This document was too large to scan as a whole document, therefore it required breaking into smaller sections.

Document number: SD-WM-DP-053

Section 3 **of** 6

Title: DST Evaporator Project 242A for Tank 241AP107 [Pgs 433 Thru 664]

Date: 01/28/1994 **Revision:** A000

Originator: Miller GL
Co: WHC

Recipient:
Co:

References: EDT-140729

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TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5727	107-AP	8- 3-93	8:31	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? .200mL	107-AP-B

Remarks, Calculations, Results

Robby Wendland

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
~~8-10-93~~ RW 8-11-93	1643	8/16/93 J. S. Lachut	8/17

54-6800-067 (R/10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5827	107-AP	8- 3-93	8:31	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? , 200.mL	107-AP-P

Remarks Calculations Results

DUPLICATE SAMPLE

Robby Wendland

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
RW ~~8-10-93~~ 8-11-93	1643	J. S. Lachut 8/16/93	8/17

54-6606-06 (R 10 83)

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TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC.REV 2.0

Sample: STD Date: 08/11/93 Time: 15:05:45

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3284311 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	2.20	0.00
2	1.01	6.70	67.16
3	1.51	16.20	58.64
4	2.00	30.30	46.53
5	2.50	45.90	33.99
6	3.00	61.30	25.12
7	3.50	75.40	18.70
8	4.00	87.30	14.12
9	4.50	98.10	10.50
10	5.00	106.70	8.06
11	5.50	113.70	6.16
12	6.00	119.60	4.93
13	6.50	124.40	3.86
14	7.00	128.50	3.19

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 435 TO 442.

BEST AVAILABLE COPY

BLANK VALUE = 2.3 micrograms carbon
BLANK FACTOR = 2.3 / 7.002991 = +3.3E-01 ug/min Carbon

SAMPLE RESULTS:
(128.5 - 2.299719)(1)/(50) = +2.524E+00 g/L Carbon
(128.5 - 2.299719)(1)/(50)(12) = +2.103E-01 Molar Carbon

Sample Run By: Robby Wendland
RA WENDLAND 8-11-93

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: BLK Date: 08/11/93 Time: 13:28:21

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = N/A

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	0.30	66.67
3	1.50	0.40	25.00
4	2.00	0.60	33.33
5	2.50	0.70	14.29
6	3.00	0.80	12.50
7	3.50	1.00	20.00
8	4.00	1.20	16.67
9	4.50	1.40	14.29
10	5.00	1.60	12.50
11	5.50	1.70	5.88
12	6.00	1.80	5.56
13	6.50	2.00	10.00
14	7.00	2.30	13.04

BEST AVAILABLE COPY

BLANK VALUE = 2.3 micrograms carbon
BLANK FACTOR = 2.3 / 7.002991 = +3.3E-01 ug/min Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-053 REV 0

Sample: V21 Date: 08/11/93 Time: 15:32:53

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3284311 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	0.30	66.67
3	1.50	0.60	50.00
4	2.00	1.10	45.45
5	2.50	2.30	62.07
6	3.00	6.30	57.97
7	3.50	12.20	43.44
8	4.00	18.10	32.60
9	4.50	23.30	24.27
10	5.00	29.20	18.15
11	5.50	33.70	13.35
12	6.00	37.80	10.85
13	6.50	41.20	8.25
14	7.00	44.20	6.79

BEST AVAILABLE COPY

BLANK VALUE = 2.3 micrograms carbon
BLANK FACTOR = 2.3 / 7.002991 = +3.3E-01 ug/min Carbon

SAMPLE RESULTS:
(44.2 - 2.299659)(1)/(200) = +2.10E-01 g/L Carbon
(44.2 - 2.299659)(1)/(200)(12) = +1.75E-02 Molar Carbon

Sample Run By: _____
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V21 DUP Date: 08/11/93 Time: 15:41:19

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3284311 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.60	0.00
2	1.01	3.20	50.00
3	1.50	4.50	28.89
4	2.01	6.00	25.00
5	2.51	8.60	30.23
6	3.01	12.30	35.34
7	3.51	16.20	30.73
8	4.01	25.60	25.00
9	4.50	31.70	19.24
10	5.00	37.30	15.01
11	5.50	42.20	11.61
12	6.00	46.50	9.25
13	6.50	50.10	7.19
14	7.00	53.40	6.18

BEST AVAILABLE COPY

BLANK VALUE = 2.3 micrograms carbon
BLANK FACTOR = 2.3 / 7.002991 = +3.3E-01 ug/min Carbon

SAMPLE RESULTS:
(53.4 - 2.300281)(1)/(200) = +2.55E-01 g/L Carbon
(53.4 - 2.300281)(1)/(200)(12) = +2.13E-02 Molar Carbon

Sample Run By: _____
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V21 SPK Date: 08/11/93 Time: 16:26:43

Sample Size = 200 uL
Dil Factor = 1.5
Blank ID # = BLK
Blank Value = .3284311 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	2.70	0.00
2	1.01	5.40	50.00
3	1.51	7.90	31.65
4	2.01	10.40	24.04
5	2.51	15.50	32.90
6	3.01	26.40	41.29
7	3.51	42.40	37.74
8	4.01	59.90	29.22
9	4.50	76.90	22.11
10	5.00	92.90	16.68
11	5.50	105.70	12.68
12	6.00	117.20	9.81
13	6.50	127.10	7.79
14	7.00	135.50	6.20

BEST AVAILABLE COPY

BLANK VALUE = 2.3 micrograms carbon
BLANK FACTOR = 2.3 / 7.002991 = +3.3E-01 ug/min Carbon

SAMPLE RESULTS:
(135.5 - 2.300281)(1.5)/(200) = +9.990E-01 g/L Carbon
(135.5 - 2.300281)(1.5)/(200)(12) = +8.325E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V21 SPK Date: 08/11/93 Time: 16:35:03

Sample Size = 200 uL
Dil Factor = 1.5
Blank ID # = BLK
Blank Value = .3284311 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	3.40	0.00
2	1.01	6.60	48.48
3	1.51	9.70	31.96
4	2.00	12.70	23.62
5	2.50	18.10	29.83
6	3.00	29.30	38.23
7	3.50	44.70	34.45
8	4.00	61.60	27.44
9	4.50	78.20	21.23
10	5.00	93.20	16.09
11	5.50	106.20	12.24
12	6.00	117.70	9.77
13	6.50	127.60	7.76
14	7.00	136.30	6.38

$$\frac{(136.3 - 2.3)\left(\frac{.2 + .1}{.2}\right) - (53.4 - 2.3)\left(\frac{.2}{.2}\right)\left(\frac{.2}{.2}\right)}{254.4} \times 100$$

= 57.9 % Recovery

BEST AVAILABLE COPY

BLANK VALUE = 2.3 micrograms carbon
BLANK FACTOR = 2.3 / 7.002991 = +3.3E-01 ug/min Carbon

SAMPLE RESULTS:
(136.3 - 2.299399)(1.5)/(200) = +1.005E+00 g/L Carbon
(136.3 - 2.299399)(1.5)/(200)(12) = +8.375E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V23 Date: 08/11/93 Time: 16:43:04

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3284311 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	6.80	0.00
2	1.01	12.70	46.46
3	1.51	18.10	29.83
4	2.00	23.10	21.65
5	2.50	28.70	19.51
6	3.00	35.60	19.38
7	3.50	44.00	19.09
8	4.00	52.80	16.67
9	4.50	61.20	13.73
10	5.00	69.00	11.30
11	5.50	76.00	9.21
12	6.00	82.40	7.77
13	6.50	88.00	6.36
14	7.00	93.10	5.48

BEST AVAILABLE COPY

BLANK VALUE = 2.3 micrograms carbon
BLANK FACTOR = 2.3 / 7.002991 = +3.3E-01 ug/min Carbon

SAMPLE RESULTS:
(93.1 - 2.299739)(1)/(200) = +4.54E-01 g/L Carbon
(93.1 - 2.299739)(1)/(200)(12) = +3.78E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V23 Date: 08/11/93 Time: 16:07:40

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3284311 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	6.50	0.00
2	1.01	12.10	46.28
3	1.51	17.40	30.46
4	2.00	22.30	21.97
5	2.50	27.80	19.78
6	3.00	35.00	20.57
7	3.50	44.00	20.45
8	4.00	53.30	17.45
9	4.50	62.40	14.58
10	5.00	70.50	11.49
11	5.50	78.00	9.62
12	6.00	84.30	7.47
13	6.50	90.10	6.44
14	7.00	95.10	5.26

BEST AVAILABLE COPY

BLANK VALUE = 2.3 micrograms carbon
BLANK FACTOR = 2.3 / 7.002991 = +3.3E-01 ug/min Carbon

SAMPLE RESULTS:
(95.1 - 2.3)(1)/(200) = +4.64E-01 g/L Carbon
(95.1 - 2.3)(1)/(200)(12) = +3.87E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

Batch # 1651

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V24, V25, V26, V27, V28	Customer ID: 107-AP-C, 107-AP-D, 107-AP-E
Analysis: TIC	Sample Prep: DIRECT

Instrument: WB39937	Procedure/ Rev: LA-622-102 1B-2
Technologist: A Walkbaugh	Date: 08-14-93
Starting Time: 13:25	Temperature N/A
Ending Time: 17:43	Chemist: J. Lachut

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS Std	V24-5527	11		
2	Reagent BLK	V25-5627	12		
3	Sample	V26-5727	13		
4	Sample Dup	V26-5827	14		
5	Sample	V27-5727	15		
6	Sample Dup	V27-5827	16		
7	Sample	V28-5727	17		
8	Sample Dup	V28-5827	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS Std	12N12A/502			
	A Walkbaugh 08-14-93			

443

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-053 REV 0

METHOD: LA 622-102				DATE START: 8/14/93					
PREPARED BY: J. LACHUT				DATE COMPLETE: 8/16/93					
	UNITS:	µg/mL							
SPL NAME	SPL ID	ANALYT	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
		TIC						5.00 µg/mL	
LMCS STD. 12N12A	V-24						104.5		
BLANK	V-25		1.30×10^{2} µg/mL						
107 AP-C 107-AP	V-26		3.01×10^{2} µg/mL	3.03×10^{2} µg/mL	3.02×10^{2} µg/mL	0.66			
107-AP-D 107-AP	V-27		2.32×10^{2} µg/mL	2.32×10^{2} µg/mL	2.32×10^{2} µg/mL	0			
107 AP-E 107-AP	V-28		2.49×10^{2} µg/mL	2.51×10^{2} µg/mL	2.50×10^{2} µg/mL	0.8			

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

These samples are reruns, they're OK. J. Lachut 8/16/93

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 34.-5527	107-AP	8- 3-93	8:38	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	% RECOVERY	N1L17	1

Sample Size	Customer ID
? 50λ	STD

Remarks, Calculations, Results

S223 C03

STD# 12 N12A RESULT .209

STD VAL. 200 % REC 104.5%.

RERUN

A Mallbrough

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
08-14-93	13:34	J. S. Lachut 8/16/93

54-6800-081 (R/10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 25.-5627	107-AP	8- 3-93	8:40	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 50λ	BLK

Remarks, Calculations, Results

REAGENT BLANK

$\frac{6.50\,mg}{0.050\,mL} = 1.30 \times 10^{2}\,mg/mL\,C$

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
08-14-93	13:16	J. S. Lachut 8/16/93

54-6800-053 (R-10/83)

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TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-5727	107-AP	8- 3-93	8:54	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 200λ	107-AP-C

Remarks, Calculations, Results

RERUN

3.01×10^{-1} g/L C x $\frac{1{,}000{,}000\ \mu g/g}{1{,}000\ mL/L}$ = 3.01×10^{2} µg/mL C

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
08-14-93	14:08	J. S. Lachut 8/16/93	8/17

54-6800-06-1 (R-10-83)

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TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-5827	107-AP	8- 3-93	8:54	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 200λ	107-AP-C

Remarks, Calculations, Results:

RERUN

DUPLICATE SAMPLE

3.03×10^{-1} mg/L C x $\frac{1,000,000 \text{ mg/L}}{1,000 \text{ mg/L}}$ = 3.03×10^{2} mg/mL C

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
08-14-93	14:56	J. S. Lachut 8/16/93	8/18

LA-0600-067 (R-10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-5727	107-AP	8- 3-93	9: 0	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 200 λ	107-AP-D

Remarks, Calculations, Results

2.32×10^{-1} g/L C $\times \frac{1{,}000{,}000 \text{ mg/g}}{1{,}000 \text{ mL/L}} = 2.32 \times 10^{2}$ mg/mL C

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
08-11-93	17:24	J. S. Lachut 8/16/93	

54-6800-005 (R-10-83)

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TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-5827	107-AP	8- 3-93	9: 0	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 200 λ	107-AP-D

Remarks, Calculations, Results

RERUN

DUPLICATE SAMPLE

2.32×10^{-1} g/L C × 1,000,000 mg/g / 1,000 mg/L = 2.32×10^{2} mg/L C

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
7				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
08-14-93	17:17	J. S. Lachut 8/16/93	8/17

(A4-6002-061 (R-10-83))

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 28.-5727	107-AP	8- 3-93	9: 2	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 2002	107-AP-E

Remarks, Calculations, Results:

RERUN

2.49×10^{-1} g/L C $\times \frac{1{,}000{,}000 \text{ mg/g}}{1{,}000 \text{ mL/L}} = 2.49 \times 10^{2}$ mg/mL C

A Wellbaugh

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
88-14-93	17:35	J. S. Lachut 8/16/93

8/17

54-6600-061 (R-10-93)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 28.-5827	107-AP	8- 3-93	9: 2	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 200 λ	107-AP-E

RERUN

Remarks, Calculations, Results:

DUPLICATE SAMPLE

~~2.51x10~~ JL 8/16/93

2.51×10^{-1} g/L C x $\frac{1{,}000{,}000\ \mu g/g}{1{,}000\ mL/L}$ = 2.51×10^{2} mg/L C

A Voelkerding

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
08-14-93	~~17:35~~ 17:43	J. S. Lachut 8/16/93

54-5800-061 (R-10/83)

BEST AVAILABLE COPY

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD Date: 08/14/93 Time: 13:34:03

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.90	0.00
2	1.01	33.90	97.35
3	1.51	72.30	53.11
4	2.00	98.10	26.30
5	2.50	113.50	13.57
6	3.00	121.90	6.89
7	3.51	126.00	3.25
8	4.01	128.80	2.17
9	4.50	130.00	0.92
10	5.00	130.50	0.38
11	5.50	131.20	0.53
12	6.00	131.50	0.23
13	6.50	131.80	0.23
14	7.00	132.10	0.23

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 453 **TO** 460 **.**

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS:
(132.1 - 5.600683)(1)/(50) = +2.530E+00 g/L Carbon
(132.1 - ~~5.600683~~)(1)/(50)(12) = ~~+2.108E-01~~ Molar Carbon
6.5 RA 8/16/93 2.093 E-1 RA 8/16/93

Sample Run By: A Hollibaugh 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: BLK Date: 08/14/93 Time: 13:16:07

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	0.90	66.67
3	1.50	1.70	47.06
4	2.00	2.30	26.09
5	2.50	2.70	14.81
6	3.00	3.20	15.63
7	3.50	3.70	13.51
8	4.00	4.20	11.90
9	4.50	4.50	6.67
10	5.00	4.80	6.25
11	5.50	5.30	9.43
12	6.00	5.70	7.02
13	6.50	6.00	5.00
14	7.00	6.50	7.69

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS:
(6.5 - 5.601318)(1)/(50) = +1.8E-02 g/L Carbon
(6.5 - 5.601318)(1)/(50)(12) = +1.5E-03 Molar Carbon

Sample Run By: AH 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V26 Date: 08/14/93 Time: 14:08:34

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.20	0.00
2	1.01	13.80	98.55
3	1.51	31.40	56.05
4	2.00	44.30	29.12
5	2.50	52.80	16.10
6	3.00	57.70	8.49
7	3.50	60.90	5.25
8	4.00	62.50	2.56
9	4.50	63.80	2.04
10	5.00	64.90	1.69
11	5.50	65.50	0.92
12	6.00	66.10	0.91
13	6.50	66.40	0.45
14	7.00	66.70	0.45

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: JL 8/16/93
(66.7 - ~~5.599219~~ 6.5)(1)/(200) = ~~+3.06~~ 3.01 E-01 g/L Carbon JL 8/16/93
(66.7 - 5.599219)(1)/(200)(12) = +2.55E-02 Molar Carbon

Sample Run By: AH 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V26-DUP Date: 08/14/93 Time: 14:56:06

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	11.60	97.41
3	1.51	29.30	60.41
4	2.00	42.90	31.70
5	2.50	51.90	17.34
6	3.00	57.90	10.36
7	3.50	61.70	6.16
8	4.00	64.60	4.49
9	4.50	67.00	3.58
10	5.00	67.00	0.00
11	5.50	67.00	0.00
12	6.00	67.00	0.00
13	6.50	67.00	0.00
14	7.00	67.00	0.00

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: JL 8/16/93
(67 - ~~5.600683~~ 6.5)(1)/(200) = JL 8/16/93 +~~3.07~~ 3.03E-01 g/L Carbon
(67 - 5.600683)(1)/(200)(12) = +2.56E-02 Molar Carbon

Sample Run By: AH 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V27 Date: 08/14/93 Time: 17:24:56

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.70	0.00
2	1.01	11.20	93.75
3	1.50	23.30	51.93
4	2.00	32.80	28.96
5	2.50	39.50	16.96
6	3.00	43.90	10.02
7	3.50	46.70	6.00
8	4.00	48.90	4.50
9	4.50	49.90	2.00
10	5.00	51.20	2.54
11	5.50	51.50	0.58
12	6.00	52.10	1.15
13	6.50	52.40	0.57
14	7.00	52.80	0.76

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: JL 8/16/93
(52.8 - ~~5.599951~~ 6.5)(1)/(200) = JL 8/16/93 ~~+2.36~~ 2.32E-01 g/L Carbon
52.8 - 5.599951)(1)/(200)(12) = +1.97E-02 Molar Carbon

Sample Run By: AH 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V27-DUP Date: 08/14/93 Time: 17:17:11

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.50	0.00
2	1.01	13.70	96.35
3	1.51	27.60	50.36
4	2.00	36.40	24.18
5	2.50	42.10	13.54
6	3.00	45.80	8.08
7	3.50	48.20	4.98
8	4.00	49.60	2.82
9	4.50	50.90	2.55
10	5.00	51.40	0.97
11	5.50	52.10	1.34
12	6.00	52.40	0.57
13	6.50	52.70	0.57
14	7.00	52.90	0.38

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: AL 8/16/93
(52.9 - ~~5.601416~~ 6.5)(1)/(200) = AL 8/16/93 ~~+2.36~~ 2.32E-01 g/L Carbon
(52.9 - 5.601416)(1)/(200)(12) = +1.97E-02 Molar Carb

Sample Run By: AL 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V28 Date: 08/14/93 Time: 17:35:28

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.60	0.00
2	1.01	10.60	94.34
3	1.51	23.10	54.11
4	2.00	33.00	30.00
5	2.50	40.30	18.11
6	3.00	45.60	11.62
7	3.50	49.00	6.94
8	4.00	51.30	4.48
9	4.50	52.80	2.84
10	5.00	54.20	2.58
11	5.50	54.70	0.91
12	6.00	55.60	1.62
13	6.50	55.80	0.36
14	7.00	56.30	0.89

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: JL 8/16/93
56.3 - ~~5.599951~~ 6.5)(1)/(200) = JL 8/16/93 ~~+2.54~~ 2.49E-01 g/L Carbon
(56.3 - 5.599951)(1)/(200)(12) = +2.11E-02 Molar Carbon

Sample Run By: AH 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V28-DUP Date: 08/14/93 Time: 17:43:02

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.50	0.00
2	1.01	9.90	94.95
3	1.51	22.10	55.20
4	2.01	32.30	31.58
5	2.51	39.60	18.43
6	3.01	44.50	11.01
7	3.51	48.20	7.68
8	4.01	50.90	5.30
9	4.50	53.10	4.14
10	5.00	54.20	2.03
11	5.50	55.10	1.63
12	6.00	55.70	1.08
13	6.50	56.40	1.24
14	7.00	56.70	0.53

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: JL 8/16/93
(56.7 - ~~5.600635~~ 6.5)(1)/(200) = JL 8/16/93 ~~+2.55E~~ 2.51 -01 g/L Carbon
(56.7 - 5.600635)(1)/(200)(12) = +2.13E-02 Molar Carbon

Sample Run By: A HOLLIBAUGH 08-14-93

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH Batch 1522 WHC-SD-WM-DP-053 REV 0

Segment Serial No. V-26,27,28	Customer ID: 107AP-C,D,E
Analysis: TIC	Sample Prep: DIRECT

Instrument: WB 39937	Procedure/ Rev: LA 622-102 / ~~B-0~~ B-2 RWS 12-2-93
Technologist: R. WENDLAND	Date: 8-10-93
Starting Time: 1849	Temperature N/A
Ending Time: 2002	Chemist: J. LACHUT

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	V24-5527	11		
2	BLANK	V25-5627	12	OUT FOR RERUN	
3	SAMPLE	V26-5727	13		
4	SAMPLE DUP	V26 5827	14		
5	SAMPLE	V27-5727	15	NOT USED IN FINAL RESULTS	JH 11-4-93
6	SAMPLE DUP	V27-5827	16		
7	SAMPLE	V28 5727	17		
8	SAMPLE DUP	V28 5827	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	69C11-0	.050 mL		

BOBBY WENDLAND 8-10-93

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA622-102/A-0 ANALYTE: TIC ANALYSIS START DATE: 8-10-93

PREPARED BY: Rob Schroeder DATE PREPARED: 11-10-93

PROJECT: 107AP UNITS: mg C/mL SAMPLE PREP: Direct / Digest wt.=

SPL PT.	SERIAL No.	RESULT #1	RESULT #2	DIFF.	AVERAGE	RPD%	%REC	DET LIM
LMCS STD. 69C11-0	V-24						90.6	
BLANK	V-25	6.00×10^1 mg/mL						5.0 mg/mL
107-AP-C	V-26	2.38×10^2 mg/m	2.53×10^2 mg/m	1.5×10^1	2.46×10^2	6.10		
107-AP-D	V-27	2.45×10^2 mg/m	2.79×10^2 mg/m	3.4×10^1	2.62×10^2	13.0		
107-AP-E	V-28	2.51×10^2 mg/m	2.49×10^2 mg/m	2	2.50×10^2	0.8		

☐ NO SPECIAL PROBLEMS / METHOD VARIATIONS IN HIS BATCH

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Batch not accepted, out for rerun.
Due to poor recoveries and precision caused by coulometer set-up / performance error.

Robert W Schroeder
11-10-93

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-053, REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 24.-5527	107-AP	8- 3-93	8:38	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .050 69C11-0	STD

Remarks Calculations Results

S223 C03

STD# 69C11-0 RESULT .192 JX 8/11/93

STD VAL ~~.200~~ .212M % REC ~~96.0%~~ 90.6%

OUT FOR RERUN

Robby Wendland

Ana	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-10-93	2002	J. S. Lachut 8/11/93	8/12

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 25.-5627	107-AP	8- 3-93	8:40	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? .050 mL H_2O	BLK

Remarks, Calculations, Results

REAGENT BLANK

OUT FOR RERUN

Robby Wendland

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-10-93	2002	J. S. Lachut 8/11/93

54-6800-001 (R/10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-5727	107-AP	8- 3-93	8:54	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? .200 mL	107-AP-C

Remarks, Calculations, Results

Robby Wendland

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-10-93	2002	J. S. Lachut 8/11/93	

54-6800-001 (R/10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-5827	107-AP	8- 3-93	8:54	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? , 200 ml	107-AP-C

Remarks, Calculations, Results

DUPLICATE SAMPLE

OUT FOR RERUN

Robby Wendland

Analyst	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-10-93	2002	J. S. Lackut

54-6800-001 (R/10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-5727	107-AP	8- 3-93	9: 0	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? .200mL	107-AP-D

Remarks, Calculations, Results

Robby Wendland

OUT FOR RERUN

	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-10-93	2007	8/11/93 J. S. Lachat	8/12

54-6500-06 (10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-5827	107-AP	8- 3-93	9: 0	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? .200mL	107-AP-D

Remarks Calculations, Results

DUPLICATE SAMPLE

OUT FOR RERUN

Rodney Wendland

Anl	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-10-93	2002	8/11/93 J. S. Lachut	8/10

54-6800-651 (R 10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 28.-5727	107-AP	8- 3-93	9: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? .200 ml	107-AP-E

Remarks, Calculations, Results

OUT FOR RERUN

Robert Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-10-93	2002	J. S. Lachut 8/10/93	

SA-0600-06 (R 10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No.	Sample Point	Date	Time Issued	Priority
V 28.-5827	107-AP	8- 3-93	9: 2	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? 200 ml	107-AP-E

Remarks, Calculations, Results

DUPLICATE SAMPLE

Robby Wendland

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-10-93	2002	J. S. Lackey 8/4/93	8/12

54-6805-061 (8-10-83)

BEST AVAILABLE COPY

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD Date: 08/10/93 Time: 19:02:43

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .4283697 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	0.00	0.00
3	1.51	0.30	100.00
4	2.00	6.00	95.00
5	2.50	22.20	72.97
6	3.00	42.70	48.01
7	3.50	62.30	31.46
8	4.00	78.70	20.84
9	4.50	91.20	13.71
10	5.00	100.40	9.16
11	5.50	107.30	6.43
12	6.00	112.20	4.37
13	6.50	115.80	3.11
14	7.00	118.30	2.11

BEST AVAILABLE COPY

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 471 TO 479.

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

SAMPLE RESULTS:
(118.3 - 2.999059)(1)/(50) = +2.306E+00 g/L Carbon
(118.3 - 2.999059)(1)/(50)(12) = +1.922E-01 Molar Carbon

Sample Run By: Robby Wendland
RA WENDLAND 8-10-93

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

WHC-SD-WM-DP-053 REV 0

Sample: BLK Date: 08/10/93 Time: 18:49:07

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = N/A

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	0.30	66.67
3	1.51	0.50	40.00
4	2.00	0.80	37.50
5	2.50	1.00	20.00
6	3.01	1.20	16.67
7	3.51	1.50	20.00
8	4.01	1.70	11.76
9	4.50	1.90	10.53
10	5.00	2.20	13.64
11	5.50	2.40	8.33
12	6.00	2.60	7.69
13	6.50	2.80	7.14
14	7.00	3.00	6.67

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

Sample Run By: RW
RA WENDLAND

BEST AVAILABLE COPY

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-053 REV 0

Sample: V26 Date: 08/10/93 Time: 19:15:40

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .4283697 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	0.20	50.00
3	1.50	0.40	50.00
4	2.00	2.50	84.00
5	2.50	8.30	69.88
6	3.00	16.40	49.39
7	3.50	24.50	33.06
8	4.00	31.60	22.47
9	4.50	37.00	14.59
10	5.00	41.40	10.63
11	5.50	44.70	7.38
12	6.00	47.20	5.30
13	6.50	49.10	3.87
14	7.00	50.60	2.96

BEST AVAILABLE COPY

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

SAMPLE RESULTS:
(50.6 - 2.999843)(1)/(200) = +2.38E-01 g/L Carbon
(50.6 - 2.999843)(1)/(200)(12) = +1.98E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-053 REV 0

Sample: V26 DUP Date: 08/10/93 Time: 19:23:36

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .4283697 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.50	0.00
2	1.01	1.10	54.55
3	1.51	1.60	31.25
4	2.00	4.20	61.90
5	2.50	10.60	60.38
6	3.00	19.10	44.50
7	3.50	27.50	30.55
8	4.00	34.50	20.29
9	4.50	40.20	14.18
10	5.00	44.50	9.66
11	5.50	47.60	6.51
12	6.00	50.20	5.18
13	6.50	52.10	3.65
14	7.00	53.60	2.80

BEST AVAILABLE COPY

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

SAMPLE RESULTS:
(53.6 - 3.000262)(1)/(200) = +2.53E-01 g/L Carbon
(53.6 - 3.000262)(1)/(200)(12) = +2.11E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-053 REV 0

Sample: V27 Date: 08/10/93 Time: 19:31:27

Sample Size = 200 uL Analyst : RA WENDLAND

Dil Factor = 1
Blank ID # = BLK
Blank Value = .4283697 ug/minute C

Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.80	0.00
2	1.01	1.50	46.67
3	1.51	2.30	34.78
4	2.00	4.90	53.06
5	2.50	11.50	57.39
6	3.00	20.20	43.07
7	3.50	28.40	28.87
8	4.01	35.10	19.09
9	4.50	40.10	12.47
10	5.00	44.20	9.28
11	5.50	46.90	5.76
12	6.00	49.10	4.48
13	6.50	50.70	3.16
14	7.00	52.00	2.50

BEST AVAILABLE COPY

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

SAMPLE RESULTS:
' 52 - 3.000314)(1)/(200) = +2.45E-01 g/L Carbon
52 - 3.000314)(1)/(200)(12) = +2.04E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-053 REV 0

Sample: V27 DUP Date: 08/10/93 Time: 19:41:20

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .4283697 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	0.60	50.00
3	1.51	1.10	45.45
4	2.01	3.70	70.27
5	2.51	10.90	66.06
6	3.01	20.50	46.83
7	3.51	29.90	31.44
8	4.01	37.80	20.90
9	4.50	44.00	14.09
10	5.00	48.70	9.65
11	5.50	52.20	6.70
12	6.00	55.00	5.09
13	6.50	57.00	3.51
14	7.00	58.80	3.06

BEST AVAILABLE COPY

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

SAMPLE RESULTS:
(58.8 - 3.000262)(1)/(200) = +2.79E-01 g/L Carbon
(58.8 - 3.000262)(1)/(200)(12) = +2.32E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-053 REV 0

Sample: V27 DUP Date: 08/10/93 Time: 19:41:20

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .4283697 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	0.60	50.00
3	1.51	1.10	45.45
4	2.01	3.70	70.27
5	2.51	10.90	66.06
6	3.01	20.50	46.83
7	3.51	29.90	31.44
8	4.01	37.80	20.90
9	4.50	44.00	14.09
10	5.00	48.70	9.65
11	5.50	52.20	6.70
12	6.00	55.00	5.09
13	6.50	57.00	3.51
14	7.00	58.80	3.06

BEST AVAILABLE COPY

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

SAMPLE RESULTS:
(58.8 - 3.000262)(1)/(200) = +2.79E-01 g/L Carbon
(58.8 - 3.000262)(1)/(200)(12) = +2.32E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-053 REV 0

Sample: V28 Date: 08/10/93 Time: 19:52:11

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .4283697 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.70	0.00
2	1.01	1.40	50.00
3	1.50	2.10	33.33
4	2.00	4.60	54.35
5	2.50	10.90	57.80
6	3.00	19.00	42.63
7	3.50	27.10	29.89
8	4.00	34.00	20.29
9	4.50	39.40	13.71
10	5.00	43.70	9.84
11	5.50	47.00	7.02
12	6.00	49.40	4.86
13	6.50	51.50	4.08
14	7.00	53.10	3.01

BEST AVAILABLE COPY

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

SAMPLE RESULTS:
(53.1 - 2.998693)(1)/(200) = +2.51E-01 g/L Carbon
(53.1 - 2.998693)(1)/(200)(12) = +2.09E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

WHC-SD-WM-DP-053 REV 0

Sample: V28 DUP Date: 08/10/93 Time: 20:02:02

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .4283697 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	0.70	57.14
3	1.50	1.10	36.36
4	2.00	3.70	70.27
5	2.50	10.80	65.74
6	3.00	19.70	45.18
7	3.50	28.20	30.14
8	4.00	35.20	19.89
9	4.50	40.50	13.09
10	5.00	44.50	8.99
11	5.50	47.50	6.32
12	6.00	49.80	4.62
13	6.50	51.50	3.30
14	7.00	52.90	2.65

BEST AVAILABLE COPY

BLANK VALUE = 3 micrograms carbon
BLANK FACTOR = 3 / 7.003296 = +4.3E-01 ug/min Carbon

SAMPLE RESULTS:
(52.9 - 3.000262)(1)/(200) = +2.49E-01 g/L Carbon
(52.9 - 3.000262)(1)/(200)(12) = +2.08E-02 Molar Carbon

Sample Run By: RW
RA WENDLAND

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch # 1648

WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V29, V30, V31	Customer ID: 107AP-FB
Analysis: TIC	Sample Prep: Direct

Instrument: WB39937	Procedure/ Rev: LA-622-102/B-2
Technologist: A Walkbaugh	Date: 08-14-93
Starting Time: 17:45	Temperature N/A
Ending Time: 21:31	Chemist: J. Lachut

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS Std	V29-5527	11		
2	Reagent Blk.	V30-5627	12		
3	Sample	V31-5727	13		
4	Sample Dup	V31-5827	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS Std	12N12A/.50 ml			
		8# 8-23-93		
	A Walkbaugh 08-14-93			

480

A-6000-881 (03/92)

GA

ANALYTICAL BATCH SUMMARY SHEET WHC-SD-WM-DP-053 REV 0

METHOD: LA 622-102 DATE START: 8/14/93.

PREPARED BY: J. LACHUT DATE COMPLETE: 8/16/93

	UNITS:	µg/mL							
SPL NAME	SPL ID	ANALYT	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
		TIC						5.00 µg/mL	
LMCS STD.	V-29						107.5		
12N12A									
BLANK	V-30		6.20x10¹ µg/mL						
107 AP-FB	V-31		<5.00 µg/mL	<5.00 µg/mL	<5.00 µg/mL	—			
107 AP									

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

This sample is a rerun; it's OK. J. Lachut 8/16/93

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 29.-5527	107-AP	8- 3-93	10:37	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	% RECOVERY	N1L17	1

Sample Size	Customer ID
? 50 ℓ	STD

Remarks, Calculations, Results:

S223 C03

RERUN

STD# 12N12A RESULT ~~.214~~ .215 M JL 8/16/93

STD VAL. 200 M % REC ~~107.00~~ 107.5 JL 8/16/93

A Kollbaugh

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
08-14-93	AM 8-14-93 ~~12:02~~ 21:12	8/16/93 J. S. Lachut	8/17

54-6800 (6-83) (F-10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 30.-5627	107-AP	8- 3-93	10:39	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 50λ	BLK

Remarks, Calculations, Results

REAGENT BLANK

$\frac{3.10\,mg}{0.050\,mL} = 6.20 \times 10^{1}\ mg/mL\ C$

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
08-14-93	17:53	J. S. Lachut 8/16/93

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-5727	107-AP	8- 3-93	10:43	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 200 l	107AP-FB

Remarks, Calculations, Results:

$< 5.00 \times 10^{-3}$ g/L C $\times \frac{1{,}000{,}000\ \mu g/g}{1{,}000\ mL/L} = \boxed{< 5.00\ \mu g/mL\ C}$ **RERUN**

A Walkbaugh

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
08-14-93	21:22	J. S. Lachut 8/16/93	8/17

SW-0800-004 (R-10-80)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-5827	107-AP	8- 3-93	10:43	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	1

Sample Size	Customer ID
? 2002	107AP-FB

Remarks, Calculations, Results

DUPLICATE SAMPLE

RERUN

$<5.00 \times 10^{-3}$ g/L C $\times \frac{1,000,000\ \mu g/g}{1,000\ mL/L} = <5.00\ \mu g/mL$ C

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr		
08-14-93	21:31	J. S. Lachut 8/16/93		8/16

54-6800-061 (11-10-93)

BEST AVAILABLE COPY

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD Date: 08/14/93 Time: 21:12:49

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	Analysis Time	Coulometer	% Difference ==
1	0.51	0.40	0.00
2	1.01	19.60	97.96
3	1.51	59.80	67.22
4	2.01	91.90	34.93
5	2.51	111.60	17.65
6	3.01	122.00	8.52
7	3.51	127.10	4.01
8	4.01	128.90	1.40
9	4.50	129.90	0.77
10	5.00	130.60	0.54
11	5.50	131.00	0.31
12	6.00	131.50	0.38
13	6.50	131.50	0.00
14	7.00	131.80	0.23

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 486 TO 487.

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: 8/16/93
(131.8 - ~~[illegible]~~ 3.1 2)(1)/(50) +2.524E+00 g/L Carbon
(131.8 - ~~[illegible]~~ 3.1 2)(1)/(50)(12) ~~+2.103E~~ -01 Molar Carbon
.2145

Sample Run By: A Hollibaugh 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOT REV 2.0

Sample: BLK Date: 08/14/93 Time: 17:53:14

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading ==	Analysis Time ===	Coulometer ====	% Difference ==
1	0.51	0.30	0.00
2	1.01	0.40	25.00
3	1.50	0.80	50.00
4	2.00	0.90	11.11
5	2.50	1.20	25.00
6	3.00	1.50	20.00
7	3.50	1.70	11.76
8	4.00	1.90	10.53
9	4.50	2.00	5.00
10	5.00	2.30	13.04
11	5.50	2.60	11.54
12	6.00	2.70	3.70
13	6.50	2.90	6.90
14	7.00	3.10	6.45

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS:
(3.1 - 5.599854)(1)/(50) = < 5.00 E-3 g/L Carbon
(3.1 - 5.599854)(1)/(50)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: AH 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: VS1 Date: 08/14/93 Time: 21:22:28

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	0.60	50.00
3	1.51	0.70	14.29
4	2.00	0.90	22.22
5	2.50	1.30	30.77
6	3.00	1.70	23.53
7	3.50	1.70	0.00
8	4.00	2.00	15.00
9	4.50	2.10	4.76
10	5.00	2.40	12.50
11	5.50	2.60	7.69
12	6.00	2.70	3.70
13	6.50	2.90	6.90
14	7.00	3.20	9.37

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: JL 8/16/93
(3.2 - ~~5.000042~~ 3.1)(1)/(200) = < 5.00 E-3 g/L Carbon
(3.2 - 5.000049)(1)/(200)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: AH 08-14-93
A HOLLIBAUGH

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V31-DUP Date: 08/14/93 Time: 21:31:10

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .7997559 ug/minute C

Analyst : A HOLLIBAUGH
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading ==	== Analysis Time ==	Coulometer ====	% Difference ==
1	0.51	0.10	0.00
2	1.01	0.40	75.00
3	1.51	0.60	33.33
4	2.00	1.00	40.00
5	2.50	1.30	23.08
6	3.00	1.40	7.14
7	3.50	1.70	17.65
8	4.00	2.00	15.00
9	4.50	2.10	4.76
10	5.00	2.40	12.50
11	5.50	2.50	4.00
12	6.00	2.90	13.79
13	6.50	3.00	3.33
14	7.00	3.20	6.25

BEST AVAILABLE COPY

BLANK VALUE = 5.6 micrograms carbon
BLANK FACTOR = 5.6 / 7.002136 = +8.0E-01 ug/min Carbon

SAMPLE RESULTS: JL 8/16/93
(3.2 - ~~5.600635~~ 3.1)(1)/(200) = < 5.00 E-3 g/L Carbon
(3.2 - 5.600635)(1)/(200)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: AH 08-14-93
A HOLLIBAUGH

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

Batch 1539

ANALYTICAL BATCH WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V-31	Customer ID: 107 AP FB
Analysis: TIC	Sample Prep: DIRECT

Instrument: WB 39937	Procedure/ Rev: LA622-102 / ~~A-0~~ B-2 RWS 12-3-93
Technologist: R. WENDLAND ( )	Date: 8-10-93
Starting Time: 2039	Temperature N/A
Ending Time: 2223	Chemist: J. LACHUT

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	V29-5527	11		
2	BLANK	V30-5627	12	OUT FOR RERUN	
3	SAMPLE	V31-5727	13		
4	DUPLICATE	V31-5727	14	NOT USED IN FINAL RESULTS	JH 11-4-93
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	69611-0	.050 mL		
		490		

ROBBY WENDLAND
8-10-93

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA 622-102/A-0 ANALYTE: TIC ANALYSIS START DATE: 8-10-93

PREPARED BY: Rob Schroeder DATE PREPARED: 11-10-93

PROJECT: 107AP UNITS: mgC/mL SAMPLE PREP: Direct / Digest wt.=

SPL PT.	SERIAL No.	RESULT #1	RESULT #2	DIFF.	AVERAGE	RPD%	%REC	DET LIM
STD	V29	0.201M					94.8	
BLK	V-30	5.60E1 mgC/mL						5.0 mg/mL
107AP-FB	V-31	<5.00 mgC/mL	<5.00 mg/mL					↓

☐ NO SPECIAL PROBLEMS / METHOD VARIATIONS IN HIS BATCH

NARRATIVE-LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH:

Batch not accepted, out for rerun.

Due to poor precission and recoveries caused by coulometer detector set-up/performance erro

Robert W. Schroeder
11-10-93

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No.	Sample Point	Date	Time Issued	Priority
V 29.-5527	107-AP	8- 3-93	10:37	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	% RECOVERY	N1L17	0

Sample Size		Customer ID
? .050 ml	69C11-0	STD

Remarks Calculations Results

S223 C03

STD# 69C11-0 RESULT .201

STD VAL .~~200~~ .212 JX 8/11/93 % REC ~~100.5%~~ 94.8% JX 8/11/93

OUT FOR RERUN

BOBBY WENDLAND

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-10-93	2223	J. S. Lachut 8/11/93

54-6800-067 (8-10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 30.-5627	107-AP	8- 3-93	10:39	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? .050 H_2O	BLK

Remarks, Calculations, Results

REAGENT BLANK

$\frac{2.80 \mu g}{0.050 mL} = 56.0 \mu g C/ml$

OUT FOR RERUN

Robert Wendland

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-10-93	2223	J. S. Lachut 8/11/93

54-5600-061 (8-10-83)

BEST AVAILABLE COPY

TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-5727	107-AP	8- 3-93	10:43	26

Determination	Method Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? · 200mL	107AP-FE

Remarks Calculations Results

$< 5.00\ E\text{-}3\ g/L \cdot \frac{1000000\ \mu g/g}{1000\ mL/L} = < 5.00\ \mu g\ C/mL$

ROBBY WENDLAND

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-10-93	2223	J. S. Lachut 8/11/93	8/18

54-6800-061 (R-10-83)

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TOTAL INORGANIC CARBON ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-5827	107-AP	8- 3-93	10:43	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TIC	LA-622-102	uG C/ML	N1L17	0

Sample Size	Customer ID
? .200 mL	107AP-FB

Remarks Calculations, Results

DUPLICATE SAMPLE

$<5.00E3\ gC/L \cdot \frac{1000000\ mg/g}{1000\ mL/L} = <5.00\ ugC/mL$

Robby Wendland

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-10-93	2223	J. S. Lachut 8/11/93	

54-6800-061 (R-10-83)

BEST AVAILABLE COPY

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD Date: 08/10/93 Time: 20:29:17

Sample Size = 50 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3997769 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.70	0.00
2	1.01	1.30	46.15
3	1.51	2.20	40.91
4	2.01	10.30	78.64
5	2.51	31.70	67.51
6	3.01	56.20	43.59
7	3.51	77.30	27.30
8	4.01	92.50	16.52
9	4.50	103.20	10.27
10	5.00	110.50	6.61
11	5.50	115.40	4.25
12	6.00	118.00	2.94
13	6.50	121.50	2.14
14	7.00	123.40	1.54

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 496 TO 499.

BEST AVAILABLE COPY

BLANK VALUE = 2.8 micrograms carbon
BLANK FACTOR = 2.8 / 7.003906 = +4.0E-01 ug/min Carbon

SAMPLE RESULTS:
(123.4 - 2.799268)(1)/(50) = +2.412E+00 g/L Carbon
(123.4 - 2.799268)(1)/(50)(12) = +2.010E-01 Molar Carbon

Sample Run By: Robert Wendland
RA WENDLAND 8-10-93

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: BLK Date: 08/10/93 Time: 20:10:47

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = N/A

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	0.70	57.14
3	1.50	0.90	22.22
4	2.00	1.20	25.00
5	2.50	1.50	20.00
6	3.00	1.60	6.25
7	3.50	1.80	11.11
8	4.00	2.00	10.00
9	4.50	2.20	9.09
10	5.00	2.30	4.35
11	5.50	2.50	8.00
12	6.00	2.60	3.85
13	6.50	2.70	3.70
14	7.00	2.80	3.57

BEST AVAILABLE COPY

BLANK VALUE = 2.8 micrograms carbon
BLANK FACTOR = 2.8 / 7.003906 = +4.0E-01 ug/min Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V31 Date: 08/10/93 Time: 22:40:21

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3997769 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	0.20	100.00
3	1.50	0.20	0.00
4	2.00	0.40	50.00
5	2.50	0.70	42.86
6	3.00	0.90	22.22
7	3.50	1.20	25.00
8	4.00	1.50	20.00
9	4.50	1.60	6.25
10	5.00	1.80	11.11
11	5.50	2.00	10.00
12	6.00	2.10	4.76
13	6.50	2.30	8.70
14	7.00	2.40	4.17

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BLANK VALUE = 2.8 micrograms carbon
BLANK FACTOR = 2.8 / 7.003906 = +4.0E-01 ug/min Carbon

SAMPLE RESULTS:
(2.4 - 2.799658)(1)/(200) = < 5.00 E-3 g/L Carbon
(2.4 - 2.799658)(1)/(200)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: RW
RA WENDLAND

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: V31 DUP Date: 08/10/93 Time: 22:23:40

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3997769 ug/minute C

Analyst : RA WENDLAND
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	0.20	50.00
3	1.51	0.40	50.00
4	2.00	0.60	33.33
5	2.50	0.80	25.00
6	3.00	1.10	27.27
7	3.50	1.30	15.38
8	4.00	1.40	7.14
9	4.50	1.70	17.65
10	5.00	1.80	5.56
11	5.50	1.90	5.26
12	6.00	2.10	9.52
13	6.50	2.20	4.55
14	7.00	2.40	8.33

BEST AVAILABLE COPY

BLANK VALUE = 2.8 micrograms carbon
BLANK FACTOR = 2.8 / 7.003906 = +4.0E-01 ug/min Carbon

SAMPLE RESULTS:
(2.4 - 2.799658)(1)/(200) = < 5.00 E-3 g/L Carbon
(2.4 - 2.799658)(1)/(200)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: RW
RA WENDLAND

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH **WHC-SD-WM-DP-053 REV 0**

Batch # 2061

Lab Segment Serial No. V-21, V-23	Customer ID: 107-AP-A, 107-AP-B
Analysis: U	Sample Prep: Direct

Instrument: AL-10620	Procedure/ Rev: LA-925-106 / B-0
Technologist: RG Achen [illegible]	Date: 11-1-93
Starting Time: 08:45	Temperature 25°C
Ending Time: 13:00	Chemist: Jennifer Slippern

Comments: Did Sample Prep on V-21, V-23 with a total Volume of 10 ml.

	Description	Lab ID		Description	Lab ID
1	STD	V-19-5540	11		
2	BLK	V-20-5640	12		
3	Sample	V-21-5740	13		
4	Sample Dup	V-21-5840	14		
5	Sample Spike	V-21-5940	15		
6	Sample Spike Dup	V-21-5040	16		
7	Sample	V-23-5741	17		
8	Sample Dup	V-23-5840	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	144338 / .100ml			
Pro. Spike	146838 / .10 ml			
Sample Spike	144338 / .100ml			

500

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-925-106

DATE START: NOVEMBER 1, 1993

PREPARED BY: J.L. SLIPPERN J.L. Slippern 11/4/93

DATE COMPLETE: NOVEMBER 4, 1993

	UNITS:	uG/mL										
SPL NAME	SPL ID	ANALYTE	RESULT #	RESULT #	AVERAGE	RPD	%REC #	%REC #	DET LIM #1	DET LIM #2	% CT ER #1	% CT ER #2
STD 144B38	V19	U	4.54E-02				117.6		3.79+00			
BLANK	V20	U	<4.50E-04						4.50E-04			
107-AP-A	V21	U	1.79E-02	1.68E-02	1.74E-02	6.3			5.98E-03	5.61E-03		
	V21	U SPIKE	4.00E-02	3.71E-02	3.86E-02	7.5	103.5	96.2				
107-AP-B	V23	U	1.50E-02	1.25E-02	1.38E-02	18.1			4.99E-03	4.99E-03		

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

THE RESULTS FOR THE STANDARD ARE IN gU/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No.	Sample Point	Date	Time Issued	Priority
V 19.-5540	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	2

Sample Size	Customer ID
? 100-10-100	STD

Remarks, Calculations, Results

S267 UEIC
STD# 146B38 RESULT 4.54E-2
STD VAL 3.86E-2 %REC 117.6%
SPIKE ID/VAL 146B38/5.04-99/L
SPIKE VOL. .100 ml

RERUN
.24
.50

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-1-93	08:45	11/4

11-1-93

54-6d06-061 (R-10-83)

BEST AVAILABLE COPY

URANIUM : LA-925-106 (B-0) LIQUIDS

			STANDARD
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V19-5540	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2061	Volume of sample (mL)	VSAM	0.100
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
2			
Instrument	Deflection (sample + fluran)	DSAM	0.24
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
R ACHEN			
Date:	Deflection (sample + fluran + spike)	DS+S	0.5
11/01/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration in sample (gU/L)		4.54E-02

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))
gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))
0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level
Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	4.54E-02
U in µg/mL=	4.54E+01

DETECTION LEVEL µg/mL= 3.79E+00

Data Entry by:		Date:	02-Nov-93
Approved by:		Date:	11/4/93

Form 1 Rev. 1:2 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 20.-5640	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	2

Sample Size	Customer ID
2 /ml	BLK

Remarks, Calculations, Results

REAGENT BLANK

Spike ID/vol - 4.58-5 g/l .02

Spike vol — 100ml .22

< 4.50 E-4 µG/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-1-93	09100	

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URANIUM : LA-925-106 (B-0) LIQUIDS

			BLANK
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V20-5640	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2061	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
2			
Instrument	Deflection (sample + fluran)	DSAM	0.02
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
R ACHEN			
Date:	Deflection (sample + fluran + spike)	DS+S	0.22
11/01/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration in sample (gU/L)	<	4.50E-07

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L = <	4.50E-07
U in µg/mL = <	4.50E-04

DETECTION LEVEL µg/mL= 4.50E-04

REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by:		Date:	02-Nov-93
Approved by:		Date:	11/4/93

Form 1 Rev. 1.2 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5740	107-AP	8- 2-93	15:16	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	2

Sample Size	Customer ID
? 1ml PF=10	107-AP-A

Remarks, Calculations, Results

Spike FD/vol — 1461338/4.58 g/l **RERUN**

Spike vol — .100ml

.06

1.79 E-2 µG/mL .21

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-1-93	09:45	11/4

54 0650-061 (R-10-83)

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URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V21-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2061	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
2			
Instrument	Deflection (sample + fluran)	DSAM	0.06
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
R ACHEN			
Date:	Deflection (sample + fluran + spike)	DS+S	0.21
11/01/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration in sample (gU/L)		1.79E-05

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	1.79E-05
U in µg/mL=	1.79E-02

DETECTION LEVEL µg/mL= 5.98E-03

Data Entry by:		Date:	02-Nov-93
Approved by:		Date:	11/4/93

Form 1 Rev. 1.2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5840	107-AP	8- 2-93	15:16	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	~~ug~~/ML	N1L17	2

Sample Size	Customer ID
? 1ml P.F.=10	107-AP-A

Remarks, Calculations, Results

DUPLICATE SAMPLE

RERUN

spike IO 1ml - 146138/4.58-5 gl .06

spike U01 - .100ml .22

1.68E-2 µG/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-01-93	10:15	

BEST AVAILABLE COPY

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V21-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2061	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell	VSUB	6.50
2	(sample + fluran + water)		
Instrument	Deflection (sample + fluran)	DSAM	0.06
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL)	VTOT	6.60
R ACHEN	(sample + fluran + water + spike)		
Date:	Deflection (sample + fluran + spike)	DS+S	0.22
11/01/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration in sample (gU/L)		1.68E-05

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	1.68E-05
U in µg/mL=	1.68E-02

DETECTION LEVEL µg/mL= 5.61E-03

Data Entry by:		Date:	02-Nov-93
Approved by:		Date:	11/4/93

Form 1 Rev. 1.2 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5940	107-AP	8- 2-93	15:16	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	2

Sample Size	Customer ID
? 100-10-1ml-100 P.F. = 10	107-AP-A

Remarks, Calculations, Results

SAMPLE SPIKED ID
SPIKE ID - 140B38
SPIKE VOLUME - .100 ml
Spike ID/Vol - 140B38/5.04 -4 g/l
Spike Vol - .100 ml

RERUN
.14
.33
103.5%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-1-93	10:40	

URANIUM : LA-925-106 (B-0) SPIKE

			SPIKE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V21-5940	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2061	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell	VSUB	5.60
2	(sample + fluran + water)		
Instrument	Volume of spike (mL)	VSP	0.1000
AL-10620	Volume of liquid in cell	VTOT	5.70
Analyst:	(sample + fluran + water + spike)		
R ACHEN	Deflection (sample + fluran)	DSAM	0.14
Date:	Deflection (sample + fluran + spike)	DS+S	0.33
11/01/93	Dilution factor of sample	DF	11.1
	Dilution factor of spike	DFS	111
	Spike value (matrix) (gU/L)	SV	3.8600E-02
	Preparation factor of sample	PF	10
	Concentration (gU/L) Form 1 or Form 3 (SAMPLE)	gU/L1	1.7900E-05
	Concentration (gU/L)	gU/LS	3.998E-02
	% Recovery		103.5

gU/L = (DSAM*VSP*CSP*DF*PF) / (((VTOT/VSUB) * DS+S - DSAM) * VSAM)
%Recovery = ((gU/LS - gU/L1) * (DFS / (DF * PF) / SV) * 100

% RECOVERY =	103.53

Data Entry by:		Date:	03-Nov-93
Approved by:		Date:	11/4/93

Form 2 Rev. 2.1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

BEST AVAILABLE COPY

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5040	107-AP	8- 2-93	15:16	35

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	2

Sample Size	Customer ID
100-10-1ml-100 P.F=10	107-AP-A

Remarks Calculations Results

SAMPLE SPIKE
DUPLICATE

SPIKE ID -1461238
SPIKE VOL -.100ml
Spike ID/vol - 1461238/5.04-4g/l
Spike vol — .100ml

.13
.32
96.2%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-1-93	11:00	

URANIUM : LA-925-106 (B-0) SPIKE

			SPIKE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V21-5040	Volume of water (mL)		4.5
Batch ID:	Volume of fluran (mL)		1
2061	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell	VSUB	5.60
2	(sample + fluran + water)		
Instrument:	Volume of spike (mL)	VSP	0.1000
AL-10620	Volume of liquid in cell	VTOT	5.70
Analyst:	(sample + fluran + water + spike)		
R ACHEN	Deflection (sample + fluran)	DSAM	0.13
Date:	Deflection (sample + fluran + spike)	DS+S	0.32
11/01/93	Dilution factor of sample	DF	11.1
	Dilution factor of spike	DFS	111
	Spike value (matrix) (gU/L)	SV	3.8600E-02
	Preparation factor of sample	PF	10
	Concentration (gU/L) Form 1 or Form 3 (SAMPLE)	gU/L1	1.6800E-05
	Concentration (gU/L)	gU/LS	3.716E-02
	% Recovery		96.2

gU/L = (DSAM*VSP*CSP*DF*PF) / (((VTOT/VSUB) * DS+S - DSAM) * VSAM)
%Recovery = ((gU/LS - gU/L1) * (DFS / (DF * PF) / SV) * 100

% RECOVERY =	96.23

Data Entry by:		Date:	03-Nov-93
Approved by:		Date:	11/4/93

Form 2 Rev. 2.1 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5740	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	2

Sample Size	Customer ID
? /ml P.F. =10	107-AP-B

Remarks, Calculations, Results

Spike 10/ul - 146B38/4.58-Spl RERUN

spike vol -.100ml

.06

.24

1.50E-2 uG/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-1-93	12:20	11/4

54-6 (Rev 061 (R-10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V23-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2061	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
2			
Instrument	Deflection (sample + fluran)	DSAM	0.06
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
R ACHEN			
Date	Deflection (sample + fluran + spike)	DS+S	0.24
11/01/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration in sample (gU/L)		1.50E-05

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))

gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	1.50E-05
U in µg/mL=	1.50E-02

DETECTION LEVEL µg/mL= 4.99E-03

Data Entry by:		Date:	03-Nov-93
Approved by:		Date:	11/4/93

Form 1 Rev. 1.2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5840	107-AP	8- 3-93	8:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	2

Sample Size	Customer ID
? 1 ml R.F=10	107-AP-B

Remarks, Calculations, Results

DUPLICATE SAMPLE

Spike ID/vol — 146/338/4.58-5 g/l URANIUM

Spike vol — .100 ml

.05

1.25E-2 µG/mL .23

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-1-93	12:50	

SL-600 061 (R-10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V23-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2061	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
2			
Instrument	Deflection (sample + fluran)	DSAM	0.05
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
R ACHEN			
Date:	Deflection (sample + fluran + spike)	DS+S	0.23
11/01/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration in sample (gU/L)		1.25E-05

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))

gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	1.25E-05
U in µg/mL=	1.25E-02

DETECTION LEVEL µg/mL= 4.99E-03

Data Entry by:		Date:	03-Nov-93
Approved by:		Date:	11/4/93

Form 1 Rev. 1.2

WESTINGHOUSE HANFORD COMPANY Batch 2023

222-S LABORATORY

ANALYTICAL BATCH WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. U-21, U-23	Customer ID: 107-AP-A, 107-AP-B
Analysis: U	Sample Prep: Direct

Instrument: AL-10620	Procedure/ Rev: LA-925-106 / B-0
Technologist: RG Acker [illegible]	Date: 10/27/93
Starting Time: 0830	Temperature 25°C
Ending Time: 1500	Chemist: Chuck Glaser

Comments: Did Sample Prep on U-21, U-23 (P.F.=10)

	Description	Lab ID
1	STD	U-19-5540
2	BLK	U-20-5640
3	Sample	U-21-5740
4	Sample Dup	U-21 5840
5	Sample Spike	U-21-5940
6	Sample Spike Dup	U-21-6040
7	Sample	U-23-5740
8	Sample Dup	U-23-5840
9		
10		

	Description	Lab ID
11		
12		
13	OUT FOR RERUN	
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	144B38 / .100ml			
Pro. Spike	146B38 / .100ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-925-106

DATE START: OCTOBER 27, 1993

PREPARED BY: J.L. SLIPPERN 10/29/93

DATE COMPLETE: OCTOBER 29, 1993

	UNITS:	uG/mL										
SPL NAME	SPL ID	ANALYTE	RESULT #	RESULT #	AVERAGE	RPD	%REC #	%REC #	DET LIM #1	DET LIM #2	% CT ER #1	% CT ER #2
STD 144B38	V19	U	3.88E-02				100.5		3.52E+00			
BLANK	V20	U	<4.50E-04						4.50E-04			
107-AP	V21	U	2.24E-02	2.11E-02	2.18E-02	6.0			5.60E-03	5.27E-03		
107-AP-A	V21	U SPIKE			108.1	5.0	110.8	105.4				
107-AP-B	V23	U	1.68E-02	3.34E-02	2.51E-02	66.1			5.61E-03	4.46E-03		

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

THE RESULTS FOR THE STANDARD ARE IN gU/L.

RPD between sample V23 and its duplicate too high.

Rerun requested for V23 only.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 19.-5540	107-AP	8- 2-93	15:14	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	1

Sample Size	Customer ID
2.100-10.100	STD

Remarks Calculations, Results

2267 UE1C
STD#144838 RESULT 3.88-2
STD VAL 3.86-2 %REC 100.5 %
SPIKE ID/VAL 146838/5.04-4 g/l
SPIKE VOL. .100 ml

RERUN
.22
.50

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/27/93	12:45	

(2-6300-06) (R/10-83)

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URANIUM : LA-925-106 (B-0) LIQUIDS

			STANDARD
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V19-5540	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2023	Volume of sample (mL)	VSAM	0.100
Rerun No.	Volume of liquid in cell	VSUB	5.60
1	(sample + fluran + water)		
Instrument	Deflection (sample + fluran)	DSAM	0.22
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL)	VTOT	5.70
	(sample + fluran + water + spike)		
Date:	Deflection (sample + fluran + spike)	DS+S	0.5
10/27/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration in sample (gU/L)		3.88E-02

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))
gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))
0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level
Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	3.88E-02
U in µg/mL=	3.88E+01

DETECTION LEVEL µg/mL= 3.52E+00

Data Entry by:		Date:	28-Oct-93
Approved by:		Date:	10/29/93

Form 1 Rev. 1.2 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 20.-5640	107-AP	8- 2-93	15:14	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	1

Sample Size	Customer ID
? / ml	BLK

Remarks, Calculations, Results

REAGENT BLANK

spike ID/vol - 146338/4.585g/k .02 .22

spike vol - .100 ml

RERUN

< 4.50E-4 µG/mL

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/27/93	13:00	

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URANIUM : LA-925-106 (B-0) LIQUIDS

			BLANK
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V20-5640	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2023	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
1			
Instrument	Deflection (sample + fluran)	DSAM	0.02
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.22
10/27/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration in sample (gU/L)	<	4.50E-07

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))

gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L = <	4.50E-07
U in µg/mL = <	4.50E-04

DETECTION LEVEL µg/mL= 4.50E-04

REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by:		Date:	28-Oct-93
Approved by:		Date:	10/29/93

Form 1 Rev. 1.2 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5740	107-AP	8- 2-93	15:16	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	1

Sample Size	Customer ID
? /ml P.F. = 10	107-AP-A

Remarks Calculations Results

Spike Vol/TO - 146D38/4.58-5 gl l .08
Spike vol — .100ml .24

RERUN

2.24 E-2 µG/mL
OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/27/93	13:30	

BEST AVAILABLE COPY

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V21-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2023	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
1			
Instrument	Deflection (sample + fluran)	DSAM	0.08
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
R ACHEN			
Date:	Deflection (sample + fluran + spike)	DS+S	0.24
10/27/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration in sample (gU/L)		2.24E-05

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))
gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))
0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level
Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB)*(DS+S))-DSAM*VSAM))*(1 E6 µg/g / 1000 mL/L)

U in sample gU/L=	2.24E-05
U in µg/mL=	2.24E-02

DETECTION LEVEL µg/mL= 5.60E-03

Data Entry by:		Date:	28-Oct-93
Approved by:	Jennifer L. Deegan	Date:	10/29/93

Form 1 Rev. 1.2 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5840	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	1

Sample Size	Customer ID
? 1 ml P.F = 10	107-AP-A

Remarks, Calculations, Results

DUPLICATE SAMPLE

Spike ID/vol - 146B38/4.58 -5/2 .08 .25

Spike vol - .100 ml

RERUN

OUT FOR RERUN

2.11 E-2 µG/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/27/93	13:45	

54-6400-061 (9-10-83)

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URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V21-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2023	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
1			
Instrument	Deflection (sample + fluran)	DSAM	0.08
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
R ACHEN			
Date	Deflection (sample + fluran + spike)	DS+S	0.25
10/27/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration in sample (gU/L)		2.11E-05

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	2.11E-05
U in µg/mL=	2.11E-02

DETECTION LEVEL µg/mL= 5.27E-03

Data Entry by:		Date:	28-Oct-93
Approved by:		Date:	10/29/93

Form 1 Rev. 1.2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5940	107-AP	8- 2-93	15:16	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	1

Sample Size	Customer ID
500 vol cell ? Lmt RGA .100-10-1ml-.100 P.F=10	107-AP-A

Remarks: Calculation 8/27/93

SAMPLE SPIKED ID .15
SPIKE ID —146B38 .34
SPIKE VOLUME— .100 ml

Spike ID/vol — 146B38/5.04-4g/l
Spike vol — .100 ml

RERUN

110.8%
OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/27/93	14:00	

54-6600-061 (4-16-83)

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URANIUM : LA-925-106 (B-0) SPIKE

			SPIKE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V21-5940	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2023	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
1			
Instrument	Volume of spike (mL)	VSP	0.1000
AL-10620	Volume of liquid in cell (sample + fluran + water + spike)	VTOT	5.70
Analyst			
R ACHEN	Deflection (sample + fluran)	DSAM	0.15
Date	Deflection (sample + fluran + spike)	DS+S	0.34
10/27/93	Dilution factor of sample	DF	11.1
	Dilution factor of spike	DFS	111
	Spike value (matrix) (gU/L)	SV	3.8600E-02
	Preparation factor of sample	PF	10
	Concentration (gU/L) Form 1 or Form 3 (SAMPLE)	gU/L1	2.2400E-05
	Concentration (gU/L)	gU/LS	4.280E-02
	% Recovery		110.8

gU/L = (DSAM*VSP*CSP*DF*PF) / (((VTOT/VSUB) * DS+S - DSAM) * VSAM)
%Recovery = ((gU/LS - gU/L1) * (DFS / (DF * PF) / SV) * 100

% RECOVERY =	110.82

Data Entry by:		Date:	28-Oct-93
Approved by:		Date:	10/29/93

Form 2 Rev. 2.1 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5040	107-AP	8- 2-93	15:16	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	1

Sample Size: STD .100-10 - VOL 1ml - CELL .100 P.F.=10

Customer ID: 107-AP-A

Remarks Calculations Results

SAMPLE SPIKE
DUPLICATE

SPIKE ID - 144838
SPIKE VOL - .100 ml
spike ID/vol - 144838/5.04-4 g/l
spike vol - .100 ml

.15
.35

RERUN

105.4 %

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/27/93	14:20	

54-6800-061 (R-10-83)

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URANIUM : LA-925-106 (B-0) SPIKE

			SPIKE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V21-5040	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2023	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
1			
Instrument	Volume of spike (mL)	VSP	0.1000
AL-10620	Volume of liquid in cell (sample + fluran + water + spike)	VTOT	5.70
Analyst:			
R ACHEN	Deflection (sample + fluran)	DSAM	0.15
Date:	Deflection (sample + fluran + spike)	DS+S	0.35
10/27/93	Dilution factor of sample	DF	11.1
	Dilution factor of spike	DFS	111
	Spike value (matrix) (gU/L)	SV	3.8600E-02
	Preparation factor of sample	PF	10
	Concentration (gU/L) Form 1 or Form 3 (SAMPLE)	gU/L1	2.1100E-05
	Concentration (gU/L)	gU/LS	4.069E-02
	% Recovery		105.4

gU/L = (DSAM*VSP*CSP*DF*PF) / (((VTOT/VSUB) * DS+S - DSAM) * VSAM)
%Recovery = ((gU/LS - gU/L1) * (DFS / (DF * PF) / SV) * 100

% RECOVERY =	105.35

Data Entry by:		Date:	28-Oct-93
Approved by:		Date:	10/29/93

Form 2 Rev. 2.1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5740	107-AP	8- 3-93	8:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	1

Sample Size	Customer ID
? 1 ml P.F.=10	107-AP-B

Remarks, Calculations, Results

Spike ID/ual - 146838) 4.58-5g/L .06 **RERUN**
Spike vol - .100ml .22

1.68E-2 µG/mL

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/27/93	14:45	

34-6800-061 (R-10-83)

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URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V23-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2023	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell	VSUB	6.50
1	(sample + fluran + water)		
Instrument	Deflection (sample + fluran)	DSAM	0.06
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL)	VTOT	6.60
R ACHEN	(sample + fluran + water + spike)		
Date:	Deflection (sample + fluran + spike)	DS+S	0.22
10/27/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration in sample (gU/L)		1.68E-05

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))
gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))
0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level
Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	1.68E-05
U in µg/mL=	1.68E-02

DETECTION LEVEL µg/mL= 5.61E-03

Data Entry by:		Date:	28-Oct-93
Approved by:		Date:	10/29/93

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5840	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	1

Sample Size		Customer ID
? (m)	P.F. =10	107-AP-B

Remarks, Calculations, Results

DUPLICATE SAMPLE

RERUN .15 .35

Spike ID/(ul) - 146/338/4.58 -5 g/l

Spik- vol - ~~100 ml~~ .100 ml RGA 10/27/93

3.34E-2 µG/mL

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10/27/93	15:00	

54-6800-061 (1-10-83)

BEST AVAILABLE COPY

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V23-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
2023	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
1			
Instrument	Deflection (sample + fluran)	DSAM	0.15
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
R ACHEN			
Date	Deflection (sample + fluran + spike)	DS+S	0.35
10/27/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration in sample (gU/L)		3.34E-05

gU/L in Sample = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

gU/L in Digest = ((DSAM*VSP*CSP*DF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in sample gU/L=	3.34E-05
U in µg/mL=	3.34E-02

DETECTION LEVEL µg/mL= 4.46E-03

Data Entry by:		Date:	28-Oct-93
Approved by:	Jennifer L. Deppen	Date:	10/29/93

Form 1 Rev. 1.2

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QA 19

WESTINGHOUSE HANFORD COMPANY Batch 1509

222-S LABORATORY

ANALYTICAL BATCH WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V-21, V-23	Customer ID: 107-AP-A, 107-AP-B
Analysis: U	Sample Prep: Direct

Instrument: AL-10620 WB88807	Procedure/ Rev: LA-925-106 / B-0
Technologist: RG Aiken [illegible]	Date: 9/13/93
Starting Time: 13:00	Temperature NA
Ending Time: 1515	Chemist: Chuck Graser

Comments:

	Description	Lab ID		Description	Lab ID
1	STD	V-19-5540	11		
2	BLK	V-20-5640	12		
3	Sample	V-21-5240	13		
4	Sample Dup	V-21-5840	14		
5	Sample Spike	V-21-5940	15		
6	Sample Spike Dup	V-21-5040	16		
7	Sample	V-23-5740	17		
8	Sample Dup	V-23-5840	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LCS	14B38 / .100ml			
Pro. Spike	14B38 / .100ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-925-106

DATE START: SEPTEMBER 13, 1993

PREPARED BY: C. G. GRASER

DATE COMPLETE: SEPTEMBER 21, 1993

C Graser 21 SEPT '93

	UNITS:	uG/mL						~~G/L~~	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
144B38-STD	V-19	U	4.08E-2				105.7	~~3.4E-0~~	
								3.4 E+0	
BLANK	V-20	U	<4.49E-3					4.49E-3	
						SPIKE			
107-AP-A	V-21	U	3.83E-2	2.93E-2	3.38E-2	~~26.7~~	73.3	6.4E-3	
						0.0	73.3	7.3E-3	
107-AP-B	V-23	U	2.85E-2	3.41E-2	3.13E-2	18.0		5.7E-3	
								5.7E-3	

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in G/L

High %RPD is acceptable, result is < one order of magnitude higher than Det. Lim.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 19.-5540	107-AP	8- 2-93	15:14	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .100-10-.100ml	STD

Remarks Calculations Results

S267 UF1C
STD# 144238 RESULT ~~4.0796-2~~ 9/13-7-93 .24
STD VAL 5.86-2 %REC 105.7 % .53

SPIKE ID/VAL 146238/5.04-4 g/l
SPIKE VOL. 100ml

RESULT:
4.08E-2 gU/L

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9/13/93	13:00	C Grant	9/21

SA-0600-061 (R-10/83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			STANDARD
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V19-5540	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1509	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
0			
Instrument	Deflection (sample + fluran)	DSAM	0.24
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.53
09/13/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration (gU/L)		4.0796E-02

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

U in gU/L=	4.08E-02
U in µg/mL=	4.08E+01

DETECTION LEVEL G/L= 3.4E-03

Data Entry by:	CA Clark	Date:	13-Sep-93
Approved by:	C Grant	Date:	21 SEPT 93

Form 1 Rev. 1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 20.-5640	107-AP	8- 2-93	15:14	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size	Customer ID
? .100 ml	BLK

Remarks, Calculations, Results

REAGENT BLANK .02

SPIKE ID - 146B38/ 4.58-5 g/l .22

Spike Vol - .100 ml

< 4.49 E-3 µg/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9/13/93	Time Completed 13:10	Lab Unit Mgr		

54-0800.06 (R-10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			BLANK
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V20-5640	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1509	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
0			
Instrument	Deflection (sample + fluran)	DSAM	0.02
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.22
09/13/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration (gU/L)		4.4918E-06

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

U in gU/L = <	4.49E-06
U in µg/mL = <	4.49E-03

DETECTION LEVEL µg/mL= 4.49E-03

REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by:	C.A. Clark	Date:	20-Sep-93
Approved by:	C. Brauer	Date:	21 SEPT 93

Form 1 Rev. 1.1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5740	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size		Customer ID
? .100 ml	PF = 1.15	107-AP-A

Remarks, Calculations, Results

(Had to adjust Ph) .12 .28

Ph-7.42 - with 3ml of sample + .450ml of HNO_3 - .1915 m = 3.450 ml

SPIK - ID - 146B38/4.58 - sg/l

Spike vol - .100ml

3.83 E-2 Mg/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/13/93	13:30	

LA-6800-041 (8-10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V21-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1509	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell	VSUB	5.60
0	(sample + fluran + water)		
Instrument	Deflection (sample + fluran)	DSAM	0.12
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL)	VTOT	5.70
	(sample + fluran + water + spike)		
Date:	Deflection (sample + fluran + spike)	DS+S	0.28
09/13/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1.15
	Concentration (gU/L)		3.8305E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

U in gU/L=	3.83E-05
U in µg/mL=	3.83E-02

DETECTION LEVEL G/L= 6.4E-06

Data Entry by:	GA Clark	Date:	20-Sep-93
Approved by:	C Fraser	Date:	21 SEPT 93

Form 1 Rev. 1.1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No.	Sample Point	Date	Time Issued	Priority
V 21.-5840	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size		Customer ID
? .100 ml	PF = 1.150	107-AP-A

Remarks, Calculations, Results

DUPLICATE SAMPLE (Had to adjust PH) .08 .22

PH 11-4-93

Ph-7.42 - with 3ml/sample + .450ml of HNO_3 - .415m = 3.450ml

spike ID - 1461335) 4.58-5 g/l

spike vol - .100ml

2.93 -2 µg/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/13/93	13:45	C Brown

9/7

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V21-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1509	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
0			
Instrument	Deflection (sample + fluran)	DSAM	0.08
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.22
09/13/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1.15
	Concentration (gU/L)		2.9276E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

U in gU/L=	2.93E-05
U in µg/ml=	2.93E-02

DETECTION LEVEL G/L= 7.3E-06

Data Entry by:	C A Plank	Date:	20-Sep-93
Approved by:	C Brown	Date:	21 SEPT 93

Form 1 Rev. 1.1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5940	107-AP	8- 2-93	15:16	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	0

Sample Size: ? .100-10 - .100-.200 ml (.500 / Spike / cell) PF=1/150 MC 9-13-93 | Customer ID: 107-AP-A

Remarks, Calculations, Results

SAMPLE SPIKED ID (total to adjust ph) .32
SPIKE ID-144338 .60
SPIKE VOLUME-.100ml
spike ID- ~~144338/5.04-4 g/l~~ JS 10-20-93 73.26 %
144338/5.04 x 10^-4 g/l
Spike vol- .100ml
ph-7.42 with 3ml of sample & .450ml of HNO_3-Pb
Total vol- 3.450ml

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/13/93	14:00	C Brown

54-6800-067 (R-10-83)

URANIUM : LA-925-106 (B-0) SPIKE

			SPIKE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V21-5940	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1509	Volume of sample (mL)	VSAM	0.2000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.70
0			
Instrument	Volume of spike (mL)	VSP	0.1000
AL-10620	Volume of liquid in cell (sample + fluran + water + spike)	VTOT	5.80
Analyst:			
	Deflection (sample + fluran)	DSAM	-0.32
Date:	Deflection (sample + fluran + spike)	DS+S	0.6
09/13/93	Dilution factor of sample	DF	102
	Dilution factor of spike	DFS	102
	Spike value (matrix) (gU/L)	SV	3.8600E-02
	Preparation factor of sample	PF	1.15
	Concentration (gU/L) Form 1 (SAMPLE)	gU/L1	3.8305E-05
	Concentration (gU/L)	gU/LS	3.256E-02
	% Recovery		73.3

gU/L = (DSAM*VSP*CSP*DF*PF) / (((VTOT/VSUB) * DS+S - DSAM) * VSAM)
%Recovery = ((gU/LS - gU/L1) * (DFS / (DF * PF) / SV) * 100

% RECOVERY =	73.26

Data Entry by:	CA Clark	Date:	20-Sep-93
Approved by:	C Brown	Date:	21 SEPT 93

Form 2 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5040	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	0

Sample Size: STD Spike Cal
? .100-.10 -.100 -.200 ml PF = 1.150

Customer ID: 107-AP-A

Remarks, Calculations, Results

SAMPLE SPIKE (Had to adjust PH) .32
DUPLICATE .60

SPIKE ID -146338/5.04-4 g/l 73.28 %
SPIKE VOL .10ml
Spike ID-146338/
Spike vol- .100 ml (PH-7.42-with 3ml of sample & .450ml of HNO3-.3715N)
Total vol- 3.450ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9/13/93	14:30	C Gerber	

54-6800-461 (R 10-88)

URANIUM : LA-925-106 (B-0) SPIKE

			SPIKE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V21-5040	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1509	Volume of sample (mL)	VSAM	0.2000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.70
0			
Instrument	Volume of spike (mL)	VSP	0.1000
AL-10620	Volume of liquid in cell (sample + fluran + water + spike)	VTOT	5.80
Analyst:			
	Deflection (sample + fluran)	DSAM	0.32
Date:	Deflection (sample + fluran + spike)	DS+S	0.6
09/13/93	Dilution factor of sample	DF	102
	Dilution factor of spike	DFS	102
	Spike value (matrix) (gU/L)	SV	3.8600E-02
	Preparation factor of sample	PF	1.15
	Concentration (gU/L) Form 1 (SAMPLE)	gU/L1	2.9276E-05
	Concentration (gU/L)	gU/LS	3.256E-02
	% Recovery		73.3

gU/L = (DSAM*VSP*CSP*DF*PF) / (((VTOT/VSUB) * DS+S - DSAM) * VSAM)
%Recovery = ((gU/LS - gU/L1) * (DFS / (DF * PF) / SV) * 100

% RECOVERY =	73.28

Data Entry by:	CA Clark	Date:	20-Sep-93
Approved by:	C Gerber	Date:	21 SEPT 93

Form 2 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5740	107-AP	8- 3-93	8:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size		Customer ID
? .100 ml	PF = 1.151	107-AP-B

Remarks, Calculations, Results (Had to adjust Ph)
Ph ~ 7.55 - with 3ml of Sample .453 g HNO_3 - .195 m - Total vol - 3.453 ml .10 .28
Spike ID - 146 (338) 4.58 - 5 g/l
Spike vol - .100 ml
2.85 E-2 µg/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/13/93	14:50	C Green

SA 590-061 (R-10-93)

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V23-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1509	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
0			
Instrument	Deflection (sample + fluran)	DSAM	0.1
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.28
09/13/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1.151
	Concentration (gU/L)		2.8495E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

U in gU/L=	2.85E-05
U in µg/mL=	2.85E-02

DETECTION LEVEL G/L= 5.7E-06

Data Entry by:	CA Clark	Date:	20-Sep-93
Approved by:	C Green	Date:	21 SEPT. 93

Form 1 Rev. 1.1 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5840	107-AP	8- 3-93	8:30	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size		Customer ID
? 100 ml	PF= 1.151	107-AP-B

Remarks, Calculations, Results

DUPLICATE SAMPLE (Had to adjust PH) 12 30

PH 7.55 - with 3 ml of sample & .453 g HNO3 - .1415 m - To Total vol - 3.45 ml

Spike ID - 146B38 / 4.58 - 5 g/L

Spike vol - .100 ml

3.41 E-2 µg/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/13/93	13:15 14:50 9/13/93	C Green

54-6800-06 (11-10-93)

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V23-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1509	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
0			
Instrument	Deflection (sample + fluran)	DSAM	0.12
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.3
09/13/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1.151
	Concentration (gU/L)		3.4128E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

U in gU/L=	3.41E-05
U in µg/mL=	3.41E-02

DETECTION LEVEL G/L= 5.7E-06

Data Entry by:	CA Vant	Date:	20-Sep-93
Approved by:	C Green	Date:	21 SEPT. 93

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QA 19

WESTINGHOUSE HANFORD COMPANY Batch 1519

222-S LABORATORY

ANALYTICAL BATCH WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. U-26, U-27, U-28	Customer ID: 107-AP-C, 107-AP-D, 107-AP-E
Analysis: U	Sample Prep: Direct

Instrument: AL-10620 WB88807	Procedure/ Rev: LA-925-106 / B-0
Technologist: Pb Acheson	Date: 9/22/93
Starting Time: 08:15	Temperature NA
Ending Time: 10:30	Chemist: Chuck Groser

Comments: Did the Sample Prep on the Samples

	Description	Lab ID
1	STD	U-24 - 5540
2	BLK	U-25 - 5640
3	Sample	U-26 - 5740
4	Sample Dup	U-26 - 5840
5	Sample	U-27 - 5740
6	Sample Dup	U-27 - 5840
7	Sample	U-28 - 5740
8	Sample Dup	U-28 - 5840
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	149838) .100ml			
Pro Spike	149838) .100ml			

530

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-925-106

DATE START: September 22, 1993

PREPARED BY: C. G. Graser

DATE COMPLETE: September 22, 1993

Graser 22 SEPT. 93

	UNITS:	ug/L							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 144B38	V-24	U	3.88E-2				100.5	~~3.52E-3~~	~~9%~~ 11 -16-93
								3.52E+0	
BLANK	V-25	U	<4.50E-3					4.50E-3	
107-AP-C	V-26	U	1.63E-2	1.92E-2	1.78E-2	16.3		4.08E-3	
								4.27E-3	
107-AP-D	V-27	U	2.24E-2	2.12E-2	2.18E-2	5.5		4.48E-3	
								4.71E-3	
107-AP-E	V-28	U	3.22E-2	2.98E-2	3.10E-2	7.7		4.96E-3	
								4.96E-3	

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in g/L.

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 24.-5540	107-AP	8- 3-93	8:31	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY ✓	N1L17	0

Sample Size	Customer ID
? 100-10-100	STD

Remarks Calculations Results

S267 UF1C
STD# 146838 RESULT .22
STD VAL 3.86E-2 g/L %REC → 100.5% .50
SPIKE ID/VAL 146838 / 5.04 -4 g/L
SPIKE VOL. 100ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/22/93	08:15	C Brauer

9/22/93 RCA

CA Clark

SF-ERDC-061 (R-10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			STANDARD
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V24-5540	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1519	Volume of sample (mL)	VSAM	0.100
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
0			
Instrument	Deflection (sample + fluran)	DSAM	0.22
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.5
09/22/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Conc. in sample/digest sol. as applicable (gU/L)		3.88E-02

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((VTOT/VSUB)*(DS+S))-DSAM*VSAM))*(1E6 µg/g / 1000 mL/L)

U in gU/L=	3.88E-02
U in µg/mL=	3.88E+01

DETECTION LEVEL µg/mL= 3.52E+00

Data Entry by:		Date:	22-Sep-93
Approved by:	C Brauer	Date:	22 SEPT 93

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 25.-5640	107-AP	8- 3-93	8:36	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size	Customer ID
? /ml	BLK

Remarks Calculations Results

REAGENT BLANK

Spike ID/vol - 146338/4.58-5 g/L

Spike vol - .100 ml

< 4.50 E-3 µg/mL

.18 RGA .02

.20 9/22/93 .22

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst 5
	Hrs	Hrs	Hrs	Hrs
Date 9/22/93 9/22/93 9/22/93 RGA	Time Completed 08:30	Laboratory Mgr		9/23

URANIUM : LA-925-106 (B-0) LIQUIDS

Serial No.			BLANK
V25-5640	Spike concentration (gU/L)	CSP	4.58E-05
	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1519	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.02
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.22
09/22/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Conc. in sample/digest sol. as applicable (gU/L)	<	4.50E-06

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in gU/L = <	4.50E-06
U in µg/mL = <	4.50E-03

DETECTION LEVEL µg/mL= 4.50E-03

REPORT RESULT AS A < (LESS THAN) VALUE

Data Entry by:		Date:	22-Sep-93
Approved by:		Date:	22 SEPT. 93

Form 1 Rev. 1.2

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-5740	107-AP	8- 3-93	8:45	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample: JRGA
? 1ml 1ml P.F.= 10

Customer ID: 107-AP-C

Remarks/Calculations Results

Spike ID/Vol - 146B38/4.58-5g/l
Spike Vol - .100 ml

1.63 E-2 µg/mL

.15 RGA 2 09/22/93
.08
.30

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/22/93	08:45	C Grauer

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V26-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1519	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.08
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.3
09/22/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Conc. in sample/digest sol. as applicable (gU/L)		1.63E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))*(1 E6 µg/g / 1000 mL/L)

U in gU/L=	1.63E-05
U in µg/mL=	1.63E-02

DETECTION LEVEL µg/mL= 4.08E-03

Data Entry by:		Date:	22-Sep-93
Approved by:	C Grauer	Date:	22 SEPT. 93

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-5840	107-AP	8- 3-93	8:45	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Id	Customer ID
? P.F=10 ~ 1ml	107-AP-C

Remarks/Results
DUPLICATE SAMPLE

1.92 E-2 µg/mL

.04
.30

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/22/93	09:00	

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V26-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1519	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.09
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.3
09/22/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Conc. in sample/digest sol. as applicable (gU/L)		1.92E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))*(1 E6 µg/g / 1000 mL/L)

U in gU/L=	1.92E-05
U in µg/mL=	1.92E-02

DETECTION LEVEL µg/mL= 4.27E-03

Data Entry by:		Date:	22-Sep-93
Approved by:		Date:	22 SEPT. 93

Form 1 Rev. 1.2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-5740	107-AP	8- 3-93	8:55	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size	Customer ID
? /ml P.F. =10	107-AP-D

Remarks, Calculations, Results

Spike ID/vol – HBB8/4.585 g/L .10

Spike vol – .100 ml .30

2.24E-2 ug/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/22/93	10:00	C Brown

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V27-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1519	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.1
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.3
09/22/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Conc. in sample/digest sol. as applicable (gU/L)		2.24E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in gU/L=	2.24E-05
U in µg/ml=	2.24E-02

DETECTION LEVEL µg/ml= 4.48E-03

Data Entry by:		Date:	22-Sep-93
Approved by:	C Brown	Date:	22 SEPT 93

Form 1 Rev. 1.2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-5840	107-AP	8- 3-93	8:55	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size	Customer ID
? /ml P.F = 10	107-AP-D

Remarks Calculations Results

DUPLICATE SAMPLE

Spike ID/vol — 146838 / 4.58-5 g/L

Spike vol — .100ml

.09

.28

2.12 E-2 µg/mL

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
	Hrs	Hrs	Hrs	Hrs
Date 9/22/93	Time Completed 09:45 RGA 9/22/93	Lab Unit Mgr		

54 6800 (REV 10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V27-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1519	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.09
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.28
09/22/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Conc. in sample/digest sol. as applicable (gU/L)		2.12E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))*(1 E6 µg/g / 1000 mL/L)

U in gU/L=	2.12E-05
U in µg/ml=	2.12E-02

DETECTION LEVEL µg/ml= 4.71E-03

Data Entry by:		Date:	22-Sep-93
Approved by:		Date:	22 SEPT. 93

Form 1 Rev. 1.2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 28.-5740	107-AP	8- 3-93	8:57	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size		Customer ID
? 1 ml	P.F. = 10	107-AP-E

Remarks Calculations Results

Spike I0/ual - 1461335/458-5 g/l .13

Spike ual - .100 ml .31

3.22 E-2 µg/mL

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/22/93	10:15	C Brown

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V28-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1519	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.13
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.31
09/22/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Conc. in sample/digest sol. as applicable (gU/L)		3.22E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))*(1E6 µg/g / 1000 mL/L)

U in gU/L=	3.22E-05
U in µg/mL=	3.22E-02

DETECTION LEVEL µg/mL= 4.96E-03

Data Entry by:		Date:	22-Sep-93
Approved by:	C Brown	Date:	22 SEPT 93

Form 1 Rev. 1.2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 28.-5840	107-AP	8- 3-93	8:57	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size	Customer ID
? /ml P.F. = 10	107-AP-E

Remarks Calculations Results

DUPLICATE SAMPLE .12

Spike FD/001 - 146B38) 4.58 std .30

Spike 001 - 100ml

2.98 E-2 µg/mL

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/22/93	10:30	

54-6PX/06.1 (R 10 831)

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V28-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1519	Volume of sample (mL)	VSAM	1.000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.12
AL-10620	Volume of spike (mL)	VSP	0.100
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.3
09/22/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Conc. in sample/digest sol. as applicable (gU/L)		2.98E-05

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((({VTOT/VSUB}*(DS+S))-DSAM)*VSAM))*(1 E6 µg/g / 1000 mL/L)

U in gU/L=	2.98E-05
U in µg/ml=	2.98E-02

DETECTION LEVEL µg/ml= 4.96E-03

Data Entry by:		Date:	22-Sep-93
Approved by:		Date:	22 SEPT 93

Form 1 Rev. 1.2

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 1531

WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V-31	Customer ID: 107AP-FB
Analysis: U	Sample Prep: Direct

Instrument: AL-10620 4088807	Procedure/ Rev: LA-925-~~106~~ 104 / B-0
Technologist: RG Adam [signature]	Date: 9/9/93
Starting Time: 10:00	Temperature NA
Ending Time: 11:15	Chemist: Chuck ~~BRA~~ Grover

Comments:

	Description	Lab ID		Description	Lab ID
1	STD	V-29-5540	11		
2	BLK	V-30-5~~642~~ 640	12		
3	Sample	V-31-5740	13		
4	Sample Dup	V-31-5840	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	144(38) .100ml			
Spike	146(38) .100ml			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-925-106

DATE START: SEPTEMBER 9, 1993

PREPARED BY: C. G. GRASER

DATE COMPLETE: SEPTEMBER 21, 1993

C Graser 21 SEPT. 93

	UNITS:	uG/mL							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
144B38-STD	V-29	U	3.88E-2				100.4	~~3.5E-8~~	11-16-93
								3.5E+0	
BLANK	V-30	U	5.00E-4					5.0E-7	
107AP-FB	V-31	U	2.24E-3	2.24E-3	2.24E-3	0.0	N/A	5.6E-4	
							N/A	5.6E-4	

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in G/L

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 29.-5540	107-AP	8- 3-93	10:36	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .100ml-10ml-.100ml	STD

Remarks Calculations Results

S267 UF1C
STD# 146338 RESULT 3.876 -2 g/L .22
STD VAL 3.86 -2 g/L %REC → 100.4 .50
SPIKE ID/VAL 146338 5.04-4 g/L
SPIKE VOL. .100ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/9/93	10:00	C Brasier

54-6830-061 (R-10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			STANDARD
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
V29-5540	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1531	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
0			
Instrument	Deflection (sample + fluran)	DSAM	0.22
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.5
09/09/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration (gU/L)		3.8760E-02

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

U in gU/L=	3.88E-02
U in µg/mL=	3.88E+01

DETECTION LEVEL G/L= 3.5E-03

Data Entry by:	Eva Perry	Date:	10-Sep-93
Approved by:	C Brasier	Date:	20 SEPT 93

Form 1 Rev. 1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 30.-5640	107-AP	8- 3-93	10:38	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size	Customer ID
? / ml	BLK

Remarks Calculations, Results

REAGENT BLANK 4.58-5 .02

Spike ID - 146B381 ~~5.04-4~~ g/L .20

Spike vol - .100ml

5.00-4 µg/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/9/93	10:15	

54-6800-26 (R 10-93)

URANIUM : LA-925-106 (B-0) LIQUIDS

			BLANK
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V30-5640	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1531	Volume of sample (mL)	VSAM	1.0000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.02
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.2
09/09/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration (gU/L)		5.0034E-07

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

U in gU/L=	5.00E-07
U in µg/ml=	5.00E-04

DETECTION LEVEL G/L= 5.0E-07

Data Entry by:		Date:	10-Sep-93
Approved by:		Date:	20 SEPT 93

Form 1 Rev. 1

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-5740	107-AP	8- 3-93	10:40	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size	Customer ID
? / ml	107AP-FB

Remarks Calculations, Results

Spike FD-146838 / 4.58 -5 g/l .08
Spike vol - .100 ml .24

2.24 -3 µg/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9/9/93	10:45	C Grasser	9/21

54-6800-081 (4-10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V31-5740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1531	Volume of sample (mL)	VSAM	1.0000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.08
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.24
09/09/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration (gU/L)		2.2383E-06

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

U in gU/L=	2.24E-06
U in µg/mL=	2.24E-03

DETECTION LEVEL G/L= 5.6E-07

Data Entry by:	[illegible]	Date:	10-Sep-93
Approved by:	C Grasser	Date:	20 SEPT 93

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-5840	107-AP	8- 3-93	10:40	25

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	N1L17	0

Sample Size	Customer ID
? /ml	107AP-FB

Remarks, Calculations, Results

DUPLICATE SAMPLE .08

Spike ID - 14B38 4.58-5 g/l .24

Spike vol - .100 ml

2.24 E-3 µg/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9/9/93	11:00	

54-6800-06 (R 10-88)

URANIUM : LA-925-106 (B-0) LIQUIDS

			DUPLICATE
Serial No.	Spike concentration (gU/L)	CSP	4.58E-05
V31-5840	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1531	Volume of sample (mL)	VSAM	1.0000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	6.50
0			
Instrument	Deflection (sample + fluran)	DSAM	0.08
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	6.60
Date:	Deflection (sample + fluran + spike)	DS+S	0.24
09/09/93	Dilution factor of sample	DF	1
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration (gU/L)		2.2383E-06

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

U in gU/L=	2.24E-06
U in µg/mL=	2.24E-03

DETECTION LEVEL G/L= 5.6E-07

Data Entry by:		Date:	10-Sep-93
Approved by:		Date:	20 SEPT 93

Form 1 Rev. 1

Batch 2123

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V 21, V 23	Customer ID: 107 AP-A, 107 AP-B
Analysis: As	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride AA) WB27979	Procedure/ Rev: LA 355-131 / B-1
Technologist: Valerie L Massie	Date: 11/09/93
Starting Time: 07:50	Temperature 900 C
Ending Time: 14:30	Chemist: L.D. SPARKS

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	V 59-5595	11		
2	DIGESTED LMCS STD	V 19-8595	12		
3	BLANK	V 20-8695	13		
4	SAMPLE	V 21-8795	14		
5	SAMPLE DUP	V 21-8895	15		
6	SPIKE	V 21-8995	16		
7	SPIKE DUP	V 21-8095	17		
8	SAMPLE	V 23-8795	18		
9	SAMPLE DUP	V 23-8895	19		
10	FINAL LMCS CHECK STD	V 59-5595	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	25N11D .250ML			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD:			DATE START:					BATCH # 2123	
LA-355-131			11-8-93						
PREPARED BY:			DATE COMPLETE:						
L. D. SPARKS			11-9-93						
	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/25N11D	V 59	As	0.090				90.2		
UNDIGESTED									
STD/25N11D	V 19	As	0.108				108.0		
ACID DIGESTED									
BLANK	V 20	As	<0.013					0.013	
107 AP	V 21	As	<0.013	<0.013	N/A	N/A	***	0.013	
107 AP	V 23	As	<0.013	<0.013	N/A	N/A		0.013	
STD/25N11D	V 59	As	0.100				99.7		
UNDIGESTED									

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

*** THE RESULTS OF THE SPIKE AND SPIKE DUP FOR V21 ARE AS FOLLOWS:

V21-8995: SPIKE 112.3 %

V21-8095: SPIKE DUP. 123.1 %

THE PERCENT RELATIVE DIFFERENCE CALCULATED USING RESULTS IN ng IS: 9.2 %

IN THE ORIGINAL ANALYSIS (BATCH #1513 9/1/93), THE SPIKE, SPIKE DUPLICATE, AND ENDING LMCS STANDARD WERE ALL HIGH (134.1, 146.4, AND 123.1%, RESPECTIVELY). WE HAVE EXPLORED THE POSSIBILITY THAT THE DIFFERENCES IN ACID CONCENTRATIONS BETWEEN THE UNDIGESTED AND ACID DIGESTED STANDARDS MAY EFFECT THE CHEMICAL REACTION FOR THE As BOROHYDRIDE FORMATION SO THAT THE ACID DIGESTED STANDARDS AND SPIKES READ HIGH. THE RESULTING RECOVERIES (SEE ABOVE) INDICATE THAT THE MISMATCHED ACID MATRIX HAS A DISCERNABLE EFFECT ON THE ABSORBANCES; HOWEVER, WE STILL HAVE NO MEASUREABLE As IN THE SAMPLES.

L D Sparks
11/9/93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

#2123

Serial No	Sample Point	Date	Time Issued	Priority
V 59.-5595	107-AP	11- 9-93	9:46	26

Determination	Method Standard	Result Unit	Charge Code	Reruns
As	LA-355-131	% RECOVERY	VOGEL	2

Sample Size	Customer ID
? 0.250 mL	STD

Remarks Calculations Results

EOP=[illegible] 11/9/93 R741 AS/HYDRD Abs= .4158 22.55 ng

STD # = 25N11D

STD VAL = 0.100 ppm

Result = 0.090 ppm

% Rec = 90.2%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Mason				
Hrs	Hrs	Hrs	Hrs	Hrs
				CA Clark
Date	Time Completed	Lab Unit Mgr 11/9/93		
11/8/93	14:30	LD Sparks	Gary Hammett	

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.250	
V59-5595	As ng (Nanograms)	22.55	
Batch ID	Conc As µg/mL (or mg/L or PPM)	0.090	N/A
2123	Conc As µg/L (PPB)	90.2	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
11/08/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
VM			
Date:			
11/08/93			

	STANDARD	DUPLICATE
Conc As µg/mL	9.02E-02	
	N/A	N/A
	N/A	N/A

Data Entry by:	LD Sparks	Date:	09-Nov-93
Approved by:	LD Sparks	Date:	11/9/93

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 19.-8595	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	2

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	STD

Remarks, Calculations, Results UDS 11/9/93

EDP ~~R741~~ R742 AS ~~/HYDRD~~ 43.18 ng

STD# 25V11D RESULT 0.108 ppm abs = .886

STD VAL 0.100 ppm %REC 108.08

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Masse				
Hrs	Hrs	Hrs	Hrs	Hrs
				CA Hall
Date	Time Completed	Lab Unit Mgr 11/9/93		
11/8/93	14:30	UDSparks		

54-5800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V19-8595	As ng (Nanograms)	43.18	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2123	Conc As µg/mL (or mg/L or PPM)	0.108	N/A
Rerun No.	Conc As µg/L (PPB)	108.0	N/A
~~0~~ 2 UDS 11/9/93		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A

Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000 ng)*DF
11/08/93	Average Conc.=(Sample + Duplicate)/2
Analyst	Relative % Difference=((ABS(Sam.−Dup.))/Average Conc.)*100
VM	
Date:	
11/08/93	

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.08E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	UDSparks	Date:	09-Nov-93
Approved by:	UDSparks	Date:	11/9/93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 20.-8695	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	2

Sample Size	Customer ID
? 2.0 mL Acid Digest DF=5	BLK

Remarks Calculations Results

REAGENT BLANK

2.03ng
abs=.032

<0.013 ug/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie L Masu				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 11/9/93	
11/8/93	14:30	LDSparks	Gary Hammond

54-6800-061 (R-10 83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V20-8695	As ng (Nanograms)	2.03	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2123	Conc As µg/mL (or mg/L or PPM)	0.005	N/A
Rerun No.	Conc As µg/L (PPB)	5.1	N/A
~~0~~ 2 LDS 11/9/93		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000 ng)*DF		
11/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1 µg/1000 ng)*DF		
Date:			
11/08/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	09-Nov-93
Approved by:	LDSparks	Date:	11/9/93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8795	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	2

Sample Size	Customer ID
? 2.0 mL Acid Digest DF = 5	107-AP-A

Remarks, Calculations, Results

1.83 ng
abs = .028

<0.013 ug/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Maas				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 11/9/93	
11/8/93	14:30	LD Sparks	Gary Hammond

54-8800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V21-8795	As ng (Nanograms)	1.83	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2123	Conc As µg/mL (or mg/L or PPM)	0.005	N/A
Rerun No.	Conc As µg/L (PPB)	4.6	N/A
~~0~~ 2 LDS 11/9/93		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000 ng)*DF		
11/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.−Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1 µg/1000 ng)*DF		
Date:			
11/08/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LD Sparks	Date:	09-Nov-93
Approved by:	LD Sparks	Date:	11/9/93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8895	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	2

Sample Size: 2.0 mL Acid Digest DF=5

Customer ID: 107-AP-1

Remarks Calculations Results: LIQUID SAMPLE

1.54 ng
abs: .022

<0.013 ug/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Vickie Moore				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11/8/93	14:30	11/9/93 LDSparks	Gary Hammond

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V21-8895	As ng (Nanograms)	1.83	1.54
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
2123	Conc As µg/mL (or mg/L or PPM)	0.005	0.004
Rerun No.	Conc As µg/L (PPB)	4.6	3.9
~~0~~ 2 LDS 11/9/93	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
11/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
11/08/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	LDSparks	Date:	09-Nov-93
Approved by:	LDSparks	Date:	11/9/93

Form 3 Rev. 2

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8995	107-AP	8- 2-93	15:16	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	2

Sample Size	Customer ID
? 5 ml	107-AP-A

Remarks, Calculations, Results

SAMPLE SPIKED ID V21
SPIKE ID 25N11D
SPIKE VOLUME 5.0ml to 25ml for a DF=5

44.91 ng
abs = .922

% Rec. = 112.3%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Moore				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 11/9/93	
11/8/93	14:30	L Sparks	Guy Hammond

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-ACID ~~DIGE~~ Digest

		SAMPLE	SPIKE
Serial No.	Sample (mL)Vol. Acid Dig. Used SAVOL	2.00	N/A
V21-8995	Spike Std Volume (mL) SSVOL	N/A	5.000
Batch ID	ng of Spike + Sample ngSSAM	N/A	44.91
2123	ng of Sample ngSAM	1.83	N/A
Rerun No.	Final Acid Digest Vol. (mL) ADVOL	N/A	25.00
2		N/A	N/A
Instrument ID:	Spike Std Dilution Factor SPDF	N/A	5.0
WB27979	Spike Std ID	N/A	25N11D
Calibration Date	Spike Std Value (ppm) SS VAL	N/A	0.100
11/08/93	% Recovery	N/A	112.3
Analyst			
VM	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery		
Date:			
11/08/93	Spike Std. Dilution Factor = ADVOL/SSVOL		

% Recovery {{{(ngSSAM/SAVOL)*(1/1000)}-{(0/SAVOL)*(1/1000)}}*SPDF)/SS VAL}*100

% Recovery =	112.3

Data Entry by:	L Sparks	**Date:**	09-Nov-93
Approved by:	L Sparks	**Date:**	11/9/93

Form 4 Rev. 1 **Page 1 of 1**

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8095	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-325-104	% RECOVERY	N1L17	2

Sample Size	Customer ID
5 ml	107-AP-A

Remarks Calculations Results

SAMPLE SPIKE V21 49.25 ng
DUPLICATE abs = 1.012
SPIKE ID 25N11D
SPIKE VOL 5.0 ml to 25 ml for a 5x DF

%Rec = 123.18

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Mosier				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 11/9/93	
11/8/93	14:30	L D Sparks	Gary Hammitt

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-ACID DIGE

		SAMPLE	SPIKE
Serial No.	Sample (mL)Vol. Acid Dig. Used SAVOL	2.00	N/A
V21-8095	Spike Std Volume (mL) SSVOL	N/A	5.000
Batch ID	ng of Spike + Sample ngSSAM	N/A	49.25
2123	ng of Sample ngSAM	1.83	N/A
Rerun No.	Final Acid Digest Vol. (mL) ADVOL	N/A	25.00
2		N/A	N/A
Instrument ID:	Spike Std Dilution Factor SPDF	N/A	5.0
WB27979	Spike Std ID	N/A	25N11D
Calibration Date	Spike Std Value (ppm) SS VAL	N/A	0.100
11/08/93	% Recovery	N/A	123.1
Analyst			
VM	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery		
Date:			
11/08/93	Spike Std. Dilution Factor = ADVOL/SSVOL		

% Recovery {((ngSSAM/SAVOL)*(1/1000)}-{(0/SAVOL)*(1/1000)}*SPDF)/SS VAL}*100

% Recovery =	123.1

Data Entry by:	L D Sparks	**Date:**	09-Nov-93
Approved by:	L D Sparks	**Date:**	11/9/93

Form 4 Rev. 1 **Page 1 of 1**

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-8795	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	2

Sample Size	Customer ID
2.0ml Acid Digest DF=5	107-AP-B

Remarks Calculations Results

2.51 ng
abs=.042

<0.013 ug/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Massie				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 11/9/93
11/8/93	14:30	LDSparks Gary Hammett

54-6800-061 (R 10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V23-8795	As ng (Nanograms)	1.83	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2123	Conc As µg/mL (or mg/L or PPM)	0.005	N/A
Rerun No.	Conc As µg/L (PPB)	4.6	N/A
~~0~~-2 11/9/93		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
11/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
11/08/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	09-Nov-93
Approved by:	LDSparks	Date:	11/9/93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO N T WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-8895	107-AP	8- 3-93	8:30	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	2

Sample Size	Customer ID
? 2.0mL Acid Digest DF=5	107-AP-B

Remarks Calculations Results
DUPLICATE SAMPLE

1.83 ng
abs = .028

<0.013 ug/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Massie				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 11/9/93	
11/8/93	14:30	LDSparks	Gary Hammitt

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V23-8895	As ng (Nanograms)	1.83	2.51
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
2123	Conc As µg/mL (or mg/L or PPM)	0.005	0.006
Rerun No.	Conc As µg/L (PPB)	4.6	6.3
~~0~~ 2 LDS 11/9/93	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
11/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
11/08/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	LDSparks	Date:	09-Nov-93
Approved by:	LDSparks	Date:	11/9/93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 59.-5595	107-AP	11- 9-93	9:46	26

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	VOGEL	2

Sample Size	Customer ID
? 0.250 ml	STD

Remarks, Calculations, Results

EDP=R741 AS/HYDRD

STD#= 25N11D

STD VAL=0-100 ppm

24.92 ng

Abs=.507

Result = 0.100 ppm

%Rec. = 99.78

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie L Massie				
Hrs	Hrs	Hrs	Hrs	Hrs
				6.0

Date	Time Completed	Lab Unit Mgr	
11/8/93	14:30	11/9/93 LDSparks	Gary Hanes

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.250	
V59-5595	As ng (Nanograms)	24.92	
Batch ID	Conc As µg/mL (or mg/L or PPM)	0.100	N/A
2123	Conc As µg/L (PPB)	99.7	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
11/08/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
VM			
Date:			
11/08/93			

	STANDARD	DUPLICATE
Conc As µg/mL	9.97E-02	
	N/A	N/A
	N/A	N/A

Data Entry by:	LDSparks	Date:	09-Nov-93
Approved by:	LDSparks	Date:	11/9/93

Form 1 Rev. 1

Page 1 of 1

QA

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY WHC-SD-WM-DP-053 REV 0

CALIBRATION RECORD

Analyte:	As		
Procedure:	LA 355-131	Revision:	B-1
Instrument:	PE2280 (Hydride AA)	Property No.:	WB27979
Technologist	Valerie L. Massie	Payroll No.:	Date: 11/09/93

Calibration Standard ID:	24N11C
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

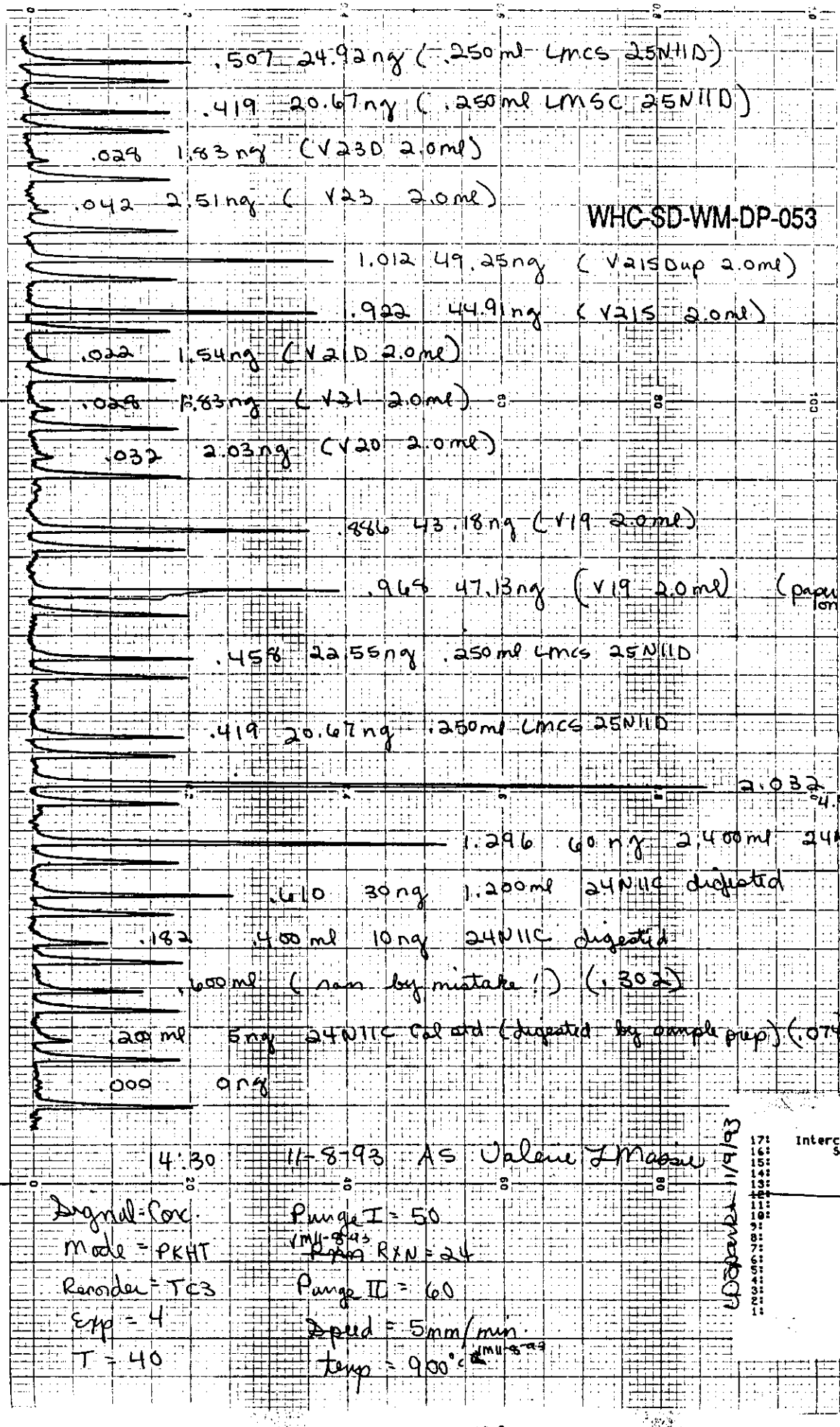
	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.200mL	5 ng	.074
3	.400mL	10 ng	.182
4	1.200mL	30 ng	.610
5	2.400mL	60 ng	1.296
6	4.000mL	100 ng	2.032
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r=.9992

Y intercept=-.0101

SLOPE=.0208

A-6000-882 (03/92)



BEST AVAILABLE COPY

#2022

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-053 REV 0

ANALYTICAL BATCH

Lab Segment Serial No. 107AP-A,107AP-B	Customer ID: V 21, V23
Analysis: As V21, V23	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride AA) WB27979	Procedure/ Rev: LA 355-131 / B-1
Technologist: Valarie Mason	Date: 11/04/93
Starting Time: 07:30	Temperature 900 C
Ending Time: 14:40	Chemist: L.D. SPARKS

Comments: This batch should be rerun (due to high spike recoveries). LDS 11/9/93.
☆ Please see comments on batch summary sheet.
☆ ~~Results (except LMCS) not entered via Lab leaders office.~~ LDS 11/13/93

	Description	Lab ID		Description	Lab ID
1	DIGESTED STD	V 19-8595	11		
2	BLANK	V 20-8695	12		
3	SAMPLE	V 21-8795	13		
4	SAMPLE DUP	V 21-8895	14		
5	SAMPLE SPIKE	V 21-8995	15	OUT FOR RERUN	
6	SPIKE DUP	V 21-8095	16		
7	SAMPLE	V 23-8795	17		
8	SAMPLE DUP	V 23-8895	18		
9	STD (beginning)	V 59-5595	19		
10	STD (ending)	V59-5595	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	25N11D .250ml			
		560		

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD:		DATE START:	BATCH # 1514
	LA-365-131	9-7-93	
PREPARED BY:		DATE COMPLETE:	
	L. D. SPARKS	9-15-93	

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/25N11C	V 57	Se	0.103				93.4		
UNDIGESTED									
STD/14N10D	V 19	Se	116.3				116.3		
ACID DIGESTED									
BLANK	V 20	Se	< 0.013					0.013	
101 AP	V 21	Se	< 0.013	< 0.013	N/A	N/A	***	0.013	
101 AP	V 23	Se	< 0.013	< 0.013	N/A	N/A		0.013	
STD/25N11C	V 58	Se	0.107				97.3		
UNDIGESTED									

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

WHC-SD-WM-DP-053 REV 0

*** THE RESULTS OF THE SPIKE AND SPIKE DUPLICATE FOR V21 ARE AS FOLLOWS:

V21-8995: SPIKE 107.7 %

V21-8095: SPIKE DUP. 111.9 %

THE PERCENT RELATIVE DIFFERENCE CALCULATED USING THE ng ANSWERS IS: 3.8 %.

L D Sparks
9-15-93

ANALYTICAL BATCH SUMMARY SHEET

METHOD:	DATE START:	BATCH # 2022
LA-355-131	11-4-93	
PREPARED BY:	DATE COMPLETE:	WHC-SD-WM-DP-053 REV 0
L D. SPARKS	11-17-93	

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/25N11D	V 59	As	0.092				92.4		
UNDIGESTED									
STD/25N11D	V 19	As	0.125				124.5		
ACID DIGESTED									
BLANK	V 20	As	<0.013					0.013	
107 AP	V 21	As	<0.013	<0.013	N/A	N/A	***	0.013	
107 AP	V 23	As	<0.013	<0.013	N/A	N/A		0.013	
STD/25N11D	V 59	As	0.114				113.8		
UNDIGESTED									

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

*** THE RESULTS OF THE SPIKE AND SPIKE DUP FOR V21 ARE AS FOLLOWS:

V21-8995: SPIKE 140.5 %

V21-8095: SPIKE DUP. 143.0 %

THE PERCENT RELATIVE DIFFERENCE CALCULATED USING RESULTS IN ng IS: 1.8 %

THESE RESULTS (RERUN 1) ARE PLAGUED BY THE SAME PROBLEM THAT WAS EVIDENT IN THE ORIGINAL ANALYSIS (RERUN 0, BATCH #1513 9/1/93). THE SPIKE, SPIKE DUPLICATE, AND ENDING LMCS STANDARD WERE ALL HIGH (134.1, 146.4, AND 123.1%, RESPECTIVELY). ANOTHER RERUN (#2) HAS SINCE BEEN ANALYZED. FOR THIS ANALYSIS (RERUN 2), THE CALIBRATION STANDARDS WERE PREPARED DIFFERENTLY THAN. THAN IN RERUNS 0 AND 1. SPECIFICALLY, THE CALIBRATION STANDARDS FOR RERUN 2 WERE DIGESTED IN THE SAME MATRIX AS THE REST OF THE BATCH. THE ACID DIGESTED STANDARDS AND SPIKE READ HIGH WHEN THE CALIBRATION STANDARDS ARE NOT PREPARED USING THE SAME ACID MATRIX.

☆ THIS ANALYSIS WAS NOT ACCEPTED BY THE CHEMIST AND ANOTHER RERUN WAS DONE (RERUN 2). HOWEVER, THE RESULTS OF RERUN 1 HAVE BEEN CALCULATED AND TABULATED FOR THE DATA PACKAGE AT THE REQUEST OF THE PROJECT COORDINATOR.

LD Sparks
11/17/93

Batch 2022

Serial No	Sample Point	Date	Time Issued	Priority
V 19.-8595	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	1

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	STD

Results
EDP ~~R741~~ R742 AS ~~/HYDRD~~ 11/9/93
STD# 2SA011D RESULT 0.124 ppm
STD VAL 0.100 ppm %REC 124.5%

RERUN
PKHT = .870
ng = 49.80 ng

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Moore				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-4-93	14:40	11/9/93 L D Sparks

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V19-8595	As ng (Nanograms)	49.80	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2022	Conc As µg/mL (or mg/L or PPM)	0.125	N/A
Rerun No.	Conc As µg/L (PPB)	124.5	N/A
1		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF		
11/04/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM			
Date:			
11/04/93			

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.25E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	L D Sparks	Date:	16-Nov-93
Approved by:	L D Sparks	Date:	11/17/93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 20.-8695	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	1

Sample Size	Customer ID
? 2.0 ml	BLK

Remarks Calculations Results

REAGENT BLANK

PRHT: .019 ng = 1.97 ng

RERUN

Rerun

<0.013 ug/mL

OUT FOR RERUN

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-4-93	14:46	11/9/93 LDSparks 11/9

54-6800-043 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V20-8695	As ng (Nanograms)	1.97	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2022	Conc As µg/mL (or mg/L or PPM)	0.005	N/A
Rerun No.	Conc As µg/L (PPB)	4.9	N/A
1		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF		
11/04/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
11/04/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	16-Nov-93
Approved by:	LDSparks	Date:	11/17/93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8795	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	1

Sample Size	Customer ID
?2.0ml	107-AP-A

Remarks, Calculations, Results

PKHT= .019
ng= 1.91ng
RERUN

Rerun
<0.013 ug/ml OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Mason				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11-4-93	14:40	L D Sparks 11/9/93	

(R-10-831)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V21-8795	As ng (Nanograms)	1.91	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2022	Conc As µg/mL (or mg/L or PPM)	0.005	N/A
Rerun No.	Conc As µg/L (PPB)	4.8	N/A
1		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
11/04/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
11/04/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	L D Sparks	Date:	16-Nov-93
Approved by:	L D Sparks	Date:	11/17/93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8895	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	1

Sample Size	Customer ID
? 2.0 ml	107-AP-A

Remarks Calculations Results

INPLICATE SAMPLE

PKHT= .049
ng= 3.65ng
RERUN

Rerun
<0.013 ug/ml

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie L Mason				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-4-93	14:40	LDSparks 11/9/93

WEDO 061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V21-8895	As ng (Nanograms)	1.91	3.65
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
2022	Conc As µg/mL (or mg/L or PPM)	0.005	0.009
Rerun No.	Conc As µg/L (PPB)	4.8	9.1
1	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
11/04/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
11/04/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	LDSparks	Date:	16-Nov-93
Approved by:	LDSparks	Date:	11/17/93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
V 21.-8995	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	1

Sample Size	Customer ID
? 2.0 ml	107-AP-A

Remarks, Calculations, Results

SAMPLE SPIKED ID V21
SPIKE ID 25N11D
SPIKE VOLUME 5.0 ml

PKHT = .984
ng = 56.19 ng
RERUN

Rerun OUT FOR RERUN
140.5% Rec

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Moore				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-4-93	14:40	11/9/93 LD Sparks

Arsenic: LA-355-131 (B-1) As LIQUIDS-ACID DIGEST

			SAMPLE	SPIKE
Serial No.	Sample (mL)Vol. Acid Dig. Used	SAVOL	2.00	N/A
V21-8995	Spike Std Volume (mL)	SSVOL	N/A	5.000
Batch ID	ng of Spike + Sample	ngSSAM	N/A	56.19
2022	ng of Sample	ngSAM	1.91	N/A
Rerun No.	Final Acid Digest Vol. (mL)	ADVOL	N/A	25.00
1			N/A	N/A
Instrument ID:	Spike Std Dilution Factor	SPDF	N/A	5.0
WB27979	Spike Std ID		N/A	25N11D
Calibration Date	Spike Std Value (ppm)	SS VAL	N/A	0.100
11/04/93	% Recovery		N/A	140.5
Analyst:				
VM	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery			
Date:				
11/04/93	Spike Std. Dilution Factor = ADVOL/SSVOL			

% Recovery = {(($(ngSSAM/SAVOL)*(1/1000)$)-$((0/SAVOL)*(1/1000)$)*SPDF)/SS VAL}*100

% Recovery =	140.5

Data Entry by:	LD Sparks	Date:	16-Nov-93
Approved by:	LD Sparks	Date:	11/17/93

Form 4 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8095	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-325-104	% RECOVERY	N1L17	1

Sample Size	Customer ID
2.0ml	107-AP-A

Remarks, Calculations, Results

SAMPLE SPIKE*
DUPLICATE

SPIKE ID 25N11D
SPIKE VOL 5 ml

PKHT= 1.002
ng: 57.20ng

RERUN

Rerun CUT FOR REPUN

143.0 % Rec

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Mason				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
11-4-93	14:40	11/9/93 LD Sparks	11/9

54-6825-061 (R/10/83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-ACID DIGEST

			SAMPLE	SPIKE
Serial No.	Sample (mL)Vol. Acid Dig. Used	SAVOL	2.00	N/A
V21-8095	Spike Std Volume (mL)	SSVOL	N/A	5.000
Batch ID	ng of Spike + Sample	ngSSAM	N/A	57.20
2022	ng of Sample	ngSAM	1.91	N/A
Rerun No.	Final Acid Digest Vol. (mL)	ADVOL	N/A	25.00
1			N/A	N/A
Instrument ID:	Spike Std Dilution Factor	SPDF	N/A	5.0
WB27979	Spike Std ID		N/A	25N11D
Calibration Date	Spike Std Value (ppm)	SS VAL	N/A	0.100
11/04/93	% Recovery		N/A	143.0
Analyst				
VM	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery			
Date:				
11/04/93	Spike Std. Dilution Factor = ADVOL/SSVOL			

% Recovery = {((ngSSAM/SAVOL)*(1/1000))-((0/SAVOL)*(1/1000))*SPDF)/SS VAL}*100

% Recovery =	143.0

Data Entry by:	LD Sparks	Date:	16-Nov-93
Approved by:	LD Sparks	Date:	11/17/93

Form 4 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-8795	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	1

Sample Size	Customer ID
? 2.0 ml	107-AP-B

Remarks, Calculations, Results

<0.013 ug/ml

PKHT= .069
ng= 4.78ng

RERUN

Rerun

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valiz Mosai				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr		
11-4-93	14:40	11/9/93		11/9

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V23-8795	As ng (Nanograms)	4.78	
Batch ID	Acid Digest Dilution Factor DF	5.0	
2022	Conc As µg/mL (or mg/L or PPM)	0.012	N/A
Rerun No.	Conc As µg/L (PPB)	12.0	N/A
1		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF		
11/04/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
11/04/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:		Date:	16-Nov-93
Approved by:		Date:	11/17/93

Form 3 Rev. 2

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-8895	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	1

Sample Size	Customer ID
? 2.0 ml	107-AF-B

Remarks Calculations Results

DUPLICATE SAMPLE

PKHT= .029
ng = 2.53ng

RERUN

Rerun
(0.013 ug/ml) OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Masey				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
11-4-93	14:40	11/9/93

ES00-251 (R 10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V23-8895	As ng (Nanograms)	4.78	2.53
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
2022	Conc As µg/mL (or mg/L or PPM)	0.012	0.006
Rerun No.	Conc As µg/L (PPB)	12.0	6.3
1	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
11/04/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
VM	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
11/04/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	L D Sparks	Date:	16-Nov-93
Approved by:	L D Sparks	Date:	11/17/93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 59.-5595	107-AP	11- 9-93	9:46	26

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	VOGEL	0

Sample Size	Customer ID
? 0.250 mL	STD

Remarks, Calculations, Results

EOP: R741 AS/HYDRD
STD #: 25N11D
STD VAL: 0.100 ppm
RESULT: 0.114
%Rec.: 113.8%

Abs: .490
28.44 ng

OUT FOR RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie I Massie				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr 11/9/93		
11-4-93	14:40	LD Sparks		

54-6800-061 (B) 10-831

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.250	
V59-5595	As ng (Nanograms)	28.44	
Batch ID	Conc As µg/mL (or mg/L or PPM)	0.114	N/A
2022	Conc As µg/L (PPB)	113.8	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
11/04/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
VM			
Date:			
11/04/93			

	STANDARD	DUPLICATE
Conc As µg/mL	1.14E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	LD Sparks	Date:	16-Nov-93
Approved by:	LD Sparks	Date:	11/17/93

Form 1 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 59.-5595	107-AP	11- 9-93	9:46	26

Determination	Method Standard	Result Units	Charge Code	Reruns
AS	LA-355-131	% RECOVERY	VOGEL	0

Sample Size	Customer ID
? 0.250 mL	SDD

Remarks Calculations Results

EDP: R741 AS/144DRD Abs: .411

STD#: 25N11D 23.10 ng

STD VAL: 0.100 ppm

RESULT: 0.092 ppm CUT FOR RERUN

%Rec: ~~96.0%~~ 92.4%

LDS 11/9/93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie L Maass				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr 11/9/93		
11-4-93	14:40	LDSparks		

54-6800-06 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.250	
V59-5595	As ng (Nanograms)	23.10	
Batch ID	Conc As µg/mL (or mg/L or PPM)	0.092	N/A
2022	Conc As µg/L (PPB)	92.4	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
11/04/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
VM			
Date:			
11/04/93			

	STANDARD	DUPLICATE
Conc As µg/mL	9.24E-02	
	N/A	N/A
	N/A	N/A

Data Entry by:	LDSparks	Date:	16-Nov-93
Approved by:	LDSparks	Date:	11/17/93

Form 1 Rev. 1

#2022

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD

WHC-SD-WM-DP-053 REV 0

Analyte:	As		
Procedure:	LA 355-131	Revision:	B-1
Instrument:	PE2280 (Hydride AA)	Property No.:	WB27979
Technologist	Valerie L Massee	Payroll No.:	Date: 11/04/93

Calibration Standard ID:	24N11C
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.052
3	.200mL	10 ng	.168
4	.600mL	30 ng	.512
5	1.200mL	60 ng	1.058
6	2.000ml	100 ng	1.762
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r=.9998

Y intercept= -.0160

slope=.0178

A-6000-882 (03/92)

.516 53.58 ng LMCS 25N11C .500 ml (V58)

.005 0.50 ng 2.0 ml V23D

.005 0.50 ng 2.0 ml V23

.431 44.75 ng 2.0 ml V21SD

.415 43.08 ng 2.0 ml V21S

.011 1.19 ng 2.0 ml V21D

.011 1.19 ng 2.0 ml V21

.007 0.70 ng 2.0 ml V20

.448 46.51 ng 2.0 ml V19

.495 51.39 ng LMCS 25N11C .500 ml (V57)

.950 2.0 ml 100 ng 22N11C

.511 50 ng 1.0 ml 22N11C

.236 25 ng .500 ml 22N11C

.037 5 ng 22N11C Cal std .100 ml

.000 0 ng

14:20 Se 9-7-93 Valerie L Massie

slope = 0.0096
y int = 0.0002
corr coeff = 0.9990

Signal = Conc.
Mode = PKHT
Recorder = TC3
Exp = 10
T = 30

Purge I = 40
Purge II = 50
Rgn = 10
temp = 975°C
Speed = ~~5cm~~ 5 mm/min vmg 7-93
mV = 20

Intercept: 0.0002
Slope: 0.0096
13: 0.9990
12: 51.3945
11: 45.5123
10: 0.7028
9: 1.1183
8: 1.1183
7: 43.0844
6: 44.7464
5: 0.4951
4: 0.4951
3: 53.5759
2:
1:

Mg 7-7-93

574

BEST AVAILABLE COPY

Batch 153 U.V.

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V 21,V 23	Customer ID: 107-AP-A,107-AP-B
Analysis: As	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride AA) WB27979	Procedure/ Rev: LA 355-131 / B-1
Technologist: Valerie M Massi	Date: 09/01/93
Starting Time: 08:00	Temperature 900 C
Ending Time: 14:35	Chemist: L.D. SPARKS

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	V 49-5595	11		
2	DIGESTED STD	V 19-8595	12		
3	BLANK	V 20-8695	13		
4	SAMPLE	V 21-8795	14		
5	SAMPLE DUP	V 21-8895	15		
6	SAMPLE SPIKE	V 21-8995	16		
7	SAMPLE SPIKE DUP	V 21-8095	17		
8	SAMPLE	V 23-8795	18		
9	SAMPLE DUP	V 23-8895	19		
10	ENDING LMCS STD	V 50-5595	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	25N11B .250ml	~~SPIKE~~ RES 9-2-93	~~20N10A DF=5000~~ RES 9-2-93	
SPIKE	20N10A DF=5000			
		575		

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD:	DATE START:	BATCH # 1513
LA-355-131	9-1-93	
PREPARED BY:	DATE COMPLETE:	
L. D. SPARKS	9-15-93	

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/25N11B	V 49	As	0.102				102.2		
UNDIGESTED									
STD/20N10A	V 19	As	139.0				139.0		
ACID DIGESTED									
BLANK	V 20	As	<0.013					0.013	
107 AP	V 21	As	<0.013	<0.013	N/A	N/A	***	0.013	
107 AP	V 23	As	<0.013	<0.013	N/A	N/A		0.013	
STD/25N11B	V 50	As	0.123				123.1		
UNDIGESTED									

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

WHC-SD-WM-DP-053 REV 0

*** THE RESULTS OF THE SPIKE AND SPIKE DUP FOR V21 ARE AS FOLLOWS:

V21-8995: SPIKE 134.1 %

V21-8095: SPIKE DUP. 146.4 %

THE PERCENT RELATIVE DIFFERENCE CALCULATED USING RESULTS IN ng IS: 8.8 %

ALTHOUGH THE SPIKE, SPIKE DUPLICATE, AND ENDING LMCS STANDARD ARE ALL HIGH (134.1, 146.4, AND 123.1%, RESPECTIVELY),THIS RUN WILL BE ACCEPTED BECAUSE THE SAMPLES ARE LESS THAN THE DETECTION LIMIT.

LDSparks
9-15-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 1513

Serial No	Sample Point	Date	Time Issued	Priority
V 49.-5595	107-AP	9- 1-93	12:54	23

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .250 ml	STD

Remarks Calculations Results

std ID = 25N11B
Std value: 0.100 ug/ml
EDP = R741 AS/HYDRD

PLHT = .580
ng = 25.54 ng

Result: 0.102 ug/ml
%Rec: 102.2%

Valeri R Massi

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-1-93	14:35	9-13-93	9/6

54-680C-06 (11-10-93)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.250	
V49-5595	As ng (Nanograms)	25.54	
Batch ID	Acid Digest Dilution Factor DF	1.0	
1513	Conc As µg/mL (or mg/L or PPM)	0.102	N/A
Rerun No.	Conc As µg/L (PPB)	102.2	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
09/01/93			

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.02E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:		Date:	13-Sep-93
Approved by:		Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 1513

Serial No	Sample Point	Date	Time Issued	Priority
V 19.-8595	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5000	STD

Remarks Calculations Results

LNS 9-13-93 R742

EDP ~~R741~~ AS/HYDRD

PKHT=1.257

ng= 55.62ng

STD# 20N10A RESULT 139.0ppm

STD VAL 100ppm %REC ~~139.0~~ 139.0%

LNS 9-15-93

Valerie L Massey

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr.
9-1-93	14:35	9-9-93

3H-5800-031 (7/10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V19-8595	As ng (Nanograms)	55.62	
Batch ID	Acid Digest Dilution Factor DF	5000.0	
1513	Conc As µg/mL (or mg/L or PPM)	139.050	N/A
Rerun No.	Conc As µg/L (PPB)	139050.0	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
09/01/93			

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.39E+02	
	N/A	N/A
	N/A	N/A

Data Entry by:		Date:	08-Sep-93
Approved by:		Date:	9-9-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 20.-8695	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	BLK

Remarks Calculations Results

REAGENT BLANK

Blank results are corrected for sample prep/dilution factors.

PKHT: .031
ng = 1.14 ng

(<0.013 ug/mL)

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-1-93	14:35	RE Ruda 9-9-93	EK 9/4

54-6600-051 (R 10-93)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V20-8695	As ng (Nanograms)	1.14	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1513	Conc As µg/mL (or mg/L or PPM)	0.003	N/A
Rerun No.	Conc As µg/L (PPB)	2.9	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	RE Ruda	Date:	08-Sep-93
Approved by:	RE Ruda	Date:	9-9-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8795	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	107-AP-A

Remarks Calculations, Results

PKHT=.023
ng=0.79 ng

<0.013 ug/ml

Valerie L Mossi

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-13-93
9-1-93	14:35	LDSparks

54-6800-061 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V21-8795	As ng (Nanograms)	0.79	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1513	Conc As µg/mL (or mg/L or PPM)	0.002	N/A
Rerun No.	Conc As µg/L (PPB)	2.0	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	13-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8895	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	107-AP-A

Remarks, Calculations, Results:

DUPLICATE SAMPLE

PKHT= .034
ng= 1.28ng

<0.013 ug/mL

Valerie K Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-1-93	14:35	9-13-93 L Sparks	9/14

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V21-8895	As ng (Nanograms)	0.79	1.28
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1513	Conc As µg/mL (or mg/L or PPM)	0.002	0.003
Rerun No.	Conc As µg/L (PPB)	2.0	3.2
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	L Sparks	Date:	13-Sep-93
Approved by:	L Sparks	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8995	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0 ml	107-AP-A

Remarks Calculations Results

SAMPLE SPIKED ID V21
SPIKE ID 20N10A
SPIKE VOLUME 0.250ml of a 50x dilution to 25ml.
Total DF = 5000.
Spike std value after dilution is 2ppm.

PKHT.-1.212
ng = 53.62ng

%Rec = 134.1%

Valeri L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-1-93	14:35	9-15-93 LDSparks

54-6a00-06 (R 16-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-ACID DIGEST

			SAMPLE	SPIKE
Serial No.	Sample (mL)Vol. Acid Dig. Used	SAVOL	2.00	N/A
V21-8995	Spike Std Volume (mL)	SSVOL	N/A	0.250
Batch ID	ng of Spike + Sample	ngSSAM	N/A	53.62
1513	ng of Sample	ngSAM	0.79	N/A
Rerun No.	Final Acid Digest Vol. (mL)	ADVOL	N/A	25.00
0			N/A	N/A
Instrument ID:	Spike Std Dilution Factor	SPDF	N/A	100.0
WB27979	Spike Std ID		N/A	20N10A
Calibration Date	Spike Std Value (ppm)	SS VAL	N/A	2.000
09/01/93	% Recovery		N/A	134.1
Analyst				
	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery			
Date:				
09/01/93	Spike Std. Dilution Factor = ADVOL/SSVOL			

% Recovery = {(ngSSAM/SAVOL)*(1/1000)}-{(0/SAVOL)*(1/1000)}*SPDF)/SS VAL}*100

% Recovery =	134.1

Data Entry by:	LDSparks	Date:	13-Sep-93
Approved by:	LDSparks	Date:	9-15-93

Form 4 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Calculation of RPD using ng answers

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V21-8895	Se ng (Nanograms)	53.62	58.55
Batch ID	Acid Digest Dilution Factor DF	5000.0	5000.0
1513	Conc Se µg/mL (or mg/L or PPM)	134.050	146.375
Rerun No.	Conc Se µg/L (PPB)	134050.0	146375.0
0	Average Conc (µg/mL)	N/A	140.213
Instrument ID:	Average Conc (µg/L)	N/A	140212.5
WB27979	Relative % Difference	N/A	8.8
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	12.500	
	Detection Limit (µg/L)	12500.00	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	1.34E+02	1.46E+02
Average Conc (µg/mL)	N/A	140.213
Relative % Difference	N/A	8.8

Data Entry by:	[illegible]	Date:	15-Sep-93
Approved by:	[illegible]	Date:	9-15-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8095	107-AP	8- 2-93	15:16	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
As	LA-325-104	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0 ml	107-AP-A

Remarks Calculations Results

SAMPLE SPIKE DUPLICATE V21

PKHT = 1.323
ng = 58.55ng

SPIKE ID 20N10A
SPIKE VOL 0.25ml of a 50x dilution to 25ml. Total DF is 5000. Spike std value after dilution is 2ppm.

Valerie L Mason

%Rec = 146.4%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-1-93	14:35	9-15-93

Arsenic: LA-355-131 (B-1) As LIQUIDS-ACID DIGEST

		SAMPLE	SPIKE
Serial No.	Sample (mL)Vol Acid Dig. Used SAVOL	2.00	N/A
V21-8095	Spike Std Volume (mL) SSVOL	N/A	0.250
Batch ID	ng of Spike + Sample ngSSAM	N/A	58.55
1513	ng of Sample ngSAM	0.79	N/A
Rerun No.	Final Acid Digest Vol (mL) ADVOL	N/A	25.00
0		N/A	N/A
Instrument ID:	Spike Std Dilution Factor SPDF	N/A	100.0
WB27979	Spike Std ID	N/A	20N10A
Calibration Date	Spike Std Value (ppm) SS VAL	N/A	2.000
09/01/93	% Recovery	N/A	146.4
Analyst			
	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery		
Date:			
09/01/93	Spike Std. Dilution Factor = ADVOL/SSVOL		

% Recovery = {(((ngSSAM/SAVOL)*(1/1000))-((0/SAVOL)*(1/1000)))*SPDF)/SS VAL}*100

% Recovery =	146.4

Data Entry by:		Date:	13-Sep-93
Approved by:		Date:	9-13-93

Form 4 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-8795	107-AP	8- 3-93	8:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	107-AP-B

Remarks Calculations Results

PRHT= .035
ng= 1.32ng

<0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-1-93	14:35	9-13-93 LDSparks

9/14

54-8800-061 (R-10-89)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V23-8795	As ng (Nanograms)	1.32	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1513	Conc As µg/mL (or mg/L or PPM)	0.003	N/A
Rerun No.	Conc As µg/L (PPB)	3.3	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	13-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-8895	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	107-AP-B

Remarks, Calculations, Results

DUPLICATE SAMPLE

PKHT = .034
ng = 1.28ng

< 0.013 ug/ml

Valeri L Mason

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-1-93	14:35	9-13-93 LDSparks 9/16

54-6500-06 (R-15-91)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V23-8895	As ng (Nanograms)	1.32	1.28
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1513	Conc As µg/mL (or mg/L or PPM)	0.003	0.003
Rerun No.	Conc As µg/L (PPB)	3.3	3.2
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1 µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	LDSparks	Date:	13-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 50.-5595	107-AP	9- 1-93	12:54	23

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .250 ml	STD

Remarks, Calculations, Results

std ID = 25N11B
std value = 0.100ppm
EDP = R743
AS/HYDRD
Valerie L Massie

PKHT = .698
ng = 30.78ng

Result: 0.123 mg/ml
%Rec.: 123.1%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-1-93	14:35	9-13-93	9/16

54-6800 (R-10-93)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.250	
V50-5595	As ng (Nanograms)	30.78	
Batch ID	Acid Digest Dilution Factor DF	1.0	
1513	Conc As µg/mL (or mg/L or PPM)	0.123	N/A
Rerun No.	Conc As µg/L (PPB)	123.1	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
09/01/93			

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.23E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:		Date:	13-Sep-93
Approved by:		Date:	9-13-93

Form 3 Rev. 2

#1513

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-053 REV 0

CALIBRATION RECORD

Analyte:	As		
Procedure:	LA 355-131	Revision:	B-1
Instrument:	PE2280 (Hydride AA)	Property No.:	WB27979
Technologist	Valerie L Mazone	Payroll No.:	Date: 09/01/93

Calibration Standard ID:	24N11B
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.125
3	.200mL	10 ng	.209
4	.600mL	30 ng	.672
5	1.200mL	60 ng	1.414
6	2.000ml	100 ng	2.225
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r=.9994

Y intercept=.0052

slope=.0225

A-6000-882 (03/92)

.6[illegible] 30.[illegible]ng .250ml LMCS 25N.[illegible](150)

.031 1.61ng

.027 1.43ng

.023 Blank ~~1.23ng~~ .125ng

.034 1.28ng 2.0ml V23D

.035 1.32ng 2.0ml V23

1.323 58.65ng 2.0ml V21SD

1.212 53.62ng 2.0ml V21S

.034 1.28ng 2.0ml V21D

.023 0.79ng 2.0ml V21

.031 1.14ng 2.0ml V20

1.257 55.62ng 2.0ml V19

.580 25.54ng .250ml LMCS 25N11B (Y49)

.604 26.60ng .250ml LMCS 25N11B

.611 26.92ng .250ml LMCS 25N11B

2.225 24N11B 2.0ml

1.414 60ng 24N11B 1.200ml

.672 30ng 24N11B .600ml

.209 10ng 24N11B .200ml

.125 5ng 24N11B Cal std .100ml

.000 0ng

14:35 As 9-1-93 Valerie L Massie

Signal = Conc.
Mode = PKHT
Recorder = TC3
Temp 900°C
Exp. 4
T 40

Purge I = 50
Rxn = 24
Purge II = 60
Speed = 5mm/min
mV = 20

Intercept:	0.0052
Slope:	0.0225
19:	0.9994
18:	[illegible]
17:	[illegible]
16:	26.9166
15:	26.6056
14:	25.5392
13:	55.6207
12:	1.1451
11:	0.7897
10:	1.2784
9:	54.2313
8:	30.8815
7:	30.5533
6:	1.3229
5:	1.2584
4:	30.6046
3:	-1.2843
2:	-1.4320
1:	-1.6097
	30.7823

L059-13-93

slope = 0.0225
y-int = 0.0052
corr coeff = 0.9994

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Batch 1528

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V 26,V 27,V 28	Customer ID: 107-AP-C,107-AP-D,107-AP-E
Analysis: As	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride AA) WB27979	Procedure/ Rev: LA 355-131 / B-1
Technologist: Valerie L Mason	Date: 09/01/93
Starting Time: 08:00	Temperature 900 C
Ending Time: 15:35	Chemist: L.D. SPARKS

Comments:

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V 51-5595
2	DIGESTED STD	V 24-8595
3	BLANK	V 25-8695
4	SAMPLE	V 26-8795
5	SAMPLE DUP	V 26-8895
6	SAMPLE	V 27-8795
7	SAMPLE DUP	V 27-8895
8	SAMPLE	V 28-8795
9	SAMPLE DUP	V 28-8895
10	ENDING LMCS STD	V 52-5595

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	25N11B .250ml	~~SPIKE~~ JMQ-2-93		
SPIKE	20N10A DF=5000			
		590		

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD:	DATE START:	BATCH # 1528
LA-355-131	9-1-93	
PREPARED BY:	DATE COMPLETE:	WHC-SD-WM-DP-053 REV 0
L. D. SPARKS	9-13-93	

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/25N11B	V 51	As	0.104				103.9		
UNDIGESTED									
STD/20N10A	V 24	As	129.1				129.1		
ACID DIGESTED									
BLANK	V 25	As	<0.013					0.013	
107 AP	V 26	As	<0.013	<0.013	N/A	N/A		0.013	
107 AP	V 27	As	<0.013	<0.013	N/A	N/A		0.013	
107 AP	V 28	As	<0.013	<0.013	N/A	N/A		0.013	
LDS 9-14-93 25N11B									
STD/~~24N11B~~	V 52	As	0.099				99.4		
UNDIGESTED									

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

THE ACID DIGESTED STANDARD RECOVERY (129.1%) IS HIGH, POSSIBLY DUE TO MATRIX EFFECTS FROM THE ACID DIGEST PROCESS. THE UNDIGESTED STANDARD RECOVERIES (103.9% AND 99.4%) ARE WITHIN ACCEPTABLE LIMITS. SINCE THE SAMPLE RESULTS (WHICH MAY ACTUALLY BE 34% HIGH) ARE BELOW THE INSTRUMENT DETECTION LIMIT, THE ANALYSIS RESULTS WILL BE ACCEPTED.

LDSparks
9-13-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 1528

Serial No	Sample Point	Date	Time Issued	Priority
V 51.-5595	107-AP	9- 1-93	12:54	23

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? , 250 ml	STD

Remarks Calculations Results

std ID - 25N11B

EDP Code = R741

Std value: 0.100 ppm

PKHT = ~~.542~~ .542 mg-1-93

ng = 25.97 ng

Result: 0.104 ug/ml

% Rec: 103.9%

Valerie L Massie

NOTE: Beginning Lines

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-1-93	15:35	9-13-93 LDSparks

54-6800-06 (4-10-83)

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Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.250	
V51-5595	As ng (Nanograms)	25.97	
Batch ID	Conc As µg/mL (or mg/L or PPM)	0.104	N/A
1528	Conc As µg/L (PPB)	103.9	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/01/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
LDS 9-13-93			
Date:			
09/01/93			

	STANDARD	DUPLICATE
Conc As µg/mL	1.04E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Foskerwell	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 1 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 1528

Serial No	Sample Point	Date	Time Issued	Priority
V 24.-8595	107-AP	8- 3-93	8:31	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Dig DF=5000	STD

Remarks, Calculations, Results

EDP ~~R741~~ R742 9-13-93 LDS AS/HYDRD

PKHT= 1.064

ng= 51.64ng

STD# 20N10A RESULT 129.1 ug/ml

STD VAL 100 ppm %REC 129.1 %

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-1-93	15:35	9-13-93 LDS

54-5800-001 (R 10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V24-8595	As ng (Nanograms)	51.64	
Batch ID	Acid Digest Dilution Factor DF	5000.0	
1528	Conc As µg/mL (or mg/L or PPM)	129.100	N/A
Rerun No.	Conc As µg/L (PPB)	129100.0	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	LDS		
Date:	9-13-93		
09/01/93			

	STANDARD	DUPLICATE
Conc As (µg/mL)	1.29E+02	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Fokabell	Date:	09-Sep-93
Approved by:	LDSpanka	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No	Sample Point	Date	Time Issued	Priority
V 25.-8695	107-AP	8- 3-93	8:36	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0ml Acid Digest DF=5	BLK

Remarks Calculations Results

REAGENT BLANK

PkHT= .040
ng = 1.29 ng

<0.013 mg/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
				9-20-93
Hrs	Hrs	Hrs	Hrs	Hrs
				9/16
Date 9-1-93	Time Completed 15:35	Lab Unit Mgr 9-13-93 LDSpanka		9/16

54-6800-064 R/C-831

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V25-8695	As ng (Nanograms)	1.29	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1528	Conc As µg/mL (or mg/L or PPM)	0.003	N/A
Rerun No.	Conc As µg/L (PPB)	3.2	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	Kelly Kokalari	Date:	09-Sep-93
Approved by:	LDSpanka	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-8795	107-AP	8- 3-93	8:45	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	107-AP-C

Remarks, Calculations, Results

PKHT = .042
ng = 1.39 ng

< 0.013 ug/ml

Valerie J Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-1-93	15:35	9-13-93 LDSparks	9/9

54-6800-067 (R-10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V26-8795	As ng (Nanograms)	1.39	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1528	Conc As µg/mL (or mg/L or PPM)	0.003	N/A
Rerun No.	Conc As µg/L (PPB)	3.5	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	Kelly Lopkabell	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-8895	107-AP	8- 3-93	8:45	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	107-AP-C

Remarks Calculations Results

DUPLICATE SAMPLE

PKHT= .043
ng= 1.44ng

<0.013 ug/ml

Valerie R Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-1-93	15:35	9-13-93

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V26-8895	As ng (Nanograms)	1.39	1.44
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1528	Conc As µg/mL (or mg/L or PPM)	0.003	0.004
Rerun No.	Conc As µg/L (PPB)	3.5	3.6
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	Kelly Jackabolp	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-8795	107-AP	8- 3-93	8:55	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	107-AP-D

Remarks, Calculations, Results

PKHT= .042
ng= 1.39 ng

<0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-13-93
9-1-93	15:35	LDSparks 9/16

54-6800-001 (R/10-83)

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Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in ml. SS	2.000	
V27-8795	As ng (Nanograms)	1.39	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1528	Conc As µg/ml. (or mg/L or PPM)	0.003	N/A
Rerun No.	Conc As µg/L (PPB)	3.5	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/ml=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/ml)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/ml)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	Kelley Frakenberg	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No	Sample Point	Date	Time Issued	Priority
V 27.-8895	107-AP	8- 3-93	8:55	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest Df = 5	107-AP-D

Remarks Calculations Results

DUPLICATE SAMPLE

PRHT= ~~.042~~ 0.039
ng = 1.24 ng

< 0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit No.
9-1-93	15:35	9-13-93

54-6800-561 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in ml. SS	2.000	2.000
V27-8895	As ng (Nanograms)	1.39	1.24
Batch ID	Acid Digest. Dilution Factor DF	5.0	5.0
1528	Conc As µg/ml. (or mg/L or PPM)	0.003	0.003
Rerun No.	Conc As µg/L (PPB)	3.5	3.1
0	Average Conc (µg/ml.)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/ml=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/ml.)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/ml.)	<0.013	<0.013
Average Conc (µg/ml.)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	Kelly Fiskabid	Date:	09-Sep-93
Approved by:	LDSpokerka	Date:	9-13-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No	Sample Point	Date	Time Issued	Priority
V 28.-8795	107-AP	8- 3-93	8:57	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	107-AP-E

Remarks, Calculations, Results

PRHT = .048
ng = 1.68 ng

<0.013 ug/ml

Valerie L Mason

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-1-93	15:35	9-13-93 LDSparks

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V28-8795	As ng (Nanograms)	1.68	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1528	Conc As µg/mL (or mg/L or PPM)	0.004	N/A
Rerun No.	Conc As µg/L (PPB)	4.2	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	Kelly Fokabell	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

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Serial No	Sample Point	Date	Time Issued	Priority
V 28.-8895	107-AP	8- 3-93	8:57	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	107-AP-E

Remarks, Calculations, Results

DUPLICATE SAMPLE

PKHT = 0.039
ng = 1.24 ng

<0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
9-1-93	15:35	LDSparks 9-13-93		

(4-6800-06) (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in ml. SS	2.000	2.000
V28-8895	As ng (Nanograms)	1.68	1.24
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1528	Conc As µg/ml. (or mg/L or PPM)	0.004	0.003
Rerun No.	Conc As µg/L (PPB)	4.2	3.1
0	Average Conc (µg/ml.)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/ml=(As ng/SS)*(1µg/1000ng)*DF		
09/01/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/01/93	Detection Limit (µg/ml.)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/ml.)	<0.013	<0.013
Average Conc (µg/ml.)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	Kelly Prokopiak	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 52.-5595	107-AP	9- 1-93	12:54	23

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .250 ml	STD

Remarks Calculations Results

std ID 25 N11B
EDP Code = R741
STD Vol: 0.100 ppm

PKHT = .519
ng = 24.84 ng

Result: 0.099 ug/ml
%Rec: 99.4%

Valerie L Massie

NOTE: Ending LINCS

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
				9/16
Date	Time Completed	Lab Unit Mgr 9-13-93		
9-1-93	15:35	LDSparks		

54-6800-061 (R-10-83)

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Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in ml. SS	0.250	
V52-5595	As ng (Nanograms)	24.84	
Batch ID	Conc As µg/ml. (or mg/L or PPM)	0.099	N/A
1528	Conc As µg/L (PPB)	99.4	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc As µg/ml=(As ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/01/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
LDS 9-13-93			
Date:			
09/01/93			

	STANDARD	DUPLICATE
Conc As µg/mL	9.94E-02	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Fakobell	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 1 Rev. 1

#1528

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD

WHC-SD-WM-DP-053 REV 0

Analyte:	As		
Procedure:	LA 355-131	Revision:	B-1
Instrument:	PE2280 (Hydride AA)	Property No.:	WB27979
Technologist	Valerie L Massie	Payroll No.:	Date: 09/01/93

Calibration Standard ID:	24N11B
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.103
3	.200mL	10 ng	.178
4	.600mL	30 ng	.653
5	1.200mL	60 ng	1.335
6	2.000ml	100 ng	1.983
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r=.9973

Y intercept=.0137

slope=.0203

.519 24.84ng .250ml LMCS 25N11B (V52)

.039 1.24ng 2.0ml V28D

.048 1.68ng 2.0ml V28

WHC-SD-WM-DP-053 REV 0

.039 1.24ng 2.0ml V27D

.042 1.39ng 2.0ml V27

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.043 1.44ng 2.0ml V26D

.042 1.39ng 2.0ml V26

.040 1.29ng 2.0ml V25

1.064 51.64ng 2.0ml V24

.554 26.56ng .250ml LMCS 25N11B

.542 25.97ng .250ml LMCS 25N11B (V51)

1.983 100ng 2.0ml 24N11B

1.335 60ng 1.200ml 24N11B

.653 30ng 24N11B .600ml

.179 .200ml 10ng 24N11B

.103 .100ml 5ng 24N11B

AZ .000 0ng

15:35 AS 9-1-93 Valerie L Massey

Signal = Conc. Purge I = 50

Mode = PKHT Run = 24

Recorder = TC3 Purge II = 60

Exp = 4 Speed = 5mm/min

T = 40 mV = 20

temp = 900°C

slope = 0.0203
y-int = 0.0137
corr coeff = 0.9973

14:	Intercept:	0.0137
13:	Slope:	0.0203
12:		0.9973
11:		
10:	V51	25.9727
9:		26.5626
8:	V24	51.6363
7:	V25	1.2903
6:	V26	1.3907
5:	V26D	1.4398
4:	V27	1.3907
3:	V27D	1.2432
2:	V28	1.6856
1:	V28D	1.2432
		24.8419

LDS 9-13-93

603

PERKIN-ELMER

Ramon 9-1-93

Tunnelinon 9-1-93

PERKIN-ELMER

Batch 1542

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V 31	Customer ID: 107-AP-FB
Analysis: As	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride AA) WB27979	Procedure/ Rev: LA 355-131 / B-1
Technologist: Valerie L Massie	Date: 09/02/93
Starting Time: 08:00	Temperature 900 C
Ending Time: 12:00	Chemist: L.D. SPARKS

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	V 53-5595	11		
2	DIGESTED STD	V 29-8595	12		
3	BLANK	V 30-8695	13		
4	SAMPLE	V 31-8795	14		
5	SAMPLE DUP	V 31-8895	15		
6	ENDING LMCS STD	V 54-5595	16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	25N11B .250ml	~~SPIKE~~ VM 9-2-93		
SPIKE	20N10A DF=5000			

604

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

QA

METHOD: LA-355-131	DATE START: 9-2-93	BATCH # 1542
PREPARED BY: L. D. SPARKS	DATE COMPLETE: 9-13-93	

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/25N11B	V 53	As	0.105				105.2		
UNDIGESTED									
STD/20N10A	V 29	As	134.2				134.2		
ACID DIGESTED									
BLANK	V 30	As	<0.013					0.013	
107 AP	V 31	As	<0.013	<0.013	N/A	N/A		0.013	
LDS 9-20-93									
STD/25N11B	V ~~82~~ 54	As	0.104				103.7		
UNDIGESTED									

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

WHC-SD-WM-DP-053 REV 0

THE ACID DIGESTED STANDARD RECOVERY (134.2%) IS HIGH, POSSIBLY DUE TO MATRIX EFFECTS FROM THE ACID DIGEST PROCESS. THE UNDIGESTED STANDARD RECOVERIES (105.2% AND 103.7%) ARE WITHIN ACCEPTABLE LIMITS. SINCE THE SAMPLE RESULTS (WHICH MAY ACTUALLY BE 34% HIGH) ARE BELOW THE INSTRUMENT DETECTION LIMIT, THE ANALYSIS RESULTS WILL BE ACCEPTED.

LDSparks
9-13-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch #1542

Serial No	Sample Point	Date	Time Issued	Priority
V 53.-5595	107-AP	9- 2-93	12:56	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .250 ml	STD

Remarks, Calculations, Results

std ID = 25N11B
sta value: 0.100 ppm
EDP = R741 AS/HYDRD

PKHT: .560
ng = 26.30ng

Result: 0.105 mg/ml
% Rec. 105.2 %

Valerie J Massie

NOTE: Beginning LMCS

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-13-93	
9-2-93	12:00	LDSparks	

54-6800-061 (R 10-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in ml. SS	0.250	
V53-5595	As ng (Nanograms)	26.30	
Batch ID	Conc As µg/mL (or mg/L or PPM)	0.105	N/A
1542	Conc As µg/L (PPB)	105.2	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979			
Calibration Date			
09/02/93			
Analyst			
LDS 9-13-93			
Date:			
09/02/93			

Conc As µg/mL=(As ng/SS)*(1µg/1000ng)
Average Conc.=(Sample + Duplicate)/2
Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100

	STANDARD	DUPLICATE
Conc As µg/ml.	1.05E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Fontaine	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 1 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 1542

Serial No	Sample Point	Date	Time Issued	Priority
V 29.-8595	107-AP	8- 3-93	10:36	25

Determination	Method-Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid digest DF=5000	STD

Remarks, Calculations, Results

LDS R742 ~~R741~~ 9-13-93 EDP AS/HYDRD PKHT= 1.159

STD#20N10A RESULT 134.2 ug/ml ng= 53.70ng

STD VAL 100ppm %REC 134.2%

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-2-93	12:00	9-13-93 LDSparks

54-6R00-06 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST		STANDARD	DUPLICATE
Serial No.	Sample Size in ml. SS	2.000	
V29-8595	As ng (Nanograms)	53.70	
Batch ID	Acid Digest Dilution Factor DF	5000.0	
1542	Conc As µg/ml. (or mg/L or PPM)	134.250	N/A
Rerun No.	Conc As µg/L (PPB)	134250.0	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/ml=(As ng/SS)*(1µg/1000ng)*DF		
09/02/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93			
Date:			
09/02/93			

	STANDARD	DUPLICATE
Conc As (µg/ml)	1.34E+02	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Lockabed	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 30.-8695	107-AP	8- 3-93	10:38	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	BLK

Remarks, Calculations, Results

REAGENT BLANK

PKHT= .051
ng= 3.01ng

<0.013 ug/ml

Valerie L Massi

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-13-93	
9-2-93	12:00	LDSparks	9/16

54 6800 61 (4 10-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in ml. SS	2.000	
V30-8695	As ng (Nanograms)	3.01	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1542	Conc As µg/ml. (or mg/L or PPM)	0.008	N/A
Rerun No.	Conc As µg/L (PPB)	7.5	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/ml.=(As ng/SS)*(1µg/1000ng)*DF		
09/02/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/02/93	Detection Limit (µg/ml)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc As (µg/ml)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	Kelly Lockabell	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-8795	107-AP	8- 3-93	10:40	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0ml Acid Digest DF=5	107AP-FB

Remarks, Calculations, Results

PKHT= .045
ng= 2.74ng

<0.013 ug/ml

Valerie L Massie

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-13-93
9-2-93	12:00	LDSparks

54-6H00-061 (11-18-83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in ml. SS	2.000	
V31-8795	As ng (Nanograms)	2.74	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1542	Conc As µg/ml. (or mg/L or PPM)	0.007	N/A
Rerun No.	Conc As µg/L (PPB)	6.9	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc As µg/ml=(As ng/SS)*(1µg/1000ng)*DF		
09/02/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/02/93	Detection Limit (µg/ml)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/ml)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	Kelly Fakubiel	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-8895	107-AP	8- 3-93	10:40	25

Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	107AP-FB

Remarks, Calculations, Results

DUPLICATE SAMPLE

PKHT= .031
ng= 2.10ng

<0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-13-93	
9-2-93	12:00	LDSparks	

54-6800-06 (R-10/83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in ml. SS	2.000	2.000
V31-8895	As ng (Nanograms)	2.74	2.10
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1542	Conc As µg/ml. (or mg/L or PPM)	0.007	0.005
Rerun No.	Conc As µg/L (PPB)	6.9	5.3
0	Average Conc (µg/ml.)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc As µg/ml=(As ng/SS)*(1µg/1000ng)*DF		
09/02/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
LDS 9-13-93	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/02/93	Detection Limit (µg/ml.)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc As (µg/ml.)	<0.013	<0.013
Average Conc (µg/ml.)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	Kelly Lockwell	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 54.-5595	107-AP	9- 2-93	12:56	26

Determination	Method-Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .250 ml	STD

Remarks, Calculations, Results

std ID=25 N11B
std value: 0.100 ppm
EDP = R741
AS/144DRD

PKHT= .552
ng: 25.93 ng
Result: 0.104 ug/ml
% Rec. 103.7 %

Valerie Y Massie

NOTE: Ending LINES

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-2-93	12:00	9-13-93 LDSparks

54-5800-06 (R-10-83)

Arsenic: LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in ml. SS	0.250	
V54-5595	As ng (Nanograms)	25.93	
Batch ID	Conc As µg/ml. (or mg/L or PPM)	0.104	N/A
1542	Conc As µg/L (PPB)	103.7	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979			
Calibration Date			
09/02/93			
Analyst			
Data:			
09/02/93			

Conc As µg/ml=(As ng/SS)*(1µg/1000ng)
Average Conc.=(Sample + Duplicate)/2
Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100

	STANDARD	DUPLICATE
Conc As µg/ml.	1.04E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Pickard	Date:	09-Sep-93
Approved by:	LDSparks	Date:	9-13-93

Form 1 Rev. 1

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY WHC-SD-WM-DP-053 REV 0

CALIBRATION RECORD

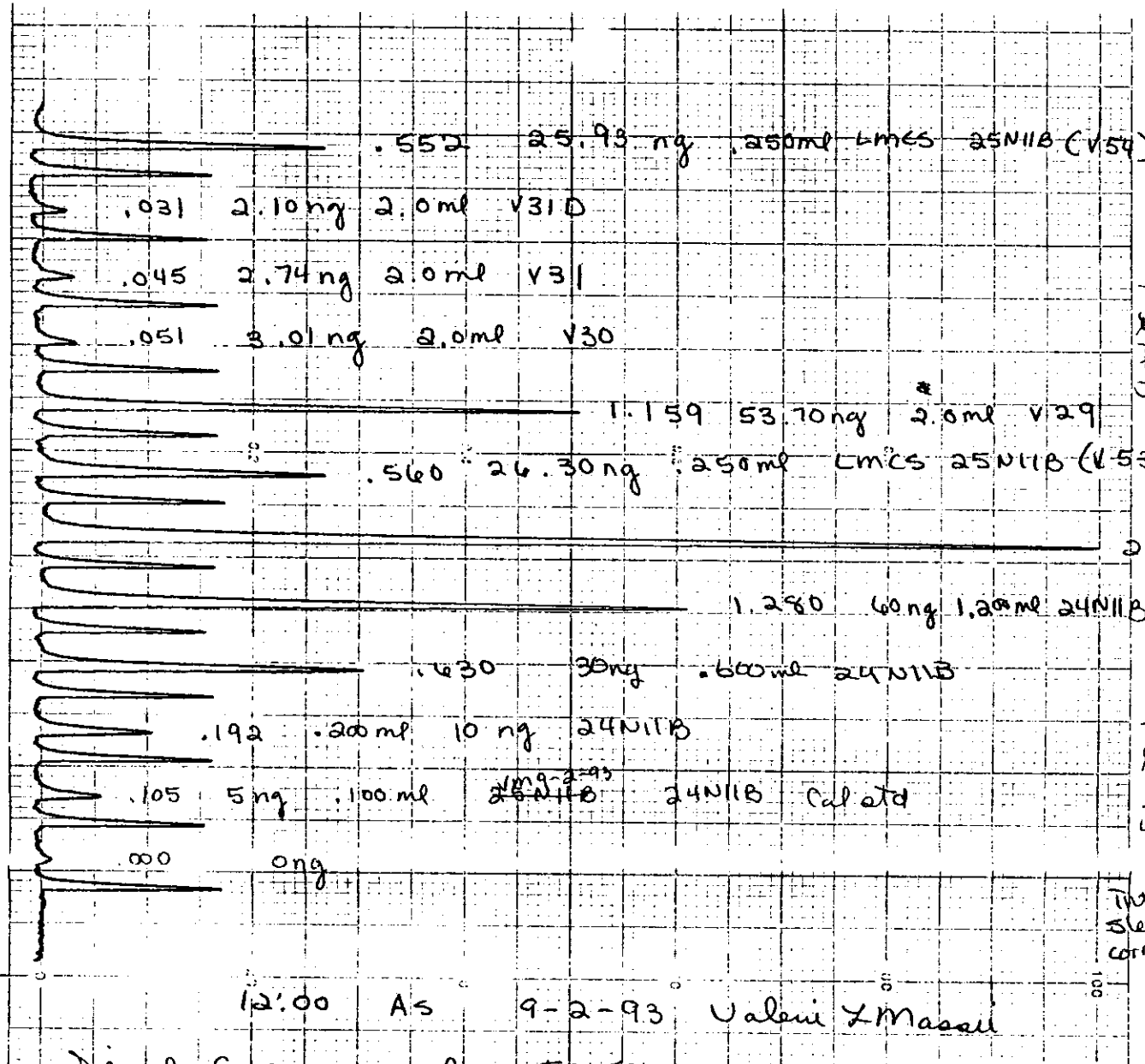
Analyte:	As		
Procedure:	LA 355-131	Revision:	B-1
Instrument:	PE2280 (Hydride AA)	Property No.:	WB27979
Technologist	Valerie L Massie	Payroll No.:	Date: 09/02/93

Calibration Standard ID:	24N11B
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.105
3	.200mL	10 ng	.192
4	.600mL	30 ng	.630
5	1.200mL	60 ng	1.280
6	2.000ml	100 ng	2.185
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r=.9999
Y intercept=-.0149
slope=.0219

A-6000-882 (03/92)


.552 25.93 ng .250ml LMCS 25N11B (V54)
.031 2.10 ng 2.0ml V31D
.045 2.74 ng 2.0ml V31
.051 3.01 ng 2.0ml V30
1.159 53.70 ng 2.0ml V29
.560 26.30 ng .250ml LMCS 25N11B (V53)
2.185 100 ng 2.0ml 24N11B
1.280 60 ng 1.20ml 24N11B
.630 30 ng .600ml 24N11B
.192 .200ml 10 ng 24N11B
.105 5 ng .100ml 24N11B Cal std
.000 0 ng
Int = -0.0149
Slope = 0.0219
corr. = 0.9999
12:00 As 9-2-93 Valerie L Massell
Signal = Conc
Mode = PKHT
Recorder = TC3
Expo = 4
T = 40
Purge I = 50
Rxn = 24
Purge II = 60
T 900°C
Speed = 5mm/min.
mV = 20
Intercept: -0.0149
Slope: 0.0219
0.9999
26.2931
53.7008
3.0127
2.7382
2.0977
25.9321

WHC-SD-WM-DP-053 : Rev. 0 #1514

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. V 21, V 23	Customer ID: 107-AP-A, 107-AP-B
Analysis: Se	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride) WB27979	Procedure/ Rev: LA 365-131 / B-2
Technologist: Valerie L Maisse	Date: 09/07/93
Starting Time: 0745	Temperature 975 C
Ending Time: ~~1325~~ 14:25 JMG 7-9-93	Chemist: L. D. SPARKS

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	V 57-5596	11		
2	DIGESTED STD	V 19-8596	12		
3	BLANK	V 20-8696	13		
4	SAMPLE	V 21-8796	14		
5	SAMPLE DUP	V 21-8896	15		
6	SAMPLE SPIKE	V 21-8996	16		
7	SAMPLE SPIKE DUP	V 21-8096	17		
8	SAMPLE	V 23-8796	18		
9	SAMPLE DUP	V 23-~~8796~~ 8896 12/14/93	19		
10	ENDING LMCS STD	V 58-5596	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	25N11C .500mL			
DIGESTED STD AND	SPIKE.	SPEX SPIKE 1 DF=	100X	

A-6000-881 (03/92)

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 1514

Serial No	Sample Point	Date	Time Issued	Priority
V 57.-5596	101-AP	9- 7-93	9: 1	26

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? , 500 ml	STD

Remarks Calculations Results

LMCS Std ID = 25N11C

EDP ~~R744~~ R743 LDS 9-15-93

Std Val: 0.110 ug/ml

PKHT = .495

ng = 51.39 ng

Result: 0.103 ug/ml

% Rec: 93.42

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-15-93	
9 - 7-93	14:25	LDSpallas	

54-6800-36 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V57-5596	Se ng (Nanograms)	51.39	
Batch ID	Acid Digest Dilution Factor DF	1.0	
1514	Conc Se µg/mL (or mg/L or PPM)	0.103	N/A
Rerun No.	Conc Se µg/L (PPB)	102.8	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
09/07/93			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.03E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	LDSpallas	Date:	15-Sep-93
Approved by:	LDSpallas	Date:	9-15-93

Form 3 Rev. 2

Page 1 of 1

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 1514

Serial No	Sample Point	Date	Time Issued	Priority
V 19.-8596	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5000	STD

Remarks, Calculations, Results

LDS 9-15-93

EDP ~~R740~~ R744 SE/HYDRD PKHT= .448

STD# 20.V10A RESULT 1163 ug/ml ng= 46.51 ng

STD VAL 1 ppm %REC 116.3%

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-15-93
9-7-93	14:25	LDSpaulding

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V19-8596	Se ng (Nanograms)	46.51	
Batch ID	Acid Digest Dilution Factor DF	5000.0	
1514	Conc Se µg/mL (or mg/L or PPM)	116.275	N/A
Rerun No.	Conc Se µg/L (PPB)	116275.0	N/A
0		N/A	N/A
Instrument ID.		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
09/07/93			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.16E+02	
	N/A	N/A
	N/A	N/A

Data Entry by:	LDSpaulding	Date:	15-Sep-93
Approved by:	LDSpaulding	Date:	9-15-93

Form 3 Rev. 2

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 20.-8696	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	BLK

Remarks Calculations Results

REAGENT BLANK

PKHT= .007
ng= 0.70ng

<0.013 mg/ml

Valerie I Massie

Ana	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-7-93	14:25	9-15-93 LDSparks

9/16

(B/1C-831)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V20-8696	Se ng (Nanograms)	0.70	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1514	Conc Se µg/mL (or mg/L or PPM)	0.002	N/A
Rerun No.	Conc Se µg/L (PPB)	1.8	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
09/07/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	15-Sep-93
Approved by:	LDSparks	Date:	9-15-93

Form 3 Rev. 2

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8796	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	107-AP-A

Remarks, Calculations, Results

PRHT = .011
ng = 1.19 ng

<0.013 ug/ml

Valerie Z Massie

	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-7-93	Time Completed 14:25	Lab Unit Mgr 9-15-93 LDSpencer		9/14

SX-6800-DEQ (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V21-8796	Se ng (Nanograms)	1.19	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1514	Conc Se µg/mL (or mg/L or PPM)	0.003	N/A
Rerun No.	Conc Se µg/L (PPB)	3.0	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/07/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSpencer	Date:	15-Sep-93
Approved by:	LDSpencer	Date:	9-15-93

Form 3 Rev. 2

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8896	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	107-AP-A

Remarks Calculations Results

DUPLICATE SAMPLE

PKHT = .011
ng = 1.19 ng

<0.013 ug/ml

Valeri Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-7-93	14:25	9-15-93	9/16

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V21-8896	Se ng (Nanograms)	1.19	1.19
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1514	Conc Se µg/mL (or mg/L or PPM)	0.003	0.003
Rerun No.	Conc Se µg/L (PPB)	3.0	3.0
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/07/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:		Date:	15-Sep-93
Approved by:		Date:	9-15-93

Form 3 Rev. 2

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

9-20-93

RPD based on ng answers for spike and spike dup.

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		Spike SAMPLE	Spike dup DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V21-8896	Se ng (Nanograms)	43.08	44.75
Batch ID	Acid Digest Dilution Factor DF	5000.0	5000.0
1514	Conc Se µg/mL (or mg/L or PPM)	107.700	111.875
Rerun No.	Conc Se µg/L (PPB)	107700.0	111875.0
0	Average Conc (µg/mL)	N/A	109.788
Instrument ID:	Average Conc (µg/L)	N/A	109787.5
WB27979	Relative % Difference	N/A	3.8
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/07/93	Detection Limit (µg/mL)	12.500	
	Detection Limit (µg/L)	12500.00	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	1.08E+02	1.12E+02
Average Conc (µg/mL)	N/A	109.788
Relative % Difference	N/A	3.8

Data Entry by:	[illegible]	Date:	15-Sep-93
Approved by:	[illegible]	Date:	9-15-93

Form 3 Rev. 2

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8996	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0 ml	107-AP-A

Remarks, Calculations, Results

SAMPLE SPIKED ID ~~20N10A~~ V21 WS 9-15-93
SPIKE ID 20N10A
SPIKE VOLUME .25 ml of a 50x dilution to 25 ml. Acid Digest DF = 5000x Total.
Spike std value after dilution is 2.0 ppm.

PKHT = .415
ng = 43.08 ng

107.7% Rec

Valerie L Massey

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6 Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-7-93	14:25	LDSpaulding 9-15-93

54-6800-064 (R 10-83)

Selenium: LA-365-131 (B-2) Se LIQUIDS-ACID DIGEST

			SAMPLE	SPIKE
Serial No.	Sample (mL)Vol. Acid Dig. Used	SAVOL	2.00	N/A
V21-8996	Spike Std Volume (mL)	SSVOL	N/A	0.250
Batch ID	ng of Spike + Sample	ngSSAM	N/A	43.08
1514	ng of Sample	ngSAM	1.19	N/A
Rerun No.	Final Acid Digest Vol. (mL)	ADVOL	N/A	25.00
0			N/A	N/A
Instrument ID:	Spike Std Dilution Factor	SPDF	N/A	100.0
WB27979	Spike Std ID		N/A	20N10A
Calibration Date	Spike Std Value (ppm)	SS VAL	N/A	2.000
09/07/93	% Recovery		N/A	107.7
Analyst:				
	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery			
Date:				
09/07/93	Spike Std. Dilution Factor = ADVOL/SSVOL			

% Recovery = {({(ngSSAM/SAVOL)*(1/1000)}-{(0/SAVOL)*(1/1000)}*SPDF)/SS VAL}*100

% Recovery =	107.7

Data Entry by:	LDSpaulding	Date:	15-Sep-93
Approved by:	LDSpaulding	Date:	9-15-93

Form 4 Rev. 1

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-8096	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0 ml	107-AP-A

Remarks Calculations Results

SAMPLE SPIKE
DUPLICATE

SPIKE ID 20N10A
SPIKE VOL 0.25 ml of a 50x dilution to 25 ml. The total acid digest DF = 5000. Spike std value after dilution is 2.0ppm.

PKHT = .431
ng = 44.75 ng

111.9 % rec.

Valeri I Masel

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
b				
Hrs	Hrs	Hrs	Hrs	Hrs

Date Completed	Time Completed	Lab Unit Mgr
9-7-93	14:25	9-15-93

54-6800-06 R 12-93

Selenium: LA-365-131 (B-2) Se LIQUIDS-ACID DIGEST

Serial No.		SAMPLE	SPIKE
V21-8096	Sample (mL)Vol. Acid Dig. Used SAVOL	2.00	N/A
	Spike Std Volume (mL) SSVOL	N/A	0.250
Batch ID	ng of Spike + Sample ngSSAM	N/A	44.75
1514	ng of Sample ngSAM	1.19	N/A
Rerun No.	Final Acid Digest Vol. (mL) ADVOL	N/A	25.00
0		N/A	N/A
Instrument ID:	Spike Std Dilution Factor SPDF	N/A	100.0
WB27979	Spike Std ID	N/A	20N10A
Calibration Date	Spike Std Value (ppm) SS VAL	N/A	2.000
09/07/93	% Recovery	N/A	111.9
Analyst			
:	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery		
Date:			
09/07/93	Spike Std. Dilution Factor = ADVOL/SSVOL		

% Recovery = {((ngSSAM/SAVOL)*(1/1000)-((0/SAVOL)*(1/1000))*SPDF)/SS VAL}*100

% Recovery =	111.9

Data Entry by:	LD Spaulding	Date:	15-Sep-93
Approved by:	LD Spaulding	Date:	9-15-93

Form 4 Rev. 1

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-8796	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF = 5	107-AP-B

Remarks, Calculations Results

PKHT = .005
ng = 0.50 ng

< 0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-7-93	14:25	9-15-93 LDSparks

54-6800-067 / R-40-831

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V23-8796	Se ng (Nanograms)	0.50	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1514	Conc Se µg/mL (or mg/L or PPM)	0.001	N/A
Rerun No.	Conc Se µg/L (PPB)	1.3	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/07/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	15-Sep-93
Approved by:	LDSparks	Date:	9-15-93

Form 3 Rev. 2

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-8896	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0ml Acid Digest DF=5 PKT PKHT= .005 ng= 0.50ng	107-AP-B

Remarks Calculations Results

DUPLICATE SAMPLE

<0.013 ug/mL

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-7-93	14:25	9-15-93

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V23-8896	Se ng (Nanograms)	0.50	0.50
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1514	Conc Se µg/mL (or mg/L or PPM)	0.001	0.001
Rerun No.	Conc Se µg/L (PPB)	1.3	1.3
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/07/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	LWSpanka	Date:	15-Sep-93
Approved by:	LWSpanka	Date:	9-15-93

Form 3 Rev. 2

WHC-SD-WM-DP-053 Rev. 0

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 58.-5596	101-AP	9- 7-93	9: 1	26

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .500 ml	STD

Remarks, Calculations, Results

LMCS Std ID = 25N11C
EDP = R743
Std Val = 0.110 ug/ml

PR HT = .516
ng = 53.58 ng

Result: 0.107 ug/ml
% Rec: ~~97.56~~ 97.48 LWS 9-20-93

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-7-93	Time Completed 14:25	Lab Unit Mgr 9-15-93 LDSparks		

54-0000-061 (8/10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V58-5596	Se ng (Nanograms)	53.58 ~~53.50~~ LWS 9-20-93	
Batch ID	Acid Digest Dilution Factor DF	1.0	
1514	Conc Se µg/mL (or mg/L or PPM)	0.107	N/A
Rerun No.	Conc Se µg/L (PPB)	107.2 ~~107.0~~ LWS 9-20-93	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/07/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
09/07/93			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.07E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	LDSparks	Date:	15-Sep-93
Approved by:	LDSparks	Date:	9-15-93

Form 3 Rev. 2

WHC-SD-WM-DP-053 Rev. 0 #1514

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD

Analyte:	Se		
Procedure:	LA 365-131	Revision:	B-2
Instrument:	PE2280 (Hydride)	Property No.:	WB27979
Technologist	Valerie L Massei	Payroll No.:	---- Date: 09/07/93

Calibration Standard ID:	22N11C
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.037
3	.500mL	25 ng	.236
4	1.000mL	50 ng	.511
5	2.000mL	100 ng	.950
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r=0.9990

Yintercept=0.0002

Slope=0.0096

Batch # 1529 OA

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V 26,V 27,V 28	Customer ID: 107AP-C, 107AP-D, 107AP-E
Analysis: Se	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride) WB27979	Procedure/ Rev: LA 365-131 / B-2
Technologist: Valerie L Masari	Date: 08/24/93
Starting Time: 07:45	Temperature 975 C
Ending Time: 14:15	Chemist: L.D. SPARKS

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	V 45-5596	11		
2	DIGESTED STD	V 24-8596	12		
3	BLANK	V 25-8696	13		
4	SAMPLE	V 26-8796	14		
5	SAMPLE DUP	V 26-8896	15		
6	SAMPLE	V 27-8796	16		
7	SAMPLE DUP	V 27-8896	17		
8	SAMPLE	V 28-8796	18		
9	SAMPLE DUP	V 28-8896	19		
10	ENDING LMCS CHECK STD	V 46-5596	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	25N11B .500mL			
		627		

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD:	DATE START:	BATCH # 1529
LA-365-131	8-24-93	
PREPARED BY:	DATE COMPLETE:	WHC-SD-WM-DP-053 REV 0
L. D. SPARKS	8-26-93	

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/25N11B	V 45	Se	0.111				100.6		
UNDIGESTED									
STD/20N10A	V 24	Se	123.4				123.4		
ACID DIGESTED									
BLANK	V 25	Se	< 0.013					0.013	
107 AP	V 26	Se	< 0.013	< 0.013	N/A	N/A		0.013	
107 AP	V 27	Se	< 0.013	< 0.013	N/A	N/A		0.013	
107 AP	V 28	Se	< 0.013	< 0.013	N/A	N/A		0.013	
STD/25N11B	V 46	Se	0.102				92.7		
UNDIGESTED									

NARRATIVE: XXXXX NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH

LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

LD Sparks
8-30-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Batch 1529

Serial No	Sample Point	Date	Time Issued	Priority
V 45.-5596	107-AP	8-24-93	9:17	12

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .500 ml	STD

Remarks Calculations Results

25N11B
EDP:R743
STDVAL 0.110ppm
SE/HYDRD

PKHT= .821
ng= 55.34 ng

Result: 0.111 ug/ml
%Rec: 100.68

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 8-30-93	
8-24-93	14:15	LD Sparks	

64-6800-063 R 10-831

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V45-5596	Se ng (Nanograms)	55.34	
Batch ID	Acid Digest Dilution Factor DF	1.0	
1529	Conc Se µg/mL (or mg/L or PPM)	0.111	N/A
Rerun No.	Conc Se µg/L (PPB)	110.7	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
08/24/93			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.11E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	LD Sparks	Date:	25-Aug-93
Approved by:	LD Sparks	Date:	8-30-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Batch 1529

Serial No	Sample Point	Date	Time Issued	Priority
V 24.-8596	107-AP	8- 3-93	8:31	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0ml (Acid Digest DF=5000)	STD

Remarks, Calculations, Results

EDP ~~R743~~ R744 SE/HYDRD PKHT= .732

STD# 20N10A RESULT 123.4 ug/mL ng= 49.37ng

STD VAL 100 ppm %REC 123.4 %

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-24-93	14:15	L D Sparks 8-30-93

24-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V24-8596	Se ng (Nanograms)	49.37	
Batch ID	Acid Digest Dilution Factor DF	5000.0	
1529	Conc Se µg/mL (or mg/L or PPM)	123.425	N/A
Rerun No.	Conc Se µg/L (PPB)	123425.0	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
08/24/93			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.23E+02	
	N/A	N/A
	N/A	N/A

Data Entry by:	L D Sparks	Date:	25-Aug-93
Approved by:	L D Sparks	Date:	8-30-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO N)T WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 25.-8696	107-AP	8- 3-93	8:36	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0ml (Acid Digest DF= 5)	BLK

Remarks Calculations Results

REAGENT BLANK

PKHT= ·038

Result: < 0.013 ug/ml

ng= 2.79 ng

Valerie L Massey

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 8-30-93	
8-24-93	14:15	LDSparks	

54-6800-063 R-10-831

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V25-8696	Se ng (Nanograms)	2.79	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1529	Conc Se µg/mL (or mg/L or PPM)	0.007	N/A
Rerun No.	Conc Se µg/L (PPB)	7.0	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
08/24/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	25-Aug-93
Approved by:	LDSparks	Date:	8-30-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO I)T WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-8796	107-AP	8- 3-93	8:45	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
?2.0ml (Acid Digest DF=5)	107-AP-C

Remarks, Calculations, Results

PKHT= .016
ng= 1.31 ng

Result: <0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 830-93	
8-24-93	14:15	LDSparks	

54-6800-001 (R-10-831)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V26-8796	Se ng (Nanograms)	1.31	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1529	Conc Se µg/mL (or mg/L or PPM)	0.003	N/A
Rerun No.	Conc Se µg/L (PPB)	3.3	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
08/24/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	25-Aug-93
Approved by:	LDSparks	Date:	8-30-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 26.-8896	107-AP	8- 3-93	8:45	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 mL (Acid Digest DF = 5)	107-AP-C

Remarks Calculations Results

DUPLICATE SAMPLE

PKHT = .023
ng = 1.78 ng

Result : <0.013 ug/mL

Valerie I Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-24-93	14:15	8-30-93 LD Sparks

54-6800-06 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V26-8896	Se ng (Nanograms)	1.31	1.78
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1529	Conc Se µg/mL (or mg/L or PPM)	0.003	0.004
Rerun No.	Conc Se µg/L (PPB)	3.3	4.5
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
08/24/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	LD Sparks	Date:	25-Aug-93
Approved by:	LD Sparks	Date:	8-30-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-8796	107-AP	8- 3-93	8:55	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
?2.0 ml (Acid Digest DF=5)	107-AP-D

Remarks Calculations Results

PKHT = .021
ng = 1.65ng

Result: <0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
8-24-93	14:15	8-30-93 LDSparks	8/31

54-6800-067 R-10-831

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V27-8796	Se ng (Nanograms)	1.65	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1529	Conc Se µg/mL (or mg/L or PPM)	0.004	N/A
Rerun No.	Conc Se µg/L (PPB)	4.1	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
08/24/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSparks	Date:	25-Aug-93
Approved by:	LDSparks	Date:	8-30-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 27.-8896	107-AP	8- 3-93	8:55	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0ml (Acid Digest DF=5)	107-AP-D

Remarks Calculations Results

DUPLICATE SAMPLE

PKHT= .020
ng= 1.58ng

Result: < 0.013 ug/ml

8-24-93
Valari L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-24-93	14:15	8-30-93

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V27-8896	Se ng (Nanograms)	1.65	1.58
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1529	Conc Se µg/mL (or mg/L or PPM)	0.004	0.004
Rerun No.	Conc Se µg/L (PPB)	4.1	4.0
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst:	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
08/24/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:		Date:	25-Aug-93
Approved by:		Date:	8-30-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW- .O NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 28.-8796	107-AP	8- 3-93	8:57	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0ml (Acid Digest DF=5)	107-AP-E

Remarks Calculations Results

PK HT= .017
ng= 1.38 ng

Result: < 0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-24-93	14:15	8-30-93

54-6800-0 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V28-8796	Se ng (Nanograms)	1.38	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1529	Conc Se µg/mL (or mg/L or PPM)	0.003	N/A
Rerun No.	Conc Se µg/L (PPB)	3.5	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
08/24/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	L D Sparks	Date:	25-Aug-93
Approved by:	L D Sparks	Date:	8-30-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 28.-8896	107-AP	8- 3-93	8:57	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml (Acid Digest DF=5)	107-AP-E

Remarks, Calculations, Results

DUPLICATE SAMPLE

PKHT= .020
ng= 1.58 ng

Result: <0.013 ug/ml

Valerie L Mason

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-24-93	14:15	LDSparks 8-30-93

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V28-8896	Se ng (Nanograms)	1.38	1.58
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1529	Conc Se µg/mL (or mg/L or PPM)	0.003	0.004
Rerun No.	Conc Se µg/L (PPB)	3.5	4.0
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
08/24/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	LDSparks	Date:	25-Aug-93
Approved by:	LDSparks	Date:	8-30-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 46.-5596	107-AP	8-24-93	9:18	12

Determination	Method/Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .500 ml	STD

Remarks, Calculations, Results

std ID - 25N11B
EDP = R743 SE/HYDRD
RESULT: 0.102 ug/mL
STD Val: 0.110 ppm %Rec. = 92.66
PKHT= .755
ng = 50.91 ng
LDS 8-30-93

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
8-24-93	14:15	8-30-93

54-6800-081 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V46-5596	Se ng (Nanograms)	50.91	
Batch ID	Acid Digest Dilution Factor DF	1.0	
1529	Conc Se µg/mL (or mg/L or PPM)	0.102	N/A
Rerun No.	Conc Se µg/L (PPB)	101.8	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
08/24/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
08/24/93			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.02E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	RESlivoda	Date:	07-Sep-93
Approved by:	RESlivoda	Date:	9-7-93

Form 3 Rev. 2

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#1529

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD

WHC-SD-WM-DP-053 REV 0

Analyte:	Se		
Procedure:	LA 365-131	Revision:	B-2
Instrument:	PE2280 (Hydride)	Property No.:	~~WA~~ YB 27979 LDS 8-26-93
Technologist	Valeri Massie	Payroll No.:	Date: 08/24/93

Calibration Standard ID:	22N11C
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.057
3	.500mL	25 ng	.380
4	1.000mL	50 ng	.744
5	2.000mL	100 ng	1.483
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r=.9999

Y intercept=-.0036

SLOPE=.0149

A-6000-882 (03/92)

RES 9/7/93

50.91 ~~55.91~~ ng LMCS std 25N11B

.755 .500 ml

.020 2.0 ml 1.58 ng V28D

.017 2.0 ml 1.38 ng V28

.026 2.0 ml 1.58 ng V27D

.021 2.0 ml 1.65 ng V27

.819 V26S 2.0 ml + .500 ml LMCS 25N11B 55.21 ng

.023 2.0 ml V26D 1.78 ng

.016 2.0 ml V26 1.31 ng

.038 2.0 ml V25 2.79 ng

.732 2.0 ml V24 49.37 ng

.821 .500 ml 55.34 ng 25N11B LMCS std V45

1.483 2.0 ml 100 ng 22N11C

.744 1.0 ml 50 ng 22N11C

.380 .500 ml 25 ng 22N11C

.057 .100 ml 5 ng 22N11C Cal std

.000 AC 0 ng

14:15 Se 8-24-93 Valerie L Massie

Signal - conc. Purge I = 40
mode - pkht Purge = 10
recorder TC3 Purge II = 50
temp. 975°C Speed 5 mm/min
Exp = 10 T = 30 mV - 20

125 Sparb 8-26-93

14:	Intercept: -0.0036
13:	Slope: 0.0149
12:	0.9999
11:	55.3427
10:	49.3694
9:	2.7913
8:	1.3147
7:	1.7845
6:	55.2084
5:	1.6503
4:	1.5832
3:	1.3819
2:	1.5832
1:	50.9131

1529 Turned in 8-30-93

BEST AVAILABLE COPY

Batch # 1543

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V 31	Customer ID: 107-AP-FB
Analysis: Se	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride) WB27979	Procedure/ Rev: LA 365-131 / B-2
Technologist: Valerie L Massai	Date: 09/08/93
Starting Time: 07:50	Temperature 975 C
Ending Time: 13:35	Chemist: L.D. SPARKS

Comments:

	Description	Lab ID
1	INITIAL LMCS CHECK STD	V 47-5596
2	DIGESTED STD	V 29-8596
3	BLANK	V 30-8696
4	SAMPLE	V 31-8796
5	SAMPLE DUP	V 31-8896
6	ENDING LMCS STD	V 48-5596
7		
8		
9		
10		

	Description	Lab ID
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	25N11C .500mL			
DIGESTED STD	20N10A DF=5000			

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ANALYTICAL BATCH SUMMARY SHEET

METHOD:	DATE START:	BATCH # 1543
LA-365-131	9-8-93	
PREPARED BY:	DATE COMPLETE:	
L. D. SPARKS	9-15-93	WHC-SD-WM-DP-053 REV 0

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/25N11C	V 47	Se	0.106				96.1		
UNDIGESTED									
STD/20N10A	V 29	Se	126.4				126.4		
ACID DIGESTED									
BLANK	V 30	Se	< 0.013					0.013	
107 AP	V 31	Se	< 0.013	< 0.013	N/A	N/A		0.013	
STD/25N11C	V 48	Se	0.107				97.6		
UNDIGESTED									

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

THE DIGESTED STANDARD %RECOVERY IS SLIGHTLY HIGH (126.4 %), BUT IS WITHIN ACCEPTABLE LIMITS. THIS RUN WILL BE ACCEPTED BECAUSE THE FRONT AND END LMCS STANDARDS ARE WITHIN +/- 5% AND BECAUSE THE SAMPLES READ LESS THAN THE DETECTION LIMIT.

LDSparks
9-15-93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Batch 1543

Serial No	Sample Point	Date	Time Issued	Priority
V 47.-5596	107-AP	8-26-93	12:57	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .500 ml	STD

Remarks, Calculations, Results

LMCS std ID 25N11C
EDP = R743
Std Val. = 0.110 ug/ml

PK HT = .504
ng = 52.84 ng
Result = 0.106 ug/ml
96.1%

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-15-93
9-8-93	13:35	LDSpanks

54-6800-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V47-5596	Se ng (Nanograms)	52.84	
Batch ID	Conc Se µg/mL (or mg/L or PPM)	0.106	N/A
1543	Conc Se µg/L (PPB)	105.7	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/08/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
Date:			
09/08/93			

	STANDARD	DUPLICATE
Conc Se µg/mL	1.06E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Jankowiak	Date:	13-Sep-93
Approved by:	LDSpanks	Date:	9-15-93

Form 1 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Batch 1543

Serial No	Sample Point	Date	Time Issued	Priority
V 29.-8596	107-AP	8- 3-93	10:36	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2.0ml Acid Digest DF = 5000X	STD

Remarks, Calculations, Results

PK Ht = .482

EDP ~~17745~~ 744 SE/HYDRD ng = 50.54ng

STD# 20N10A RESULT 126.4 ug/ml

STD VAL 100ppm %REC 126.4 %

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-8-93	13:35	9-15-93

54-6800-061

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V29-8596	Se ng (Nanograms)	50.54	
Batch ID	Acid Digest Dilution Factor DF	5000.0	
1543	Conc Se µg/mL (or mg/L or PPM)	126.350	N/A
Rerun No.	Conc Se µg/L (PPB)	126350.0	N/A
0		N/A	N/A
Instrument ID.		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Date:			
09/08/93			

	STANDARD	DUPLICATE
Conc Se (µg/mL)	1.26E+02	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Lakowski	Date:	13-Sep-93
Approved by:	L D Sparks	Date:	9-15-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 30.-8696	107-AP	8- 3-93	10:38	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0ml Acid digest DF = 5	BLK

Remarks Calculations Results

REAGENT BLANK

PK HT: .020
ng: 2.28ng

<0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-15-93
9-8-93	13:35	LD Gerlicks

SA-5800-861 R-10-831

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V30-8696	Se ng (Nanograms)	2.28	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1543	Conc Se µg/mL (or mg/L or PPM)	0.006	N/A
Rerun No.	Conc Se µg/L (PPB)	5.7	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/08/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	BLANK	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	Nelly Lookabill	Date:	13-Sep-93
Approved by:	LD Gerlicks	Date:	9-13-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-8796	107-AP	8- 3-93	10:40	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest DF=5	107AP-FB

Remarks, Calculations, Results

PKHT: ~~.015~~ .013
ng = ~~1.76ng~~ 1.55ng

<0.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-8-93	13:35	LDSpanks 9-15-93	9/16

54-6800-961 (R 10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V31-8796	Se ng (Nanograms)	1.55	
Batch ID	Acid Digest Dilution Factor DF	5.0	
1543	Conc Se µg/mL (or mg/L or PPM)	0.004	N/A
Rerun No.	Conc Se µg/L (PPB)	3.9	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979		N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
09/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Date:			
09/08/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	LDSpanks	Date:	13-Sep-93
Approved by:	LDSpanks	Date:	9-15-93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 31.-8896	107-AP	8- 3-93	10:40	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	N1L17	0

Sample Size	Customer ID
? 2.0 ml Acid Digest ~~DF~~ DF = 5	107AP-FB

Remarks, Calculations, Results

DUPLICATE SAMPLE

PKHT= .020
ng = 2.28 ng

20.013 ug/ml

Valerie L Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 9-15-93	
9-8-93	13:35	LD Spankas	9/16

54-6880-061 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V31-8896	Se ng (Nanograms) LDS 9-15-93	1.55 ~~1.70~~	2.28
Batch ID	Acid Digest Dilution Factor DF	5.0	5.0
1543	Conc Se µg/mL (or mg/L or PPM)	0.004	0.006
Rerun No.	Conc Se µg/L (PPB) LDS 9-15-93	3.9 ~~4.4~~	5.7
0	Average Conc (µg/mL)	N/A	N/A
Instrument ID:	Average Conc (µg/L)	N/A	N/A
WB27979	Relative % Difference	N/A	N/A
Calibration Date	Conc Se µg/mL=(Se ng/SS)*(1 µg/1000ng)*DF		
09/08/93	Average Conc.=(Sample + Duplicate)/2		
Analyst	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
	Detection Limit = (5 ng/SS)*(1 µg/1000ng)*DF		
Date:			
09/08/93	Detection Limit (µg/mL)	0.013	
	Detection Limit (µg/L)	12.50	

	SAMPLE	DUPLICATE
Conc Se (µg/mL)	<0.013	<0.013
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	Kelley Lookabill	Date:	13-Sep-93
Approved by:	LD Spankas	Date:	9-15-93

Form 3 Rev. 2

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 48.-5596	107-AP	8-26-93	12:57	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	% RECOVERY	N1L17	0

Sample Size	Customer ID
? .500 ml	STD

Remarks, Calculations, Results

LMCS std ID=25N11C
EDP = R743
Std Value: 0.110 µg/mL

PKHT= .512
ng = 53.67 ng
Result: 0.107 µg/mL
97.6% Rec.

Valerie J Massie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-8-93	13:35	9-15-93 LDSparks

54-6800-062 (R-10-83)

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
V48-5596	Se ng (Nanograms)	53.67	
Batch ID	Conc Se µg/mL (or mg/L or PPM)	0.107	N/A
1543	Conc Se µg/L (PPB)	107.3	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB27979	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/08/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
Date:			
09/08/93			

	STANDARD	DUPLICATE
Conc Se µg/mL	1.07E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	Kelly Frankstreet	Date:	13-Sep-93
Approved by:	LDSparks	Date:	9-15-93

Form 1 Rev. 1

H 1543

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD

WHC-SD-WM-DP-053 REV 0

Analyte:	Se		
Procedure:	LA 365-131	Revision:	B-2
Instrument:	PE2280 (Hydride)	Property No.:	WB27979
Technologist	Valerie L Massey	Payroll No.:	Date: 09/08/93

Calibration Standard ID:	22N11C
Analyte Concentration:	.100ppm
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.000
2	.100mL	5 ng	.052
3	.500mL	25 ng	.212
4	1.000mL	50 ng	.500
5	2.000mL	100 ng	.950
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

mments: r=.9990

Y intercept=-.0019

SLOPE=.0096

A-6000-882 (03/92)

.512 53.67ng LMCS std 25N11C (V48)

.020 2.28ng 2.0ml V31D

.013 1.55ng 2.0ml V31

.015 1.76ng 2.0ml V30

.481 50.44ng 2.0ml V29

.020 2.28ng 2.0ml V30

.482 50.54ng 2.0ml V29

.504 52.84ng .500ml LMCS std 25N11C (V47)

.950 2.0ml 100ng 22N11C

.500 50ng 22N11C 1.0ml

.212 .500ml 25ng 22N11C

.052 .100 ~~ml~~ ml 5ng 22N11C Cal std

.000 0ng

13:35 Se 9-8-93 Valerie Massie

slope = ~~+0.0096~~ 0.0096 9-13-93

y-int = -0.0019

corr coeff = 0.9990

Signal = Conc. Purge I = 40

Mode = PKHT Rxn = 10

Recorder = TC3 Purge II = 50

Exp = 10 temp = 975°C

T = 30 speed = 5mm/min

mV = 20

11:	Intercept: -0.0019
10:	Slope: 0.0096
9:	0.9990
8:	52.8379
7:	50.5400
6:	2.2823
5:	50.4355
4:	1.7601
3:	1.5511
2:	2.2823
1:	53.6736

✓ 1A 34

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch# 1510

WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V 21, V 23	Customer ID: 107-AP-A, 107-AP-B
Analysis: Hg	Sample Prep: RES 9-8-93 ~~UNDIGESTED~~ DIRECT

Instrument: PE2380(Hydride AA) WB26847	Procedure/ Rev: LA 325-104 / A-1
Technologist: Jeff Solbrack JLSolbrack	Date: 09/05/93
Starting Time: 1650	Temperature 175 C
Ending Time: 2330	Chemist: R.A. SKODA

Comments: r = .9991 Y-intercept = .0003 SLOPE = .0105

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	V 19-5597	11		
2	REAGENT BLANK	V 20-5697	12		
3	SAMPLE	V 21-5797	13		
4	DUPLICATE SAMPLE	V 21-5897	14		
5	SPIKED SAMPLE	V 21-5997	15		
6	DUPLICATE SPIKED SAMPLE	V 21-5097	16		
7	SAMPLE	V 23-5797	17		
8	DUPLICATE SAMPLE	V 23-5897	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	21N11C .300mL			
SPIKE	21N11C .300mL			

651

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD:		DATE START:	Batch# 1510
LA-325-104		9-05-93	
PREPARED BY:		DATE COMPLETE:	WHC-SD-WM-DP-053 REV 0
R. E. SKODA		9-13-93	

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/21N11C	V19	Hg	.101				100.9		
BLANK	V20	Hg	<0.005					0.005	
107 AP	V21	Hg	<0.003	<0.003	N/A	N/A	99.9	0.003	
107 AP SPK DUP	V21	Hg					95.2		
107 AP	V23	Hg	<0.003	<0.003	N/A	N/A		0.003	
STD/21N11C		Hg	.098				98.3		

NARRATIVE: XXXXXXX NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Detection limits for sample and blank are different due to difference in sample size.

RESkoda 9-13-93

$$RPD = \frac{29.98\,ng - 28.55\,ng}{[(29.98\,ng + 28.55\,ng)/2]} = \frac{1.43\,ng}{29.265\,ng} \times 100 = 4.98$$

for spike and spike dup. based on ng answers.

LD Sparks
11/4/93

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Batch 1510

Serial No	Sample Point	Date	Time Issued	Priority
V 19:-5597	107-AP	8-2-93	15:14	05

Determination	Method Standard	Result Units	Charge Code	Reruns
Hg	LA-325-104	% RECOVERY	N1L17	0

Sample Size	Customer ID
? , 300mL	STD

Remarks Calculations Results

PK Ht. .318

EDP R716 HG/HYDRD

STD#21N11-C RESULT 0.101 ppm

ng. 30.26

STD VAL 0.100ppm %REC 100.9%

Jeff Sollenberger

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-5-93	2330	9-7-93

54-5500-065 (R 10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.300	
V19-5597	Hg ng (Nanograms)	30.26	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.101	N/A
1510	Conc Hg µg/L (PPB)	100.9	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1 µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/05/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
Date:			
09/05/93			

	STANDARD	DUPLICATE
Conc Hg µg/mL	1.01E-01	
	N/A	N/A
	N/A	N/A

Data Entry by:	RE Wroda	Date:	07-Sep-93
Approved by:	RE Wroda	Date:	9-7-93

Form 1 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 20.-5697	107-AP	8- 2-93	15:14	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Hg	LA-325-104	uG/ML	N1L17	0

Sample Size	Customer ID
? 1ml.	BLK

Remarks, Calculations, Results

REAGENT BLANK

PK. HT. .001

ng. 0.0624

<0.005 µg/ml

Jeff Sellbach

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-5-93	2330	RESlivda 9-7-93	9/93

54-6800-06 (R-1) #31

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		BLANK	DUPLICATE
Serial No.	Sample Size in mL SS	1.000	
V20-5697	Hg ng (Nanograms)	0.06	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.000	N/A
1510	Conc Hg µg/L (PPB)	0.1	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/05/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
	Detection Limit is Corrected for Sample Prep/Dilution		
Date:			
09/05/93	Detection Limit (µg/mL) =	0.005	
	Detection Limit (µg/L) =	5.0	

	BLANK	DUPLICATE
Conc Hg µg/mL	<0.005	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	RESlivda	Date:	07-Sep-93
Approved by:	RESlivda	Date:	9-7-93

Form 1 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5797	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Hg	LA-325-104	uG/ML	N1L17	0

Sample Size	Customer ID
? 2 ml	107-AP-A

Remarks Calculations Results

PK.HT. .012

ng. 1.1105

<0.003 µg/ml

Jeff Sellnach

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Use Only
9-5-93	2330	9-7-93

(R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V21-5797	Hg ng (Nanograms)	1.11	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.001	N/A
1510	Conc Hg µg/L (PPB)	0.6	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/05/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
	Detection Limit is Corrected for Sample Prep/Dilution		
Date:			
09/05/93	Detection Limit (µg/mL) =	0.003	
	Detection Limit (µg/L) =	2.5	

	SAMPLE	DUPLICATE
Conc Hg µg/mL	<0.003	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	CEsllwoda	Date:	07-Sep-93
Approved by:	CEsllwoda	Date:	9-7-93

Form 1 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5897	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Hg	LA-325-104	uG/ML	N1L17	0

Sample Size	Customer ID
? 2mL	107-AP-A

Remarks. Calculations. Results

DUPLICATE SAMPLE

Pk. Ht. .015

ng. 1.39

<0.003µg/mL

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-5-93	2330	9-7-93

34-5800-001 (A-10-831)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	2.000
V21-5897	Hg ng (Nanograms)	1.11	1.39
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.001	0.001
1510	Conc Hg µg/L (PPB)	0.6	0.7
Rerun No.	Average Conc (µg/mL)	N/A	N/A
0	Average Conc (µg/L)	N/A	N/A
Instrument ID:	Relative % Difference	N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1 µg/1000 ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/05/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1 µg/1000 ng)		
	Detection Limit is Corrected for Sample Prep/Dilution		
Date:			
09/05/93	Detection Limit (µg/mL) =	0.003	
	Detection Limit (µg/L) =	2.5	

	SAMPLE	DUPLICATE
Conc Hg µg/mL	<0.003	0.003
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:	CC Shoda	Date:	07-Sep-93
Approved by:	CC Shoda	Date:	9-7-93

Form 1 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5997	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Hg	LA-325-104	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2 ml. + .300 ml. 21N11-C	107-AP-A

Remarks Calculations Results

SAMPLE SPIKED ID V-21
SPIKE ID 21N11-C
SPIKE VOLUME .300 ml.

PK. Ht. .315
ng. 29.98

99.9% recovery

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-5-93	2330	9-7-93	9/7/93

54-6800-261 (R/10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

			SAMPLE	SPIKE
Serial No.	Spike Std Volume (mL)	SSVOL		0.300
V21-5997	ng of Spike + Sample	ngSSAM		29.98
Batch ID	ng of Sample	ngSAM	1.11	
1510	Spike Std ID			21N11C
Rerun No.	Spike Std Value (ppm)			0.100
0	% Recovery		N/A	99.9

Instrument ID:
WB26847
Calibration Date
09/05/93
Analyst
Date:
09/05/93

Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery

% Recovery = {[(ngSSAM−0)/(SSVOL*1000µL/mL)]/Spike Std Value}*100

% Recovery =	99.9

Data Entry by:	RE Skoda	Date:	07-Sep-93
Approved by:	RE Skoda	Date:	9 / 7 / 93

Form 2 Rev. 1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 21.-5097	107-AP	8- 2-93	15:16	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Hg	LA-325-104	% RECOVERY	N1L17	0

Sample Size	Customer ID
? 2ml. + .300ml. 21N11-C	107-AP-A

Remarks Calculations Results

SAMPLE SPIKE
DUPLICATE

Pk. Ht. .300
ng. 28.55

SPIKE ID 21N11-C
SPIKE VOL .300ml.

95.2%

Avg ng = 29.26ng
% RPD = 4.9% based on ng

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-5-93	2330	9-7-93

54-6800-061 (9/93)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

			SAMPLE	SPIKE
Serial No.	Spike Std Volume (mL)	SSVOL		0.300
V21-5097	ng of Spike + Sample	ngSSAM		28.55
Batch ID	ng of Sample	ngSAM	1.11	
1510	Spike Std ID			21N11C
Rerun No.	Spike Std Value (ppm)			0.100
0	% Recovery		N/A	95.2
Instrument ID:				
WB26847				
Calibration Date				
09/05/93				
Analyst				
Date:				
09/05/93				

Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery

% Recovery = {[(ngSSAM-0)/(SSVOL*1000µL/mL)]/Spike Std Value}*100

% Recovery = 95.2

Data Entry by:		Date:	07-Sep-93
Approved by:		Date:	9-7-93

Form 2 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-053 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5797	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Hg	LA-325-104	uG/ML	N1L17	0

Sample Size	Customer ID
? 2ml.	107-AP-B

Remarks Calculations Results

PH.HH. .008

ng. 0.729

<0.003 µg/ml

Analyst 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
9-5-93	2330	9-7-93	9/93

54-6800-067 (R 10-93)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	2.000	
V23-5797	Hg ng (Nanograms)	0.73	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.000	N/A
1510	Conc Hg µg/L (PPB)	0.4	N/A
Rerun No.		N/A	N/A
0		N/A	N/A
Instrument ID:		N/A	N/A
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/05/93	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
	Detection Limit is Corrected for Sample Prep/Dilution		
Date:			
09/05/93	Detection Limit (µg/mL) =	0.003	
	Detection Limit (µg/L) =	2.5	

	SAMPLE	DUPLICATE
Conc Hg µg/mL	<0.003	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	RE Wooda	Date:	07-Sep-93
Approved by:	RE Wooda	Date:	9-7-93

Form 1 Rev. 1

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
V 23.-5897	107-AP	8- 3-93	8:30	25

Determination	Method Standard	Result Units	Charge Code	Reruns
Hg	LA-325-104	uG/ML	N1L17	0

Sample Size	Customer ID
? 2ml.	107-AP-B

Remarks, Calculations, Results

DUPLICATE SAMPLE

PK. Ht. .006

ng. 0.538

<0.003 µg/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs
Date: 9-5-93	Time Completed: 2330	Lab Unit Mgr: 9-7-93		

54-6800-06 (R-10-83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in ml. SS	2.000	2.000
V23-5897	Hg ng (Nanograms)	0.73	0.54
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.000	0.000
1510	Conc Hg µg/L (PPB)	0.4	0.3
Rerun No.	Average Conc (µg/mL)	N/A	N/A
0	Average Conc (µg/L)	N/A	N/A
Instrument ID:	Relative % Difference	N/A	N/A
WB26847			
Calibration Date			
09/05/93			
Analyst			
Date:			
09/05/93			

Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)
Average Conc.=(Sample + Duplicate)/2
Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100
Detection Limit = (5 ng/SS)*(1µg/1000ng)
Detection Limit is Corrected for Sample Prep/Dilution

Detection Limit (µg/mL)	=	0.003
Detection Limit (µg/L)	=	2.5

	SAMPLE	DUPLICATE
Conc Hg µg/mL	<0.003	0.003
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by:		Date:	07-Sep-93
Approved by:		Date:	9-7-93

Form 1 Rev. 1

#1510

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD

WHC-SD-WM-DP-053 REV 0

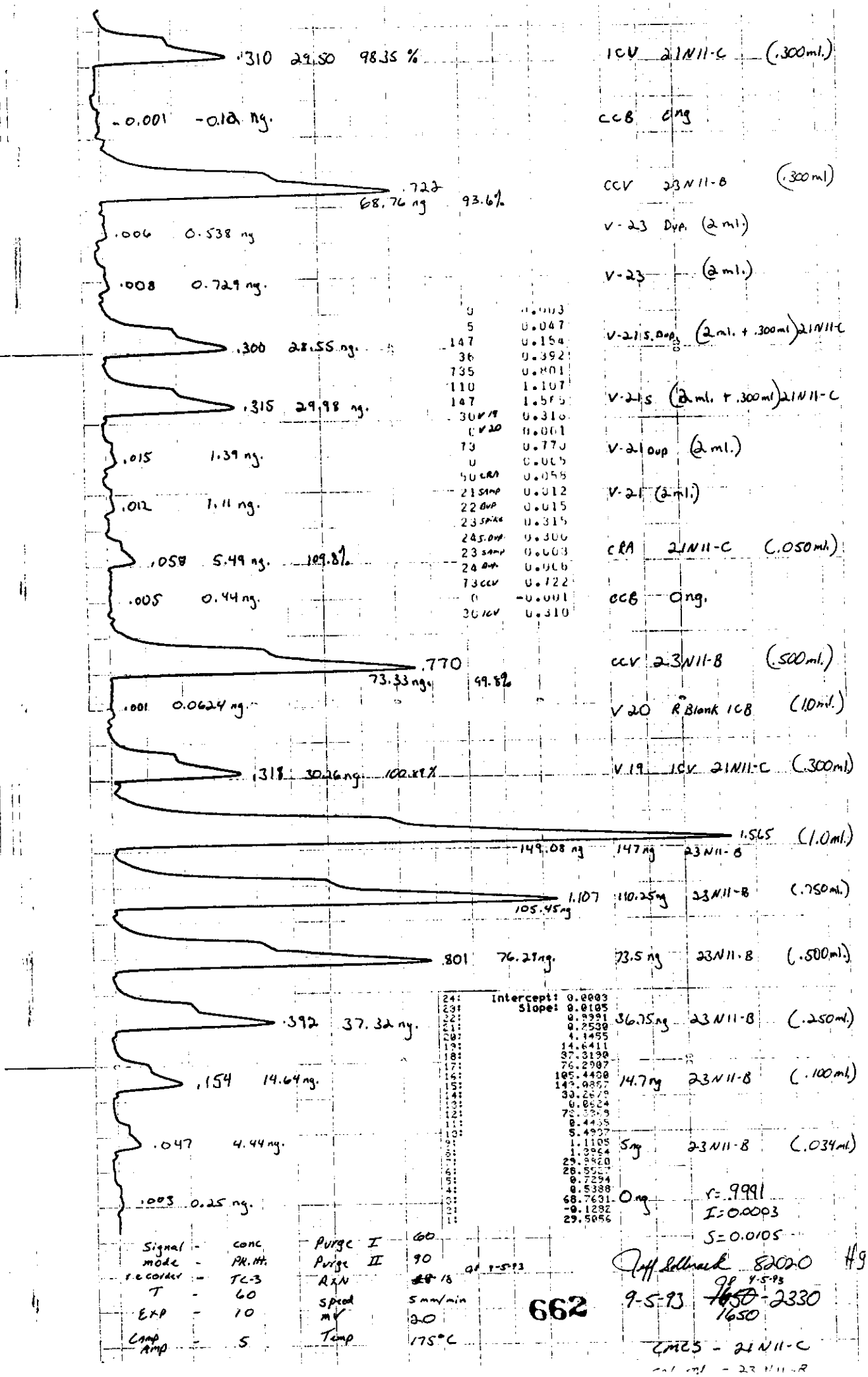
Analyte:	Hg		
Procedure:	LA 325-104	Revision:	A-1
Instrument:	PE2380 (Hydride AA)	Property No.:	WB26847
Technologist	J SOLBRACK	Payroll No.:	Date: 09/05/93

Calibration Standard ID:	23N11-B
Analyte Concentration:	.147
Type of Calibration:	LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0ng	.003
2	.034mL	5ng	.047
3	.100mL	14.7ng	.154
4	.250mL	36.75 ng	.392
5	.500mL	73.5 ng	.801
6	.750mL	110.25 ng	1.107
7	1.000mL	147 ng	1.565
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: r= .9998 1 Y-intercept = 0.0003 SLOPE= 0.0105

LDS 9-13-93



0	0.003
5	0.047
147	0.154
36	0.392
735	0.801
110	1.107
147	1.565
30 V19	0.318
0 V20	0.001
73	0.770
0	0.005
50 CRA	0.058
21 SMP	0.012
22 DUP	0.015
23 SPIKE	0.315
24 S.DUP	0.300
23 SMP	0.003
24 DUP	0.006
73 CCV	0.722
0	-0.001
30 ICV	0.310

Intercept:	0.0003
Slope:	0.0105
24:	0.9991
23:	0.2530
22:	4.1455
21:	14.6411
20:	37.3190
19:	76.2907
18:	105.4400
17:	149.0867
16:	30.2679
15:	0.0624
14:	73.3358
13:	0.4435
12:	5.4907
11:	1.1105
10:	1.0964
9:	29.9820
8:	28.5557
7:	0.7294
6:	0.5388
5:	68.7631
4:	-0.1282
3:	29.5056
2:	
1:	

662

WHC-SD-WM-DP-053 REV 0
BEST AVAILABLE COPY

Batch # 1520 ✓ QA 34

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-053 REV 0

Lab Segment Serial No. V 26, V 27, V 28	Customer ID: 107-AP-C, 107-AP-D, 107-AP-E
Analysis: Hg	Sample Prep: RES 9-8-93 ~~UNDIGESTED~~ DIRECT

Instrument: PE2380(Hydride AA) WB26847	Procedure/ Rev: LA 325-104 / A-1
Technologist: JI Solbrack Jay Solbrack	Date: 09/06/93
Starting Time: 1600	Temperature 175 C
Ending Time: 2330	Chemist: R.A. SKODA

Comments: r = .9998 Y-intercept = -.0001 SLOPE = .0105

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	V 24-5597	11		
2	REAGENT BLANK	V 25-5697	12		
3	SAMPLE	V 26-5797	13		
4	DUPLICATE SAMPLE	V 26-5897	14		
5	SAMPLE	V 27-5797	15		
6	DUPLICATE SAMPLE	V 27-5897	16		
7	SAMPLE	V 28-5797	17		
8	DUPLICATE SAMPLE	V 28-5897	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS	21N11C .300mL			

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

#1520

METHOD:	DATE START:
LA-325-104	9-06-93
PREPARED BY:	DATE COMPLETE:
R. E. SKODA	9-10-93

~~WHC-SD-WM-DP-053~~ REV 0

	UNITS:		ug/mL	ug/mL	ug/mL			ug/mL	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/21N11C	V24	Hg	.100				100.1		
BLANK	V25	Hg	<0.005					0.005	
107 AP	V26	Hg	<0.003	<0.003	N/A	N/A		0.003	
107 AP	V27	Hg	<0.003	<0.003	N/A	N/A		0.003	
107 AP	V28	Hg	<0.003	<0.003	N/A	N/A		0.003	
STD/21N11C		Hg	0.096				96.0		

NARRATIVE: XXXXXXX NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Detection limits for sample and blank are different due to difference in sample size.

RESkoda 9-13-93