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Project Title/Work Order WHC-SD-WM-DP-081, Rev. 0 Aqueous Samples from B-Plant, Tank 9-1		ECN NO.: N/A		
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5. Proj./Prog./Dept./Div.: B-Plant - Tank 9-1/Waste Management/PS/AS	6. Cog. Engr.: Kevin E. Bell	7. Purchase Order No.: N/A
8. Originator Remarks: This document is being released into the Supporting Document System for retrievability purposes.		9. Equip./Component No.: N/A
11. Receiver Remarks: For Release.		10. System/Bldg./Facility: N/A
		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 01/11/95

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
-1	WHC-SD-WM-DP-081	N/A	0	Aqueous Samples from B-Plant, Tank 9-1	Q	2	1	

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Document Number: WHC-SD-WM-DP-081, REV.0

Document Title: Aqueous Samples from B-Plant, Tank 9-1

Release Date: January 13, 1995

**This document was reviewed following the
procedures described in WHC-CM-3-4 and is:**

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara M. Broz

January 13, 1995

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SUPPORTING DOCUMENT

1. Total Pages 210

2. Title

Aqueous Samples from B-Plant, Tank 9-1

3. Number

WHC-SD-WM-DP-081

4. Rev No.

0

5. Key Words

Aqueous Samples, B-Plant, Tank 9-1, 9-1

6. Author

Name: Kevin E. Bell

Signature

Kevin E. Bell

Organization/Charge Code 8E480/MDR21

7. Abstract

N/A

8. RELEASE STAMP

Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL SERVICES

Project: AQUEOUS SAMPLE FROM B-PLANT

TANK: 9-1

Date Printed: DECEMBER 27, 1994

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WHC-SD-WM-DP-081, REV. 0

NARRATIVE

B-PLANT TANK 9-1
CASE NARRATIVE

1.0 INTRODUCTION

This is the final report for the fiscal year 1994 B-Plant Tank 9-1 sampling and analysis effort. B-Plant waste types, generation, storage, analytical requirements, and sampling are described in *B-Plant Waste Analysis Plan* (WHC-SD-WM-TI-438, Rev. 1). The project description and quality control (QC) requirements are described in *B-Plant Radioactive Liquid Waste Characterization Quality Assurance Project Plan* (WHC-SD-WM-QAPP-012, Rev. 0). Laboratory operations at the 222-S Facility for this project were performed according to *Quality Assurance Project Plan for Chemical Analysis of Highly Radioactive Mixed Waste Samples in Support of Environmental Activities on the Hanford Site* (WHC-SD-CP-QAPP-002, Rev. 00B) and *Quality Assurance Program Plan for Laboratory Analysis and Process Testing* (WHC-SD-CP-QAPP-003, Rev. 01A) unless superseded by the quality assurance project plan referenced above.

Included in this data package are summary tables of the analytical and quality control data as well as all raw data. Also included are copies of the chain of custody documentation and Request for Special Analysis (RSA) forms.

1.1 TANK 9-1 ANALYTICAL SUMMARY

Samples received at the 222-S Laboratory from B-Plant were analyzed for the metals Ba, Cd, Cr, Pb, Ag, As, Hg, and Se; the anions nitrate, nitrite, and hydroxide; total organic carbon, differential scanning calorimetry, and pH. Acid digestions were performed on subsamples of R5597 (inorganic trip blank) and R5599 prior to inductively coupled plasma (ICP) and atomic absorption (AA) analysis.

Sample R5599 for organic analysis indicated the presence of acetone at a concentration of 700 ug/L as the only positively identified volatile organic compound. Sample R5596 contained a significant amount of total organic carbon (TOC) and hydroxide, and smaller amounts of nitrate, nitrite, Cr, and Hg. The identity of the TOC is unknown. It cannot be accounted for from the organic analysis and there was no exotherm in the differential scanning calorimetry (DSC) as might be expected with most sources of TOC.

With few exceptions, all required quality control (QC) elements defined for this project were met. The inorganic and organic trip blanks showed little or no contamination.

2.0 SAMPLE RECEIPT

A total of four liquid samples were received from B-Plant: 1) one sample for inorganic analysis, 2) an inorganic trip blank, 3) one sample for volatile organic analysis (VOA), 4) an organic sample trip blank. Sample 1 was collected from tank 9-1 at B-Plant on 8/23/94 at 1515 hours and received at the 222-S Laboratory on 8/23/94 at 1655 hours. The sample for VOA analysis was collected for tank 9-1 on 8/23/94 at 1445 hours and received at 222-S on 8/23/94 at 1800 hours. The two trip blanks were created on 8/15/94 and consisted of deionized water supplied by the 222-S Laboratory. Copies of the chain of custody forms are provided in attachment 1.

2.1 SAMPLE TRACKING AND LABORATORY IDENTIFICATION

Each sample received is given a laboratory identification number. Subsamples withdrawn for analysis are given the respective sample number followed by an extension that identifies the method of preparation, sample type (standard, blank, duplicate, or spike), and subsequent analysis. Identification numbers begin with a letter designator to identify the customer and/or analytical protocol. The cross reference for the first two numbers in the extension are listed below:

<u>1ST Number</u>	<u>2nd Number</u>
5 - Direct	5 - Standard
6 - Fusion Dissolution	6 - Blank
7 - Water Digest	7 - Sample
8 - Acid Digest	8 - Duplicate
9 - TCLP Prep	9 - Spike

The sample numbers assigned to the tank 9-1 samples received are given below.

<u>Sample</u>	<u>Number</u>
Inorganic sample	R5596
Inorganic trip blank	R5597
Organic sample	R5599
Organic trip blank	R5600

RSA forms were submitted by the customer with the samples above. They are reproduced in attachment 2. There were some deviations from the analyses prescribed by the RSA's. 1) At the request of the customer on 9/27/94, analysis of samples R5596 and R5597 for pH was requested. 2) Sample R5596 was depleted before all requested analyses were performed. Remaining sample R5599 was used instead. This sample was collected one half hour before sample R5596 from the same location and, therefore, is expected to be very similar. Depletion of R5596 was primarily due to delivery of a partially filled sample bottle.

3.0 LABORATORY OPERATIONS

Analytical Batch sheets appear with each analytical batch. These sheets provide a summary of what samples were run in a given batch, as well as information such as procedure number, performing technologist, date, and other pertinent information. In addition, Analytical Batch Summary Sheets appear with many of the analytical batches. These forms do not show any raw data, rather they summarize the calculated results for samples, duplicates, spikes, blanks, relative percent differences (RPD's), and detection limits from the initial data evaluation, and provide a means of obtaining descriptive results from the chemist and chemical technologist on each sample batch.

4.0 QUALITY CONTROL

The required QC criteria for this project as defined in the documentation referenced in Section 1.0 are summarized as follows:

- Matrix Spikes
 - Frequency: each analytical batch or every 20 samples.
 - Criteria: spike recovery between 75 and 125%, RPD of spike duplicates $\pm 20\%$.
- Surrogate Recovery
 - Frequency: all samples for organic analysis.
 - Criteria: recovery between 80 and 120%.
- Duplicates
 - Frequency: each analytical batch or every 20 samples.
 - Criteria: RPD $\pm 20\%$. This criterion assumes sample concentration is >10 times the detection limit.
- Accuracy
 - Criteria: $\pm 20\%$ or listed as "to be determined". Accuracy is assessed by standard recoveries.
- Precision
 - Criteria: $\pm 25\%$ or listed as "to be determined". Precision is assessed by relative percent difference of duplicate results.
- Analytical Blanks
 - Frequency: each batch or every 20 samples.
 - Criteria: flag any detected contaminants.
- Trip Blanks
 - Frequency: each sampling event.
 - Criteria: Prepared using ASTM Type II reagent water, shipped for analysis with the samples collected during the sampling event in the same type of container, blanks remain unopened throughout the sampling event.
- Minimum Quantitation Levels
 - Criteria: Specified in QAPP (WHC-SD-WM-QAPP-012)

- SW-846 Requirements
 - Frequency: from language in the B-Plant QAPP and specification on the RSA form, it appears that SW-846 protocol is required or desired.
 - Criteria: SW-846 methods and holding times.
- Completeness
 - Criteria: 90%

Sample analyses are normally repeated upon failure of any of the above QC criteria except for completeness and SW-846 holding times and methods. If a re-run was not performed or if a re-run continued to not meet the above QC criteria, reasons for not performing the initial or second re-run is provided in this narrative.

4.1 QUALITY CONTROL GENERALITIES

The following generalities with respect to QC are enumerated here. 1) All analyses on samples R5596 and R5599 were run in 100% duplicate except VOA. The trip blanks R5597 and R5600 were not run in duplicate. 2) Matrix spike and matrix spike duplicates were run for all analyses on samples R5596 and R5599 where spikes are used. (Some analyses such as pH do not use spikes.) Spikes and spike duplicates were not performed on the trip blank samples. 3) A 90% completeness was not achieved for sample R5596 due to sample depletion. The remaining analyses were performed on sample R5599. 4) Analytical blanks were performed as prescribed above for each method in which they are required. 5) Trip blanks met the criteria described above except that ASTM Type II water was not used. The 222-S reagent water, from which the trip blanks were generated, is deionized water and periodically tested for contamination. In addition, reagent blanks run with most analytical methods serve to ensure the purity of the laboratory reagent water. 6) Averages and RPD values are not reported when less-than results are reported. 7) The analytical methods used for this project were not SW-846 methods. However, many of the methods are based on the SW-846 methods. Furthermore, some SW-846 holding times were not met and any required SW-846 sample preservations were not performed except that samples for VOA analyses were stored at 4° C. Missed holding times and further clarifications of any QC parameters are discussed for each analysis below.

5.0 ANALYTICAL RESULTS

5.1 SUMMARY TABLES

Analytical results for B-Plant tank 9-1 samples are summarized in tables presented in attachment 3. These tables were intended to aid in review of analytical data, and may not include all of the associated information present in the raw data. The spreadsheet summaries display sample identification numbers, standard and spike recoveries, blank results, analytical results, detection limits, and RPD between duplicates.

Some explanation of the various table columns is in order. 1) Standards are reported as a percent recovery of the known standard concentration. Most analytical batches begin and end with a standard. These may be thought of as instrument control standards. If a sample digestion was performed, a digested standard is also analyzed and reported to assess any loss during digestion. 2) Two types of blanks are used, although some analyses do not require a blank. Reagent blanks consist of reagent water used as a diluent for the sample. Preparation blanks consist of reagent water treated as a sample and subjected to any preparations, such as acid digestion, reagents, and/or dilutions prior to analysis. This provides an indication of any sample contamination that may occur during preparation or contamination in any reagent solutions. 3) Spiked sample results are reported as percent recovery of the spike. 4) Values preceded with the "<" symbol were found to be less than the detection limit.

5.2 SAMPLE PREPARATION

The samples received were subsampled for the requested analyses. Depending on the analytical method being performed, the subsample may have been diluted with acid or water, concentrated, digested, purged, extracted, mixed with various reagents, or a combination of the above. Analysis of undigested samples is termed "direct" analysis, although some preparation is usually performed prior to analysis. Details of each analysis are not normally provided since they are beyond the scope of this narrative. All the analyses reported here were performed directly with the exception of the metals Ag, Ba, Cd, Cr, and Pb by ICP and the metals As and Se by AA. Analysis of these metals was performed on acid-digested material. The ICP metals were also analyzed directly.

Samples for inorganic analysis that were analyzed directly required four independent subsamples for each analysis: 1) sample, 2) duplicate, 3) spiked sample, 4) spiked duplicate. Subsamples of R5597 and R5599 were subjected to acid digestion according to procedure LA-505-159, Rev. B-1. The results are presented in Table 1. Digestions were performed on the Laboratory Management Control Standard (LMCS) for ICP metals and As and Se by AA. Two reagent blanks were digested; one for ICP and one for AA. One 1 mL aliquot of sample R5597 was digested and brought to a volume of 100 mL, hence the dilution factor of 100. Six 1 mL aliquots of sample R5599 were digested; sample and duplicate digestion, spike and duplicate spike digestion for ICP, and spike and duplicate spike digestion for AA.

5.3 ORGANIC ANALYSIS

Volatile organic analyses were performed by purge and trap on samples R5599 and R5600 per procedure LA-523-405, Rev A-4. A narrative of these analyses was provided by the organic chemists and is provided as attachment 4. A summary of the analyses is presented in Table 2.

Matrix spike and matrix spike duplicates were all within the required 75 to 125% recovery. The Environmental Protection Agency Contract Laboratory Program (CLP) spiking compounds were used. Surrogate recoveries were also within the quality control limits required above. The surrogate compounds used were also defined by the CLP. The minimum quantitation limit of 10 ug/L defined in the B-Plant QAPP was not met for all compounds of sample R5599 and for 1-butanol of sample R5600. This limit is applied to all VOA analyses

rather than being specific to each compound. Even then it can often be met when ample sample sizes can be used.

Analysis of the sample and trip blank indicate that all analytes are either below the quantitation limit or tentatively identified except the presence of acetone in sample R5599. The quantitation limit for butanol is high primarily due to its poor purgability and the small sample size that had to be used. Its relatively low volatility and high water solubility also contribute to the high quantitation limit. As explained in attachment 4, the samples were not analyzed for pyridine. Investigations are underway with respect to problems with pyridine recovery using the purge and trap method.

5.4 INORGANIC TEST METHODS

5.4.1 pH

The pH of liquid samples was measured according to procedure LA-212-102, Rev. C-5. No reagent or preparation blanks are used with this procedure because no reagents are used and no sample preparation is performed. Likewise, spikes are not performed on pH measurements. Analysis was not performed immediately as required by SW-846. Results are presented in Table 3. There was insufficient sample to perform a duplicate determination on R5596, therefore the pH of R5599 was measured in duplicate with comparable results. Trip blank R5597 was run at two different times. The pH is close to 7 as expected, however the value of 8.09 appears high.

5.4.2 Hydroxide Determination by Titration

Hydroxide concentrations were determined by titration by nitric acid according to procedure LA-211-102, Rev. B-1. There were no procedure variations and no problems were noted by the chemist. As shown in Table 4, any hydroxide present in the trip blank is below the detection limit. The hydroxide results for sample R5596 compare well with the pH measurement. The pH calculated from the average hydroxide concentration yields a value of 12.6 compared to 12.1 to 12.2 for the measured pH. The measured pH is probably biased low due to a high concentration of sodium indicated by the ICP measurements.

5.4.3 Metals by Inductively Coupled Plasma

Concentrations of the metals silver (Ag), barium (Ba), cadmium (Cd), chromium (Cr), and lead (Pb) were determined by inductively coupled plasma (ICP) per procedure LA-505-151, Rev. A-0. The concentration values of these metals were not reported on the analytical cards for samples R5597 and R5599, however these data are reported in the table on page 85. They were extracted from the raw data by the ICP chemist. All QC criteria were met with the exception of the spike recovery for Ag on sample R5596; this is discussed below. Initially, samples R9956 and R5597 were run directly on the diluted, filtered liquid. A poor spike recovery for Ag resulted in re-analysis of an acid-digested sample. Sample R5599 was used for the re-analysis since R5596 had been depleted. The spike recovery for Ag vastly improved upon re-analysis, although it is still somewhat low. This may be attributed to the

presence of chloride ion in the sample which causes Ag to precipitate as AgCl. A chloride concentration of approximately 70 ug/mL is indicated by ion chromatography. Acid digestion employs an excess of hydrochloric acid, hence chloride ion, which complexes the AgCl rendering the silver more soluble.

All blank and sample values are below the method detection limits except for Cr in sample R5596. This is not inconsistent with the Cr results for sample R5599 which shows a less-than value. There is a much higher dilution factor with digested samples resulting in higher method detection limits.

5.4.4 Metals by Atomic Absorption Spectroscopy

Concentrations of the metals arsenic (As), selenium (Se), and mercury (Hg) in samples R5596 or R5597 and R5600 were determined by AA spectroscopy and are reported in Table 6. Analyses for all three metals on the trip blank sample R5597 are below the detection limit as expected. There were no procedure variations and no problems were noted by the chemist for any of the analyses.

5.4.4.1 As Determinations

Procedure LA-355-131, Rev. B-1 was used to analyze acid-digested subsamples of R5599 and R5597 by hydride generation atomic absorption. The ending standard was outside the 80-120% limit. However, the batch was not re-run since the spike recoveries were acceptable and all results were below the method detection limit of 0.250 ug/mL.

5.4.4.2 Se Determinations

Hydride generation atomic absorption was used in the determination of Se in acid-digested subsamples of R5597 and R5599 per procedure LA-365-131, Rev. B-2. The first matrix spike result for sample R5599 and the ending standard result for the analytical batch were outside of the QC parameters defined above. This batch had been run previously because of poor matrix spike RPD results on sample R5599. The batch was not re-run a second time for several reasons including: 1) As stated in the analytical method, "the performance of the method is very dependent on the condition of the surface of the quartz cell. 2) The sample results were less than or very close to the detection limit. 3) Evidence suggests a carrier gas leak may have occurred in the cell which would cause lower standard and spike recoveries. The instrument had been in repair for this reason before and after these analyses were performed. Results for sample R5599 were less than the method detection limit. The result for sample R5597 was 0.258 ug/mL. This value is very close to the method detection limit of 0.250 ug/mL and should be used with caution.

5.4.4.3 Hg Determinations

Determinations for Hg were made by cold-vapor atomic absorption according to procedure LA-325-104, Rev. A-1. No acid digestion was performed on the samples prior this analysis, which was performed on samples R5596 and R5597. As expected, there was less than the detectable amount of Hg in the trip blank while the tank 9-1 sample was found to contain an average of 20.8 ug/mL.

5.4.5 Nitrate and Nitrite by Ion Chromatography

Concentration of the anions nitrate and nitrite were determined by ion chromatography according to procedure LA-533-105, Rev. C-2. Table 7 shows that all QC acceptance criteria were met and no problems with the analyses were noted. The SW-846 holding time of 48 hours for nitrate was not met. The trip blank contains a less than detectable amount of both anions. At 40 ug/mL sample R5596 is approximately 35% more concentrated in nitrate than nitrite.

5.4.6 Total Organic Carbon

Total Organic Carbon (TOC) analysis by furnace oxidation was performed on samples R5596 and R5597 using procedure LA-344-105, Rev. B-3. Results are presented in Table 8. No method variations or problems with the analysis were noted. Sample R5596 was found to contain 445 ug of carbon (C) per mL of sample, and one determination of the trip blank gave 7.15 ug C/mL. The latter value is only slightly greater than the detection limit of 5.00 ug C/mL and the amount present may be due to the use of a plastic sample bottle.

Acetone was the only positively identified compound found in the VOA analysis described above. Converting the concentration of acetone into a TOC value gives 0.434 ug C/mL. This is more than a factor of 1000 below the observed TOC level. Other organic compounds, volatile or otherwise, for which the sample was not analyzed appear to be present in the sample.

5.4.7 Differential Scanning Calorimetry

Procedure LA-514-113, Rev. B-1 was used to perform differential scanning calorimetry on samples R5596 and R5597 as shown in Table 9. No procedure variations or other problems were noted. Analyses are performed directly on the samples, therefore no reagent or preparation blanks are created. This method also does not require the use of spiked samples.

The DSC scans show endotherms due to the heating and evaporation of water. The endotherm for sample R5597 was slightly greater than in sample R5596 probably due to dissolved solids in the latter sample.

Attachment 1

WHC-SD-WM-DP-081, REV. 0

SAMPLING AND CUSTODY DATA

WHC-SD-WM-DP-081, REV. 0

COPY.

CHAIN OF CUSTODY

Company Contact: Tina M. Ridge Telephone: 312-3560

Samples Collected by: Frank Miksch Date: 8/23/94 Time: 2:45

Sample Location: B-Plant TK 9-1

Ice Chest No.: _____ Field Logbook Page No.: _____

Remarks: Inorganic Sample

Method of Shipment: _____

Sample Identification

~~RB~~ R5596 B8L5Z

CHAIN OF POSSESSION

Relinquished by:
Edmund J. McSorley

Received by:
Suzanne Lentz

Date/Time
8/23/94/1452

Relinquished by
Suzanne Gentle

Received By: MDP

Date/Time
8/23/94 1655

Relinquished by:

Received by:

Date/Time

Relinquished by:

Received by: .

Date/Time

CHAIN OF CUSTODY

Company Contact: WHC Telephone: 373-2570
Samples Collected by: KD FRISBY Date: 8-15-94 Time: 15:15
Sample Location: 222-SA
Ice Chest No.: _____ Field Logbook Page No.: _____
Remarks: Inorganic Trip Blank

Method of Shipment: _____

Sample Identification

<u>B8517</u>	<u>B8653</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

CHAIN OF POSSESSION

Relinquished by: [Signature]

Received by: [Signature]

Date/Time
8/15/94 -15:15

Relinquished by: [Signature]

Received by: [Signature]

Date/Time
8/18/94-0900

Relinquished by: [Signature]

Received by: [Signature]

Date/Time
8/23/94/1452

Relinquished by: Suzanne Gentle

12 Received by: [Signature]

Date/Time
8/23/94 1655

COPY

Company Contact: Tina M. Ridge Telephone: 372-3560
Samples Collected by: Frank M. Ksch Date: 8/23/94 Time: 2:45
Sample Location: B-Plant TK 9-1
Ice Chest No.: _____ Field Logbook Page No.: _____
Remarks: Oxygen Sample.

Sample Identification

[illegible]

Relinquished by:

Relinquished by:
Frank J. Meehan

Received by:

Dana Jacobs

Date/Time

8/23/94/15 29

Relinquished by:

Relinquished by:
Bryan Jackson

Received by:

Received by: Suzanne Gentry

Date/Time

Date/Time
8-23-94 / 6:00 PM

Relinquished by

Relinquished by Suzanne Leath ⁵⁶

Received by:

Received by:

~~Date/Time~~

~~Date/Time~~

Relinquished by:

Relinquished by:
Suzanne Lenth

13

Received by:

Received by:
m-g Ch

Date/Time

Date/Time
8/23/94 1900

COPY

CHAIN OF CUSTODY

Company Contact: WHC Telephone: 313-2570
8-15-94
 Samples Collected by: KP Feisby Date: ~~8-15-94~~ Time: 1515
 Sample Location: 222-SA
 Ice Chest No.: _____ Field Logbook Page No.: _____
 Remarks: VOA Trip Blanks

Method of Shipment: pkg.

Sample Identification

R 5:600

B8655

CHAIN OF POSSESSION

Relinquished by: Suzanne Gentile

Received by: *[Signature]*

~~Date/Time~~
~~5/23/94~~

Relinquished by:

Received by:

Date/Time

Relinquished by:

Received by:

Date/Time

Relinquished by:

Received by:

Date/Time

To:

Attachment 2

WHC-SD-WM-DP-081, REV. 0

REQUEST FOR SPECIAL ANALYSIS FORMS

REQUEST FOR SPECIAL ANALYSIS (RSA)					RSA No. Sample: R5596 Trip Blank: R5597		
1. Sample Origin Plant IK 9-1		2. Date Submitted		4. Requester Name S. E. Killoy		6. Charge Code/Work Package KB24X	
		3. Submitted By		5. Requester Phone/MSIN 2-0183 S6-70		7. Date Required	
8. Customer ID		Collected		9. Laboratory ID		12. Number of Samples	
		Date	Time			13. Volume of Samples	
9-1				B8652		100	
TRIP BLANK				B8653		ml/sample	
						14. Protocols	
						☐ None ☒ RCRA ☐ NQA-1 ☐ Other ☐ CERCLA	
						15. Sample Type	
						☐ Solid ☐ Soil ☐ Slurry ☐ Gas ☒ Water ☐ Waste ☐ Solution ☐ Sludge ☐ Oil ☐ Other (specify) _____	
						16. Storage Requirements	
						☐ None ☒ Specify <u>SW-846 Holding times and Standards</u> <u>WHC-SD-WM-DP-081, REV. 0</u>	
						17. Process Knowledge/Known Listed Wastes	
						☐ Unknown ☐ Known (Please attach list) ☒ Previously submitted for this Project	
10. Determination		11. Expected Range		18. Survey			
ICP Barium		588 ug/l		Dose Rate			
Cadium		229 ug/l		HPT Signature			
Chromium		760 ug/l		19. Disposition of Waste			
Lead		3266 ug/l		☐ Return to Client/Location _____ ☒ Dispose per 222-S Procedures ☐ Other _____			
Silver		761 ug/l		20. Additional Information			
Arsenic		81 ug/l					
Mercury		20 ug/l					
Selenium		24 ug/l					
Nitrite		1.3 ug/l					
Nitrate		0.3 g/l					
Hydroxide		1.7 g/l					
Total Organic Carbon		0.067 g/l					
Diff. Scan. Calorimetry		No Exotherm					
21. Chain of Custody				22. Assigned Custodial Group (select one)			
☐ No ☒ Yes Number: _____				☐ PCL ☐ PDSU ☐ ENV ☒ Process			
23. Sample Received By:				24. Laboratory Manager (if required)			
Date: <u>8/23/94</u> Time: <u>1640</u>				Date: _____			

[illegible]

Attachment 3

WHC-SD-WM-DP-081, REV. 0

SAMPLE DATA SUMMARY

TABLE 1. ACID DIGEST RESULTS

SAMPLE I.D.	STD/ICP D.F.*	STD/AS,SE D.F.	BLK/ICP	BLK/AS,SE	RESULT 1 D.F.	RESULT 2 D.F.	SPK 1/ICP D.F.	SPK 2/ICP D.F.	SPK 1/AS,SE D.F.	SPK 2/AS,SE D.F.	STD I.D.	BLANK I.D.	SPIKE I.D.
R5597	20	4	COMPLETE	COMPLETE	100	N/A	N/A	N/A	N/A	N/A	R5594	R5595	N/A
R5599	20	4	COMPLETE	COMPLETE	100	100	100/20	100/20	100/4	100/4	R5594	R5595	R5599

* D.F. = dilution factor

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Table 2. Volatile Organics Analysis Results.

Lab. ID	Analyte	Results	Units	Quantitation Limit
R5599	Chloromethane	ND*	ug/L	500
	Bromomethane	ND	ug/L	500
	Vinyl Chloride	ND	ug/L	500
	Chloroethane	ND	ug/L	500
	Methylene Chloride	ND	ug/L	500
	Acetone	700	ug/L	500
	Carbon Disulfide	ND	ug/L	500
	1,1-Dichloroethene	ND	ug/L	500
	1,1-Dichloroethane	ND	ug/L	500
	1,2-Dichloroethene (total)	ND	ug/L	500
	Chloroform	ND	ug/L	500
	1,2-Dichloroethane	ND	ug/L	500
	2-Butanone	110~	ug/L	500
	1,1,1-Trichloroethane	ND	ug/L	500
	Carbon Tetrachloride	ND	ug/L	500
	Bromodichloromethane	ND	ug/L	500
	1,2-Dichloropropane	ND	ug/L	500
	cis-1,3-Dichloropropene	ND	ug/L	500
	Trichloroethene	ND	ug/L	500
	Dibromochloromethane	ND	ug/L	500
	1,1,2-Trichloroethane	ND	ug/L	500
	Benzene	ND	ug/L	500
	trans-1,3-Dichloropropene	ND	ug/L	500
	Bromoform	ND	ug/L	500
	4-methyl-2-pentanone	ND	ug/L	500
	2-Hexanone	ND	ug/L	500
	Tetrachloroethene	ND	ug/L	500
	Toluene	0.3~	ug/L	500
	Chlorobenzene	ND	ug/L	500
	Ethylbenzene	ND	ug/L	500
	Styrene	ND	ug/L	500
	Xylene (total)	ND	ug/L	500
	1-Butanol	ND	ug/L	25000

*ND = none detected

~ Estimated value; spectra meet criteria, but response is below the quantitation limit.

Table 2 (Cont.). Volatile Organics Analysis Results.

Lab. ID	Analyte	Results	Units	Quantitation Limit
R5600	Chloromethane	ND*	ug/L	10
	Bromomethane	ND	ug/L	10
	Vinyl Chloride	ND	ug/L	10
	Chloroethane	ND	ug/L	10
	Methylene Chloride	1~	ug/L	10
	Acetone	0.5~	ug/L	10
	Carbon Disulfide	ND	ug/L	10
	1,1-Dichloroethene	ND	ug/L	10
	1,1-Dichloroethane	ND	ug/L	10
	1,2-Dichloroethene (total)	ND	ug/L	10
	Chloroform	ND	ug/L	10
	1,2-Dichloroethane	ND	ug/L	10
	2-Butanone	ND	ug/L	10
	1,1,1-Trichloroethane	ND	ug/L	10
	Carbon Tetrachloride	ND	ug/L	10
	Bromodichloromethane	ND	ug/L	10
	1,2-Dichloropropane	ND	ug/L	10
	cis-1,3-Dichloropropene	ND	ug/L	10
	Trichloroethene	ND	ug/L	10
	Dibromochloromethane	ND	ug/L	10
	1,1,2-Trichloroethane	ND	ug/L	10
	Benzene	ND	ug/L	10
	trans-1,3-Dichloropropene	ND	ug/L	10
	Bromoform	ND	ug/L	10
	4-methyl-2-pentanone	ND	ug/L	10
	2-Hexanone	ND	ug/L	10
	Tetrachloroethene	ND	ug/L	10
	Toluene	0.2~	ug/L	10
	Chlorobenzene	ND	ug/L	10
	Ethylbenzene	ND	ug/L	10
	Styrene	ND	ug/L	10
	Xylene (total)	ND	ug/L	10
	1-Butanol	ND	ug/L	500

*ND = none detected

~ Estimated value; spectra meet criteria, but response is below the quantitation limit.

TABLE 3. PH OF LIQUID SAMPLES

QC INFORMATION		SAMPLE INFORMATION					QC I.D.	
SAMPLE I.D.	STD %	END STD %	RESULT 1	RESULT 2	AVERAGE %	RPD %	BEG STD I.D.	END STD I.D.
R5596	99.75	100.0	12.12	*IN SUFF	N/A	N/A	R5594	R5598
R5597	99.75	100.0	6.48	N/A	N/A	N/A	R5594	R5598
R5599	99.8	99.8	12.18	12.12	12.15	.494	R5594	R5598
R5597	99.8	99.8	8.09	N/A	N/A	N/A	R5594	R5598

• INSUFFICIENT SAMPLE

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TABLE 4. HYDROXIDE RESULTS

QC INFORMATION				SAMPLE INFORMATION						SAMPLE IDENTIFICATION			
SAMPLE I.D.	STD %	END STD %	REG BLK ug OH/ml	RESULT 1 ug OH/ml	RESULT 2 ug OH/ml	AVERAGE ug OH/ml	RPD %	SPIKE 1 %	SPIKE 2 %	AVERAGE %	RPD %	DET LIM ug OH/ml	BEG STD I.D.
R5596	96.4	98.5	<4.17E+1	6.81E+02	6.68E+02	6.74E+02	1.93	109.4	99.7	104.3	9.28	1.25E+02	R5594
R5597	96.4	98.5	<4.17E+1	<4.17E+01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.17E+01	R5594
													R5598
													R5595
													R5596
													N/A

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TABLE 5 SELECTED METALS BY INDUCTIVELY COUPLED PLASMA

Ag

QC INFORMATION				SAMPLE INFORMATION								QC IDENTIFICATION					
SAMPLE I.D.	STD	END STD	DIGESTED STD	PREP BLK	RESULT 1	RESULT 2	AVERAGE	RPD	SPIKE 1	SPIKE 2	AVERAGE	RPD	DET LIM*	BEG STD	END STD	BLANK	SPIKE I.D.
R5596	101.14	105.34	N/A	< .01	<1.10E - 01	<1.10E - 01	N/A	N/A	38.0	38.9	37.45	2.94	1.00E - 02	R5594	R5598	R5595	R5596
R5597	101.14	105.34	N/A	< .01	<1.00E - 02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00E - 02	R5594	R5598	R5595	N/A
R5599	104.02	103.50	86.01	< .01	<1.00E + 00	<1.00E + 00	N/A	N/A	87.16	89.20	88.18	2.31	1.00E - 02	R5594	R5598	R5595	R5599
R5597	104.02	103.50	86.01	< .01	<1.00E + 00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00E - 02	R5594	R5598	R5595	N/A

Ba

QC INFORMATION				SAMPLE INFORMATION										QC IDENTIFICATION			
SAMPLE I.D.	STD	END STD	DIGESTED STD	PREP BLK ug/ml	RESULT 1	RESULT 2	AVERAGE	RPD	SPIKE 1	SPIKE 2	AVERAGE	RPD	DET LIM*	BEG STD I.D.	END STD I.D.	BLANK I.D.	SPIKE I.D.
R5596	96.60	101.64	N/A	< .05	<5.50E -01	<5.50E -01	N/A	N/A	100.0	97.30	98.65	2.74	5.00E -02	R5594	R5598	R5595	R5596
R5597	96.60	101.64	N/A	< .05	<5.00E -02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.00E -02	R5594	R5598	R5595	N/A
R5599	103.70	103.66	98.74	< .05	<5.00E +00	<5.00E +00	N/A	N/A	98.84	101.32	100.08	2.48	5.00E -02	R5594	R5598	R5595	R5599
R5597	103.70	103.66	98.74	< .05	<5.00E +00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.00E -02	R5594	R5598	R5595	N/A

Cd

QC INFORMATION				SAMPLE INFORMATION								QC IDENTIFICATION					
SAMPLE I.D.	STD %	END STD %	DIGESTED STD	PREP BLK ug/ml	RESULT 1 ug/ml	RESULT 2 ug/ml	AVERAGE ug/ml	RPD %	SPIKE 1 %	SPIKE 2 %	AVERAGE %	RPD %	DET LIM* ug/ml	BEG STD I.D.	END STD I.D.	BLANK I.D.	SPIKE I.D.
R5596	101.60	108.10	N/A	< 0.1	<1.10E-01	<1.10E-01	N/A	N/A	102.0	100.0	101.0	1.98	1.00E-02	R5594	R5598	R5595	R5596
R5597	101.60	108.10	N/A	< 0.1	<1.00E-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00E-02	R5594	R5598	R5595	N/A
R5599	105.92	104.74	96.66	< 0.1	<1.00E+00	<1.00E+00	N/A	N/A	97.04	97.42	97.23	0.391	1.00E-02	R5594	R5598	R5595	R5599
R5597	105.92	104.74	96.66	< 0.1	<1.00E+00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00E-02	R5594	R5598	R5595	N/A

Cr

QC INFORMATION				SAMPLE INFORMATION								QC IDENTIFICATION					
SAMPLE I.D.	STD %	END STD %	DIGESTED STD	PREP BLK ug/ml	RESULT 1 ug/ml	RESULT 2 ug/ml	AVERAGE ug/ml	RPD %	SPIKE 1 %	SPIKE 2 %	AVERAGE %	RPD %	DET LIM* ug/ml	BEG STD I.D.	END STD I.D.	BLANK I.D.	SPIKE I.D.
R5596	102.06	108.16	N/A	<.01	2.20E-01	2.09E-01	2.15E-01	5.12	103.0	101.1	102.05	1.86	1.00E-02	R5594	R5598	R5595	R5596
R5597	102.06	108.16	N/A	<.01	<1.00E-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00E-02	R5594	R5598	R5595	N/A
R5599	106.40	105.70	97.5	<.01	<1.00E+00	<1.00E+00	N/A	N/A	98.52	98.78	98.65	0.264	1.00E-02	R5594	R5598	R5595	R5599
R5597	106.40	105.70	97.5	<.01	<1.00E+00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00E-02	R5594	R5598	R5595	N/A

Pb

QC INFORMATION					SAMPLE INFORMATION							QC IDENTIFICATION					
SAMPLE I.D.	STD %	END STD %	DIGESTED STD	PREP BLK ug/ml	RESULT 1 ug/ml	RESULT 2 ug/ml	AVERAGE ug/ml	RPD %	SPIKE 1 %	SPIKE 2 %	AVERAGE %	RPD %	DET LIM* ug/ml	BEG STD I.D.	END STD I.D.	BLANK I.D.	SPIKE I.D.
R5596	102.94	109.08	N/A	<.10	<1.10	<1.10	N/A	N/A	106.0	105.0	105.5	0.948	1.00E-01	R5594	R5598	R5595	R5596
R5597	102.94	109.08	N/A	<.10	<1.00E-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00E-01	R5594	R5598	R5595	N/A
R5599	102.96	102.10	93.40	<10.0	<1.00E+01	<1.00E+01	N/A	N/A	94.50	94.00	94.25	0.531	1.00E-01	R5594	R5598	R5595	R5599
R5597	102.96	102.10	93.40	<10.0	<1.00E+01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.00E-01	R5594	R5598	R5595	N/A

* Instrument Detection Limit

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As																				
QC INFORMATION										SAMPLE INFORMATION							QC IDENTIFICATION			
SAMPLE I.D.	STD %	DIGESTED STD %	END STD	REG BLK ug/ml	PREP BLK ug/ml	RESULT1 ug/ml	RESULT2 ug/ml	AVERAGE ug/ml	RPD %	SPIKE 1 %	AVERAGE %	RPD %	DET LIM ug/ml	BEG STD I.D.	END STD I.D.	BLANK I.D.	SPIKE I.D.			
R5599	118.0	96.6	125.0	<0.003	<0.250	<0.250	<0.250	N/A	N/A	104.7	106.3	3.1	0.250	R5594	R5598	R5595	R5599			
R5597	118.0	96.6	125.0	<0.003	<0.250	<0.250	<0.250	N/A	N/A	N/A	N/A	N/A	0.250	R5594	R5598	R5595	N/A			

Hg		QC INFORMATION			SAMPLE INFORMATION							QC IDENTIFICATION				
SAMPLE I.D.	STD	END STD	REG BLK	RESULT 1	RESULT 2	AVERAGE	RPD	SPIKE 1	SPIKE 2	AVERAGE	RPD	DET LIM	BEG STD	END STD	BLANK I.D.	SPIKE I.D.
			ug/ml	ug/ml	ug/ml	ug/ml	%	%	%	%	%	ug/ml	I.D.	I.D.		
R5596	93.9	95.4	<10.0	20.2	21.3	20.8	5.29	87.0	80.1	83.5	8.26	10.0	R5594	R5598	R5595	R5596
R5597	93.9	95.4	<10.0	<10.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.0	R5594	R5598	R5595	N/A

Se	QC INFORMATION					SAMPLE INFORMATION							QC IDENTIFICATION						
	SAMPLE I.D.	STD %	DIGESTED	END STD %	PREP BLK ug/ml	DIG BLK ug/ml	RESULT 1 ug/ml	RESULT 2 ug/ml	AVERAGE ug/ml	RPD %	SPIKE 1 %	SPIKE 2 %	AVERAGE %	RPD %	DET LIM ug/ml	BEG STD I.D.	END STD I.D.	BLANK I.D.	SPIKE I.D.
	R5999	84.4	87.9	77.3	<0.003	<0.250	<0.250	<0.250	N/A	N/A	74.8	82.7	78.8	10.1	0.250	R5598	R5598	R5595	R5599
	R5597	84.4	87.9	77.3	<0.003	<0.250	0.258	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.250	R5594	R5598	R5595	N/A

TABLE 7. SELECTED ANIONS BY ION CHROMATOGRAPHY

NO2

QC INFORMATION			SAMPLE INFORMATION										SAMPLE IDENTIFICATION			
SAMPLE I.D.	STD %	END STD %	REG BLK ug/ml	RESULT 1 ug/ml	RESULT 2 ug/ml	AVERAGE ug/ml	RPD %	SPIKE 1 %	SPIKE 2 %	AVERAGE %	RPD %	DET LIM ug/ml	BEG STD I.D.	END STD I.D.	BLANK I.D.	SPIKE I.D.
R5596	103.8	103.1	<1	2.92E+01	2.88E+01	2.90E+01	1.4	89.1	91.5	90.3	2.66	<1	R5594	R5598	R5595	R5596
R5597	103.8	103.1	<1	<1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1	R5594	R5598	R5595	N/A

NO3

QC INFORMATION				SAMPLE INFORMATION							SAMPLE IDENTIFICATION					
SAMPLE I.D.	STD %	END STD %	REG BLK ug/ml	RESULT 1 ug/ml	RESULT 2 ug/ml	AVERAGE ug/ml	RPD %	SPIKE 1 %	SPIKE 2 %	AVERAGE %	RPD %	DET LIM ug/ml	BEG STD I.D.	END STD I.D.	BLANK I.D.	SPIKE I.D.
R5596	105.4	105.7	<1	3.98E+01	4.06E+01	4.02E+01	2.0	80.9	77.8	79.3	3.91	<1	R5594	R5598	R5595	R5596
R5597	105.4	105.7	<1	<1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1	R5594	R5598	R5595	N/A

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TABLE 8. TOTAL ORGANIC CARBON RESULTS

TOC

QC INFORMATION				SAMPLE INFORMATION						QC IDENTIFICATION			
SAMPLE I.D.	STD %	END STD %	REG BLK ug C/ml	RESULT 1 ug C/ml	RESULT 2 ug C/ml	AVERAGE ug C/ml	RPD %	SPIKE 1 %	SPIKE 2 %	AVERAGE %	RPD %	DET LIM ug C/ml	BEG STD I.D.
R5596	100.0	100.3	<5.00	4.43E+02	4.48E+02	4.45E+02	1.12	96.1	94.9	95.5	1.26	5.00E+00	R5594
R5597	100.0	100.3	<5.00	7.15E+00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5.00E+00	R5594
													R5598
													R5595
													R5596
													N/A

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TABLE 9. DIFFERENTIAL SCANNING CALORIMETRY RESULTS

QC INFORMATION			SAMPLE RESULTS				SAMPLE I.D	
SAMPLE I.D.	STD	END STD	RESULT 1	RESULT 2	AVERAGE	RPD	BEG STD	END STD
	%	%				%	I.D	I.D
R5596	98.1	96.3	NO EXO	NO EXO	N/A	N/A	R5594	R5598
R5597	98.1	96.3	NO EXO	NO EXO	N/A	N/A	R5594	R5598

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Attachment 4

WHC-SD-WM-DP-081, REV. 0

VOLATILE ORGANIC ANALYSES

WHC-SD-WM-DP-081, REV. 0

SDG NARRATIVE - B-PLANT
TK-9-1
September 6, 1994

VOLATILE ORGANICS

SDG Number R-5599

The initial GC/MS calibration and continuing calibration met all protocols for RCRA analysis. All mass spectral tuning requirements were met for all standards, blanks and samples. The method blank met all applicable protocols and requirements. All internal standards and system monitoring compounds retention times and peak areas met all protocols. All system monitoring compound recoveries were within the required limits. The sample holding time was met. The sample was diluted because of excessive foaming. A Matrix Spike and Matrix Spike Duplicate were run and met all protocols.

In order to meet sample holding time and due to a high background of Pyridine in the Purge & Trap this sample could not be analyzed for Pyridine. The accuracy of the sample analysis was compromised due to the following list of reasons.

- 1) The sample was in a plastic container .
- 2) The walls of the container were collapsed indicating the sample was under a vacuum.
- 3) No liner present in the cap.
- 4) The cap had a hole in it which was sealed with an unknown white sealer plugging it.
- 5) The bottle was about one third full of sample leaving a large head space.

D.E. NELSON
J.B. DELAROSA-CHANG
Organic Chemistry

D E Nelson 9-7-94
Johel Rosa - Chang 9-7-94

VOLATILE ORGANIC ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
A 5600.-4502	TK-9-1	6-22-94	16:52	26
Determination	Method Standard	Result Units	Charge Code	Reruns
VOA	LA-523-405	NONE	KE24X	0
Sample Size	Customer ID			
?	TRIP ELK			
Remarks Calculations Results				
complete				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Don</i>	<i>JDC</i>			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
9-7-94				

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

Serial No	Sample Point	Date	Time Issued	Priority
A 5639.-4502	TK-9-1	6-22-94	16:52	26
Determination	Method Standard	Result Units	Charge Code	Reruns
VOA	LA-523-405	NONE	KE24X	0
Sample Size	Customer ID			
?	SAMPLE			
Remarks Calculations Results				
complete				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>Don</i>	<i>JDC</i>			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
9-7-94				

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

BEST AVAILABLE COPY

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

R5600

Lab Name: WHCWA

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: R5599

Matrix: (soil/water) WATER

Lab Sample ID: R5600

Sample wt/vol: 5 (g/mL) ML

Lab File ID: >AI02E

Level: (low/med) LOW

Date Received: 08/22/94

% Moisture: not dec. WHC-SD-WM-DP-081, REV. 0

Date Analyzed: 9/02/94

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor: 1

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NO.

COMPOUND

Q

74-87-3-----	Chloromethane	10.	U
74-83-9-----	Bromomethane	10.	U
75-01-4-----	Vinyl Chloride	10.	U
75-00-3-----	Chloroethane	10.	U
75-09-2-----	Methylene Chloride	1.	J
67-64-1-----	Acetone	.5	J
75-15-0-----	Carbon Disulfide	10.	U
75-35-4-----	1,1-Dichloroethene	10.	U
75-34-3-----	1,1-Dichloroethane	10.	U
540-59-0-----	1,2-Dichloroethene (total)	10.	U
67-66-3-----	Chloroform	10.	U
107-02-2-----	1,2-Dichloroethane	10.	U
78-93-3-----	2-Butanone	10.	U
71-55-6-----	1,1,1-Trichloroethane	10.	U
56-23-5-----	Carbon Tetrachloride	10.	U
75-27-4-----	Bromodichloromethane	10.	U
78-87-5-----	1,2-Dichloropropane	10.	U
10061-01-5-----	cis-1,3-Dichloropropene	10.	U
79-01-6-----	Trichloroethene	10.	U
124-48-1-----	Dibromochloromethane	10.	U
79-00-5-----	1,1,2-Trichloroethane	10.	U
71-43-2-----	Benzene	10.	U
10061-02-6-----	trans-1,3-Dichloropropene	10.	U
75-25-2-----	Bromoform	10.	U
108-10-1-----	4-Methyl-2-pentanone	10.	U
591-78-6-----	2-Hexanone	10.	U
127-18-4-----	Tetrachloroethene	10.	U
79-34-5-----	1,1,2,2-Tetrachloroethane	10.	U
108-88-3-----	Toluene	.2	J
108-90-7-----	Chlorobenzene	10.	U
100-41-4-----	Ethylbenzene	10.	U
100-42-5-----	Styrene	10.	U
133-02-7-----	Xylene (total)	10.	U
71-36-3-----	1-Butanol	500.	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

R5600

Lab Name: WHCWA

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: R5599

Matrix: (soil/water) WATER

Lab Sample ID: R5600

Sample wt/vol: 5 (g/mL) ML

Lab File ID: >AI02E

Level: (low/med) LOW

Date Received: 08/22/94

% Moisture: not dec. WHC-SD-WM-DP-081, REV. 0

Date Analyzed: 9/02/94

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor: 1

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
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21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

VOLATILE ORGANICS ANALYSIS DATA SHEET

R5599

Lab Name: WHCWA

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: R5599

Matrix: (soil/water) WATER

Lab Sample ID: R5599

Sample wt/vol: 0.1 (g/mL) ML

Lab File ID: >AI02F

Level: (low/med) LOW

Date Received: 08/22/94

% Moisture: not dec. WHC-SD-WM-DP-081, REV. 0

Date Analyzed: 9/02/94

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor: 1

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NO.

COMPOUND

Q

74-87-3-----	Chloromethane	500.	U
74-83-9-----	Bromomethane	500.	U
75-01-4-----	Vinyl Chloride	500.	U
75-00-3-----	Chloroethane	500.	U
75-09-2-----	Methylene Chloride	500.	U
67-64-1-----	Acetone	700.	
75-15-0-----	Carbon Disulfide	500.	U
75-35-4-----	1,1-Dichloroethene	500.	U
75-34-3-----	1,1-Dichloroethane	500.	U
540-59-0-----	1,2-Dichloroethene (total)	500.	U
67-66-3-----	Chloroform	500.	U
107-02-2-----	1,2-Dichloroethane	500.	U
78-93-3-----	2-Butanone	110.	J
71-55-6-----	1,1,1-Trichloroethane	500.	U
56-23-5-----	Carbon Tetrachloride	500.	U
75-27-4-----	Bromodichloromethane	500.	U
78-87-5-----	1,2-Dichloropropane	500.	U
10061-01-5-----	cis-1,3-Dichloropropene	500.	U
79-01-6-----	Trichloroethene	500.	U
124-48-1-----	Dibromochloromethane	500.	U
79-00-5-----	1,1,2-Trichloroethane	500.	U
71-43-2-----	Benzene	500.	U
10061-02-6-----	trans-1,3-Dichloropropene	500.	U
75-25-2-----	Bromoform	500.	U
108-10-1-----	4-Methyl-2-pentanone	500.	U
591-78-6-----	2-Hexanone	500.	U
127-18-4-----	Tetrachloroethene	500.	U
79-34-5-----	1,1,2,2-Tetrachloroethane	500.	U
108-88-3-----	Toluene	3.	J
108-90-7-----	Chlorobenzene	500.	U
100-41-4-----	Ethylbenzene	500.	U
100-42-5-----	Styrene	500.	U
133-02-7-----	Xylene (total)	500.	U
71-36-3-----	1-Butanol	25000.	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

R5599

Lab Name: WHCWA

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: R5599

Matrix: (soil/water) WATER

Lab Sample ID: R5599

Sample wt/vol: 0.1 (g/mL) ML

Lab File ID: >AI02F

Level: (low/med) LOW

Date Received: 08/22/94

% Moisture: not dec. WHC-SD-WM-DP-081, REV.0

Date Analyzed: 9/02/94

GC Column: DB-624 ID: 0.53 (mm)

Dilution Factor: 1

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
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27.				
28.				
29.				
30.				

WHC-SD-WM-DP-081, REV. 0

RAW ANALYTICAL DATA

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

R5597-R5599

Customer ID:

TK 9-1

Analysis:

Acid Digest

Sample Prep:

Acid Digest

Instrument: SNFO 4495

Procedure/ Rev: LA-505-159 B-1

Technologist: Lisa Hughs-Stanley

Date: 9-5-94 11-2-94

Starting Time: 8:00

Temperature: NA 95°C

Ending Time: 10:35

Chemist: Beetravel Griffin

Comments:

	Description	Lab ID
1	std	R5594-8500
2	std	R5594-8500
3	Blank	R5595-8600
4	Blank	R5595-8600
5	Sample	R5597-8700
6	Sample	R5599-8700
7	Sample + Dup	R5599-8800
8	Sample + Spike ^{for ICP}	R5599-8900
9	Sample + Spike ^{for ICP} Dup	R5599-8900
10	Sample + spike for As, Se	R5599-8900

	10-25-94 LAD Description	Lab ID
11	Sam Sample + spike for As, Se	R5599-8900
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	44N11-B			
WHC-1A				
WHC-2				

4391

ANALYTICAL BATCH SUMMARY SHEET					
METHOD LA-505-159/B-1		RERUN# 0	ANALYSIS START DATE 09-05-94		
PREPARED BY LH STANDLEY			SUMMARY DATE 09-5-94		
SAMPLE TK-9-1 POINT		TIME START 0800	TIME COMPLETE 1035		
SPL ID	SERIAL NO	RESULT #1	G OR ML ->	MLS	COMMENTS
STD	R 5594 8500	D.F. = 20	5mL	100	5mL -> 100mL WHC-1A/Y4JWHC1AN10 WHC-2/G3MWHC2N1G
STD	R 5594 8500	D.F. = 4	12.5 mL	50	12.5mL->50mL
BLK	R 5595 8600	-	-	100	TOTAL VOLUME:100mL NOTE: THERE ARE TWO BLK,S;ONE FOR ICP AND ONE FOR AS/SE.
SAM	R 5599 8700	D.F. = 100	1 ML	100	1 ML -> 100mL
DUP	R 5599 8800	D.F. = 100	1 ML	100	1 ML -> 100mL
SPIKE ICP	R 5599 8900	D.F. = 100 D.F. = 20	1 ML 5 ML	100	1 ML -> 100mL 5 ML -> WHC-1A/Y4JWHC1AN10 WHC-2/ G3MWHC2N1G
SPIKE DUP ICP	R 5599 8900	D.F. = 100 D.F. = 20	1 ML 5 ML	100	1 ML -> 100mL 5 ML -> STD'S ARE THE SAME AS ABOVE.
SPIKE AA	R 5599 8900	D.F. = 100 D.F. = 4	1 ML 25ML	100	1 ML -> 100 mL 25ML -> 44N11-B
SPIKE DUP AA	R 5599 8900	D.F. = 100 D.F. = 4	1 ML 25ML	100	1 ML -> 100mL 25ML -> STD IS THE SAME AS ABOVE.
SAM	R 5597 8700	D.F.=100	1ML	100	1ML -> 100ML
<div style="display: flex; justify-content: space-between;"> <i>Don't send to Jeff II</i> <i>11-2-94</i> </div>					

ANALYTICAL BATCH SUMMARY SHEET					

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

Bertand Giff II

11-2-94

WHC-SD-WM-DP-081, REV. 0
ACID DIGESTION ANALYSIS

Serial No R 5594.-8500	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:47	Priority 23
Determination ACD DGST	Method Standard LA-505-159 LA-505-158	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ?	12.5 ml → 50 ml		Customer ID STD	
Remarks Calculations Results LMCS CHECK SAMPLE LMCS ID 44011-B $DF = \frac{50 \text{ ml}}{12.5 \text{ ml}} = 4$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> NOTE: 50 ml final vol. as a result of lack of STD. here used. 6/22/94 10-17-94 </div>				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-5-94 10 EDT 11-2-94	Time Completed 1035	Lab Unit Mgr Bertland Griffin II

Bdu 4391

Serial No R 5594.-8500	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:47	Priority 23
Determination ACD DGST	Method Standard LA-505-159 LA-505-158	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ?	5 mL → 100 mL		Customer ID STD	
Remarks Calculations Results LMCS CHECK SAMPLE LMCS ID WHC-1A/Y4JWHCIANIO WHC-2/G3MWHC2UIG $DF = \frac{100 \text{ mL}}{5 \text{ mL}} = 20$				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 6-5-94 10 EDT 11-2-94	Time Completed 1035	Lab Unit Mgr Bertland Griffin II

ACID DIGESTION ANALYSIS

Serial No R 5595.-8600	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:48	Priority 23
Determination ACD DGST	Method Standard LA-505-158 LA-505-159 6/21/94 10:11-94	Result Units G/L	Charge Code KB24X	Reruns 0
Sample Size ? 100mL			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK for ICP /COMPLETE				
Analyst - 1 Mrs	Analyst - 2 Mrs	Analyst - 3 Mrs	Analyst - 4 Mrs	Analyst - 5 Mrs
Date 10-5-94	Time Completed 1035	Lab Unit Mgr Bertland Griffin II

54-680C-061 (R-10 83)

Serial No R 5595.-8600	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:48	Priority 23
Determination ACD DGST	Method Standard LA-505-158 LA-505-159 6/21/94 10:11-94	Result Units G/L	Charge Code KB24X	Reruns 0
Sample Size ? 100mL			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK for As, Se /COMPLETE				
Analyst - 1 Mrs	Analyst - 2 Mrs	Analyst - 3 Mrs	Analyst - 4 Mrs	Analyst - 5 Mrs
Date 10-5-94	Time Completed 1035	Lab Unit Mgr Bertland Griffin II

54-680C-061 (R-10 83)

WHC-SD-WM-DP-081, REV. 0

ACID DIGESTION ANALYSIS

Serial No R 5597.-8700	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:50	Priority 23
Determination ACD DGST	Method Standard LA-505-159 LA-505-159 6-22-94 10-11-94	Result Units G/L	Charge Code KB24X	Reruns 0
Sample Size ? 1 ml → 100 ml			Customer ID TRIP BLK	
Remarks Calculations Results JAR ID# GRAMS SAMPLE 1 ml DF: $\frac{100\text{ml}}{1\text{ml}} = 100$ VOLUME ON COMPLETION 100 ml				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-5-94	Time Completed 1035	Lab Unit Mgr Bertrand Griffin II

54-6500-061 (R-10 83)

Serial No R 5599.-8700	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination ACD DGST	Method Standard LA-505-158 LA-505-159 6-22-94 10-11-94	Result Units G/L	Charge Code KB24X	Reruns 0
Sample Size ? 1 ml → 100 ml			Customer ID SAMPLE	
Remarks Calculations Results JAR ID# GRAMS SAMPLE 1 ml DF: $\frac{100\text{ml}}{1\text{ml}} = 100$ VOLUME ON COMPLETION 100 ml				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-5-94	Time Completed 1035	Lab Unit Mgr Bertrand Griffin II

54-6500-061 (R-10 83)

ACID DIGESTION ANALYSIS

Serial No R 5599.-8800	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination ACD DGST	Method Standard LA-505-158 LA-505-159 6/22/94 12-11-94	Result Units G/L	Charge Code KB24X	Re:uns 0
Sample Size ?	1 ml → 100 ml		Customer ID SAMPLE	
Remarks Calculations Results DUPLICATE SAMPLE JAR ID# GRAMS SAMPLE <u>1 ml</u> $\frac{100 \text{ ml}}{1 \text{ ml}} = 100$ VOLUME ON COMPLETION <u>100 ml</u>				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 10-5-94	Time Completed 1035	Lab Unit Mgr Bertrand Griffin II

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

Serial No R 5599.-8900	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination ACD DGST	Method Standard LA-505-158 LA-505-159 6/22/94 12-11-94	Result Units G/L	Charge Code KB24X	Re:uns 0
Sample Size ?	1 ml → 100 ml		Customer ID SAMPLE	
Remarks Calculations Results <u>Spike for ICP</u> SPIKE SAMPLE SPIKE ID <u>WHC-1A & WHC2</u> SPIKE VOLUME <u>5 ml</u> $DF: \frac{100 \text{ ml}}{5 \text{ ml}} = 20$ $DF: \frac{100 \text{ ml}}{1 \text{ ml}} = 100$				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 10-5-94	Time Completed 1035	Lab Unit Mgr Bertrand Griffin II

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

WHC-SD-WM-DP-081, REV. 0

ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
R 5599.-8900	TK-9-1	6-22-94	19:52	23
Determination	Method Standard	Result Units	Charge Code	Re-uns
ACD DGST	LA-505-158 LA-505-159	G/L	KB24X	0
Sample Size	Customer ID			
? 1 ml → 100 ml	SAMPLE DUP			
Remarks Calculations Results <i>Spike Duplicate for ICP</i> SPIKE SAMPLE SPIKE ID WHC-1A, WHC-2 SPIKE VOLUME 5 ml of each $DF = \frac{100 \text{ ml}}{5 \text{ ml}} = 20$ $DF = \frac{100 \text{ ml}}{5 \text{ ml}} = 20$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>	<i>[Signature]</i>			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
6-5-94	1035	<i>Bertie L. Griffin III</i>	<i>[Signature]</i>	

54-6800-061 (R 10-83)

Serial No	Sample Point	Date	Time Issued	Priority
R 5599.-8900	TK-9-1	6-22-94	19:52	23
Determination	Method Standard	Result Units	Charge Code	Re-uns
ACD DGST	LA-505-158 LA-505-159	G/L	KB24X	0
Sample Size	Customer ID			
? 1 ml → 100 ml	SAMPLE			
Remarks Calculations Results <i>spike for As, Se</i> SPIKE SAMPLE SPIKE ID 44311-B SPIKE VOLUME 25 ml $DF = \frac{100 \text{ ml}}{25 \text{ ml}} = 4$ $DF = \frac{100 \text{ ml}}{25 \text{ ml}} = 4$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>	<i>[Signature]</i>			
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
6-5-94	1035	<i>Bertie L. Griffin III</i>	<i>[Signature]</i>	

54-6800-061 (R 10-83)

WHC-SD-WM-DP-081, REV. 0
ACID DIGESTION ANALYSIS

Serial No R 5599.-8900	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination ACD DGST	Method Standard LA-505-158 LA-505-159 6/22/94 12:12:44	Result Units G/L	Charge Code KB24X	Reruns 0
Sample Size ? 1 ml → 100 ml			Customer ID SAMPLE (DUP)	
Remarks, Calculations, Results Spike duplicate for As, Se SPIKE SAMPLE SPIKE ID 44211-B SPIKE VOLUME 2.5 ml $DF = \frac{100 \text{ ml}}{2.5 \text{ ml}} = 40$ $DF = \frac{100 \text{ ml}}{1 \text{ ml}} = 100$				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 9-5-94	Time Completed 1035	Lab Unit Mgr 54 6800-061 (R-10-83)		

008
P-4

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. R 5596, R 5597	Customer ID: SAMPLE, TRIP BLK
Analysis: pH	Sample Prep: DIRECT

Instrument: SN 246354	Procedure/ Rev: LA-212-102/C-45 RWS 11-8-94
Technologist: SM FULTON	Date: 09/27/94
Starting Time: 1930	Temperature 25 CENTIGRADE
Ending Time: 1945	Chemist: R. S. SCHROEDER RWS 9-29-94

Comments: BATCH #4625
 INSUFFICIENT SAMPLE # R 5596 TO RUN DUPLICATE ANALYSIS.

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS STANDARD	R 5594-5513	11		
2	SAMPLE	R 5596-5713	12		
3	SAMPLE DUPLICATE	R 5596-5813	13		
4	SAMPLE	R 5597-5713	14		
5	ENDING LMCS STANDARD	R 5598-5513	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	52N16-B 3.0ml			

[illegible]

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

RW Schroeder 10-25-94

WHC-SD-WM-DP-081, REV. 0

pH ANALYSIS - UNDIGESTED SAMPLE

PUSH Batch 4625

Serial No	Sample No	Date	Time Issued	Priority
R 5594.-5513	TK-9-1	6-22-94	19:47	16
Determination	Method Standard	Result Units	Charge Code	Reruns
pH	LA-212-102	NONE	KB24X	0
Sample Size			Customer ID	
? Direct			STD	
Remarks Calculations Results				
<p>S350 PH MAT. pH = 3.99</p> <p>STD# RESULT</p> <p>STD VAL %REC</p> <p>S353 NBSPH1</p> <p>STD# 52N/G-B RESULT</p> <p>STD VAL 4.00 %REC 99.75</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Int. Fulton				
Hrs	Hrs	Hrs	Hrs	Hrs
				24 hours
Date	Time Completed	Lab Unit Mgr	Signature	
9-27-94	1945	RW Schneider	D. H. Hines	

54-680C-061 R 10 831

PUSH

Serial No	Sample No	Date	Time Issued	Priority
R 5596.-5713	TK-9-1	6-22-94	19:48	16
Determination	Method Standard	Result Units	Charge Code	Reruns
pH	LA-212-102	NONE	KB24X	0
Sample Size			Customer ID	
? Direct			SAMPLE	
Remarks Calculations Results				
<p style="text-align: right;">pH = 12.12</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Int. Fulton				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr	Signature	
9-27-94	1945	RW Schneider	D. H. Hines	

54-680C-061 R 10 831

WHC-SD-WM-DP-081, REV. 0
pH ANALYSIS - UNDIGESTED SAMPLE

RUSH

Serial No R 5596.-5813		Sample No. TK-9-1		Date 6-22-94	Time Issued 19:48	Priority 16
Determination pH	Method Standard LA-212-102		Result Units NONE	Charge Code KB24X	Retuns 0	
Sample Size ?				Customer ID SAMPLE		
Remarks Calculations Results <div style="text-align: center; font-size: 1.2em;">1 S.</div> <div style="text-align: center;">INSUFF. SAMPLE</div>						
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 9-27-94	Time Completed 1945	Lab Unit Mgr 9-29-94 <i>[Signature]</i>		<i>[Signature]</i>		

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

RUSH

Serial No R 5597.-5713		Sample No. TK-9-1		Date 6-22-94	Time Issued 19:50	Priority 16
Determination pH	Method Standard LA-212-102		Result Units NONE	Charge Code KB24X	Retuns 0	
Sample Size ? Direct				Customer ID TRIP BLK		
Remarks Calculations Results <div style="text-align: center; font-size: 1.2em;">pH = 6.48</div>						
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 9-27-94	Time Completed 1945	Lab Unit Mgr 9-29-94 <i>[Signature]</i>		<i>[Signature]</i>		

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

WHC-SD-WM-DP-081, REV. 0

pH ANALYSIS - UNDIGESTED SAMPLE

Serial No R 5598.-5513		Sample Point TK-9-1		Date 6-22-94	Time Issued 19:51	Priority 16
Determination pH	Method Standard LA-212-102	Result Units NONE	Charge Code KB24X	Reruns 0		
Sample Size ? <i>Direct</i>				Customer ID STD		
Remarks Calculations Results S350 PH MAT. pH = 4.00 STD# RESULT STD VAL %REC S353 NBSPH1 STD# <i>92 N16-B</i> RESULT STD VAL <i>400</i> %REC 100.0						
Analyst - 1 <i>S. Dalton</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Mrs	Mrs	Mrs	Mrs	Mrs <i>B. H. H. H.</i>		
Date 9-27-94	Time Completed 1945	Laboratory <i>Rw. Schneider</i>	Date 9-29-94 <i>B. H. H. H.</i>			

34-5800-251 R 10 33

08
241

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. R5594, 5597, 5598, 5599	Customer ID: KB24x
Analysis: PH	Sample Prep: KB24x ³⁵ 10-3-94 Direct

Instrument: 246354	Procedure/ Rev: LA 212-102 /C-5
Technologist: JD Spellman	Date: 10-3-94
Starting Time: 1400	Temperature NA
Ending Time: 1430	Chemist: R. Schroeder

Comments: _____

	Description	Lab ID		Description	Lab ID
1	STD	R5594-5513	11		
2	Blank	R5597-5513	12		
3	Sample	R5599-5513	13		
4	Dup	R5599-5513	14		
5	STD	R5598-5513	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	18N14m			

WHC-SD-WM-DP-081, REV. 0

[illegible]

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH
Rerun because the wrong standard was used for the previous batch. This batch
has no discrepancies. *P. J. Schaefer 10-24-94*

RW Schroeder 10-24-94

WHC-SD-WM-DP-081, REV. 0
pH ANALYSIS - UNDIGESTED SAMPLE

Serial No RUSH R 5594.-5513		Sample Point TK-9-1		Date 6-22-94		Time Issued 19:47		Priority 16	
Determination pH		Method-Standard LA-212-102		Result Units NONE		Charge Code KB24X		Reruns 1	
Sample Size ? ~1ml						Customer ID STD			
Remarks, Calculations, Results S350 PH MAT. 9.98 STD# 15/16M STD VAL 10.03 RESULT 9.98 S353 NBSPH1 %REC 99.8 STD# RESULT STD VAL %REC									
Analyst - 1 <i>JAS</i>		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
Hrs		Hrs		Hrs		Hrs		Hrs	
Date 10-3-94		Time Completed 1400		Lab Unit Mgr 10-5-94 <i>RW Schroeder</i>		<i>[Signature]</i>			

754-6800-061 (R-10-83)

Serial No RUSH R 5597.-5713		Sample Point TK-9-1		Date 6-22-94		Time Issued 19:50		Priority 16	
Determination pH		Method-Standard LA-212-102		Result Units NONE		Charge Code KB24X		Reruns 1	
Sample Size ? ~1ml						Customer ID TRIP BLK			
Remarks, Calculations, Results 8.09									
Analyst - 1 <i>JAS</i>		Analyst - 2		Analyst - 3		Analyst - 4		Analyst - 5	
Hrs		Hrs		Hrs		Hrs		Hrs	
Date 10-3-94		Time Completed 1400		Lab Unit Mgr 10-5-94 <i>RW Schroeder</i>		<i>[Signature]</i>			

754-6800-061 (R-10-83)

WHC-SD-WM-DP-081, REV. 0

pH ANALYSIS - UNDIGESTED SAMPLE

RUSH

Serial No	R 5599.-5713 TK-9-1		Date	6-22-94	Time Issued	19:52	Priority	16
Determination	Method Standard	Result Units	Charge Code		Refuns			
pH	LA-212-102	NONE	KB24X		0			
Sample Size	? ~ 1 mL		Customer ID		SAMPLE			
Remarks Calculations Results								
12.18

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5				
Mrs	Mrs	Mrs	Mrs	Mrs				
Date	Time Completed	Lab Unit Mgr	<div style="display: flex; justify-content: space-between;"> 10-3-94 1400 10-5-94 10-21-94 </div> <div style="display: flex; justify-content: space-between;"> R. Schoeder R. Schoeder </div>					

54-6800-061 (R 10 83)

RUSH

Serial No	R 5599.-5813 TK-9-1		Date	6-22-94	Time Issued	19:52	Priority	16
Determination	Method Standard	Result Units	Charge Code		Refuns			
pH	LA-212-102	NONE	KB24X		0			
Sample Size	? ~ 1 mL		Customer ID		SAMPLE			
Remarks Calculations Results								
DUPLICATE SAMPLE 12.12

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5				
Mrs	Mrs	Mrs	Mrs	Mrs				
Date	Time Completed	Lab Unit Mgr	<div style="display: flex; justify-content: space-between;"> 10-3-94 1400 10-5-94 11-8-94 </div> <div style="display: flex; justify-content: space-between;"> R. Schoeder R. Schoeder </div>					

54-6800-061 (R 10 83)

pH ANALYSIS - UNDIGESTED SAMPLE

Serial No R 5598.-5513	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:51	Priority 16
Determination pH	Method Standard LA-212-102	Result Units NONE	Charge Code KB24X	Reruns 1
Sample Size ?	~1 mL		Customer ID STD	
Remarks, Calculations, Results S350 PH MAT. RESULT 9.98 STD# 18V16 ~ %REC 99.8 STD VAL 10.00 S353 NBSPH1 STD# RESULT STD VAL %REC 9.98				
Analyst - 1 <i>JHSp</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs <i>DK</i>
Date 10-3-94	Time Completed 1400	Lao Unit Mgr 10-5-94 <i>Rue Schneider</i>	<i>Dug Hunt</i>	

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

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

R5596, R5597

Customer ID:

SAMPLE, TRIP BLK

TK 9-1

Analysis:

OH LIQ

Sample Prep:

UNDIGESTED

Instrument: WC06695

Procedure/ Rev: LA 211-102 B-1

Technologist: JT KNIGHT Jr.

Date: 09/08/94

Starting Time: 13:00

Temperature 25 C

Ending Time: 15:30

Chemist: ROBERT WILLIAM SCHROEDER

Comments: BATCH #4410

	Description	Lab ID
1	INITIAL LMCS STANDARD	R5594-5529
2	BLANK	R5595-5629
3	SAMPLE	R5596-5729
4	SAMPLE DUPLICATE	R5596-5829
5	SAMPLE SPIKED	R5596-5929
6	SAMPLE DUPLICATE SPIKED	R5596-5929
7	SAMPLE	R5597-5729
8	FINAL LMCS STANDARD	R5598-5529
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 ITS-OH	21N8A .050ML			

ANALYTICAL BATCH SUMMARY SHEET

METHOD: La-211-102 **ANALYTE:** OH **ANALYSIS START DATE** 9/15/94

PREPARED BY: Rob Schroeder **SUMMARY DATE:** 10/25/94

PROJECT TK-9-1 UNITS: ug OH/mL SAMPLE PREP: Direct

[illegible]

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS/ VARIATIONS FOR THIS BATCH

RW Schroeder 10-25-94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

PERUN Batch 4410

Serial No A 5594-5529	Sample Point LA-211-102	Date 9-01-94	Time Issued 13:17	Priority 1
Determination OH	Method-Standard LA-211-102	Result Units RECOVERED	Charge Code 12000	Reruns 1
Sample Size 0.050 mL			Customer ID 37	
Remarks Calculations Results 2/1884 RESULT 0.904 M STD VAL 0.938 STD 96.4 $(.236) \times (.1916) \times (.050) \times (x)$				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 9.8.94	Time Completed	Lab Unit Mgr 9-15-94 <i>[Signature]</i>	<i>[Signature]</i>	

WHC-SD-WM-DP-081, REV. 0

54-5800-061 (R 10 83)

OH (AUTO) : LA-211-102 (B-1)

		STANDARD
Type	Sample Size (mL) SS	0.050
STANDARD	Concentration of HNO3 (Molarity)	0.1916
Work List	HNO3 Titrant at OH end-point in mL	0.236
4410	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	9.04E-01
	OH in Sample in µg/mL (PPM)	1.54E+04
Matrix	BEST AVAILABLE COPY	
LIQUID		
Sample #		
R5594-5529		
Instrument Code		
AL-10636		
Analyst	OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
J. KNIGHT JR.		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
09/08/94		
Time		
03:30 PM		
		STANDARD
Concentration of OH in Sample (Molarity)		9.04E-01
OH in Sample in µg/mL (PPM)		1.54E+04

Data Entry by:	<i>[Signature]</i>	Date:	09/15/94
Approved by:	<i>[Signature]</i>	Date:	10-25-94

Form 211102_1 Rev. 1.3

DETERMINATION OF HYDROXIDE IONS IN SOLUTION - UNDIGESTED SAMPLE

R 5594- 5529

R 9.8.94

DATE 04-09-94 11:45
 GET pH 11.2
 Id. #1 11.73
 Id. #2 11.73
 pH 11.73
 EP1 19.00
 EP2 7.05
 STOP vol. reached
 =====

R

DATE 04-09-94 11:45
 GET pH 11.2
 Id. #1 11.73
 Id. #2 11.73
 pH 11.73
 EP1 19.00
 EP2 7.05
 STOP vol. reached
 =====

DATE 04-09-94 11:45
 GET pH 11.2
 Id. #1 11.73
 Id. #2 11.73
 pH 11.73
 EP1 19.00
 EP2 7.05
 STOP vol. reached
 =====

WHC-SD-WM-DP-081, REV. 0

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PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No 5500-6009	Sample Point CK-0-1	Date 6-08-94	Time Issued 19:43	Priority 36
Determination 14	Method Standard LA-211-102	Result Units ug/L	Charge Code R3040	Reruns 1
Sample Size 3ml H ₂ O + 1ml BaCl ₂			Customer ID BLANK	
Remarks: Calculation Results REAGENT BLANK $(0.000)(1.916) = (3\text{mL})(0.0)$ $< 42 \text{ ug/mL}$ $D.L. = 120 \frac{\mu\text{g}}{3\text{mL}} = 42 \text{ ug/mL}$				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9.8.94	Time Completed	Lab Unit Mgr 9-8-94 <i>[Signature]</i> RW Schneider		

WHC-SD-WM-DP-081, REV. 0

54-6800-061 (R 10 83)

OH (AUTO) : LA-211-102 (B-1)

Type	Sample Size (mL) SS	BLANK
BLANK	Concentration of HNO ₃ (Molarity)	3.000
Work List	HNO ₃ Titrant at OH end-point in mL	0.1916
4410	Dilution Factor DF	0.000
Test Code	Concentration of OH in Sample (Molarity)	1
	OH in Sample in ug/mL (PPM)	0.00E+00
Matrix		0.00E+00
LIQUID		
Sample #	Detection Limit = 125ug / SS * DF	
R5595-5629		
Instrument Code	Detection Limit (ug/mL)	4.17E+01
AL-10636		
Analyst	OH Molarity = ((mL HNO ₃)*(M HNO ₃))/Sample Size in mL*Dilution Factor	
J. KNIGHT JR.		
Date	OH in ug/mL = (OH MOLARITY)*(17.0g/mole)*((1000000ug/g)/(1000mL/L))	
09/08/94		
Time		BLANK
03:30 PM	Concentration of OH in Sample (Molarity)	0.00E+00
	OH in Sample in ug/mL (PPM)	<42

The Result is < Detection Limit

Data Entry by:	<i>[Signature]</i>	Date:	09/15/94
Approved by:	<i>[Signature]</i>	Date:	10-25-94

DETERMINATION OF HYDROXIDE IONS IN SOLUTION - UNDIGESTED SAMPLE

R5595-5629

WHC-SD-WM-DP-081, REV. 0

R
 done 94-09-08 time 08:35
 GET pH 12 # 99
 10 ml 55.555613
 10 ml 10.13
 10 ml 6.71
 pH 5.64
 stop 10.13
 5.64

done 94-09-08 time 08:35
 GET pH 12 # 99
 10 ml 10.13
 stop 10.13

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PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5596.-5729		Sample Point TK-9-1		Date 6-22-94	Time Issued 19:48	Priority 26
Determination OH LIQ	Method/Standard LA-211-102	Result Units uG/ML	Charge Code KB24X	Reruns 1		
Sample Size 1 ML			Customer ID SAMPLE			
Remarks, Calculations, Results $(0.097)(0.1916) = (1.0 \text{ mL}) \times 6.81 \text{ E+2 } \mu\text{g/mL}$ $0.0186 \text{ M} \times 17000 = 3.16 \text{ E+2 } \mu\text{g/mL}$ 0.0400 M $\text{D.L.} = 125 \text{ } \mu\text{g/mL}$						
Analyst - 1 <i>J. Knight Jr.</i> Hrs	Analyst - 2	Analyst - 3	Analyst - 4 <i>R. Schneider</i> Hrs	Analyst - 5		
Date 9-8-94	Time Completed	Lab Unit Mgr 9-8-94 <i>R. Schneider</i>	<i>R. Jones</i> 54-6800-061 (R-10-831)			

WHC-SD-WM-DP-081, REV. 0

OH (AUTO) : LA-211-102 (B-1)

Type	Sample Size (mL) SS	SAMPLE
SAMPLE	Concentration of HNO3 (Molarity)	1.000
Work List	HNO3 Titrant at OH end-point in mL	0.1916
4410	Dilution Factor DF	0.209
Test Code	Concentration of OH in Sample (Molarity)	1
	OH in Sample in $\mu\text{g/mL}$ (PPM)	4.00E-02
Matrix		6.81E+02
LIQUID		
Sample #	Detection Limit = $125 \mu\text{g} / \text{SS} \cdot \text{DF}$	
R5596-5729		
Instrument Code	Detection Limit ($\mu\text{g/mL}$)	1.25E+02
AL-10636		
Analyst	OH Molarity = $((\text{mL HNO3}) \cdot (\text{M HNO3})) / (\text{Sample Size in mL} \cdot \text{Dilution Factor})$	
J. KNIGHT JR.		
Date	OH in $\mu\text{g/mL}$ = $(\text{OH MOLARITY}) \cdot (17.0 \text{ g/mole}) \cdot ((1000000 \mu\text{g/g}) / (1000 \text{ mL/L}))$	
09/08/94		
Time		SAMPLE
03:30 PM	Concentration of OH in Sample (Molarity)	4.00E-02
	OH in Sample in $\mu\text{g/mL}$ (PPM)	6.81E+02

Data Entry by: <i>R. Jones</i>	Date: 09/15/94
Approved by: <i>R. Schneider</i>	Date: 10-25-94

DETERMINATION OF HYDROXIDE IONS IN SOLUTION - UNDIGESTED SAMPLE

WHC-SD-WM-DP-081, REV. 0

R5596-5729

date 8-1-88 time 08:51
 GET pH 11 # 100
 Is.#1 55965729
 Is.#2 .191A
 pH(10ml) 11.67
 EF1 .200 pH 8.52
 stop with 100 ml

date 8-1-88 time 08:51
 GET pH 11 # 100
 .10ml pH=11.67
 stop with 100 ml

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5596-5829	Sample Point TX-3-1	RERUN	Date 8-22-94	Time Issued 19:48	Priority 26
Determination W-300	Method Standard SA-011-102	Result Units UG/ML	Charge Code K8040	Reruns 1	
Sample Size 1.00	Customer ID SAMPLE				
Remarks Calculations Results DUPLICATE SAMPLE $D.L. = 125 \mu g/mL$ $0.205 \times (0.091) \times (1.916) = (1.0 mL) \times 6.68 E+2 \mu g/mL$ $0.0174 M \times 17000 = 2.96 E+2 \mu g/mL$ $0.0393 M$					
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5	
Date 9.8.94	Time Completed	Lab Unit Mgr <i>[Signature]</i>	9-8-94 <i>[Signature]</i>		

WHC-SD-WM-DP-081, REV. 0

54-6800-061 (R 10-83)

OH (AUTO) : LA-211-102 (B-1)

Type	Sample Size (mL) SS	1.000
DUPLICATE	Concentration of HNO3 (Molarity)	0.1916
Work List	HNO3 Titrant at OH end-point in mL	0.205
4410	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	3.93E-02
	OH in Sample in $\mu g/mL$ (PPM)	6.68E+02
Matrix		
LIQUID		
Sample #	Detection Limit = $125 \mu g / SS * DF$	BEST AVAILABLE COPY
R5596-5829		
Instrument Code	Detection Limit ($\mu g/mL$)	1.25E+02
AL-10636		
Analyst	OH Molarity = $((mL HNO3) * (M HNO3)) / Sample Size in mL * Dilution Factor$	
J. KNIGHT JR.		
Date	OH in $\mu g/mL$ = $(OH MOLARITY) * (17.0g/mole) * ((1000000 \mu g/g) / (1000mL/L))$	
09/08/94		
Time		
03:30 PM	Concentration of OH in Sample (Molarity)	3.93E-02
	OH in Sample in $\mu g/mL$ (PPM)	6.68E+02

Data Entry by: <i>[Signature]</i>	Date: 09/15/94
Approved by: <i>[Signature]</i>	Date: 10-25-94

DETERMINATION OF HYDROXIDE IONS IN SOLUTION - UNDIGESTED SAMPLE

R5596-5829

WHC-SD-WM-DP-081, REV. 0

R
 date 94-09-08 time 08:59
 GET pH 11.7 # 101
 Id.#1 55965829
 Id.#2 11.7
 pH(101) 11.7
 Vol 1 pH
 EP1 1.203 3.55
 stop auto-reached
 =====

date 94-09-08 time 08:59
 GET pH 11.7 # 101
 .10ml tit .10ml/dm
 start 1.203 ml

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

RE RUN

Serial No 5596-5929	Sample Point TR-341	Date 6-22-94	Time Issued 19:43	Priority LB
Determination OF	Method Standard LA-211-102	Result Units % RECOVERY	Charge Code KB24X	Reruns 1
Sample Size 1 ml + .250 ml .18916 m NaOH			Customer ID SAMPLE	
Remarks Calculations Results $(0.475 - 0.205) = 0.270$ $(0.270)(.1916M) = (.250ML)(XM)$ $0.2069M / 0.18916 = 109.4 \% \text{ rec}$				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4 <i>[Signature]</i>	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9.8.94	Time Completed	Lab Unit Mgr 9-8-94 <i>[Signature]</i>		

WHC-SD-WM-DP-081, REV. 0

54-6800-061 (R-10 83)

OH (AUTO) : LA-211-102 (B-1)

		SPIKE
Type	Volume of Sample in Sample+Spike Aliquot in mL (VSS)	1
SPIKE	Volume of Sample in mL from Form 1 (VS)	1
Work List	Volume of Spike in mL (S)	0.25
4410	Sample+Spike Titrant Volume in mL (VSST)	0.475
Test Code	Sample Titrant Volume in mL from Form 1 (VST)	0.205
	Concentration of HNO3 (titrant) in Molarity (MNO)	0.1916
Matrix	Book # of Spike Standard Used	NA
LIQUID	Concentration of Spike Standard (Molarity) True Value (MSS)	0.189
Sample #	Analyzed Concentration of Spike (Molarity) (MOH)	2.07E-01
R5596-5929	% Spike Recovery	1.09E+02
Instrument Code		
AL-10636		
Analyst		
J. KNIGHT JR.	MOH = ((VSST - VST) * MNO) / S	
Date		
09/08/94	% Spike Recovery = MOH / MSS * 100	
Time		
03:30 PM		
Analyzed Concentration of Spike (Molarity)		2.07E-01
% Spike Recovery		1.09E+02

BEST AVAILABLE COPY

Data Entry by: *[Signature]* Date: 09/15/94
 Approved by: *[Signature]* Date: 10-25-95
 Form 211102_X Rev. 2.2 Page 1 of 1

DETERMINATION OF HYDROXIDE IONS IN SOLUTION - UNDIGESTED SAMPLE

R5596-5929

WHC-SD-WM-DP-081, REV. 0

date 01-29-00 time 11:00
 GET pH 12 # 107
 Id.#1 55965423
 Id.#2 .1913
 pH(initial) 12.03
 4.941 pH
 EP1 .384 11.36
 EP2 .443 10.74
 EP3 .493 9.30
 EP4 .523 8.81
 EP5 .552 6.38

stop vol. reached
 =====

date 01-29-00 time 11:00
 GET pH 12 # 107
 .12ml at pH=12.00
 start .393 ml

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

WHC-SD-WM-DP-081, REV. 0

RERUN

Serial No E 5596-5929	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:40	Priority 23
Determination IF	Method-Standard LA-661-102	Result Units % RECOVERY	Charge Code NECAN	Reruns 2
Sample Size 1ml + 250ml. 18916m NaOH			Customer ID SAMPLE	
Remarks Calculations Results $(.455) - (0.209) = (0.246)(.1916) = (.250)(x)$ $x = 0.1885 / .18916 =$ <div style="border: 1px solid black; padding: 5px; display: inline-block;">99.7% rec</div>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 <i>[Signature]</i> Hrs	Analyst - 3 <i>[Signature]</i> Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 9-8-94	Time Completed	Lab Unit Mgr 9-8-94 <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 R 10-831

OH (AUTO) : LA-211-102 (B-1)

		SPIKE
Type	Volume of Sample in Sample+Spike Aliquot in mL (VSS)	1
SPIKE	Volume of Sample in mL from Form 1 (VS)	1
Work List	Volume of Spike in mL (S)	0.25
4410	Sample+Spike Titrant Volume in mL (VSST)	0.455
Test Code	Sample Titrant Volume in mL from Form 1 (VST)	0.209
	Concentration of HNO3 (titrant) in Molarity (MNO)	0.1916
Matrix	Book # of Spike Standard Used	NA
LIQUID	Concentration of Spike Standard (Molarity) True Value (MSS)	0.189
Sample #	Analyzed Concentration of Spike (Molarity) (MOH)	1.89E-01
R5596-5929	% Spike Recovery	9.97E+01
Instrument Code		
AL-10636		
Analyst		
J. KNIGHT JR.		
Date		
09/08/94		
Time		
03:30 PM		
MOH = ((VSST - VST) * MNO) / S		
% Spike Recovery = MOH / MSS * 100		
Analyzed Concentration of Spike (Molarity)		1.89E-01
% Spike Recovery		9.97E+01

BEST AVAILABLE COPY

Data Entry by: *[Signature]* Date: 09/15/94
 Approved by: *[Signature]* Date: 10-25-94

Form 211102_X Rev. 2.2

Page 1 of 1

DETERMINATION OF HYDROXIDE IONS IN SOLUTION - UNDIGESTED SAMPLE

WHC-SD-WM-DP-081, REV. 0

R5596-5929

[Handwritten signature]

date 94-09-05 time 13:24
 GET pH 12 # 108
 Id.#1 55965929
 Id.#2 .1916
 pH(int) 12.06
 V/ml pH
 EP1 .455 8.96
 stop vlt. reached
 =====

[Handwritten signature]

date 94-09-05 time 13:21
 GET pH 12 # 108
 Id.#1 55965929
 Id.#2 .1916
 pH(int) 12.03
 V/ml pH
 EP1 .464 8.24
 EP2 .518 6.58
 stop vlt. reached
 =====

date 94-09-05 time 13:21
 GET pH 12 # 108
 .12ml/dlv 20ml/div
 start 1.000 ml

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PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

RERUN

Serial No R 5507.-5729	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:50	Priority 23
Determination OH SIG	Method: Standard LA-211-102	Result Units ug/mL	Charge Code KEDAK	Reruns 1
Sample Size 9.8.94 3ml			Customer ID TRIP BLK	
Remarks, Calculations Results $(0.000)(.1916) = (3\text{mL})(xM)$ $125/3\text{mL} = <42 \text{ ug/mL}$				
Analyst - 1 <i>[Signature]</i>	Analyst - 2	Analyst - 3	Analyst - 4 <i>[Signature]</i>	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9.8.94	Time Completed	Lab Unit Mgr 9-8-94 <i>[Signature]</i>		

WHC-SD-WM-DP-081, REV. 0

54-6800-061 (R-10 83)

OH (AUTO) : LA-211-102 (B-1)

Type	Sample Size (mL) SS	SAMPLE
SAMPLE	Concentration of HNO3 (Molarity)	3.000
Work List	HNO3 Titrant at OH end-point in mL	0.1916
4410	Dilution Factor DF	0.000
Test Code	Concentration of OH in Sample (Molarity)	1
	OH in Sample in ug/mL (PPM)	0.00E+00
Matrix		0.00E+00
LIQUID		
Sample #	Detection Limit = 125ug / SS * DF	
R5597-5729		
Instrument Code	Detection Limit (ug/mL)	4.17E+01
AL-10636		
Analyst	OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
J. KNIGHT JR.		
Date	OH in ug/mL = (OH MOLARITY)*(17.0g/mole)*((1000000ug/g)/(1000mL/L))	
09/08/94		
Time		SAMPLE
03:30 PM	Concentration of OH in Sample (Molarity)	0.00E+00
	OH in Sample in ug/mL (PPM)	<42

The Result is < Detection Limit

Data Entry by: <i>[Signature]</i>	Date: 09/15/94
Approved by: <i>[Signature]</i>	Date: 10-25-94

DETERMINATION OF HYDROXIDE IONS IN SOLUTION - UNDIGESTED SAMPLE

R5597-5729

WHC-SD-WM-DP-081, REV. 0

[Handwritten signature]

date 94-09-08 time 13:31
ET # 12 # 109
I.#1 55975729
I.#2 .1913
offset 7.25
stop volt reached
=====

date 94-09-08 time 13:32
ET # 12 # 109
I.#1 55975729
I.#2 .1913
offset 7.25
stop volt reached
=====

3 8
I.#1 55975729
I.#2 .1913
offset 7.25
stop volt reached
=====

Blank
date 94-09-08 time 13:33
ET # 12 # 110
I.#1 55975729
I.#2 .1913
offset 7.25
stop volt reached
=====

date 94-09-08 time 13:33
ET # 12 # 110
I.#1 55975729
I.#2 .1913
offset 7.25
stop volt reached
=====

2 4
I.#1 55975729
I.#2 .1913
offset 7.25
stop volt reached
=====

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PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5598-5529		Sample Point TX-S-1		Date 6-22-94	Time Issued 13:51	Priority 13
Determination OH	Method-Standard LA-211-102	Result Units % RECOVERY	Charge Code KBC4K	Reruns 1		
Sample Size 0.050 ML				Customer ID STD		
Remarks, Calculations, Results SETS ITS-OH STD=2118A RESULT 0.924M STD VAL 9.38E-1M RECV 98.5 $(.241)(.1916) = (.050)(x)$ $x = 0.924M$						
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 <i>[Signature]</i> Hrs		
Date 9-8-94	Time Completed	Lab Unit Mgr 9-15-94 <i>[Signature]</i>				

WHC-SD-WM-DP-081, REV. 0

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

OH (AUTO) : LA-211-102 (B-1)

Type	Sample Size (mL) SS	STANDARD
STANDARD	Concentration of HNO3 (Molarity)	0.050
Work List	HNO3 Titrant at OH end-point in mL	0.1916
4410	Dilution Factor DF	0.241
Test Code	Concentration of OH in Sample (Molarity)	1
	OH in Sample in µg/mL (PPM)	9.24E-01
Matrix		1.57E+04
LIQUID	BEST AVAILABLE COPY	
Sample #		
R5598-5529		
Instrument Code		
AL-10636		
Analyst	OH Molarity = ((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
J. KNIGHT JR.		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
09/08/94		
Time		
03:30 PM	Concentration of OH in Sample (Molarity)	STANDARD
	OH in Sample in µg/mL (PPM)	9.24E-01
		1.57E+04

Data Entry by:	<i>[Signature]</i>	Date:	09/15/94
Approved by:	<i>[Signature]</i>	Date:	10-25-94

DETERMINATION OF HYDROXIDE IONS IN SOLUTION - UNDIGESTED SAMPLE

R5598-5529

WHC-SD-WM-DP-081, REV. 0

[Handwritten signature]

date 94-09-30 time 10:39
 GET pH 12 # 103
 Id.#1 55945519
 Id.#2 1913
 pH(init) 11.33
 vol pH
 EF1 .241 9.90
 EF2 .313 7.05
 stop vol. reached
 =====

date 94-09-30 time 10:39
 GET pH 12 # 103
 .10ml 3.0 pH=12.0
 start .200 ml

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

9-1

Lab Segment Serial No. R5574, R5577	Customer ID: Sample, Trip BLK
Analysis: JCP	Sample Prep: Direct

Instrument: W238735	Procedure/ Rev: LQ-505-141 / Q. 0
Technologist: J.K. Sato	Date: 8-29-94
Starting Time: 0930	Temperature: 6/0
Ending Time: 1130	Chemist: S. P. ... J. ...

Comments: _____

	Description	Lab ID		Description	Lab ID
1	Long Check Std	- - -	11	Long Check Std	R5574-5577
2	Reagent Blank	- - -	12		
3	Long Check Std	R5574-5577	13		
4	Reagent Blank	R5575-5576	14		
5	Sample	R5574-5577	15		
6	Duplicate Sample	R5574-5577	16		
7	Spike	R5574-5577	17		
8	Duplicate Spike	R5574-5577	18		
9	Sample	R5577-5578	19		
10	Reagent Blank	- - -	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
Long Check Std 5574	33 B/V 2/direct			

INDUCTIVELY COUPLED PLASMA ANALYSIS

Batch 4320

Serial No R 5594.-5550	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:47	Priority 26
Determination ICP	Method/Standard LA-505-171/161	Result Units % RECOVERY	Charge Code K224X	Reruns 0
Sample Size ? SST4 33B48Q direct			Customer ID STD	
Remarks, Calculations, Results LMC'S CHECK SAMPLE $\text{Ag } (5.057/5)(100) = 101.14\% \checkmark$ $\text{Pb } 5.147 = 102.44\% \checkmark$ $\text{Ba } 4.830 = 96.60\% \checkmark$ $\text{Cd } 5.080 = 101.60\% \checkmark$ $\text{Cr } 5.103 = 102.06\% \checkmark$				
Analyst - 1 <i>JK LST</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94		Time Completed 1130	Lab Unit Mgr <i>S. Pung</i>	<i>8-29-94</i>

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

Serial No R 5595.-5650	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:48	Priority 26
Determination ICP	Method/Standard LA-505-171/161	Result Units ug/mL	Charge Code K224X	Reruns 0
Sample Size : Direct			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK $\text{Ba } < .05 \text{ ug/mL} \checkmark$ $\text{Cd } < .01 \checkmark$ $\text{Cr } < .01 \checkmark$ $\text{Pb } < .10 \checkmark$ $\text{Ag } < .01 \checkmark$				
Analyst - 1 <i>JK LST</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94		Time Completed 1130	Lab Unit Mgr <i>S. Pung</i>	<i>8-29-94</i>

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

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WHC-SD-WM-DP-081, REV. 0

INDUCTIVELY COUPLED PLASMA ANALYSIS

Serial No R 1556 -5750	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:48	Priority 20
Determination ICP-LIQ	Method/Standard LA-505-TDTH	Result Units UG/ML	Charge Code KE24X	Repeats 0
Sample Size 1.10 ul, filtered			Customer ID SAMPLE	
Remarks, Calculations, Results $Cg < .01 \times 11 = < 1.10 E^{-1} ug/ul$ ✓ $Ba < .05 \times 11 = < 5.50 E^{-1}$ ✓ $Cl < .01 \times 11 = < 1.10 E^{-1}$ ✓ $Cr .040 \times 11 = 2.20 E^{-1}$ ✓ $Pb < .10 \times 11 = < 1.10$ ✓				
Analyst - 1 JK 8/24	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Mrs	Mrs	Mrs	Mrs	Mrs
Date 8-27-94	Time Completed 1130	Lab Unit Mgr S. Pany	8-29-94	

54-6800-061 (R 10-83)

Serial No R 1556 -5850	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:48	Priority 20
Determination ICP-LIQ	Method/Standard LA-505-TDTH	Result Units UG/ML	Charge Code KE24X	Repeats 0
Sample Size 1.10 ul, filtered			Customer ID SAMPLE	
Remarks, Calculations, Results DUPLICATE SAMPLE $Cg < .01 \times 11 = < 1.10 E^{-1} ug/ul$ ✓ $Ba < .05 \times 11 = < 5.50 E^{-1}$ ✓ $Cl < .01 \times 11 = < 1.10 E^{-1}$ ✓ $Cr .019 \times 11 = 2.09 E^{-1}$ ✓ $Pb < .10 \times 11 = < 1.10$ ✓				
Analyst - 1 JK 8/24	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Mrs	Mrs	Mrs	Mrs	Mrs
Date 8-29-94	Time Completed 1130	Lab Unit Mgr S. Pany	8-29-94	

54-6800-061 (R 10-83)

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WHC-SD-WM-DP-081, REV. 0

INDUCTIVELY COUPLED PLASMA ANALYSIS

Report No.	Sample Point	Date	Time Issued	Priority
R 5596--5950	TK-N-1	6-22-94	19:48	26
Determination	Method/Standard	Result Units	Charge Code	Remarks
ICP	LA-505 151/4	% RECOVERY	KL24X	0
Sample Size	Customer ID			
1.161 g filtered	SAMPLE			
Remarks, Calculations, Results				
<p> $(5 \text{ ppm}) / (4 \text{ mL}) = (10 \text{ mL}) / (x) \quad x = 1 \text{ ppm}$ SAMPLE SPIKED 10 SPIKE ID 33848A SPIKE VOLUME 2 mL $\text{Cd } \frac{1.02-0}{1} \times 100 = 102\% \quad \checkmark$ $\text{Qg } (3.80-0) / 1 = 3.8 \quad \checkmark$ $3.8 \times 100 = 38\% \quad \checkmark$ $\text{Cr } \frac{1.05-2.1}{1} \times 100 = 83.0\% \quad \checkmark$ $\text{Ba } \frac{1.00-0}{1} \times 100 = 100\% \quad \checkmark$ $\text{Pb } \frac{1.04-0}{1} \times 100 = 104\% \quad \checkmark$ SP 05/21/94 Over </p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
JK LGO				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
8-29-94	1130	S. Palmer	JK LGO 8-29-94	

54-6100-061 1B-10-83

R.5596 - 5950

$$C_2 = \frac{1.05 - 0.020}{1} \times 100 = 103.0 \%$$

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WHC-SD-WM-DP-081, REV. 0
INDUCTIVELY COUPLED PLASMA ANALYSIS

Serial No R 5596-5950	Sample Point TR-11	Date 6-22-94	Time Issued 10:41	Priority LO
Determination ICP	Method/Standard EPA 821.1 EPA 800.1-161	Result Units mg/L	Charge Code E12245	Reruns 0
Sample Size 8-14 1-10 ml filtered			Customer ID SAMPLE	
Remarks Calculations Results (5 ppm)(2 ml) = (10 ml)(x) x = 1 ppm Cd $\frac{1.00-0}{1} \times 100 = 100\%$ ✓ Spike duplicate Qy $\frac{.349-0}{1} \times 100 = 36.9\%$ ✓ Bc $\frac{.973-0}{1} \times 100 = 97.3\%$ ✓ Pb $\frac{1.05-0}{1} \times 100 = 105\%$ ✓ SP 02/21/94 OVER				
Analyst - 1 JK Ldt	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-24-94	Time Completed 1130	Lab Unit Mgr S. Lang	Date 8-24-94 54-6800-061 (R 10 83)	

R5596-5950

$$C_d = \frac{1.03 - 0.019}{1} \times 100 = 101.1\%$$

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WHC-SD-WM-DP-081, REV. 0

INDUCTIVELY COUPLED PLASMA ANALYSIS

Serial No R 5597.-5750	Sample Point TE-9-1	Date 8-22-94	Time Issued 19:50	Priority 26
Determination ICP-LIQ	Method/Standard LA-505-45/41	Result Units UG/ML	Charge Code KBC4X	Retuns 0
Sample Size Direct			Customer ID TRIP BLK	
Remarks, Calculations, Results Ag <.01 ug/l ✓ Ba <.05 ✓ Cd <.01 ✓ Cr <.01 ✓ Pb <.10 ✓				
Analyst JK 4/10	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94	Time Completed 1130	Lab Unit Mgr S. Parry	8-29-94	

54 6800-061 (R-10-83)

Serial No R 5598.-5550	Sample Point TK-9 1	Date 8-22-94	Time Issued 19:51	Priority 26
Determination ICP	Method/Standard LA-505-45/41	Result Units % RECOVERY	Charge Code KBC4X	Retuns 0
Sample Size SSTY 33848 Q Direct			Customer ID STD	
Remarks, Calculations, Results LMC'S CHECK SAMPLE Ag $(5.447/5)(100) = 105.34\%$ ✓ Ba $5.082 = 101.44\%$ ✓ Cd $5.405 = 108.10\%$ ✓ Cr $5.408 = 108.14\%$ ✓ Pb $5.454 = 109.08\%$ ✓				
Analyst JK 4/10	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94	Time Completed 1130	Lab Unit Mgr S. Parry	8-29-94	

54 6800-061 (R-10-83)

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#	Sample Name	File	Method	Date	Time	OpID	Type	Mode
1	SST4	940829A	ICP2	08/29/94	09:04	DKS	Q	CONC
2	HNO3 REAG BLK	940829A	ICP2	08/29/94	09:07	DKS	Q	CONC
3	R5594 SST4	940829A	ICP2	08/29/94	09:12	DKS	Q	CONC
4	R5595 REAG BLK	940829A	ICP2	08/29/94	09:15	DKS	Q	CONC
5	R5596 SAMDIL	940829A	ICP2	08/29/94	09:19	DKS	S	CONC
6	R5596 DUPDIL	940829A	ICP2	08/29/94	09:22	DKS	S	CONC
7	R5596 SPIKE	940829A	ICP2	08/29/94	09:27	DKS	S	CONC
8	R5596 SPIKE DUP	940829A	ICP2	08/29/94	09:32	DKS	S	CONC
9	R5597 SAMPLE	940829A	ICP2	08/29/94	09:38	DKS	S	CONC
10	R5597 SAMPLE	940829A	ICP2	08/29/94	09:44	DKS	S	CONC
11	HNO3 REAG BLK	940829A	ICP2	08/29/94	09:47	DKS	Q	CONC
12	R5598 SST4	940829A	ICP2	08/29/94	09:51	DKS	Q	CONC

WHC-SD-WM-DP-081, REV. 0

JK Loto
8-29-94
TK-9-1
R5594-R5598

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 52 TO 83.

#	Sample Name	Ag	Al	As	B	Ba	Be
1	SST4	5.125	5.087	5.230	5.013	4.964	5.256
2	HNO3 REAG BLK	.0053	.0204	-.0183	.0120	.0001	.0003
3	R5594 SST4	5.057	4.982	5.125	4.899	4.830	5.139
4	R5595 REAG BLK	.0059	.0153	.0123	.0088	.0002	.0003
5	R5596 SAMDIL	.0097	.5285	.0062	.0294	.0123	-.0000
6	R5596 DUPDIL	.0081	.5422	-.0070	.0258	.0127	.0002
7	R5596 SPIKE	.3802	1.612	1.032	1.021	1.003	1.043
8	R5596 SPIKE DUP	.3692	1.585	1.031	.9994	.9732	1.022
9	R5597 SAMPLE	.0026	.0435	-.0161	.0029	.0001	-.0000
10	R5597 SAMPLE	.0029	.0395	.0001	.0056	.0002	-.0001
11	HNO3 REAG BLK	.0043	.0289	-.0199	.0074	.0000	.0002
12	R5598 SST4	5.267	5.201	5.378	5.082	5.082	5.403

WHC-SD-WM-DP-081, REV. 0

#	Sample Name	Bi	Ca	Cd	Ce	Co	Cr
1	SST4	5.203	4.779	5.218	5.055	5.234	5.224
2	HNO3 REAG BLK	.0414	.0078	.0001	.0017	.0032	.0031
3	R5594 SST4	5.092	4.656	5.080	4.906	5.114	5.103
4	R5595 REAG BLK	.0377	.0051	-.0003	.0080	.0005	.0016
5	R5596 SAMDIL	.0118	.8480	.0018	-.0040	.0032	.0199
6	R5596 DUPDIL	.0243	.8408	.0025	.0053	.0009	.0188
7	R5596 SPIKE	1.051	1.900	1.021	1.021	1.025	1.047
8	R5596 SPIKE DUP	.9821	1.850	1.000	.9973	1.006	1.029
9	R5597 SAMPLE	.0468	.0521	.0007	-.0091	-.0008	.0017
10	R5597 SAMPLE	.0227	.0570	-.0002	.0013	-.0031	.0020
11	HNO3 REAG BLK	.0500	.0122	.0007	.0001	.0021	.0029
12	R5598 SST4	5.380	4.968	5.405	5.202	5.420	5.408

#	Sample Name	Cu	Eu	Fe	K	La	Li
1	SST4	5.119	.0280	5.182	5.047	5.025	4.967
2	HNO3 REAG BLK	.0013	-.0022	.0034	.0607	.0007	.0014
3	R5594 SST4	5.020	.0266	5.063	5.107	4.897	4.901
4	R5595 REAG BLK	.0006	-.0032	.0029	-.1228	.0012	.0008
5	R5596 SAMDIL	.0367	-.0007	.1854	.8933	.0036	.0007
6	R5596 DUPDIL	.0367	-.0012	.1839	.9662	.0040	.0010
7	R5596 SPIKE	1.066	.0061	1.239	1.700	1.022	1.005
8	R5596 SPIKE DUP	1.046	.0061	1.216	1.821	.9927	.9921
9	R5597 SAMPLE	.0003	.0018	.0067	-.0455	-.0016	.0028
10	R5597 SAMPLE	.0008	.0017	.0065	.0489	.0000	.0030
11	HNO3 REAG BLK	.0011	-.0012	.0039	.2495	.0004	.0017
12	R5598 SST4	5.210	.0286	5.337	5.244	5.167	5.002

#	Sample Name	Mg	Mn	Mo	Na	Nd	Ni
1	SST4	5.093	5.112	5.158	4.964	5.155	5.184
2	HNO3 REAG BLK	.0189	.0009	.0066	.0095	.0054	-.0038
3	R5594 SST4	5.010	4.976	5.030	4.886	5.025	5.072
4	R5595 REAG BLK	.0159	.0007	.0082	.0072	.0025	-.0046
5	R5596 SAMDIL	.3831	.0128	.0073	203.6	.0068	.0000

6210°	8870°	8100°	8500°	Σ#
0910°	7970°	9100°	8700°	Σ#
6610°	9880°	0200°	6500°	1#

22°10'	002°6'	70°13'	19°61'	%RSD
--------	--------	--------	--------	------

Analysis Report

#	Sample Name	Mg	Mn	Mo	Na	Nd	Ni
6	R5596 DUPDIL	.3849	.0131	.0012	202.2	.0067	.0074
7	R5596 SPIKE	1.432	.9927	1.026	228.6	1.045	1.030
8	R5596 SPIKE DUP	1.398	.9744	1.002	222.6	1.020	.9952
9	R5597 SAMPLE	.0607	.0013	.0037	.0343	.0027	-.0027
10	R5597 SAMPLE	.0584	.0011	-.0015	.0359	.0041	-.0088
11	HNO3 REAG BLK	.0290	.0004	.0041	.0137	.0072	-.0043
12	R5598 SST4	5.213	5.245	5.335	4.968	5.284	5.385

WHC-SD-WM-DP-081, REV. 0

#	Sample Name	P	Pb	S	Sb	Se	Si
1	SST4	5.132	5.250	5.215	4.907	5.124	4.954
2	HNO3 REAG BLK	.0092	.0486	-.0098	.0125	.0172	.0222
3	R5594 SST4	5.228	5.147	5.174	4.811	5.021	4.872
4	R5595 REAG BLK	.0182	.0459	.0023	.0166	.0269	.0147
5	R5596 SAMDIL	.6138	.0442	3.508	.0249	-.0209	3.325
6	R5596 DUPDIL	.6152	.0519	3.521	.0174	-.0006	3.349
7	R5596 SPIKE	1.718	1.063	4.961	.9617	1.005	4.826
8	R5596 SPIKE DUP	1.684	1.054	4.910	.9615	1.001	4.710
9	R5597 SAMPLE	.0169	.0848	-.0177	.0078	.0319	.0107
10	R5597 SAMPLE	.0140	.0655	-.0068	.0122	.0072	.0100
11	HNO3 REAG BLK	.0110	.0410	.0120	.0078	.0360	.0092
12	R5598 SST4	5.500	5.454	5.417	5.034	5.238	5.087

#	Sample Name	Sm	Sr	Ti	Tl	U	V
1	SST4	5.046	4.948	4.948	5.069	9.940	5.158
2	HNO3 REAG BLK	.0135	.0003	.0014	.0054	.0512	.0026
3	R5594 SST4	4.909	4.828	4.827	4.883	9.682	5.034
4	R5595 REAG BLK	.0102	.0002	.0009	-.0040	.0502	.0018
5	R5596 SAMDIL	.0074	.0094	.0034	.0217	.0370	.0029
6	R5596 DUPDIL	.0066	.0095	.0034	.0106	.0333	.0026
7	R5596 SPIKE	1.022	1.009	.9924	.9707	2.046	1.028
8	R5596 SPIKE DUP	.9954	.9805	.9735	.9827	2.003	1.005
9	R5597 SAMPLE	.0422	.0006	.0007	.0040	.1569	.0077
10	R5597 SAMPLE	.0403	.0007	.0000	-.0028	.1654	.0073
11	HNO3 REAG BLK	.0222	.0002	.0011	.0037	.0786	.0040
12	R5598 SST4	5.173	5.079	5.088	5.240	10.22	5.320

#	Sample Name	Y	Zn	Zr
1	SST4	.0118	5.264	5.039
2	HNO3 REAG BLK	.0003	.0021	.0019
3	R5594 SST4	.0114	5.163	4.913
4	R5595 REAG BLK	.0002	.0035	.0013
5	R5596 SAMDIL	.0002	.1189	.0039
6	R5596 DUPDIL	.0001	.1003	.0039
7	R5596 SPIKE	.0025	1.150	1.001
8	R5596 SPIKE DUP	.0025	1.145	.9790
9	R5597 SAMPLE	.0018	.0122	.0051
10	R5597 SAMPLE	.0018	.0124	.0051
11	HNO3 REAG BLK	.0009	.0007	.0032

#	Sample Name	Y	Zn	Zr

12	R5598 SST4	.0127	5.413	5.186

WHC-SD-WM-DP-081, REV. 0

JK *SA*
8-29-94
TK-9-1
R5574-R5598

00
P.4

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. <i>R 5584-88</i>	Customer ID: <i>TK-9-1</i>
Analysis: <i>Inf</i>	Sample Prep: <i>ACID DIGEST</i>

Instrument: <i>WB 58535</i>	Procedure/ Rev: <i>LA 505-161 / 1A 0</i>
Technologist: <i>B. GEDERKE</i>	Date: <i>10-20-84</i>
Starting Time: <i>13:15</i>	Temperature <i>NA</i>
Ending Time: <i>15:15</i>	Chemist: <i>S. PARONG</i>

Comments: _____

	Description	Lab ID		Description	Lab ID
1	L.M.S. CHECK STD SSTU	R5584-5550	11		
2	TK 9-1, Dig STD.	R5584-8550	12		
3	TK 9-1, Dig BLK	R5585-8650	13		
4	TK 9-1, Std	R5589-8750	14		
5	TK 9-1, Dig	R5589-8850	15		
6	TK 9-1, Dig spike	R5589-8950	16		
7	TK 9-1, Dig Dig spike	R5589-9050	17		
8	TK 9-1, Trip BLK	R5589-8750	18		
9	L.M.S. CHECK STD SSTU	R5588-5550	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
<i>SSTU Inf</i>	<i>36B48A DIRECT</i>			<i>DIRECT</i>

	Ag	Ba	Cd	Cr	Pb	Units
R5594-5550	104.02%	103.70%	105.92%	106.40%	102.96%	
R5594-8550	86.01%	98.74%	96.66%	97.5%	93.40%	
R5595-8650	<.01	<.05	<.01	<.01	<.10	µg/mL
R5599-8750	<1.00	<5.00	<1.00	<1.00	<10.0	µg/mL
R5599-8850	<1.00	<5.00	<1.00	<1.00	<10.0	µg/mL
R5599-8950	87.16%	98.84%	97.04%	98.52%	94.50%	
R5599-8050	89.20%	101.32%	97.42%	98.78%	94.00%	
R5597-8750	<1.00	<5.00	<1.00	<1.00	<10.0	µg/mL
R5598-5550	103.50%	103.66%	104.74%	105.70%	102.10%	

WHC-SD-WM-DP-081, REV. 0

WHC-SD-WM-DP-081, REV. 0
INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No R 5594.-5550		Sample Point TK-9-1 ^{LAD}		Date 6-22-94	Time Issued 19:47	Priority 23
Determination ICP		Method-Standard LA-505-151 ¹⁶¹		Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? 36.3481A 5514 Direct					Customer ID STD	
Remarks Calculations, Results LMCS CHECK SAMPLE $AL\ 5.003 / 5(100) = 100.06\%$ $CA\ 5.233 = 104.66\%$ $NA\ 4.965 = 98.30\%$ $S\ 5.221 = 104.42\%$ $SI\ 4.952 = 99.04\%$ $2N\ 5.243 = 104.68\%$						
Analyst - 1 <i>[Signature]</i> Hrs		Analyst - 2 Hrs		Analyst - 3 Hrs		Analyst - 4 Hrs
Analyst - 5 Hrs						
Date 10-20-94		Time Completed 13:20		Lab Unit Mgr 10-24-94 <i>Brian Webb</i>		10-21-94 <i>[Signature]</i>

54-6800-061 (R-10 83)

Serial No R 5594.-8550		Sample Point TK-9-1 ^{LAD}		Date 6-22-94	Time Issued 19:47	Priority 23
Determination ICP		Method-Standard LA-505-151 ¹⁶¹		Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? 5.21 ^{WHC-1A} ? 5.21 ^{WHC-2} is 100%					Customer ID STD	
Remarks Calculations, Results 1st STD Digested STD $AL\ 4.772 / 5(100) = 95.44\%$ $CA\ 4.763 = 95.26\%$ $NA\ 4.790 = 95.50\%$ $S\ 4.846 = 96.92\%$ $SI\ 5.407 = 108.14\%$ $2N\ 4.686 = 93.72\%$						
Analyst - 1 <i>[Signature]</i> Hrs		Analyst - 2 Hrs		Analyst - 3 Hrs		Analyst - 4 Hrs
Analyst - 5 Hrs						
Date 10-20-94		Time Completed 13:00		Lab Unit Mgr 10-24-94 <i>Brian Webb</i>		10-21-94 <i>[Signature]</i>

54-6800-061 (R 10 83)

WHC-SD-WM-DP-081, REV. 0
INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No R 5595.-8650	Sample Point TK-9-1, ^{LAD} 10-27-94	Date 6-22-94	Time Issued 19:48	Priority 23
Determination ICP	Method/Standard LA-505-151 ¹⁶¹ ⁵⁶	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? <i>Direct (Direct)</i>			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK 2N <.01 ✓ AL <.05 ✓ CA <.10 ✓ NA <.10 ✓ S <.05 ✓ Si <.05 ✓				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 10-20-94	Time Completed 1300	Lab Unit Mgr <i>Brian Allen</i>	<i>[Signature]</i> 10-21-94	

54 6000-061 R 10 83)

Serial No R 5599.-8750	Sample Point TK-9-1, ^{LAD} 10-27-94	Date 6-22-94	Time Issued 19:52	Priority 23
Determination ICP-LIQ	Method/Standard LA-505-151 ¹⁶¹ ⁵⁶	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? <i>1.002g (0.6=1.00)</i>			Customer ID SAMPLE	
Remarks Calculations Results AL .085(100) = 8.50 u _g /L ✓ 2N .012 = 1.20 ✓ CA .150 = 1.50 E1 ✓ NA 25.1 = 2.51 E3 ✓ S .426 = 4.26 E1 ✓ Si .407 = 4.07 E1 ✓				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 10-20-94	Time Completed 1300	Lab Unit Mgr <i>Brian Allen</i>	<i>[Signature]</i> 10-21-94	

54 6000 061 (R-10-83)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 5599.-8850	TK-9-1 ^{LAD} ₁₀₋₂₂₋₉₄	6-22-94	19:52	23
Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP-LIQ	LA-505-151 ¹⁶¹ ₁₅₁	uG/ML	KB24X	0
Sample Size	Customer ID			
? / uL in 100 uL (d.f. = 100)	SAMPLE			
Remarks Calculations Results				
DUPLICATE SAMPLE $Si .405 = 4.05\% \checkmark$ $Al .093 (100) = 8.30\% \checkmark$ $Ca .178 = 1.78\% \checkmark$ $Na 25.1 = 2.51\% \checkmark$ $S .428 = 4.28\% \checkmark$ $BZ .017 = 1.70\% \checkmark$				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Title Completed	Lab Unit Mgr		
10-20-94	1300	10-24-94 Brian Mela	10-21-94	

54 6800 081 (R 10 83)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

WHC-SD-WM-DP-081, REV. 0

Serial No R 5599.-8950	Sample Point TK-9-1 ^{LAD} ₁₀₋₂₇₋₉₄	Date 6-22-94	Time Issued 19:52	Priority 23
Determination ICP	Method Standard LA-505-151 ¹⁶¹ ₁₅₁	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? _{1 ml in 100 ml}			Customer ID SAMPLE	
Remarks Calculations Results SPIKE SAMPLE SPIKE ID <u>WIK-1A-VK-2</u> SPIKE VOLUME <u>5.0 ml</u> AL 4.858 - .085 / 5 (100) = 95.46 % ✓ CA 4.965 - .150 / 5 (100) = 96.30 % ✓ NA 29.68 - 25.1 / 5 (100) = 91.60 % ✓ S 5.252 - .426 / 5 (100) = 91.12 % ✓ OVER →				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 10-20-94	Time Completed 1300	Lab Unit Mgr 10-24-94	10-21-94

54-6800-061 (R-10 83)

$$Si \ 5.125 - .407 / 5 (100) = 94.36 \% \checkmark$$

$$Zn \ 4.753 - .012 / 5 (100) = 94.82 \% \checkmark$$

R 5599 - 8950

WHC-SD-WM-DP-081, REV. 0

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 5599.-8050	TK-9-1, ¹⁰⁻²⁷⁻⁹⁴ _{2, 20}	6-22-94	19:52	23
Determination	Method-Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151 ¹⁶¹	% RECOVERY	KB24X	0
Sample Size	Customer ID			
? ¹⁰⁻²⁷⁻⁹⁴	SAMPLE			
Remarks Calculations Results				
<p>SAMPLE SPIKE DUPLICATE</p> <p>SPIKE ID WHC-1A, WHC-2 SPIKE VOL 5ml</p> <p>AL 4.934 - .043 / 5 (ml) = 97.02% ✓ CA 4.945 - .114 / 5 (ml) = 95.34% ✓ NA 30.47 - 25.1 / 5 (ml) = 107.70% ✓</p> <p style="text-align: right;">OVER →</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i> Mrs	Mrs	Mrs	Mrs	Mrs
Date	Time Completed	Lab Unit Mgr		
10-20-94	13:20	Brian <i>[Signature]</i> 10-24-94	10-21-94	

54 6d00-061 (R 10 83)

S 5.283 - .424 / 5 (ml) = 97.10% ✓

Si 5.179 - .405 / 5 (ml) = 95.44% ✓

ZW 4.757 - .017 / 5 (ml) = 94.50% ✓

R 5599-8050

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No R 5597.-8750	Sample Point TK-9-1 ⁴⁴⁰ 111-2530	Date 6-22-94	Time Issued 19:50	Priority 23
Determination ICP-LIQ	Method: Standard LA-505- ¹⁶¹ 151	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? / 1.00 in 1.00			Customer ID TRIP BLK	
Remarks, Calculations, Results AL <.05 (uG) = < 5.00 ✓ Ca <.10 = < 1.00E1 ✓ Na <.10 = < 1.00E1 ✓ S <.05 = < 5.00 ✓ Si <.05 = < 5.00 ✓ Zn <.01 = < 1.00 ✓				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-20-94	Time Completed 1300	Lab Unit Mgr Brian ¹⁰⁻²⁴⁻⁹⁴ 10-21-94	10-21-94	

54-6800-061 (R 10-83)

WHC-SD-WM-DP-081, REV. 0

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No R 5598.-5550	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:51	Priority 23
Determination ICP	Method: Standard LA-505-151	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? 368484 SST4 Direct			Customer ID STD	
Remarks Calculations, Results LMCS CHECK SAMPLE $Al\ 5.028 / 5 (w) = 100.162\%$ $Ca\ 5.177 = 103.542\%$ $Na\ 4.916 = 99.722\%$ $S\ 5.190 = 103.102\%$ $Si\ 4.922 = 98.442\%$ $Zn\ 5.772 = 104.442\%$				
Analyst - 1 Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 10-20-94	Time Completed 1300	Lab Unit Mgr Brian Miller 10-24-94		

54 6800-061 (R 10-83)

#	Sample Name	File	Method	Date	Time	OpID	Type	Mode
1	R5594 SST4 36B48A	941020A	ICP2	10/20/94	12:13	BJG	Q	CONC
2	HNO3 REAG BLK	941020A	ICP2	10/20/94	12:17	BJG	Q	CONC
3	R5595 DIG BLK	941020A	ICP2	10/20/94	12:20	BJG	S	CONC
4	R5594 DIG STD	941020A	ICP2	10/20/94	12:24	BJG	S	CONC
5	R5599 SAM	941020A	ICP2	10/20/94	12:29	BJG	S	CONC
6	R5599 DUP	941020A	ICP2	10/20/94	12:34	BJG	S	CONC
7	R5599 DIG SPIKE	941020A	ICP2	10/20/94	12:38	BJG	S	CONC
8	R5599 DUP DIG SPIKE	941020A	ICP2	10/20/94	12:41	BJG	S	CONC
9	R5597 TRIP BLK	941020A	ICP2	10/20/94	12:45	BJG	S	CONC
10	HNO3 REAG BLK	941020A	ICP2	10/20/94	12:49	BJG	Q	CONC
11	R5598 SST4 36B48A	941020A	ICP2	10/20/94	12:52	BJG	Q	CONC

WHC-SD-WM-DP-081, REV. 0

Sgt for B.J. Goetze

10-20-94

TK 9-1 R5594-95, 97, 98, 99

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 93 TO 95.

#	Sample Name	Ag	Al	As	B	Ba	Be
1	R5594 SST4 36B48A	5.201	5.003	5.193	5.086	5.185	5.334
2	HNO3 REAG BLK	.0005	.0110	-.0038	.0074	.0000	.0005
3	R5595 DIG BLK	.0079	.0368	.0037	.0093	.0001	.0005
4	R5594 DIG STD	.8601	4.772	4.800	4.780	4.937	5.572
5	R5599 SAM	.0040	.0850	-.0025	.0102	.0011	.0003
6	R5599 DUP	.0022	.0835	-.0025	.0125	.0011	.0004
7	R5599 DIG SPIKE	.8716	4.858	4.858	4.806	4.942	5.282
8	R5599 DUP DIG SPIKE	.8920	4.934	4.852	4.882	5.066	5.360
9	R5597 TRIP BLK	.0010	.0315	.0049	.0074	.0020	.0005
10	HNO3 REAG BLK	-.0002	.0117	-.0153	.0065	.0000	.0005
11	R5598 SST4 36B48A	5.175	5.008	5.136	5.064	5.183	5.318

WHC-SD-WM-DP-081, REV. 0

#	Sample Name	Bi	Ca	Cd	Ce	Co	Cr
1	R5594 SST4 36B48A	5.060	5.233	5.296	5.153	5.247	5.320
2	HNO3 REAG BLK	.0131	.0046	.0018	.0035	.0033	.0017
3	R5595 DIG BLK	.0169	.0164	.0018	.0076	.0025	.0009
4	R5594 DIG STD	4.644	4.763	4.833	4.953	4.925	4.875
5	R5599 SAM	-.0018	.1495	.0015	.0051	.0028	.0045
6	R5599 DUP	.0102	.1784	.0013	-.0023	.0041	.0046
7	R5599 DIG SPIKE	4.638	4.965	4.852	4.947	4.962	4.926
8	R5599 DUP DIG SPIKE	4.758	4.945	4.871	5.060	4.975	4.939
9	R5597 TRIP BLK	.0043	.0614	.0015	.0022	.0036	.0022
10	HNO3 REAG BLK	.0188	.0043	.0013	-.0022	.0015	-.0001
11	R5598 SST4 36B48A	5.057	5.177	5.237	5.149	5.188	5.285

#	Sample Name	Cu	Eu	Fe	K	La	Li
1	R5594 SST4 36B48A	5.146	.0261	5.215	4.548	5.170	4.983
2	HNO3 REAG BLK	.0009	-.0000	.0008	.0513	-.0006	.0004
3	R5595 DIG BLK	.0003	-.0022	.0031	.0604	.0006	-.0017
4	R5594 DIG STD	4.854	.0226	4.851	4.393	4.971	4.848
5	R5599 SAM	.0055	-.0012	.0346	.2653	.0008	-.0013
6	R5599 DUP	.0112	-.0015	.0352	.0772	-.0002	-.0012
7	R5599 DIG SPIKE	4.850	.0235	4.919	4.586	4.978	4.875
8	R5599 DUP DIG SPIKE	4.961	.0233	4.959	4.621	5.094	5.026
9	R5597 TRIP BLK	.0012	-.0016	.0050	.0840	.0002	-.0008
10	HNO3 REAG BLK	.0002	-.0001	.0007	.0324	.0002	.0004
11	R5598 SST4 36B48A	5.155	.0263	5.190	4.716	5.158	5.022

#	Sample Name	Mg	Mn	Mo	Na	Nd	Ni
1	R5594 SST4 36B48A	4.908	5.203	5.231	4.965	4.886	5.255
2	HNO3 REAG BLK	.0067	.0003	.0005	.0047	.0024	-.0030
3	R5595 DIG BLK	.0047	-.0002	.0012	-.0022	.0011	-.0023
4	R5594 DIG STD	4.596	4.786	4.927	4.790	4.578	4.864
5	R5599 SAM	.0555	.0017	.0011	25.08	.0030	.0021
6	R5599 DUP	.0526	.0014	.0025	25.13	.0020	.0043
7	R5599 DIG SPIKE	4.690	4.813	4.948	29.68	4.582	4.917
8	R5599 DUP DIG SPIKE	4.747	4.856	4.975	30.47	4.696	4.932

#	Sample Name	Mg	Mn	Mo	Na	Nd	Ni
9	R5597 TRIP BLK	.0148	-.0001	-.0004	.0329	.0032	.0005
10	HN03 REAG BLK	-.0053	.0001	-.0012	.0040	-.0015	-.0005
11	R5598 SST4 36B48A	4.913	5.147	5.184	4.986	4.879	5.197

WHC-SD-WM-DP-081, REV. 0

#	Sample Name	P	Pb	S	Sb	Se	Si
1	R5594 SST4 36B48A	5.290	5.148	5.221	5.036	5.093	4.952
2	HN03 REAG BLK	.0151	.0250	.0010	-.0058	.0272	.0083
3	R5595 DIG BLK	.0404	.0166	.0395	-.0052	.0356	.0107
4	R5594 DIG STD	4.974	4.670	4.846	4.676	4.747	5.407
5	R5599 SAM	.0922	.0178	.4261	-.0058	.0041	.4067
6	R5599 DUP	.1065	.0129	.4284	-.0023	.0144	.4049
7	R5599 DIG SPIKE	5.090	4.725	5.282	4.648	4.772	5.125
8	R5599 DUP DIG SPIKE	5.061	4.700	5.283	4.713	4.801	5.179
9	R5597 TRIP BLK	.0412	.0068	.0177	-.0000	.0118	.0333
10	HN03 REAG BLK	.0261	.0199	-.0019	.0061	.0229	.0040
11	R5598 SST4 36B48A	5.161	5.105	5.190	4.990	5.061	4.922

#	Sample Name	Sm	Sr	Ti	Tl	U	V
1	R5594 SST4 36B48A	5.111	5.062	5.030	5.031	9.914	5.162
2	HN03 REAG BLK	.0039	-.0006	.0002	-.0127	.0238	.0013
3	R5595 DIG BLK	-.0214	-.0006	.0011	-.0126	-.0638	-.0026
4	R5594 DIG STD	4.923	4.874	4.815	4.667	9.630	4.814
5	R5599 SAM	-.0118	.0011	.0007	.0173	-.0381	-.0020
6	R5599 DUP	-.0154	.0011	.0005	-.0027	-.0509	-.0026
7	R5599 DIG SPIKE	4.934	4.893	4.832	4.657	9.664	4.855
8	R5599 DUP DIG SPIKE	5.065	4.992	4.894	4.740	9.912	4.901
9	R5597 TRIP BLK	-.0143	-.0006	.0005	-.0100	-.0484	-.0018
10	HN03 REAG BLK	.0060	-.0006	-.0011	-.0122	.0212	.0011
11	R5598 SST4 36B48A	5.107	5.058	5.021	4.966	9.894	5.136

#	Sample Name	Y	Zn	Zr
1	R5594 SST4 36B48A	.0114	5.243	5.136
2	HN03 REAG BLK	.0002	.0009	.0013
3	R5595 DIG BLK	-.0009	.0073	-.0019
4	R5594 DIG STD	.0091	4.686	4.901
5	R5599 SAM	-.0006	.0120	.0000
6	R5599 DUP	-.0009	.0169	-.0013
7	R5599 DIG SPIKE	.0093	4.753	4.907
8	R5599 DUP DIG SPIKE	.0092	4.757	4.975
9	R5597 TRIP BLK	-.0007	.0050	-.0013
10	HN03 REAG BLK	.0003	.0004	.0006
11	R5598 SST4 36B48A	.0113	5.222	5.115

0841

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY
ANALYTICAL BATCH

WHC-SD-WM-DP-081, REV. 0

Lab Segment Serial No.
R 5599, R 5597

Customer ID:
TK-9-1

Analysis:
As

Sample Prep:
ACID DIGEST

Instrument: PE2280(Hydride AA) WB27979

Procedure/ Rev: LA 355-131 / B-1

Technologist: *Valerie L. Massie*

Date: 10/19/94

Starting Time: 07:45

Temperature 900 C

Ending Time: 14:00

Chemist: R.A. Esch

Comments: Batch # 4322

	Description	Lab ID
1	UNDIGESTED LMCS STD	R 5594-5595
2	REAGENT BLANK <i>10-3-94</i>	R 5595 -5695
3	ACID DIGEST LMCS STD	R 5594-8595
4	ACID DIGEST BLANK <i>10-3-94</i>	R 5595 -8695
5	SAMPLE	R 5599-8795
6	DUPLICATE SAMPLE	R 5599-8895
7	SPIKED SAMPLE	R 5599-8995
8	SPIKED SAMPLE DUPLICATE	R 5599-8095
9	UNDIGESTED LMCS STD	R 5598-5595
10	TRIP BLK	R 5597-8795 <i>10-3-94</i>

	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	44N11A .250ml			
ACID DIGEST LMCS	44N11B DF=4			
DIGESTED SPIKE	44N11B DF=4			

ANALYTICAL BATCH SUMMARY SHEET

METHOD:		DATE START:				BATCH #4322			
LA-355-131		10-19-94							
PREPARED BY:		DATE COMPLETE:				WHC-SD-WM-DP-081, REV. 0			
R. A. Esch		10-24-94							
UNITS:									
SPL NAME	SPL ID	ANALYTE	ug/mL	ug/mL	ug/mL	RPD%	%REC	ug/mL	% CT ER
STD/44N11A	R5594	As	0.118				118.0		
UNDIGESTED									
Reagent BLK	R5595	As	< 0.003					0.003	
UNDIGESTED									
STD/44N11B	R5594	As	0.0966				96.6		
DIGESTED									
PREP BLK	R5595	As	< 0.250					0.250	
DIGESTED									
TK-9-1	R5599	As	< 0.250	< 0.250	N/A	N/A	104.7	0.250	
						3.1 *	108.0 *		
TK-9-1	R5597	As	< 0.250					0.250	
Trip Blk									
STD/40N11C	R5598	As	0.125				125.0		
UNDIGESTED									

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

* - These results are for the matrix spike duplicate analysis.

R. A. Esch
 10-24-94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

3835 Batch 4322

Serial No R 5594.-5595	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:47	Priority 23
Determination As	Method Standard LA-355-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? .250 ml			Customer ID STD	
Remarks Calculations Results EDP R741 AS/HYDRD PKHT= .728 STD# 44N11A RESULT 1.18-1 ng= 29.44 STD VAL .100ppm %REC 118.00%				
Analyst - 1 V.Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Unit Mgr P. Allen 10-24-94	D. Honaker	

54 5800-061 R 10 831

Arsenic : LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Type	Sample Size in mL SS	0.250	
STANDARD	As ng (Nanograms)	29.44	
Work List	Conc As µg/mL (or mg/L or PPM)	0.118	N/A
4322	Conc As µg/L (PPB)	117.8	N/A
Test Code		N/A	
AS		N/A	
Matrix		N/A	
LIQUID	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)		
Sample #	Average Conc.=(Sample + Duplicate)/2		
R5594-5595	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Calibration Date			
10/19/94			
Instrument Code			
WB27979			
Analyst			
V.MASSIE			
Date		STANDARD	DUPLICATE
10/19/94	Conc As µg/mL	1.18E-01	
Time		N/A	
02:00 PM		N/A	

Data Entry by: *D. Honaker* Date: 10/21/94
 Approved by: *P. Allen* Date: 10/24/94
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PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5595.-5695	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:48	Priority 23
Determination As	Method/Standard LA-355-131	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? 2.0 mL			Customer ID BLANK	
Remarks, Calculations Results REAGENT BLANK <p style="text-align: right;">pkwt = .148 ng = -1.44</p> <p style="text-align: right;"><0.003 ug/ml</p>				
Analyst - 1 Dale Maser	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Unit Mgr R. Balch 10-24-94	10/24/94	

54-6800-061 R 10 831

Arsenic : LA-355-131 (B-1) As LIQUIDS-DIRECT

	BLANK	DUPLICATE
Type	2.000	
Sample Size in mL SS		
BLANK	1.44	
As ng (Nanograms)		
Work List	0.001	N/A
Conc As µg/mL (or mg/L or PPM)		
4322	0.7	N/A
Conc As µg/L (PPB)		
Test Code	N/A	
AS	N/A	
Matrix	N/A	
LIQUID	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)	
Sample #	Average Conc.=(Sample + Duplicate)/2	
R5595-5695	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	
Calibration Date	Detection Limit = (5 ng/SS)*(1µg/1000ng)	
10/19/94	Detection Limit is Corrected for Sample Prep/Dilution	
Instrument Code		
WB27979	Detection Limit (µg/mL) =	0.003
Analyst	Detection Limit (µg/L) =	2.5
V.MASSIE		
Date	BLANK	DUPLICATE
10/19/94	Conc As µg/mL	<0.003
Time	N/A	
02:00 PM	N/A	

The Result is < Detection Limit

Data Entry by: <i>10/24/94</i>	Date: 10/21/94
Approved by: <i>R. Balch</i>	Date: 10/24/94

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PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

1723				
Serial No	Sample Point	Date	Time Issued	Priority
R 5594.-8595	TK-9-1	6-22-94	19:47	23
Determination	Method Standard	Result Units	Charge Code	Reruns
As	LA-355-131	% RECOVERY	KB24X	0
Sample Size	Acid dig. DF = 4		Customer ID	
? 2.0mL			STD	
Remarks Calculations Results				
EDP R742 AS/HYDRD			pkwt = 1.082	
STD# 44N113 RESULT 966 ⁻²			ng = 48.28	
STD .100gpm %REC 9640%				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
O'Brien, Massie				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit/Qty		
10-19-94	14:00	10-24-94	D. Tonahar	

54-6800-061 (R 10 83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		STANDARD	DUPLICATE
Type	Sample Size in mL SS	2.000	
STANDARD	As ng (Nanograms)	48.28	
Work List	Acid Digest Dilution Factor DF	4.0	
4322	Conc As µg/mL (or mg/L or PPM)	0.097	N/A
Test Code	Conc As µg/L (PPB)	96.6	N/A
AS		N/A	
Matrix		N/A	
LIQUID		N/A	
Sample #	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
R5594-8595	Average Conc.=(Sample + Duplicate)/2		
Calibration Date	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
10/19/94			
Instrument Code			
WB27979			
Analyst			
V.MASSIE			
Date		STANDARD	DUPLICATE
10/19/04	Conc As (µg/mL)	9.66E-02	
Time		N/A	
02:00 PM		N/A	

Data Entry by:	<i>D. Tonahar</i>	Date:	10/21/94
Approved by:	<i>R. E. Hall</i>	Date:	10/24/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5595.-8695	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:48	Priority 23
Determination AS	Method/Standard LA-355-131	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? 2.0ml	Acid dig 1ml → 100ml		Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK used this value for calculation to compare w/sample results. $< 0.250 \mu\text{g/ml}$				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Unit Mgr P. K. K. 10-24-94	Signature W. H. H. H.	

54-6800-061 (R-10 83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

Type	Sample Size in mL	SS	BLANK	DUPLICATE
BLANK	As ng (Nanograms)		2.000	
Work List	Acid Digest Dilution Factor	DF	100.0	
4322	Conc As $\mu\text{g/mL}$ (or mg/L or PPM)		-0.232	N/A
Test Code	Conc As $\mu\text{g/L}$ (PPB)		-231.5	N/A
AS			N/A	
Matrix			N/A	
LIQUID			N/A	
Sample #	Conc As $\mu\text{g/mL} = (\text{As ng/SS}) * (1\mu\text{g}/1000\text{ng}) * \text{DF}$			
R5595-8695	Average Conc. = (Sample + Duplicate)/2			
Calibration Date	Relative % Difference = ((ABS(Sam.-Dup.))/Average Conc.)*100			
10/19/94	Detection Limit = (5 ng/SS)*(1 $\mu\text{g}/1000\text{ng}$)*DF			
Instrument Code				
WB27979	Detection Limit ($\mu\text{g/mL}$)		0.250	
Analyst	Detection Limit ($\mu\text{g/L}$)		250.00	
V.MASSIE				
Date			BLANK	DUPLICATE
10/19/04	Conc As ($\mu\text{g/mL}$)		<0.250	
Time			N/A	
02:00 PM			N/A	

The Result is < Detection Limit

Data Entry by: <i>W. H. H. H.</i>	Date: 10/21/94
Approved by: <i>P. K. K.</i>	Date: 10/24/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5599.-8795	Sample Point TK-9-1.	Date 6-22-94	Time Issued 19:52	Priority 23
Determination As	Method Standard LA-355-131	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? 2.0ml	Acid dig. 1ml → 2.0ml		Customer ID SAMPLE	
Remarks Calculations Results $pkht = .114$ $ng = -3.25$ < 0.250				
Analyst - 1 V. Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Unit 10-24-94	Signature D. Honaker	

54-6800-061 R 10 831

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Type	Sample Size in mL	SS
SAMPLE	As ng (Nanograms)	2.000
Work List	Acid Digest Dilution Factor DF	-3.25
4322	Conc As µg/mL (or mg/L or PPM)	100.0
Test Code	Conc As µg/L (PPB)	-0.163
AS		N/A
Matrix		N/A
LIQUID		N/A
Sample #	Conc As µg/mL = (As ng/SS) * (1µg/1000ng) * DF	
R5599-8795	Average Conc. = (Sample + Duplicate) / 2	
Calibration Date	Relative % Difference = ((ABS(Sam.-Dup.)) / Average Conc.) * 100	
10/19/94	Detection Limit = (5 ng/SS) * (1µg/1000ng) * DF	
Instrument Code	Detection Limit (µg/mL)	0.250
WB27979	Detection Limit (µg/L)	250.00
Analyst		
V.MASSIE		
Date	SAMPLE	DUPLICATE
10/19/04	Conc As (µg/mL)	<0.250
Time		N/A
02:00 PM		N/A

The Result is < Detection Limit

Data Entry by: <i>D. Honaker</i>	Date: 10/21/94
Approved by: <i>R. E. ...</i>	Date: 10/24/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5599.-8895	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination As	Method-Standard LA-355-131	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? 2.0mL Acid dig 1mL → 100mL			Customer ID SAMPLE	
Remarks Calculations, Results DUPLICATE SAMPLE pkwt = .114 ng = -3.25 2.250 ug/ml				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Unit Mgr R. L. L. 10-24-94	Signature D. Honaker	

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

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Type	2.000	2.000
SAMPLE	-3.25	-3.25
Work List		
4322	100.0	100.0
Test Code	-0.163	-0.163
AS	-162.5	-162.5
Matrix	N/A	N/A
LIQUID	N/A	N/A
Sample #		
R5599-8895		
Calibration Date		
10/19/94		
Instrument Code		
WB27979		
Analyst		
V.MASSIE		
Date		
10/19/04		
Time		
02:00 PM		

Conc As µg/mL (or mg/L or PPM)	2.000	2.000
Conc As µg/L (PPB)	-3.25	-3.25
Average Conc (µg/mL)	100.0	100.0
Average Conc (µg/L)	-0.163	-0.163
Relative % Difference	-162.5	-162.5
Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF	N/A	N/A
Average Conc.=(Sample + Duplicate)/2	N/A	N/A
Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	N/A	N/A
Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF	N/A	N/A
Detection Limit (µg/mL)	0.250	
Detection Limit (µg/L)	250.00	

	SAMPLE	DUPLICATE
Conc As (µg/mL)	<0.250	<0.250
Average Conc (µg/mL)	N/A	N/A
Relative % Difference	N/A	N/A

Both Results are < Detection Limit

Data Entry by: D. Honaker	Date: 10/21/94
Approved by: R. L. L.	Date: 10/24/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5599.-8995	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination As	Method-Standard LA-355-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? 2.0 mL Acid dig 1 mL → 100 mL			Customer ID SAMPLE	
Remarks Calculations Results SAMPLE SPIKED ID SPIKE ID 44N11B SPIKE VOLUME Acid Dig DF = 4 25 mL → 100 mL STD value = .100 ppm PK wt = 1.158 ng = 52.33 104.7%				
Analyst - 1 V. Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Util Mon 10-24-94	D. Honaker	

54 6800-061 R 10 831

Arsenic: LA-355-131 (B-1) As LIQUIDS-ACID DIGEST

Type	Sample (mL) Vol. Acid Dig. Used SAVOL	SAMPLE	SPIKE
SPIKE	2.00	N/A	N/A
Work List	Spike Std Volume (mL) SSVOL	N/A	25.000
4322	ng of Spike + Sample ngSSAM	N/A	52.33
Test Code	ng of Sample ngSAM	-3.25	N/A
AS	Final Acid Digest Vol. (mL) ADVOL	N/A	100.00
Matrix	Spike Std Dilution Factor SPDF	N/A	N/A
LIQUID	Spike Std ID	N/A	4.0
Sample #	Spike Std Value (ppm) SS VAL	N/A	44N11B
R5599-8995	% Recovery	N/A	0.100
Calibration Date			104.7%
10/19/94	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery		
Instrument Code	Spike Std. Dilution Factor = ADVOL/SSVOL		
WB27979	% Recovery = {(((ngSSAM/SAVOL)*(1/1000))-(0/SAVOL)*(1/1000))*SPDF/SS VAL}*100		
Analyst			
V.MASSIE			
Date			
10/19/94			
Time	% Recovery = 104.7%		
02:00 PM			

Data Entry by:

D. Honaker

Date: 10/21/94

Approved by:

R. E. L.

Date: 10/24/94

Form 355131_4 Rev. 1.1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5599.-8095	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination AS	Method Standard LA-355-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? 2.0ml Acid dig Incl. → 100ml			Customer ID SAMPLE	
Remarks Calculations, Results SAMPLE SPIKE DUPLICATE SPIKE ID 44N11B SPIKE VOL Acid dig DF = 4 25ml → 100ml pkwt = 1.189 ng = 53.98 108.0%				
Analyst - 1 Valerie L. Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Unit Mgr R. B. B. 10-24-94	Signature D. Honaker	

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

Arsenic: LA-355-131 (B-1) As LIQUIDS-ACID DIGEST

Type	Sample (mL) Vol. Acid Dig. Used SAVOL	SAMPLE	SPIKE
SPIKE	Spike Std Volume (mL) SSVOL	2.00	N/A
Work List	ng of Spike + Sample ngSSAM	N/A	25.000
4322	ng of Sample ngSAM	3.25	53.98
Test Code	Final Acid Digest Vol. (mL) ADVOL	N/A	N/A
AS		N/A	100.00
Matrix	Spike Std Dilution Factor SPDF	N/A	N/A
LIQUID	Spike Std ID	N/A	4.0
Sample #	Spike Std Value (ppm) SS VAL	N/A	44N11B
R5599-8095	% Recovery	N/A	0.100
Calibration Date			108.0%
10/19/94	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery		
Instrument Code	Spike Std. Dilution Factor = ADVOL/SSVOL		
WB27979			
Analyst	V. MASSIE		
Date	% Recovery = $\{(((ngSSAM/SAVOL)*(1/1000)) - ((0/SAVOL)*(1/1000))) * SPDF / SS VAL\} * 100$		
10/19/94			
Time	% Recovery = 108.0%		
02:00 PM			

Data Entry by: <i>D. Honaker</i>	Date: 10/21/94
Approved by: <i>R. B. B.</i>	Date: 10/24/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

WHC-SD-WM-DP-081, REV. 0

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Type	Sample Size in mL SS	2.000	2.000
SAMPLE	As ng (Nanograms)	52.33	53.98
Work List	Acid Digest Dilution Factor DF	4.0	4.0
4322	Conc As µg/mL (or mg/L or PPM)	0.105	0.108
Test Code	Conc As µg/L (PPB)	104.7	108.0
AS	Average Conc (µg/mL)	N/A	0.10631
Matrix	Average Conc (µg/L)	N/A	106.31
LIQUID	Relative % Difference	N/A	3.10%
Sample #	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)*DF		
R5599-8095	Average Conc.=(Sample + Duplicate)/2		
Calibration Date	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
10/19/94	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Instrument Code			
WB27979	Detection Limit (µg/mL)	0.010	
Analyst	Detection Limit (µg/L)	10.00	
V.MASSIE			
Date		SAMPLE	DUPLICATE
10/19/04	Conc As (µg/mL)	1.05E-01	1.08E-01
Time	Average Conc (µg/mL)	N/A	0.10631
02:00 PM	Relative % Difference	N/A	310.41%

Data Entry by: <i>D. Honaker</i>	Date: 10/21/94
Approved by: <i>R. P. ...</i>	Date: 10/24/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5598.-5595	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:51	Priority 23
Determination As	Method-Standard LA-355-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? .250 mL			Customer ID STD	
Remarks, Calculations, Results EDP R741 AS/HYDRD STD# 44N11A RESULT .125 STD VAL .100ppm %REC 125.00% pH = 7.61 ug = 31.19				
Analyst - 1 <i>Valerie Mason</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Unit Mgr <i>R. DeL...</i> 10-24-94	<i>D. Honaker</i>	

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

Arsenic : LA-355-131 (B-1) As LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Type	Sample Size in mL SS	0.250	
STANDARD	As ng (Nanograms)	31.19	
Work List	Conc As µg/mL (or mg/L or PPM)	0.125	N/A
4322	Conc As µg/L (PPB)	124.8	N/A
Test Code		N/A	
AS		N/A	
Matrix		N/A	
LIQUID	Conc As µg/mL=(As ng/SS)*(1µg/1000ng)		
Sample #	Average Conc.=(Sample + Duplicate)/2		
R5598-5595	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Calibration Date			
10/19/94			
Instrument Code			
WB27979			
Analyst			
V.MASSIE			
Date		STANDARD	DUPLICATE
10/19/94	Conc As µg/mL	1.25E-01	
Time		N/A	
02:00 PM		N/A	

Data Entry by: <i>D. Honaker</i>	Date: 10/21/94
Approved by: <i>R. DeL...</i>	Date: 10/24/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5597.-8795	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:50	Priority 23
Determination As	Method Standard LA-355-131	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? 2.0ml Acid dig 1ml → 100ml			Customer ID TRIP BLK	
Remarks Calculations Results $PK_{int} = .116$ $ng = -3.14$ $< .250 \mu g/ml$				
Analyst - 1 Valerie Mason	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-19-94	Time Completed 14:00	Lab Unit Mgr R. B. L. 10-24-94	Signature D. Honaker	

54 6800-061 (R 10 83)

Arsenic: LA-355-131 (B-1) As LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Type	Sample Size in mL	SS
SAMPLE	As ng (Nanograms)	2.000
Work List	Acid Digest Dilution Factor DF	-3.14
4322	Conc As $\mu g/mL$ (or mg/L or PPM)	100.0
Test Code	Conc As $\mu g/L$ (PPB)	-0.157
AS		N/A
Matrix		N/A
LIQUID		N/A
Sample #	Conc As $\mu g/mL = (As \text{ ng}/SS) * (1 \mu g/1000 \text{ ng}) * DF$	
R5597-8795	Average Conc. = (Sample + Duplicate)/2	
Calibration Date	Relative % Difference = ((ABS(Sam.-Dup.))/Average Conc.)*100	
10/19/94	Detection Limit = (5 ng/SS)*(1 $\mu g/1000 \text{ ng}$)*DF	
Instrument Code		
WB27979	Detection Limit ($\mu g/mL$)	0.250
Analyst	Detection Limit ($\mu g/L$)	250.00
V.MASSIE		
Date		
10/19/04	Conc As ($\mu g/mL$)	<0.250
Time		N/A
02:00 PM		N/A

The Result is < Detection Limit

Data Entry by: <i>D. Honaker</i>	Date: 10/21/94
Approved by: <i>R. B. L.</i>	Date: 10/24/94

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD WHC-SD-WM-DP-081, REV. 0

Analyte: As

Procedure: LA 355-131

Revision: B-1

Instrument: PE2280 (Hydride AA)

Property No.: WB27979

Technologist *Valerie Massie*

Payroll No.: N/A

Date: 10/19/94

Calibration Standard ID: 41N11F

Analyte Concentration: .100ppm

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	.148
2	.050mL	5 ng	.265
3	.100mL	10 ng	.377
4	.300mL	30 ng	.710
5	.600mL	60 ng	1.397
6	1.000mL	100 ng	2.004
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Comments: $r=.9976$

Y intercept= .1750

slope=.0188

113 - 3.50 ng ¹⁰⁻¹⁹⁻⁹⁴ 1.0 ml 55 (102LW)
 230 2.43 ng 1.0 ml 59988 (58LW)
 761 31.19 ng .250 ml direct LMCS R5593 44011A
 116 25.14 ng 2.0 ml R5597
 1.189 53.98 ng 2.0 ml R5599 spike Dup
 1.158 52.33 ng 2.0 ml R5599 spike
 114 - 3.25 ng 2.0 ml R5599 Dup
 114 - 3.25 ng 2.0 ml R5599
 756 - 4.63 ng 2.0 ml digest Blank R5595
 1.052 48.28 ng digest LMCS 44011B R5597
 2.0 ml
 145 - 1.44 ng 2.0 ml ¹⁰⁻¹⁹⁻⁹⁴ R5595
 725 29.44 ng .250 ml direct LMCS 44011A R5594
 2.0 ml 150 ng 1.0 ml 44011B
 1.947 60 ng 1.0 ml 44011B
 710 20 ng 1.0 ml 44011B
 577 10 ng 1.0 ml ¹⁰⁻¹⁹⁻⁹⁴ 44011B
 265 5 ng 1.0 ml 44011B
 146 5 ng

14:00 10-19-94 AS Valerie L Massie

Analyte: AS Analyst: Valerie L Massie
 Date: 10-19-94 Start Time: 07:45 End Time: 14:00

MLIS.20 Data:

Signal: Concentration Purge 1: 50 sec.
 Mode: PKHL Reaction: 24 sec.
 Recorder: EC1 Purge 2: 60 sec.
 Time: 40 sec. Temperature: 200 C
 Expansion: 4 EDL Power: 8 Watts

Chart Recorder Data:

Chart speed: 5 mm/min Chart full scale: 20 mV

Calibration Data:

Intercept: 0.1750 absorbance units
 Slope: 0.0188 abs. units / concentration
 Correlation: 0.9976 (unitless)

15: Intercept: 0.1750 ✓
 14: Slope: 0.0188
 13: 0.9976
 12: 23.4379
 11: 1.4365
 10: 48.6319
 9: -4.5302
 8: -3.2462
 7: -3.2462
 6: 52.3275
 5: 53.9776
 4: 57.1397
 3: 31.1946
 2: 2.9287
 1: -1.2994

Valerie L Massie
 10-19-94

0A
P-41

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. R 5599, R 5597	Customer ID: TK-9-1
Analysis: Se	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride) WB27979	Procedure/ Rev: LA 365-131 / B-2
Technologist: <i>Valerie L. Massie</i>	Date: 10/24/94
Starting Time: 07:45	Temperature 975 C
Ending Time: 14:00	Chemist: RA Esch

Comments: BATCH #4805

	Description	Lab ID		Description	Lab ID
1	LMCS STD	R 5594-5596	11		
2	DIGESTED LMCS STD	R 5594-5596	12		
3	REAGENT BLANK	R 5594-5596	13		
4	DIGESTED BLANK	R 5595-8696	14		
5	SAMPLE	R 5599-8796	15		
6	DUPLICATE SAMPLE	R 5599-8896	16		
7	SPIKED SAMPLE	R 5599-8996	17		
8	DUPLICATE SPIKED SAMPLE	R 5599-8096	18		
9	TRIP BLANK	R 5597-8796	19		
10	ENDING LMCS STD	R 5598-5596	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	44N11A .250mL			
DIGESTED LMCS	44N11B DF = 4			
DIGESTED SPIKE	44N11B DF = 4			

ANALYTICAL BATCH SUMMARY SHEET

[illegible]

WHC-SD-WM-DP-081, REV. 0

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

* - These results are for the matrix spike duplicate analysis.

10-27-94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

4805

Serial No R 5594.-5598	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:47	Priority 23
Determination Se	Method-Standard LA-365-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 1/2
Sample Size ? .500ml			Customer ID STD	REC 10-25-94
Remarks, Calculations, Results EDP R743 SE/HYDRD STD# 44N11A RESULT .0844 STD VAL .100 %REC 84.4% PKHT = .328 ng = 42.22ng				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:50	Lab Unit 10-26-94		

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

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

	STANDARD	DUPLICATE
Type	0.500	
Sample Size in mL SS	42.22	
Se ng (Nanograms)	0.084	N/A
Conc Se µg/mL (or mg/L or PPM)	84.4	N/A
Conc Se µg/L (PPB)	N/A	
Test Code	N/A	
Matrix	N/A	
LIQUID	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)	
Sample #	Average Conc.=(Sample + Duplicate)/2	
R5594-5596	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	
Calibration Date		
10/24/94		
Instrument Code		
WB27979		
Analyst		
MASSIE		
Date	STANDARD	DUPLICATE
10/24/94	8.44E-02	
Time	N/A	
02:00 PM	N/A	

Data Entry by: <i>Valerie Massie</i>	Date: 10/25/94
Approved by: <i>Robert L. ...</i>	Date: 10/26/94

Form 365131_1 Rev. 1.1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

WHC-SD-WM-DP-081, REV. 0

Serial No R 5594.-8596	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:47	Priority 23
Determination Se	Method-Standard LA-365-131	Result Units % RECOVERY	Charge Code KB24X	Reuns 12
Sample Size ? 2.0 ml DF=4			Customer ID STD ^{Roe} 10-25-94	
Remarks Calculations Results EDP R744 SE/HYDRD PKHT= .342 STD# 44N118 RESULT .0879 ng= 43.96ng STD VAL .100 %REC 87.9%				
Analyst - 1 <i>Valerie Massie</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit Mgr <i>R. L. L.</i> 10-26-94		

54-6800-061 (R 10 831)

Selenium : LA-365-131 (B-2) Se LIQUID-ACID DIGEST

Type	Sample Size in mL	SS	STANDARD	DUPLICATE
STANDARD	Se ng (Nanograms)		2.000	
Work List	Acid Digest Dilution Factor DF		43.96	
4805	Conc Se µg/mL (or mg/L or PPM)		4.0	
Test Code	Conc Se µg/L (PPB)		0.088	N/A
			87.9	N/A
			N/A	
Matrix			N/A	
LIQUID			N/A	
Sample #	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF			
R5594-8596	Average Conc.=(Sample + Duplicate)/2			
Calibration Date	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100			
10/24/94				
Instrument Code				
WB27979				
Analyst				
MASSIE				
Date			STANDARD	DUPLICATE
10/24/94	Conc Se (µg/mL)		8.79E-02	
Time			N/A	
02:00 PM			N/A	

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Data Entry by: <i>W. L. L.</i>	Date: 10/25/94
Approved by: <i>R. L. L.</i>	Date: 10/26/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5595.-5696	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:48	Priority 23
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code KB24X	Reruns 17
Sample Size ? 2.0ml	Customer ID BLANK		208 10-25-94	
Remarks, Calculations, Results REAGENT BLANK PKHT = .010 ng = 2.81ng <0.003 µg/ml				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit Mgr Robert 10-26-94

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

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		BLANK	DUPLICATE
Type	Sample Size in mL SS	2.000	
BLANK	Se ng (Nanograms)	2.81	
Work List	Conc Se µg/mL (or mg/L or PPM)	0.001	N/A
4805	Conc Se µg/L (PPB)	1.4	N/A
Test Code		N/A	
		N/A	
Matrix		N/A	
LIQUID	Conc Se µg/mL = (Se ng/SS) * (1µg/1000ng)		
Sample #	Average Conc. = (Sample + Duplicate)/2		
R5595-5696	Relative % Difference = ((ABS(Sam.-Dup.))/Average Conc.)*100		
Calibration Date	Detection Limit = (5 ng/SS) * (1µg/1000ng)		
10/24/94	Detection Limit is Corrected for Sample Prep/Dilution		
Instrument Code			
WB27979	Detection Limit (µg/mL) =	0.003	
Analyst	Detection Limit (µg/L) =	2.5	
MASSIE			
Date		BLANK	DUPLICATE
10/24/94	Conc Se µg/mL	<0.003	
Time		N/A	
02:00 PM		N/A	

The Result is < Detection Limit

Data Entry by:	Date: 10/25/94
Approved by:	Date: 10/26/94

Form 365131_1 Rev. 1.1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

WHC-SD-WM-DP-081, REV. 0

Serial No R 5595.-8696	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:48	Priority 23
Determination Se	Method-Standard LA-365-131	Result Units uG/ML	Charge Code KB24X	Reruns 17
Sample Size ? 2.0 ml Acid dig DF = 100 - used			Customer ID BLANK 10-25-94	
Remarks Calculations Results REAGENT BLANK for comparison with samples. PKHT = .023 ng = 4.42 ng < 0.250 µg/ml				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit No. 10-26-94

54-6800-061 (R 10-83)

Selenium : LA-365-131 (B-2) Se LIQUID-ACID DIGEST

Type	Sample Size in mL	SS	BLANK	DUPLICATE
BLANK	Se ng (Nanograms)		2.000	
Work List	Acid Digest Dilution Factor	DF	4.42	
4805	Conc Se µg/mL (or mg/L or PPM)		100.0	
Test Code	Conc Se µg/L (PPB)		0.221	N/A
			221.0	N/A
			N/A	
Matrix			N/A	
LIQUID			N/A	
Sample #	Conc Se µg/mL = (Se ng/SS) * (1µg/1000ng) * DF			
R5595-8696	Average Conc. = (Sample + Duplicate) / 2			
Calibration Date	Relative % Difference = ((ABS(Sam.-Dup.)) / Average Conc.) * 100			
10/24/94	Detection Limit = (5 ng/SS) * (1µg/1000ng) * DF			
Instrument Code				
WB27979	Detection Limit (µg/mL)		0.250	
Analyst	Detection Limit (µg/L)		250.00	
MASSIE				
Date			BLANK	DUPLICATE
10/24/94	Conc Se (µg/mL)		<0.250	
Time			N/A	
02:00 PM			N/A	

The Result is < Detection Limit 116

Data Entry by:	Date: 10/25/94
Approved by:	Date: 10/26/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

WHC-SD-WM-DP-081, REV. 0

Serial No. R 5599.-8796	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code KB24X	Reruns 1/
Sample Size ? 2.0ml DF=100			Customer ID SAMPLE	
Remarks, Calculations, Results PKHT= .019 ng= 3.92ng 0.250 µg/mL				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit Mgr Robert 10-26-94	Signature [Signature]	

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

Selenium : LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Type	Sample Size in mL SS	2.000	
SAMPLE	Se ng (Nanograms)	3.92	
Work List	Acid Digest Dilution Factor DF	100.0	
4805	Conc Se µg/mL (or mg/L or PPM)	0.196	N/A
Test Code	Conc Se µg/L (PPB)	196.0	N/A
		N/A	
Matrix		N/A	
LIQUID		N/A	
Sample #	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
R5599-8796	Average Conc.=(Sample + Duplicate)/2		
Calibration Date	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
10/24/94	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Instrument Code			
WB27979	Detection Limit (µg/mL)	0.250	
Analyst	Detection Limit (µg/L)	250.00	
MASSIE			
Date		SAMPLE	DUPLICATE
10/24/94	Conc Se (µg/mL)	<0.250	
Time		N/A	
02:00 PM		N/A	

The Result is < Detection Limit

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Data Entry by: [Signature]	Date: 10/25/94
Approved by: [Signature]	Date: 10/26/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5599.-8896	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination Se	Method/Standard LA-365-131	Result Units uG/ML	Charge Code KB24X	Reruns 1/2
Sample Size ? 2.0 ml	DF=100	Customer ID SAMPLE	10-25-94	
Remarks Calculations Results DUPLICATE SAMPLE PKHT = .025 ng = 4.67ng 50.250 µg/mL AVG dRAD - N/A				
Analyst - 1 Valerie Masae	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit Mgr R. L. L. 10-26-94		

54-6800-061 (R-10 83)

Selenium : LA-365-131 (B-2) Se LIQUID-ACID DIGEST

	SAMPLE	DUPLICATE
Type	2.000	2.000
SAMPLE	3.92	4.67
Work List	100.0	100.0
4805	0.196	0.234
Test Code	196.0	233.5
	N/A	N/A
Matrix	N/A	N/A
LIQUID	N/A	N/A
Sample #	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF	
R5599-8896	Average Conc.=(Sample + Duplicate)/2	
Calibration Date	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100	
10/24/94	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF	
Instrument Code		
WB27979	Detection Limit (µg/mL)	0.250
Analyst	Detection Limit (µg/L)	250.00
MASSIE		
Date	SAMPLE	DUPLICATE
10/24/94	Conc Se (µg/mL)	<0.250
Time	Average Conc (µg/mL)	N/A
02:00 PM	Relative % Difference	N/A

Both Results are < Detection Limit

Data Entry by:	Date: 10/26/94
Approved by:	Date: 10/27/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

WHC-SD-WM-DP-081, REV. 0

Selenium : LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Type	Sample Size in mL SS	2.000	2.000
SAMPLE	Se ng (Nanograms)	37.39	41.35
Work List	Acid Digest Dilution Factor DF	4.0	4.0
4805	Conc Se µg/mL (or mg/L or PPM)	0.075	0.083
Test Code	Conc Se µg/L (PPB)	74.8	82.7
	Average Conc (µg/mL)	N/A	0.07874
Matrix	Average Conc (µg/L)	N/A	78.74
LIQUID	Relative % Difference	N/A	10.1%

Sample # Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF
R5599-8896 Average Conc.=(Sample + Duplicate)/2
Calibration Date Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100
10/24/94 Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF

Instrument Code	
WB27979	Detection Limit (µg/mL)
	0.010
Analyst	Detection Limit (µg/L)
	10.00

MASSIE			
Date		SAMPLE	DUPLICATE
10/24/94	Conc Se (µg/mL)	7.48E-02	8.27E-02
Time	Average Conc (µg/mL)	N/A	0.07874
02:00 PM	Relative % Difference	N/A	1005.8%

Data Entry by: <i>[Signature]</i>	Date: 10/26/94
Approved by: <i>[Signature]</i>	Date: 10/27/94

Form 365131_3 Rev. 2.1 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5599.-8996	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination Se	Method-Standard LA-365-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 1
Sample Size ? 2.0 ml			Customer ID SAMPLE	
Remarks Calculations Results SAMPLE SPIKED ID R5599 SPIKE ID 44N11B SPIKE VOLUME 25ml → 100ml PKHT = .239 ng = 37.39ng 74.8%				
Analyst - 1 Valerie J. Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit 10-26-94	34-6800-061 R 10-831	

Selenium: LA-365-131 (B-2) Se LIQUIDS-ACID DIGEST

	SAMPLE	SPIKE
Type	2.00	N/A
SPIKE	N/A	25.000
Work List	N/A	37.39
4805	3.92	N/A
Test Code	N/A	100.00
	N/A	N/A
Matrix	N/A	4.0
LIQUID	N/A	44N11B
Sample #	N/A	0.100
R5599-8996	N/A	74.8%
Calibration Date	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery	
10/24/94		
Instrument Code	Spike Std. Dilution Factor = ADVOL/SSVOL	
WB27979		
Analyst	% Recovery = {(((ngSSAM/SAVOL)*(1/1000))-(0/SAVOL)*(1/1000))}*SPDF/SS VAL}*100	
MASSIE		
Date		
10/24/94		
Time	% Recovery = 74.8%	
02:00 PM		

Data Entry by:	Date: 10/25/94
Approved by:	Date: 10/26/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5599.-8096	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:52	Priority 23
Determination SE	Method-Standard LA-365-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 1
Sample Size ? 2.0ml DF=4			Customer ID SAMPLE	
Remarks, Calculations, Results SAMPLE SPIKE R5599 DUPLICATE SPIKE ID 44N11B SPIKE VOL 25ml → 100ml PKHT = .321 ng = 41.35ng 82.7%				
Analyst - 1 <i>Valeit Masin</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit Mgr <i>Redlich</i> 10-26-94	<i>[Signature]</i>	

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

Selenium: LA-365-131 (B-2) Se LIQUIDS-ACID DIGEST

		SAMPLE	SPIKE
Type	Sample (mL) Vol. Acid Dig. Used SAVOL	2.00	N/A
SPIKE	Spike Std Volume (mL) SSVOL	N/A	25.000
Work List	ng of Spike + Sample ngSSAM	N/A	41.35
4805	ng of Sample ngSAM	4.67	N/A
Test Code	Final Acid Digest Vol. (mL) ADVOL	N/A	100.00
		N/A	N/A
Matrix	Spike Std Dilution Factor SPDF	N/A	4.0
LIQUID	Spike Std ID	N/A	44N11B
Sample #	Spike Std Value (ppm) SS VAL	N/A	0.100
R5599-8096	% Recovery	N/A	82.7%
Calibration Date	Sample result is < 5 ng, 0 ng of sample is used in the calculation for % recovery		
10/24/94			
Instrument Code	Spike Std. Dilution Factor = ADVOL/SSVOL		
WB27979			
Analyst	% Recovery = {(((ngSSAM/SAVOL)*(1/1000))-(0/SAVOL)*(1/1000))}*SPDF/SS VAL}*100		
MASSIE			
Date	% Recovery =		
10/24/94			
Time	82.7%		
02:00 PM			

Data Entry by: <i>[Signature]</i>	Date: 10/25/94
Approved by: <i>[Signature]</i>	Date: 10/26/94

Form 365131_4 Rev. 1.1 Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

WHC-SD-WM-DP-081, REV. 0

Serial No R 5597.-8796	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:50	Priority 23
Determination Se	Method-Standard LA-365-131	Result Units uG/ML	Charge Code KB24X	Reruns 1
Sample Size ? 2.0 ml DF=100			Customer ID TRIP BLK	
Remarks Calculations Results PKHT = .029 ng = 5.16 ng 0.258 µg/ml				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit Mgr. 10-26-94		

54-6800-C61 (R-10-83)

Selenium : LA-365-131 (B-2) Se LIQUID-ACID DIGEST

		SAMPLE	DUPLICATE
Type	Sample Size in mL SS	2.000	
SAMPLE	Se ng (Nanograms)	5.16	
Work List	Acid Digest Dilution Factor DF	100.0	
4805	Conc Se µg/mL (or mg/L or PPM)	0.258	N/A
Test Code	Conc Se µg/L (PPB)	258.0	N/A
		N/A	
Matrix		N/A	
LIQUID		N/A	
Sample #	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)*DF		
R5597-8796	Average Conc.=(Sample + Duplicate)/2		
Calibration Date	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
10/24/94	Detection Limit = (5 ng/SS)*(1µg/1000ng)*DF		
Instrument Code			
WB27979	Detection Limit (µg/mL)	0.250	
Analyst	Detection Limit (µg/L)	250.00	
MASSIE			
Date		SAMPLE	DUPLICATE
10/24/94	Conc Se (µg/mL)	2.58E-01	
Time		N/A	
02:00 PM		N/A	

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Data Entry by:	Date: 10/25/94
Approved by:	Date: 10/26/94

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

WHC-SD-WM-DP-081, REV. 0

Serial No R 5598.-5596	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:51	Priority 23
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 1
Sample Size ? .500ml			Customer ID STD	
Remarks, Calculations, Results EDP R743 SE/HYDRD STD# 44NHA RESULT .0773 STD VAL .100 %REC 77.3% PKHT = .299 ng = 38.63ng				
Analyst - 1 Valerie Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-24-94	Time Completed 14:00	Lab Unit No 10-26-94		

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

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Type	Sample Size in mL SS	0.500	
STANDARD	Se ng (Nanograms)	38.63	
Work List	Conc Se µg/mL (or mg/L or PPM)	0.077	N/A
4805	Conc Se µg/L (PPB)	77.3	N/A
Test Code		N/A	
		N/A	
Matrix		N/A	
LIQUID	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)		
Sample #	Average Conc.=(Sample + Duplicate)/2		
R5598-5596	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Calibration Date			
10/24/94			
Instrument Code			
WB27979			
Analyst			
MASSIE			
Date		STANDARD	DUPLICATE
10/24/94	Conc Se µg/mL	7.73E-02	
Time		N/A	
02:00 PM		N/A	

123

Data Entry by: <i>Valerie Massie</i>	Date: 10/25/94
Approved by: <i>Valerie Massie</i>	Date: 10/26/94

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

CALIBRATION RECORD

Analyte: Se

Procedure: LA 365-131

Revision: B-2

Instrument: PE2280 (Hydride)

Property No.: WB27979

Technologist *Valerie Massie*

Payroll No.: N/A

Date: 10/24/94

Calibration Standard ID: 37N11G

Analyte Concentration: .100ppm

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0 ng	-.002
2	.050mL	5 ng	.029
3	.250mL	25 ng	.199
4	.500mL	50 ng	.352
5	1.000mL	100 ng	.811
6			
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19			
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21			

Comments: $r = .9977$ Y intercept= $-.0127$ slope= $.0081$

.029 37.62 ng .500 direct unsp. R5595
 .024 5.16 ng 2.0 ml R5597
 .321 41.35 ng 2.0 ml R5599 apine dup
 .289 37.39 ng 2.0 ml R5599 apine
 .045 4.47 ng 2.0 ml R5599 dup
 .019 3.92 ng 2.0 ml R5599
 .023 4.42 ng 2.0 ml R5595 digested blank
 .324 41.73 ng 2.0 ml digested (1176, 14118) R5599 in acid
 .342 43.96 ng 2.0 ml digested (1176, 14118) R5599
 .010 2.61 ng 2.0 ml direct blank R5595
 .325 40.22 ng .500 ml direct unsp. 14118 A R5594
 .011 10.1 ng 1.0 ml R5594
 .252 5.22 ng 2.0 ml R5594
 .191 2.0 ng 2.0 ml R5594
 .024 5.16 ng 2.0 ml R5594
 .022 5.16 ng 2.0 ml R5594

WHC-SD-WM-DP-081, REV. 0

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5-6-8-01 sample
 5-23-94

14:00 10-24-94 Se Valerie L. Massie

Analyte: Se Analyst: Valerie L. Massie
 Date: 10-24-94 Start Time: 07:45 End Time: 14:00

MHS 20 Data:

Signal Concentration Purge I 40 sec
 Mode PKIT Reaction 10 sec
 Recorder IC2 Purge II 50 sec
 Time 30 sec Temperature 975 C
 Equation 10 LDI Power 2.2 mW

Chart Recorder Data:

Chart speed 5 mm/min Chart full scale 20 mV

Calibration Data:

Intercept -0.0127 absorbance units
 Slope 0.0031 abs units / concentration
 Correlation 0.9977 (unitless)

Valerie L. Massie
 10-24-94

10A
Pr-41

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY WHC-SD-WM-DP-081, REV. 0
ANALYTICAL BATCH

Lab Segment Serial No. R5596, R5597	Customer ID: TK-9-1
Analysis: Hg	Sample Prep: DIRECT

Instrument: PE2380(Hydride AA) WB26847	Procedure/ Rev: LA 325-104 / A-1
Technologist: <i>Rich Hill</i>	Date: 09/01/94
Starting Time: 0900	Temperature 175 C
Ending Time: 1410	Chemist: R. E. Skoda

Comments: Batch # 4324

	Description	Lab ID
1	INITIAL LMCS CHECK STD	R5594-5597
2	REAGENT BLANK	R5595-5697
3	SAMPLE	R5596-5797
4	DUPLICATE SAMPLE	R5596-5897
5	SPIKED SAMPLE	R5596-5997
6	DUPLICATE SPIKED SAMPLE	R5596-5997
7	TRIP BLK	R5597-5797
8	ENDING LMCS STD	R5598-5597
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	39N11D .300mL			
SPIKE	39N11D .300mL			

ANALYTICAL BATCH SUMMARY SHEET

METHOD:		LA-325-104		DATE START:		9-1-94		BATCH #4324	
PREPARED BY:		R. E. Skoda		DATE COMPLETE:		9-6-94		WHC-SD-WM-DP-081, REV. 0	
UNITS:		ug/L		ug/L		ug/L		ug/L	
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD/39N11D	R5594	Hg	0.0939				93.9		
Reagent Blk	R5595	Hg	<10.0					10.0	
TK-9-1	R5596	Hg	20.2	21.3	20.8	5.3	87.0	10.0	
	R5596					5.9 *	80.1 *		
Trip Blk	R5597	Hg	<10.0					10.0	
STD/39N11D	R5598	Hg	.0954				95.4		

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

* – These results refer to the matrix spike duplicate analysis.

10-24-94

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

Batch 4324

Serial No.	Sample Point	Date	Time Issued	Priority
Determination	Method Standard	Result Units	Charge Code	Reruns
Sample Size	Customer ID			
.300ml				
Remarks Calculations Results				
39N1-D 100ppm 93.9% 93.9 µg/L 9.39E-2 ppm PKHT .275 28.17 ng 9/6/94				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Steele				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab. Unit		
9-1-94	1410	9/6/94		

54-5800-061 R 10 331

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.300	
R5594-5597	Hg ng (Nanograms)	28.17	
Batch ID:	Conc Hg µg/mL (or mg/L or PPM)	0.094	N/A
4324	Conc Hg µg/L (PPB)	93.9	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)*(1µg/1000ng)		
Calibration Date:	Average Conc.=(Sample + Duplicate)/2		
09/01/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst:			
Jackie Steele			
Date:			
09/01/94			

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	STANDARD	DUPLICATE
Conc Hg µg/mL	9.39E-02	
	N/A	N/A
	N/A	N/A

Data Entry by:	JD [Signature]	Date:	06-Sep-94
Approved by:	[Signature]	Date:	9/6/94

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

Serial No R5595-5697	Sample Point TK-3-1	Date 8-22-94	Time Issued 13:48	Priority 03
Determination Hg	Method-Standard LA-325-104	Result Units ug/mL	Charge Code K3C4K	Reruns 0
Sample Size 25.0			Customer ID BLANK	
Remarks, Calculations, Results REAGENT BLANK 0.500 mL sample size was used for calculation as a comparison with the sample results. 0.010 0.00 ug/mL = $<10 \mu\text{g/L}$ PLAT -0.005 -2.28ng AS 9/6/94				
Analyst - 1 J Steele	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-1-94	Time Completed 1410	Lab Unit J Steele 9/6/94	Reprints	

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

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

	BLANK	DUPLICATE
Serial No: R5595-5697	0.500	
Sample Size in mL SS	-2.28	
Hg ng (Nanograms)		
Batch ID: 4324	-0.005	N/A
Conc Hg $\mu\text{g/mL}$ (or mg/L or PPM)	-4.6	N/A
Conc Hg $\mu\text{g/L}$ (PPB)		
Rerun No: 0	N/A	N/A
Instrument ID: WB26847	N/A	N/A
Conc Hg $\mu\text{g/mL} = (\text{Hg ng}/\text{SS}) \times (1 \mu\text{g}/1000 \text{ng})$		
Calibration Date: 09/01/94		
Average Conc. = (Sample + Duplicate)/2		
Relative % Difference = $((\text{ABS}(\text{Sam.} - \text{Dup.}))/\text{Average Conc.}) \times 100$		
Analyst: Jackie Steele		
Detection Limit = $(5 \text{ ng}/\text{SS}) \times (1 \mu\text{g}/1000 \text{ng})$		
Detection Limit is Corrected for Sample Prep/Dilution		
Date: 09/01/94	Detection Limit ($\mu\text{g/mL}$) = 0.010	
	Detection Limit ($\mu\text{g/L}$) = 10.0	

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	BLANK	DUPLICATE
Conc Hg $\mu\text{g/mL}$	<0.010	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by: <i>JD Smith</i>	Date: 06-Sep-94
Approved by: <i>J Steele</i>	Date: 9/6/94

Form 1 Rev. 1 Page 1 of 1

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

Serial No R 5596-5797	Sample Point TK-9-1	Date 9-02-94	Time Issued 10:45	Priority 15
Determination Hg 117	Method Standard LA-325-104	Result Units ug/L	Charge Code NBLAN	Reruns 0
Sample Size .500ml			Customer ID SAMPLE	
Remarks Calculations Results <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 10px; text-align: center;">20.2 ug/L</div> <div style="text-align: center;"> PLHT .109 10.12 ng </div> </div>				
Analyst - 1 <i>Jackie Steele</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-1-94	Time Completed 1410	Lab Unit 9/6/94	Reprints	

54 6800-051 R 10 831

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No	Sample Size in mL SS	0.500	
R5596-5797	Hg ng (Nanograms)	10.12	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.020	N/A
4324	Conc Hg µg/L (PPB)	20.2	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		
09/01/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
Jackie Steele	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
09/01/94	Detection Limit (µg/mL) =	0.010	
	Detection Limit (µg/L) =	10.0	

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	SAMPLE	DUPLICATE
Conc Hg µg/mL	2.02E-02	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>AK</i>	Date: 06-Sep-94
Approved by: <i>RE Steele</i>	Date: 9/6/94

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

Serial No R 5506-5897	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:43	Priority 26
Determination Hg-LIQ	Method Standard LA-325-104	Result Units UG/L	Charge Code KELAK	Reruns 0
Sample Size ? .500ml			Customer ID SAMPLE	
Remarks, Calculations Results DUPLICATE SAMPLE (21.3 ug/L) PKHT .114 10.67ng AVG = 20.8 ug/L RPD = 5.3%				
Analyst - 1 J Steele	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-1-94	Time Completed 1410	Lab Unit Mg Reploda 9/6/94	R Jones	

54-6800-061 R-10-831

CVA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No	Sample Size in mL SS	0.500	0.500
R5596-5897	Hg ng (Nanograms)	10.12	10.67
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.020	0.021
4324	Conc Hg µg/L (PPB)	20.2	21.3
Rerun No	Average Conc (µg/mL)	N/A	0.021
0	Average Conc (µg/L)	N/A	20.8
Instrument ID	Relative % Difference	N/A	5.3
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/01/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
Jackie Steele	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
09/01/94	Detection Limit (µg/mL) =	0.010	
	Detection Limit (µg/L) =	10.0	

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	SAMPLE	DUPLICATE
Conc Hg µg/mL	2.02E-02	2.13E-02
Average Conc (µg/mL)	N/A	0.021
Relative % Difference	N/A	5.3

Data Entry by: <i>RD Smith</i>	Date: 06-Sep-94
Approved by: <i>Reploda</i>	Date: 9/6/94

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

WHC-SD-WM-DP-081, REV. 0

Spike duplicate

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	0.300	0.300
R5596-5897	Hg ng (Nanograms)	36.22	34.16
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.121	0.114
4324	Conc Hg µg/L (PPB)	120.7	113.9
Run No.	Average Conc (µg/mL)	N/A	0.117
0	Average Conc (µg/L)	N/A	117.3
Instrument ID	Relative % Difference	N/A	5.9
WB26847	Conc Hg µg/mL=(Hg ng/SS)*(1µg/1000ng)		
Calibration Date	Average Conc.=(Sample + Duplicate)/2		
09/01/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1µg/1000ng)		
Jackie Steele	Detection Limit is Corrected for Sample Prep/Dilution		
Date			
09/01/94	Detection Limit (µg/mL) =	0.017	
	Detection Limit (µg/L) =	16.7	

	SAMPLE	DUPLICATE
Conc Hg µg/mL	1.21E-01	1.14E-01
Average Conc (µg/mL)	N/A	0.117
Relative % Difference	N/A	5.9

Data Entry by:	<i>MD</i>	Date:	06-Sep-94
Approved by:	<i>R. E. Hoda</i>	Date:	9/10/94

Serial No R 5596.-6097	Sample Point TK-3-1	Date 6-22-94	Time Issued 19:48	Priority 26
Determination Hg	Method Standard LA-325-104	Result Units % RECOVERY	Charge Code K334K	Reruns 0
Sample Size 0.500ml			Customer ID SAMPLE	
Remarks Calculations, Results SAMPLE SPIKE ID SPIKE ID 39NII-D SPIKE VOLUME .300ml <div style="border: 1px solid black; border-radius: 50%; width: 100px; height: 100px; display: flex; align-items: center; justify-content: center; margin: 10px auto;">87.0%</div> <div style="float: right; text-align: right;"> PK#T .349 36.22ng </div> <div style="clear: both;"></div> <div style="text-align: right;">WHC-SD-WM-DP-081, REV. 0</div>				
Analyst - 1 <i>J Steele</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-1-94	Time Completed 1410	Lab Unit Mgr <i>R. K. [Signature]</i> 9/6/94	<i>[Signature]</i>	

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

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT		SAMPLE	SPIKE
Serial No.	Spike Std Volume (mL) SSVOL		0.300
R5596-5997	ng of Spike + Sample ngSSAM		36.22
Batch ID	ng of Sample ngSAM	10.12	
4324	Spike Std ID		39N11-D
Run No.	Spike Std Value (ppm)		0.100
0	% Recovery	N/A	87.0
Instrument ID:			
EB26847			
Calibration Date:			
09/01/94			
Analyst			
Jackie Steele			
Date:			
09/01/94			

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$$\% \text{ Recovery} = \{[(\text{ngSSAM}-\text{ngSAM})/(\text{SSVOL} \times 1000 \mu\text{L}/\text{mL})]/\text{Spike Std Value}\} \times 100$$

% Recovery =	87.0
--------------	------

Data Entry by:	<i>NO Smith</i>	Date:	06-Sep-94
Approved by:	<i>RE Smith</i>	Date:	9/6/94
Form 2 Rev. 1		Page 1 of 1	

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

Serial No 5596-5997	Sample Point IN-104	Date 9-1-94	Time Issued 13:40	Priority 1
Determination	Method Standard 39N11-D	Result Units ng	Charge Code K704X	Reruns
Sample Size 500ml			Customer ID J-1813	
Remarks Calculations Results 39N11-D 300ml Spike duplicate 80.1 % recovery RPD=5.9% PKHT, 330 34.16ng WHC-SD-WM-DP-081, REV. 0				
Analyst 1 J Steele	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-1-94	Time Completed 1410	Lab Unit Mgr K. E. L. Loda 9/6/94	Re Jones	

54-6800-061 (R 10 83)

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT			SAMPLE	SPIKE
Serial No.	Spike Std Volume (mL)	SSVOL		0.300
R5596-5997	ng of Spike + Sample	ngSSAM		34.16
Batch ID	ng of Sample	ngSAM	10.12	
4324	Spike Std ID			39N11-D
Rerun No.	Spike Std Value (ppm)			0.100
0	% Recovery		N/A	80.1
Instrument ID:			BEST AVAILABLE COPY	
EB26847				
Calibration Date:				
09/01/94				
Analyst:				
Jackie Steele				
Date:				
09/01/94				

$$\% \text{ Recovery} = \{[(\text{ngSSAM}-\text{ngSAM})/(\text{SSVOL} \times 1000 \mu\text{L/mL})]/\text{Spike Std Value}\} \times 100$$

% Recovery =	80.1
--------------	------

Data Entry by: <i>AD Smith</i>	Date: 06-Sep-94
Approved by: <i>K. E. L. Loda</i>	Date: 9/6/94

Form 2 Rev. 1 Page 1 of 1

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

Serial No R 5597.-5797	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:50	Priority 26
Determination Hg LIQ	Method Standard LA-325-104	Result Units µg/L	Charge Code K524X	Reruns 0
Sample Size 0.500ml			Customer ID TRIP BLK	
Remarks, Calculations, Results <div style="text-align: center;"> <p><u>-3.9 µg/L</u></p> <p>PKHT-002 -1.95 ng</p> <p><u><10.0 µg/L</u> * <i>Resh</i> 9/6/94</p> </div>				
Analyst - 1 <i>J Steele</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-1-94	Time Completed 1410	Lab Unit - Mg <i>R. Edwards</i> 9/6/94	<i>Re Jones</i>	

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

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		SAMPLE	DUPLICATE
Serial No.	Sample Size in mL SS	0.500	
R5597-5797	Hg ng (Nanograms)	-1.95	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	-0.004	N/A
4324	Conc Hg µg/L (PPB)	-3.9	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		
09/01/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst	Detection Limit = (5 ng/SS)*(1 µg/1000ng)		
Jackie Steele	Detection Limit is Corrected for Sample Prep/Dilution		
Data			
09/01/94	Detection Limit (µg/mL) =	0.010	
	Detection Limit (µg/L) =	10.0	

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	SAMPLE	DUPLICATE
Conc Hg µg/mL	<0.010	
	N/A	N/A
	N/A	N/A

The Result is < Detection Limit

Data Entry by:	<i>MD Smith</i>	Date:	06-Sep-94
Approved by:	<i>R. Edwards</i>	Date:	9/6/94

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

Serial No R 5598.-5597	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:51	Priority 23
Determination Hg	Method-Standard LA-325-104	Result Units % RECOVERY	Charge Code WB24K	Reruns 0
Sample Size 0.300ml			Customer ID ETC	
Remarks Calculations Results STD R716 HQ/HYDRD STD-39N11-D RESULT STD VAL 1100ppm %REC 95.4% PKHT .279 28.61ng 9.54E-2ppm 9/6/94				
Analyst - 1 J Steele	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9-1-94	Time Completed 1410	Lab Unit Mod Residue 9/6/94	Signature Le Jones	

54-6800-061 R 10 931

CVAA: LA-325-104 (A-1) Hg LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Serial No.	Sample Size in mL SS	0.300	
R5598-5597	Hg ng (Nanograms)	28.61	
Batch ID	Conc Hg µg/mL (or mg/L or PPM)	0.095	N/A
4324	Conc Hg µg/L (PPB)	95.4	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		
09/01/94	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Analyst			
Jackie Steele			
Date			
09/01/94			

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	STANDARD	DUPLICATE
Conc Hg µg/mL	9.54E-02	
	N/A	N/A
	N/A	N/A

Data Entry by: <i>TH</i>	Date: 06-Sep-94
Approved by: <i>Residue</i>	Date: 9/6/94

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

CALIBRATION RECORD

WHC-SD-WM-DP-081, REV. 0

Analyte: Hg

Procedure: LA 325-104

Revision: A-1

Instrument: PE2380 (Hydride AA)

Property No.: WB26847

Technologist *Neil Steel*

Payroll No.:

Date: 09/01/94

Calibration Standard ID: 42N11-A

Analyte Concentration: .147 ppm

Type of Calibration: LINEAR

	Dilution	Concentration	Instrument Reading Unit
1	.000mL	0ng	.003
2	.034mL	5ng	.049
3	.100mL	14.7ng	.144
4	.250mL	36.75 ng	.372
5	500mL	73.5 ng	.711
6	.750mL	110.25 ng	1.064
7	1.000mL	147 ng	1.329
8			
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20			
21			

Comments: $r = 0.9989$ Y-intercept = 0.0159 SLOPE= 0.0092

279 28.6mg ICV R5598 300ml 39N11-D 45.36%

100 1.05mg CCB 250ml

WHC-SD-WM-DP-081, REV. 0

102 74.6mg CCB 500ml 42N11-A 10.51%

321 20.1mg 100% purity 500ml

349 34.2mg 100% purity 500ml

374 37.4mg 100% purity 500ml

379 37.9mg 100% purity 500ml

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446 34.6mg CCB 100ml 39N11-D

450 4.5mg CCB 500ml

459 71.02mg CCB 500ml 42N11-A 10.51%

459 2.2mg CCB 250ml

459 21.12mg 100% purity 300ml

459 10.02mg 100% purity 500ml

459 10.02mg 100% purity 500ml

711 73.5mg 500ml 42N11-A

372 34.75mg 250ml 42N11-A

459 10.02mg 100% purity 500ml

459 10.02mg 100% purity 500ml

459 10.02mg 100% purity 500ml

Analyte: Hg
 Date: 9-1-94
 Analyst: *Reed Helle*
 Start Time: 8:30
 End Time: 14:10
 8-31-94 9-1-94

MHS 20 Data.
 Concentration: 25.000
 Path: 1.000
 Wavelength: 253.7
 Temperature: 25.0
 EOL: 5.000

Chart Recorder Data.
 Chart: 5.000000 Chart: 4.000000 20.00V

Calibration Data.
 Concentration: 0.159
 Absorbance: 0.099
 Concentration: 0.159

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH 9-1

Lab Segment Serial No.

R-5596 R-5597

Customer ID:

SAMPLE

Analysis:

ANION ANALYSIS DIONEX 4000i

Sample Prep:

DIRECT

Instrument: AL10657

Procedure/ Rev: LA-533-105 C-2

Technologist: E.H. COLVIN *PN Colvin*

Date: 08/29/94

Starting Time: 0600

Temperature 25C

Ending Time: 1500

Chemist: J.M. FRYE

Comments: _____

	Description	Lab ID
1	INITIAL LMCS CHECK STD	R-5594-5571
2	REAGENT BLANK	R-5595-5671
3	SAMPLE	R-5596-5771
4	SAMPLE DUPLICATE	R-5596-5871
5	SAMPLE + SPIKE	R-5596-5971
6	SAMPLE + SPIKE DUP	R-5596-5971
7	SAMPLE	R-5597-5771
8	ENDING LMCS CHK STD	R-5598-5571
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
DIONEX2 44N9-F	.100ML-10ML			
DIONEX SPK 44N9F	.100ML			

WHC-SD-WM-DP-081, REV. 0

Analytical Batch Summary Sheet

Method: LIT-533-105-C-2

Date Start: 5/31/14

Prepared by: *John Fuge*

Date Complete: 5/31/14

Analyst: Ed Colverin

Batch: 4221

	Units:		ng/ml			%	ng/ml	%	
Sample Name	Sample ID	Analyte	Sample	Duplicate	%RPD	% RJC	Det.Lim.	Spike	Spike Dup.
<i>10111-F</i>	<i>R5584</i>	<i>F</i>	<i>64.2</i>			<i>96.1</i>	<i>2.1</i>		
		<i>Cl</i>	<i>78.1</i>			<i>101.2</i>	<i>2.2</i>		
		<i>NO2</i>	<i>555</i>			<i>100.1</i>	<i>1.1</i>		
		<i>NO3</i>	<i>609</i>			<i>100.4</i>	<i>1.1</i>		
		<i>PC1</i>	<i>544</i>			<i>100.2</i>	<i>1.1</i>		
		<i>SO1</i>	<i>645</i>			<i>100.2</i>	<i>1.1</i>		
<i>Regent Blank</i>	<i>R5595</i>	<i>NO2</i>	<i>21</i>						
		<i>NO3</i>	<i>21</i>						
	<i>R5596</i>	<i>NO2</i>	<i>25251</i>	<i>2.28E1</i>	<i>1.4</i>	<i>3.1</i>	<i>3.1</i>	<i>71.1</i>	<i>71.1</i>
		<i>NO3</i>	<i>35851</i>	<i>4.06E1</i>	<i>2.0</i>			<i>80.7</i>	<i>77.1</i>
	<i>R5597</i>	<i>NO2</i>	<i>21</i>						
		<i>NO3</i>	<i>21</i>						
	<i>R5598</i>	<i>F</i>	<i>56.1</i>			<i>100.2</i>			
		<i>Cl</i>	<i>80.1</i>			<i>101.2</i>			
		<i>NO2</i>	<i>552</i>			<i>100.1</i>			
		<i>NO3</i>	<i>611</i>			<i>105.7</i>			
		<i>PC1</i>	<i>560</i>			<i>100.2</i>			
		<i>SO1</i>	<i>647</i>			<i>100.1</i>			

Comments:

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

Batch 4321

Serial No 5-5594-5571	Sample Point TX-3-1	Date 8-12-94	Time Issued 13:47	Priority 53
Determination 53	Method Standard LA-533-105	Result Units % RECOVERY	Charge Code N204X	Reruns 0
Sample Size 100 ml - 10 ml			Customer ID STD	
Remarks Calculations Results 44N9-E 54.2 96.8 78.1 104.2 555 103.8 544 105.4 645 105.2 107.7				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94	Time Completed 1500	Lab Unit Mgr Frank Faye		

54-6800-061 R-10-831

ANION ANALYSIS ON DIONEX MODEL 4000i - PREPARED SAMPLES

LA-533-105 (C-1)

	FLUORIDE	CHLORIDE	NITRITE	NITRATE	PHOSPHATE	SULFATE
Type	Sample Conc. (µg/mL)	5.42E+01	7.81E+01	5.55E+02	6.09E+02	5.44E+02
STD	Sample Prep DF (g/L)					
Work List	Sample Dilution Factor					
4321	Duplicate Conc. (µg/mL)					
Test Code	Duplicate Prep DF (g/L)					
	Duplicate Dilution Factor					
Matrix	Spike+Sample (µg/mL)					
LIQUID						
Sample #	Volume of Spike (mL)					
5594-5571	Spike Book Number					
Instrument Code	Total Volume					
AL10657	Spike Std. (µg/mL)					
Analyst	Results in µg/g sample = Analyte/(g sample/L) * 1000 mL/L					
COLVIN	Relative Percent Difference = ((Sample-Duplicate)/(Sample + Duplicate)/2) * 100					
Date	Less than Values are Calculated from the Detection Limit * Dilution Factor					
08/29/94	Spike Recovery = (((Spike+Sample)-(Sample)*(Vol of Sample&Diluent)))/((Spike Vol)*(Spike Std.)*(Sample DF))*100					
Time	Note: (For Spike Recovery When The Sample Conc. is Less Than Detection Limit You Do NOT Subtract Sample Conc.)					
15:00	Spike Actual = Spike Found / Spike Recovery					

RESULTS	SAMPLE	DUPLICATE	DUP RPD	SPIKE	SPIKE RECV'Y	SPIKE ACT.
Fluoride (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Chloride (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Nitrite (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Nitrate (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Phosphate (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Sulfate (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A

Data Entry by:	Date:	01-Sep-94
Approved by:	Date:	7 7 94

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

Serial No F 5095-6871	Sample Point TK-6-1	Date 8-22-94	Time Issued 13:48	Priority 36
Determination CC	Method Standard LA-535-105	Result Units ug/mL	Charge Code KBC47	Reruns
Sample Size	Customer ID BLANK			
Remarks Calculations Results BEANHEAT BLANK NO ₂ <1 NO ₃ <1 E.H. Calhoun				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94	Time Completed 1500	Lab Unit Mgr [Signature] 54 6800-061 (R 10 83)		

ANION ANALYSIS ON DIONEX MODEL 4000i - PREPARED SAMPLES

LA-533-105 (C-1)

	FLOURIDE	CHLORIDE	NITRITE	NITRATE	PHOSPHATE	SULFATE
Type	Sample Conc. (µg/mL)		<1	<1		
BLK	Sample Prep DF (g/L)					
Work List	Sample Dilution Factor					
4321	Duplicate Conc. (µg/mL)					
Test Code	Duplicate Prep DF (g/L)					
	Duplicate Dilution Factor					
Matrix	Spike+Sample (µg/mL)					
LIQUID						
Sample #	Volume of Spike (mL)					
R5595-5671	Spike Book Number					
Instrument Code	Total Volume					
AL10657	Spike Std. (µg/mL)					
Analyst	Results in µg/g sample = Analyte/(g sample/L) * 1000 mL/L					
COLVIN	Relative Percent Difference = ((Sample-Duplicate)/(Sample + Duplicate/2)) * 100					
Date	Less than Values are Calculated from the Detection Limit * Dilution Factor					
08/29/94	Spike Recovery = (((Spike+Sample)-(Sample)*(Vol of Sample&Diluent)))/((Spike Vol)*(Spike Std.)*(Sample DF))*100					
Time	Note: (For Spike Recovery When The Sample Conc. is Less Than Detection Limit You Do NOT Subtract Sample Conc.)					
15:00	Spike Actual = Spike Found / Spike Recovery					

RESULTS v	SAMPLE	DUPLICATE	DUP RPD	SPIKE	SPIKE RECVY	SPIKE ACT.
Flouride (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Chloride (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Nitrite (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Nitrate (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Phosphate (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A
Sulfate (µg/g)	ERR	ERR	N/A	N/A	N/A	N/A

Data Entry by: [Signature]	Date: 01-Sep-94
Approved by: [Signature]	Date: 9/7/94

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

Serial No R 5596.-5771	Sample Point TK-S-1	Date 8-22-94	Time Issued 13:48	Priority 26
Determination 10	Method Standard LA-533-105	Result Units UG/ML	Charge Code K324K	Reruns 0
Sample Size 1 mL - 10 mL			Customer ID SAMPLE	
Remarks Calculations Results $\mu\text{g/mL}$ NO_2 29.2 2.92E1 NO_3 39.8 3.98E1 <i>29.2 10-3794 AD</i> <i>39.8 10-3794 AD</i> <i>29.2 3.98E1</i> <i>39.8 3.98E1</i> <i>94H. Colvin</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94	Time Completed 1500	Lab Unit Mgr <i>Patricia</i> <i>James J. J...</i>		

54-6800-061 (R-10 831)

ANION ANALYSIS ON DIONEX MODEL 4000i - PREPARED SAMPLES

LA-533-105 (C-1)

	FLOURIDE	CHLORIDE	NITRITE	NITRATE	PHOSPHATE	SULFATE
Type: Sample Conc. ($\mu\text{g/mL}$)			2.92E+01	3.98E+01		
SAM Sample Prep DF (g/L)						
Work List Sample Dilution Factor						
#321 Duplicate Conc. ($\mu\text{g/mL}$)						
Test Code Duplicate Prep DF (g/L)						
Duplicate Dilution Factor						
Matrix Spike+Sample ($\mu\text{g/mL}$)						
LIQUID						
Sample # Volume of Spike (mL)						
R5596-5771 Spike Book Number						
Instrument Code Total Volume						
AL10657 Spike Std. ($\mu\text{g/mL}$)						
Analyst Results in $\mu\text{g/g}$ sample = Analyte/(g sample/L) * 1000 mL/L						
COLVIN Relative Percent Difference = ((Sample-Duplicate)/((Sample + Duplicate)/2)) * 100						
Date Less than Values are Calculated from the Detection Limit * Dilution Factor						
08/29/94 Spike Recovery = (((Spike+Sample)-(Sample)*(Vol of Sample/Diluent)))/((Spike Vol)*(Spike Std.)*(Sample DF))*100						
Time Note: (For Spike Recovery When The Sample Conc. is Less Than Detection Limit You Do NOT Subtract Sample Conc.)						
15:00 Spike Actual = Spike Found / Spike Recovery						

RESULTS	SAMPLE	DUPLICATE	DUP RPD	SPIKE	SPIKE REC'Y	SPIKE ACT.
Flouride ($\mu\text{g/g}$)	ERR	ERR	N/A	N/A	N/A	N/A
Chloride ($\mu\text{g/g}$)	ERR	ERR	N/A	N/A	N/A	N/A
Nitrite ($\mu\text{g/g}$)	ERR	ERR	N/A	N/A	N/A	N/A
Nitrate ($\mu\text{g/g}$)	ERR	ERR	N/A	N/A	N/A	N/A
Phosphate ($\mu\text{g/g}$)	ERR	ERR	N/A	N/A	N/A	N/A
Sulfate ($\mu\text{g/g}$)	ERR	ERR	N/A	N/A	N/A	N/A

Data Entry by: <i>James J. J...</i>	Date: 01-Sep-94
Approved by: <i>James J. J...</i>	Date: 9/7/94

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

WHC-SD-WM-DP-081, REV. 0

Serial No R 5596-5871	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:42	Priority 25
Determination IC	Method Standard LA-533-105	Result Units ug/mL	Charge Code KE24K	Reruns 0
Sample Size 1 mL - 10 mL			Customer ID SAMPLE	
Remarks Calculations Results NITRATE SAMPLE <u>ug/mL</u> <u>% RPD</u> NO ₂ 2.88 E1 1.4 NO ₃ 4.06 E1 2.0 E.H. Cohen				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-15-94	Time Completed 1500	Lab Unit Mgr John L. Lyle

54 6800-061 R 10 831

ANION ANALYSIS ON DIONEX MODEL 4000i - PREPARED SAMPLES

LA-533-105 (C-1)

	FLUORIDE	CHLORIDE	NITRITE	NITRATE	PHOSPHATE	SULFATE
Type			2.88E+01	4.06E+01		
DUP						
Work List						
4321						
Test Code						
Matrix						
LIQUID						
Sample #						
R5596-5871						
Instrument Code						
AL10657						
Analyst	Results in ug/g sample = Analyte/(g sample/L) * 1000 mL/L					
COLVIN	Relative Percent Difference = ((Sample-Duplicate)/((Sample + Duplicate)/2)) * 100					
Date	Less than Values are Calculated from the Detection Limit * Dilution Factor					
08/29/94	Spike Recovery = ((Spike+Sample)-(Sample)*(Vol of Sample&Diluent))/((Spike Vol)*(Spike Std)*(Sample DF))*100					
Time	Note: (For Spike Recovery When The Sample Conc. is Less Than Detection Limit You Do NOT Subtract Sample Conc.)					
15:00	Spike Actual = Spike Found / Spike Recovery					

RESULTS	SAMPLE	DUPLICATE	DUP RPD	SPIKE	SPIKE RECV'Y	SPIKE ACT.
Fluoride (ug/g)	ERR	ERR	N/A	N/A	N/A	N/A
Chloride (ug/g)	ERR	ERR	N/A	N/A	N/A	N/A
Nitrite (ug/g)	ERR	ERR	N/A	N/A	N/A	N/A
Nitrate (ug/g)	ERR	ERR	N/A	N/A	N/A	N/A
Phosphate (ug/g)	ERR	ERR	N/A	N/A	N/A	N/A
Sulfate (ug/g)	ERR	ERR	N/A	N/A	N/A	N/A

Data Entry by:	Date:	01-Sep-94
Approved by:	Date:	9/7/94

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

WHC-SD-WM-DP-081, REV. 0

Serial No R 5596-5871	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:43	Priority 26
Determination IC	Method Standard LA-533-105	Result Units % RECOVERY	Charge Code K504X	Reruns 0
Sample Size 1 mL - 10 mL + .100 mL SPIKE			Customer ID SAMPLE	
Remarks Calculations Results <p style="text-align: center;"><u>% Recovery</u></p> <p>SAMPLE SPIKED ID 44N9-F NO₂ 89.1</p> <p>SPIKE VOLUME .100 mL NO₃ 80.9</p> <p><i>Ed Colvin</i></p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94		Time Completed 1500	Lab Unit Mgr <i>James L. Lutz</i>	<i>Ed Colvin</i>

54-6800-061 (R-1G 83)

ANION ANALYSIS ON DIONEX MODEL 4000i

LA-533-105, C-1 DIRECT SAMPLES

	FLUORIDE	CHLORID	NITRITE	NITRATE	PHOSPHA	SULFATE
Type	SAMPLE DATA (µg/mL)		2.92E+01	3.98E+01		
sample	SAMPLE DILUTION FACTOR		11	11		
Work List	DUPLICATE DATA (µg/mL)		2.88E+01	4.06E+01		
Test Code	DUPLICATE DILUTION FACTOR		11	11		
Matrix	SPIKE + SAMPLE (in µg/mL)		8.11E+01	9.07E+01		
Liquid	VOLUME OF SPIKE (mL)		1.00E-01	1.00E-01		
Sample #	SPIKE BOOK NUMBER		44n9f	44n9f	44n9f	44n9f
R5596.dup.spk.spkd	TOTAL VOLUME		10.10	10.10		
Instrument Code	SPIKE STD. (µg/mL)		535	578		
Dionex	Spike Recovery = $\frac{((\text{Spike} + \text{Sample}) - (\text{Sample}) * (\text{Vol. of Sample} \& \text{Diluent}))}{((\text{Spike Vol.}) * (\text{Spike Std}))}$					
Analyst	Ed Colvin					
Date	08/31/94					
Time	Spike Actual = Spike Found / Spike Recovery					

v RESULTS v	SAMPLE	DUPLICAT	DUP RPD	SPIKE FOU	SPIKE RE	SPIKE AC
FLUORIDE (µg/mL)	<0.000	<0.000	N/A		ERR	ERR
CHLORIDE (µg/mL)	<0.000	<0.000	N/A		ERR	ERR
NITRITE (µg/mL)	2.92E+01	2.88E+01	1.4%	5.19E+01	89.1%	5.83E+01
NITRATE (µg/mL)	3.98E+01	4.06E+01	2.0%	5.09E+01	80.9%	6.30E+01
PHOSPHATE (µg/mL)	<0.000	<0.000	N/A		ERR	ERR
SULFATE (µg/mL)	<0.000	<0.000	N/A		ERR	ERR

Data Entry by: *James L. Lutz* Date: 31-Aug-94
 Approved by: *Ed Colvin* Date: 11/1/94

Serial No	Sample Point	Date	Time Issued	Priority
Determination	Method Standard	Result Units	Charge Code	Reruns
Sample Size			Customer ID	
1 mL - 10 mL + 100 mL SPIKE Remarks Calculations Results 44N9-F NO ₂ 91.5 Spike duplicate 100 mL NO ₃ 77.8 90 Rec EKH Colvin				
Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Ltd Unit Mgr		
8-29-94	1500	James L. Lutz	54 5800-061 R 10 831	

ANION ANALYSIS ON DIONEX MODEL 4000i
LA-533-105, C-1 DIRECT SAMPLES

Type	FLOURIDE	CHLORID	NITRITE	NITRATE	PHOSPHA	SULFATE
SAMPLE DATA (µg/mL)			2.88E+01	4.06E+01		
SAMPLE DILUTION FACTOR			11	11		
Work List						
DUPLICATE DATA (µg/mL)			2.88E+01	4.06E+01		
DUPLICATE DILUTION FACTOR			11	11		
Matrix	SPIKE + SAMPLE (in µg/mL)					
			8.21E+01	8.96E+01		
liquid						
Sample #	VOLUME OF SPIKE (mL)		1.00E-01	1.00E-01		
R5596.dup.spk/spkd	SPIKE BOOK NUMBER	44n9f	44n9f	44n9f	44n9f	44n9f
Instrument Code	TOTAL VOLUME		10.10	10.10		
Dionex	SPIKE STD. (µg/mL)		535	578		
Analyst	Spike Recovery = (((Spike+Sample)-(Sample)*(Vol.of Sample&Diluent)))/((Spike Vol.)*(Spike Std					
Ed Colvin	Note: (For spike recovery when the sample conc. is less than detection limit you do NOT sub					
Date	Relative Percent Difference = ((Sample - Duplicate) / ((Sample + Duplicate) / 2) * 100)					
08/31/94	Less than Values are Calculated from the Detection Limit*Dilution Factor					
Time	Spike Actual = Spike Found / Spike Recovery					

v RESULTS v

	SAMPLE	DUPLICAT	DUP RPD	SPIKE FOU	SPIKE RE	SPIKE AC
FLOURIDE (µg/mL)	<0.000	<0.000	N/A		ERR	ERR
CHLORIDE (µg/mL)	<0.000	<0.000	N/A		ERR	ERR
NITRITE (µg/mL)	2.88E+01	2.88E+01	0.0%	5.33E+01	91.5%	5.83E+01
NITRATE (µg/mL)	4.06E+01	4.06E+01	0.0%	4.90E+01	77.8%	6.30E+01
PHOSPHATE (µg/mL)	<0.000	<0.000	N/A		ERR	ERR
SULFATE (µg/mL)	<0.000	<0.000	N/A		ERR	ERR

Data Entry by: Date: 31-Aug-94
 Approved by: Date: 31-Aug-94

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

WHC-SD-WM-DP-081, REV. 0

Serial No E 5597.-5771	Sample Point TX-9-1	Date 6-22-94	Time Issued 19:30	Priority 26
Determination NO	Method Standard LA-533-105	Result Units UG/ML	Charge Code KECH	Reruns 0
Sample Size DIRECT			Customer ID TRIP BLK	
Remarks Calculations Results $NO_2 < 1$ $NO_3 < 1$ <i>E.H. Colvin</i>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-29-94	Time Completed 1500	Lab Unit Mgr <i>John F. Faye</i> 54-5800-061 (R-10 83)		

ANION ANALYSIS ON DIONEX MODEL 4000i

LA-533-105, C-1 DIRECT SAMPLES

Type	FLOURIDE	CHLORIDE	NITRITE	NITRATE	PHOSPHATE	SULFATE
SAMPLE DATA (µg/mL)			<1	<1		
SAMPLE DILUTION FACTOR						
Work List						
4321						
Test Code						
Matrix						
LIQUID						
Sample #						
R5597-5771						
Instrument Code						
AL10857						
Analyst	Spike Recovery = $\frac{((\text{Spike} + \text{Sample}) - (\text{Sample}) * (\text{Vol of Sample} \& \text{Diluent}))}{((\text{Spike Vol}) * (\text{Spike Std.}) * (\text{Sample DF}))} * 100$					
COLVIN	Note: (For spike recovery when the sample conc. is less than detection limit you do NOT subtract sample conc.)					
Date	Relative Percent Difference = $\frac{((\text{Sample} - \text{Duplicate}) / ((\text{Sample} + \text{Duplicate}) / 2)) * 100}{}$					
08/29/94	Less than Values are Calculated from the Detection Limit * Dilution Factor					
Time	Spike Actual = Spike Found / Spike Recovery					
15:00						

RESULTS	SAMPLE	DUPLICATE	DUP RPD	SPIKE FOUND	SPIKE RECV'Y	SPIKE ACT.
FLOURIDE (µg/mL)	<0.000	<0.000	N/A		N/A	N/A
CHLORIDE (µg/mL)	<0.000	<0.000	N/A		N/A	N/A
NITRITE (µg/mL)	<0.000	<0.000	N/A		N/A	N/A
NITRATE (µg/mL)	<0.000	<0.000	N/A		N/A	N/A
PHOSPHATE (µg/mL)	<0.000	<0.000	N/A		N/A	N/A
SULFATE (µg/mL)	<0.000	<0.000	N/A		N/A	N/A

Data Entry by: <i>John F. Faye</i>	Date: 01-Sep-94
Approved by: <i>John F. Faye</i>	Date: 9/7/94

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

WHC-SD-WM-DP-081, REV. 0

Serial No R 5598-5571	Sample Point TX-2-1	Date 8-22-94	Time Issued 12:51	Priority 23
Determination 11	Method Standard LA-533-105	Result Units 1. RECOVERY	Charge Code NBDK	Retuns 0
Sample Size .100 mL - 10 mL			Customer ID STD	
Remarks Calculations Results <div style="display: flex; justify-content: space-between;"> <div> 44N9-F 56.1 80.4 552 611 560 647 </div> <div> 9. KOC 100.2 107.2 103.1 105.7 108.2 108.1 </div> </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 3-29-94	Time Completed 1500	Lab Unit Mgr <i>John Faye</i>		

54 6800-061 R 1G 831

ANION ANALYSIS ON DIONEX MODEL 4000i

LA-533-105, C-1 DIRECT SAMPLES

Type	SAMPLE DATA (µg/mL)	FLOURIDE	CHLORIDE	NITRITE	NITRATE	PHOSPHATE	SULFATE
STD	SAMPLE DILUTION FACTOR	5.61E+01	8.04E+01	5.52E+02	6.11E+02	5.60E+02	6.47E+02
Work List							
4321	DUPLICATE DATA (µg/mL)						
Test Code	DUPLICATE DILUTION FACTOR						
Matrix	SPIKE + SAMPLE (in µg/mL)						
LIQUID							
Sample #	VOLUME OF SPIKE (mL)						
R5598-5571	SPIKE BOOK NUMBER						
Instrument Code	TOTAL VOLUME						
AL10657	SPIKE STD. (µg/mL)						
Analyst	Spike Recovery = (((Spike+Sample)-(Sample)*(Vol of Sample&Diluent)))/((Spike Vol)*(Spike Std.)*(Sample DF))*100						
COLVIN	Note: (For spike recovery when the sample conc. is less than detection limit you do NOT subtract sample conc.)						
Date	Relative Percent Difference = ((Sample - Duplicate) / ((Sample + Duplicate) / 2) * 100)						
08/29/94	Less than Values are Calculated from the Detection Limit * Dilution Factor						
Time	Spike Actual ☐ Spike Found / Spike Recovery						
15:00							

v RESULTS v

	SAMPLE	DUPLICATE	DUP RPD	SPIKE FOUND	SPIKE RECV'Y	SPIKE ACT.
FLOURIDE (µg/mL)	5.61E+01	<0.000	N/A	-5.61E+01	N/A	N/A
CHLORIDE (µg/mL)	8.04E+01	<0.000	N/A	-8.04E+01	N/A	N/A
NITRITE (µg/mL)	5.52E+02	<0.000	N/A	-5.52E+02	N/A	N/A
NITRATE (µg/mL)	6.11E+02	<0.000	N/A	-6.11E+02	N/A	N/A
PHOSPHATE (µg/mL)	5.60E+02	<0.000	N/A	-5.60E+02	N/A	N/A
SULFATE (µg/mL)	6.47E+02	<0.000	N/A	-6.47E+02	N/A	N/A

Data Entry by:	Date: 01-Sep-94
Approved by:	Date: 9/7/94

Form L2 Rev. 2.0

Page 1 of 1

Sample Name: R-5594 44N9-F STD
 Data File : C:\DX\DATA\94082901.D02
 Method : C:\DX\METHOD\MEL.MET
 ACI Address: 1 System: 1 Inject#: 2
 Analyst : *PH Colman* Column: *8 125, 4i*

Date: 08/29/1994 08:44:04
 WHC-SD-WM-DP-081, REV. 0
 Detector: CDM-1

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	101	2400	5Hz	0.00	8.00		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	110	519	2	
2	1.12	fluoride	54.224	96.83	7756	2	0.90
4	1.65	chloride	78.124	104.16	8422	1	1.23
5	1.97	nitrite	555.254	103.78	40828	1	1.55
6	2.90	bromide	584.267	102.14	28518	1	5.07
7	3.28	nitrate	609.282	105.41	38220	1	6.84
8	4.69	phosphate	544.042	105.23	14937	1	1.96
9	6.15	sulfate	645.372	107.74	51075	1	7.14
Totals			3070.564	25980	190274		

File: 94082901.D02 Sample: R-5594 44N9-F STD

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 149 TO 151.

Sample Name: R-5598 44N9-F STD Date: 08/29/1994 11:49:25
 Data File : C:\DX\DATA\94082901.D11 WHC-SD-WM-DP-081, REV. 0
 Method : C:\DX\METHOD\MEL.MET
 ACI Address: 1 System: 1 Inject#: 11 Detector: CDM-1
 Analyst : *E. H. Ecker* Column:

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	101	2400	5Hz	0.00	8.00		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	110	492	2	
2	1.12	fluoride	56.132	1663	8076	2	0.90
3	1.48		0.000	50	244	1	
4	1.65	chloride	80.386	2008	8683	1	1.23
5	1.96	nitrite	551.530	7993	40537	1	1.03
6	2.89	bromide	585.889	4564	28612	1	4.71
7	3.27	nitrate	610.862	5141	38343	1	6.51
8	4.68	phosphate	559.691	1154	15478	1	1.74
9	6.13	sulfate	647.372	3349	51275	1	6.79
Totals			3091.861	26032	191741		

File: 94082901.D11 Sample: R-5598 44N9-F STD

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=====
Sample Name: R-5595 BLANK                      Date: 08/29/1994 08:34:24
Data File  : C:\DX\DATA\94082901.D01
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1   System: 1   Inject#: 1
Analyst    :                      Column:
=====

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WHC-SD-WM-DP-081, REV. 0
Detector: CDM-1

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=====
Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          1   2400   5Hz   0.00   8.00          200
=====

```

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	1.48		0.000	39	241	1	
3	3.32	nitrate	1.220	48	327	1	8.14
Totals			1.220	87	568		

File: 94082901.D01 Sample: R-5595 BLANK

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=====
Sample Name: R-5596                      Date: 08/29/1994 09:21:13
Data File  : C:\DX\DATA\94082901.D05    WHC-SD-WM-DP-081, REV. 0
Method     : C:\DX\METHOD\MEL.MET
ACI Address: 1 System: 1 Inject#: 5      Detector: CDM-1
Analyst    :                          Column:
=====

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Calibration Volume Dilution Points Rate Start Stop Area Reject
-----
External          1          11   2400   5Hz   0.00   8.00          200
-----

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***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.97		0.000	1394	7674	2	
2	1.14	fluoride	4.669	1365	5851	2	2.70
3	1.22		0.000	2266	17660	2	
4	1.60	chloride	70.480	13672	74147	1	-1.84
5	1.93	nitrite	29.196	3133	18419	1	-0.52
6	2.17		0.000	88	446	1	
7	3.28	nitrate	39.789	2472	19202	1	6.84
8	4.69	phosphate	19.666	182	2374	1	1.96
9	6.10	sulfate	95.033	4557	73769	1	6.27
Totals			258.833	29128	219542		

File: 94082901.D05 Sample: R-5596

Sample Name: R-5596
 Data File : C:\DX\DATA\94082901.D06
 Method : C:\DX\METHOD\MEL.MET
 ACI Address: 1 System: 1 Inject#: 6
 Analyst : Column:

Date: 08/29/1994 09:32:52
 WHC-SD-WM-DP-081, REV. 0

Detector: CDM-1

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	11	2400	5Hz	0.00	8.00		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.97		0.000	1391	7530	2	
2	1.14	fluoride	4.672	1379	5856	2	2.70
3	1.22		0.000	2472	18438	2	
4	1.60	chloride	70.308	14135	73965	1	-1.84
5	1.93	nitrite	28.848	3152	18170	1	-0.52
6	2.17		0.000	86	413	1	
7	3.27	nitrate	40.571	2481	19761	1	6.51
8	4.68	phosphate	19.727	184	2393	1	1.74
9	6.09	sulfate	96.335	4644	74963	1	6.10
Totals			260.462	29923	221489		

File: 94082901.D06 Sample: R-5596

Sample Name: R-5596 + SPIKE
 Data File : C:\DX\DATA\94082901.D08
 Method : C:\DX\METHOD\MEL.MET
 ACI Address: 1 System: 1 Inject#: 8
 Analyst : Column:

Date: 08/29/1994 09:55:24

WHC-SD-WM-DP-081 REV.0
 Detector: CDM-1

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	11	2400	5Hz	0.00	8.00		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.97		0.000	1273	6188	2	
2	1.12	fluoride	9.149	2336	12753	2	0.90
3	1.22		0.000	2411	17230	2	
4	1.60	chloride	77.874	15461	81989	1	-1.84
5	1.93	nitrite	81.138	9690	55633	1	-0.52
6	2.87	bromide	58.659	3817	25857	1	3.99
7	3.25	nitrate	90.701	7067	55646	1	5.86
8	4.68	phosphate	64.269	1215	16529	1	1.74
9	6.08	sulfate	152.087	7885	126093	1	5.92
Totals			533.877	51155	397918		

File: 94082901.D08 Sample: R-5596 + SPIKE

Sample Name: R-5596 + SPIKE
 Data File : C:\DX\DATA\94082901.D07
 Method : C:\DX\METHOD\MEL.MET
 ACI Address: 1 System: 1 Inject#: 7
 Analyst : Column:

Date: 08/29/1994 09:44:12
 WHC-SD-WM-DP-081, REV. 0
 Detector: CDM-1

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	11	2400	5Hz	0.00	8.00		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	1069	4960	2	
2	1.12	fluoride	8.817	2219	12242	2	0.90
3	1.22		0.000	2321	16260	2	
4	1.60	chloride	78.910	15532	83088	1	-1.84
5	1.93	nitrite	82.050	9599	56286	1	-0.52
6	2.87	bromide	58.377	3772	25706	1	3.99
7	3.25	nitrate	89.597	6908	54856	1	5.86
8	4.67	phosphate	64.942	1212	16743	1	1.52
9	6.08	sulfate	151.856	7861	125881	1	5.92
Totals			534.549	50494	396022		

File: 94082901.D07 Sample: R-5596 + SPIKE

Sample Name: R-5596 + SPIKE
 Data File : C:\DX\DATA\94082901.D09
 Method : C:\DX\METHOD\MEL.MET
 ACI Address: 1 System: 1 Inject#: 9
 Analyst : Column:

Date: 08/29/1994 11:25:17
 WHC-SD-WM-DP-081, REV. 0
 Detector: CDM-1

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	11	2400	5Hz	0.00	8.00		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.96		0.000	1176	5476	2	
2	1.12	fluoride	8.459	2262	11691	2	0.90
3	1.22		0.000	2300	15583	2	
4	1.61	chloride	80.980	16271	85283	1	-1.23
5	1.93	nitrite	83.238	9789	57138	1	-0.52
6	2.87	bromide	59.310	3907	26205	1	3.99
7	3.25	nitrate	91.381	7274	56133	1	5.86
8	4.66	phosphate	65.811	1240	17019	1	1.30
9	6.06	sulfate	153.786	8031	127651	1	5.57
Totals			542.966	52250	402179		

File: 94082901.D09 Sample: R-5596 + SPIKE

Sample Name: R-5597	Date: 08/29/1994 11:36:08
Data File : C:\DX\DATA\94082901.D10	WHC-SD-WM-DP-081, REV. 0
Method : C:\DX\METHOD\MEL.MET	
ACI Address: 1 System: 1 Inject#: 10	Detector: CDM-1
Analyst :	Column:

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2400	5Hz	0.00	8.00		200

***** Peak Report: All Peaks *****

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	1.39		0.000	55	586	1	
2	1.65	chloride	0.168	272	1361	1	1.23
3	3.31	nitrate	1.272	103	738	1	7.82
Totals			1.441	431	2685		

File: 94082901.D10 Sample: R-5597

98
RJA

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.
R5596 , R5597

Customer ID:
SAMPLE , TRIP BLANK

Analysis:
TOTAL ORGANIC CARBON

Sample Prep:
DIRECT

Instrument: AL-10723

Procedure/ Rev: LA-344-105/B-2/3 *2-3* *1-3* *1-3*

Technologist: PATRICK MCCOWN

Date: 08/26/94

Starting Time: 1200

Temperature 25 C

Ending Time: 1500

Chemist: R. W. SCHROEDER

Comments: BATCH # 4318

	Description	Lab ID
1	LMCS	R5594-5526
2	REAGENT BLANK	R5595-5626
3	SAMPLE	R5596-5726
4	SAMPLE DUPLICATE	R5596-5826
5	SAMPLE SPIKE	R5596-5926
6	SAMPLE SPIKE DUPLICATE	R5596-5926
7	SAMPLE	R5597-5726
8	LMCS	R5598-5526
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	10N12D / .200ML			
SPIKE	11N12D / .400ML			

[illegible]

X

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH

Robert W. Schroeder 8-29-94

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

Batch 4318

Serial No LA-44-105	Sample Point TR 3-3	Date 8-22-94	Time Issued 15:47	Priority 10
Determination C	Method Standard LA-344-100	Result Units % RECOVERY	Charge Code REC-4X	Reruns .
Sample Size .200mL-2mL-.200 mL			Customer ID SID	
Remarks Calculations Results VAL = 0.8200 C11-10N12-D RESULT 3.00 VAL 3.00 REC 100.0				
Analyst - 1 <i>P. McCOWN</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 Hrs	Analyst - 5 Hrs
Date 8/26/94	Time Completed 1500	Lab Unit Mgr <i>RW Schneider</i>	8-29-94 <i>D. Hammitt</i>	

WHC-SD-WM-DP-081, REV. 0

54-6800-061 R 10 831

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TOC: LA-344-105 (B-2) *8-29-94* LIQUIDS

Type	Sample Volume in mL (SS)	STANDARD
STANDARD	H2SO4 Volume in mL (VR)	0.200
Work List	Volume Injected in mL (VI)	2.000
4318	Dilution Factor (DF)	0.200
Test Code	Digest Dilution Factor (DDF)	11
TOC	µg of Carbon in Sample (C1)	1
Matrix	µg of Carbon in Blank (C2)	59
LIQUID	g of Carbon/L =	4.4
Sample #		3.00E+00
R5594-5526	g of Carbon/L =	
Instrument Code		$\frac{(C1-C2) * DF * DDF}{VI * 1000}$
AL-10723		
Analyst	µg of Carbon/mL =	g of Carbon/L * 1000000 µg/g / 1000 mL/L
P McCOWN		
Date		
08/26/94	Detection Level (µg/mL) =	$\frac{1 \text{ µg C} * DF * DDF}{VI}$
Time		
15:00		

µg Carbon/mL =	3.00E+03	DETECTION LEVEL
		in µg/mL
		5.50E+01

Data Entry by: <i>D. Hammitt</i>	Date: 27-Aug-94
Approved by: <i>RW Schneider</i>	Date: 8-29-94

Serial No R 5545.-5628	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:46	Priority 16
Determination TOC	Method Standard LA-344-105	Result Units µg C/mL	Charge Code HED47	Reruns 0
Sample Size 7.200 mL			Customer ID BLANK	
Remarks Calculations Results REAGENT BLANK WHC-SD-WM-DP-081, REV. 0 < 5.00 µg C/mL				
Analyst - 1 <i>Robert L. McLean</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/26/94	Time Completed 1500	Lab Unit Mgr 8-29-94 <i>RW Schroeder</i>		

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

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TOC: LA-344-105 (B-2) 3 ^{RWS} 11-2-94 LIQUIDS

		BLANK
Type	Sample Volume in mL (SS)	0.200
BLANK	H2SO4 Volume in mL (VR)	0.200
Work List	Volume Injected in mL (VI)	0.200
4318	Dilution Factor (DF)	1
Test Code	Digest Dilution Factor (DDF)	1
TOC	µg of Carbon in Sample (C1)	4.8
Matrix	µg of Carbon in Blank (C2)	4.4
LIQUID	g of Carbon/L = <	5.00E-03
Sample #	$\text{g of Carbon/L} = \frac{(C1 - C2) \cdot DF \cdot DDF}{VI \cdot 1000}$	
R5595-5626	$\mu\text{g of Carbon/mL} = \text{g of Carbon/L} \cdot 1000000 \mu\text{g/g} / 1000 \text{ mL/L}$	
Instrument Code	$\text{Detection Level } (\mu\text{g/mL}) = \frac{1 \mu\text{g C} \cdot DF \cdot DDF}{VI}$	
AL-10723		
Analyst		
P McCOWN		
Date		
08/26/94		
Time		
15:00		

NOTE: Reported Result is Below Detection Level.

µg Carbon/mL = < 5.00E+00	DETECTION LEVEL
	in µg/mL 5.00E+00

Data Entry by: <i>Ray Thompson</i>	Date: 27-Aug-94
Approved by: <i>RW Schroeder</i>	Date: 8-29-94

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

Serial No R 5596-5726	Sample Point IN-9-1	Date 8-22-94	Time Issued 18:48	Priority 26
Determination TOC	Method Standard LA-344-105	Result Units UG C/ML	Charge Code KPS4X	Reruns 0
Sample Size 2 mL - .200ML - .200ML			Customer ID SAMPLE	
Remarks Calculations Results WHC-SD-WM-DP-081, REV. 0 4.43 ^{EO2} _{ug C/mL}				
Analyst - 1 <i>Patrick F. McCown</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/26/94	Time Completed 1500	Lab Unit Mgr <i>RW Schroeder</i>	8-29-94 <i>Jay Hammett</i>	

54-6800-061 (R 10 83)

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TOC: LA-344-105 (B-2) ^{RWS} ₁₁₋₈₋₉₄ LIQUIDS

Type	Sample Volume in mL	(SS)	SAMPLE
SAMPLE	H2SO4 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
4318	Dilution Factor	(DF)	1.1
Test Code	Digest Dilution Factor	(DDF)	1
TOC	µg of Carbon in Sample	(C1)	85
Matrix	µg of Carbon in Blank	(C2)	4.4
LIQUID	g of Carbon/L	=	4.43E-01
Sample #			
R5596-5726	g of Carbon/L = $\frac{(C1-C2) \cdot DF \cdot DDF}{VI \cdot 1000}$		
Instrument Code			
AL-10723			
Analyst	µg of Carbon/mL = g of Carbon/L * 1000000 µg/g / 1000 mL/L		
P McCOWN			
Date			
08/26/94	Detection Level (µg/mL) = $\frac{1 \mu g C \cdot DF \cdot DDF}{VI}$		
Time			
15:00			

µg Carbon/mL =	4.43E + 02	DETECTION LEVEL
		in µg/mL
		5.50E + 00

Data Entry by: <i>Jay Hammett</i>	Date: 27-Aug-94
Approved by: <i>RW Schroeder</i>	Date: 8-29-94

Serial No R 5596.-5826	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:48	Priority 26
Determination TOC	Method Standard LA-344-105	Result Units ug C/ML	Charge Code KED4Y	Reruns 0
Sample Size 2 mL - .200ML - .200ML			Customer ID SAMPLE	
Remarks Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-081, REV. 0 4.48E+02 ug C/mL				
Analyst - 1 <i>P. McCown</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/26/94	Time Completed 1500	Lab Unit Mgr <i>RW Schroeder</i>	8-29-94 <i>Jay Hammond</i>	

54-6800-061 R-10 831

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 TOC: LA-344-105 (B-2)3 ^{RUS} 11-2-94 LIQUIDS

		DUPLICATE
Type	Sample Volume in mL (SS)	2.000
DUPLICATE	H2SO4 Volume in mL (VR)	0.200
Work List	Volume Injected in mL (VI)	0.200
4318	Dilution Factor (DF)	1.1
Test Code	Digest Dilution Factor (DDF)	1
TOC	ug of Carbon in Sample (C1)	85.9
Matrix	ug of Carbon in Blank (C2)	4.4
LIQUID	g of Carbon/L =	4.48E-01
Sample #		
R5596-5826		
Instrument Code		
AL-10723		
Analyst		
P McCOWN		
Date		
08/26/94		
Time		
15:00		

ug Carbon/mL =		4.48E+02	DETECTION LEVEL
			in ug/mL
			5.50E+00

Data Entry by: <i>Jay Hammond</i>	Date: 27-Aug-94
Approved by: <i>RW Schroeder</i>	Date: 8-29-94

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

Serial No R 5596-5926	Sample Point TK-3-1	Date 8-22-94	Time Issued 19:43	Priority 25
Determination TOC	Method Standard LA-344-105	Result Units RECOVERY	Charge Code K324X	Reruns 0
Sample Size .400ML - .200mL + .400mL SPIKE			Customer ID SAMPLE	
Remarks Calculations Results SAMPLE SPIKED ID R 5596-5726 SPIKE ID 11N12D SPIKE VOLUME .400 ML WHC-SD-WM-DP-081, REV. 0 96.1% Recovery				
Analyst - 1 P. McCown	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/26/94	Time Completed 1500	Lab Unit Mgr: 8-29-94 RW Schroeder		

TOC: LA-344-105 (B-2)-3 RWS 11-8-94 LIQUIDS		SPIKE
Type	Sample Volume in mL (SS)	0.400
SPIKE	H2SO4 Volume in mL (VR)	0.200
Work List	Volume Injected in mL (VI)	0.200
4318	Dilution Factor (DF)	2.5
Test Code	Digest Dilution Factor (DDF)	1
TOC	µg of Carbon in Sample (C1)	97.5
Matrix	µg of Carbon in Blank (C2)	4.4
LIQUID	g of Carbon/L =	1.16E+00
Sample #		
R5596-5926	g of Carbon/L =	$\frac{(C1-C2) \cdot DF \cdot DDF}{VI \cdot 1000}$
Instrument Code		
AL-10723		
Analyst	µg of Carbon/mL =	g of Carbon/L * 1000000 µg/g / 1000 mL/L
P McCOWN		
Date		
08/26/94	Detection Level (µg/mL) =	$\frac{1 \mu g C \cdot DF \cdot DDF}{VI}$
Time		
15:00		

$$\left[(97.5 - 4.4) \left(\frac{1.2 + 4.4}{2} \right) \right] - \left[(85 - 4.4) \left(\frac{1.2 + 2}{2} \right) \left(\frac{.400}{2} \right) \right] = 288.18 \mu g C$$

$$(750 \mu g/mL) \left(\frac{.400 mL}{1000} \right) = 300 \mu g C \quad SPIKE VALUE \quad \left(\frac{288.18 \times 100}{300} \right) = 96.1\%$$

µg Carbon/mL =	1.16E+03	DETECTION LEVEL
		in µg/mL
		1.25E+01

Data Entry by: P. McCown	Date: 27-Aug-94
Approved by: RW Schroeder	Date: 8-29-94

Serial No R5596-5726	Sample Point TR 1-1	Date 8-29-94	Time Issued 1:10	Priority 23
Determination TOC	Method Standard LA-344-105	Result Units % RECOVERY	Charge Code REC-1X	Repeats 1
Sample Size -400ML - .200ML + .400ML SPIKE			Customer ID 545000	
Remarks, Calculations, Results ANALYST: P. McCOWN INSTRUMENT: AL-10723 VOLUME: .400ML Spike duplicate WHC-SD-WM-DP-081, REV. 0 94.9 % Recovery				
Analyst - 1 <i>P. McCOWN</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/26/94	Time Completed 1500	Lab Unit Mgr <i>R. Schneider</i>	<i>8-29-94</i> <i>Sam Hamm</i>	

54-5800-061 (R-10 83)

TOC: LA-344-105 (B-2) 3 ^{Res} LIQUIDS		DUPLICATE SPIKE
Type	Sample Volume in mL (SS)	0.400
DUPLICATE SPIKE	H2SO4 Volume in mL (VR)	0.200
Work List	Volume Injected in mL (VI)	0.200
4318	Dilution Factor (DF)	2.5
Test Code	Digest Dilution Factor (DDF)	1
TOC	µg of Carbon in Sample (C1)	97.2
Matrix	µg of Carbon in Blank (C2)	4.4
LIQUID	g of Carbon/L =	1.16E+00
Sample #	g of Carbon/L = $\frac{(C1-C2) \cdot DF \cdot DDF}{VI \cdot 1000}$	
R5596-5926	0	
Instrument Code	AL-10723	
Analyst	P McCOWN	
Date	08/26/94	
Time	15:00	

$$\begin{aligned}
 \text{Detection Level } (\mu\text{g/mL}) &= \frac{1 \mu\text{g C} \cdot DF \cdot DDF}{\left[(97.2 - 4.4) \left(\frac{.2 + .4}{.2} \right) \right] - \left[(85.9 - 4.4) \left(\frac{.2 + .2}{.2} \right) \left(\frac{.400}{.2} \right) \right]} = 284.7 \mu\text{g C} \\
 (750 \mu\text{g C/mL SPIKE} \times .400) &= 300 \mu\text{g C SPIKE VALUE} \quad \frac{(284.7 \times 100)}{300} = 94.9\% \text{ Rec}
 \end{aligned}$$

µg Carbon/mL =	1.16E+03	DETECTION LEVEL in µg/mL
		1.25E+01

Data Entry by: <i>Sam Hamm</i>	Date: 27-Aug-94
Approved by: <i>R. Schneider</i>	Date: 8-29-94

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

Serial No R 5597-5726	Sample Point TK-9-1	Date 6-22-94	Time Issued 13:50	Priority 26
Determination TOC	Method Standard LA-344-105	Result Units ug C/ML	Charge Code HEC4X	Reruns 0
Sample Size <i>plm</i> 7/8/26/94 2ML-.200ML-.200ML			Customer ID TRIP BLK	
Remarks Calculations Results WHC-SD-WM-DP-081, REV. 0 7.15 ug C/mL				
Analyst - 1 <i>P. McCown</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/26/94	Time Completed 1500	Lab Unit Mgr <i>RW Schroeder</i>	8-29-94 <i>Paul Hammett</i>	

54-6800-061 (R 10 83)

BEST AVAILABLE COPY

TOC: LA-344-105 (B-2) <i>3</i> <i>Res</i> <i>use it</i> LIQUIDS		TRIP BLANK
Type	Sample Volume in mL (SS)	2.000
TRIP BLANK	H2SO4 Volume in mL (VR)	0.200
Work List	Volume Injected in mL (VI)	0.200
4318	Dilution Factor (DF)	1.1
Test Code	Digest Dilution Factor (DDF)	1
TOC	ug of Carbon in Sample (C1)	5.7
Matrix	ug of Carbon in Blank (C2)	4.4
LIQUID	g of Carbon/L =	7.15E-03
Sample #	g of Carbon/L = $\frac{(C1-C2) \cdot DF \cdot DDF}{VI \cdot 1000}$	
R5597-5726		
Instrument Code		
AL-10723		
Analyst	ug of Carbon/mL = g of Carbon/L * 1000000 ug/g / 1000 mL/L	
P McCOWN		
Date	Detection Level (ug/mL) = $\frac{1 \text{ ug C} \cdot DF \cdot DDF}{VI}$	
08/26/94		
Time		
15:00		

ug Carbon/mL = 7.15E + 00	DETECTION LEVEL
	in ug/mL
	5.50E + 00

Data Entry by: <i>Paul Hammett</i>	Date: 27-Aug-94
Approved by: <i>RW Schroeder</i>	Date: 8-29-94

Serial No R 5598.-5526	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:51	Priority 26
Determination TOC	Method-Standard LA-344-105	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? .200ML - 2ML - .200ML			Customer ID STD	
Remarks Calculations Results 5856 COSTOC STD# 10N12-D RESULT 3.01 STD VAL 3.00 %REC 100.3 WHC-SD-WM-DP-081, REV. 0				
Analyst - 1 <i>Patrick S. McCown</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8/26/94	Time Completed 1500	Lab Unit Mgr 8-29-94 <i>RW Schroeder</i>	<i>D. Hammitt</i>	

54-6800-051 (R-10-83)

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TOC: LA-344-105 (B-2) ^{RWS} ₁₁₋₃₋₉₄ LIQUIDS

		STANDARD
Type	Sample Volume in mL (SS)	0.200
STANDARD	H2SO4 Volume in mL (VR)	2.000
Work List	Volume Injected in mL (VI)	0.200
4318	Dilution Factor (DF)	11
Test Code	Digest Dilution Factor (DDF)	1
TOC	µg of Carbon in Sample (C1)	59.1
Matrix	µg of Carbon in Blank (C2)	4.4
LIQUID	g of Carbon/L =	3.01E+00
Sample #		
R5598-5526		
Instrument Code		
AL-10723		
Analyst		
P McCOWN		
Date		
08/26/94		
Time		
15:00		

$$\text{g of Carbon/L} = \frac{(C1 - C2) \cdot DF \cdot DDF}{VI \cdot 1000}$$

$$\mu\text{g of Carbon/mL} = \text{g of Carbon/L} \cdot 1000000 \mu\text{g/g} / 1000 \text{ mL/L}$$

$$\text{Detection Level } (\mu\text{g/mL}) = \frac{1 \mu\text{g C} \cdot DF \cdot DDF}{VI}$$

$\mu\text{g Carbon/mL} =$	3.01E+03	DETECTION LEVEL
		in $\mu\text{g/mL}$
		5.50E+01

Data Entry by: <i>D. Hammitt</i>	Date: 27-Aug-94
Approved by: <i>RW Schroeder</i>	Date: 8-29-94

WHC-SD-WM-DP-081, REV. 3

TGC- TOTAL ORGANIC CARBON ANALYSIS METHOD
TICTEC REV 3.0

Order #5574-5525

Date: 09/26/94

Lab # 1111

Sample Size = 200 mL

Analyst: J. McLean

Dil Factor = 11

File # 1111

Blank Value = 0.00

File # 1111

Blank Value = 0.00 ug/minute C

% Difference = 10

== Reading ==	Analysis Time ==	Concentration ==	% Difference ==
1	0.51	0.50	0.00
2	1.51	18.50	75.00
3	1.51	48.50	20.00
4	2.01	32.50	7.50
5	2.51	54.50	3.50
6	3.01	51.50	2.50
7	3.51	56.00	0.71
8	4.01	56.00	1.00
9	4.50	57.50	1.50
10	5.00	67.50	2.50
11	5.50	51.50	0.50
12	6.00	51.50	1.00
13	6.51	56.00	1.50
14	7.00	56.00	1.00

BEST AVAILABLE COPY

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 168 TO 176.

SAMPLE VALUE = 4.4 mg/L organic carbon

IF ALL SAMPLES = 4.4 mg/L organic carbon

File # 1111

SAMPLE RESULTS:

(50 = 4.400000 (1111) (200)

4.400000 (1111) (200)

(50 = 4.400000 (1111) (200) (1111)

4.400000 (1111) (200) (1111)

Sample # 1111

Patricia J. McLean 9/26/94

WHC-SD-WM-DP-081, REV. 0

TOL- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: R5395-5425

Date: 10/26/74

Time: 12:13:14

Sample Size = 200 uL

Dil Factor = 1

Blank ID # = BLANK

Blank Value = .6282318 ug/minute C

Analyst: PG MCCOWH

Min Readings = 14

Max Readings = 14

% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.10	0.00
2	1.01	0.70	85.71
3	1.51	1.40	50.00
4	2.01	1.60	12.50
5	2.51	2.10	23.81
6	3.01	2.30	8.70
7	3.51	2.70	14.61
8	4.01	2.00	10.00
9	4.51	1.00	2.00
10	5.01	1.50	5.01
11	5.51	3.00	10.00
12	6.01	4.20	11.11
13	6.51	4.40	4.55
14	7.00	4.20	1.8

BEST AVAILABLE COPY

BLANK VALUE = 4.4 micrograms carbon

BLANK FACTOR = $4.4 / 7.003784 =$

$+6.2E-01$ ug/min Carbon

SAMPLE RESULTS:

(4.8 - 4.40069)(1)/(200) =

< 5.00 E-3 g/L Carbon

(4.9 - 4.40069)(1)/(200)(12) =

< 4.17 E-4 Molar Carbon

Sample Run By:

Patricia J. McCowh
PG MCCOWH

10000

WHC-SD-WM-DP-081, REV. 0

TITLE: ANALYTICAL ORGANIC CARBON ANALYSIS REPORT

TITLE REV: 2.0

<<< BLANK ANALYSIS >>>

Sample: BLANK

Date: 08/27/97

Time: 12:11:00

Sample Size = 200 µL

Dil Factor = 1

Blank To B = BLANK

Blank Value = 0.00

Analyst: J. J. C. H.

Min Readings = 14

Max Readings = 14

1.0 Difference = 1.0

== Reading ==	Analysis	Time ==	Coulometer	== % Difference ==
1	0.51		0.10	0.00
2	1.01		0.60	83.33
3	1.50		1.10	75.00
4	2.00		1.60	25.00
5	2.50		1.90	24.00
6	3.00		2.20	13.33
7	3.50		2.50	14.29
8	4.00		2.80	10.00
9	4.50		3.10	11.11
10	5.00		3.40	12.00
11	5.50		3.70	13.33
12	6.00		4.00	15.00
13	6.50		4.30	16.92
14	7.00		4.60	18.57

BEST AVAILABLE COPY

ALPHABETICALLY = 0.00 (unpublished) (unpublished)

ANALYTICAL FACTOR = 1.00 (unpublished) (unpublished)

ANALYTICAL FACTOR = 1.00 (unpublished) (unpublished)

Sample Size: 0.00

Patricia L. McLowry
Patricia L. McLowry

WHC-SD-WM-DP-081, REV. 0

TCC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TIC1000 REV 2.0

Sample: R5596-5726 Date: 08/26/94 Time: 13:23:51
Sample Size = 200 uL Analyst: PJ McCOWN
Dil Factor = 1.1 Min Readings = 14
Blank ID # = BLANK Max Readings = 14
Blank Value = .6282318 ug/minute C % Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.80	0.00
2	1.01	49.00	98.37
3	1.51	66.10	25.87
4	2.00	73.50	10.07
5	2.50	77.80	5.53
6	3.00	79.50	2.14
7	3.50	81.40	2.33
8	4.00	82.10	0.85
9	4.50	82.60	0.61
10	5.00	83.10	0.60
11	5.50	83.70	0.71
12	6.00	84.10	0.48
13	6.50	84.50	0.47
14	7.00	85.00	0.5

BEST AVAILABLE COPY

BLANK VALUE = 4.4 micrograms carbon
BLANK FACTOR = 4.4 / 7.003764 = +5.5E-01 ug/min Carbon

GATTLE RESULTS:
(85 - 4.399502)(1.1)/(200) = +4.43E-01 g/L Carbon
(85 - 4.399502)(1.1)/(200)(12) = +5.67E-02 Molar Carbon

Sample Run By:

Patricia J. McCown
PJ MCCOWN

00000

WHC-SD-WM-DP-081, REV. 0

TCD- Total Organic Carbon Analyzer
TICTOC REV 2.0

Sample: K5510-5026

Date: 08/26/94

Time: 13:00:41

Sample Size = 200 uL

Dil Factor = 1.1

Blank TO C = 0.000

Blank Value = .0282318 ug/minute C

Anal. St #: 10 P100.11

Min Readings = 14

Max Readings = 14

% Difference = 10

Reading	Analysis	Time	Coulometer	% Difference
1	0.51	0.20	0.00	
2	1.01	42.10	42.31	2.31
3	1.51	63.90	64.12	2.12
4	2.01	75.00	75.47	2.47
5	2.51	77.50	77.81	2.81
6	3.01	79.70	80.04	3.04
7	3.51	81.70	82.11	3.11
8	4.01	82.40	82.85	3.85
9	4.51	84.2	84.51	3.51
10	5.01	85.70	86.01	3.01
11	5.51	87.20	87.51	3.51
12	6.01	88.70	89.01	3.01
13	6.51	89.11	89.41	3.41
14	7.01	90.51	90.81	3.81

BEST AVAILABLE COPY

BLANK VALUE = 4.4 ug inorganic carbon

BLANK FACTOR = 4.4 / 7.003784 =

BLANK = 1.0 ug inorganic carbon

SAMPLE RESULTS:

1.5519 = 4.900115 ((1.137/2.00) =

10.4484 ug inorganic carbon

1.5519 = 4.900115 ((1.137/2.00)/(1.1) =

9.4985 ug inorganic carbon

Sample Run By:

Patricia J. McCown
PI 1011

WHC-SD-WM-DP-081, REV. 0

TOL- TOTAL ORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: 25576-3726

Date: 06/28/94

Time: 13:45:25

Sample Size = 200 uL

Dil Factor = 2.5

Blank ID # = BLANK

Blank Value = .6282318 ug/minute L

Analyst : PJ MCCOWN

Min Readings = 14

Max Readings = 14

% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.20	0.00
2	1.01	50.50	99.60
3	1.51	74.00	31.76
4	2.01	84.60	12.53
5	2.51	89.60	5.58
6	3.01	92.00	2.61
7	3.51	93.30	1.39
8	4.01	94.10	0.85
9	4.51	94.90	0.64
10	5.01	95.80	0.44
11	5.51	96.20	0.42
12	6.01	96.60	0.41
13	6.51	97.10	0.51
14	7.00	97.50	0.41

BEST AVAILABLE COPY

BLANK VALUE = 4.4 micrograms carbon
BLANK FACTOR = 4.4 / 7.003784 =

+6.2E-01 ug/min Carbon

SAMPLE RESULTS:

(97.5 - 4.40069) (2.5) / (200) =
(97.5 - 4.40069) (2.5) / (200) (12) =

+1.18E+00 g/L Carbon
+5.70E-02 Molar Carbon

Sample Run by:

PJ McCown
PJ MCCOWN

0000

WHC-SD-WM-DP-081, REV. 0

TIC- TOTAL OBTAINED LABOUR ANALYSIS REPORT
TICROC REV 2.0

Sample P-390-3F26

Date: 03/28/79

Time: 10:11:27

Sample Size = 200 GL

Oil Factor = 2.5

Blank 12 % = BLANK

Blank Value = .6232318 ug/minute C

Analyst: P. H. McOWEN

Min Reading = 14

Max Reading = 10

% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.30	0.00
2	1.01	50.60	99.41
3	1.51	73.30	30.97
4	2.01	83.30	12.01
5	2.51	88.60	5.95
6	3.01	91.00	2.61
7	3.51	93.40	2.57
8	4.01	93.70	0.31
9	4.51	94.80	0.10
10	5.01	95.00	0.00
11	5.51	95.10	0.11
12	6.01	96.30	0.50
13	6.51	96.70	0.40
14	7.00	97.10	0.40

BEST AVAILABLE COPY

BLANK VALUE = 4.4 micrograms carbon

BLANK FACTOR = 4.4 / 7.003734 =

+6.2E-01 0.00000000

SAMPLE RESULTS:

97.2 = 4.400632 (2.5)/(200) =

+1.1E-06 0.00000000

97.2 = 4.400632 (2.5)/(200)(12) =

+1.1E-06 0.00000000

Sample Run By:

Patricia J. McCown
P. H. McOWEN

WHC-SD-WM-DP-081, REV. 0

TOC - TOTAL ORGANIC CARBON ANALYSIS REPORT TICTOC REV 2.0

Sample: R5597-5726 Date: 08/26/94 Time: 14:07:22

Sample Size = 200 uL Analyst : PJ MCCOWN
Dil Factor = 1.1 Min Readings = 14
Blank ID # = BLANK Max Readings = 14
Blank Value = .6282318 ug/minute C % Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.30	0.00
2	1.01	1.10	72.73
3	1.51	1.70	35.29
4	2.01	2.30	26.07
5	2.51	2.70	14.81
6	3.01	3.10	12.90
7	3.51	3.50	11.43
8	4.01	3.80	7.89
9	4.51	4.10	7.33
10	5.01	4.80	14.58
11	5.51	4.30	0.00
12	6.01	5.20	7.69
13	6.51	5.40	6.70
14	7.00	5.70	5.20

BEST AVAILABLE COPY

BLANK VALUE = 4.4 micrograms carbon
BLANK FACTOR = $4.4 / 7.003764 = 6.282318 \times 10^{-4}$ ug/min carbon

SAMPLE RESULTS:
 $(5.7 - 4.400652) (1.1) / (200) = 7.1 \times 10^{-3}$ g/L Carbon
 $(5.7 - 4.400652) (1.1) / (200) (12) = 6.0 \times 10^{-4}$ Molar Carbon

Sample Run by

PJ McCown
PJ MCCOWN

06000

WHC-SD-WM-DP-081, REV. 0

TGC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TGCDC REV 2.0

Sample: P539a-153a

Date: 08/26/99

Time: 13:15:41

Sample Size = 20.0 UL

Dil Factor = 11

Blank ID # = BLANK

Blank Value = .6282318 ug/minute C

Analyst = PJ BLUM

Pin Reading = 1

Gas Reading = 1

% Difference = 1

== Reading ==	Analysis Time ==	Coulometer ==	% Difference ==
1	0.51	0.80	0.00
2	1.01	32.00	97.50
3	1.51	44.50	98.40
4	2.00	49.90	10.00
5	2.50	53.10	6.00
6	3.00	54.61	2.75
7	3.50	55.90	2.11
8	4.01	56.40	1.00
9	4.50	57.30	1.00
10	5.00	57.80	0.80
11	5.50	57.90	0.00
12	6.00	58.00	0.00
13	6.50	58.00	0.00
14	7.00	58.00	0.00

BEST AVAILABLE COPY

BLANK VALUE = 4.4 micrograms carbon

% BLANK FACTOR = 4.4 / 2.000000 =

SAMPLE RESULTS:

% TGC = 4.400000 / (11) / (20.0) =

% TGC = 4.400000 / (11) / (20.0) =

* TGC = 4.400000 / (11) / (20.0) =

Sample Run By:

Robert J. McCown

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No.

R5594 - R5598

Customer ID:

Sample TK-9-1

Analysis:

DSC

Sample Prep:

Direct

Instrument:

WC 16134, WC 16129

Procedure/ Rev:

LA-514-113 & 1

Technologist:

K.L. Vogel

Date:

LA 12-34-94
10/25/94 6-9-94

Starting Time:

9/9/94

Temperature

25

Ending Time:

9/9/94

Chemist:

J. Frye

Comments:

Jann Frye for K.L. Vogel 10/25/94

	Description	Lab ID
1	LMCS STD	R5594-5511
2	Sample	R5596-5711
3	Dup	R5596-5811
4	Sample	R5597-5711
5	Dup GMF 10/25/94	R5597-5711
6	Sample STD	R5598-5711
7		5511
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	12N14A 6.712mg			

WHC-SD-WM-DP-081, REV. 0

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - DIRECT

Burch 4317

Serial No R 5594.-5511	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:47	Priority 26
Determination DSC	Method Standard LA-514-113	Result Units % RECOVERY	Charge Code RB24X	Reruns 0
Sample Size 6.712			Customer ID STD	
Remarks Calculations Results <i>Indium #12N14A Result: 27.98/g</i> <i>Value: 28.458/g</i> <i>% Recovery: 98.1%</i>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 <i>[Signature]</i> Hrs
Date 9/9/94	Time Completed 0630	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10 83)

Serial No R 5596.-5511	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:48	Priority 26
Determination DSC	Method Standard LA-514-113	Result Units EXOTHERMS	Charge Code RB24X	Reruns 0
Sample Size 9.655 mg			Customer ID SAMPLE	
Remarks Calculations Results <i>No exotherms,</i>				
Analyst - 1 <i>[Signature]</i> Hrs	Analyst - 2 Hrs	Analyst - 3 Hrs	Analyst - 4 <i>[Signature]</i> Hrs	Analyst - 5 Hrs
Date 9/9/94	Time Completed 0630	Lab Unit Mgr <i>[Signature]</i>	<i>[Signature]</i>	

54-6800-061 (R-10 83)

DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - DIRECT

Serial No	Sample Point	Date	Time Issued	Priority
R 5596.-5811	TK-9-1	6-22-94	19:48	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
DSC	LA-514-113	EXOTHERMS	KE24X	0
Sample Size	Customer ID			
10.280	SAMPLE			
Remarks Calculations Results				
DUPLICATE SAMPLE No exotherm				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>			<i>[Signature]</i>	
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
9/9/94	0630	<i>[Signature]</i>	<i>[Signature]</i>	

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

Serial No	Sample Point	Date	Time Issued	Priority
R 5597.-5711	TK-9-1	6-22-94	19:50	26
Determination	Method-Standard	Result Units	Charge Code	Reruns
DSC	LA-514-113	EXOTHERMS	KE24X	0
Sample Size	Customer ID			
9.764 mg	TRIP BLK			
Remarks Calculations Results				
No exotherms				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
<i>[Signature]</i>			<i>[Signature]</i>	
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
9/9/94	0630	<i>[Signature]</i>	<i>[Signature]</i>	

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

WHC-SD-WM-DP-081, REV. 0
DIFFERENTIAL SCANNING CALORIMETRY ANALYSIS - DIRECT

Serial No R 5598-5511	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:51	Priority 26
Determination DEC	Method-Standard LA-514-113	Result Units % RECOVERY	Charge Code KL24X	Reruns 0
Sample Size 6.712 mg			Customer ID STD	
Remarks Calculations. Results Indium #72N14A Result: 27.49/g Value: 28.452/g % Recovery: 96.3% W.P.# 7463				
Analyst	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 9/9/94	Time Completed 0630	Lab Unit Mgr

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

DSC STD

6.712 mg

Rate: 10.0 °C/min

File: 00039.001 DSC METTLER 08-Sep-94

Ident: 0.0 222-S Laboratory

exo

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT
COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 181 TO 185.

Revised 9/9/94

R5596-5711

9.655 mg

Rate: 10.0 °C/min

File: 00040.001 DSC METTLER 08-Sep-94

Ident: 0.0 222-S Laboratory

WHC-SD-WM-DP-081, REV. 0

R5596-5811

10.280 mg

Rate: 10.0 °C/min

File: 00041.001

Ident: 0.0

DSC METTLER 08-Sep-94

222-S Laboratory

exo >

50. mW

Integration
Delta H 18150 mJ
Peak 103.8 °C
-112.0 mW

WHC-SD-WM-DP-081, REV. 0

100. 200. 300. 400. °C

R5597-5711

9.764 mg

Rate: 10.0 °C/min

File: 00042.001 DSC METTLER 08-Sep-94

Ident: 0.0 222-S Laboratory

exo >

50. mW

184

Integration
Delta H18337 mJ
1878.0 J/g
Peak 108.8°C
-106.1 mW

WHC-SD-WM-DP-081, REV. 0

°C

400.

300.

200.

100.

DSC STD

6.712 mg

Rate: 10.0 °C/min

File: 00043.001 DSC METTLER 08-Sep-94

Ident: 0.0 222-S Laboratory

exo >

5. mW

185

Integration
Delta H 184 mJ
27.4 J/g
Peak 160.0 °C
-8.1 mW

WHC-SD-WM-DP-081, REV. 0

120.

140.

160.

180. °C

Handwritten: 9/9/94

THE FOLLOWING ANALYSES ARE INCLUDED IN THE DATA PACKAGE BUT THE RESULTS HAVE NOT BEEN REPORTED IN THE FINAL SUMMARY REPORTS.

WESTINGHOUSE HANFORD COMPANY

WHC-SD-WM-DP-081, REV. 0

222-S LABORATORY

ANALYTICAL BATCH

9-1

Lab Segment Serial No.
R5594 - R5598

Customer ID:
SAMPLE, TRIP BLK

Analysis:
OH-

Sample Prep:
DIRECT

Instrument:

Procedure/ Rev: LA-211-102/B-1

Technologist: RA GREEN *Rae Ann Green*

Date: 08/27/94

Starting Time: 08:30

Temperature 22 **OUT FOR RERUN**

Ending Time: 13:00

Chemist: R.W. SCHROEDER

Comments: *Batch 4319*

Rerun - Possible tech error

	Description	Lab ID
1	LMCS STANDARD	R5594.-5529
2	REAGENT BLANK	R5595.-5629
3	SAMPLE	R5596.-5729
4	DUPLICATE SAMPLE	R5596.-5829
5	SAMPLE SPIKED	R5596.-5929
6	DUPLICATE SPIKED	R5596.-5929
7	SAMPLE (TRIP BLANK)	R5597.-5729
8	LMCS STANDARD	5598.-5529
9		
10		

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

**DATA
NOT USED
IN PACKAGE**

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
ITS--OH	21N8-B/.050			

[illegible]

NO SPECIAL PROBLEMS / METHOD VARIATIONS IN THIS BATCH

NARRATIVE -- LIST SPECIFIC PROBLEMS / VARIATIONS FOR THIS BATCH
This batch needs to be re-analyzed due to poor spike recoveries. Unknown
analysis error. Rw Schroeder 10-24-94

1916 M HNO₃ Batch 4319

Se. No	Sample Point	Date	Time Issued	Priority
LA-211-102	TK-2-1	8-27-94	10:47	16
Determination	Method Standard	Result Units	Charge Code	Reruns
OH	LA-211-102	PERCENT	NBOK	0
Sample Size	Customer IO			
100ml	STD			
Remarks Calculations Results				
100% OH 2108-8 PERCENT 9.24E-1 STD VAL 9.39E-1 M PERCENT 98.72 WHC-SD-WM-DP-081, REV. 0 OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit No		
8-27-94	12:45	9-1-94		
		Rw Schneider		

54-6800-061 • R 10 831

LA-211-102 B-1 OH (AUTO)

	STANDARD
Type	Sample Size (mL) SS
STANDARD	0.050
Work List	Concentration of HNO ₃ (Molarity)
4319	0.1916
Test Code	HNO ₃ Titrant at OH end-point in mL
OH-	0.241
Matrix	Dilution Factor DF
LIQUID	1
Sample #	Concentration of OH in Sample (Molarity)
R5594-5529	9.24E-01
Instrument Code	OH in Sample in µg/mL (PPM)
	1.57E+04
Analyst	
R GREEN	
Date	
08/27/94	
Time	
1300	

OH Molarity = ((mL HNO ₃) * (M HNO ₃)) / Sample Size in mL * Dilution Factor	
OH in µg/mL = (OH Molarity) * (17.0 g/mole) * ((1000000 µg/g) / (1000 mL/L))	

	STANDARD
Concentration of OH in Sample (Molarity)	9.24E-01
OH in Sample in µg/mL (PPM)	1.57E+04

Data Entry by:	<i>Rae Ann Green</i>	Date:	27-Aug-94
Approved by:	<i>Rw Schneider</i>	Date:	9-1-94

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

1916 M HNO₃

Serial No 15595-5629	Sample Point TR-2-1	Date 8-12-94	Time Issued 19:46	Priority 13
Determination A	Method Standard LA-211-102	Result Units mg/L	Charge Code KSD4K	Reruns 0
Sample Size 3 ml H ₂ O + 1 ml BaCl			Customer ID BLANK	
Remarks Calculations Results BLANK WHC-SD-WM-DP-081, REV. 0 <42 OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-27-94	Time Completed 10:45	Lab Unit Mgr R. Schneider

54-6200-061 R 10 831

LA-211-102 B-1 OH (AUTO)

Type	Sample Size (mL) SS	BLANK
BLANK	Concentration of HNO ₃ (Molarity)	3.000
Work List	HNO ₃ Titrant at OH end-point in mL	0.1916
4319	Dilution Factor DF	0.009
Test Code	Concentration of OH in Sample (Molarity)	1
OH-	OH in Sample in µg/mL (PPM)	5.75E-04
Matrix		9.77E+00
LIQUID		
Sample #	Detection Limit = 125 µg / SS * DF	
R5595-5629		
Instrument Code	Detection Limit (µg/mL)	4.17E+01
Analyst		
R GREEN	OH Molarity = ((mL HNO ₃)*(M HNO ₃))/Sample Size in mL*Dilution Factor	
Date		
08/27/94	OH in µg/mL = (OH MOLARITY)*(17.0 g/mole)*((1000000 µg/g)/(1000 mL/L))	
Time		BLANK
1300	Concentration of OH in Sample (Molarity)	5.75E-04
	OH in Sample in µg/mL (PPM)	<42

The Result is < Detection Limit

Data Entry by:		Date:	27-Aug-94
Approved by:		Date:	9-1-94

Form L1 Rev. 1.2 Page 1 of 1

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

.1916 M HNO₃

Serial No R5596-5729	Sample Point TK-9-1	Date 8-22-94	Time Issued 13:42	Priority 75
Determination OH LIO	Method Standard LA-211-102	Result Units mg/mL	Charge Code KBLAX	Reruns 0
Sample Size 1 ml			Customer ID SAMPLE	
Remarks Calculations, Results <p style="text-align: center;">WHC-SD-WM-DP-081, REV. 0</p> <p style="text-align: center;">7.20E+2 mg/mL</p> <p style="text-align: center;">OUT FOR RERUN</p> <p style="text-align: center;">Rae Ann Green</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-27-94 8-26-94	Time Completed 12:45	Lab Unit Mgr R. Schneider	<p style="text-align: center;">9-1-94</p> <p style="text-align: center;">R. Schneider</p>	

54-8800-061 (R-10-331)

LA-211-102 B-1 OH (AUTO)

		SAMPLE
Type	Sample Size (mL) SS	1.000
SAMPLE	Concentration of HNO ₃ (Molarity)	0.1916
Work List	HNO ₃ Titrant at OH end-point in mL	0.221
4319	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	4.23E-02
OH-	OH in Sample in µg/mL (PPM)	7.20E+02
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
R5596-5729		
Instrument Code	Detection Limit (µg/mL)	1.25E+02
Analyst		
R GREEN	OH Molarity = ((mL HNO ₃) * (M HNO ₃)) / Sample Size in mL * Dilution Factor	
Date	OH in µg/mL = (OH MOLARITY) * (17.0g/mole) * ((1000000µg/g) / (1000mL/L))	
08/27/94		
Time		
1300	Concentration of OH in Sample (Molarity)	4.23E-02
	OH in Sample in µg/mL (PPM)	7.20E+02

Data Entry by: <i>Rae Ann Green</i>	Date: 27-Aug-94
Approved by: <i>R. Schneider</i>	Date: 9-1-94

Form L1 Rev. 1.2

Page 1 of 1

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

1916 M HNO₃

Serial No 5503-5800	Sample Point TX-9-1	Date 6-20-94	Time Issued 13:40	Priority 03
Determination OH 110	Method Standard LA-211-102	Result Units UG/ML	Charge Code NEPAK	Reruns 0
Sample Size 1 ml			Customer ID SAMPLE	
Remarks Calculations Results DUPLICATE SAMPLE WHC-SD-WM-DP-081, REV. 0 7.36 ETZ OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-27-94	Time Completed 12:45	Lab Unit Mgr 9-1-94 Rw Schroeder		

54-6800-061 (R 10 93)

LA-211-102 B-1 OH (AUTO)		DUPLICATE
Type	Sample Size (mL) SS	1.000
DUPLICATE	Concentration of HNO ₃ (Molarity)	0.1916
Work List	HNO ₃ Titrant at OH end-point in mL	0.226
4319	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	4.33E-02
OH-	OH in Sample in µg/mL (PPM)	7.36E+02
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
R5596-5829		
Instrument Code	Detection Limit (µg/mL)	1.25E+02
Analyst		
R GREEN	OH Molarity = ((mL HNO ₃)*(M HNO ₃))/Sample Size in mL*Dilution Factor	
Date		
08/27/94	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
Time		
1300	Concentration of OH in Sample (Molarity)	4.33E-02
	OH in Sample in µg/mL (PPM)	7.36E+02

Data Entry by: <i>Ann Green</i>	Date: 27-Aug-94
Approved by: <i>Rw Schroeder</i>	Date: 9-1-94

Form L1 Rev. 1.2 Page 1 of 1

1916 M HNO₃

Serial No R 5596-5929	Sample Point TX-9-1	Date 8-28-94	Time Issued 12:45	Priority LR
Determination OH	Meth:1 Stan:3rd LA-661-102	Result Units % RECOVERY	Charge Code X824X	Reruns 0
Sample Size 1ml + .050ml spike			Customer ID SAMPLE	
Remarks Calculations Results Spike ID 21N8-B 69.8% OUT FOR RERUN Rae Ann Green				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-26-94	Time Completed 8-28-94 12:45	Lab Unit Mgr Rae Ann Green		

54-6800-061 (R 10 83)

WHC-SD-WM-DP-081, REV.0

LA-211-102 B-1 OH (AUTO)

		SPIKE
Type	Volume of Sample in Sample+Spike Aliquot in mL (VSS)	1.000
SPIKE	Volume of Sample in mL from Form 1 (VS)	1.000
Work List	Volume of Spike in mL (S)	0.050
4319	Sample+Spike Titrant Volume in mL (VSST)	0.392
Test Code	Sample Titrant Volume in mL from Form 1 (VST)	0.221
OH-	Concentration of HNO ₃ (titrant) in Molarity (MNO)	0.19160
Matrix	Book # of Spike Standard Used	21N8B
LIQUID	Concentration of Spike Standard (Molarity) True Value (MSS)	0.93900
Sample #	Analyzed Concentration of Spike (Molarity) (MOH)	6.55E-01
R5596-5929	% Spike Recovery	6.98E+01
Instrument Code		
Analyst		
R GREEN	MOH = ((VSST - VST) * MNO) / S	
Date	% Spike Recovery = MOH / MSS * 100	
08/27/94		
Time		
1300		
	Analyzed Concentration of Spike (Molarity)	6.55E-01
	% Spike Recovery	6.98E+01

Data Entry by: <i>Bing H. Green</i>	Date: 27-Aug-94
Approved by: <i>Rae Ann Green</i>	Date: 9-1-94

Form 2 Rev. 2.1 Page 1 of 1

1916 M HNO₃

Serial No.	Sample Point	Date	Time Issued	Priority
Determination	Method Standard	Result Units	Charge Code	Reruns
Sample Size 1ml + .050ml spike			Customer ID	
Remarks Calculations Results Spike duplicate ID 21N8-B 65.3% Rae Ann Green OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-27-94	Time Completed 12:45	Lab Unit Mgr RW Schneider	9-1-94	

54-6800-061 (R 10-83)

WHC-SD-WM-DP-081, REV. 0

LA-211-102 B-1 OH (AUTO)

		SPIKE
Type	Volume of Sample in Sample+Spike Aliquot in mL (VSS)	1.000
SPIKE	Volume of Sample in mL from Form 1 (VS)	1.000
Work List	Volume of Spike in mL (S)	0.050
4319	Sample+Spike Titrant Volume in mL (VSST)	0.386
Test Code	Sample Titrant Volume in mL from Form 1 (VST)	0.226
OH-	Concentration of HNO ₃ (titrant) in Molarity (MNO)	0.13160
Matrix	Book # of Spike Standard Used	21N8B
LIQUID	Concentration of Spike Standard (Molarity) True Value (MSS)	0.93900
Sample #	Analyzed Concentration of Spike (Molarity) (MOH)	6.13E-01
R5596-5929	% Spike Recovery	6.53E+01
Instrument Code		
Analyst		
R GREEN	MOH = ((VSST - VST) * MNO) / S	
Date		
08/27/94	% Spike Recovery = MOH / MSS * 100	
Time		
1300		
Analyzed Concentration of Spike (Molarity)		6.13E-01
% Spike Recovery		6.53E+01

Data Entry by: <i>Greg Hummer</i>	Date: 27-Aug-94
Approved by: <i>RW Schneider</i>	Date: 9-1-94

19116 M HNO₃

Serial No R 5597-5729	Sample Point TK-9-1	Date 8-22-94	Time Issued 19:50	Priority 28
Determination OH LIQ	Method Standard LA-211-102	Result Units ug/mL	Charge Code KE24X	Reruns 0
Sample Size 1 mL			Customer ID IRIP BLK	
Remarks Calculations, Results <div style="text-align: center;"> <p><125 ug/mL</p> <p>OUT FOR RERUN</p> <p>Rae Ann Green.</p> </div>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-28-94	Time Completed 12:45	Lab Unit Mgr Rae Ann Green	<div style="text-align: center;"> <p>9-1-94</p> <p>RW Schroeder</p> </div>	

WHC-SD-WM-DP-081, REV. 0

54-6800-061 R-10-831

LA-211-102 B-1 OH (AUTO)

		SAMPLE
Type	Sample Size (mL) SS	1.000
SAMPLE	Concentration of HNO ₃ (Molarity)	0.1916
Work List	HNO ₃ Titrant at OH end-point in mL	0.011
4319	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	2.11E-03
OH-	OH in Sample in ug/mL (PPM)	3.58E+01
Matrix		
LIQUID		
Sample #	Detection Limit = 125ug / SS * DF	
R5597-5729		
Instrument Code	Detection Limit (ug/mL)	1.25E+02
Analyst		
R GREEN	OH Molarity = ((mL HNO ₃) * (M HNO ₃)) / Sample Size in mL * Dilution Factor	
Date	OH in ug/mL = (OH MOLARITY) * (17.0g/mole) * ((1000000ug/g) / (1000mL/L))	
08/27/94		
Time		
1300	Concentration of OH in Sample (Molarity)	2.11E-03
	OH in Sample in ug/mL (PPM)	<125

The Result is < Detection Limit

Data Entry by: <i>Rae Ann Green</i>	Date: 27-Aug-94
Approved by: <i>RW Schroeder</i>	Date: 9-1-94

Form L1 Rev. 1.2 Page 1 of 1

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

1916 M HNO₃

Serial No S. 5598-5520	Sample Point K-9-1	Date 6-22-94	Time Issued 19:51	Priority C6
Determination OH	Method: Standard LA-211-102	Result Units % RECOVERY	Charge Code KED4K	Reruns 0
Sample Size - 050ml			Customer ID STD	
Remarks Calculations Results STD# 21N3-B RESULT 9.27E-1M STD VAL 9.39E-1M WREC 98.72 <div style="text-align: right; font-size: 1.2em;">OUT FOR RERUN</div>				
Analyst - 1 <i>Rae Ann Green</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 8-27-94	Time Completed 12:45	Lab Unit Mgr <i>R. Schneider</i>	<i>9-1-94</i> <div style="text-align: right;">54-6800-061 (R 10 83)</div>	

WHC-SD-WM-DP-081, REV. 0

LA-211-102 B-1 OH (AUTO)

		STANDARD
Type	Sample Size (mL) SS	0.050
STANDARD	Concentration of HNO ₃ (Molarity)	0.1916
Work List	HNO ₃ Titrant at OH end-point in mL	0.242
4319	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	9.27E-01
OH-	OH in Sample in µg/mL (PPM)	1.58E+04
Matrix		
LIQUID		
Sample #		
R5598-5529		
Instrument Code		
Analyst		
R GREEN	OH Molarity = ((mL HNO ₃)*(M HNO ₃))/Sample Size in mL*Dilution Factor	
Date		
08/27/94	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
Time		
1300	Concentration of OH in Sample (Molarity)	9.27E-01
	OH in Sample in µg/mL (PPM)	1.58E+04

Data Entry by: <i>[Signature]</i>	Date: 27-Aug-94
Approved by: <i>R. Schneider</i>	Date: 9-1-94

R5594-5529
 ibration data
 94-03-27
 9) 1 10.00
 9) 2 7.00
 1. 22.0 °C
 1.1 (rel) .974
 1.2 48.5 mV
 Electr. input 1
 =====

date 94-03-27 time 09:10
 GET pH 12 # 1
 Id.#1 5594
 Id.#2 .1916
 pH (init) 11.77
 V/mV pH
 EP1 .241 9.88
 EP2 .316 6.99
 stop volt. reached
 =====

R5596-5829
 date 94-03-27 time 12:27
 GET pH 12 # 21
 Id.#1 5596
 Id.#2 .1916
 pH (init) 11.49
 V/mV pH
 EP1 .236 8.53
 EP2 .500 4.00
 stop volt. reached
 =====

date 94-03-27 time 12:37
 GET pH 12 # 21
 .10ml/dio ΔpH=1/dio
 start V .000 ml

R5595-5629

date 94-03-27 time 11:5-
 GET pH 12 # 1
 Id.#1 5595
 Id.#2 .1916
 pH (init) 5.95
 V/mV pH
 EP1 .059 4.75
 stop volt. reached
 =====

date 94-03-27 time 11:54
 GET pH 12 # 18
 .10ml/dio ΔpH=1/dio
 start V .000 ml

R5594-5929

date 94-03-27 time 12:41
 GET pH 12 # 22
 Id.#1 5595
 Id.#2 .1916
 pH (init) 11.53
 V/mV pH
 EP1 .393 9.00
 EP2 .463 7.00
 EP3 .933 4.00
 stop volt. reached
 =====

date 94-03-27 time 12:41
 GET pH 12 # 22
 .10ml/dio ΔpH=1/dio
 start V .000 ml

R5596-5729

date 94-03-27 time 12:04
 GET pH 12 # 19
 Id.#1 5596
 Id.#2 .1916
 pH (init) 11.49
 V/mV pH
 EP1 .211 8.67
 EP2 .211 6.75
 EP3 .211 4.65
 stop volt. reached
 =====

date 94-03-27 time 12:07
 GET pH 12 # 19
 .10ml/dio ΔpH=1/dio
 start V .000 ml

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-081, REV. 0

ANALYTICAL BATCH

Lab Segment Serial No. R 5599, R 5597	Customer ID: TK-9-1
Analysis: Se	Sample Prep: ACID DIGEST

Instrument: PE2280(Hydride) WB27979	Procedure/ Rev: LA 365-131 / B-2
Technologist: <i>Daniel Massie</i>	Date: 10/19/94
Starting Time: 07:45	Temperature 975 C
Ending Time: 13:45	Chemist: RA Esch

Comments: BATCH #4323

OUT FOR RERUN

High RPD on matrix spike / spike duplicate

	Description	Lab ID
1	LMCS STD	R 5594-5596
2	DIGESTED LMCS STD	R 5595-8596
3	REAGENT BLANK	R 5594-5696
4	DIGESTED BLANK	R 5595-8696
5	SAMPLE	R 5599-8796
6	DUPLICATE SAMPLE	R 5599-8896
7	SPIKED SAMPLE	R 5599-8996
8	DUPLICATE SPIKED SAMPLE	R 5599-8096
9	TRIP BLANK	R 5597-8796
10	ENDING LMCS STD	R 5598-5596

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

DATA
NOT USED
IN PACKAGE

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	44N11A .250mL			
DIGESTED LMCS	44N11B DF = 4			
DIGESTED SPIKE	44N11B DF = 4			

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5594.-5596		Sample Point TK-9-1		Date 6-22-94	Time Issued 19:47	Priority 23
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY		Charge Code KB24X	Reruns 0	
Sample Size ? .500 ml				Customer ID STD		
Remarks Calculations Results EDP R743 SE/HYDRD STD# 44N11A RESULT 1.01-1 STD VAL 1.00-1 %REC 101.00% PKHT = .316 ng = 50.71 ng OUT FOR RERUN						
Analyst - 1 Valeio Massie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5		
Hrs	Hrs	Hrs	Hrs	Hrs		
Date 10-21-94	Time Completed 13:45	Lab Unit R026/54 10/26/94 R02		Signature D. Honaker		

54-6800-061 (R 10 83)

WHC-SD-WM-DP-081, REV. 0

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Type	Sample Size in mL SS	0.500	
STANDARD	Se ng (Nanograms)	50.71	
Work List	Conc Se µg/mL (or mg/L or PPM)	0.101	N/A
4323	Conc Se µg/L (PPB)	101.4	N/A
Test Code		N/A	
Se		N/A	
Matrix		N/A	
LIQUID	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)		
Sample #	Average Conc.=(Sample + Duplicate)/2		
R5594-5596	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Calibration Date			
10/21/94			
Instrument Code			
WB27979			
Analyst			
V. MASSIE			
Date		STANDARD	DUPLICATE
10/21/94	Conc Se µg/mL	1.01E-01	
Time		N/A	
01:45 PM		N/A	

Data Entry by: *D. Honaker* Date: 10/24/94
 Approved by: *R026* Date: 10/26/94
 Form 365131_1 Rev. 1.1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5594.-8596	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:47	Priority 23
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? 2.0 ml Acid dig DF=4			Customer ID STD	
Remarks, Calculations, Results EDP R744 SE/HYDRD 10^{-27-94} PKHT = .241 STD# 44N118 RESULT 1.99×10^{-2} ng = 39.72 ng STD VAL .100 %REC 19.9% OUT FOR REPT 10^{-27-94} $7.94 \times 10^{-2} \mu\text{g/mL}$ 79.4%				
Analyst - 1 <i>Calvin J. Massie</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 <i>MSD</i>
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-21-94	Time Completed 13:45	Lab Unit, Mgr <i>10-26-94</i>	<i>Detonaku</i>	

WHC-SD-WM-DP-081, REV. 0

Selenium : LA-365-131 (B-2) Se LIQUID-ACID DIGEST

	STANDARD	DUPLICATE
Type	2.000	
Sample Size in mL	SS	
STANDARD	Se ng (Nanograms)	39.72
Work List	Acid Digest Dilution Factor DF	4.0
4323	Conc Se $\mu\text{g/mL}$ (or mg/L or PPM)	0.079 N/A
Test Code	Conc Se $\mu\text{g/L}$ (PPB)	79.4 N/A
N/A		N/A
Matrix		N/A
LIQUID		N/A

Sample #	Conc Se $\mu\text{g/mL} = (\text{Se ng/SS}) \times (1 \mu\text{g}/1000 \text{ng}) \times \text{DF}$
R5594-8596	Average Conc. = (Sample + Duplicate)/2
Calibration Date	Relative % Difference = ((ABS(Sam.-Dup.))/Average Conc.)*100
10/21/94	
Instrument Code	
WB27979	
Analyst	

V MASSIE		
Date	STANDARD	DUPLICATE
10/21/94	Conc Se ($\mu\text{g/mL}$)	7.94E-02
Time		N/A
01:45 PM		N/A

Data Entry by: <i>Calvin J. Massie</i>	Date: 10/27/94
Approved by: <i>Calvin J. Massie</i>	Date: 10/27/94

WHC-SD-WM-DP-081, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
R 5595.-5696	TK-9-1	6-22-94	19:48	23
Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	KB24X	0
Sample Size	Customer ID			
? 2.0 ml	BLANK			
Remarks Calculations Results REAGENT BLANK PKHT = .005 ng = 3.68 ng OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Massie				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
10-21-94	13:45	10-26-94	D. Honaker	

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

Serial No	Sample Point	Date	Time Issued	Priority
R 5595.-8696	TK-9-1	6-22-94	19:48	23
Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	KB24X	0
Sample Size	Customer ID			
? 2.0 ml	BLANK			
Remarks Calculations Results REAGENT BLANK PKHT = -.014 ng = 2.36 ng OUT FOR RERUN				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie Massie				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
10-21-94	13:45	10-26-94	D. Honaker	

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

WHC-SD-WM-DP-081, REV. 0

Serial No	Sample Point	Date	Time Issued	Priority
R 5599.-8796	TK-9-1	6-22-94	19:52	23
Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	KB24X	0
Sample Size	Customer ID			
? 2.0 ml	SAMPLE			
Remarks, Calculations Results				
<p>PKHT = -.002 ng = 4.12 ng OUT FOR RERUN</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie L. Masie				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
10-21-94	13:45	Robert 10-26-94	D. Honaker	

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

Serial No	Sample Point	Date	Time Issued	Priority
R 5599.-8896	TK-9-1	6-22-94	19:52	23
Determination	Method Standard	Result Units	Charge Code	Reruns
Se	LA-365-131	uG/ML	KB24X	0
Sample Size	Customer ID			
? 2.0 ml	SAMPLE			
Remarks, Calculations Results				
<p>DUPLICATE SAMPLE</p> <p>PKHT = -.010 ng = 2.95 ng OUT FOR RERUN</p>				
Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Valerie L. Masie				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
10-21-94	13:45	Robert 10-26-94	D. Honaker	

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

WHC-SD-WM-DP-081, REV. 0

Serial No R 5599.-8996		Sample Point TK-9-1		Date 6-22-94	Time Issued 19:52	Priority 23
Determination Se	Method/Standard LA-365-131	Result Units % RECOVERY		Charge Code KB24X	Reruns 0	
Sample Size ? 2.0 ml				Customer ID SAMPLE		
Remarks Calculations Results SAMPLE SPIKED ID R5599 SPIKE ID 44N11B SPIKE VOLUME PKHT = .257 ng = 42.07 ng OUT FOR RERUN						
Analyst - 1 Valerie Masse		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 10-21-94		Time Completed 13:45		Lab Unit Mgr R. Decker 10/26/94		Signature D. Honaker

54-6800-061 (R 10 83)

Serial No R 5599.-8096		Sample Point TK-9-1		Date 6-22-94	Time Issued 19:52	Priority 23
Determination SE	Method/Standard LA-365-131	Result Units % RECOVERY		Charge Code KB24X	Reruns 0	
Sample Size ? 2.0 ml				Customer ID SAMPLE		
Remarks Calculations Results SAMPLE SPIKE R5599 DUPLICATE SPIKE ID 44N11B SPIKE VOL PKHT = .335 ng = 53.49 ng OUT FOR RERUN						
Analyst - 1 Valerie Masse		Analyst - 2		Analyst - 3		Analyst - 4
Hrs		Hrs		Hrs		Hrs
Date 10-21-94		Time Completed 13:45		Lab Unit Mgr R. Decker 10/26/94		Signature D. Honaker

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

WHC-SD-WM-DP-081, REV. 0

Serial No R 5597.-8796	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:50	Priority 23
Determination Se	Method-Standard LA-365-131	Result Units uG/ML	Charge Code KB24X	Reruns 0
Sample Size ? 2.0 ml			Customer ID TRIP BLK	
Remarks Calculations Results <div style="text-align: right;"> PKHT = 7.004 ng = 3.82 ng OUT FOR RERUN </div>				
Analyst - 1 <i>Calvin L. Meade</i>	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-21-94	Time Completed 13:45	Lab Unit <i>10/26/94</i>	<i>D. H. naker</i>	

54-6800-061 (R 10 83)

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

Serial No R 5598.-5596	Sample Point TK-9-1	Date 6-22-94	Time Issued 19:51	Priority 23
Determination Se	Method-Standard LA-365-131	Result Units % RECOVERY	Charge Code KB24X	Reruns 0
Sample Size ? .500 ml			Customer ID STD	
Remarks Calculations Results EDP R743 SE/HYDRD STD# 44N11A RESULT 1.20 ⁻¹ STD VAL 1.00 ⁻¹ %REC 120.00 ⁰ PKHT = .379 ng = 59.94 ng OUT FOR RERUN				
Analyst - 1 Valerie Masie	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 10-21-94	Time Completed 13:45	Lab Unit Mgr 10/26/94	D. Honaker	

54-6800-061 (R-10-831)

Selenium: LA-365-131 (B-2) Se LIQUIDS-DIRECT

		STANDARD	DUPLICATE
Type	Sample Size in mL SS	0.500	
STANDARD	Se ng (Nanograms)	59.94	
Work List	Conc Se µg/mL (or mg/L or PPM)	0.120	N/A
4323	Conc Se µg/L (PPB)	119.9	N/A
Test Code		N/A	
Se		N/A	
Matrix		N/A	
LIQUID	Conc Se µg/mL=(Se ng/SS)*(1µg/1000ng)		
Sample #	Average Conc.=(Sample + Duplicate)/2		
R5598-5596	Relative % Difference=((ABS(Sam.-Dup.))/Average Conc.)*100		
Calibration Date			
10/21/94			
Instrument Code			
WB27979			
Analyst			
V. MASSIE			
Date		STANDARD	DUPLICATE
10/21/94	Conc Se µg/mL	1.20E-01	
Time		N/A	
01:45 PM		N/A	

Data Entry by: <i>D. Honaker</i>	Date: 10/25/94
Approved by: <i>R. B. Smith</i>	Date: 10/26/94

E-201111 4323
 Jan 10/1/94

.379 59.94 ng .50ml direct LMCS-14N11A
 - .004 3.62 ng 2.0ml R5597
 .355 53.49 ng 2.0ml R5599 spike dup
 .257 42.07 ng 2.0ml R5599 spike
 - .010 2.95 ng 2.0ml R5599 dup
 .241 39.72 ng 2.0ml R5594 (digested)
 - .002 4.12 ng 2.0ml R5599
 - .014 2.36 ng 2.0ml R5595 (digested blank)
 - .005 3.66 ng 2.0ml direct blank R5595 (direct)
 .316 50.71 ng .50ml LMCS 44N11A R5594 (direct)
 .655 1.0ml 37N116 Cal std
 .312 .50ml 37N116 Cal std
 .128 .50ml 37N116 Cal std
 .006 .05 ml 37N116 Cal std
 - .013 0 ng

WHC-SD-WM-DP-081, REV. 0

13:45 10-21-94 Se Valerie Massie

BEST AVAILABLE COPY

Analyte: Se Analyst: Valerie Massie
 Date: 10-21-94 Start Time: 7:45 End Time: 13:45

MHS 20 Data:

Signal Concentration Purge 1 40 sec
 Mode PKHT Reaction 10 sec
 Recorder 103 Purge 2 40 sec
 Time 40 sec Temperature 975 C
 Expansion 10 FCL Power 9 Watts

Chart Recorder Data:

Chart speed 1 in/min Chart full scale 20 mV

Calibration Data:

Intercept -0.0301 absorbance units
 Slope 0.0063 abs units / concentration
 Correlation 0.9996 (unitless)

14: Intercept: -0.0301
 13: Slope: 0.0063
 12: 0.0063
 11: 50.7109
 10: 5.2771
 9: 14.7223
 8: 3.7584
 7: 4.1167
 6: 2.7217
 5: 3.0445
 4: 4.0588
 3: 15.4348
 2: 3.0236
 1: 50.7413