ENVIRONMENTAL STRATEGIES CORPORATION
8521 LEESBURG, PIKE, SUITE 650
VIENNA, VIRGINIA 22182
703-821-3700
FAX-703-821-3734

REMEDIAL INVESTIGATION REPORT
FOR THE
FORMER NCR CORPORATION FACILITY
MILLSBORO, SUSSEX COUNTY, DELAWARE

LABORATORY DELIVERABLES

VOLUME I

REGIONAL OFFICES
101 Metro Drive • Suite 650 • San Jose, California • 95110 • 408-286-0100
1740 Massachusetts Avenue • Boxborough, Massachusetts • 01719 • 508-635-9600

HITTMAN EBASCO ASSOCIATES INC.
A Subsidiary of EBASCO SERVICES INCORPORATED
9151 Rumsey Road, Columbia, MD 21045
(301) 730-8525

HITTMAN EBASCO

Environmental Strategies

Enclosed are the following results:

CLP metals forms I - X (Full CLP package to follow)

non-CLP metals and wet chem results for soil and water samples

non-CLP TCE results (CLP organic data package to follow)

PLEASE UNDERSTAND THAT THESE ARE PRELIMIARY RESULTS

EAP
1/6/88

(8)

WITTMAN ENDECO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
WATERS

CLIENT NAME Environmental Strategies

REPORT DATE _____

CONTRACT # ESTR-8001-002

CLIENT SAMPLE ID SW-1

WEAI SAMPLE ID 7161, 7170, 7176

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD		RESULT	UNITS
Cr total	218.2	10	<10	ug/L
Cr VI	SM 312B	20	<20	ug/L
Alkalinity	310.1	1	3.5	mg $CaCO_3$/L
COD	410.1	50	<50	mg/L
Hardness	130.2	1	109.7	mg $CaCO_3$/L
Total Suspended Solids	160.2	1	17	mg/L

AR301783

(8)

WITTMAN ENGCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
WATERS

CLIENT NAME Environmental Strategies

REPORT DATE _____

CONTRACT # ES1R-80101.002

CLIENT SAMPLE ID SW-2

WEAI SAMPLE ID 7162, 71, 80

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD		RESULT	UNITS
Cr total	218.2	10	<10	ug/L
Cr VI	SM 312B	20	<20	ug/L
Alkalinity	310.1	1	20.9	mg/L $CaCO_3$/L
COD	410.1	50	<50	mg/L
Hardness	130.2	1	23.8	mg/L $CaCO_3$/L
Total Suspend Solids	160.2	1	26	mg/L

AR301784

NITTRAN ERASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
WATERS

CLIENT NAME Environmental Strategies

CLIENT SAMPLE ID SW-3

REPORT DATE _____

NEAI SAMPLE ID 7163.72.81

CONTRACT # ESTR-8001-002

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD		RESULT	UNITS
Cr total	218.2	10	<10	ug/L
Cr VI	SM 312B	20	<20	ug/L
Alkalinity	310.1	1	21.3	mg CaCO3/L
COD	410.1	50	<50	mg/L
Hardness	130.2	1	89.7	mg CaCO3/L
Total Suspended Solids	160.2	1	88	mg/L

AR301785

(8)

NUS/TRW ENSCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
WATERS

CLIENT NAME Environmental Strategies

CLIENT SAMPLE ID SW-4

REPORT DATE _____

NEAL SAMPLE ID 71473,82

CONTRACT # ESTR-8001-002

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD		RESULT	UNITS
Cr, total	218.2	10	<10	ug/L
Cr VI	SM 312B	20	<20	ug/L
Alkalinity	310.1	1	43.7	mg $CaCO_3$/L
COD	410.1	50	<50	mg/L
Hardness	130.2	1	159	mg $CaCO_3$/L
Total Suspended Solids	160.2	1	17	mg/L
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NITTMAN EDASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
WATERS

CLIENT NAME Environmental Strategies

REPORT DATE _____

CONTRACT # ES1B-8001-002

CLIENT SAMPLE ID SW-6

NEAT SAMPLE ID 71660, 75, 84

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD		RESULT	UNITS
Cr total	218.2	10	<10	ug/L
Cr VI	SM 312B	20	<20	ug/L
Alkalinity	310.1	1	33.0	mg $CaCO_3$/L
COD	410.1	50	72	mg/L
Hardness	130.2	1	6.12	mg $CaCO_3$/L
Total Suspended Solids	160.2	1	6	mg/L

AR301787

(8)

NITTMAN ERASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
WATERS

CLIENT NAME Environmental Strategies

REPORT DATE _____

CONTRACT # ESTR-8001-002

CLIENT SAMPLE ID SW-1

NEAT SAMPLE ID 7167 76.85

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD		RESULT	UNITS
Cr total	218.2	10	<10	ug/L
Cr VI	SM 312B	20	<20	ug/L
Alkalinity	310.1	1	32.8	mg CaCO3/L
COD	410.1	50	222	mg/L
Hardness	130.2	1	69.9	mg CaCO3/L
Total Suspended Solids	160.2	1	17	mg/L
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BITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
WATERS

CLIENT NAME Environmental Strategies

CLIENT SAMPLE ID SD-8

REPORT DATE _____

BEAI SAMPLE ID 7168,72,86

CONTRACT # ESIR-8001-002

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD		RESULT	UNITS
Cr total	218.2	10	<10	ug/L
Cr VI	SM 312B	20	<20	ug/L
Alkalinity	310.1	1	69.5	mg/L CaCO3/L
COD	410.1	50	348	mg/L
Hardness	130.2	~~10~~ 1	31.20	mg/L CaCO3/L
Total Suspended Solids	160.2	1	53	mg/L

AR301789

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WITTMAN ENGINEERED ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
WATERS

CLIENT NAME Environmental Strategies

REPORT DATE _____

CONTRACT # ES12-8001-002

CLIENT SAMPLE ID SW-9

WEAI SAMPLE ID 7109,78,87

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD		RESULT	UNITS
Cr total	218.2	10	<10	ug/L
Cr VI	SM 312B	20	<20	ug/L
Alkalinity	310.1	1	80.3	mg/L $CaCO_3$/L
COD	410.1	50	84	mg/L
Hardness	130.2	1	89.7	mg/L $CaCO_3$/L
Total Suspended Solids	160.2	1	67	mg/L
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AR301790

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WITTMAN ENDECO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
SOILS

CLIENT NAME Environmental Strategies
REPORT DATE _____
CONTRACT # ESTR-8001-002

CLIENT SAMPLE ID SED1
WEAI SAMPLE ID 7153
REPORT PREPARED BY _____
DATA RELEASED BY _____

PARAMETER	EPA METHOD	IDL	RESULT	UNITS
Cr, total	218.2	2	23	mg/kg
Cr VI	SM 312B (X)	0.2	<0.6	mg/kg
Alkalinity	310.1	10	571	mg $CaCO_3$/kg
COD	410.1	3500	154,000	mg/kg
Hardness	130.2	10	135	mg $CaCO_3$/kg
% SOLIDS	EPA CLP-M	—	34.7	%

AR301791

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NUS/TRW ENSCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
5015

CLIENT NAME: Environmental Strategies
REPORT DATE: _____
CONTRACT #: ESTR-8001-002

CLIENT SAMPLE ID: SED2
NEA SAMPLE ID: 7154
REPORT PREPARED BY: _____
DATA RELEASED BY: _____

PARAMETER	EPA METHOD	IDL	RESULT	UNITS
Cr, total	218.2	2	7.5	mg/kg
Cr VI	SM 312B	0.2	<0.3	mg/kg
Alkalinity	310.1	10	164	mg CaCO3/kg
COD	410.1	2500	21,200	mg/kg
Hardness	130.2	10	56	mg CaCO3/kg
% SOLIDS	EPA CLP-M	—	68.1	%

AR301792

NITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
SOILS

CLIENT NAME: Environmental Stategies
REPORT DATE: _____
CONTRACT #: ESTR-8001-002

CLIENT SAMPLE ID: SED 3
NEA SAMPLE ID: 7155
REPORT PREPARED BY: _____
DATA RELEASED BY: _____

PARAMETER	EPA METHOD	IDL	RESULT	UNITS
Cr, total	218.2	2	5.2	mg/kg
Cr VI	SM 312B	~~10~~ ~~5~~.2	<0.3	mg/kg
Alkalinity	310.1	10	171	mg $CaCO_3$/kg
COD	410.1	2500	39,900	mg/kg
Hardness	130.2	10	129	mg $CaCO_3$/kg
% SOLIDS	EPA CLP-M	—	59.2	%

AR301793

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NITTHAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
SOILS

CLIENT NAME Environmental Strategies
REPORT DATE _____
CONTRACT # ESTR-8001-002

CLIENT SAMPLE ID SED 4
NEAT SAMPLE ID 7156
REPORT PREPARED BY _____
DATA RELEASED BY _____

PARAMETER	EPA METHOD	IDL	RESULT	UNITS
Cr, total	218.2	2	7.3	mg/kg
Cr VI	SM 312B (DX)	X.2	<0.4	mg/kg
Alkalinity	310.1	10	465	mg $CaCO_3$/kg
COD	410.1	2500	32,300	mg/kg
Hardness	130.2	10	826	mg $CaCO_3$/kg
% SOLIDS	EPA CLP-M	—	55.1	%

AR301794

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WITTMAN ENASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
SOILS

CLIENT NAME: Environmental Strategies
REPORT DATE: _____
CONTRACT #: ESTR-8001-002

CLIENT SAMPLE ID: SED 6
WEAI SAMPLE ID: 7158
REPORT PREPARED BY: _____
DATA RELEASED BY: _____

PARAMETER	EPA METHOD	IDL	RESULT	UNITS
Cr, total	218.2	2	26	mg/kg
Cr VI	SM 312B	1.2	21.4	mg/kg
Alkalinity	310.1	10	983	mg $CaCO_3$/kg
COD	410.1	2500	663,000	mg/kg
Hardness	130.2	10	3620	mg $CaCO_3$/kg
% SOLIDS	EPA CLP-M	—	14.6	%

AR301795

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NITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
SOILS

CLIENT NAME Environmental Strategies
REPORT DATE _____
CONTRACT # ESTR-8001-002

CLIENT SAMPLE ID SED 7
NEAI SAMPLE ID 7159
REPORT PREPARED BY _____
DATA RELEASED BY _____

PARAMETER	EPA METHOD	IDL	RESULT	UNITS
Cr, total	218.2	2	5.9	mg/kg
Cr VI	SM 312B	0.2	<0.3	mg/kg
Alkalinity	310.1	10	61	mg CaCO3/kg
COD	410.1	3500	13,600	mg/kg
Hardness	130.2	10	208	mg CaCO3/kg
% SOLIDS	EPA CLP-M	—	71.8	%

AR301796

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WITTMAN ENSCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS
SOILS

CLIENT NAME Environmental Strategies

REPORT DATE _____

CONTRACT # ESTR-8001-002

CLIENT SAMPLE ID SED 8

WEAI SAMPLE ID 7160

REPORT PREPARED BY _____

DATA RELEASED BY _____

PARAMETER	EPA METHOD	IDL	RESULT	UNITS
Cr, total	218.2	2	37	mg/kg
Cr VI	SM 312B	~~10~~ 0.2	<0.5	mg/kg
Alkalinity	310.1	10	828	mg $CaCO_3$/kg
COD	410.1	2500	199,000	mg/kg
Hardness	130.2	10	915	mg $CaCO_3$/kg
% SOLIDS	EPA CLP-M	—	41.7	%

AR301797

Hittman Ebasco Associates Inc. 12/10/87

ESTR-8061

HEAI #	Client ID	Date Analyzed	TCE	
7191	SW-1	12/4/87	<.10	ug/L
7192	SW-2	12/4/87	<.10	ug/L
7193	SW-3	12/2/87	54	ug/L
7194	SW-4	12/5/87	43	ug/L
7195	SW-6	12/5/87	35	ug/L
7196	SW-7	12/5/87	<.10	ug/L
7197	SW-8	12/5/87	0.40	ug/L
7198	SW-9	12/5/87	34	ug/L
7199	SW-10	12/1/87	<.10	ug/L
7200	BLANK	12/5/87	<.10	ug/L
7201	SED 1	12/8/87	<.20	ug/Kg
7202	SED 2	12/8/87	<.20	ug/Kg
7203	SED 3	12/8/87	0.58	ug/Kg
7204	SED 4	12/8/87	0.30	ug/Kg
7205	SED 6	12/8/87	<.20	ug/Kg
7206	SED 7	12/8/87	<.20	ug/Kg
7207	SED 8	12/8/87	<.20	ug/Kg

Data release authorized by:

Julie Dixon
Organic Section Manager

TCE = Trichloroethene

AR301798

FORM I

ENVIRONMENTAL STRATEGIES
ESTR-8061-002

CLIENT SAMPLE ID
SED 5

DATE _____

INORGANIC ANALYSIS DATA SHEET

LAB NAME: HITTMAN EBASCO ASSOCIATES INC.
SOW NO. 7/85
LAB SAMPLE ID.NO. 7157

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION: LOW ✓ MEDIUM _____
MATRIX: WATER _____ SOIL ✓ SLUDGE _____ OTHER _____

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

1. ANTIMONY	0.9UF	8. MERCURY	0.2UCV	15. HEXAVALENT CHROMIUM	0.3 U
2. ARSENIC	[3.1]F	9. NICKEL	15 P	16. ALKALINITY	34 mg $CaCO_3$/Kg
3. BERYLLIUM	0.6UP	10. SELENIUM	16 UFN (Exp 1-6-88)	17. CHEMICAL OXYGEN DEMAND	24,500 N mg
4. CADMIUM	1.2UP	11. SILVER	0.2 3.2UFN	18. HARDNESS	724 mg $CaCO_3$/Kg
5. CHROMIUM	8.9F*	12. THALLIUM	1.3UFN	19. TOTAL SUSPENDED SOLIDS	N/A
6. COPPER	[3.2]P	13. ZINC	50 PE		
7. LEAD	7.1F	14. % SOLIDS	61.8		

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: E = serial dilution out of control
Se dilution factor = 10x

INORGANIC SECTION MANAGER _____

FORM I

ENVIRONMENTAL STRATEGIES
ESTR-8061-002

CLIENT SAMPLE ID
SW-5

DATE _____

INORGANIC ANALYSIS DATA SHEET

LAB NAME: HITTMAN EBASCO ASSOCIATES INC.
SOW NO. 7/85
LAB SAMPLE ID.NO. 7165, 7174, 7183

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION: LOW ✓ MEDIUM _____
MATRIX: WATER ✓ SOIL _____ SLUDGE _____ OTHER _____

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

1. ANTIMONY	3.2UFN	8. MERCURY	0.2UCV	15. HEXAVALENT CHROMIUM	20U
2. ARSENIC	1.4UF	9. NICKEL	[30]P	16. ALKALINITY	37.3 mg/L $CaCO_3$
3. BERYLLIUM	2.0UP	10. SELENIUM	1.7UFN	17. CHEMICAL OXYGEN DEMAND	62 mg/L
4. CADMIUM	4.1UP	11. SILVER	[1.0]FN	18. HARDNESS	305N mg/L $CaCO_3$/L
5. CHROMIUM	[2.6]F	12. THALLIUM	100UFN	19. TOTAL SUSPENDED SOLIDS	5
6. COPPER	9.1UP	13. ZINC	27P		
7. LEAD	[4.7]FSN	14. % SOLIDS	N/A		

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: 10X dilution on Thallium

INORGANIC SECTION MANAGER _____

FORM II A

Q.C. REPORT NO._____ CASE NO.: ESTR-8061-002

ENVIRONMENTAL STRATEGIES

INITIAL AND CONTINUING CALIBRATION VERIFICATION SOW NO.: 7/85

LAB NAME: HITTMAN EBASCO ASSOC. INC. UNITS ug/L

DATE _____

COMPOUND	INITIAL CALIB. TRUE VALUE	INITIAL CALIB. FOUND	INITIAL CALIB. %R	CONTINUING CALIBRATION TRUE VALUE	CONTINUING CALIBRATION FOUND	CONTINUING CALIBRATION %R	FOUND	%R	METHOD
1. ANTIMONY	101	96	95	101	100	99	105	104	F
2. ARSENIC	49	50	102	49	53	108	51	104	F
3. BERYLLIUM	481	497	103	500	522	104	521	104	P
4. CADMIUM	489	474	97	500	509	102	514	103	P
5. CHROMIUM	51	52	102	51	53	104	53	104	F
6. COPPER	542	498	92	500	501	100	507	101	P
7. LEAD	45	48	107	45	46	102	49	109	F
MERCURY	5.2	5.1	98	5.2	5.3	102			C.V
9. NICKEL	4000	3970	99	4000	3910	98	3910	98	P
10. SELENIUM	20	19	95	20	20	100	19	95	F
11. SILVER	49	53	108	49	51	104	51	104	F
12. THALLIUM	48	51	106	48	50	104	50	104	F
13. ZINC	3100	2940	95	500	482	96	482	96	P
14. CHROMIUM VI	N/A								SM 312 B
15. ALKALINITY, mg/L	141	154	109	141	154	109	136	96	310.1
16. CHEMICAL OXYGEN DEMAND	N/A								410.1
17. HARDNESS, mg/L	365	347	95	365	345	95			130.2
18. TOTAL SUSPENDED SOLIDS mg/L	22	22	100	22	18	82			160.2

FOR INITIAL AND CONTINUING CALIBRATION SOURCE SEE FOLLOWING

FORM II B

Q.C. REPORT NO._____ CASE NO.: ESTR-8061-002

ENVIRONMENTAL STRATEGIES

INITIAL AND CONTINUING CALIBRATION VERIFICATION SOW NO.: 7/85

LAB NAME: NITTMAN EBASCO ASSOC. INC. UNITS _____

DATE _____

COMPOUND	INITIAL CALIB. TRUE VALUE	FOUND	%R	CONTINUING CALIBRATION TRUE VALUE	FOUND	%R	FOUND	%R	METHOD
1. ANTIMONY									
2. ARSENIC	49	49	100	49	50	102			F
3. BERYLLIUM									
4. CADMIUM									
5. CHROMIUM				51	55	108			F
6. COPPER									
7. LEAD				45	47	104	46	102	F
8. MERCURY									
9. NICKEL									
10. SELENIUM				20 FAP, 1.05					
11. SILVER									
12. THALLIUM				FAP 1.05 50 48	51	100			F
13. ZINC									
14. CHROMIUM VI									
15. ALKALINITY, mg/L	141	134	95	141	137	97			310.1
16. CHEMICAL OXYGEN DEMAND	N/A								410.1
17. HARDNESS, mg/L	365	344	94	365	344	94			130.2
18. TOTAL SUSPENDED SOLIDS mg/L	22	20	91	22	21	95			160.2

FOR INITIAL AND CONTINUING CALIBRATION SOURCE SEE FOLLOWING

AR301802

FORM II C

Q.C. REPORT NO._____ CASE NO.: ESTR-8061-002

ENVIRONMENTAL STRATEGIES

INITIAL AND CONTINUING CALIBRATION VERIFICATION SOW NO.: 7/85

LAB NAME: HITTMAN EBASCO ASSOC. INC. UNITS ug/l

DATE _____

COMPOUND	INITIAL CALIB.			CONTINUING CALIBRATION					
	TRUE VALUE	FOUND	%R	TRUE VALUE	FOUND	%R	FOUND	%R	METHOD
1. ANTIMONY									
2. ARSENIC									
3. BERYLLIUM									
4. CADMIUM									
5. CHROMIUM	51	46	90	51	47	92	48	94	F
6. COPPER									
LEAD									
8. MERCURY									
9. NICKEL									
10. SELENIUM									
11. SILVER									
12. THALLIUM									
13. ZINC									
14. CHROMIUM VI									
15. ALKALINITY									
16. CHEMICAL OXYGEN DEMAND									
17. HARDNESS									
18. TOTAL SUSPENDED SOLIDS									

FOR INITIAL AND CONTINUING CALIBRATION SOURCE SEE FOLLOWING

FORM II D

Q.C. REPORT NO._____ CASE NO.: ESTR-8061-002

ENVIRONMENTAL STRATEGIES

INITIAL AND CONTINUING CALIBRATION VERIFICATION SOW NO.: 7/85

LAB NAME: HITTMAN EBASCO ASSOC. INC. UNITS ug/L

DATE _____

COMPOUND	INITIAL CALIB. TRUE VALUE	FOUND	%R	CONTINUING CALIBRATION TRUE VALUE	FOUND	%R	FOUND	%R	METHOD
1. ANTIMONY									
2. ARSENIC									
3. BERYLLIUM									
4. CADMIUM									
5. CHROMIUM	51	49	96	51	49	96			F
6. COPPER									
7. LEAD									
8. MERCURY									
9. NICKEL									
10. SELENIUM									
11. SILVER									
12. THALLIUM									
13. ZINC									
14. CHROMIUM VI									
15. ALKALINITY									
16. CHEMICAL OXYGEN DEMAND									
17. HARDNESS									
18. TOTAL SUSPENDED SOLIDS									

FOR INITIAL AND CONTINUING CALIBRATION SOURCE SEE FOLLOWING

AR301804

LAB NAME: NITTMAN EBASCO ASSOCIATES, INC. ICV AND CCV SOURCES PROJECT: ENVIRONMENTAL STRATEGIES
DATE _____ CONTRACT NO: ESTR-8061-002

ELEMENT	ICV SOURCE	CCV SOURCE
ANTIMONY	ICV#3	ICV#3
ARSENIC	ICV#2	ICV#2
BERYLLIUM	ICV-IX-487	Fisher 500
CADMIUM	ICV-IX-487	Fisher 500
CHROMIUM	ICV#1	ICV#1
COPPER	ICV-IX-487	Fisher 500
LEAD	ICV#1	ICV#1
MERCURY	ICV#5	ICV#5
SELENIUM	ICV#2	ICV#2
SILVER	ICV#4	ICV#4
THALLIUM	ICV#4	ICV#4
ZINC	ICV-IX-487	Fisher 500
CHROMIUM VI	none available	
ALKALINITY	ERA Minerals #9912 →	
COD	N/A	
HARDNESS	ERA Hardness #9909 →	
TSS	ERA Hardness #9909 →	
NICKEL	Fisher 4000	Fisher 4000

AR301805

FORM III A

Q.C. REPORT NO._____

BLANKS

CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

UNITS ug/L

LAB NAME: HITTMAN EBASCO ASSOC, INC.

MATRIX: water + soil

DATE _____

COMPOUND	INITIAL CALIBRATION BLANK VALUE	CONTINUING CALIBRATION BLANK VALUE 1	2	3	4	PREPARATION BLANK MATRIX: water ug/L	MATRIX: soil mg/kg
1. ANTIMONY	3.2U	3.2U	3.2U	3.2U		3.2U	0.6U
2. ARSENIC	1.4U	1.4U	1.4U	1.4U		1.4U	0.2U
3. BERYLLIUM	2.0U	2.0U	2.0U			2.0U	0.4U
4. CADMIUM	4.1U	4.1U	4.1U			4.1U	0.8U
5. CHROMIUM	0.6U	[0.7]	0.6U	0.6U	0.6U	[1.5]	[0.6]
6. COPPER	9.1U	9.1U	9.1U			9.1U	1.7U
7. LEAD	2.5U	2.5U	2.5U	2.5U	2.5U	[4.0]	0.4U
8. MERCURY	0.2U	0.2U	0.2U			0.2U	0.1U
9. NICKEL	[19]	[25]	13U			[16]	[2.9]
10. SELENIUM	1.7U	1.7U	1.7U	1.7U		1.7U	0.3U
11. SILVER	0.7U	0.7U	0.7U	0.7U		0.7U	0.1U
12. THALLIUM	3.9U	3.9U	3.9U	3.9U	3.9U	3.9U	0.7U
13. ZINC	5.3U	5.3U	5.3U			5.3U	1.0U
14. CHROMIUM VI	20U					20U	0.2U
15. ALKALINITY, mg/L						1U	10U
16. CHEMICAL OXYGEN DEMAND, mg/L						50U	2500U
17. HARDNESS, mg/L						1U	10U
18. TOTAL SUSPENDED SOLIDS, mg/L						1U	

FORM III B

Q.C. REPORT NO._____

BLANKS

CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

UNITS ug/L

LAB NAME: NITTMAN EBASCO ASSOC. INC.

MATRIX: water

DATE _____

COMPOUND	INITIAL CALIBRATION BLANK VALUE	CONTINUING CALIBRATION BLANK VALUE 1	2	3	4	PREPARATION BLANK MATRIX: water	MATRIX:	
1. ANTIMONY						3.2U		
2. ARSENIC	1.4U	1.4U	1.4U					
3. BERYLLIUM						2.0U		
4. CADMIUM						4.1U		
5. CHROMIUM	0.6U	[7.8]	0.6U	0.6U				
6. COPPER						9.1U		
7. LEAD	FB 2.5U	2.5U						
8. MERCURY								
9. NICKEL						[19]		
10. SELENIUM								
11. SILVER								
12. THALLIUM								
13. ZINC						5.9U		
14. CHROMIUM VI	20U							
15. ALKALINITY								
16. CHEMICAL OXYGEN DEMAND								
17. HARDNESS								
18. TOTAL SUSPENDED SOLIDS mg/L						1U		

AR301807

FORM III C

Q.C. REPORT NO. _____

BLANKS

CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

UNITS ug/L

MATRIX: SOIL

LAB NAME: HITTMAN EBASCO ASSOC. INC.

DATE _____

COMPOUND	INITIAL CALIBRATION BLANK VALUE	CONTINUING CALIBRATION BLANK VALUE 1	2	3	4	PREPARATION BLANK MATRIX: _____	MATRIX: _____
1. ANTIMONY							
2. ARSENIC							
3. BERYLLIUM							
4. CADMIUM							
5. CHROMIUM	0.64	[0.67]	0.64				
6. COPPER							
7. LEAD							
8. MERCURY							
9. NICKEL							
10. SELENIUM							
11. SILVER							
12. THALLIUM							
13. ZINC							
14. CHROMIUM VI							
15. ALKALINITY							
16. CHEMICAL OXYGEN DEMAND							
17. HARDNESS							
18. TOTAL SUSPENDED SOLIDS							

FORM IV A

Q.C. REPORT NO._____

ICP INTERFERENCE CHECK SAMPLE

LAB NAME: NITTMAN EBASCO ASSOC. INC.

DATE _____

CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES
CHECK SAMPLE I.D.: ICS AB 0387

CHECK SAMPLE SOURCE: EPA

UNITS ug/L

COMPOUND	CONTROL LIMITS 1 MEAN	CONTROL LIMITS 1 STD. DEV.	TRUE 2	INITAL OBSERVED	%R	FINAL OBSERVED	%R
1. ANTIMONY							
2. ARSENIC							
3. BERYLLIUM			474	465	98	466	98
4. CADMIUM			909	891	98	891	98
5. CHROMIUM							
6. COPPER			534	478	90	468	88
7. LEAD							
8. MERCURY							
9. NICKEL			916	896	98	917	100
10. SELENIUM							
11. SILVER							
12. THALLIUM							
13. ZINC			973	901	93	894	92

1 MEAN VALUE BASED ON n = 5

2 TRUE VALUE OF EPA ICP INTERFERENCE CHECK SAMPLE OR CONTRACTOR STANDARD

FORM V A

SPIKES

Q.C. REPORT NO.

LAB NAME: NITTMAN EBASCO ASSOCIATES INC.

CASE: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

SAMPLE NO. 7157

DATE _____

UNITS ug/L

MATRIX Soil

COMPOUND	CONTROL LIMIT	SPIKED SAMPLE RESULT(SSR)	SAMPLE RESULT(SR)	SPIKE ADDED(SA)	%R	
ANALYTES:						
ANTIMONY	75-125	51	3.2U	50	102	
ARSENIC	75-125	56	[9.7]	40	116	
BERYLLIUM	75-125	48	2.0U	50	96	
CADMIUM	75-125	46	4.1U	50	92	
CHROMIUM	75-125	43	28	20	75	
COPPER	75-125	234	[11]	250	89	
LEAD	75-125	165	22	50	86	
MERCURY	75-125	0.8	0.2U	1.0	80	
NICKEL	75-125	496	53	500	89	
SELENIUM	75-125	[3.9]	5.0U	10	33	N
SILVER	75-125	33	0.7 [4.1U]	50	66	N
THALLIUM	75-125	27	3.9U	50	54	N
ZINC	75-125	701	174	500	105	
CHROMIUM VI	75-125	N/A				
ALKALINITY, mg/L $CaCO_3$	75-125 (7153)	264	20.3	250	97	
COD, mg/L	75-125 (7159)	227	201	95	21	N
HARDNESS, mg/L $CaCO_3$	75-125 EPA 130.2 (7140)	507	15.3	500	98	
[illegible]	75-125	N/A				

%R = [(SSR - SR) / SA] * 100
N = OUT OF CONTROL

AR301810

FORM V B

SPIKES

Q.C. REPORT NO.

CASE: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

LAB NAME: NITTMAN EBASCO ASSOCIATES INC.

SAMPLE NO. 7183

DATE _____

UNITS ug/L

MATRIX water

COMPOUND	CONTROL LIMIT	SPIKED SAMPLE RESULT(SSR)	SAMPLE RESULT(SR)	SPIKE ADDED(SA)	%R	
ANALYTES:						
ANTIMONY	75-125	[5.5]	3.2U	50	11	N
ARSENIC	75-125	71	1.4U	80	89	
BERYLLIUM	75-125	46	2.0U	50	92	
CADMIUM	75-125	40	4.1U	50	80	
CHROMIUM	75-125	37	[2.6]	40	86	
COPPER	75-125	224	9.1U	250	90	
LEAD	75-125	28	[4.7]	40	58	N
MERCURY	75-125	*				
NICKEL	75-125	344	[30]	400	79	
SELENIUM	75-125	10	1.7U	20	50	N
SILVER	75-125	25	[1.0]	100	24	N
THALLIUM	75-125	[9.0]	100U	50	18	N
ZINC	75-125	193	27	200	83	
CHROMIUM VI	75-125	N/A				
ALKALINITY, mg/L as $CaCO_3$	75-125 (7169)	386	80.3	250	98	
COD, mg/L	75-125 (7170)	112	<50	95	118	
HARDNESS mg $CaCO_3$/L	75-125 (7187)	319	89.7	500	46	N
JS	75-125	N/A				

%R = ((SSR - SR) / SA) * 100
N = OUT OF CONTROL

* Please see case narrative

FORM VI A
DUPLICATES

LAB NAME: HITTMAN ESASCO ASSOC. INC.

PROJECT: ENVIRONMENTAL STRATEGIES
CASE NO.: ESTR-8061-002
SAMPLE NUMBER 7151

DATE _____ MATRIX: SOIL

UNITS ug/L

COMPOUND	CONTROL LIMIT	SAMPLE (S)	DUPLICATE (D)	RPD
ANTIMONY		3.2U	3.2U	NC
ARSENIC		[9.7]	[7.3]	NC
BERYLLIUM		2.0U	2.0U	NC
CADMIUM		4.1U	4.1U	NC
CHROMIUM	±10ug/L	28	16	55 *
COPPER		[11]	9.1U	NC
LEAD	±5ug/L	22	19	15
MERCURY		0.2U	0.2U	NC
NICKEL	±40ug/L	53	43	21
SELENIUM		50U	50U	NC
SILVER		0.7U	0.7U	NC
THALLIUM		3.9U	3.9U	NC
ZINC	±20%	174	186	6.7
CHROMIUM VI (7153)		20U	20U	NC
ALKALINITY (7153) mg/L	±20%	20.3	20.3	0.0
COD (7100) mg/L	±20%	332	333	0.3
HARDNESS (7160) mg/L	±20%	37.2	38.2	2.7
TSS		N/A		

AR301812

FORM VI B
DUPLICATES

LAB NAME: NITTMAN EBASCO ASSOC. INC.

PROJECT: ENVIRONMENTAL STRATEGIES
CASE NO.: ESTR-8061.002
SAMPLE NUMBER 7183

DATE _____

MATRIX: WATER

UNITS ug/L

COMPOUND	CONTROL LIMIT	SAMPLE (S)	DUPLICATE (D)	RPD
ANTIMONY		3.2U	3.2U	NC
ARSENIC		1.4U	*	
BERYLLIUM		2.0U	2.0U	NC
CADMIUM		4.1U	4.1U	0 NC
CHROMIUM		[2.0]	*	
COPPER		9.1U	9.1U	NC
LEAD		[4.7]	*	
MERCURY		0.2U	*	
NICKEL		[30]	[29]	NC
SELENIUM		1.7U	*	
SILVER		[1.0]	*	
THALLIUM		100U	*	
ZINC	±20ug/L	27	27	0.0
CHROMIUM VI				
ALKALINITY (9169) mg/L	±20%	80.3	80.0	0.4
COD mg/L (9170)		50U	50U	NC
HARDNESS mg/L (9187)	±20%	89.7	89.3	0.4
TSS		N/A		

* Please see case narrative

AR301813

FORM VIIA

Q.C. REPORT NO._____

INSTRUMENT DETECTION LIMITS AND

LAB NAME: HITTMAN EBASCO ASSOCIATES INC. LABORATORY CONTROL SAMPLE CASE: ESTR-8061-002

ENVIRONMENTAL STATEGIES

DATE _____ UNITS ug/L

COMPOUND	REQUIRED DETECTION LIMITS (CRDL)-ug/l	INSTRUMENT DETECTION LIMITS (IDL)-ug/l ICP/AA	FURNACE	LAB CONTROL SAMPLE ug/L TRUE	FOUND	ug/Kg %R
ANALYTES:						
ANTIMONY	60		~~2.0~~ 3.2	80	0	0 *
ARSENIC	10		~~3.5~~ 1.4	~~80~~ 80 EW 1.0	73	91
BERYLLIUM	5.0	2.0		300	294	98
CADMIUM	5.0	4.1		50	49	98
CHROMIUM	10		1.0	80	75	94
COPPER	25	9.1		400	403	101
LEAD	5.0		~~2.0~~ 2.5	80	79	99
MERCURY	0.2	0.17		7.0	6.6	94
NICKEL	40	13		300	302	101
SELENIUM	5.0		~~2.0~~ 1.7	80	78	98
SILVER	10		~~1.0~~ 0.7	40	36	90
THALLIUM	10		~~5.0~~ 3.9	80	73	91
ZINC	20	5.3		400	394	99
CHROMIUM VI	~~10~~ 20			N/A		
ALKALINITY	1					
COD	50			190	182	96
HARDNESS	1					
TSS	1					

*Please see case narrative

AR301814

FORM VII B

Q.C. REPORT NO._____

INSTRUMENT DETECTION LIMITS AND

LAB NAME: NITTMAN EBASCO ASSOCIATES INC. LABORATORY CONTROL SAMPLE CASE: ESTR-8061-002

ENVIRONMENTAL STATEGIES

DATE _____ UNITS ug/L

COMPOUND	REQUIRED DETECTION LIMITS (CRDL)-ug/l	INSTRUMENT DETECTION LIMITS (IDL)-ug/l ICP/AA	FURNACE	LAB CONTROL SAMPLE ug/L TRUE	FOUND	mg/Kg %R
ANALYTES:						
ANTIMONY	60		~~3.5~~ 3.2	80	0	0 *
ARSENIC	10		~~3.5~~ 1.4			
BERYLLIUM	5.0	2.0		300	282	94
CADMIUM	5.0	4.1		50	40	80
CHROMIUM	10		1.0	80	82	103
COPPER	25	9.1		400	382	96
LEAD	5.0		~~3.5~~ 2.5	80	68	85
MERCURY	0.2	0.17				
NICKEL	40	13		300	281	94
SELENIUM	5.0		0.9			
SILVER	10		1.3			
THALLIUM	10		5.5	80	68	85
ZINC	20	5.3		400	349	87
CHROMIUM VI	10					
ALKALINITY	1					
COD	50			190	176	93
HARDNESS	1					
TSS	1					

*Please see case narrative

Form VIII

Q.C. Report No. _____

STANDARD ADDITION RESULTS

LAB NAME HITTMAN EBASCO ASSOC. CASE NO. ESB-8001-002

DATE _____ UNITS: ug/L

EPA Sample #	Element	Matrix	0 ADD ABS.	1 ADD CON.	1 ADD ABS.[2]	2 ADD CON.	2 ADD ABS.[2]	3 ADD CON.	3 ADD ABS.[2]	FINAL CON.[3]	r*
LCSA	AS	water	.0795	10	.1285	20	.1685	40	.2585	7.3	.999
LCSC	Pb	water	.088	10	.138	20	.198	40	.296	6.8	.999
7157 DUP	"	soil	.081	10	.124	20	.165	40	.250	19	.999
7183	"	water	.017	10	.057	20	.092	40	.169	[4.7]	.999
7158	Cr	soil	.169	10	.239	20	.313	40	.473	22	.999

1 Matrix abbreviations: Low Solid, LS; Medium Solid, MS; Low Aqueous, LA; Medium Aqueous, MA.

2 CON is the concentration added, ABS. is the instrument readout in absorbance or concentration.

3 Concentration as determined by MSA

*"r" is the correlation coefficient.

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

FORM IX

ICP SERIAL DILUTIONS

PROJECT: ENVIRONMENTAL STRATEGIES

CONTRACT NO.: ESTR-0061-002

LAB NAME: HITTMAN EBASCO ASSOC. INC.

SAMPLE ID: 7157

DATE _____

MATRIX: SOIL

UNITS ug/L

COMPOUND	INITIAL SAMPLE CONCENTRATION (I)	SERIAL DILUTION RESULT (S)	% DIFFERENCE	
ANTIMONY				
ARSENIC				
BERYLLIUM	NR			
CADMIUM	NR			
CHROMIUM				
COPPER	NR			
EAD				
MERCURY				
NICKEL	NR			
SELENIUM				
SILVER				
THALLIUM				
ZINC	174	85	51	E

NR = NOT REQUIRED; INITIAL SAMPLE CONCENTRATION LESS THAN 10X IDL

PERCENT DIFFERENCE = $\frac{|I - S|}{I} \times 100$

NA = ELEMENT NOT ANALYZED FOR THIS CONTRACT.

AR301817

Form X

QC Report No. _____

HOLDING TIMES

LAB NAME HITTMAN ERASCO

DATE _____ CASE NO. ESIA: 8010I-002

EPA Sample No.	Matrix	Date Received	Mercury Prep Date	Mercury Holding Time (Days)	CN Prep Date	CN Holding Time (Days)
SED 5	SOIL	12/4/87	12/21/87	17	N/A	
SW 5	water	1	1	1		

HITTMAN EBASCO ASSOCIATES INC.
A Subsidiary of EBASCO SERVICES INCORPORATED
HITTMAN EBASCO
9151 Rumsey Road, Columbia, MD 21045
(301) 730-8525

January 11, 1988

Mr. Jim Bulman
Environmental Strategies
8521 Leesburg Pike
Vienna, Virginia 22108

Dear Mr. Bulman:

Enclosed is the full CLP data package and final non-CLP wet chemistry report for the samples received December 4, 1987. The organic CLP data package will follow under separate cover.

The samples were analyzed in accordance with EPA-approved procedures.

Please feel free to call Craig Rice at (301) 730-8525 if you have any questions about this report.

Sincerely,

Elizabeth A. Pickral
Reporting Section Supervisor

ESTR-8061-002
Enclosures
eap

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SW-1

HEAI SAMPLE ID: 7161, 7170, 7179

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	10	<10	ug/L
CHROMIUM, HEXAVALENT	SM 312B	20	<20	ug/L
ALKALINITY	310.1	1	3.5	mgCaCO3/L
CHEMICAL OXYGEN DEMAND	410.1	50	<50	mg/L
HARDNESS	130.2	1	69.7	mgCaCO3/L
TOTAL SUSPENDED SOLIDS	160.2	1	17	mg/L

AR301821

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SW-2

HEAI SAMPLE ID: 7162, 7171, 7180

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	10	<10	ug/L
CHROMIUM, HEXAVALENT	SM 312B	20	<20	ug/L
ALKALINITY	310.1	1	20.9	mgCaCO3/L
CHEMICAL OXYGEN DEMAND	410.1	50	<50	mg/L
HARDNESS	130.2	1	23.8	mgCaCO3/L
TOTAL SUSPENDED SOLIDS	160.2	1	26	mg/L

AR301822

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SW-3

HEAI SAMPLE ID: 7163, 7172, 7181

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	10	<10	ug/L
CHROMIUM, HEXAVALENT	SM 3128	20	<20	ug/L
ALKALINITY	310.1	1	21.3	mgCaCO3/L
CHEMICAL OXYGEN DEMAND	410.1	50	<50	mg/L
DNESS	130.2	1	89.7	mgCaCO3/L
TOTAL SUSPENDED SOLIDS	160.2	1	28	mg/L

AR301823

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SW-4

HEAI SAMPLE ID: 7164, 7173, 7182

REPORT PREPARED BY EHP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	10	<10	ug/L
CHROMIUM, HEXAVALENT	SM 312B	20	<20	ug/L
ALKALINITY	310.1	1	43.7	mgCaCO3/L
CHEMICAL OXYGEN DEMAND	410.1	50	<50	mg/L
HARDNESS	130.2	1	159	mgCaCO3/L
TOTAL SUSPENDED SOLIDS	160.2	1	17	mg/L

AR301824

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SW-6

HEAI SAMPLE ID: 7166, 7175, 7184

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	10	<10	ug/L
CHROMIUM, HEXAVALENT	SM 312B	20	<20	ug/L
ALKALINITY	310.1	1	33.0	mgCaCO3/L
CHEMICAL OXYGEN DEMAND	410.1	50	72	mg/L
HARDNESS	130.2	1	612	mgCaCO3/L
TOTAL SUSPENDED SOLIDS	160.2	1	6	mg/L

AR301825

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SW-7

HEAI SAMPLE ID: 7167, 7176, 7185

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	10	<10	ug/L
CHROMIUM, HEXAVALENT	SM 312B	20	<20	ug/L
ALKALINITY	310.1	1	32.0	mgCaCO3/L
CHEMICAL OXYGEN DEMAND	410.1	50	222	mg/L
HARDNESS	130.2	1	69.9	mgCaCO3/L
TOTAL SUSPENDED SOLIDS	160.2	1	17	mg/L

AR301826

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SW-8

HEAI SAMPLE ID: 7168, 7177, 7186

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	10	<10	ug/L
CHROMIUM, HEXAVALENT	SM 312B	20	<20	ug/L
ALKALINITY	310.1	1	69.5	mgCaCO3/L
CHEMICAL OXYGEN DEMAND	410.1	50	348	mg/L
:DNESS	130.2	1	3620	mgCaCO3/L
TOTAL SUSPENDED SOLIDS	160.2	1	53	mg/L

AR301827

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SW-9

HEAI SAMPLE ID: 7169, 7178, 7187

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT		UNITS
CHROMIUM, TOTAL	218.2	10	<10	< 10	ug/L
CHROMIUM, HEXAVALENT	SM 312B	20	<20		ug/L
ALKALINITY	310.1	1	80.3		mgCaCO3/L
CHEMICAL OXYGEN DEMAND	410.1	50	84		mg/L
HARDNESS	130.2	1	89.7		mgCaCO3/L
TOTAL SUSPENDED SOLIDS	160.2	1	67		mg/L

AR301828

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SED 1

HEAI SAMPLE ID: 7153

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	2	23	mg/kg
CHROMIUM, HEXAVALENT	SM 312B	0.2	<0.6	mg/kg
ALKALINITY	310.1	10	571	mgCaCO3/kg
CHEMICAL OXYGEN DEMAND	410.1	2500	154,000	mg/kg
IDNESS	130.2	10	135	mgCaCO3/kg
PERCENT SOLIDS	EPA CLP-M		34.7	%

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SED 2

HEAI SAMPLE ID: 7154

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	2	7.5	mg/kg
CHROMIUM, HEXAVALENT	SM 312B	0.2	<0.3	mg/kg
ALKALINITY	310.1	10	164	mgCaCO3/kg
CHEMICAL OXYGEN DEMAND	410.1	2500	21,200	mg/kg
HARDNESS	130.2	10	56	mgCaCO3/kg
PERCENT SOLIDS	EPA CLP-M		68.1	%

AR301830

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CLIENT SAMPLE ID: SED 3

CONTRACT NO: ESTR-8061-002

HEAI SAMPLE ID: 7155

REPORTING DATE: JANUARY 7, 1988

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	2	5.2	mg/kg
CHROMIUM, HEXAVALENT	SM 312B	0.2	<0.3	mg/kg
ALKALINITY	310.1	10	171	mgCaCO3/kg
CHEMICAL OXYGEN DEMAND	410.1	2500	39,900	mg/kg
:DNESS	130.2	10	129	mgCaCO3/kg
PERCENT SOLIDS	EPA CLP-M		59.2	%

AR301831

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SED 4

HEAI SAMPLE ID: 7156

REPORT PREPARED BY FAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	2	7.3	mg/kg
CHROMIUM, HEXAVALENT	SM 312B	0.2	<0.4	mg/kg
ALKALINITY	310.1	10	465	mgCaCO3/kg
CHEMICAL OXYGEN DEMAND	410.1	2500	32,300	mg/kg
HARDNESS	130.2	10	826	mgCaCO3/kg
PERCENT SOLIDS	EPA CLP-M		55.1	%

AR301832

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SED 6

HEAI SAMPLE ID: 7158

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	2	26	mg/kg
CHROMIUM, HEXAVALENT	SM 312B	0.2	<1.4	mg/kg
ALKALINITY	310.1	10	983	mgCaCO3/kg
CHEMICAL OXYGEN DEMAND	410.1	2500	663,000	mg/kg
HARDNESS	130.2	10	3620	mgCaCO3/kg
PERCENT SOLIDS	EPA CLP-M		14.6	%

AR301833

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CLIENT SAMPLE ID: SED 7

CONTRACT NO: ESTR-8061-002

HEAI SAMPLE ID: 7159

REPORTING DATE: JANUARY 7, 1988

REPORT PREPARED BY

DATA RELEASED BY

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	2	5.9	mg/kg
CHROMIUM, HEXAVALENT	SM 312B	0.2	<0.3	mg/kg
ALKALINITY	310.1	10	61	mgCaCO3/kg
CHEMICAL OXYGEN DEMAND	410.1	2500	13,600	mg/kg
HARDNESS	130.2	10	208	mgCaCO3/kg
PERCENT SOLIDS	EPA CLP-M		71.8	%

AR301834

HITTMAN EBASCO ASSOCIATES, INC.
ANALYTICAL REPORT
SAMPLE RESULTS

CLIENT: ENVIRONMENTAL STRATEGIES

CONTRACT NO: ESTR-8061-002

REPORTING DATE: JANUARY 7, 1988

CLIENT SAMPLE ID: SED 8

HEAI SAMPLE ID: 7160

REPORT PREPARED BY EAP

DATA RELEASED BY PC

PARAMETER	EPA METHOD	DETECTION LIMIT	RESULT	UNITS
CHROMIUM, TOTAL	218.2	2	37	mg/kg
CHROMIUM, HEXAVALENT	SM 3128	0.2	<0.5	mg/kg
ALKALINITY	310.1	10	828	mgCaCO3/kg
CHEMICAL OXYGEN DEMAND	410.1	2500	199,000	mg/kg
HARDNESS	130.2	10	975	mgCaCO3/kg
PERCENT SOLIDS	EPA CLP-M		41.7	%

AR301835

SECTION III CONTINUED

NITTMAN EBASCO ASSOCIATES INC
EPA CONTRACT LAB PROGRAM
CONTRACT 68-01-7056

CASE Environmental Stategies
DATE 1/7/88

DATA PACKAGE INVENTORY

		PAGE NUMBER	NO. of PAGES
SECTION I	DATA FORMS		
SECTION II	AIRBILLS	NA	
	CHAIN OF CUSTODY		
	TRAFFIC REPORTS	NA	
	SAMPLE TAGS	NA	
	SAMPLE RECEIVING INVENTORY	N/A	
	SAMPLE LOGBOOK PAGES		
	SAMPLE TRACKING SHEETS		
	WEEKLY REPORTS	N/A	
	TELEPHONE CONTACT REPORTS	N/A	
SECTION III	ICAP RAW DATA		
SECTION IV	RAW DATA		
	FLAME	N/A	
	FURNACE		
	MERCURY		
	EAP - ~~CYANIDE~~ WET CHEM 1-7-88		
	DIGESTION DATA		
	SPIKING & LCS SOLUTIONS		
	PERCENT SOLIDS ANALYSIS		
SECTION V	LOGBOOKS		
	STANDARDS LOG		
	SAMPLE LOG-IN, LOGOUT		
	PE 603		
	PE 5000		
	ZEEMAN 3030		
	PE 6500		
	ANALYTICAL BALANCES		
	WATER QUALITY		

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

Date 01/07/88

COVER PAGE
INORGANIC ANALYSES DATA PACKAGE

Lab Name HITTMAN EBASCO ASSOC. INC. Case No. Environmental Strategies

SOW No. 7/85 Q.C. Report No. _____

Lab Receipt Date 12/4/87

Sample Numbers

EPA No.	Lab ID No.	EPA No.	Lab ID No.
BED 5	7157		
SW-5	7183		

Comments: _____

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 detecion limit but less than the contract-required detection limit, report the value in brackets (i.e., [10]). Indicate the analytical method used with P (for ICP), A (for Flame AA) or F (for Furnace AA).

U - Indicates element was analyzed for but not detected. Report with the instrument 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.

N - Indicates spike sample recovery is not within control limits.

* - Indicates duplicate analysis is not within control limits.

+ - Indicates the correlation coefficient for method of standard addition is less than 0.995

M - Indicates duplicate injection results exceeded control limits.

Indicate method used: P for ICP; A for Flame AA and F for Furnace.

HITTMAN EBASCO ASSOCIATES, INC.
ENVIRONMENTAL STRATEGIES
PRIORITY POLLUTANT METALS AND WET CHEMISTRY
CASE NARRATIVE

PROBLEMS, COMMENTS AND OBSERVATIONS RELATING TO THE ANALYSIS OF SOIL AND WATER SAMPLES FOR THIRTEEN PRIORITY POLLUTANT METALS, HEXAVALENT CHROMIUM, HARDNESS, ALKALINITY, CHEMICAL OXYGEN DEMAND, AND TOTAL SUSPENDED SOLIDS.

(1) No Antimony Lab Control sample was included with the flame digestion. An insufficient volume of sample was available for redigestion. LCS percent recovery is reported as 0% on Form VII.

(2) An insufficient volume of water sample 5 was received to perform a furnace method duplicate, a Mercury method duplicate or Mercury matrix spike.

(3) Two furnace Lab Control samples were digested on December 14, but only one was required. The extra LCS was analyzed for Chromium, Lead, and Thallium but not for Arsenic, Selenium, and Silver.

(4) The EPA Contract Lab program does not specify protocols for the analysis of Chromium VI, hardness, alkalinity, chemical oxygen demand, and total suspended solids. The laboratory adhered as much as possible to CLP quality control requirements in performing the wet chemistry procedures. Instances in which this was not feasible are cited below:

No ICV/CCV or LCS source was available for hexavalent chromium. The analysis of matrix spikes was omitted. A soil method duplicate was analyzed, but was omitted for the waters.

No LCS source was available for Alkalinity. The QC samples were reported as calibration verification check samples. Units are mgCaCO3/L for the waters and mgCaCO3/kg for the soils.

No ICV/CCV source was available for COD. The QC sample was reported as a lab control sample. Units are mg/L for the waters and mg/kg for the soils.

No LCS source was available for Hardness. The QC samples were reported as calibration verification check samples. Units for reporting are mgCaCO3/L for the waters and mgCaCO3/kg for the soils.

No LCS source was available for Total Suspended Solids. The QC samples were reported as calibration verification check samples. Each sample was analyzed in triplicate, and the average of the two closer results reported. No method duplicate was performed. Spiking is not appropriate for this analysis.

ALL WET CHEMISTRY QC RESULTS ARE REPORTED ON THE CLP FORMS WHEN APPLICABLE.

Report prepared by Elizabeth A Pickral
Elizabeth A. Pickral
Reporting Supervisor

Data released by Phyllis Christopher
Phyllis Christopher
Inorganic Section Manager

Ebasco Associates Inc.

12/10/87

061

RI #	Client ID	Date Analyzed	TCE	
7191	SW-1	12/4/87	(.10	ug/L
7192	SW-2	12/4/87	(.10	ug/L
7193	SW-3	12/2/87	54	ug/L
7194	SW-4	12/5/87	43	ug/L
7195	SW-6	12/5/87	35	ug/L
7196	SW-7	12/5/87	(.10	ug/L
7197	SW-8	12/5/87	0.40	ug/L
7198	SW-9	12/5/87	34	ug/L
7199	SW-10	12/1/87	(.10	ug/L
7200	BLANK	12/5/87	(.10	ug/L
7201	SED 1	12/8/87	(.20	ug/Kg
7202	SED 2	12/8/87	(.20	ug/Kg
7203	SED 3	12/8/87	0.58	ug/Kg
7204	SED 4	12/8/87	0.30	ug/Kg
7205	SED 6	12/8/87	(.20	ug/Kg
7206	SED 7	12/8/87	(.20	ug/Kg
7207	SED 8	12/8/87	(.20	ug/Kg

Data release authorized by:

Julie Dixon
Organic Section Manager

TCE = Trichloroethene

AR301840

FORM 1

ENVIRONMENTAL STRATEGIES
ESTR-8061-002

CLIENT SAMPLE ID
9E05

DATE

INORGANIC ANALYSIS DATA SHEET

LAB NAME: HITTMAN EBASCO ASSOCIATES INC.
SOW NO. 7/85
LAB SAMPLE ID.NO. 7157

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION: LOW ✓ MEDIUM
MATRIX: WATER SOIL ✓ SLUDGE OTHER

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

1. ANTIMONY 0.9UF	8. MERCURY 0.2UCV	15. HEXAVALENT CHROMIUM 0.3 U
2. ARSENIC [3.1]F	9. NICKEL 15 P	16. ALKALINITY 34mgCaCO3/Kg
3. BERYLLIUM 0.6UP	10. SELENIUM 16UFN	17. CHEMICAL OXYGEN DEMAND 86,500 N mg/K
4. CADMIUM 1.2UP	11. SILVER 0.2 3.8UFN (Exp 1-6-88)	18. HARDNESS 724 mgCaCO3/Kg
5. CHROMIUM 8.9F*	12. THALLIUM 1.3UFN	19. TOTAL SUSPENDED SOLIDS N/A
6. COPPER [3.2]P	13. ZINC 50PE	
7. LEAD 7.1F	14. % SOLIDS 41.8	

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: E = serial dilution out of control
Se dilution factor = 10x

INORGANIC SECTION MANAGER

AR301841

FORM I

CLIENT SAMPLE ID
SW-5

DATE

VIRONMENTAL STRATEGIES
STR-8061-002

INORGANIC ANALYSIS DATA SHEET

LAB NAME: HITTMAN EBASCO ASSOCIATES INC.
SOW NO. 7/85
LAB SAMPLE ID.NO. 7165, 7174, 7183

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION: LOW ✓ MEDIUM ____
MATRIX: WATER ____ SOIL ____ SLUDGE ____ OTHER ____

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

1. ANTIMONY	3.2UFN	8. MERCURY	0.2UCV	15. HEXAVALENT CHROMIUM	20U
2. ARSENIC	1.4UF	9. NICKEL	[30]P	16. ALKALINITY	37.3 mg/L $CaCO_3$
3. BERYLLIUM	2.0UP	10. SELENIUM	1.7UFN	17. CHEMICAL OXYGEN DEMAND	62 mg/L
4. CADMIUM	4.1UP	11. SILVER	[1.0]FN	18. HARDNESS	305N mg $CaCO_3$/L
5. CHROMIUM	[9.6]F	12. THALLIUM	100UFN	19. TOTAL SUSPENDED SOLIDS	5
6. COPPER	9.1UP	13. ZINC	27P		
7. LEAD	[4.7]FSN	14. % SOLIDS	N/A		

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: 10x dilution on Thallium

INORGANIC SECTION MANAGER ____

AR301842

SECTION I

FORM I

ENVIRONMENTAL STRATEGIES
ESTR-8061-002

CLIENT SAMPLE ID
SED 5

DATE

INORGANIC ANALYSIS DATA SHEET

LAB NAME: KITTMAN ENSCO ASSOCIATES INC.
SOW NO. 7/85
LAB SAMPLE ID.NO. 7157

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION:
MATRIX: WATER____ LOW ✓ SOIL ✓ MEDIUM____ SLUDGE____ OTHER____

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

1. ANTIMONY	0.9UF	8. MERCURY	0.2UCV	15. HEXAVALENT CHROMIUM	0.3 U
2. ARSENIC	[3.1]F	9. NICKEL	15 P	16. ALKALINITY	34 mgCaCO3/Kg
3. BERYLLIUM	0.6UP	10. SELENIUM	16UFN (Exp 1-6-88)	17. CHEMICAL OXYGEN DEMAND	84,500 N mg/Kg
4. CADMIUM	1.2UP	11. SILVER	0.2 3.2UFN	18. HARDNESS	724 mgCaCO3/Kg
5. CHROMIUM	8.9F*	12. THALLIUM	1.3UFN	19. TOTAL SUSPENDED SOLIDS	N/A
6. COPPER	[3.2]P	13. ZINC	50PE		
7. LEAD	7.1F	14. % SOLIDS	61.8		

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: E = Serial dilution out of control
Se dilution factor = 10x

INORGANIC SECTION MANAGER P Christopher

AR301844

FORM I

ENVIRONMENTAL STRATEGIES
ESTR-8061-002

CLIENT SAMPLE ID
SW-5

DATE _____

INORGANIC ANALYSIS DATA SHEET

LAB NAME: HITTMAN KBASCO ASSOCIATES INC.
SOW NO. 7/85
LAB SAMPLE ID.NO. 7165, 7174, 7183

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION: LOW ✓ MEDIUM _____
MATRIX: WATER ✓ SOIL _____ SLUDGE _____ OTHER _____

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

1. ANTIMONY	3.2UFN	8. MERCURY	0.2UCV	15. HEXAVALENT CHROMIUM	20 U
2. ARSENIC	1.4UF	9. NICKEL	[30]P	16. ALKALINITY	37.3 mg/L $CaCO_3$
3. BERYLLIUM	2.0UP	10. SELENIUM	1.7UFN	17. CHEMICAL OXYGEN DEMAND	62 mg/L
4. CADMIUM	4.1UP	11. SILVER	[1.0]FN	18. HARDNESS	305N mg/L $CaCO_3$
5. CHROMIUM	[2.6]F	12. THALLIUM	100UFN	19. TOTAL SUSPENDED SOLIDS	5
6. COPPER	9.1UP	13. ZINC	27P		
7. LEAD	[4.7]FSN	14. % SOLIDS	N/A		

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: 10X dilution for Thallium

INORGANIC SECTION MANAGER _____

FORM II A

Q.C. REPORT NO._____ CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

INITIAL AND CONTINUING CALIBRATION VERIFICATION SOW NO.: 7/85

LAB NAME: RITTMAN EBASCO ASSOC, INC. UNITS ug/L
DATE _____

COMPOUND	INITIAL CALIB. TRUE VALUE	INITIAL CALIB. FOUND	INITIAL CALIB. %R	CONTINUING CALIBRATION TRUE VALUE	CONTINUING CALIBRATION FOUND	CONTINUING CALIBRATION %R	FOUND	%R	METHOD
1. ANTIMONY	101	96	95	101	100	99	105	104	F
2. ARSENIC	49	50	102	49	53	108	51	104	F
3. BERYLLIUM	481	497	103	500	522	104	521	104	P
4. CADMIUM	489	474	97	500	509	102	514	103	P
5. CHROMIUM	51	52	102	51	53	104	53	104	F
6. COPPER	542	498	92	500	501	100	507	101	P
7. LEAD	45	48	107	45	46	102	49	109	F
. MERCURY	5.2	5.1	98	5.2	5.3	102			C.V
9. NICKEL	4000	3970	99	4000	3910	98	3910	98	P
10. SELENIUM	20	19	95	20	20	100	19	95	F
11. SILVER	49	53	108	49	51	104	51	104	F
12. THALLIUM	48	51	106	48	50	104	50	104	F
13. ZINC	3100	2940	95	500	482	96	482	96	P
14. CHROMIUM VI	N/A								SM 312 B
15. ALKALINITY, mg/L	141	154	109	141	154	109	136	96	310.1
16. CHEMICAL OXYGEN DEMAND	N/A								410.1
17. HARDNESS, mg/L	365	347	95	365	345	95			130.2
18. TOTAL SUSPENDED SOLIDS mg/L	22	22	100	22	18	82			160.2

FOR INITIAL AND CONTINUING CALIBRATION SOURCE SEE FOLLOWING

FORM II B

Q.C. REPORT NO._____ CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

INITIAL AND CONTINUING CALIBRATION VERIFICATION SOW NO.: 7/85

LAB NAME: NITTMAN EBASCO ASSOC. INC. UNITS _____
DATE _____

COMPOUND	INITIAL CALIB. TRUE VALUE	FOUND	%R	CONTINUING CALIBRATION TRUE VALUE	FOUND	%R	FOUND	%R	METHOD
1. ANTIMONY									
2. ARSENIC	49	49	100	49	50	102			F
3. BERYLLIUM									
4. CADMIUM									
5. CHROMIUM				51	55	108			F
6. COPPER									
7. LEAD				45	47	104	46	102	F
8. MERCURY									
9. NICKEL									
10. SELENIUM				20 EP. 6.05					
11. SILVER									
12. THALLIUM				PW 6.05 50 48	51	100			F
13. ZINC									
14. CHROMIUM VI									
15. ALKALINITY, mg/L	141	134	95	141	137	97			310.1
16. CHEMICAL OXYGEN DEMAND	N/A								410.1
17. HARDNESS, mg/L	365	344	94	365	344	94			130.2
18. TOTAL SUSPENDED SOLIDS mg/L	22	20	91	22	21	95			160.2

FOR INITIAL AND CONTINUING CALIBRATION SOURCE SEE FOLLOWING

AR301647

FORM II C

Q.C. REPORT NO._____ CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

INITIAL AND CONTINUING CALIBRATION VERIFICATION SOW NO.: 7/85

LAB NAME: NITTMAN EBASCO ASSOC. INC. UNITS ug/L
DATE _____

COMPOUND	INITIAL CALIB. TRUE VALUE	FOUND	%R	CONTINUING CALIBRATION TRUE VALUE	FOUND	%R	FOUND	%R	METHOD
1. ANTIMONY									
2. ARSENIC									
3. BERYLLIUM									
4. CADMIUM									
5. CHROMIUM	51	46	90	51	47	92	48	94	F
6. COPPER									
LEAD									
MERCURY									
9. NICKEL									
10. SELENIUM									
11. SILVER									
12. THALLIUM									
13. ZINC									
14. CHROMIUM VI									
15. ALKALINITY									
16. CHEMICAL OXYGEN DEMAND									
17. HARDNESS									
18. TOTAL SUSPENDED SOLIDS									

FOR INITIAL AND CONTINUING CALIBRATION SOURCE SEE FOLLOWING

FORM II D

Q.C. REPORT NO._____ CASE NO.: ESTR-8061-002

ENVIRONMENTAL STRATEGIES

INITIAL AND CONTINUING CALIBRATION VERIFICATION SOW NO.: 7/85

LAB NAME: NITTMAN EBASCO ASSOC. INC. UNITS ug/L

DATE _____

COMPOUND	INITIAL CALIB.			CONTINUING CALIBRATION					
	TRUE VALUE	FOUND	%R	TRUE VALUE	FOUND	%R	FOUND	%R	METHOD
1. ANTIMONY									
2. ARSENIC									
3. BERYLLIUM									
4. CADMIUM									
5. CHROMIUM	51	49	96	51	49	96			F
6. COPPER									
LEAD									
8. MERCURY									
9. NICKEL									
10. SELENIUM									
11. SILVER									
12. THALLIUM									
13. ZINC									
14. CHROMIUM VI									
15. ALKALINITY									
16. CHEMICAL OXYGEN DEMAND									
17. HARDNESS									
18. TOTAL SUSPENDED SOLIDS									

FOR INITIAL AND CONTINUING CALIBRATION SOURCE SEE FOLLOWING

AR301849

LAB NAME: NITTMAN EBASCO ASSOCIATES, INC. ICV AND CCV SOURCES PROJECT: ENVIRONMENTAL STRATEGIES
DATE _____ CONTRACT NO: ESTR-8061-002

ELEMENT	ICV SOURCE	CCV SOURCE
ANTIMONY	ICV#3	ICV#3
ARSENIC	ICV#2	ICV#2
BERYLLIUM	ICV-IX-487	Fisher 500
CADMIUM	ICV-IX-487	Fisher 500
CHROMIUM	ICV#1	ICV#1
COPPER	ICV-IX-487	Fisher 500
LEAD	ICV#1	ICV#1
MERCURY	ICV#5	ICV#5
SELENIUM	ICV#2	ICV#2
SILVER	ICV#4	ICV#4
THALLIUM	ICV#4	ICV#4
ZINC	ICV-IX-487	Fisher 500
CHROMIUM VI	none available	
ALKALINITY	ERA Minerals #9912 →	
COD	N/A	
HARDNESS	ERA Hardness #9909 →	
TSS	ERA Hardness #9909 →	
NICKEL	Fisher 4000	Fisher 4000

AR301850

FORM III A

S.C. REPORT NO. _____

BLANKS

CASE NO.: ESTA-8061-002
ENVIRONMENTAL STRATEGIES

UNITS ug/L

LAB NAME: HITTMAN EBASCO ASSOC. INC.

MATRIX: water + soil

DATE _____

COMPOUND	INITIAL CALIBRATION BLANK VALUE	CONTINUING CALIBRATION BLANK VALUE 1	2	3	4	PREPARATION BLANK MATRIX: water ug/L	MATRIX: soil mg/kg
1. ANTIMONY	3.2U	3.2U	3.2U	3.2U		3.2U	0.6U
2. ARSENIC	1.4U	1.4U	1.4U	1.4U		1.4U	0.2U
3. BERYLLIUM	2.0U	2.0U	2.0U			2.0U	0.4U
4. CADMIUM	4.1U	4.1U	4.1U			4.1U	0.8U
5. CHROMIUM	0.6U	[0.7]	0.6U	0.6U	0.6U	[1.5]	[0.6]
6. COPPER	9.1U	9.1U	9.1U			9.1U	1.7U
7. LEAD	2.5U	2.5U	2.5U	2.5U	2.5U	[4.0]	0.4U
8. MERCURY	0.2U	0.2U	0.2U			0.2U	0.1U
9. NICKEL	[19]	[25]	13U			[16]	[2.9]
10. SELENIUM	1.7U	1.7U	1.7U	1.7U		1.7U	0.3U
11. SILVER	0.7U	0.7U	0.7U	0.7U		0.7U	0.1U
12. THALLIUM	3.9U	3.9U	3.9U	3.9U	3.9U	3.9U	0.7U
13. ZINC	5.3U	5.3U	5.3U			5.3U	1.0U
14. CHROMIUM VI	20U					20U	0.2U
15. ALKALINITY, mg/L						1U	10U
16. CHEMICAL OXYGEN DEMAND, mg/L						50U	2500U
17. HARDNESS, mg/L						1U	10U
18. TOTAL SUSPENDED SOLIDS, mg/L						1U	

FORM III B

Q.C. REPORT NO._____

CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

BLANKS

UNITS ug/L

LAB NAME: NITTMAN ERASCO ASSOC. INC.

MATRIX: water

DATE _____

COMPOUND	INITIAL CALIBRATION BLANK VALUE	CONTINUING CALIBRATION BLANK VALUE 1	2	3	4	PREPARATION BLANK MATRIX: water	MATRIX:
1. ANTIMONY						32U	
2. ARSENIC	1.4U	1.4U	1.4U				
3. BERYLLIUM						2.0U	
4. CADMIUM						4.1U	
5. CHROMIUM	0.6U	[7.8]	0.6U	0.6U			
6. COPPER						9.1U	
7. LEAD	~~2.5U~~ FOR 10	2.5U					
8. MERCURY							
9. NICKEL						[19]	
10. SELENIUM							
11. SILVER							
12. THALLIUM							
13. ZINC						5.9U	
14. CHROMIUM VI	20U						
15. ALKALINITY							
16. CHEMICAL OXYGEN DEMAND							
17. HARDNESS							
18. TOTAL SUSPENDED SOLIDS mg/L						1U	

FORM III C

Q.C. REPORT NO. _____

BLANKS

CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

UNITS ug/L

MATRIX: SOIL

LAB NAME: NITTMAN EBASCO ASSOC. INC.

DATE _____

COMPOUND	INITIAL CALIBRATION BLANK VALUE	CONTINUING CALIBRATION BLANK VALUE 1	2	3	4	PREPARATION BLANK MATRIX: _____	MATRIX: _____
1. ANTIMONY							
2. ARSENIC							
3. BERYLLIUM							
4. CADMIUM							
5. CHROMIUM	0.64	[0.6]	0.64				
6. COPPER							
7. LEAD							
MERCURY							
9. NICKEL							
10. SELENIUM							
11. SILVER							
12. THALLIUM							
13. ZINC							
14. CHROMIUM VI							
15. ALKALINITY							
16. CHEMICAL OXYGEN DEMAND							
17. HARDNESS							
18. TOTAL SUSPENDED SOLIDS							

FORM IV A

Q.C. REPORT NO._____

ICP INTERFERENCE CHECK SAMPLE

LAB NAME: NITTMAN EBASCO ASSOC. INC.

DATE _____

CASE NO.: ESTR-8061-002
ENVIRONMENTAL STRATEGIES
CHECK SAMPLE I.D.: ICS AB 0387

CHECK SAMPLE SOURCE: EPA

UNITS ug/L

COMPOUND	CONTROL LIMITS 1 MEAN	CONTROL LIMITS 1 STD. DEV.	TRUE 2	INITAL OBSERVED	INITAL %R	FINAL OBSERVED	FINAL %R
1. ANTIMONY							
2. ARSENIC							
3. BERYLLIUM			474	465	98	466	98
4. CADMIUM			909	891	98	891	98
5. CHROMIUM							
6. COPPER			534	478	90	468	88
7. LEAD							
8. MERCURY							
9. NICKEL			916	896	98	917	100
10. SELENIUM							
11. SILVER							
12. THALLIUM							
13. ZINC			973	901	93	894	92

1 MEAN VALUE BASED ON n = 5

2 TRUE VALUE OF EPA ICP INTERFERENCE CHECK SAMPLE OR CONTRACTOR STANDARD

AR301854

FORM V A

SPIKES

Q.C. REPORT NO.

LAB NAME: NITTMAN ESASCO ASSOCIATES INC.

CASE: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

DATE _____

SAMPLE NO. 2157

MATRIX Soil

UNITS ug/L

COMPOUND	CONTROL LIMIT	SPIKED SAMPLE RESULT(SSR)	SAMPLE RESULT(SR)	SPIKE ADDED(SA)	%R	
ANALYTES:						
ANTIMONY	75-125	51	3.2U	50	102	
ARSENIC	75-125	56	[9.7]	40	116	
BERYLLIUM	75-125	48	2.0U	50	96	
CADMIUM	75-125	46	4.1U	50	92	
CHROMIUM	75-125	43	28	20	75	
COPPER	75-125	234	[11]	250	89	
LEAD	75-125	65	22	50	86	
MERCURY	75-125	0.8	0.2U	1.0	80	
NICKEL	75-125	496	53	500	89	
SELENIUM	75-125	[3.9]	5.0U	10	33	N
SILVER	75-125	33	0.7 [4.9U] 10.00	50	66	N
THALLIUM	75-125	27	3.9U	50	54	N
ZINC	75-125	701	174	500	105	
CHROMIUM VI	75-125	N/A				
ALKALINITY, mg/L CaCO3	75-125 (7153)	264	20.3	250	97	
COD, mg/L	75-125 (7159)	227	207	95	21	N
HARDNESS, mg/L CaCO3	75-125 EPA 215.1 (7140)	507	15.3	500	98	
S	75-125	N/A				

%R = [(SSR - SR) / SA] * 100
N = OUT OF CONTROL

AR301855

FORM V B

SPIKES

Q.C. REPORT NO.

CASE: ESTR-8061-002
ENVIRONMENTAL STRATEGIES

LAB NAME: NITTMAN EBASCO ASSOCIATES INC.

SAMPLE NO. 7183

DATE _____

UNITS ug/L

MATRIX water

COMPOUND	CONTROL LIMIT	SPIKED SAMPLE RESULT(SSR)	SAMPLE RESULT(SR)	SPIKE ADDED(SA)	%R	
ANALYTES:						
ANTIMONY	75-125	[5.5]	3.2U	50	11	N
ARSENIC	75-125	71	1.4U	80	89	
BERYLLIUM	75-125	46	2.0U	50	92	
CADMIUM	75-125	40	4.1U	50	80	
CHROMIUM	75-125	37	[2.6]	40	86	
COPPER	75-125	224	9.1U	250	90	
LEAD	75-125	28	[4.7]	40	58	N
MERCURY	75-125	*				
NICKEL	75-125	344	[30]	400	79	
SELENIUM	75-125	10	1.7U	20	50	N
SILVER	75-125	25	[1.0]	100	24	N
THALLIUM	75-125	[9.0]	100U	50	18	N
ZINC	75-125	193	27	200	83	
CHROMIUM VI	75-125	N/A				
ALKALINITY, mg/L as $CaCO_3$	75-125 (7169)	396	80.3	250	98	
COD, mg/L	75-125 (7170)	112	<50	95	118	
HARDNESS mg/L $CaCO_3$	75-125 (7187)	319	89.7	500	46	N
TSS	75-125	N/A				

SR = [(SSR - SR) / SA] * 100
N = OUT OF CONTROL

* Please see case narrative

FORM VI A
DUPLICATES

LAB NAME: NITTMAN EBASCO ASSOC. INC.

PROJECT: ENVIRONMENTAL STRATEGIES
CASE NO.: ESTR-8061-002
SAMPLE NUMBER 7157
UNITS ug/L

DATE _____ MATRIX: SOIL

COMPOUND	CONTROL LIMIT	SAMPLE (S)	DUPLICATE (D)	RPD
ANTIMONY		3.2U	3.2U	NC
ARSENIC		[9.7]	[7.3]	NC
BERYLLIUM		2.0U	2.0U	NC
CADMIUM		4.1U	4.1U	NC
CHROMIUM	±10ug/L	28	16	55 *
COPPER		[11]	9.1U	NC
LEAD	±5ug/L	22	19	15
MERCURY		0.2U	0.2U	NC
NICKEL	±40ug/L	53	43	21
SELENIUM		50U	50U	NC
SILVER		0.7U	0.7U	NC
THALLIUM		3.9U	3.9U	NC
ZINC	±20%	174	186	6.7
CHROMIUM VI (7153)		20U	20U	NC
ALKALINITY mg/L (7153)	±20%	20.3	20.3	0.0
COD mg/L (7100)	±20%	332	333	0.3
HARDNESS mg/L (7160)	±20%	37.2	38.2	2.7
TSS		N/A		

AR301857

FORM VI B
DUPLICATES

LAB NAME: NITTMAN EBASCO ASSOC, INC.

PROJECT: ENVIRONMENTAL STRATEGIES
CASE NO.: ESTR-8061-002
SAMPLE NUMBER 7183

DATE _____

MATRIX: WATER

UNITS ug/L

COMPOUND	CONTROL LIMIT	SAMPLE (S)	DUPLICATE (D)	RPD
ANTIMONY		3.2U	3.2U	NC
ARSENIC		1.4U	*	
BERYLLIUM		2.0U	2.0U	NC
CADMIUM		4.1U	4.1U	0 NC
CHROMIUM		[2.0]	*	
COPPER		9.1U	9.1U	NC
LEAD		[4.7]	*	
MERCURY		0.2U	*	
NICKEL		[30]	[29]	NC
SELENIUM		1.7U	*	
SILVER		[1.0]	*	
THALLIUM		100U	*	
ZINC	±20ug/L	27	27	0.0
CHROMIUM VI				
ALKALINITY mg/L (7149)	±20%	80.3	80.0	0.4
COD mg/L (7190)		50U	50U	NC
HARDNESS mg/L (7181)	±20%	89.7	89.3	0.4
TSS		N/A		

* Please see case narrative

FORM VII A

Q.C. REPORT NO. _____

INSTRUMENT DETECTION LIMITS AND

LAB NAME: NITTMAN EBASCO ASSOCIATES INC. LABORATORY CONTROL SAMPLE CASE: ESTR-8061-002
ENVIRONMENTAL STATEGIES

DATE _____ UNITS ug/L

COMPOUND	REQUIRED DETECTION LIMITS (CRDL)-ug/l	INSTRUMENT DETECTION LIMITS (IDL)-ug/l ICP/AA	INSTRUMENT DETECTION LIMITS (IDL)-ug/l FURNACE	LAB CONTROL SAMPLE ug/L TRUE	LAB CONTROL SAMPLE ug/L FOUND	LAB CONTROL SAMPLE %R
ANALYTES:						
ANTIMONY	60		~~2.5~~ 3.2	80	0	0 *
ARSENIC	10		~~3.5~~ 1.4	~~80~~ 80 Ext 1.0	73	91
BERYLLIUM	5.0	2.0		300	294	98
CADMIUM	5.0	4.1		50	49	98
CHROMIUM	10		1.0	80	75	94
COPPER	25	9.1		400	403	101
LEAD	5.0		~~2.5~~ 2.5	80	79	99
MERCURY	0.2	0.17		7.0	6.6	94
NICKEL	40	13		300	302	101
SELENIUM	5.0		~~2.5~~ 1.7	80	78	98
SILVER	10		~~3.0~~ 0.7	40	36	90
THALLIUM	10		~~3.5~~ 3.9	80	73	91
ZINC	20	5.3		400	394	99
CHROMIUM VI	~~10~~ 20			N/A		
ALKALINITY	1					
COD	50			190	182	96
HARDNESS	1					
TSS	1					

*Please see case narrative

FORM VII B

Q.C. REPORT NO._____

INSTRUMENT DETECTION LIMITS AND

LAB NAME: ROY F. WESTON INC. LABORATORY CONTROL SAMPLE CASE: ESTR-8061-002 ENVIRONMENTAL STATEGIES

DATE _____ UNITS ug/L

COMPOUND	REQUIRED DETECTION LIMITS (CRDL)-ug/l	INSTRUMENT DETECTION LIMITS (IDL)-ug/l ICP/AA	INSTRUMENT DETECTION LIMITS (IDL)-ug/l FURNACE	LAB CONTROL SAMPLE ug/L TRUE	LAB CONTROL SAMPLE ug/L FOUND	LAB CONTROL SAMPLE mg/Kg %R
ANALYTES:						
ANTIMONY	60		~~2~~ 3.2	80	0	0 *
ARSENIC	10		~~3~~ 1.4			
BERYLLIUM	5.0	2.0		300	282	94
CADMIUM	5.0	4.1		50	40	80
CHROMIUM	10		1.0	80	82	103
COPPER	25	9.1		400	382	96
LEAD	5.0		~~3~~ 2.5	80	68	85
MERCURY	0.2	0.17				
NICKEL	40	13		300	281	94
SELENIUM	5.0		0.9			
SILVER	10		1.3			
THALLIUM	10		5.5	80	68	85
ZINC	20	5.3		400	349	87
CHROMIUM VI	10					
ALKALINITY	1					
COD	50			190	176	93
HARDNESS	1					
SS	1					

*Please see case narrative

Form VIII

Q.C. Report No. _____

STANDARD ADDITION RESULTS

LAB NAME HITTMAN EBASCO ASSOC. CASE NO. ESB-8001-002

DATE _____ UNITS: ug/L

LFA Sample #	Element	Matrix	0 ADD ABS.	1 ADD CON.	1 ADD ABS.[2]	2 ADD CON.	2 ADD ABS.[2]	3 ADD CON.	3 ADD ABS.[2]	FINAL CON.[3]	r*
LCSA	AS	Water	.0795	10	.1285	20	.1685	40	.2585	13	.999
LCSC	Pb	Water	.088	10	.138	20	.198	40	.296	18	.999
7159 DUP	"	Soil	.081	10	.134	20	.165	40	.250	19	.997
7183	"	Water	.017	10	.059	20	.092	40	.169	[4.7]	.979
7158	Cr	Soil	.169	10	.339	20	.313	40	.473	22	.999

1 Matrix abbreviations: Low Solid, LS; Medium Solid, MS; Low Aqueous, LA; Medium Aqueous, MA.

2 CON is the concentration added, ABS. is the instrument readout in absorbance or concentration.

3 Concentration as determined by MSA

* "r" is the correlation coefficient.

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

IFB Amend. One

FORM IX

ICP SERIAL DILUTIONS

PROJECT: ENVIRONMENTAL STRATEGIES

CONTRACT NO.: ESTR-8061-002

LAB NAME: WITTMAN ENASCO ASSOC. INC.

SAMPLE ID: 7157

DATE _____

MATRIX: SOIL

UNITS ug/L

COMPOUND	INITIAL SAMPLE CONCENTRATION (I)	SERIAL DILUTION RESULT (S)	% DIFFERENCE	
ANTIMONY				
ARSENIC				
BERYLLIUM	NR			
CADMIUM	NR			
CHROMIUM				
COPPER	NR			
LEAD				
MERCURY				
NICKEL	NR			
SELENIUM				
SILVER				
THALLIUM				
ZINC	174	85	51	E

NR = NOT REQUIRED; INITIAL SAMPLE CONCENTRATION LESS THAN 10X IDL

$$\text{PERCENT DIFFERENCE} = \frac{|I - S|}{I} \times 100$$

NA = ELEMENT NOT ANALYZED FOR THIS CONTRACT.

Form I

QC Report No. _____

HOLDING TIMES

LAB NAME HUNTSMAN ERASCO

DATE _____ CASE NO. ESAR: 8010-002

EPA Sample No.	Matrix	Date Received	Mercury Prep Date	Mercury Holding Time (Days)	CN Prep Date	CN Holding Time (Days)
SED 5	SOIL	12/4/87	12/21/87	17	N/A	
SW 5	water	1	1	1		

Form X

QC Report No. _____

HOLDING TIMES

LAB NAME HITTMAN ERASCO

DATE _____ CASE NO. ESIA: 8041.002

EPA Sample No.	Matrix	Date Received	Mercury Prep Date	Mercury Holding Time (Days)	CN Prep Date	CN Holding Time (Days)
SED 5	SOIL	12/4/87	12/21/87	17	N/A	
SW 5	water	1	1	1		

SECTION II

HITTMAN EBASCO

CHAIN OF CUSTODY RECORD

HITTMAN EBASCO ASSOCIATES INC.
A Subsidiary of EBASCO SERVICES INCORPORATED
9151 Rumsey Road, Columbia, MD 21045
(301) 730-8525

PROJECT: Millsboro

SAMPLERS: (Signature)

SAMPLE NUMBER	DATE	TIME	MATRIX	NO. CONTAINERS	TCE only	VOC - GC/MS	Total Chromium	Hex. Chromium	COD	TSS	Hardness	Alkalinity	HSL Volatile Organics	Acid/Base Neutrals	Pesticides & PCBs	Priority Pollutant Meth.	REMARKS OR SAMPLE LOCATION	PRESERVATION: ICED	PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN
SW1	12-3-87	5:10	SW	5	✓	✓	✓	✓	✓	✓	✓						S.loc. 7		
SW2	12-3-87	4:00	SW	5	✓	✓	✓	✓	✓	✓	✓								
SW3	12-3-87	3:00	SW	5	✓	✓	✓	✓	✓	✓	✓								
SW4	12-3-87	2:15	SW	5	✓	✓	✓	✓	✓	✓	✓								
SW5	12-3-87	12:45	SW	7			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	CLP protocols		
SW6	12-3-87	12:00	SW	5	✓	✓	✓	✓	✓	✓	✓								
SW7	12-3-87	5:40	SW	5	✓	✓	✓	✓	✓	✓	✓						Sample loc. 1		
SW8	12-3-87	9:15	SW	5	✓	✓	✓	✓	✓	✓	✓								
SW9	12-3-87	9:25	SW	5	✓	✓	✓	✓	✓	✓	✓								
SW 10	12-3-87	5:15	SW	2	✓														

	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Shipped via:
①		12-4-87 / 12:35		④		
②		12-4 / 1545		Received for Laboratory by: (Signature) Mark Ward	12/4/87 / 14:30	Shipping Ticket No.
③	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Remarks:		

AR301866

HITTMAN EBASCO

CHAIN OF CUSTODY RECORD

HITTMAN EBASCO ASSOCIATES INC.
A Subsidiary of EBASCO SERVICES INCORPORATED
9151 Rumsey Road, Columbia, MD 21045
(301) 730-8525

PROJECT: Millsboro ESTR 8061-002

SAMPLERS: (Signature)

SAMPLE NUMBER	DATE	TIME	MATRIX	NO. CONTAINERS	TCE only	VOC-601	Total Chromium	Hexa. Chromium	COD	Total Solids	Hardness	Alkalinity	HSL Volatile Organics	Acid/Base Neutral	Pesticides + PCBs	Priority Pollutant Metals	REMARKS OR SAMPLE LOCATION	PRESERVATION: ICED	PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN
SED-1	12-3-87	5:00	SED	3	✓	✓	✓	✓	✓	✓	✓						S. Loc. 7		
SED-2	12-3-87	4:15	SED	3	✓	✓	✓	✓	✓	✓	✓								
SED-3	12-3-87	3:15	SED	3	✓	✓	✓	✓	✓	✓	✓								
SED-4	12-3-87	2:00	SED	3	✓	✓	✓	✓	✓	✓	✓								
SED-5	12-3-87	12:45	SED	5			✓	✓	✓	✓	✓	✓	✓	✓	✓		CLP protocols		
SED-6	12-3-87	12:00	SED	3	✓	✓	✓	✓	✓	✓	✓								
SED-7	12-3-87	6:00	SED	3	✓	✓	✓	✓	✓	✓	✓								
SED-8	12-3-87	9:15	SED	3	✓	✓	✓	✓	✓	✓	✓						S. Location 1		
				3	✓	✓	✓	✓	✓	✓	✓								

	Date / Time		Date / Time	
Relinquished by: (Signature) ①	12-4-87 12:25	Received by: (Signature)	Relinquished by: (Signature) ④	Shipped via:
Relinquished by: (Signature) ②	12/04 1345	Received by: (Signature)	Received for Laboratory by: (Signature) Marta Ward	12/4/87 14:00 Shipping Ticket No.
Relinquished by: (Signature) ③	Date / Time	Received by: (Signature)	Remarks:	

AR301867

12/07/87
PAGE 1

Log Mark
✓ Ent 12 7 87

Paul's Blank

NON - REPORTED SAMPLES
METAL - SPECIFIC CLIENT REPORT

HEAT ID	CLIENT ID	CLIENT	CON NUM	TAS NUM	DATE REC	DATE DUE	DATE SAMPLED	MATRIX	pH	Al	Sb	As	Ba	Be	B	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	Mo	Ni	K	Se	Ag	Na	Tl	Sn	V	Zn	OTHER	COMMENTS	LOC	REPORT
7153	MEB 1	ESTR	8661	002	12/04/87	12/25/87	12/03/87	SOIL									A	A																			N	N
7154	SLE 2	ESTR	8661	002	12/04/87	12/25/87	12/03/87	SOIL									A	A																			N	N
7155	MEB 3	ESTR	8661	002	12/04/87	12/25/87	12/03/87	SOIL									A	A																			N	N
7156	SES 4	ESTR	8661	002	12/04/87	12/25/87	12/03/87	SOIL									A	A																			N	N
7157	SES 5	ESTR	8661	002	12/04/87	12/25/87	12/03/87	SOIL		A	A		A		A		A	A		A		A			A			A				A			FULL CLP PROTOCOL		N	N
7158	MEB 6	ESTR	8661	002	12/04/87	12/25/87	12/03/87	SOIL									A	A																			N	N
7159	MEB 7	ESTR	8661	002	12/04/87	12/25/87	12/03/87	SOIL									A	A																			N	N
7160	MEB 8	ESTR	8661	002	12/04/87	12/25/87	12/03/87	SOIL									A	A																			N	N
7161	MW-1	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																				N	N
7162	MW-2	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																				N	N
7163	MW-3	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																				N	N
7164	MW-4	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																				N	N
7165	MW-5	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																		FULL CLP PROTOCOL		N	N
7166	MW-6	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																				N	N
7167	MW-7	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																				N	N
7168	MW-8	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																				N	N
7169	MW-9	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2								A																				N	N
7179	MW-1	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2									A																			N	N
7180	MW-2	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2									A																			N	N
7181	MW-3	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2									A																			N	N
7182	MW-4	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2									A																			N	N
7183	MW-5	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2	A	A		A		A		X	A		A		A			A			A				A			FULL CLP PROTOCOL		N	N
7184	MW-6	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2									A																			N	N
7185	MW 7	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2									A																			N	N
7186	MW-8	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2									A																			N	N
7187	MW-9	ESTR	8661	002	12/04/87	12/25/87	12/03/87	WATER	2									A																			N	N

25 METAL RECORDS
E = EXTRACT D = DIGEST L = LEACH A = ANALYZE DA = DUPLICATE C = COMPLETE RA = REANALYZE

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V EAP 12-7-87

AR301869

Phyllis Client

NUM - REPORTED SAMPLES
INORGANIC - SPECIFIC CLIENT REPORT

MEAS ID	CLIENT ID	CLIENT NUM	CON NUM	TAS NUM	DATE REC	DATE DUE	DATE SAMPLED	MATRIX	BLK pH	CE NCI	CBn CBB	CBn CBR	FLP CYA	GRN F-	MB2	pH	PHS BAS	ELF PHC	TOC LEA	ACH S=	GAS TOX	GAS	BAS TSS	TDS TE	TAS TWS	TWS COX	SCL TCL	FCL RSOL	ANIS	OTHER GTN	COMMENTS
7153	SED 1		ESTR	8061	082	12/04/87	12/25/87	12/01/87	SOIL	A			A															A	A	
7154	SED 2		ESTR	8061	082	12/04/87	12/25/87	12/01/87	SOIL	A			A															A	A	
7155	SED 3		ESTR	8061	082	12/04/87	12/25/87	12/01/87	SOIL	A			A															A	A	
7156	SED 4		ESTR	8061	082	12/04/87	12/25/87	12/01/87	SOIL	A			A															A	A	
7157	SED 5		ESTR	8061	...	12/04/87	12/25/87	12/01/87	SOIL	A			A															A	A	FULL CLP PROTOCOL
7158	SED 6		ESTR	8061	082	12/04/87	12/25/87	12/01/87	SOIL	A			A															A	A	
7159	SED 7		ESTR	8061	082	12/04/87	12/25/87	12/01/87	SOIL	A			A															A	A	
7160	SED 8		ESTR	8061	082	12/04/87	12/25/87	12/01/87	SOIL	A			A															A	A	
7161	SW-1		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A						
7162	SW-2		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A						
7163	SW-3		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A						
7164	SW-4		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A						
7165	SW-5		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A							FULL CLP
7166	SW-6		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A						
7167	SW-7		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A						
7168	SW-8		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A						
7169	SW-9		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	A													A						
7170	SW-1		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			A																		
7171	SW-2		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			A																		
7172	SW-3		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			A																		
7173	SW-4		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			A																		
7174	SW-5		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			A																		FULL CLP
7175	SW-6		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			C																		
7176	SW-7		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			A																		
7177	SW-8		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			A																		
7178	SW-9		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER			A																		
7179	SW-1		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER																					
7180	SW-2		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER																			A		
7181	SW-3		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER																			A		
7182	SW-4		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER																			A		
7183	SW-5		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	2																		A		FULL CLP PROTOCOL
7184	SW-6		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	2																		A		
7185	SW-7		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	2																		A		
7186	SW-8		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	2																		A		
7187	SW-9		ESTR	8061	082	12/04/87	12/25/87	12/01/87	WATER	2																		A		

35 GENERAL CHEM RECORDS

E = EXTRACT D = DIGEST L = LEACH A = ANALYZE AA = RUN DUPLICATE C = COMPLETE AB = REANALYZE Y = REPORTED N = NOT REPORTED V = VIAL

NITTMAN EBASCO ASSOCIATES, INC.
SAMPLE TRACKING SHEETS
ESTR-8061-002
PRIORITY POLLUTANT METALS

MEAI ID 7157

EPA ID SED #5

DATE RECEIVED 12/04/87

ANALYTE	DIGESTION DATE	ANALYSIS DATE
ANTIMONY	12/15/87	12/17/87
ARSENIC	12/14/87	12/18/87
BERYLLIUM	12/15/87	12/30/87
CADMIUM	12/15/87	12/30/87
CHROMIUM	12/14/87	12/21/87
COPPER	12/15/87	12/30/87
LEAD	12/14/87	12/15/87
MERCURY	12/21/87	12/21/87
NICKEL	12/15/87	12/30/87
SELENIUM	12/14/87	12/18/87
SILVER	12/14/87	12/18/87
THALLIUM	12/14/87	12/17/87
ZINC	12/15/87	12/30/87

NITTMAN EBASCO ASSOCIATES, INC.
SAMPLE TRACKING SHEETS
ESTR-8061-002
PRIORITY POLLUTANT METALS

NEAI ID	7183
EPA ID	SW 5
DATE RECEIVED	12/04/87

ANALYTE	DIGESTION DATE	ANALYSIS DATE
ANTIMONY	12/11/87	12/17/87
ARSENIC	12/14/87	12/18/87
BERYLLIUM	12/11/87	12/30/87
CADMIUM	12/11/87	12/30/87
CHROMIUM	12/14/87	12/21/87
COPPER	12/11/87	12/30/87
LEAD	12/14/87	12/15/87
MERCURY	12/21/87	12/21/87
NICKEL	12/11/87	12/30/87
SELENIUM	12/14/87	12/18/87
SILVER	12/14/87	12/18/87
THALLIUM	12/14/87	12/17/87
ZINC	12/11/87	12/30/87

SECTION III

EAP 1/6/88
Reviewed by PC 12/30/87

Perkin-Elmer ICP/6500 Analytical Report

Method File: becdcusn Date Collected: 87/12/30 Time: 09:23
Analyst: RW environ. Strat Date of Report: 87/12/30 Time: 10:26

#7157, 7183

cal blk	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	-8	-4	-1	-8
SD	0.8	0.7	0.3	0.0

icv-1x-487	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	Over Range	474 499	497 481	498 542
SD		4.9	0.9	4.4
		97%	103%	92%

icv-1-5x	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	587 552 2935	98	101	93
SD	3.0	2.6	0.2	6.7
	95%	TV=3100		

ics ab	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	901 917	891 909	465 474	478 534
SD	6.5	1.2	5.6	3.7
	93%	98%	98%	9?%

ics c 12/11	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	394 400	49 50	294 300	403 400
SD	19.7	2.1	2.4	0.3
	99%	98%	98%	101%

prep blk 12/11	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
water Units	ppb	ppb	ppb	ppb
Conc.	-3	-2	0	6
SD	3.3	0.1	0.0	2.8

7183	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	27	-3	0	1
SD	0.2	0.0	0.0	0.6

ics c 12/16	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	349 400	40 50	282 300	382 400
SD	0.8	0.6	1.2	0.0
	87%	80	94%	96%

prep blk soil	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	-18	-5	-1	5
SD	0.2	3.6	0.5	9.3

prep blk h20	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	-7	-7	0	8
SD	2.2	0.4	0.7	2.8

7157 sed-5	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	174	-1	0	11
SD	5.9	1.7	0.1	4.7

7157-d	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	184	-2	0	9
SD	0.0	2.2	0.7	1.0

cal blk	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	-12	-6	0	-2
SD	2.6	2.1	0.5	2.1

ccv 500ppb	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	482	509	522	501
SD	8.5	0.9	0.8	1.3
	96%	102%	104%	100%

7157-s	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	701 500	46 50	48 50	234 250
SD	11.0	0.5	0.0	2.1
	105%	92%	96%	89%

7183-d sw-5	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	27	-4	0	4
SD	0.9	0.0	0.6	0.8

7183-s	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	193 200	40 50	46 50	224 250
SD	2.6	2.2	0.2	0.2
	83%	80%	92%	89%

7157 s.d1:5	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	17	-6	0	-16
SD	0.1	3.1	1.5	1.2
	49%			

ics ab	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	894 993	891 907	466 474	468 534
SD	5.9	4.1	7.6	1.6
	97%	98%	98%	88%

cal blk	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	-1	-3	0	0
SD	10.9	2.7	0.2	0.7

ccv 500ppb	sn213epa-1	cd226epa-1	be313epa-1	cu324epa-1
Units	ppb	ppb	ppb	ppb
Conc.	482	514	521	507
SD	4.2	0.0	8.0	3.4
	96%	103%	104%	101%

301674

Run Manual Mode 87/12/30 09:23

Method Name: becdcusn Replicates: 2 Read Delay: 20
Print Format: All Data ID Name: Data Name: ESTR-m4
Remarks: Eviron. Strat. #7157,#7183 analyst/RLC

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sn213epa-1 cd226epa-1 be313epa-1 cu324epa-1

Element Name sn213epa-1 Gain 528
Element Name cd226epa-1 Gain 509
Element Name be313epa-1 Gain 344
Element Name cu324epa-1 Gain 524

Standard 1 Replicate 1

sn213epa-1	EM	141743
cd226epa-1	EM	135852
be313epa-1	EM	129599
cu324epa-1	EM	145796

Standard 1 Replicate 2

sn213epa-1	EM	139405
cd226epa-1	EM	137088
be313epa-1	EM	130259
cu324epa-1	EM	146716

sn213epa-1	AV	140574	SD	1651.7	CV	1.1	CONC	1000 ppb
cd226epa-1	AV	136470	SD	873.4	CV	0.6	CONC	1000 ppb
be313epa-1	AV	129929	SD	464.1	CV	0.3	CONC	1000 ppb
cu324epa-1	AV	146256	SD	649.1	CV	0.4	CONC	1000 ppb

Standard 2 Replicate 1

sn213epa-1	EM	39151
cd226epa-1	EM	39744
be313epa-1	EM	28794
cu324epa-1	EM	61716

Standard 2 Replicate 2

sn213epa-1	EM	38912
cd226epa-1	EM	39169
be313epa-1	EM	28444
cu324epa-1	EM	61429

sn213epa-1	AV	39031	SD	168.9	CV	0.4	CONC	100 ppb
cd226epa-1	AV	39456	SD	406.5	CV	1.0	CONC	100 ppb
be313epa-1	AV	28619	SD	247.3	CV	0.8	CONC	100 ppb

reviewed by RC 12/30/87

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Standard 3 Replicate 1

sn213epa-1	EM	32720
cd226epa-1	EM	29019
be313epa-1	EM	17910
cu324epa-1	EM	55215

Standard 3 Replicate 2

sn213epa-1	EM	31499
cd226epa-1	EM	29123
be313epa-1	EM	17842
cu324epa-1	EM	55588

sn213epa-1	AV	32109	SD	863.3	CV	2.6	CONC	20 ppb
cd226epa-1	AV	29071	SD	72.8	CV	0.2	CONC	5 ppb
be313epa-1	AV	17876	SD	47.6	CV	0.2	CONC	5 ppb
cu324epa-1	AV	55401	SD	263.4	CV	0.4	CONC	25 ppb

Blank Replicate 1

sn213epa-1	EM	28069
cd226epa-1	EM	28457
be313epa-1	EM	17391
cu324epa-1	EM	52322

Blank Replicate 2

sn213epa-1	EM	27771
cd226epa-1	EM	28174
be313epa-1	EM	17327
cu324epa-1	EM	51915

sn213epa-1	AV	27920	SD	210.4	CV	0.7	CONC	0 ppb
cd226epa-1	AV	28315	SD	199.8	CV	0.7	CONC	0 ppb
be313epa-1	AV	17329	SD	1.4	CV	0.0	CONC	0 ppb
cu324epa-1	AV	52118	SD	286.6	CV	0.5	CONC	0 ppb

Element Name sn213epa-1	Correlation Coefficent	0.9998
Element Name cd226epa-1	Correlation Coefficent	0.9999
Element Name be313epa-1	Correlation Coefficent	1.0000
Element Name cu324epa-1	Correlation Coefficent	0.9999

cal blk Replicate 1

sn213epa-1	-8 ppb	
cd226epa-1	-5 ppb	Peak Offset
be313epa-1	0 ppb	
cu324epa-1	-8 ppb	

cal blk Replicate 2

		cd226epa-1		-4 ppb				
		be313epa-1		-1 ppb				
		cu324epa-1		-8 ppb				
	sn213epa-1	AV	-8 ppb		SD	0.8	CV	9.1
	cd226epa-1	AV	-4 ppb		SD	0.7	CV	15.1
	be313epa-1	AV	-1 ppb		SD	0.3	CV	29.4
	cu324epa-1	AV	-8 ppb		SD	0.0	CV	0.0
icv-1x-487		Replicate 1						
		sn213epa-1				Over Range		
		cd226epa-1		470 ppb				
		be313epa-1		496 ppb				
		cu324epa-1		501 ppb				
icv-1x-487		Replicate 2						
		sn213epa-1				Over Range		
		cd226epa-1		477 ppb				
		be313epa-1		498 ppb				
		cu324epa-1		495 ppb				
		sn213epa-1				Over Range		
	cd226epa-1	AV	474 ppb		SD	4.9	CV	1.0
	be313epa-1	AV	497 ppb		SD	0.9	CV	0.1
	cu324epa-1	AV	498 ppb		SD	4.4	CV	0.8
icv-1-5x		Replicate 1						
		sn213epa-1		585 ppb				
		cd226epa-1		95 ppb				
		be313epa-1		101 ppb				
		cu324epa-1		88 ppb				
icv-1-5x		Replicate 2						
		sn213epa-1		589 ppb				
		cd226epa-1		91 ppb				
		be313epa-1		101 ppb				
		cu324epa-1		98 ppb				
	sn213epa-1	AV	587 ppb		SD	3.0	CV	0.5
	cd226epa-1	AV	93 ppb		SD	2.6	CV	2.8
	be313epa-1	AV	101 ppb		SD	0.2	CV	0.2
	cu324epa-1	AV	93 ppb		SD	6.7	CV	7.2
ics ab		Replicate 1						
		sn213epa-1		896 ppb				
		cd226epa-1		890 ppb				

cu324epa-1	476	ppb

ics ab Replicate 2

sn213epa-1	906	ppb
cd226epa-1	892	ppb
be313epa-1	461	ppb
cu324epa-1	481	ppb

sn213epa-1	AV	901	ppb	SD	4.5	CV	0.7
cd226epa-1	AV	891	ppb	SD	1.2	CV	0.1
be313epa-1	AV	465	ppb	SD	5.6	CV	1.2
cu324epa-1	AV	478	ppb	SD	3.7	CV	0.7

ics c 12/11 Replicate 1

sn213epa-1	408	ppb
cd226epa-1	50	ppb
be313epa-1	296	ppb
cu324epa-1	403	ppb

ics c 12/11 Replicate 2

sn213epa-1	380	ppb
cd226epa-1	47	ppb
be313epa-1	292	ppb
cu324epa-1	402	ppb

sn213epa-1	AV	394	ppb	SD	19.7	CV	5.0
cd226epa-1	AV	49	ppb	SD	2.1	CV	4.4
be313epa-1	AV	294	ppb	SD	2.4	CV	0.8
cu324epa-1	AV	403	ppb	SD	0.3	CV	0.0

prep blk 12/11 Replicate 1

sn213epa-1	0	ppb
cd226epa-1	-2	ppb
be313epa-1	0	ppb
cu324epa-1	8	ppb

prep blk 12/11 Replicate 2

sn213epa-1	-5	ppb
cd226epa-1	-2	ppb
be313epa-1	0	ppb
cu324epa-1	4	ppb

sn213epa-1	AV	-3	ppb	SD	3.3	CV	103.5
cd226epa-1	AV	-2	ppb	SD	0.1	CV	7.2
be313epa-1	AV	0	ppb	SD	0.0	CV	36.9
cu324epa-1	AV	6	ppb	SD	2.8	CV	45.9

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7183 Replicate 1

	sn213epa-1	27 ppb	
	cd226epa-1	-3 ppb	
	be313epa-1	0 ppb	
	cu324epa-1	1 ppb	

7183 Replicate 2

sn213epa-1	27 ppb	
cd226epa-1	-3 ppb	
be313epa-1	0 ppb	
cu324epa-1	2 ppb	

sn213epa-1	AV	27 ppb	SD	0.2	CV	0.8
cd226epa-1	AV	-3 ppb	SD	0.0	CV	1.2
be313epa-1	AV	0 ppb	SD	0.0	CV	12.4
cu324epa-1	AV	1 ppb	SD	0.6	CV	36.8

lcs c 12/16 Replicate 1

sn213epa-1	349 ppb	
cd226epa-1	40 ppb	
be313epa-1	283 ppb	
cu324epa-1	382 ppb	

lcs c 12/16 Replicate 2

sn213epa-1	350 ppb	
cd226epa-1	41 ppb	
be313epa-1	282 ppb	
cu324epa-1	382 ppb	

sn213epa-1	AV	349 ppb	SD	0.8	CV	0.2
cd226epa-1	AV	40 ppb	SD	0.6	CV	1.5
be313epa-1	AV	282 ppb	SD	1.2	CV	0.4
cu324epa-1	AV	382 ppb	SD	0.0	CV	0.0

prep blk soil Replicate 1

sn213epa-1	-18 ppb	
cd226epa-1	-2 ppb	
be313epa-1	-1 ppb	Peak Offset
cu324epa-1	12 ppb	

prep blk soil Replicate 2

sn213epa-1	-18 ppb	
cd226epa-1	-7 ppb	Peak Offset
be313epa-1	-1 ppb	Peak Offset
cu324epa-1	0 ppb	

sn213epa-1	AV	-18 ppb	SD	0.2	CV	1.4
cd226epa-1	AV	-5 ppb	SD	3.6	CV	69.2
be313epa-1	AV	-1 ppb	SD	0.5	CV	32.1
cu324epa-1	AV	5 ppb	SD	9.3	CV	160.6

prep blk h20 Replicate 1

sn213epa-1	-5 ppb	
cd226epa-1	-6 ppb	Peak Offset
be313epa-1	0 ppb	
cu324epa-1	1 ppb	

prep blk h20 Replicate 2

sn213epa-1	-8 ppb	
cd226epa-1	-7 ppb	Peak Offset
be313epa-1	-1 ppb	
cu324epa-1	-3 ppb	

sn213epa-1	AV	-7 ppb	SD	2.2	CV	31.0
cd226epa-1	AV	-7 ppb	SD	0.4	CV	5.8
be313epa-1	AV	0 ppb	SD	0.7	CV	114.4
cu324epa-1	AV	0 ppb	SD	2.8	CV	301.4

7157 sed-5 Replicate 1

sn213epa-1	170 ppb	
cd226epa-1	-2 ppb	
be313epa-1	0 ppb	
cu324epa-1	7 ppb	

7157 sed-5 Replicate 2

sn213epa-1	179 ppb	
cd226epa-1	0 ppb	
be313epa-1	1 ppb	
cu324epa-1	14 ppb	

sn213epa-1	AV	174 ppb	SD	5.9	CV	3.4
cd226epa-1	AV	-1 ppb	SD	1.7	CV	131.7
be313epa-1	AV	0 ppb	SD	0.1	CV	17.1
cu324epa-1	AV	11 ppb	SD	4.7	CV	42.7

7157-d Replicate 1

sn213epa-1	187 ppb	
cd226epa-1	-1 ppb	
be313epa-1	0 ppb	
cu324epa-1	8 ppb	

7157-d Replicate 2

sn213epa-1	186 ppb	
cd226epa-1	-4 ppb	Peak Offset
be313epa-1	0 ppb	Peak Offset
cu324epa-1	9 ppb	

sn213epa-1	AV	186 ppb	SD	0.0	CV	0.0

be313epa-1	AV	0 ppb	SD	0.7	CV	155.5
cu324epa-1	AV	9 ppb	SD	1.0	CV	10.8

cal blk Replicate 1

sn213epa-1	-10 ppb
cd226epa-1	-5 ppb
be313epa-1	0 ppb
cu324epa-1	-1 ppb

cal blk Replicate 2

sn213epa-1	-13 ppb
cd226epa-1	-8 ppb
be313epa-1	0 ppb
cu324epa-1	-4 ppb

Peak Offset

sn213epa-1	AV	-12 ppb	SD	2.6	CV	21.5
cd226epa-1	AV	-6 ppb	SD	2.1	CV	31.6
be313epa-1	AV	0 ppb	SD	0.5	CV	135.8
cu324epa-1	AV	-2 ppb	SD	2.1	CV	81.9

ccv Replicate 1

sn213epa-1	476 ppb
cd226epa-1	508 ppb
be313epa-1	521 ppb
cu324epa-1	502 ppb

ccv Replicate 2

sn213epa-1	488 ppb
cd226epa-1	510 ppb
be313epa-1	523 ppb
cu324epa-1	501 ppb

sn213epa-1	AV	482 ppb	SD	8.5	CV	1.7
cd226epa-1	AV	509 ppb	SD	0.9	CV	0.1
be313epa-1	AV	522 ppb	SD	0.8	CV	0.1
cu324epa-1	AV	501 ppb	SD	1.3	CV	0.2

7157-s Replicate 1

sn213epa-1	494 ppb
cd226epa-1	46 ppb
be313epa-1	48 ppb
cu324epa-1	233 ppb

7157-s Replicate 2

sn213epa-1	709 ppb
cd226epa-1	47 ppb
be313epa-1	48 ppb
cu324epa-1	234 ppb

sn213epa-1	AV	701 ppb	SD	11.0	CV	1.5
cd226epa-1	AV	46 ppb	SD	0.5	CV	1.2
be313epa-1	AV	48 ppb	SD	0.0	CV	0.1
cu324epa-1	AV	234 ppb	SD	2.1	CV	0.9

7183-d sw-5 Replicate 1

sn213epa-1	28 ppb	
cd226epa-1	-4 ppb	Peak Offset
be313epa-1	0 ppb	Peak Offset
cu324epa-1	4 ppb	

7183-d sw-5 Replicate 2

sn213epa-1	26 ppb	
cd226epa-1	-4 ppb	Peak Offset
be313epa-1	0 ppb	
cu324epa-1	3 ppb	

sn213epa-1	AV	27 ppb	SD	0.9	CV	3.5
cd226epa-1	AV	-4 ppb	SD	0.0	CV	1.6
be313epa-1	AV	0 ppb	SD	0.6	CV	185.1
cu324epa-1	AV	4 ppb	SD	0.8	CV	20.5

7183-s Replicate 1

sn213epa-1	191 ppb
cd226epa-1	38 ppb
be313epa-1	46 ppb
cu324epa-1	224 ppb

7183-s Replicate 2

sn213epa-1	195 ppb
cd226epa-1	41 ppb
be313epa-1	46 ppb
cu324epa-1	324 ppb

sn213epa-1	AV	193 ppb	SD	2.6	CV	1.3
cd226epa-1	AV	40 ppb	SD	2.2	CV	5.7
be313epa-1	AV	46 ppb	SD	0.2	CV	0.5
cu324epa-1	AV	224 ppb	SD	0.2	CV	0.1

7157 s.d1:5 Replicate 1

sn213epa-1	17 ppb	
cd226epa-1	-8 ppb	Peak Offset
be313epa-1	-1 ppb	Peak Offset
cu324epa-1	-17 ppb	

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7157 s.d1:5 Replicate 2

sn213epa-1	17 ppb

		cd226epa-1		-5 ppb				
		be313epa-1		0 ppb				
		cu324epa-1		-15 ppb				
	zn213epa-1	AV	17 ppb		SD	0.1	CV	0.5
	cd226epa-1	AV	-6 ppb		SD	2.1	CV	32.1
	be313epa-1	AV	0 ppb		SD	1.5	CV	801.4
	cu324epa-1	AV	-16 ppb		SD	1.2	CV	7.5
ics ab		Replicate 1						
		zn213epa-1		898 ppb				
		cd226epa-1		888 ppb				
		be313epa-1		461 ppb				
		cu324epa-1		469 ppb				
ics ab		Replicate 2						
		zn213epa-1		889 ppb				
		cd226epa-1		894 ppb				
		be313epa-1		472 ppb				
		cu324epa-1		467 ppb				
	zn213epa-1	AV	894 ppb		SD	5.9	CV	0.6
	cd226epa-1	AV	891 ppb		SD	4.1	CV	0.4
	be313epa-1	AV	466 ppb		SD	7.6	CV	1.6
	cu324epa-1	AV	468 ppb		SD	1.6	CV	0.3
cal blk		Replicate 1						
		zn213epa-1		6 ppb				
		cd226epa-1		-1 ppb				
		be313epa-1		0 ppb				
		cu324epa-1		0 ppb				
cal blk		Replicate 2						
		zn213epa-1		-9 ppb				
		cd226epa-1		-5 ppb		Peak Offset		
		be313epa-1		0 ppb				
		cu324epa-1		0 ppb				
	zn213epa-1	AV	-1 ppb		SD	10.9	CV	751.9
	cd226epa-1	AV	-3 ppb		SD	2.7	CV	85.5
	be313epa-1	AV	0 ppb		SD	0.2	CV	62.8
	cu324epa-1	AV	0 ppb		SD	0.7	CV>	999
ccv		Replicate 1						
		zn213epa-1		485 ppb				
		cd226epa-1		514 ppb				
		be313epa-1		516 ppb				
		cu324epa-1		505 ppb				

ccv

Replicate 2

sn213epa-1	479 ppb
cd226epa-1	514 ppb
be313epa-1	527 ppb
cu324epa-1	510 ppb

sn213epa-1	AV	482 ppb	SD	4.2	CV	0.8
cd226epa-1	AV	514 ppb	SD	0.0	CV	0.0
be313epa-1	AV	521 ppb	SD	8.0	CV	1.5
cu324epa-1	AV	507 ppb	SD	3.4	CV	0.6

Perkin-Elmer ICP/6500 Analytical Report

Method File: epa ni Date Collected: 87/12/30 Time: 10:30
Date of Report: 87/12/30 Time: 11:04

Analyst: RW, Enviro. STAT.

cal blk	ni231epa-2	
Units	ppb	
Conc.	19	
SD	3.1	
icv fisher4000	ni231epa-2	
Units	ppb	
Conc.	3969	99%
SD	37.9	
ics ab	ni231epa-2	
Units	ppb	
Conc.	896	98%
SD	3.4	
	N=916	
ics c	ni231epa-2	
Units	ppb	
Conc.	302	101%
SD	11.2	
	N=300	
prep blk 12/11	ni231epa-2	
Units	ppb	
Conc.	16	
SD	12.9	
7183 sw-5	ni231epa-2	
Units	ppb	
Conc.	30	
SD	4.7	
ics c 12/16	ni231epa-2	
Units	ppb	
Conc.	281	94%
SD	2.7	
	N=300	
prep blk soil	ni231epa-2	
Units	ppb	
Conc.	16	
SD	14.7	
prep blk h20	ni231epa-2	
Units	ppb	
Conc.	19	
SD	0.6	
7157 sed-5	ni231epa-2	
Units	ppb	
Conc.	53	
SD	7.2	

reviewed by PC 1/30/87

EAP 1/6/87

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7157-d sed-5	ni231epa-2	
Units	ppb	
Conc.	43	
SD	5.4	
7157-s	ni231epa-2	
Units	ppb	
Conc.	496	500 89%
SD	9.5	
cal blk	ni231epa-2	
Units	ppb	
Conc.	25	
SD	0.8	
ccv 4000	ni231epa-2	
Units	ppb	
Conc.	3905	99%
SD	26.6	
7183-d sw-5	ni231epa-2	
Units	ppb	
Conc.	29	
SD	5.8	
7183-s	ni231epa-2	
Units	ppb	
Conc.	344	400 79%
SD	5.2	
ics ab	ni231epa-2	
Units	ppb	
Conc.	917	100%
SD	7.7	
cal blk	ni231epa-2	
Units	ppb	
Conc.	12	
SD	9.8	
ccv 4000	ni231epa-2	
Units	ppb	
Conc.	3909	
SD	13.4	

99%

Run Manual Mode 87/12/30 10:30

Method Name: epa ni Replicates: 2 Read Delay: 20
Print Format: All Data ID Name: Data Name: ESTR-ni
Remarks: Environ. Strat. #7157,#7183 analyst/RLC

---

ni231epa-2

Element Name ni231epa-2 Gain 489

Standard 1 Replicate 1

ni231epa-2 EM 145222

Standard 1 Replicate 2

ni231epa-2 EM 145084

ni231epa-2 AV 145153 SD 71.5 CV 0.0 CONC 5000 ppb

Standard 2 Replicate 1

ni231epa-2 EM 48061

Standard 2 Replicate 2

ni231epa-2 EM 48373

ni231epa-2 AV 48217 SD 219.4 CV 0.4 CONC 1000 ppb

Standard 3 Replicate 1

ni231epa-2 EM 29947

Standard 3 Replicate 2

ni231epa-2 EM 29949

ni231epa-2 AV 29948 SD 5.6 CV 0.0 CONC 200 ppb

Standard 4 Replicate 1

ni231epa-2 EM 26539

AR301888 reviewed by 12/30/87

Standard 4 Replicate 2

ni231epa-2 EM 26360

ni231epa-2 AV 26449 SD 126.0 CV 0.4 CONC 50 ppb

Blank Replicate 1

ni231epa-2 EM 25136

Blank Replicate 2

ni231epa-2 EM 25347

ni231epa-2 AV 25241 SD 149.1 CV 0.5 CONC 0 ppb

Element Name ni231epa-2 Correlation Coefficent 0.9999

cal blk Replicate 1

ni231epa-2 17 ppb Peak Offset

cal blk Replicate 2

ni231epa-2 21 ppb

ni231epa-2 AV 19 ppb SD 3.1 CV 16.3

icv fisher4000 Replicate 1

ni231epa-2 3996 ppb

icv fisher4000 Replicate 2

ni231epa-2 3942 ppb

ni231epa-2 AV 3969 ppb SD 37.9 CV 0.9

ics ab Replicate 1

ni231epa-2 894 ppb

ics ab Replicate 2

ni231epa-2 899 ppb

ni231epa-2 AV 896 ppb SD 3.4 CV 0.3

ics c Replicate 1

ni231epa-2 294 ppb

lcs c Replicate 2

ni231epa-2 310 ppb

ni231epa-2 AV 302 ppb SD 11.2 CV 3.7

prep blk 12/11 Replicate 1

ni231epa-2 7 ppb Peak Offset

prep blk 12/11 Replicate 2

ni231epa-2 25 ppb

ni231epa-2 AV 16 ppb SD 12.9 CV 77.7

7183 sw-5 Replicate 1

ni231epa-2 33 ppb

7183 sw-5 Replicate 2

ni231epa-2 26 ppb

ni231epa-2 AV 30 ppb SD 4.7 CV 15.5

lcs c 12/16 Replicate 1

ni231epa-2 283 ppb

lcs c 12/16 Replicate 2

ni231epa-2 280 ppb

ni231epa-2 AV 281 ppb SD 2.7 CV 0.9

prep blk soil Replicate 1

ni231epa-2 26 ppb

prep blk soil Replicate 2

ni231epa-2 5 ppb Peak Offset

ni231epa-2 AV 16 ppb SD 14.7 CV 90.3

prep blk h20 Replicate 1

ni231epa-2 20 ppb

prep blk h20 Replicate 2

ni231epa-2 19 ppb Peak Offset

ni231epa-2 AV 19 ppb SD 0.6 CV 3.4

7157 sed-5 Replicate 1

ni231epa-2 48 ppb

7157 sed-5 Replicate 2

ni231epa-2 58 ppb

ni231epa-2 AV 53 ppb SD 7.2 CV 13.5

7157-d sed-5 Replicate 1

ni231epa-2 39 ppb

7157-d sed-5 Replicate 2

ni231epa-2 47 ppb

ni231epa-2 AV 43 ppb SD 5.4 CV 12.4

7157-s Replicate 1

ni231epa-2 489 ppb

7157-s Replicate 2

ni231epa-2 503 ppb

ni231epa-2 AV 496 ppb SD 9.5 CV 1.9

cal blk Replicate 1

ni231epa-2 25 ppb

cal blk Replicate 2

ni231epa-2 24 ppb

ni231epa-2 AV 25 ppb SD 0.8 CV 3.3

ccv 4000 Replicate 1

ni231epa-2 3924 ppb

ccv 4000 Replicate 2

ni231epa-2 3886 ppb

ni231epa-2 AV 3905 ppb SD 26.6 CV 0.6

7183-d sw-5 Replicate 1

ni231epa-2 25 ppb

7183-d sw-5 Replicate 2

ni231epa-2 33 ppb

ni231epa-2 AV 29 ppb SD 5.8 CV 19.9

7183-s Replicate 1

ni231epa-2 340 ppb

7183-s Replicate 2

ni231epa-2 348 ppb

ni231epa-2 AV 344 ppb SD 5.2 CV 1.5

ics ab Replicate 1

ni231epa-2 923 ppb

ics ab Replicate 2

ni231epa-2 912 ppb

ni231epa-2 AV 917 ppb SD 7.7 CV 0.8

cal blk Replicate 1

ni231epa-2 19 ppb

cal blk Replicate 2

ni231epa-2 5 ppb Peak Offset

ni231epa-2 AV 12 ppb SD 9.8 CV 76.8

ccv 4000 Replicate 1

ni231epa-2 3919 ppb

ccv 4000 Replicate 2

ni231epa-2 3900 ppb

ni231epa-2 AV 3909 ppb SD 13.4 CV 0.3

SECTION IV

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST KK
DATE 12/17/87
NOTEBOOK NO 852
PAGE NO 165

ANTIMONY
FURNACE USEPA METHOD 204.2
EPACLP DETECTION 40 ug/L

INSTRUMENT NUMBER 2
CASE NUMBER [illegible]-5061
STOCK SOLUTION ID# [illegible] EP

Start 10:00

SUPERVISORY REVIEW PC 12/18/87 EAP 1/6/88

I.D.L 5.2

Recommend not reporting Sb results or Qualifying them in the Case narrative.

MATRIX MODIFIER NA

WAVELENGTH 217.6
BACKGROUND CORRECTION: YES (NO) ?
TRAY # 1

INITIAL CAL. VERIFICATION SOURCE ICV #3
CONCENTRATION (10) 10.00 ug/L; ABS 101
CONTINUING CAL. VERIF. SOURCE ↓
CONCENTRATION ↓
LAB CONTROL SAMPLE SOURCE HEAT
CONCENTRATION (ICP) 80
LAB CONTROL SAMPLE SOURCE
CONCENTRATION (GFAA)
METHOD SPIKE CONC. WATER 50 ug/L
SOIL 50 ug/L

* all correction made by K.K 12/17/87

DUP #	EPA SAMPLE #	ABSORBANCE	AVERAGE ABSORBANCE	DILUTION FACTOR	CONC. ug/L	CONC. mg/kg	% RECOVERY	COMMENTS
	1 INIT. CAL. BLANK	.000 .000	.000					PE 4951
	2 20	.029 .029	.029					PE 9.040-3
	3 50	.070 .071	.070					PE 1.1X10-2
	4 100	.130 .127	.1285					
1	5 200	.219 .219	.219					
2	6 CAL. BLANK	.001 .000	.000					
3	7 ICV	.118 .117	.118	1X	95.8		95%	
4	8 LCS 5 + B	.002 .000	.000	2X	0			
5	9 LCS SPIKE 120	.136 .138	.137	↓	236		95.0%	
6	10 METHOD BLK. Water	.000 .000	.000	1X	0			I.D.L
7	11 M.BLK Soil	.000 .000	.000		0			I.D.L
8	12 MBlk+BLK	.000 .000	.000		0			<CRDL
9	13 +120	.141 .137	.140		121		101%	
10	14 [illegible]	.015 .015	.015		5.5	<CRDL		<CRDL
11	15 CAL BLK	.000 .000	.000		0			I.D.L
12	16 CCV	.118 .118	.118		102		99.93%	K.K
13	17 [illegible] K.K 12/17/87	.000 .000	.000		0			
14	18 CCV K.K 12/17/87	.128 .128	.128		111		93%	
15	19 [illegible]	.000 .000	.000		0			
16	20 +120	.133 .132	.132		113		94%	
17	21 [illegible]	.0064 .0065	.0065	↓	5.1		112%	
18	22 MBLK Soil K.K 12/17/87	.000 .000	.000	2X	0			
19	23 +120	.144 .145	.1445	↓	250		104%	
20	24 MBlk Water	.000 .000	.000	1X				

Both Sb LCS's are 0% recovery
Not enough sample to redigest

AA301894

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST KK
DATE 12/17/87
NOTEBOOK #: 852
PAGE NO 149

ANTIMONY
FURNACE USEPA METHOD 204.2
EPACLP DETECTION 60 ug/L

CASE NUMBER ESY

SUPERVISOR REVIEW PG
DATE 12/18/87

****
CALIBRATION CURVE FOR THESE SAMPLES
IS ON THE PRECEDING PAGE.
****

MATRIX MODIFIER: NA

WAVELENGTH: 217.6
BACKGROUND CORRECTION: YES (1) NO: 0
TRAY # (1)

CUP #	EPA SAMPLE #	ABSORBANCE		AVERAGE ABSORBANCE	DILUTION FACTOR	CONCT. ug/L	CONCT. ug/Kg	% RECOVERY	COMMENTS
21	22 31B3+B	000	000	000	1X	0	-------	95%	----------
22	23 +120	131	137	136	↓	119	-------		----------
23	24 CAL BLK	000	000	000		0	-------		----------
24	25 ~~CAL BLK~~ CCV	120	125	1225	↓	105.1	-------	104%	----------
25	CCV	-------	------	-------	-------	-------	-------	-------	----------
26	-------	-------	------	-------	-------	-------	-------	-------	----------
27	-------	-------	------	-------	-------	-------	-------	-------	----------
28	-------	-------	------	-------	-------	-------	-------	-------	----------
29	-------	-------	------	-------	-------	-------	-------	-------	----------
30	-------	-------	------	-------	-------	-------	-------	-------	----------
31	-------	-------	------	-------	-------	-------	-------	-------	----------
32	-------	-------	------	-------	-------	-------	-------	-------	----------
33	-------	-------	------	-------	-------	-------	-------	-------	----------
34	-------	-------	------	-------	-------	-------	-------	-------	----------
35	CAL.BLANK	-------	------	-------	-------	-------	-------	-------	----------
37	CCV	-------	------	-------	-------	-------	-------	-------	----------

Sb
ESTK 12/17/82 KHL
BK852 PG 108-109

		0.000			1.01	CV
		-0.000			0.015	
		0.000	AV		0.015	
		06	ER	11	0.015	AV
		0.000	AZ		0.00	CV
		0.000			-0.000	
		0.000			-0.001	
		0.000	AV	12	-0.001	AV
		06	ER		06	ER
		0.	S1		0.118	
		0.029			0.118	
		0.029		13	0.118	AV
		0.029	AV		0.00	CV
		0.00	CV		0.000	
		0.	S2		-0.001	
		0.070		14	-0.001	AV
		0.070			06	ER
		0.070	AV		0.130	
		0.00	CV		0.128	
		0.	S3	15	0.129	AV
		0.130			1.10	CV
		0.127			-0.002	
1		0.1285	AV		-0.001	
		1.65	CV	16	-0.001	AV
		0.219			47.14	CV
		0.219			0.133	
2		0.219	AV		0.130	
		0.00	CV	17	0.132	AV
		0.001			1.61	CV
		-0.001			0.064	
3		-0.000	AV		0.065	
		06	ER	18	0.064	AV
		0.112			1.10	CV
		0.114			-0.001	
4		0.113	AV		-0.000	
		1.25	CV	19	-0.001	AV
		0.002			06	ER
		-0.000			0.144	
5		0.001	AV		0.145	
		06	ER	20	0.144	AV
		0.136			0.49	CV
		0.138			-0.000	
6		0.137	AV		-0.000	
		1.03	CV	21	-0.000	AV
		-0.000			06	ER
		-0.001			-0.001	
7		-0.001	AV		-0.001	
		06	ER	22	-0.001	AV
		-0.001			0.00	CV
		-0.001			0.139	
8		-0.001	AV		0.137	
		0.00	CV	23	0.138	AV
		-0.001			1.03	CV
		0.000			0.000	
9		-0.000	AV		-0.000	
		06	ER	24	-0.000	AV
		0.141			06	ER
		0.139			0.120	
10		0.140	AV		0.125	
				25	0.123	AV
					2.89	CV

AR301896

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

EPA CLP PERKIN ELMER 3030 ZEEMAN FURNACE
INSTRUMENT # 2
CASE # ESAT BATC 027/ONREL

METAL As
1.4 I.D.L

ANALYST KK
DATE 12/18/87
START TIME 5:30
STOP TIME
NOTEBOOK # 816
PAGE # 28

INITIAL CALIBRATION VERIFICATION 10 PPB
ICV CONCENTRATION 95% T.C. 1:20 dil. = 49.4
CONTINUING CALIBRATION VERIFICATION
CCV CONCENTRATION
LAB CONTROL SAMPLE HEAS 80%
SPIKE CONCENTRATION WATER 40 ug/l in 40 EAP 1/6/88
SPIKE CONCENTRATION SOIL 40 mg/kg 80 40
STANDARD PREPARATION DATE 12/18/87
STANDARD SOURCE NBS 2126-2

r = .99 CAL 12/20/87
m = 41 X 10 = 3
b = 1484 X 10 = 3 KK 12/20/87

SUPERVISORY REVIEW PC EAP 1/6/88
DATE 12/21/87

STANDARD 1	Cal Blk	29.	7276	22.	
STANDARD 2	10 ppb	30.	7277	23.	
STANDARD 3	20	31.	7278	24.	
STANDARD 4	50	32.	CAL BLK	25.	CAL BLANK 5
STANDARD 5	100	33.	CCV	26.	CCV 5
3.	INITIAL CAL BLANK		34.		27.	
4.	ICV		35.		28.	
5.	LCS WATER KK C	+6 2X Rerun 4pt MSA	36.		29.	
6.	LCS SOIL KK	+20 V	37.		30.	
7.	PREP BLANK WATER		38.		31.	
8.	PREP BLANK SOIL		39.	CAL BLANK 3	32.	
9.	7193+B		40.	CCV 3	33.	
10.	+20		3.		34.	
11.	7183SPK		4.		35.	
12.	7157+B	~~Rerun 4pt MSA~~ KK not necessary 12/20/87	5.		36.	
13.	+20		6.		37.	CAL BLANK 6
14.	7157SPK		7.		38.	CCV 6
15.	CAL BLANK 1		8.			
16.	CCV 1		9.			
17.	7157 DUP+B		10.			
18.	+20		11.			
19.	CAL BLK		12.			
20.	CCV	Stop rerun for ESAT	13.	CAL BLANK 4		
21.	LCS ~~EP~~ BATC	2X	14.	CCV 4		
22.	+20	V	15.			
23.	7264	Rerun 2X	16.			
24.	7265	Rerun 5X	17.			
25.	~~CAL BLK~~ KK	M.BLK 40	18.			
26.	~~CCV~~ KK	Cal Blk	19.			
27.	CAL BLANK KK	CCV	20.			
28.	CCV KK	7275	21.			

* all corrections made + initialed by KK on 12/18/87, reviewed + corrected by KK 12/20/87

AS

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.017	0.018	0.017
PEAK AREA (ABS-SECONDS)	0.018	-0.005	0.021

READ: -0.006 -.003 0

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.033	0.019	0.018
PEAK AREA (ABS-SECONDS)	0.028	-0.001	0.024

READ: -0.002

MEAN= -0.004 STD.DEV.= 0.008 COEF.VAR.= 76.81 %

****

0.000 AUTOZERO

****

AS

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.110	0.101	0.015
PEAK AREA (ABS-SECONDS)	0.057	0.042	0.016

READ: 0.045 .045+.003=.048

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.117	0.115	0.020
PEAK AREA (ABS-SECONDS)	0.070	0.048	0.022

READ: 0.051

MEAN= 0.048 STD.DEV.= 0.005 COEF.VAR.= 9.54 %

****

10.0 STANDARD 1

****

AS

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.224	0.211	0.020
PEAK AREA (ABS-SECONDS)	0.113	0.099	0.024

READ: 10.2 .084+.013=.09

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.235	0.211	0.020
PEAK AREA (ABS-SECONDS)	0.109	0.095	0.024

READ: 10.4

MEAN= 10.6 STD.DEV.= 0.6 COEF.VAR.= 5.01 %

****

10.9

E-50: READING GREATER THAN HIGHEST STANDARD

****

10.7 STANDARD 2

****

AS

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.518	0.477	0.044
PEAK AREA (ABS-SECONDS)	0.246	0.206	0.040

(1991.003 = .202)

(CONTINUED)

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.515	0.467	0.055
PEAK AREA (ABS-SECONDS)	0.235	0.192	0.046

READ: 42.6

MEAN= 44.2 STD.DEV.= 2.2 COEF.VAR.= 5.05 %

44.2

E-50: READING GREATER THAN HIGHEST STANDARD

48.8 STANDARD 3

AS

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	1.055	0.990	0.076
PEAK AREA (ABS-SECONDS)	0.479	0.419	0.059

READ: 100.5 (.4115 - .1003 = .4145)

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	1.031	0.958	0.072
PEAK AREA (ABS-SECONDS)	0.458	0.410	0.048

READ: 99.8

MEAN= 100.0 STD.DEV.= 0.8 COEF.VAR.= 0.82 %

100.0

E-50: READING GREATER THAN HIGHEST STANDARD

100.0 STANDARD 4

AS 0003 dublK

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.028	0.014	0.029
PEAK AREA (ABS-SECONDS)	0.028	-0.005	0.033

READ: -0.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.025	0.016	0.016
PEAK AREA (ABS-SECONDS)	0.019	-0.003	0.022

READ: 0.0

MEAN= -0.3 STD.DEV.= 0.3 COEF.VAR.= 99.99 %

AS 0004 ICV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.563	0.514	0.052
PEAK AREA (ABS-SECONDS)	0.244	0.211	0.034

AR301899

READ: 51.6

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.564	0.520	0.044
PEAK AREA (ABS-SECONDS)	0.234	0.197	0.037

READ: 48.8

101%

MEAN= 48.9 [49.4] STD.DEV.= 2.3 COEF.VAR.= 4.56 %

****

AS 0005 LCSCtB 2y Return ft MSA

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.871	0.854	0.027
PEAK AREA (ABS-SECONDS)	0.158	0.136	0.020

READ: 88.6

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE) 85%	0.889	0.855	0.034
PEAK AREA (ABS-SECONDS)	0.167	0.141	0.026

READ: 84.7 68.2

MEAN= 84.1 [72] STD.DEV.= 0.8 COEF.VAR.= 2.52 %

****

AS 0006 t20

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.827	0.593	0.042
PEAK AREA (ABS-SECONDS)	0.271	0.232	0.039

READ: 56.7

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE) 117%	0.654	0.611	0.045
PEAK AREA (ABS-SECONDS)	0.279	0.241	0.038

READ: 58.6 [122] 115.

MEAN= 57.7 STD.DEV.= 1.5 COEF.VAR.= 2.61 %

****

AS 0007 Prep blk w

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.026	0.025	0.015
PEAK AREA (ABS-SECONDS)	0.019	-0.012	0.031

READ: -2.2

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.029	0.021	0.017
PEAK AREA (ABS-SECONDS)	0.015	-0.004	0.020

READ: -0.3

MEAN= -1.2 STD.DEV.= 1.3 COEF.VAR.= 99.99 %

****

AS 0008 Prep blks

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.021	0.014	0.019
PEAK AREA (ABS-SECONDS)	0.020	-0.006	0.026

READ: -0.7

	AA	ZAA	BB

PEAK HEIGHT (ABSORBANCE)	0.018	0.015	0.021
PEAK AREA (ABS-SECONDS)	0.018	-0.010	0.028

READ: -1.7

MEAN= -1.2 STD.DEV.= 0.7 COEF.VAR.= 57.38 %

****

AS 0009 7183 +B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.054	0.020	0.052
PEAK AREA (ABS-SECONDS	0.062	0.005	0.057

READ: 2.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.054	0.022	0.047
PEAK AREA (ABS-SECONDS)	0.046	-0.006	0.052

READ: -0.7

MEAN= 0.6 STD.DEV.= 1.8 COEF.VAR.= 95.95 %

****

AS 0010 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.316	0.262	0.058
PEAK AREA (ABS-SECONDS)	0.146	0.090	0.056

READ: 22.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.308	0.255	0.062
PEAK AREA (ABS-SECONDS)	0.145	0.092	0.059

READ: 22.9 114%

MEAN= 22.7 STD.DEV.= 0.4 COEF.VAR.= 1.68 %

****

AS 0011 7183 Spk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.952	0.866	0.091
PEAK AREA (ABS-SECONDS)	0.967	0.894	0.072

READ: 71.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.930	0.828	0.096
PEAK AREA (ABS-SECONDS)	0.373	0.290	0.084

READ: 70.7 142%/C +78% EAP 1/16/88 89%

MEAN= 71.2 STD.DEV.= 0.7 COEF.VAR.= 1.04 %

****

AS 0012 7154 +B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.342	0.104	0.238
PEAK AREA (ABS-SECONDS)	0.184	0.037	0.147

AM301901

READ: 9.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.262	0.116	0.269
PEAK AREA (ABS-SECONDS)	0.190	0.087	0.152

READ: 9.6

MEAN= 9.7 STD.DEV.= 0.1 COEF.VAR.= 1.26 %

****

AS 0013 f20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.556	0.298	0.264
PEAK AREA (ABS-SECONDS)	0.291	0.134	0.146

READ: 98.1

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.555	0.300	0.272
PEAK AREA (ABS-SECONDS)	0.288	0.139	0.144

READ: 94.8 120%

sample abs < 50% of spk

MEAN= 96.7 STD.DEV.= 1.8 COEF.VAR.= 1.86 %

****

AS 0014

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.764	0.486	0.280
PEAK AREA (ABS-SECONDS)	0.399	0.230	0.154

READ: 56.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.739	0.458	0.281
PEAK AREA (ABS-SECONDS)	0.378	0.227	0.151

READ: 55.5

MEAN= 55.8 STD.DEV.= 0.5 COEF.VAR.= 0.81 %

****

AS 0015 calib

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.015	0.017	0.018
PEAK AREA (ABS-SECONDS)	0.012	-0.007	0.019

READ: -0.9

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.020	0.016	0.020
PEAK AREA (ABS-SECONDS)	0.027	0.000	0.025

READ: 0.7

MEAN= -0.1 STD.DEV.= 1.1 COEF.VAR.= 99.99 %

****

AR301902

AS 0016 CCV

PEAK HEIGHT (ABSORBANCE)	0.518	0.478	0.051
PEAK AREA (ABS-SECONDS)	0.248	0.211	0.037

READ: 51.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.515	0.476	0.044
PEAK AREA (ABS-SECONDS)	0.251	0.220	0.031

READ: 52.2 107%

MEAN= 52.2 [49.4] STD.DEV.= 1.5 COEF.VAR.= 2.80 %

****

AS 0017 #157 DUPTB

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.269	0.078	0.157
PEAK AREA (ABS-SECONDS)	0.143	0.026	0.129

READ: 7.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.275	0.077	0.208
PEAK AREA (ABS-SECONDS)	0.147	0.028	0.119

READ: 7.5

MEAN= 7.3 STD.DEV.= 0.2 COEF.VAR.= 2.90 %

****

AS 0018 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.464	0.254	0.210
PEAK AREA (ABS-SECONDS)	0.248	0.116	0.130

READ: 26.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.465	0.269	0.215
PEAK AREA (ABS-SECONDS)	0.253	0.125	0.128

READ: 31.3 113%

MEAN= 29.9 STD.DEV.= 1.6 COEF.VAR.= 5.25 %

****

AS 0019 Colb/c

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.033	0.017	0.018
PEAK AREA (ABS-SECONDS)	0.033	-0.005	0.037

READ: -0.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.035	0.016	0.019
PEAK AREA (ABS-SECONDS)	0.026	-0.005	0.031

READ: -0.3

MEAN= -0.4 STD.DEV.= 0.1 COEF.VAR.= 33.79 %

****

AR301903

AS 0020CCV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.522	0.499	0.059
PEAK AREA (ABS-SECONDS)	0.252	0.207	0.045

READ: 50.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.538	0.491	0.044
PEAK AREA (ABS-SECONDS)	0.245	0.207	0.038

READ: 50.7 103%

MEAN= 50.7 [49.4] STD.DEV.= 0.0 COEF.VAR.= 0.08 %

Stop here for ESTR-80W

AS 0021 LCSCCP 2X

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.848	0.822	0.035
PEAK AREA (ABS-SECONDS)	0.160	0.122	0.038

READ: 30.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.842	0.818	0.025
PEAK AREA (ABS-SECONDS)	0.160	0.126	0.035

79%

READ: 32.9 X2=65.8

MEAN= 31.5 STD.DEV.= 1.8 COEF.VAR.= 5.87 %

AS 0022+20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.575	0.535	0.042
PEAK AREA (ABS-SECONDS)	0.251	0.218	0.042

READ: 58.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.580	0.537	0.045
PEAK AREA (ABS-SECONDS)	0.259	0.220	0.039

READ: 58.9 X2=117.8 107%

MEAN= 58.7 STD.DEV.= 0.6 COEF.VAR.= 0.58 %

AS 0023 9384 Rerun 2X

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	1.299	1.224	0.088
PEAK AREA (ABS-SECONDS)	0.570	0.517	0.053

READ: 125.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	1.344	1.248	0.096
PEAK AREA (ABS-SECONDS)	0.593	0.519	0.074

READ: 125.8

AR30-19

MEAN= 125.6 STD.DEV.= 0.3 COEF.VAR.= 0.21 %

125.6

****

AS 0024 7385 Rerun 5X

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	2.451	2.311	0.141
PEAK AREA (ABS-SECONDS)	0.916	0.827	0.089

READ: 200.6
E-87: VALUE GREATER THAN ROLLOVER ABSORBANCE

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	3.078	2.942	0.137
PEAK AREA (ABS-SECONDS)	0.926	0.859	0.067

READ: 208.0
E-87: VALUE GREATER THAN ROLLOVER ABSORBANCE

MEAN= 204.2 STD.DEV.= 5.4 COEF.VAR.= 2.65 %

****

204.2
E-53: READING GREATER THAN HIGHEST STANDARD

****

AS 0025 M,B11CW

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.023	0.016	0.022
PEAK AREA (ABS-SECONDS)	0.023	-0.007	0.030

READ: -0.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.018	0.022	0.016
PEAK AREA (ABS-SECONDS)	0.009	-0.008	0.017

READ: -1.2

MEAN= -1.0 STD.DEV.= 0.2 COEF.VAR.= 19.24 %

****

AS 0026 CW blk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.022	0.015	0.022
PEAK AREA (ABS-SECONDS)	0.020	-0.008	0.029

READ: -1.1

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.025	0.014	0.021
PEAK AREA (ABS-SECONDS)	0.019	-0.008	0.027

READ: -1.1

MEAN= -1.1 STD.DEV.= 0.0 COEF.VAR.= 3.94 %

****

AS 0027 CCV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.505	0.470	0.044
PEAK AREA (ABS-SECONDS)	0.253	0.213	0.040

READ: 52.1

AR301905

0027 (CONTINUED)

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.486	0.454	0.048
PEAK AREA (ABS-SECONDS)	0.296	0.202	0.094

READ: 49.5 103%

MEAN= 50.8 [49.4] STD.DEV.= 1.8 COEF.VAR.= 3.61 %

AS 0028 7275

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.068	0.056	0.026
PEAK AREA (ABS-SECONDS)	0.069	0.016	0.059

READ: 4.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.064	0.062	0.031
PEAK AREA (ABS-SECONDS)	0.064	0.015	0.049

READ: 4.4

MEAN= 4.5 STD.DEV.= 0.1 COEF.VAR.= 2.45 %

AS 0029 7276

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.040	0.028	0.030
PEAK AREA (ABS-SECONDS)	0.051	0.009	0.042

READ: 1.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.037	0.018	0.029
PEAK AREA (ABS-SECONDS)	0.042	0.000	0.042

READ: 0.7

MEAN= 1.1 STD.DEV.= 0.6 COEF.VAR.= 58.01 %

AS 0030 7277

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.043	0.029	0.029
PEAK AREA (ABS-SECONDS)	0.042	-0.005	0.047

READ: -0.3

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.034	0.018	0.025
PEAK AREA (ABS-SECONDS)	0.040	-0.006	0.048

READ: 0.2

MEAN= -0.1 STD.DEV.= 0.2 COEF.VAR.= 99.99 % AR301906

AS 0031 7278

PEAK HEIGHT (ABSORBANCE)	0.036	0.018	0.038
PEAK AREA (ABS-SECONDS)	0.038	-0.004	0.040

READ: -0.2

0081 cal blk KK 12/20/87 (CONTINUED)

	AA	ZAA	EC
PEAK HEIGHT (ABSORBANCE)	0.035	0.024	0.028
PEAK AREA (ABS-SECONDS)	0.048	-0.004	0.047

READ: -0.3

MEAN= -0.2 STD.DEV.= 0.0 COEF.VAR.= 4.61 %

****

AS 0082 calblc

	AA	ZAA	EC
PEAK HEIGHT (ABSORBANCE)	0.022	0.022	0.018
PEAK AREA (ABS-SECONDS)	0.018	-0.002	0.021

READ: 0.8

	AA	ZAA	EC
PEAK HEIGHT (ABSORBANCE)	0.024	0.020	0.020
PEAK AREA (ABS-SECONDS)	0.021	-0.006	0.026

READ: -0.6

MEAN= -0.2 STD.DEV.= 0.6 COEF.VAR.= 99.99 %

****

AS 0083 ccv

	AA	ZAA	EC
PEAK HEIGHT (ABSORBANCE)	0.477	0.447	0.049
PEAK AREA (ABS-SECONDS)	0.235	0.199	0.040

READ: 48.7

	AA	ZAA	EC
PEAK HEIGHT (ABSORBANCE)	0.526	0.486	0.041
PEAK AREA (ABS-SECONDS)	0.244	0.209	0.040

READ: 49.6 100/0

MEAN= 49.2 [49.4] STD.DEV.= 0.8 COEF.VAR.= 1.64 %

****

ESTR 8061/ BATC 027
12/21/87
KG BR 916 pg 84

S

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.026	0.011	0.024
PEAK AREA (ABS-SECONDS)	0.047	-0.005	0.052

READ: -0.007 -.0035 0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.018	0.009	0.012
PEAK AREA (ABS-SECONDS)	0.032	-0.002	0.034

READ: -0.003

MEAN= -0.005 STD.DEV.= 0.002 COEF.VAR.= 47.14 %

0.000 AUTOZERO

AS

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.112	0.035	0.025
PEAK AREA (ABS-SECONDS)	0.094	0.036	0.058

READ: 0.040 .0385+.0035=.042

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.120	0.099	0.029
PEAK AREA (ABS-SECONDS)	0.111	0.041	0.073

READ: 0.044

MEAN= 0.042 STD.DEV.= 0.003 COEF.VAR.= 7.76 %

10.0 STANDARD 1

AS

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.210	0.182	0.032
PEAK AREA (ABS-SECONDS)	0.155	0.090	0.065

.0385+.0035=.092

READ: 22.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.214	0.184	0.030
PEAK AREA (ABS-SECONDS)	0.148	0.087	0.059

READ: 21.6

MEAN= 22.0 STD.DEV.= 0.6 COEF.VAR.= 2.62 %

22.0

E-50: READING GREATER THAN HIGHEST STANDARD

20.0 STANDARD 2

AS

AR301908

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.514	0.462	0.052

READ: 50.5 +.0035 = .2285

(CONTINUED)

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.514	0.462	0.054
PEAK AREA (ABS-SECONDS)	0.901	0.225	0.075

READ: 50.4

MEAN= 50.4 STD.DEV.= 0.1 COEF.VAR.= 0.17 %

****

50.4

E-50: READING GREATER THAN HIGHEST STANDARD

****

50.1 STANDARD 3

****

AS

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.951	0.878	0.076
PEAK AREA (ABS-SECONDS)	0.546	0.462	0.084

READ: 102.1 .46154 .0035 = .465

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.947	0.868	0.081
PEAK AREA (ABS-SECONDS)	0.543	0.461	0.082

READ: 101.5

MEAN= 101.9 STD.DEV.= 0.2 COEF.VAR.= 0.22 %

****

101.9

E-50: READING GREATER THAN HIGHEST STANDARD

****

100.4 STANDARD 4

****

AS 0003 lab blk

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.025	0.006	0.025
PEAK AREA (ABS-SECONDS)	0.061	-0.004	0.064

READ: 0.0

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.025	0.014	0.024
PEAK AREA (ABS-SECONDS)	0.067	0.003	0.064

READ: 1.4

MEAN= 0.7 STD.DEV.= 1.0 COEF.VAR.= 99.99 %

****

AS 0004 CV

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.478	0.415	0.059
PEAK AREA (ABS-SECONDS)	0.911	0.225	0.083

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.482	0.423	0.059
PEAK AREA (ABS-SECONDS)	0.302	0.223	0.080

READ: 48.9 99%

MEAN= 49.0 [49.4] STD.DEV.= 0.0 COEF.VAR.= 0.02 %

****

AS 0005 LOSC +B 4X

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.192	0.161	0.031
PEAK AREA (ABS-SECONDS)	0.141	0.076	0.066

91% +.0035

r=.9996
b=8.1X10-2
m=4.4X10-3 conc 73.1

17.1 10795

****

AS 0006 +10

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.299	0.264	0.038
PEAK AREA (ABS-SECONDS)	0.196	0.125	0.071

27.8 .1285

****

AS 0007 +20

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.378	0.344	0.042
PEAK AREA (ABS-SECONDS)	0.238	0.165	0.069

36.9 .1685

****

AS 0008 +40

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.560	0.526	0.057
PEAK AREA (ABS-SECONDS)	0.341	0.255	0.086

55.8 .2585

****

AS 0009 CALIB L

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.028	0.009	0.020
PEAK AREA (ABS-SECONDS)	0.052	0.000	0.052

0.7

****

AS 0010 CCV

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.482	0.420	0.058
PEAK AREA (ABS-SECONDS)	0.295	0.226	0.072

48.5 [49.4] 100% Drop zone for ESTR

****

AS 0011 7384 2X

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.601	0.543	0.060
PEAK AREA (ABS-SECONDS)	0.348	0.260	0.088

READ: 56.9

AR301910

	AA	ZAA	BC

PEAK AREA (ABS-SECONDS)	0.851	0.272	0.079

READ: 58.6 116.

MEAN= 58.2 K2 STD.DEV.= 1.9 COEF.VAR.= 3.26 %

****

AS 0012 7385 5Y

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.506	0.456	0.052
PEAK AREA (ABS-SECONDS)	0.303	0.224	0.079

READ: 48.1

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.504	0.460	0.047
PEAK AREA (ABS-SECONDS)	0.300	0.224	0.076

READ: 48.1 K5 = 246.

MEAN= 48.1 STD.DEV.= 0.1 COEF.VAR.= 0.19 %

****

AS 0013 cal b/K

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.026	0.009	0.025
PEAK AREA (ABS-SECONDS)	0.052	-0.007	0.059

READ: -0.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.034	0.007	0.025
PEAK AREA (ABS-SECONDS)	0.056	-0.005	0.053

READ: -0.6

MEAN= -0.7 STD.DEV.= 0.2 COEF.VAR.= 25.85 %

****

AS 0014 CCV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.489	0.437	0.057
PEAK AREA (ABS-SECONDS)	0.315	0.222	0.093

READ: 48.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.481	0.428	0.059
PEAK AREA (ABS-SECONDS)	0.306	0.224	0.082

READ: 49.0 99%

MEAN= 48.9 [99.4] STD.DEV.= 0.2 COEF.VAR.= 0.37 %

****

AR301911

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

EPA CLP PERKIN ELEMER 3030 ZEEMAN FURNACE
INSTRUMENT # 5
CASE # ESTR 8069

METAL Cr
I.D.L 0.16

ANALYST KK
DATE 12/21/87
START TIME 8:00
STOP TIME 12:00
NOTEBOOK # 896
PAGE # 30

r = .9999
m = 6.3x10-3
b = 1.2x10-3

INITIAL CALIBRATION VERIFICATION ICV#1(0487)
ICV CONCENTRATION 1:100dil =50.16
CONTINUING CALIBRATION VERIFICATION ↓
CCV CONCENTRATION ↓
LAB CONTROL SAMPLE HEAT
SPIKE CONCENTRATION WATER 20 ug/l in 40
SPIKE CONCENTRATION SOIL 20
STANDARD PREPARATION DATE 12.21.87
STANDARD SOURCE Fisher 863177-24
Range 40

SUPERVISORY REVIEW RC
DATE 12/22/87

STANDARD 1	Calbk	29.	7160+20	22.	+20 2X
STANDARD 2	10 Prk	30.	LCSC+B 2x Rerun Prior Sam	23.	
STANDARD 3	20	31.	LCSC+B 2X	24.	
STANDARD 4	50	32.	+20 ↓	25. CAL BLANK 5	
STANDARD 5	100	33.	7171+B	26. CCV 5	
. INITIAL CAL BLANK		34.	+20	27.	
4. ICV		35.	7180+B	28.	
5. LCS WATER C#1 +B	2X	36.	+20	29.	
6. LCS SOIL +20	↓	37.	7181+B	30.	
7. PREP BLANK WATER		38.	+20	31.	
8. PREP BLANK SOIL		39. CAL BLANK 3		32.	
9.	7153+B	40. CCV 3		33.	
10.	+20	3. Nothing in cup Recal. all to sample tape out		34.	
11.	7154+B	4.	7157+B — Rerun was 2x soln	35.	
12.	+20	5.	+20	36.	
13.	7155+B	6.	7183+B — Rerun wrong spk soln	37. CAL BLANK 6	
14.	+20	7.	+20	38. CCV 6	
15. CAL BLANK 1		8.	7182+B		
16. CCV 1		9.	+20		
17.	7156+B	10.	7183 2X		
18.	+20	11.	7184+B		
19.	7157+B	12.	+20		
20.	+20	13. CAL BLANK 4			
21.	7158+B	14. CCV 4			
22.	7158+B Heat Rerun	15.	7185+B		
23.	+20	16.	+20		
24.	7159+B	17.	7186+B		
25.	+20	18.	+20		
26.	Cal Blk	19.	7187+B		
27. ~~CAL BLANK 2~~ KK 12/21/87	CCV	20.	+20		
1. ~~CCV 2~~ 12/21/87 KK	7160+B Rerun 2X	21.	7158+B 2X		

AR301912

KK
ESTR
12/21/87
BK896 P930

CR

	AA	ZAA	BC
PEAK HEIGHT (ABS-BEARICE)	0.008	0.004	0.007
PEAK AREA (ABS-SECONDS)	0.011	-0.003	0.014

READ: 0.000 -.0002 0

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.005	0.006	0.007
PEAK AREA (ABS-SECONDS)	0.008	-0.001	0.008

READ: 0.011

MEAN= 0.001 STD.DEV.= 0.001 COEF.VAR.= 88.88 %

0.001 AUTOSEP

CR

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.042	0.038	0.006
PEAK AREA (ABS-SECONDS)	0.058	0.064	0.012

READ: 0.056 .0635+.002 = .0655

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE	0.043	0.040	0.007
PEAK AREA (ABS-SECONDS	0.175	0.069	0.013

READ: 0.065

MEAN= 0.167 STD.DEV.= 0.001 COEF.VAR.= 0.86 %

10.0 STANDARD

CR

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE	0.078	0.071	0.006
PEAK AREA (ABS-SECONDS	0.132	0.129	0.009

READ: 18.3 .1215+.002=.1235

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.075	0.070	0.007
PEAK AREA (ABS-SECONDS)	0.130	0.120	0.011

READ: 18.3

MEAN= 18.0 STD.DEV.= 0.3 COEF.VAR.= 1.64 %

18.0
E-50: READING GREATER THAN HIGHEST STANDARD

18.3 STANDARD 3

CR

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.192	0.184	0.011
PEAK AREA (ABS-SECONDS	0.344	AM 3 0 1913	0.021

READ: 51.9

1324

(CONTINUED)

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.196	0.185	0.014
PEAK AREA (ABS-SECONDS)	0.850	0.831	0.081

READ: 51.6

MEAN= 51.8 STD.DEV.= 0.3 COEF.VAR.= 0.42 %

51.8

E-50: READING GREATER THAN HIGHEST STANDARD

53.3 STANDARD 3

OR

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.881	0.843	1.020
PEAK AREA (ABS-SECONDS)	0.662	0.630	1.043

READ: 96.6

1628+1002.6B

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.871	0.854	1.018
PEAK AREA (ABS-SECONDS)	0.679	0.686	0.087

READ: 98.1

MEAN= 97.8 STD.DEV.= 1.8 COEF.VAR.= 1.82 %

97.8

E-50: READING GREATER THAN HIGHEST STANDARD

98.5 STANDARD 4

OR 0005 Ab blk

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.010	0.006	0.008
PEAK AREA (ABS-SECONDS)	0.017	0.004	0.018

READ: 0.9

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.006	0.006	0.014
PEAK AREA (ABS-SECONDS)	0.006	0.001	0.004

READ: 1.5

MEAN= 1.7 STD.DEV.= 0.3 COEF.VAR.= 46.88 %

OR 0004 KCV

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.190	0.182	0.011
PEAK AREA (ABS-SECONDS)	0.848	0.831	0.121

READ: 52.3

AR301914

	AA	ZAA	BC

PEAK AREA (ABS-SECONDS) [illegible]

READ: 52.6 104%

MEAN= 52.4 [50.6] STD.DEV.= 0.9 COEF.VAR.= 0.52 %

CR 0005 LCSC#1 +B 2x

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.146	0.137	0.013
PEAK AREA (ABS-SECONDS)	0.262	0.238	0.024

READ: 97.9

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.144	0.137	0.008
PEAK AREA (ABS-SECONDS) 94%	0.254	0.238	0.015

READ: 97.5 75.4

MEAN= 97.7 X2= STD.DEV.= 0.3 COEF.VAR.= 0.32 %

CR 0006 +20

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.216	0.205	0.014
PEAK AREA (ABS-SECONDS)	0.385	0.351	0.034

READ: 97.5

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.212	0.211	0.010
PEAK AREA (ABS-SECONDS)	0.364	0.361	0.003

READ: 97.6 99%

MEAN= 97.6 X2= 115. STD.DEV.= 0.0 COEF.VAR.= 0.01 %

CR 0007 Prepblk water

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.011	0.007	0.004
PEAK AREA (ABS-SECONDS)	0.018	0.008	0.007

READ: 1.6

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.008	0.008	0.005
PEAK AREA (ABS-SECONDS)	0.013	0.006	0.007

READ: 1.2

MEAN= [1.5] STD.DEV.= 0.3 COEF.VAR.= 18.73 %

CR 0008 Prepblk soil

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.014	0.014	0.006
PEAK AREA (ABS-SECONDS)	0.023	0.018	0.005

READ: 3.1

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.018	0.016	0.004
PEAK AREA (ABS-SECONDS)	[illegible]	[illegible]	[illegible]

READ: 9.5

MEAN= 9.9 STD.DEV.= 0.2 COEF.VAR.= 6.76 %

CR 00097153+B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.142	0.140	0.010
PEAK AREA (ABS-SECONDS)	0.366	0.347	0.019

READ: 98.3

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.148	0.140	0.011
PEAK AREA (ABS-SECONDS)	0.398	0.351	0.018

READ: 99.8

MEAN= 99.6 STD.DEV.= 0.5 COEF.VAR.= 1.18 %

CR 00107+20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.223	0.211	0.015
PEAK AREA (ABS-SECONDS	0.436	0.361	0.028

READ: 81.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.219	0.203	0.019
PEAK AREA (ABS-SECONDS)	0.402	0.377	0.025

READ: 98.8 103%

MEAN= 61.3 STD.DEV.= 0.4 COEF.VAR.= 0.67 %

CR 00117154+B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	1.183	0.088	1.011
PEAK AREA (ABS-SECONDS)	0.181	0.169	1.012

READ: 25.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.096	0.080	0.010
PEAK AREA (ABS-SECONDS)	0.173	0.158	0.015

READ: 25.3

MEAN= 25.7 STD.DEV.= 0.5 COEF.VAR.= 1.99 %

CR 00127+20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.173	0.168	1.011
PEAK AREA (ABS-SECONDS)	0.314	0.292	1.022

READ: 46.4

AR301916

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.170	0.163	0.011
PEAK AREA (ABS-SECONDS)	0.306	0.292	0.017

READ: 46.5 104%

MEAN= 46.4 STD.DEV.= 0.1 COEF.VAR.= 0.17 %

CR 0013 7155+13

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.057	0.056	0.006
PEAK AREA (ABS-SECONDS)	0.103	0.096	0.017

READ: 15.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.058	0.056	0.006
PEAK AREA (ABS-SECONDS)	0.104	0.096	0.008

READ: 15.8

MEAN= 15.6 STD.DEV.= 0.1 COEF.VAR.= 0.73 %

CR 0014 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.134	0.128	0.010
PEAK AREA (ABS-SECONDS)	0.241	0.228	0.018

READ: 88.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.133	0.127	0.008
PEAK AREA (ABS-SECONDS)	0.240	0.226	0.014

READ: 96.3 104%

MEAN= 96.3 STD.DEV.= 0.8 COEF.VAR.= 0.74 %

CR 0015 Cal blk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.007	0.005	0.005
PEAK AREA (ABS-SECONDS)	0.007	-0.001	0.003

READ: 0.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.007	0.005	0.005
PEAK AREA (ABS-SECONDS)	0.005	0.000	0.005

READ: 0.3

MEAN= 0.3 STD.DEV.= 0.0 COEF.VAR.= 15.28 %

CR 0016 cov

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.199	0.199	0.014

READ: 52.8

	AA	ZAA	BI
PEAK HEIGHT (ABSORBANCE)	0.181	0.186	0.014
PEAK AREA (ABS-SECONDS)	0.368	0.388	0.034

READ: 58.7 105%

MEAN= 55.2 [50.6] STD.DEV.= 3.7 COEF.VAR.= 1.27 %

CR 001 7156+B

	AA	ZAA	BI
PEAK HEIGHT (ABSORBANCE)	0.074	0.070	0.005
PEAK AREA (ABS-SECONDS)	0.133	0.127	0.016

READ: 30.4

	AA	ZAA	BI
PEAK HEIGHT (ABSORBANCE)	0.077	0.075	0.010
PEAK AREA (ABS-SECONDS)	0.138	0.124	0.011

READ: 30.7

MEAN= 30.6 STD.DEV.= 0.2 COEF.VAR.= 0.67 %

CR 001 8+20

	AA	ZAA	BI
PEAK HEIGHT (ABSORBANCE)	0.154	0.147	0.011
PEAK AREA (ABS-SECONDS)	0.284	0.265	0.031

READ: 42.1

	AA	ZAA	BI
PEAK HEIGHT (ABSORBANCE)	0.151	0.148	0.011
PEAK AREA (ABS-SECONDS)	0.285	0.267	0.018

READ: 42.4 109%

MEAN= 42.3 STD.DEV.= 1.2 COEF.VAR.= 0.54 %

CR 001 9757+B

	AA	ZAA	BI
PEAK HEIGHT (ABSORBANCE)	0.106	0.100	0.009
PEAK AREA (ABS-SECONDS)	0.187	0.173	0.014

READ: 27.6

	AA	ZAA	BI
PEAK HEIGHT (ABSORBANCE)	0.105	0.101	0.008
PEAK AREA (ABS-SECONDS)	0.187	0.173	0.014

READ: 27.6

MEAN= 27.6 STD.DEV.= 0.0 COEF.VAR.= 0.16 %

AR30-1-918

PEAK HEIGHT (ABSORBANCE)	0.180	0.165	0.014
PEAK AREA (ABS-SECONDS)	0.335	0.307	0.028

PEAK: 48.9

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.193	0.174	0.014
PEAK AREA (ABS-SECONDS)	0.337	0.311	0.026

PEAK: 49.4 108%

MEAN= 49.1 STD.DEV.= 0.4 COEF.VAR.= 0.85 %

****

CR 00021 7157SPK

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.158	0.148	0.010
PEAK AREA (ABS-SECONDS)	0.288	0.270	0.018

PEAK: 48.8

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.153	0.142	0.011
PEAK AREA (ABS-SECONDS)	0.286	0.265	0.022

PEAK: 48.1 85% pa 12/20/95 ~~94%~~ OK

MEAN= 48.5 STD.DEV.= 0.6 COEF.VAR.= 1.31 %

****

CR 00022 7158TB Rerun 4/4/1996

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.078	0.068	0.009
PEAK AREA (ABS-SECONDS)	0.131	0.119	0.012

PEAK: 18.1

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.071	0.060	0.010
PEAK AREA (ABS-SECONDS)	0.130	0.119	0.011

PEAK: 18.1

MEAN= 18.1 STD.DEV.= 0.1 COEF.VAR.= 0.38 %

****

CR 00023 720

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.128	0.118	0.011
PEAK AREA (ABS-SECONDS)	0.244	0.225	0.020

PEAK: 95.9

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.131	0.124	0.010
PEAK AREA (ABS-SECONDS)	0.245	0.225	0.020

PEAK: 95.8 84%

MEAN= 25.5 STD.DEV.= ... COEF.VAR.= ... %

****

CR 00247169115

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.060	0.075	0.007
PEAK AREA (ABS-SECONDS)	0.143	0.182	0.011

LEAD: 21.2

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.082	0.078	0.008
PEAK AREA (ABS-SECONDS)	0.144	0.192	0.013

READ: 21.1

MEAN= 21.1 STD.DEV.= 0.0 COEF.VAR.= 0.21 %

****

CR 00251120

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.156	0.146	0.011
PEAK AREA (ABS-SECONDS)	0.288	0.269	0.022

READ: 41.8

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.158	0.144	0.013
PEAK AREA (ABS-SECONDS)	0.285	0.261	0.024

READ: 41.5

103%

MEAN= 41.7 STD.DEV.= 0.2 COEF.VAR.= 0.51 %

****

CR 0026 Cal blk

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.008	0.006	0.010
PEAK AREA (ABS-SECONDS)	0.003	0.001	0.004

READ: 0.5

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.003	0.005	0.008
PEAK AREA (ABS-SECONDS)	0.003	-0.001	0.003

READ: 0.2

MEAN= 0.3 STD.DEV.= 0.2 COEF.VAR.= 57.74 %

****

CR 0027 ccv

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.204	0.194	0.010
PEAK AREA (ABS-SECONDS)	0.359	0.334	0.025

READ: 56.0

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.201	0.188	0.013
...	...	...	...

READ: 52.9 100%

MEAN= 53.0 (50.6) STD.DEV.= 0.1 COEF.VAR.= 0.19 %

CR 0028 7160TB Rerun with top STD

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.811	0.816	0.015
PEAK AREA (ABS-SECONDS)	0.628	0.595	0.028

READ: 84.2

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.835	0.829	0.017
PEAK AREA (ABS-SECONDS)	0.634	0.592	0.043

READ: 93.7

MEAN= 94.0 STD.DEV.= 0.9 COEF.VAR.= 0.95 %

CR 0028 T20

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.868	0.884	0.031
PEAK AREA (ABS-SECONDS)	0.747	0.712	0.035

READ: 113.7

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.895	0.876	0.021
PEAK AREA (ABS-SECONDS)	0.753	0.710	0.043

READ: 113.6 93%

MEAN= 113.6 STD.DEV.= 0.0 COEF.VAR.= 0.15 %

113.6 E-50: READING GREATER THAN HIGHEST STANDARD

CR 0028 LSC #2 2x Rerun prob. jam

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.152	0.144	0.008
PEAK AREA (ABS-SECONDS)	0.240	0.227	0.013

READ: 41.5

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.155	0.142	0.011

CR 0031LOSCHB 2X

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.154	0.147	0.008
PEAK AREA (ABS-SECONDS)	0.274	0.258	0.016

READ: 41.1

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.153	0.148	0.013
PEAK AREA (ABS-SECONDS)	0.276	0.259	0.017

READ: 41.1 103%

MEAN= 41.1 X2 = 82.2 STD.DEV.= 0.1 COEF.VAR.= 0.26 %

CR 0032 +20

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.224	0.212	0.014
PEAK AREA (ABS-SECONDS)	0.403	0.360	0.039

READ: 60.4

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.226	0.216	0.010
PEAK AREA (ABS-SECONDS)	0.408	0.61.	0.036

READ: 60.5 102%

MEAN= 60.5 X2 = 121. STD.DEV.= 0.1 COEF.VAR.= 0.15

CR 0033E 9179+B

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.018	0.015	0.006
PEAK AREA (ABS-SECONDS	0.034	0.024	0.011

READ: 4.0

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.018	0.015	0.003
PEAK AREA (ABS-SECONDS	0.037	0.031	0.007

READ: 3.8

MEAN= 3.8 STD.DEV.= 0.9 COEF.VAR.= 0.12 %

CR 0034+20

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.088	0.080	0.008
PEAK AREA (ABS-SECONDS)	0.154	0.138	0.016

READ: 22.1

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.088	0.078	0.010
PEAK AREA (ABS-SECONDS)	0.155	0.139	0.015

READ: 22.2 92%

MEAN= 22.2 STD.DEV.= 0.1 COEF.VAR.= 0.50 %

AR301922

CR 0035 7807A

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.013	0.010	0.007
PEAK AREA (ABS-SECONDS)	0.021	0.012	0.008

READ: 2.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.011	0.010	0.006
PEAK AREA (ABS-SECONDS)	0.016	0.010	0.006

READ: 1.6

MEAN= 2.1 STD.DEV.= 0.2 COEF.VAR.= 10.58 %

CR 0036 720

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.078	0.076	0.006
PEAK AREA (ABS-SECONDS)	0.138	0.126	0.012

READ: 20.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE) 92%	0.081	0.076	0.005
PEAK AREA (ABS-SECONDS)	0.148	0.126	0.015

READ: 20.7

MEAN= 20.5 STD.DEV.= 0.4 COEF.VAR.= 1.79 %

CR 0037 7818

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	1.021	0.015	0.005
PEAK AREA (ABS-SECONDS)	0.033	0.030	0.003

READ: 5.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.031	0.030	0.004
PEAK AREA (ABS-SECONDS)	0.032	0.031	0.001

READ: 5.3

MEAN= 5.2 STD.DEV.= 0.2 COEF.VAR.= 3.03 %

CR 0038 720

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.085	0.085	0.017
PEAK AREA (ABS-SECONDS)	0.153	0.147	0.006

READ: 28.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.092	0.081	0.011
PEAK AREA (ABS-SECONDS)	0.152	0.150	0.002

93%

READ: 24.1

MEAN= 26.2 STD.DEV.= 0.4 COEF.VAR.= 1.57

CR 0035 calblK

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.009	0.005	0.013
PEAK AREA (ABS-SECONDS)	0.010	0.000	0.013

READ: 0.9

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.008	0.006	0.007
PEAK AREA (ABS-SECONDS)	0.007	-0.001	0.008

READ: 0.1

MEAN= 0.2 STD.DEV.= 0.2 COEF.VAR.= 75.55 %

CR 0040 CCV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.210	0.200	0.014
PEAK AREA (ABS-SECONDS)	0.870	0.844	0.026

READ: 54.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.212	0.201	0.014
PEAK AREA (ABS-SECONDS)	0.867	0.844	0.023

READ: 54.6 108%

MEAN= 54.6 [806] STD.DEV.= 1.0 COEF.VAR.= 0.02 %

CR P/2T RK 3 Nothing in cup Recal, sequence out of order below autosampler error code time out

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.009	0.005	0.004
PEAK AREA (ABS-SECONDS)	0.017	0.003	0.014

READ: 0.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.007	0.004	0.003
PEAK AREA (ABS-SECONDS)	0.002	0.001	0.007

READ: 0.5

MEAN= 0.6 STD.DEV.= 0.2 COEF.VAR.= 30.50 %

CR 0005 4 1/5TTB

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.007	0.004	0.003
PEAK AREA (ABS-SECONDS)	0.005	-0.005	0.010

READ: -0.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.007	0.004	0.004
PEAK AREA (ABS-SECONDS)	0.004	-0.002	0.006

READ: 0.0

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

EPA CLP PERKIN ELMER 3030 ZEEMAN FURNACE
INSTRUMENT # 5
CASE # ESTL 9001

METAL Cr
IDL 0.6

ANALYST K.K
DATE 12/21/87
START TIME 12:15
STOP TIME 2:15
NOTEBOOK # 882
PAGE # 31

r = .9999
m = 6.9x10-3
b = -9.5x10-4

INITIAL CALIBRATION VERIFICATION ICV#1(04687)
ICV CONCENTRATION 1:100 dil = 50.6
CONTINUING CALIBRATION VERIFICATION
CCV CONCENTRATION
LAB CONTROL SAMPLE HEAL
SPIKE CONCENTRATION WATER 20 ppb
SPIKE CONCENTRATION SOIL 20 ppm x 40 = 20
STANDARD PREPARATION DATE 12/21/87
STANDARD SOURCE Fisher 8.317-24
purge 40

SUPERVISORY REVIEW PC
DATE 12/23/87

STANDARD 1	Calblk	29.	+40	22.	
STANDARD 2	10.000	30.	CalBlk	23.	
STANDARD 3	40	31.	CCV	24.	
STANDARD 4	50	32.		25. CAL BLANK 5	
STANDARD 5	100	33.		26. CCV 5	
INITIAL CAL BLANK		34.		27.	
4. ICV		35.		28.	
5. ~~EGG WATER~~ K.K 12/21	7159+B DUP	36.	CALBLK	29.	
6. ~~EGG SOIL~~ K.K 12/21	+20	37. STD 1	10	30.	
7. ~~PREP BLANK WATER~~ K.K 12/21	7153+B	38. 2	20	31.	
8. ~~PREP BLANK SOIL~~ 12/21 K.K	+20	39. CAL BLANK 3	50	32.	
9.	7152+B	40. CCV 3	100 ppb	33.	
10.	+20	3. CalBlk		34.	
11.	7133 SOK	4. CCV		35.	
12.	7154+B	5. 7156+B	1X	36.	
13.	+20	6. +10		37. CAL BLANK 6	
14.	CalBlk	7. +20		38. CCV 6	
15. ~~CAL BLANK~~ K.K 12/21	CCV	8. +40			
16. ~~CCV 4~~ K.K 12/21	7155+B	9. CALBLK			
17.	+20	10. CCV			
18.	7156+B	11.			
19.	+20	12.			
20.	7157+B	13. CAL BLANK 4			
21.	+20	14. CCV 4			
22. 7160	7158+B 2X	15.			
23. 12/21 K.K	+20	16.			
24.	CALBLK	17.			
25.	CCV	18.			
26.	7159+B	19.			
27. ~~CAL BLANK~~ K.K 12/21	+10 Recal	20.			
~~CCV 5~~ K.K 12/21	+20	21.			

AR301925

CR

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.008	0.004	0.007
PEAK AREA (ABS-SECONDS)	0.011	-0.001	0.012

READ: -0.008 0

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.005	0.004	0.009
PEAK AREA (ABS-SECONDS)	0.012	0.001	0.012

READ: -0.006

MEAN= -0.007 STD.DEV.= 0.001 COEF.VAR.= 21.48 %

0.000 AUTOZERO

CR

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.043	0.042	0.011
PEAK AREA (ABS-SECONDS)	0.073	0.057	0.016

READ: 0.058 .1585

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.048	0.041	0.008
PEAK AREA (ABS-SECONDS)	0.071	0.060	0.011

READ: 0.061

MEAN= 0.059 STD.DEV.= 0.002 COEF.VAR.= 3.46 %

10.0 STANDARD 1

CR

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.087	0.080	0.006
PEAK AREA (ABS-SECONDS)	0.135	0.120	0.015

READ: 20.4 .118

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.099	0.082	0.019
PEAK AREA (ABS-SECONDS)	0.129	0.116	0.013

READ: 19.7

MEAN= 20.0 STD.DEV.= 0.5 COEF.VAR.= 2.50 %

20.0

E-50: READING GREATER THAN HIGHEST STANDARD

20.0 STANDARD 2

CR

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.210	0.199	0.015
PEAK AREA (ABS-SECONDS)	0.325	0.303	0.022

READ: 51.2

(CONTINUED)

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.216	0.204	0.013
PEAK AREA (ABS-SECONDS)	0.338	0.313	0.028

READ: 52.9

MEAN= 52.0 STD.DEV.= 1.2 COEF.VAR.= 2.36 %

52.0

E-50: READING GREATER THAN HIGHEST STANDARD

50.9 STANDARD 3

CR

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.403	0.395	0.018
PEAK AREA (ABS-SECONDS)	0.636	0.603	0.035

READ: 98.5 .6055

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.405	0.391	0.017
PEAK AREA (ABS-SECONDS)	0.630	0.608	0.022

READ: 99.4

MEAN= 98.9 STD.DEV.= 0.6 COEF.VAR.= 0.64 %

98.9

E-50: READING GREATER THAN HIGHEST STANDARD

98.9 STANDARD 4

CR 0005 Cal blk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.038	0.034	0.006
PEAK AREA (ABS-SECONDS)	0.059	0.048	0.011

READ: 7.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.033	0.035	0.003
PEAK AREA (ABS-SECONDS)	0.052	0.047	0.005

READ: 7.9

MEAN= [7.8] 2 CRPL STD.DEV.= 0.1 COEF.VAR.= 1.69 %

CR 0004 ICV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.186	0.180	0.014
PEAK AREA (ABS-SECONDS)	0.297	0.277	0.020

READ: 45.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.186	0.180	0.012
PEAK AREA (ABS-SECONDS)	0.298	0.277	0.021

READ: 45.8 90%

MEAN= 45.7 [50.6] STD.DEV.= 0.1 COEF.VAR.= 0.21 %

CR 0005 7157 HB DWP

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.062	0.066	0.007
PEAK AREA (ABS-SECONDS)	0.104	0.095	0.010

READ: 15.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.068	0.068	0.008
PEAK AREA (ABS-SECONDS)	0.111	0.091	0.010

READ: 15.9

MEAN= 15.5 STD.DEV.= 0.3 COEF.VAR.= 1.57 %

CR 0006 720

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.154	0.146	0.010
PEAK AREA (ABS-SECONDS)	0.246	0.233	0.024

READ: 98.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE	0.154	0.143	0.011
PEAK AREA (ABS-SECONDS)	0.249	0.229	0.021

READ: 96.8 106%

MEAN= 96.7 STD.DEV.= 0.0 COEF.VAR.= 0.05 %

CR 0007 7183 B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.013	0.012	0.006
PEAK AREA (ABS-SECONDS)	0.018	0.016	-0.003

READ: 2.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.017	0.019	0.006
PEAK AREA (ABS-SECONDS)	0.025	0.018	0.009

READ: 2.6

MEAN= 2.6 STD.DEV.= 0.0 COEF.VAR.= 0.25 %

CR 0008 720

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.099	0.095	0.007
PEAK AREA (ABS-SECONDS)	0.155	0.148	0.009

READ: 24.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.100	0.096	0.009
PEAK AREA (ABS-SECONDS)	0.158	0.148	0.010

READ: 24.4

10/70

MEAN= 24.4 STD.DEV.= 0.0 COEF.VAR.= 0.18 %

CR 0009 7182HB

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.014	0.009	0.005
PEAK AREA (ABS-SECONDS)	0.011	0.007	0.004

READ: 1.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.012	0.012	0.004
PEAK AREA (ABS-SECONDS)	0.008	0.009	0.000

READ: 1.4

MEAN= 1.3 STD.DEV.= 0.1 COEF.VAR.= 6.92 %

CR 0010 720

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.090	0.088	0.008
PEAK AREA (ABS-SECONDS)	0.136	0.131	0.008

READ: 21.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.088	0.086	0.007
PEAK AREA (ABS-SECONDS)	0.144	0.132	0.012

READ: 21.8 102%

MEAN= 21.7 STD.DEV.= 0.1 COEF.VAR.= 0.50 %

CR 0011 7183 SPC

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.150	0.141	0.012
PEAK AREA (ABS-SECONDS)	0.241	0.225	0.016

READ: 37.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.154	0.146	0.013
PEAK AREA (ABS-SECONDS)	0.235	0.224	0.011

12/23/80

READ: 36.8 ~~172~~% 86%

MEAN= 37.0 STD.DEV.= 0.1 COEF.VAR.= 0.26 %

CR 0012 7184HB

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.021	0.018	0.009
PEAK AREA (ABS-SECONDS)	0.037	0.023	0.014

READ: 3.9

AB301929

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.018	0.016	0.006

PEAK AREA (ABS-SECONDS)	0.027	0.031	0.047

READ: 9.8

MEAN= 9.8 STD.DEV.= 0.4 COEF.VAR.= 11.02 %

CR 0013 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.106	0.092	0.011
PEAK AREA (ABS-SECONDS)	0.173	0.154	0.019

READ: 25.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.105	0.093	0.010
PEAK AREA (ABS-SECONDS)	0.172	0.150	0.022

READ: 24.7 105%

MEAN= 25.1 STD.DEV.= 0.5 COEF.VAR.= 2.06 %

CR 0014 calblc

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.003	0.004	0.006
PEAK AREA (ABS-SECONDS)	0.005	0.000	0.007

READ: 0.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.003	0.006	0.016
PEAK AREA (ABS-SECONDS)	0.005	0.000	0.005

READ: 0.1

MEAN= 0.0 STD.DEV.= 0.0 COEF.VAR.= 99.99 %

CR 0015 CCV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.194	0.184	0.012
PEAK AREA (ABS-SECONDS)	0.304	0.284	0.020

READ: 46.9

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.193	0.186	0.014
PEAK AREA (ABS-SECONDS)	0.315	0.287	0.028

READ: 47.3 93%

MEAN= 47.1 50.63 STD.DEV.= 0.3 COEF.VAR.= 0.58 %

CR 0016 H85+B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.017	0.013	0.005
PEAK AREA (ABS-SECONDS)	0.025	0.018	0.012

READ: 2.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.013	0.011	0.006
PEAK AREA (ABS-SECONDS)	0.021	0.011	0.010

BAD: 1.8

MEAN= 2.0 STD.DEV.= 0.2 COEF.VAR.= 10.69 %

****

CR 0017 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.097	0.092	0.010
PEAK AREA (ABS-SECONDS)	0.155	0.139	0.016

BAD: 29.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.100	0.095	0.010
PEAK AREA (ABS-SECONDS)	0.158	0.142	0.016

BAD: 28.4 106%

MEAN= 28.2 STD.DEV.= 0.8 COEF.VAR.= 1.18 %

****

CR 0018 7186 + B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.018	0.016	0.006
PEAK AREA (ABS-SECONDS)	0.024	0.020	0.005

BAD: 3.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.016	0.013	0.006
PEAK AREA (ABS-SECONDS)	0.022	0.019	0.008

BAD: 3.9

MEAN= 3.8 STD.DEV.= 0.0 COEF.VAR.= 0.88 %

****

CR 0019+20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.108	0.101	0.008
PEAK AREA (ABS-SECONDS)	0.181	0.165	0.019

BAD: 27.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.105	0.099	0.008
PEAK AREA (ABS-SECONDS)	0.182	0.162	0.020

BAD: 26.7 119%

MEAN= 27.0 STD.DEV.= 0.4 COEF.VAR.= 1.45 %

****

CR 0020 7187 B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.012	0.010	0.007

PEAK AREA (ABS-SECONDS)	0.017	0.009	0.008

READ: 1.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.011	0.011	0.005
PEAK AREA (ABS-SECONDS)	0.016	0.013	0.008

READ: 2.2

MEAN= 1.9 STD.DEV.= 0.4 COEF.VAR.= 22.69 %

****

CR 00021 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.100	0.094	0.010
PEAK AREA (ABS-SECONDS)	0.156	0.144	0.015

READ: 23.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.098	0.096	0.011
PEAK AREA (ABS-SECONDS)	0.160	0.148	0.017

READ: 23.8 109.6%

MEAN= 23.6 STD.DEV.= 0.1 COEF.VAR.= 0.47 %

****

CR 00227160+B 2X

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.170	0.169	0.011
PEAK AREA (ABS-SECONDS)	0.275	0.256	0.030

READ: 42.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.173	0.161	0.010
PEAK AREA (ABS-SECONDS)	0.278	0.257	0.031

READ: 42.9 84.8

MEAN= 42.4 X2= STD.DEV.= 0.3 COEF.VAR.= 0.89 %

****

CR 0028 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.262	0.254	0.015
PEAK AREA (ABS-SECONDS)	0.413	0.395	0.018

READ: 65.1

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE	114% 0.265	0.251	0.015
PEAK AREA (ABS-SECONDS)	0.430	0.396	0.034

130,

READ: 65.8 12/21/07

MEAN= 65.2X2 STD.DEV.= 0.1 COEF.VAR.= 0.10

****

K.K

CR 0024 7+4+B Cal blk

12/21/87

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.009	0.005	0.007
PEAK AREA (ABS-SECONDS)	0.011	0.003	0.002

BLAD: 0.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.005	0.005
PEAK AREA (ABS-SECONDS)	0.002	0.000	0.002

READ: 0.1

MEAN= 0.3 STD.DEV.= 0.3 COEF.VAR.= 99.99 %

****

K.K 12/21/87 CCV

CR 0025 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.194	0.192	0.015
PEAK AREA (ABS-SECONDS)	0.318	0.285	0.033

READ: 47.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.200	0.188	0.014
PEAK AREA (ABS-SECONDS)	0.315	0.291	0.024

READ: 48.0 94%

MEAN= 47.5 [50.6] STD.DEV.= 0.8 COEF.VAR.= 1.61 %

****

CR 0026 7+5+B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.070	0.066	0.006
PEAK AREA (ABS-SECONDS)	0.106	0.087	0.009

16.1

****

CR 0027 +10

Void

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.115	0.110	0.005
PEAK AREA (ABS-SECONDS)	0.177	0.164	0.013

27.1

****

CR 0028 +20

12/23

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.160	0.151	0.013
PEAK AREA (ABS-SECONDS)	0.250	0.227	0.023

37.5

****

CR 0029 +40

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.241	0.228	0.014
PEAK AREA (ABS-SECONDS)	0.378	0.355	0.023

58.6

CR 0030 CALBLK

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.010	0.007	0.007
PEAK AREA (ABS-SECONDS)	0.006	0.001	0.005

0.2

CR 0031 CCV Recal

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.167	0.175	0.012
PEAK AREA (ABS-SECONDS)	0.292	0.278	0.013

45.1 89%

AR301934

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

EPA CLP PERKIN ELEMER 3030 ZEEMAN FURNACE
INSTRUMENT # 5
CASE # E3TR80G

METAL Cr
1.D.L.0.6

ANALYST JK
DATE 12/22/87
START TIME 8:00
STOP TIME 9:38
NOTEBOOK # 264
PAGE # 31

INITIAL CALIBRATION VERIFICATION ICV#1 (04487)
ICV CONCENTRATION 1:100 = 50.0
CONTINUING CALIBRATION VERIFICATION ↓
CCV CONCENTRATION ↓
LAB CONTROL SAMPLE HEM
SPIKE CONCENTRATION WATER N/A
SPIKE CONCENTRATION SOIL
STANDARD PREPARATION DATE 8/27/87
STANDARD SOURCE Fisher

r = .9999
m = 8.5X10-3
b = 3.5x10-3

SUPERVISORY REVIEW PC
DATE 12/23/87

STANDARD 1	CALBK	29.		22.	
STANDARD 2	10 ppb	30.		23.	
STANDARD 3	20	31.		24.	
STANDARD 4	50	32.		25. CAL BLANK 5	
STANDARD 5	100	33.		26. CCV 5	
3. INITIAL CAL BLANK		34.		27.	
4. ICV		35.		28.	
5. ~~LCS WATER~~ K.K 2/22	71588	36.		29.	
6. ~~LCS SOIL~~ K.K 2/22	+10	37.		30.	
7. ~~PREP BLANK WATER~~ K.K 2/22	+26	38.		31.	
8. ~~PREP BLANK SOIL~~ K.K 2/22	+40	39. CAL BLANK 3		32.	
9.	CALBK	40. CCV 3		33.	
10.	CCV	3.		34.	
11.		4.		35.	
12.		5.		36.	
13.		6.		37. CAL BLANK 6	
14.		7.		38. CCV 6	
15. CAL BLANK 1		8.			
16. CCV 1		9.			
17.		10.			
18.		11.			
19.		12.			
20.		13. CAL BLANK 4			
21.		14. CCV 4			
22.		15.			
23.		16.			
24.		17.			
25.		18.			
26.		19.			
CAL BLANK 2		20.			
CCV 2		21.			

142407

CR 896 pg 31

	AA	DAA	BC
PEAK HEIGHT (ABSORBANCE)	0.010	0.006	0.011
PEAK AREA (ABS-SECONDS)	0.013	-0.004	0.017

BAD: -0.007 −.1003

	AA	DAA	BC
PEAK HEIGHT (ABSORBANCE)	0.013	0.007	0.011
PEAK AREA (ABS-SECONDS)	0.014	-0.002	0.017

READ: -0.006

MEAN= -0.006 STD.DEV.= 0.001 COEF.VAR.= 18.58 %

0.000 AUTOZERO

CR

	AA	DAA	BC
PEAK HEIGHT (ABSORBANCE)	0.082	0.052	0.013
PEAK AREA (ABS-SECONDS)	0.105	0.064	0.022

READ: 0.087 .0845+.1003=.0875

	AA	DAA	BC
PEAK HEIGHT (ABSORBANCE)	0.152	0.058	0.010
PEAK AREA (ABS-SECONDS)	0.188	0.065	0.013

READ: 0.088

MEAN= 0.087 STD.DEV.= 0.101 COEF.VAR.= 0.86 %

10.0 STANDARD

CR

	AA	DAA	BC
PEAK HEIGHT (ABSORBANCE)	0.113	0.100	0.014
PEAK AREA (ABS-SECONDS)	0.137	0.171	0.022

READ: 18.8 .170+.1003=.173

	AA	DAA	BC
PEAK HEIGHT (ABSORBANCE)	0.104	0.084	0.014
PEAK AREA (ABS-SECONDS)	0.132	0.166	0.027

READ: 19.8

MEAN= 19.8 STD.DEV.= 0.1 COEF.VAR.= 0.51 %

19.9

E-50: READING GREATER THAN HIGHEST STANDARD

20.0 STANDARD E

CR

	AA	DAA	BC
PEAK HEIGHT (ABSORBANCE)	0.248	0.338	0.011
PEAK AREA (ABS-SECONDS)	0.451	0.429	0.035

READ: 49.8 .435+.1003=.438

AR301936

(CONTINUED)

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.246	0.236	0.016
PEAK AREA (ABS-SECONDS)	0.471	0.441	0.030

READ: 51.9

MEAN= 50.6 STD.DEV.= 1.0 COEF.VAR.= 2.05 %

****

50.6

E-50: READING GREATER THAN HIGHEST STANDARD

****

50.1 STANDARD 9

****

CR

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.486	0.456	0.181
PEAK AREA (ABS-SECONDS)	0.904	0.846	1.058

READ: 97.3 1846+1039=849

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.470	0.451	1.137
PEAK AREA (ABS-SECONDS)	0.887	0.846	1.053

READ: 97.1

MEAN= 97.1 STD.DEV.= 0.1 COEF.VAR.= 0.07 %

****

97.1

E-50: READING GREATER THAN HIGHEST STANDARD

****

98.8 STANDARD 4

****

CR 0008 cal blk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.010	0.008	0.116
PEAK AREA (ABS-SECONDS)	0.018	0.004	0.018

READ: 0.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.012	0.008	0.011
PEAK AREA (ABS-SECONDS)	0.018	0.001	0.018

READ: 0.8

MEAN= 0.6 STD.DEV.= 0.4 COEF.VAR.= 66.27 %

****

CR 0004 ICV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.232	0.222	0.016
PEAK AREA (ABS-SECONDS)	0.445	0.411	0.034

READ: 48.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.234	0.226	0.019
PEAK AREA (ABS-SECONDS)	0.454	0.419	0.035

READ: 48.8 96%

MEAN= 48.7 [50.6] STD.DEV.= 0.4 COEF.VAR.= 0.72 %

CR 0005 7158+B conc 2.16

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.104	0.087	0.014
PEAK AREA (ABS-SECONDS)	0.196	0.166 +.003	0.031

19.9 n=.9995 m=.3746x10-3 b=1.7x10-1 .169

CR 0006 +10

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.145	0.140	0.015
PEAK AREA (ABS-SECONDS)	0.267	0.236	0.031

39.0 .239

CR 0007 +20

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.184	0.178	0.017
PEAK AREA (ABS-SECONDS)	0.342	0.313	0.029

58.8 .313

CR 0008 +40

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.275	0.256	0.024
PEAK AREA (ABS-SECONDS)	0.514	0.470	0.044

55.4 .473

CR 0009 CAL BLK

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE	0.011	0.007	0.011
PEAK AREA (ABS-SECONDS)	0.018	0.000	0.018

0.8

CR 0010 CCV

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.232	0.216	0.016
PEAK AREA (ABS-SECONDS)	0.459	0.415	0.044

48.8 [50.6] 97%

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST KJK
DATE 12/15/87
NOTEBOOK NO 97-3
PAGE NO 39

start 9:15

)LEAD(
FURNACE USEPA METHOD 239.2
EPACLP DETECTION 5 ug/L

INSTRUMENT NUMBER 2
CASE NUMBER ESSE 8006
STOCK SOLUTION LOT# 2121-2NBS

SUPERVISORY REVIEW PC
DATE 12/15/87

EAP 1/6/88

I.D.L 2.5

INITIAL CAL. VERIFICATION SOURCE ICVH 10467
CONCENTRATION TV 15100 ug/l
CONTINUING CAL. VERIF. SOURCE ICVH 1
CONCENTRATION 45.1
LAB CONTROL SAMPLE SOURCE HEAT
CONCENTRATION (H2O) 80 ug/l
LAB CONTROL SAMPLE SOURCE 2
CONCENTRATION (SOIL)
METHOD SPIKE CONCT. WATER 40 ug/L
SOIL 100 EAP 1/6/88
50

MATRIX MODIFIER: Yes

WAVELENGTH: 283.3
BACKGROUND CORRECTION: YES(X) NO( )
TRAY # 1

20ml sample vol

CLP #	EPA SAMPLE #	ABSORBANCE		AVERAGE ABSORBANCE	DILUTION FACTOR	CONCT. ug/L	CONCT. ug/kg	% RECOVERY	COMMENTS
A2	S-INIT.CAL.BLAN.	.000	.001	.000					r= .99986
S1	S25	.122	.122	.1220					b= 51+NO
S2	S3 10	.045	.047	.1460					m= 4.1X10-3
S3	1 ICSAB KJK 12/15/87	.088	.092	.0905					
1	2 50	.222	.221	.2215					
2	3 100	.403	.405	.4045					
3	4 CAL.BLANK	.000	.000	.000	1X	0			
4	5 ICV	.202	.196	.199	1X	47.7		106%	
5	6 LCS #1 C+B	.166	.167	.1665	2X	79.3		99%	
6	7 LCS ANAL.SPK. +10	.207	.203	.205	↓	96.5		95%	
7	8 METHOD BLK. water	.002	.002	.002	1X	1.0			
8	9 715 +B	.096	.095	.0955	1X	22.2			
9	10 +10	.134	.136	.135	1X	31.9		97%	
10	11 715 DUP+B	.081	.080	.0805	1X	18.5			Reran 4 pt cal
11	12 +10	.115	.113	.114	1X	26.7		82%	
12	13 715 SPK	.267	.275	.271	1X	65.4		43%	EAP 1/6/88
13	14 CAL BLK	.001	.001	.001	1X	0			
14	15 CAL. CHK KJK 12/15/87	.192	.194	.1915	1X	45.8		102%	
15	16 LCSAW KJK 12/15/87 #2 C+B	.175	.168	.1715	2X	81.8		102%	Reran spk cal.
16	17 +10	.249	.244	.2465	↓	119		93	
17	18 W.BLK SOIL	.003	.004	.0035	1X	0			
18	19 715 DUP+B	.014	.017	.0155	1X	2.7			Reran 4 pt cal
19	20 +10	.098	.099	.0985	1X	19.8		99%	
20	21 715 SPK	.115	.120	.117	1X	27.5		68%	

572 12/16/87

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST RK
DATE 12/15/87
NOTEBOOK NO R13
PAGE NO 58-90

XLEADX
FURNACE USEPA METHOD 239.2
EPACLP DETECTION 5 ug/L

CASE NUMBER ESTR 8061

SUPERVISORY REVIEW PC
DATE 12/18/87

****
CALIBRATION CURVE FOR THESE SAMPLES
IS ON THE PRECEDING PAGE.
****

MATRIX MODIFIER:_____

WAVELENGTH: 283.3
BACKGROUND CORRECTION: YES(X) NO( )
TRAY #_____

CUP #	EPA SAMPLE #	ABSORBANCE		AVERAGE ABSORBANCE	DILUTION FACTOR	CONCT. ug/L	CONCT. ug/Kg	% RECOVERY	COMMENTS
21									
22									
23	CAL BLK	.001	.001	.001	1X	0			
24	CCV	.211	.201	.206	1X	49.4		110%	
25	CAL BLANK	.165	.161	.1662	2X	79.		99%	
26	PREP BLK +10	.216	.217	.2165	↓	104.		125%	
27	7151 DUP			.081	1X	19.3			r=.99999
28	+10			.1124					M=4.2110-3
29	+20			.1465					b=8.1X10-2
30	+40			.1250					
31	7153			.0177	1X	4.7 <DL			r=.9998
32	+10			.1617					M=9.8X10-3
33	+20			.1092					b=1.6X10-2
34	+40			.1169	↓				
35	CAL BLK			.0000	1X	0			
36	CAL BLANK CCV 12/15			.1997	↓				
37	CCV 12/15								

AR301940

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST K.K
DATE 12/15/87
NOTEBOOK NO. S-3
PAGE NO. 91

INSTRUMENT NUMBER: 2
CASE # ESTK 8261
STOCK SOLUTION LOT # ____

XLEADC
FURNACE USEPA METHOD 239.2-CLP-M
EPACLP DETECTION 5 ug/L

SUPERVISORY REVIEW PC
DATE 12/18/87
TRAY # 8

****
CALIBRATION CURVE FOR THESES SAMPLES
IS TWO PAGES PREVIOUS TO THIS.
****

CUP #	EPA SAMPLE #	ABSORBANCE		AVERAGE ABSORBANCE	DILUTION FACTOR	CONCT. ug/L	CONCT. ug/Kg	% RECOVERY	COMMENTS
1	~~CAL BLANK~~ CCV			.196	1X	47.2		105%	
2	11/5 per LCS ctb #2			.1058	4X	67.6		85%	r=.9993
3	T10			1.138					m=5.2 x 10^-3
4	T20			1.188					b=8.8 x 10^-2
5	T40			.1296	↓				
6	CAL BLK			0	1X	0			
7	CCV			.193	1X	46.2		102%	
8									
9									
	CAL. BLANK								
13	CCV								
14									
15									
16									
17									
18									
19									
20									
21									
22									
23	CAL. BLANK								
24	CCV								
25									
26									
27									
28									
29									
30									
31									
32									
33									
34	CAL. BLANK								
35	CCV								

AR301941

PD. KK 12/15/97
BK 873 pg 89, 90, 91
ESTR 8161

	-0.018	
	-0.019	
	-0.018	AV
	3.82	CV
	0.000	AZ
	0.000	
	0.001	
	0.000	AV
	06	ER
	0.	S1
	0.022	
	0.022	
	0.022	AV
	0.00	CV
	0.	S2
	0.045	
	0.047	
	0.046	AV
	3.07	CV
	0.	S3
	0.089	
1 .0905	0.092	
	0.091	AV
	2.34	CV
	0.222	
	0.221	
2 .2215	0.222	AV
	0.32	CV
	0.403	
	0.405	
3	0.404	AV
	0.35	CV
	-0.000	
	-0.000	
4	-0.000	AV
	06	ER
	0.202	
	0.196	
5	0.199	AV
	2.13	CV
	0.167	
	0.166	
6	0.166	AV
	0.43	CV
	0.207	
	0.203	
7	0.205	AV
	1.38	CV
	0.002	
	0.002	
8	0.002	AV
	0.00	CV
	0.096	
	0.095	
9	0.096	AV
	0.74	CV
	0.134	
	0.136	
10	0.135	AV
	1.05	CV
	0.081	
11	0.080	
	0.081	AV
	0.88	CV
	0.115	
	0.113	
12	0.114	AV
	1.24	CV
	0.267	
	0.275	
13	0.271	AV
	2.09	CV
	0.001	
	0.001	
14	0.001	AV
	0.00	CV
	0.189	
	0.194	
15	0.192	AV
	1.85	CV
	0.175	
	0.168	
16	0.171	AV
	2.89	CV
	0.249	
	0.244	
17	0.247	AV
	1.43	CV
	0.003	
	0.004	
18	0.004	AV
	20.20	CV
	0.016	
	0.017	
19	0.017	AV
	4.29	CV
	0.048	
	0.049	
20	0.049	AV
	1.46	CV
	0.115	
	0.120	
21	0.117	AV
22	[illegible]	CV
	0.001	
	0.001	
23	0.001	AV
	0.00	CV
	0.211	
	0.201	
24	0.206	AV
	3.43	CV
	0.165	
	0.167	
25	0.166	AV
	0.85	CV
	0.216	
	0.217	
26	0.216	AV
	0.33	CV
27	0.081	

28	0.124
29	0.165
30	0.250
31	0.017
32	0.057
33	0.092
34	0.169
35	-0.001
1	0.197
2	0.088
3	0.138
4	0.198
5	0.296
6	-0.000
7	0.193

AR301942

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST KK
DATE 12/15/87
NOTEBOOK NO 582
PAGE NO 17

Start 9:45

>SELENIUM<
FURNACE USEPA METHOD 270.2
EPACLP DETECTION 5 ug/L

INSTRUMENT NUMBER 2
CASE NUMBER ESTRIGMRL
STOCK SOLUTION LOT# MB5-2276-2

1.D.L 1.7

SUPERVISORY REVIEW PG EPA 1/6/88
DATE 12/22/87

INITIAL CAL. VERIFICATION SOURCE KK KIT#2
CONCENTRATION 19.64 T.C dil 1.00 = 19.64
CONTINUING CAL. VERIF. SOURCE KIT#2
CONCENTRATION 19.64
LAB CONTROL SAMPLE SOURCE HEAT
CONCENTRATION (H2O)
LAB CONTROL SAMPLE SOURCE
CONCENTRATION (SOIL)
METHOD SPIKE CONCT. WATER 20 ~~10~~ ug/L
SOIL ~~20~~ ~~10~~ ug/L
10 12/22

MATRIX MODIFIER: NaS

WAVELENGTH: 196.0
BACKGROUND CORRECTION: YES (1) NO ( )
TRAY # 1

all corrections made by KKirkland on 12/18/87

CUP #	EPA SAMPLE #	ABSORBANCE		AVERAGE ABSORBANCE	DILUTION FACTOR	CONCT. ug/L	CONCT. ug/kg	% RECOVERY	COMMENTS
A2	S1 INIT.CAL.BLANK	.001	.000	.000					r=.9999
B1	S2 5	.018	.020	.019				-7.4 X 10-4	b=.1774
B2	S3 10	.038	.038	.038					a=3.8 X 10
B3	~~Pass 20~~	.071	.074	.0726					
1	2 50	.156	.157	.1565					
2	3 100	.358	.359	.3585					
3	4 CAL.BLANK	.002	.002	.0025	1X	0			
4	5 ICV	.072	.073	.0725	↓	19.4		99%	
5	6 LCS	.139	.141	.140	2X	38.3		98%	
6	7 LCS ANAL.SPK.	.095	.097	.096	↓	96.1		89%	
7	8 METHOD BLK. water	.002	.003	.0025	1X	0			
8	9 MBLK soil	.000	.000	.0015	↓	0			
9	10 715S1B	.002	.006	.004		1.2			<LOD <5.0
10	11 +10	.028	.025	.0265		7.1		55%	
11	12 715S5AC	.039	.036	.0375		10		50% ~~100%~~ 75%	
12	13 715S1+B	.000	.000	.000					Rerun 10X
13	14 +10	.000	.000	.000		0		0%	
14	15 CAL.BLANK	.000	.000	.000		0			<LOD
15	16 CCV	.075	.074	.0745		19.1		100%	
16	17 715S10QAB	.000	.000	.000		0			Rerun 10X
17	18 +10	.007	.011	.009		2.5		25%	
18	19 715S5AC	.010	.014	.012		3.5		~~33%~~ 35%	~~<10~~ OK 35
19	20 715S1+B	.000	.000	.000	10X	0			<50.
20	21 +10	.030	.030	.030	↓	8.0		80%	

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST KK
DATE 12/18/89
NOTEBOOK NO 872
PAGE NO 15

>SELENIUM<
FURNACE USEPA METHOD 270.2
EPACLP DETECTION 5 ug/L

CASE NUMBER ESTR/GMRL

SUPERVISORY REVIEW PY
DATE 12/22/89

****
CALIBRATION CURVE FOR THESE SAMPLES
IS ON THE PRECEDING PAGE.
****

MATRIX MODIFIER: Yes

WAVELENGTH: 196.0
BACKGROUND CORRECTION: YES (X) NO ( )
TRAY # (1)

CUP #	EPA SAMPLE #	ABSORBANCE		AVERAGE ABSORBANCE	DILUTION FACTOR	CONCT. ug/L	CONCT. ug/kg	% RECOVERY	COMMENTS
KK									
22	ESTR/GMRL B	.000	.000	.000	1X	0			<50.
23	TLV	.032	.030	.031		5.3		83%	
24	Calblk	.000	.000	.000		0			
25	~~CAL. BLANK~~ CCV	.074	.073	.0735		19.4		99%	2X DIL
26	~~CCV~~ KK 7275	.000	.000	.000		0			D
27	7276	.000	.000	.000		0			
28	7279	.000	.000	.000		0			
29	7278	.000	.000	.000		0			
30	Calblk	.000	.000	.000		0			
31	CCV	.073	.076	.0745 KK		19.7		100%	
32									
33									
34									
35									
37	CAL. BLANK								
38	CCV								

AR301944

9e ESTR 88101
12/18/87
K.K BK892 Pg 17

	-0.004			0.028			0.074	
	-0.006			0.025			0.073	
	-0.005	AV	11	0.027	AV	25	0.074	AV
	28.28	CV		8.01	CV		0.96	CV
	0.000	AZ		0.039			-0.014	
	0.001			0.036			-0.015	
	-0.001		12	0.037	AV	26	-0.015	AV
	-0.000	AV		5.66	CV		4.88	CV
	06	ER		-0.009			-0.010	
	0.018			-0.012			-0.008	
	0.020		13	-0.010	AV	27	-0.009	AV
	0.019	AV		20.20	CV		15.71	CV
	7.44	CV		-0.002			-0.010	
	0.038			-0.002			-0.011	
	0.038		14	-0.002	AV	28	-0.011	AV
	0.038	AV		0.00	CV		6.73	CV
	0.00	CV		-0.001			-0.012	
	0.077			-0.001			-0.012	
	0.076		15	-0.001	AV	29	-0.012	AV
1	0.076	AV		0.00	CV		0.00	CV
	0.92	CV		0.075			-0.002	
	0.186			0.074			-0.002	
	0.187		16	0.075	AV	30	-0.002	AV
2	0.186	AV		0.95	CV		0.00	CV
	0.38	CV		-0.012			0.073	
	0.378			-0.011			0.076	
	0.389		17	-0.012	AV	31	0.074	AV
3	0.383	AV		6.15	CV		2.85	CV
	2.03	CV		0.007				
	0.003			0.011				
	0.002		18	0.009	AV			
4	0.003	AV		31.43	CV			
	28.28	CV		0.010				
	0.072			0.014				
	0.075		19	0.012	AV			
5	0.074	AV		23.57	CV			
	2.89	CV		-0.004				
	0.152			-0.003				
	0.146		20	-0.004	AV			
6	0.149	AV		20.20	CV			
	2.85	CV		0.030				
	0.185			0.030				
	0.181		21	0.030	AV			
7	0.183	AV		0.00	CV			
	1.55	CV		-0.015				
	0.002			-0.013				
	0.001		22	-0.014	AV			
8	0.002	AV		10.10	CV			
	47.14	CV		0.032				
	0.004			0.030				
	-0.001		23	0.031	AV			
9	0.002	AV		4.56	CV			
	06	ER		-0.001				
	0.002			-0.002				
	0.006		24	-0.002	AV			
10	0.004	AV		47.14	CV			
	70.71	CV						

AR301945

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

EPA CLP PERKIN ELEMER 3030 ZEEMAN FURNACE
INSTRUMENT # 5
CASE # ESTR/CRL

METAL Hg
I.D.L 006

ANALYST K.K.
DATE 12/18/87
START TIME 2:00
STOP TIME
NOTEBOOK # SLC
PAGE # 29

INITIAL CALIBRATION VERIFICATION ICV#4 (X-SL)
ICV CONCENTRATION 1:20 dil. = 48.55
CONTINUING CALIBRATION VERIFICATION ↓ ↓
CCV CONCENTRATION
LAB CONTROL SAMPLE HEAI 45.00
SPIKE CONCENTRATION WATER 50 for ICV
SPIKE CONCENTRATION SOIL 50 for ICV
STANDARD PREPARATION DATE 12/8/87 01 for 12/21/87
STANDARD SOURCE Spex 3-33-EP

r =
m =
b =

Start 2:00

SUPERVISORY REVIEW
DATE 12/22/87 1/6/88

STANDARD 1	Calblk	29.		22.	
STANDARD 2	10.00	30.		23.	
STANDARD 3	20.	31.		24.	
STANDARD 4	50	32.		25. CAL BLANK 5	
TANDARD 5	100	33.		26. CCV 5	
3. INITIAL CAL BLANK		34.		27.	
4. ICV		35.		28.	
5. LCS WATER A +B		36.		29.	
6. LCS SOIL +20		37.		30.	
7. PREP BLANK WATER		38.		31.	
8. PREP BLANK SOIL		39. CAL BLANK 3		32.	
9. 7193 +B		40. CCV 3		33.	
10. +20		3.		34.	
11. 71938		4.		35.	
12. 7157+B		5.		36.	
13. +20		6.		37. CAL BLANK 6	
14. 7157 SPK		7.		38. CCV 6	
15. CAL BLANK 1		8.			
16. CCV 1		9.			
17. 71570 DUP+B		10.			
18. +20		11.			
19. Calblk		12.			
20. CCV	STOP PD not ESTR	13. CAL BLANK 4			
21. ~~ESTR~~ K.K 7275		14. CCV 4			
22. 7276		15.			
23. 7277		16.			
24. 7278		17.			
25. Calblk		18.			
26. CCV		19.			
7. CAL BLANK 2		20.			
8. CCV 2		21.			

AR301946

ESTR/ GRIND
12/18/87
AG BK 896 P929
K/K

r=.9992
m= 3.6 X 10⁻³
b= 2.1 X 10⁻³

	AA	ZAA	EA
PEAK HEIGHT (ABSORBANCE)	0.005	0.004	0.004
PEAK AREA (ABS-SECONDS	0.003	0.001	0.001

READ: 0.020

	AA	ZAA	EA
PEAK HEIGHT (ABSORBANCE)	0.005	0.004	0.004
PEAK AREA (ABS-SECONDS)	0.002	0.001	0.005

READ: 0.019

MEAN= 0.019 STD.DEV.= 0.000 COEF.VAR.= 1.48 %

1.000 AUTOZERO

AG

	AA	ZAA	EA
PEAK HEIGHT (ABSORBANCE)	0.061	0.058	0.005
PEAK AREA (ABS-SECONDS)	0.039	0.038	-0.114

READ: 0.097 1037

	AA	ZAA	EA
PEAK HEIGHT (ABSORBANCE)	0.061	0.058	0.005
PEAK AREA (ABS-SECONDS	0.039	0.038	-0.114

READ: 0.097

MEAN= 0.097 STD.DEV.= 0.000 COEF.VAR.= 0.00 %

10.0 STANDARD 1

AG

	AA	ZAA	EA
PEAK HEIGHT (ABSORBANCE)	0.138	0.116	0.112
PEAK AREA (ABS-SECONDS	0.174	0.072	0.338

READ: 15.4 0705

	AA	ZAA	EA
PEAK HEIGHT (ABSORBANCE)	0.138	0.116	0.012
PEAK AREA (ABS-SECONDS)	0.073	0.071	0.017

READ: 13.1

MEAN= 15.2 STD.DEV.= 0.3 COEF.VAR.= 1.50 %

15.2

E-50: READING GREATER THAN HIGHEST STANDARD

19.2 STANDARD 2

AG

	AA	ZAA	EA
PEAK HEIGHT (ABSORBANCE)	1.955	1.947	0.032
PEAK AREA (ABS-SECONDS)	0.104	0.111	0.011

AR401947

(CONTINUED)

.1915

	AA	BAA	BB
PEAK HEIGHT (ABSORBANCE)	0.853	0.833	1.088
PEAK AREA (ABS-SECONDS)	0.348	0.198	1.115

PEAK: 54.0

MEAN= 56.8 STD.DE..= 0.1 COEF.VAR.= 0.26 %

****

58.8

E-50: READING GREATER THAN HIGHEST STANDARD

****

51.8 STANDARD 3

****

AG

	AA	BAA	BB
PEAK HEIGHT (ABSORBANCE)	1.756	1.687	1.185
PEAK AREA (ABS-SECONDS)	0.881	0.858	1.181

PEAK: 54.5

.357

	AA	BAA	BB
PEAK HEIGHT (ABSORBANCE)	0.748	0.688	1.188
PEAK AREA (ABS-SECONDS)	0.888	0.857	1.181

PEAK: 88.8

MEAN= 84.2 STD.DEV.= 1.4 COEF.VAR.= 0.48 %

****

84.2

E-50: READING GREATER THAN HIGHEST STANDARD

****

88.5 STANDARD 4

****

AG 0005 Calb/K

	AA	BAA	BB
PEAK HEIGHT (ABSORBANCE)	0.102	0.004	0.011
PEAK AREA (ABS-SECONDS)	-0.008	0.001	-0.111

PEAK: 0.0

	AA	BAA	BB
PEAK HEIGHT (ABSORBANCE)	0.008	0.004	0.012
PEAK AREA (ABS-SECONDS)	-0.006	0.001	-0.005

PEAK: -0.5

MEAN= -0.2 STD.DEV.= 0.2 COEF.VAR.= 88.88 %

****

AG 0004 ccv/ICV

K 12/18/87

	AA	BAA	BB
PEAK HEIGHT (ABSORBANCE)	0.418	0.388	0.057
PEAK AREA (ABS-SECONDS)	0.210	0.192	0.018

AR301948

PEAK: 52.7

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.431	0.386	0.036
PEAK AREA (ABS-SECONDS)	0.207	0.184	0.018

READ: 98.1

109%

MEAN= 98.8 [48.55] STD.DEV.= 0.8 COEF.VAR.= 0.82 %

****

AC 0005 LCSA+B

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.268	0.246	0.022
PEAK AREA (ABS-SECONDS)	0.142	0.132	0.010

READ: 98.1

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.281	0.239	0.042
PEAK AREA (ABS-SECONDS)	0.142	0.132	0.009

READ: 96.8 91%

MEAN= 96.2 STD.DEV.= 0.1 COEF.VAR.= 0.25 %

****

AC 0006 +20

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.422	0.387	0.035
PEAK AREA (ABS-SECONDS)	0.218	0.198	0.019

READ: 54.7

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.411	0.375	0.036
PEAK AREA (ABS-SECONDS)	0.215	0.198	0.017

READ: 54.8 92%

MEAN= 54.8 STD.DEV.= 0.1 COEF.VAR.= 0.27 %

****

AC 0007 Prep blk W

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.004	0.004	0.004
PEAK AREA (ABS-SECONDS	0.001	0.001	0.000

READ: 0.1

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.003	0.004	0.001
PEAK AREA (ABS-SECONDS)	-0.002	-0.001	-0.001

READ: -0.5

MEAN= -0.2 STD.DEV.= 0.4 COEF.VAR.= 95.88 %

****

AC 0008 Prep blk S

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.005	0.005	0.005
PEAK AREA (ABS-SECONDS)	0.002	-0.001	0.003

READ: -0.5

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.00-	0.00-	0.002
PEAK AREA (ABS-SECONDS	0.00-	0.00-	0.00-

READ: 0.4

MEAN= 0.1 STD.DEV.= 0.7 COEF.VAR.= 88.88 %

AG 0009 7/837B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	1.008	0.005	0.015
PEAK AREA (ABS-SECONDS)	0.002	0.014	-0.003

READ: 0.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.098	1.005	0.004
PEAK AREA (ABS-SECONDS)	0.008	0.005	-0.002

READ: 1.2

MEAN= 1.0 STD.DEV.= 0.2 COEF.VAR.= 15.72 %

AG 0010 7/837B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.090	0.080	0.010
PEAK AREA (ABS-SECONDS)	0.088	0.085	0.004

READ: 17.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.081	0.070	0.011
PEAK AREA (ABS-SECONDS)	0.368	0.083	0.015

READ: 17.1 89%

MEAN= 17.3 STD.DEV.= 0.4 COEF.VAR.= 2.14 %

AG 0011 7/837B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	1.124	1.108	0.016
PEAK AREA (ABS-SECONDS)	0.105	0.099	0.015

READ: 25.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.113	0.100	0.013
PEAK AREA (ABS-SECONDS)	0.098	0.093	0.014

READ: 25.2 5% 0% 12/12/87 25%

MEAN= 25.5 STD.DEV.= 0.0 COEF.VAR.= 0.12 %

AG 0012 7/57+B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.009	0.004	0.005
PEAK AREA (ABS-SECONDS)	-0.007	-0.0	-0.005

READ: -0.4

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.128	0.004	0.002
PEAK AREA (ABS-SECONDS)	-0.002	0.001	-0.006

READ: 0.1

MEAN= -0.2 STD.DEV.= 1.4 COEF.VAR.= 99.99 %

****

AG 0013 T20

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.148	0.136	0.111
PEAK AREA (ABS-SECONDS)	0.091	0.068	0.102

READ: 18.0

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.145	0.136	0.013
PEAK AREA (ABS-SECONDS)	0.071	0.068	0.013

READ: 18.6 92%

MEAN= 18.3 STD.DEV.= 0.4 COEF.VAR.= 2.38 %

****

AG 0014 91% SPK

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.261	0.233	0.134
PEAK AREA (ABS-SECONDS)	0.130	0.121	0.018

READ: 99.1

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.234	0.236	0.11.
PEAK AREA (ABS-SECONDS)	0.125	0.120	0.014

READ: 82.9 46% 12/22/17 33% SPK

MEAN= 99.0 STD.DEV.= 0.1 COEF.VAR.= 0.07 %

****

AG 0015 Calb/K

	AA	ZAA	BA
PEAK HEIGHT ABSORBANCE	0.002	0.006	0.001
PEAK AREA (ABS-SECONDS)	-0.001	0.001	-0.006

READ: 0.1

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE	0.008	0.008	0.002
PEAK AREA (ABS-SECONDS)	-0.005	-0.002	-0.008

READ: -0.3

MEAN= -0.3 STD.DEV.= 1.5 COEF.VAR.= 99.99 %

****

AG 0016 CCV

AR307951

	AA	ZAA	BA
PEAK HEIGHT ABSORBANCE)	0.425	0.355	0.041
PEAK AREA (ABS-SECONDS)	1.714	1.475	0.218

READ: 50.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.420	0.861	1.098
PEAK AREA (ABS-SECONDS)	0.204	0.196	0.015

READ: 51.5 100%

MEAN= 51.4 [48.55] STD.DEV.= 0.7 COEF.VAR.= 1.37 %

AG 0017 7157 DUP+B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	0.008	1.118
PEAK AREA (ABS-SECONDS)	-0.003	0.011	-0.138

READ: 1.3

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.006	0.004	1.122
PEAK AREA (ABS-SECONDS)	-0.003	0.011	-0.134

READ: 0.1

MEAN= 0.2 STD.DEV.= 1.1 COEF.VAR.= 84.28 %

AG 0018 120

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.185	0.124	1.011
PEAK AREA (ABS-SECONDS)	0.170	0.067	1.013

READ: 18.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.184	0.128	1.011
PEAK AREA (ABS-SECONDS)	0.183	0.071	-0.011

READ: 18.3 93%

MEAN= 18.8 STD.DEV.= 0.5 COEF.VAR.= 2.81 %

AG 0019 calblc

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	1.004	0.008
PEAK AREA (ABS-SECONDS)	-0.004	0.000	-0.004

READ: -0.1

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.008	0.004	0.014
PEAK AREA (ABS-SECONDS)	-0.008	-0.000	-0.008

READ: -0.4

AR301952

MEAN= -0.8 STD.DEV.= 0.2 COEF.VAR.= 31.35 %

AG 0020 ccv

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.998	0.995	0.000
PEAK AREA (ABS-SECONDS)	0.198	0.195	0.010

READ: 50.8

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	1.419	0.978	1.185
PEAK AREA (ABS-SECONDS)	0.201	0.198	0.018

READ: 51.7 105%

MEAN= 51.2 [48.55] STD.DEV.= 0.6 COEF.VAR.= 1.17 %

****

AG 00317275

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.004	0.005	0.000
PEAK AREA (ABS-SECONDS	0.001	0.001	-0.000

READ: 0.1

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE	0.000	0.004	0.000
PEAK AREA (ABS-SECONDS)	-0.001	0.000	-0.004

READ: 0.0

MEAN= 0.4 STD.DEV.= 0.0 COEF.VAR.= 99.99 %

****

AG 00327276

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.000	0.004	0.000
PEAK AREA (ABS-SECONDS)	-0.000	0.001	-0.000

READ: 0.0

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.000	0.000	0.000
PEAK AREA (ABS-SECONDS)	-0.004	0.000	-0.004

READ: -0.2

MEAN= -0.1 STD.DEV.= 0.0 COEF.VAR.= 99.99 %

****

AG 00337277

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.004	0.004	0.000
PEAK AREA (ABS-SECONDS)	-0.000	0.000	-0.000

READ: -0.1

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.004	0.004	0.000
PEAK AREA (ABS-SECONDS)	0.001	0.001	0.000

READ: 0.1

MEAN= 0.0 STD.DEV.= 0.0 COEF.VAR.= 99.99 %

****

AG 00347278

AR301953

	AA	ZAA	BA
PEAK HEIGHT (ABSORBANCE)	0.004	0.005	0.000

READ: 0.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.007	0.018	0.012
PEAK AREA (ABS-SECONDS)	-0.001	0.004	-0.005

READ: 0.8

MEAN= 0.8 STD.DEV.= 0.0 COEF.VAR.= 55.06 %

****

AC 00025 calblk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.002	0.013	0.008
PEAK AREA (ABS-SECONDS)	-0.000	-0.002	0.001

READ: -0.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE	0.009	0.014	0.010
PEAK AREA (ABS-SECONDS	-0.000	0.000	-0.000

READ: -0.2

MEAN= -0.5 STD.DEV.= 0.5 COEF.VAR.= 80.02 %

****

AC 00026CCV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.438	0.381	0.388
PEAK AREA (ABS-SECONDS)	0.185	0.175	0.011

READ: 48.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.482	0.385	0.387
PEAK AREA (ABS-SECONDS)	0.182	0.176	0.006

READ: 48.4 99%

MEAN= 48.2 [48857] STD.DEV.= 0.3 COEF.VAR.= 0.57 %

****

AR301954

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

EPA CLP PERKIN ELMER 3030 ZEEMAN FURNACE
INSTRUMENT # 5
CASE # ESTRL 0001

METAL ESTRL
I.D.L 39

ANALYST KK
DATE 12/17/87
START TIME 9:00
STOP TIME 10:45
NOTEBOOK # 816
PAGE # 27

r = .9996
m = 1.6x10-3
b = 1.8x10-3

INITIAL CALIBRATION VERIFICATION ICV# 4
ICV CONCENTRATION TV952 1:20dil=47.6
CONTINUING CALIBRATION VERIFICATION ↓ ↓
CCV CONCENTRATION
LAB CONTROL SAMPLE
SPIKE CONCENTRATION WATER 50
SPIKE CONCENTRATION SOIL 50
STANDARD PREPARATION DATE BLNK 12/17/87
STANDARD SOURCE BLNK 17-18

* all corrections by K.K made 12/17/87

SUPERVISORY REVIEW KK EAP
DATE 12/21/87 1/6/88

STANDARD 1	Calblk	29.		22.	
STANDARD 2	10.000	30.		23.	
STANDARD 3	20.0	31.		24.	
STANDARD 4	50	32.		25. CAL BLANK 5	
STANDARD 5	100	33.		26. CCV 5	
3. INITIAL CAL BLANK		34.		27.	
4. ICV		35.		28.	
5. LCS WATER B KK HB	2X	36.		29.	
6. LCS SOIL V +20	↓	37.		30.	
7. PREP BLANK WATER		38.		31.	
8. PREP BLANK SOIL KK	7151 FB	39. CAL BLANK 3		32.	
9.	+20	40. CCV 3		33.	
10.	7195 SP FB KK	3.		34.	
11.	Calblk	4.		35.	
12.	CCV	5.		36.	
13.	1953 FB	6.		37. CAL BLANK 6	
14.	+20	7.		38. CCV 6	
15. CAL BLANK KK	MBLK 50%	8.			
16. CCV 1 KK	7193 FB Rerun IDX	9.			
17.	+20 ↓	10.			
18.	7193 SP	11.			
19.	Calblk	12.			
20.	CCV	13. CAL BLANK 4			
21.	7151 Dup FB	14. CCV 4			
22.	+20	15.			
23.	KK Calblk 7193 10X FB	16.			
24.	KK CCV 7193 ↓ +20	17.			
25.	Calblk	18.			
26.	CCV	19.			
CAL BLANK 2		20.			
CCV 2		21.			

AR301955

ESTF

TL

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.006	0.006	0.004
PEAK AREA (ABS-SECONDS)	0.005	0.004	0.001

READ: 0.004

.0025

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.004	0.006	0.003
PEAK AREA (ABS-SECONDS)	0.002	0.001	0.001

READ: 0.001

MEAN= 0.003 STD.DEV.= 0.002 COEF.VAR.= 67.85 %

0.000 AUTOZERO

TL

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.067	0.018	0.021
PEAK AREA (ABS-SECONDS)	0.340	0.018	0.133

READ: 0.018

.0185 - .0025 = .016

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.036	0.022	0.016
PEAK AREA (ABS-SECONDS)	0.187	0.019	0.017

READ: 0.017

MEAN= 0.016 STD.DEV.= 0.001 COEF.VAR.= 5.73 %

10.0 STANDARD 1

TL

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.072	0.035	0.033
PEAK AREA (ABS-SECONDS)	0.070	0.035	0.035

READ: 20.0

.0355 - .0025 = .033

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.071	0.037	0.037
PEAK AREA (ABS-SECONDS)	0.071	0.036	0.035

READ: 20.0

MEAN= 20.0 STD.DEV.= 0.0 COEF.VAR.= 0.00 %

20.0

E-50: READING GREATER THAN HIGHEST STANDARD

20.1 STANDARD 2

TL

	AA	ZAA	BB
PEAK HEIGHT (ABSORBANCE)	0.178	0.083	0.083

AR301956

READ: 53.3

(CONTINUED)

1087-.0025=.1845

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.170	0.082	0.091
PEAK AREA (ABS-SECONDS)	0.184	0.086	0.098

READ: 51.4

MEAN= 51.8 STD.DEV.= 0.6 COEF.VAR.= 1.15 %

****

51.8

E-50: READING GREATER THAN HIGHEST STANDARD

****

50.8 STANDARD 2

****

TL

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.818	0.146	0.174
PEAK AREA (ABS-SECONDS)	0.848	0.153	0.185

READ: 95.9

.1625-.0025=.16

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.309	0.151	0.175
PEAK AREA (ABS-SECONDS)	0.349	0.162	0.187

READ: 95.6

MEAN= 95.6 STD.DEV.= 0.4 COEF.VAR.= 0.44 %

****

95.6

E-50: READING GREATER THAN HIGHEST STANDARD

****

95.8 STANDARD 4

****

TL 0003 CNBLK

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.005	0.008
PEAK AREA (ABS-SECONDS)	-0.008	-0.001	-0.012

READ: -2.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.005	0.013
PEAK AREA (ABS-SECONDS)	0.009	0.004	-0.001

READ: 0.7

MEAN= -0.9 STD.DEV.= 2.2 COEF.VAR.= 99.99 %

****

TL 0004 LCV#4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.171	0.081	0.091
PEAK AREA (ABS-SECONDS)	0.173	0.087	0.091

READ: 51.9

	AA	ZAA	BG

PEAK AREA (ABS-SECONDS)	0.179	0.089	0.085

READ: 46.8

MEAN= 50.9 STD.DEV.= 1.4 COEF.VAR.= 2.76 %

[47.6] 107%

****

TL 0005 CSB+B 2X

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.118	0.056	0.064
PEAK AREA (ABS-SECONDS)	0.130	0.062	0.067

READ: 37.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.118	0.056	0.060
PEAK AREA (ABS-SECONDS) 92%	0.122	0.061	0.061

READ: 36.2 73.2

MEAN= 36.6 X2= STD.DEV.= 0.6 COEF.VAR.= 1.55 %

****

TL 0006 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.182	0.088	0.087
PEAK AREA (ABS-SECONDS)	0.197	0.094	0.103

READ: 56.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE) 100%	0.178	0.086	0.085
PEAK AREA (ABS-SECONDS)	0.194	0.094	0.101

READ: 56.2 =113,

MEAN= 56.3 X2= STD.DEV.= 0.1 COEF.VAR.= 0.24 %

****

TL 0007 Prep blk wash

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	0.005	0.004
PEAK AREA (ABS-SECONDS)	-0.003	-0.001	-0.003

READ: -2.1

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.005	0.004
PEAK AREA (ABS-SECONDS)	0.000	-0.003	0.000

READ: -3.4

MEAN= -3.8 STD.DEV.= 0.9 COEF.VAR.= 23.05 %

****

TL 0008 715A+B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.008	0.002
PEAK AREA (ABS-SECONDS)	-0.001	0.004	-0.005

READ: 0.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.007	0.003
PEAK AREA (ABS-SECONDS)	-0.001	-0.001	0.000

MEAN= -0.6 STD.DEV.= 2.0 COEF.VAR.= 99.99 %

TL 0009 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.027	0.019	0.021
PEAK AREA (ABS-SECONDS)	0.034	0.017	0.017

READ: 9.2

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.038	0.021	0.021
PEAK AREA (ABS-SECONDS)	0.035	0.018	0.018

READ: 9.8 48%

MEAN= 9.5 STD.DEV.= 0.5 COEF.VAR.= 4.73 %

TL 0010 7157 SP

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.103	0.053	0.054
PEAK AREA (ABS-SECONDS)	0.097	0.047	0.050

READ: 27.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.101	0.050	0.055
PEAK AREA (ABS-SECONDS)	0.100	0.047	0.055

READ: 27.9 59% 55%

MEAN= 27.4 STD.DEV.= 0.0 COEF.VAR.= 0.12 %

TL 0011 calb K

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.007	0.004
PEAK AREA (ABS-SECONDS)	0.002	0.003	0.000

READ: -0.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	0.004	0.004
PEAK AREA (ABS-SECONDS)	-0.001	0.000	-0.001

READ: -1.8

MEAN= -1.2 STD.DEV.= 0.9 COEF.VAR.= 74.89 %

TL 0012 CCV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.177	0.086	0.094
PEAK AREA (ABS-SECONDS)	0.178	0.082	0.086

READ: 48.2

	AA	ZAA	BG

PEAK AREA (ABS-SECONDS)	0.176	0.084	0.092

READ: 50.2

MEAN= 49.7 STD.DEV.= 0.7 COEF.VAR.= 1.34 %

[47.6] 104%

****

TL 0013 LCSB+B 2X

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.123	0.058	0.065
PEAK AREA (ABS-SECONDS)	0.115	0.056	0.059

READ: 38.1

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.134	0.062	0.064
PEAK AREA (ABS-SECONDS)	0.124	0.060	0.064

READ: 35.8 X̄= 68.7 80%

MEAN= 34.3 STD.DEV.= 1.5 COEF.VAR.= 4.49 %

****

TL 0014 +20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.189	0.090	0.099
PEAK AREA (ABS-SECONDS)	0.185	0.088	0.099

READ: 53.5

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.184	0.090	0.095
PEAK AREA (ABS-SECONDS) 99%	0.181	0.090	0.101

READ: 54.0 X̄= 108

MEAN= 53.8 STD.DEV.= 0.4 COEF.VAR.= 0.65 %

****

TL 0015 M.B|C SOIL

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.002	0.005	0.002
PEAK AREA (ABS-SECONDS)	-0.005	0.001	-0.009

READ: -1.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.006	0.004
PEAK AREA (ABS-SECONDS)	0.002	0.002	0.000

READ: -0.8

MEAN= -0.8 STD.DEV.= 0.3 COEF.VAR.= 36.44 %

****

TL 0016 4183+B Rerun 10X

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.024	0.044	0.022
PEAK AREA (ABS-SECONDS)	0.053	0.001	0.052

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.024	0.005	0.024
PEAK AREA (ABS-SECONDS)	0.052	-0.001	0.053

READ: -1.6

MEAN= -1.4 STD.DEV.= 0.8 COEF.VAR.= 54.88 %

****

TL 0017 +20 < 40%

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.025	0.007	0.032
PEAK AREA (ABS-SECONDS)	0.060	0.004	0.056

READ: 0.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.024	0.008	0.032
PEAK AREA (ABS-SECONDS)	0.059	0.004	0.055

READ: 0.6

MEAN= 0.6 STD.DEV.= 0.3 COEF.VAR.= 34.34 %

****

TL 0018 7103 SPL

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.041	0.020	0.029
PEAK AREA (ABS-SECONDS)	0.093	0.015	0.078

READ: 8.0

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.046	0.023	0.030
PEAK AREA (ABS-SECONDS)	0.100	0.018	0.081

READ: 10.0 18%

MEAN= 9.0 STD.DEV.= 1.4 COEF.VAR.= 15.60 %

****

TL 0019 cal blk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	0.004	0.005
PEAK AREA (ABS-SECONDS)	-0.003	0.000	-0.003

READ: -1.4

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.005	0.004
PEAK AREA (ABS-SECONDS)	0.004	0.002	0.003

READ: -0.5

MEAN= -1.0 STD.DEV.= 0.7 COEF.VAR.= 70.10 %

****

TL 0020 CCV

	AA	ZAA	BG
[illegible]	[illegible]	[illegible]	[illegible]

PEAK AREA (ABS-SECONDS)	0.121	0.084	0.087

READ: 50.3

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.188	0.080	0.087
PEAK AREA (ABS-SECONDS)	0.179	0.089	0.095

READ: 49.3 105%

MEAN= 50.1 STD.DEV.= 0.8 COEF.VAR.= 0.69 %

****

AR301963

TL 0021 7157DUP+B

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	0.006	0.002
PEAK AREA (ABS-SECONDS)	0.000	0.003	-0.003

READ: 0.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	0.005	0.004
PEAK AREA (ABS-SECONDS)	-0.002	-0.001	-0.001

READ: -2.0

MEAN= -0.6 STD.DEV.= 1.6 COEF.VAR.= 99.99 %

****

TL 0022 T20

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.045	0.029	0.024
PEAK AREA (ABS-SECONDS)	0.037	0.020	0.013

READ: 10.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.046	0.025	0.025
PEAK AREA (ABS-SECONDS)	0.033	0.018	0.020

READ: 10.1 52% <CRDL

MEAN= 10.4 STD.DEV.= 0.4 COEF.VAR.= 4.17 %

****

TL 0023 7183 +B 10X <CRDL 10 X 10 = <100.

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	0.005	0.003
PEAK AREA (ABS-SECONDS)	0.002	0.001	0.000

READ: -0.7

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.004	0.006	0.003
PEAK AREA (ABS-SECONDS)	0.002	0.003	-0.002

READ: 0.5

MEAN= -0.1 STD.DEV.= 0.9 COEF.VAR.= 99.99 %

****

TL 0024 +20 10X

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.018	0.011	0.010
PEAK AREA (ABS-SECONDS)	0.015	0.005	0.010

READ: 1.8

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.015	0.011	0.009
PEAK AREA (ABS-SECONDS)	0.009	0.005	0.004

READ: 1.4

MEAN= 1.6 STD.DEV.= 0.3 COEF.VAR.= 18.39 %

****

TL 0025 calblc

	AA	ZAA	BD
PEAK HEIGHT (ABSORBANCE)	0.004	0.006	0.003
PEAK AREA (ABS-SECONDS)	-0.002	0.001	-0.003

READ: -0.9

	AA	ZAA	BD
PEAK HEIGHT (ABSORBANCE)	0.005	0.006	0.002
PEAK AREA (ABS-SECONDS)	-0.003	-0.001	-0.003

READ: -2.2

MEAN= -1.4 STD.DEV.= 0.8 COEF.VAR.= 53.48 %

****

TL 0026 ccv

	AA	ZAA	BD
PEAK HEIGHT (ABSORBANCE)	0.173	0.084	0.188
PEAK AREA (ABS-SECONDS)	0.175	0.082	0.184

READ: 48.8

	AA	ZAA	BD
PEAK HEIGHT (ABSORBANCE)	0.121	0.085	0.088
PEAK AREA (ABS-SECONDS)	0.173	0.087	0.092

READ: 52.1 106%

MEAN= 50.6 [47.6] STD.DEV.= 1.9 COEF.VAR.= 3.81 %

****

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

EPA CLP PERKIN ELMER 3030 ZEEMAN FURNACE
INSTRUMENT # 2
CASE # ESTR

METAL TL
LD.639

ANALYST MK
DATE 12/14/87
START TIME 5:00
STOP TIME 6:01
NOTEBOOK # 896
PAGE # 38

INITIAL CALIBRATION VERIFICATION ICV# 4
ICV CONCENTRATION dil 1120 = 47.6 T.e952.
CONTINUING CALIBRATION VERIFICATION
CCV CONCENTRATION
LAB CONTROL SAMPLE
SPIKE CONCENTRATION WATER N/A
SPIKE CONCENTRATION SOIL
STANDARD PREPARATION DATE 12/8/87
STANDARD SOURCE RANVEL 47.18

not required

r = r=.9984
m = 1.45x10-3
b = 2.15x10-3

SUPERVISORY REVIEW PC
DATE 12/21/87

not reported ESP 1/6/88

STANDARD 1	CAL BLK	29.	22.
STANDARD 2	10.00	30.	23.
STANDARD 3	20 "	31.	24.
STANDARD 4	50	32.	25. CAL BLANK 5
STANDARD 5	100	33.	26. CCV 5
3. INITIAL CAL BLANK		34.	27.
4. ICV		35.	28.
5. ~~LCS WATER~~ 12/8/87	M.B.R.S.T.D.	36.	29.
6. ~~LCS SOIL~~ 12/8/87	CAL BLK	37.	30.
7. ~~PREP BLANK WATER~~		38.	31.
8. PREP BLANK SOIL		39. CAL BLANK 3	32.
9.		40. CCV 3	33.
10.		3.	34.
11.		4.	35.
12.		5.	36.
13.		6.	37. CAL BLANK 6
14.		7.	38. CCV 6
15. CAL BLANK 1		8.	
16. CCV 1		9.	
17.		10.	
18.		11.	
19.		12.	
20.		13. CAL BLANK 4	
21.		14. CCV 4	
22.		15.	
23.		16.	
24.		17.	
25.		18.	
		19.	
. CAL BLANK 2		20.	
8. CCV 2		21.	

analyzed by 12/17/87 set

AR301966

LSTR
12/12/89
KLK
BK 89689 30

TL

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.004	0.005	0.005
PEAK AREA (ABS-SECONDS)	-0.006	0.001	-0.007

READ: 0.000 .0005 0

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.005	0.005	0.004
PEAK AREA (ABS-SECONDS)	-0.006	0.001	-0.004

READ: 0.000

MEAN= 0.000 STD.DEV.= 0.000 COEF.VAR.= 51.65 %

0.000 AUTOZERO

TL

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.048	0.024	0.036
PEAK AREA (ABS-SECONDS)	0.032	0.018	0.018

READ: 0.018 .0195-.0005 = .018

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.050	0.025	0.038
PEAK AREA (ABS-SECONDS	0.041	0.019	0.033

READ: 0.018

MEAN= 0.018 STD.DEV.= 0.100 COEF.VAR.= 1.54 %

10.0 STANDARD 1

TL

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.090	0.045	0.067
PEAK AREA (ABS-SECONDS)	0.065	0.036	0.039

READ: 19.9 .0335-.0005 = .033

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.091	0.045	0.067
PEAK AREA (ABS-SECONDS)	0.064	0.031	0.039

READ: 16.7

MEAN= 18.3 STD.DEV.= 2.3 COEF.VAR.= 12.48 %

15.3

E-50: READING GREATER THAN HIGHEST STANDARD

19.6 STANDARD 2

TL

	AA	ZAA	BC
PEAK HEIGHT (ABSORBANCE)	0.230	0.107	0.134

AR301967

READ: 5:17 1.055 - .0005 = .0545

(CONTINUED)

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.235	0.111	0.138
PEAK AREA (ABS-SECONDS)	0.177	0.083	0.104

READ: 49.2

MEAN= 50.4 STD.DEV.= 1.6 COEF.VAR.= 3.50 %

****

50.4

E-50: READING GREATER THAN HIGHEST STANDARD

****

50.1 STANDARD 3

****

TL

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.416	0.188	0.231
PEAK AREA (ABS-SECONDS)	0.825	0.154	0.172

READ: 90.2 .1545-.1005=.154

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.418	0.189	0.229
PEAK AREA (ABS-SECONDS)	0.826	0.155	0.170

READ: 91.3

MEAN= 90.7 STD.DEV.= 0.8 COEF.VAR.= 0.86 %

****

90.7

E-50: READING GREATER THAN HIGHEST STANDARD

****

97.5 STANDARD 4

****

TL 0003 ave blk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.004	0.005
PEAK AREA (ABS-SECONDS)	-0.009	-0.001	-0.001

READ: -1.1

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.006	0.005	0.004
PEAK AREA (ABS-SECONDS)	0.002	0.001	0.001

READ: 0.5

MEAN= -0.2 STD.DEV.= 1.1 COEF.VAR.= 99.99 %

****

TL 0004 ICV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.207	0.095	0.108
PEAK AREA (ABS-SECONDS)	0.159	0.076	0.088

READ: 47.6

	AA	ZAA	BG

PEAK AREA (ABS-SECONDS)	0.158	0.077	0.081

READ: 48.8 101%

MEAN= 48.1 [47.6] STD.DEV.= 0.7 COEF.VAR.= 1.56 %

[HBBS] 99% KIT

****

TL 0005 M,BIKS.

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.006	0.006	0.000
PEAK AREA (ABS-SECONDS)	0.001	0.004	-0.012

READ: 2.9

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.006	0.004	0.005
PEAK AREA (ABS-SECONDS)	0.008	0.001	0.002

READ: 0.5

MEAN= 1.4 STD.DEV.= 1.3 COEF.VAR.= 89.40 % Add injection?

****

TL 0006 Cal blk

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.008	0.005	0.004
PEAK AREA (ABS-SECONDS)	-0.004	0.002	-0.005

READ: 0.6

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.005	0.004	0.005
PEAK AREA (ABS-SECONDS)	-0.001	-0.001	0.000

READ: -0.7

MEAN= -0.1 STD.DEV.= 1.1 COEF.VAR.= 88.88 %

****

TL 0007 QCV

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.217	0.100	0.117
PEAK AREA (ABS-SECONDS)	0.158	0.076	0.081

READ: 47.3

	AA	ZAA	BG
PEAK HEIGHT (ABSORBANCE)	0.215	0.100	0.115
PEAK AREA (ABS-SECONDS)	0.158	0.076	0.081

READ: 48.1

MEAN= 47.6 100% STD.DEV.= 0.7 COEF.VAR.= 1.37 % [47.6]

****

AR301970

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST W.D.
DATE 12/21/87
NOTEBOOK NO 8.17
PAGE NO

>MERCURY<
COLD VAPOR USEPA METHOD 245.5
EPACLP DETECTION 0.2 PPB

INSTRUMENT NUMBER 1
CASE NUMBER EA...
STOCK SOLUTION LOT# EA...

ESTR 8061

SUPERVISORY REVIEW PC
DATE 12/22/87 EAP 1.6.88

CALIBRATION CURVE

ug/L	ABSORBANCE		AVERAGE
CALIBRATION BLANK	.000	.000	.000
0.2	.009	.007	.0075
0.5	.010	.011	.0105
1	.023	.024	.0235
2	.045	.047	.046
5	.103	.104	.1035
10	.197	.213	.205
.1	.005	.005	.005

r= .9997
b=2.6X10^-3
a=2.0X10^-2

INITIAL CAL. VERIFICATION SOURCE ICV #5
CONCENTRATION 5.2 ug/L
CONTINUING CAL. VERIF. SOURCE
CONCENTRATION
LAB CONTROL SAMPLE SOURCE HFAI
CONCENTRATION (H2O) 7.0
LAB CONTROL SAMPLE SOURCE
CONCENTRATION (SOIL)
METHOD SPIKE CONCT. WATER ug/L
SOIL 1.0 ug/L

WAVELENGTH: 253.7
BACKGROUND CORRECTION: YES[X] NO[ ]

	EPA SAMPLE #	ABSORBANCE		AVERAGE ABSORBANCE	DILUTION FACTOR	CONCT. ug/L	CONCT. ug/Kg	% RECOVERY	COMMENT
CAL. BLANK	Cal.Blk	.000	.000	.000	1x	0			
INIT.CAL.VER (80-120%)	5.2	.105	.110	.1075	1x	5.1		98	
1 LAB CONTROL (80-120%)	7.0	.142	.134	.138	1x	6.6		94	
2 METHOD BLK. SOIL	dup BLK ESTR	.000	.000	.000	1x	0			ESTR + G-KAL
3 METHOD BLK. H2O	dup BLK WATER	.000	.000	.000	1x	0			
4 SAMPLE	7183	.005	.005	.005	1x	0			ONLY 100 ml ext.
5 SAMPLE	7157	.000	.004	.0015	1x	0			
6 METHOD SPIKE	dup 7157	.000	.000	.000	1x	0			
7	7157	.017	.021	.019	1x	0.90		90	DIL=10
8	EP 10X 7161 WL	.000	.000	.000	1x	0			EAP, GRML
9	7135	.000	.000	.000	1x	0			
10 CAL. BLANK	7136	.000	.000	.000	1x	0			
CONT.CAL.VER.(80-120%)	Cal.Blk	.000	.000	.000	1x	0			
11	ICV	.114	.108	.111	1x	5.3		102	EAP, 1.6.88
12	Digstr Blk	.000	.000	.000	1x	0			EGRML (Hot)
13	7117	.000	.000	.000	1x	0			GRML EPA
14	dup 7117	.000	.000	.000	1x	0			
15	7118	.000	.000	.000	1x	0			
16	7119	.000	.000	.000	1x	0			
17	7120	.000	.000	.000	1x	0			
18	7175 [illegible]	.000	.000	.000	1x	0			GRML 1:1 HNO3
19	7177	.004	.006	.005	1x	0			H2O
20 CAL. BLANK	7177	.000	.000	.000	1x	0			
CONT.CAL.VER.(80-120%)	7176	.000	.000	.000	1x	0			

STOP here for ESTR

ESTR

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7056

ANALYST W. Dunn
DATE 4/12/95
NOTEBOOK NO 9.0
PAGE NO

MERCURY(
COLD VAPOR USEPA METHOD 245.5
EPACLP DETECTION 0.2 PPB

CASE NUMBER GKML

SUPERVISORY REVIEW
DATE 12/22/94

****
CALIBRATION CURVE FOR THESE SAMPLES
IS ON THE PRECEDING PAGE.
****

	EPA SAMPLE	ABSORBANCE		AVERAGE ABSORBANCE	DILUTION FACTOR	CONCT. ug/L	CONCT. ug/kg	% RECOVERY	COMMENTS
22	Cal Blk	.000	.000	.000	1x	0			
23	CCV	.120	.108	.115	1x	4.9		94	
24	7140	.000	.000	.000	1x	0			GKMLEP
25	7140D	.000	.000	.000	1x	0			
26	7141	.000	.000	.000	1x	0			
27	7142	.000	.000	.000	1x	0			
28	7143	.000	.000	.000	1x	0			
29	7144	.000	.000	.000	1x	0			
30	7145	.000	.000	.000	1x	0			
31 CAL. BLANK	7146	.000	.000	.000	1x	0			
CONT. CAL. VER. (80-120%)	7146	.087	.089	.088	10x	42		105	T.V=40 ug/L
32	Cal Blk	.000	.000	.000	1x	0			
33	CCV	.100	.100	.100	1x	4.8		92	
34									
35									
36									
37									
38									
39									
40									
41 CAL. BLANK									
CONT. CAL. VER. (80-120%)									

AR301972

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST KS DATE 12-4-87 NOTEBOOK # 819
CHKD. BY PC DATE 12/11/87 Exp 1/6/88
CLIENT ESTR - 8061 - 002
PROJECT Hexavalent Chromium
SUBJECT STD Methods 312 B

Std. Curve

conc mg/l	Abs 540nm	
0	0.000	
10	0.065	r = .9994
25	0.178	
50	0.362	
100	0.732	

Client ID	mls sample / 100 ml	Abs 540	DF	conc mg/l Cr+6
Blank	50	0.000	x2	.65 <20
7161	50	0.000	x2	.65
7162	50	0.001	x2	.78
7163	50	0.001	x2	.78
7164	50	0.000	x2	.65
7165	50	0.000	x2	.65
7166	50	0.000	x2	.65
7167	50	0.001	x2	.78
7168	50	0.000	x2	.65
7169	50	0.000	x2	.65

elevated detection limit because samples were diluted

PC
12/11/87

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST KS/LM DATE ~~12-17-97~~ 12-17-97 Exp 1/10/98 NOTEBOOK # 819
CHKD. BY pc ATR 12/18/97
CLIENT ESTR 80161
PROJECT Hexavalent Chromium
SUBJECT

Standard Curve

Conc ug/L	Abs. 540nm
0	0.000
10	0.067
25	0.188
50	0.373
100	0.740

r = .9999

Client ID	HEAL #	g/100mls	Amt for color	DF	(colour) Abs 540nm	uncolored Abs 540nm	ug/L Cr+6
Blank	DI H_2O	—	50	2	0.000		.176
seal	7153	10.06 g	50	2	0.197	0.198	.26
↓	7153dup	9.98 g	50	2	0.196	0.196	0.053 ~~1.52~~
sed 2	7154	10.00 g	50	2	0.232	0.232	0.00
Sed 3	7155	10.10 g	50	2	0.061	0.062	~~0.176~~ 0.0
sed 4	7156	9.98 g	50	2	0.014	0.014	0.0
sed 5	7157	9.85 g	50	2	0.015	0.015	0.0
sed 6	7158	9.97 g	50	2	0.076	0.076	0.0
sed 7	7159	10.50 g	50	2	0.142	0.142	0.0
sed 8	7160	9.91 g	50	2	0.285	0.285	0.0

all samples < 20ug/L

$$20 ug/L \times \frac{0.1 L}{g\ sample \times \frac{\%\ Solids}{100}} = DL\ for\ Samp$$

AR301974

301

ALKALINITY
EPA METHOD 310.1
DETECTION LIMIT 1 mg/L CaCO3 (✓) WATER
1 mg/Kg CaCO3 ( ) SOIL
HOLDING TIME - 13 DAYS

IF SOIL _____ GRAMS EXTRACTED IN _____ mls H2O

CHECK SAMPLE SOURCE ERA #19912
TRUE VALUE 154.33/L

reviewed by PC 12/16/87
EAP 1/6/88

ANALYST MM/KS
DATE 12/15/87
PAGE 66
NOTEBOOK 0.680

CLIENT ESTR
8061-2

CLIENT #	REA #	ml SAMPLE USED	RUNS 1	2	AVE.	mg/L CaCO3	mg/Kg CaCO3
	STANDARD .05	10	21.81	21.83	21.82	N=.023	
DiH_2O	BLANK	50	.10	.10	.10	0	
lot 9912	ICV	50	6.80	6.82	6.81	154.33	
1. SW1	7161	50	.25	.25	.25	3.46	
2. SW2	7162	50	1.0	1.02	1.01	20.93	
3. SW3	7163	50	1.0	1.05	1.025	21.23	
4. SW4	7164	50	2.05	2.0	2.0	45.77	43.7
5. SW5	7165	50	1.71	1.73	1.72	37.26	
6	7166	50	1.62	1.55	1.535	33.00	
7. SW7	7167	50	1.5	1.55	1.525	33.77	32.7
8. SW8	7168	50	3.15	3.15	3.12	69.46	
9. SW9	7169	50	3.60	3.58	3.57	80.27	
10. SW9	7169dup	50	3.57	3.59	3.58	80.04	
lot 9912	CCV	50	6.80	6.82	6.81	154.33	
1. SW9	7169spk	50.5	14.28	14.30	14.29	326.37	
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
lot 9912	CCV	50	5.98	6.01	5.995	136	

QC RECOVERY = ----- X 100 = %

NOTES:
1. DUPLICATE AND SPIKE MUST BE MADE FOR EACH TYPE OF MATRIX (WATER OR SOIL).
2. SPIKE LEVEL MUST BE EITHER TWICE THE AMOUNT IN THE SAMPLE AND > 10 TIMES THE DETECTION LIMIT OR > 10 TIMES THE DETECTION LIMIT IF SAMPLE CONTAINS LESS THAN 5 mg/L CaCO3.
3. IF SAMPLES REQUIRE GREATER THAN 15 ml TITRANT DILUTE UNTIL IT USES LESS THAN 15. (10 ml INSTEAD OF 50 mls.)

mls titrant - blank x N/s
mls sample

spike = 5ml of .05N Na_2CO_3 added to 50ml sample TV = 250.

spike recovery $\frac{326.37 - 80.27}{250} \times 100 = 98.44\%$

ICV = $\frac{154.33}{141} = 109\%$ AB30/1975

CCV1 = $\frac{154.33}{141} \times 100 = 109$

mid = $\frac{136}{141} \times 100 = 96.7$

mg/kg = mg/L x 250ml / g sample x %solids/100

ALKALINITY
EPA METHOD 310.1
DETECTION LIMIT 1 mg/L CaCO3 ( ) WATER
1 mg/Kg CaCO3 (X) SOIL
HOLDING TIME - 13 DAYS
IF SOIL 10g GRAMS EXTRACTED IN 250 mls H2O

ANALYST KS
DATE 12-14-87
PAGE 17
NOTEBOOK # 621

CLIENT ESTR
SDG# 5006-00

reviewed by pc 12/14/87
EAP 1/6/88

CHECK SAMPLE SOURCE lot 9912
TRUE VALUE Wingfield

CLIENT #	HEAT #	ml SAMPLE USED	RUNS 1	2	AVE.	mg/L CaCO3	mg/Kg CaCO3
	STANDARD	10	22.10	22.15	22.125	N=.0225	
D.H2O	BLANK	50	0.10	0.10	.10	0	
9912	ICV	50	6.05	6.10	6.075	134.44	
1. sed1	7153	25.54g 50ml	1.0	1.0	1.0	20.25	
2. sed1	7153dup	25.54g	1.0	1.0	1.0	20.25	
3. sed1	7153spk	25.54g	11.21	11.34	11.275	263.81	
4. sed2	7154	25.22g	0.6	0.6	0.6	11.25	
5. sed3	7155	25.06g	0.55	0.55	0.55	10.125	
6. sed4	7156	25.27g	1.25	1.25	1.25	25.275	
7. sed5	7157	26.69g	0.20	0.20	0.20	2.22	
8. sed6	7158	25.48g	0.75	0.70	0.725	14.625	
9. sed7	7159	25.58g	0.30	0.30	0.30	4.5	
10. sed8	7160	23.29g	1.50	1.51	1.505	31.16	
9912	CCV	50	6.15	6.18	6.165	136.5	
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
	CCV						

QC RECOVERY = ——— X 100 = %

NOTES:
1. DUPLICATE AND SPIKE MUST BE MADE FOR EACH TYPE OF MATRIX (WATER OR SOIL).
2. SPIKE LEVEL MUST BE EITHER TWICE THE AMOUNT IN THE SAMPLE AND > 10 TIMES THE DETECTION LIMIT OR > 10 TIMES THE DETECTION LIMIT IF SAMPLE CONTAINS LESS THAN 5 mg/L CaCO3.
3. IF SAMPLES REQUIRE GREATER THAN 15 ml TITRANT DILUTE UNTIL IT USES LESS THAN 15. (5ml INSTEAD OF 50 mls.)

ICV = 134.44/141 x100 = 95%

spike - 5mls of .05N Na_2CO_3 added to 50mls sample TV = 250

CCV = 136.5/141 x100 = 97

spike rec = (263.81 - 20.25)/250 x100 = 97%

AR301976

$mg/kg = \frac{mg/L \times 50\,ml}{g\ sample \times \frac{\%\ SOL}{100}}$

Analyst KS | LM
Supervisor review QC 12/21/87 EAP 1/6/88
Date 12-17-87

Notebook# 887
Page # 2

Chemical Oxygen Demand EPA method 410.

Client#	Heal#	mls sample	mls titrant	mls dichromate	cod mg/l
DiH2o	blank	50mls	25.00	25mls	0
TV=190	QC	50ml	20.45		182
Sed1	7153	.27g/50ml	17.80		288
Sed2	7154	1.03g	17.55		NS in TB 298
Sed3	7155	1.01g	13.08		476.8
Sed4	7156	.27g	23.60		96
Sed5	7157	1.14g	15.68		372.8
Sed6	7158	1259	12.91		483.6
Sed7	7159	1.06g	19.90		207
Sed7	7159spk	1.01g	19.32		227.2
Sed8	7160	.20g	16.71		331.6
Sed8	7160dup	.20g	16.68		332.8

Standardization	Mls .25N dichromate	Mls Ferrous
Rep#1	25	25.01
Rep#2	25	25.00
Rep#3	25	25.00

N=.25

$$\text{Cod mg/l} = \frac{(A-B)N \times 8000}{S}$$

A=mls for blank
B=mls for sample
N=
S=mls of sample

QC = ERA Demand 9914 10mls to 1 liter TV=190

$Spk4 = \frac{(25mls)(190\ QC)}{50mls\ sample}$ TV=95

QC recovery = $\frac{182}{190} \times 100 = 96\%$

All samples diluted to 50mls.

Spike recovery was low do to high oxygen demand in sample.

$spike = \frac{227.2 - 207}{95} \times 100 = 21\%$

AR301977

Analyst LM
Supervisor review PC 12/23/87 all crosschecks by PC 12/28/87 EAP 1/6/88
Date 12/18/87

Notebook# 887
Page # 3

Chemical Oxygen Demand EPA method 410.

Client#	Heal#	mlssample	mlstitrant	mlsdichromate		codmg/l
DiH2o	blank	50	24.60	25		—
TV:190	qc	50	20.20	25	176.0	~~178.20~~ 176.8 PC
S-1	7170	50	23.80	25	32.0	~~32.38~~ PC
S-1	7170dup	50	23.81	25	31.6	~~31.98~~ PC
S-1	7170sp	50	21.79	25	112.4	~~113.75~~ PC
S-2	7171	50	23.90	25	23.0	~~26.37~~ PC
S-3	7172	50	23.91	25	27.6	~~27.99~~ PC
S-4	7173	50	24.20	25	16.0	~~16.20~~ PC
S-5	7174	50	23.05	25	62.0	~~62.75~~ PC
S-6	7175	50	22.80	25	73.0	~~72.86~~ PC
S-7	7176	50	19.05	25	222	~~224.68~~ PC
S-8	7177	50	15.90	25	348	~~352.18~~ PC

Standardization	Mls.25N dichromate	Mls Ferrous
Rep#1	25	24.68
Rep#2	25	24.65
Rep#3	25	24.52

N = .2583 24.61

Cod mg/l = $\frac{(A-B)N \times 8000}{S}$

A=mls for blank
B=mls for sample
N=
S=mls of sample

S-9	7178	50	22.55	25	PC ~~82.98~~	84

QC = ERA Demand 9914 10mls → 1 liter TV = 190

Spike = $\frac{(25\text{mls})(190\ QC)}{50\text{mls}}$ TV = 95

QC recovery = $\frac{178.20}{190} \times 100 = 94\%$

Spike recovery = $\frac{113.75 - 32.38}{95}$ 86%

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST LM DATE 12/4/87 NOTEBOOK # 819
CHKD. BY R DATE 12/16/87 EXP 1/6/88
CLIENT ESTR 8061
PROJECT Hardness 130.2
SUBJECT

Client ID.	HEAI #	mls sample	Run #1 mls titrant used	Run #2	Ave.	mg/l $CaCO_3$
.02N C_2	Standard	10	10.45	10.47	10.46	N = .0191
Di H_2O ~~lot 9909~~	Blank	50	.10	.10	.10	1.91 0
lot 9909	ICV	10	3.70	3.70	3.70	343.8
SED 1	7153	20	.20	.20	.20	4.775
SED 2	7154	25	.20	.20	.20	3.82
SED 3	7155	25	.30	.30	.30	7.64
SED 4	7156	25	1.31	1.30	1.305	46.031
SED 5	7157	25	1.40	1.30	1.35	47.75
SED 6	7158	25	1.50	1.52	1.51	53.862
SED 7	7159	25	.50	.50	.50	15.28
SED 8	7160	25	~~13.50~~ 1.05	~~13.39~~ 1.10	1.075	37.245
lot 9909	CCV	25 10	3.70	3.70	3.70	343.8
SED 7	7159sp.	25	13.35	13.39	13.37	506.914
SED 8	7160dup	25	1.10	1.10	1.10	38.20

Same sample prep as for alkalinity NB 620 p.67

QC - Hardness lot 9909 True Value = 365 mg/l

$$mg/l\,CaCO_3 = \frac{mls\ titrant\ used \times N \times 50{,}000}{mls\ sample}$$

$$ICV\ recovery = \frac{mg/l\,CaCO_3}{True\ Value} \times 100 = \frac{343.8}{365} \times 100 = \boxed{94\%}$$

$$CCV\ recovery = \frac{343.8}{365} \times 100 = \boxed{94\%}$$

$$spike\ recovery = \frac{506.914 - 15.28}{200} \times 100 = \boxed{245\%}$$

$$spike = \frac{(5\ ml\ std)(1000\ mg/l)}{25\ mls\ sample} = 200\ mg/l\ T.V.$$ → 1000 mg/L Ca Std = 2500 mg $CaCO_3$/L

AR301979

← 500 mg $CaCO_3$/L true value

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST LH/KS DATE 12/11/87 NOTEBOOK # 819
CHKD. BY [illegible] DATE 12/16/87 EAD 1/6/88
CLIENT ESTR 8061-002
PROJECT Hardness 130.2
SUBJECT

Client ID.	HEAI #	mls sample	Run # 1	2	Ave.	mg/l CaCO3
.02 NC_2	Standard	10	10.10	10.11	10.105 N = .0198	
lot 9909	Blank	50	.05	.05	.05 ~~.925~~ = 0	
lot 9909	ICV	10	3.60	3.50	3.55 ~~344.75~~	
SW-1	7179	25	1.80	1.82	1.81 ~~69.57~~	69.
SW-2	7180	25	.65	.65	.65 ~~25.04~~	25
SW-3	7181	25	2.31	2.32	2.315 ~~89.24~~	89.
SW-4	7182	25	4.05	4.10	4.075 ~~158.585~~	159
SW-5	7183	25	7.48	8.0	7.74 ~~302.98~~	30
SW-6	7184	25	14.50	14.50	14.50 ~~569.33~~	61
SW-7	7185	25	1.81	1.82	1.815 ~~69.541~~	69.
SW-8	7186	1	3.70	3.71	3.705 ~~3600.175~~	36
SW-9	7187	25	2.32	2.31	2.315 ~~89.241~~	89.
SW-9	7187dup.	25	2.31	2.30	2.305 ~~88.847~~	88.
SW-9	7187spk.	25	8.12	8.09	8.105 ~~317.367~~	31
lot 9909	CCV	10	3.52	3.55	3.535 ~~343.27~~	34

all accounts by PC on 12/16/87

spike = $\frac{(5\text{mls stnd})(1000\text{mg/l})}{25\text{mls sample}}$ TV = 200 mg/l

QC = Hardness lot 9909 = 500 mg $CaCO_3$/L TV = 365

Equation = $\frac{\text{mls titrant} \times N \times 50{,}000}{\text{mls sample}}$

ICV recovery $\frac{344.75^{R}}{365} \times 100 = 94\%^{PC}$ 95%

CCV recovery $\frac{343.27^{R}}{365} \times 100 = 94\%^{PC}$ 95%

spike recovery $\frac{317.367 - 89.24}{200} \times 100 = 114\%$ PC 12/14/87

$\frac{319 - 89.7}{200} \times 100 = 115\%$

AR301980

961

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST KS DATE 12-9-87 NOTEBOOK # 837
CHKD. BY PC DATE 12/11/87
CLIENT Total Susp. Solids
PROJECT ESTR 8061 EPA Method 160.2
SUBJECT

	Client ID	HEAT #	sample vol.	tare wt	final wt	mg residue	mg/l TSS
11				13.1046			
2047	DiH_2O	Blank	100	~~17.5537~~ KS	13.1046	0	0
22.4	↓	↓	100	16.3011	16.3011	0	0
9-24	lot 9909	ICV	~~100~~ 50	19.2059	19.2069	1	20
—	↓	↓	~~100~~ 50	13.5290	13.5302	1.2	24
2	SW-1	7161	50	13.1882	13.1882	0	0
5	↓	↓	50	19.2347	19.2356	.9	18
3	SW-2	7162	50	13.1332	13.1345	1.3	26
3802	↓	↓	50	16.0665	16.0678	1.3	26
7	SW-3	7163	50	15.4733	15.4766	3.3	66
22	↓	↓	50	19.2842	19.2859	1.7	34
0333	SW4	7164	50	13.2865	13.2867	.2	4
4444	↓	↓	50	13.7713	~~18.3427~~ 13.7719	.6	12
1862	SW5	7165	100	18.3427	~~18.3427~~ 18.3432 KS	.5	10 5
1734	↓	↓	100	18.9110	18.9115	.5	10 5
17	SW6	7166	100	19.3655	19.3661	.6	6
55	↓	↓	100	13.0267	13.0276	.9	9
204	SW7	7167	50	18.5546	18.5552	.6	12
8888	↓	↓	50	13.5265	13.5276	1.1	22
1039	SW8	7168	50	16.5633	16.5658	2.5	50
61	↓	↓	50	18.8139	18.8177	3.8	76
777	SW9	7169	50	13.0706	~~13.0739~~ 13.0739 KS	3.3	66
19	↓	↓	50	19.5381	19.5415	3.4	68
11	lot 9909	CCV	100	15.6807	15.6812	.5	5 (18)
18	↓	↓	100	16.2044	16.2062	1.8	

samples were cloudy & took a lot of time to filter so volume of sample used was cut in half.
EPA Hardness lot 9909 TV = 22 mg/l

ICV = $\frac{20}{22} \times 100 = 91\%$ CCV = $\frac{5}{22} \times 100 \cdot 22\%$
ICV = $\frac{24}{22} \times 100 = 109\%$ CCV = $\frac{18}{22} \times 100$ 82%

All crossouts by KS on 12/9/87

AR301981

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST KS DATE 12-12-87 NOTEBOOK # 837
CHKD. BY [illegible] DATE 12/16/87
CLIENT Total Suspended Solids
PROJECT ESTR 8061 EPA 160.2
SUBJECT

	Client ID	HETTH #	Vol Sample	tare wt	final wt	mg/l residue	mg/l TSS
				19.6580			
3 X	DiH_2O	Blank	100	17.9727 KS	19.6580	0	0
24-2	Lot 9909	ICV	100	19.0936	19.0956	2	20
10	SW-1	7161	50	16.8808	16.8816	.8	16
5-19	SW-2	7162	50	16.7578	~~16.8067~~	16.7578	0 0
2.0	SW-3	7163	50	15.8056	15.8067	1.1	22
105	SW-4	7164	50	16.5267	16.5278	1.1	22
6t	SW-5	7165	50	19.3877	19.3881	.4	8
42-20	SW-6	7166	50	19.7472	19.7475	.3	6
204	SW-7	7167	50	19.3840	19.3836	0	0
56	SW-8	7168	50	16.9149	16.9177	2.8	56
25-3	SW-9	7169	50	19.6580 KS	17.9754	2.7	54
10-8	Lot 9909	CCV	100	18.8607	18.8628	2.1	21

ERA Hardness lot 9909 TV = 22 mg/l

ICV $\frac{20}{22} \times 100 = 91\%$

CCV $= \frac{21}{22} \times 100 = 95\%$

Only enough sample to repeat one replicate per sample.

All crossouts by KS on 12/11/87

AR301982

TSS

7161 0 > original
18
16 - revision

7162 26 >
26
0

7163 66 >
34
22 38

7164 4 >
12
22

7165 5 >
5
8

7166 6 >
9
6

7167 12 >
22
0

7168 50
76 >
56

7169 66
68 >
54

Hittman Associates

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO: 68-01-7056 SOW 7/84 ( )
CONTRACT NO: 68-01-7311 SOW 7/85 ( )

NOTEBOOK: 856
PAGE: 17
TECHNICIAN: TM
DATE: 12/14/87

>DIGESTION<
>ATOMIC ABSORPTION TECHNIQUE<

METALS TO BE ANALYZED:
(FOR REDIGESTION SELECT ONLY THOSE METALS APPLICABLE)
FLAME (✓) Sb( ) Al( ) Ba( ) Be( ) Cd( ) Ca( ) Co( ) Cu( ) Fe( )
Mg( ) Mn( ) Ni( ) K( ) Mo( ) Sn( ) V( ) Zn( )

CASE NUMBER RPM1X64, ESTP8061 (7183)

FURNACE ( ) As( ) Cr( ) Pb( ) Se( ) Ag( ) Tl( )

COLD VAPOR ( ) Hg( )

SUPERVISOR REVIEW R

DATE 12/14/87

SAMPLE MATRIX
LIQUID (✓) EPA 200.7-HDD-CLP
SOIL ( ) EPA 3050-HDB-CLP
OTHER (SPECIFY) ( )

MERCURY DIGESTION ( ) EPA 245.5 CLP-M

SAMPLE CONCENTRATION LOW( ) MEDIUM( )

INITIAL DIGESTION (✓)
REDIGESTION ( )
REASON FOR REDIGESTION _____

AR301984

	MEAL NUMBER	CLIENT ID	WEIGHT OR VOLUME	FINAL DIGESTATE VOLUME	COLORATION	CLARITY	TEXTURE	H202 ADDED	COMMENTS
LABORATORY CONTROL SAMPLE	456		100ml	100ml					dilute 10ml-100ml
PREPARATION BLANK	0647				colorless	clear			
MATRIX SPIKE	1147	SW-1							
UNSPIKED SAMPLE	1148	SW-1							
UNSPIKED DUPLICATE	1149	SW-1							
R1 VOID 12/14/87	1150	SW-2							
1.	1151	SW-2							
2.	1152	SW-2							
3.	1153	SW-2							
4.	1154	SW-2							
5.	1155	SW-6							
6.	1156	SW-7							
7. VOID 12/14/87	1157	SW-X							
8.	1158	SW-9							
9.	1159	MW-1							
10.	1160	MW-2							CRML
11.	1161	MW-3							↓
12.	1162	MW-4							dilute 1ml - 100ml
13.	1163								
14.									
15.									
16.									
17.									
18.									
19.									
20.									

COLORATION: RED, BLUE, YELLOW, GREEN, ORANGE, VIOLET, WHITE, COLORLESS, BROWN, GRAY, BLACK
CLARITY: CLEAR, CLOUDY, OPAQUE
TEXTURE: FINE, MEDIUM, COARSE

Hittman Ebasco Assoc.

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO: 68-01-7056 SOW 7/84 ( )
CONTRACT NO: 68-01-7311 SOW 7/85 (✓)

NOTEBOOK : 86
PAGE : 126
TECHNICIAN: CH
DATE : 12/15/87

>DIGESTION<
>ATOMIC ABSORPTION TECHNIQUE<

METALS TO BE ANALYZED:
(FOR REDIGESTION SELECT ONLY THOSE METALS APPLICABLE)

CASE NUMBER SAU1AK6LS, LE06603602, ESTR2061

FLAME (✓) Sb( ) Al( ) Ba( ) Be( ) Cd( ) Ca( ) Co( ) Cu( ) Fe( )
Mg( ) Mn( ) Ni( ) K( ) Na( ) Sr( ) V( ) Zn( )

FURNACE ( ) As( ) Cr( ) Pb( ) Se( ) Ag( ) Tl( )

COLD VAPOR ( ) Hg( )

SUPERVISOR REVIEW PC

DATE 12/30/87

SAMPLE MATRIX
LIQUID (✓) EPA 200.7-ICP-CLP
SOIL (✓) EPA 3050-ICP-CLP
OTHER (SPECIFY) ( )

MERCURY DIGESTION ( ) EPA 245.5 CLP-M

SAMPLE CONCENTRATION LOW( ) MEDIUM( )

INITIAL DIGESTION (✓)
REDIGESTION ( )
REASON FOR REDIGESTION _____

		HEAT NUMBER	CLIENT ID	WEIGHT OR VOLUME	FINAL DIGESTATE VOLUME	COLORATION	CLARITY	TEXTURE	H2O2 ADDED	COMMENTS
LABORATORY CONTROL SAMPLE		LCS (ICP/AA)		100ml	100ml					dilute 1ml→100ml
PREPARATION BLANK				100ml	100ml					
MATRIX SPIKE										
UNSPIKED SAMPLE										
UNSPIKED DUPLICATE										
	1.	7103	PATIENT	100ml	100ml	Colorless	Clear			SHOW
	2.	7104	PATIENT	100ml	100ml	Colorless	Clear			↓
	3.	7105	SAMPLE	100ml	100ml	Colorless	Cloudy			LEO
sp	4.	7183	SW-5	50ml	50ml	Colorless	Clear			ESTR
dp	5.	7183	SW-5	50ml	50ml	Colorless	Clear			
	6.	Blank(S)		1.0g	100ml				5ml	
dp	7.	7151	SED-5	1.14g	100ml	Black		Natural		
sp	8.	7151	SED-5	1.07g	100ml	Black		Natural		
	9.	7167	SED-5	1.15g	100ml	Black		Natural	↓	↓
	10.									
	11.									
	12.									
	13.									
	14.									
	15.									
	16.									
	17.									
	18.									
	19.									
	20.									

COLORATION: RED, BLUE, YELLOW, GREEN, ORANGE, VIOLET, WHITE, COLORLESS, BROWN, GRAY, BLACK
CLARITY: CLEAR, CLOUDY, OPAQUE
TEXTURE: FINE, MEDIUM, COARSE

• ESTR 7183 was digested on 12/11/87, w/out a dup+spike
The dup+spike are a redigestate here on 12/15/87.
Sample itself Not digested due to limited volume

AR301985

Hittman Ebasco Assoc.

>DIGESTION<
>ATOMIC ABSORPTION TECHNIQUE<

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO: 68-01-7056 SOW 7/84 ( )
CONTRACT NO: 68-01-7311 SOW 7/85 ( )

NOTEBOOK : 856
PAGE : 123
TECHNICIAN: LA
DATE : 12/14/87

METALS TO BE ANALYZED:
(FOR REDIGESTION SELECT ONLY THOSE METALS APPLICABLE)
FLAME ( ) Sb( ) Al( ) Ba( ) Be( ) Cd( ) Ca( ) Co( ) Cu( ) Fe( )
Mg( ) Mn( ) Ni( ) K( ) Mo( ) Sn( ) V( ) Zn( )

CASE NUMBER ESTR8061, GENL8064

SAMPLE MATRIX
LIQUID (✓)
SOIL ( )
OTHER (SPECIFY) ( )

EPA 200.7-MOD-CLP
EPA 3050-MOD-CLP

FURNACE (✓) As( ) Cr( ) Pb( ) Se( ) Ag( ) Tl( )

COLD VAPOR ( ) Hg( )

SUPERVISOR REVIEW

DATE 12/14/87

page 1 of 2

MERCURY DIGESTION ( ) EPA 245.5 CLP-M

SAMPLE CONCENTRATION LOW( ) MEDIUM( )

INITIAL DIGESTION (✓)
REDIGESTION ( )
REASON FOR REDIGESTION _____

	MEAL NUMBER	CLIENT ID	WEIGHT OR VOLUME	FINAL DIGESTATE VOLUME	COLORATION	CLARITY	TEXTURE	H2O2 ADDED	COMMENTS
LABORATORY CONTROL SAMPLE	LCSA		100ml	100ml					2 Aq 40ab
PREPARATION BLANK	PBW		100ml	100ml					
MATRIX SPIKE	7183	SW-5	50ml	50ml	Colorless	Clear			Spike was 1ml → 50ml
UNSPIKED SAMPLE	7183	SW-6	50ml	50ml					
UNSPIKED DUPLICATE	7183	SW-7	50ml	50ml	25ml				
	7183	SW-8	50ml	50ml					
1.	7179	SW-1	100ml	100ml					
2.	7180	SW-2							
3.	7181	SW-3							
4.	7183	SW-4							
5.	7184	SW-6							
6.	7185	SW-7							
7.	7186	SW-8							
8.	7187	SW-9							
9.	7215	MW-1							
10.	7216	MW-2							
11.	7217	MW-3							
12.	7218	MW-4	✓	✓	✓	✓			
13.	LCSB		100ml	100ml					IL 3000D dilute: 1ml → 100ml
14.	LCSC		100ml	100ml					
15.									
16.									
17.									
18.									
19.									
20.									

COLORATION: RED, BLUE, YELLOW, GREEN, ORANGE, VIOLET, WHITE, COLORLESS, BROWN, GRAY, BLACK
CLARITY: CLEAR, CLOUDY, OPAQUE
TEXTURE: FINE, MEDIUM, COARSE

7183 Dup + sample lost, Sample redone at 25 ml

AR301986

Hittman Assoc.
EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO: 68-01-7056 SOW 7/84 ( )
CONTRACT NO: 68-01-7311 SOW 7/85 (✓)

NOTEBOOK # 856
PAGE # 123
TECHNICIAN: TM
DATE # 12/14/87

>DIGESTION<
>ATOMIC ABSORPTION TECHNIQUE<

METALS TO BE ANALYZED:
(FOR REDIGESTION SELECT ONLY THOSE METALS APPLICABLE)
FLAME ( ) Sb( ) Al( ) Ba( ) Be( ) Cd( ) Ca( ) Co( ) Cu( ) Fe( )
Mg( ) Mn( ) Ni( ) K( ) Na( ) Sr( ) V( ) Zn( )
FURNACE (✓) As( ) Cr( ) Pb( ) Se( ) Ag( ) Tl( )
COLD VAPOR ( ) Hg( )

CASE NUMBER ESTR 8061
SUPERVISOR REVIEW PC
DATE 12/14/87
page 2 of 2

SAMPLE MATRIX
LIQUID ( ) EPA 200.7-HDB-CLP
SOIL (✓) EPA 3050-HDB-CLP
OTHER (SPECIFY) ( )
MERCURY DIGESTION ( ) EPA 245.5 CLP-M
SAMPLE CONCENTRATION LOW( ) MEDIUM( )

INITIAL DIGESTION (✓)
REDIGESTION ( )
REASON FOR REDIGESTION _____

		HEAT NUMBER	CLIENT ID	WEIGHT OR VOLUME	FINAL DIGESTATE VOLUME	COLORATION	CLARITY	TEXTURE	H202 ADDED	COMMENTS
LABORATORY CONTROL SAMPLE		1CSA		100ml	100ml	(not required - use LCS from p. 122 w/ these samples				Aq 400b
PREPARATION BLANK		2BLK		1.1g	200ml	Black		Medium	1 x	
MATRIX SPIKE		1SA	SED-5	1.02g						
UNSPIKED SAMPLE		1SD	SED-5	1.00g						
UNSPIKED DUPLICATE		1SD	SED-3	1.00g						
	1.	1S4	SED-1	1.08g						
	2.	1S4	SED-2	1.01g						
	3.	1S5	SED-3	1.00g						
	4.	1S6	SED-4	1.02g						
	5.	1S7	SED-6	1.05g						
	6.	1S9	SED-7	1.00g						
	7.	1S10	SED-8	1.05g	↓	Brown		Medium	↓	
	8.	1CSA		100ml	100ml					Aq 400b
	9.	1BLK		100ml	100ml					dilute 1ml → 100ml
	10.									
	11.									
	12.									
	13.									
	14.									
	15.									
	16.									
	17.									
	18.									
	19.									
	20.									

COLORATION: RED, BLUE, YELLOW, GREEN, ORANGE, VIOLET, WHITE, COLORLESS, BROWN, GRAY, BLACK
CLARITY: CLEAR, CLOUDY, OPAQUE
TEXTURE: FINE, MEDIUM, COARSE

AR301987

Hittman Assoc.
EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO: 68-01-7056 SOW 7/86 ( )
CONTRACT NO: 68-01-7311 SOW 7/85 ( )

NOTEBOOK : B56
PAGE : 139
TECHNICIAN: W. Dixon
DATE : 12/21/87

DIGESTION<
ATOMIC ABSORPTION TECHNIQUE<

METALS TO BE ANALYZED:
(FOR REDIGESTION SELECT ONLY THOSE METALS APPLICABLE)
ALL ( ) Sb( ) Al( ) Ba( ) Be( ) Cd( ) Ca( ) Co( ) Cu( ) Fe( )
Pb( ) Mg( ) Mn( ) Ni( ) K( ) Mo( ) Se( ) V( ) Zn( )

CASE NUMBER ESTR 8061, GRAL 8064

ARSENIC ( ) As( ) Cr( ) Pb( ) Se( ) Ag( ) Tl( )

SUPERVISOR REVIEW R

DATE 12/31/87

SAMPLE MATRIX
LIQUID (✓) EPA 200.7-NOB-CLP
SOIL (✓) EPA 3050-NOA-CLP
OTHER (SPECIFY) ( )

MERCURY (COLD VAPOR (✓) Hg(✓) MERCURY DIGESTION (✓) EPA 245.5 CLP-M

SAMPLE CONCENTRATION LOW(✓ MEDIUM( )

INITIAL DIGESTION (✓
REDIGESTION ( )
REASON FOR REDIGESTION _____

		HEAT NUMBER	CLIENT ID	WEIGHT OR VOLUME	FINAL DIGESTATE VOLUME	COLORATION	CLARITY	TEXTURE	H2O2 ADDED	COMMENTS
LABORATORY CONTROL SAMPLE		2048	—	100ml	100ml					Wix Fisher
PREPARATION BLANK		8064	—	100ml	100ml					
MATRIX SPIKE	ESTR	7161	SMS	100 ml	100 ml	Black	—	mod.		
ISPIKED SAMPLE		7162	↓	100 ml	100 ml	↓	—	↓		
ISPIKED DUPLICATE		7163	↓	100 ml	100 ml	Brown	CLEAR	—		
		1. 7164	SMS	100 ml	100 ml					
		2. Blank #1	—	100 ml	100 ml					
	GRAL	3. 7165	MW-1	100ml	100ml	Brown	Cloudy	—		
		4. 7166	MW-2	100ml	100ml					
		5. 7167	MW-3	100ml	100ml					
		6. 7168	MW-4	100ml	100ml					
		7. Blank #2	—	100ml	100ml	—	—	—		Lion Sample Lic
		8.								
		9.								
		10.								
		11.								
		12.								
		13.								
		14.								
		15.								
		16.								
		17.								
		18.								
		19.								
		20.								

Curve digitok
Spec 4-85-5a
0.0 → 100ml
0.2 → 100ml
0.5 → 100ml
1.0 → 100ml
2.0 → 100ml
5.0 → 100ml
10.0 → 100ml

COLORATION: RED, BLUE, YELLOW, GREEN, ORANGE, VIOLET, WHITE, COLORLESS, BROWN, GRAY, BLACK
CLARITY: CLEAR, CLOUDY, OPAQUE
TEXTURE: FINE, MEDIUM, COARSE

AR301988

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST EPP DATE 7.15.87 NOTEBOOK # 428

CHKD. BY _____ DATE _____

CLIENT FPM

PROJECT _____

SUBJECT Spiking Solutions - ICP metals

I. SOIL ICP Spiking Solution

Use Spex 1000ppm unadulterated, put 2 ml 1:1 HNO_3 in 100 ml vol. flask first.

LOT # ON SUMP	METAL	SPIKING LEVEL	SPIKE SOL. CONC	VOL. SPEX TO 100 ML
	Sb	50 ppm	25 ug/ml	2.5 ml
	Ba	2000	1000	20
	Be	50	25	0.5
	Cd	50	25	0.5
	Co	500	250	5.0
	Cu	250	125	2.5
	Mn	500	250	5.0
	Ni	500	250	5.0
	Sn	500	250	5.0
	V	500	250	5.0
	Zn	500	250	5.0

See following page 9/10/87 mw

II WATER ICP SPIKING SOLUTION

Use Spex 1000ppm unadulterated, put 2 ml 1:1 HNO_3 in 100 ml vol. flask first.

LOT # ON SUMP	METAL	SPIKING LEVEL	SPIKE SOL. CONC.	VOL. SPEX TO 100
	Al	2000 ppb	2000 ug/ml	2.0 ml
	Sb	50	5	0.5
	Ba	2,000	200	20
	Be	50	5	0.5
	Cd	50	5	0.5
*	Ca	100,000	—	—
	Co	500	50	5.0
	Cu	250	25	2.5
	Fe	1000	100	10
*	Mg	50,000	—	—
	Mn	200	20	2.0
*	Na	100,000	—	—
*	K	50,000	—	—
	Ni	400	40	4.0
	Sn	400	40	4.0
	V	500	50	5.0
	Zn	200	20	2.0

II. SOIL SPIKING SOLUTIONS: ICP METALS
USE SPEX 1000 ppm UNDILUTED
PUT ~~5~~ 1.1 HNO3 IN 100 mL VOL. FLASK FIRST

DATE 10.9.87
NOTEBOOK #, 847
PAGE # 3
ANALYST EHP

LOT NUMBER SPEX	METAL	SPIKING LEVEL	SPIKE SOLN. CONC.	VOLUME (mL) OF SPEX TO 100 mL
2-137EP PLSB2-2X	Sb	50 ppb	25 ug/5mL	0.5 mL
PLBA2-2X	Ba	2000	1000	20
PLBE2-2X	Be	50	25	0.5
PLCD2-2X	Cd	50	25	0.5
PLCO2-2X	Co	500	250	5
PLCU2-2X	Cu	250	125	2.5
PLMN2-2X	Mn	500	250	5
PLNI2-2X	Ni	500	250	5
FISHER EG13K 24 PLSN2 2X EHP	Sn	500	250	5
2-137EP PLV2-2X	V	500	250	5
2-137EP PLZN2-2X	Zn	500	250	5

USE SPEX STANDARDS (OR OTHER 1000 ppm) AS FOLLOWS:
WATER FURNACE: SPIKING SOLUTION

DATE 8-25-87
NOTEBOOK # 8-12
PAGE # 1
ANALYST

LOT NUMBER	METAL	SPIKING LEVEL	SPIKE SOLN. CONC.	VOL. OF STOCK TO DILUTE 1L
SPEX D8160	As	20 ug/L	2 ug/mL	2 mL
SPEX 4-43-JA	Se	10	1	1
ALFA H0711	Pb	20	2	2
MALLINKRODT H584 RXGY	Tl	50	5	5
VWR VW0758-3	Ag	50	5	5
FISHER 852228-24	Cr	20	2	2

20 ml conc. HNO_3
ADD ~~40mL 1:1 HNO_3~~ TO FLASK FIRST. ADD ALL METALS EXCEPT Ag.
BRING UP TO JUST SHORT OF 1L. ADD SILVER. BRING TO 1L AND DILUTE.

AR301991

USE SPEX STANDARDS (OR OTHER 1000 ppm) AS FOLLOWS:
BOIL FURNACE: SPIKING SOLUTION

DATE 8/25/87
NOTEBOOK # 243
PAGE # 1
ANALYST EdP

LOT NUMBER	METAL	SPIKING LEVEL	SPIKE SOLN. CONC.	VOL. OF STOCK TO DILUTE 1L
SPEX CSSCCC	As	40 ug/L	20ug/5mL	4 mL
SPEX 4-43-JA	Se	10	5	1
RICCA H071	Pb	50	25	5
HOBH KKGY molybdate	Tl	50	25	5
VWR VW0758-3	Ag	50	25	5
FISHER 852238-24	Cr	20	10	2

20 mL conc. HNO_3
ADD ~~10 mL 1:1 HNO_3~~ TO FLASK FIRST. ADD ALL METALS EXCEPT Ag.
BRING UP TO JUST SHORT OF 1L. ADD SILVER. BRING TO 1L AND DILUTE.

AR301992

LCS SOLUTION A: FLAME
FIRST DILUTE Na, AND K NBS STOCK SOLUTIONS 5mL-50mL
USE DILUTIONS AS FOLLOWS:

DATE 8.2C
NOTEBOOK 8 244
PAGE 8
ANALYST EAP

METAL	INITIAL VOL. TO 1L	FINAL CONC.	TRUE VALUE 1/10 DILUTION
Na	25 mL	25 ppm	2500 ppb
K	25 mL	25 ppm	2500 ppb

ADD 20 mL OF ~~HNO3~~ Conc HNO3 TO FLASK BEFORE BRINGING UP TO VOLUME. EAP

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST FAP DATE 7.1.87 NOTEBOOK # 678

CHKD. BY _____ DATE _____

CLIENT EPA

PROJECT _____

SUBJECT FLAME LCS SOLUTION B

1. Put 20 ml 1:1 HNO_3 in 1 liter volumetric flask

2. Use NBS STOCK SOLUTIONS UNDILUTED as follows:

METAL	INITIAL VOL. TO 1L	FINAL CONC.	TRUE VALUE - 1/10 DILUTION
Ca	7.5 ml	75 mg/L	7500 ug/L
Mg	5.0 ml	50 mg/L	5000 ug/L
Ba	5.0 ml	50 mg/L	5000 ug/L

AR301994

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

050

ANALYST EAP DATE 7.15.87 NOTEBOOK # 1678

CHKD. BY _____ DATE _____

CLIENT EPA

PROJECT _____

SUBJECT LCS "C" - Furnace Metals

① Dilute NBS 10,000 ppm Stock Solutions 5→50:
AS, Pb, Cr, Se

② From above dilutions make LCS C as follows
8 mls As
8 mls Pb
8 mls Cr
8 mls Se
} + 40 ml 1:1 HNO_3 make up to 1 liter

AR301995

HITTMAN EBASCO ASSOCIATES INC.
ANALYTICAL LABORATORY

ANALYST EAP DATE 2/13/87 NOTEBOOK # 678

CHKD. BY _____ DATE _____

CLIENT EPA

PROJECT LCS "C" AND LCS "D" - flame metals

SUBJECT _____

I. LCS C

① Dilute the following NBS Standards 10→100 first:
Cd, Co, Cu, Fe, Mn, Ni, Sn, Zn

② Use the following SPEX Stock Solutions undiluted: Al, Be, V

③ Put 20 ml of 1:1 HNO_3 in 1 liter flask first

④ Prepare LCS C as follows:

METAL	INITIAL VOL TO 1 l	FINAL CONC	★ 1/100
Cd ✓	5	5 ppm	50 ppb
Co ✓	30	30	300
Cu ✓	40	40	400
Fe ✓	80	80	800
Mn ✓	40	40	400
Ni ✓	30	30	300
Sn ✓	80	80	800
Zn ✓	40	40	400
Al ✓	80	80	800
Be ✓	30	30	300
V ✓	80	80	800

Use NBS DILUTION

Spex Straight

★ 1/100 dilution prior to digestion

II. LCS D

① Use Spex Antimony Stock undiluted
② put 40 ml of 1:1 HNO_3 in one liter flask first.
③ Prepare LCS D as follows:

METAL	INITIAL VOL TO 1 l	FINAL CONC.	★ 1:100
Sb	8.0	8 ppm	80 ppb

Spex Straight

★ 1/100 dilution prior to digestion

EPA CONTRACT LABORATORY PROGRAM: METALS
CONTRACT NO. 68-01-7054

ANALYST AH
DATE 12/16/87
NOTEBOOK # 867
PAGE # 26

PERCENT SOLIDS
EPA METHOD 335.2 CLP-M
Mettler AE 163

CASE NUMBER ESTR 8061

SUPERVISOR REVIEW: PC
DATE: 12/18/87

AR301997

START TIME 4:00 PM
OVEN TEMP 103°C

END TIME 8:AM
OVEN TEMP 103°C

	CRUCIBLE NUMBER	HEAT NUMBER	EPA NUMBER	TARE WEIGHT	SAMPLE WEIGHT	CRUC. WT.01	CRUC. WT.02	CRUC. WT.03	CRUC. WT.04	CRUC. WT.05	SAMPLE WEIGHT	% SOLIDS	
1	1	Blank		1.0018	5.0916	1.0018					0.0	0	
2	2	7153	SED 1	1.0020	5.1604	2.7920					1.7900	34.69	
3	3	7154	SED 2	0.9951	5.0424	4.4295					3.4344	68.11	68.4
4	4	7155	SED 3	0.9999	5.1440	4.0486					3.0487	59.25	58.5
5	5	7156	SED 4	0.9998	5.0089	3.7592					2.7594	55.1	
6	6	7157	SED 5	1.0066	6.1158	4.1679					3.1613	51.8	
7	7	7158	SED 6	0.9998	5.4063	1.7918					0.7920	14.64	14.7
8	8	7159	SED 7	1.0044	5.1414	4.6942					3.6898	718	
9	9	7160	SED 8	0.9959	5.9380	3.2634					2.2675	41.7	
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													

Samples were dried for at least 12 hrs

1. USE ONLY ONE CASE LOT ON EACH NOTEBOOK PAGE.
2. WEIGHT UNITS ARE GRAMS.

SECTION V

PRIORITY POLLUTANT METALS

HITTMAN EBASCO STANDARDS LOG | EPA CLP: METALS CONTRACT # ESTR-8061-002 | DATE: JANUARY 7, 1988 ENVIRONMENTAL STRATEGIES | NOTEBOOK 5152

ELEMENT	STOCK #	STANDARDS PREP DATE	ANALYSIS DATE	NOTEBOOK NUMBER	PAGE NUMBER	PREP BY
ANTIMONY	SPEX 2137EP	12/17/87	12/17/87	852	108	KK
ARSENIC	NBS 2126-2	12/18/87	12/18/87	896	28	KK
BERYLLIUM	SPEX 2137EP	12/16/87	12/30/87	677	259	RLC
CADMIUM	SPEX 2137EP	12/16/87	12/30/87	677	259	RLC
CHROMIUM	FISHER 863177-24	12/21/87	12/21/87	896	30, 31	KK
COPPER	SPEX 2137EP	12/16/87	12/30/87	677	259	RLC
LEAD	NBS 2121-2	12/15/87	12/15/87	873	89	KK
MERCURY	FISHER	12/21/87	12/21/87	877		MD
CKEL	SPEX 0786MP	07/22/87	12/30/87	677	260	RLC
SELENIUM	NBS-2126-2	12/18/87	12/18/87	892	17	KK
SILVER	SPEX 3-33-EP	12/18/87	12/18/87	896	29	KK
THALLIUM	BANCO 177-18	12/17/87	12/17/87	896	27	KK
ZINC	SPEX 2137EP	12/16/87	12/30/87	677	259	RLC

WALK - IN REFRIGERATOR LOGIN/OUT NOTEBOOK

SAMPLE NO.	DATE OUT	TECHNICIAN INITIALS	DATE IN	TECHNICIAN INITIALS	COMMENTS
6552-6559	11/20/87	KS	11/20/87	KS	
6595-6596	11/20/87	KS	11/20/87	KS	
6850-660	11/27/87	BZ			Dr. Lo S.I.s
6661-671	11/27/87	WF	"	"	"
6855(877)-74	11/23/8	MM			
6881-8 & 6857					
6 889-96, 6893					
6654-66	11/30/87	BZ	11/30	WF	REMIII
6967-69	11/30/87	RLA			Epta - EZ
6770-74	11/30/87	WF			Epta - WCC
6951-53	12/10/87	WF			" "
7117-7127	12-7-87	KS	12-7-87	KS	
7126	12-7-87	KS			
7104-13	12/2/87	BZ	12/3/87	WF	REMIII
7166-62	12/8/87	TN	12/8	WF	
7158	12/8/87	TN	12/8	WF	
7283-7300	12-9-87	KS	12-9-87	KS	Chem. assays
6511	12-9-87	KS			thaw out
6261	12-9-87	KS			All of the following time
7402-05	12/16/87	BZ	12/16/87	KDA	SHUN
7117-7120	12/14/87	RLA	12/14/87	RLA	GRAM
7140-7146	12/12/87	RLA			GRAM
7135-7136	12/14/87	RLA			ECL
7405-50	12/18/87	BZ	12/18/87	BZ	EPA
7471-73, 25-83	12/21/87	BZ	12/21/87	BZ	EPA
7135-36	12/21/87	GWD	12/21/87	GWD	GRAM, EPA
7103-7157					ESDI
7117-7120					GRAM, EPA
7140-7146					GRAM, EPA
7212-20					GRAM, EPA
7471-73, 25-83	12/22/87	BZ	12/22/87	BZ	EPA
2451-53	12/22/87	BF	12/22/87	BZ	SHUN
7135-7134	12/23/87	RLA	12/23/87	RLA	ECL
7117-7120					GRAM
7140-7141					GRAM
7135-7136	12/23/87	RLA	12/23/87	RLA	ECL
7432-36	12-28-87	KS	12-28-87	KS	
7437-40	12-28-87	KS			
7578-81	12/28/87	KDA	12/28/87	KDA	ONDC #71
7117-20	12/29/87	RLA	12/29/87	RLA	GRAM
7140-46	12/29/87	RLA			GRAM
7117-20	12/30/87	RLA			GRAM
7140-46					

AR302000

DIGESTATE REFRIGERATOR LOGIN/OUT NOTEBOOK

SAMPLE NO.	DATE OUT	TECHNICIAN INITIALS	DATE IN	TECHNICIAN INITIALS	COMMENTS
MW 133-MW1611	9-24-87	WD	9-24-87	WD	EPA 7233.1 FC.
50.41	9-24-87	WD	9-24-87	WD	Cadmium 7406 - only
5910-5912	9-24-87	JXN	9-24-87	JXN	—
5451 - 5454	9/30/87	MW	9/30/87	MW	SAS III AM
5076 - 5080	10/2/87	MW	10/6/87	MW	7806 only
5069 - 5082	10/13	MW	10/13	MW	Epa 7841
5064 - 5066	10/13	MW	10/13	MW	Epa 7841 7843
5069 - 5082	10/14	MW	10/14	DEL	Epa 7841
5064 - 5066	10/14	Rec	10/14	MW	Epa 7841
5064 - 5066	10/15	MW	10/15	Rec	Epa 7841
MW 8231-20426	10/19/87	WD	10/19/87	WD	EPA Blank
69 - 95	11/2/87	MW			ST to DE
6552 - 6553	11/3	MW			
6607-6608	11/6/87	EM	"	"	"
6667 - 73	11/				
6624 6629-32	11-13-87	JXN	11-13-87	JXN	—
6638-42	11-17-87	JXN	11-17-87	JXN	—
6641-43	11-20-87	JXN	11-20-87	JXN	—
6641-42, 6644	11-30-87	JXN	11-30-87	JXN	—
6950	12/2/87	MW	12/4/87	MW	Upland
6834, 40-42, 45-46	12/2/87	MW	12/2/87	MW	Doylestown
6867-6867	12/2/87	Rec	12/2/87	Rec	Doylestown
6830-6839	12/2/87	Rec	12/2/87	Rec	Doylestown
7022-7024	12/2/87	Rec	12/2/87	Rec	Doylestown
7022-31	12/3/87	RT	12/7/87	WD	RETTM
7104-13	12/3/87	RT			
7123 7151	12/4/87	MW	12/7/87	MW	Vetro
TKM-7149-NW	12/4/87	MW	12/7/87	MW	TKM - epa
6674-6679	12/4/87	MW	12/4/87	MW	Doylestown reorg.
TKM-7149-NW	12/4/87	MW	12/4/87	MW	TKM EPA
6834, 40-42, 45-46	12/4/87	MW	12/4/87	MW	Doylestown
6867-6867	12/4/87	MW	12/4/87	MW	"
6830-6839	12/4/87	MW	12/4/87	MW	"
TKM-7149-NW	12/5/87	MW	12/5/87	MW	TKM Reorg
TKM-7149-NW	12/6/87	MW	12/6/87	MW	TKM
6834, 40-42, 45-46	12/7/87	MW	12/7/87	MW	Doylestown
6867-6867	12/7/87	MW			
6830-6839	12/7/87	MW			
7275-7278	12/29/87	MW	1/4/88	MW	EPA ML
7432-7442	12/31/87	MW	1/3/88	MW	Epa 8701
7523-7525	12/31/87	MW	1/3/88	MW	Epa 8777
7432-7442	1/5/88	MW	1/5/88	MW	Epa 8701
7523-7525	1/5/88	MW	1/5/88	MW	Epa 8777
EPA777/8805	1/6/88	MW			

AR302001

HITTMAN EBASCO ASSOCIATES INC.
INSTRUMENT LOG FOR PE 603

DATE 12/7/87
ANALYST W.Dixon
METAL Na FL (✓) FURN ( )
CLIENT Marks & Ft. Pe.
200ppb (.468abs)
Comments r=.995

DATE 12/8/87
ANALYST W.Dixon
METAL Hg FL ( ) FURN ( )
Cold VAPor
CLIENT Douglasville EPA 7006-007
10 ppb (.207abs)
Comments r=.9995

DATE 12/9/87
ANALYST W.Dixon
METAL Na FL (✓) FURN ( )
CLIENT Douglas EPA 7006-007
200ppb (.451abs)
Comments r=.9990

DATE 12/10/87
ANALYST W.D.
METAL Hg FL ( ) FURN ( )
Cold VAPor
CLIENT Douglasville
10 ppb (.192abs)
Comments r=.9999

DATE 12/11/87
ANALYST W.D
METAL Na FL (✓) FURN ( )
CLIENT Douglasville EPA 007
200 ppb (. abs)
Comments r=.

DATE 12/12/87
ANALYST W.Dixon
METAL Hg FL ( ) FURN ( )
Cold VAPor
CLIENT EPA GRAB 6503
10 ppb (.210abs)
Comments r=.9991

DATE 12/23/87
ANALYST W.Dixon
METAL Na FL (✓) FURN ( )
CLIENT Salt drift EPA 6005
2000ppb (.483 abs)
Comments r=.999

DATE 1/4/88
ANALYST W.Dixon
METAL Na FL (✓) FURN ( )
CLIENT EPA 9705
2000ppb (.4655 abs)
Comments r=.999

DATE 1/5/88
ANALYST W.Dixon
METAL Hg FL ( ) FURN ( )
Cold VAPor
CLIENT EPA 9707, 9705
10 ppb (.1445 abs)
Comments r=.9989
6003 002

PE 1/11/88

AR302002

HITTMAN ECASCO ASSOCIATES INC.
INSTRUMENT LOG FOR PE 5000

pc 12/8/87

DATE 12/4/87
ANALYST K.K
METAL Pb FL ( ) FURN ✓
ENERGY 66
CLIENT BATC 8011 024
100 ppb (412)
Comments

DATE 12/7/87
ANALYST K.K
METAL Se FL ( ) FURN ✓
ENERGY 69
CLIENT USATHAMA 001
200 ppb (1759)
Comments

DATE 12/8/87
ANALYST K.K
METAL Sb FL ( ) FURN ✓
ENERGY 65
CLIENT USATHAMA 002
100 ppb (121)
Comments

DATE 12/8/87
ANALYST K.K
METAL Sb FL ( ) FURN ✓
ENERGY 65
CLIENT USATHAMA 011
100 ppb (26)
Comments

DATE 12/11/87
ANALYST K.K
METAL Sb FL ( ) FURN ✓
ENERGY 68
CLIENT USATHAMA
320 ppb ( )
Comments

DATE 12/14/87
ANALYST K.K
METAL Pb FL ( ) FURN ( )
ENERGY 69
CLIENT ESTR
100 ppb ( )
Comments

DATE 12/17/87
ANALYST K.K
METAL Sb FL ( ) FURN ✓
ENERGY 66
CLIENT BSTR
100 ppb ( )
Comments flameless

DATE 12/7/87
ANALYST K.K
METAL Pb FL ( ) FURN ✓
ENERGY 70
CLIENT ESTR/GMRL Aqueous 8624 8626 8627
100 ppb (475)
Comments

DATE 12/8/87
ANALYST K.K
METAL Se FL ( ) FURN ✓
ENERGY
CLIENT ESTR
100 ppb (383)
2040 injngs
Comments

HITTMAN EBASCO INTRUMENT LOG

ZEEMAN 3030 Furnace

pc 12/14/87

DATE 12/11/87
ANALYST K.K
METAL Cr, As FL ( ) FURN ✓
CLIENT VTRO
100 ppb (340 abs)
Cr
As
Comments

DATE 12/11/87
ANALYST K.K
METAL As FL ( ) FURN ✓
CLIENT BATC
100 ppb (350 abs)
Comments burned out

DATE 12/14/87
ANALYST K.K
METAL As FL ( ) FURN ✓
CLIENT BATC-026
100 ppb (23 abs)
Comments

DATE 12/15/87
ANALYST K.K
METAL Cd FL ( ) FURN ✓
CLIENT I.D.L. #3
50 ppb (347 abs)
Comments K.K 3/5

DATE 12/17/87
ANALYST K.K
METAL TL FL ( ) FURN ✓
CLIENT ESTR 061
100 ppb (162 abs)
Comments

DATE 12/17/87
ANALYST K.K
METAL As FL ( ) FURN ✓
CLIENT ESTR 061
100 ppb (_____ abs)
Comments

DATE 12/18/87
ANALYST K.K
METAL As FL ( ) FURN ✓
CLIENT ESTR 061
100 ppb (_____ abs)
Comments

DATE 12/20/87
ANALYST K.K
METAL As FL ( ) FURN ✓
CLIENT ESTR/BATC
100 ppb (353 abs)
Comments COV out 114%

DATE 12/22/87
ANALYST K.K
METAL Cr FL ( ) FURN ✓
CLIENT ESTR
100 ppb (_____ abs)
Comments

HITTMAN EBASCO INTRUMENT LOG

ZEEMAN 3030 Furnace

DATE 12/22/87	DATE 12/28	DATE 12/30
ANALYST K.K	ANALYST K.K	ANALYST K.K
METAL Cr FL ( ) FURN AT	METAL TL FL ( ) FURN AT	METAL TL FL ( ) FURN AT
CLIENT ESTR	CLIENT EPA 7006	CLIENT EPA 7004
100 ppb (814 abs)	100 ppb (147 abs)	100 ppb (148 abs)
Cosents api 47158	Cosents	Cosents
DATE 12/30	DATE 12/30	DATE 12/31
ANALYST K.K	ANALYST K.K	ANALYST K.K
METAL Cr FL ( ) FURN AT	METAL Cr FL ( ) FURN AT	METAL As FL ( ) FURN AT
CLIENT EPA 7004	CLIENT GWRL	CLIENT ESTR/BATC 828
100 ppb (513 abs)	100 ppb (513 abs)	100 ppb (146 abs)
Cosents	Cosents	Cosents
DATE 12/31/87	DATE 1/5/88	DATE 1/6/88
ANALYST K.K	ANALYST K.K	ANALYST K.K
METAL Ag FL ( ) FURN AT	METAL Ag FL ( ) FURN AT	METAL AS FL ( ) FURN AT
CLIENT EPA 7004 8777/8705	CLIENT EPA 7004 8777 8705	CLIENT BATC-8811
100 ppb (abs)	100 ppb (398 abs)	100 ppb (abs)
Cosents redig sample	Cosents	Cosents

AR302005

HITTMAN EBASCO ASSOCIATES INC.
ICP OPERATIONAL PARAMETERS

DATE	12/17/87	12/17/87
PLASMA FLOW/NEB	13.0 / 0.97	13.0 / 0.97
VIEWING HGT.	15	15
ELEMENT	Ca Mg	Ba Mg
CHECK SAMPLE	Fisher	Fisher
TRUE VALUE	1000 7000	1000
ANAL. VALUE	1010 7007	1007
COMMENTS	Run opt IDL	Run opt IDL

DATE	12/17/87	12/22/87
PLASMA FLOW/NEB	14.3 / 1.19	13.0 / 0.87
VIEWING HGT.	15	15
ELEMENT	K Na	Ba Ag
CHECK SAMPLE	ICV-IX-487 / FISHER	ICAP-07
TRUE VALUE	50,700 / SUPER	970 - 990
ANAL. VALUE	52,650 #5.5%	1069 - 1010
COMMENTS	Run Nashville Sets I, II, III, IV	Run ECR optex

DATE	12/22/87	12/29/87
PLASMA FLOW/NEB	13.0 / 0.87	13.0 / 0.86
VIEWING HGT.	15	15
ELEMENT	Se 95 Cr Cd Pb	Ba Ag
CHECK SAMPLE	Heat 5000 (Fisher)	ICAP-07
TRUE VALUE	5000 ppb	970 990
ANAL. VALUE	5095-4909-5016-5046-5032	1036 990
COMMENTS	Run Optex ECR	Run Grimm 7117-20 Optex 7140-41

DATE	12/29/87	12/29/87
PLASMA FLOW/NEB	13.0 / 0.87	13.0 / 0.87
VIEWING HGT.	15	15
ELEMENT	Se 95 Cr Cd Pb	Mn Zn
CHECK SAMPLE	Fisher 5000	Fisher - ICAP-19
TRUE VALUE	Sweeper	Aquapure - 1010
ANAL. VALUE		3864 - 1004
COMMENTS	Run Grimm Optex 7117-20, 7140-41	Run Grimm Optex 7075-78 + tubes 7112-24, 7146-46

DATE	12/29/87	12/30/87
PLASMA FLOW/NEB	13.0 / 0.87	13.0 / 0.87
VIEWING HGT.	15	15
ELEMENT	Ba	Zn Cd Be Cu
CHECK SAMPLE	Fisher	ICV-IX-987
TRUE VALUE	2500 ppb	3109484 - 481 - 542
ANAL. VALUE	2618	2925 - 474 - 497 - 498
COMMENTS	Run opt Grimm Tubes # 7075-78	Run ENV. STDS

Note: 12/22/87 - PE service visit

AR302006

HITTMAN EBASCO ASSOCIATES INC.
ICP OPERATIONAL PARAMETERS

DATE	12/30/87	12/30/87
PLASMA FLOW/NEB	13.0/0.87	13.0/0.87
VIEWING HGT.	15	15
ELEMENT	Mn	Cu
CHECK SAMPLE	ICV-Fisher	ICV-1X-487
TRUE VALUE	1000 ppb	500
ANAL. VALUE	396.9	585
COMMENTS	Run Envir. Start.	Run Shavers Creek (ppb)

DATE	12/30/87			12/31/87
PLASMA FLOW/NEB	13.0/0.87			13.0/0.87
VIEWING HGT.	15			15
ELEMENT	Cd	Co	Cu	Fe
CHECK SAMPLE	Fisher	Fisher	Fisher	Fisher
TRUE VALUE	1000	1000	1000	1000
ANAL. VALUE	1007	1008	1015	981
COMMENTS	Run after LDL			Run IDL after

DATE	12/31/87	1/5/88
PLASMA FLOW/NEB	13.0/0.87	13.0/0.87
VIEWING HGT.	15	15
ELEMENT	Al Ca Fe Mg	V Co Cu
CHECK SAMPLE	ICV-1X-487	Fisher Fisher
TRUE VALUE	1980=49,500=1980=25,000	1000 1000 1000
ANAL. VALUE	2007=47409=2010=25,655	1004 1010 999
COMMENTS	Run after CS#8705 #X772	Run after IDL

DATE	1/5/88	1/5/88
PLASMA FLOW/NEB	13.0/0.87	13.0/0.87
VIEWING HGT.	15	15
ELEMENT	Fe	Mn Ba
CHECK SAMPLE	Fisher	ICV-1X-487
TRUE VALUE	1000 ppb	496 1980
ANAL. VALUE	984	468 2090
COMMENTS	Run after IDL	Run after CS#8705 #X772

DATE	1/6/88	1/7/88
PLASMA FLOW/NEB	13.0/0.87	13.0/0.87
VIEWING HGT.	15	15
ELEMENT	Ba Cd Co Mn Ni Cu V	Fe Mg Ca
CHECK SAMPLE	ICV-1X-487	ICV-1X-487
TRUE VALUE	3100-489-494-515-548-502-514	1990=25000=4975
ANAL. VALUE	3135-482-491-492-492-505-504	1917=24 [illegible]
COMMENTS	Run after	Run after ICV #8705 S.D. #761

AR302007

mettler AE 163

NOTEBOOK NO. 698
PAGE NO. 13
REVIEWED BY: QC 12/14/87

1. THE BALANCE SHOULD BE CALIBRATED BEFORE EACH USE.

2. CHECK THE BALANCE CALIBRATION BY WEIGHING TWO CLASS S STANDARD WEIGHTS THAT BRACKET THE APPROXIMATE WEIGHT OF THE SAMPLE. IF ONE OR BOTH ARE MORE THAN 1.0% FROM THEIR CERTIFIED WEIGHT THE BALANCE IS DECLARED UNCERTIFIED AND MUST NOT BE USED UNTIL IT IS CHECKED BY A TRAINED METROLOGIST.

DATE	TECHNICIAN	WEIGHT	WEIGHT	CALIBRATION WEIGHT	REMARKS
11:30:87	KS	10.00036	2.00005	.09999	changed mode
12/3/87	BZ	10.00040	2.00014	.10003	
12/4/87	KS	10.00035	2.00010	.09999	changed mode
12/14/87	ZM	10.00041	2.00010 12/15/87	—	Calibration wt values 1.99998 / 10.00001

AR302008

Allied Fisher Scientific

Model 7215A

NOTEBOOK NO. 71B
PAGE NO. 16
REVIEWED BY: PC

1. THE BALANCE SHOULD BE CALIBRATED BEFORE EACH USE.

2. CHECK THE BALANCE CALIBRATION BY WEIGHING TWO CLASS S STANDARD WEIGHTS THAT BRACKET THE APPROXIMATE WEIGHT OF THE SAMPLE. IF ONE OR BOTH ARE MORE THAN 1.0% FROM THEIR CERTIFIED WEIGHT THE BALANCE IS DECLARED UNCERTIFIED AND MUST NOT BE USED UNTIL IT IS CHECKED BY A TRAINED METROLOGIST.

DATE	TECHNICIAN	WEIGHT 2.0	WEIGHT 10.0	~~CALIBRATION WEIGHT~~ 100.0	REMARKS
11/27/87	BZ	2.01	10.00	99.98	
11/30/87	BZ	2.00	9.99	99.98	
12/1/87	BZ	2.00	10.00	99.98	
12/2/87	BZ	2.00	10.00	99.99	
12-3-87	JXN	2.00	10.00	99.99	—
12-4-87	JXN	2.00	10.00	100.00	—
12/7/87	WE	2.00	10.00	99.98	
12/8/87	WD	2.00	10.00	99.99	
12/9/87	WD	2.00	10.00	99.98	
12/11/87	WD	2.00	10.00	99.98	
12/15/87	LM	1.99	10.00	100.00	
12/21/87	WD	2.00	10.00	100.00	
12-22-87	K.S	2.00	10.00	100.00	
12-30-87	KS	2.00	10.00	100.00	
1/4/88	WD	2.00	10.00	99.99	
1/5/88	WD	2.00	10.00	99.99	

AR302009

TOLERANCE Limits < 1.0 uohms/cm OR notify supervisor & DISCONTINUE USE

HITTMAN EBASCO ASSOCIATES INC.

Deionized Water

Notebook # 894
Page # 1

Date	Spec. Cond. (uohos/cm)	Checked by:
11/3/87	0.74	W.D.
11/4/87	0.76	W.D.
11/5/87	0.70	PC
11/6/87	0.60	PC
11/9/87	0.55	W.D.
11/10/87	0.73	W.D.
11/11/87	0.73	W.D.
11/12/87	0.74	W.D
11/13/87	0.71	WD
11/16/87	0.73	WD
11/17/87	0.69	WD
11/18/87	0.70	WD
11/19/87	0.70	WD
11/24.87	0.70	PC
11/23/87	0.71	WD
11/24/87	0.69	WD
11/25/87	0.70	W.D
11/30/87	0.70	WD
12/1/87	0.71	WD
12/2/87	0.69	WD
12/3/87	0.70	W.D
12/4/87	0.71	W.D
12/7/87	0.70	W.D
12/8/87	0.93	W.D
12/9/87	0.97	W.D.

Hydro Service changed tubing

AR302010 PC 12/10/87

Tolerance Limits < 1.0 uohms/cm or notify supervisor & Discontinue use

NITTMAN EBASCO ASSOCIATES INC.

Deionized Water

Notebook # 894
Page # 2

Date	Spec. Cond. (uohos/cm)	Checked by:
12/10/87	0.94	W.D.
12/14/87	0.90	PC
12/15/87	0.90	PC

AR302011