130 U	25000	95 J	22 U	73 U	200	9.8 U	110 U	2200 J	15 U	77 J	240
S03003ESA1	37 U	9.4 U	130 U	23000	80 J	22 U	73 U	140	12 J	110 U	1800 J	15 U	240	200
S03003ESA1D	37 U	9.4 U	130 U	26000	110	22 U	73 U	160	9.8 U	110 U	2000 J	15 U	250	230
S03003ESB1	37 U	9.4 U	130 U	20000	86 J	22 U	73 U	180	9.8 U	110 U	1900 J	15 U	300	220
S03003ESC1	37 U	9.4 U	130 U	26000	100	22 U	73 U	170	9.8 U	110 U	2200 J	15 U	280	200
S03003ESD1	37 U	9.4 U	130 U	25000	95 J	22 U	110 J	250	9.8 U	110 U	1900 J	18 J	83 J	210
S03003ESE1	42 J	9.4 U	130 U	26000	98	22 U	73 U	150	10 J	110 U	1900 J	15 U	130	240
S03003ESF1	58 U	7.9 U	160 U	31000	100	27 U	130 U	160	14 J	88 U	2500 J	19 U	87 J	290
S03003ESG1	58 U	7.9 U	160 U	25000	91	27 U	130 U	230	8.8 U	88 U	2000 J	19 U	110 J	240
S03003SEA1	78 U	7.1 U	59 U	28000	78	24 U	130 U	170	12 J	75 U	2000 J	12 U	110 J	270
S03003SEB1	78 U	7.1 U	59 U	26000	100	24 U	130 U	140	11 U	75 U	1700 J	20 J	87 J	220
S03003SEC1	78 U	7.1 U	59 U	24000	76	24 U	130 U	230	11 U	75 U	2000 J	12 U	120 J	280
S03003SEC1R	78 U	7.1 U	59 U	26000	99	24 U	130 U	220	11 U	75 U	2300 J	12 U	83 J	240
S03003SED1	78 U	7.1 U	59 U	26000	78	24 U	130 U	210	11 U	75 U	2400 J	14 J	120 J	270
S03003SWA1	78 U	7.1 U	59 U	26000	100	24 U	130 U	190	11 U	75 U	2100 J	12 U	88 J	260
S03003SWB1	78 U	7.1 U	59 U	30000	100	24 U	130 U	200	11 U	75 U	2400 J	15 J	140 J	280
S03003SWC1	78 U	7.1 U	59 U	24000	81	24 U	130 U	240	11 U	75 U	2500 J	12 U	72 U	280
S03003SWD1	78 U	7.1 U	59 U	27000	110	24 U	130 U	130	11 U	75 U	2300 J	12 U	92 J	250
S03004SEA1	78 U	7.1 U	59 U	27000	110	24 U	130 U	180	11 U	75 U	2300 J	12 U	110 J	260
S03004SEB1	78 U	7.1 U	59 U	30000	120	24 U	130 U	200	14 J	75 U	2000 J	20 J	99 J	230
S03004SEC1	78 U	7.1 U	59 U	30000	98	24 U	130 U	150	11 U	86 J	2100 J	12 U	160 J	230
S03004SEC1R	75 U	6.7 U	170 U	26000	94	18 U	120 U	140	12 U	59 U	1800 J	7.3 U	150 J	200
S03004SED1	78 U	7.1 U	59 U	24000	95	24 U	130 U	130	11 U	75 U	2500 J	12 U	110 J	200
S03004SWA1	78 U	7.1 U	59 U	27000	94	24 U	130 U	170	11 U	75 U	2600 J	12 U	180 J	230
S03004SWB1	75 U	6.7 U	170 U	27000	98	18 U	120 U	210	12 U	59 U	1600 J	7.3 U	130 J	260
S03004SWC1	75 U	6.7 U	170 U	26000	93	18 U	120 U	220	12 U	59 U	1600 J	11 J	94 U	250
S03004SWD1	75 U	6.7 U	170 U	24000	89	18 U	120 U	180	12 U	59 U	2500 J	15 J	140 J	230
S0300AL1S1	44 U	5.3 U	170 U	22000	90	23 U	110 U	250	11 J	63 U	2400 J	8.8 U	93 J	240
S0300AL1S2	44 U	5.3 U	170 U	22000	85	23 U	110 U	220	11 U	63 U	2600 J	19 J	90 J	250
S0300AL1S3	44 U	5.3 U	170 U	23000	90	23 U	110 U	230	12 J	63 U	2500 J	15 J	120 J	260
S0300AL2S1	44 U	5.3 U	170 U	23000	94	23 U	110 U	200	11 U	63 U	3000 J	11 J	150	260
S0300CEEE1	58 U	7.9 U	160 U	23000	95	27 U	130 U	150	8.8 U	88 U	1600 J	19 U	110 J	240

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0300CEEG1	58 U	7.9 U	160 U	24000	110	27 U	130 U	200	8.8 U	88 U	2000 J	19 U	73 J	220
S0300CEWG1	58 U	7.9 U	160 U	21000	96	27 U	130 U	210	8.8 U	88 U	2000 J	19 U	130 J	310
S0300FCEA1	19 U	5.4 U	87 U	25000	110	24 U	150 U	85 J	14 U	140 U	3300 J	11 J	49 J	250
S0300FCEB1	19 U	5.4 U	87 U	32000	120	24 U	150 U	33 J	14 U	140 U	1800 J	21 J	41 U	320
S0300FCEC1	19 U	5.4 U	88 J	26000	15 U	24 U	150 U	130	14 U	140 U	1900 J	15 J	73 J	250
S0300FCED1	19 U	5.4 U	87 U	32000	110	24 U	150 U	150	14 U	140 U	2100 J	13 J	120 J	230
S0300FCWA1	24 J	5.4 U	87 U	25000	100	24 U	160 J	120	14 U	140 U	2000 J	10 J	66 J	240
S0300FCWB1	19 U	5.4 U	87 U	24000	92	24 U	150 U	120	14 U	140 U	2200 J	13 J	130 J	240
S0300FCWC1	19 U	5.4 U	87 U	25000	96	24 U	150 U	130	14 U	140 U	2200 J	9.9 U	140	230
S0300MNNA1	58 U	7.9 U	160 U	22000	93	27 U	130 U	170	8.8 U	88 U	2100 J	19 U	220	220
S0300MNNB1	58 U	7.9 U	160 U	24000	100	27 U	130 U	230	8.8 U	88 U	2300 J	19 U	150 J	270
S0300MNNC1	58 U	7.9 U	160 U	23000	110	27 U	130 U	220	8.8 U	88 U	1900 J	22 J	150 J	230
S0300MNNE1	58 U	7.9 U	160 U	23000	100	27 U	130 U	180	8.8 U	88 U	1700 J	19 U	270	250
S0300MNNF1	58 U	7.9 U	160 U	23000	95	27 U	130 U	220	8.8 U	88 U	2000 J	19 U	210	210
S0300MNNF1D	19 U	5.4 U	87 U	24000	92	24 U	150 U	210	14 U	140 U	2200 J	9.9 U	180	250
S0300MNNG1	19 U	5.4 U	87 U	26000	92	24 U	150 U	200	14 U	140 U	1900 J	12 J	320	210
S0300MNSA1	58 U	7.9 U	160 U	26000	96	27 U	130 U	220	8.8 U	88 U	2900	19 U	130 J	350
S0300MNSB1	58 U	7.9 U	160 U	27000	99	27 U	130 U	210	9.9 J	88 U	2200 J	19 U	62 J	200
S0300MNSC1	58 U	7.9 U	160 U	22000	95	27 U	130 U	180	8.8 U	88 U	2000 J	19 U	130 J	230
S0300MNSD1	58 U	7.9 U	160 U	32000	130	27 U	130 U	86	16 J	88 U	2100 J	23 J	100 J	240
S0300MNSF1	58 U	7.9 U	160 U	23000	89	27 U	130 U	130	8.8 U	88 U	1600 J	19 U	110 J	220
S0300MNSG1	58 U	7.9 U	160 U	24000	88	27 U	130 U	210	8.8 U	88 U	1700 J	19 U	160 J	240
S0300MNSG1R	58 U	7.9 U	160 U	23000	74 J	27 U	130 U	210	11 J	88 U	1800 J	19 U	140 J	220
S0300RWSA1	19 U	5.4 U	87 U	24000	88	24 U	150 U	110	14 U	140 U	1800 J	15 J	120 J	240
S0300RWSB1	19 U	5.4 U	87 U	26000	110	24 U	150 U	180	14 U	140 U	1600 J	9.9 U	78 J	290
S0300RWSC1	19 U	5.4 U	87 U	30000	140	24 U	150 U	120	14 U	140 U	2700 J	13 J	89 J	260
S0300RWSD1	19 U	5.4 U	87 U	26000	85	24 U	150 U	190	14 U	140 U	2000 J	11 J	130 J	310
S0300RWSF1	19 U	5.4 U	87 U	24000	110	24 U	150 U	230	14 U	140 U	1900 J	9.9 U	69 J	200
S0300SPEA1	19 U	5.4 U	87 U	26000	93	24 U	150 U	130	14 U	140 U	1300 J	9.9 U	110 J	240
S0300SPEB1	19 J	5.4 U	87 U	29000	100	24 U	150 U	110 J	14 U	140 U	1400 J	9.9 U	87 J	240
S0300SPEC1	19 U	5.4 U	87 U	26000	89	24 U	150 U	130	14 U	140 U	1900 J	12 J	100 J	240
S0300SPED1	19 U	5.4 U	87 U	25000	100	24 U	150 U	150	14 U	140 U	1400 J	12 J	55 J	240
S0300SPEE1	19 U	5.4 U	87 U	22000	97	24 U	150 U	190	14 U	140 U	1200 J	9.9 U	70 J	210
S0300SPEF1	19 U	5.4 U	87 U	23000	94	24 U	150 U	180	14 U	140 U	1700 J	12 J	120 J	220
S0300SPEG1	19 U	5.4 U	87 U	26000	91	24 U	150 U	190	14 U	140 U	2100 J	12 J	130 J	210

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0300SPEG1R	19 U	5.4 U	87 U	27000	98	24 U	150 U	190	14 U	140 U	1800 J	9.9 U	120 J	190
S0304MA1S1	44 U	5.3 U	170 U	17000	72	23 U	110 U	210	11 U	63 U	3500 J	8.8 U	150	420
S0304MA1S2	44 U	5.3 U	170 U	22000	84	23 U	110 U	200	11 U	63 U	2200 J	18 J	87 J	280
S0304MA1S3	44 U	5.3 U	170 U	21000	110	23 U	110 U	200	11 U	63 U	2400 J	12 J	170	270
S0304MA1S4	44 U	5.3 U	170 U	27000	110	23 U	110 U	110	11 U	63 U	2400 J	11 J	71 J	290
S0304MA1S5	44 U	5.3 U	170 U	26000	100	23 U	110 U	170	11 U	63 U	2600 J	8.8 U	130 J	280
S0304MA1S5R	44 U	5.3 U	170 U	26000	98	23 U	110 U	170	11 U	64 J	2400 J	8.8 U	200	260
S03053W1S1	54 U	5.5 U	170 U	26000	100	20 U	86 U	250	8.5 U	160 U	1900 J	10 U	140 J	240
S03053W1S2	54 U	5.5 U	170 U	33000	110	20 U	150 J	150	11 J	160 U	2400	13 J	99 J	250
S0306AR1S1	44 U	5.3 U	170 U	22000	95	23 U	110 U	220	11 U	63 U	2700 J	8.8 J	57 J	360
S0306AR1S2	44 U	5.3 U	170 U	25000	84	23 U	110 U	210	11 U	63 U	2100 J	8.8 U	81 J	260
S0306AR1S3	44 U	5.3 U	170 U	28000	100	23 U	110 U	100 J	17 J	63 U	2400 J	10 J	130 J	260
S0306AR1S3R	44 U	5.3 U	170 U	30000	110	23 U	110 U	100 J	11 U	63 U	2500 J	15 J	190	310
S0306AR2S1	44 U	5.3 U	170 U	22000	87	23 U	110 U	210	11 U	63 U	2100 J	15 J	84 J	320
S0306MA1S1	44 U	5.3 U	170 U	21000	92	23 U	110 U	200	11 U	63 U	2900 J	16 J	88 J	300
S0306MA1S2	44 U	5.3 U	170 U	21000	86	23 U	110 U	200	11 U	63 U	2600 J	14 J	120 J	330
S0306MA1S2D	44 U	5.3 U	170 U	23000	100	23 U	110 U	200	12 J	63 U	3000 J	11 J	150	280
S0307IM1S1	54 U	5.5 U	170 U	20000	86 J	20 U	86 U	250	8.5 U	160 U	2600	10 U	380	300
S0307MA1S1	44 U	5.3 U	170 U	17000	74	23 U	110 U	190	11 U	63 U	2500 J	8.8 U	160	230
S0307MA1S2	44 U	5.3 U	170 U	18000	79	23 U	110 U	220	11 U	63 U	2500 J	8.8 U	180	280
S0307MA1S3	44 U	5.3 U	170 U	23000	80	23 U	110 U	220	12 J	63 U	3000 J	16 J	88 J	300
S0309MT1S1	44 U	5.3 U	170 U	22000	86	23 U	110 U	220	11 U	63 U	2500 J	11 J	79 J	300
S0309MT1S2	44 U	5.3 U	170 U	23000	100	23 U	110 U	210	11 U	63 U	2600 J	8.8 U	110 J	250
S0309MT1S3	44 U	5.3 U	170 U	27000	88	23 U	110 U	180	11 U	63 U	2600 J	13 J	130 J	280
S03102E1S1	19 U	5.4 U	87 U	28000	97	24 U	150 U	190	14 U	140 U	2200 J	9.9 U	150	300
S0311MA1S1	44 U	5.3 U	170 U	31000	150	23 U	110 U	79 J	11 U	63 U	2200 J	11 J	100 J	260
S0311MA1S2	44 U	5.3 U	170 U	20000	82	23 U	110 U	180	11 U	63 U	2400 J	11 J	170	300
S0311MA1S3	44 U	5.3 U	170 U	19000	86	23 U	110 U	200	11 U	63 U	3100 J	8.8 U	210	270
S0311MN1S1	54 U	5.5 U	170 U	23000	96 J	20 U	86 U	260	8.5 U	160 U	1900 J	12 J	93 J	270
S0311MN1S2	54 U	5.5 U	170 U	24000	82 J	20 U	86 U	260	9.6 J	160 U	2000 J	10 U	88 J	270
S0319OM1S1	54 U	5.5 U	170 U	27000	100	20 U	86 U	200	10 J	160 U	1900 J	10 U	160 J	270
S0319OM1S2	54 U	5.5 U	170 U	29000	110	20 U	110 J	170	8.5 U	160 U	2600	10 U	100 J	310
S0319OM1S3	54 U	5.5 U	170 U	25000	95 J	20 U	86 U	240	8.5 U	160 U	2300	10 U	83 J	220
S04002WNA1	78 U	7.1 U	59 U	28000	82	24 U	130 U	210	11 U	75 U	1900 J	12 U	100 J	210
S04002WNB1	78 U	7.1 U	59 U	24000	80	24 U	130 U	140	11 U	75 U	2100 J	12 U	170 J	280

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S04002WNC1	78 U	7.1 U	59 U	28000	89	24 U	130 U	220	11 U	75 U	2200 J	12 U	81 J	200
S04002WNC1R	78 U	7.1 U	59 U	26000	100	24 U	130 U	110 J	11 J	75 U	2300 J	12 U	97 J	280
S04002WND1	78 U	7.1 U	59 U	27000	96	24 U	130 U	210	11 U	75 U	2100 J	12 U	100 J	220
S04002WNE1	78 U	7.1 U	59 U	29000	100	24 U	130 U	140	12 J	75 U	2600 J	12 U	72 U	280
S04002WSA1	78 U	7.1 U	59 U	27000	100	24 U	130 U	120	11 U	75 U	1800 J	12 U	96 J	240
S04002WSB1	78 U	7.1 U	59 U	26000	87	24 U	180 J	230	13 J	75 U	1800 J	17 J	100 J	280
S04002WSC1	78 U	7.1 U	59 U	25000	84	24 U	130 U	220	19 J	75 U	3200	12 U	81 J	270
S04002WSD1	78 U	7.1 U	59 U	27000	100	24 U	140 J	140	11 U	75 U	2400 J	12 U	760	290
S04002WSE1	78 U	7.1 U	59 U	25000	88	24 U	140 J	220	11 U	75 U	2000 J	12 U	130 J	250
S04003ENA1	58 U	7.9 U	160 U	27000	96	27 U	150 J	240	8.8 U	88 U	1800 J	19 U	59 J	180
S04003ENB1	58 U	7.9 U	160 U	25000	90	27 U	130 U	200	8.8 U	88 U	1800 J	19 U	59 U	190
S04003ENC1	58 U	7.9 U	160 U	28000	100	27 U	130 U	200	8.8 U	88 U	2100 J	19 U	77 J	200
S04003END1	58 U	7.9 U	160 U	26000	110	27 U	130 U	210	8.8 U	88 U	2400 J	19 U	59 U	250
S04003ENE1	58 U	7.9 U	160 U	23000	100	27 U	130 U	200	8.8 U	88 U	1900 J	19 U	170 J	210
S04003ENF1	58 U	7.9 U	160 U	23000	96	27 U	130 U	240	8.8 U	88 U	1800 J	19 U	74 J	210
S04003ENG1	58 U	7.9 U	160 U	21000	86	27 U	130 U	160	8.8 U	88 U	1200 J	19 U	110 J	200
S04003ESA1	58 U	7.9 U	160 U	27000	110	27 U	130 U	140	8.8 U	88 U	2000 J	19 U	180 J	230
S04003ESB1	58 U	7.9 U	160 U	24000	91	27 U	130 U	220	8.8 U	88 U	2000 J	19 U	100 J	210
S04003ESC1	58 U	7.9 U	160 U	30000	110	27 U	130 U	150	8.8 U	88 U	2700	19 U	150 J	220
S04003ESD1	58 U	7.9 U	160 U	27000	110	27 U	130 U	140	8.8 U	88 U	1700 J	19 U	110 J	250
S04003ESDX	75 U	6.7 U	170 U	22000	81	18 U	120 U	250	12 U	59 U	2700 J	9.8 J	94 U	270
S04003ESE1	58 U	7.9 U	160 U	25000	98	27 U	130 U	140	8.8 U	88 U	1800 J	19 U	2800	170
S04003ESF1	58 U	7.9 U	160 U	23000	100	27 U	130 U	240	8.8 U	88 U	1500 J	19 U	220	190
S04003ESG1	58 U	7.9 U	160 U	23000	91	27 U	130 U	200	8.8 U	88 U	2100 J	19 U	230	220
S04003ESG1D	58 U	7.9 U	160 U	24000	90	27 U	130 U	230	8.8 U	88 U	1600 J	19 U	190 J	200
S04003ESG1R	58 U	7.9 U	160 U	22000	95	27 U	130 U	230	8.8 U	88 U	1700 J	19 U	210	220
S0400DI1S1	75 U	6.7 U	170 U	28000	92	18 U	120 U	200	12 U	59 U	2100 J	11 J	97 J	220
S0400EHCC1	19 U	5.4 U	87 U	20000	86	24 U	150 U	180	14 U	140 U	1400 J	9.9 U	91 J	220
S0400EM1S1	78 U	7.1 U	59 U	26000	93	24 U	130 U	140	11 U	75 U	2200 J	12 U	86 J	270
S0400EM1S2	78 U	7.1 U	59 U	23000	93	24 U	130 U	160	11 U	75 U	2700 J	12 U	90 J	250
S0400EM1S3	78 U	7.1 U	59 U	26000	90	24 U	130 U	85 J	11 U	75 U	1800 J	12 U	72 U	270
S0400EM1S4	78 U	7.1 U	59 U	20000	78	24 U	130 U	160	11 U	75 U	2900 J	12 U	140 J	240
S0400EM1S5	78 U	7.1 U	59 U	27000	91	24 U	130 U	230	11 U	75 U	3000 J	20 J	80 J	360
S0400HS1S1	78 U	7.1 U	59 U	24000	87	24 U	130 U	200	11 U	75 U	2200 J	12 U	130 J	280
S0400HS1S2	78 U	7.1 U	59 U	19000	79	24 U	130 U	160	11 U	75 U	2600 J	13 J	150 J	250

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0400HS1S3	78 U	7.1 U	59 U	24000	84	24 U	130 U	230	11 U	75 U	1700 J	12 U	97 J	200
S0400HS1S4	78 U	7.1 U	59 U	26000	87	24 U	130 U	180	11 U	75 U	2000 J	12 U	79 J	290
S0400HS1S5	78 U	7.1 U	59 U	25000	100	24 U	130 U	210	11 U	75 U	1900 J	12 U	86 J	280
S0400HS1S6	78 U	7.1 U	59 U	24000	98	24 U	130 U	160	16 J	75 U	2600 J	12 U	72 U	240
S0400HT1S1	44 U	5.3 U	170 U	23000	67	23 U	110 U	130	11 U	63 U	1900 J	15 J	62 J	290
S0400HT2DC	44 U	5.3 U	170 U	20000	85	23 U	110 U	210	11 U	63 U	2300 J	11 J	96 J	260
S0400HT2DCB	54 U	5.5 U	170 U	3100 U	29 U	20 U	86 U	36 U	8.5 U	160 U	690 U	10 U	68 U	27 J
S0400HT2S1	44 U	5.3 U	170 U	22000	88	23 U	110 U	170	11 U	63 U	2500 J	8.8 U	78 J	290
S0400HT2S2	44 U	5.3 U	170 U	22000	100	23 U	110 U	190	11 U	63 U	1900 J	8.8 U	81 J	310
S0400HT2S3	44 U	5.3 U	170 U	23000	91	23 U	110 U	200	11 U	63 U	1700 J	14 J	50 J	320
S0400HT2S4	44 U	5.3 U	170 U	22000	84	23 U	110 U	150	11 U	63 U	1800 J	8.8 U	56 J	320
S0400HT3S1	44 U	5.3 U	170 U	28000	90	23 U	110 U	200	11 U	63 U	2400 J	8.8 U	110 J	310
S0400HT4D1	54 U	5.5 U	170 U	24000	97 J	20 U	86 U	140	8.5 U	160 U	2200 J	10 U	1700	220
S0400HT4D2	54 U	5.5 U	170 U	27000	69 J	20 U	140 J	91 J	8.5 U	160 U	1800 J	21 J	2400	220
S0400HT4D3	54 U	5.5 U	170 U	25000	100	20 U	86 U	140	23 J	160 U	2000 J	10 U	410	170
S0400HT4S1	78 U	7.1 U	59 U	32000	74	24 U	150 J	82 J	11 U	75 U	1900 J	16 J	3400	170
S0400HT4S1D	78 U	7.1 U	59 U	31000	99	24 U	130 U	78 J	21 J	75 U	2000 J	12 U	3300	170
S0400ILEA1	78 U	7.1 U	59 U	32000	110	24 U	130 U	140	11 U	75 U	1900 J	15 J	91 J	290
S0400ILEB1	78 U	7.1 U	59 U	29000	100	24 U	130 U	140	11 U	75 U	2000 J	12 U	72 U	240
S0400ILEC1	78 U	7.1 U	59 U	28000	85	24 U	130 U	150	17 J	75 U	1800 J	18 J	86 J	270
S0400ILED1	78 U	7.1 U	59 U	27000	83	24 U	130 U	130	11 U	75 U	1800 J	12 U	72 U	250
S0400ILEE1	78 U	7.1 U	59 U	27000	98	24 U	130 U	150	11 U	75 U	2200 J	12 U	72 U	210
S0400ILEF1	78 U	7.1 U	59 U	28000	86	24 U	130 U	170	11 U	75 U	2900 J	17 J	100 J	260
S0400ILEG1	78 U	7.1 U	59 U	28000	98	24 U	130 U	130	11 U	75 U	1900 J	12 U	72 U	260
S0400ILEG1D	78 U	7.1 U	59 U	25000	86	24 U	160 J	130	11 U	75 U	2000 J	12 U	89 J	240
S0400ILWA1	78 U	7.1 U	59 U	29000	95	24 U	130 U	130	11 U	75 U	2200 J	17 J	120 J	250
S0400ILWB1	78 U	7.1 U	59 U	26000	99	24 U	130 U	170	11 U	75 U	2800 J	12 U	72 U	230
S0400ILWC1	78 U	7.1 U	59 U	26000	94	24 U	130 U	140	12 J	75 U	2100 J	14 J	72 U	300
S0400ILWD1	78 U	7.1 U	59 U	32000	130	24 U	130 U	110 J	11 U	75 U	2600 J	15 J	180 J	220
S0400ILWE1	78 U	7.1 U	59 U	31000	110	24 U	130 U	140	11 J	75 U	2600 J	12 U	91 J	310
S0400ILWF1	78 U	7.1 U	59 U	35000	130	24 U	130 U	110 J	11 U	75 U	2400 J	12 U	150 J	260
S0400ILWG1	78 U	7.1 U	59 U	34000	110	24 U	130 U	130	13 J	75 U	2100 J	12 U	110 J	270
S0400ILWG1R	78 U	7.1 U	59 U	30000	110	24 U	130 U	130	11 U	75 U	2200 J	12 U	88 J	270
S0400MAEA1	37 U	9.4 U	130 U	23000	96 J	22 U	73 U	160	9.8 U	110 U	2200 J	15 U	79 J	210
S0400MAEB1	37 U	9.4 U	130 U	26000	100	22 U	73 U	170	9.8 U	110 U	2100 J	15 U	120	190

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0400MAEC1	37 U	9.4 U	130 U	25000	90 J	22 U	87 J	130	11 J	110 U	1700 J	15 U	77 J	250
S0400MAED1	37 U	9.4 U	130 U	30000	95 J	22 U	73 U	210	9.8 U	110 U	2100 J	15 U	100	180
S0400MAEE1	37 U	9.4 U	130 U	26000	110	22 U	91 J	120	9.8 U	110 U	1600 J	15 U	160	210
S0400MAEF1	37 U	9.4 U	130 U	30000	100	22 U	73 U	110	9.8 U	110 U	2300 J	15 U	150	230
S0400MAWA1	37 U	9.4 U	130 U	30000	100	22 U	98 J	140	9.8 U	110 U	2200 J	15 U	140	250
S0400MAWB1	37 U	9.4 U	130 U	31000	110	22 U	130 J	130	11 J	110 U	2100 J	15 U	230	270
S0400MAWC1	37 U	9.4 U	130 U	22000	93 J	22 U	73 U	250	9.8 U	110 U	2200 J	15 U	120	190
S0400MAWD1	37 U	9.4 U	130 U	23000	99	22 U	73 U	160	9.8 J	110 U	2600	15 U	140	230
S0400MAWE1	37 U	9.4 U	130 U	26000	110	22 U	92 J	120	9.8 U	110 U	2100 J	15 U	82 J	200
S0400MAWF1	37 U	9.4 U	130 U	24000	99	22 U	73 U	190	9.8 U	110 U	1700 J	15 U	70 J	250
S0400MN1S1	54 U	5.5 U	170 U	27000	81 J	20 U	86 U	270	8.5 U	160 U	1700 J	10 U	87 J	250
S0400MN1S2	54 U	5.5 U	170 U	24000	82 J	20 U	86 U	250	9.2 J	160 U	1600 J	11 J	170 J	260
S0400MNNA1	58 U	7.9 U	160 U	23000	92	27 U	130 U	230	8.8 U	88 U	1800 J	19 U	74 J	190
S0400MNNB1	58 U	7.9 U	160 U	22000	78 J	27 U	130 U	230	9.5 J	88 U	1600 J	19 U	98 J	220
S0400MNNC1	58 U	7.9 U	160 U	25000	90	27 U	130 U	240	8.8 U	88 U	2200 J	19 U	95 J	200
S0400MNND1	58 U	7.9 U	160 U	24000	94	27 U	130 U	270	8.8 U	88 U	1500 J	19 U	59 U	220
S0400MNSA1	58 U	7.9 U	160 U	24000	99	27 U	130 U	190	8.8 U	88 U	1800 J	19 U	93 J	210
S0400MNSA1D	58 U	7.9 U	160 U	25000	110	27 U	130 U	210	8.8 U	88 U	2100 J	19 U	72 J	240
S0400MNSB1	58 U	7.9 U	160 U	25000	94	27 U	130 U	270	8.8 U	88 U	1400 J	19 U	60 J	210
S0400MNSC1	58 U	7.9 U	160 U	24000	91	27 U	130 U	140	8.8 U	88 U	1900 J	19 U	120 J	210
S0400MNSD1	58 U	7.9 U	160 U	23000	95	27 U	130 U	200	8.8 U	88 U	1500 J	19 U	150 J	240
S0400PAMA1	37 U	9.4 U	130 U	20000	90 J	22 U	73 U	240	9.8 U	110 U	1800 J	15 U	140	200
S0400PAMB1	37 U	9.4 U	130 U	25000	86 J	22 U	73 U	230	9.8 U	110 U	2000 J	15 U	390	200
S0400PAMC1	37 U	9.4 U	130 U	26000	96 J	22 U	73 U	210	9.8 U	110 U	2400 J	15 U	370	210
S0400PAMD1	37 U	9.4 U	130 U	27000	110	22 U	73 U	150	13 J	110 U	2000 J	15 U	170	220
S0400PAMD1D	37 U	9.4 U	130 U	28000	120	22 U	73 U	160	9.8 U	110 U	1800 J	15 U	140	240
S0400PAME1	37 U	9.4 U	130 U	26000	110	22 U	84 J	160	11 J	110 U	1900 J	15 U	210	230
S0400PAMF1	37 U	9.4 U	130 U	27000	110	22 U	73 U	140	9.8 U	110 U	2100 J	16 J	170	240
S0400PAMG1	37 U	9.4 U	130 U	27000	93 J	22 U	73 U	170	9.8 U	110 U	2200 J	15 U	190	240
S0400PAMG1R	37 U	9.4 U	130 U	26000	95 J	22 U	90 J	170	9.8 U	110 U	2100 J	15 U	200	220
S0400SAMA1	37 U	9.4 U	130 U	29000	29 U	22 U	73 U	180	18 J	120 J	2700	15 U	69 J	330
S0400SAMB1	37 U	9.4 U	130 U	26000	100	22 U	73 U	160	9.8 U	110 U	1900 J	16 J	95	230
S0400SAMB1D	37 U	9.4 U	130 U	27000	120	22 U	73 U	180	9.8 U	110 U	2100 J	15 U	87 J	230
S0400SAMC1	37 U	9.4 U	130 U	30000	93 J	22 U	73 U	200	14 J	110 U	2000 J	17 J	110	270
S0400SAMD1	37 U	9.4 U	130 U	28000	100	22 U	73 U	170	9.8 U	110 U	1700 J	15 U	88 J	260

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0400SAME1	37 U	9.4 U	130 U	27000	97 J	22 U	91 J	200	9.8 U	110 U	2100 J	15 U	62 J	260
S0400SAMF1	37 U	9.4 U	130 U	25000	100	22 U	73 U	120	9.8 U	110 U	1900 J	15 U	140	220
S0400SAMG1	37 U	9.4 U	130 U	20000	87 J	22 U	73 U	150	9.8 U	110 U	1300 J	18 J	100	220
S0400SAMG1R	58 U	7.9 U	160 U	24000	91	27 U	130 U	190	8.8 U	88 U	1800 J	19 U	100 J	210
S0400SPEA1	37 U	9.4 U	130 U	29000	110	22 U	73 U	160	13 J	110 U	2300 J	15 U	140	230
S0400SPEB1	37 U	9.4 U	130 U	24000	84 J	22 U	73 U	210	9.8 U	110 U	2000 J	15 U	170	250
S0400SPEC1	37 U	9.4 U	130 U	25000	86 J	22 U	73 U	120	9.8 U	110 U	1200 J	15 U	1700	220
S0400SPED1	37 U	9.4 U	130 U	27000	140	22 U	73 U	140	9.8 U	110 U	1900 J	15 U	320	250
S0400SPEDX	75 U	6.7 U	170 U	23000	89	18 U	120 U	260	13 J	59 U	1800 J	7.3 U	94 U	210
S0400SPEE1	37 U	9.4 U	130 U	22000	97	22 U	73 U	150	9.8 U	110 U	1800 J	15 U	820	270
S0400SPEF1	37 U	9.4 U	130 U	25000	94 J	22 U	86 J	110	9.8 U	110 U	1900 J	15 U	390	230
S0400SPEG1	37 U	9.4 U	130 U	35000	120	22 U	73 U	150	9.8 U	110 U	2600	19 J	1000	250
S0400SPWA1	37 U	9.4 U	130 U	21000	90 J	22 U	73 U	200	9.8 U	110 U	1900 J	16 J	120	220
S0400SPWB1	37 U	9.4 U	130 U	23000	80 J	22 U	73 U	210	9.8 U	110 U	1900 J	16 J	120	230
S0400SPWC1	37 U	9.4 U	130 U	26000	92 J	22 U	78 J	220	13 J	110 U	1700 J	15 U	130	220
S0400SPWD1	37 U	9.4 U	130 U	24000	100	22 U	73 U	110	9.8 U	110 U	1800 J	15 U	110	230
S0400SPWE1	37 U	9.4 U	130 U	25000	84 J	22 U	73 U	210	9.8 U	110 U	1700 J	15 U	560	210
S0400SPWF1	37 U	9.4 U	130 U	26000	100	22 U	96 J	230	9.8 U	110 U	1800 J	15 U	780	230
S0400SPWG1	37 U	9.4 U	130 U	27000	110	22 U	73 U	90	10 J	110 U	1900 J	15 U	150	220
S04032W1D3	75 U	6.7 U	170 U	24000	87	18 U	140 J	250	12 U	59 U	2600 J	12 J	140 J	270
S04032W1S1	54 U	5.5 U	170 U	23000	100	20 U	86 U	220	8.5 U	160 U	2400	12 J	120 J	270
S04032W1S2	54 U	5.5 U	170 U	25000	99	20 U	110 J	230	8.5 U	160 U	2300	10 U	120 J	240
S04032W1S3	54 U	5.5 U	170 U	24000	53 J	20 U	250 J	110 J	8.5 U	160 U	1700 J	16 J	2700	220
S04032W1S3R	54 U	5.5 U	170 U	24000	74 J	20 U	280 J	110 J	8.5 U	160 U	1700 J	10 U	2900	190
S0403IL1S1	44 U	5.3 U	170 U	25000	87	23 U	110 U	170	11 U	63 U	2200 J	8.8 U	81 J	270
S0403IL1S2	44 U	5.3 U	170 U	21000	91	23 U	110 U	180	11 U	63 U	2000 J	13 J	58 J	250
S0403IL1S3	44 U	5.3 U	170 U	23000	83	23 U	110 U	160	11 U	63 U	2500 J	8.8 U	110 J	250
S0403RW1S1	78 U	7.1 U	59 U	23000	84	24 U	130 U	220	15 J	75 U	2200 J	12 U	89 J	320
S0403RW1S2	78 U	7.1 U	59 U	23000	93	24 U	130 U	240	11 U	75 U	2500 J	12 U	220 J	310
S0404AL1S1	44 U	5.3 U	170 U	18000	89	23 U	110 U	210	11 U	63 U	2900 J	11 J	180	230
S0404AL1S2	44 U	5.3 U	170 U	22000	95	23 U	110 U	180	11 U	63 U	2100 J	8.8 U	110 J	290
S0404AL1S3	44 U	5.3 U	170 U	25000	95	23 U	110 U	260	11 U	63 U	1700 J	8.8 U	130 J	220
S0404AR1S1	44 U	5.3 U	170 U	23000	87	23 U	110 U	250	11 U	63 U	2000 J	15 J	100 J	250
S0404AR1S2	44 U	5.3 U	170 U	24000	94	23 U	110 U	240	11 U	63 U	1700 J	10 J	100 J	220
S04053E1S1	25 J	5.4 U	87 U	28000	100	24 U	150 U	130	14 U	140 U	2400 J	12 J	82 J	280

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S04053E1S2	19 U	5.4 U	87 U	22000	83	24 U	150 U	220	14 U	140 U	2200 J	9.9 U	170	250
S0407IH1D1	75 U	6.7 U	170 U	12000	59 J	18 U	120 U	630	12 U	59 U	2800 J	7.3 U	9800	240
S0407IM1S1	54 U	5.5 U	170 U	20000	75 J	20 U	86 U	240	8.5 U	160 U	4400	10 U	1000	300
S05002WNA1	78 U	7.1 U	59 U	29000	110	24 U	130 U	130	11 U	75 U	3000 J	12 U	79 J	250
S05002WNB1	78 U	7.1 U	59 U	30000	110	24 U	130 U	120	11 U	75 U	2000 J	13 J	72 U	260
S05002WNC1	78 U	7.1 U	59 U	34000	110	24 U	130 U	160	11 U	75 U	2100 J	12 U	72 U	240
S05002WSA1	78 U	7.1 U	59 U	32000	120	24 U	130 J	140	11 U	75 U	2200 J	12 U	150 J	230
S05002WSB1	78 U	7.1 U	59 U	29000	110	24 U	130 U	140	11 U	75 U	1900 J	12 U	94 J	230
S05002WSC1	78 U	7.1 U	59 U	33000	120	24 U	130 U	150	11 U	75 U	2500 J	12 U	98 J	250
S05003E1S1	44 U	5.3 U	170 U	30000	87	23 U	110 U	180	18 J	63 U	2300 J	14 J	93 J	260
S05003E1S2	44 U	5.3 U	170 U	22000	86	23 U	110 U	260	11 U	63 U	2500 J	8.8 U	110 J	260
S05003E1S3	44 U	5.3 U	170 U	25000	81	23 U	110 U	290	11 U	63 U	2600 J	8.8 U	110 J	250
S05003E1S3D	44 U	5.3 U	170 U	23000	84	23 U	110 U	290	11 U	63 U	2400 J	8.8 U	87 J	260
S0500EHCC1	19 J	5.4 U	87 U	22000	83	24 U	150 U	210	14 U	140 U	1500 J	9.9 U	55 J	210
S0500EHNE1	19 U	5.4 U	87 U	28000	72	24 U	150 U	110	14 U	140 U	1000 U	11 J	44 J	140
S0500EHSE1	19 U	5.4 U	87 U	18000	81	24 U	150 U	170	14 U	140 U	1500 J	19 J	67 J	180
S0500MN1D1	75 U	6.7 U	170 U	23000	93	18 U	120 U	280	12 U	59 U	2100 J	10 J	94 J	220
S0500MN1S1	54 U	5.5 U	170 U	24000	79 J	20 U	86 U	240	11 J	160 U	2300	10 U	760	210
S0500MN1S2	54 U	5.5 U	170 U	21000	80 J	20 U	89 J	260	11 J	160 U	2200 J	19 J	160 J	250
S0500PDEA1	37 U	9.4 U	130 U	24000	94 J	22 U	73 U	200	9.8 U	110 U	2500	15 U	87 J	270
S0500PDEB1	37 U	9.4 U	130 U	17000	82 J	22 U	73 U	200	9.8 U	110 U	1900 J	15 U	120	220
S0500PDEC1	37 U	9.4 U	130 U	20000	79 J	22 U	73 U	200	15 J	110 U	1500 J	15 U	54 J	200
S0500PDED1	37 U	9.4 U	130 U	21000	93 J	22 U	73 U	110	9.8 U	110 U	1500 J	15 U	100	220
S0500PDEE1	37 U	9.4 U	130 U	19000	98	22 U	73 U	190	13 J	110 U	1800 J	15 U	92	220
S0500PDEF1	37 U	9.4 U	130 U	20000	76 J	22 U	73 U	170	9.8 U	110 U	1800 J	15 U	33 J	220
S0500PDEG1	37 U	9.4 U	130 U	23000	84 J	22 U	73 U	130	9.8 U	110 U	1500 J	15 U	69 J	220
S0500PDEH1	37 U	9.4 U	130 U	26000	90 J	22 U	73 U	170	9.8 U	110 U	1800 J	15 U	99	210
S0500PDEH1R	37 U	9.4 U	130 U	23000	87 J	22 U	73 U	160	9.8 U	110 U	1900 J	15 U	87 J	220
S0500PDWA1	37 U	9.4 U	130 U	20000	91 J	22 U	73 U	200	9.8 U	110 U	1600 J	15 U	110	200
S0500PDWB1	37 U	9.4 U	130 U	23000	100	22 U	73 U	140	9.8 U	110 U	1800 J	15 U	150	190
S0500PDWC1	37 U	9.4 U	130 U	22000	95 J	22 U	73 U	150	9.8 U	110 U	2400	15 U	82 J	170
S0500PDWD1	37 U	9.4 U	130 U	24000	89 J	22 U	73 U	200	9.8 U	110 U	2200 J	15 U	91	260
S0500PDWE1	37 U	9.4 U	130 U	22000	86 J	22 U	73 U	190	9.8 U	110 U	1700 J	15 U	100	190
S0500PDWE1D	37 U	9.4 U	130 U	21000	86 J	22 U	73 U	170	9.8 U	110 U	1700 J	15 U	110	200
S0500PDWF1	37 U	9.4 U	130 U	20000	91 J	22 U	73 U	180	9.8 U	110 U	1700 J	15 U	140	190

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0500PDWG1	37 U	9.4 U	130 U	22000	95 J	22 U	73 U	180	14 J	110 U	2000 J	15 U	80 J	200
S0500PDWH1	37 U	9.4 U	130 U	21000	92 J	22 U	73 U	180	9.8 U	110 U	2000 J	15 U	83 J	190
S0500PDWI1	37 U	9.4 U	130 U	23000	94 J	22 U	73 U	180	18 J	110 U	2200 J	15 U	64 J	210
S0500SESA1	19 U	5.4 U	87 U	24000	89	24 U	150 U	190	14 U	140 U	1600 J	9.9 U	67 J	190
S0500SESB1	19 U	5.4 U	87 U	26000	100	24 U	150 U	150	14 U	140 U	1500 J	14 J	97 J	200
S0500SESC1	32 J	5.4 U	87 U	23000	90	24 U	150 U	230	14 U	140 U	2000 J	18 J	62 J	250
S0500SESD1	19 U	5.4 U	87 U	21000	94	24 U	150 U	220	14 U	140 U	1500 J	9.9 U	85 J	250
S0502MN1S1	54 U	5.5 U	170 U	25000	82 J	20 U	86 U	230	8.5 U	160 U	2200 J	10 U	110 J	300
S0502MN1S2	54 U	5.5 U	170 U	22000	87 J	20 U	99 J	260	8.5 U	160 U	2000 J	13 J	130 J	240
S05103E1S1	44 U	5.3 U	170 U	29000	99	23 U	110 U	180	11 U	63 U	2500 J	8.8 U	110 J	280
S05103E1S2	44 U	5.3 U	170 U	20000	73	23 U	110 U	260	11 U	63 U	2500 J	8.8 U	160	230
S06004AMA1	37 U	9.4 U	130 U	26000	110	22 U	73 U	150	9.8 U	110 U	2000 J	15 U	89 J	210
S06004AMB1	37 U	9.4 U	130 U	27000	130	22 U	73 U	130	9.8 U	110 U	2300 J	15 U	64 J	260
S06004AMC1	37 U	9.4 U	130 U	25000	120	22 U	97 J	120	9.8 U	110 U	1600 J	15 U	62 J	230
S06004AMD1	37 U	9.4 U	130 U	27000	110	22 U	73 U	120	13 J	110 U	2200 J	15 U	40 J	220
S06004AME1	37 U	9.4 U	130 U	28000	160	22 U	110 J	110	15 J	110 U	1900 J	15 U	96	250
S06004AMF1	37 U	9.4 U	130 U	28000	110	22 U	77 J	130	16 J	110 U	2200 J	15 U	120	230
S06004AMG1	37 U	9.4 U	130 U	27000	110	22 U	140 J	140	10 J	110 U	1800 J	15 U	76 J	240
S06004AMH1	37 U	9.4 U	130 U	26000	110	22 U	73 U	110	9.8 U	110 U	1700 J	19 J	120	220
S06004AMI1	37 U	9.4 U	130 U	26000	120	22 U	73 U	120	9.8 U	110 U	2100 J	15 U	110	200
S06004AMJ1	37 U	9.4 U	130 U	27000	130	22 U	73 U	120	15 J	110 U	2200 J	15 U	83 J	240
S06004AMK1	37 U	9.4 U	130 U	25000	120	22 U	73 U	130	13 J	110 U	1500 J	18 J	79 J	230
S06004AML1	37 U	9.4 U	130 U	26000	120	22 U	73 U	120	9.8 U	110 U	2100 J	15 U	93	240
S06004AMM1	37 U	9.4 U	130 U	27000	120	22 U	73 U	110	9.8 U	110 U	1800 J	15 U	52 J	250
S06004AMN1	37 U	9.4 U	130 U	25000	120	22 U	88 J	120	9.8 U	110 U	1600 J	15 U	89 J	230
S06004AMO1	37 U	9.4 U	130 U	30000	110	22 U	73 U	140	9.8 U	110 U	2000 J	15 U	43 J	230
S06004AMP1	37 U	9.4 U	130 U	24000	100	22 U	91 J	150	9.8 U	110 U	1700 J	22 J	100	230
S06004AMQ1	37 U	9.4 U	130 U	27000	130	22 U	73 U	150	9.8 U	110 U	2700	15 U	100	260
S06004AMQ1D	37 U	9.4 U	130 U	28000	120	22 U	73 U	140	9.8 U	110 U	2100 J	15 U	85 J	250
S06004AMR1	37 U	9.4 U	130 U	28000	120	22 U	73 U	140	14 J	110 U	2700	15 U	71 J	260
S06004AMS1	37 U	9.4 U	130 U	24000	120	22 U	73 U	110	9.8 U	110 U	2000 J	15 U	120	220
S06004AMT1	37 U	9.4 U	130 U	21000	110	22 U	73 U	130	9.8 U	110 U	1900 J	15 U	140	210
S06004AMU1	37 U	9.4 U	130 U	25000	98	22 U	73 U	130	9.8 U	110 U	1700 J	15 U	86 J	310
S06004AMU1R	37 U	9.4 U	130 U	23000	110	22 U	73 U	120	9.8 U	110 U	2000 J	15 U	100	220
S06004AMV1	37 U	9.4 U	130 U	22000	92 J	22 U	96 J	170	9.9 J	110 U	1500 J	15 U	83 J	220

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B
SUPERIOR WASTE ROCK
SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S06005AMA1	65 U	7.1 U	93 U	26000	94	21 U	120 J	170	14 U	99 U	1600 J	13 U	57 U	220
S06005AMB1	65 U	7.1 U	93 U	21000	100	21 U	100 U	180	14 U	99 U	1600 J	14 J	72 J	160
S06005AMC1	65 U	7.1 U	93 U	27000	110	21 U	100 U	130	14 U	99 U	1900 J	13 U	120 J	240
S06005AMD1	65 U	7.1 U	93 U	26000	110	21 U	100 U	190	14 U	99 U	1500 J	13 U	92 J	230
S06005AME1	65 U	7.1 U	93 U	23000	100	21 U	100 U	120	14 U	99 U	1900 J	13 U	63 J	220
S06005AMF1	65 U	7.1 U	93 U	23000	96	21 U	100 U	110	16 J	99 U	2800	13 U	110 J	210
S06005AMG1	65 U	7.1 U	93 U	22000	83	21 U	100 U	180	14 U	99 U	1700 J	13 U	57 U	190
S06005AMH1	65 U	7.1 U	93 U	25000	110	21 U	100 U	140	17 J	99 U	1500 J	13 U	64 J	190
S06005AMH1R	65 U	7.1 U	93 U	26000	97	21 U	100 U	130	14 U	99 U	2100 J	13 U	100 J	220
S06005AMI1	65 U	7.1 U	93 U	25000	99	21 U	100 U	220	14 U	99 U	2000 J	13 J	76 J	220
S06005AMJ1	65 U	7.1 U	93 U	23000	86	21 U	110 J	100	14 U	99 U	2500	16 J	110 J	210
S06005AMK1	65 U	7.1 U	93 U	25000	86	21 U	100 U	130	14 U	99 U	2500	13 U	95 J	240
S06005AML1	65 U	7.1 U	93 U	23000	110	21 U	100 U	160	14 U	99 U	2100 J	13 U	120 J	220
S06005AML1D	65 U	7.1 U	93 U	24000	110	21 U	100 U	150	14 U	99 U	2400	13 U	83 J	250
S06005AMM1	65 U	7.5 J	93 U	25000	100	21 U	100 U	120	16 J	99 U	1800 J	13 U	140 J	220
S06005AMN1	65 U	7.1 U	93 U	26000	94	21 U	100 U	130	14 U	99 U	2300 J	16 J	140 J	250
S06005AMO1	65 U	7.1 U	93 U	22000	99	21 U	100 U	97	14 U	99 U	2100 J	13 U	57 U	210
S06005ENA1	65 U	7.1 U	93 U	28000	110	21 U	100 U	140	14 U	99 U	2600	17 J	120 J	220
S06005ENB1	65 U	7.1 U	93 U	29000	120	21 U	100 U	120	14 U	99 U	1500 J	13 U	95 J	220
S06005ENC1	65 U	7.1 U	93 U	29000	100	21 U	100 U	120	14 U	99 U	2200 J	13 U	59 J	240
S06005END1	65 U	7.1 U	93 U	27000	110	21 U	100 U	140	14 U	99 U	1800 J	19 J	220	230
S06005ENE1	65 U	7.1 U	93 U	24000	94	21 U	100 U	230	14 U	99 U	2100 J	13 U	83 J	200
S06005ENE1R	65 U	7.1 U	93 U	23000	87	21 U	100 U	200	14 U	99 U	2100 J	13 U	120 J	190
S06005ENF1	65 U	7.1 U	93 U	22000	98	21 U	100 U	220	14 U	99 U	1600 J	13 U	73 J	170
S06005ENG1	65 U	7.1 U	93 U	26000	81	21 U	100 U	170	14 U	99 U	1500 J	15 J	63 J	220
S06005ENH1	65 U	7.1 U	93 U	24000	95	21 U	100 U	160	14 U	99 U	1800 J	13 U	83 J	220
S06005ENI1	65 U	7.1 U	93 U	27000	91	21 U	100 U	140	14 U	99 U	2000 J	13 U	120 J	230
S06005ENJ1	65 U	7.1 U	93 U	24000	98	21 U	100 U	170	14 U	99 U	2000 J	15 J	120 J	240
S06005ENK1	65 U	7.1 U	93 U	23000	90	21 U	100 U	130	14 U	99 U	1800 J	13 U	100 J	240
S06005ENL1	65 U	7.1 U	93 U	26000	110	21 U	100 U	150	14 U	99 U	1900 J	13 U	65 J	210
S06005ENM1	65 U	7.1 U	93 U	28000	110	21 U	110 J	120	14 U	99 U	2200 J	13 U	57 U	240
S06005ENN1	65 U	7.1 U	93 U	23000	98	21 U	100 U	150	14 U	99 U	1600 J	13 U	100 J	180
S06005ENO1	65 U	7.1 U	93 U	23000	95	21 U	100 U	110	14 U	99 U	1900 J	13 U	100 J	230
S06005ENP1	65 U	7.1 U	93 U	24000	98	21 U	100 U	130	14 U	99 U	2000 J	13 U	69 J	230
S06005ENP1D	65 U	7.1 U	93 U	24000	76	21 U	100 U	110	14 U	99 U	1800 J	13 U	59 J	240

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S06005ENQ1	65 U	7.1 U	93 U	22000	92	21 U	100 U	180	14 U	99 U	1600 J	14 J	75 J	210
S06005ENR1	65 U	7.1 U	93 U	25000	92	21 U	100 U	110	14 U	99 U	2200 J	13 U	120 J	230
S06005ENS1	65 U	7.1 U	93 U	23000	92	21 U	100 U	170	14 U	99 U	2200 J	13 U	62 J	240
S06005ESA1	65 U	7.1 U	93 U	30000	120	21 U	100 U	170	14 U	99 U	2300 J	13 U	110 J	210
S06005ESA1R	65 U	7.1 U	93 U	25000	110	21 U	100 U	160	14 U	99 U	1700 J	13 U	91 J	200
S06005ESB1	65 U	7.1 U	93 U	25000	100	21 U	100 U	150	14 U	99 U	1900 J	13 U	120 J	180
S06005ESC1	65 U	7.1 U	93 U	24000	120	21 U	100 U	150	14 U	99 U	1600 J	13 U	210	190
S06005ESD1	65 U	7.1 U	93 U	28000	130	21 U	110 J	120	14 U	99 U	2600	13 U	65 J	190
S06005ESE1	37 U	9.4 U	130 U	23000	93 J	22 U	73 U	230	9.8 U	110 U	2200 J	15 U	65 J	190
S06005ESF1	37 U	9.4 U	130 U	24000	96 J	22 U	120 J	210	9.8 U	110 U	1400 J	15 U	78 J	240
S06005ESG1	37 U	9.4 U	130 U	31000	130	22 U	73 U	130	9.8 U	110 U	2400	15 U	43 J	210
S06005ESH1	37 U	9.4 U	130 U	26000	100	22 U	97 J	240	12 J	110 U	1800 J	15 U	58 J	160
S06005ESI1	37 U	9.4 U	130 U	29000	100	22 U	94 J	160	9.8 U	110 U	2200 J	15 U	51 J	200
S06005ESJ1	37 U	9.4 U	130 U	25000	90 J	22 U	73 U	180	9.8 U	110 U	1400 J	15 U	110	190
S06005ESK1	37 U	9.4 U	130 U	26000	110	22 U	140 J	170	9.8 U	110 U	1900 J	15 U	85 J	220
S06005ESL1	37 U	9.4 U	130 U	28000	110	22 U	79 J	200	9.8 U	110 U	1800 J	15 U	41 J	220
S06005ESM1	37 U	9.4 U	130 U	28000	100	22 U	73 U	130	9.8 U	110 U	2700	19 J	51 J	200
S06005ESN1	37 U	9.4 U	130 U	24000	95 J	22 U	96 J	190	9.8 U	110 U	1500 J	15 U	100	260
S06005ESO1	37 U	9.4 U	130 U	26000	100	22 U	73 U	190	9.8 U	110 U	2100 J	20 J	86 J	200
S06005ESP1	37 U	9.4 U	130 U	23000	80 J	22 U	120 J	210	10 J	110 U	2000 J	15 U	45 J	240
S06005ESP1D	37 U	9.4 U	130 U	24000	91 J	22 U	73 U	200	11 J	110 U	1600 J	15 U	59 J	220
S06005ESQ1	37 U	9.4 U	130 U	28000	99	22 U	73 U	140	9.8 U	110 U	2400 J	19 J	140	240
S06005ESR1	37 U	9.4 U	130 U	30000	99	22 U	73 U	170	9.8 U	110 U	2100 J	15 U	110	220
S06005ESS1	37 U	9.4 U	130 U	33000	120	22 U	73 U	160	9.8 U	110 U	2400	15 U	100	240
S06006ENA1	65 U	7.1 U	93 U	27000	99	21 U	100 U	150	14 U	99 U	2100 J	13 U	91 J	280
S06006ENB1	65 U	7.1 U	93 U	36000	130	21 U	100 U	150	14 U	99 U	2600	15 J	100 J	250
S06006ENC1	65 U	7.1 U	93 U	35000	120	21 U	100 U	120	14 U	99 U	1700 J	18 J	92 J	250
S06006END1	65 U	7.1 U	93 U	21000	93	21 U	100 U	230	14 U	99 U	1300 J	13 U	140 J	180
S06006ENE1	65 U	7.1 U	93 U	21000	85	21 U	100 U	180	14 U	99 U	1700 J	13 U	100 J	220
S06006ENF1	65 U	7.1 U	93 U	24000	89	21 U	100 U	190	14 U	99 U	2100 J	13 U	110 J	190
S06006ENF1D	65 U	7.1 U	93 U	22000	85	21 U	100 U	190	14 U	99 U	1500 J	13 U	99 J	180
S06006ENG1	65 U	7.1 U	93 U	23000	95	21 U	100 U	140	14 U	99 U	1700 J	13 U	140 J	190
S06006ENH1	65 U	7.1 U	93 U	22000	86	21 U	100 U	220	14 U	99 U	1800 J	13 U	110 J	180
S06006ENI1	65 U	7.1 U	93 U	20000	86	21 U	100 U	200	14 U	99 U	2300 J	13 U	100 J	180
S06006ENJ1	65 U	7.1 U	93 U	24000	110	21 U	100 U	170	14 U	99 U	1400 J	13 U	75 J	180

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S06006ENM1	65 U	7.1 U	93 U	23000	91	21 U	100 U	220	14 U	99 U	1700 J	13 U	120 J	190
S06006ENN1	65 U	7.1 U	93 U	20000	75	21 U	100 U	160	14 U	99 U	2100 J	13 U	150 J	220
S06006ENO1	65 U	7.1 U	93 U	23000	83	21 U	100 U	180	14 U	99 U	1500 J	15 J	110 J	230
S06006ESA1	65 U	7.1 U	93 U	26000	94	21 U	100 U	250	14 U	99 U	1700 J	13 U	79 J	210
S06006ESA1D	65 U	7.1 U	93 U	25000	99	21 U	100 U	260	14 U	99 U	1500 J	13 U	120 J	190
S06006ESB1	65 U	7.1 U	93 U	23000	95	21 U	100 U	260	14 U	99 U	1900 J	13 U	83 J	190
S06006ESC1	65 U	7.1 U	93 U	26000	110	21 U	100 U	240	14 U	99 U	2200 J	13 U	84 J	230
S06006ESD1	65 U	7.1 U	93 U	27000	100	21 U	100 U	260	14 U	99 U	2000 J	14 J	57 U	240
S06006ESE1	65 U	7.1 U	93 U	22000	97	21 U	100 U	240	14 U	99 U	1800 J	13 U	57 U	200
S06006ESF1	65 U	7.1 U	93 U	20000	70	21 U	100 U	210	14 U	99 U	1700 J	13 U	140 J	200
S06006ESG1	65 U	7.1 U	93 U	21000	92	21 U	100 U	230	14 U	99 U	1900 J	13 U	66 J	180
S06006ESH1	65 U	7.1 U	93 U	21000	86	21 U	100 U	230	14 U	99 U	1700 J	13 U	130 J	160
S06006ESI1	65 U	7.1 U	93 U	23000	100	21 U	100 U	220	14 U	99 U	2000 J	13 U	99 J	200
S06006ESJ1	65 U	7.1 U	93 U	22000	77	21 U	100 U	210	14 U	99 U	1900 J	13 U	58 J	180
S06006ESK1	65 U	7.1 U	93 U	22000	83	21 U	100 U	180	14 U	99 U	1600 J	13 U	68 J	220
S06006ESL1	65 U	7.1 U	93 U	20000	95	21 U	100 U	190	14 U	99 U	1800 J	13 U	140 J	180
S06006ESM1	65 U	7.1 U	93 U	21000	84	21 U	100 U	190	14 U	99 U	1600 J	14 J	110 J	230
S06006ESN1	65 U	7.1 U	93 U	22000	88	21 U	100 U	210	14 U	99 U	1900 J	13 U	120 J	230
S06006ESO1	65 U	7.1 U	93 U	22000	80	21 U	100 U	150	14 U	99 U	1800 J	13 J	150 J	210
S06045E1S1	54 U	5.5 U	170 U	24000	85 J	20 U	86 J	210	8.5 U	160 U	1900 J	10 U	99 J	260
S06045E1S2	54 U	5.5 U	170 U	22000	88 J	20 U	86 U	200	8.5 U	160 U	2300 J	14 J	120 J	240
S0604MN1S1	54 U	5.5 U	170 U	25000	95 J	20 U	86 U	240	8.5 U	160 U	1900 J	13 J	68 U	240
S0604MN1S2	54 U	5.5 U	170 U	24000	96 J	20 U	86 U	240	8.5 U	160 U	2200 J	11 J	68 U	220
S0604MN1S3	54 U	5.5 U	170 U	24000	86 J	20 U	86 U	250	8.5 U	160 U	2300	10 U	76 J	260
S06125E1S1	54 U	5.5 U	170 U	27000	90 J	20 U	86 U	260	12 J	160 U	2200 J	16 J	150 J	240
S06125E1S2	54 U	5.5 U	170 U	24000	90 J	20 U	86 U	220	8.5 U	160 U	2200 J	10 U	68 U	250
S06125E1S3	54 U	5.5 U	170 U	26000	100	20 U	86 U	150	8.5 U	160 U	2000 J	10 U	250	290
S06154E1S1	44 U	5.3 U	170 U	20000	77	23 U	110 U	180	11 U	63 U	2800 J	13 J	84 J	270
S06154E1S2	44 U	5.3 U	170 U	23000	75	23 U	110 U	200	11 U	63 U	1900 J	16 J	100 J	240
S06154E1S3	44 U	5.3 U	170 U	23000	99	23 U	110 U	170	11 U	63 U	2400 J	9.8 J	130 J	240
S06174E1S1	44 U	5.3 U	170 U	25000	94	23 U	110 U	170	15 J	63 U	2300 J	10 J	120 J	280
S06174E1S2	44 U	5.3 U	170 U	22000	84	23 U	110 U	210	11 U	63 U	2700 J	8.8 U	130 J	230
S06186E1S1	54 U	5.5 U	170 U	20000	77 J	20 U	86 U	210	18 J	160 U	2600	10 U	120 J	310
S06186E1S2	54 U	5.5 U	170 U	21000	85 J	20 U	120 J	240	8.5 U	160 U	2000 J	12 J	77 J	290
S06205E1S1	54 U	5.5 U	170 U	23000	88 J	20 U	86 U	210	9.5 J	160 U	2200 J	13 J	100 J	240

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S06205E1S2	54 U	5.5 U	170 U	25000	110	20 U	86 U	190	8.5 U	160 U	1800 J	10 U	100 J	250
S06274E1S1	44 U	5.3 U	170 U	22000	88	23 U	110 U	170	11 U	63 U	2400 J	13 J	78 J	290
S06274E1S1D	44 U	5.3 U	170 U	22000	96	23 U	110 U	180	11 U	63 U	2000 J	8.8 U	130 J	250
S06274E1S2	44 U	5.3 U	170 U	18000	93	23 U	110 U	190	11 U	63 U	2200 J	8.8 U	150	250
S06285E1S1	54 U	5.5 U	170 U	18000	92 J	20 U	86 U	190	8.5 U	160 U	2000 J	10 U	140 J	270
S06285E1S2	54 U	5.5 U	170 U	21000	94 J	20 U	86 U	200	8.5 U	160 U	2500	12 J	110 J	240
S06315E1S1	44 U	5.3 U	170 U	21000	88	23 U	110 U	220	11 U	63 U	1700 J	16 J	97 J	260
S06315E1S2	44 U	5.3 U	170 U	23000	76	23 U	110 U	210	18 J	63 U	2100 J	8.8 U	72 J	300
S06315E1S3	54 U	5.5 U	170 U	26000	82 J	20 U	86 U	170	8.5 U	160 U	2200 J	10 U	200 J	220
S06394E1S1	44 U	5.3 U	170 U	19000	76	23 U	110 U	200	11 U	63 U	3100 J	11 J	140 J	280
S06394E1S2	44 U	5.3 U	170 U	20000	97	23 U	110 U	200	11 U	63 U	1900 J	8.8 U	130 J	270
S0800RVSA1	19 U	5.4 U	87 U	27000	100	24 U	150 U	230	14 U	140 U	1500 J	9.9 U	62 J	250
S0800RVSB1	19 U	5.4 U	87 U	22000	84	24 U	150 U	190	14 U	140 U	1400 J	12 J	94 J	200
S0800RVSC1	19 U	5.4 U	87 U	26000	85	24 U	150 U	130	14 U	140 U	2000 J	9.9 U	79 J	210
S0800RVSD1	19 U	5.4 U	87 U	22000	92	24 U	150 U	210	14 U	140 U	1600 J	9.9 U	110 J	210
S0800RVSE1	19 U	5.4 U	87 U	24000	88	24 U	150 U	250	14 U	140 U	1600 J	9.9 U	74 J	220
S0800RVSF1	19 U	5.4 U	87 U	23000	90	24 U	150 U	200	14 U	140 U	2100 J	12 J	44 J	250
S0800RVSG1	19 U	5.4 U	87 U	24000	92	24 U	150 U	160	14 U	140 U	1900 J	10 J	79 J	230
S0800RVSG1R	19 U	5.4 U	87 U	25000	100	24 U	150 U	170	14 U	140 U	1900 J	9.9 U	78 J	250
S0800WFBE1	39 J	5.4 U	87 U	29000	83	24 U	150 U	220	14 U	140 U	2300 J	14 J	94 J	230
S0800WFBW1	19 U	5.4 U	87 U	30000	89	24 U	150 U	170	14 U	140 U	2400 J	14 J	91 J	230
S0800WFNE1	19 U	5.4 U	87 U	28000	100	24 U	150 U	270	14 U	140 U	2100 J	9.9 U	69 J	190
S0800WFNW1	19 U	5.4 U	87 U	25000	110	24 U	150 U	260	14 U	140 U	1500 J	9.9 U	43 J	190
S0800WFSE1	19 U	5.4 U	87 U	23000	110	24 U	150 U	210	14 U	140 U	1500 J	9.9 U	74 J	250
S0800WFSE1D	19 U	5.4 U	87 U	23000	88	24 U	150 U	230	14 U	140 U	2100 J	9.9 U	69 J	220
S0800WFSW1	19 U	5.4 U	87 U	25000	87	24 U	150 U	230	14 U	140 U	1900 J	9.9 J	73 J	260
S08014E1S1	44 U	5.3 U	170 U	24000	94	23 U	110 U	220	11 U	63 U	2200 J	8.8 U	100 J	280
S08014E1S2	44 U	5.3 U	170 U	22000	82	23 U	110 U	210	11 U	63 U	2200 J	16 J	97 J	270
S08014E1S3	44 U	5.3 U	170 U	21000	89	23 U	110 U	210	11 U	63 U	2500 J	9.8 J	98 J	260
S09034E1S1	44 U	5.3 U	170 U	23000	90	23 U	110 U	290	11 U	63 U	2700 J	8.8 U	100 J	220
S09034E1S2	44 U	5.3 U	170 U	25000	94	23 U	110 U	260	11 U	63 U	3100 J	8.8 U	110 J	240
S0CTYSH1D1	75 U	6.7 U	170 U	25000	100	18 U	120 U	200	12 U	65 J	2400 J	7.3 U	94 U	300
S0CTYSH1S1	54 U	5.5 U	170 U	24000	98	20 U	86 U	240	8.5 U	160 U	2900	10 U	1200	270
S0CTYSH1S2	54 U	5.5 U	170 U	30000	91 J	20 U	86 U	190	8.5 U	160 U	2200 J	10 U	760	300
S0CTYSH1S3	54 U	5.5 U	170 U	25000	89 J	20 U	110 J	290	8.5 U	160 U	1700 J	10 U	620	210

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

TABLE 1B

SUPERIOR WASTE ROCK

SPECTRACE 9000 XRF DATA (PPM)

ID	Hg	Mo	Ni	K	Rb	Se	Ag	Sr	Th	Sn	Ti	U	Zn	Zr
S0CTYSH1S4	75 U	6.7 U	170 U	24000	81	18 U	120 U	230	12 U	59 U	1900 J	12 J	200 J	240
S0CTYSH1S5	75 U	6.7 U	170 U	26000	98	18 U	120 U	180	12 U	59 U	1800 J	7.3 U	100 J	250
S0VFWNW1	58 U	7.9 U	160 U	25000	90	27 U	130 U	240	13 J	88 U	1900 J	19 U	250	240
S1RSOSCCS1	19 U	5.4 U	87 U	27000	94	24 U	150 U	160	14 U	140 U	2000 J	12 J	370	210
S1RSOSNES1	19 U	5.4 U	87 U	27000	110	24 U	150 U	130	14 U	140 U	2600 J	10 J	1200	230
S1RSOSNWS1	19 U	5.4 U	87 U	28000	96	24 U	150 U	150	14 U	140 U	2400 J	9.9 U	310	240
S1RSOSSES1	19 U	5.4 U	87 U	27000	96	24 U	150 U	170	14 U	140 U	1900 J	10 J	110 J	230
S1RSOSSSS1	23 J	5.4 U	87 U	28000	110	24 U	150 U	87 J	14 U	140 U	2400 J	15 J	77 J	260
S1RSOSSWS1	19 U	5.4 U	87 U	27000	98	24 U	150 U	140	14 U	140 U	2100 J	9.9 U	130 J	280
S2RSOSCCS1	44 U	5.3 U	170 U	29000	110	23 U	120 J	160	11 U	63 U	2000 J	8.8 U	330	240
S2RSOSNES1	44 U	5.3 U	170 U	24000	120	23 U	110 U	120	11 U	63 U	2400 J	8.8 U	460	200
S2RSOSNWS1	44 U	5.3 U	170 U	28000	92	23 U	110 U	140	11 U	63 U	2400 J	16 J	100 J	270
S2RSOSSES1	44 U	5.3 U	170 U	28000	110	23 U	110 U	150	11 U	63 U	2500 J	8.8 U	170	270
S2RSOSSWS1	44 U	5.3 U	170 U	25000	92	23 U	110 U	120	13 J	63 U	3100 J	8.8 U	74 J	260
S2RSOSSWS1B	44 U	5.3 U	170 U	4800 U	15 U	23 U	110 U	32 U	11 U	63 U	1400 U	8.8 U	43 U	22 U
S700FGANE1	19 U	5.4 U	87 U	25000	81	24 U	150 U	210	14 U	140 U	1200 J	9.9 U	69 J	150
S700FGANW1	19 U	5.4 U	87 U	27000	84	24 U	150 U	210	14 U	140 U	1200 J	16 J	41 J	170
S700FGASE1	19 U	5.4 U	87 U	26000	100	24 U	150 U	210	14 U	140 U	2100 J	9.9 U	57 J	140
S700FGASW1	19 U	5.4 U	87 U	27000	94	24 U	150 U	190	14 U	140 U	1600 J	9.9 U	73 J	170
S700FGCSW1	19 U	5.4 U	87 U	24000	81	24 U	150 U	65 J	14 U	140 U	1500 J	9.9 U	4100	140
S700FGCSWX	75 U	6.7 U	170 U	31000	100	18 U	120 U	100	12 U	59 U	1700 J	7.3 U	6600	200
S700FGCWC1	19 U	5.4 U	87 U	29000	110	24 U	150 U	150	14 U	140 U	2500 J	13 J	110 J	270
S700FGCWC1D	19 U	5.4 U	87 U	27000	100	24 U	150 U	150	14 U	140 U	2700 J	21 J	120 J	230
S700FGECC1	19 U	5.4 U	87 U	31000	130	24 U	150 U	140	14 U	140 U	2200 J	15 J	120 J	270
S700FGGCC1	19 U	5.4 U	87 U	26000	110	24 U	150 U	140	14 U	140 U	2100 J	15 J	180	180
S700FGGCC1R	19 U	5.4 U	87 U	27000	90	24 U	150 U	140	14 U	140 U	1900 J	9.9 U	120 J	180
S700FGGNE1	19 U	5.4 U	87 U	27000	110	24 U	150 U	120	14 U	140 U	1900 J	9.9 U	160	200
S700FGGNW1	19 U	5.4 U	87 U	26000	92	24 U	150 U	240	14 U	140 U	2200 J	15 J	130 J	260
S700FGGSE1	25 J	5.4 U	87 U	25000	120	24 U	150 U	130	14 U	140 U	2000 J	13 J	140	210
S700FGGSW1	19 U	5.4 U	87 U	23000	98	24 U	150 U	140	14 U	140 U	2600 J	9.9 U	220	180

U - The analyte was not detected above the detection limit. the detection limit is reported.

J - The associated numerical value is an estimated quantity between the detection limit and the quantitation limit.

APPENDIX D

Street Codes for Sample Identification

Street	Code
1ST STREET	1S
2ND AVENUE EAST	2E
2ND AVENUE WEST	2W
3RD AVENUE EAST	3E
3RD AVENUE WEST	3W
3RD STREET	3S
4TH AVENUE EAST	4E
4TH AVENUE WEST	4W
4TH STREET	4S
5TH AVENUE EAST	5E
5TH AVENUE EAST	5E
5TH STREET WEST	FI
6TH AVENUE EAST	6E
7TH STREET	7S
ALDER STREET	AL
ALLEY BETWEEN 4TH & 5TH AVENUE	4A
ALLEY BETWEEN 5TH & 6TH AVENUE	5A
ALLEY BETWEEN ALDER & SPRUCE	SA
ALLEY BETWEEN PINE & SPRUCE	PA
ARIZONA AVENUE	AR
CALIFORNIA AVENUE	CA
CEDAR STREET	CE
CEMETARY ROAD	CM
CITY SHOP	SP
COUNTRY LANE	CO
DIAMOND ROAD	DI
ELEMENTARY SCHOOL	EM
EVA HORNING PARK	EH
FAIRGROUNDS	FG
FLAT CREEK ROAD	FC
HIGH SCHOOL	HS
HIGH SCHOOL TRACK	HT
ILLINOIS AVENUE	IL
IRON MOUNTAIN HIGHT	IH
IRON MOUNTAIN ROAD	IM
LITTLE PARK	LP
MAIN STREET WEST	MN
MAPLE STREET	MA
MONTANA AVENUE	MT
MULLAN ROAD EAST	ME
MULLAN ROAD WEST	MW
OLAD MULLAN ROAD	OM
PIKE STREET	PD
RIVER STREET	RI
RIVER STREET NORTH	RN
RIVERBEND ROAD	RB

Street	Code
RIVERSIDE ROAD	RV
RIVERSIDE ROAD ALLEY	RA
RIVERSIDE ROAD WEST	RW
RIVERSTREET/JOHNSON LANE OPENSPACE	OS
ROBINS NEST LANE	RL
SHAW GULCH LANE	SG
SLOWAY WEST	SW
SOUTHSIDE ROAD	SO
SPRITIS WALK LANE	SL
SPRUCE STREET	SP
SUNNYSIDE LANE	SU
WESTFIELD PARK	WF