UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
HOUSTON BRANCH
6608 HORNWOOD DRIVE
HOUSTON, TEXAS 77074

Ref. Case No. 7770

Site Name South Cavalcade

Date: 10-9-87

Subject: CLP Data Review

From: Michael Daggett, Chief, Organic Lab Section; 6E-HL

To: Keith Bradley, Hazardous Waste Section; 6E-SH

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section. Samples were:

INORGANIC: MFC319
MFC320

ORGANIC:

The data was found:

(✓) Acceptable

( ) Provisional; use of data requires caution. Problems are noted in Review Summary.

( ) Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

1012324

cc: David Stockton, 6E-HL
Duane Geuder, WH-548A

004768

004768

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
HOUSTON BRANCH
6608 HORNWOOD DRIVE
HOUSTON, TEXAS 77074

INORGANIC QC CHECKLIST

Site: SOUTH CAVALCADE
Case No.: 7770
Reviewed by: M. EL-FEKY
Date: 10-3-87

Contract No.: 68-01-7068
Contractor: RMA
Matrix: WATER [LOW CONCENTRATION]
Acct #: TFA06MUS6 SF #: STFAJNA6

Sample No.: MFC-319
L-320 FB

004769

COMMENTS (To be completed by EPA Personnel)

1. Data Completeness	✓ Acceptable	___ Provisional	___ Unacceptable
2. Instrument Calibration Tune	✓ Acceptable	___ Provisional	___ Unacceptable
3. Interference Check Sample	✓ Acceptable	___ Provisional	___ Unacceptable
4. Blank Analysis	✓ Acceptable	___ Provisional	___ Unacceptable
5. Matrix Spikes	✓ Acceptable	___ Provisional	___ Unacceptable
6. Duplicates	✓ Acceptable	___ Provisional	___ Unacceptable
7. Field Blanks	✓ Acceptable	___ Provisional	___ Unacceptable
8. Other	___ Acceptable	___ Provisional	___ Unacceptable

ADDITIONAL COMMENTS

DATA PACKAGE IS ACCEPTABLE. ONE WATER SAMPLE AND ONE RINSATE BLANK, ANALYZED FOR TOTAL METALS. OVERALL QC DATA MET ALL CONTRACT REQUIREMENTS.

Acceptable - All items delivered; all criteria met
Provisional - Data usable; some non-essential review items missing or criteria were not met
Unacceptable - Data unusable; essential review items missing or criteria not met

000001

U.S. EPA Contract Laboratory Program
Sample Management Office
P.O. Box 818 - Alexandria, VA 22313
703/557-2490 FTS: 8-557-2490

Date 9-15-87

COVER PAGE
INORGANIC ANALYSIS DATA PACKAGE

Lab Name ROCKY MOUNTAIN ANALYTICAL
SOW No. 784

Case No. 7770
QC Report No. 87173

Sample Numbers

EPA No.	Lab ID No.	EPA No.	Lab ID No.
MFC319			
MFC319D			
MFC319S			
MFC320			
[MFC999]			

004770

Comments: 2 LOW WATERS FOR TOTAL METALS ANALYSIS
SERIAL DILUTION FOR SAMPLE MFC319 IS IDENTIFIED AS [MFC999]

ICP Interelement and background corrections applied? Yes ___ No ___.
If yes, corrections applied before___or after___generation of raw data.

Footnotes:

NR - not required by contract at this time
Form I:
Value - If the result is a value greater than or equal to the instrument detection limit but less than the contract required detection limit, report the value in brackets (i.e., [10]). Indicate the method used with P (for ICP/Flame AA) or F (for furnace).
U - Indicates element was analyzed for but not detected. Report with the detection limit value (e.g., 10U).
E - Indicates a value estimated or not reported due to the presence of interference. Explanatory note included on cover page.
S - Indicates value determined by Method of Standard Addition.
R - Indicates spike sample recovery is not within control limits.
X - Indicates duplicate analysis is not within control limits.
+ - Indicates the correlation coefficient for method of standard addition is Less than 0.995
CV - Indicates Cold Vapor
AS - Indicates Automated Spectrophotometric

Form I

U.S. EPA Contract Laboratory Program
Sample Management Office
209 Madison St - Alexandria, VA 22314
703/557-2490 FTS: 8-557-2490

EPA Sample No.
MFC319

Date 9-15-87

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL
SOW NO. 784
LAB SAMPLE ID. NO. -

CASE NO. 7770
QC REPORT NO. 87173

Elements Identified and Measured

Concentration: Low X Medium ____
Matrix: Water X Soil ____ Sludge ____ Other ____

UG/L

1.	ALUMINUM	[49]	P	13.	MAGNESIUM	14400	P
2.	ANTIMONY	25U	P	14.	MANGANESE	165	P
3.	ARSENIC	10U	F	15.	MERCURY	0.2U	CV
4.	BARIUM	[185]	P	16.	NICKEL	8U	P
5.	BERYLLIUM	1U	P	17.	POTASSIUM	[3270]	P
6.	CADMIUM	4U	P	18.	SELENIUM	5U	F R
7.	CALCIUM	53800	P	19.	SILVER	4U	P
8.	CHROMIUM	4U	P	20.	SODIUM	67200	P
9.	COBALT	9U	P	21.	THALLIUM	10U	F R
10.	COPPER	[8.1]	P	22.	TIN	22U	P
11.	IRON	[89]	P	23.	VANADIUM	7U	P
12.	LEAD	5U	F R	24.	ZINC	[14] ~~[151]~~ 110	P

Cyanide NR

Percent Solids (%)

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:

Lab Manager [illegible]

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Form I

U.S. EPA Contract Laboratory Program
Sample Management Office
209 Madison St. - Alexandria, VA 22314
703/557-2490 FTS: 8-557-2490

EPA Sample No.
MFC320

Date 9-15-87

INORGANIC ANALYSIS DATA SHEET

LAB NAME ROCKY MOUNTAIN ANALYTICAL
SOW NO. 784
LAB SAMPLE ID. NO. -

CASE NO. 7770
QC REPORT NO. 87173

Elements Identified and Measured

Concentration: Low X Medium ____
Matrix: Water X Soil ____ Sludge ____ Other ____

UG/L

1.	ALUMINUM	15U	P	13.	MAGNESIUM	6080	P
2.	ANTIMONY	25U	P	14.	MANGANESE	4U	P
3.	ARSENIC	10U	F	15.	MERCURY	0.2U	CV
4.	BARIUM	[53]	P	16.	NICKEL	8U	P
5.	BERYLLIUM	1U	P	17.	POTASSIUM	175U	P
6.	CADMIUM	4U	P	18.	SELENIUM	5U	F R
7.	CALCIUM	22500	P	19.	SILVER	4U	P
8.	CHROMIUM	4U	P	20.	SODIUM	[3720]	P
9.	COBALT	9U	P	21.	THALLIUM	10U	F R
10.	COPPER	[10]	P	22.	TIN	22U	P
11.	IRON	24U	P	23.	VANADIUM	7U	P
12.	LEAD	5U	F R	24.	ZINC	30	P

Cyanide NR Percent Solids (%) ____

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: Sample Is A Field Blank

Lab Manager [illegible]

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FORM II

000004

Q.C. Report No. 87173

INITIAL AND CONTINUING CALIBRATION VERIFICATION[3]

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 7770

SOW NO. 784

DATE 9-15-87

UNITS ug/L

Compound	Initial Calib.[1,5]			Continuing Calibration[2]					
Metals:	True Value	Found	%R	True Value	Found	%R	Found	%R	Method[4]
1. ALUMINUM	1980			1000	1000	100			P
2. ANTIMONY	1090			1000	1090	109			P
3. ARSENIC	49								
4. BARIUM	1980			1000	998	100			P
5. BERYLLIUM	481			1000	973	97			P
6. CADMIUM	489			1000	983	98			P
7. CALCIUM	49800			100000	100000	100			P
8. CHROMIUM	506			1000	1010	101			P
9. COBALT	474			1000	984	98			P
10. COPPER	542			1000	976	98			P
11. IRON	1990			1000	1030	103			P
12. LEAD	98								
13. MAGNESIUM	25000			100000	101000	101			P
14. MANGANESE	513			1000	983	98			P
15. MERCURY	1.0			1					CV
16. NICKEL	496			1000	984	98			P
17. POTASSIUM	50200			100000	102,000	102			P
18. SELENIUM	98			20					F
19. SILVER	509			1000	985	98			P
20. SODIUM	50700			100000	101000	101			P
21. THALLIUM	97			20					F
22. TIN	2000			1000	923	92			P
23. VANADIUM	511			1000	1000	100			P
24. ZINC	3100			1000	1020	102			P
Other:									F
									F
CYANIDE									AS

[1] Initial Calibration Source ICV-1&3 [2] Continuing Calibration Source J.T.

[3] Control Limits: Mercury and Tin 80-120; All Other Compounds 90-110

[4] Indicate Analytical Method Used: P - ICP/Flame AA; F - Furnace
CV - Cold Vapor AS - Automated Spectrophotometric

[5] Furnace Initial Calibration Source ICV 2&4

[6] Cyanide Initial Calibration Source ERA 9909

Form II

Q.C. Report No. 87173

INITIAL AND CONTINUING CALIBRATION VERIFICATION[3]

LAB NAME ROCKY MOUNTAIN ANALYTICAL

CASE NO. 7770

SOW NO. 784

DATE 9-15-87

UNITS ug/L

Compound Metals:	Initial Calib.[1,5] True Value	Found	%R	Continuing Calibration[2] True Value	Found	%R	Found	%R	Method[4]
1. ALUMINUM	1980	1980	100	1000	987	99			P
2. ANTIMONY	1010	1030	102	1000	1070	107			P
3. ARSENIC	49	49	100	20	~~44~~ 19	95	19	95	F
4. BARIUM	1980	1930	97	1000	968	97			P
5. BERYLLIUM	481	468	97	1000	941	94			P
6. CADMIUM	489	499	102	1000	964	96			P
7. CALCIUM	49800	50500	101	100000	97200	97			P
8. CHROMIUM	506	492	97	1000	978	98			P
9. COBALT	474	486	103	1000	963	96			P
10. COPPER	542	516	95	1000	940	94			P
11. IRON	1990	2020	102	1000	995	99			P
12. LEAD	98	104	106	20	21	105	21	105	F
13. MAGNESIUM	25000	25300	101	100000	98100	98			P
14. MANGANESE	513	508	99	1000	956	96			P
15. MERCURY	1.00	1.0	100	1.00	1.0	100			CV
16. NICKEL	496	487	98	1000	960	96			P
17. POTASSIUM	50200	52500	105	100000	93600	94			P
18. SELENIUM	98	~~53~~ 106	108	20	21	105	21	105	F
19. SILVER	509	495	97	1000	955	95			P
20. SODIUM	50700	51400	101	100000	96700	97			P
21. THALLIUM	97	104	107	20	20	100	21	105	F
22. TIN	2000	1970	98	1000	911	91			P
23. VANADIUM	511	507	99	1000	964	96			P
24. ZINC	3100	3030	98	1000	1000	100			P
Other:									
CYANIDE	58			100					AS

[1] Initial Calibration Source ICV-1&3 [2] Continuing Calibration Source FISH

[3] Control Limits: Mercury and Tin 80-120; All Other Compounds 90-110

[4] Indicate Analytical Method Used: P - ICP/Flame AA; F - Furnace
CV - Cold Vapor AS - Automated Spectrophotometric

[5] Furnace Initial Calibration Source ICV 2&4

[6] Cyanide Initial Calibration Source ERA 9909

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Form III

Q.C. Report No. 87173

BLANKS

LAB NAME ROCKY MOUNTAIN ANALYTICAL
DATE 9-15-87

CASE NO. 7770
UNITS ug/L

Matrix WATER

Preparation Compound	Initial Calibration Blank Value	Continuing Calibration Blank Value 1	2	3	4	Preparation Blank 1	2
Metals:							
1. ALUMINUM		15u					
2. ANTIMONY		25u					
3. ARSENIC		2uu					
4. BARIUM		3u					
5. BERYLLIUM		1u					
6. CADMIUM		4u					
7. CALCIUM		179u					
8. CHROMIUM		4u					
9. COBALT		9u					
10. COPPER		8u					
11. IRON		24u					
12. LEAD							
13. MAGNESIUM		153u					
14. MANGANESE		4u					
15. MERCURY							
16. NICKEL		9u					
17. POTASSIUM		175u					
18. SELENIUM							
19. SILVER		4u					
20. SODIUM		1090u					
21. THALLIUM							
22. TIN		22u					
23. VANADIUM		7u					
24. ZINC		3u					
Other:							
Cyanide							

Form III

Q.C. Report No. 87173

BLANKS

LAB NAME ROCKY MOUNTAIN ANALYTICAL
DATE 9-15-87

CASE NO. 7770
UNITS ug/L

Matrix WATER

Preparation Compound	Initial Calibration Blank Value	Continuing Calibration Blank Value 1	2	3	4	Preparation Blank 1	2
Metals:							
1. ALUMINUM	15U	15U				15U	
2. ANTIMONY	25U	[26]				25U	
3. ARSENIC	10u	10u	10u			10u	
4. BARIUM	3U	3U				3U	
5. BERYLLIUM	1U	1U				1U	
6. CADMIUM	4U	4U				4U	
7. CALCIUM	179U	179U				179U	
8. CHROMIUM	4U	4U				4U	
9. COBALT	9U	9U				9U	
10. COPPER	6U	6U				6U	
11. IRON	24U	24U				24U	
12. LEAD	5u	5u	5u			5u	
13. MAGNESIUM	153U	153U				153U	
14. MANGANESE	4U	4U				4U	
15. MERCURY	0.2u	0.2u				0.2u	
16. NICKEL	8U	8U				8U	
17. POTASSIUM	175U	175U				175U	
18. SELENIUM	5u	5u	5u			5u	
19. SILVER	4U	4U				4U	
20. SODIUM	1090U	1090U				1090U	
21. THALLIUM	10u	10u	10u			10u	
22. TIN	22U	22U				22U	
23. VANADIUM	7U	7U				7U	
24. ZINC	3U	3U				[11]	
Other:							
Cyanide							

004776

Form IV

Q.C. Report No. 87173

ICP INTERFERENCE CHECK SAMPLE

LAB NAME ROCKY MOUNTAIN ANALYTICAL

DATE 9-15-87

CASE NO 7770
Check Sample I.D. INT CHK
Check Sample Source EMSL-LV
Units mg/L

Compound	Control Limits[1] Mean	Control Limits[1] Std. Dev.	True[2]	Initial Observed	Initial %R	Final Observed	Final %R
Metals:							
1. ALUMINUM			508	476	94	478	94
2. ANTIMONY				0.025U		0.025U	
3. ARSENIC				0.031U		0.031U	
4. BARIUM			0.483	0.431	89	0.442	92
5. BERYLLIUM			0.474	0.433	91	0.438	92
6. CADMIUM			0.909	0.898	99	0.923	102
7. CALCIUM			516	474	92	475	92
8. CHROMIUM			0.513	0.476	93	0.485	95
9. COBALT			0.478	0.436	91	0.449	94
10. COPPER			0.534	0.484	91	0.468	88
11. IRON			203	179	88	182	90
12. LEAD	4.7	0.14	4.85	4.36	93	4.56	97
13. MAGNESIUM			509	491	96	486	95
14. MANGANESE			0.531	0.517	97	0.523	98
15. MERCURY							
16. NICKEL			0.916	0.83	91	0.863	94
17. POTASSIUM				0.175U		0.175U	
18. SELENIUM							
19. SILVER			0.993	0.930	94	0.927	93
20. SODIUM				1.09U		1.09U	
21. THALLIUM			0.921				
22. TIN				0.022U		0.022U	
23. VANADIUM			0.475	0.458	96	0.463	97
24. ZINC			0.973	0.891	92	0.938	96
Other:							

[1] Mean value based on n = 37.
[2] True value of EPA ICP Interference Check Sample or contractor standard.

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Form V

Q.C. Report No. 87173

SPIKE SAMPLE RECOVERY

LAB NAME ROCKY MOUNTAIN ANALYTICAL

DATE 9-15-87

CASE NO. 7770
EPA Sample No. MFC 319
Lab Sample ID No. -
Units UG/L

MATRIX WATER

Compound	Control Limit %R	Spiked Sample Result (SSR)	Sample Result (SR)	Spike Added (SA)	%R[1]	
Metals:						
1. ALUMINUM	75-125	1730	[49]	2000	84	
2. ANTIMONY	75-125	442	25u	500	88	
3. ARSENIC	75-125	20 S	10u	20	100	
4. BARIUM	75-125	1860	[185]	2000	84	
5. BERYLLIUM	75-125	43	1u	50	86	
6. CADMIUM	75-125	40	4u	50	80	
7. CALCIUM	75-125	148000	53800	100000	94	
8. CHROMIUM	75-125	181	4u	200	90	
9. COBALT	75-125	408	9u	500	82	
10. COPPER	75-125	207	[8.1]	250	80	
11. IRON	75-125	1020	[89]	1000	93	
12. LEAD	75-125	30	5u	20	150	R
13. MAGNESIUM	75-125	59700	14400	50000	91	
14. MANGANESE	75-125	321	165	200	78	
15. MERCURY	75-125	1.0	0.2u	1.0	100	
16. NICKEL	75-125	337	8u	400	84	
17. POTASSIUM	75-125	47820	[3270]	50000	89	
18. SELENIUM	75-125	7.3 S	5u	10	73	R
19. SILVER	75-125	38	4u	50	76	
20. SODIUM	75-125	157000	67200	100000	90	
21. THALLIUM	75-125	30 S	10u	50	60	R
22. TIN	75-125	~~47820~~ 309	22u	400	77	
23. VANADIUM	75-125	415	7u	500	83	
24. ZINC	75-125	194	~~[153]~~ [17]	200	90	
Other:						
Cyanide	75-125					

[1] %R = [(SSR - SR)/SA] x 100

"R"- out of control

Comments: MATRIX SPIKES RESULTS FOR Tl SE+AS DETERMINED BY MSA

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Form VI

Q.C. Report No. 87173

DUPLICATES

LAB NAME ROCKY MOUNTAIN ANALYTICAL

DATE 9-15-87

CASE NO. 7770
EPA Sample No. MFC319
Lab Sample ID No. -
Units UG/L

Matrix WATER

Compound	Control Limit[1]	Sample(S)	Duplicate(D)	RPD[2]
Metals:				
1. ALUMINUM		[49]	[38]	NC
2. ANTIMONY		25U	25U	NC
3. ARSENIC		10U	10U	NC
4. BARIUM		[185]	[179]	NC
5. BERYLLIUM		1U	1U	NC
6. CADMIUM		4U	4U	NC
7. CALCIUM		53800	51500	4.4
8. CHROMIUM		4U	4U	NC
9. COBALT		9U	9U	NC
10. COPPER		[8.1]	[7.1]	NC
11. IRON		[89]	[89]	NC
12. LEAD		5U	5.9	NC
13. MAGNESIUM		14400	13700	5
14. MANGANESE		165	161	2.5
15. MERCURY		0.2U	0.2U	NC
16. NICKEL		8U	8U	NC
17. POTASSIUM		[3270]	[3000]	NC
18. SELENIUM		5U	5U	NC
19. SILVER		4U	4U	NC
20. SODIUM		67200	62500	7.2
21. THALLIUM		10U	10U	NC
22. TIN		22U	22U	NC
23. VANADIUM		7U	7U	NC
24. ZINC		[14]	[14]	NC
Other:				
Cyanide				

X Out of Control
[1] To be added at a later date. [2] RPD = [|S-D|/((S+D)/2)] x 100
NC - Non calculable RPD due to value(s) less than CRDL

004779

Form VII

Q.C. Report No. 87173
INSTRUMENT DETECTION LIMITS AND
LABORATORY CONTROL SAMPLE

LAB NAME ROCKY MOUNTAIN ANALYTICAL
DATE 9-15-87

CASE NO 7770
UNITS ug/L

Compound	Required Detection Limits (CRDL)-ug/l	Instrument Detection Limits (IDL)-ug/l ICP/AA	Furnace	Lab Control Sample True	Found	%R
Metals:						
1. ALUMINUM	200	15		1980	1900	96
2. ANTIMONY	60	25		1010	1110	110
3. ARSENIC	10	31	2	49	48	98
4. BARIUM	200	3		1980	1850	93
5. BERYLLIUM	5	1		481	470	98
6. CADMIUM	5	4		489	468	96
7. CALCIUM	5000	179		49800	47600	96
8. CHROMIUM	10	4		506	470	93
9. COBALT	50	9		474	479	101
10. COPPER	25	6		542	510	94
11. IRON	100	24		1990	1930	97
12. LEAD	5	20	1	98	108	110
13. MAGNESIUM	5000	153		25000	23900	96
14. MANGANESE	15	4		513	486	95
15. MERCURY	0.2		0.2CV	1.0	1.0	100
16. NICKEL	40	8		496	459	93
17. POTASSIUM	5000	175		50200	51300	102
18. SELENIUM	5		1	98	98	100
19. SILVER	10	4		509	465	91
20. SODIUM	5000	1090		50700	48800	96
21. THALLIUM	10		1	97	104	107
22. TIN	40	22		2000	1850	92
23. VANADIUM	50	7		511	483	94
24. ZINC	20	3		3100	2920	94
Other:						
Cyanide	10		10AS	58		

CV - Cold Vapor
AS - Automated Spectrophotometric

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FORM VIII

p. 1 of 3

000012

Q.C. Report No. 87173

STANDARD ADDITION RESULTS

LAB NAME RMAL

CASE NO. 7770

DATE 9/14/87

UNITS ug/l

Sample #	Element	0 ADD ABS.	1 ADD CON./ABS.[1]	2 ADD CON./ABS.[1]	3 ADD CON./ABS.[1]	D F	FINAL CON.[2]	r*
MFC3195	As	25.0	10/35.8	20/47.2	30/61.0	1	20	.97
		slope =	1.19	intercept =	24.3			
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				

[1] CON is the concentration added, ABS. is the instrument readout in absorbance or concentration.

[2] Concentration as determined by MSA

*"r" is the correlation coefficient.

+ - correlation coefficient is outside of control window of 0.995.

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FORM VIII

p. 2of3

000013

Q.C. Report No. 87173

STANDARD ADDITION RESULTS

LAB NAME SWAL

CASE NO. 2770

DATE 9-14-87

UNITS ug/l

Sample #	Element	0 ADD ABS.	1 ADD CON./ABS.[1]	2 ADD CON./ABS.[1]	3 ADD CON./ABS.[1]	DF	FINAL CON.[2]	r*
MFC 3195	Se	3.6	10 / 8.9	20 / 15	30 / 18.9	1	7.3	0.996
	Slope =	0.520	Intercept = ~~7.708~~	3.50				

[1] CON is the concentration added, ABS. is the instrument readout in absorbance or concentration.

[2] Concentration as determined by MSA

*"r" is the correlation coefficient.

+ - correlation coefficient is outside of control window of 0.995.

004782

004782

FORM VIII

p. 3 of 3

000014

Q.C. Report No. 87173

STANDARD ADDITION RESULTS

LAB NAME EMAL

CASE NO. 7770

DATE 9/14/87

UNITS µg/l

Sample #	Element	0 ADD ABS.	1 ADD CON./ABS.[1]	2 ADD CON./ABS.[1]	3 ADD CON./ABS.[1]	D F	FINAL CON.[2]	r*
MFC 3195	Tl	18.7	10/24.2	20/30.8	30/37.0	1	30	.99
		slope =	.615	intercept =	17.4			
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				
			/	/	/			
		slope =		intercept =				

[1] CON is the concentration added, ABS. is the instrument readout in absorbance or concentration.

[2] Concentration as determined by MSA

*"r" is the correlation coefficient.

+ - correlation coefficient is outside of control window of 0.995.

004783

Form IX (Quarterly)

Instrument Detection Limits

ACT EPA2E

Lab Name: Rocky Mountain Analytical

ICAP Model Number: JA 9000A

Date: July 15, 1987

Furnace AA Number:

Element	Wavelength (nm)	CRDL ug/L	IDL ug/L	Element	Wavelength (nm)	CRDL ug/L	IDL ug/L
Aluminum	237.31	200	15P	Magnesium	279.08	5000	153P
Antimony	206.84	60	25P	Manganese	294.92	15	4P
Arsenic	193.70	10	31P	Mercury	253.7 B	0.2	0.2
Barium	233.53	200	3P	Nickel	231.60	40	8P
Beryllium	313.04	5	1P	Potassium	766.49	5000	175P
Cadmium	228.80	5	4P	Selenium	196.03	5	230P
Calcium	370.60	5000	179P	Silver	328.07	10	4P
Chromium	267.72	10	4P	Sodium	330.24	5000	1090P
Cobalt	228.62	50	9P	Thallium		10	
Copper	324.75	25	6P	Tin	189.99	40	22P
Iron	259.84	100	24P	Vanadium	292.40	50	7P
Lead	220.35	5	20P	Zinc	213.86	20	3P

Footnotes:

* Indicate the element for which the IDL applies with a P (for ICP) or a F (for Furnace AA) behind the IDL value.
* Indicate elements commonly run with background correction (AA) with a B behind the analytical wavelength.
* If more than one ICP/Flame or Furnace AA is used, submit separate Forms IX-XI for each instrument.

Comments: Spectro Products HG-3 spectrophotometer used for manual cold-vapor mercury determinations.

Lab Manager

Form IX (Quarterly)

Instrument Detection Limits

Lab Name: Rocky Mountain Analytical

ICAP Model Number:

Date: July 15, 1987

Furnace AA Number: PE Z5000

Element	Wavelength (nm)	CRDL ug/L	IDL ug/L	Element	Wavelength (nm)	CRDL ug/L	IDL ug/L
Aluminum		200		Magnesium		5000	
Antimony	217.6 B	60	2F	Manganese		15	
Arsenic	193.7 B	10	2F	Mercury		0.2	
Barium		200		Nickel		40	
Beryllium		5		Potassium		5000	
Cadmium		5		Selenium	196.0 B	5	1F
Calcium		5000		Silver		10	
Chromium		10		Sodium		5000	
Cobalt		50		Thallium		10	
Copper		25		Tin		40	
Iron		100		Vanadium		50	
Lead		5		Zinc		20	

004785

Footnotes:

* Indicate the element for which the IDL applies with a P (for ICP) or a F (for Furnace AA) behind the IDL value.
* Indicate elements commonly run with background correction (AA) with a B behind the analytical wavelength.
* If more than one ICP/Flame or Furnace AA is used, submit separate Forms IX-XI for each instrument.

Comments: This instrument is equipped with Zeeman background correction.

Lab Manager

Form IX (Quarterly)

Instrument Detection Limits

Lab Name: Rocky Mountain Analytical

ICAP Model Number:

Date: July 15, 1987

Furnace AA Number: PE 2380

Element	Wavelength (nm)	CRDL ug/L	IDL ug/L	Element	Wavelength (nm)	CRDL ug/L	IDL ug/L
Aluminum		200		Magnesium		5000	
Antimony		60		Manganese		15	
Arsenic	193.7 B	10	2F	Mercury		0.2	
Barium		200		Nickel		40	
Beryllium		5		Potassium		5000	
Cadmium	228.8 B	5	0.1F	Selenium		5	
Calcium		5000		Silver		10	
Chromium		10		Sodium		5000	
Cobalt		50		Thallium	276.8 B	10	1F
Copper		25		Tin		40	
Iron		100		Vanadium		50	
Lead	283.3 B	5	1F	Zinc		20	

004786

Footnotes:

* Indicate the element for which the IDL applies with a P (for ICP) or a F (for Furnace AA) behind the IDL value.
* Indicate elements commonly run with background correction (AA) with a B behind the analytical wavelength.
* If more than one ICP/Flame or Furnace AA is used, submit separate Forms IX-XI for each instrument.

Comments: This instrument is equipped with Deuterium background correction.

Lab Manager

Form X (Quarterly)

000018

ICP Interelement Correction Factors

ACT EPA2E

Lab Name: Rocky Mountain Analytical

ICP Model Number: JA 9000A

Date: July 15, 1987

		Interelement Correction Factors				
Analyte	Analyte Wavelength (nm)	Aluminum	Antimony	Arsenic	Barium	Calcium
Aluminum	237.31					
Antimony	206.84					
Arsenic	193.70	0.00440999	0.00033900			
Barium	233.53					
Beryllium	313.04					
Cadmium	228.80			0.0106000		
Calcium	370.60					
Chromium	267.72					
Cobalt	228.62				0.0003360	
Copper	324.75					
Iron	259.84		0.00162200			
Lead	220.35	0.00053099	-0.0003700			
Manganese	294.92					
Nickel	231.60		0.00030200			
Silver	328.07					
Sodium	330.24					
Tin	189.99		-0.0039199			
Vanadium	292.40					
Zinc	213.86					

Lab Manager

004787

004787

Form X (Quarterly)

ICP Interelement Correction Factors

ACT EPA2E

Lab Name: Rocky Mountain Analytical

ICP Model Number: JA 9000A

Date: July 15, 1987

		Interelement Correction Factors				
Analyte	Analyte Wavelength (nm)	Chromium	Copper	Iron	Lead	Magnesium
Aluminum	237.31			-0.002790		
Antimony	206.84	0.01080000		0.0003240		-0.0000359
Arsenic	193.70	0.00111999		0.0002750		
Barium	233.53	-0.0001260				
Beryllium	313.04					
Cadmium	228.80					-0.0000170
Calcium	370.60					
Chromium	267.72					
Cobalt	228.62			0.0000720		
Copper	324.75			-0.000066		
Iron	259.84		-0.0001169			
Lead	220.35	-		0.0001960		
Manganese	294.92					
Nickel	231.60			-0.000040		
Silver	328.07					
Sodium	330.24					
Tin	189.99			0.0001640	-0.000372	
Vanadium	292.40	-0.0024199				
Zinc	213.86		0.00340999	0.0001340		

Lab Manager

Form X (Quarterly)

000020

ICP Interelement Correction Factors

ACT EPA2E

Lab Name: Rocky Mountain Analytical

ICP Model Number: JA 9000A

Date: July 15, 1987

		Interelement Correction Factors				
Analyte	Analyte Wavelength (nm)	Manganese	Molybdenum	Nickel	Tin	Titanium
Aluminum	237.31	0.00055099	-0.0030600			
Antimony	206.84		-0.0011800	-0.000477	-0.005270	0.00156000
Arsenic	193.70	-0.0002139	0.00049499			
Barium	233.53		-0.0006290	-0.000194	-0.003400	
Beryllium	313.04					
Cadmium	228.80			-0.000236		
Calcium	370.60	0.01680000				0.07450000
Chromium	267.72	0.00020400				
Cobalt	228.62		-0.0004510		-0.001490	0.00191000
Copper	324.75		0.00059000			
Iron	259.84	-0.0114000				
Lead	220.35		-0.0006959	0.0002960		0.00045599
Manganese	294.92					-0.0041299
Nickel	231.60		-0.0022700			
Silver	328.07	0.00015800				
Sodium	330.24					0.10400000
Tin	189.99	-0.0001219	-0.0002729			0.00111999
Vanadium	292.40	-0.0001360	-0.0023499			0.00040000
Zinc	213.86			0.0035900		

Lab Manager

004789

004789

FORM X (Quarterly)

ICP Interelement Correction Factors

ACT EPA2E

Lab Name: Rocky Mountain Analytical

ICP Model Number: JA 9000A

Date: July 15, 1987

		Interelement Correction Factors				
Analyte	Analyte Wavelength (nm)	Vanadium	Zinc	Cobalt	Boron	Silver
Aluminum	237.31	-0.0027299		0.0006140		0.00048399
Antimony	206.84	-0.0103000	-0.0003490			
Arsenic	193.70	0.00769000		0.0013700		
Barium	233.53	0.00053700				
Beryllium	313.04	0.00116000				
Cadmium	228.80			0.0001220		
Calcium	370.60					
Chromium	267.72	-0.0015700				
Cobalt	228.62					
Copper	324.75			-0.000640		
Iron	259.84				-0.000197	
Lead	220.35			-0.006100		
Manganese	294.92	0.00067500				
Nickel	231.60			0.0019400		
Silver	328.07	-0.0060999				
Sodium	330.24		0.39200000			
Tin	189.99			0.0001540		
Vanadium	292.40					
Zinc	213.86	-0.0047200				

Lab Manager

FORM XI (Quarterly)

ICP Linear Ranges

ACT EPA2E

Lab Name: Rocky Mountain Analytical ICP Model Number: JA 9000A

Date: July 15, 1987

Upper ICP Linearity Limits

Analyte	Integration Time	Concentration (ug/L)	Analyte	Integration Time	Concentration (ug/L)
Aluminum	5	600000	Magnesium	5	1000000
Antimony	5	100000	Manganese	5	100000
Arsenic	5	100000	Mercury	NA	
Barium	5	100000	Nickel	5	100000
Beryllium	5	100000	Potassium	5	1000000
Cadmium	5	100000	Selenium	NA	
Calcium	5	1000000	Silver	5	100000
Chromium	5	100000	Sodium	5	1000000
Cobalt	5	100000	Thallium	NA	
Copper	5	100000	Tin	5	100000
Iron	5	500000	Vanadium	5	100000
Lead	5	100000	Zinc	5	100000

Footnotes: * Indicate elements not analysed by ICP with the notation NA.

Comments

Lab Manager

ICAP UNITS/DILUTION FACTORS

Soil samples are prepared at a total dilution factor of 1:500 (SOW 784). The Jarrell-Ash 9000A ICAP outputs soil data in mg/kg. Unless otherwise noted, ICAP data for soils already has the 1:500 dilution applied in the raw data.

ICAP data for waters is output, unless otherwise noted, in mg/l. The conversion from mg/l to ug/l is performed before the raw data is transferred to the Report Forms.

GRAPHITE FURNACE REPORTING LIMITS

The current scope of work (SOW784) specifies that graphite furnace data be reported only down to the Contract Required Detection Limits (CRDL's). On the Graphite Furnace Worksheets, initial concentration data are reported down to RMAL's calculated Instrument Detection Limits (IDL's). CRDL's are reported for both the final concentration (on the worksheet) and on Forms I, V, VI of the Data Package.

PROCEDURE FOR MERCURY SOIL SAMPLE DILUTIONS

Soil samples are prepared at a total dilution factor of 1:500 (SOW 784). Samples which require a further dilution are prepped at the 1:500 dilution. Several blanks are prepped with the sample. At the time of analysis, an aliquot of the prepped sample is spiked into a blank to make the required dilution. The total dilution factor for the sample is the 1:500 prep dilution multiplied by the dilution made with the blank.

000002 FILE # 87173
DISK # 244

ACT NAME : EPA2E TIME:14-SEP-87 17:48 STANDARD NAME : STD 1

	I.S.	AL	SB	AS	BA	BE	B	CD	CA	CR
EXP# 1	1000	.0050	.0700	.0010	-.0120	.0040	.0080	.0030	.0040	.0030
EXP# 2	1000	.0050	-.0640	-.0010	-.0030	.0050	.0070	.0040	.0050	.0010
EXP# 3	1000	.0030	-.0760	.0000	-.0030	.0050	.0050	.0020	.0030	.0030
AVERAGE	1000	.0043	-.0233	.0000	-.0060	.0047	.0067	.0030	.0040	.0023

	CO	CU	FE	PB	MG	MN	MO	NI	P	K
EXP# 1	.0000	.0020	.0010	.0110	.0000	.0110	.0060	.0030	-.0760	.0500
EXP# 2	-.0020	.0030	.0000	.0120	.0010	.0050	-.0030	.0030	-.0210	.0430
EXP# 3	.0000	.0000	.0010	.0010	.0010	.0200	.0020	.0040	-.0530	.0515
AVERAGE	-.0007	.0017	.0007	.0080	.0007	.0120	.0017	.0033	-.0500	.0482

	SE	SIO2	AG	NA	SR	TI	SN	V	ZN
EXP# 1	-.0060	.0080	-.0530	.0900	.0030	.0010	.0000	.0050	.0240
EXP# 2	-.0100	.0090	-.0530	.0760	-.0020	.0000	.0060	.0040	.0210
EXP# 3	-.0035	.0070	-.0450	.0760	.0020	.0010	.0080	.0060	.0240
AVERAGE	-.0065	.0080	-.0503	.0807	.0010	.0007	.0047	.0050	.0230

004793

ACT NAME : EPA2E TIME:14-SEP-87 17:51 STANDARD NAME : STD 2

	I.S.	AG
EXP# 1	1000	3.489
EXP# 2	1000	3.502
EXP# 3	1000	3.503
AVERAGE	1000	3.498

ACT NAME : EPA2E TIME:14-SEP-87 17:53 STANDARD NAME : STD 3

	I.S.	AL	SB	AS	BA	BE	B	CD	CR	CO
EXP# 1	1000	10.22	5.916	.1630	5.633	2.191	4.048	1.331	1.505	1.029
EXP# 2	1000	10.24	5.833	.1660	5.672	2.199	4.055	1.344	1.509	1.024
EXP# 3	1000	10.24	6.025	.1660	5.683	2.192	4.052	1.341	1.510	1.038
AVERAGE	1000	10.23	5.925	.1650	5.663	2.194	4.052	1.339	1.508	1.030

	CU	FE	PB	MN	MO	NI	P	SE	SR	TI
EXP# 1	1.524	1.187	.5920	4.676	1.705	.7890	.3930	.5075	.4110	1.679
EXP# 2	1.523	1.192	.5940	4.681	1.722	.7920	.4390	.5090	.4120	1.681
EXP# 3	1.521	1.194	.5920	4.678	1.721	.8010	.4920	.5170	.4190	1.682
AVERAGE	1.523	1.191	.5927	4.678	1.716	.7940	.4413	.5112	.4140	1.681

ERA LOT # 8709

ACT NAME : EPA2E TIME:14-SEP-87 17:53 STANDARD NAME : STD 3

	SN	V	ZN
EXP# 1	2.070	2.786	4.368
EXP# 2	2.096	2.783	4.378
EXP# 3	2.109	2.781	4.419
AVERAGE	2.092	2.783	4.388

ACT NAME : EPA2E TIME:14-SEP-87 17:56 STANDARD NAME : STD 4

	I.S.	CA	MG	K	SIO2	NA
EXP# 1	1000	21.30	4.023	20.29	9.135	2.387
EXP# 2	1000	21.04	3.973	19.67	9.035	2.386
EXP# 3	1000	21.17	4.010	20.31	9.137	2.386
AVERAGE	1000	21.17	4.002	20.09	9.102	2.386

004794

M.P.

000004

ELEMENT	SLOPE	INTERCEPT
AL	.977676389	-4.23659768E-03
SB	.168123739	3.92288725E-03
AS	6.06060606	0
BA	.176408327	1.05844996E-03
BE	.456760049	-2.13154689E-03
B	.247218789	-1.64812526E-03
CD	.748689793	-2.24606938E-03
CA	4.72463266	-.0188985306
CR	.664157627	-1.54970113E-03
CO	.969932104	6.46621403E-04
CU	.657462196	-1.09577033E-03
FE	8.40100813	-5.60067208E-03
PB	1.71037628	-.0136830103
MG	24.9916695	-.016661113
MN	.214301022	-2.57161226E-03
MO	.58331713	-9.72195217E-04
NI	1.26475548	-4.2158516E-03
P	2.03527816	.101763908
K	4.99022748	-.240362623
SE	19.3174501	.125563426
SIO2	23.5311366	-.188249093
AG	.281822452	.0141850634
NA	43.3714038	-3.49862657
SR	2.42130751	-2.42130751E-03
TI	.595238095	-3.96825397E-04
SN	.479156684	-2.23606453E-03
V	.359928014	-1.79964007E-03
ZN	.229077581	-5.26878436E-03

004795

INITIAL INTERFERENCE CHECK

000005

FILE NAME : IC5-0914

DATE : 15-SEP-87 07:42

ACT NAME : EPA2E

CONCENTRATION

SAMPLE	ANALYSIS DATE	OPERATOR	TEXT STRING
INT CHK	14-SEP-87 18:08	MP	.

004796

INITIAL INTERFERENCE CHEC

000006

FILE NAME : IC5-0914

DATE : 15-SEP-87 07:42

ACT NAME : EPA2E

CONCENTRATION

INT CHK
14-SEP-87
18:08

AL	475.7
SB	-.022
AS	-.1277
BA	.4311
BE	.4329
CD	.8977
CA	473.8
CR	.4763
CO	.436
CU	.4844
FE	179.4
PB	4.356
MG	491.3
MN	.5166
NI	.8299
K	-.0427
AG	.9303
NA	-.4513
SN	-.0208
V	.4585
ZN	.8911

004797

hp

INTIAL CALIBRATION VERIFICATION

000007

FILE NAME : IV3-0914

DATE : 15-SEP-87 07:50

ACT NAME : EPA2E

CONCENTRATION

SAMPLE	ANALYSIS DATE	OPERATOR	TEXT STRING
ICB	14-SEP-87 18:15	MP	.
ICV-1	14-SEP-87 18:19	MP	.
ICV-3	14-SEP-87 18:22	MP	.

004798

INITIAL CALIBRATION VERIFICATION

000008

FILE NAME : IV3-0914

DATE : 15-SEP-87 07:50

ACT NAME : EPA2E

CONCENTRATION

	ICB 14-SEP-87 18:15	ICV-1 14-SEP-87 18:19	ICV-3 14-SEP-87 18:22
	.	.	.
AL	-.0018	1.984	-.0018
SB	.0049	-.0049	1.034
BA	-.0003	1.93	.0065
BE	-.0001	.4684	-.0005
CD	-.0011	.4991	-.0007
CA	.0094	50.49	.0257
CR	-.0019	.4925	-.0006
CO	-.0008	.4862	.0041
CU	.0015	.5161	-.0004
FE	.0154	2.025	.0095
PB	.0077	4.277	.0158
MG	-.0292	25.29	.0208
MN	.0018	.5075	-.0013
NI	-.0042	.4869	-.0026
K	.0104	52.46	.3635
AG	.0011	.495	-.0026
NA	-.8529	51.36	-.0308
SN	-.0041	.0069	1.97
V	-.0014	.5071	-.0016
ZN	-.0003	3.032	.0062

004799

M.P

FINAL INTERFERENCE CHECK

000009

FILE NAME : IC6-0914

DATE : 15-SEP-87 07:45

ACT NAME : EPA2E

CONCENTRATION

SAMPLE	ANALYSIS DATE	OPERATOR	TEXT STRING
INT CHK	15-SEP-87 01:00	MP	

004800

FINAL INTERFERENCE CHECK

000010

FILE NAME : IC6-0914

DATE : 15-SEP-87 07:45

ACT NAME : EPA2E

CONCENTRATION

INT CHK
15-SEP-87
01:00

AL	477.9
SB	-.067
AS	-.1531
BA	.4416
BE	.4383
CD	.9232
CA	475.4
CR	.4846
CO	.4494
CU	.4685
FE	183
PB	4.559
MG	486.4
MN	.5228
NI	.8628
K	-.0028
AG	.9272
NA	-.3102
SN	-.0177
V	.4626
ZN	.9379

004801

DOC# 87173 ~~87172~~ 110 CASE# 7770 ~~767~~ 160

000011

FILE NAME : 87173 ~~87172~~ 110

DATE : 15-SEP-87 08:13

ACT NAME : EPA2E

CONCENTRATION

	LCS 14-SEP-87 23:43	CCB 14-SEP-87 23:45	CCV 14-SEP-87 23:52
AL	1.95	-.0145	1.005
SB	1.068	.0074	1.094
BA	1.885	.0018	.9985
BE	.4892	-.0008	.9728
CD	.4711	-.0025	.9832
CA	48.57	-.0071	100.1
CR	.4765	-.0019	1.006
CO	.4812	-.0003	.9845
CU	.5309	-.0021	.976
FE	1.977	-.0098	1.029
PB	4.178	-.0094	.9896
MG	24.7	-.0417	101.4
MN	.4944	-.0004	.9832
NI	.4727	.0002	.9837
K	54.29	-.0345	101.9
AG	.4747	-.0006	.9851
NA	50.56	-.4408	101.4
SN	1.846	-.0036	.9234
V	.4947	-.0018	.9995
ZN	2.946	-.0005	1.022

110

N/A

004802

M.R.

QC# 87173 CASE # 9770

000012

FILE NAME : 87173

DATE : 15-SEP-87 08:17

ACT NAME : EPA2E

CONCENTRATION

SAMPLE	ANALYSIS DATE		OPERATOR	TEXT STRING
PREP BLK	14-SEP-87	23:56	MP	
MFC319	14-SEP-87	23:58	MP	
MFC319D	15-SEP-87	00:02	MP	
MFC319S	15-SEP-87	00:08	MP	
MFC320	15-SEP-87	00:11	MP	
MFC999	15-SEP-87	00:16	MP	MFC319 10X ← SERIAL DILUTION
LCS	15-SEP-87	00:23	MP	
CCB	15-SEP-87	00:49	MP	
CCV	15-SEP-87	00:52	MP	

004803

QC # 87173 CASE # 2770 000013

FILE NAME : 87173 DATE : 15-SEP-87 08:17

ACT NAME : EPA2E CONCENTRATION

	PREP BLK 14-SEP-87 23:56	MFC319 14-SEP-87 23:58	MFC319D 15-SEP-87 00:02	MFC319S 15-SEP-87 00:08	MFC320 15-SEP-87 00:11	MFC999 15-SEP-87 00:16 MFC319 10X
AL	.0066	.0487	.0385	1.729	-.011	-.0423
SB	.0041	.003	.0075	.4425	-.0097	.044
BA	.001	.1853	.1786	1.856	.053	.2047
BE	-.0001	-.0003	-.0005	.0431	.0002	-.0076
CD	-.0015	-.0004	-.0025	.0395	-.0025	-.0141
CA	-.0072	53.79	51.5	147.8	22.48	56.57
CR	.0008	.0014	.0011	.1807	-.0012	-.0089
CO	.0016	.0006	.0006	.4078	.0016	-.0035
CU	.0045	.0081	.0071	.2067	.0101	.012
FE	.0112	.0887	.0886	1.018	.0154	.0296
PB	.0068	.0017	.0171	.4059	-.0026	.1026
MG	.0333	14.43	13.67	59.69	6.081	14.7
MN	-.0016	.1648	.1614	.3209	.0004	.1483
NI	.0021	.0015	.0015	.337	-.0017	-.0105
K	.0017	3.272	2.997	47.82	.1589	3.285
AG	-.0002	-.0011	.0004	.0379	-.0022	.0051
NA	-.2918	67.15	62.47	157	3.716	72.99
SN	-.0099	-.007	-.0012	.3094	-.0114	.0281
V	-.0013	.0002	0	.4146	.0005	-.0036
ZN	.0107	.0145	.014	.1930	.03	.0126

SERIAL DILUTION

004804

004804

QC # 87173 CASE # 7770

000014

FILE NAME : 87173

DATE : 15-SEP-87 08:17

ACT NAME : EPA2E

CONCENTRATION

	LCS 15-SEP-87 00:23	CCB 15-SEP-87 00:49	CCV 15-SEP-87 00:52
AL	1.897	-.0047	.9874
SB	1.112	.0258	1.073
BA	1.847	.0017	.9681
BE	.4701	-.0003	.9411
CD	.4678	-.0011	.9635
CA	47.62	.0166	97.25
CR	.4705	-.0009	.9775
CO	.4788	-.0013	.9631
CU	.5099	-.0004	.9405
FE	1.93	.0028	.995
PB	4.105	.0009	.9621
MG	23.94	.0083	98.08
MN	.4857	.0009	.9563
NI	.4594	-.003	.9597
K	51.28	.0304	93.58
AG	.4652	.0005	.9546
NA	48.79	.0796	96.67
SN	1.846	.0074	.9111
V	.4828	-.0005	.9641
ZN	2.919	-.0002	1.001

004805

GRAPHITE FURNACE WORKSHEET

STANDARD CONCENTRATION (PPB)	ABSORBANCE
0	0.000
10	.067
50	.296
100	0.517

ELEMENT As MATRIX LOW WATER
BACKGROUND CORRECTION D2
CASE/SAS NO. ~~7084~~ 7770
RMA NO. 87173 DATE 9/14/87
ANALYST JH INSTRUMENT 232 B

CUP NO.	EPA NO.	CONC. 1 (PPB)	CONC. 2 (PPB)	AVERAGE CONC. (PPB)	% RSD	D/F	FINAL CONCENTRATION UG/L	COMMENTS
1	ICB	2u	2u	2u	NC			ICV-2
2	ICV	49	49	49	0.3	1		% spike recovery
3	PREP BLK	2u	2u	2u	NC			
4	MFC319	[2.8]	[2.6]	[2.7]	6.5	1	10u	
5	MFC319+	26	26	26	1.2			112%
6	MFC319D	[2.9]	[2.6]	[2.8]	8.7	1	10u	
7	MFC319D+	27	26	27	1.4			121%
8	MFC319S	24	24	24	0.7	1	MSA required	
9	MFC319S+	49	46	48	3.3		0	120%
10	MFC320	2u	2u	2u	NC	1	10u	
11	MFC320+	24	24	24	0.9			120%
12	LCS	24	24	24	0.2	2	~~48~~ 40u	
13	CCB	2u	2u	2u	NC			
14	CCV	19	19	19	1.4			
15	LCS+	44	44	44	0.2			110%
16	319S	Std 0	25.0			1	20	MSA
17		10	35.8					slope = 1.19
18		20	47.2					intercept = 24.3
19		30	61.0					r = .993
20	CCB	2u	2u	2u	NC			
21	CCV	19	19	19	0.0			
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								

GRAPHITE FURNACE WORKSHEET

STANDARD CONCENTRATION (ppb)	ABSORBANCE
0.0	.000
10	.032
50	.159
100	.314

ELEMENT Se MATRIX Low water
BACKGROUND CORRECTION Zeeman
CASE/SAS NO. 7770
RMA NO. 87173 DATE 9-14-87
ANALYST D.A.P. w/ H Inst. 5300B

CUP NO.	EPA NO.	CONC. 1 (ppb)	CONC. 2 (ppb)	AVERAGE CONC. (ppb)	% RSD	D/F	FINAL CONCENTRATION (ug/L) (mg/kg)	COMMENTS
1	ICB	1u	1u	1u	NC			
2	ICV	53	53	53	0.5	2		ICV-2
3	Prep Blk	1u	1u	1u	NC			
4	MFC 319	1u	1u	1u	NC	1	5u	% spike recover.
5	319	5.3	[4.6]	5.0	10			50%
6	319D	1u	1u	1u	NC	1	5u	
7	319D+	[4.3]	[4.5]	[4.4]	3.2			44%
8	319S	[3.7]	[3.3]	[3.5]	8.1	1	Reqnuires MSA	
9	319S+	8.5	9.1	8.8	4.8			53%
10	320	1u	1u	1u	NC	1	5u	
11	320+	8.7	8.1	8.4	5.0			84%
12	LCS	49	50	49	0.6	2		
13	CCB	1u	1u	1u	NC			
14	CCV	21	20	21	4.1			
15	LCS+	60	59	60	0.5			120%
16	MFC-319S	Add 0	3.6			1	7.3	MSA
17	319S	10	8.9					r = .996
18	319S	20	15.0					
19	319S	30	18.9					
20	CCB	1u	1u	1u	NC			
21	CCV	21	21	21	1.7			
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								

GRAPHITE FURNACE WORKSHEET

STANDARD CONCENTRATION (PPB)	ABSORBANCE
0	0.000
10	0.061
50	0.283
100	0.470

ELEMENT Tl MATRIX LOW WATER
BACKGROUND CORRECTION D2
CASE/SAS NO. ~~7055~~ 7770
RMA NO. 87173 DATE 9/11/87
ANALYST JH INSTRUMENT 2380 C

CUP NO.	EPA NO.	CONC. 1 (PPB)	CONC. 2 (PPB)	AVERAGE CONC. (PPB)	% RSD	D/F	FINAL CONCENTRATION UG/L	COMMENTS
1	ICB	1u	1u	1u	NC			ICV-4
2	ICV	52	52	52	0.5	2		% spike recovery
3	PREP BLK	1u	1u	1u	NC			
4	MFC319	1u	1u	1u	NC	1	10u	
5	MFC319+	8.1	8.2	8.1	0.7			40%
6	MFC319D	1u	1u	1u	NC	1	10u	
7	MFC319D+	8.5	8.3	8.4	1.8			40%
8	MFC319S	19	19	19	0.2	1	MSA required	
9	MFC319S+	30	31	30	1.4			55%
10	MFC320	1u	1u	1u	NC	1	10u	
11	MFC320-	17	18	18	0.3			90%
12	LCS	26	25	26	0.9	4	104	
13	CCB	1u	1u	1u	NC			
14	CCV	20	20	20	1.4			
15	LCS+	46	46	46	1.0			100%
16	319S	Std 0	18.7			1	30	MSA
17		10	24.2					slope = .615
18		20	30.8					intercept = 18.7
19		30	37.0					r = .999
20	CCB	1u ~~2u~~ JH	1u	1u	NC			
21	CCV	21	21	21	0.6			
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								

000018

GRAPHITE FURNACE WORKSHEET

STANDARD CONCENTRATION (ppb)	ABSORBANCE
Ø	0.000
10.0	0.083
50.0	0.360
100.0	0.618

ELEMENT Pb MATRIX LOW WATER
BACKGROUND CORRECTION D2
CASE/SAS NO. 7770
RMA NO. 87173 DATE 9/14/87
ANALYST SH/RKO INSTRUMENT 2380F

CUP NO.	EPA NO.	CONC. 1 (ppb)	CONC. 2 (ppb)	AVERAGE CONC. (ppb)	% RSD	D/F	FINAL CONCENTRATION ug/L mg/kg	COMMENTS
1	ICB	1u	1u	1u	NC			
2	ICV	52	52	52	0.2	2X		
3	PREP BLK	1u	1u	1u	NC			
4	MFC319	[3.2]	[2.7]	[3.0]	NC	1X	5u	
5	MFC319+	14	14	14	1.0			110%
6	MFC319D	5.7	6.1	5.9	NC	1X	5.9	
7	MFC319D+	17	17	17	1.0			111%
8	MFC319S	31	30	30	1.3	1X	30	
9	MFC319S+	40	40	40	2.1			100%
10	MFC320	[4.5]	[4.6]	[4.6]	NC	1X	5u	
11	MFC320+	16	16	16	0.0			114%
12	LCS	27	27	27	1.7	4X		
13	CCB	1u	1u	1u	NC			
14	CCV	21	21	21	0.0			
15	LCS+	36	35	36	2.6			90%
16	CCB	1u	1u	1u	NC			
17	CCV	21	21	21	0.6			
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								

004809

MERCURY WORKSHEET

STANDARD CONCENTRATION (ppb)	READING (mV)
BLANK	0.005
0.2	0.030
0.5	0.060
1.0	0.125
2.0	0.235

CORR. COEFF. ~~CASE/SAS NO.~~ 0.9995

CASE NO/ RMA NO. 7770 / QC# 87173

MATRIX LOW WATER

ANALYST BR / MW

DATE 9.4.87

BOTTLE NO.	EPA NO.	READING (mV)	INITIAL CONCENTRATION (ppb)	D/F	FINAL CONCENTRATION ug/L mg/kg	COMMENTS
	ICB	0.005	0.2u			
	ICV	0.116	1.0			
	PrepBlk	0.005	0.2u			
	WFC 319	0.005	0.2u	1x	0.2u	
	319D	0.008	0.2u	↓	0.2u	
	319S	0.117	1.0	↓	1.0	
	320	0.004	0.2u	1x	0.2u	
	LCS	0.119	1.0			
	CCB	0.005	0.2u			
	CCV	0.116	1.0			

004810

EPA SAMPLE DESCRIPTION SHEET

RMA NO. 87173 CASE/SAS NO. ~~7697~~ 7770 MATRIX: LOW WATER

EPA NO.	COLOR	CLARITY
MFC319	COLORLESS	CLEAR
MFC320	COLORLESS	CLEAR

KEY:

COLOR		CLARITY	TEXTURE
1 RED	7 WHITE	1 CLEAR	1 FINE (POWDERY)
2 BLUE	8 COLORLESS	2 CLOUDY	2 MEDIUM (SAND)
3 YELLOW	9 BROWN	3 OPAQUE	3 COARSE (LARGE CRYSTALS OR ROCKS)
4 GREEN	10 GREY	4 OTHER (SPECIFY)	4 CLAY
5 ORANGE	11 BLACK		5 OTHER (SPECIFY)
6 VIOLET	12 OTHER (SPECIFY)		

COMMENTS:

EPA SAMPLE PREPARATION SHEET

RMA NO. 87173 CASE/SAS NO. ~~7007~~ 7770 MATRIX: LOW WATER

EPA NO.	DATE REC'D	PARAMETERS	ICP METALS g/ml	ICP METALS ml	FURNACE METALS g/ml	FURNACE METALS ml	MERCURY g/ml	MERCURY ml	CYANIDE g/ml	CYANIDE ml	pH
PREP BLK	-------	TOTAL METALS	100	100	100	100	100	100			—
LCS	-------	TOTAL METALS									—
MFC319	8-05-87	TOTAL METALS									OK
MFC319D	8-05-87	TOTAL METALS									
MFC319S	8-05-87	TOTAL METALS									
MFC320	8-05-87	TOTAL METALS									
DATE / INITIALS:			/		/		9/2/87 YB		/		

SPECIAL INSTRUCTIONS and/or CAUTIONS:

Sample MFC 320 Field Blank

- Prep MFC319 10ml & 10ml for ICP + Furnace

SAMPLE LOCATION

004812

INORGANICS TRAFFIC REPORT

Sample Number **MFC 319**

① Case Number: 7770
Sample Site Name/Code:

② SAMPLE CONCENTRATION (Check One)
X Low Concentration
___ Medium Concentration

③ SAMPLE MATRIX (Check One)
X Water
___ Soil/Sediment

④ Ship To:
Rocky Mountain Analytical Lab, Inc.
5530 Marshall St.
Arvada, CO 80002
Attn: John Laferty

Transfer Ship To:

⑤ Sampling Office: VI
Sampling Personnel:
(Name) Lynn Mays
(Phone) (512) 345-6651
Sampling Date:
(Begin) ___ (End) 8/4/87

⑥ Shipping Information:
Name Of Carrier: Federal Express
Date Shipped: 8/4/87
Airbill Number: 4668487983

⑨ ANALYSIS LAB:
Recd by: [illegible]
Date Recd: 8-5-87

⑦ Sample Description: (Check One)
X Surface Water
___ Ground Water
___ Leachate
___ Mixed Media
___ Solids
___ Other ___ (specify)

⑧ Mark Volume Level On Sample Bottle
Check Analysis required
X Total Metals
___ Cyanide

⑩ Sample Condition On Receipt:
(eg. broken, leakage, chain of custody, etc.)
OK

U.S. ENVIRONMENTAL PROTECTION AGENCY HWI Sample Management Office

INORGANICS TRAFFIC REPORT

Sample Number **MFC 320**

① Case Number: 7770
Sample Site Name/Code:

② SAMPLE CONCENTRATION (Check One)
X Low Concentration
___ Medium Concentration

③ SAMPLE MATRIX (Check One)
X Water
___ Soil/Sediment

④ Ship To:
Rocky Mountain Analytical Lab, Inc.
5539 Marshall St.
Arvada, CO 80002
Attn: John Laferty

Transfer Ship To:

⑤ Sampling Office: VI
Sampling Personnel:
(Name) Lynn Mays
(Phone) (512) 345-6651
Sampling Date:
(Begin) ___ (End) 8/4/87

⑥ Shipping Information:
Name Of Carrier: Federal Express
Date Shipped: 8/4/87
Airbill Number: 4668487983

⑨ ANALYSIS LAB:
Recd by: [illegible]
Date Recd: 8-5-87

⑦ Sample Description: (Check One)
___ Surface Water
___ Ground Water
___ Leachate
___ Mixed Media
___ Solids
X Other Field Blank (specify)
MATCHES ORGANIC SAMPLE NO. ___

⑧ Mark Volume Level On Sample Bottle
Check Analysis required
X Total Metals
___ Cyanide

⑩ Sample Condition On Receipt:
(eg. broken, leakage, chain of custody, etc.)
OK

LAB COPY FOR RETURN TO SMO