PASSF 1.7v1
9/13/85 TDD
HH52, II59

ecology and environment, inc.

108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537

International Specialists in the Environmental Sciences

MEMORANDUM

DATE: September 13, 1985

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: Roger McGinnis, Chemist, E&E, Seattle RMM
Andrew Hafferty, Senior Chemist, E&E, Seattle

THRU: David Buecker, FIT RPM, E&E, Seattle

SUBJ: QA of Case 4768 (Inorganics)
Resource Recovery WA 0280

REF: TDD R10-8507-01

CC: Gerald Muth, EPA, Manchester
Harold Takenaka, DPO, EPA, Region IX
Bill Ritthaler, E&E, Seattle

The Quality Assurance review of 26 samples, Case 4768, collected at Resource Recovery has been completed. The eight water samples and 18 soil samples were analyzed at low level for inorganics by California Analytical Laboratories, Inc. of West Sacramento, California. The samples were numbered:

MJA222	MJA216	MJA231
MJA223	MJA217	MJA232
MJA221	MJA218	MJA233
MJA227	MJA219	MJA212
MJA237	MJA224	MJA213
MJA210	MJA225	MJA236
MJA211	MJA228	MJA248
MJA214	MJA229	MJA249
MJA215	MJA230	

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA84A-266.

1) Timeliness - Acceptable

2) Initial Calibration - Acceptable

USEPA SF
1371154

3) Continuing Calibration - Acceptable

4) Blanks - Acceptable

5) Instrument Detection Limits - Acceptable

6) ICP Interference Check - Acceptable

7) Laboratory Control Sample - Acceptable

8) Duplicate Sample Analysis

Two out of 24 of the water matrix sample % RPDs were out of control.

Element	% RPD	QC Limit
Lead	34%	<20%
Vanadium	21%	<20%

9) Spiked Sample Analysis

Two out of 18 soil matrix sample % recoveries were out of control.

Element	% Recovery	QC Limit
Antimony	58%	75-125%
Selenium	30%	75-125%

Four out of 24 water matrix sample % recoveries were out of control.

Element	% Recovery	QC Limit
Antimony	56%	75-125%
Arsenic	65%	75-125%
Lead	15%	75-125%
Thallium	68%	75-125%

10) ICP Serial Dilution

No serial dilution was done for a soil matrix sample.

11) Furnace AA - Acceptable

12) Mercury Analysis - Acceptable

13) Samples

Results are reported on a dry weight basis for soil matrix samples. Antimony and selenium results for soil samples are flagged as estimated (J) based on low spike recoveries.

Vanadium results for water matrix samples are flagged as estimated (J) due to low duplicate analysis RPDs. Antimony, arsenic, and thallium results for water samples are flagged as estimated (J) based on low spike recoveries. Lead results for water samples are rejected (R) due to excessively low spike recovery.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" (R-582-5-5-01).

The data are ACCEPTABLE for use except where flagged with data qualifiers which modify the usefulness of the individual values.

Lead data for water samples are NOT usable.

Data Qualifiers

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated sample quantitation limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material (tentative identification).

E - The detection limit was elevated as a result of matrix interference.

RM:dk

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA222
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2742

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM
MATRIX: WATER: XX

ELEMENTS..METHOD	UG/L
1. ALUMINIUM...P	26390
2. ANTIMONY....P	12 U J
3. ARSENIC.....F	11.4 J
4. BARIUM.....P	773
5. BERYLLIUM...P	2.7
6. CADMIUM.....P	1.9 U
7. CALCIUM.....P	94780
8. CHROMIUM....P	72
9. COBALT.....P	38
10.COPPER.....P	62
11.IRON.....P	61640
12.LEAD.....F	33.6 R ~~16.5~~ TC
13.MAGNESIUM...P	31280
14.MANGANESE...P	1264
15.MERCURY....CV	0.3
16.NICKEL.....P	78
17.POTASSIUM...P	12880
18.SELENIUM....F	TC ~~0.1~~ 25 U
19.SILVER.....P	6.8
20.SODIUM.....P	32670
21.THALLIUM....F	10 U J
22.TIN.....P	18 U
23.VANADIUM....P	116.0 J
24.ZINC.....P	439
25.CYANIDE.....C	N/R

COMMENTS:

LAB MANAGER: JMC

RZM
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA223
DATE:8/29/85

2

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2743

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM
MATRIX: WATER: XX

ELEMENTS..METHOD	UG/L
1. ALUMINIUM...P	18320
2. ANTIMONY....P	12 U J
3. ARSENIC.....F	10 ~~0.1~~ UJ TC
4. BARIUM.....P	526
5. BERYLLIUM...P	2.1
6. CADMIUM.....P	1.9 U
7. CALCIUM.....P	80770
8. CHROMIUM....P	62
9. COBALT.....P	25
10.COPPER.....P	45
11.IRON.....P	39950
12.LEAD.....P	84 R
13.MAGNESIUM...P	29600
14.MANGANESE...P	887
15.MERCURY....CV	0.18 U
16.NICKEL.....P	46
17.POTASSIUM...P	9272
18,SELENIUM....F	TC ~~0.1~~ <25 U
19.SILVER.....P	6.4
20.SODIUM.....P	34140
21.THALLIUM....F	10 UJ
22.TIN.....P	18 U
23.VANADIUM....P	89.4 J
24.ZINC.....P	160
25.CYANIDE.....C	N/R

COMMENTS:

LAB MANAGER: TMC

RNM
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA221
DATE:8/29/85

INORGANCC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2766

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM
MATRIX: WATER: XX

ELEMENTS..METHOD	UG/L
1. ALUMINIUM...P	2413
2. ANTIMONY....P	12 U J
3. ARSENIC.....F	~~0.1~~ TC 10 UJ
4. BARIUM.....P	103
5. BERYLLIUM...P	0.50 U
6. CADMIUM.....P	1.9 U
7. CALCIUM.....P	57990
8. CHROMIUM....P	24
9. COBALT.....P	3.9 U
10.COPPER.....P	10
11.IRON.....P	4349
12.LEAD.....F	TC ~~0.1~~ 5 U R
13.MAGNESIUM...P	21880
14.MANGANESE...P	147
15.MERCURY....CV	0.18 U
16.NICKEL.....P	24
17.POTASSIUM...P	8561
18,SELENIUM....F	TC ~~0.1~~ 25 U
19.SILVER.....P	3.3 U
20.SODIUM.....P	35780
21.THALLIUM....F	10 UJ
22.TIN.....P	18 U
23.VANADIUM....P	15.9 J
24.ZINC.....P	289
25.CYANIDE.....C	N/R

COMMENTS:

LAB MANAGER:

KMM
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA227
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2767

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM
MATRIX: WATER: XX

ELEMENTS..METHOD	UG/L	
1. ALUMINIUM...P	22560	
2. ANTIMONY....P	16	J
3. ARSENIC.....F	TC ~~0.1~~	10 U J
4. BARIUM.....P	400	
5. BERYLLIUM...P	1.1	
6. CADMIUM.....P	2.7	
7. CALCIUM.....P	70920	
8. CHROMIUM....P	51	
9. COBALT.....P	32	
10.COPPER.....P	82	
11.IRON.....P	52150	
12.LEAD.....F	29.1	R
13.MAGNESIUM...P	29930	
14.MANGANESE...P	1488	
15.MERCURY....CV	0.18 U	
16.NICKEL.....P	50	
17.POTASSIUM...P	9989	
18,SELENIUM....F	TC ~~0.1~~	25 U
19.SILVER.....P	3.3 U	
20.SODIUM.....P	36130	
21.THALLIUM....F	1 0	U J
22.TIN.....P	18 U	
23.VANADIUM....P	111.3	J
24.ZINC.....P	297	
25.CYANIDE.....C	N/R	

COMMENTS:

LAB MANAGER: [illegible]

[illegible]
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA237
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM
MATRIX: WATER: XX

ELEMENTS..METHOD	UG/L
1. ALUMINIUM...P	9291
2. ANTIMONY....P	12 U J
3. ARSENIC.....F	TC ~~0.1~~ 10 UJ
4. BARIUM.....P	235
5. BERYLLIUM...P	0.50 U
6. CADMIUM.....P	1.9 U
7. CALCIUM.....P	65910
8. CHROMIUM....P	62
9. COBALT.....P	12
10.COPPER.....P	40
11.IRON.....P	21750
12.LEAD.....F	17.9 R
13.MAGNESIUM...P	24040
14.MANGANESE...P	709
15.MERCURY....CV	0.18 U
16.NICKEL.....P	46
17.POTASSIUM...P	8855
18,SELENIUM....F	TC ~~0.1~~ 25 U
19.SILVER.....P	3.3 U
20.SODIUM.....P	35220
21.THALLIUM....F	10 UJ
22.TIN.....P	18 U
23.VANADIUM....P	53.8 J
24.ZINC.....P	346
25.CYANIDE.....C	N/R

COMMENTS:

LAB MANAGER:

RNM
9/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA211
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2770

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	6686
2. ANTIMONY....P	10
3. ARSENIC.....F	3.2U
4. BARIUM.....P	101
5. BERYLLIUM...P	0.5
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	14123
8. CHROMIUM....P	10
9. COBALT.....P	13
10.COPPER.....P	11
11.IRON.....P	23483
12.LEAD.....F	4.5
13.MAGNESIUM...P	6210
14.MANGANESE...P	377
15.MERCURY....CV	0.1U
16.NICKEL.....P	8U
17.POTASSIUM...P	2465
18.SELENIUM....F	1.8U
19.SILVER.....P	3.2
20.SODIUM.....P	535
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	47.0
24.ZINC.....P	50
25.CYANIDE.....C	N/R
% SOLID	94.6

COMMENTS:

LAB MANAGER:

True

7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA214
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2771

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	7046
2. ANTIMONY....P	6U J
3. ARSENIC.....F	3.3U
4. BARIUM.....P	104
5. BERYLLIUM...P	0.5
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	11053
8. CHROMIUM....P	12
9. COBALT.....P	12
10.COPPER.....P	10
11.IRON.....P	20929
12.LEAD.....F	5.2
13.MAGNESIUM...P	6165
14.MANGANESE...P	398
15.MERCURY....CV	0.1U
16.NICKEL.....P	9U
17.POTASSIUM...P	2740
18.SELENIUM....F	1.9U J
19.SILVER.....P	3.5
20.SODIUM.....P	562
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	42.4
24.ZINC.....P	49
25.CYANIDE.....C	N/R
% SOLID	93.1

COMMENTS:

LAB MANAGER: Trc

RMM
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA215
DATE:8/29/85

8

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2772

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	6215
2. ANTIMONY....P	6U J
3. ARSENIC.....F	3.3U
4. BARIUM.....P	99
5. BERYLLIUM...P	0.5
6. CADMIUM.....P	1.1
7. CALCIUM.....P	10414
8. CHROMIUM....P	9
9. COBALT.....P	13
10.COPPER.....P	12
11.IRON.....P	23027
12.LEAD.....F	4.5
13.MAGNESIUM...P	5876
14.MANGANESE...P	422
15.MERCURY....CV	0.1U
16.NICKEL.....P	9U
17.POTASSIUM...P	2225
18.SELENIUM....F	1.9U J
19.SILVER.....P	2.8
20.SODIUM.....P	585
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	46.0
24.ZINC.....P	47
25.CYANIDE.....C	N/R
% SOLID	93

COMMENTS:

LAB MANAGER: TMC

7 n m
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA216
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2773

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	7087
2. ANTIMONY....P	7U J
3. ARSENIC.....F	3.3U
4. BARIUM.....P	652
5. BERYLLIUM...P	0.5
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	10603
8. CHROMIUM....P	11
9. COBALT.....P	12
10.COPPER.....P	12
11.IRON.....P	21375
12.LEAD.....F	4.7
13.MAGNESIUM...P	6283
14.MANGANESE...P	390
15.MERCURY....CV	0.6
16.NICKEL.....P	9U
17.POTASSIUM...P	2761
18.SELENIUM....F	1.9U J
19.SILVER.....P	3.3
20.SODIUM.....P	1406
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	43.6
24.ZINC.....P	49
25.CYANIDE.....C	N/R
% SOLID	92

COMMENTS:

LAB MANAGER: TMC

RMM
9/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA217
DATE:8/29/85

10

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2774

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	5785
2. ANTIMONY....P	6U J
3. ARSENIC.....F	3.3U
4. BARIUM.....P	111
5. BERYLLIUM...P	0.4
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	10081
8. CHROMIUM....P	8
9. COBALT.....P	13
10.COPPER.....P	11
11.IRON.....P	22263
12.LEAD.....F	4.4
13.MAGNESIUM...P	5543
14.MANGANESE...P	378
15.MERCURY....CV	0.2
16.NICKEL.....P	9U
17.POTASSIUM...P	2191
18.SELENIUM....F	1.9U J
19.SILVER.....P	2.2
20.SODIUM.....P	605
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	43.9
24.ZINC.....P	47
25.CYANIDE.....C	N/R
% SOLID	93

COMMENTS:

LAB MANAGER: TMC

7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA218
DATE:8/29/85

11

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2775

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	8332
2. ANTIMONY....P	4 J
3. ARSENIC.....F	0.0U
4. BARIUM.....P	106
5. BERYLLIUM...P	0.5 u
6. CADMIUM.....P	2.0 ~~0.0~~U
7. CALCIUM.....P	12054
8. CHROMIUM....P	12
9. COBALT.....P	13
10.COPPER.....P	12
11.IRON.....P	24587
12.LEAD.....F	6.3
13.MAGNESIUM...P	7076
14.MANGANESE...P	447
15.MERCURY....CV	0.2 ~~0.0~~ u
16.NICKEL.....P	9
17.POTASSIUM...P	2523
18.SELENIUM....F	4.0 ~~0.0~~U J
19.SILVER.....P	1.9
20.SODIUM.....P	835
21.THALLIUM....F	5.0 U
22.TIN.....P	10U
23.VANADIUM....P	48.8
24.ZINC.....P	68
25.CYANIDE.....C	N/R
% SOLID	92

COMMENTS:

LAB MANAGER: TMC

[illegible]
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA219
DATE:8/29/85

12

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2776

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	7457
2. ANTIMONY....P	7U J
3. ARSENIC.....F	3.3U
4. BARIUM.....P	104
5. BERYLLIUM...P	0.6
6. CADMIUM.....P	1.3
7. CALCIUM.....P	10995
8. CHROMIUM....P	10
9. COBALT.....P	15
10.COPPER.....P	11
11.IRON.....P	26310
12.LEAD.....F	4.3
13.MAGNESIUM...P	6043
14.MANGANESE...P	447
15.MERCURY....CV	0.1U
16.NICKEL.....P	9U
17.POTASSIUM...P	2507
18.SELENIUM....F	1.9U J
19.SILVER.....P	3.4
20.SODIUM.....P	669
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	56.8
24.ZINC.....P	56
25.CYANIDE.....C	N/R
% SOLID	92

COMMENTS:

LAB MANAGER: TMC

RMM
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA224
DATE:8/29/85

12

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2777

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	8712
2. ANTIMONY....P	8 J
3. ARSENIC.....F	3.3U
4. BARIUM.....P	103
5. BERYLLIUM...P	0.5
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	13000
8. CHROMIUM....P	12
9. COBALT.....P	13
10.COPPER.....P	17
11.IRON.....P	25832
12.LEAD.....F	9.7
13.MAGNESIUM...P	7223
14.MANGANESE...P	457
15.MERCURY....CV	0.1U
16.NICKEL.....P	11
17.POTASSIUM...P	2683
18.SELENIUM....F	9.5U J
19.SILVER.....P	2.5
20.SODIUM.....P	726
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	49.3
24.ZINC.....P	218
25.CYANIDE.....C	N/R
% SOLID	92

COMMENTS:

LAB MANAGER: TWC

7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA225
DATE:8/29/85

11

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2778

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	6140
2. ANTIMONY....P	6U J
3. ARSENIC.....F	3.3U
4. BARIUM.....P	112
5. BERYLLIUM...P	0.3
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	11285
8. CHROMIUM....P	8
9. COBALT.....P	11
10.COPPER.....P	14
11.IRON.....P	20780
12.LEAD.....F	3.8
13.MAGNESIUM...P	5769
14.MANGANESE...P	455
15.MERCURY....CV	0.1U
16.NICKEL.....P	9U
17.POTASSIUM...P	2515
18.SELENIUM....F	1.9U J
19.SILVER.....P	1.9
20.SODIUM.....P	605
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	35.7
24.ZINC.....P	59
25.CYANIDE.....C	N/R
% SOLID	93

COMMENTS:

LAB MANAGER: [signature]

[signature]
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA228
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2779

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	7692
2. ANTIMONY....P	7U J
3. ARSENIC.....F	3.4U
4. BARIUM.....P	114
5. BERYLLIUM...P	0.3U
6. CADMIUM.....P	1.4
7. CALCIUM.....P	11516
8. CHROMIUM....P	28
9. COBALT.....P	11
10.COPPER.....P	19
11.IRON.....P	22319
12.LEAD.....P	100
13.MAGNESIUM...P	6308
14.MANGANESE...P	407
15.MERCURY....CV	0.2
16.NICKEL.....P	9U
17.POTASSIUM...P	2491
18.SELENIUM....F	1.9U J
19.SILVER.....P	1.8U
20.SODIUM.....P	647
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	40.0
24.ZINC.....P	76
25.CYANIDE.....C	N/R
% SOLID	91

COMMENTS:

LAB MANAGER: TVC

7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA229
DATE:8/29/85

11

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2780

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	5346
2. ANTIMONY....P	6U J
3. ARSENIC.....F	3.2U
4. BARIUM.....P	92
5. BERYLLIUM...P	0.3
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	9899
8. CHROMIUM....P	7
9. COBALT.....P	13
10.COPPER.....P	12
11.IRON.....P	23074
12.LEAD.....F	6.2
13.MAGNESIUM...P	4753
14.MANGANESE...P	399
15.MERCURY....CV	0.1U
16.NICKEL.....P	9
17.POTASSIUM...P	1935
18.SELENIUM....F	1.9U J
19.SILVER.....P	1.8U
20.SODIUM.....P	580
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	45.0
24.ZINC.....P	45
25.CYANIDE.....C	N/R
% SOLID	94

COMMENTS:

LAB MANAGER: [illegible]

[illegible]
9/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA230
DATE:8/29/85

17

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2781

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	4831
2. ANTIMONY....P	6U J
3. ARSENIC.....F	3.2U
4. BARIUM.....P	88]
5. BERYLLIUM...P	0.3U
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	9354
8. CHROMIUM....P	4
9. COBALT.....P	12
10.COPPER.....P	13
11.IRON.....P	21375
12.LEAD.....F	3.6
13.MAGNESIUM...P	4524
14.MANGANESE...P	375
15.MERCURY....CV	0.1U
16.NICKEL.....P	8U
17.POTASSIUM...P	1711
18.SELENIUM....F	9.0U J
19.SILVER.....P	1.7U
20.SODIUM.....P	528
21.THALLIUM....F	2U
22.TIN.....P	9U
23.VANADIUM....P	42.3
24.ZINC.....P	42
25.CYANIDE.....C	N/R
% SOLID	96

COMMENTS:

LAB MANAGER: Tmc

RNM
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA231
DATE:8/29/85

1

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2782

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	8810
2. ANTIMONY....P	8U J
3. ARSENIC.....F	3.9U
4. BARIUM.....P	119
5. BERYLLIUM...P	0.6
6. CADMIUM.....P	1.2U
7. CALCIUM.....P	11785
8. CHROMIUM....P	12
9. COBALT.....P	14
10.COPPER.....P	12
11.IRON.....P	27462
12.LEAD.....F	5.8
13.MAGNESIUM...P	6943
14.MANGANESE...P	485
15.MERCURY....CV	0.1U
16.NICKEL.....P	10U
17.POTASSIUM...P	2942
18.SELENIUM....F	2.2U J
19.SILVER.....P	2.7
20.SODIUM.....P	665
21.THALLIUM....F	3U
22.TIN.....P	11U
23.VANADIUM....P	61.3
24.ZINC.....P	58
25.CYANIDE.....C	N/R
% SOLID	79

COMMENTS:

LAB MANAGER: Tue

Rnm
7/6/55

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA232
DATE:8/29/85

19

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2783

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	8934
2. ANTIMONY....P	7U J
3. ARSENIC.....F	7.1
4. BARIUM.....P	119
5. BERYLLIUM...P	0.6
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	15703
8. CHROMIUM....P	13
9. COBALT.....P	13
10.COPPER.....P	12
11.IRON.....P	24879
12.LEAD.....F	8.1
13.MAGNESIUM...P	8363
14.MANGANESE...P	486
15.MERCURY....CV	0.1U
16.NICKEL.....P	14
17.POTASSIUM...P	2929
18.SELENIUM....F	1.9U J
19.SILVER.....P	2.8
20.SODIUM.....P	725
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	45.9
24.ZINC.....P	59
25.CYANIDE.....C	N/R
% SOLID	91

COMMENTS:

LAB MANAGER: [illegible]

[illegible]
9/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA234
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2784

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	4671
2. ANTIMONY....P	6U J
3. ARSENIC.....F	3.2U
4. BARIUM.....P	79
5. BERYLLIUM...P	0.4
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	7616
8. CHROMIUM....P	6
9. COBALT.....P	11
10.COPPER.....P	10
11.IRON.....P	21489
12.LEAD.....F	2.9
13.MAGNESIUM...P	4523
14.MANGANESE...P	313
15.MERCURY....CV	0.1U
16.NICKEL.....P	8U
17.POTASSIUM...P	1888
18.SELENIUM....F	1.8U J
19.SILVER.....P	2.6
20.SODIUM.....P	591
21.THALLIUM....F	2U
22.TIN.....P	9U
23.VANADIUM....P	41.8
24.ZINC.....P	40
25.CYANIDE.....C	N/R
% SOLID	95

COMMENTS:

LAB MANAGER: TWC

RMM
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA212
DATE:8/29/85

21

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2785

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	6888
2. ANTIMONY....P	6U J
3. ARSENIC.....F	3.2U
4. BARIUM.....P	97
5. BERYLLIUM...P	0.5
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	8862
8. CHROMIUM....P	10
9. COBALT.....P	11
10.COPPER.....P	11
11.IRON.....P	20000
12.LEAD.....F	5.9
13.MAGNESIUM...P	5846
14.MANGANESE...P	411
15.MERCURY....CV	0.1U
16.NICKEL.....P	9U
17.POTASSIUM...P	2610
18.SELENIUM....F	1.9U J
19.SILVER.....P	2.6
20.SODIUM.....P	522
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	38.9
24.ZINC.....P	53
25.CYANIDE.....C	N/R
% SOLID	94

COMMENTS:

LAB MANAGER: [illegible]

[illegible]
9/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA213
DATE:8/29/85

22

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2786

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM:
MATRIX: SOIL: XX

ELEMENTS..METHOD	MG/KG DRY WEIGHT
1. ALUMINIUM...P	4728
2. ANTIMONY....P	8 J
3. ARSENIC.....F	3.3U
4. BARIUM.....P	81
5. BERYLLIUM...P	0.4
6. CADMIUM.....P	1.0U
7. CALCIUM.....P	8247
8. CHROMIUM....P	7
9. COBALT.....P	11
10.COPPER.....P	11
11.IRON.....P	21344
12.LEAD.....F	3.2
13.MAGNESIUM...P	4549
14.MANGANESE...P	345
15.MERCURY....CV	0.1U
16.NICKEL.....P	9U
17.POTASSIUM...P	1508
18.SELENIUM....F	1.9U J
19.SILVER.....P	2.3
20.SODIUM.....P	592
21.THALLIUM....F	2U
22.TIN.....P	10U
23.VANADIUM....P	40.5
24.ZINC.....P	43
25.CYANIDE.....C	N/R
% SOLID	93

COMMENTS:

LAB MANAGER: Tuc

7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA236
DATE:8/29/85

2.7

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2787

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM
MATRIX: WATER: XX

ELEMENTS..METHOD	UG/L
1. ALUMINIUM...P	124
2. ANTIMONY....P	12 U J
3. ARSENIC.....F	TC ~~0.1~~ <10 U J
4. BARIUM.....P	20 U
5. BERYLLIUM...P	0.50 U
6. CADMIUM.....P	1.9 U
7. CALCIUM.....P	430 U
8. CHROMIUM....P	3.7 U
9. COBALT.....P	3.9 U
10.COPPER.....P	1.7 U
11.IRON.....P	242
12.LEAD.....F	TC ~~0.1~~ 5 U R
13.MAGNESIUM...P	300 U
14.MANGANESE...P	5
15.MERCURY....CV	0.18 U
16.NICKEL.....P	16 U
17.POTASSIUM...P	787]
18,SELENIUM....F	TC ~~0.1~~ 5 U
19.SILVER.....P	3.3 U
20.SODIUM.....P	1474]
21.THALLIUM....F	10 U J
22.TIN.....P	18 U
23.VANADIUM....P	5.2 U J
24.ZINC.....P	14
25.CYANIDE.....C	N/R

COMMENTS:

LAB MANAGER: [illegible]

[illegible]
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA248
DATE:8/29/85

21

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB.
SOW NO.: 784
LAB.SAMPLE NO.: P2788

CASE NO:4768
QC RPT.#4768

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM
MATRIX: WATER: XX

ELEMENTS..METHOD	UG/L
1. ALUMINIUM...P	8983
2. ANTIMONY....P	12 UJ
3. ARSENIC.....F	TC ~~0.1~~ 10 UJ
4. BARIUM.....P	297
5. BERYLLIUM...P	0.50 U
6. CADMIUM.....P	1.9 U
7. CALCIUM.....P	101500
8. CHROMIUM....P	48
9. COBALT.....P	15
10.COPPER.....P	22
11.IRON.....P	27090
12.LEAD.....F	5.9 R
13.MAGNESIUM...P	27570
14.MANGANESE...P	2698
15.MERCURY....CV	0.18 U
16.NICKEL.....P	21
17.POTASSIUM...P	11690
18,SELENIUM....F	TC ~~0.1~~ 25 U
19.SILVER.....P	3.3 U
20.SODIUM.....P	31920
21.THALLIUM....F	10 UJ
22.TIN.....P	18 U
23.VANADIUM....P	46.4 J
24.ZINC.....P	75
25.CYANIDE.....C	N/R

COMMENTS:

LAB MANAGER: [illegible]

[illegible]
7/6/85

U.S. EPA CONTRACT LABORATORY PROGRAM
SAMPLE MANAGEMENT OFFICE
P.O. BOX 818 ALEXANDRIA,VA 22313
703/557-2490 FTS:8-557-2490

EPA SAMPLE NO:
MJA249
DATE:8/29/85

INORGANIC ANALYSIS SHEET

LAB NAME: CALIF.ANAL.LAB. CASE NO:4768
SOW NO.: 784 QC RPT.#4768
LAB.SAMPLE NO.: P2789

ELEMENTS IDENTIFIED AND MEASURED

CONC.: LOW: XX MEDIUM
MATRIX: WATER: XX

ELEMENTS..METHOD	UG/L	
1. ALUMINIUM...P	70420	
2. ANTIMONY....P	19	J
3. ARSENIC.....F	TC ~~0.1~~	10 U J
4. BARIUM.....P	1929	
5. BERYLLIUM...P	4.5	
6. CADMIUM.....P	2.3	
7. CALCIUM.....P	190000	
8. CHROMIUM....P	134	
9. COBALT.....P	102	
10.COPPER.....P	191	
11.IRON.....P	167600	
12.LEAD.....F	36.2	R
13.MAGNESIUM...P	64500	
14.MANGANESE...P	3631	
15.MERCURY....CV	0.2	
16.NICKEL.....P	131	
17.POTASSIUM...P	20700	
18,SELENIUM....F	TC ~~0.1~~	25 U
19.SILVER.....P	7.8	
20.SODIUM.....P	47580	
21.THALLIUM....F	<10	U J
22.TIN.....P	18	U
23.VANADIUM....P	281.9	J
24.ZINC.....P	443	
25.CYANIDE.....C	N/R	

COMMENTS:

LAB MANAGER: TMC

TMC
9/6/85