

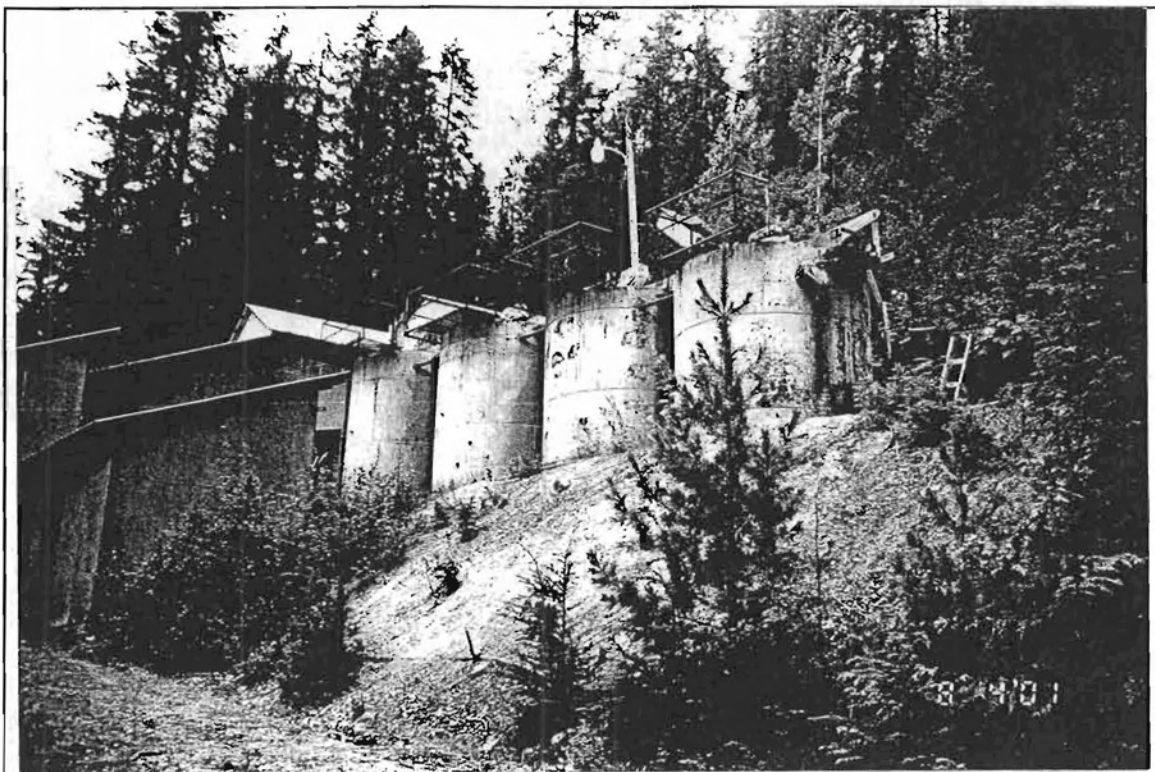
APPENDIX A
PHOTOLOG

photo 1



General view of the Shoshone Silver Mill. The Maintenance Shop is on the left, the Main Mill Building in the center, and the office trailer is on the right. Looking southwest.

photo 2



View of the four Mill Building ASTs by the main mill building. Note carbon drums on the platform towards the right. Looking southwest.

photo 3



View of the gray ore piles stockpiled along the north boundary of the site. Looking east.

photo 4



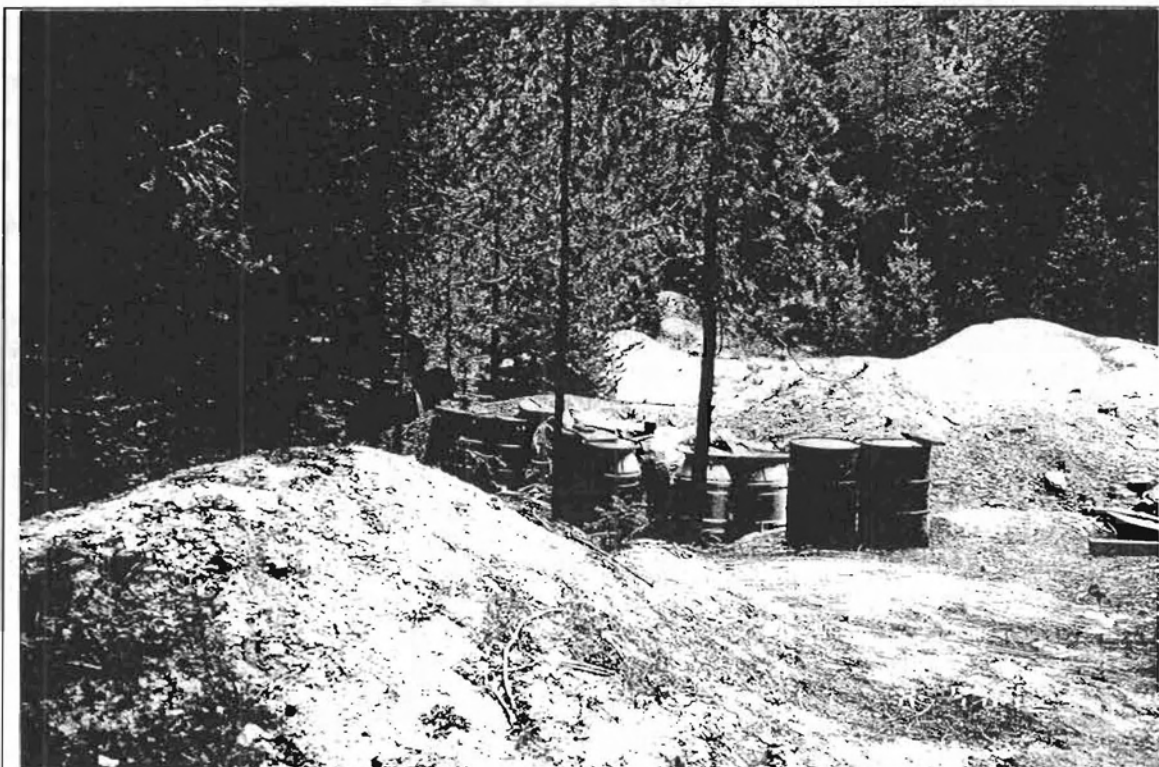
View of the tan ore piles along the north boundary of the site. Looking north.

photo 5



View of the trailings pond. Note the revegetated, low lying area towards the center of the pond. Looking northeast.

photo 6



View of the drums accumulated on the south open area. Note the plastic ore-concentrate drums. Looking east.

photo 7



View of the gray and tan ore piles stockpiled at the south open area.
Looking southeast.

photo 8



View of the scrap metal and burn piles at the south open area. Looking northeast.

APPENDIX B
DATA VALIDATION MEMORANDA
AND FORM I ANALYTICAL RESULTS



ORIGINAL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

1200 Sixth Avenue
Seattle, Washington 98101

RECEIVED

OCT 03 2001

IN REPLY

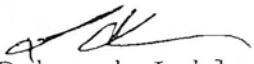
REFER TO: OEA-095

October 2, 2001

MEMORANDUM

SUBJECT: Gold Creek Shoshone Silver Mill, CLP Inorganics Analysis,
Data Validation
Case: 29571
SDG: MJ0C42

FROM: Laura Castrilli, Chemist
Quality Assurance and Data Unit, OEA

TO: 
Deborah Leblang, Site Assessment Manager
Office of Environmental Cleanup

CC: Bruce Woods, Region 10 CLP TPO
Paul Swift, Roy F. Weston, Inc.

The following is a validation of ICP-AES and mercury analyses of fourteen soil/sediment and one water sample (investigation derived waste) from the Gold Creek Shoshone Silver Mill site. The soil/sediment samples were also analyzed for cyanide. The analyses were performed following the USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis Multi-media, Multi-Concentration, ILM04.1. Analyses were conducted by Sentinel, Inc., Huntsville, Alabama. This validation was conducted for the following samples:

MJ0C42	MJ0C45	MJ0C48	MJ0C51	MJ0C54
MJ0C43	MJ0C46	MJ0C49	MJ0C52	MJ0C55
MJ0C44	MJ0C47	MJ0C50	MJ0C53	MJ0C56

Data Qualifications

The following comments refer to the Sentinel Laboratory's performance in meeting quality control specifications outlined in the CLP Statement of Work (CLP-SOW) for Inorganic Analysis, rev. ILM04.1. The comments presented herein are based on the information provided for the review.

1.0 Timeliness - Acceptable

The technical (40 CFR part 136) holding time from the date of collection for cyanide in water is 14 days. The holding time for

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mercury in water is 28 days. The holding time for the remaining metals in water is 180 days. The samples were collected between 08/03/01 and 08/06/01. ICP-AES analyses were completed between 8/18/01 and 08/25/01. Mercury analyses were completed on 08/17/01. Cyanide analyses were completed on 08/16/01.

All analyses were conducted within the technical water holding times, therefore no qualification was made based on holding time.

2.0 Sample Preparation - Acceptable

The samples were prepared for cyanide, mercury and ICP-AES analyses on 08/16/01. No qualification was made based on sample preparation.

3.0 Calibrations/Calibration Verifications - Acceptable

The samples were analyzed for mercury by CVAAS on 08/17/01. The initial calibration included one blank and six standards. The curve was linear with a correlation coefficient greater than 0.995.

The samples were analyzed by ICP-AES on 08/18/01 (most analytes), 08/22/01 (thallium) and 08/25/01 (dilution analysis for sodium in sample MJ0C56 (IDW)). The instruments were standardized each day of analysis according to the analytical method using one blank and a single calibration standard for each element.

The samples were analyzed for cyanide colorimetrically on 08/16/01. The initial calibration included one blank and five standards. The curve was linear with a correlation coefficient greater than 0.995.

All ICP-AES, colorimetric (cyanide) and CVAAS (mercury) calibrations were performed as required and met the acceptance criteria; therefore, no qualification was made on this basis.

Calibration verification samples are required before and after sample analysis and after every 10 samples during analysis. Cyanide recoveries must be between 85-115%. Mercury recoveries must be within 80-120%. Other metal recoveries must be within 90-110%.

All ICP-AES, colorimetric (cyanide) and CVAAS (mercury) calibration verification (initial and continuing) samples bracketing reported sample results met the frequency and recovery criteria; therefore no qualification was made based on ICP-AES, colorimetric, or CVAAS calibration verification.

4.0 Laboratory Control Samples - Acceptable

Laboratory Control samples (LCS) are digested and analyzed along with the samples to verify the efficiency of laboratory procedures (LCS analyses are not required for mercury in water). All recoveries associated with reported sample results met the acceptance criteria

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for control samples, therefore no qualification was made based on LCS results.

5.0 Blanks -

Procedural blanks were prepared with the samples to show potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified if the analyte concentration was less than five times the analytical value in the blank.

Aluminum, barium, cadmium, calcium, magnesium, and potassium were detected in the water preparation blank. Calcium, manganese, and sodium were detected in the soil/sediment preparation blank. Aluminum, antimony, chromium, cobalt, cyanide, iron, magnesium, potassium, silver, vanadium, and zinc had negative values with absolute values greater than the detection limits in the soil/sediment preparation blank. Aluminum, barium, beryllium, cadmium, calcium, chromium, copper, cyanide, iron, magnesium, manganese, and silver were detected in one or more continuing calibration blanks (CCBs).

Based on blank contamination, the following qualifications were made:

- ♦ antimony in samples MJ0C44, MJ0C46, MJ0C50, MJ0C51, MJ0C53, and MJ0C54 was qualified 'J', estimated
- ♦ beryllium in sample MJ0C53 was qualified 'U', undetected
- ♦ cobalt samples MJ0C42 and MJ0C53 was qualified 'J', estimated or 'UJ', estimated detection limit
- ♦ cadmium in samples MJ0C53 and MJ0C54 was qualified 'U', undetected
- ♦ cyanide in all soil/sediment samples was qualified 'UJ', estimated detection limit
- ♦ silver in samples MJ0C44, MJ0C50, MJ0C51, MJ0C53, and MJ0C54 was qualified 'J', estimated
- ♦ sodium in all soil/sediment samples was qualified 'U', undetected
- ♦ vanadium in sample MJ0C53 was qualified 'J', estimated

The remaining sample results were greater than five times the associated blank levels (or were already undetected) and were not qualified on this basis.

6.0 ICP-AES Interference Check Sample -

The interference check sample (ICS) is analyzed by ICP-AES to verify

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interelement and background correction factors. Analysis is required at the beginning and end of each sample analysis run and recoveries must be between 80% and 120%. All ICS recoveries associated with reported sample results were within the recovery criterion.

Some of the samples had interfering levels of iron. Selenium in samples MJ0C42 and MJ0C52 was qualified 'UJ' estimated detection limit/possible false negative due to suspected iron interference.

7.0 Duplicate Analysis - Acceptable

Duplicate analysis was done on soil/sediment sample MJ0C44. Soil/sediment duplicate results were within the $\pm 35\%$ Relative Percent Difference (RPD) or $\pm 2 \times \text{CRDL}$ criteria for soil/sediment results < 5 times the CRDL criteria; therefore no qualification was made on this basis.

Laboratory '**' qualifiers were removed from soil/sediment copper, lead, and manganese results as the laboratory used the stricter water criteria to qualify soil/sediment results.

The water sample was investigation derived waste water submitted for characterization purposes, therefore duplicate analysis for water was not needed and no qualification was made to water results based on the soil/sediment duplicate analysis.

8.0 Matrix Spike Analysis -

Matrix spike sample analyses are done to provide information about the effect of the sample matrix on digestion and measurement methods. Matrix spike recovery must be within the limits of 75 - 125%.

Matrix spike analysis was done on soil/sediment sample MJ0C44. All soil/sediment matrix spike recoveries were within the required QC limits; with the exception of antimony (56%R). All antimony soil/sediment results were qualified 'J', estimated (low bias suspected for samples not qualified for other reasons).

The water sample was investigation derived waste water submitted for characterization purposes, therefore matrix spike analysis for water was not needed and no qualification was made to water results based on the soil/sediment matrix spike analysis.

9.0 ICP-AES Serial Dilution -

Sample MJ0C44 was analyzed by ICP-AES serial dilution to check for potential interferences. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) were within the 10%D criteria; with the exception of calcium (31%D) and copper (58%D). All soil/sediment calcium and copper results were qualified 'J', estimated (unknown bias).

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The water sample was investigation derived waste water submitted for characterization purposes, therefore serial dilution analysis for water was not needed and no qualification was made to water results based on the soil/sediment serial dilution analysis.

10.0 Detection Limits - Acceptable

Sample results which fall below the instrument detection limit (IDL) are assigned the value of the instrument detection limit and the 'U' qualifier is attached.

Contract Required Detection Limit (CRDL) standards are required for most analytes to demonstrate a linear calibration curve near the CRDL. CRDL standards were run at the required frequency.

11.0 Overall Assessment of the Data

This validation of the data is based on the criteria outlined in the *National Functional Guidelines for Inorganic Data Review (02/94)*.

One of the sample coolers had a temperature upon receipt of 11.5°C. According to the sample receipt log book, all applicable pHs were within specific guidelines. The request for cyanide on IDW sample MJ0C56 was cancelled as only a total metals pH<2 aliquot was submitted. Properly preserved water metals samples (pH<2) do not require cooling (40 CFR 136.2, Table II). In the reviewer's judgement, it is unlikely that the elevated temperature for soil/sediment would cause appreciable loss of metals or cyanide, therefore no action was taken based on the elevated cooler temperature.

The cooler that arrived at 11.5°C had one of the three custody seals torn. The other two custody seals were intact, precluding the possibility of sample tampering during shipment.

Soil/sediment samples MJ0C53 and MJ0C54 had very low percent solids - 11.6% and 22.9%, respectively. The raw data was checked to make sure there wasn't a calculation error. There was no calculation error.

For soil/sediment the amount of each sample analyzed for mercury is 0.2 g, wet weight, while the amount of each sample analyzed for cyanide and other metals is 1.0 gram, wet weight. With 11.6% and 22.9% solids, this means only approximately 0.023 g and 0.046 g, respectively, of solid material was analyzed for mercury and approximately 0.116 g and 0.229 g, respectively, of solid material was analyzed for cyanide and the other metals. Since mercury was not detected in these samples and since such a minute amount of material was digested, the undetected mercury results for samples MJ0C53 and MJ0C54 were qualified 'R', unusable. There were some detects for the ICP-AES analysis, indicating that at least some ICP analytes were measurable in the small sample aliquots. The larger sample size was

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also used for cyanide distillation. All cyanide and ICP-AES analytes, including non-detects, in samples MJ0C53 and MJ0C54 were qualified 'J', estimated (unknown bias).

There were 330 data points reported: 45 results were qualified due to blank contamination; 14 results were estimated due to matrix spike recovery; 28 results were estimated due to serial dilution; two results were suspected to be possible false negatives; 42 results were estimated due to reduced sample aliquot size; 2 results were rejected due to extremely reduced sample aliquot size. Overall, 35 percent of the data was qualified (only counting one qualification per data point for those results qualified for more than one reason).

Note that the Computer Assisted Data Review Expert (CADRE) software uses results of field QC samples as blanks in order to qualify any field sample results in the same SDG that are less than five times any detected analytes in the field QC sample(s). For this SDG, the electronic data may have extra qualifiers on a lot of ICP-AES analytes. Data users will need to carefully correct the CADRE data qualifiers using the reviewer qualified forms attached to this memorandum.

Below are the definitions for the National Functional Guidelines for Inorganic Data Review (02/94) qualifiers used when validating/qualifying data from Inorganic analysis.

DATA QUALIFIERS

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

At the request of the site assessment manager, bias for the data was qualitatively assessed and if applicable, the following additional qualifiers were applied:

- L - Low bias.
- H - High bias.
- K - Unknown Bias.

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C42

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40152S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 94.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5470			P
7440-36-0	Antimony	148		NJL	P
7440-38-2	Arsenic	1310			P
7440-39-3	Barium	40.0	B		P
7440-41-7	Beryllium	0.18	B		P
7440-43-9	Cadmium	0.04	U		P
7440-70-2	Calcium	167	B	EJL	P
7440-47-3	Chromium	6.8			P
7440-48-4	Cobalt	0.23	U	JL	P
7440-50-8	Copper	34.6		*EJL	P
7439-89-6	Iron	39000			P
7439-92-1	Lead	915		*	P
7439-95-4	Magnesium	5800			P
7439-96-5	Manganese	79.9		*	P
7439-97-6	Mercury	0.13			CV
7440-02-0	Nickel	4.1	B		P
7440-09-7	Potassium	550	B		P
7782-49-2	Selenium	0.72	U	JK	P
7440-22-4	Silver	71.6			P
7440-23-5	Sodium	144	B	G	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	8.9	B		P
7440-66-6	Zinc	94.6			P
	Cyanide	0.06	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C43

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40153S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 91.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9340			P
7440-36-0	Antimony	17.4		# JK	P
7440-38-2	Arsenic	114			P
7440-39-3	Barium	59.5			P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	1.4			P
7440-70-2	Calcium	695	B	E JK	P
7440-47-3	Chromium	6.9			P
7440-48-4	Cobalt	4.4	B		P
7440-50-8	Copper	96.2		#E JK	P
7439-89-6	Iron	17000			P
7439-92-1	Lead	1080		*	P
7439-95-4	Magnesium	4220			P
7439-96-5	Manganese	659		*	P
7439-97-6	Mercury	0.09	B		CV
7440-02-0	Nickel	9.2			P
7440-09-7	Potassium	584	B		P
7782-49-2	Selenium	0.74	U		P
7440-22-4	Silver	16.3			P
7440-23-5	Sodium	112	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	9.1	B		P
7440-66-6	Zinc	749			P
	Cyanide	0.07	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C44

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40154S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 93.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10100	-		P
7440-36-0	Antimony	3.6	B	JK	P
7440-38-2	Arsenic	50.2			P
7440-39-3	Barium	69.2			P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	0.33	B		P
7440-70-2	Calcium	1270		JK	P
7440-47-3	Chromium	7.3			P
7440-48-4	Cobalt	5.6	B		P
7440-50-8	Copper	21.4		*E JK	P
7439-89-6	Iron	15700			P
7439-92-1	Lead	48.8		*	P
7439-95-4	Magnesium	4240			P
7439-96-5	Manganese	582		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	9.8			P
7440-09-7	Potassium	862	B		P
7782-49-2	Selenium	0.73	U		P
7440-22-4	Silver	2.2		JK	P
7440-23-5	Sodium	112	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	12.4			P
7440-66-6	Zinc	184			P
	Cyanide	0.06	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C45

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40155S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 90.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13900			P
7440-36-0	Antimony	17.9		N JL	P
7440-38-2	Arsenic	668			P
7440-39-3	Barium	77.6			P
7440-41-7	Beryllium	0.70	B		P
7440-43-9	Cadmium	0.41	B		P
7440-70-2	Calcium	647	B	E JK	P
7440-47-3	Chromium	16.0			P
7440-48-4	Cobalt	5.7	B		P
7440-50-8	Copper	52.1		*E JK	P
7439-89-6	Iron	34300			P
7439-92-1	Lead	308		*	P
7439-95-4	Magnesium	7950			P
7439-96-5	Manganese	1360		*	P
7439-97-6	Mercury	0.07	B		CV
7440-02-0	Nickel	16.4			P
7440-09-7	Potassium	604	B		P
7782-49-2	Selenium	0.75	U		P
7440-22-4	Silver	23.2			P
7440-23-5	Sodium	115	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	15.8			P
7440-66-6	Zinc	259			P
	Cyanide	0.07	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C46

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40156S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 86.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	25300			P
7440-36-0	Antimony	6.3	B	N JK	P
7440-38-2	Arsenic	62.6			P
7440-39-3	Barium	172			P
7440-41-7	Beryllium	0.52	B		P
7440-43-9	Cadmium	3.4			P
7440-70-2	Calcium	858	B	E JK	P
7440-47-3	Chromium	7.1			P
7440-48-4	Cobalt	4.7	B		P
7440-50-8	Copper	50.3		*E JK	P
7439-89-6	Iron	16000			P
7439-92-1	Lead	318		*	P
7439-95-4	Magnesium	2530			P
7439-96-5	Manganese	578		X	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	10.3			P
7440-09-7	Potassium	626	B		P
7782-49-2	Selenium	0.78	U		P
7440-22-4	Silver	4.4			P
7440-23-5	Sodium	180	B	U	P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	22.1			P
7440-66-6	Zinc	780			P
	Cyanide	0.07	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C47

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40157S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 68.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11900			P
7440-36-0	Antimony	59.8		JK	P
7440-38-2	Arsenic	289			P
7440-39-3	Barium	92.8			P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	5.3			P
7440-70-2	Calcium	2830		JK	P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	5.2	B		P
7440-50-8	Copper	242		JK	P
7439-89-6	Iron	18100			P
7439-92-1	Lead	3240		*	P
7439-95-4	Magnesium	4740			P
7439-96-5	Manganese	989		*	P
7439-97-6	Mercury	0.13	B		CV
7440-02-0	Nickel	10.5	B		P
7440-09-7	Potassium	1020	B		P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	31.2			P
7440-23-5	Sodium	170	B	4	P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	12.8	B		P
7440-66-6	Zinc	1880			P
	Cyanide	0.09	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C48

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40158S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 93.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9510			P
7440-36-0	Antimony	15.5		#JK	P
7440-38-2	Arsenic	170			P
7440-39-3	Barium	49.7			P
7440-41-7	Beryllium	0.46	B		P
7440-43-9	Cadmium	1.3			P
7440-70-2	Calcium	2630		EJK	P
7440-47-3	Chromium	7.7			P
7440-48-4	Cobalt	6.9	B		P
7440-50-8	Copper	52.1		*EJK	P
7439-89-6	Iron	18700			P
7439-92-1	Lead	410		*	P
7439-95-4	Magnesium	9060			P
7439-96-5	Manganese	1040		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	15.5			P
7440-09-7	Potassium	636	B		P
7782-49-2	Selenium	0.73	U		P
7440-22-4	Silver	16.5			P
7440-23-5	Sodium	124	B	G	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	9.0	B		P
7440-66-6	Zinc	595			P
	Cyanide	0.06	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C49

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40159S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 95.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7660			P
7440-36-0	Antimony	8.9	B	# JL	P
7440-38-2	Arsenic	129			P
7440-39-3	Barium	43.6			P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	1.3			P
7440-70-2	Calcium	4110		E JL	P
7440-47-3	Chromium	8.4			P
7440-48-4	Cobalt	5.4	B		P
7440-50-8	Copper	28.9		*EJK	P
7439-89-6	Iron	16400			P
7439-92-1	Lead	137		*	P
7439-95-4	Magnesium	8620			P
7439-96-5	Manganese	802		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	13.6			P
7440-09-7	Potassium	520	B		P
7782-49-2	Selenium	0.71	U		P
7440-22-4	Silver	8.9			P
7440-23-5	Sodium	103	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	8.3	B		P
7440-66-6	Zinc	557			P
	Cyanide	0.06	U	Jk	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C50 JK

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40160S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 93.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000	-		P
7440-36-0	Antimony	1.4	B	NJK	P
7440-38-2	Arsenic	44.5			P
7440-39-3	Barium	93.3			P
7440-41-7	Beryllium	0.47	B		P
7440-43-9	Cadmium	0.04	U		P
7440-70-2	Calcium	734	B	EJK	P
7440-47-3	Chromium	9.8			P
7440-48-4	Cobalt	7.3	B		P
7440-50-8	Copper	14.0		*EJK	P
7439-89-6	Iron	17900			P
7439-92-1	Lead	29.1		*	P
7439-95-4	Magnesium	4740			P
7439-96-5	Manganese	454		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	11.1			P
7440-09-7	Potassium	675	B		P
7782-49-2	Selenium	0.72	U		P
7440-22-4	Silver	1.1	B	JK	P
7440-23-5	Sodium	120	B	G	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	13.1			P
7440-66-6	Zinc	95.7			P
	Cyanide	0.06	U	JK	CA

8/8/01/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C51 DL

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40161S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 76.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	31000			P
7440-36-0	Antimony	1.2	B	#JK	P
7440-38-2	Arsenic	36.0			P
7440-39-3	Barium	349			P
7440-41-7	Beryllium	0.65	B		P
7440-43-9	Cadmium	0.05	U		P
7440-70-2	Calcium	2290		E-JK	P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	6.2	B		P
7440-50-8	Copper	18.6		*E-JK	P
7439-89-6	Iron	20300			P
7439-92-1	Lead	16.7		*	P
7439-95-4	Magnesium	1990			P
7439-96-5	Manganese	1230		*	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	12.0			P
7440-09-7	Potassium	855	B		P
7782-49-2	Selenium	0.89	U		P
7440-22-4	Silver	1.3	B	JK	P
7440-23-5	Sodium	205	B	U	P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	26.2			P
7440-66-6	Zinc	104			P
	Cyanide	0.08	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C52

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40162S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 91.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8660			P
7440-36-0	Antimony	7.5	B	#JL	P
7440-38-2	Arsenic	228			P
7440-39-3	Barium	57.4			P
7440-41-7	Beryllium	0.45	B		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	8140		#JK	P
7440-47-3	Chromium	10.7			P
7440-48-4	Cobalt	6.6	B		P
7440-50-8	Copper	28.6		#EJK	P
7439-89-6	Iron	20300			P
7439-92-1	Lead	210		*	P
7439-95-4	Magnesium	10700			P
7439-96-5	Manganese	1930		*	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	14.6			P
7440-09-7	Potassium	596	B		P
7782-49-2	Selenium	0.74	U	JK	P
7440-22-4	Silver	8.6			P
7440-23-5	Sodium	99.7	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	9.7	B		P
7440-66-6	Zinc	474			P
	Cyanide	0.07	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C53

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40163S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 11.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15600		JK	P
7440-36-0	Antimony	7.6	B	NJK	P
7440-38-2	Arsenic	38.8		JK	P
7440-39-3	Barium	133	B	JK	P
7440-41-7	Beryllium	0.48	B	UJK	P
7440-43-9	Cadmium	0.78	B	UJK	P
7440-70-2	Calcium	17900		EJK	P
7440-47-3	Chromium	19.8		JK	P
7440-48-4	Cobalt	5.3	B	JK	P
7440-50-8	Copper	26.0	B	*EJK	P
7439-89-6	Iron	16500		JK	P
7439-92-1	Lead	49.6		*JK	P
7439-95-4	Magnesium	4530	B	JK	P
7439-96-5	Manganese	1050		*JK	P
7439-97-6	Mercury	0.43	U	R	CV
7440-02-0	Nickel	18.0	B	JK	P
7440-09-7	Potassium	1130	B	JK	P
7782-49-2	Selenium	5.9	U	JK	P
7440-22-4	Silver	2.7	B	JK	P
7440-23-5	Sodium	868	B	UJK	P
7440-28-0	Thallium	8.8	U	JK	P
7440-62-2	Vanadium	13.1	B	JK	P
7440-66-6	Zinc	173		JK	P
	Cyanide	0.52	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C54 *2A*

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40164S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 22.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15600		JK	P
7440-36-0	Antimony	3.1	B	NJK	P
7440-38-2	Arsenic	18.7		JK	P
7440-39-3	Barium	102	B	JK	P
7440-41-7	Beryllium	0.41	B	JK	P
7440-43-9	Cadmium	0.46	B	JK	P
7440-70-2	Calcium	7440		BJK	P
7440-47-3	Chromium	15.8		JK	P
7440-48-4	Cobalt	4.4	B	JK	P
7440-50-8	Copper	26.3		*BJK	P
7439-89-6	Iron	14700		JK	P
7439-92-1	Lead	18.4		*JK	P
7439-95-4	Magnesium	2830	B	JK	P
7439-96-5	Manganese	476		*JK	P
7439-97-6	Mercury	0.22	U	R	CV
7440-02-0	Nickel	14.3	B	JK	P
7440-09-7	Potassium	900	B	JK	P
7782-49-2	Selenium	3.0	U	JK	P
7440-22-4	Silver	1.2	B	JK	P
7440-23-5	Sodium	538	B	JK	P
7440-28-0	Thallium	4.5	U	JK	P
7440-62-2	Vanadium	12.4	B	JK	P
7440-66-6	Zinc	114		JK	P
	Cyanide	0.26	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C55

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): SOIL

Lab Sample ID: 40165S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 77.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14800			P
7440-36-0	Antimony	15.1	B	NJL	P
7440-38-2	Arsenic	254			P
7440-39-3	Barium	107			P
7440-41-7	Beryllium	0.29	B		P
7440-43-9	Cadmium	0.05	U		P
7440-70-2	Calcium	712	B	EJK	P
7440-47-3	Chromium	7.7			P
7440-48-4	Cobalt	4.5	B		P
7440-50-8	Copper	41.2		*EJK	P
7439-89-6	Iron	23000			P
7439-92-1	Lead	161		*	P
7439-95-4	Magnesium	2880			P
7439-96-5	Manganese	529		*	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	7.4	B		P
7440-09-7	Potassium	498	B		P
7782-49-2	Selenium	1.0	B		P
7440-22-4	Silver	12.5			P
7440-23-5	Sodium	286	B	U	P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	11.8	B		P
7440-66-6	Zinc	82.9			P
	Cyanide	0.08	U	JK	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C56

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

Matrix (soil/water): WATER

Lab Sample ID: 40166S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	893			P
7440-36-0	Antimony	5.7	B		P
7440-38-2	Arsenic	195			P
7440-39-3	Barium	49.3	B		P
7440-41-7	Beryllium	1.2	B		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	26000			P
7440-47-3	Chromium	47.5			P
7440-48-4	Cobalt	3.8	B		P
7440-50-8	Copper	49.1			P
7439-89-6	Iron	1990			P
7439-92-1	Lead	54.8			P
7439-95-4	Magnesium	7540			P
7439-96-5	Manganese	46.4			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	32.1	B		P
7440-09-7	Potassium	8140			P
7782-49-2	Selenium	5.6			P
7440-22-4	Silver	9.1	B		P
7440-23-5	Sodium	1340000			P
7440-28-0	Thallium	5.1	U		P
7440-62-2	Vanadium	4.2	B		P
7440-66-6	Zinc	827			P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FB

U.S. EPA - CLP

10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

ICP ID Number:

P3

Date: 07/15/01

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium	330.20		5000	554.5	P
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide			10		NR

Comments:

P3: THERMO JARRELL ASH

OPTIONAL FORM 99 (7 90)

FAX TRANSMITTAL

of pages ► 13

To: Santa Fernandez	From: Laura Castillo
Dept./Agency	Phone #
Fax #	Fax #

NSN 7540-01-317-7368

5099-101

GENERAL SERVICES ADMINISTRATION

IN

ILM04.1

36

U.S. EPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

ICP ID Number:

P4

Date: 07/15/01

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	17.7	P
Antimony	206.80		60	2.9	P
Arsenic	189.00		10	4.6	P
Barium	493.40		200	0.7	P
Beryllium	313.00		5	0.1	P
Cadmium	226.50		5	0.2	P
Calcium	317.90		5000	40.4	P
Chromium	267.70		10	0.4	P
Cobalt	228.60		50	1.1	P
Copper	324.70		25	0.9	P
Iron	271.40		100	9.8	P
Lead	220.30		3	1.8	P
Magnesium	279.00		5000	13.5	P
Manganese	257.60		15	0.3	P
Mercury			0.2		NR
Nickel	231.60		40	1.6	P
Potassium	766.40		5000	9.7	P
Selenium	196.00		5	3.4	P
Silver	328.00		10	0.3	P
Sodium	330.20		5000	114.2	P
Thallium	190.80		10	5.1	P
Vanadium	292.40		50	0.7	P
Zinc	206.20		20	0.9	P
Cyanide			10		NR

Comments:

P4: THERMO JARRELL ASH

U.S. EPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

ICP ID Number:

Date: 07/15/01

Flame AA ID Number: C5

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	253.70		200	0.1	NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide			10		NR

Comments:

C5: CETAC M6000

U.S. EPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C42

ICP ID Number:

Date: 07/15/01

Flame AA ID Number: C1

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide	578.00		10	1.2	CA

Comments:

C1: LACHAT

13
PREPARATION LOG

Method: P

49

13
PREPARATION LOG

Method: CV

ILM04.1

- . - .

PREPARATION LOG

Contract: 68-W-00-085

SDG No. : MJ0C42

[illegible]



ORIGINAL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

1200 Sixth Avenue
Seattle, Washington 98101

RECEIVED
OCT 03 2001

IN REPLY

REFER TO: OEA-095

October 2, 2001

MEMORANDUM

SUBJECT: Gold Creek Shoshone Silver Mill, CLP Inorganics Analysis,
Data Validation
Case: 29571
SDG: MJ0C18

FROM: 
Laura Castrilli, Chemist
Quality Assurance and Data Unit, OEA

TO: Deborah Leblang, Site Assessment Manager
Office of Environmental Cleanup

CC: Bruce Woods, Region 10 CLP TPO
Paul Swift, Roy F. Weston, Inc.

The following is a validation of ICP-AES and mercury analyses of nineteen soil/sediment and one water rinseate samples from the Gold Creek Shoshone Silver Mill site. The soil/sediment samples were also analyzed for cyanide. The analyses were performed following the USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis Multi-media, Multi-Concentration, ILM04.1. Analyses were conducted by Sentinel, Inc., Huntsville, Alabama. This validation was conducted for the following samples:

MJ0C18	MJ0C25	MJ0C28	MJ0C31	MJ0C34	MJ0C37	MJ0C40
MJ0C23	MJ0C26	MJ0C29	MJ0C32	MJ0C35	MJ0C38	MJ0C41
MJ0C24	MJ0C27	MJ0C30	MJ0C33	MJ0C36	MJ0C39	

Data Qualifications

The following comments refer to the Sentinel Laboratory's performance in meeting quality control specifications outlined in the CLP Statement of Work (CLP-SOW) for Inorganic Analysis, rev. ILM04.1. The comments presented herein are based on the information provided for the review.

1.0 Timeliness -

The technical (40 CFR part 136) holding time from the date of collection for cyanide in water is 14 days. The holding time for mercury in water is 28 days. The holding time for the remaining

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metals in water is 180 days. The samples were collected between 07/31/01 and 08/03/01. ICP-AES analyses were completed between 8/16/01 and 08/17/01. Mercury analyses were completed on 08/14/01. Cyanide analyses were completed on 08/15/01.

All analyses were conducted within the technical water holding times, with the exception of the cyanide analysis for sample MJ0C18. The cyanide distillation (conducted 8/14/01) was within the within the analysis holding time. Since the cyanide distillation was within the 14 day holding time, no qualification was made based on holding time.

Note that the laboratory did meet the contractual holding time of cyanide analysis within 12 days of verified time of sample receipt.

2.0 Sample Preparation - Acceptable

The samples were prepared for mercury and ICP-AES analyses on 08/13/01. The samples were prepared for cyanide analyses on 08/14/01. No qualification was made based on sample preparation.

3.0 Calibrations/Calibration Verifications - Acceptable

The samples were analyzed for mercury by CVAAS on 08/14/01. The initial calibration included one blank and six standards. The curve was linear with a correlation coefficient greater than 0.995.

The samples were analyzed by ICP-AES on 08/16/01 (most analytes) and 08/17/01 (dilution analyses for manganese in sample MJ0C30 and arsenic in MJ0C37). The instrument was standardized each day of analysis according to the analytical method using one blank and a single calibration standard for each element.

The samples were analyzed for cyanide colorimetrically on 08/15/01. The initial calibration included one blank and five standards. The curve was linear with a correlation coefficient greater than 0.995.

All ICP-AES, colorimetric (cyanide) and CVAAS (mercury) calibrations were performed as required and met the acceptance criteria; therefore, no qualification was made on this basis.

Calibration verification samples are required before and after sample analysis and after every 10 samples during analysis. Cyanide recoveries must be between 85-115%. Mercury recoveries must be within 80-120%. Other metal recoveries must be within 90-110%.

All ICP-AES, colorimetric (cyanide) and CVAAS (mercury) calibration verification (initial and continuing) samples bracketing reported sample results met the frequency and recovery criteria; therefore no qualification was made based on ICP-AES, colorimetric, or CVAAS calibration verification.

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4.0 Laboratory Control Samples - Acceptable

Laboratory Control samples (LCS) are digested and analyzed along with the samples to verify the efficiency of laboratory procedures (LCS analyses are not required for mercury in water). All recoveries associated with reported sample results met the acceptance criteria for control samples, therefore no qualification was made based on LCS results.

5.0 Blanks -

Procedural blanks were prepared with the samples to show potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified if the analyte concentration was less than five times the analytical value in the blank.

Aluminum, barium, cadmium, calcium, chromium, copper, iron, magnesium, manganese, potassium, silver, and zinc were detected in the water preparation blank. Cadmium, calcium, chromium, iron, manganese, potassium, sodium, and zinc were detected in the soil/sediment preparation blank. Aluminum, antimony, barium, cadmium, calcium, chromium, iron, magnesium, manganese, potassium, silver, vanadium, and zinc were detected in one or more continuing calibration blanks (CCBs).

Based on blank contamination, the following qualifications were made:

- ♦ aluminum in water sample MJ0C29 was qualified 'U', undetected
- ♦ barium in water sample MJ0C29 was qualified 'U', undetected
- ♦ cadmium in soil/sediment samples MJ0C27, MJ0C34, and MJ0C35 was qualified 'U', undetected
- ♦ calcium in water sample MJ0C29 and soil/sediment sample MJ0C40 was qualified 'U', undetected
- ♦ copper in water sample MJ0C29 was qualified 'U', undetected
- ♦ iron in water sample MJ0C29 was qualified 'U', undetected
- ♦ magnesium in water sample MJ0C29 and soil/sediment sample MJ037 was qualified 'U', undetected
- ♦ manganese in water sample MJ0C29 was qualified 'U', undetected
- ♦ sodium in all soil/sediment samples except MJ0C37 was qualified 'U', undetected
- ♦ vanadium in soil/sediment sample MJ0C37 was qualified 'U',

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undetected

- ♦ zinc in water sample MJ0C29 was qualified 'U', undetected

The remaining sample results were greater than five times the associated blank levels (or were already undetected) and were not qualified on this basis.

6.0 ICP-AES Interference Check Sample -

The interference check sample (ICS) is analyzed by ICP-AES to verify interelement and background correction factors. Analysis is required at the beginning and end of each sample analysis run and recoveries must be between 80% and 120%. All ICS recoveries associated with reported sample results were within the recovery criterion.

Some of the samples had interfering levels of iron. Cadmium in sample MJ0C34 could have been a false positive due to high iron, but since cadmium in this sample was already qualified 'U', undetected due to blank contamination, no further qualification was made based on suspected interference.

See Section 9.0 for a discussion of an evaluation of the diluted sample analyses required for a couple of samples.

7.0 Duplicate Analysis - Acceptable

Duplicate analysis was done on soil/sediment sample MJ0C18. Soil/sediment duplicate results were within the $\pm 35\%$ Relative Percent Difference (RPD) or $\pm 2 \times \text{CRDL}$ criteria for soil/sediment results < 5 times the CRDL criteria; therefore no qualification was made on this basis.

Laboratory '*' qualifiers were removed from soil/sediment zinc results as the laboratory used the stricter water criteria to qualify soil/sediment results.

The water sample was a blank, therefore duplicate analysis for water was not needed and no qualification was made to water results based on the soil/sediment duplicate analysis.

8.0 Matrix Spike Analysis -

Matrix spike sample analyses are done to provide information about the effect of the sample matrix on digestion and measurement methods. Matrix spike recovery must be within the limits of 75 - 125%.

Matrix spike analysis was done on soil/sediment sample MJ0C18. All soil/sediment matrix spike recoveries were within the required QC limits; with the exception of antimony (72%R) and arsenic (160%R). All antimony soil/sediment results were qualified 'J', estimated (low

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bias suspected). Detected soil/sediment arsenic results were qualified 'J', estimated (high bias suspected).

The water sample was a blank, therefore matrix spike analysis for water was not needed and no qualification was made to water results based on the soil/sediment matrix spike analysis.

9.0 ICP-AES Serial Dilution -

Sample MJ0C18 was analyzed by ICP-AES serial dilution to check for potential interferences. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) were within the 10%D criteria; with the exception of calcium (22%D), chromium (11%D) magnesium (12%D), potassium (11%D), and zinc (12%D). All soil/sediment calcium, magnesium, and zinc results were qualified 'J', estimated (unknown bias), except as noted below. Laboratory 'E' qualifiers were removed from the chromium and potassium results as the serial dilution results were just slightly outside the acceptance criteria.

The water samples were blanks, therefore serial dilution analysis for water was not needed and no qualification was made to water results based on the soil/sediment serial dilution analysis.

Samples MJ0C30 and MJ0C37 were analyzed at ten fold dilutions in order to report manganese and arsenic, respectively. The dilution data was compared to the undiluted data to see if there were significant differences/possible interference. No significant differences were found for sample MJ0C30. Sodium in sample MJ0C37 was not detected in the undiluted analysis but was detected in the ten-fold dilution analysis, indicating a possible suppression of sodium in this sample. Sodium in sample MJ0C37 was qualified 'UJ', estimated detection limit.

Since the zinc results for the undiluted and ten fold dilution analyses for sample MJ0C37 had a 9.8% difference, zinc in this sample was not qualified based on serial dilution results.

Since the calcium and magnesium results for the undiluted and ten fold dilution analyses for sample MJ0C30 had 4.9% and 3.8% differences, respectively, calcium and magnesium in this sample was not qualified based on serial dilution results.

10.0 Detection Limits - Acceptable

Sample results which fall below the instrument detection limit (IDL) are assigned the value of the instrument detection limit and the 'U' qualifier is attached.

Contract Required Detection Limit (CRDL) standards are required for most analytes to demonstrate a linear calibration curve near the CRDL. CRDL standards were run at the required frequency.

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11.0 Overall Assessment of the Data

This validation of the data is based on the criteria outlined in the *National Functional Guidelines for Inorganic Data Review (02/94)*.

The sample cooler temperature upon receipt was 6°C for sample MJ0C18 and 11.5°C for the remaining samples. According to the sample receipt log book, all applicable pHs were within specific guidelines. The request for cyanide on rinseate sample MJ0C29 was cancelled as only a total metals pH<2 aliquot was submitted. Properly preserved water metals samples (pH<2) do not require cooling (40 CFR 136.2, Table II). In the reviewer's judgement, it is unlikely that the elevated temperature for soil/sediment would cause appreciable loss of metals or cyanide, therefore no action was taken based on the elevated cooler temperature.

The cooler that arrived at 11.5°C had one of the three custody seals torn. The other two custody seals were intact, precluding the possibility of sample tampering during shipment.

There were 460 data points reported: 33 results were undetected due to blank contamination; 38 results were estimated due to matrix spike recovery; 54 results were estimated due to serial dilution; and one result was suspected to be a possible false negative. Overall, 27 percent of the data was qualified.

Note that the Computer Assisted Data Review Expert (CADRE) software uses results of field QC samples as blanks in order to qualify any field sample results in the same SDG that are less than five times any detected analytes in the field QC sample(s). For this SDG, the electronic data may have extra qualifiers on a few beryllium and calcium results that may or may not be necessary. Data users will need to determine what if any qualification is necessary for all applicable sample results due to detects in the rinseate blanks.

Below are the definitions for the National Functional Guidelines for Inorganic Data Review (02/94) qualifiers used when validating/qualifying data from Inorganic analysis.

DATA QUALIFIERS

- U - The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.
- J - The associated value is an estimated quantity.
- R - The data are unusable. (Note: Analyte may or may not be present.)

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UJ - The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

At the request of the site assessment manager, bias for the data was qualitatively assessed and if applicable, the following additional qualifiers were applied:

L - Low bias.

H - High bias.

K - Unknown Bias.

INORGANIC ANALYSIS DATA SHEET

MJ0C18

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40132S

Level (low/med): LOW

Date Received: 08/04/01

Solids: 50.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000			P
7440-36-0	Antimony	1.1	U	N JL	P
7440-38-2	Arsenic	23.0		N JH	P
7440-39-3	Barium	64.8	B		P
7440-41-7	Beryllium	0.51	B		P
7440-43-9	Cadmium	0.08	U		P
7440-70-2	Calcium	7100		E JK	P
7440-47-3	Chromium	13.3		E	P
7440-48-4	Cobalt	5.7	B		P
7440-50-8	Copper	16.3			P
7439-89-6	Iron	17400			P
7439-92-1	Lead	14.4			P
7439-95-4	Magnesium	7960		E JK	P
7439-96-5	Manganese	309			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	12.9	B		P
7440-09-7	Potassium	1000	B	E	P
7782-49-2	Selenium	1.3	U		P
7440-22-4	Silver	0.82	B		P
7440-23-5	Sodium	226	B	U	P
7440-28-0	Thallium	2.0	U		P
7440-62-2	Vanadium	12.0	B		P
7440-66-6	Zinc	40.5		E JK	P
	Cyanide	0.12	U		CA

See 08/07/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C23

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40133S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 94.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6100			P
7440-36-0	Antimony	4.6	B	N JK	P
7440-38-2	Arsenic	166		N JK	P
7440-39-3	Barium	40.5	B		P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	1.1			P
7440-70-2	Calcium	2540		E JK	P
7440-47-3	Chromium	7.6		E	P
7440-48-4	Cobalt	4.7	B		P
7440-50-8	Copper	21.7			P
7439-89-6	Iron	14900			P
7439-92-1	Lead	97.3			P
7439-95-4	Magnesium	6230		E JK	P
7439-96-5	Manganese	910			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	11.7			P
7440-09-7	Potassium	697	B	E	P
7782-49-2	Selenium	0.71	U		P
7440-22-4	Silver	2.6			P
7440-23-5	Sodium	97.5	B	4	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	6.9	B		P
7440-66-6	Zinc	470		*E JK	P
	Cyanide	0.08	B		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C24

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40134S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 95.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8350			P
7440-36-0	Antimony	6.4	B	#JL	P
7440-38-2	Arsenic	246		#JK	P
7440-39-3	Barium	44.4			P
7440-41-7	Beryllium	0.52	B		P
7440-43-9	Cadmium	1.3			P
7440-70-2	Calcium	2230		#JK	P
7440-47-3	Chromium	9.7		#	P
7440-48-4	Cobalt	6.0	B		P
7440-50-8	Copper	32.0			P
7439-89-6	Iron	17600			P
7439-92-1	Lead	142			P
7439-95-4	Magnesium	8670		#JK	P
7439-96-5	Manganese	1090			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	13.3			P
7440-09-7	Potassium	706	B	#	P
7782-49-2	Selenium	0.71	U		P
7440-22-4	Silver	6.5			P
7440-23-5	Sodium	95.1	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	8.8	B		P
7440-66-6	Zinc	522		#JK	P
	Cyanide	0.06	U		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C25

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40135S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 95.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5750	-		P
7440-36-0	Antimony	8.9	B	N JL	P
7440-38-2	Arsenic	601		N JH	P
7440-39-3	Barium	54.1			P
7440-41-7	Beryllium	0.56	B		P
7440-43-9	Cadmium	2.1			P
7440-70-2	Calcium	999	B	E JK	P
7440-47-3	Chromium	7.7		E	P
7440-48-4	Cobalt	6.6	B		P
7440-50-8	Copper	36.8			P
7439-89-6	Iron	16700			P
7439-92-1	Lead	172			P
7439-95-4	Magnesium	3120		E JK	P
7439-96-5	Manganese	1290			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	11.1			P
7440-09-7	Potassium	1040	B	E	P
7782-49-2	Selenium	0.71	U		P
7440-22-4	Silver	4.7			P
7440-23-5	Sodium	78.6	B	Y	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	8.0	B		P
7440-66-6	Zinc	795		*E JK	P
	Cyanide	0.21	B		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C26

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40136S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 95.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9300			P
7440-36-0	Antimony	7.7	B	# JL	P
7440-38-2	Arsenic	199		# JH	P
7440-39-3	Barium	49.2			P
7440-41-7	Beryllium	0.54	B		P
7440-43-9	Cadmium	1.3			P
7440-70-2	Calcium	2570		# JK	P
7440-47-3	Chromium	9.9		#	P
7440-48-4	Cobalt	6.5	B		P
7440-50-8	Copper	29.8			P
7439-89-6	Iron	19300			P
7439-92-1	Lead	123			P
7439-95-4	Magnesium	9530		# JK	P
7439-96-5	Manganese	1070			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	16.4			P
7440-09-7	Potassium	792	B	#	P
7782-49-2	Selenium	0.71	U		P
7440-22-4	Silver	12.5			P
7440-23-5	Sodium	71.5	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	9.4	B		P
7440-66-6	Zinc	523		# JK	P
	Cyanide	0.06	U		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C27 *lv*

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40137S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 85.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8780	-		P
7440-36-0	Antimony	2.6	B	N JL	P
7440-38-2	Arsenic	114		N JH	P
7440-39-3	Barium	43.8	B		P
7440-41-7	Beryllium	0.43	B		P
7440-43-9	Cadmium	0.18	B	U	P
7440-70-2	Calcium	390	B	E JK	P
7440-47-3	Chromium	6.0		E	P
7440-48-4	Cobalt	10.8	B		P
7440-50-8	Copper	18.9			P
7439-89-6	Iron	10000			P
7439-92-1	Lead	15.1			P
7439-95-4	Magnesium	1150		EJK	P
7439-96-5	Manganese	231			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	21.5			P
7440-09-7	Potassium	1940		E	P
7782-49-2	Selenium	0.78	U		P
7440-22-4	Silver	2.2	B		P
7440-23-5	Sodium	156	B	U	P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	10.1	B		P
7440-66-6	Zinc	165		*E JK	P
	Cyanide	0.07	U		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

MJ0C28 LA

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40138S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 52.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000			P
7440-36-0	Antimony	1.1	U	#JL	P
7440-38-2	Arsenic	7.5		#JH	P
7440-39-3	Barium	355			P
7440-41-7	Beryllium	0.25	B		P
7440-43-9	Cadmium	2.0			P
7440-70-2	Calcium	4850		#JK	P
7440-47-3	Chromium	9.3		#	P
7440-48-4	Cobalt	7.0	B		P
7440-50-8	Copper	16.7			P
7439-89-6	Iron	16200			P
7439-92-1	Lead	72.1			P
7439-95-4	Magnesium	2480		#JK	P
7439-96-5	Manganese	1650			P
7439-97-6	Mercury	0.15	B		CV
7440-02-0	Nickel	9.6	B		P
7440-09-7	Potassium	1470	B	#	P
7782-49-2	Selenium	1.3	U		P
7440-22-4	Silver	1.4	B		P
7440-23-5	Sodium	279	B	U	P
7440-28-0	Thallium	1.9	U		P
7440-62-2	Vanadium	25.5			P
7440-66-6	Zinc	145		#EJK	P
	Cyanide	0.27	B		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C29

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): WATER

Lab Sample ID: 40139S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	65.7	B	U	P
7440-36-0	Antimony	2.9	U		P
7440-38-2	Arsenic	4.6	U		P
7440-39-3	Barium	1.6	B	U	P
7440-41-7	Beryllium	0.17	B		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	133	B	U	P
7440-47-3	Chromium	0.40	U		P
7440-48-4	Cobalt	1.1	U		P
7440-50-8	Copper	1.1	B	U	P
7439-89-6	Iron	15.9	B	U	P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	32.2	B	U	P
7439-96-5	Manganese	0.38	B	U	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.6	U		P
7440-09-7	Potassium	139	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	454	B		P
7440-28-0	Thallium	5.1	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	6.7	B	U	P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FB

INORGANIC ANALYSIS DATA SHEET

MJ0C30

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40140S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 98.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11100			P
7440-36-0	Antimony	105		N JL	P
7440-38-2	Arsenic	368		N JH	P
7440-39-3	Barium	71.2			P
7440-41-7	Beryllium	1.5			P
7440-43-9	Cadmium	32.5			P
7440-70-2	Calcium	8390		E	P
7440-47-3	Chromium	6.7		E	P
7440-48-4	Cobalt	12.4			P
7440-50-8	Copper	915			P
7439-89-6	Iron	28600			P
7439-92-1	Lead	5580			P
7439-95-4	Magnesium	17600		E	P
7439-96-5	Manganese	8440			P
7439-97-6	Mercury	0.17			CV
7440-02-0	Nickel	15.4			P
7440-09-7	Potassium	1990		E	P
7782-49-2	Selenium	0.69	U		P
7440-22-4	Silver	44.8			P
7440-23-5	Sodium	153	B	u	P
7440-28-0	Thallium	1.0	U		P
7440-62-2	Vanadium	9.5	B		P
7440-66-6	Zinc	14700		*E JK	P
	Cyanide	0.09	B		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C31

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40141S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 94.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12200			P
7440-36-0	Antimony	202		#JK	P
7440-38-2	Arsenic	1530		#JH	P
7440-39-3	Barium	86.5			P
7440-41-7	Beryllium	0.73	B		P
7440-43-9	Cadmium	9.3			P
7440-70-2	Calcium	1990		#JK	P
7440-47-3	Chromium	11.4		#	P
7440-48-4	Cobalt	5.0	B		P
7440-50-8	Copper	759			P
7439-89-6	Iron	34900			P
7439-92-1	Lead	9550			P
7439-95-4	Magnesium	7330		#JK	P
7439-96-5	Manganese	2600			P
7439-97-6	Mercury	0.46			CV
7440-02-0	Nickel	14.2			P
7440-09-7	Potassium	1190		#	P
7782-49-2	Selenium	0.72	U		P
7440-22-4	Silver	111			P
7440-23-5	Sodium	121	#	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	14.7			P
7440-66-6	Zinc	3850		*#JK	P
	Cyanide	0.17	B		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C32

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40142S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 93.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9720			P
7440-36-0	Antimony	4.8	B	H JL	P
7440-38-2	Arsenic	51.7		N JH	P
7440-39-3	Barium	67.6			P
7440-41-7	Beryllium	0.42	B		P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	890	B	E JK	P
7440-47-3	Chromium	8.9		E	P
7440-48-4	Cobalt	4.5	B		P
7440-50-8	Copper	34.4			P
7439-89-6	Iron	17000			P
7439-92-1	Lead	341			P
7439-95-4	Magnesium	5810		E JK	P
7439-96-5	Manganese	456			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	10.3			P
7440-09-7	Potassium	737	B	E	P
7782-49-2	Selenium	0.72	U		P
7440-22-4	Silver	3.2			P
7440-23-5	Sodium	102	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	11.1			P
7440-66-6	Zinc	293		*E JK	P
	Cyanide	0.15	B		CA

JL 8/7/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C33

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40143S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 89.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6330			P
7440-36-0	Antimony	270		N JL	P
7440-38-2	Arsenic	1100		N JH	P
7440-39-3	Barium	85.5			P
7440-41-7	Beryllium	0.54	B		P
7440-43-9	Cadmium	8.0			P
7440-70-2	Calcium	353	B	E JK	P
7440-47-3	Chromium	13.9		E	P
7440-48-4	Cobalt	4.4	B		P
7440-50-8	Copper	546			P
7439-89-6	Iron	35100			P
7439-92-1	Lead	9480			P
7439-95-4	Magnesium	4510		E JK	P
7439-96-5	Manganese	3840			P
7439-97-6	Mercury	0.33			CV
7440-02-0	Nickel	11.3			P
7440-09-7	Potassium	1210		E	P
7782-49-2	Selenium	1.2			P
7440-22-4	Silver	39.9			P
7440-23-5	Sodium	96.2	B U	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	11.7			P
7440-66-6	Zinc	2230		E JK	P
	Cyanide	2.8			CA

See 08/07/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C34

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40144S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 93.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7490			P
7440-36-0	Antimony	96.8		#JL	P
7440-38-2	Arsenic	823		#JH	P
7440-39-3	Barium	108			P
7440-41-7	Beryllium	0.19	B		P
7440-43-9	Cadmium	0.05	B	U	P
7440-70-2	Calcium	705	B	EJK	P
7440-47-3	Chromium	11.1		E	P
7440-48-4	Cobalt	0.79	B		P
7440-50-8	Copper	74.2			P
7439-89-6	Iron	41300			P
7439-92-1	Lead	968			P
7439-95-4	Magnesium	4060		EJK	P
7439-96-5	Manganese	295			P
7439-97-6	Mercury	0.15			CV
7440-02-0	Nickel	7.8	B		P
7440-09-7	Potassium	845	B	E	P
7782-49-2	Selenium	0.73	U		P
7440-22-4	Silver	77.6			P
7440-23-5	Sodium	167	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	16.9			P
7440-66-6	Zinc	208		*EJK	P
	Cyanide	0.06	U		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C37

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40147S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 87.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	414			P
7440-36-0	Antimony	641		N JL	P
7440-38-2	Arsenic	55500		N JH	P
7440-39-3	Barium	104			P
7440-41-7	Beryllium	0.02	U		P
7440-43-9	Cadmium	33.3			P
7440-70-2	Calcium	142	B	E JK	P
7440-47-3	Chromium	2.7		E	P
7440-48-4	Cobalt	46.5			P
7440-50-8	Copper	154			P
7439-89-6	Iron	201000			P
7439-92-1	Lead	5650			P
7439-95-4	Magnesium	78.9	B	E WK	P
7439-96-5	Manganese	17.2			P
7439-97-6	Mercury	3.6			CV
7440-02-0	Nickel	51.6			P
7440-09-7	Potassium	1050	B	E	P
7782-49-2	Selenium	2.4			P
7440-22-4	Silver	236			P
7440-23-5	Sodium	26.2	U	JK	P
7440-28-0	Thallium	5.8			P
7440-62-2	Vanadium	0.52	B	U	P
7440-66-6	Zinc	9940		*E	P
	Cyanide	0.07	U		CA

JL 08/27/01

Color Before: GREY

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C38

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40148S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 82.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4180			P
7440-36-0	Antimony	276		N JL	P
7440-38-2	Arsenic	1300		N JH	P
7440-39-3	Barium	72.2			P
7440-41-7	Beryllium	0.14	B		P
7440-43-9	Cadmium	0.05	U		P
7440-70-2	Calcium	369	B	E JK	P
7440-47-3	Chromium	9.2		E	P
7440-48-4	Cobalt	0.27	U		P
7440-50-8	Copper	102			P
7439-89-6	Iron	41600			P
7439-92-1	Lead	2770			P
7439-95-4	Magnesium	3300		E JK	P
7439-96-5	Manganese	77.7			P
7439-97-6	Mercury	0.22			CV
7440-02-0	Nickel	4.1	B		P
7440-09-7	Potassium	895	B	E	P
7782-49-2	Selenium	0.82	U		P
7440-22-4	Silver	225			P
7440-23-5	Sodium	134	B	U	P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	10.2	B		P
7440-66-6	Zinc	232		*E JK	P
	Cyanide	0.07	U		CA

See 01/01/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C39

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40149S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 87.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3520			P
7440-36-0	Antimony	169		NJC	P
7440-38-2	Arsenic	1160		NJH	P
7440-39-3	Barium	43.6	B		P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.05	U		P
7440-70-2	Calcium	117	B	EJK	P
7440-47-3	Chromium	7.9		E	P
7440-48-4	Cobalt	0.25	U		P
7440-50-8	Copper	97.8			P
7439-89-6	Iron	39700			P
7439-92-1	Lead	1360			P
7439-95-4	Magnesium	2840		EJK	P
7439-96-5	Manganese	101			P
7439-97-6	Mercury	0.18			CV
7440-02-0	Nickel	4.3	B		P
7440-09-7	Potassium	699	B	E	P
7782-49-2	Selenium	0.78	U		P
7440-22-4	Silver	113			P
7440-23-5	Sodium	159	B	U	P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	10.4	B		P
7440-66-6	Zinc	226		*EJK	P
	Cyanide	0.10	B		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C40

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40150S

Level (low/med): LOW

Date Received: 08/07/01

Solids: 89.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2720			P
7440-36-0	Antimony	147		N JL	P
7440-38-2	Arsenic	908		N JH	P
7440-39-3	Barium	38.7	B		P
7440-41-7	Beryllium	0.09	B		P
7440-43-9	Cadmium	0.05	U		P
7440-70-2	Calcium	83.9	B	E USK	P
7440-47-3	Chromium	5.4		E	P
7440-48-4	Cobalt	0.25	U		P
7440-50-8	Copper	80.9			P
7439-89-6	Iron	36500			P
7439-92-1	Lead	1190			P
7439-95-4	Magnesium	2040		E JK	P
7439-96-5	Manganese	96.5			P
7439-97-6	Mercury	0.12			CV
7440-02-0	Nickel	3.2	B		P
7440-09-7	Potassium	724	B	E	P
7782-49-2	Selenium	0.76	U		P
7440-22-4	Silver	89.3			P
7440-23-5	Sodium	150	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	8.5	B		P
7440-66-6	Zinc	217		*E JK	P
	Cyanide	0.07	U		CA

Acetone

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C41

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Matrix (soil/water): SOIL

Lab Sample ID: 40151S

Level (low/med): LOW

Date Received: 08/07/01

% Solids: 94.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5510			P
7440-36-0	Antimony	155		NJL	P
7440-38-2	Arsenic	1250		NJH	P
7440-39-3	Barium	40.6	B		P
7440-41-7	Beryllium	0.19	B		P
7440-43-9	Cadmium	0.04	U		P
7440-70-2	Calcium	156	B	EJK	P
7440-47-3	Chromium	6.7		E	P
7440-48-4	Cobalt	0.23	U		P
7440-50-8	Copper	33.6			P
7439-89-6	Iron	37400			P
7439-92-1	Lead	920			P
7439-95-4	Magnesium	5850		EJK	P
7439-96-5	Manganese	78.7			P
7439-97-6	Mercury	0.11			CV
7440-02-0	Nickel	3.9	B		P
7440-09-7	Potassium	576	B	E	P
7782-49-2	Selenium	0.71	U		P
7440-22-4	Silver	71.9			P
7440-23-5	Sodium	173	B	U	P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	8.7	B		P
7440-66-6	Zinc	90.9		*EJK	P
	Cyanide	0.06	U		CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

ICP ID Number:

P4

Date: 07/15/01

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	17.7	P
Antimony	206.80		60	2.9	P
Arsenic	189.00		10	4.6	P
Barium	493.40		200	0.7	P
Beryllium	313.00		5	0.1	P
Cadmium	226.50		5	0.2	P
Calcium	317.90		5000	40.4	P
Chromium	267.70		10	0.4	P
Cobalt	228.60		50	1.1	P
Copper	324.70		25	0.9	P
Iron	271.40		100	9.8	P
Lead	220.30		3	1.8	P
Magnesium	279.00		5000	13.5	P
Manganese	257.60		15	0.3	P
Mercury			0.2		NR
Nickel	231.60		40	1.6	P
Potassium	766.40		5000	9.7	P
Selenium	196.00		5	3.4	P
Silver	328.00		10	0.3	P
Sodium	330.20		5000	114.2	P
Thallium	190.80		10	5.1	P
Vanadium	292.40		50	0.7	P
Zinc	206.20		20	0.9	P
Cyanide			10		NR

Comments:

P4: THERMO JARRELL ASH

U.S. EPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

ICP ID Number:

Date: 07/15/01

Flame AA ID Number: C5

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	253.70		200	0.1	NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide			10		NR

Comments:

C5: CETAC M6000

U.S. EPA - CLP

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

ICP ID Number:

Date: 07/15/01

Flame AA ID Number: C1

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide	578.00		10	1.2	CA

Comments:

C1: LACHAT

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Method: P

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS	08/13/01	1.00	200
LCSW	08/13/01		100
MJ0C18	08/13/01	1.00	200
MJ0C18D	08/13/01	1.00	200
MJ0C18S	08/13/01	1.00	200
MJ0C23	08/13/01	1.01	200
MJ0C24	08/13/01	1.01	200
MJ0C25	08/13/01	1.01	200
MJ0C26	08/13/01	1.00	200
MJ0C27	08/13/01	1.02	200
MJ0C28	08/13/01	1.01	200
MJ0C29	08/13/01		100
MJ0C30	08/13/01	1.01	200
MJ0C31	08/13/01	1.00	200
MJ0C32	08/13/01	1.00	200
MJ0C33	08/13/01	1.00	200
MJ0C34	08/13/01	1.00	200
MJ0C35	08/13/01	1.00	200
MJ0C36	08/13/01	1.00	200
MJ0C37	08/13/01	1.00	200
MJ0C38	08/13/01	1.00	200
MJ0C39	08/13/01	1.00	200
MJ0C40	08/13/01	1.00	200
MJ0C41	08/13/01	1.01	200
PBS	08/13/01	1.00	200
PBW	08/13/01		100

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C18

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS	08/13/01	0.20	100
MJ0C18	08/13/01	0.20	100
MJ0C18D	08/13/01	0.20	100
MJ0C18S	08/13/01	0.20	100
MJ0C23	08/13/01	0.22	100
MJ0C24	08/13/01	0.20	100
MJ0C25	08/13/01	0.22	100
MJ0C26	08/13/01	0.20	100
MJ0C27	08/13/01	0.21	100
MJ0C28	08/13/01	0.20	100
MJ0C29	08/13/01		100
MJ0C30	08/13/01	0.20	100
MJ0C31	08/13/01	0.20	100
MJ0C32	08/13/01	0.20	100
MJ0C33	08/13/01	0.20	100
MJ0C34	08/13/01	0.20	100
MJ0C35	08/13/01	0.20	100
MJ0C36	08/13/01	0.20	100
MJ0C37	08/13/01	0.20	100
MJ0C38	08/13/01	0.20	100
MJ0C39	08/13/01	0.20	100
MJ0C40	08/13/01	0.20	100
MJ0C41	08/13/01	0.21	100
PBS	08/13/01	0.20	100
PBW	08/13/01		100

13
PREPARATION LOG

Contract: 68-W-00-085

SDG No. : MJ0C18

[illegible]



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

RECEIVED
OCT 03 2001

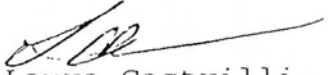
IN REPLY

REFER TO: OEA-095

October 2, 2001

MEMORANDUM

SUBJECT: Gold Creek Shoshone Silver Mill, CLP Inorganics Analysis,
Data Validation
Case: 29571
SDG: MJ0C02

FROM: 
Laura Castrilli, Chemist
Quality Assurance and Data Unit, OEA

TO: Deborah Leblang, Site Assessment Manager
Office of Environmental Cleanup

CC: Bruce Woods, Region 10 CLP TPO
Paul Swift, Roy F. Weston, Inc.

The following is a validation of ICP-AES and mercury analyses of eighteen soil/sediment and two water rinseate samples from the Gold Creek Shoshone Silver Mill site. The soil/sediment samples were also analyzed for cyanide. The analyses were performed following the USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis Multi-media, Multi-Concentration, ILM04.1. Analyses were conducted by Sentinel, Inc., Huntsville, Alabama. This validation was conducted for the following samples:

MJ0C02	MJ0C05	MJ0C08	MJ0C11	MJ0C14	MJ0C17	MJ0C21
MJ0C03	MJ0C06	MJ0C09	MJ0C12	MJ0C15	MJ0C19	MJ0C22
MJ0C04	MJ0C07	MJ0C10	MJ0C13	MJ0C16	MJ0C20	

Data Qualifications

The following comments refer to the Sentinel Laboratory's performance in meeting quality control specifications outlined in the *CLP Statement of Work (CLP-SOW) for Inorganic Analysis, rev. ILM04.1*. The comments presented herein are based on the information provided for the review.

1.0 Timeliness -

The technical (40 CFR part 136) holding time from the date of collection for cyanide in water is 14 days. The holding time for mercury in water is 28 days. The holding time for the remaining

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metals in water is 180 days. The samples were collected between 07/30/01 and 08/01/01. ICP-AES analyses were completed on 08/16/01. Mercury analyses were completed on 08/10/01. Cyanide analyses were completed on 08/15/01.

All analyses were conducted within the technical water holding times, with the exception of the cyanide analyses for most soil/sediment samples. Samples MJ0C21 and MJ0C22 were analyzed within the cyanide holding time. The cyanide distillations (conducted 8/14/01) for some soil/sediment samples were within the analysis holding time while the distillations for others were 1 day outside the analysis holding time. Since the cyanide results were already qualified 'J' due to low matrix spike recovery, no further action was taken based on just missing the holding time.

Note that the laboratory did meet the contractual holding time of cyanide analysis within 12 days of verified time of sample receipt.

2.0 Sample Preparation - Acceptable

The samples were prepared for mercury analyses on 08/08/01. The samples were prepared for ICP-AES analyses on 08/10/01. The samples were prepared for cyanide analyses on 08/14/01. No qualification was made based on sample preparation.

3.0 Calibrations/Calibration Verifications - Acceptable

The samples were analyzed for mercury by CVAAS on 08/10/01. The initial calibration included one blank and six standards. The curve was linear with a correlation coefficient greater than 0.995.

The samples were analyzed by ICP-AES on 08/16/01. The instrument was standardized the day of analysis according to the analytical method using one blank and a single calibration standard for each element.

The samples were analyzed for cyanide colorimetrically on 08/15/01. The initial calibration included one blank and five standards. The curve was linear with a correlation coefficient greater than 0.995.

All ICP-AES, colorimetric (cyanide) and CVAAS (mercury) calibrations were performed as required and met the acceptance criteria; therefore, no qualification was made on this basis.

Calibration verification samples are required before and after sample analysis and after every 10 samples during analysis. Cyanide recoveries must be between 85-115%. Mercury recoveries must be within 80-120%. Other metal recoveries must be within 90-110%.

All ICP-AES, colorimetric (cyanide) and CVAAS (mercury) calibration verification (initial and continuing) samples bracketing reported sample results met the frequency and recovery criteria; therefore no

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qualification was made based on ICP-AES, colorimetric, or CVAAS calibration verification.

4.0 Laboratory Control Samples - Acceptable

Laboratory Control samples (LCS) are digested and analyzed along with the samples to verify the efficiency of laboratory procedures (LCS analyses are not required for mercury in water). All recoveries associated with reported sample results met the acceptance criteria for control samples, therefore no qualification was made based on LCS results.

5.0 Blanks -

Procedural blanks were prepared with the samples to show potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified if the analyte concentration was less than five times the analytical value in the blank.

Potassium was detected in the water and soil/sediment preparation blanks. Aluminum and magnesium in the soil/sediment preparation blank had negative results with absolute values greater than the detection limits. Aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, iron, lead, magnesium, manganese, potassium, silver, and thallium were detected in one or more continuing calibration blanks (CCBs). Aluminum and magnesium in several CCBs associated had negative results with absolute values greater than the detection limit.

Based on blank contamination, the following qualifications were made:

- ♦ aluminum in water samples MJ0C19 and MJ0C20 was qualified 'UJ', estimated detection limit
- ♦ barium in water sample MJ0C19 was qualified 'U', undetected
- ♦ beryllium in water sample MJ0C19 was qualified 'U', undetected
- ♦ cadmium in soil/sediment samples MJ0C02, MJ0C04, MJ0C05, MJ0C08 through MJ0C10, MJ0C13 through MJ0C15, and MJ0C22 was qualified 'U', undetected
- ♦ calcium in water samples MJ0C19 and MJ0C20 was qualified 'U', undetected
- ♦ iron in water samples MJ0C19 and MJ0C20 was qualified 'U', undetected
- ♦ magnesium in water samples MJ0C19 and MJ0C20 was qualified 'UJ', estimated detection limit

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- ♦ manganese in water samples MJ0C19 and MJ0C20 was qualified 'U', undetected
- ♦ silver in water sample MJ0C19 was qualified 'U', undetected
- ♦ thallium in water sample MJ0C20 and soil/sediment sample MJ0C05 was qualified 'U', undetected

The remaining sample results were greater than five times the associated blank levels (or were already undetected) and were not qualified on this basis.

6.0 ICP-AES Interference Check Sample - Acceptable

The interference check sample (ICS) is analyzed by ICP-AES to verify interelement and background correction factors. Analysis is required at the beginning and end of each sample analysis run and recoveries must be between 80% and 120%. All ICS recoveries associated with reported sample results were within the recovery criterion.

None of the samples had interfering levels of elements, therefore no qualification was made on this basis.

7.0 Duplicate Analysis -

Duplicate analysis was done on soil/sediment sample MJ0C12. Soil/sediment duplicate results were within the $\pm 35\%$ Relative Percent Difference (RPD) or $\pm 2 \times \text{CRDL}$ criteria for soil/sediment results < 5 times the CRDL criteria, with the exception of arsenic (54%RPD), calcium (73%RPD), lead (123%RPD), magnesium (93%RPD), and manganese (62%RPD). Arsenic, calcium, lead, magnesium, and manganese in soil/sediment samples was qualified 'J', estimated (unknown bias).

Laboratory '*' qualifiers were removed from soil/sediment copper and iron results as the laboratory used the stricter water criteria to qualify soil/sediment results.

The water samples were blanks, therefore duplicate analysis for water was not needed and no qualification was made to water results based on the soil/sediment duplicate analysis.

8.0 Matrix Spike Analysis -

Matrix spike sample analyses are done to provide information about the effect of the sample matrix on digestion and measurement methods. Matrix spike recovery must be within the limits of 75 - 125%.

Matrix spike analysis was done on soil/sediment sample MJ0C12. All soil/sediment matrix spike recoveries were within the required QC limits; with the exception of cyanide (70%R) and zinc (143%R). All cyanide soil/sediment results were qualified 'J', estimated (low bias

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suspected). Detected soil/sediment zinc results were qualified 'J', estimated (high bias suspected).

The water samples were blanks, therefore matrix spike analysis for water was not needed and no qualification was made to water results based on the soil/sediment matrix spike analysis.

9.0 ICP-AES Serial Dilution -

Sample MJ0C12 was analyzed by ICP-AES serial dilution to check for potential interferences. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) were within the 10%D criteria; with the exception of copper (90%D). All soil/sediment copper results were qualified 'J', estimated (unknown bias).

The water samples were blanks, therefore serial dilution analysis for water was not needed and no qualification was made to water results based on the soil/sediment serial dilution analysis.

10.0 Detection Limits - Acceptable

Sample results which fall below the instrument detection limit (IDL) are assigned the value of the instrument detection limit and the 'U' qualifier is attached.

Contract Required Detection Limit (CRDL) standards are required for most analytes to demonstrate a linear calibration curve near the CRDL. CRDL standards were run at the required frequency.

11.0 Overall Assessment of the Data

This validation of the data is based on the criteria outlined in the *National Functional Guidelines for Inorganic Data Review (02/94)*.

The sample cooler temperature upon receipt was 6°C. According to the sample receipt log book, all applicable pHs were within specific guidelines. Properly preserved water metals samples (pH<2) do not require cooling (40 CFR 136.2, Table II). In the reviewer's judgement, it is unlikely that the slightly elevated temperature for soil/sediment would cause appreciable loss of metals or cyanide, therefore no action was taken based on the slightly elevated cooler temperature.

There were 460 data points reported: 25 results were estimated/undetected due to blank contamination; 36 results were estimated due to matrix spike recovery; 90 results were qualified due to duplicate precision; and 28 results were estimated due to serial dilution. Overall, 36.7 percent of the data was qualified.

Note that the Computer Assisted Data Review Expert (CADRE) software uses results of field QC samples as blanks in order to qualify any

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field sample results in the same SDG that are less than five times any detected analytes in the field QC sample(s). For this SDG, the electronic data may have extra qualifiers on a few chromium results and most of the sodium results that may or may not be necessary. Data users will need to determine what if any qualification is necessary for all applicable sample results due to detects in the rinseate blanks.

Below are the definitions for the National Functional Guidelines for Inorganic Data Review (02/94) qualifiers used when validating/qualifying data from Inorganic analysis.

DATA QUALIFIERS

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

At the request of the site assessment manager, bias for the data was qualitatively assessed and if applicable, the following additional qualifiers were applied:

- L - Low bias.
- H - High bias.
- K - Unknown Bias.

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1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C02

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40112S

Level (low/med): LOW

Date Received: 08/04/01

Solids: 81.6

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6470			P
7440-36-0	Antimony	1.7	B		P
7440-38-2	Arsenic	50.8		*JK	P
7440-39-3	Barium	37.8	B		P
7440-41-7	Beryllium	0.40	B		P
7440-43-9	Cadmium	0.32	B	U	P
7440-70-2	Calcium	15600		*JK	P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	4.6	B		P
7440-50-8	Copper	12.9		*E JK	P
7439-89-6	Iron	15500		*	P
7439-92-1	Lead	30.6		*JK	P
7439-95-4	Magnesium	10700		*JK	P
7439-96-5	Manganese	343		*JK	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	9.9			P
7440-09-7	Potassium	1120	B		P
7782-49-2	Selenium	0.83	U		P
7440-22-4	Silver	0.89	B		P
7440-23-5	Sodium	161	B		P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	8.0	B		P
7440-66-6	Zinc	183		*JH	P
	Cyanide	0.07	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C03

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40113S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 73.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6120	-		P
7440-36-0	Antimony	6.3	B		P
7440-38-2	Arsenic	530		* JK	P
7440-39-3	Barium	46.8	B		P
7440-41-7	Beryllium	0.37	B		P
7440-43-9	Cadmium	1.8			P
7440-70-2	Calcium	35200		* JK	P
7440-47-3	Chromium	8.6			P
7440-48-4	Cobalt	4.4	B		P
7440-50-8	Copper	15.2		* EJK	P
7439-89-6	Iron	14600		*	P
7439-92-1	Lead	79.9		* JK	P
7439-95-4	Magnesium	18600		* JK	P
7439-96-5	Manganese	347		* JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	9.8	B		P
7440-09-7	Potassium	1070	B		P
7782-49-2	Selenium	0.92	U		P
7440-22-4	Silver	4.2			P
7440-23-5	Sodium	191	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	8.1	B		P
7440-66-6	Zinc	594		* JH	P
	Cyanide	0.08	U	* JL	CA

Arriba

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C04

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40114S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 81.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4240	—		P
7440-36-0	Antimony	2.3	B		P
7440-38-2	Arsenic	78.6		*JK	P
7440-39-3	Barium	41.2	B		P
7440-41-7	Beryllium	0.28	B		P
7440-43-9	Cadmium	0.34	B	4	P
7440-70-2	Calcium	7380		*JK	P
7440-47-3	Chromium	5.0			P
7440-48-4	Cobalt	3.5	B		P
7440-50-8	Copper	14.2		*EJK	P
7439-89-6	Iron	10500		*	P
7439-92-1	Lead	32.5		*JK	P
7439-95-4	Magnesium	5690		*JK	P
7439-96-5	Manganese	528		*JK	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	6.6	B		P
7440-09-7	Potassium	927	B		P
7782-49-2	Selenium	0.83	U		P
7440-22-4	Silver	1.4	B		P
7440-23-5	Sodium	149	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	5.1	B		P
7440-66-6	Zinc	147		*JH	P
	Cyanide	0.07	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C05

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40115S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 81.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6430	—		P
7440-36-0	Antimony	2.5	B		P
7440-38-2	Arsenic	81.4		*JK	P
7440-39-3	Barium	42.7	B		P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	0.30	B	U	P
7440-70-2	Calcium	14800		*JK	P
7440-47-3	Chromium	9.7			P
7440-48-4	Cobalt	4.1	B		P
7440-50-8	Copper	14.4		*EJK	P
7439-89-6	Iron	14100		*	P
7439-92-1	Lead	39.8		*JK	P
7439-95-4	Magnesium	7940		*JK	P
7439-96-5	Manganese	460		*JK	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	10.1			P
7440-09-7	Potassium	1080	B		P
7782-49-2	Selenium	0.83	U		P
7440-22-4	Silver	1.2	B		P
7440-23-5	Sodium	168	B		P
7440-28-0	Thallium	1.5	B	U	P
7440-62-2	Vanadium	7.9	B		P
7440-66-6	Zinc	185		*JH	P
	Cyanide	0.07	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C06

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40116S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 69.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5990	—		P
7440-36-0	Antimony	4.5	B		P
7440-38-2	Arsenic	148		*JK	P
7440-39-3	Barium	54.6	B		P
7440-41-7	Beryllium	0.42	B		P
7440-43-9	Cadmium	0.67	B		P
7440-70-2	Calcium	17300		*JK	P
7440-47-3	Chromium	7.9			P
7440-48-4	Cobalt	4.6	B		P
7440-50-8	Copper	22.0		*EJK	P
7439-89-6	Iron	14700		±	P
7439-92-1	Lead	60.4		± JK	P
7439-95-4	Magnesium	10100		*JK	P
7439-96-5	Manganese	611		± JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	10.9	B		P
7440-09-7	Potassium	1020	B		P
7782-49-2	Selenium	0.96	U		P
7440-22-4	Silver	2.8	B		P
7440-23-5	Sodium	190	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	8.2	B		P
7440-66-6	Zinc	271		*JH	P
	Cyanide	0.09	U	*JL	CA

JAC 07/26/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C07

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40117S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 69.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6490	-		P
7440-36-0	Antimony	4.8	B		P
7440-38-2	Arsenic	120		*JK	P
7440-39-3	Barium	55.0	B		P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	0.57	B		P
7440-70-2	Calcium	16300		*JK	P
7440-47-3	Chromium	8.1			P
7440-48-4	Cobalt	4.7	B		P
7440-50-8	Copper	19.8		*EJK	P
7439-89-6	Iron	13700		*	P
7439-92-1	Lead	70.0		*JK	P
7439-95-4	Magnesium	10800		*JK	P
7439-96-5	Manganese	556		*JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	10.8	B		P
7440-09-7	Potassium	1090	B		P
7782-49-2	Selenium	0.97	U		P
7440-22-4	Silver	3.9			P
7440-23-5	Sodium	143	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	8.3	B		P
7440-66-6	Zinc	262		*JH	P
	Cyanide	0.09	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C08

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40118S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 59.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4540	—		P
7440-36-0	Antimony	2.8	B		P
7440-38-2	Arsenic	68.5		*JK	P
7440-39-3	Barium	43.0	B		P
7440-41-7	Beryllium	0.32	B		P
7440-43-9	Cadmium	0.24	B	U	P
7440-70-2	Calcium	7690		*JK	P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt	3.6	B		P
7440-50-8	Copper	17.1		*EJK	P
7439-89-6	Iron	11100		*	P
7439-92-1	Lead	24.9		*JK	P
7439-95-4	Magnesium	6760		*OK	P
7439-96-5	Manganese	282		*JK	P
7439-97-6	Mercury	0.08	U		CV
7440-02-0	Nickel	11.5	B		P
7440-09-7	Potassium	906	B		P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	0.87	B		P
7440-23-5	Sodium	243	B		P
7440-28-0	Thallium	1.7	U		P
7440-62-2	Vanadium	6.2	B		P
7440-66-6	Zinc	164		*JH	P
	Cyanide	0.10	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C09

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40119S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 82.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5690			P
7440-36-0	Antimony	1.3	B		P
7440-38-2	Arsenic	29.6		*JK	P
7440-39-3	Barium	40.8	B		P
7440-41-7	Beryllium	0.34	B		P
7440-43-9	Cadmium	0.15	B	u	P
7440-70-2	Calcium	19700		*JK	P
7440-47-3	Chromium	6.8			P
7440-48-4	Cobalt	4.1	B		P
7440-50-8	Copper	10.5		*E JK	P
7439-89-6	Iron	12100		*	P
7439-92-1	Lead	22.0		*JK	P
7439-95-4	Magnesium	14700		*JK	P
7439-96-5	Manganese	252		*JK	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	8.9	B		P
7440-09-7	Potassium	1050	B		P
7782-49-2	Selenium	0.81	U		P
7440-22-4	Silver	0.85	B		P
7440-23-5	Sodium	189	B		P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	6.7	B		P
7440-66-6	Zinc	176		*JH	P
	Cyanide	0.07	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C10

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40120S

Level (low/med): LOW

Date Received: 08/04/01

Solids: 71.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5820			P
7440-36-0	Antimony	5.0	B		P
7440-38-2	Arsenic	143		*JK	P
7440-39-3	Barium	47.4	B		P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	0.35	B	U	P
7440-70-2	Calcium	16100		*JK	P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	4.6	B		P
7440-50-8	Copper	17.8		*EJK	P
7439-89-6	Iron	14400		*	P
7439-92-1	Lead	65.1		*JK	P
7439-95-4	Magnesium	9640		*JK	P
7439-96-5	Manganese	396		*JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	10.2	B		P
7440-09-7	Potassium	1040	B		P
7782-49-2	Selenium	0.93	U		P
7440-22-4	Silver	2.1	B		P
7440-23-5	Sodium	174	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	8.0	B		P
7440-66-6	Zinc	255		*JN	P
	Cyanide	0.08	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C11

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40121S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 56.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9520			P
7440-36-0	Antimony	5.6	B		P
7440-38-2	Arsenic	204		*JK	P
7440-39-3	Barium	98.2			P
7440-41-7	Beryllium	0.56	B		P
7440-43-9	Cadmium	0.93	B		P
7440-70-2	Calcium	17700		*JK	P
7440-47-3	Chromium	11.6			P
7440-48-4	Cobalt	6.8	B		P
7440-50-8	Copper	28.0		*EJK	P
7439-89-6	Iron	17800		*	P
7439-92-1	Lead	112		*JK	P
7439-95-4	Magnesium	10400		*JK	P
7439-96-5	Manganese	567		*JK	P
7439-97-6	Mercury	0.08	U		CV
7440-02-0	Nickel	15.1			P
7440-09-7	Potassium	1330	B		P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	4.8			P
7440-23-5	Sodium	281	B		P
7440-28-0	Thallium	1.8	U		P
7440-62-2	Vanadium	12.0	B		P
7440-66-6	Zinc	383		*JN	P
	Cyanide	0.10	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C12

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40122S

Level (low/med): LOW

Date Received: 08/04/01

Solids: 86.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5150	-		P
7440-36-0	Antimony	4.5	B		P
7440-38-2	Arsenic	39.4		*JK	P
7440-39-3	Barium	70.6			P
7440-41-7	Beryllium	0.40	B		P
7440-43-9	Cadmium	0.53	B		P
7440-70-2	Calcium	8980		*JK	P
7440-47-3	Chromium	5.7			P
7440-48-4	Cobalt	3.8	B		P
7440-50-8	Copper	14.3		*EJK	P
7439-89-6	Iron	16400		*	P
7439-92-1	Lead	70.1		*JK	P
7439-95-4	Magnesium	6060		*JK	P
7439-96-5	Manganese	591		*JK	P
7439-97-6	Mercury	0.07	B		CV
7440-02-0	Nickel	7.9	B		P
7440-09-7	Potassium	1290			P
7782-49-2	Selenium	0.79	U		P
7440-22-4	Silver	0.98	B		P
7440-23-5	Sodium	179	B		P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	6.3	B		P
7440-66-6	Zinc	153		*JH	P
	Cyanide	0.07	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C13

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40123S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 74.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10900	-		P
7440-36-0	Antimony	2.8	B		P
7440-38-2	Arsenic	79.2		*JK	P
7440-39-3	Barium	67.2			P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	0.27	B	U	P
7440-70-2	Calcium	14500		*JK	P
7440-47-3	Chromium	10.8			P
7440-48-4	Cobalt	4.7	B		P
7440-50-8	Copper	12.9		*EJK	P
7439-89-6	Iron	21100		±	P
7439-92-1	Lead	37.0		*JK	P
7439-95-4	Magnesium	16900		*JK	P
7439-96-5	Manganese	411		*JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	13.7			P
7440-09-7	Potassium	1100	B		P
7782-49-2	Selenium	0.90	U		P
7440-22-4	Silver	1.6	B		P
7440-23-5	Sodium	173	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	10.3	B		P
7440-66-6	Zinc	309		*JH	P
	Cyanide	0.08	U	*JL	CA

Mc 8/22/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C14

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40124S

Level (low/med): LOW

Date Received: 08/04/01

Solids: 76.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7430	-		P
7440-36-0	Antimony	3.2	B		P
7440-38-2	Arsenic	106		*JK	P
7440-39-3	Barium	42.8	B		P
7440-41-7	Beryllium	0.46	B		P
7440-43-9	Cadmium	0.22	B	4	P
7440-70-2	Calcium	17900		*JK	P
7440-47-3	Chromium	8.6			P
7440-48-4	Cobalt	6.4	B		P
7440-50-8	Copper	12.0		*EJK	P
7439-89-6	Iron	16400		*	P
7439-92-1	Lead	30.8		*JK	P
7439-95-4	Magnesium	14900		*JK	P
7439-96-5	Manganese	258		*JK	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	11.5			P
7440-09-7	Potassium	1280	B		P
7782-49-2	Selenium	0.89	U		P
7440-22-4	Silver	1.7	B		P
7440-23-5	Sodium	191	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	8.4	B		P
7440-66-6	Zinc	196		#JH	P
	Cyanide	0.08	U	#JL	CA

JTC 8/26/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

MJ0C15

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40125S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 67.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7170	-		P
7440-36-0	Antimony	2.7	B		P
7440-38-2	Arsenic	125		*JK	P
7440-39-3	Barium	68.2			P
7440-41-7	Beryllium	0.43	B		P
7440-43-9	Cadmium	0.35	B	4	P
7440-70-2	Calcium	21400		*JK	P
7440-47-3	Chromium	10.0			P
7440-48-4	Cobalt	10.6	B		P
7440-50-8	Copper	18.7		*EJK	P
7439-89-6	Iron	17000		*	P
7439-92-1	Lead	46.1		*JK	P
7439-95-4	Magnesium	12000		*JK	P
7439-96-5	Manganese	669		*JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	13.0			P
7440-09-7	Potassium	1250	B		P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	1.7	B		P
7440-23-5	Sodium	227	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	9.6	B		P
7440-66-6	Zinc	218		*JK	P
	Cyanide	0.09	U	*5L	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C16

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40126S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 68.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6490	—		P
7440-36-0	Antimony	4.3	B		P
7440-38-2	Arsenic	142		*JK	P
7440-39-3	Barium	44.7	B		P
7440-41-7	Beryllium	0.42	B		P
7440-43-9	Cadmium	0.67	B		P
7440-70-2	Calcium	6390		*JK	P
7440-47-3	Chromium	7.9			P
7440-48-4	Cobalt	5.1	B		P
7440-50-8	Copper	19.4		*PJK	P
7439-89-6	Iron	15200		*	P
7439-92-1	Lead	60.8		*JK	P
7439-95-4	Magnesium	6740		*JK	P
7439-96-5	Manganese	598		*JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	11.6	B		P
7440-09-7	Potassium	1020	B		P
7782-49-2	Selenium	0.99	U		P
7440-22-4	Silver	2.3	B		P
7440-23-5	Sodium	187	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	8.3	B		P
7440-66-6	Zinc	261		*JH	P
	Cyanide	0.09	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C17

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40127S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 67.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6920			P
7440-36-0	Antimony	10.2	B		P
7440-38-2	Arsenic	46.4		*JK	P
7440-39-3	Barium	42.8	B		P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	1.2	B		P
7440-70-2	Calcium	7280		*JK	P
7440-47-3	Chromium	8.1			P
7440-48-4	Cobalt	4.7	B		P
7440-50-8	Copper	20.1		*EJK	P
7439-89-6	Iron	15100		*	P
7439-92-1	Lead	48.4		*JK	P
7439-95-4	Magnesium	6170		*JK	P
7439-96-5	Manganese	560		*JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	10.4	B		P
7440-09-7	Potassium	1160	B		P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	5.3			P
7440-23-5	Sodium	161	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	7.7	B		P
7440-66-6	Zinc	426		*JN	P
	Cyanide	0.09	U	*JL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C19

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): WATER

Lab Sample ID: 40128S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	140	B	UJK	P
7440-36-0	Antimony	2.9	U		P
7440-38-2	Arsenic	4.6	U		P
7440-39-3	Barium	1.3	B	U	P
7440-41-7	Beryllium	0.18	B	U	P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	219	B	U	P
7440-47-3	Chromium	5.4	B		P
7440-48-4	Cobalt	1.1	U		P
7440-50-8	Copper	1.1	B		P
7439-89-6	Iron	70.3	B	U	P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	19.3	B	UJK	P
7439-96-5	Manganese	2.3	B	U	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.6	B		P
7440-09-7	Potassium	189	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	0.38	B	U	P
7440-23-5	Sodium	596	B		P
7440-28-0	Thallium	5.1	U		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	5.5	B		P
	Cyanide				NR

APC 08/26/01

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FB

U.S. EPA - CLP

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0C20

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): WATER

Lab Sample ID: 40129S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	105	B	UJK	P
7440-36-0	Antimony	2.9	U		P
7440-38-2	Arsenic	4.6	U		P
7440-39-3	Barium	0.70	U		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.20	U		P
7440-70-2	Calcium	105	B	U	P
7440-47-3	Chromium	0.40	U		P
7440-48-4	Cobalt	1.1	U		P
7440-50-8	Copper	0.90	U		P
7439-89-6	Iron	14.6	B	U	P
7439-92-1	Lead	1.8	U		P
7439-95-4	Magnesium	13.5	U	Jk	P
7439-96-5	Manganese	0.71	B	U	P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.6	U		P
7440-09-7	Potassium	192	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	494	B		P
7440-28-0	Thallium	5.3	B	U	P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	6.6	B		P
	Cyanide				NR

Color Before: COLORLESS

Clarity Before: CLEAR

Texture:

Color After: COLORLESS

Clarity After: CLEAR

Artifacts:

Comments:

FB

INORGANIC ANALYSIS DATA SHEET

MJ0C21

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40130S

Level (low/med): LOW

Date Received: 08/04/01

Solids: 70.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7550	-		P
7440-36-0	Antimony	1.6	B		P
7440-38-2	Arsenic	27.9		*JK	P
7440-39-3	Barium	55.3	B		P
7440-41-7	Beryllium	0.71	B		P
7440-43-9	Cadmium	0.06	U		P
7440-70-2	Calcium	1530		*JK	P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt	6.2	B		P
7440-50-8	Copper	14.6		*BJK	P
7439-89-6	Iron	22200		*	P
7439-92-1	Lead	11.2		*JK	P
7439-95-4	Magnesium	3300		*JK	P
7439-96-5	Manganese	332		*JK	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	13.2			P
7440-09-7	Potassium	1050	B		P
7782-49-2	Selenium	0.96	U		P
7440-22-4	Silver	0.98	B		P
7440-23-5	Sodium	184	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	10.7	B		P
7440-66-6	Zinc	40.5		*JH	P
	Cyanide	0.09	U	*JL	CA

JL 08/06/01

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0C22

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Matrix (soil/water): SOIL

Lab Sample ID: 40131S

Level (low/med): LOW

Date Received: 08/04/01

% Solids: 79.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3640			P
7440-36-0	Antimony	0.98	B		P
7440-38-2	Arsenic	15.3		*JK	P
7440-39-3	Barium	27.9	B		P
7440-41-7	Beryllium	0.28	B		P
7440-43-9	Cadmium	0.28	B	4	P
7440-70-2	Calcium	736	B	*JK	P
7440-47-3	Chromium	3.6			P
7440-48-4	Cobalt	2.2	B		P
7440-50-8	Copper	14.2		*EJK	P
7439-89-6	Iron	10400		*	P
7439-92-1	Lead	5.6		*JK	P
7439-95-4	Magnesium	2130		*JK	P
7439-96-5	Manganese	157		*JK	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	5.5	B		P
7440-09-7	Potassium	709	B		P
7782-49-2	Selenium	0.85	U		P
7440-22-4	Silver	0.47	B		P
7440-23-5	Sodium	155	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	4.5	B		P
7440-66-6	Zinc	33.0		*JH	P
	Cyanide	0.08	U	NJL	CA

Color Before: BROWN

Clarity Before:

Texture: MEDIUM

Color After: YELLOW

Clarity After:

Artifacts:

Comments:

U.S. EPA - CLP

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

ICP ID Number:

P4

Date: 07/15/01

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	17.7	P
Antimony	206.80		60	2.9	P
Arsenic	189.00		10	4.6	P
Barium	493.40		200	0.7	P
Beryllium	313.00		5	0.1	P
Cadmium	226.50		5	0.2	P
Calcium	317.90		5000	40.4	P
Chromium	267.70		10	0.4	P
Cobalt	228.60		50	1.1	P
Copper	324.70		25	0.9	P
Iron	271.40		100	9.8	P
Lead	220.30		3	1.8	P
Magnesium	279.00		5000	13.5	P
Manganese	257.60		15	0.3	P
Mercury			0.2		NR
Nickel	231.60		40	1.6	P
Potassium	766.40		5000	9.7	P
Selenium	196.00		5	3.4	P
Silver	328.00		10	0.3	P
Sodium	330.20		5000	114.2	P
Thallium	190.80		10	5.1	P
Vanadium	292.40		50	0.7	P
Zinc	206.20		20	0.9	P
Cyanide			10		NR

Comments:

P4: THERMO JARRELL ASH

U.S. EPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

ICP ID Number:

Date: 07/15/01

Flame AA ID Number: C5

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	253.70		200	0.1	NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide			10		NR

Comments:

C5: CETAC M6000

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

ICP ID Number:

Date: 07/15/01

Flame AA ID Number: C1

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide	578.00		10	1.2	CA

Comments:

C1: LACHAT

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PREPARATION LOG

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Method: P

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS	08/10/01	1.00	200
LCSW	08/10/01		100
MJ0C02	08/10/01	1.00	200
MJ0C03	08/10/01	1.00	200
MJ0C04	08/10/01	1.00	200
MJ0C05	08/10/01	1.01	200
MJ0C06	08/10/01	1.01	200
MJ0C07	08/10/01	1.01	200
MJ0C08	08/10/01	1.01	200
MJ0C09	08/10/01	1.02	200
MJ0C10	08/10/01	1.02	200
MJ0C11	08/10/01	1.00	200
MJ0C12	08/10/01	1.00	200
MJ0C12D	08/10/01	1.00	200
MJ0C12S	08/10/01	1.00	200
MJ0C13	08/10/01	1.01	200
MJ0C14	08/10/01	1.00	200
MJ0C15	08/10/01	1.00	200
MJ0C16	08/10/01	1.00	200
MJ0C17	08/10/01	1.00	200
MJ0C19	08/10/01		100
MJ0C20	08/10/01		100
MJ0C21	08/10/01	1.01	200
MJ0C22	08/10/01	1.01	200
PBS	08/10/01	1.00	200
PBW	08/10/01		100

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

of pages ▶ 6

To <i>Sonia Fernandez</i>	From <i>Laura Costelli</i>
Dept /Agency	Phone #
Fax #	Fax #

NSN 7540-01-317-7368

5099-101

GENERAL SERVICES ADMINISTRATION

ILM04.1

54

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: Sentinel, Inc.

Contract: 68-W-00-085

Lab Code: SENTIN

Case No.: 29571

SAS No.:

SDG No.: MJ0C02

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS	08/08/01	0.20	100
MJ0C02	08/08/01	0.20	100
MJ0C03	08/08/01	0.20	100
MJ0C04	08/08/01	0.22	100
MJ0C05	08/08/01	0.22	100
MJ0C06	08/08/01	0.22	100
MJ0C07	08/08/01	0.22	100
MJ0C08	08/08/01	0.22	100
MJ0C09	08/08/01	0.22	100
MJ0C10	08/08/01	0.21	100
MJ0C11	08/08/01	0.22	100
MJ0C12	08/08/01	0.20	100
MJ0C12D	08/08/01	0.20	100
MJ0C12S	08/08/01	0.20	100
MJ0C13	08/08/01	0.20	100
MJ0C14	08/08/01	0.21	100
MJ0C15	08/08/01	0.21	100
MJ0C16	08/08/01	0.21	100
MJ0C17	08/08/01	0.21	100
MJ0C19	08/08/01		100
MJ0C20	08/08/01		100
MJ0C21	08/08/01	0.22	100
MJ0C22	08/08/01	0.20	100
PBS	08/08/01	0.20	100
PBW	08/08/01		100

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PREPARATION LOG

Method: CA

[illegible]

APPENDIX C
SAMPLE ALTERATION FORMS

SAMPLE PLAN ALTERATION FORM

Project Name and Number: Gold Creek Shoshone Silver Mill PA/SI - TDD 01-01-0029

Material to be sampled: Surface Sediment

Measurement Parameter: TAL metals and cyanide

Standard Procedure for Field collection and Laboratory Analysis (cite references):

NA

Reason for change in Field Procedure or Analytical Variance:

Sampling locations moved from proposed locations due to accessibility issues in the field.

Variance from Field or Analytical Procedure:

Sampling locations were moved due to steep slopes and lack of physical access to the proposed locations
⇒ Locations altered CS002, CS003, CS005, CS006 & CS007

Special Equipment, Materials, or Personnel Required:

NA

Initiators Name: Sonia Fernández - Site Leader Date: 7/31/01 to 8/4/01

Project Approval: Deborah Leblang - Task Manager Date: 8/1/01

QA Officer/Reviewer: NA Date: _____

SAMPLE PLAN ALTERATION FORM

Project Name and Number: Gold Creek Shoshone Silver Mill PA/SI TDD-01-01-0039

Material to be sampled: Surface Sediment

Measurement Parameter: TAL metals, cyanide

Standard Procedure for Field collection and Laboratory Analysis (cite references):

NA

Reason for change in Field Procedure or Analytical Variance:

Sampling locations for background samples SD-BK001, SD-BK003, And SD-BK004 were moved from proposed locations due to access issues (steep slopes, no access) and to move away from adits found during field effort.

Variance from Field or Analytical Procedure:

Moved location of samples to accessible areas within the PA/SI parameters/requirements.

Special Equipment, Materials, or Personnel Required:

NA

Initiators Name: Sonia Fernandez Date: 8/2-4/01

Project Approval: Deborah Leblang Date: 8/11/01

QA Officer/Reviewer: _____ Date: _____

SAMPLE PLAN ALTERATION FORM

Project Name and Number: Gold Creek Shoshone Silver Mill PA/SI

Material to be sampled: VARIOUS

Measurement Parameter: TAL metals, cyanide

Standard Procedure for Field collection and Laboratory Analysis (cite references):
NA

Reason for change in Field Procedure or Analytical Variance:
Additional potential sources were identified during the field effort.

Variance from Field or Analytical Procedure:
Collected additional samples of newly identified sources.

Special Equipment, Materials, or Personnel Required: .

Initiators Name: Sonia Fernandez Date: 8/3/01 - 8/4/01

Project Approval: Deborah Leblanc Date: 8/1/01

QA Officer/Reviewer: NA Date: _____

SAMPLE PLAN ALTERATION FORM

Project Name and Number: Gold Creek Shoshone Silver Mill PA/SI TDD 01-01-0039

Material to be sampled: Surface water and surface soil.

Measurement Parameter: TAL metals and cyanide

Standard Procedure for Field collection and Laboratory Analysis (cite references):

NA

Reason for change in Field Procedure or Analytical Variance:

The outfall mentioned in the IGS video was not identified upon field inspection - Does not exist.

Variance from Field or Analytical Procedure:

Omitted these proposed samples for the out fall - Middle PPE ⇒ surface water and surface soil.

Special Equipment, Materials, or Personnel Required:

NA

Initiators Name: Sonia Fernandez Date: 8/3/01

Project Approval: Deborah Leblanc Date: 8/1/01

QA Officer/Reviewer: NA Date: _____