154135

INORGANIC DATA VALIDATION REPORT

1.0 INTRODUCTION

REF 15f

Site:	Sauget Area 1
Laboratory:	Ecology and Environment, Inc.
Validation:	PRC Environmental Management, Inc.
Review Date:	May 1993
Case Number:	U-4474
Sample Numbers:	DC-SS-24 through DC-SS-44 and DC-SS-46 through DC-SS-48
Analyses:	Target Analyte List (TAL) Metals and Cyanide
Collection Dates:	November 11 through November 13, 1986

The data for these 24 samples were reviewed according to the EPA document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses" (July 1988). Data sheets (Form I) with appropriate data validation qualifiers are provided in Appendix A. The justifications for qualification of sample results are discussed in the following section.

2.0 DATA REVIEW REQUIREMENTS

The quality control (QC) criteria reviewed include data completeness, holding times, calibrations, blanks, interference check sample (ICS) results, laboratory control sample (LCS) results, duplicate sample results, matrix spike sample results, furnace QC, and sample results verification. The criteria are discussed below.

2.1 DATA COMPLETENESS

The laboratory failed to complete the appropriate report form for the analysis of the ICS; however, the raw data were reviewed, and the results are within acceptable QC limits.

2.2 HOLDING TIMES

All holding time requirements were met.

2.3 CALIBRATIONS

All calibrations are acceptable and meet QC requirements for initial and continuing calibration checks.

2.4 BLANKS

All blank results are less than the contract required detection limit (CRDL) and therefore do not indicate any presence of contamination.

2.5 INTERFERENCE CHECK SAMPLES

The ICSs analyzed by inductively coupled plasma (ICP) generally meet the QC requirements. The laboratory failed to report the results on the appropriate form; however, the raw data were reviewed, and the results are within acceptable limits.

2.6 LABORATORY CONTROL SAMPLES

The LCSs prepared and analyzed with the sample batch are within acceptable QC limits.

2.7 DUPLICATE SAMPLE ANALYSIS

The arsenic, chromium, and nickel laboratory duplicate sample results are above the acceptable QC limit for precision. All positive arsenic, chromium, and nickel results for all samples in this case are considered estimated and qualified "J." A bias cannot be determined.

The laboratory indicated in its cover letter dated January 29, 1987 that "The samples were course in texture and contain chunks of material, some colored brown, white, red, orange, or black. Every attempt was made to take a 'representative' one gram sample (0.2 grams for Hg). However, this is next to impossible with a sample of this nature." The heterogenous nature of the samples is evident in the duplicate sample results.

2.8 MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike percent recoveries (%R) for cadmium (150 %R), chromium (60 %R), manganese (182 %R), and silver (58 %R) are outside the acceptable QC limits of 75 to 125 %R. Since a high bias is indicated for cadmium and manganese, all positive results for these analytes are considered estimated and qualified "J." The undetected results for cadmium and manganese are acceptable. Since a low bias is indicated for chromium and silver, all results both positive and undetected are considered estimated and qualified "J" or "UJ," respectively.

2.9 FURNACE ATOMIC ABSORPTION QC

To determine the extent of matrix interference in graphite furnace analyses, a post-digestion spike (PDS) was analyzed for each sample. Initially, the sample digest was analyzed, followed by a second analysis to which a known amount of analyte was added. The %R of the spike indicates the extent of matrix interference and bias. The following samples have PDS recoveries less than the lower QC limit of 85 %R.

Analyte	Samples
Arsenic	DC-SS-41, DC-SS-42, and DC-SS-43
Selenium	DC-SS-31
Thallium	DC-SS-32, DC-SS-34, and DC-SS-41

The results for the analytes and sample numbers listed above are considered estimated and qualified "UJ." The sample results are biased low.

2.10 SAMPLE RESULT VERIFICATION

The sample results for lead are greater than five times the instrument detection limit for ICP; therefore, the laboratory analyzed the lead using ICP instead of graphite furnace. The data are acceptable.

3.0 OVERALL ASSESSMENT

Generally, the data are acceptable Level IV data with the exceptions noted in Section 2.0. The data are qualified due to matrix interference, possibly caused by high organic content. This matrix interference may contribute to biased data. The qualified data are biased as indicated in Sections 2.8 and 2.9 and may be used for scoring.

APPENDIX A

CORRECTED FORMS I

CASE NUMBER U-4474

Form I

Sample No.
DC-SS-24

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9790 QC REPORT NO.

Elements Identified and Measured

Concentration: Low ____ Medium ____

Matrix: Water ____ Soil X Sludge ____ Other ____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	4470	P	13.	Magnesium	NR	
2.	Antimony	16 U	P	14.	Manganese	184 R *	P J
3.	Arsenic	39 *	F J	15.	Mercury	1.02	CV
4.	Barium	6320	P	16.	Nickel	105 *	P J
5.	Beryllium	1.3 U	P	17.	Potassium	NR	
6.	Cadmium	17 R *	P J	18.	Selenium	1.4 U	F
7.	Calcium	NR		19.	Silver	3.7 R *	P J
8.	Chromium	41 R *	P J	20.	Sodium	NR	
9.	Cobalt	13 U	P	21.	Thallium	2.7 U	F
10.	Copper	1480	P	22.	Tin	11 U	F
11.	Iron	26800 *	P	23.	Vanadium	64	P
12.	Lead	418 *	P	24.	Zinc	32200	P

Cyanide 1.3 Percent Solids (%) 77

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Lohrbach

Form I

Sample No.
DC-SS-25

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9791 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	5720	P	13.	Magnesium	NR	
2.	Antimony	17 U	P	14.	Manganese	204 R *	P J
3.	Arsenic	24 *	F J	15.	Mercury	1.13	CV
4.	Barium	2220	P	16.	Nickel	135 *	P J
5.	Beryllium	1.4 U	P	17.	Potassium	NR	
6.	Cadmium	20 R *	P J	18.	Selenium	1.4 U	F
7.	Calcium	NR		19.	Silver	3.4 R *	P J
8.	Chromium	50 R *	P J	20.	Sodium	NR	
9.	Cobalt	[5.0]	P	21.	Thallium	2.8U	F
10.	Copper	1900	P	22.	Tin	16	F
11.	Iron	29200 *	P	23.	Vanadium	75	P
12.	Lead	437 *	P	24.	Zinc	41400	P

Cyanide 1.70 Percent Solids (%) 69

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-26

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9792 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	16300	P	13.	Magnesium	NR	
2.	Antimony	15 U	P	14.	Manganese	326 R *	P J
3.	Arsenic	11 *	F J	15.	Mercury	1.6	CV
4.	Barium	3190	P	16.	Nickel	60 *	P J
5.	Beryllium	1.2 U	P	17.	Potassium	NR	
6.	Cadmium	21 R *	P J	18.	Selenium	1.2 U	F
7.	Calcium	NR		19.	Silver	3.5 R *	P J
8.	Chromium	137 R *	P J	20.	Sodium	NR	
9.	Cobalt	[6.3]	P	21.	Thallium	2.4 U	F
10.	Copper	1620	P	22.	Tin	9.8 U	F
11.	Iron	33900 *	P	23.	Vanadium	108	P
12.	Lead	580 *	P	24.	Zinc	4660	P
Cyanide		1.3	U	Percent Solids (%)		79	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-27

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9793 QC REPORT NO.

Elements Identified and Measured

Concentration: Low ____ Medium ____

Matrix: Water ____ Soil X Sludge ____ Other ____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	5040	P	13.	Magnesium	NR	
2.	Antimony	15 U	P	14.	Manganese	259 R*	P J
3.	Arsenic	10 *	F J	15.	Mercury	26	CV
4.	Barium	1460	P	16.	Nickel	34 *	P J
5.	Beryllium	1.2 U	P	17.	Potassium	NR	
6.	Cadmium	27 R*	P J	18.	Selenium	1.3 U	F
7.	Calcium	NR		19.	Silver	2.5 U R*	P U J
8.	Chromium	22 R*	P J	20.	Sodium	NR	
9.	Cobalt	[5.2]	P	21.	Thallium	2.5 U	F
10.	Copper	648	P	22.	Tin	10 U	F
11.	Iron	28700 *	P	23.	Vanadium	59	P
12.	Lead	440 *	P	24.	Zinc	4520	P
Cyanide		1.3	U	Percent Solids (%)		78	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rotstein

Form I

Sample No.
DC-SS-28

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9794 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	14900	P	13.	Magnesium	NR	
2.	Antimony	14 U	P	14.	Manganese	247 R *	P J
3.	Arsenic	11 *	F J	15.	Mercury	3.0	CV
4.	Barium	1000	P	16.	Nickel	86 *	P J
5.	Beryllium	1.4	P	17.	Potassium	NR	
6.	Cadmium	5.2 R *	P J	18.	Selenium	1.2 U	F
7.	Calcium	NR		19.	Silver	2.3 U R *	P UJ
8.	Chromium	92 R *	P J	20.	Sodium	NR	
9.	Cobalt	[3.9]	P	21.	Thallium	2.4 U	F
10.	Copper	4880	P	22.	Tin	43	F
11.	Iron	35600 *	P	23.	Vanadium	75	P
12.	Lead	873 *	P	24.	Zinc	3280	P
	Cyanide	2.5			Percent Solids (%)	84	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohstael

Form I

Sample No.
DC-SS-29

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9795 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	19500	P	13.	Magnesium	NR	
2.	Antimony	21 U	P	14.	Manganese	75 R *	P J
3.	Arsenic	10 *	F J	15.	Mercury	0.66	CV
4.	Barium	3760	P	16.	Nickel	111 *	P J
5.	Beryllium	1.8 U	P	17.	Potassium	NR	
6.	Cadmium	8.0 R *	P J	18.	Selenium	1.8 U	F
7.	Calcium	NR		19.	Silver	3.5 U R *	P UJ
8.	Chromium	12 R *	P J	20.	Sodium	NR	
9.	Cobalt	[18]	P	21.	Thallium	3.5 U	F
10.	Copper	489	P	22.	Tin	14 U	F
11.	Iron	12500 *	P	23.	Vanadium	11	P
12.	Lead	279 *	P	24.	Zinc	3080	P
	Cyanide	1.8	U		Percent Solids (%)	56	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-30

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9796 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	2890	P	13.	Magnesium	NR	
2.	Antimony	17 U	P	14.	Manganese	238 R *	P J
3.	Arsenic	84 *	F J	15.	Mercury	23	CV
4.	Barium	1430	P	16.	Nickel	52 *	P J
5.	Beryllium	1.4 U	P	17.	Potassium	NR	
6.	Cadmium	11 R *	P J	18.	Selenium	1.4 U	F
7.	Calcium	NR		19.	Silver	3.6 R *	P J
8.	Chromium	28 R *	P J	20.	Sodium	NR	
9.	Cobalt	[3.3]	P	21.	Thallium	2.9 U	F
10.	Copper	852	P	22.	Tin	12	F
11.	Iron	34000 *	P	23.	Vanadium	284	P
12.	Lead	304 *	P	24.	Zinc	67800	P
Cyanide		2.9 +	U	Percent Solids (%)		69	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.
+: Elevated detection limit due to matrix interference.

Lab Manager Bruce H Rotenberg

Form I

Sample No.
DC-SS-31

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9797 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	4790	P	13.	Magnesium	NR	
2.	Antimony	18 U	P	14.	Manganese	408 R *	P J
3.	Arsenic	74 *	F J	15.	Mercury	18	CV
4.	Barium	1250	P	16.	Nickel	35 *	P J
5.	Beryllium	1.5 U	P	17.	Potassium	NR	
6.	Cadmium	8.7 R *	P J	18.	Selenium	1.5 U	F UJ
7.	Calcium	NR		19.	Silver	3.0 U R *	P UJ
8.	Chromium	29 R *	P J	20.	Sodium	NR	
9.	Cobalt	15 U	P	21.	Thallium	3.0 U	F
10.	Copper	624	P	22.	Tin	14	F
11.	Iron	82900 *	P	23.	Vanadium	632	P
12.	Lead	232 *	P	24.	Zinc	20600	P
Cyanide		1.6	U	Percent Solids (%)		64	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rotenberg

Form I

Sample No.
DC-SS-32

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9798 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	12700	P	13.	Magnesium	NR	
2.	Antimony	16 U	P	14.	Manganese	191 R *	P J
3.	Arsenic	8.6 *	F J	15.	Mercury	0.91	CV
4.	Barium	1390	P	16.	Nickel	29 *	P J
5.	Beryllium	1.3 U	P	17.	Potassium	NR	
6.	Cadmium	8.1 R *	P J	18.	Selenium	1.3 U	F
7.	Calcium	NR		19.	Silver	5.4 R *	P J
8.	Chromium	21 R *	P J	20.	Sodium	NR	
9.	Cobalt	[4.0]	P	21.	Thallium	2.7 U	F UJ
10.	Copper	1420	P	22.	Tin	11 U	F
11.	Iron	17500 *	P	23.	Vanadium	30	P
12.	Lead	1270 *	P	24.	Zinc	1890	P
Cyanide		1.3	U	Percent Solids (%)		75	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H. Pohstael

Form I

Sample No.
DC-SS-33

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9799 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	14300	P	13.	Magnesium	NR	
2.	Antimony	19	P	14.	Manganese	43 R *	P J
3.	Arsenic	16 *	F J	15.	Mercury	0.90	CV
4.	Barium	1340	P	16.	Nickel	12 U *	P
5.	Beryllium	1.4 U	P	17.	Potassium	NR	
6.	Cadmium	5.2 R *	P J	18.	Selenium	1.4 U	F
7.	Calcium	NR		19.	Silver	4.1 R *	P J
8.	Chromium	14 R *	P J	20.	Sodium	NR	
9.	Cobalt	14 U	P	21.	Thallium	2.9 U	F
10.	Copper	596	P	22.	Tin	12 U	F
11.	Iron	12400 *	P	23.	Vanadium	16	P
12.	Lead	417 *	P	24.	Zinc	44400	P
Cyanide		2.9 +	U	Percent Solids (%)		68	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.
+: Elevated detection limit due to matrix interference.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-34

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9800 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	5720	P	13.	Magnesium	NR	
2.	Antimony	16 U	P	14.	Manganese	119 R *	P J
3.	Arsenic	25 *	F J	15.	Mercury	2.0	CV
4.	Barium	9200	P	16.	Nickel	21 *	P J
5.	Beryllium	1.3 U	P	17.	Potassium	NR	
6.	Cadmium	6.5 R *	P J	18.	Selenium	1.3 U	F
7.	Calcium	NR		19.	Silver	2.6 U R *	P UJ
8.	Chromium	24 R *	P J	20.	Sodium	NR	
9.	Cobalt	[12]	P	21.	Thallium	2.7 U	F UJ
10.	Copper	435	P	22.	Tin	11 U	F
11.	Iron	16400 *	P	23.	Vanadium	112	P
12.	Lead	318 *	P	24.	Zinc	12000	P
	Cyanide	2.0			Percent Solids (%)	76	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rotobach

Form I.

Sample No.
DC-SS-35

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9801 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	2830		P	13.	Magnesium	NR		
2.	Antimony	14	U	P	14.	Manganese	102	R * P	J
3.	Arsenic	16	*	F J	15.	Mercury	2.2	CV	
4.	Barium	533		P	16.	Nickel	15	* P	J
5.	Beryllium	1.2	U	P	17.	Potassium	NR		
6.	Cadmium	4.3	R *	P J	18.	Selenium	1.1	U F	
7.	Calcium	NR			19.	Silver	2.4	U R * P	UJ
8.	Chromium	28	R *	P J	20.	Sodium	NR		
9.	Cobalt	[2.4]		P	21.	Thallium	2.3	U F	
10.	Copper	317		P	22.	Tin	9.1	U F	
11.	Iron	23400	*	P	23.	Vanadium	39	P	
12.	Lead	205	*	P	24.	Zinc	21700	P	
Cyanide		22			Percent Solids (%)		87		

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-36

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9802 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	6370		P	13.	Magnesium	NR		
2.	Antimony	17	U	P	14.	Manganese	243	R*	P J
3.	Arsenic	4.6	*	F J	15.	Mercury	4.5		CV
4.	Barium	1750		P	16.	Nickel	95	*	P J
5.	Beryllium	1.4	U	P	17.	Potassium	NR		
6.	Cadmium	15	R *	P J	18.	Selenium	1.9		F
7.	Calcium	NR			19.	Silver	8.9	R*	P J
8.	Chromium	49	R *	P J	20.	Sodium	NR		
9.	Cobalt	[9.7]		P	21.	Thallium	2.6	U	F
10.	Copper	5500		P	22.	Tin	14		F
11.	Iron	28400	*	P	23.	Vanadium	132		P
12.	Lead	689	*	P	24.	Zinc	4980		P
	Cyanide	1.4		U		Percent Solids (%)	73		

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-37

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9803 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	4560	P	13.	Magnesium	NR	
2.	Antimony	16 U	P	14.	Manganese	746 R *	P J
3.	Arsenic	5.2 *	F J	15.	Mercury	2.6	CV
4.	Barium	3870	P	16.	Nickel	53 *	P J
5.	Beryllium	1.4 U	P	17.	Potassium	NR	
6.	Cadmium	26 R *	P J	18.	Selenium	4.1	F
7.	Calcium	NR		19.	Silver	8.0 R *	P J
8.	Chromium	45 R *	P J	20.	Sodium	NR	
9.	Cobalt	[5.9]	P	21.	Thallium	2.8 U	F
10.	Copper	2260	P	22.	Tin	18	F
11.	Iron	53900 *	P	23.	Vanadium	118	P
12.	Lead	724 *	P	24.	Zinc	4720	P

Cyanide 2.3 Percent Solids (%) 73

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Pohstrack

Form I

Sample No.
DC-SS-38

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9864 QC REPORT NO.

Elements Identified and Measured

Concentration: Low ____ Medium ____

Matrix: Water ____ Soil X Sludge ____ Other ____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	2630		P	13.	Magnesium	NR		
2.	Antimony	16	U	P	14.	Manganese	50	R * P J	
3.	Arsenic	4.1	*	F J	15.	Mercury	0.49	P	
4.	Barium	18300		P	16.	Nickel	35	* P J	
5.	Beryllium	1.4	U	P	17.	Potassium	NR		
6.	Cadmium	2.0	R *	P J	18.	Selenium	1.4 U	F	
7.	Calcium	NR			19.	Silver	2.7 U	R * P	U J
8.	Chromium	19	R *	P J	20.	Sodium	NR		
9.	Cobalt	[20]		P	21.	Thallium	2.8 U	F	
10.	Copper	327		P	22.	Tin	16	F	
11.	Iron	9780	*	P	23.	Vanadium	23	P	
12.	Lead	105	*	P	24.	Zinc	239	P	

Cyanide 1.4 Percent Solids (%) 73

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohstad

Form I

Sample No.
DC-SS-39

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9805 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	4890	P	13.	Magnesium	NR	
2.	Antimony	16	P	14.	Manganese	193 R *	P J
3.	Arsenic	17 *	F J	15.	Mercury	2.9	CV
4.	Barium	4480	P	16.	Nickel	159 *	P J
5.	Beryllium	1.3 U	P	17.	Potassium	NR	
6.	Cadmium	9.7 R *	P J	18.	Selenium	1.8	F
7.	Calcium	NR		19.	Silver	6.9 R *	P J
8.	Chromium	26 R *	P J	20.	Sodium	NR	
9.	Cobalt	[6.3]	P	21.	Thallium	2.6 U	F
10.	Copper	1090	P	22.	Tin	17	F
11.	Iron	22000 *	P	23.	Vanadium	120	P
12.	Lead	725 *	P	24.	Zinc	1660	P
	Cyanide	1.3	U		Percent Solids (%)	77	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-40

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9806 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	7640	P	13.	Magnesium	NR	
2.	Antimony	18	P	14.	Manganese	457 R *	P J
3.	Arsenic	18 *	F J	15.	Mercury	2.2	CV
4.	Barium	1940	P	16.	Nickel	70 *	P J
5.	Beryllium	1.2 U	P	17.	Potassium	NR	
6.	Cadmium	26 R *	P J	18.	Selenium	1.3	F
7.	Calcium	NR		19.	Silver	19 R *	P J
8.	Chromium	106 R *	P J	20.	Sodium	NR	
9.	Cobalt	[16]	P	21.	Thallium	2.4 U	F
10.	Copper	1660	P	22.	Tin	22	F
11.	Iron	75100 *	P	23.	Vanadium	33	P
12.	Lead	18400 *	P	24.	Zinc	6350	P
	Cyanide	13			Percent Solids (%)	83	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-41

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9807 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	10300	P	13.	Magnesium	NR	
2.	Antimony	18 U	P	14.	Manganese	77 R *	P J
3.	Arsenic	42 *	F J	15.	Mercury	1.2	CV
4.	Barium	5210	P	16.	Nickel	30 *	P J
5.	Beryllium	1.5 U	P	17.	Potassium	NR	
6.	Cadmium	8.1 R *	P J	18.	Selenium	1.5 U	F
7.	Calcium	NR		19.	Silver	3.9 R *	P J
8.	Chromium	20 R *	P J	20.	Sodium	NR	
9.	Cobalt	[4.6]	P	21.	Thallium	3.0 U	F UJ
10.	Copper	1510	P	22.	Tin	12 U	F
11.	Iron	15300 *	P	23.	Vanadium	17	P
12.	Lead	516 *	P	24.	Zinc	39000	P

Cyanide 1.8 Percent Solids (%) 66

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohobach

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Form I

Sample No.
DC-SS-42

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9808 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	5540	P	13.	Magnesium	NR	
2.	Antimony	15 U	P	14.	Manganese	331 R *	P J
3.	Arsenic	12 *	F J	15.	Mercury	2.8	CV
4.	Barium	1960	P	16.	Nickel	145 *	P J
5.	Beryllium	1.3 U	P	17.	Potassium	NR	
6.	Cadmium	13 R *	P J	18.	Selenium	1.4	F
7.	Calcium	NR		19.	Silver	2.8 R *	P J
8.	Chromium	21 R *	P J	20.	Sodium	NR	
9.	Cobalt	[10]	P	21.	Thallium	2.4 U	F
10.	Copper	1090	P	22.	Tin	10 U	F
11.	Iron	26500 *	P	23.	Vanadium	550	P
12.	Lead	411 *	P	24.	Zinc	2360	P

Cyanide 1.3 Percent Solids (%) 80

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Potsbacl

Form I

Sample No.
DC-SS-43

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9809 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	8960	P	13.	Magnesium	NR	
2.	Antimony	16 U	P	14.	Manganese	159 R *	P J
3.	Arsenic	8.2 *	F J	15.	Mercury	3.4	P
4.	Barium	360	P	16.	Nickel	27 *	P J
5.	Beryllium	1.3 U	P	17.	Potassium	NR	
6.	Cadmium	14 R *	P J	18.	Selenium	1.2 U	F
7.	Calcium	NR		19.	Silver	2.6 R *	P J
8.	Chromium	66 R *	P J	20.	Sodium	NR	
9.	Cobalt	[4.4]	P	21.	Thallium	2.4 U	F
10.	Copper	753	P	22.	Tin	10 U	F
11.	Iron	17700 *	P	23.	Vanadium	16	P
12.	Lead	326 *	P	24.	Zinc	1500	P
	Cyanide	1.3	U		Percent Solids (%)	78	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

Form I

Sample No.
DC-SS-44

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9810 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	7520	P	13.	Magnesium	NR	
2.	Antimony	16 U	P	14.	Manganese	336 R *	P J
3.	Arsenic	4.7 U *	F	15.	Mercury	0.12 U	CV
4.	Barium	441	P	16.	Nickel	15 *	P J
5.	Beryllium	1.3 U	P	17.	Potassium	NR	
6.	Cadmium	1.5 R *	P J	18.	Selenium	1.3 U	F
7.	Calcium	NR		19.	Silver	2.6 UR *	P UJ
8.	Chromium	11 R *	P J	20.	Sodium	NR	
9.	Cobalt	[4.1]	P	21.	Thallium	2.6 U	F
10.	Copper	33	P	22.	Tin	10 U	F
11.	Iron	13400 *	P	23.	Vanadium	19	P
12.	Lead	60 *	P	24.	Zinc	170	P
	Cyanide	1.3	U		Percent Solids (%)	77	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H. Rohrbach

Form I

Sample No.
DC-SS-46

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9811 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	4810 P	13.	Magnesium	NR
2.	Antimony	17 U P	14.	Manganese	627 R * P J
3.	Arsenic	5.3 * F J	15.	Mercury	0.41 CV
4.	Barium	346 P	16.	Nickel	59 * P J
5.	Beryllium	1.4 U P	17.	Potassium	NR
6.	Cadmium	2.3 R * P J	18.	Selenium	1.4 U F
7.	Calcium	NR	19.	Silver	2.8 U R * P UJ
8.	Chromium	123 R * P J	20.	Sodium	NR
9.	Cobalt	14 U P	21.	Thallium	2.8 U F
10.	Copper	135 P	22.	Tin	11 U F
11.	Iron	52500 * P	23.	Vanadium	14 U P
12.	Lead	34 * P	24.	Zinc	65 P
	Cyanide	1.4 U		Percent Solids (%)	72

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rohrbach

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Form I

Sample No.
DC-SS-47

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9812 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	630	P	13.	Magnesium	NR	
2.	Antimony	13 U	P	14.	Manganese	2180 R * P J	
3.	Arsenic	9.1 *	F J	15.	Mercury	0.09 U	CV
4.	Barium	25	P	16.	Nickel	350 * P J	
5.	Beryllium	1.1 U	P	17.	Potassium	NR	
6.	Cadmium	13 R *	P J	18.	Selenium	1.1 U	F
7.	Calcium	NR		19.	Silver	2.2 U R *	P UJ
8.	Chromium	690 R *	P J	20.	Sodium	NR	
9.	Cobalt	[19]	P	21.	Thallium	2.2 U	F
10.	Copper	614	P	22.	Tin	10 U	F
11.	Iron	243000 *	P	23.	Vanadium	11 U	P
12.	Lead	23 *	P	24.	Zinc	46	P
Cyanide		1.1	U	Percent Solids (%)		88	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: NR: Analysis not requested.

Lab Manager Bruce H Rotstein

Form I

Sample No.
DC-SS-48

Date 1/29/87

INORGANIC ANALYSIS DATA SHEET

LAB NAME Ecology and Environment, Inc. CASE NO. U-4474

SOW NO. 784

LAB SAMPLE ID. NO. 9813 QC REPORT NO. _____

Elements Identified and Measured

Concentration: Low _____ Medium _____

Matrix: Water _____ Soil X Sludge _____ Other _____

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	651	P	13.	Magnesium	NR	
2.	Antimony	13 U	P	14.	Manganese	1430 R * P J	
3.	Arsenic	6.4 *	F J	15.	Mercury	0.09 U	CV
4.	Barium	24	P	16.	Nickel	377 * P J	
5.	Beryllium	1.1 U	P	17.	Potassium	NR	
6.	Cadmium	9.9 R * P J		18.	Selenium	1.1 U	F
7.	Calcium	NR		19.	Silver	2.1 U R * P UJ	
8.	Chromium	500 R * P J		20.	Sodium	NR	
9.	Cobalt	[13]	P	21.	Thallium	2.2 U	F
10.	Copper	615	P	22.	Tin	10 U	F
11.	Iron	201000 *	P	23.	Vanadium	11 U	P
12.	Lead	30 *	P	24.	Zinc	34	P
Cyanide		1.1	U	Percent Solids (%)		91	

Footnotes: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: .NR: Analysis not requested.

Lab Manager: Bruce H Rohrbach