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START

Westinghouse Hanford Company

0020926

P.O. Box 1970 Richland, WA 99352

222-S/RCRA Analytical Laboratories

APPROVED FOR PUBLIC RELEASE
D. Berkland
4/10/92

Project:	Single-Shell Tank Waste Characterization
Tank:	241-U-110
Core:	12
Segment:	4
Customer Id. Number:	89-072
Report Revision:	2
Date Printed:	October 15, 1991

MAY 1992 RECEIVED EDMC

OCT 1991 RECEIVED DATA RECEIPT

Hanford Operations and Engineering Contractor for the US Department of Energy

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DATA SUMMARY CONTENTS

Title Page
Laboratory Review Sign-off Page
Introduction (narrative)
Sampling and Custody Data
Serial Numbers and Customer ID
Sample Data Summary
Physical Test Analysis
Undigested Sample Analysis Results
KOH Fusion Results
- Radionuclides-Wet Sample
- Radionuclides-Laboratory Digestions

Water Digestion Test Results
- Laboratory Results of Solids-Wet Sample
- Laboratory Results on Laboratory Digestion

Acid Digestion Test Results
- ICP Data Summary
- ICP Raw Data Summary
- ICP Raw Data (six pages)

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Note:

Only the ICP analytes which were within calibration limits are listed in the ICP Data Summary. The ICP Raw Data Summary and the ICP Raw Data pages contain the results of all ICP analytes.

9513325.2325

Acid Digestion Test Results.....131

ICP Data Summary.....132
Acid Digestion Analysis.....133
Inductively Coupled Plasma Spectrographic Analysis.....134
ICP Raw Data Summary.....135

Appendix A Analytical Analysis Cards.....170

Undigested Sample Analysis.....A1-A5
KOH Fusion Analysis.....A6-A20
Water Digestion Analysis.....A21-A39
Acid Digestion Analysis.....A40-A42

Appendix B Analytical Detection Limits.....171

Detection Limits by Procedure.....B1-B3

This report consists of pages 1-171, plus pages 124.1, 139.1, 139.2, and 144.1.
Appendix A consists of pages A1-A42, plus pages A6.1, A21.1, A40.1.
Appendix B consists of pages B1-B3.

NOTE:

Due to re-evaluation of ICP data the following pages have been revised: 12, 131, 132, and 133-139.2.

Due to re-evaluation of initial source data the following pages have been revised: 1-4, 6, 7, 23, 27-29, 31, 71, 72, 73, 75, 97, 131, 133, 137, 138, plus Appendix A, pages A7, A9, A11, and A13.

The following pages and Appendix B page 3 have been recopied to correct poor copy quality: 17, 20, 40-69, 125-130, and pages 145-152.

REVISION 2 OF CORE 12 SEGMENT 4

We have reviewed this report and certify that this data package meets the requirements of "Quality Assurance Project Plan for the Chemical Analysis of Highly Radioactive Samples in Support of Environmental Activities on the Hanford Site" - WHC-SD-CP-QAPP-002. This data package is a complete and accurate representation of the data generated from the requested laboratory analyses performed on this sample. This revision includes adjustments to prior reports based on a technical review of source data.

Larry P. Markel for Larry H. Taylor Date 10-22-91
Data Coordinator

Daniel M. Thornton Date 10-22-91
Daniel M. Thornton
Unit Manager

Larry P. Markel Date 10/21/91
Larry P. Markel
Laboratory Q.A. Officer

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INTRODUCTION

INTRODUCTION

Westinghouse Hanford Company 222-S/RCRA Analytical Laboratories are supporting the characterization efforts of the single shell tanks. The characterization of tank 241-U-110 was performed under Phase 1A and 1B of the Waste Characterization Plan for the Hanford Site Single-Shelled Tanks (WHC-EP-0210).

Tank 241-U-110 has a 500,000 gallon capacity; construction was completed in 1944. The tank received first cycle waste, REDOX high-level waste, coating waste, and laboratory waste until 1975. Between July 7, 1975 and February 2, 1976, P-10 pumps were installed, and 41,700 gallons of liquid waste were pumped from the tank. Tank 241-U-110 still contains an estimated 195,000 gallons of waste.

The Analytical Laboratories perform all analytical analyses to the specifications of WHC-SD-CP-QAPP-002. In accordance with WHC-SD-CP-QAPP-002 the following laboratory policies are being followed. Spikes are performed on either the undissolved sample, or the sample after dissolution as directed by the chemist. If the spike addition is found to be less than 20% of an analyte concentration, the spike recovery is not reported due to errors introduced by the precision of the sample analysis. The concentration of spike additions will be re-evaluated before the start of phase 1C. Two spiking routines are being used during phase 1A and 1B. For the following analyses, Inductively Coupled Plasma, Mercury Hydride, Total Organic Carbon, and Carbonate analyses the solid sample is spiked and digested independently from the sample digestion. Any non-homogeneity of the sample could adversely affect the spike recoveries. For the radioisotopic analyses and other analyses not specified above, the spikes were performed by spiking an aliquot of sample after digestion.

The laboratory does not report sample results from batch analyses that are questionable. The results from questionable batches are discarded and the analysis is repeated. Sample cards (laboratory travelers) for the repeated analysis are reissued for analysis after they have been stamped "rerun". Laboratory travelers are issued using a computerized routine according to a "sample point". This sample point label (segment-n) on the laboratory travelers and on the GEA analysis reports, has no relationship to the sampling activities or the sample identification. All results in this data package relate only to the sample identified as segment 4 from core 12 taken from tank 241-U-110.

The organic analysis of this sample will be performed by Pacific Northwest Laboratories (PNL). Due to instrument and procedure problems, PNL has been unable to separate organic from the normal paraffin hydrocarbon present in the samples. The results from the organic analysis will be provided when available.

Samples analyzed for Total Carbon between November 1, 1989 and February 22, 1990 were not acidified. When samples are not acidified the results from this method include Total Organic Carbon, Carbonate, and dissolved carbon dioxide from the air. The validity of these analyses are subject to interpretation. The Total Organic Carbon procedure will be corrected by acidification of all future samples and these analyses will be repeated whenever possible.

All sample results reported here by weight are reported as the "wet weight" of the sample. Some samples lost moisture during the process of aliquoting and weighing the sample for digestion. The percent moisture was determined at the earliest opportunity so any errors introduced by the loss of moisture will bias the results high. Performing the analysis on the sample after removing the moisture resulted in increased radiation exposure of approximately tenfold. In order to reduce and control radiation exposures to laboratory personnel, the samples were not dried before aliquoting and digestion.

This report is formatted into sections corresponding to the type of dissolutions performed prior to analysis. A brief summary of analytical results is reported, followed by calibration data and an analysis batch report. Any notable observations regarding an analysis are noted on the batch report for that analysis. Copies of laboratory travelers can be found in Appendix A.

This revision has been issued to correct errors found in the initial Single Shell Tank (SST) 241-U-110 data packages previously released. A formal technical review was performed on all of the data contained in the SST-241-U-110 data packages. The review identified errors due to data transcription, calculations, faulty spreadsheet and electronic reprocessing of original data scans. The errors have been addressed and corrected. Any changes in pagination are a result of data correction and realignment of sections of data.

Ion Chromatographic Analysis (Dionex) discrepancies were noted. The calibrations and sample chromatagrams were electronically reprocessed to produce a clear copy for duplication purposes. Not all raw data files could be reprocessed using the same initial parameters, and therefore the concentration values listed on the chromatograms are slightly different from those listed on the laboratory travelers. These discrepancies are due to program differences. The value listed on the traveler is correctly reported.

Gamma Energy Analysis (GEA), using the Jupiter GEA system, performs a peak analysis on a spectrum and subtracts a background spectrum when the sample is analyzed. When a report is generated at a date other than the original processing date, any subsequent report will vary due to Jupiter GEA system reconstructing the spectrum each time a report is generated from stored spectrum. The variance between the original value listed on the travelers and the reprocessed value is small. The value listed on the traveler is correctly reported.

Some Inductively Coupled Plasma (ICP) analysis data was found to include one or more of the following: incorrect reporting of sample and duplicate results due to inconsistent use of dilution factors; data transcription and calculation errors. These problems were compounded by computational errors due to a flaw in the spreadsheet program utilized for data reduction.

To correct these errors, the equations and format used to report the ICP data were reviewed for each package and approved by the Laboratory Computer Control Board (LCCB). The concentrations, determined by the ICP that were below the instrument detection limit, were reported in the summary as "less than" values calculated from the instrument detection limit and the sample preparation information. Transcription and calculation errors were corrected.

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SAMPLING AND CUSTODY DATA

CHAIN-OF-CUSTODY RECORD FOR CORE SAMPLING

(1) Shipment Number S-032-89 (2) Sample Number 89-072 (3) Supervisor DC Hartley

(4) Tank 110U (5) Riser R2 (6) Segment 4 (7) Cask Serial Number C1022

Radiation Survey Data:	(8) FIELD	(20) LABORATORY
Over Top Dose Rate	<0.5 mr/HR.	
Side Dose Rate	10 mr/HR	10 mR/HR
Bottom Dose Rate	3.5 mr/HR	
Smearable Contamination	<DET. (alpha)	<DET (alpha)
	<DET. (beta-gamma)	<DET (beta-gamma)
	RPT BAA (Signature)	RPT [illegible] (Signature)

(9) Shipment Description:

A. Work Package Number	2W-89-01060/W
B. Cask Seal Number	For Future Use
C. Sampler Number Used	19
D. Date and Time Sampler Unseated	11-29-89/1650
E. Expected Liquid Content	10%
F. Expected Solid Content	90%
G. Dose Rate Through Drill String	380 mr/HR.
H. Expected Sample Length	9"

(10) INFORMATION *(Include statement of laboratory tests to be performed.*)*

Core #12 WHC-EP-0210 Waste Characterization Plan for the Hanford Site Single Shell Tanks

*Reference laboratory work request, if available.

Comments:

(11) POINT OF ORIGIN	(12) SENDER NAME / SENDER SIGNATURE	(13) DATE AND TIME RELEASED	(14) DESTINATION	(16) RECIPIENT NAME / RECIPIENT SIGNATURE	(17) DATE AND TIME RECEIVED
241-U 110	DC Hartley / DC Hartley	11-29-89 2152	2225	John C Abercrombie	11/29/89 22:07

(15) Seal Intact Upon Release?	(18) Seal Intact Upon Receipt?	(19) Seal Data Consistent with this Record? Shipment No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

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Single Shell Tank Waste Characterization
Summary of Core Sample

Tank ID:	241-U-110
Riser ID:	R2
Core ID:	#12

Date Sampling Initiated:	11-29-89
Date Sampling Completed:	11-29-89

Segment		
1	Lab Serial No.	F0393
	Customer ID No.	89-069
	Last Segment?	NO
2	Lab Serial No.	F0417
	Customer ID No.	89-070
	Last Segment?	NO
3	Lab Serial No.	F0441
	Customer ID No.	89-071
	Last Segment?	NO
4	Lab Serial No.	F0465
	Customer ID No.	89-072
	Last Segment?	YES
5	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
6	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
7	Lab Serial No.	
	Customer ID No.	
	Last Segment?	

Segment		
8	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
9	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
10	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
11	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
12	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
13	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
14	Lab Serial No.	
	Customer ID No.	
	Last Segment?	

SST-1 Rev. C 9/7/90 Interim

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SAMPLE DATA SUMMARY

SUMMARY DATA REPORT

Reported results are wet sample weight

Single Shell Tank Project Phase 1B

Tank:	241-U-110
Core:	12
Segment:	4
Customer ID:	89-072

Untreated Sample Results

	Sample	Duplicate
pH	12.53	12.53
%Water	44.10%	44.36%

Fusion Analysis Results

	Sample	Duplicate
Fusion Dissolution	2.88 g/L	3.52 g/L
Total Alpha	5.97E-01 uci/g	<5.00E-01 uci/g
Total Beta	2.05E+03 uci/g	1.98E+03 uci/g
GEA Cs-137	2.36E+01 uci/g	2.24E+01 uci/g
Uranium	7.33E+03 ug/g	6.62E+03 ug/g

Water Digestion Results

	Sample	Duplicate
Water Digestion	9.80 g/L	1.00E+01 g/L
Ion Chromatograph		
Fluoride	1.91E+03 ug/g	1.42E+03 ug/g
Chloride	<1.03E+03 ug/g	1.65E+03 ug/g
Nitrate	6.10E+04 ug/g	4.70E+04 ug/g
Phosphate	<1.03E+04 ug/g	<1.01E+04 ug/g
Sulfate	4.16E+03 ug/g	3.56E+03 ug/g
Total Organic Carbon	8.98E+02 ug/g	7.15E+02 ug/g

ICP Analytical Results

	Sample	Duplicate
Aluminum	36826 ug/g	48263 ug/g
Arsenic	165 ug/g	89 LT
Barium	78 ug/g	51 ug/g
Beryllium	5 ug/g	3 ug/g
Bismuth	6354 ug/g	5393 ug/g
Boron	968 ug/g	66 ug/g
Cadmium	28 ug/g	16 LT
Calcium	492 ug/g	515 ug/g
Cerium	1272 ug/g	543 LT
Chromium	794 ug/g	825 ug/g
Copper	112 ug/g	63 LT
Europium	21 ug/g	10 LT
Iron	6842 ug/g	8395 ug/g
Lanthanum	129 ug/g	56 LT
Lead	675 ug/g	175 ug/g
Lithium	39 ug/g	13 LT
Magnesium	1155 ug/g	173 ug/g
Manganese	5412 ug/g	6982 ug/g
Mercury	1477 ug/g	1374 ug/g
Molybdenum	58 ug/g	22 ug/g
Nickel	234 ug/g	166 ug/g
Phosphorous	2159 ug/g	1567 ug/g
Potassium	1560 ug/g	848 LT
Samarium	1239 ug/g	610 LT
Selenium	1188 ug/g	703 ug/g
Silver	98 ug/g	73 LT
Sodium	43084 ug/g	56657 ug/g
Strontium	526 ug/g	656 ug/g
Sulfur	928 ug/g	708 ug/g
Tantalum	256 ug/g	109 LT
Thallium	5297 ug/g	1093 ug/g
Thorium	2829 ug/g	185 ug/g
Tin	141 ug/g	69 ug/g
Titanium	61 ug/g	24 ug/g
Uranium	15299 ug/g	8549 ug/g
Vanadium	100 ug/g	52 ug/g
Zinc	104 ug/g	56 ug/g
Zirconium	260 ug/g	129 ug/g

LT: Less Than
NC: Not Calibrated
NOT CALC: Not Calculated

Note: ICP elements that did not meet calibration instrument limits were not included in this report.

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PHYSICAL TEST RESULTS

Single Shell Tank
Extrusion of Segment -- Physical Tests

Lab Segment Serial #: F0465 Customer ID: 89-072

Analyst: Richard L. Weiss Date Extruded: January 29, 1990

Drainable Liquid Liquid Submitted for Segment Analysis? -- NO

Gross <10ml	Tare			Net
Serial	Date/Time			Estimated
Specific	Calculated			

Appearance of Liquid: No liquid was collected

Dimensions of Segment

Completed Segment Obtained? No	Length: 10 in.	Calculated Volume: 7.9 in^3
Remarks None		

Appearance of Solids: Light brown solids. Upper 1.5 in. medium browm, and very smooth in appearance.

Penetrometer	11.3 lbs/sq in	Remarks: None

Homogenization

Procedure: T038A-00712 Revision: F		Quantity of Material: 192.11	Grams
Date Homogenized: 02-14-90		Time Homogenized: 5.0	Minutes
Operator: K. J. Patterson			

Laboratory Notebook Reference	WHC-N-313-4	26
	Notebook No.	Page No.

9513325.2357

Single Shell Tank
Segment -- Subsamples

Lab Segment Serial #:	F0465	Customer ID:	89-072

Volatile Organic Analysis

VOA Sample	Lab Serial #: 89-072-278	Date Sampled: 01-29-90

Sample shipped to PNL

Particle Size Distribution Analysis

Particle Size Sample	Lab Serial #: F0465	Date Sampled: 01-29-90

Homogenized Solids

Undigested Solids Analysis

Laboratory Serial Number For Sample:	F0465	Date Sampled: 02-14-90
Laboratory Serial Number of Duplicate Sample:	F0466	

Fusion Analysis of Solids

Laboratory Serial Number of Sample:	F0470	Date Sampled: 02-14-90
Laboratory Serial Number of Duplicate Sample:	F0471	
Laboratory Serial Number of Spiked Sample:	F0472	

Acid Digestion Analysis of Solids

Laboratory Serial Number of Sample:	F0480	Date Sampled: 02-14-90
Laboratory Serial Number of Duplicate Sample:	F0481	
Laboratory Serial Number of Spiked Sample:	F0482	

Water Digestion Analysis of Solids

Laboratory Serial Number of Sample:	F0475	Date Sampled: 02-14-90
Laboratory Serial Number of Duplicate Sample:	F0476	
Laboratory Serial Number of Spiked Sample:	F0477	

Laboratory Notebook Reference	WHC-N-313-4	32
	Notebook No.	Page No.

SST-5 Rev. D 9/7/90 Interim

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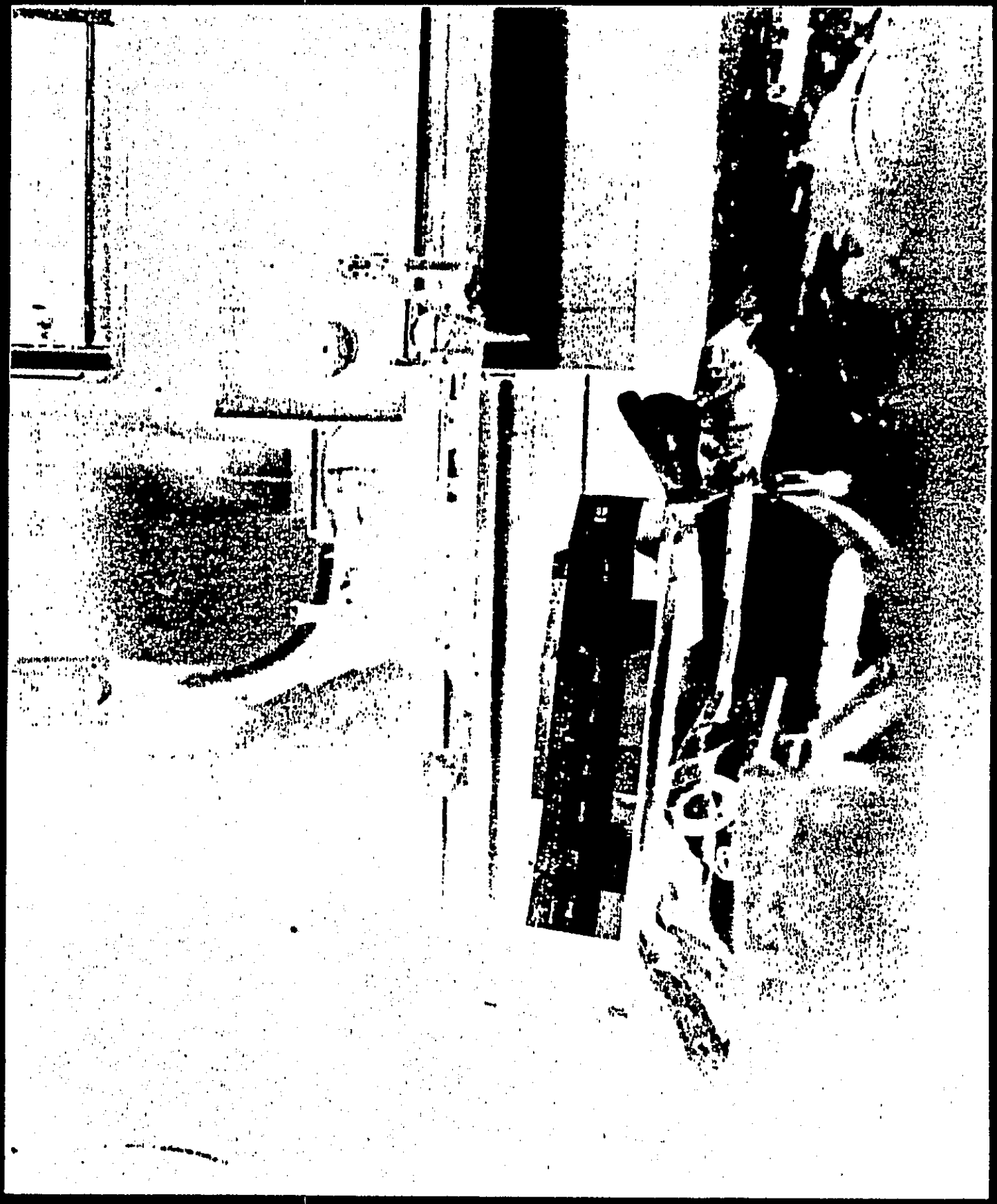

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Brinkmann
Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSI:
VIA BRINKMANN 2010
STATISTICS

SAMPLE NAME : SST,B000279,F0465,GLY-ETOH,SBK
FILE NAME : F0465.001

DATE	: 22/02/1990	ACQ. RANGE	: 0.5-150	COUNTS	: 53365
TIME	: 10:37	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 317 SEC	S.D.U.	: 2868
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.6E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 6.3E-03 %

	MEAN Diameter	S.D.
Number, Length :	0.99 µm	0.94 µm
Number, Area :	1.37 µm	1.02 µm
Number, Volume :	2.63 µm	1.89 µm
Length, Area :	1.89 µm	3.85 µm
Length, Volume :	4.29 µm	4.53 µm
Area, Volume :	9.71 µm	15.01 µm
Volume, Moment :	32.90 µm	24.28 µm

	MEDIAN Diameter	MODE	CONFIDENCE
Number :	0.81 µm	0.75 µm	100.00%
Area :	3.58 µm	50.33 µm	85.09%
Volume :	32.99 µm	50.33 µm	99.67%

Organics present in sample; dispersed in etOH-glycerine

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Brinkmann
Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS
VIA BRINKMANN 2010
STATISTICS

SAMPLE NAME : SST,B000279,F00465,GLY-ETOH,SBK
FILE NAME : F0465.002

DATE	: 22/02/1990	ACQ. RANGE	: 0.5-60	COUNTS	: 16957
TIME	: 10:51	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 95 SEC	S.D.U.	: 3342
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 3	CONCENTR.	: 7.2E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 9.1E-03 %

	MEAN Diameter	S.D.
Number, Length :	0.89 µm	0.98 µm
Number, Area :	1.33 µm	1.08 µm
Number, Volume :	2.89 µm	2.23 µm
Length, Area :	1.98 µm	4.82 µm
Length, Volume :	5.21 µm	5.81 µm
Area, Volume :	13.74 µm	19.06 µm
Volume, Moment :	40.19 µm	18.78 µm

	MEDIAN Diameter	MODE	CONFIDENCE
Number :	0.71 µm	0.55 µm	100.00%
Area :	4.24 µm	53.27 µm	60.72%
Volume :	51.26 µm	53.27 µm	98.89%

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UNDIGESTED SAMPLE RESULTS

Single Shell Tank Project

Untreated Sample Results

Tank: 241-U-110
Core: 12
Segment: 4
Customer ID: 89-072

	Check Standard	Blank	Sample	Sample Duplicate	Check Standard
Laboratory ID:	F0464	F0485	F0465	F0466	F0468
pH	100.80%	9.72	12.53	12.53	100.90%
Laboratory ID:	F0416	F0437	F0465	F0466	F0564
%Water	98.30%	6.2mg	44.10%	44.36%	96.95%

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KOH FUSION RESULTS

Single Shell Tank Project

Fusion Analysis
Laboratory Results of Solids
Units for Samples Are Wet Weight

Tank: 241-U-110
Core: 12
Segment: 4
Customer ID: 89-072

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample	Check Standard
Laboratory ID:		F0436		F0470		F0471			
Fusion Dissolution		Complete		2.88	g/L	3.52	g/L		
Laboratory ID:	F0469	F0484		F0470		F0471		F0472	F0473
Total Alpha	97.20%	<7.65E-05	uci/L	5.97E-01	uci/g	<5.00E-01	uci/g	103.10%	95.40%
Total Beta	100.90%	4.40E-04	uci/L	2.05E+03	uci/g	1.98E+03	uci/g	112.10%	99.50%
Laboratory ID:	F0421	F0436		F0470		F0471		F0568	F0569
GEA Cs-137	98.30%	<4.81E-04	uci/L	2.36E+01	uci/g	2.24E+01	uci/g	93.50%	97.30%
Laboratory ID:	F0469	F0484		F0470		F0471		F0472	F0473
Uranium	83.70%	<7.40E-05	g/L	7.33E+03	ug/g	6.62E+03	ug/g	123.20%	85.00%

Single Shell Tank Project

Fusion Analysis
Results on Laboratory Digestions

Tank: 241-U-110
Core: 12
Segment: 4
Customer ID: 89-072

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample	Check Standard
Laboratory ID:		F0436		F0470		F0471			
Fusion Dissolution		Complete		2.88	g/L	3.52	g/L		
Laboratory ID:	F0469	F0484		F0470		F0471		F0472	F0473
Total Alpha	97.20%	<7.63E-05	uci/L	1.72	uci/L	<1.76	uci/L	103.30%	95.40%
Total Beta	100.90%	4.40E-04	uci/L	5.91E+03	uci/L	6.96E+03	uci/L	112.10%	99.50%
Laboratory ID:	F0421	F0436		F0470		F0471		F0568	F0569
GEA Cs-137	98.30%	<4.81E-04	uci/L	6.79E+01	uci/L	7.87E+01	uci/L	93.50%	97.30%
Laboratory ID:	F0469	F0484		F0470		F0471		F0472	F0473
Uranium	83.70%	<7.40E-05	g/L	2.11E-02	g/L	2.33E-02	g/L	123.20%	85.00%

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WATER DIGESTION TEST RESULTS

Single Shell Tank Project

Water Digestion
Laboratory Results of Solids
Units Are Sample Wet Weight

Tank: 241-U-110
Core: 12
Segment: 4
Customer ID: 89-072 Laboratory Segment Serial No.: F0465

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample		Check Standard
Laboratory ID:		F0486		F0475		F0476		F0477		
Water Digestion		Complete		9.80	g/L	1.00E+01	g/L	1.02E+01	g/L	
Laboratory ID:	F0426	F0438		F0475		F0476		F0429		F0574
Ion Chromatograph										
Fluoride	90.80%	<1.00E-01	ppm	1.91E+03	ug/g	1.42E+03	ug/g	85.60%		91.80%
Chloride	99.70%	2.02E-01	ppm	<1.03E+03	ug/g	1.65E+03	ug/g	102.40%		97.50%
Nitrate	101.90%	<1.00	ppm	6.10E+04	ug/g	4.70E+04	ug/g	108.40%		102.70%
Phosphate	100.80%	<1.00	ppm	<1.03E+04	ug/g	<1.01E+04	ug/g	105.60%		101.50%
Sulfate	100.80%	<1.00	ppm	4.16E+03	ug/g	3.56E+03	ug/g	110.30%		100.50%
Laboratory ID:	F0474	F0486		F0475		F0476		F0477		F0478
Total Organic Carbon	97.50%	2.60	ug	8.98E+02	ug/g	7.15E+02	ug/g	96.28%		96.70%

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Single Shell Tank Project

Water Digestion
Sample Results on Laboratory Digestions

Tank: 241-U-110
Core: 12
Segment: 4
Customer ID: 89-072

Laboratory Segment Serial No.: F0465

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample		Check Standard
Laboratory ID:		F0486		F0475		F0476		F0477		
Water Digestion		Complete		9.80	g/L	1.00E+01	g/L	1.02E+01	g/L	
Laboratory ID:	F0426	F0438		F0475		F0476		F0429		F0574
Ion Chromatograph										
Fluoride	90.80%	<1.00E-01	ppm	1.87E+01	ppm	1.42E+01	ppm	85.60%		91.80%
Chloride	99.70%	2.02E-01	ppm	<1.01E+01	ppm	1.65E+01	ppm	102.40%		97.50%
Nitrate	101.90%	<1.00	ppm	5.98E+02	ppm	4.70E+02	ppm	108.40%		102.70%
Phosphate	100.80%	<1.00	ppm	<1.01E+02	ppm	<1.01E+02	ppm	105.60%		101.50%
Sulfate	100.80%	<1.00	ppm	4.08E+01	ppm	3.56E+01	ppm	110.30%		100.50%
Laboratory ID:	F0474	F0486		F0475		F0476		F0477		F0478
Total Organic Carbon	97.50%	2.60	ug	8.80E-03	g/L	7.15E-03	g/L	96.28%		96.70%

9413525.2349

9513325.2349

ACID DIGESTION TEST RESULTS

ICP DATA SUMMARY

Acid Digestion

Date Analyzed: March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Instrument Starting LMCS Standard %	Acid Digest. LMCS Standard %	Reagent BLANK ppm	Wet Weight Sample ug/g	Wet Weight Sample Duplicate ug/g	Spike Recovery %	LMCS ACID Digestion %	Closing LMCS Standard %
Aluminum	101.78%		0.17	36826	48263	NOT CALC.	88.04%	106.89%
Arsenic	104.53%		0.03 LT	165	89 LT			105.48%
Barium	96.48%		0.00 LT	78	51	135.89%	81.31%	99.54%
Beryllium	95.14%		0.00	5	3			98.55%
Bismuth	102.68%	100.08%	0.35	6354	5393	NOT CALC.		106.10%
Boron	98.70%	87.77%	0.16	968	66	0.00%		101.92%
Cadmium	95.29%	90.21%	0.01	28	16 LT	40.63%		103.35%
Calcium	99.48%	91.28%	0.08	492	515	37.09%		102.80%
Cerium	95.82%		0.20 LT	1272	543 LT	0.00%	77.25%	101.33%
Chromium	94.02%		0.01 LT	794	825	144.51%	78.04%	100.28%
Copper	97.48%	88.42%	0.02 LT	112	63 LT	24.07%		100.98%
Europium	97.82%		0.00 LT	21	10 LT			101.23%
Iron	97.36%		0.05	6842	8395	NOT CALC.	82.27%	102.65%
Lanthanum	93.19%	84.28%	0.09	129	56 LT	20.59%		96.47%
Lead	99.82%	97.96%	0.16	675	175	246.48%		103.03%
Lithium	97.10%		0.01	39	13 LT	141.46%	81.06%	98.78%
Magnesium	98.54%	91.03%	0.02	1155	173	0.00%		104.28%
Manganese	96.33%		0.02	5412	6982	NOT CALC.	81.24%	102.18%
Mercury	99.31%		0.02	1477	1374			96.81%
Molybdenum	100.25%	97.08%	0.01	58	22	25.32%		101.70%
Nickel	96.28%		0.02 LT	234	166	160.17%	80.69%	103.50%
Phosphorous	103.15%	94.46%	0.13	2159	1567	148.31%		94.76%
Potassium	97.96%	92.02%	0.32 LT	1560	848 LT	0.00%		102.77%
Samarium	100.65%		0.23 LT	1239	610 LT			103.81%
Selenium	100.93%		0.10	1188	703			102.21%
Silver	101.65%		0.03 LT	98	73 LT			104.62%
Sodium	96.97%	90.36%	0.27	43084	56657	NOT CALC.		99.99%
Strontium	98.01%	89.46%	0.00	526	656	45.91%		101.61%
Sulfur	99.04%		0.17	928	708			98.43%
Tantalum	94.15%		0.04 LT	256	109 LT	12.90%	79.69%	94.36%
Thallium	99.75%		0.08	5297	1093			103.48%
Thorium	103.25%		0.06	2829	185			106.80%
Tin	99.41%		0.06	141	69	181.10%	83.10%	108.40%
Titanium	98.09%		0.06	61	24	147.92%	82.38%	103.28%
Uranium	106.26%		1.71 LT	15299	8549			109.55%
Vanadium	96.43%		0.02 LT	100	52			100.11%
Zinc	95.88%	87.80%	0.13	104	56	35.82%		102.09%
Zirconium	98.54%		0.02 LT	260	129	187.34%	83.90%	103.64%

LT: Less Than
NC: Not Calibrated
NOT CALC: Not Calculated

ICP RAW DATA SUMMARY

Date Analyzed: March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Instrument Starting LMCS Standard %	Acid Digest. LMCS Standard %	Reagent BLANK ppm	Wet Weight Sample ug/g	Wet Weight Sample Duplicate ug/g	Spike Recovery %	LMCS ACID Digestion %	Closing LMCS Standard %
Aluminum	101.78%		0.17	36826	48263	NOT CALC.	88.04%	106.89%
Antimony	102.26%		0.24	974	444			110.63% #
Arsenic	104.53%		0.03 LT	165	89 LT			105.48%
Barium	96.48%		0.00 LT	78	51	135.89%	81.31%	99.54%
Beryllium	95.14%		0.00	5	3			98.55%
Bismuth	102.68%	100.08%	0.35	6354	5393	NOT CALC.		106.10%
Boron	98.70%	87.77%	0.16	968	66	0.00%		101.92%
Cadmium	95.29%	90.21%	0.01	28	16 LT	40.63%		103.35%
Calcium	99.48%	91.28%	0.08	492	515	37.09%		102.80%
Cerium	95.82%		0.20 LT	1272	543 LT	0.00%	77.25%	101.33%
Chromium	94.02%		0.01 LT	794	825	144.51%	78.04%	100.28%
Cobalt	85.78% #		0.04	493	98 LT	265.91%	69.56%	87.77% #
Copper	97.48%	88.42%	0.02 LT	112	63 LT	24.07%		100.98%
Europium	97.82%		0.00 LT	21	10 LT			101.23%
Iron	97.36%		0.05	6842	8395	NOT CALC.	82.27%	102.65%
Lanthanum	93.19%	84.28%	0.09	129	56 LT	20.59%		96.47%
Lead	99.82%	97.96%	0.16	675	175	246.48%		103.03%
Lithium	97.10%		0.01	39	13 LT	141.46%	81.06%	98.78%
Magnesium	98.54%	91.03%	0.02	1155	173	0.00%		104.28%
Manganese	96.33%		0.02	5412	6982	NOT CALC.	81.24%	102.18%
Mercury	99.31%		0.02	1477	1374			96.81%
Molybdenum	100.25%	97.08%	0.01	58	22	25.32%		101.70%
Neodymium	89.33% #		0.32 LT	792	851 LT	381.28%	74.65%	95.03%
Nickel	96.28%		0.02 LT	234	166	160.17%	80.69%	103.50%
Phosphorous	103.15%	94.46%	0.13	2159	1567	148.31%		94.76%
Potassium	97.96%	92.02%	0.32 LT	1560	848 LT	0.00%		102.77%
Samarium	100.65%		0.23 LT	1239	610 LT			103.81%
Selenium	100.93%		0.10	1188	703			102.21%
Silicon	82.30% #	56.97%	0.21	3791	2084	0.00%		85.22% #
Silver	101.65%		0.03 LT	98	73 LT			104.62%
Sodium	96.97%	90.36%	0.27	43084	56657	NOT CALC.	-	99.99%
Strontium	98.01%	89.46%	0.00	526	656	445.91%		101.61%
Sulfur	99.04%		0.17	928	708			98.43%
Tantalum	94.15%		0.04 LT	256	109 LT	12.90%	79.69%	94.36%
Thallium	99.75%		0.08	5297	1093			103.48%
Thorium	103.25%		0.06	2829	185			106.80%
Tin	99.41%		0.06	141	69	181.10%	83.10%	108.40%
Titanium	98.09%		0.06	61	24	147.92%	82.38%	103.28%
Tungsten	84.26% #		0.04 LT	243	118			84.98% #
Uranium	106.26%		1.71 LT	15299	8549			109.55%
Vanadium	96.43%		0.02 LT	100	52			100.11%
Zinc	95.88%	87.80%	0.13	104	56	35.82%		102.09%
Zirconium	98.54%		0.02 LT	260	129	187.34%	83.90%	103.64%

LT: Less Than
NC: Not Calibrated
NOT CALC: Not Calculated
Instrument Standards Outside Control Limits

ICP Raw Data

Date Analyzed: March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	SST-1	SST-2	SST-3	Starting LMCS Instrument Standard ppm	LMCS Standard Recovery %		F0479 LMCS Acid Digestion Standard ppm	Acid Digestion Standard Recovery %	F0487 Reagent Blank ppm
Aluminum				50.89	101.78%				0.17
Antimony	10.23				102.26%				0.24
Arsenic				52.26	104.53%				0.02 LT
Barium	9.65				96.48%				0.00 LT
Beryllium				9.51	95.14%				0.00
Bismuth		51.44			102.68%		10.01	100.08%	0.35
Boron	9.87				98.70%		8.78	87.77%	0.16
Cadmium	9.53				95.29%		9.02	90.21%	0.01
Calcium	9.95				99.48%		9.13	91.28%	0.08
Cerium	9.58				95.82%				0.07 LT
Chromium	9.40				94.02%				0.00 LT
Cobalt	8.58				85.78%	#			0.04
Copper	9.75				97.48%		8.84	88.42%	0.01 LT
Europium		9.78			97.82%				0.00 LT
Iron	9.74				97.36%				0.05
Lanthanum		46.69			93.19%		8.43	84.28%	0.09
Lead		50.01			99.82%		9.80	97.96%	0.16
Lithium	9.71				97.10%				0.01
Magnesium	9.85				98.54%		9.10	91.03%	0.02
Manganese	9.63				96.33%				0.02
Mercury				24.83	99.31%				0.02
Molybdenum				50.13	100.25%		9.69	97.08%	0.01
Neodymium	8.93				89.33%	#			-0.09 LT
Nickel	9.63				96.28%				0.02 LT
Phosphorous				51.57	103.15%		9.45	94.46%	0.13
Potassium	24.49				97.96%		9.20	92.02%	0.12 LT
Samarium		10.07			100.65%				0.06 LT
Selenium				50.46	100.93%				0.10
Silicon				41.15	82.30%	#	5.70	56.97%	0.21
Silver		10.17			101.65%		7.22		0.01 LT
Sodium	24.24				96.97%		9.04	90.36%	0.27
Strontium	9.80				98.01%		8.95	89.46%	0.00
Sulfur				49.52	99.04%				0.17
Tantalum				47.08	94.15%				0.02 LT
Thallium				49.88	99.75%				0.08
Thorium		51.73			103.25%				0.06
Tin	49.70				99.41%				0.06
Titanium				49.05	98.09%				0.06
Tungsten				21.07	84.26%	#			0.04 LT
Uranium		53.24			106.26%				0.27 LT
Vanadium				9.64	96.43%				0.00 LT
Zinc	9.59				95.88%		8.78	87.80%	0.13
Zirconium				49.27	98.54%				0.01 LT
Dilution Factor	1.00	1.00	1.00				10.00		1.00

ICP Raw Data

Date Analyzed: 31-Mar-90
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Digestion Weight	.4820 g		Digestion Weight	.3935 g	
	Volume	F0480	F0480	Volume	50 mL	F0481
	Sample	Sample	Sample	Sample	Sample	Sample
				Duplicate	Duplicate	Duplicate
	Dilution	Dilution	Dilution	Dilution	Dilution	Dilution
	Three	Two	One	Three	Two	One
	ppm	ppm	ppm	ppm	ppm	ppm
Aluminum		355.00	485.38		380.31	361.71
Antimony		24.03	9.39		23.55	3.5
Arsenic		3.99	1.59		2.90	0.50 LT
Barium		1.83	0.75		0.68	0.40
Beryllium		0.14	0.05		0.10	0.02
Bismuth		64.27	61.25		56.94	42.5
Boron		9.33	1.27		2.84	0.52
Cadmium		0.84	0.27		0.35	0.06 LT
Calcium		4.74	4.41		4.06	3.42
Cerium		35.82	12.26		14.76	1.66 LT
Chromium		7.65	10.03		6.5	7.26
Cobalt		10.88	4.75		9.8	0.23 LT
Copper		2.76	1.08		1.28	0.43 LT
Europium		0.59	0.21		0.24	0.03 LT
Iron		65.96	87.62		66.15	63.41
Lanthanum		2.36	1.25		1.36	0.28 LT
Lead		11.32	6.51		15.98	1.38
Lithium		1.14	0.37		0.29	-0.01 LT
Magnesium		11.14	1.61		1.36	1.17
Manganese		52.17	69.98		55.02	53.07
Mercury		14.24	3.6		10.83	1.70
Molybdenum		1.27	0.56		0.68	0.17
Neodymium		17.92	7.63		-4.33	-1.54 LT
Nickel		3.58	2.26		2.73	1.31
Phosphorous		21.71	20.81		21.18	12.35
Potassium		44.64	15.03		12.45	0.68 LT
Samarium		35.42	11.94		13.51	1.40 LT
Selenium		20.48	11.45		11.28	5.54
Silicon		36.55	19.06		24.14	16.42
Silver		2.59	0.95		1.04	0.18 LT
Sodium		415.33	540.11		446.46	432.63
Strontium		5.07	6.36		5.17	4.90
Sulfur		9.48	8.95		8.24	5.58
Tantalum		7.44	2.47		3.26	0.44 LT
Thallium		51.06	21.98		29.86	8.61
Thorium		27.27	9.14		11.66	1.46
Tin		3.67	1.36		1.71	0.54
Titanium		1.52	0.59		0.76	0.19
Tungsten		6.21	2.34		3.55	0.93
Uranium		266.22	147.48		142.49	67.37
Vanadium		2.15	0.96		1.25	0.41
Zinc		1.17	1		0.77	0.44
Zirconium		5.12	2.5		2.54	1.02
Dilution Factor		101.00	21.00		101.00	21.00

ICP Raw Data

Date Analyzed: 31-Mar-90
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Digestion Weight	.3946 g					
	Volume	50.00					
	Spike of Sample Dilution Three ppm	Spike of Sample Dilution Two ppm	Spike of Sample Dilution One ppm		Spike Recovery %	Standard LMCS Acid Digestion ppm	Acid Digestion Standard Recovery %
Aluminum							
Antimony		421.18	366.06		NOT CALC	8.80	88.04%
Arsenic		39.89	4.20				
Barium		5.81	1.03				
Beryllium		14.20	11.84		135.89%	8.13	81.31%
Bismuth		0.18	0.02				
Boron		78.01	40.75		NOT CALC		
Cadmium		5.87	3.04		-45.79%		
Calcium		4.28	2.84		40.63%		
Cerium		7.58	6.54		37.09%		
Chromium		58.97	4.73		-52.79%	7.73	77.25%
Cobalt		20.83	17.25		144.51%	7.87	78.04%
Copper		30.47	10.41		265.91%	6.96	69.56%
Europium		6.50	3.29		24.07%		
Iron		0.91	0.06	LT			
Lanthanum		76.17	5.20		NOT CALC	8.23	82.27%
Lead		7.71	3.08		20.59%		
Lithium		29.96	6.65		246.48%		
Magnesium		14.45	11.83		141.46%	8.11	81.06%
Manganese		4.89	4.13		-42.04%		
Mercury		68.16	58.65		NOT CALC	8.12	81.24%
Molybdenum		5.97	0.51				
Neodymium		2.72	2.98		25.32%		
Nickel		42.04	44.36		381.28%	7.47	74.65%
Phosphorous		17.86	12.36		160.17%	8.07	80.69%
Potassium		31.82	16.00		148.31%		
Samarium		69.67	4.05	LT	-82.24%		
Selenium		54.36	1.59	LT			
Silicon		32.07	10.02			3.27	
Silver		26.16	11.16		-186.81%		
Sodium		7.19	3.12				
Strontium		448.44	388.06		NOT CALC		
Sulfur		8.73	7.37		45.91		
Tantalum		11.00	5.67				
Thallium		13.21	3.30		12.90%	7.93	79.69%
Thorium		69.83	8.51				
Tin		40.73	1.90				
Titanium		19.22	12.28		181.10%	8.31	83.10%
Tungsten		15.29	12.09		147.92%	8.25	82.38%
Uranium		8.15	0.86				
Vanadium		392.78	68.61			5.42	
Zinc		2.76	0.37	LT			
Zirconium		4.4	3.27		35.82%		
		20.74	12.72		187.34%	8.37	83.90%
			2.5				
Dilution Factor		101.00	21.00			10.00	

ICP Raw Data

Date Analyz March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	SST-1	SST-2	Ending LMCS Standard SST-3	Standard Recovery %
Aluminum			53.44	106.89%
Antimony	11.06			110.63% #
Arsenic			52.74	105.48%
Barium	9.95			99.54%
Beryllium			9.86	98.55%
Bismuth		53.16		106.10%
Boron	10.19			101.92%
Cadmium	10.34			103.35%
Calcium	10.28			102.80%
Cerium	10.13			101.33%
Chromium	10.03			100.28%
Cobalt	8.78			87.77% #
Copper	10.10			100.98%
Europium		10.12		101.23%
Iron	10.27			102.65%
Lanthanum		48.33		96.47%
Lead		51.62		103.03%
Lithium	9.88			98.78%
Magnesium	10.43			104.28%
Manganese	10.22			102.18%
Mercury			24.20	96.81%
Molybdenum			50.85	101.70%
Neodymium	9.50			95.03%
Nickel	10.35			103.50%
Phosphorou			47.38	94.76%
Potassium	25.69			102.77%
Samarium		10.38		103.81%
Selenium			51.11	102.21%
Silicon			42.61	85.22% #
Silver		10.46		104.62%
Sodium	25.00			99.99%
Strontium	10.16			101.61%
Sulfur			49.21	98.43%
Tantalum			47.18	94.36%
Thallium			51.74	103.48%
Thorium		53.51		106.80%
Tin	54.20			108.40%
Titanium			51.64	103.28%
Tungsten			21.25	84.98% #
Uranium		54.89		109.55%
Vanadium			10.01	100.11%
Zinc	10.21			102.09%
Zirconium			51.82	103.64%
	1.00	1.00	1.00	

ICP Raw Data

Date Analyz March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Spike Standard LMCS ppm added	Spike Standard ID Book # 5.0 mL 103C15C + 5.0 mL 104C15D	SST-1	SST-2	LMCS Standards Values ppm SST-3	LMCS Standard IDs Book # 78C11D 82B38B 77C11D	ACID DIGESTION LMCS STANDARD VALUES ppm in Sample	ACID DIGEST. LMCS IDs Book # 81C11A 82C11A
Aluminum	10.00				50.00		100.00	
Antimony			10.00					
Arsenic					50.00			
Barium	10.00		10.00				100.00	
Beryllium					10.00			
Bismuth	10.00			50.10			100.00	
Boron	10.00		10.00				100.00	
Cadmium	10.00		10.00				100.00	
Calcium	10.00		10.00				100.00	
Cerium	10.00		10.00				100.00	
Chromium	10.09		10.00				100.90	
Cobalt	10.00		10.00				100.00	
Copper	10.00		10.00				100.00	
Europium				10.00				
Iron	10.00		10.00				100.00	
Lanthanum	10.00			50.10			100.00	
Lead	10.00			50.10			100.00	
Lithium	10.00		10.00				100.00	
Magnesium	10.00		10.00				100.00	
Manganese	10.00		10.00				100.00	
Mercury					25.00			
Molybdenum	9.98				50.00		99.80	
Neodymium	10.00		10.00				100.00	
Nickel	10.00		10.00				100.00	
Phosphorou	10.00				50.00		100.00	
Potassium	10.00		25.00				100.00	
Samarium				10.00				
Selenium					50.00			
Silicon	10.00				50.00		100.00	
Silver				10.00				
Sodium	10.00		25.00				100.00	
Strontium	10.00		10.00				100.00	
Sulfur					50.00			
Tantalum	9.95				50.00		99.50	
Thallium					50.00			
Thorium				50.10				
Tin	10.00		50.00				100.00	
Titanium	10.01				50.00		100.10	
Tungsten					25.00			
Uranium				50.10				
Vanadium					10.00			
Zinc	10.00		10.00				100.00	
Zirconium	9.98				50.00		99.80	
	10.00						10.00	

ICP Raw Data

		Acid Digested Standard	F0479
Date Analyzed:	March 31.1990	Reagent Blank	F0487
Procedure:	LA-505-151/A-0	Sample	F0480
Analyst:	J. A. White	Duplicate	F0481
		Spike	F0482
		Digested Acid Standard	F0483

	Calc. Sample F0480 ug/mL	Calc. Duplicate F0481 ug/mL	Calc. Spike F0482 ug/mL	RPD from Summary	IDL (2 sigma)
Aluminum	355	380	421	26.9%	0.0745
Antimony	9	4	4	74.8%	0.0949
Arsenic	2	1	1		0.0223
Barium	1	0	14	41.8%	0.0026
Beryllium	0	0	0	63.1%	0.0004
Bismuth	61	43	41	16.3%	0.0839
Boron	9	1	3	174.5%	0.0083
Cadmium	0	0	4		0.0039
Calcium	5	4	8	4.6%	0.0002
Cerium	12	2	5		0.1359
Chromium	8	7	21	3.8%	0.0039
Cobalt	5	0	30		0.0246
Copper	1	0	3		0.0158
Europium	0	0	0		0.0024
Iron	66	66	76	20.4%	0.0073
Lanthanum	1	0	3		0.0141
Lead	7	1	30	117.6%	0.0273
Lithium	0	-0	14		0.0032
Magnesium	11	1	5	148.0%	0.0001
Manganese	52	55	68	25.3%	0.0011
Mercury	14	11	6	7.2%	0.0036
Molybdenum	1	0	3	91.0%	0.0049
Neodymium	8	-2	44		0.2130
Nickel	2	1	18	34.0%	0.0147
Phosphorou	21	12	32	31.7%	0.0308
Potassium	15	1	4		0.2122
Samarium	12	1	2		0.1525
Selenium	11	6	10	51.3%	0.0631
Silicon	37	16	11	58.1%	0.0314
Silver	1	0	3		0.0183
Sodium	415	446	448	27.2%	0.0483
Strontium	5	5	9	22.0%	0.0010
Sulfur	9	6	6	26.9%	0.0163
Tantalum	2	0	3		0.0273
Thallium	51	9	70	131.6%	0.0437
Thorium	27	1	41	175.4%	0.0122
Tin	1	1	19	69.2%	0.0144
Titanium	1	0	15	87.2%	0.0035
Tungsten	2	1	1	69.3%	0.0273
Uranium	147	67	69	56.6%	1.1405
Vanadium	1	0	0	62.8%	0.0124
Zinc	1	0	4	60.2%	0.0017
Zirconium	3	1	21	66.9%	0.0141

9513325.2358

APPENDIX B

ANALYTICAL DETECTION LIMITS

SINGLE SHELL TANK PROJECT
Analytical Detection Limits
October 12, 1990

The following detection limits are derived on ideal matrices. These values were derived by using either calibration standards or pure matrix standards. Detection limits on actual single shell tank samples are likely to be much higher. No information regarding procedure detection limits is available for procedures not listed in this report.

Procedure LA-355-131
Arsenic Analysis by Hydride Generation Atomic Absorption

Detection Limit = 0.005 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.

Procedure LA-325-102
Mercury Analysis by Atomic Absorption Manual Cold Vapor Technique

Detection Limit = 0.002 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.
Solids were analyzed directly.

Procedure LA-362-131
Selenium Analysis by Hydride Generation Atomic Absorption

Detection Limit = 0.005 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.

Procedure **LA-533-105**
Anion Analysis on Dionex Model 4000i

Typical sample dilution was 0.000099g/mL

Fluoride
Detection Limit in solution = 0.09 ppm.

Chloride
Detection Limit in solution = 0.04 ppm.

Nitrate
Detection Limit in solution = 0.24 ppm.

Phosphate
Detection Limit in solution = 0.13 ppm.

Sulfate
Detection Limit in solution = 0.13 ppm.

Procedure **LA-622-102**
Determination of Carbonate in Solutions by Coulometry

Detection Limit = 5 ppm in solution
Typical sample dilution was 0.01g/mL

Procedure **LA-344-105**
Total Organic Carbon
Determination of Carbon Insolation by Combustion and Coulometry

Detection Limit = 5.5 ppm in solution
Typical sample dilution was 0.01g/mL

Procedure: LA-505-151 (Nominal Detection Limits)

Inductively Coupled Plasma (ICP) Emission Spectrometer Operations and Analysis.

Typical sample dilution for the Fusion Dissolution was 0.00019 g/mL.

Typical sample dilution for the Water Digestion was 0.000476 g/mL.

Typical sample dilution for the Acid Digestion was 0.000476 g/mL

Instrument Detection Limit ppm.

Aluminum	0.0745	Antimony	0.1424
Arsenic	0.0223	Barium	0.0026
Beryllium	0.0006	Bismuth	0.0839
Boron	0.0083	Cadmium	0.0039
Calcium	0.0002	Cerium	0.1359
Chromium	0.0039	Cobalt	0.0246
Copper	0.0158	Europium	0.0024
Iron	0.0073	Lanthanum	0.0141
Lead	0.0273	Lithium	0.0032
Magnesium	0.0001	Manganese	0.0011
Mercury	0.0036	Molybdenum	0.0049
Neodymium	0.2130	Nickel	0.0147
Phosphorous	0.0308	Potassium	0.2122
Samarium	0.1525	Selenium	0.0631
Silicon	0.0314	Silver	0.0183
Sodium	0.0483	Strontium	0.0010
Sulfur	0.0163	Tantalum	0.0273
Thallium	0.0646	Thorium	0.0122
Tin	0.0144	Titanium	0.0035
Tungsten	0.0273	Uranium	1.1405
Vanadium	0.0186	Zinc	0.0017
Zirconium	0.0141		

OSM RCRA DATA ASSESSMENT

DATE 3-30-92

REVIEWED BY RL Shaver

LABORATORY 222-S

CASE # SST-241-U-110

SDG # Core 12, Seq 4, 89-072

SAMPLES/MATRIX

Raw Sample	F0465
KOH Fusion	F0470
Water Digestion	F0475
Acid Digestion	F0480

DATA ASSESSMENT SUMMARY

QUALITY CONTROL CHECK	ANALYSIS ICP	IC	TOC
1. Holding Time	O	X	X
2. Calibration	O	O	O
3. Analytical Blank	O	O	O
4. Lab Control Sample	X	N/A	N/A
5. Interference Check Sample	N/A	N/A	N/A
6. Matrix Spike	M	O	O
7. Duplicate Analysis	M	X	X
8.			
9.			
10.			

O = data had no problems
X = minor problems, data may be qualified
M = data qualified due to major problems/some data may be unusable

OVERALL ASSESSSMENT: There was poor agreement between the sample and the duplicate. Almost all of the matrix spikes had poor recovery, and some were in the R (unusable) range.

NOTES:

o Refer to the corresponding attachments for explanation of any problems.

9513325.2363

OSM RCRA DATA ASSESSMENT

DATE 3-30-92

REVIEWED BY RL Shaver

LABORATORY 222-S

CASE # SST-241-U-110

SDG # Core 12, Seq 4, 89-072

SAMPLES/MATRIX

Raw Sample	F0465
KOH Fusion	F0470
Water Digestion	F0475
Acid Digestion	F0480

DATA ASSESSMENT SUMMARY

QUALITY CONTROL CHECK	ANALYSIS pH	% Water	
1. Holding Time	X	0	
2. Calibration	0	0	
3. Analytical Blank	N/A	N/A	
4. Lab Control Sample	N/A	N/A	
5. Interference Check Sample	N/A	N/A	
6. Matrix Spike	N/A	N/A	
7. Duplicate Analysis	0	0	
8.			
9.			
10.			

0 = data had no problems
X = minor problems, data may be qualified
M = data qualified due to major problems/some data may be unusable

OVERALL ASSESSSMENT:

NOTES:

o Refer to the corresponding attachments for explanation of any problems.

9513325.2364

SUMMARY DATA REPORT

Reported results are wet sample weight

Single Shell Tank Project Phase 1B

Tank:	241-U-110
Core:	12
Segment:	4
Customer ID:	89-072

Untreated Sample Results

	Sample	Duplicate
pH	12.53 J	12.53
%Water	44.10%	44.36%

Fusion Analysis Results

	Sample	Duplicate
Fusion Dissolution	2.88 g/L	3.52 g/L
Total Alpha	5.97E-01 uci/g	<5.00E-01 uci/g
Total Beta	2.05E+03 uci/g	1.98E+03 uci/g
GEA Cs-137	2.36E+01 uci/g	2.24E+01 uci/g
Uranium	7.33E+03 ug/g	6.62E+03 ug/g

Water Digestion Results

	Sample	Duplicate
Water Digestion	9.80 g/L	1.00E+01 g/L
Ion Chromatograph		
Fluoride	1.91E+03 ug/g J	1.42E+03 ug/g
Chloride	<1.03E+03 ug/g J	1.65E+03 ug/g
Nitrate	6.10E+04 ug/g J	4.70E+04 ug/g
Phosphate	<1.03E+04 ug/g J	<1.01E+04 ug/g
Sulfate	4.16E+03 ug/g J	3.56E+03 ug/g
Total Organic Carbon	8.98E+02 ug/g J	7.15E+02 ug/g

ICP Analytical Results

	Sample	Duplicate
Aluminum	38826 ug/g J	48263 ug/g
Arsenic	165 ug/g J	89 LT
Barium	78 ug/g J	51 ug/g
Beryllium	5 ug/g J	3 ug/g
Bismuth	6354 ug/g J	5393 ug/g
Boron	968 ug/g R	66 ug/g
Cadmium	28 ug/g J	16 LT
Calcium	492 ug/g J	515 ug/g
Cerium	1272 ug/g R	543 LT
Chromium	794 ug/g J	825 ug/g
Copper	112 ug/g R	63 LT
Europium	21 ug/g J	10 LT
Iron	6842 ug/g J	8395 ug/g
Lanthanum	129 ug/g J	56 LT
Lead	675 ug/g J	175 ug/g
Lithium	39 ug/g J	13 LT
Magnesium	1155 ug/g R	173 ug/g
Manganese	5412 ug/g J	6982 ug/g
Mercury	1477 ug/g J	1374 ug/g
Molybdenum	58 ug/g R	22 ug/g
Nickel	234 ug/g J	166 ug/g
Phosphorous	2159 ug/g J	1567 ug/g
Potassium	1560 ug/g R	848 LT
Samarium	1239 ug/g J	610 LT
Selenium	1188 ug/g J	703 ug/g
Silver	98 ug/g J	73 LT
Sodium	43084 ug/g J	56657 ug/g
Strontium	526 ug/g J	656 ug/g
Sulfur	928 ug/g J	708 ug/g
Tantalum	256 ug/g R	109 LT
Thallium	5297 ug/g J	1093 ug/g
Thorium	2829 ug/g J	185 ug/g
Tin	141 ug/g J	69 ug/g
Titanium	61 ug/g J	24 ug/g
Uranium	15299 ug/g J	8549 ug/g
Vanadium	100 ug/g J	52 ug/g
Zinc	104 ug/g J	56 ug/g
Zirconium	260 ug/g J	129 ug/g

LT: Less Than
NC: Not Calibrated
NOT CALC: Not Calculated

Note: ICP elements that did not meet calibration instrument limits were not included in this report.

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Holding Time

COMMENTS: Holding times for ICP elements were within limits. Holding time was out of procedure limits for pH, TOC, and IC. The procedure does not specify limits for % water. It should be noted that there was no statement of work specifying holding time limits, and the limits in the OSM procedure may not be achievable for SST core samples and hot cell prepatation.

ACTION: Qualify out-of-limit analytes per OSM procedure as estimated (J) values, or estimated non-detects (UJ) for non-detects.

sample #	constituent	value/qual
F0465	pH	J
F0475	TOC	J
	F	J
	Cl	UJ
	NO3	J
	SO3	J
	PO4	UJ

sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Calibration

COMMENTS: Initial and continuing calibration are within control for ICP, IC, TOC, pH, and % water.

ACTION: None

sample #	constituent	value/qual	sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Analytical Blank

COMMENTS: ICP elements are within control limits.
IC analytes are within control limits.
TOC analysis is within control limits.
pH: N/A
% Water: N/A

ACTION: None

sample #	constituent	value/qual	sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Laboratory Control Sample

COMMENTS: No Laboratory Control Sample data provided for pH, % water, TOC, or IC. The ICP elements listed below were out-of-limits for Laboratory Control Sample.

ACTION: Qualify out-of-limit analytes per OSM procedure as estimated (J) values, or as estimated non-detects (UJ) for non-detects.

sample #	constituent	value/qual	sample #	constituent	value/qual
F0480			F0480		
				Samarium	J
	Arsenic	J		Selenium	J
	Beryllium	J		Silver	J
	Cerium	J		Sulfur	J
	Chromium	J		Tantalum	J
	Europium	J		Thallium	J
	Mercury	J		Thorium	J
				Uranium	J
				Vanadium	J

RCRA QC

Name R L Shaver Date 3-17-92

QC Check: Interference Check Sample

COMMENTS: No interference check sample data was supplied with data package for ICP, IC, TOC, pH, or % water.

ACTION: None

sample #	constituent	value/qual	sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Matrix Spike

COMMENTS: No matrix spike data supplied with pH or % water. The ICP elements listed below were out of limits for matrix spike. TOC and IC analytes were within limits.

ACTION: Qualify out-of-limit analytes per OSM procedure as estimated (J) values or estimated non-detects (UJ) for non-detects or rejected (R) for unusable data.

sample #	constituent	value/qual	sample #	constituent	value/qual
F0480			F0480		
	Aluminum	J		Molybdenum	R
	Arsenic	J		Nickel	J
	Barium	J		Potassium	R
	Beryllium	J		Phosphorus	J
	Bismuth	J		Samarium	J
	Boron	R		Selenium	J
	Cadmium	J		Silver	J
	Calcium	J		Sodium	J
	Cerium	R		Strontium	J
	Chromium	J		Sulfur	J
	Copper	J		Tantalum	R
	Europium	J		Thallium	J
	Iron	J		Thorium	J
	Lanthanum	J		Tin	J
	Lead	J		Titanium	J
	Lithium	J		Uranium	J
	Magnesium	R		Vanadium	J
	Manganese	J		Zinc	J
	Mercury	J		Zirconium	J

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Duplicate Analysis

COMMENTS: Duplicate Analyses were within control limits for pH, and % water. The ICP, and IC analytes which were out of control limits are listed below. The TOC was out of control limits. The relative percent difference is listed in parentheses. A value of >20 RPD qualifies data as out of limit.

ACTION: Qualify out-of-limit analytes per OSM procedure as estimated (J) values.

sample #	constituent	value/qual
F0465		
	TOC	J (31)
F0475		
	F	J (23)
	Cl	UJ (46)
	NO3	J (26)
F0480		
	Aluminum	J (27)
	Arsenic	J (50)
	Barium	J (42)
	Boron	J (174)
	Cadmium	J (55)
	Cerium	J (80)
	Copper	J (56)
	Europium	J (71)
	Iron	J (20)
	Lanthanum	J (78)
	Lead	J (118)
	Lithium	J (100)

sample #	constituent	value/qual
F0480		
	Magnesium	J (148)
	Manganese	J (25)
	Molybdenum	J (90)
	Nickel	J (34)
	Potassium	J (59)
	Phosphorus	J (32)
	Samarium	J (34)
	Selenium	J (51)
	Silver	J (29)
	Strontium	J (28)
	Sodium	J (22)
	Tantalum	J (80)
	Thallium	J (132)
	Thorium	J (175)
	Tin	J (68)
	Titanium	J (86)
	Uranium	J (57)
	Vanadium	J (63)
	Zinc	J (60)
	Zirconium	J (67)

9513325.2372

OFFICE OF SAMPLE MANAGEMENT DATA PACKAGE VERIFICATION CHECKLIST

VER-92-0175
Verification Number

	PRESENT	ABSENT
FIELD DOCUMENTATION		
▪ WHC Chain-of-Custody	X	
▪ Request for Analysis		X
SHIPPING DOCUMENTATION		
▪ Airbill		N/A*
▪ WHC Shipping Order		N/A*
▪ Signature and Tally		N/A*
▪ HMSR, RSR or Off-site Property Control Form (Circle One)		N/A*
▪ Other:		
ANALYTICAL RESULTS		
▪ Case Narrative	X	
▪ Data Reporting Forms	N/A	
▪ Raw Data	X	
▪ Diskette Deliverables		N/A
▪ Sample Receipt Form	X	
▪ Laboratory Chain of Custody		X

COMMENTS: VERIFICATION BY: DCB

* Samples hand carried to 222-S Laboratory. Shipping documentation not required.

OSM DATA MANAGEMENT ADMINISTRATOR:

Jeanette M Duncan (Print Name) — Jeanette M. Duncan (Sign Name) — 4/3/92 Date

OSM PROJECT COORDINATOR:

KURT L SILVERS (Print Name) — Kurt L. Silvers (Sign Name) — 4-1-92 Date

9513325.2373

OFFICE OF SAMPLE MANAGEMENT DATA PACKAGE VERIFICATION FORM

VER-92-0175
Verification Number

VERIFICATION DATE: 03-19-92	NCR NUMBER:
DATE DATA PACKAGE RECEIVED: 10-24-91	
SAMPLE DELIVERY GROUP: 222-S, 89-072, CORE 12, SEGMENT 4, REV. 2	
SAMPLE NUMBERS: 89-072.	
PROJECT: SINGLE SHELL TANK	PROJECT COORDINATOR: LEELA SASAKI

DATA PACKAGE DEFICIENCIES:

SEE ATTACHED LISTS
VERIFICATION BY - DCB

LABORATORY DEFICIENCY RESPONSE DUE DATE:

OSM DATA MANAGEMENT ADMINISTRATOR:

Jeanette M Duncan	Jeanette M. Duncan	4/3/92
(Print Name)	(Sign Name)	Date

OSM PROJECT COORDINATOR:

KURT L SILVERS	Kurt L. Silvers	4-1-92
(Print Name)	(Sign Name)	Date

DATA PACKAGE DEFICIENCIES
222-S
CORE 12, SEGMENT 4, REV. 2, 89-072

1. GENERAL COMMENT Core 12, Segment 4, Rev. 2 : Request for Analysis Laboratory Chain of Custody are not present in the data package. Please submit paginate as part of the data package.
2. Page 157 - Cross-Out not signed and dated.
3. Page 167 - Cross-Out not signed and dated.
4. Page A-4 - Cross-Out not signed and dated.
5. Page A-9 - Cross-Out not signed and dated.
6. Page A-13 - Cross-Out not signed and dated.
7. Page A-16 - Cross-Out not signed and dated.
8. Page A-17 - Cross-Out not signed and dated.
9. Page A-19 - Cross-Out not signed and dated.
10. Page A-22 - Cross-Out not signed and dated.
11. Page A-23 - Cross-Out not signed and dated.
12. Page A-26 - Cross-Out not signed and dated.
13. Page A-29 - Cross-Out not signed and dated.
14. Page A-32 - Cross-Out not signed and dated.
15. Page A-34 - Cross-Out not signed and dated.
16. Page A-40 - Cross-Out not signed and dated.

9213323.0075

OSM RCRA DATA ASSESSMENT

DATE 3-30-92

REVIEWED BY RL Shaver

LABORATORY 222-S

CASE # SST-241-U-110

SDG # Core 12, Seq 4, 89-072

SAMPLES/MATRIX	
Raw Sample	F0465
KOH Fusion	F0470
Water Digestion	F0475
Acid Digestion	F0480

DATA ASSESSMENT SUMMARY

QUALITY CONTROL CHECK	ANALYSIS ICP	IC	TOC
1. Holding Time	O	X	X
2. Calibration	O	O	O
3. Analytical Blank	O	O	O
4. Lab Control Sample	X	N/A	N/A
5. Interference Check Sample	N/A	N/A	N/A
6. Matrix Spike	M	O	O
7. Duplicate Analysis	M	X	X
8.			
9.			
10.			

O = data had no problems
X = minor problems, data may be qualified
M = data qualified due to major problems/some data may be unusable

OVERALL ASSESSSMENT: There was poor agreement between the sample and the duplicate. Almost all of the matrix spikes had poor recovery, and some were in the R (unusable) range.

NOTES:

o Refer to the corresponding attachments for explanation of any problems.

9513325.2376

OSM RCRA DATA ASSESSMENT

DATE 3-30-92

REVIEWED BY RL Shaver

LABORATORY 222-S

CASE # SST-241-U-110

SDG # Core 12, Seq 4, 89-072

SAMPLES/MATRIX	
Raw Sample	F0465
KOH Fusion	F0470
Water Digestion	F0475
Acid Digestion	F0480

DATA ASSESSMENT SUMMARY

QUALITY CONTROL CHECK	ANALYSIS pH	% Water	
1. Holding Time	X	0	
2. Calibration	0	0	
3. Analytical Blank	N/A	N/A	
4. Lab Control Sample	N/A	N/A	
5. Interference Check Sample	N/A	N/A	
6. Matrix Spike	N/A	N/A	
7. Duplicate Analysis	0	0	
8.			
9.			
10.			

0 = data had no problems
X = minor problems, data may be qualified
M = data qualified due to major problems/some data may be unusable

OVERALL ASSESSSMENT:

NOTES:

o Refer to the corresponding attachments for explanation of any problems.

9513325.2377

SUMMARY DATA REPORT

Reported results are wet sample weight

Single Shell Tank Project Phase 1B

Tank:	241-U-110
Core:	12
Segment:	4
Customer ID:	89-072

Untreated Sample Results

	Sample	Duplicate
pH	12.53 J	12.53
%Water	44.10%	44.36%

Fusion Analysis Results

	Sample	Duplicate
Fusion Dissolution	2.88 g/L	3.52 g/L
Total Alpha	5.97E-01 uci/g	<5.00E-01 uci/g
Total Beta	2.05E+03 uci/g	1.98E+03 uci/g
GEA Cs-137	2.36E+01 uci/g	2.24E+01 uci/g
Uranium	7.33E+03 ug/g	6.62E+03 ug/g

Water Digestion Results

	Sample	Duplicate
Water Digestion	9.80 g/L	1.00E+01 g/L
Ion Chromatograph		
Fluoride	1.91E+03 ug/g J	1.42E+03 ug/g
Chloride	<1.03E+03 ug/g J	1.65E+03 ug/g
Nitrate	6.10E+04 ug/g J	4.70E+04 ug/g
Phosphate	<1.03E+04 ug/g J	<1.01E+04 ug/g
Sulfate	4.16E+03 ug/g J	3.56E+03 ug/g
Total Organic Carbon	8.98E+02 ug/g J	7.15E+02 ug/g

ICP Analytical Results

	Sample	Duplicate
Aluminum	36826 ug/g J	48263 ug/g
Arsenic	165 ug/g J	89 LT
Barium	78 ug/g J	51 ug/g
Beryllium	5 ug/g J	3 ug/g
Bismuth	6354 ug/g J	5393 ug/g
Boron	968 ug/g R	66 ug/g
Cadmium	28 ug/g J	16 LT
Calcium	492 ug/g J	515 ug/g
Cerium	1272 ug/g R	543 LT
Chromium	794 ug/g J	825 ug/g
Copper	112 ug/g R	63 LT
Europium	21 ug/g J	10 LT
Iron	6842 ug/g J	8395 ug/g
Lanthanum	129 ug/g J	56 LT
Lead	675 ug/g J	175 ug/g
Lithium	39 ug/g J	13 LT
Magnesium	1155 ug/g R	173 ug/g
Manganese	5412 ug/g J	6982 ug/g
Mercury	1477 ug/g J	1374 ug/g
Molybdenum	58 ug/g R	22 ug/g
Nickel	234 ug/g J	166 ug/g
Phosphorous	2159 ug/g J	1567 ug/g
Potassium	1560 ug/g R	848 LT
Samarium	1239 ug/g J	610 LT
Selenium	1188 ug/g J	703 ug/g
Silver	98 ug/g J	73 LT
Sodium	43084 ug/g J	56657 ug/g
Strontium	526 ug/g J	656 ug/g
Sulfur	928 ug/g J	708 ug/g
Tantalum	256 ug/g R	109 LT
Thallium	5297 ug/g J	1093 ug/g
Thorium	2829 ug/g J	185 ug/g
Tin	141 ug/g J	69 ug/g
Titanium	61 ug/g J	24 ug/g
Uranium	15299 ug/g J	8549 ug/g
Vanadium	100 ug/g J	52 ug/g
Zinc	104 ug/g J	56 ug/g
Zirconium	260 ug/g J	129 ug/g

LT: Less Than
NC: Not Calibrated
NOT CALC: Not Calculated

Note: ICP elements that did not meet calibration instrument limits were not included in this report.

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Holding Time

COMMENTS: Holding times for ICP elements were within limits. Holding time was out of procedure limits for pH, TOC, and IC. The procedure does not specify limits for % water. It should be noted that there was no statement of work specifying holding time limits, and the limits in the OSM procedure may not be achievable for SST core samples and hot cell prepatation.

ACTION: Qualify out-of-limit analytes per OSM procedure as estimated (J) values, or estimated non-detects (UJ) for non-detects.

sample #	constituent	value/qual
F0465	pH	J
F0475	TOC	J
	F	J
	Cl	UJ
	NO3	J
	SO3	J
	PO4	UJ

sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Calibration

COMMENTS: Initial and continuing calibration are within control for ICP, IC, TOC, pH, and % water.

ACTION: None

sample #	constituent	value/qual	sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Analytical Blank

COMMENTS: ICP elements are within control limits.

IC analytes are within control limits.

TOC analysis is within control limits.

pH: N/A

% Water: N/A

ACTION: None

sample #	constituent	value/qual	sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Laboratory Control Sample

COMMENTS: No Laboratory Control Sample data provided for pH, % water, TOC, or IC. The ICP elements listed below were out-of-limits for Laboratory Control Sample.

ACTION: Qualify out-of-limit analytes per OSM procedure as estimated (J) values, or as estimated non-detects (UJ) for non-detects.

sample #	constituent	value/qual	sample #	constituent	value/qual
F0480			F0480		
	Arsenic	J		Samarium	J
	Beryllium	J		Selenium	J
	Cerium	J		Silver	J
	Chromium	J		Sulfur	J
	Europium	J		Tantalum	J
	Mercury	J		Thallium	J
				Thorium	J
				Uranium	J
				Vanadium	J

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Interference Check Sample

COMMENTS: No interference check sample data was supplied with data package for ICP, IC, TOC, pH, or % water.

ACTION: None

sample #	constituent	value/qual	sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Matrix Spike

COMMENTS: No matrix spike data supplied with pH or % water. The ICP elements listed below were out of limits for matrix spike. TOC and IC analytes were within limits.

ACTION: Qualify out-of-limit analytes per OSM procedure as estimated (J) values or estimated non-detects (UJ) for non-detects or rejected (R) for unusable data.

sample #	constituent	value/qual	sample #	constituent	value/qual
F0480			F0480		
	Aluminum	J		Molybdenum	R
	Arsenic	J		Nickel	J
	Barium	J		Potassium	R
	Beryllium	J		Phosphorus	J
	Bismuth	J		Samarium	J
	Boron	R		Selenium	J
	Cadmium	J		Silver	J
	Calcium	J		Sodium	J
	Cerium	R		Strontium	J
	Chromium	J		Sulfur	J
	Copper	J		Tantalum	R
	Europium	J		Thallium	J
	Iron	J		Thorium	J
	Lanthanum	J		Tin	J
	Lead	J		Titanium	J
	Lithium	J		Uranium	J
	Magnesium	R		Vanadium	J
	Manganese	J		Zinc	J
	Mercury	J		Zirconium	J

RCRA QC

Name RL Shaver Date 3-17-92

QC Check: Duplicate Analysis

COMMENTS: Duplicate Analyses were within control limits for pH, and % water. The ICP, and IC analytes which were out of control limits are listed below. The TOC was out of control limits. The relative percent difference is listed in parentheses. A value of >20 RPD qualifies data as out of limit.

ACTION: Qualify out-of-limit analytes per OSM procedure as estimated (J) values.

sample #	constituent	value/qual
F0465		
	TOC	J (31)
F0475		
	F	J (23)
	Cl	UJ (46)
	NO3	J (26)
F0480		
	Aluminum	J (27)
	Arsenic	J (50)
	Barium	J (42)
	Boron	J (174)
	Cadmium	J (55)
	Cerium	J (80)
	Copper	J (56)
	Europium	J (71)
	Iron	J (20)
	Lanthanum	J (78)
	Lead	J (118)
	Lithium	J (100)

sample #	constituent	value/qual
F0480		
	Magnesium	J (148)
	Manganese	J (25)
	Molybdenum	J (90)
	Nickel	J (34)
	Potassium	J (59)
	Phosphorus	J (32)
	Samarium	J (34)
	Selenium	J (51)
	Silver	J (29)
	Strontium	J (28)
	Sodium	J (22)
	Tantalum	J (80)
	Thallium	J (132)
	Thorium	J (175)
	Tin	J (68)
	Titanium	J (86)
	Uranium	J (57)
	Vanadium	J (63)
	Zinc	J (60)
	Zirconium	J (67)

9513325.2385

Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

222-S/RCRA Analytical Laboratories

Project:	Single-Shell Tank Waste Characterization
Tank:	241-U-110
Core:	12
Segment:	4
Customer Id. Number:	89-072
Report Revision:	2
Date Printed:	October 15, 1991

OCT 1991
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Hanford Operations and Engineering Contractor for the US Department of Energy

54 7600-075

Table of Contents

Signature Page....4

Introduction....5

Sampling and Custody Data....8

Sample Data Summary....11

Physical Test Results....13

- Extrusion of Segment....14
- Appearance of Solid....14
- Homogenization....14
- Single Shell Tank Segment - Subsamples....15
- VOA Sampling....15
- Photograph of Tank 241-U-110 Core 12 Segment 4....16
- Particle Size Analysis....17

Undigested Sample Results....23

- Untreated Sample Results Summary....24
- pH Analysis....25
- Percent Water....26

KOH Fusion Results....27

- Fusion Analysis Results Of Solids....28
- Fusion Analysis of Laboratory Solutions....29
- Fusion Dissolution....30
- Total Alpha and Beta Analysis....31
- GEA Analysis....36
- Uranium Analysis....70

Water Digestion Test Results....71

- Water Digestion Results of Solids....72
- Water Digestion Analysis of Laboratory Solutions....73
- Water Digestion....74
- Ion Chromatographic Analysis I....75
- Ion Chromatographic Analysis II....97
- Total Organic Carbon Analysis....124

9513325.2387

Acid Digestion Test Results.....131

ICP Data Summary.....132
Acid Digestion Analysis.....133
Inductively Coupled Plasma Spectrographic Analysis.....134
ICP Raw Data Summary.....135

Appendix A Analytical Analysis Cards.....170

Undigested Sample Analysis.....A1-A5
KOH Fusion Analysis.....A6-A20
Water Digestion Analysis.....A21-A39
Acid Digestion Analysis.....A40-A42

Appendix B Analytical Detection Limits.....171

Detection Limits by Procedure.....B1-B3

This report consists of pages 1-171, plus pages 124.1, 139.1, 139.2, and 144.1.
Appendix A consists of pages A1-A42, plus pages A6.1, A21.1, A40.1.
Appendix B consists of pages B1-B3.

NOTE:

Due to re-evaluation of ICP data the following pages have been revised: 12, 131, 132, and 133-139.2.

Due to re-evaluation of initial source data the following pages have been revised: 1-4, 6, 7, 23, 27-29, 31, 71, 72, 73, 75, 97, 131, 133, 137, 138, plus Appendix A, pages A7, A9, A11, and A13.

The following pages and Appendix B page 3 have been recopied to correct poor copy quality: 17, 20, 40-69, 125-130, and pages 145-152.

REVISION 2 OF CORE 12 SEGMENT 4

We have reviewed this report and certify that this data package meets the requirements of "Quality Assurance Project Plan for the Chemical Analysis of Highly Radioactive Samples in Support of Environmental Activities on the Hanford Site" - WHC-SD-CP-QAPP-002. This data package is a complete and accurate representation of the data generated from the requested laboratory analyses performed on this sample. This revision includes adjustments to prior reports based on a technical review of source data.

Larry P. Markel for Larry H. Taylor Date 10-22-91
Data Coordinator

Daniel M. Thornton Date 10-22-91
Daniel M. Thornton
Unit Manager

Larry P. Markel Date 10/21/91
Larry P. Markel
Laboratory Q.A. Officer

9513325.2389

INTRODUCTION

INTRODUCTION

Westinghouse Hanford Company 222-S/RCRA Analytical Laboratories are supporting the characterization efforts of the single shell tanks. The characterization of tank 241-U-110 was performed under Phase 1A and 1B of the Waste Characterization Plan for the Hanford Site Single-Shelled Tanks (WHC-EP-0210).

Tank 241-U-110 has a 500,000 gallon capacity; construction was completed in 1944. The tank received first cycle waste, REDOX high-level waste, coating waste, and laboratory waste until 1975. Between July 7, 1975 and February 2, 1976, P-10 pumps were installed, and 41,700 gallons of liquid waste were pumped from the tank. Tank 241-U-110 still contains an estimated 195,000 gallons of waste.

The Analytical Laboratories perform all analytical analyses to the specifications of WHC-SD-CP-QAPP-002. In accordance with WHC-SD-CP-QAPP-002 the following laboratory policies are being followed. Spikes are performed on either the undissolved sample, or the sample after dissolution as directed by the chemist. If the spike addition is found to be less than 20% of an analyte concentration, the spike recovery is not reported due to errors introduced by the precision of the sample analysis. The concentration of spike additions will be re-evaluated before the start of phase 1C. Two spiking routines are being used during phase 1A and 1B. For the following analyses, Inductively Coupled Plasma, Mercury Hydride, Total Organic Carbon, and Carbonate analyses the solid sample is spiked and digested independently from the sample digestion. Any non-homogeneity of the sample could adversely affect the spike recoveries. For the radioisotopic analyses and other analyses not specified above, the spikes were performed by spiking an aliquot of sample after digestion.

The laboratory does not report sample results from batch analyses that are questionable. The results from questionable batches are discarded and the analysis is repeated. Sample cards (laboratory travelers) for the repeated analysis are reissued for analysis after they have been stamped "rerun". Laboratory travelers are issued using a computerized routine according to a "sample point". This sample point label (segment-n) on the laboratory travelers and on the GEA analysis reports, has no relationship to the sampling activities or the sample identification. All results in this data package relate only to the sample identified as segment 4 from core 12 taken from tank 241-U-110.

The organic analysis of this sample will be performed by Pacific Northwest Laboratories (PNL). Due to instrument and procedure problems, PNL has been unable to separate organic from the normal paraffin hydrocarbon present in the samples. The results from the organic analysis will be provided when available.

Samples analyzed for Total Carbon between November 1, 1989 and February 22, 1990 were not acidified. When samples are not acidified the results from this method include Total Organic Carbon, Carbonate, and dissolved carbon dioxide from the air. The validity of these analyses are subject to interpretation. The Total Organic Carbon procedure will be corrected by acidification of all future samples and these analyses will be repeated whenever possible.

All sample results reported here by weight are reported as the "wet weight" of the sample. Some samples lost moisture during the process of aliquoting and weighing the sample for digestion. The percent moisture was determined at the earliest opportunity so any errors introduced by the loss of moisture will bias the results high. Performing the analysis on the sample after removing the moisture resulted in increased radiation exposure of approximately tenfold. In order to reduce and control radiation exposures to laboratory personnel, the samples were not dried before aliquoting and digestion.

This report is formatted into sections corresponding to the type of dissolutions performed prior to analysis. A brief summary of analytical results is reported, followed by calibration data and an analysis batch report. Any notable observations regarding an analysis are noted on the batch report for that analysis. Copies of laboratory travelers can be found in Appendix A.

This revision has been issued to correct errors found in the initial Single Shell Tank (SST) 241-U-110 data packages previously released. A formal technical review was performed on all of the data contained in the SST-241-U-110 data packages. The review identified errors due to data transcription, calculations, faulty spreadsheet and electronic reprocessing of original data scans. The errors have been addressed and corrected. Any changes in pagination are a result of data correction and realignment of sections of data.

Ion Chromatographic Analysis (Dionex) discrepancies were noted. The calibrations and sample chromatagrams were electronically reprocessed to produce a clear copy for duplication purposes. Not all raw data files could be reprocessed using the same initial parameters, and therefore the concentration values listed on the chromatograms are slightly different from those listed on the laboratory travelers. These discrepancies are due to program differences. The value listed on the traveler is correctly reported.

Gamma Energy Analysis (GEA), using the Jupiter GEA system, performs a peak analysis on a spectrum and subtracts a background spectrum when the sample is analyzed. When a report is generated at a date other than the original processing date, any subsequent report will vary due to Jupiter GEA system reconstructing the spectrum each time a report is generated from stored spectrum. The variance between the original value listed on the travelers and the reprocessed value is small. The value listed on the traveler is correctly reported.

Some Inductively Coupled Plasma (ICP) analysis data was found to include one or more of the following: incorrect reporting of sample and duplicate results due to inconsistent use of dilution factors; data transcription and calculation errors. These problems were compounded by computational errors due to a flaw in the spreadsheet program utilized for data reduction.

To correct these errors, the equations and format used to report the ICP data were reviewed for each package and approved by the Laboratory Computer Control Board (LCCB). The concentrations, determined by the ICP that were below the instrument detection limit, were reported in the summary as "less than" values calculated from the instrument detection limit and the sample preparation information. Transcription and calculation errors were corrected.

95/3325.2392

SAMPLING AND CUSTODY DATA

CHAIN-OF-CUSTODY RECORD FOR CORE SAMPLING

(1) Shipment Number S-032-89 (2) Sample Number 89-072 (3) Supervisor DCHartley

(4) Tank 110U (5) Riser R2 (6) Segment 4 (7) Cask Serial Number C1022

Radiation Survey Data:	(8) FIELD	(20) LABORATORY
Over Top Dose Rate	<0.5mr/HR.	
Side Dose Rate	10mr/HR	10mR/HR
Bottom Dose Rate	3.5mr/HR	
Smearable Contamination	<DET. (alpha)	<DET (alpha)
	<DET. (beta-gamma)	<DET (beta-gamma)
	RPT BJA (Signature)	RPT DEM (Signature)

(9) Shipment Description:	
A. Work Package Number	2W-89-01060/W
B. Cask Seal Number	For Future Use
C. Sampler Number Used	19
D. Date and Time Sampler Unseated	11-29-89, 1650
E. Expected Liquid Content	10%
F. Expected Solid Content	90%
G. Dose Rate Through Drill String	380 mr/HR.
H. Expected Sample Length	19"

(10) INFORMATION (*Include statement of laboratory tests to be performed.**)

Core #12 WHC-EP-0210 Waste Characterization Plan for the Hanford Site Single Shell Tanks

*Reference laboratory work request, if available.

Comments:

(11) POINT OF ORIGIN	(12) SENDER NAME / SENDER SIGNATURE	(13) DATE AND TIME RELEASED	(14) DESTINATION	(16) RECIPIENT NAME / RECIPIENT SIGNATURE	(17) DATE AND TIME RECEIVED
241-4 110	DCHartley / DCHartley	11-29-89 2152	2225	John C Abercrombie / [signature]	11/29/89 22:07

(15) Seal Intact Upon Release?	(18) Seal Intact Upon Receipt?	(19) Seal Data Consistent with this Record? Shipment No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

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Single Shell Tank Waste Characterization
Summary of Core Sample

TANK ID:	241-U-110
RISER ID:	R2
CORE ID:	#12

DATE SAMPLING INITIATED:	11-29-89
DATE SAMPLING COMPLETED:	11-29-89

SEGMENT		
1	Lab Serial No.	F0393
	Customer ID No.	89-069
	Last Segment?	NO
2	Lab Serial No.	F0417
	Customer ID No.	89-070
	Last Segment?	NO
3	Lab Serial No.	F0441
	Customer ID No.	89-071
	Last Segment?	NO
4	Lab Serial No.	F0465
	Customer ID No.	89-072
	Last Segment?	YES
5	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
6	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
7	Lab Serial No.	
	Customer ID No.	
	Last Segment?	

SEGMENT		
8	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
9	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
10	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
11	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
12	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
13	Lab Serial No.	
	Customer ID No.	
	Last Segment?	
14	Lab Serial No.	
	Customer ID No.	
	Last Segment?	

SST-1 Rev. C 9/7/90 Interim

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SAMPLE DATA SUMMARY

SUMMARY DATA REPORT

Reported results are wet sample weight

Single Shell Tank Project Phase 1B

Tank:	241-U-110
Core:	12
Segment:	4
Customer ID:	89-072

Untreated Sample Results

	Sample	Duplicate
pH	12.53	12.53
%Water	44.10%	44.36%

Fusion Analysis Results

	Sample	Duplicate
Fusion Dissolution	2.88 g/L	3.52 g/L
Total Alpha	5.97E-01 uci/g	<5.00E-01 uci/g
Total Beta	2.05E+03 uci/g	1.98E+03 uci/g
GEA Cs-137	2.36E+01 uci/g	2.24E+01 uci/g
Uranium	7.33E+03 ug/g	6.62E+03 ug/g

Water Digestion Results

	Sample	Duplicate
Water Digestion	9.80 g/L	1.00E+01 g/L
Ion Chromatograph		
Fluoride	1.91E+03 ug/g	1.42E+03 ug/g
Chloride	<1.03E+03 ug/g	1.65E+03 ug/g
Nitrate	6.10E+04 ug/g	4.70E+04 ug/g
Phosphate	<1.03E+04 ug/g	<1.01E+04 ug/g
Sulfate	4.16E+03 ug/g	3.56E+03 ug/g
Total Organic Carbon	8.98E+02 ug/g	7.15E+02 ug/g

ICP Analytical Results

	Sample	Duplicate
Aluminum	36826 ug/g	48263 ug/g
Arsenic	165 ug/g	89 LT
Barium	78 ug/g	51 ug/g
Beryllium	5 ug/g	3 ug/g
Bismuth	6354 ug/g	5393 ug/g
Boron	968 ug/g	66 ug/g
Cadmium	28 ug/g	16 LT
Calcium	492 ug/g	515 ug/g
Cerium	1272 ug/g	543 LT
Chromium	794 ug/g	825 ug/g
Copper	112 ug/g	63 LT
Europium	21 ug/g	10 LT
Iron	6842 ug/g	8395 ug/g
Lanthanum	129 ug/g	56 LT
Lead	675 ug/g	175 ug/g
Lithium	39 ug/g	13 LT
Magnesium	1155 ug/g	173 ug/g
Manganese	5412 ug/g	6982 ug/g
Mercury	1477 ug/g	1374 ug/g
Molybdenum	58 ug/g	22 ug/g
Nickel	234 ug/g	166 ug/g
Phosphorous	2159 ug/g	1567 ug/g
Potassium	1560 ug/g	848 LT
Samarium	1239 ug/g	610 LT
Selenium	1188 ug/g	703 ug/g
Silver	98 ug/g	73 LT
Sodium	43084 ug/g	56657 ug/g
Strontium	526 ug/g	656 ug/g
Sulfur	928 ug/g	708 ug/g
Tantalum	256 ug/g	109 LT
Thallium	5297 ug/g	1093 ug/g
Thorium	2829 ug/g	185 ug/g
Tin	141 ug/g	69 ug/g
Titanium	61 ug/g	24 ug/g
Uranium	15299 ug/g	8549 ug/g
Vanadium	100 ug/g	52 ug/g
Zinc	104 ug/g	56 ug/g
Zirconium	260 ug/g	129 ug/g

LT: Less Than
NC: Not Calibrated
NOT CALC: Not Calculated

Note: ICP elements that did not meet calibration instrument limits were not included in this report.

9513325.2397

PHYSICAL TEST RESULTS

Single Shell Tank
Extrusion of Segment -- Physical Tests

Lab Segment Serial #: F0465 Customer ID: 89-072

Analyst: Richard L. Weiss Date Extruded: January 29, 1990

Drainable Liquid Liquid Submitted for Segment Analysis? -- NO

Gross <10ml	Tare			Net
Serial	Date/Time			Estimated
Specific	Calculated			

Appearance of Liquid: No liquid was collected

Dimensions of Segment

Completed Segment Obtained? No	Length: 10 in.	Calculated Volume: 7.9 in^3
Remarks None		

Appearance of Solids: Light brown solids. Upper 1.5 in. medium browm, and very smooth in appearance.

Penetrometer	11.3 lbs/sq in	Remarks: None

Homogenization

Procedure: T038A-00712 Revision: F		Quantity of Material: 192.11	Grams
Date Homogenized: 02-14-90		Time Homogenized: 5.0	Minutes
Operator: K. J. Patterson			

Laboratory Notebook Reference	WHC-N-313-4	26
	Notebook No.	Page No.

Single Shell Tank Segment -- Subsamples

Lab Segment Serial #:	F0465	Customer ID:	89-072

Volatile Organic Analysis

VOA Sample	Lab Serial #: 89-072-278	Date Sampled: 01-29-90

Sample shipped to PNL

Particle Size Distribution Analysis

Particle Size Sample	Lab Serial #: F0465	Date Sampled: 01-29-90

Homogenized Solids

Undigested Solids Analysis

Laboratory Serial Number For Sample:	F0465	Date Sampled: 02-14-90
Laboratory Serial Number of Duplicate Sample:	F0466	

Fusion Analysis of Solids

Laboratory Serial Number of Sample:	F0470	Date Sampled: 02-14-90
Laboratory Serial Number of Duplicate Sample:	F0471	
Laboratory Serial Number of Spiked Sample:	F0472	

Acid Digestion Analysis of Solids

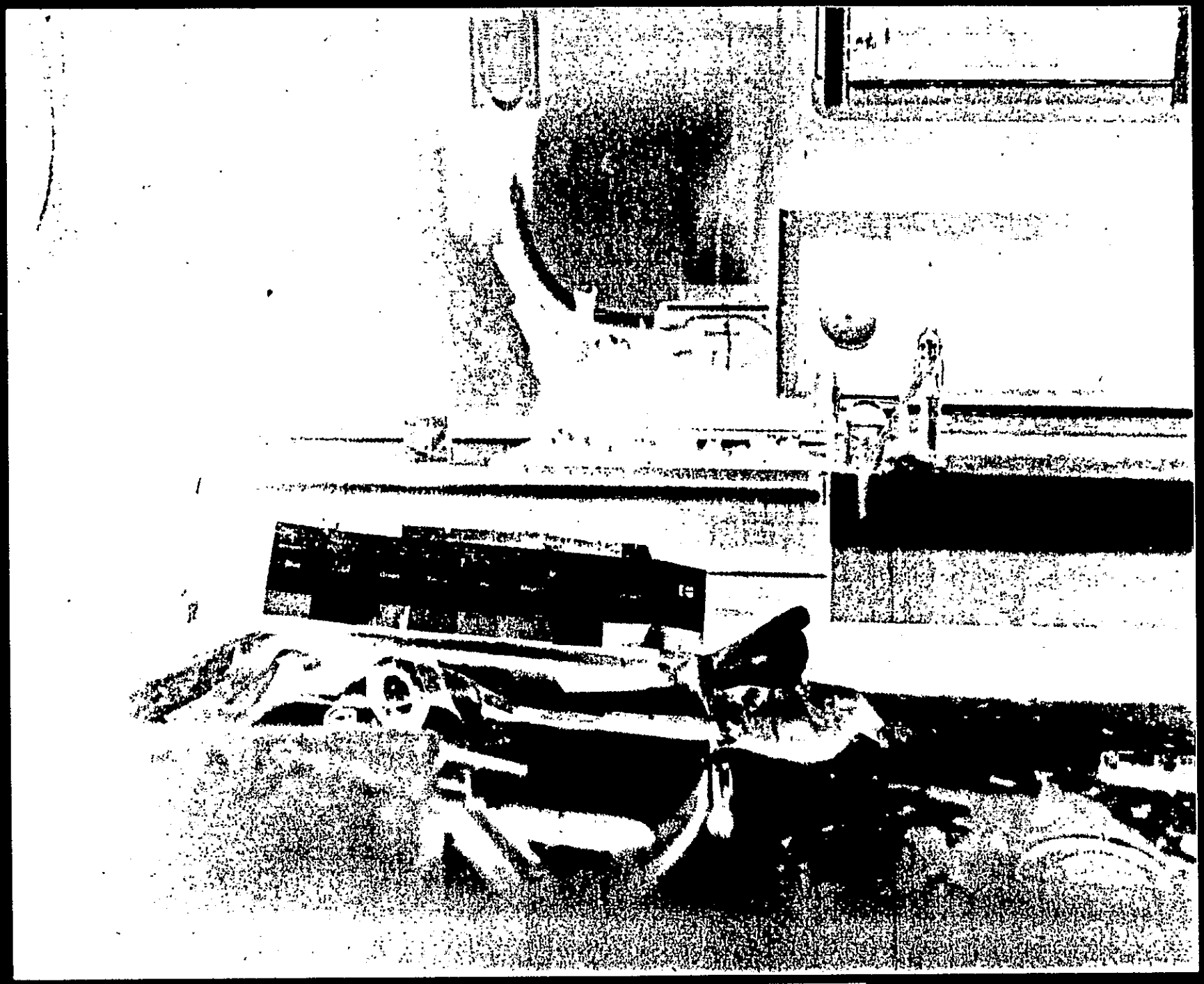
Laboratory Serial Number of Sample:	F0480	Date Sampled: 02-14-90
Laboratory Serial Number of Duplicate Sample:	F0481	
Laboratory Serial Number of Spiked Sample:	F0482	

Water Digestion Analysis of Solids

Laboratory Serial Number of Sample:	F0475	Date Sampled: 02-14-90
Laboratory Serial Number of Duplicate Sample:	F0476	
Laboratory Serial Number of Spiked Sample:	F0477	

Laboratory Notebook Reference	WHC-N-313-4	32
	Notebook No.	Page No.

SST-5 Rev. D 9/7/90 Interim



TANK 241-U-110, CORE 12, SEGMENT 4

Brinkmann
Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS VIA BRINKMANN 2010
STATISTICS

SAMPLE NAME : SST,B000279,F0465,GLY-ETOH,SBK
FILE NAME : F0465.001

DATE	: 22/02/1990	ACQ. RANGE	: 0.5-150	COUNTS	: 53365
TIME	: 10:37	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 317 SEC	S.D.U.	: 2868
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.6E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 6.3E-03 %

	MEAN Diameter	S.D.
Number, Length :	0.99 µm	0.94 µm
Number, Area :	1.37 µm	1.02 µm
Number, Volume :	2.63 µm	1.89 µm
Length, Area :	1.89 µm	3.85 µm
Length, Volume :	4.29 µm	4.53 µm
Area, Volume :	9.71 µm	15.01 µm
Volume, Moment :	32.90 µm	24.28 µm

	MEDIAN Diameter	MODE	CONFIDENCE
Number :	0.81 µm	0.75 µm	100.00%
Area :	3.58 µm	50.33 µm	85.09%
Volume :	32.99 µm	50.33 µm	99.67%

Organics present in sample; dispersed in etOH-glycerine

BEST COPY AVAILABLE

95/3325.2402

SAMPLE NAME : SST,B000279,F0465,GLY-ETOH,SBK
FILE NAME : F0465.001

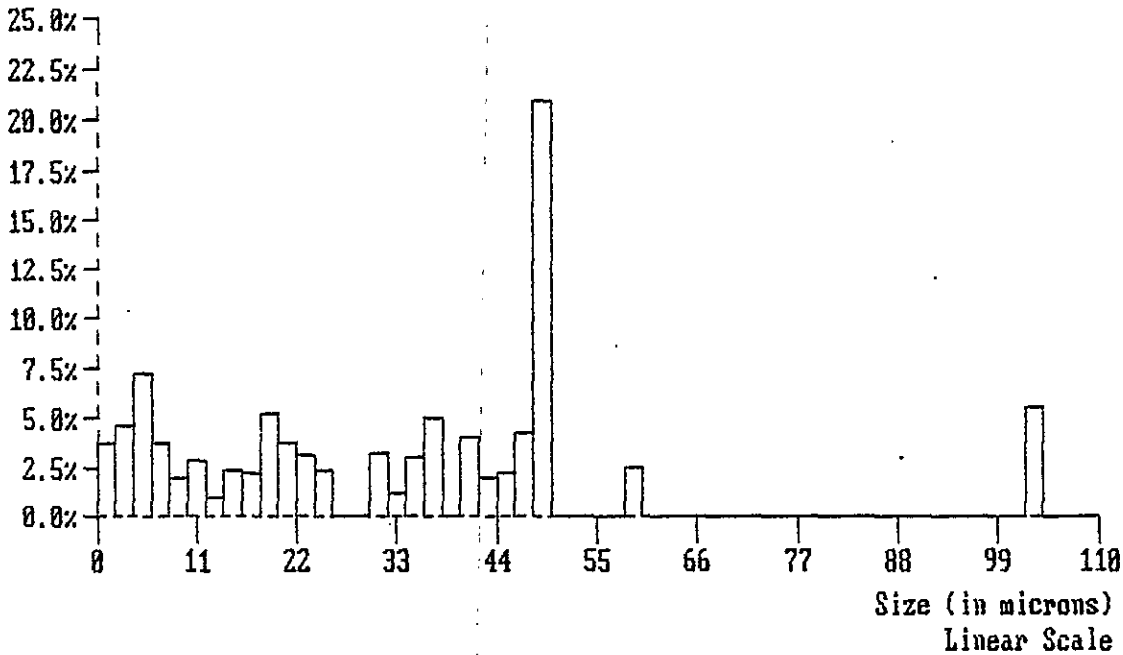
DATE	: 22/02/1990	ACQ. RANGE	: 0.5-150	COUNTS	: 53365
TIME	: 10:37	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 317 SEC	S.D.U.	: 2868
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.6E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 6.3E-03 %

PROBABILITY VOLUME DENSITY GRAPH

Name: SST,B000279,F0465,GLY-ETOH,SBK
6.3E-05 cc/ml(100.0%)
Mode at 49.00 µm
<< SCALE RANGE (µm): ADJUSTED >>

Mean(nv): 2.63µm
S.D.(nv): 1.89µm

Median : 32.99µm
Mean(vm): 32.90µm
S.D.(vm): 24.28µm
Conf(vm): 99.67 %



SAMPLE NAME : SST,B000279,F0465,GLY-ETOH,SBK
FILE NAME : F0465.001

DATE	: 22/02/1990	ACQ. RANGE	: 0.5-150	COUNTS	: 53365
TIME	: 10:37	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 317 SEC	S.D.U.	: 2868
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.6E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 6.3E-03 %

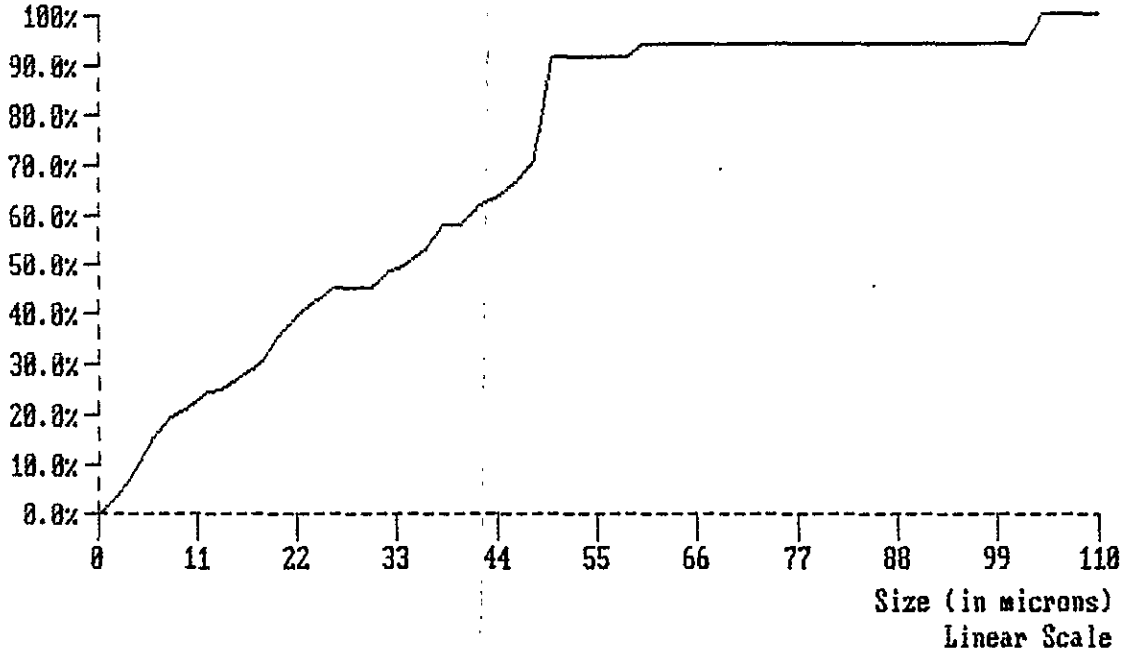
PROBABILITY VOLUME DISTRIBUTION GRAPH

Name: SST,B000279,F0465,GLY-ETOH,SBK
6.3E-05 cc/ml(100.0%)

Mean(nv): 2.63µm
S.D.(nv): 1.89µm

Median : 32.99µm
Mean(vm): 32.90µm
S.D.(vm): 24.28µm
Conf(vm): 99.67 %

<< SCALE RANGE (µm): ADJUSTED >>



Brinkmann
Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS VIA BRINKMANN 2010
STATISTICS

SAMPLE NAME : SST,B000279,F00465,GLY-ETOH,SBK
FILE NAME : F0465.002

DATE	: 22/02/1990	ACQ. RANGE	: 0.5-60	COUNTS	: 16957
TIME	: 10:51	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 95 SEC	S.D.U.	: 3342
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 3	CONCENTR.	: 7.2E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 9.1E-03 %

	MEAN Diameter	S.D.
Number, Length :	0.89 µm	0.98 µm
Number, Area :	1.33 µm	1.08 µm
Number, Volume :	2.89 µm	2.23 µm
Length, Area :	1.98 µm	4.82 µm
Length, Volume :	5.21 µm	5.81 µm
Area, Volume :	13.74 µm	19.06 µm
Volume, Moment :	40.19 µm	18.78 µm

	MEDIAN Diameter	MODE	CONFIDENCE
Number :	0.71 µm	0.55 µm	100.00%
Area :	4.24 µm	53.27 µm	60.72%
Volume :	51.26 µm	53.27 µm	98.88%

BEST COPY AVAILABLE

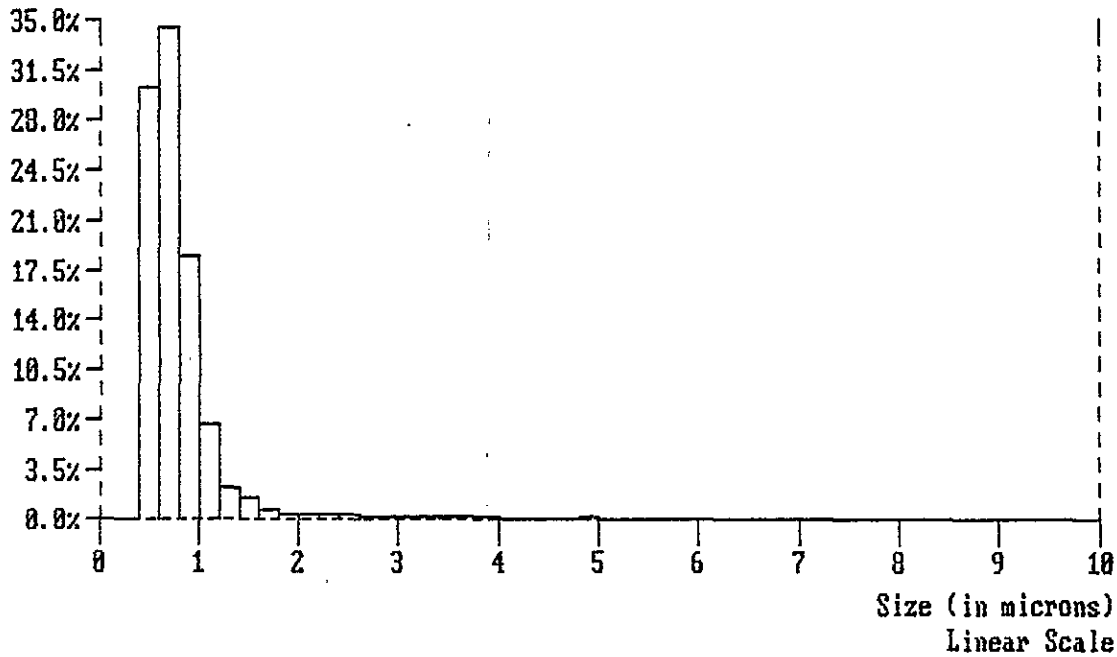
SAMPLE NAME : SST,B000279,F00465,GLY-ETOH,SBK
FILE NAME : F0465.002

DATE	: 22/02/1990	ACQ. RANGE	: 0.5-60	COUNTS	: 16957
TIME	: 10:51	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 95 SEC	S.D.U.	: 3342
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 3	CONCENTR.	: 7.2E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 9.1E-03 %

PROBABILITY NUMBER DENSITY GRAPH

Name: SST,B000279,F00465,GLY-ETOH,SBK
7.2E+06 #/ml(99.9%)
Mode at 0.70 µm
<< SCALE RANGE (µm): 0 - 10 >>

Local Median : 0.71µm
Local Mean(nl): 0.87µm
Local S.D.(nl): 0.68µm
Local Conf(nl): 100.00 %



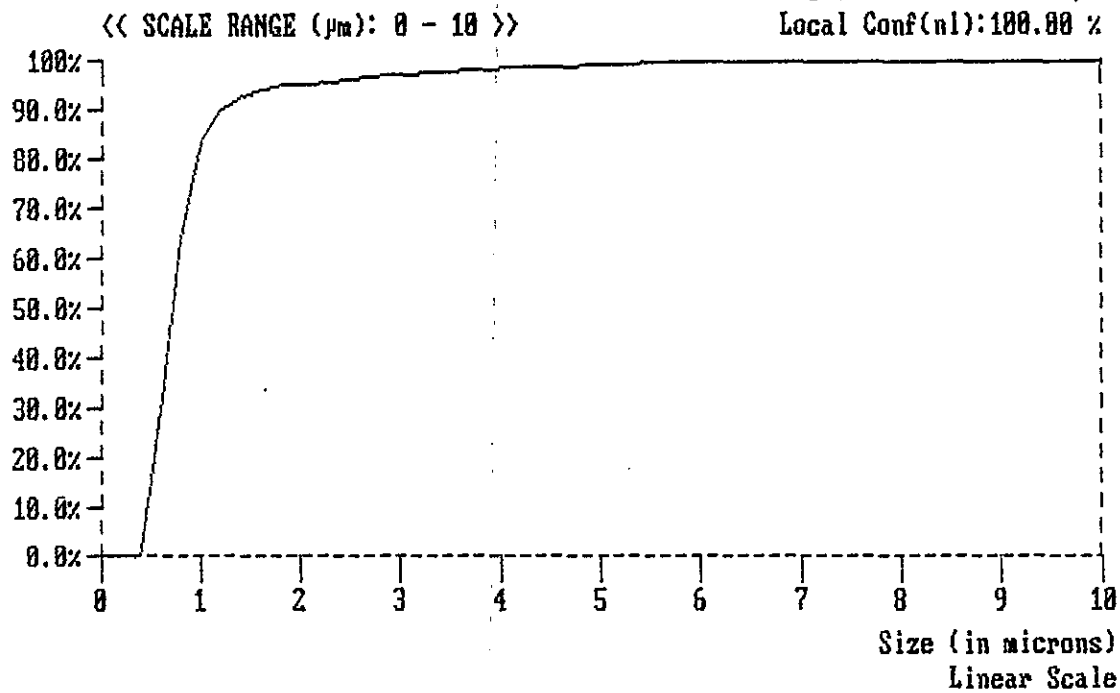
SAMPLE NAME : SST,B000279,F00465,GLY-ETOH,SBK
FILE NAME : F0465.002

DATE	: 22/02/1990	ACQ. RANGE	: 0.5-60	COUNTS	: 16957
TIME	: 10:51	ACQ. MODE	: SAMPLE	S.N.F.	: 0.91
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 95 SEC	S.D.U.	: 3342
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 3	CONCENTR.	: 7.2E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 9.1E-03 %

PROBABILITY NUMBER DISTRIBUTION GRAPH

Name: SST,B000279,F00465,GLY-ETOH,SBK
7.2E+06 #/ml(99.9%)

Local Median : 0.71µm
Local Mean(nl): 0.87µm
Local S.D.(nl): 0.68µm
Local Conf(nl):100.00 %



9513325.2407

UNDIGESTED SAMPLE RESULTS

Single Shell Tank Project

Untreated Sample Results

Tank: 241-U-110
Core: 12
Segment: 4
Customer ID: 89-072

	Check Standard	Blank	Sample	Sample Duplicate	Check Standard
Laboratory ID:	F0464	F0485	F0465	F0466	F0468
pH	100.80%	9.72	12.53	12.53	100.90%
Laboratory ID:	F0416	F0437	F0465	F0466	F0564
%Water	98.30%	6.2mg	44.10%	44.36%	96.95%

9413345.2408

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

pH analysis of the solid sample

INSTRUMENT	N/A
PROCEDURE/REV	LA-212-103/A-1
TECHNOLOGIST	Mary Franz
DATE	March 06,1990
TEMPERATURE	21.9 C
STARTING TIME	1000
ENDING TIME	1530
CHEMIST	R. E. Brandt

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0464
2	Reagent Blank	F0485
3	Sample 89-072	F0465
4	Duplicate Sample 89-072	F0466
5	Final LMCS Check Std.	F0468
6		
7		
8		
9		
10		
11		

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
LMCS Check Standard	72C11-B/1.0 mL			1.0 mL

SST-102 Rev. F 9/7/90 Interim

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

% Water in Sample 89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-564-101/D-1
TECHNOLOGIST	R. D. Hale
DATE	March 02, 1990
TEMPERATURE	120 C
STARTING TIME	1400 03-01-90
ENDING TIME	1430 03-02-90
CHEMIST	R. E. Brandt

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0416
2	Reagent Blank		F0437
3	Sample	89-070	F0417
4	Duplicate Sample	89-070	F0418
5	Sample	89-071	F0441
6	Duplicate Sample	89-071	F0442
7	Sample	89-072	F0465
8	Duplicate Sample	89-072	F0466
9	Sample	89-073	F0489
10	Duplicate Sample	89-073	F0490
11	Sample	89-074	F0513

	DESCRIPTION		LAB ID
12	Duplicate Sample	89-074	F0514
13	Sample	89-075	F0537
14	Duplicate Sample	89-075	F0538
15	Sample	89-076	F0561
16	Duplicate Sample	89-076	F0562
17	Final LMCS Check Std		F0564
18			
19			
20			
21			
22			

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
LMCS Check Standard	11C11AH/1.0 mL			1.0 mL

SST-102 Rev. F 9/7/90 Interim

95/3325.2411

KOH FUSION RESULTS

Single Shell Tank Project

Fusion Analysis
Laboratory Results of Solids
Units for Samples Are Wet Weight

Tank:	241-U-110
Core:	12
Segment:	4
Customer ID:	89-072

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample	Check Standard
Laboratory ID:		**F0436**		**F0470**		**F0471**			
Fusion Dissolution		Complete		2.88	g/L	3.52	g/L		
Laboratory ID:	**F0469**	**F0484**		**F0470**		**F0471**		**F0472**	**F0473**
Total Alpha	97.20%	<7.65E-05	uci/L	5.97E-01	uci/g	<5.00E-01	uci/g	103.10%	95.40%
Total Beta	100.90%	4.40E-04	uci/L	2.05E+03	uci/g	1.98E+03	uci/g	112.10%	99.50%
Laboratory ID:	**F0421**	**F0436**		**F0470**		**F0471**		**F0568**	**F0569**
GEA Cs-137	98.30%	<4.81E-04	uci/L	2.36E+01	uci/g	2.24E+01	uci/g	93.50%	97.30%
Laboratory ID:	**F0469**	**F0484**		**F0470**		**F0471**		**F0472**	**F0473**
Uranium	83.70%	<7.40E-05	g/L	7.33E+03	ug/g	6.62E+03	ug/g	123.20%	85.00%

Single Shell Tank Project

Fusion Analysis
Results on Laboratory Digestions

Tank:	241-U-110
Core:	12
Segment:	4
Customer ID:	89-072

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample	Check Standard
Laboratory ID:		F0436		F0470		F0471			
Fusion Dissolution		Complete		2.88	g/L	3.52	g/L		
Laboratory ID:	F0469	F0484		F0470		F0471		F0472	F0473
Total Alpha	97.20%	<7.63E-05	uci/L	1.72	uci/L	<1.76	uci/L	103.30%	95.40%
Total Beta	100.90%	4.40E-04	uci/L	5.91E+03	uci/L	6.96E+03	uci/L	112.10%	99.50%
Laboratory ID:	F0421	F0436		F0470		F0471		F0568	F0569
GEA Cs-137	98.30%	<4.81E-04	uci/L	6.79E+01	uci/L	7.87E+01	uci/L	93.50%	97.30%
Laboratory ID:	F0469	F0484		F0470		F0471		F0472	F0473
Uranium	83.70%	<7.40E-05	g/L	2.11E-02	g/L	2.33E-02	g/L	123.20%	85.00%

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

Fusion Dissolution

INSTRUMENT	N/A
PROCEDURE/REV	LA-549-141/A-1
TECHNOLOGIST	R. D. Hale
DATE	March 10, 1990
TEMPERATURE	450 C
STARTING TIME	0800
ENDING TIME	1200
CHEMIST	S. A. Catlow

	DESCRIPTION		LAB ID
1	Reagent Blank		F0436
2	Sample	89-070	F0422
3	Duplicate Sample	89-070	F0423
4	Sample	89-071	F0446
5	Duplicate Sample	89-071	F0447
6	Sample	89-072	F0470
7	Duplicate Sample	89-072	F0471
8	Sample	89-075	F0442
9	Duplicate Sample	89-075	F0443
10	Sample	89-076	F0566
11	Duplicate Sample	89-076	F0567

	DESCRIPTION		LAB ID
12	Sample	89-077	F1095
13	Duplicate Sample	89-077	F1096
14	Sample	89-078	F1119
15	Duplicate Sample	89-078	F1120
16	Sample	89-079	F1143
17	Duplicate Sample	89-079	F1144
18	Sample	89-080	F1167
19	Duplicate Sample	89-080	F1168
20			
21			
22			

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
N/A				

SST-102 Rev. F 9/7/90 Interim

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	WA57277
PROCEDURE/REV	LA-508-101/C-2*
TECHNOLOGIST	Mary Franz
DATE	03/29/90
TEMPERATURE	N/A
STARTING TIME	08:30
ENDING TIME	10:30
CHEMIST	S. A. Catlow

Total Beta & Total Alpha Analysis of the Fusion Dissolution. Detector #15

* Std. and Spike relating to this procedure may have been prepared according to LA-548-101. Samples also may have been prepared according to LA-548-101 due to varying sample mount size.

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0469
2	Reagent Blank	F0484
3	Sample 89-072	F0470
4	Duplicate Sample 89-072	F0471
5	Spike of Sample 89-072	F0472
6	Final LMCS Check Std.	F0473
7		
8		
9		
10		
11		

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
LMCS Check Standard	132B44/10 mL			N/A
Spike	132B44/10 mL	F0470/1.0 uL		N/A

SST-102 Rev. F 9/7/90 Interim

9513325.2416

Single Shell Tank
Calibration Record

ANALYTE:	Am^{241}		
PROCEDURE:	LQ-508-002	REVISION:	A-0
INSTRUMENT:	Detector #15	PROPERTY NUMBER:	WA57276
TECHNOLOGIST:	R.A. Jones	PAYROLL NUMBER:	65801
DATE:	March 3, 1990		
CALIBRATION STANDARD ID:	36B40A8; 36B40B7; 36B40C7; 36B40A3; 36B40B3; 36B40C3; 36B40A6; 36B40B6; 36B40C5		
ANALYTE CONCENTRATION:	N/A		
TYPE OF CALIBRATION:	Efficiency		

SST-103 Rev. (Draft) 9/15/90 Short Interim

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No.DET 15

RADIONUCLIDE: Am-241
HALF LIFE: 154497
COUNT TIME: 5
CPM BKG: 0.5

TIME ZERO DATE (HD): 15897

DATE COUNTED (HD): 16595

CALIBRATED BY: RA JONES

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	03/03/90	0056	92907	92752	92932	93124
36B40B7	1	03/03/90	0109	164871	165823	165202	164885
36B40C7	1	03/03/90	0123	238572	238414	237538	237678
36B40A3	2	03/03/90	0136	73407	73242	73418	73818
36B40B3	2	03/03/90	0148	133719	133357	132740	133381
36B40C3	2	03/03/90	0202	187650	188370	188565	189527
36B40A6	5	03/03/90	0214	65974	63160	64479	65939
36B40B6	5	03/03/90	0227	137241	133185	127193	132343
36B40C5	5	03/03/90	0240	182035	182021	175939	183009

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A8	1"	60570	18585	1.00	18644	0.3078
36B40B7	1"	109900	33039	1.00	33142	0.3016
36B40C7	1"	159700	47610	1.00	47759	0.2991

AVERAGE, 1" = 0.3028 +/- @95% 0.0088 2.92 % ON 09/09/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	14694	1.00	14740	0.2385
36B40B3	2"	110700	26659	1.00	26743	0.2416
36B40C3	2"	161400	37705	1.00	37823	0.2343

AVERAGE, 2" = 0.2381 +/- @95% 0.0071 2.99 % ON 09/09/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	12977	1.00	13018	0.2189
36B40B6	5"	109800	26498	1.00	26581	0.2421
36B40C5	5"	160100	36150	1.00	36263	0.2265

AVERAGE, 5" = 0.2292 +/- @95% 0.0232 10.11 % ON 09/09/90

NEW EFFS FOR DET 15 Am-241 1" = 0.3028 2" = 0.2381

5" = 0.2292

Single Shell Tank Calibration Record

Analyte:	Co^{60}		
Procedure:	LQ-508-002	Revision:	A-0
Instrument:	Detector #15	Property Number:	WA57277
Technologist:	R.A. Jones	Payroll Number:	65801
Date:	May 3, 1990		
Calibration Standard ID:	100B40A2; 100B40B1; 100B40C1; 32B40A4; 32B40B3; 32B40C4; 32B40A5; 32B40B6; 32B40C5		
Analyte Concentration:	N/A		
Type of Calibration:	Efficiency		

SST-103 Rev. (Draft) 9/15/90 Short Interim

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 15

RADIONUCLIDE:	Co-60	2" & 5" STD TIME ZERO DATE (HD):	15883
HALF LIFE:	1925	1" STD TIME ZERO DATE (HD):	16573
COUNT TIME:	5	DATE COUNTED (HD):	16595
CPM BKG:	8	DATE COUNTED 1" (HD)	16595
CPM 1" BKG:	8		

CALIBRATED BY: RA JONES

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
100B40A2	1	03/03/90	0253	111380	110747	111696	111703
100B40B1	1	03/03/90	0305	227251	227654	226737	227044
100B40C1	1	03/03/90	00318	328474	327446	327088	326036
32B40A4	2	03/03/90	0330	86815	86915	86832	86082
32B40B3	2	03/03/90	0342	169113	168274	168996	167860
32B40C4	2	03/03/90	0354	243994	243963	244914	244649
32B40A5	5	03/03/90	0406	73505	72852	75820	75343
32B40B6	5	03/03/90	0417	148130	155479	156650	154379
32B40C5	5	03/03/90	0430	222669	220281	220095	224735

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
100B40A2	1"	67290	22268	1.01	22445	0.3336
100B40B1	1"	137800	45426	1.01	45788	0.3323
100B40C1	1"	199700	65444	1.01	65965	0.3303
AVERAGE, 1" =		0.3321	+/- @95%	0.0032	0.96 %	ON 09/09/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A4	2"	70480	17324	1.29	22387	0.3176
32B40B3	2"	135100	33704	1.29	43554	0.3224
32B40C4	2"	202400	48868	1.29	63149	0.3120
AVERAGE, 2" =		0.3173	+/- @95%	0.0102	3.21 %	ON 09/09/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A5	5"	70160	14868	1.29	19213	0.2738
32B40B6	5"	135700	30724	1.29	39703	0.2926
32B40C5	5"	201900	44381	1.29	57351	0.2841
AVERAGE, 5" =		0.2835	+/- @95%	0.0184	6.48 %	ON 09/09/90

NEW EFFS FOR DET 15 Co-60 1" = 0.3321 2" = 0.3173

5" = 0.2835

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-548-121/C-2
TECHNOLOGIST	R. D. Hale
DATE	March 14, 1990
TEMPERATURE	23 C
STARTING TIME	0900
ENDING TIME	1000
CHEMIST	S. A. Catlow

GEA Analysis
Fusion Dissolution
Samples are prepared in batch, but counted randomly.

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0421
2	Reagent Blank		F0436
3	Sample	89-070	F0422
4	Duplicate Sample	89-070	F0423
5	Sample	89-071	F0446
6	Duplicate Sample	89-071	F0447
7	Sample	89-072	F0470
8	Duplicate Sample	89-072	F0471
9	Sample	89-071	F0442
10	Duplicate Sample	89-071	F0443
11	Sample	89-076	F0566

	DESCRIPTION		LAB ID
12	Duplicate Sample	89-076	F0567
13	Spike	89-076	F0568
14	Final LMCS Check Std.		F0569
15			
16			
17			
18			
19			
20			
21			
22			

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
LMCS Check Standard	122B44/500 uL			22 mL
Spike	122B44/500 uL	F0447/50 uL		22 mL

SST-102 Rev. F 9/7/90 Interim

Single Shell Tank Calibration Record

Analyte:	Isotope, Mixed Gamma		
Procedure:	LQ-508-003	Revision:	A-0
Instrument:	GEA Detector #1	Property Number:	401934
Technologist:	J. L. Anderson	Payroll Number:	61413
Date:	February 14, 1990		
Calibration Standard ID:	56B40 D1		
Analyte Concentration:	N/A		
Type of Calibration:	Gamma Energy Analysis (Efficiency)		

Comments:

SST-103 Rev. (Draft) 9/4/90 Interim

DETECTOR: 1
GEOMETRY CODE: 42
GEOMETRY DECSRIPTION: 22 ML LIQUID, POS 2
CALIBRATION DATE: 14-Feb-89
ANALYST(S): J. L. ANDERSON/M. R. DOWELL
STANDARD ID: 56840 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	5.721347E-03
88.032	1.512568E-02
122.0614	2.041958E-02
165.853	1.856472E-02
279.1967	
391.668	1.042777E-02
513.99	7.856059E-03
661.65	6.838966E-03
898.021	5.300244E-03
1173.237	4.218416E-03
1332.501	3.785537E-03
1836.129	2.931033E-03

EQUATION 0-165 KEV

```
LOG(EFF) =    -5.343694E+01
         +     2.034704E+01 *LOG(ENERGY)
         +    -2.088264E+00 *LOG(ENERGY)^2
```

EQUATION 165-1836 KEV

```
LOG(EFF) =     8.372735E+00
         +    -7.762489E+00 *LOG(ENERGY)
         +     2.017698E+00 *LOG(ENERGY)^2
         +    -2.447560E-01 *LOG(ENERGY)^3
         +     1.067720E-02 *LOG(ENERGY)^4
```

GEA CALIBRATION RECORD PROCEDURE LQ-508-003

DETECTOR: 1
GEOMETRY CODE: 43
GEOMETRY DECSRIPTION: 22 ML LIQUID, POS 3
CALIBRATION DATE: 16-Feb-89
ANALYST(S): J. L. ANDERSON/M. R. DOWELL
STANDARD ID: 56840 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	1.397695E-03
88.032	3.641448E-03
122.0614	5.035820E-03
165.853	4.620516E-03
279.1967	
391.668	2.619018E-03
513.99	1.890740E-03
661.65	1.782478E-02
898.021	1.392563E-03
1173.237	1.117189E-03
1332.501	1.007670E-03
1836.129	7.782502E-04

EQUATION 0-165 KEV

```
LOG(EFF) =    -5.354869E+01
```

```
                    +    1.975356E+01 *LOG(ENERGY)
                    +   -2.020858E+00 *LOG(ENERGY)^2
```

EQUATION 165-1836 KEV

```
LOG(EFF) =          4.001880E+01
                    +   -2.857555E+01 *LOG(ENERGY)
                    +    6.748440E+00 *LOG(ENERGY)^2
                    +    7.173093E-01 *LOG(ENERGY)^3
                    +    2.821780E-02 *LOG(ENERGY)^4
```

GEA CALIBRATION RECORD PROCEDURE LQ-508-003

9513325.2429

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
*              G A M M A   S P E C T R U M   A N A L Y S I S          *
*                                                                     *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM 27-AUG-90 13:08:43

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 1 / GEOMETRY NUMBER: 42
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1070
ANALYZED BY: VR

SAMPLE DESCRIPTION: F421 SEG F
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 5.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAR-90 AT 11:00:58

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3005. SECONDS
DEAD TIME: 0.17 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89
EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM 27-AUG-90 13:08:43

P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.46	563.20	1.34	417.	456.	13.9	CS-134, EU-152
2C	1139.52	569.23	1.34	456.	822.	12.2	CS-134, BI-207
3C	1210.35	604.63	1.41	394.	5339.	3.3	CS-134
4C	1219.45	609.18	1.41	323.	79.	30.4	BI-214, RU-103
5	1324.22	661.55	1.47	366.	9209.	2.1	CS-137
5B		661.82			35.	46.4	
6C	1592.53	795.69	1.55	258.	3769.	4.0	CS-134
7C	1604.74	801.80	1.55	227.	359.	14.3	CS-134
8	2347.09	1173.10	1.74	186.	4807.	3.0	CO-60
9	2665.49	1332.42	1.97	37.	4508.	3.0	CO-60
10	2731.21	1365.31	2.48	13.	101.	22.6	CS-134
11	2921.74	1460.68	2.12	11.	187.	15.5	K-40
11B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BK0011
BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00
BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM 27-AUG-90 13:08:43

SAMPLE: F421 SEG F
DATA COLLECTED ON 14-MAR-90 AT 11:00:58
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<7.86E-01		LLD<7.86E-01		911.07	
AG-108M	LLD<1.96E-01		LLD<1.96E-01		433.94	
AG-110M	LLD<8.94E-01		LLD<8.94E-01		657.76	
AM-241	LLD<8.34E-01		LLD<8.34E-01		59.54	
AM-243	LLD<2.10E-01		LLD<2.10E-01		74.67	
AR-41	LLD<1.48E-01		LLD<1.48E-01		1293.64	
AU-198	LLD<1.70E-01		LLD<1.70E-01		411.80	
BA-133	LLD<2.57E-01		LLD<2.57E-01		356.02	
BA-139	LLD<5.05E-01		LLD<5.05E-01		165.85	
BA-140	LLD<7.04E-01		LLD<7.04E-01		537.27	
BA-141	LLD<5.12E-01		LLD<5.12E-01		190.23	
BE-7	LLD<1.78E+00		LLD<1.78E+00		477.59	
BI-207	LLD<1.69E-01		LLD<1.69E-01		569.70	
BI-212	LLD<2.47E+00		LLD<2.47E+00		727.27	
BI-214	1.70E-01	+-1.58E-01	1.70E-01	+-1.58E-01	609.32	-0.14
CD-109	LLD<3.08E+00		LLD<3.08E+00		88.03	
CE-139	LLD<1.14E-01		LLD<1.14E-01		165.85	
CE-141	LLD<1.77E-01		LLD<1.77E-01		145.44	
CEPR144	LLD<1.51E+00		LLD<1.51E+00		133.51	
CO-56	LLD<1.88E-01		LLD<1.88E-01		846.76	
CO-57	LLD<9.58E-02		LLD<9.58E-02		122.06	
CO-58	LLD<1.83E-01		LLD<1.83E-01		810.75	
CO-60	2.14E+01	+-6.73E-01	2.14E+01	+-6.73E-01	1332.50	-0.08
					1173.24	-0.14
CR-51	LLD<1.38E+00		LLD<1.38E+00		320.09	
CS-134	1.36E+01	+-5.63E-01	1.36E+01	+-5.63E-01	795.84	-0.15
					604.70	-0.07
CS-136	LLD<1.85E-01		LLD<1.85E-01		818.51	
CS-137	2.85E+01	+-7.04E-01	2.85E+01	+-7.04E-01	661.65	-0.10
CS-138	LLD<1.38E-01		LLD<1.38E-01		1435.86	
EU-152	LLD<3.23E-01		LLD<3.23E-01		1408.01	
EU-154	LLD<3.09E-01		LLD<3.09E-01		1274.45	
EU-155	LLD<3.73E-01		LLD<3.73E-01		105.31	
FE-59	LLD<4.20E-01		LLD<4.20E-01		1099.25	
HF-181	LLD<1.95E-01		LLD<1.95E-01		482.20	
HG-203	LLD<1.60E-01		LLD<1.60E-01		279.20	
I-131	LLD<1.97E-01		LLD<1.97E-01		364.48	
I-132	LLD<2.60E-01		LLD<2.60E-01		667.69	
I-133	LLD<1.90E-01		LLD<1.90E-01		529.69	
I-134	LLD<2.70E-01		LLD<2.70E-01		847.03	
I-135	LLD<4.06E-01		LLD<4.06E-01		1260.41	
K-40	LLD<1.90E+00		LLD<1.90E+00		1460.75	
KR-85	LLD<4.08E+01		LLD<4.08E+01		513.99	
KR-85M	LLD<1.12E-01		LLD<1.12E-01		151.17	
KR-87	LLD<4.37E-01		LLD<4.37E-01		402.58	
KR-89	LLD<6.52E+00		LLD<6.52E+00		220.90	
LA-140	LLD<7.35E-02		LLD<7.35E-02		1596.20	

LA-142	LLD<3.84E-01	LLD<3.84E-01	641.83
MN-54	LLD<1.75E-01	LLD<1.75E-01	834.83
MN-56	LLD<2.12E-01	LLD<2.12E-01	846.76
NA-22	LLD<1.03E-01	LLD<1.03E-01	1274.55
NA-24	LLD<1.68E-01	LLD<1.68E-01	1368.60
NB-94	LLD<1.59E-01	LLD<1.59E-01	702.63
NB-95	LLD<1.60E-01	LLD<1.60E-01	765.78
NB-97	LLD<1.08E+00	LLD<1.08E+00	657.92
NP-238	LLD<8.25E-01	LLD<8.25E-01	984.45
NP-239	LLD<8.99E-01	LLD<8.99E-01	277.60
PA-233	LLD<4.03E-01	LLD<4.03E-01	311.98
PA-234M	LLD<3.46E+01	LLD<3.46E+01	1001.03
PB-210	LLD<4.65E+00	LLD<4.65E+00	465.03
PB-212	LLD<2.86E-01	LLD<2.86E-01	239.00
PB-214	LLD<4.25E-01	LLD<4.25E-01	351.92
PO-210	LLD<1.64E+04	LLD<1.64E+04	804.00
PO-214	LLD<6.88E+03	LLD<6.88E+03	799.70
PO-216	LLD<1.32E+04	LLD<1.32E+04	804.90
PU-239	LLD<1.30E+03	LLD<1.30E+03	129.30
PU-241	LLD<4.57E+04	LLD<4.57E+04	148.57
RA-224	LLD<3.12E+00	LLD<3.12E+00	240.99
RA-226	LLD<2.72E+00	LLD<2.72E+00	186.10
RB-88	LLD<6.32E-01	LLD<6.32E-01	1836.00
RB-89	LLD<9.12E-01	LLD<9.12E-01	1031.88
RN-220	LLD<1.46E+02	LLD<1.46E+02	549.73
RU-103	LLD<1.78E-01	LLD<1.78E-01	497.08
RURH106	LLD<3.28E+00	LLD<3.28E+00	621.80
SB-124	LLD<3.08E-01	LLD<3.08E-01	602.72
SB-125	LLD<1.46E+00	LLD<1.46E+00	176.33
SC-46	LLD<2.22E-01	LLD<2.22E-01	1120.45
SE-75	LLD<2.20E-01	LLD<2.20E-01	264.66
SN-113	LLD<2.49E-01	LLD<2.49E-01	391.67
SR-85	LLD<1.79E-01	LLD<1.79E-01	513.99
SR-91	LLD<3.03E-01	LLD<3.03E-01	555.60
SR-92	LLD<7.70E-02	LLD<7.70E-02	1383.94
TA-182	LLD<6.21E-01	LLD<6.21E-01	1121.30
TC-99M	LLD<1.02E-01	LLD<1.02E-01	140.51
TE-123M	LLD<1.09E-01	LLD<1.09E-01	159.00
TE-125M	LLD<2.77E+01	LLD<2.77E+01	109.27
TE-132	LLD<1.34E-01	LLD<1.34E-01	228.16
TH-228	LLD<9.61E+00	LLD<9.61E+00	84.37
TL-208	LLD<2.18E-01	LLD<2.18E-01	583.14
U-235	LLD<1.81E-01	LLD<1.81E-01	185.71
U-237	LLD<5.53E-01	LLD<5.53E-01	208.00
W-187	LLD<5.51E-01	LLD<5.51E-01	685.74
XE-131M	LLD<4.72E+00	LLD<4.72E+00	163.98
XE-133	LLD<3.42E-01	LLD<3.42E-01	81.00
XE-133M	LLD<1.18E+00	LLD<1.18E+00	233.21
XE-135	LLD<1.44E-01	LLD<1.44E-01	249.79
XE-138	LLD<1.09E+00	LLD<1.09E+00	258.41
Y-88	LLD<6.00E-02	LLD<6.00E-02	1836.06
Y-91	LLD<4.84E+01	LLD<4.84E+01	1204.90
Y-91M	LLD<2.29E-01	LLD<2.29E-01	555.60
ZN-65	LLD<4.36E-01	LLD<4.36E-01	1115.55
ZR-95	LLD<3.02E-01	LLD<3.02E-01	756.73
ZR-97	LLD<1.59E-01	LLD<1.59E-01	743.33
TOTAL	6.37E+01 +-1.14E+00	6.37E+01 +-1.14E+00	

STANDARD DEVIATION = 0.04

'92.0325.2428

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.44E-09 UC/LI
TOTAL MEASURED ACTIVITY = 6.37E+01 (+-1.14E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.46	563.20	456.	13.9	1.95E+01
1139.52	569.23	822.	12.2	3.55E+01
1604.74	801.80	359.	14.3	2.06E+01
2731.21	1365.31	101.	22.6	9.06E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2921.74	1460.68	187.	15.5	1.77E+01

9513325.2429

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM 27-AUG-90 13:13:16

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 1 / GEOMETRY NUMBER: 42
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1071
ANALYZED BY: JLA

SAMPLE DESCRIPTION: F-436 SEGMENT-U
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-01 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAR-90 AT 12:26:23

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3001. SECONDS
DEAD TIME: 0.03 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89
EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM 27-AUG-90 13:13:16

P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	1324.38	661.63	1.53	40.	52.	45.6	CS-137
1B		661.82			35.	46.4	
2	2922.13	1460.87	2.07	8.	194.	14.8	K-40
2B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BK0011
BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00
BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM 27-AUG-90 13:13:16

SAMPLE: F-436 SEGMENT-U
DATA COLLECTED ON 14-MAR-90 AT 12:26:23
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<1.24E-03		LLD<1.24E-03		911.07	
AG-108M	LLD<2.52E-04		LLD<2.52E-04		433.94	
AG-110M	LLD<4.41E-04		LLD<4.41E-04		657.76	
AM-241	LLD<1.52E-03		LLD<1.52E-03		59.54	
AM-243	LLD<4.29E-04		LLD<4.29E-04		74.67	
AR-41	LLD<3.67E-04		LLD<3.67E-04		1293.64	
AU-198	LLD<2.12E-04		LLD<2.12E-04		411.80	
BA-133	LLD<4.21E-04		LLD<4.21E-04		356.02	
BA-139	LLD<9.27E-04		LLD<9.27E-04		165.85	
BA-140	LLD<8.81E-04		LLD<8.81E-04		537.27	
BA-141	LLD<9.08E-04		LLD<9.08E-04		190.23	
BE-7	LLD<2.21E-03		LLD<2.21E-03		477.59	
BI-207	LLD<2.47E-04		LLD<2.47E-04		569.70	
BI-212	LLD<3.74E-03		LLD<3.74E-03		727.27	
BI-214	LLD<8.46E-04		LLD<8.46E-04		609.32	
CD-109	LLD<5.88E-03		LLD<5.88E-03		88.03	
CE-139	LLD<2.10E-04		LLD<2.10E-04		165.85	
CE-141	LLD<3.38E-04		LLD<3.38E-04		145.44	
CEPR144	LLD<2.82E-03		LLD<2.82E-03		133.51	
CO-56	LLD<2.05E-04		LLD<2.05E-04		846.76	
CO-57	LLD<1.79E-04		LLD<1.79E-04		122.06	
CO-58	LLD<2.81E-04		LLD<2.81E-04		810.75	
CO-60	LLD<3.73E-04		LLD<3.73E-04		1332.50	
CR-51	LLD<2.03E-03		LLD<2.03E-03		320.09	
CS-134	LLD<3.00E-04		LLD<3.00E-04		795.84	
CS-136	LLD<2.68E-04		LLD<2.68E-04		818.51	
CS-137	LLD<4.81E-04		LLD<4.81E-04		661.65	
CS-138	LLD<7.32E-04		LLD<7.32E-04		1435.86	
EU-152	LLD<1.04E-03		LLD<1.04E-03		1408.01	
EU-154	LLD<1.01E-03		LLD<1.01E-03		1274.45	
EU-155	LLD<7.24E-04		LLD<7.24E-04		105.31	
FE-59	LLD<4.30E-04		LLD<4.30E-04		1099.25	
HF-181	LLD<2.61E-04		LLD<2.61E-04		482.20	
HG-203	LLD<2.61E-04		LLD<2.61E-04		279.20	
I-131	LLD<2.93E-04		LLD<2.93E-04		364.48	
I-132	LLD<2.98E-04		LLD<2.98E-04		667.69	
I-133	LLD<2.29E-04		LLD<2.29E-04		529.69	
I-134	LLD<3.08E-04		LLD<3.08E-04		847.03	
I-135	LLD<1.49E-03		LLD<1.49E-03		1260.41	
K-40	LLD<9.27E-03		LLD<9.27E-03		1460.75	
KR-85	LLD<7.79E-02		LLD<7.79E-02		513.99	
KR-85M	LLD<2.17E-04		LLD<2.17E-04		151.17	
KR-87	LLD<5.54E-04		LLD<5.54E-04		402.58	
KR-89	LLD<1.15E-02		LLD<1.15E-02		220.90	
LA-140	LLD<4.13E-04		LLD<4.13E-04		1596.20	
LA-142	LLD<6.29E-04		LLD<6.29E-04		641.83	
MN-54	LLD<2.72E-04		LLD<2.72E-04		834.83	

MN-56	LLD<2.31E-04	LLD<2.31E-04	846.76
NA-22	LLD<3.24E-04	LLD<3.24E-04	1274.55
NA-24	LLD<3.15E-04	LLD<3.15E-04	1368.60
NB-94	LLD<3.18E-04	LLD<3.18E-04	702.63
NB-95	LLD<2.93E-04	LLD<2.93E-04	765.78
NB-97	LLD<5.34E-04	LLD<5.34E-04	657.92
NP-238	LLD<1.38E-03	LLD<1.38E-03	984.45
NP-239	LLD<1.46E-03	LLD<1.46E-03	277.60
PA-233	LLD<6.42E-04	LLD<6.42E-04	311.98
PA-234M	LLD<5.40E-02	LLD<5.40E-02	1001.03
PB-210	LLD<6.01E-03	LLD<6.01E-03	465.03
PB-212	LLD<4.55E-04	LLD<4.55E-04	239.00
PB-214	LLD<6.66E-04	LLD<6.66E-04	351.92
PO-210	LLD<2.27E+01	LLD<2.27E+01	804.00
PO-214	LLD<2.22E+00	LLD<2.22E+00	799.70
PO-216	LLD<1.39E+01	LLD<1.39E+01	804.90
PU-239	LLD<2.35E+00	LLD<2.35E+00	129.30
PU-241	LLD<8.31E+01	LLD<8.31E+01	148.57
RA-224	LLD<5.60E-03	LLD<5.60E-03	240.99
RA-226	LLD<4.92E-03	LLD<4.92E-03	186.10
RB-88	LLD<1.98E-03	LLD<1.98E-03	1836.00
RB-89	LLD<1.01E-03	LLD<1.01E-03	1031.88
RN-220	LLD<2.10E-01	LLD<2.10E-01	549.73
RU-103	LLD<2.45E-04	LLD<2.45E-04	497.08
RURH106	LLD<5.76E-03	LLD<5.76E-03	621.80
SB-124	LLD<2.54E-04	LLD<2.54E-04	602.72
SB-125	LLD<2.64E-03	LLD<2.64E-03	176.33
SC-46	LLD<3.04E-04	LLD<3.04E-04	1120.45
SE-75	LLD<3.31E-04	LLD<3.31E-04	264.66
SN-113	LLD<3.25E-04	LLD<3.25E-04	391.67
SR-85	LLD<3.42E-04	LLD<3.42E-04	513.99
SR-91	LLD<4.47E-04	LLD<4.47E-04	555.60
SR-92	LLD<5.12E-04	LLD<5.12E-04	1383.94
TA-182	LLD<9.06E-04	LLD<9.06E-04	1121.30
TC-99M	LLD<1.87E-04	LLD<1.87E-04	140.51
TE-123M	LLD<2.02E-04	LLD<2.02E-04	159.00
TE-125M	LLD<4.76E-02	LLD<4.76E-02	109.27
TE-132	LLD<2.38E-04	LLD<2.38E-04	228.16
TH-228	LLD<1.86E-02	LLD<1.86E-02	84.37
TL-208	LLD<2.78E-04	LLD<2.78E-04	583.14
U-235	LLD<3.30E-04	LLD<3.30E-04	185.71
U-237	LLD<9.03E-04	LLD<9.03E-04	208.00
W-187	LLD<9.68E-04	LLD<9.68E-04	685.74
XE-131M	LLD<9.89E-03	LLD<9.89E-03	163.98
XE-133	LLD<7.16E-04	LLD<7.16E-04	81.00
XE-133M	LLD<2.05E-03	LLD<2.05E-03	233.21
XE-135	LLD<2.36E-04	LLD<2.36E-04	249.79
XE-138	LLD<1.79E-03	LLD<1.79E-03	258.41
Y-88	LLD<1.88E-04	LLD<1.88E-04	1836.06
Y-91	LLD<1.39E-01	LLD<1.39E-01	1204.90
Y-91M	LLD<3.38E-04	LLD<3.38E-04	555.60
ZN-65	LLD<7.69E-04	LLD<7.69E-04	1115.55
ZR-95	LLD<4.59E-04	LLD<4.59E-04	756.73
ZR-97	LLD<3.07E-04	LLD<3.07E-04	743.33
TOTAL	0.00E-01 +-0.00E-01	0.00E-01 +-0.00E-01	

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1324.38	661.63	52.	45.6	2.55E+00
2922.13	1460.87	194.	14.8	1.84E+01

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*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM 29-AUG-90 08:02:36

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 1 / GEOMETRY NUMBER: 42
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1077
ANALYZED BY: EMB

SAMPLE DESCRIPTION: F470
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 2.5000E-02
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAR-90 AT 19:33:21

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3001. SECONDS
DEAD TIME: 0.03 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89
EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM 29-AUG-90 08:02:36

P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	1324.27	661.58	1.50	45.	1129.	6.1	CS-137
1B		661.82			35.	46.4	
2	2922.71	1461.16	2.10	3.	185.	14.7	K-40
2B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BK0011
BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00
BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM 29-AUG-90 08:02:36

SAMPLE: F470
DATA COLLECTED ON 14-MAR-90 AT 19:33:21
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<4.77E+00		LLD<4.77E+00		911.07	
AG-108M	LLD<1.39E+00		LLD<1.39E+00		433.94	
AG-110M	LLD<6.23E+00		LLD<6.23E+00		657.76	
AM-241	LLD<8.69E+00		LLD<8.69E+00		59.54	
AM-243	LLD<2.59E+00		LLD<2.59E+00		74.67	
AR-41	LLD<1.39E+00		LLD<1.39E+00		1293.64	
AU-198	LLD<1.21E+00		LLD<1.21E+00		411.80	
BA-133	LLD<2.22E+00		LLD<2.22E+00		356.02	
BA-139	LLD<5.15E+00		LLD<5.15E+00		165.85	
BA-140	LLD<4.90E+00		LLD<4.90E+00		537.27	
BA-141	LLD<5.07E+00		LLD<5.07E+00		190.23	
BE-7	LLD<1.25E+01		LLD<1.25E+01		477.59	
BI-207	LLD<1.16E+00		LLD<1.16E+00		569.70	
BI-212	LLD<1.92E+01		LLD<1.92E+01		727.27	
BI-214	LLD<3.45E+00		LLD<3.45E+00		609.32	
CD-109	LLD<3.78E+01		LLD<3.78E+01		88.03	
CE-139	LLD<1.17E+00		LLD<1.17E+00		165.85	
CE-141	LLD<1.79E+00		LLD<1.79E+00		145.44	
CEPR144	LLD<1.61E+01		LLD<1.61E+01		133.51	
CO-56	LLD<1.19E+00		LLD<1.19E+00		846.76	
CO-57	LLD<1.05E+00		LLD<1.05E+00		122.06	
CO-58	LLD<9.41E-01		LLD<9.41E-01		810.75	
CO-60	LLD<1.21E+00		LLD<1.21E+00		1332.50	
CR-51	LLD<1.07E+01		LLD<1.07E+01		320.09	
CS-134	LLD<1.08E+00		LLD<1.08E+00		795.84	
CS-136	LLD<1.31E+00		LLD<1.31E+00		818.51	
CS-137	6.79E+01	+-4.47E+00	6.79E+01	+-4.47E+00	661.65	-0.07
CS-138	LLD<2.57E+00		LLD<2.57E+00		1435.86	
EU-152	LLD<5.66E+00		LLD<5.66E+00		1408.01	
EU-154	LLD<4.04E+00		LLD<4.04E+00		1274.45	
EU-155	LLD<4.42E+00		LLD<4.42E+00		105.31	
FE-59	LLD<2.59E+00		LLD<2.59E+00		1099.25	
HF-181	LLD<1.54E+00		LLD<1.54E+00		482.20	
HG-203	LLD<1.28E+00		LLD<1.28E+00		279.20	
I-131	LLD<1.46E+00		LLD<1.46E+00		364.48	
I-132	LLD<1.88E+00		LLD<1.88E+00		667.69	
I-133	LLD<1.38E+00		LLD<1.38E+00		529.69	
I-134	LLD<1.70E+00		LLD<1.70E+00		847.03	
I-135	LLD<4.92E+00		LLD<4.92E+00		1260.41	
K-40	LLD<3.62E+01		LLD<3.62E+01		1460.75	
KR-85	LLD<3.95E+02		LLD<3.95E+02		513.99	
KR-85M	LLD<1.19E+00		LLD<1.19E+00		151.17	
KR-87	LLD<3.13E+00		LLD<3.13E+00		402.58	
KR-89	LLD<5.60E+01		LLD<5.60E+01		220.90	
LA-140	LLD<1.37E+00		LLD<1.37E+00		1596.20	
LA-142	LLD<2.89E+00		LLD<2.89E+00		641.83	
MN-54	LLD<1.12E+00		LLD<1.12E+00		834.83	

MN-56	LLD<1.34E+00	LLD<1.34E+00	846.76
NA-22	LLD<1.35E+00	LLD<1.35E+00	1274.55
NA-24	LLD<1.26E+00	LLD<1.26E+00	1368.60
NB-94	LLD<1.06E+00	LLD<1.06E+00	702.63
NB-95	LLD<9.45E-01	LLD<9.45E-01	765.78
NB-97	LLD<7.55E+00	LLD<7.55E+00	657.92
NP-238	LLD<3.38E+00	LLD<3.38E+00	984.45
NP-239	LLD<7.18E+00	LLD<7.18E+00	277.60
PA-233	LLD<3.17E+00	LLD<3.17E+00	311.98
PA-234M	LLD<2.90E+02	LLD<2.90E+02	1001.03
PB-210	LLD<3.55E+01	LLD<3.55E+01	465.03
PB-212	LLD<2.51E+00	LLD<2.51E+00	239.00
PB-214	LLD<3.16E+00	LLD<3.16E+00	351.92
PO-210	LLD<7.62E+04	LLD<7.62E+04	804.00
PO-214	LLD<1.09E+04	LLD<1.09E+04	799.70
PO-216	LLD<6.39E+04	LLD<6.39E+04	804.90
PU-239	LLD<1.34E+04	LLD<1.34E+04	129.30
PU-241	LLD<4.66E+05	LLD<4.66E+05	148.57
RA-224	LLD<2.72E+01	LLD<2.72E+01	240.99
RA-226	LLD<2.44E+01	LLD<2.44E+01	186.10
RB-88	LLD<1.44E+01	LLD<1.44E+01	1836.00
RB-89	LLD<5.37E+00	LLD<5.37E+00	1031.88
RN-220	LLD<9.88E+02	LLD<9.88E+02	549.73
RU-103	LLD<1.32E+00	LLD<1.32E+00	497.08
RURH106	LLD<2.05E+01	LLD<2.05E+01	621.80
SB-124	LLD<8.92E-01	LLD<8.92E-01	602.72
SB-125	LLD<1.35E+01	LLD<1.35E+01	176.33
SC-46	LLD<1.21E+00	LLD<1.21E+00	1120.45
SE-75	LLD<1.62E+00	LLD<1.62E+00	264.66
SN-113	LLD<1.76E+00	LLD<1.76E+00	391.67
SR-85	LLD<1.73E+00	LLD<1.73E+00	513.99
SR-91	LLD<2.26E+00	LLD<2.26E+00	555.60
SR-92	LLD<1.64E+00	LLD<1.64E+00	1383.94
TA-182	LLD<3.48E+00	LLD<3.48E+00	1121.30
TC-99M	LLD<1.01E+00	LLD<1.01E+00	140.51
TE-123M	LLD<1.03E+00	LLD<1.03E+00	159.00
TE-125M	LLD<3.26E+02	LLD<3.26E+02	109.27
TE-132	LLD<1.13E+00	LLD<1.13E+00	228.16
TH-228	LLD<1.11E+02	LLD<1.11E+02	84.37
TL-208	LLD<1.26E+00	LLD<1.26E+00	583.14
U-235	LLD<1.66E+00	LLD<1.66E+00	185.71
U-237	LLD<4.96E+00	LLD<4.96E+00	208.00
W-187	LLD<4.09E+00	LLD<4.09E+00	685.74
XE-131M	LLD<4.76E+01	LLD<4.76E+01	163.98
XE-133	LLD<4.25E+00	LLD<4.25E+00	81.00
XE-133M	LLD<1.08E+01	LLD<1.08E+01	233.21
XE-135	LLD<1.14E+00	LLD<1.14E+00	249.79
XE-138	LLD<8.80E+00	LLD<8.80E+00	258.41
Y-88	LLD<1.36E+00	LLD<1.36E+00	1836.06
Y-91	LLD<4.97E+02	LLD<4.97E+02	1204.90
Y-91M	LLD<1.71E+00	LLD<1.71E+00	555.60
ZN-65	LLD<3.15E+00	LLD<3.15E+00	1115.55
ZR-95	LLD<1.98E+00	LLD<1.98E+00	756.73
ZR-97	LLD<1.09E+00	LLD<1.09E+00	743.33
TOTAL	6.79E+01 +-4.47E+00	6.79E+01 +-4.47E+00	

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI
TOTAL MEASURED ACTIVITY = 6.79E+01 (+-4.47E+00) UC/LI

% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.71	1461.16	185.	14.7	1.75E+01

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*                                                                     *
*              G A M M A   S P E C T R U M   A N A L Y S I S          *
*                                                                     *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM 29-AUG-90 08:07:31

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 1 / GEOMETRY NUMBER: 42
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1079
ANALYZED BY: EMB

SAMPLE DESCRIPTION: F471
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 2.5000E-02
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAR-90 AT 21:47:50

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3001. SECONDS
DEAD TIME: 0.03 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89
EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM 29-AUG-90 08:07:31

P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1$	93.35	46.58	2.27	238.	53.	95.7	PU-240, EU-155
2$	99.70	49.75	2.27	372.	36.	96.4	U-234
3	1324.26	661.57	1.46	47.	1301.	5.7	CS-137
3B		661.82			35.	46.4	
4	2922.43	1461.03	2.09	8.	169.	16.0	K-40
4B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

$ - MULTIPLET ANALYSIS CONVERGED DUE TO LACK OF CHI-SQ IMPROVEMENT
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BK0011
BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00
BACKGROUND LIVE TIME: 6000. SECONDS

9513325.2441

222-S COUNTING ROOM 29-AUG-90 08:07:31

SAMPLE: F471
DATA COLLECTED ON 14-MAR-90 AT 21:47:50
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI				ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<3.46E+00		LLD<3.46E+00		911.07	
AG-108M	LLD<1.49E+00		LLD<1.49E+00		433.94	
AG-110M	LLD<6.67E+00		LLD<6.67E+00		657.76	
AM-241	LLD<9.14E+00		LLD<9.14E+00		59.54	
AM-243	LLD<2.79E+00		LLD<2.79E+00		74.67	
AR-41	LLD<1.22E+00		LLD<1.22E+00		1293.64	
AU-198	LLD<1.21E+00		LLD<1.21E+00		411.80	
BA-133	LLD<2.25E+00		LLD<2.25E+00		356.02	
BA-139	LLD<5.18E+00		LLD<5.18E+00		165.85	
BA-140	LLD<5.33E+00		LLD<5.33E+00		537.27	
BA-141	LLD<4.70E+00		LLD<4.70E+00		190.23	
BE-7	LLD<1.15E+01		LLD<1.15E+01		477.59	
BI-207	LLD<1.00E+00		LLD<1.00E+00		569.70	
BI-212	LLD<1.79E+01		LLD<1.79E+01		727.27	
BI-214	LLD<3.89E+00		LLD<3.89E+00		609.32	
CD-109	LLD<3.85E+01		LLD<3.85E+01		88.03	
CE-139	LLD<1.17E+00		LLD<1.17E+00		165.85	
CE-141	LLD<1.85E+00		LLD<1.85E+00		145.44	
CEPR144	LLD<1.66E+01		LLD<1.66E+01		133.51	
CO-56	LLD<9.36E-01		LLD<9.36E-01		846.76	
CO-57	LLD<1.11E+00		LLD<1.11E+00		122.06	
CO-58	LLD<1.33E+00		LLD<1.33E+00		810.75	
CO-60	LLD<1.49E+00		LLD<1.49E+00		1332.50	
CR-51	LLD<1.20E+01		LLD<1.20E+01		320.09	
CS-134	LLD<1.34E+00		LLD<1.34E+00		795.84	
CS-136	LLD<1.16E+00		LLD<1.16E+00		818.51	
CS-137	7.87E+01	+-4.78E+00	7.87E+01	+-4.78E+00	661.65	-0.08
CS-138	LLD<1.59E+00		LLD<1.59E+00		1435.86	
EU-152	LLD<6.46E+00		LLD<6.46E+00		1408.01	
EU-154	LLD<2.55E+00		LLD<2.55E+00		1274.45	
EU-155	LLD<4.63E+00		LLD<4.63E+00		105.31	
FE-59	LLD<2.59E+00		LLD<2.59E+00		1099.25	
HF-181	LLD<1.56E+00		LLD<1.56E+00		482.20	
HG-203	LLD<1.40E+00		LLD<1.40E+00		279.20	
I-131	LLD<1.58E+00		LLD<1.58E+00		364.48	
I-132	LLD<2.17E+00		LLD<2.17E+00		667.69	
I-133	LLD<1.40E+00		LLD<1.40E+00		529.69	
I-134	LLD<1.49E+00		LLD<1.49E+00		847.03	
I-135	LLD<5.56E+00		LLD<5.56E+00		1260.41	
K-40	LLD<3.82E+01		LLD<3.82E+01		1460.75	
KR-85	LLD<3.78E+02		LLD<3.78E+02		513.99	
KR-85M	LLD<1.18E+00		LLD<1.18E+00		151.17	
KR-87	LLD<3.11E+00		LLD<3.11E+00		402.58	
KR-89	LLD<5.84E+01		LLD<5.84E+01		220.90	
LA-140	LLD<1.56E+00		LLD<1.56E+00		1596.20	
LA-142	LLD<2.93E+00		LLD<2.93E+00		641.83	
MN-54	LLD<1.06E+00		LLD<1.06E+00		834.83	

MN-56	LLD<1.06E+00	LLD<1.06E+00	846.76
NA-22	LLD<7.56E-01	LLD<7.56E-01	1274.55
NA-24	LLD<1.42E+00	LLD<1.42E+00	1368.60
NB-94	LLD<1.15E+00	LLD<1.15E+00	702.63
NB-95	LLD<1.11E+00	LLD<1.11E+00	765.78
NB-97	LLD<8.08E+00	LLD<8.08E+00	657.92
NP-238	LLD<5.29E+00	LLD<5.29E+00	984.45
NP-239	LLD<7.75E+00	LLD<7.75E+00	277.60
PA-233	LLD<3.39E+00	LLD<3.39E+00	311.98
PA-234M	LLD<2.53E+02	LLD<2.53E+02	1001.03
PB-210	LLD<3.28E+01	LLD<3.28E+01	465.03
PB-212	LLD<2.54E+00	LLD<2.54E+00	239.00
PB-214	LLD<3.19E+00	LLD<3.19E+00	351.92
PO-210	LLD<1.01E+05	LLD<1.01E+05	804.00
PO-214	LLD<9.80E+03	LLD<9.80E+03	799.70
PO-216	LLD<5.84E+04	LLD<5.84E+04	804.90
PU-239	LLD<1.46E+04	LLD<1.46E+04	129.30
PU-241	LLD<4.80E+05	LLD<4.80E+05	148.57
RA-224	LLD<2.75E+01	LLD<2.75E+01	240.99
RA-226	LLD<2.70E+01	LLD<2.70E+01	186.10
RB-88	LLD<7.92E+00	LLD<7.92E+00	1836.00
RB-89	LLD<5.74E+00	LLD<5.74E+00	1031.88
RN-220	LLD<1.04E+03	LLD<1.04E+03	549.73
RU-103	LLD<1.31E+00	LLD<1.31E+00	497.08
RURH106	LLD<2.36E+01	LLD<2.36E+01	621.80
SB-124	LLD<1.26E+00	LLD<1.26E+00	602.72
SB-125	LLD<1.39E+01	LLD<1.39E+01	176.33
SC-46	LLD<1.53E+00	LLD<1.53E+00	1120.45
SE-75	LLD<1.77E+00	LLD<1.77E+00	264.66
SN-113	LLD<1.75E+00	LLD<1.75E+00	391.67
SR-85	LLD<1.66E+00	LLD<1.66E+00	513.99
SR-91	LLD<2.17E+00	LLD<2.17E+00	555.60
SR-92	LLD<1.06E+00	LLD<1.06E+00	1383.94
TA-182	LLD<3.33E+00	LLD<3.33E+00	1121.30
TC-99M	LLD<1.10E+00	LLD<1.10E+00	140.51
TE-123M	LLD<1.13E+00	LLD<1.13E+00	159.00
TE-125M	LLD<3.52E+02	LLD<3.52E+02	109.27
TE-132	LLD<1.23E+00	LLD<1.23E+00	228.16
TH-228	LLD<1.24E+02	LLD<1.24E+02	84.37
TL-208	LLD<1.30E+00	LLD<1.30E+00	583.14
U-235	LLD<1.80E+00	LLD<1.80E+00	185.71
U-237	LLD<4.82E+00	LLD<4.82E+00	208.00
W-187	LLD<4.44E+00	LLD<4.44E+00	685.74
XE-131M	LLD<4.65E+01	LLD<4.65E+01	163.98
XE-133	LLD<4.42E+00	LLD<4.42E+00	81.00
XE-133M	LLD<1.08E+01	LLD<1.08E+01	233.21
XE-135	LLD<1.23E+00	LLD<1.23E+00	249.79
XE-138	LLD<9.05E+00	LLD<9.05E+00	258.41
Y-88	LLD<7.52E-01	LLD<7.52E-01	1836.06
Y-91	LLD<4.65E+02	LLD<4.65E+02	1204.90
Y-91M	LLD<1.64E+00	LLD<1.64E+00	555.60
ZN-65	LLD<4.11E+00	LLD<4.11E+00	1115.55
ZR-95	LLD<2.16E+00	LLD<2.16E+00	756.73
ZR-97	LLD<1.14E+00	LLD<1.14E+00	743.33
TOTAL	7.87E+01 +-4.78E+00	7.87E+01 +-4.78E+00	

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI
TOTAL MEASURED ACTIVITY = 7.87E+01 (+-4.78E+00) UC/LI

% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
93.35	46.58	53.	95.7	7.80E+00
99.70	49.75	36.	96.4	4.05E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.43	1461.03	169.	16.0	1.60E+01

9513325.2444

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE

222-S COUNTING ROOM 27-AUG-90 13:22:40

A N A L Y S I S P A R A M E T E R S

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 1 / GEOMETRY NUMBER: 42
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1084
ANALYZED BY: MAX

SAMPLE DESCRIPTION: F568
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 5.0000E-02
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 15-MAR-90 AT 04:41:44

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3006. SECONDS
DEAD TIME: 0.20 %

DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89
EFFICIENCY CALIBRATION PERFORMED 2-MAR-89

222-S COUNTING ROOM 27-AUG-90 13:22:40

P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.31	563.13	1.39	475.	428.	17.4	CS-134, EU-152
2C	1139.70	569.32	1.39	485.	740.	14.4	CS-134, BI-207
3	1210.36	604.64	1.47	520.	4961.	3.1	CS-134
4	1324.22	661.55	1.53	326.	13178.	1.8	CS-137
4B		661.82			35.	46.4	
5C	1592.50	795.68	1.50	258.	3527.	4.2	CS-134
6C	1604.72	801.79	1.50	246.	368.	13.7	CS-134
7	2347.08	1173.09	1.79	210.	4735.	3.0	CO-60
8	2665.49	1332.42	1.86	39.	4119.	3.1	CO-60
9	2730.86	1365.14	1.58	7.	99.	21.4	CS-134
10	2922.13	1460.87	2.48	10.	172.	16.0	K-40
10B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BK0011
BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00
BACKGROUND LIVE TIME: 6000. SECONDS

9513325.2446

222-S COUNTING ROOM 27-AUG-90 13:22:40

SAMPLE: F568
DATA COLLECTED ON 15-MAR-90 AT 04:41:44
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<7.40E+00		LLD<7.40E+00		911.07	
AG-108M	LLD<2.06E+00		LLD<2.06E+00		433.94	
AG-110M	LLD<1.06E+01		LLD<1.06E+01		657.76	
AM-241	LLD<8.73E+00		LLD<8.73E+00		59.54	
AM-243	LLD<2.29E+00		LLD<2.29E+00		74.67	
AR-41	LLD<1.23E+00		LLD<1.23E+00		1293.64	
AU-198	LLD<1.86E+00		LLD<1.86E+00		411.80	
BA-133	LLD<2.82E+00		LLD<2.82E+00		356.02	
BA-139	LLD<5.43E+00		LLD<5.43E+00		165.85	
BA-140	LLD<6.94E+00		LLD<6.94E+00		537.27	
BA-141	LLD<5.59E+00		LLD<5.59E+00		190.23	
BE-7	LLD<1.93E+01		LLD<1.93E+01		477.59	
BI-207	LLD<1.78E+00		LLD<1.78E+00		569.70	
BI-212	LLD<2.31E+01		LLD<2.31E+01		727.27	
BI-214	LLD<1.01E+01		LLD<1.01E+01		609.32	
CD-109	LLD<3.37E+01		LLD<3.37E+01		88.03	
CE-139	LLD<1.23E+00		LLD<1.23E+00		165.85	
CE-141	LLD<1.90E+00		LLD<1.90E+00		145.44	
CEPR144	LLD<1.58E+01		LLD<1.58E+01		133.51	
CO-56	LLD<1.78E+00		LLD<1.78E+00		846.76	
CO-57	LLD<1.03E+00		LLD<1.03E+00		122.06	
CO-58	LLD<1.76E+00		LLD<1.76E+00		810.75	
CO-60	1.96E+02	+-6.41E+00	1.96E+02	+-6.41E+00	1332.50	-0.08
					1173.24	-0.15
CR-51	LLD<1.43E+01		LLD<1.43E+01		320.09	
CS-134	1.27E+02	+-5.53E+00	1.27E+02	+-5.53E+00	795.84	-0.17
					604.70	-0.06
CS-136	LLD<1.79E+00		LLD<1.79E+00		818.51	
CS-137	4.08E+02	+-8.75E+00	4.08E+02	+-8.75E+00	661.65	-0.10
CS-138	LLD<1.38E+00		LLD<1.38E+00		1435.86	
EU-152	LLD<3.04E+00		LLD<3.04E+00		1408.01	
EU-154	LLD<3.24E+00		LLD<3.24E+00		1274.45	
EU-155	LLD<4.02E+00		LLD<4.02E+00		105.31	
FE-59	LLD<4.53E+00		LLD<4.53E+00		1099.25	
HF-181	LLD<2.13E+00		LLD<2.13E+00		482.20	
HG-203	LLD<1.65E+00		LLD<1.65E+00		279.20	
I-131	LLD<2.07E+00		LLD<2.07E+00		364.48	
I-132	LLD<2.80E+00		LLD<2.80E+00		667.69	
I-133	LLD<1.94E+00		LLD<1.94E+00		529.69	
I-134	LLD<2.53E+00		LLD<2.53E+00		847.03	
I-135	LLD<4.50E+00		LLD<4.50E+00		1260.41	
K-40	LLD<1.85E+01		LLD<1.85E+01		1460.75	
KR-85	LLD<4.26E+02		LLD<4.26E+02		513.99	
KR-85M	LLD<1.22E+00		LLD<1.22E+00		151.17	
KR-87	LLD<4.55E+00		LLD<4.55E+00		402.58	
KR-89	LLD<6.73E+01		LLD<6.73E+01		220.90	
LA-140	LLD<6.86E-01		LLD<6.86E-01		1596.20	

LA-142	LLD<3.84E+00	LLD<3.84E+00	641.83
MN-54	LLD<1.73E+00	LLD<1.73E+00	834.83
MN-56	LLD<2.01E+00	LLD<2.01E+00	846.76
NA-22	LLD<1.07E+00	LLD<1.07E+00	1274.55
NA-24	LLD<1.50E+00	LLD<1.50E+00	1368.60
NB-94	LLD<1.58E+00	LLD<1.58E+00	702.63
NB-95	LLD<1.63E+00	LLD<1.63E+00	765.78
NB-97	LLD<1.28E+01	LLD<1.28E+01	657.92
NP-238	LLD<7.72E+00	LLD<7.72E+00	984.45
NP-239	LLD<9.48E+00	LLD<9.48E+00	277.60
PA-233	LLD<4.17E+00	LLD<4.17E+00	311.98
PA-234M	LLD<3.77E+02	LLD<3.77E+02	1001.03
PB-210	LLD<4.92E+01	LLD<4.92E+01	465.03
PB-212	LLD<3.06E+00	LLD<3.06E+00	239.00
PB-214	LLD<4.56E+00	LLD<4.56E+00	351.92
PO-210	LLD<1.62E+05	LLD<1.62E+05	804.00
PO-214	LLD<6.74E+04	LLD<6.74E+04	799.70
PO-216	LLD<1.36E+05	LLD<1.36E+05	804.90
PU-239	LLD<1.38E+04	LLD<1.38E+04	129.30
PU-241	LLD<4.87E+05	LLD<4.87E+05	148.57
RA-224	LLD<3.34E+01	LLD<3.34E+01	240.99
RA-226	LLD<2.90E+01	LLD<2.90E+01	186.10
RB-88	LLD<9.27E+00	LLD<9.27E+00	1836.00
RB-89	LLD<9.20E+00	LLD<9.20E+00	1031.88
RN-220	LLD<1.53E+03	LLD<1.53E+03	549.73
RU-103	LLD<1.87E+00	LLD<1.87E+00	497.08
RURH106	LLD<3.23E+01	LLD<3.23E+01	621.80
SB-124	LLD<3.09E+00	LLD<3.09E+00	602.72
SB-125	LLD<1.54E+01	LLD<1.54E+01	176.33
SC-46	LLD<2.20E+00	LLD<2.20E+00	1120.45
SE-75	LLD<2.27E+00	LLD<2.27E+00	264.66
SN-113	LLD<2.55E+00	LLD<2.55E+00	391.67
SR-85	LLD<1.87E+00	LLD<1.87E+00	513.99
SR-91	LLD<3.06E+00	LLD<3.06E+00	555.60
SR-92	LLD<1.10E+00	LLD<1.10E+00	1383.94
TA-182	LLD<6.32E+00	LLD<6.32E+00	1121.30
TC-99M	LLD<1.06E+00	LLD<1.06E+00	140.51
TE-123M	LLD<1.14E+00	LLD<1.14E+00	159.00
TE-125M	LLD<3.04E+02	LLD<3.04E+02	109.27
TE-132	LLD<1.44E+00	LLD<1.44E+00	228.16
TH-228	LLD<9.91E+01	LLD<9.91E+01	84.37
TL-208	LLD<2.21E+00	LLD<2.21E+00	583.14
U-235	LLD<1.94E+00	LLD<1.94E+00	185.71
U-237	LLD<5.64E+00	LLD<5.64E+00	208.00
W-187	LLD<5.34E+00	LLD<5.34E+00	685.74
XE-131M	LLD<5.26E+01	LLD<5.26E+01	163.98
XE-133	LLD<3.69E+00	LLD<3.69E+00	81.00
XE-133M	LLD<1.26E+01	LLD<1.26E+01	233.21
XE-135	LLD<1.48E+00	LLD<1.48E+00	249.79
XE-138	LLD<1.12E+01	LLD<1.12E+01	258.41
Y-88	LLD<8.79E-01	LLD<8.79E-01	1836.06
Y-91	LLD<4.23E+02	LLD<4.23E+02	1204.90
Y-91M	LLD<2.32E+00	LLD<2.32E+00	555.60
ZN-65	LLD<4.60E+00	LLD<4.60E+00	1115.55
ZR-95	LLD<3.07E+00	LLD<3.07E+00	756.73
ZR-97	LLD<1.49E+00	LLD<1.49E+00	743.33
TOTAL	7.31E+02 +-1.22E+01	7.31E+02 +-1.22E+01	

STANDARD DEVIATION = 0.05

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.73E-09 UC/LI
TOTAL MEASURED ACTIVITY = 7.31E+02 (+-1.22E+01) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.31	563.13	428.	17.4	1.83E+01
1139.70	569.32	740.	14.4	3.20E+01
1604.72	801.79	368.	13.7	2.11E+01
2730.86	1365.14	99.	21.4	8.84E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.13	1460.87	172.	16.0	1.63E+01

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*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

CANBERRA SPECTRAN-F V2.06  SOFTWARE

222-S COUNTING ROOM                                  27-AUG-90  13:28:16

                A N A L Y S I S   P A R A M E T E R S

MCA UNIT NUMBER:   2     /     ADC UNIT NUMBER: 1.0
DETECTOR NUMBER:    1    /     GEOMETRY NUMBER:  42
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:     5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
LLD CALCULATION PERFORMED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1087
ANALYZED BY:        MAX

SAMPLE DESCRIPTION: F569
GEOMETRY DESCRIPTION:
SAMPLE SIZE:   1.0000E-03 LI      / CONVERSION FACTOR: 5.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 15-MAR-90 AT 07:10:10

COLLECT LIVE TIME:    3254. SECONDS
        REAL TIME:     199. SECONDS
        DEAD TIME: -1535.18 %

 DECAYED TO      0. DAYS,  0.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 23-NOV-89
EFFICIENCY CALIBRATION PERFORMED  2-MAR-89
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9513325.2450

222-S COUNTING ROOM 27-AUG-90 13:28:16

P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.55	563.25	1.38	459.	523.	12.7	CS-134, EU-152
2C	1139.64	569.29	1.38	494.	890.	11.4	CS-134, BI-207
3	1210.42	604.67	1.52	526.	5470.	2.9	CS-134
4	1324.31	661.60	1.59	393.	9861.	2.1	CS-137
4B		661.82			38.	46.4	
5C	1592.64	795.75	1.54	258.	3854.	4.0	CS-134
6C	1604.90	801.88	1.54	258.	405.	14.2	CS-134
7	2347.09	1173.10	1.83	230.	5233.	2.9	CO-60
8	2665.64	1332.50	1.90	72.	4671.	2.9	CO-60
9	2730.89	1365.15	1.76	20.	92.	25.4	CS-134
10	2922.37	1460.99	2.02	11.	178.	15.9	K-40
10B		1461.77			197.	11.2	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BK0011
BACKGROUND COLLECT STARTED ON 10-JAN-85 AT 12:00:00
BACKGROUND LIVE TIME: 6000. SECONDS

222-S COUNTING ROOM 27-AUG-90 13:28:16

SAMPLE: F569
DATA COLLECTED ON 15-MAR-90 AT 07:10:10
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

R A D I O N U C L I D E A N A L Y S I S R E P O R T

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI				ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<7.24E-01		LLD<7.24E-01		911.07	
AG-108M	LLD<1.84E-01		LLD<1.84E-01		433.94	
AG-110M	LLD<8.41E-01		LLD<8.41E-01		657.76	
AM-241	LLD<7.59E-01		LLD<7.59E-01		59.54	
AM-243	LLD<2.01E-01		LLD<2.01E-01		74.67	
AR-41	LLD<1.15E-01		LLD<1.15E-01		1293.64	
AU-198	LLD<1.64E-01		LLD<1.64E-01		411.80	
BA-133	LLD<2.45E-01		LLD<2.45E-01		356.02	
BA-139	LLD<4.12E-01		LLD<4.12E-01		165.85	
BA-140	LLD<6.21E-01		LLD<6.21E-01		537.27	
BA-141	LLD<2.36E-01		LLD<2.36E-01		190.23	
BE-7	LLD<1.72E+00		LLD<1.72E+00		477.59	
BI-207	LLD<1.70E-01		LLD<1.70E-01		569.70	
BI-212	LLD<2.23E+00		LLD<2.23E+00		727.27	
BI-214	LLD<1.00E+00		LLD<1.00E+00		609.32	
CD-109	LLD<2.87E+00		LLD<2.87E+00		88.03	
CE-139	LLD<1.12E-01		LLD<1.12E-01		165.85	
CE-141	LLD<1.72E-01		LLD<1.72E-01		145.44	
CEPR144	LLD<1.43E+00		LLD<1.43E+00		133.51	
CO-56	LLD<1.73E-01		LLD<1.73E-01		846.76	
CO-57	LLD<9.28E-02		LLD<9.28E-02		122.06	
CO-58	LLD<1.69E-01		LLD<1.69E-01		810.75	
CO-60	2.05E+01	+-6.38E-01	2.05E+01	+-6.38E-01	1332.50	-0.00
					1173.24	-0.14
CR-51	LLD<1.27E+00		LLD<1.27E+00		320.09	
CS-134	1.28E+01	+-5.38E-01	1.28E+01	+-5.38E-01	795.84	-0.10
					604.70	-0.03
CS-136	LLD<1.71E-01		LLD<1.71E-01		818.51	
CS-137	2.81E+01	+-6.78E-01	2.81E+01	+-6.78E-01	661.65	-0.05
CS-138	LLD<9.04E-02		LLD<9.04E-02		1435.86	
EU-152	LLD<3.59E-01		LLD<3.59E-01		1408.01	
EU-154	LLD<2.89E-01		LLD<2.89E-01		1274.45	
EU-155	LLD<3.56E-01		LLD<3.56E-01		105.31	
FE-59	LLD<3.89E-01		LLD<3.89E-01		1099.25	
HF-181	LLD<1.81E-01		LLD<1.81E-01		482.20	
HG-203	LLD<1.50E-01		LLD<1.50E-01		279.20	
I-131	LLD<1.91E-01		LLD<1.91E-01		364.48	
I-132	LLD<2.26E-01		LLD<2.26E-01		667.69	
I-133	LLD<1.76E-01		LLD<1.76E-01		529.69	
I-134	LLD<1.83E-01		LLD<1.83E-01		847.03	
I-135	LLD<3.87E-01		LLD<3.87E-01		1260.41	
K-40	LLD<1.82E+00		LLD<1.82E+00		1460.75	
KR-85	LLD<3.74E+01		LLD<3.74E+01		513.99	
KR-85M	LLD<1.02E-01		LLD<1.02E-01		151.17	
KR-87	LLD<3.42E-01		LLD<3.42E-01		402.58	
KR-89	LLD<7.88E-01		LLD<7.88E-01		220.90	
LA-140	LLD<6.32E-02		LLD<6.32E-02		1596.20	

LA-142	LLD<3.12E-01	LLD<3.12E-01	641.83
MN-54	LLD<1.66E-01	LLD<1.66E-01	834.83
MN-56	LLD<1.74E-01	LLD<1.74E-01	846.76
NA-22	LLD<9.83E-02	LLD<9.83E-02	1274.55
NA-24	LLD<1.44E-01	LLD<1.44E-01	1368.60
NB-94	LLD<1.53E-01	LLD<1.53E-01	702.63
NB-95	LLD<1.62E-01	LLD<1.62E-01	765.78
NB-97	LLD<8.22E-01	LLD<8.22E-01	657.92
NP-238	LLD<7.78E-01	LLD<7.78E-01	984.45
NP-239	LLD<8.62E-01	LLD<8.62E-01	277.60
PA-233	LLD<3.87E-01	LLD<3.87E-01	311.98
PA-234M	LLD<3.57E+01	LLD<3.57E+01	1001.03
PB-210	LLD<4.39E+00	LLD<4.39E+00	465.03
PB-212	LLD<2.70E-01	LLD<2.70E-01	239.00
PB-214	LLD<4.18E-01	LLD<4.18E-01	351.92
PO-210	LLD<1.54E+04	LLD<1.54E+04	804.00
PO-214	LLD<6.40E+03	LLD<6.40E+03	799.70
PO-216	LLD<1.30E+04	LLD<1.30E+04	804.90
PU-239	LLD<1.24E+03	LLD<1.24E+03	129.30
PU-241	LLD<4.57E+04	LLD<4.57E+04	148.57
RA-224	LLD<2.96E+00	LLD<2.96E+00	240.99
RA-226	LLD<2.64E+00	LLD<2.64E+00	186.10
RB-88	LLD<3.44E-01	LLD<3.44E-01	1836.00
RB-89	LLD<3.82E-01	LLD<3.82E-01	1031.88
RN-220	LLD<1.44E+02	LLD<1.44E+02	549.73
RU-103	LLD<1.71E-01	LLD<1.71E-01	497.08
RURH106	LLD<3.00E+00	LLD<3.00E+00	621.80
SB-124	LLD<3.09E-01	LLD<3.09E-01	602.72
SB-125	LLD<1.38E+00	LLD<1.38E+00	176.33
SC-46	LLD<2.04E-01	LLD<2.04E-01	1120.45
SE-75	LLD<2.02E-01	LLD<2.02E-01	264.66
SN-113	LLD<2.33E-01	LLD<2.33E-01	391.67
SR-85	LLD<1.64E-01	LLD<1.64E-01	513.99
SR-91	LLD<2.80E-01	LLD<2.80E-01	555.60
SR-92	LLD<7.87E-02	LLD<7.87E-02	1383.94
TA-182	LLD<5.90E-01	LLD<5.90E-01	1121.30
TC-99M	LLD<9.22E-02	LLD<9.22E-02	140.51
TE-123M	LLD<1.03E-01	LLD<1.03E-01	159.00
TE-125M	LLD<2.66E+01	LLD<2.66E+01	109.27
TE-132	LLD<1.28E-01	LLD<1.28E-01	228.16
TH-228	LLD<9.26E+00	LLD<9.26E+00	84.37
TL-208	LLD<1.96E-01	LLD<1.96E-01	583.14
U-235	LLD<1.76E-01	LLD<1.76E-01	185.71
U-237	LLD<5.18E-01	LLD<5.18E-01	208.00
W-187	LLD<5.18E-01	LLD<5.18E-01	685.74
XE-131M	LLD<4.68E+00	LLD<4.68E+00	163.98
XE-133	LLD<3.20E-01	LLD<3.20E-01	81.00
XE-133M	LLD<1.15E+00	LLD<1.15E+00	233.21
XE-135	LLD<1.35E-01	LLD<1.35E-01	249.79
XE-138	LLD<3.99E-01	LLD<3.99E-01	258.41
Y-88	LLD<6.95E-02	LLD<6.95E-02	1836.06
Y-91	LLD<4.43E+01	LLD<4.43E+01	1204.90
Y-91M	LLD<1.61E-01	LLD<1.61E-01	555.60
ZN-65	LLD<4.48E-01	LLD<4.48E-01	1115.55
ZR-95	LLD<2.81E-01	LLD<2.81E-01	756.73
ZR-97	LLD<1.49E-01	LLD<1.49E-01	743.33
TOTAL	6.14E+01 +-1.07E+00	6.14E+01 +-1.07E+00	

STANDARD DEVIATION = 0.05

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.46E-09 UC/LI
TOTAL MEASURED ACTIVITY = 6.14E+01 (+-1.07E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.55	563.25	523.	12.7	2.06E+01
1139.64	569.29	890.	11.4	3.54E+01
1604.90	801.88	405.	14.2	2.14E+01
2730.89	1365.15	92.	25.4	7.57E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.37	1460.99	178.	15.9	1.55E+01

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	WA77344
PROCEDURE/REV	LA-925-106/A-2
TECHNOLOGIST	Sue Lai
DATE	June 22,1990
TEMPERATURE	N/A
STARTING TIME	0800
ENDING TIME	1140
CHEMIST	S. A. Catlow

Uranium Analysis
Fusion Dissolution

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0469
2	Reagent Blank		F0484
3	Sample	89-070	F0470
4	Duplicate Sample	89-070	F0471
5	Spike of Sample	89-070	F0472
6	Final LMCS Check Std.		F0473
7			
8			
9			
10			
11			

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
LMCS Check Standard	58B38/1 uL			5.7 mL
Spike	58B38/1 uL	F0470/1 uL		5.7 mL

SST-102 Rev. F 9/7/90 Interim

9513325.2455

WATER DIGESTION TEST RESULTS

Single Shell Tank Project

Water Digestion
Laboratory Results of Solids
Units Are Sample Wet Weight

Tank:	241-U-110
Core:	12
Segment:	4
Customer ID:	89-072

Laboratory Segment Serial No.: F0465

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample		Check Standard
Laboratory ID:		F0486		F0475		F0476		F0477		
Water Digestion		Complete		9.80	g/L	1.00E+01	g/L	1.02E+01	g/L	
Laboratory ID:	F0426	F0438		F0475		F0476		F0429		F0574
Ion Chromatograph										
Fluoride	90.80%	<1.00E-01	ppm	1.91E+03	ug/g	1.42E+03	ug/g	85.60%		91.80%
Chloride	99.70%	2.02E-01	ppm	<1.03E+03	ug/g	1.65E+03	ug/g	102.40%		97.50%
Nitrate	101.90%	<1.00	ppm	6.10E+04	ug/g	4.70E+04	ug/g	108.40%		102.70%
Phosphate	100.80%	<1.00	ppm	<1.03E+04	ug/g	<1.01E+04	ug/g	105.60%		101.50%
Sulfate	100.80%	<1.00	ppm	4.16E+03	ug/g	3.56E+03	ug/g	110.30%		100.50%
Laboratory ID:	F0474	F0486		F0475		F0476		F0477		F0478
Total Organic Carbon	97.50%	2.60	ug	8.98E+02	ug/g	7.15E+02	ug/g	96.28%		96.70%

Single Shell Tank Project

Water Digestion
Sample Results on Laboratory Digestions

Tank: 241-U-110
Core: 12
Segment: 4
Customer ID: 89-072

Laboratory Segment Serial No.: F0465

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample		Check Standard
Laboratory ID:		F0486		F0475		F0476		F0477		
Water Digestion		Complete		9.80	g/L	1.00E+01	g/L	1.02E+01	g/L	
Laboratory ID:	F0426	F0438		F0475		F0476		F0429		F0574
Ion Chromatograph										
Fluoride	90.80%	<1.00E-01	ppm	1.87E+01	ppm	1.42E+01	ppm	85.60%		91.80%
Chloride	99.70%	2.02E-01	ppm	<1.01E+01	ppm	1.65E+01	ppm	102.40%		97.50%
Nitrate	101.90%	<1.00	ppm	5.98E+02	ppm	4.70E+02	ppm	108.40%		102.70%
Phosphate	100.80%	<1.00	ppm	<1.01E+02	ppm	<1.01E+02	ppm	105.60%		101.50%
Sulfate	100.80%	<1.00	ppm	4.08E+01	ppm	3.56E+01	ppm	110.30%		100.50%
Laboratory ID:	F0474	F0486		F0475		F0476		F0477		F0478
Total Organic Carbon	97.50%	2.60	ug	8.80E-03	g/L	7.15E-03	g/L	96.28%		96.70%

9413926.2457

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-504-101/A-2
TECHNOLOGIST	S. Cervantes
DATE	March 07, 1990
TEMPERATURE	25 C
STARTING TIME	1300 03-06-90
ENDING TIME	1045 03-07-90
CHEMIST	H. S. Rich

Water Digestion

Note: Sample is not spiked prior to digestion. This procedure provides a sample to be spiked later with the appropriate elements.

	DESCRIPTION		LAB ID
1	Reagent Blank		F0486
2	Sample	89-072	F0475
3	Duplicate Sample	89-072	F0476
4	Spike of Sample	89-072	F0477
5			
6			
7			
8			
9			
10			
11			

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
N/A				
Spike (See Note)				

SST-102 Rev. F 9/7/90 Interim

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	DIONEX 4000
PROCEDURE/REV	LA-533-105/A-3
TECHNOLOGIST	N. E. Wright
DATE	April 06, 1990
TEMPERATURE	22 C
STARTING TIME	11:00 04-05-90
ENDING TIME	15:15 04-05-90
CHEMIST	H. S. Rich

Ion Chromatograph Analysis
Water Digestion

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0426
2	Reagent Blank		F0438
3	Sample	89-070	F0427
4	Duplicate Sample	89-070	F0428
5	Spike of Sample	89-070	F0429
6	Sample	89-071	F0451
7	Duplicate Sample	89-071	F0452
8	Sample	89-072	F0475
9	Duplicate Sample	89-072	F0476
10	Sample	89-075	F0547
11	Duplicate Sample	89-075	F0548

	DESCRIPTION		LAB ID
12	Sample	89-076	F0571
13	Duplicate Sample	89-076	F0572
14	Sample	Core-007	F0983
15	Duplicate Sample	Core-007	F0984
16	Duplicate Sample	89-043	F0064
17	Final LMCS Check Std		F0574
18			
19			
20			
21			
22			

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
LMCS Check Std.	6C11HO/100 uL			10.1 mL
Spike	35C9-77/300 uL	F0427/50 uL		5.3 mL

SST-102 Rev. F 9/7/90 Interim

9513325.2460

Single Shell Tank
Calibration Record

Analyte:	Ion Chromatograph		
Procedure:	LA-533-105	Revision:	A-3
Instrument:	DIONEX 4000	Property Number:	WB24721
Technologist:	Nora Wright	Payroll Number:	6B107
Date:	April 03, 1990		

Calibration Standard ID: 35C9-77 issued April 02, 1990

Analyte Concentration: F 60.0 Cl 76.0 NO_3 611.0 PO_4 606.0 SO_4 589.0

Type of Calibration: Linear

Comments:

SST-103 Rev. (Draft) 9/4/90 Interim

DIONEX METHOD PARAMETERS - SST.MET

Detector Parameters

Number of Detectors	1
Detector 1 Type	CDM

Report Options

Run Time (minutes)	11.50
Detector 1 real time plot scale	20.00
Print Report	Yes
Print Replot	Yes
AutoScale Replot to Highest Peak	Yes
Print Retention Times on Chromatogram	Yes
List Peaks Not Found in this run	No
Report Unknowns found in run	Yes
Record Raw Data	Yes
Raw Data File Name: A:\90040300.D05	
Record Result Data	No

Integration Parameters

Sampling Rate (seconds)	0.20
Peak Threshold (mV or uS/data pt interval)	0.400
Starting Peak Width (seconds)	10.0
Peak Area Reject	1000

Integration Timed Events

Time	Description

Calibration Parameters

External or Internal Calibration	External
Calibrate by Area or Height	Height
Replace Or Average Calibrations	Replace
Number Of Levels for Calibration	6
Calibration fit type	Quadratic
Response Factor for unknown peaks	0.0
Default Injection Volume	1.0
Default Dilution Factor	1.0
Area Reject for Reference Peaks	1000
Percent Retention Time Window for Reference Peaks	5.0

9513325.2462

Component # 1 FLUORIDE Retention Time 1.02
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 4.11817E-004
Least Squares Intercept = -6.11181E-002
Ka = -3.36922E-010

Level	Amount	Area	Height
1	1.19800E-001	1733	320
2	2.98500E-001	4705	821
3	5.94100E-001	9348	1644
4	1.17650E+000	21998	3547
5	2.30800E+000	37180	5315
6	4.44440E+000	74116	11092

Component # 2 CHLORIDE Retention Time 1.62
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 7.20825E-004
Least Squares Intercept = -7.89437E-002
Ka = -1.05413E-008

Level	Amount	Area	Height
1	1.51700E-001	1456	241
2	3.78110E-001	4024	594
3	7.52480E-001	8080	1191
4	1.49020E+000	17215	2702
5	2.92300E+000	28370	4066
6	5.62950E+000	59291	9183

Component # 3 NITRITE Retention Time 1.95
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 6.03697E-004
Least Squares Intercept = 4.43064E-001
Ka = 3.82504E-009

Level	Amount	Area	Height
1	1.06990E+000	9937	1360
2	2.66670E+000	25698	3515
3	5.30700E+000	53506	7323
4	1.05099E+001	114215	15244
5	2.06146E+001	218918	28443
6	3.97026E+001	440177	49476

Component # 4 BROMIDE Retention Time 3.00
Reference Peak FLUORIDE Window Size 5.00%
Least Squares Slope = 1.66948E-003
Least Squares Intercept = 2.80223E-001
Ka = -5.76698E-010

Level	Amount	Area	Height
1	1.00100E+000	0	495
2	2.49500E+000	0	1341
3	4.96500E+000	0	2740
4	9.86850E+000	0	5689
5	1.92877E+001	0	11502
6	3.71471E+001	0	22240

Component # 5 NITRATE Retention Time 3.70
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 2.26506E-003
Least Squares Intercept = -5.58779E-001
Ka = 2.11324E-008

Level	Amount	Area	Height
1	1.21960E+000	7363	607
2	3.03970E+000	19564	1518
3	6.04950E+000	39111	2906
4	1.19805E+001	83794	5858
5	2.34991E+001	132213	9250
6	4.52580E+001	274103	17468

Component # 6 PHOSPHATE Retention Time 6.03
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 6.51026E-003
Least Squares Intercept = -2.98628E-001
Ka = -1.07878E-007

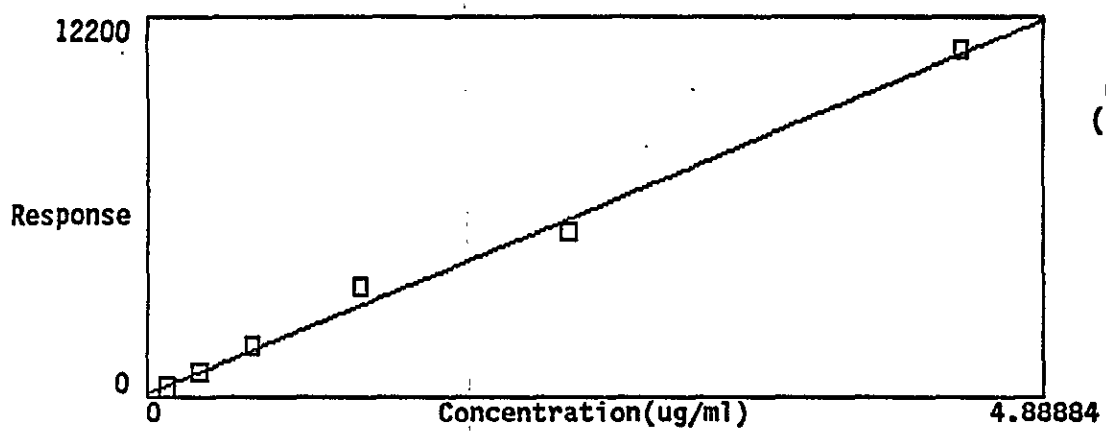
Level	Amount	Area	Height
1	1.20960E+000	3420	198
2	3.01490E+000	9585	519
3	6.00000E+000	19755	1057
4	1.18824E+001	32539	1886
5	2.33068E+001	69406	3876
6	4.48876E+001	142872	8003

Component # 7 SULFATE Retention Time 7.48
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 3.09635E-003
Least Squares Intercept = -7.42866E-001
Ka = -2.82182E-008

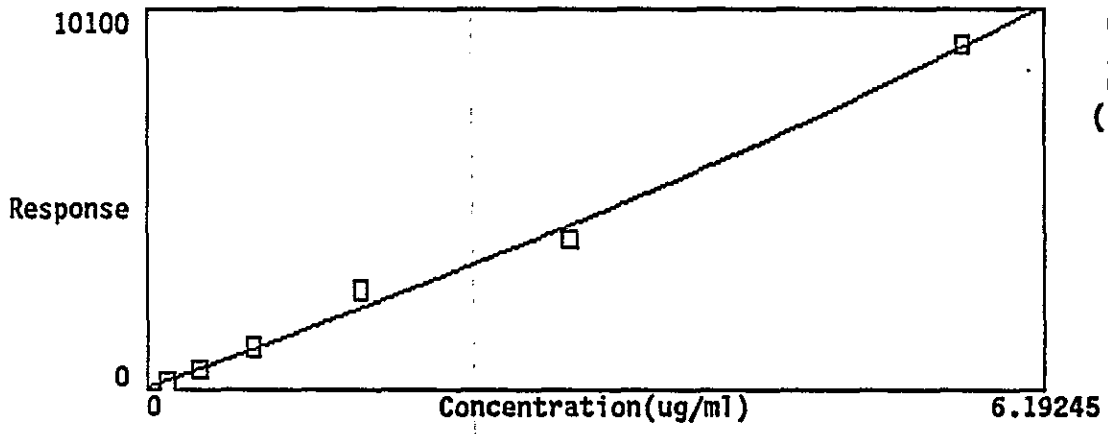
Level	Amount	Area	Height
1	1.17560E+000	10745	515
2	2.93030E+000	26326	1236
3	5.83170E+000	50588	2357
4	1.15491E+001	79004	4005
5	2.26530E+001	163581	8158
6	4.36284E+001	343157	16953

Component # 8 Oxalate Retention Time 9.77
Reference Peak FLUORIDE Window Size 10.00%
Least Squares Slope = 0.00000E+000
Least Squares Intercept = 0.00000E+000
Ka = 0.00000E+000

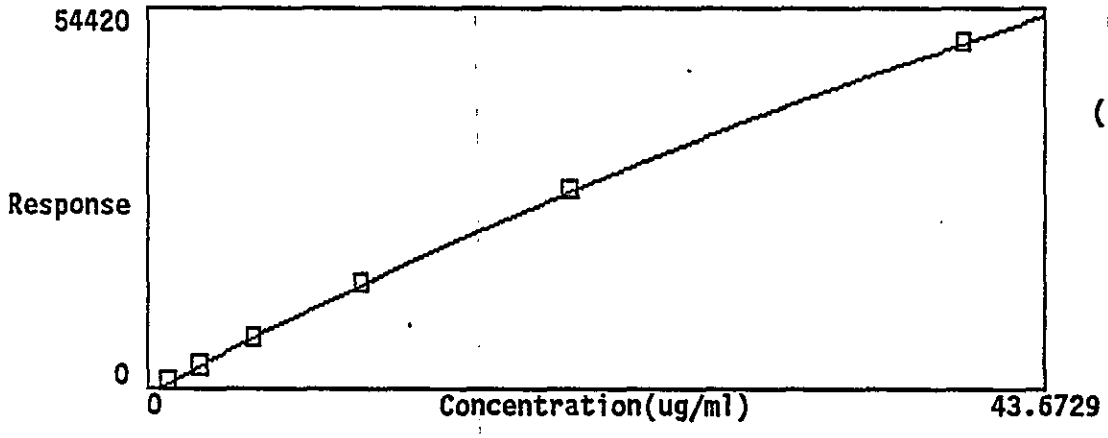
Level	Amount	Area	Height
1	0.00000E+000	0	0
2	0.00000E+000	0	0
3	0.00000E+000	0	0
4	0.00000E+000	0	0
5	0.00000E+000	0	0
6	0.00000E+000	98993	5848



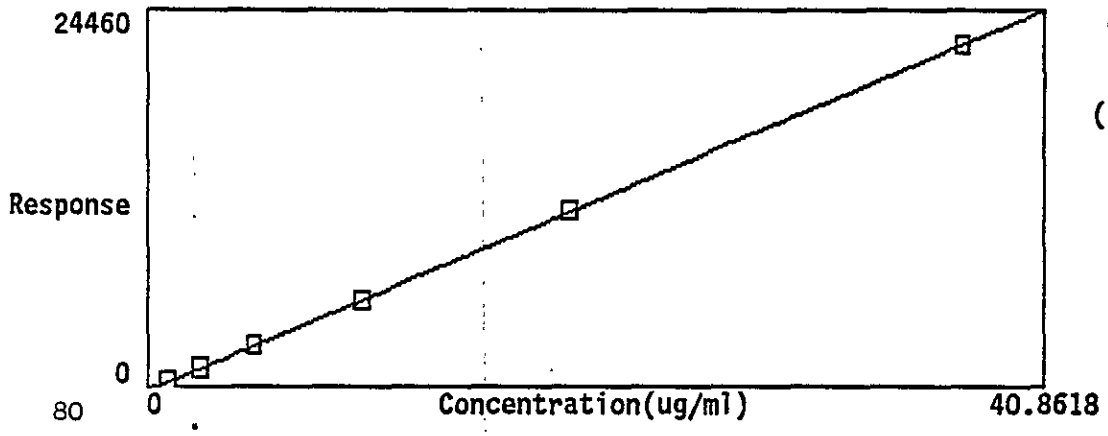
Component: *FLUORIDE*
Fit Type: Quadratic
Conc = (-3.369224e-010
(4.118173e-004 * Resp)+



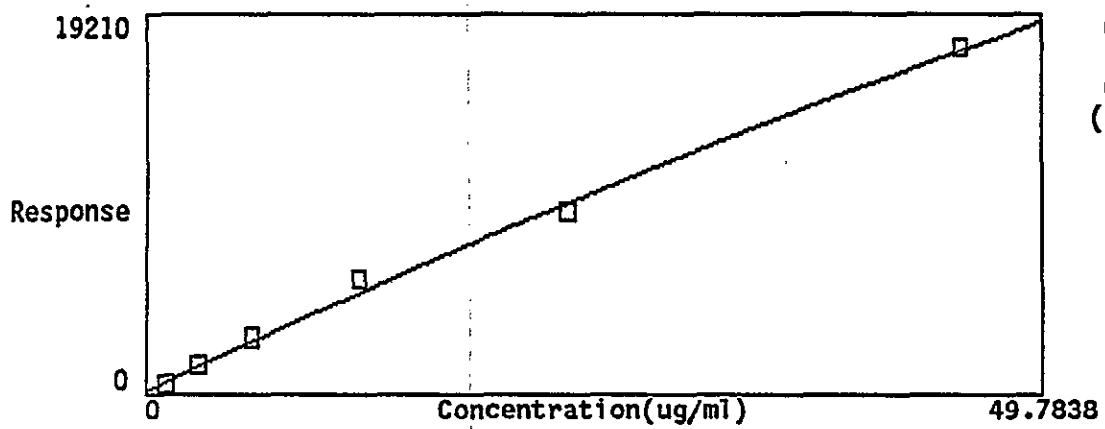
Component: CHLORIDE
Fit Type: Quadratic
Conc = (-1.054134e-008
(7.208249e-004 * Resp)+



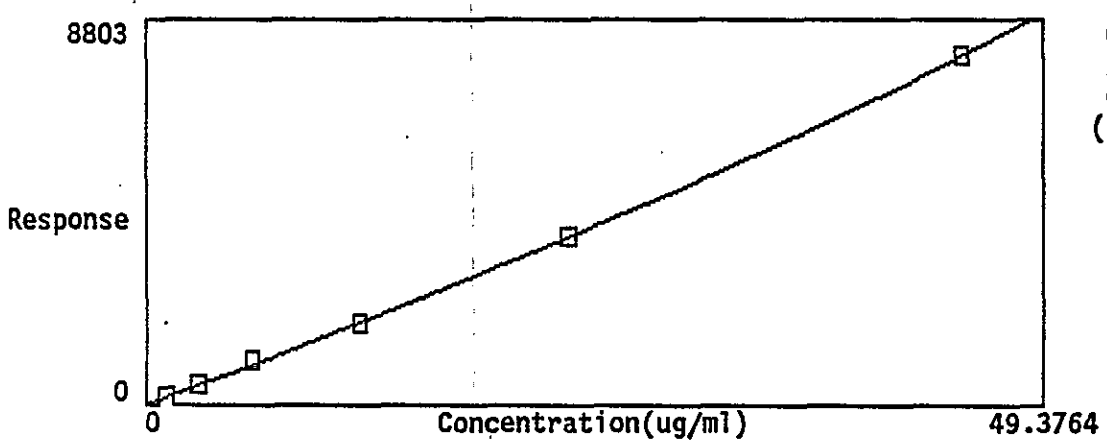
Component: NITRITE
Fit Type: Quadratic
Conc = (3.824921e-009 *
(6.037006e-004 * Resp)+



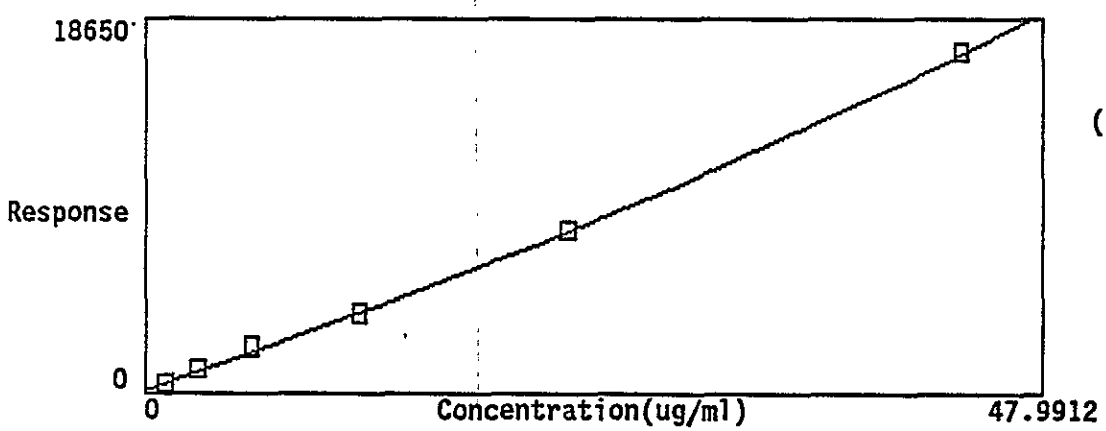
Component: BROMIDE
Fit Type: Quadratic
Conc = (-5.766983e-010
(1.669477e-003 * Resp)+



Component: NITRATE
Fit Type: Quadratic
Conc = (2.113242e-008 *
(2.265060e-003 * Resp)+



Component: PHOSPHATE
Fit Type: Quadratic
Conc = (-1.078779e-007
(6.510264e-003 * Resp)+



Component: SULFATE
Fit Type: Quadratic
Conc = (-2.821818e-008
(3.096352e-003 * Resp)+

DATA REPROCESSED ON Mon Jul 02 13:05:05 1990

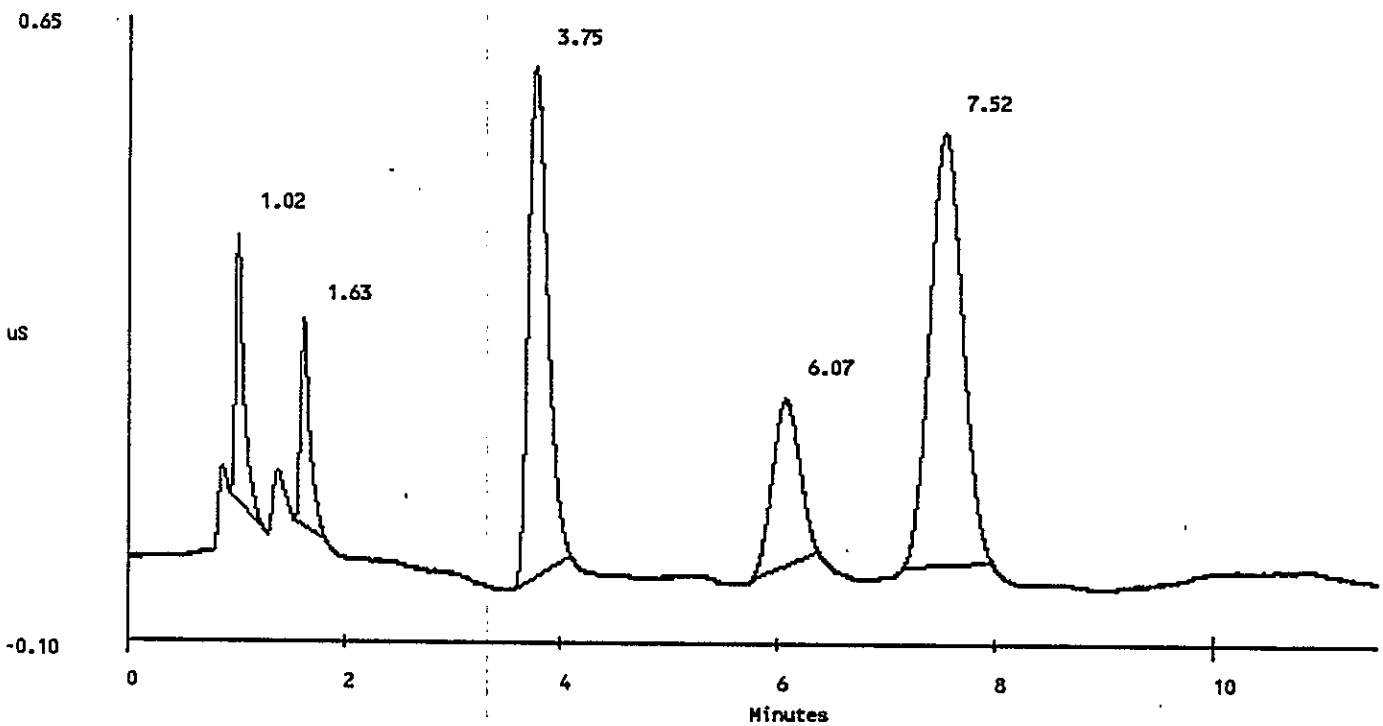
Sample Name: AUTOCAL1R Date: Tue Apr 03 10:17:01 1990
Data File : A:\90040300.D03
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 3 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes
Area reject = 1000
Amount Injected = 1

Number of Data Points = 3451
One Data Point per 0.2 seconds
Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.198e-001	1.733e+003	320	1	0	0.00%
2	1.63	CHLORIDE	1.517e-001	1.456e+003	241	1	0	0.00%
3	3.75	NITRATE	1.220e+000	7.363e+003	607	1	0	0.00%
4	6.07	PHOSPHATE	1.210e+000	3.420e+003	198	1	0	0.00%
5	7.52	SULFATE	1.176e+000	1.075e+004	515	1	0	0.00%



9513325.2467

DATA REPROCESSED ON Mon Jul 02 14:37:19 1990

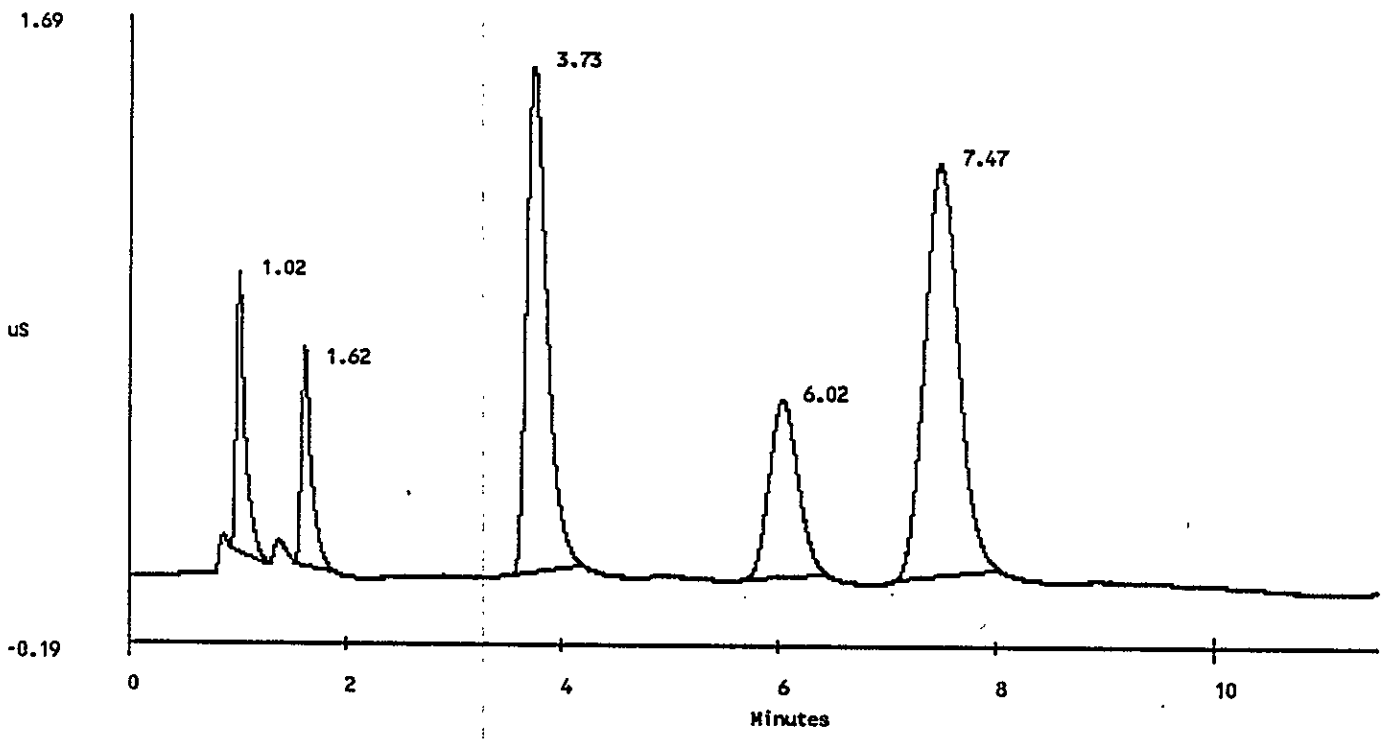
Sample Name: AUTOCAL2R Date: Tue Apr 03 10:29:21 1990
Data File : A:\90040300.D04
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 4 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes
Area reject = 1000
Amount Injected = 1

Number of Data Points = 3451
One Data Point per 0.2 seconds
Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	2.984e-001	4.705e+003	821	1	0	0.00%
2	1.62	CHLORIDE	3.783e-001	4.024e+003	594	1	0	-1.02%
3	3.73	NITRATE	3.039e+000	1.956e+004	1518	1	0	-0.44%
4	6.02	PHOSPHATE	5.755e+000	9.585e+003	519	1	0	-0.82%
5	7.47	SULFATE	6.145e+000	2.633e+004	1236	1	0	-0.67%



9513325.246B

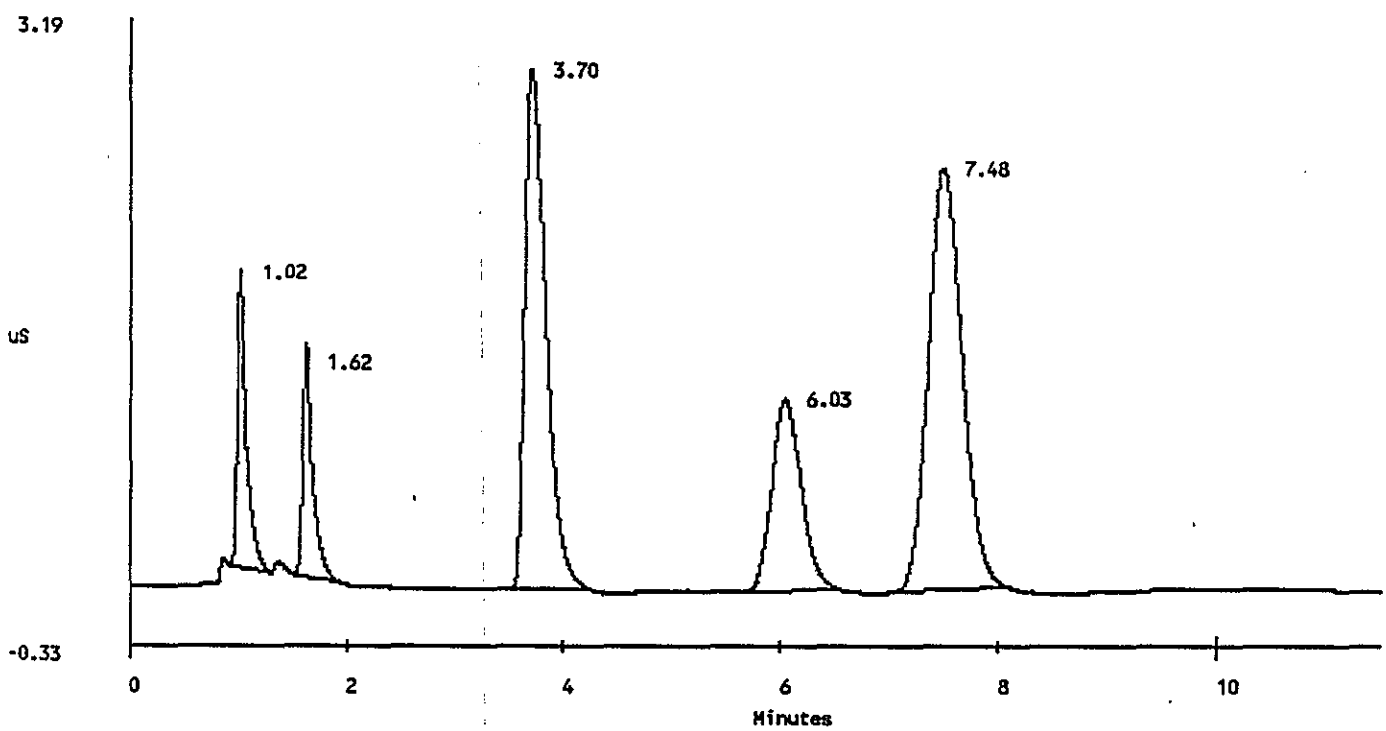
DATA REPROCESSED ON Mon Jul 02 14:37:59 1990

Sample Name: AUTOCAL3R Date: Tue Apr 03 10:41:41 1990
Data File : A:\90040300.D05
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 5 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3451
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	5.941e-001	9.348e+003	1644	1	0	0.00%
2	1.62	CHLORIDE	7.523e-001	8.080e+003	1191	1	0	-1.02%
3	3.70	NITRATE	6.051e+000	3.911e+004	2906	1	0	-1.33%
4	6.03	PHOSPHATE	8.564e+000	1.976e+004	1057	1	0	-0.55%
5	7.48	SULFATE	8.817e+000	5.059e+004	2357	1	0	-0.44%



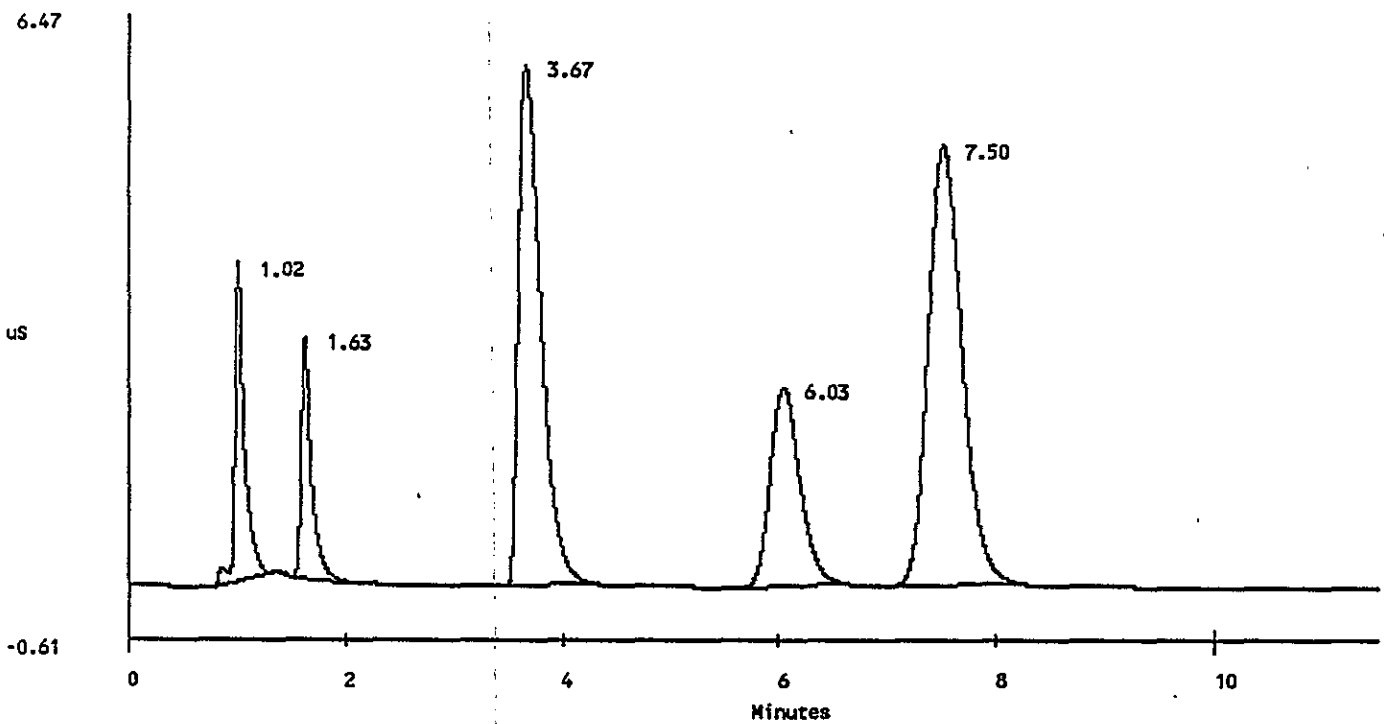
DATA REPROCESSED ON Mon Jul 02 14:38:33 1990

Sample Name: AUTOCAL4R Date: Tue Apr 03 10:54:02 1990
Data File : A:\90040300.D06
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 6 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.177e+000	2.200e+004	3547	1	0	0.00%
2	1.63	CHLORIDE	1.490e+000	1.722e+004	2702	1	0	0.00%
3	3.67	NITRATE	1.198e+001	8.379e+004	5858	1	0	-2.22%
4	6.03	PHOSPHATE	1.460e+001	4.206e+004	2212	1	0	-0.55%
5	7.50	SULFATE	1.496e+001	1.068e+005	4931	1	0	-0.22%



9513325.2470

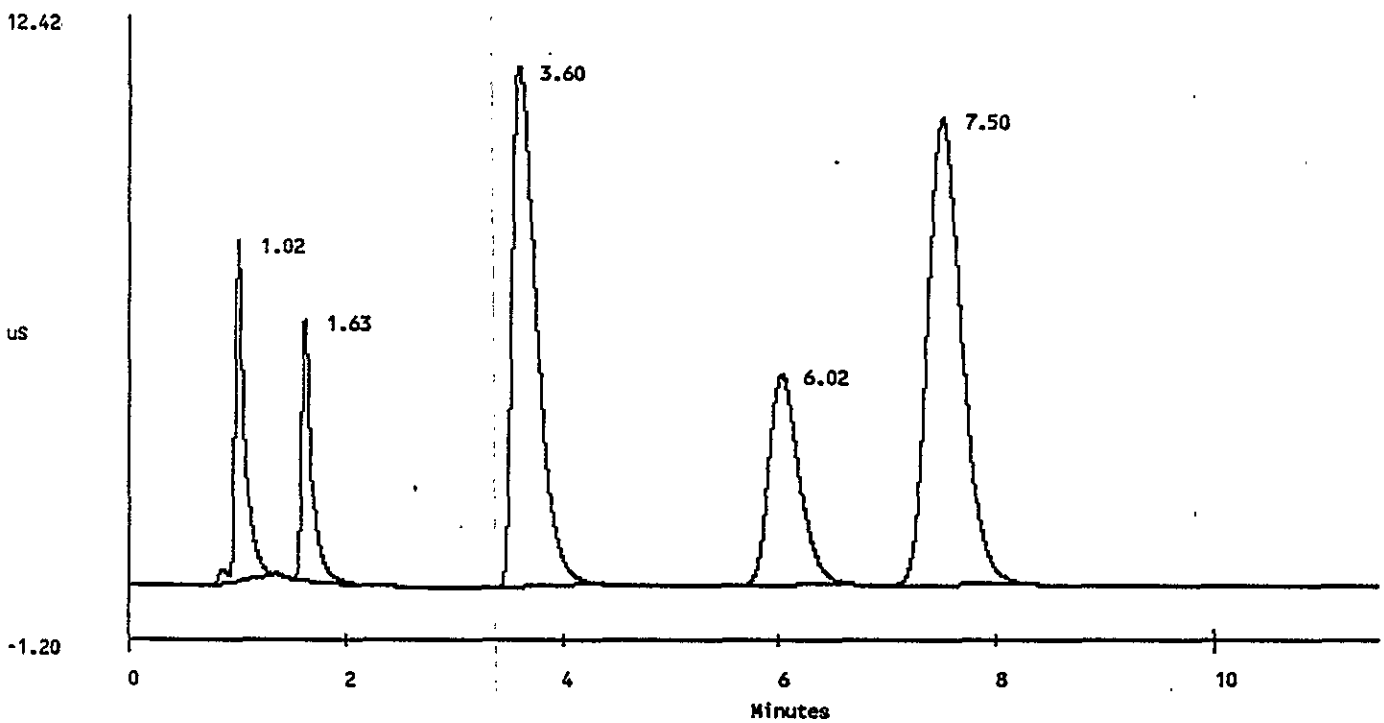
DATA REPROCESSED ON Mon Jul 02 14:39:07 1990

Sample Name: AUTOCAL5R Date: Tue Apr 03 11:06:22 1990
Data File : A:\90040300.D07
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 7 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	3.050e+000	4.520e+004	7323	1	0	0.00%
2	1.63	CHLORIDE	3.751e+000	3.558e+004	5631	1	0	0.00%
3	3.60	NITRATE	2.869e+001	1.757e+005	11209	1	0	-4.00%
4	6.02	PHOSPHATE	2.675e+001	8.811e+004	4535	1	0	-0.82%
5	7.50	SULFATE	2.728e+001	2.192e+005	10100	1	0	-0.22%



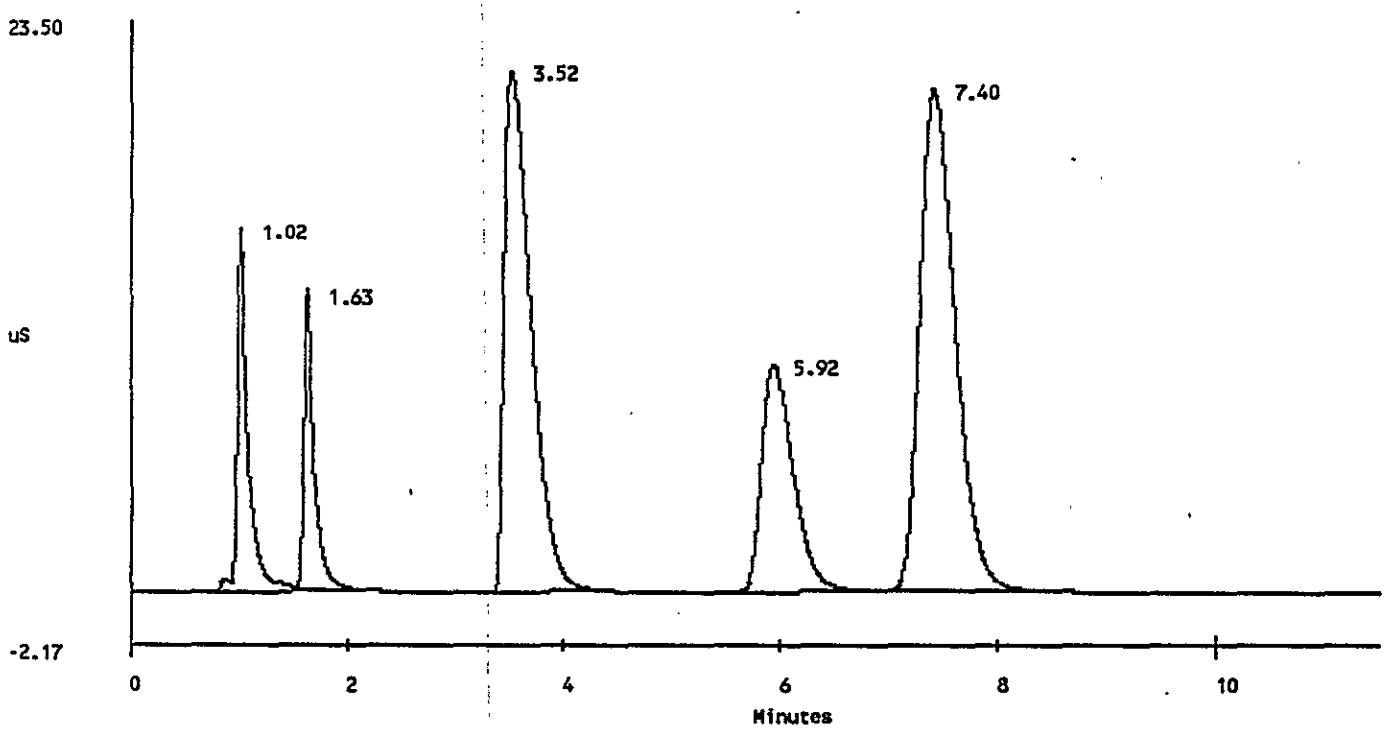
DATA REPROCESSED ON Mon Jul 02 14:39:42 1990

Sample Name: AUTOCAL6R Date: Tue Apr 03 11:18:42 1990
Data File : A:\90040300.D08
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 8 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3451
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	5.778e+000	9.886e+004	14697	2	0	0.00%
2	1.63	CHLORIDE	7.060e+000	7.699e+004	11887	2	0	0.00%
3	3.52	NITRATE	5.544e+001	3.641e+005	21314	1	0	-6.22%
4	5.92	PHOSPHATE	5.042e+001	1.851e+005	9060	1	0	-2.47%
5	7.40	SULFATE	5.218e+001	4.591e+005	20537	1	0	-1.55%



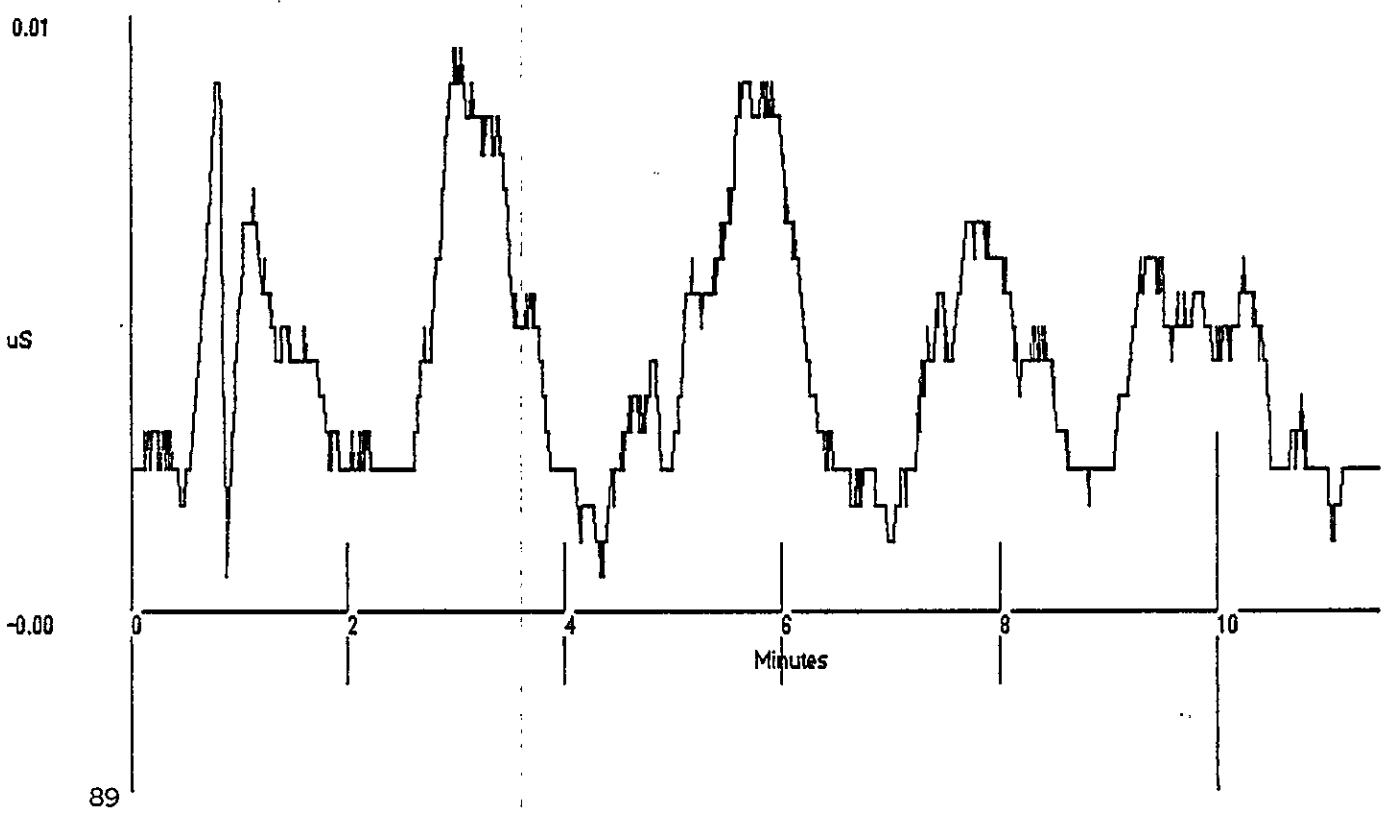
DIONEX SCHEDULE - A:\90040500.SCH

Inject	Sample Name	Method Name	Data File	Volume	Dilution	Int Std
1	SETUP	c:\windows\ai	c:\windows\ai	1	1	0
2	BLANK	c:\windows\ai	c:\windows\ai	1	1	0
3	LMCS/6C11-HO	c:\windows\ai	c:\windows\ai	1	101	0
4	438B	c:\windows\ai	c:\windows\ai	1	1	0
5	427	c:\windows\ai	c:\windows\ai	1	101	0
6	428D	c:\windows\ai	c:\windows\ai	1	101	0
7	429S	c:\windows\ai	c:\windows\ai	1	101	0
8	451	c:\windows\ai	c:\windows\ai	1	101	0
9	452D	c:\windows\ai	c:\windows\ai	1	101	0
10	475	c:\windows\ai	c:\windows\ai	1	101	0
11	476D	c:\windows\ai	c:\windows\ai	1	101	0
12	547	c:\windows\ai	c:\windows\ai	1	101	0
13	548D	c:\windows\ai	c:\windows\ai	1	101	0
14	571	c:\windows\ai	c:\windows\ai	1	101	0
15	572D	c:\windows\ai	c:\windows\ai	1	101	0
16	983	c:\windows\ai	c:\windows\ai	1	51	0
17	984D	c:\windows\ai	c:\windows\ai	1	51	0
18	64D	c:\windows\ai	c:\windows\ai	1	101	0
19	LMCS/6C11-HO	c:\windows\ai	c:\windows\ai	1	101	0

```
==================================================================================
| Sample Name: SETUP                                Date: Thu Apr 05 11:44:48 1990|
| Data File  : c:\windows\ai400\data\900-5963.d01                                 |
| Method     : c:\windows\ai400\method\sst.met                                    |
| CIM Address: 1        System : 1        Cycle#:   1       Detector: CDM        |
==================================================================================
**********************  EXTERNAL STANDARD REPORT  *************************

Start Time =  0.00 minutes              Stop time = 11.50 Minutes
Number of Data Points  =  3450           One Data Point per 0.2 seconds
Areareject = 1000
Amount Injected = 1        Dilution factor = 1

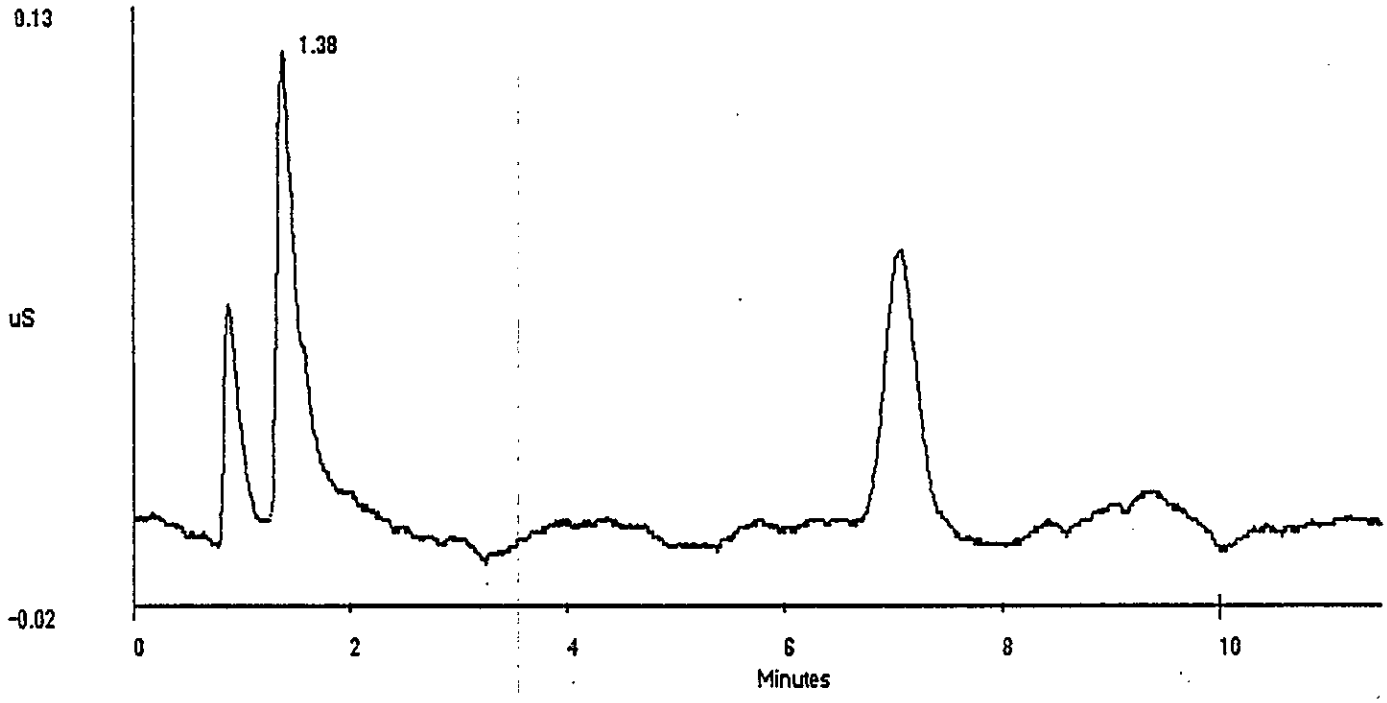
PEAK RET    PEAK                CONC. in                                REF   % DELTA
NUM  TIME   NAME                ug/ml          AREA     HEIGHT BL PEAK RET TIME
----------------------------------------------------------------------------------
```



```
==========================================================================
| Sample Name: BLANK                          Date: Thu Apr 05 11:57:04 1990|
| Data File  : c:\windows\ai400\data\900-5963.d02                          |
| Method     : c:\windows\ai400\method\sst.met                             |
| CIM Address: 1        System : 1        Cycle#:   2      Detector: CDM  |
==========================================================================
**********************  EXTERNAL STANDARD REPORT  **************************

Start Time =  0.00 minutes            Stop time = 11.50 Minutes
Number of Data Points  =  3450         One Data Point per 0.2 seconds
Areareject = 1000
Amount Injected = 1       Dilution factor = 1
```

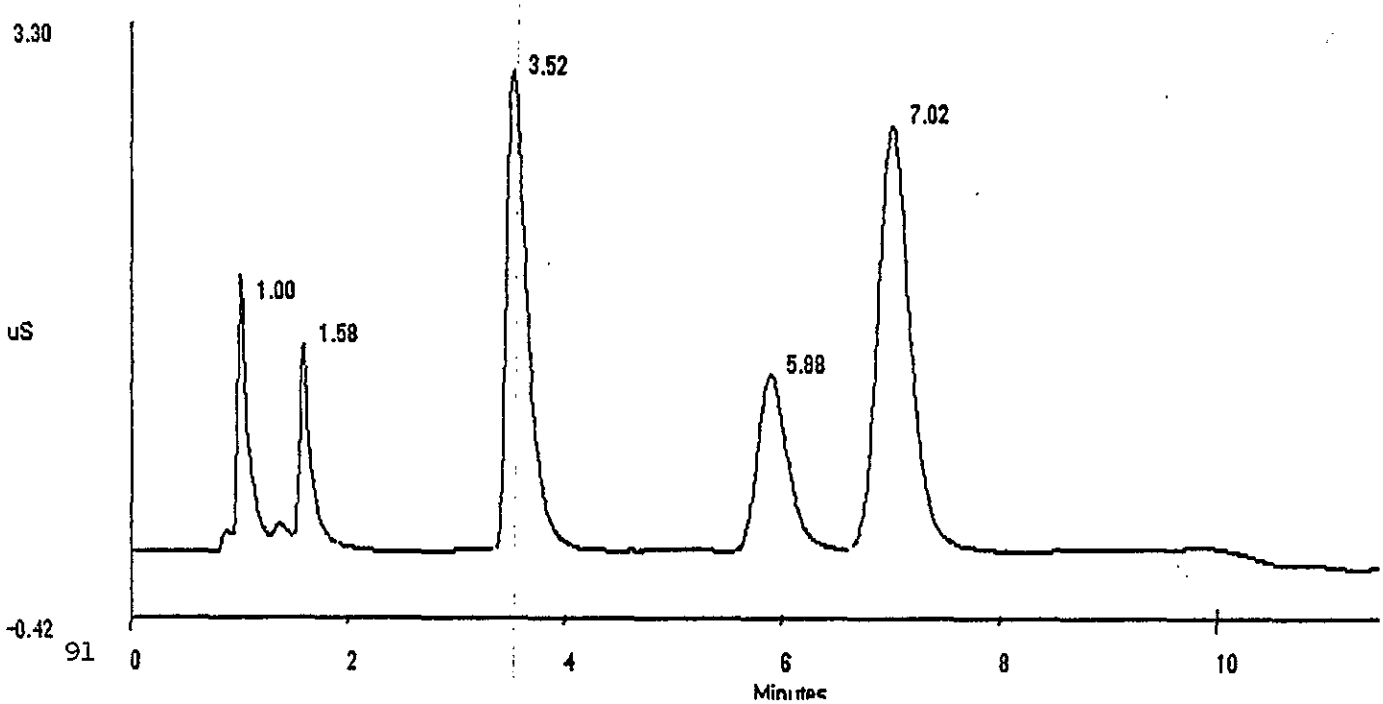
PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.38		0.000e+000	1.021e+003	106	1		



```
==================================================================================
| Sample Name: LMCS/6C11-HO                    Date: Thu Apr 05 12:09:18 1990|
| Data File  : c:\windows\ai400\data\900-5963.d03                            |
| Method     : c:\windows\ai400\method\sst.met                               |
| CIM Address: 1        System : 1        Cycle#:   3       Detector: CDM    |
==================================================================================
**********************  EXTERNAL STANDARD REPORT  **************************

Start Time =  0.00 minutes              Stop time = 11.50 Minutes
Number of Data Points  =  3450           One Data Point per 0.2 seconds
Areareject = 1000
Amount Injected = 1        Dilution factor = 101
```

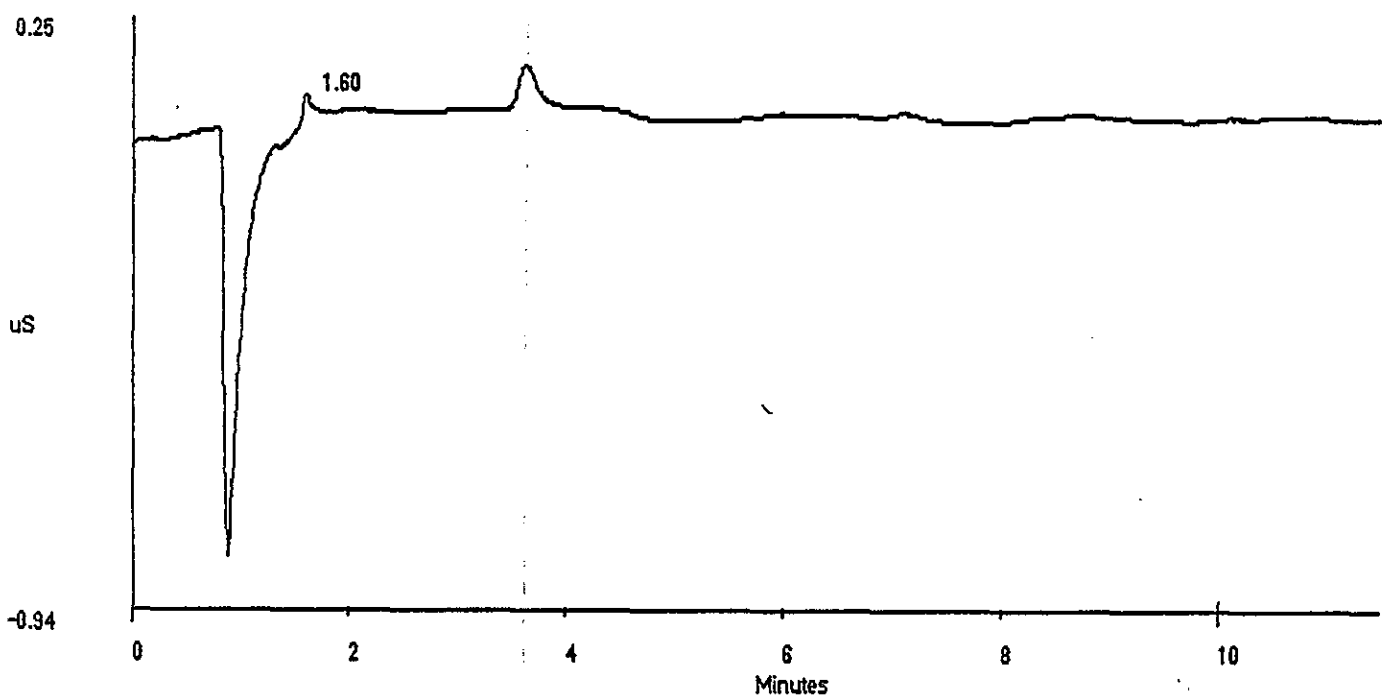
PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	5.097e+001	9.542e+003	1452	1	0	-1.64%
2	1.58	CHLORIDE	7.181e+001	7.920e+003	1209	1	0	-3.06%
3	3.52	NITRATE	6.106e+002	3.939e+004	2949	1	0	0.00%
4	5.88	PHOSPHATE	6.038e+002	2.002e+004	1084	1	0	-0.56%
5	7.02	SULFATE	6.268e+002	5.312e+004	2626	1	0	-5.18%



```
==================================================================================
| Sample Name: 438B                                Date: Thu Apr 05 12:21:34 1990|
| Data File  : c:\windows\ai400\data\900-5963.d04                                |
| Method     : c:\windows\ai400\method\sst.met                                   |
| CIM Address: 1        System : 1        Cycle#:   4       Detector: CDM       |
==================================================================================
*********************  EXTERNAL STANDARD REPORT  ************************

Start Time =  0.00 minutes            Stop time = 11.50 Minutes
Number of Data Points  =  3450         One Data Point per 0.2 seconds
Areareject = 1000
Amount Injected = 1        Dilution factor = 1
```

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.60	CHLORIDE	2.017e-001	1.746e+004	266	1	0	-2.04%



9513325.2477

DATA REPROCESSED ON Thu Aug 23 13:22:47 1990

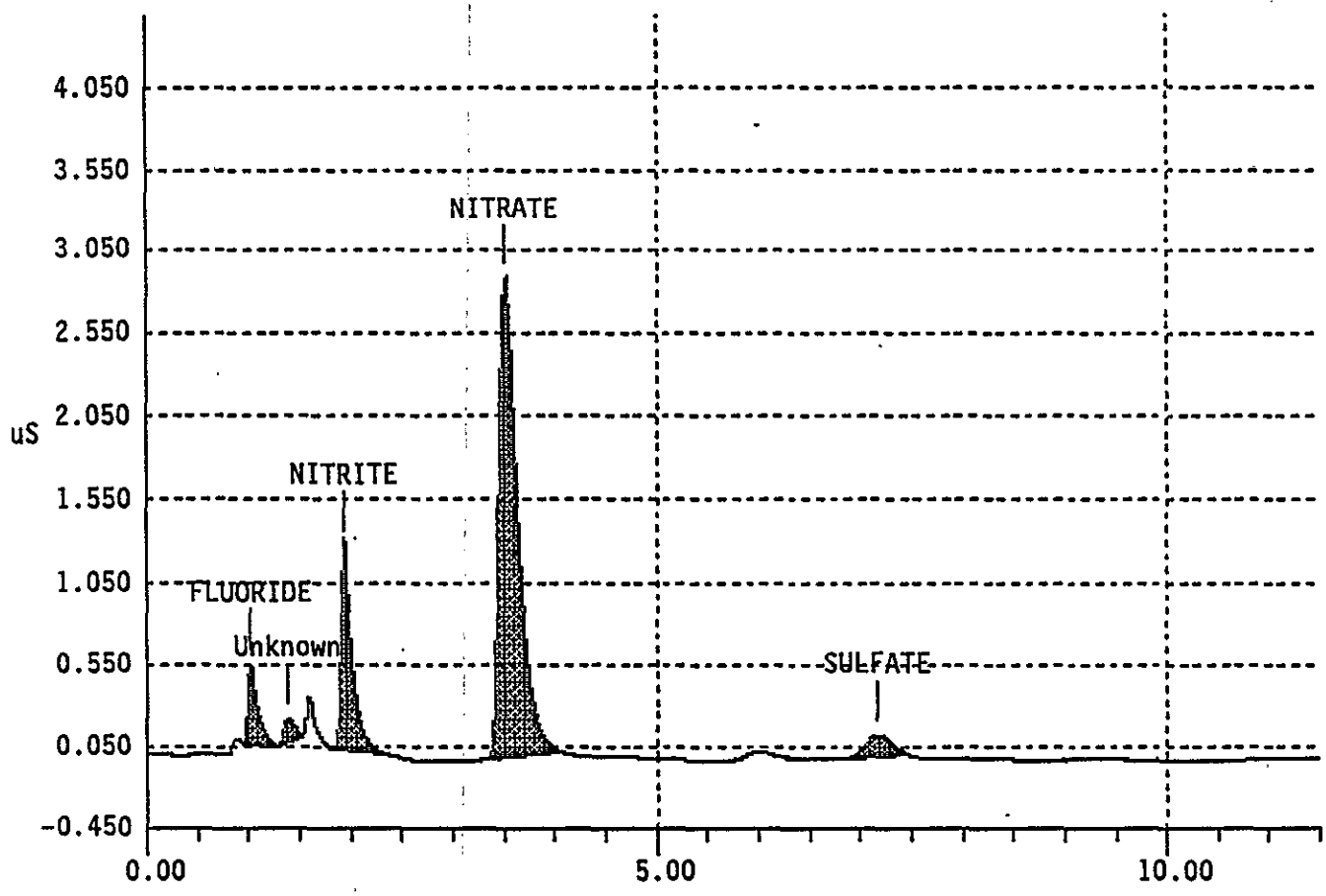
Sample Name: 475 Date: Thu Apr 05 14:35:06 1990
Data File : A:\90040500.D10
Method : c:\windows\ai400\method\sst.met
ACI Address: 1 System : 1 Inject#: 10 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.986e+001	3.223e+003	493	1	0	0.00%
2	1.38		0.000e+000	1.031e+003	149	1		
3	1.93	NITRITE	1.467e+002	9.369e+003	1239	1	0	0.00%
4	3.52	NITRATE	5.977e+002	3.801e+004	2887	1	0	0.00%
5	7.17	SULFATE	4.085e+001	2.343e+003	132	1	0	0.00%

File: A:\90040500.D10 Sample: 475



DATA REPROCESSED ON Thu Aug 23 13:24:13 1990

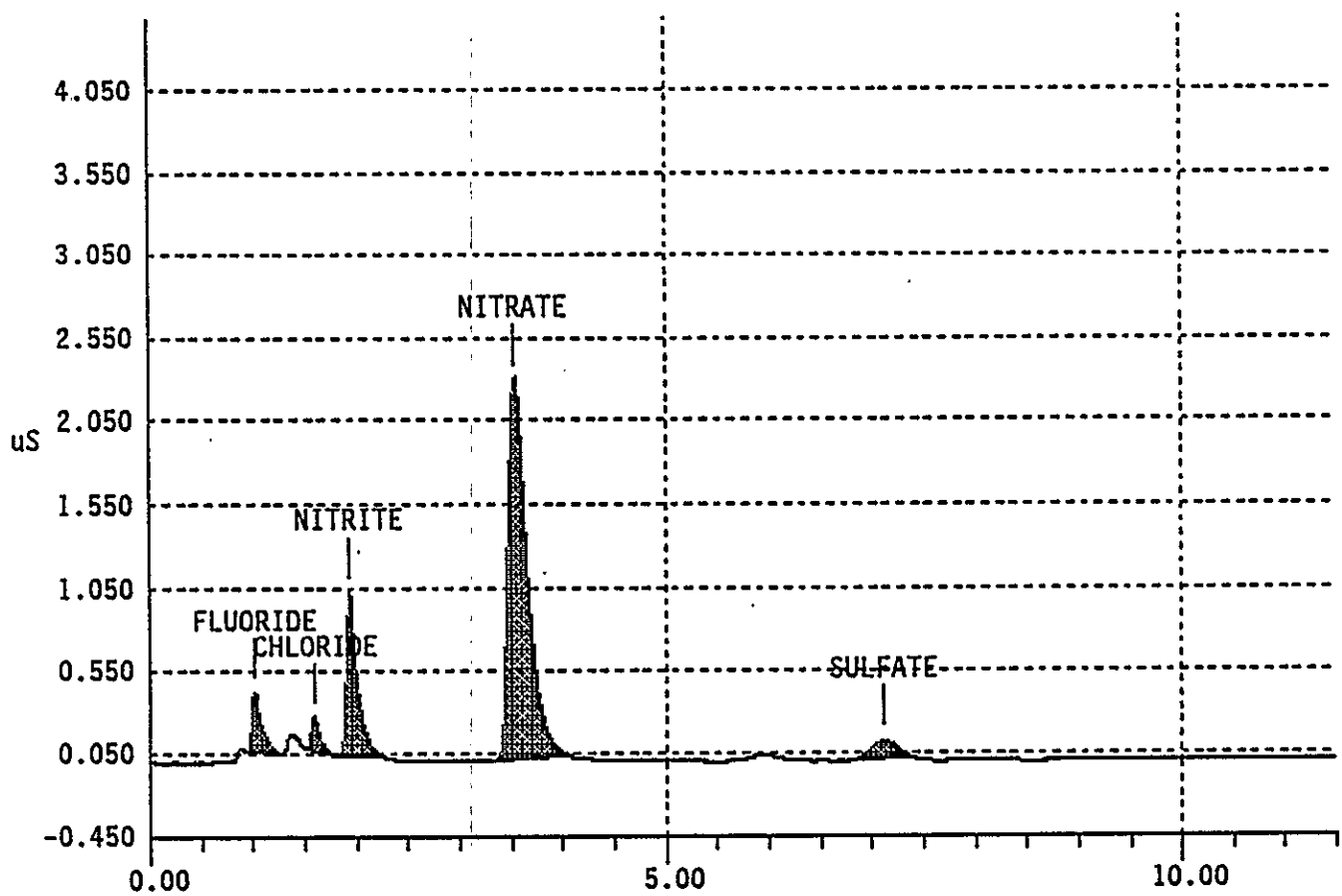
Sample Name: 476D Date: Thu Apr 05 14:47:21 1990
Data File : A:\90040500.D11
Method : c:\windows\ai400\method\sst.met
ACI Address: 1 System : 1 Inject#: 11 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.572e+001	2.360e+003	366	1	0	0.00%
2	1.60	CHLORIDE	1.652e+001	1.143e+003	197	1	0	0.00%
3	1.93	NITRITE	1.243e+002	7.294e+003	1000	1	0	0.00%
4	3.53	NITRATE	4.702e+002	2.966e+004	2279	1	0	0.00%
5	7.12	SULFATE	3.565e+001	1.927e+003	111	1	0	0.00%

File: A:\90040500.D11 Sample: 476D



DATA REPROCESSED ON Thu Aug 23 13:17:53 1990

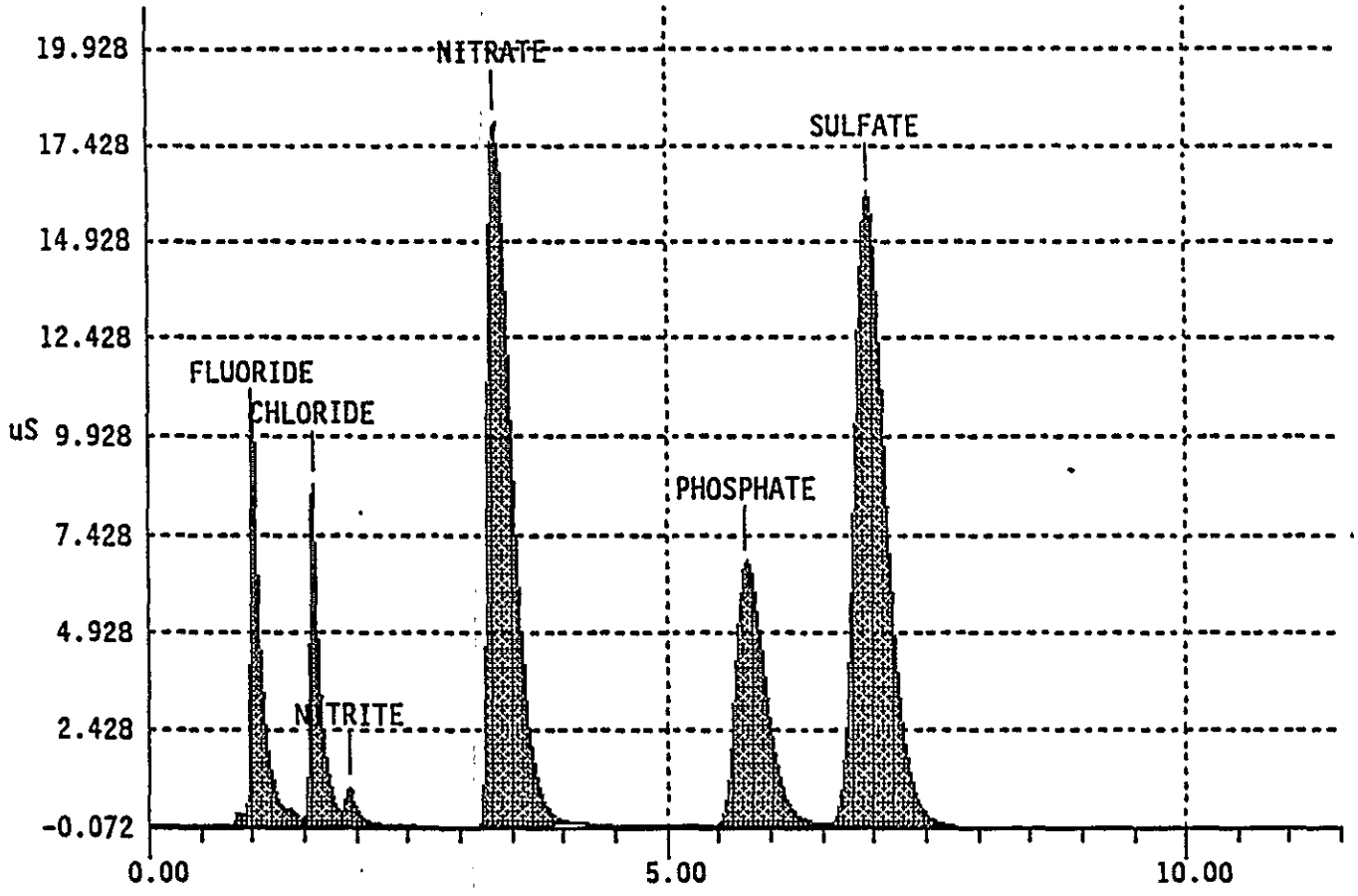
Sample Name: 429S Date: Thu Apr 05 13:58:17 1990
Data File : A:\90040500.D07
Method : c:\windows\ai400\method\sst.met
ACI Address: 1 System : 1 Inject#: 7 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	3.052e+002	7.634e+004	9685	2	0	0.00%
2	1.58	CHLORIDE	4.348e+002	5.743e+004	8656	3	0	0.00%
3	1.93	NITRITE	1.089e+002	6.323e+003	836	4	0	0.00%
4	3.35	NITRATE	3.839e+003	2.908e+005	17987	1	0	0.00%
5	5.77	PHOSPHATE	3.452e+003	1.356e+005	6762	2	0	0.00%
6	6.93	SULFATE	3.527e+003	3.404e+005	16085	2	0	-6.31%

File: A:\90040500.D07 Sample: 429S



DATA REPROCESSED ON Thu Aug 23 13:37:04 1990

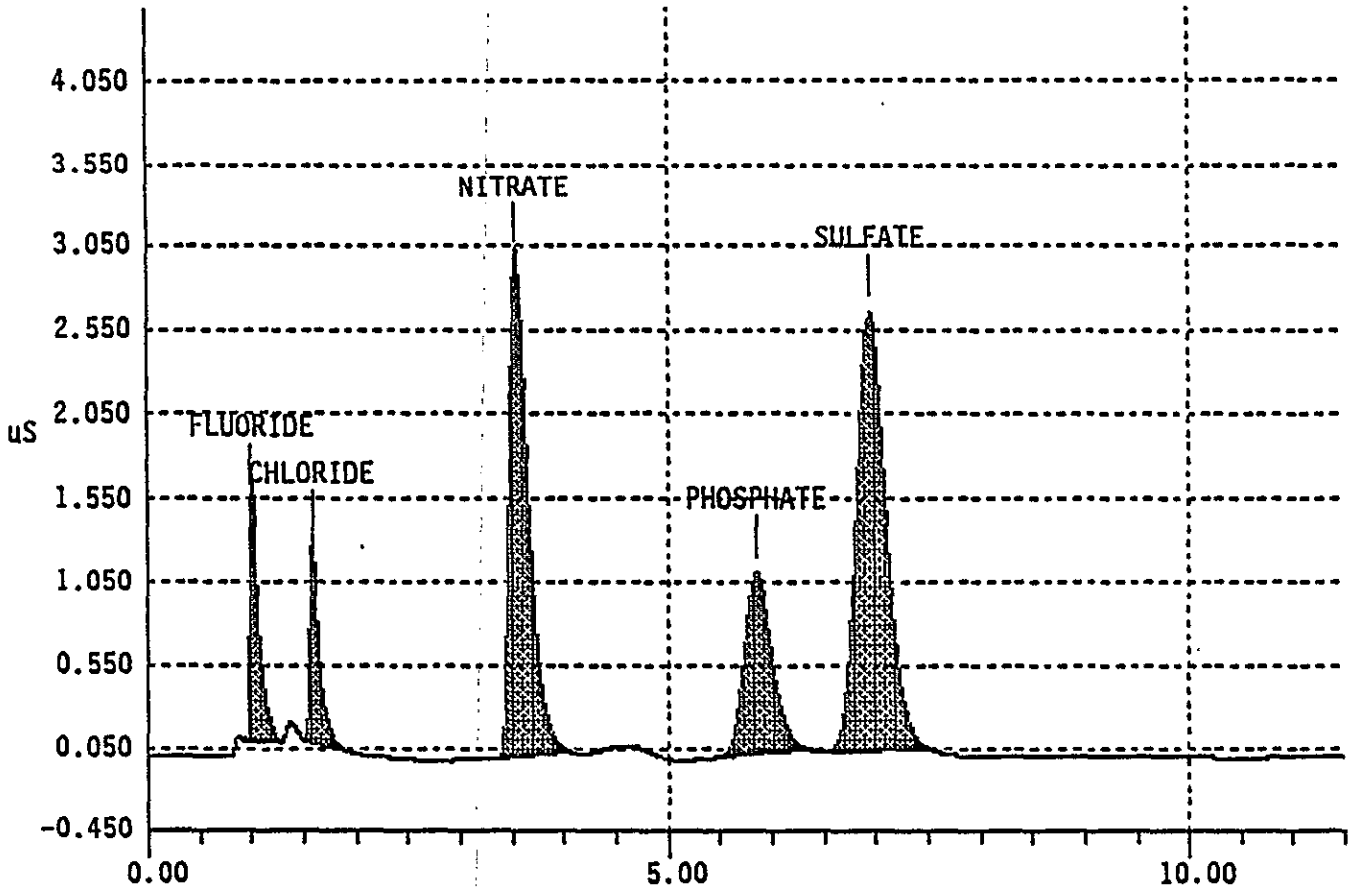
Sample Name: LMCS/6C11-HO F0574 Date: Thu Apr 05 16:25:34 1990
Data File : A:\90040500.D19
Method : c:\windows\ai400\method\sst.met
ACI Address: 1 System : 1 Inject#: 19 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	5.094e+001	9.493e+003	1451	1	0	0.00%
2	1.58	CHLORIDE	7.021e+001	-7.816e+003	1180	1	0	0.00%
3	3.53	NITRATE	6.154e+002	3.890e+004	2971	1	0	0.00%
4	5.85	PHOSPHATE	6.079e+002	2.009e+004	1091	1	0	0.00%
5	6.95	SULFATE	6.252e+002	5.262e+004	2619	1	0	-6.08%

File: A:\90040500.D19 Sample: LMCS/6C11-HO



Analytical Batch

Lab Segment Serial #:F0465

Customer ID:89-072

Instrument	WB24721
Procedure/Rev	LA-533-105/A-3
Technologist	N. E. Wright
Date	April 12, 1990
Temperature	22.5 C
Starting Time	1100
Ending Time	1420
Chemist	H. S. Rich

Ion Chromatograph Analysis
Water Digestion
* Run for Fluoride only

	Description		Lab ID
1	Initial LMCS Check Std.		F0426
2	Reagent Blank		F0438
3	Sample	89-070	F0427
4	Duplicate Sample	89-070	F0428
5	Spike of Sample	89-070	F0429
6	Sample	89-071	F0451
7	Duplicate Sample	89-071	F0452
8	Sample	89-072	F0475
9	Duplicate Sample	89-072	F0476
10	Sample	89-075	F0547
11	Duplicate Sample	89-075	F0548

	Description		Lab ID
12	Sample	89-076	F0571
13	Final LMCS Check Std.		F0574
14			
15			
16			
17			
18			
19			
20			
21			
22			

Standard Type	Primary Book # & Aliquot Vol.	Second Book # & Aliquot Vol.	Third Bk# & Alqt. Vol.	Final Vol. of Std.
LMCS Check Std.	6C11HO/100 uL			10.1 mL
Spike for 89-072	35C9-77/300 uL	F0427/50 uL		5.3 mL

SST-102 Rev. F 9/7/90 Interim

9513325.2482

Single Shell Tank Calibration Record

Analyte:	Ion Chromatograph		
Procedure:	LA-533-105	Revision:	A-3
Instrument:	DIONEX 4000	Property Number:	WB24271
Technologist:	N.E. Wright	Payroll Number:	6B107
Date:	April 11, 1990		

Calibration Standard ID: 35C9-79 issued April 10, 1990

Analyte Concentration: F 49 Cl 66 PO_4 609 NO_3 611 SO_4 596 (ppm)

Type of Calibration: Linear

Comments:

SST-103 Rev. (Draft) 9/4/90 Interim

DIONEX METHOD PARAMETERS - SST.MET

Detector Parameters

Number of Detectors	1
Detector 1 Type	CDM

Report Options

Run Time (minutes)	11.50
Detector 1 real time plot scale	20.00
Print Report	Yes
Print Replot	Yes
AutoScale Replot to Highest Peak	Yes
Print Retention Times on Chromatogram	Yes
List Peaks Not Found in this run	No
Report Unknowns found in run	Yes
Record Raw Data	Yes
Raw Data File Name: A:\90040979.D08	
Record Result Data	No

Integration Parameters

Sampling Rate (seconds)	0.20
Peak Threshold (mV or uS/data pt interval)	0.400
Starting Peak Width (seconds)	10.0
Peak Area Reject	1000

Integration Timed Events

Time	Description

Calibration Parameters

External or Internal Calibration	External
Calibrate by Area or Height	Height
Replace Or Average Calibrations	Replace
Number Of Levels for Calibration	6
Calibration fit type	Quadratic
Response Factor for unknown peaks	0.0
Default Injection Volume	1.0
Default Dilution Factor	1.0
Area Reject for Reference Peaks	1000
Percent Retention Time Window for Reference Peaks	5.0

Component # 1 FLUORIDE Retention Time 1.00
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 3.68480E-004
Least Squares Intercept = -1.99974E-004
Ka = -4.02362E-009

Level	Amount	Area	Height
1	9.78000E-002	1668	300
2	2.43800E-001	3642	607
3	4.85200E-001	9315	1320
4	9.60800E-001	18456	2776
5	1.88460E+000	35592	5385
6	3.62900E+000	83552	11233

Component # 2 CHLORIDE Retention Time 1.60
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 6.15991E-004
Least Squares Intercept = -3.39552E-002
Ka = -1.21610E-008

Level	Amount	Area	Height
1	1.31700E-001	2313	358
2	3.28400E-001	3676	587
3	6.53500E-001	6685	1135
4	1.29410E+000	14160	2092
5	2.53800E+000	28199	4705
6	4.88900E+000	62634	9921

Component # 3 NITRITE Retention Time 1.95
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 7.28693E-004
Least Squares Intercept = 2.72186E-001
Ka = 3.36454E-009

Level	Amount	Area	Height
1	1.18960E+000	9937	1360
2	2.99000E+000	25698	3515
3	5.95050E+000	53506	7323
4	1.17843E+001	114215	15244
5	2.39442E+001	218918	28443
6	4.45185E+001	440177	49476

Component # 4 NITRATE Retention Time 3.38
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 2.06336E-003
Least Squares Intercept = -2.78230E-001
Ka = 2.72813E-010

Level	Amount	Area	Height
1	1.21960E+000	7900	677
2	3.03980E+000	19225	1565
3	6.04950E+000	40617	3098
4	1.19800E+001	84027	6111
5	2.35000E+001	171346	11368
6	4.52600E+001	368906	22029

Component # 5 PHOSPHATE Retention Time 5.80
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 5.30474E-003
Least Squares Intercept = 1.89883E-001
Ka = -4.78291E-008

Level	Amount	Area	Height
1	1.21550E+000	3360	198
2	3.02990E+000	9889	536
3	6.02970E+000	20802	1103
4	1.19412E+001	43160	2270
5	2.34230E+001	88767	4565
6	4.51110E+001	186751	9238

Component # 6 SULFATE Retention Time 6.85
Reference Peak C:\WINDOWS\AI400\METHOD\SST.MET Window Size
Least Squares Slope = 2.26381E-003
Least Squares Intercept = 6.72726E-003
Ka = -1.34143E-008

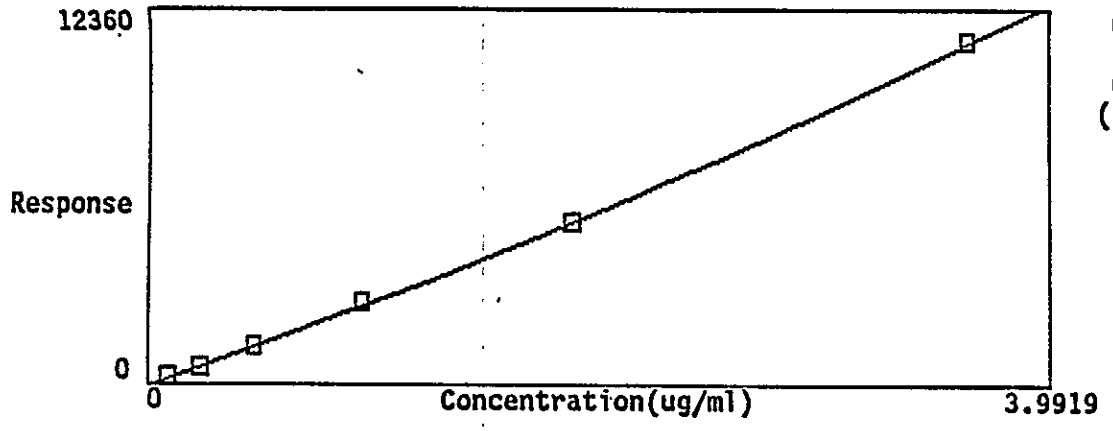
Level	Amount	Area	Height
1	1.18960E+000	10771	557
2	2.96520E+000	25693	1297
3	5.90100E+000	51993	2607
4	1.16860E+001	108657	5358
5	2.29231E+001	220178	10811
6	4.41480E+001	472662	22498

Component # 7 Oxalate Retention Time 9.77
Reference Peak FLUORIDE Window Size 10.00%
Least Squares Slope = 0.00000E+000
Least Squares Intercept = 0.00000E+000
Ka = 0.00000E+000

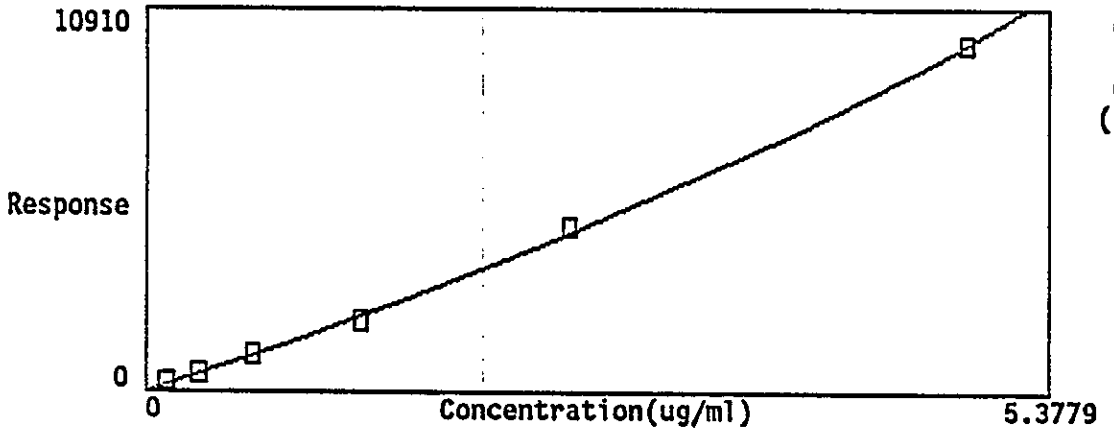
Level	Amount	Area	Height
1	0.00000E+000	0	0
2	0.00000E+000	0	0
3	0.00000E+000	0	0
4	0.00000E+000	0	0
5	0.00000E+000	0	0
6	0.00000E+000	98993	5848

IC Control File: C:\WINDOWS\AI400\METHOD\GROUT01.TE

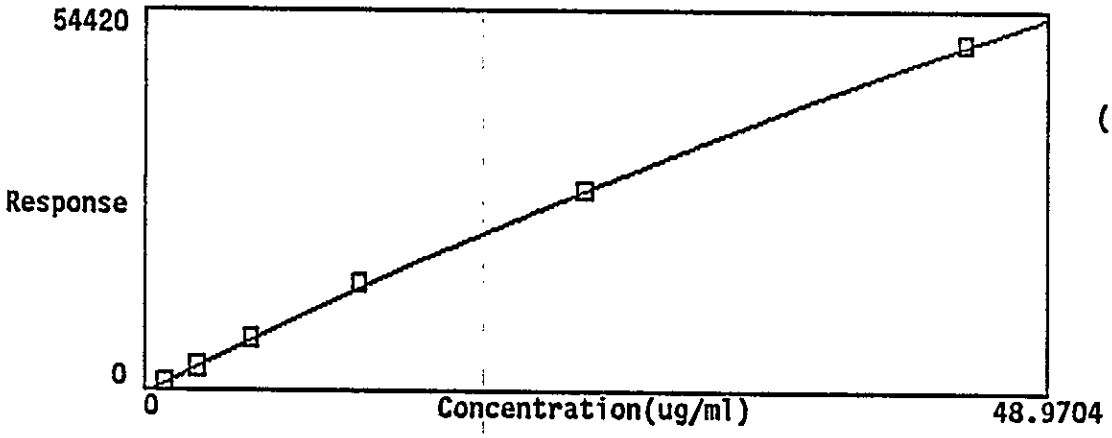
Step	Time	Description
Init		CDM AutoOffset Off
Init		CDM Recorder Mark OFF
Init		CDM Temp. Comp. = 1.7 / Deg C
Init		CDM Recorder Range = 1.000 uS
Init		CDM Cell ON
Init		CMA Heater = 25 Deg. C
Init		Valve A ON
Init		Valve B ON
Init		Inject Valve OFF
Init		CIM Relay 1 OFF
Init		CIM Relay 2 OFF
Init		CIM AC 1 OFF
Init		CIM AC 2 OFF
Init		GPM Start
Init		GPM Hold Gradient Clock
Init		GPM Reset ON
1	0.0	CDM AutoOffset ON
1	0.0	GPM Reset OFF
2	0.1	Inject Valve ON
2	0.1	GPM Run Gradient Clock
3	3.0	Inject Valve OFF
4	3.5	CIM Relay 1 ON
5	4.0	CIM Relay 1 OFF



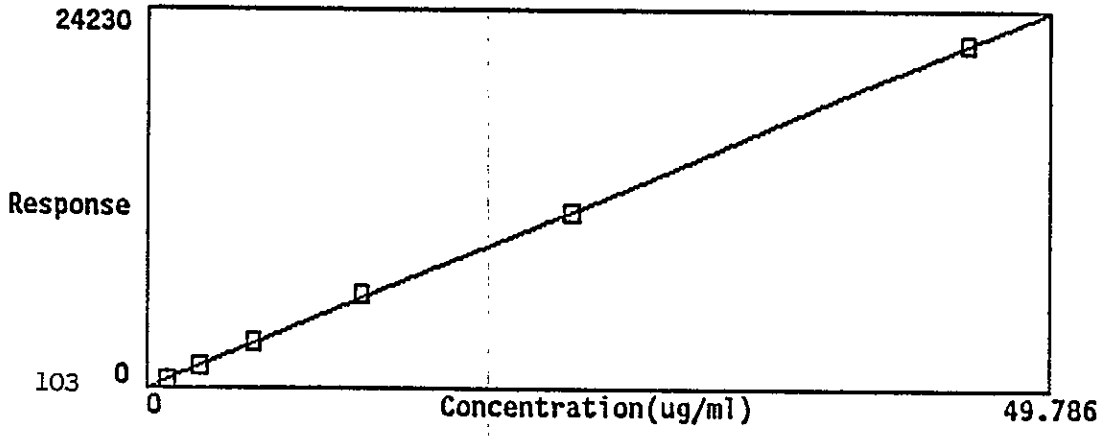
Component: FLUORIDE
Fit Type: Quadratic
Conc = (-4.023616e-009
(3.684797e-004 * Resp)+



Component: CHLORIDE
Fit Type: Quadratic
Conc = (-1.216103e-008
(6.159914e-004 * Resp)+

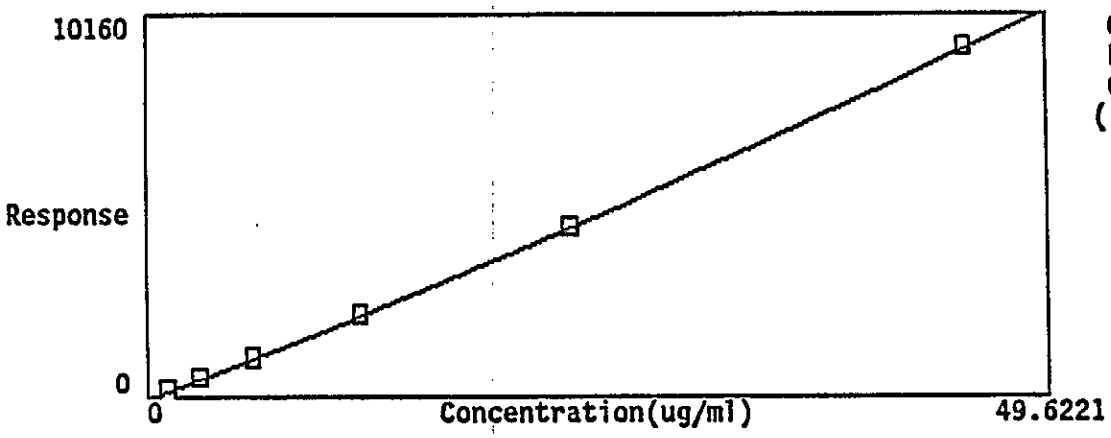


Component: NITRITE
Fit Type: Quadratic
Conc = (3.364537e-009 *
(7.286927e-004 * Resp)+

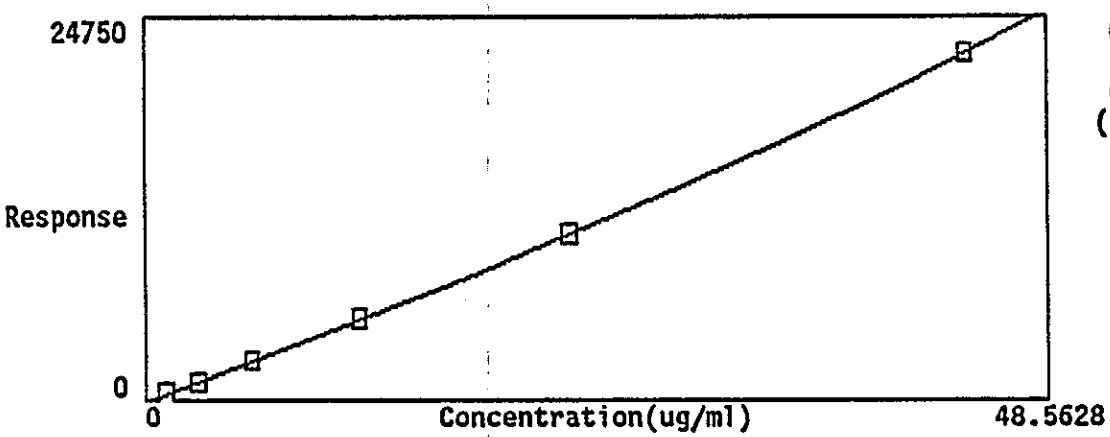


Component: NITRATE
Fit Type: Quadratic
Conc = (2.728131e-010 *
(2.063355e-003 * Resp)+

9573325.2488



Component: PHOSPHATE
Fit Type: Quadratic
Conc = (-4.782909e-008
(5.304744e-003 * Resp)+



Component: SULFATE
Fit Type: Quadratic
Conc = (-1.341431e-008
(2.263806e-003 * Resp)+

9513325.2489

```
*********************    AUTOMATIC CALIBRATION UPDATE    **********************
Method File:   C:\WINDOWS\AI400\METHOD\SST.MET
Result File:   CALDATA.R10
Sample Name:   AUTOCAL1R                          Calibration Level :  1
Interface #: 1  Cycle #: 3      Result File Date: Wed Apr 11 10:22:06 1990
Start time  = 0          Stop time = 11.50
Area reject = 1000       One DataPoint per 0.2 seconds
Amount Injected = 1      Dilution factor = 1
**********************  PEAKS NOT FOUND IN THIS RUN  ************************
```

Name	Adjusted Ret Time	Reference Peak
FLUORIDE	1.00	0
Oxalate	9.77	1

```
********************    COMPONENTS FOUND IN THIS RUN    ************************
```

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
2	CHLORIDE	1.60	1.60	1.60	3.580e+002	3.583e+002	3.583e+002
3	NITRITE	1.95	1.95	1.95	1.360e+003	1.360e+003	1.360e+003
4	NITRATE	3.38	3.67	3.67	4.680e+002	6.767e+002	6.767e+002
5	PHOSPHATE	5.80	6.00	6.00	1.800e+002	1.983e+002	1.983e+002
6	SULFATE	6.85	6.98	6.98	1.980e+002	5.565e+002	5.565e+002

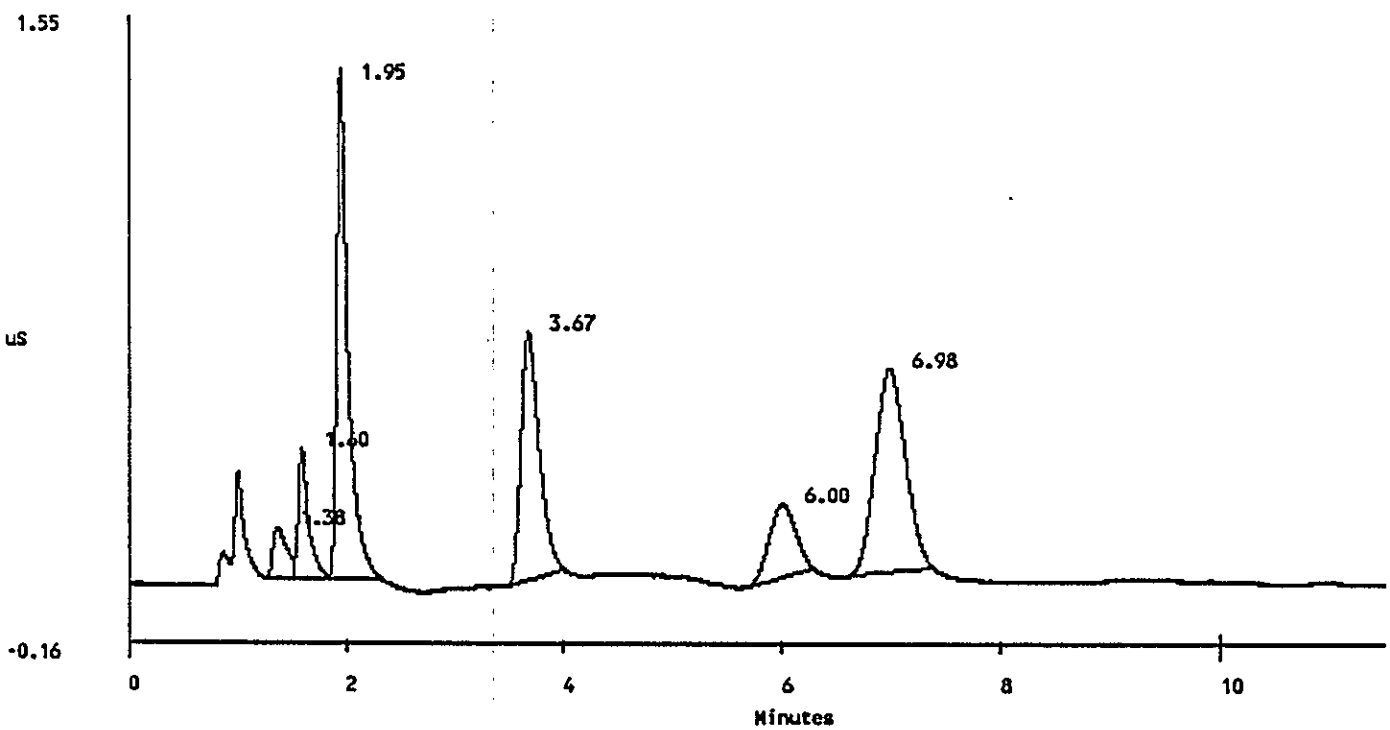
DATA REPROCESSED ON Mon Jul 16 10:15:06 1990

Sample Name: AUTOCAL1R Date: Wed Apr 11 10:22:06 1990
Data File : A:\90040979.D03
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 3 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3451
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.38		0.000e+000	1.225e+003	140	2		
2	1.60	CHLORIDE	1.317e-001	2.313e+003	358	2	0	0.00%
3	1.95	NITRITE	1.190e+000	9.937e+003	1360	2	0	0.00%
4	3.67	NITRATE	1.220e+000	7.900e+003	677	1	0	0.00%
5	6.00	PHOSPHATE	1.216e+000	3.360e+003	198	1	0	0.00%
6	6.98	SULFATE	1.190e+000	1.077e+004	557	1	0	0.00%



9513325.2491

********** AUTOMATIC CALIBRATION UPDATE **********

Method File: C:\WINDOWS\AI400\METHOD\SST.MET
Result File: CALDATA.R10
Sample Name: AUTOCAL2R Calibration Level : 2
Interface #: 1 Cycle #: 4 Result File Date: Wed Apr 11 10:34:25 1990
Start time = 0 Stop time = 11.50
Area reject = 1000 One DataPoint per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

********** PEAKS NOT FOUND IN THIS RUN **********

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	6.160e+002	6.067e+002	6.067e+002
2	CHLORIDE	1.60	1.60	1.60	4.890e+002	5.866e+002	5.866e+002
3	NITRITE	1.95	1.95	1.95	3.515e+003	3.515e+003	3.515e+003
4	NITRATE	3.67	3.63	3.63	1.234e+003	1.565e+003	1.565e+003
5	PHOSPHATE	6.00	5.98	5.98	4.370e+002	5.364e+002	5.364e+002
6	SULFATE	6.98	6.97	6.97	9.220e+002	1.297e+003	1.297e+003

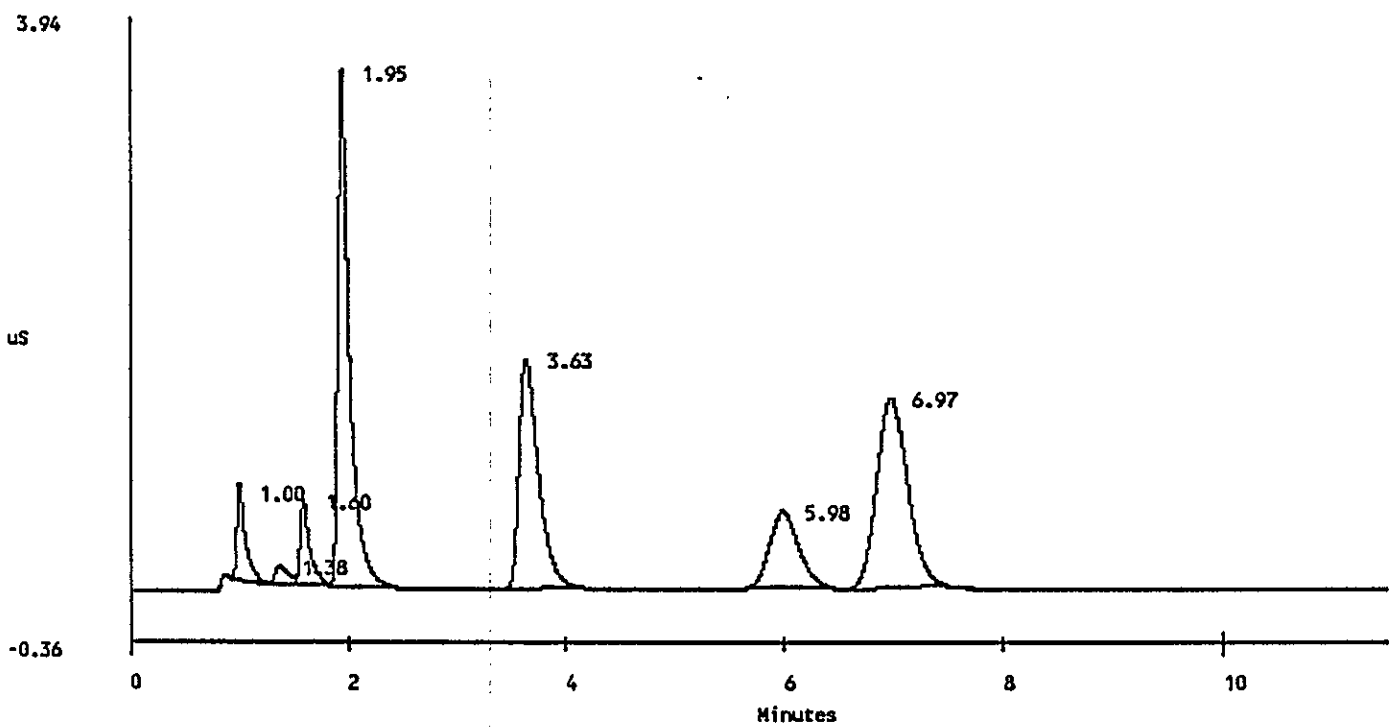
DATA REPROCESSED ON Mon Jul 16 10:16:39 1990

Sample Name: AUTOCAL2R Date: Wed Apr 11 10:34:25 1990
Data File : A:\90040979.D04
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 4 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3451
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	2.438e-001	3.642e+003	607	1	0	0.00%
2	1.38		0.000e+000	1.159e+003	132	2		
3	1.60	CHLORIDE	3.284e-001	3.676e+003	587	2	0	0.00%
4	1.95	NITRITE	2.990e+000	2.570e+004	3515	2	0	0.00%
5	3.63	NITRATE	3.040e+000	1.923e+004	1565	1	0	0.00%
6	5.98	PHOSPHATE	3.030e+000	9.889e+003	536	1	0	0.00%
7	6.97	SULFATE	2.965e+000	2.569e+004	1297	1	0	0.00%



```
*********************    AUTOMATIC CALIBRATION UPDATE    **********************
Method File:   C:\WINDOWS\AI400\METHOD\SST.MET
Result File:   CALDATA.R10
Sample Name:   AUTOCAL3R                          Calibration Level :  3
Interface #: 1  Cycle #: 5      Result File Date: Wed Apr 11 10:46:43 1990
Start time  = 0          Stop time = 11.50
Area reject = 1000       One DataPoint per 0.2 seconds
Amount Injected = 1      Dilution factor = 1
**********************  PEAKS NOT FOUND IN THIS RUN  *************************
```

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

```
********************    COMPONENTS FOUND IN THIS RUN    **********************
```

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	1.226e+003	1.320e+003	1.320e+003
2	CHLORIDE	1.60	1.60	1.60	1.017e+003	1.135e+003	1.135e+003
3	NITRITE	1.95	1.95	1.95	7.323e+003	7.323e+003	7.323e+003
4	NITRATE	3.63	3.58	3.58	2.460e+003	3.098e+003	3.098e+003
5	PHOSPHATE	5.98	5.97	5.97	9.480e+002	1.103e+003	1.103e+003
6	SULFATE	6.97	6.97	6.97	1.890e+003	2.607e+003	2.607e+003

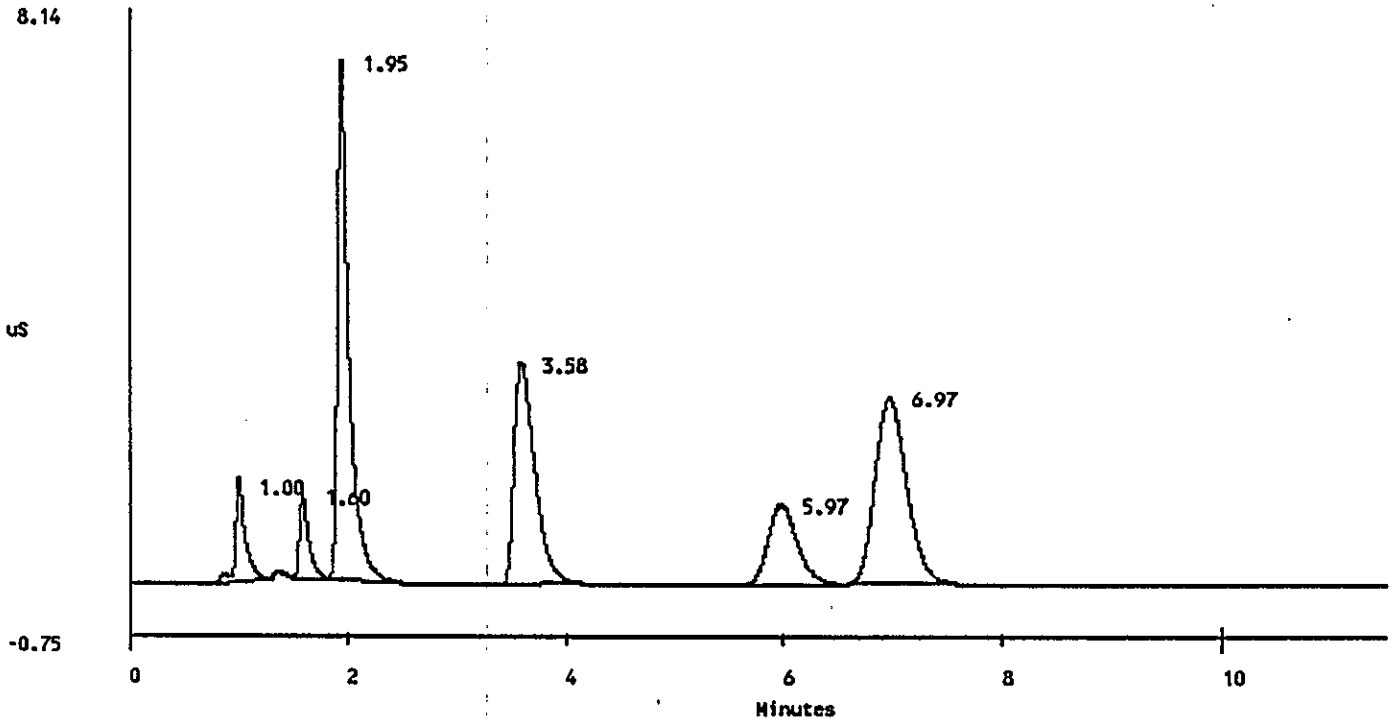
DATA REPROCESSED ON Mon Jul 16 10:17:20 1990

Sample Name: AUTOCAL3R Date: Wed Apr 11 10:46:43 1990
Data File : A:\90040979.D05
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 5 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	4.852e-001	9.315e+003	1320	1	0	0.00%
2	1.60	CHLORIDE	6.535e-001	6.685e+003	1135	1	0	0.00%
3	1.95	NITRITE	5.951e+000	5.351e+004	7323	1	0	0.00%
4	3.58	NITRATE	6.050e+000	4.062e+004	3098	1	0	0.00%
5	5.97	PHOSPHATE	6.030e+000	2.080e+004	1103	2	0	0.00%
6	6.97	SULFATE	5.901e+000	5.199e+004	2607	2	0	0.00%



********** AUTOMATIC CALIBRATION UPDATE **********

Method File: C:\WINDOWS\AI400\METHOD\SST.MET
Result File: CALDATA.R10
Sample Name: AUTOCAL4R Calibration Level : 4
Interface #: 1 Cycle #: 6 Result File Date: Wed Apr 11 10:59:03 1990
Start time = 0 Stop time = 11.50
Area reject = 1000 One DataPoint per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

********** PEAKS NOT FOUND IN THIS RUN **********

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	2.625e+003	2.776e+003	2.776e+003
2	CHLORIDE	1.60	1.58	1.58	2.088e+003	2.092e+003	2.092e+003
3	NITRITE	1.95	1.95	1.95	1.524e+004	1.524e+004	1.524e+004
4	NITRATE	3.58	3.53	3.53	4.753e+003	6.111e+003	6.111e+003
5	PHOSPHATE	5.97	5.93	5.93	1.886e+003	2.270e+003	2.270e+003
6	SULFATE	6.97	6.93	6.93	4.005e+003	5.358e+003	5.358e+003

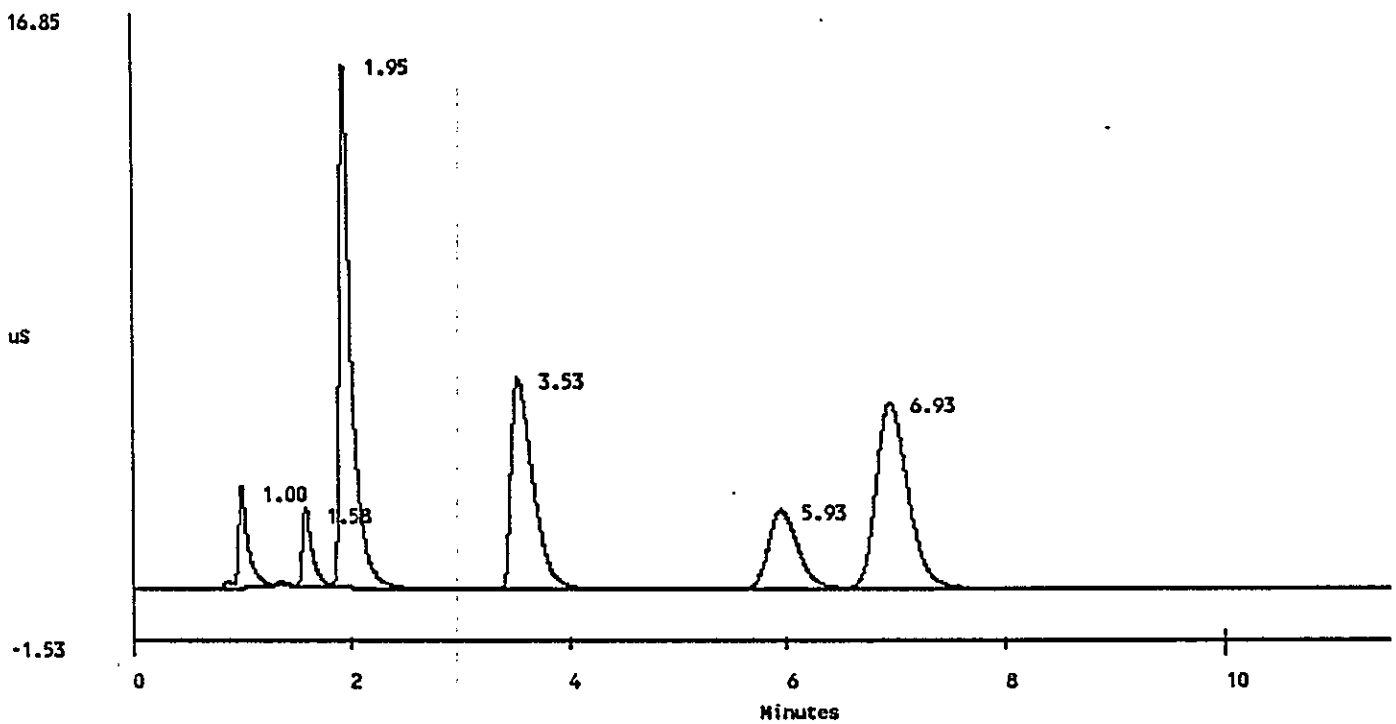
DATA REPROCESSED ON Mon Jul 16 10:17:59 1990

Sample Name: AUTOCAL4R Date: Wed Apr 11 10:59:03 1990
Data File : A:\90040979.D06
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 6 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIM
1	1.00	FLUORIDE	9.608e-001	1.846e+004	2776	1	0	0.00%
2	1.58	CHLORIDE	1.294e+000	1.416e+004	2092	2	0	0.00%
3	1.95	NITRITE	1.178e+001	1.142e+005	15244	2	0	0.00%
4	3.53	NITRATE	1.198e+001	8.403e+004	6111	1	0	0.00%
5	5.93	PHOSPHATE	1.194e+001	4.316e+004	2270	2	0	0.00%
6	6.93	SULFATE	1.169e+000	1.087e+005	5358	2	0	0.00%



9513325.2497

********** AUTOMATIC CALIBRATION UPDATE **********

Method File: C:\WINDOWS\AI400\METHOD\SST.MET
Result File: CALDATA.R10
Sample Name: AUTOCAL5R Calibration Level : 5
Interface #: 1 Cycle #: 7 Result File Date: Wed Apr 11 11:11:21 1990
Start time = 0 Stop time = 11.50
Area reject = 1000 One DataPoint per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

********** PEAKS NOT FOUND IN THIS RUN **********

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	5.315e+003	5.385e+003	5.385e+003
2	CHLORIDE	1.58	1.60	1.60	4.066e+003	4.705e+003	4.705e+003
3	NITRITE	1.95	1.95	1.95	2.844e+004	2.844e+004	2.844e+004
4	NITRATE	3.53	3.47	3.47	9.250e+003	1.137e+004	1.137e+004
5	PHOSPHATE	5.93	5.88	5.88	3.876e+003	4.565e+003	4.565e+003
6	SULFATE	6.93	6.90	6.90	8.158e+003	1.081e+004	1.081e+004

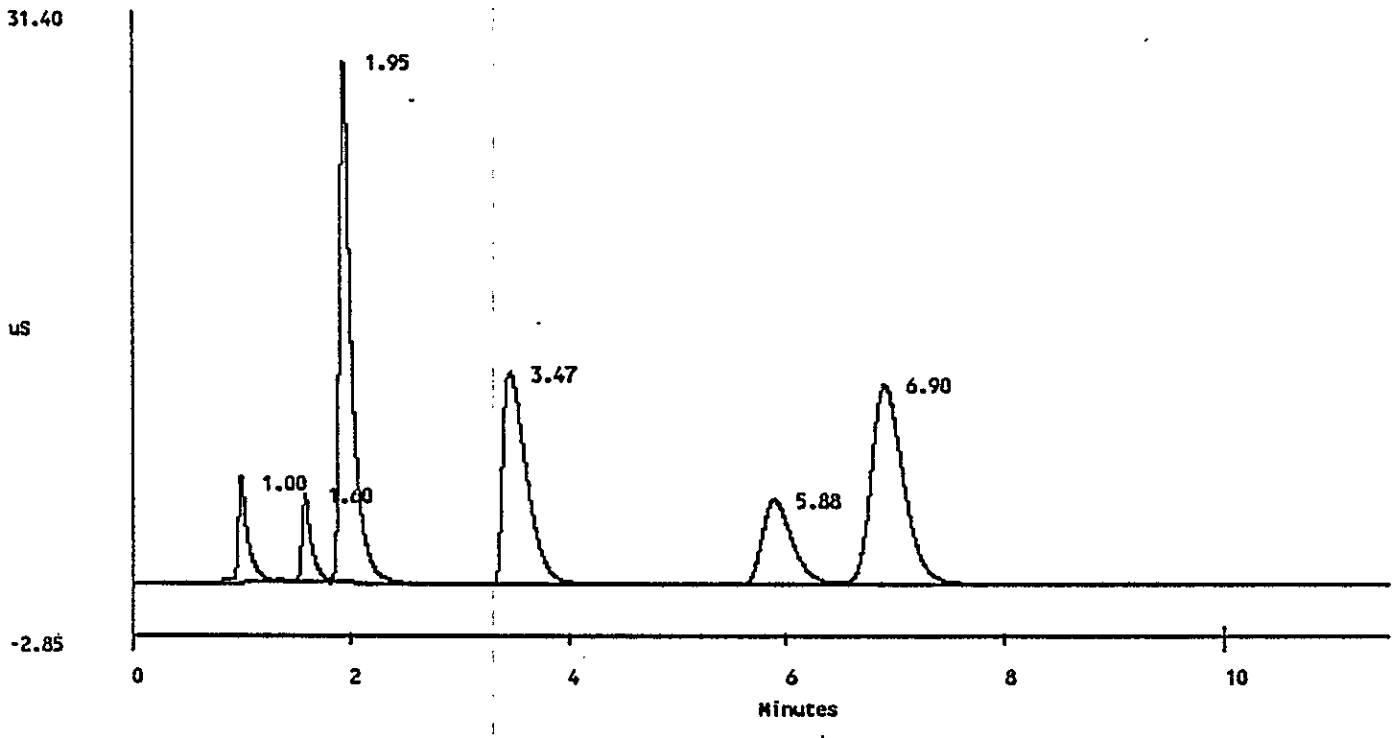
DATA REPROCESSED ON Mon Jul 16 10:18:38 1990

Sample Name: AUTOCAL5R Date: Wed Apr 11 11:11:21 1990
Data File : A:\90040979.D07
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 7 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	1.885e+000	3.559e+004	5385	1	0	0.00%
2	1.60	CHLORIDE	2.538e+000	2.820e+004	4705	2	0	0.00%
3	1.95	NITRITE	2.394e+001	2.189e+005	28443	2	0	0.00%
4	3.47	NITRATE	2.350e+004	1.713e+005	11368	1	0	0.00%
5	5.88	PHOSPHATE	2.342e+001	8.877e+004	4565	2	0	0.00%
6	6.90	SULFATE	2.292e+001	2.202e+005	10811	2	0	0.00%



```
*********************    AUTOMATIC CALIBRATION UPDATE    **********************
Method File:  C:\WINDOWS\AI400\METHOD\SST.MET
Result File:  CALDATA.R10
Sample Name:  AUTOCAL6R                          Calibration Level :  6
Interface #: 1  Cycle #: 8      Result File Date: Wed Apr 11 11:23:42 1990
Start time  = 0          Stop time = 11.50
Area reject = 1000       One DataPoint per 0.2 seconds
Amount Injected = 1      Dilution factor = 1
**********************  PEAKS NOT FOUND IN THIS RUN  *************************
```

Name	Adjusted Ret Time	Reference Peak
Oxalate	9.77	1

```
********************    COMPONENTS FOUND IN THIS RUN    ************************
```

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD HEIGHT	MEASURED HEIGHT	NEW HEIGHT
1	FLUORIDE	1.00	1.00	1.00	1.109e+004	1.123e+004	1.123e+004
2	CHLORIDE	1.60	1.60	1.60	9.183e+003	9.921e+003	9.921e+003
3	NITRITE	1.95	1.95	1.95	4.948e+004	4.948e+004	4.948e+004
4	NITRATE	3.47	3.38	3.38	1.747e+004	2.203e+004	2.203e+004
5	PHOSPHATE	5.88	5.80	5.80	8.003e+003	9.238e+003	9.238e+003
6	SULFATE	6.90	6.85	6.85	1.695e+004	2.250e+004	2.250e+004

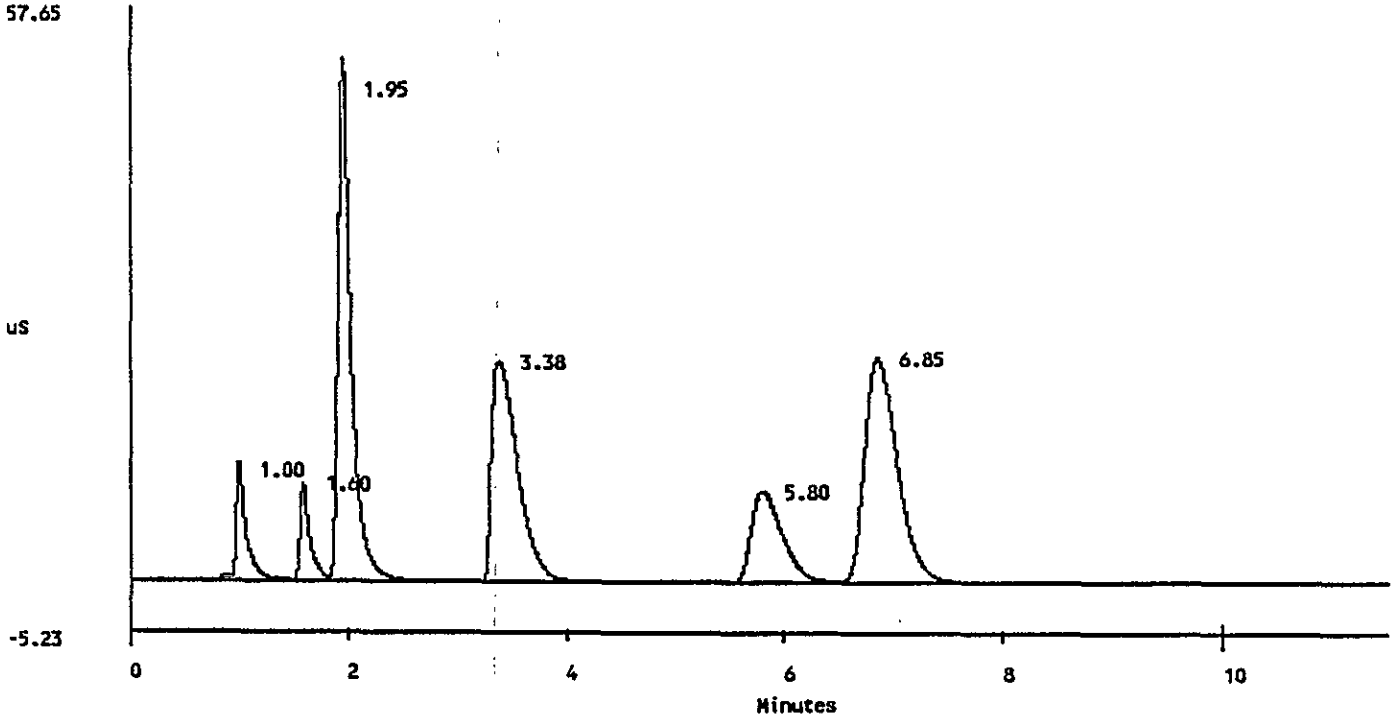
DATA REPROCESSED ON Mon Jul 16 10:19:17 1990

Sample Name: AUTOCAL6R Date: Wed Apr 11 11:23:42 1990
Data File : A:\90040979.D08
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 8 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Stop time = 11.50 Minutes Number of Data Points = 3450
Area reject = 1000 One Data Point per 0.2 seconds
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	3.629e+000	8.355e+004	11233	2	0	0.00%
2	1.60	CHLORIDE	4.889e+000	6.263e+004	9921	2	0	0.00%
3	1.95	NITRITE	4.452e+001	4.402e+005	49476	2	0	0.00%
4	3.38	NITRATE	4.526e+001	3.689e+005	22029	1	0	0.00%
5	5.80	PHOSPHATE	4.511e+001	1.868e+005	9238	2	0	0.00%
6	6.85	SULFATE	4.415e+001	4.727e+005	22498	2	0	0.00%



DIONEX SCHEDULE - A:\90041200.SCH

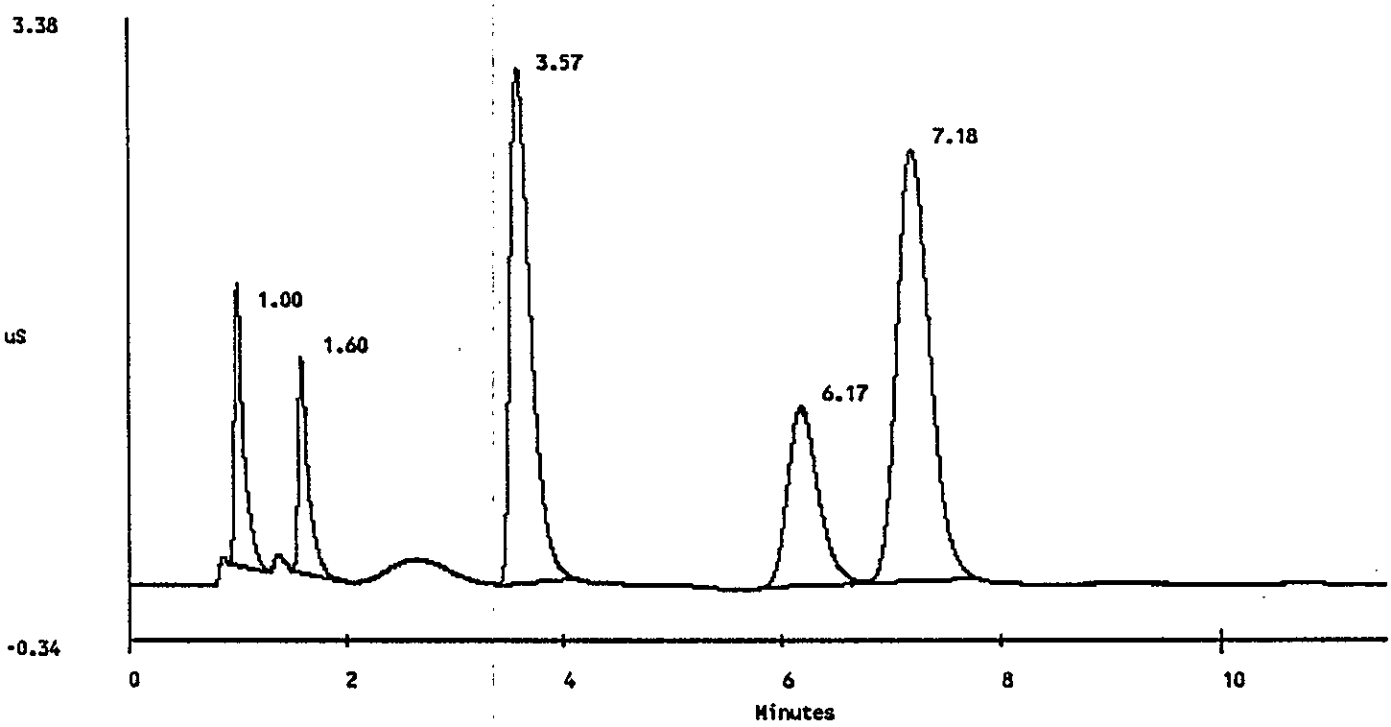
Inject	Sample Name	Method Name	Data File	Volume	Dilution	Int Std
1	SETUP	c:\windows\ai	c:\windows\ai	1	1	0
2	BLANK	c:\windows\ai	c:\windows\ai	1	1	0
3	LMCS/6C11-HO	c:\windows\ai	c:\windows\ai	1	101	0
4	438B	c:\windows\ai	c:\windows\ai	1	1	0
5	427	c:\windows\ai	c:\windows\ai	1	101	0
6	428D	c:\windows\ai	c:\windows\ai	1	101	0
7	429S	c:\windows\ai	c:\windows\ai	1	101	0
8	451	c:\windows\ai	c:\windows\ai	1	101	0
9	452D	c:\windows\ai	c:\windows\ai	1	101	0
10	475	c:\windows\ai	c:\windows\ai	1	101	0
11	476D	c:\windows\ai	c:\windows\ai	1	101	0
12	547	c:\windows\ai	c:\windows\ai	1	101	0
13	548D	c:\windows\ai	c:\windows\ai	1	101	0
14	571	c:\windows\ai	c:\windows\ai	1	101	0
15	572D	c:\windows\ai	c:\windows\ai	1	101	0
16	983	c:\windows\ai	c:\windows\ai	1	21	0
17	984D	c:\windows\ai	c:\windows\ai	1	21	0
18	LMCS/6C11-HO	c:\windows\ai	c:\windows\ai	1	101	0

Sample Name: LMCS/6C11-HO Date: Thu Apr 12 11:33:35 1990
Data File : 90041200.D03
Method : c:\windows\ai400\method\sst.met
CIM Address: 1 System : 1 Cycle#: 3 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Start Time = 0.00 minutes Stop time = 11.50 Minutes
Number of Data Points = 3451 One Data Point per 0.2 seconds
Arearject = 1000
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	5.450e+001	9.780e+003	1489	1	0	0.00%
2	1.60	CHLORIDE	7.288e+001	7.890e+003	1258	1	0	0.00%
3	3.57	NITRATE	5.993e+002	3.943e+004	3009	1	0	5.42%
4	6.17	PHOSPHATE	5.816e+002	2.084e+004	1060	2	0	6.32%
5	7.18	SULFATE	5.781e+002	5.320e+004	2564	2	0	4.87%



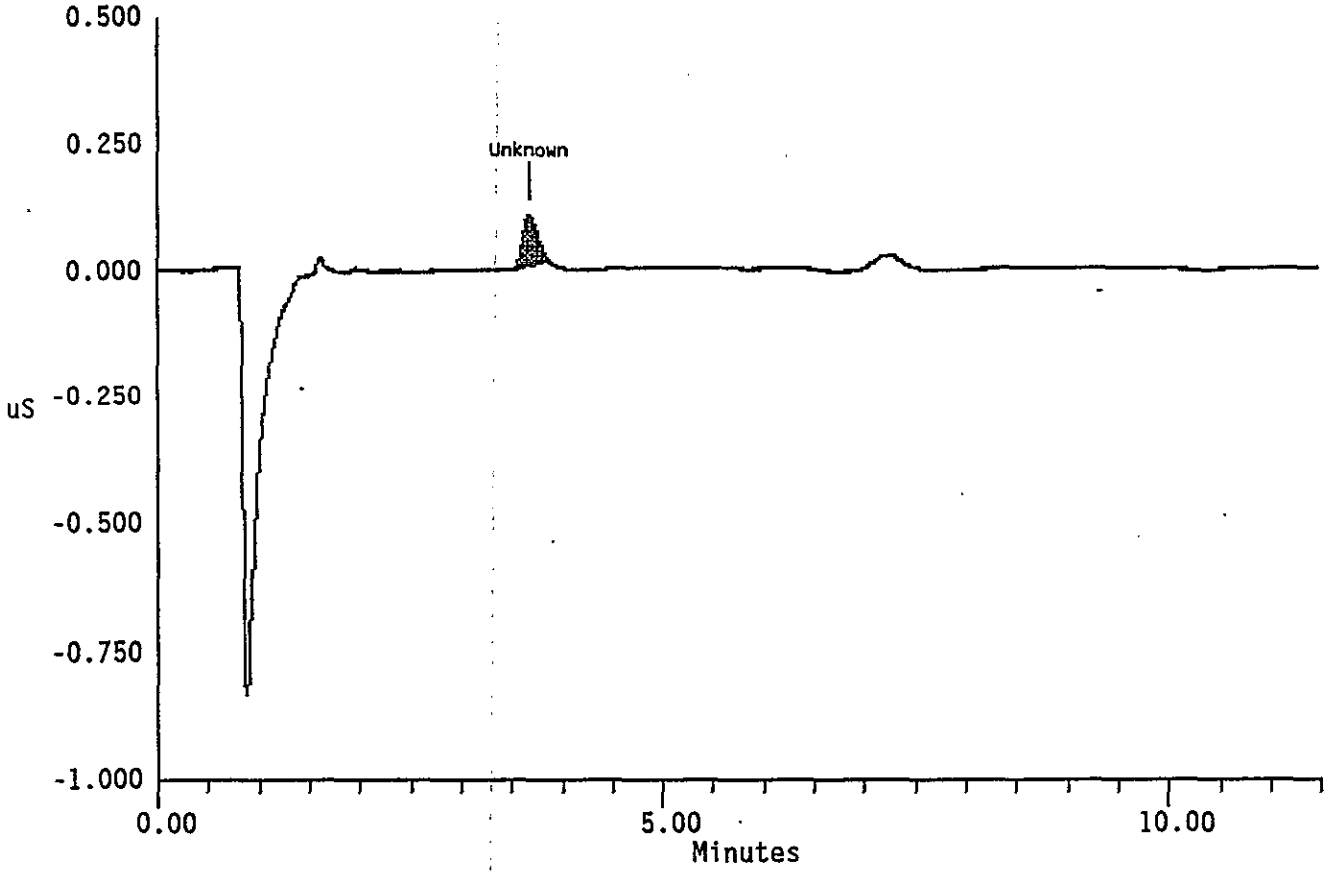
DATA REPROCESSED ON Mon Oct 08 08:14:08 1990

Sample Name: 438B	Date: Thu Apr 12 12:45:50 1990
Data File : A:\90041200.D04	
Method : c:\windows\ai400\method\sst.met	
ACI Address: 1 System : 1 Inject#: 4	Detector: CDM-1

REPORT	VOLUME	DILUTION	POINTS	RATE	START	STOP	AREA REJ
External	1	1	3451	5Hz	0.00	11.50	1000

Pk. Num	Ret Time	Component Name	Concentration	Height	Area	Bl. Code	%Delta

File: A:\90041200.D04 Sample: 438B

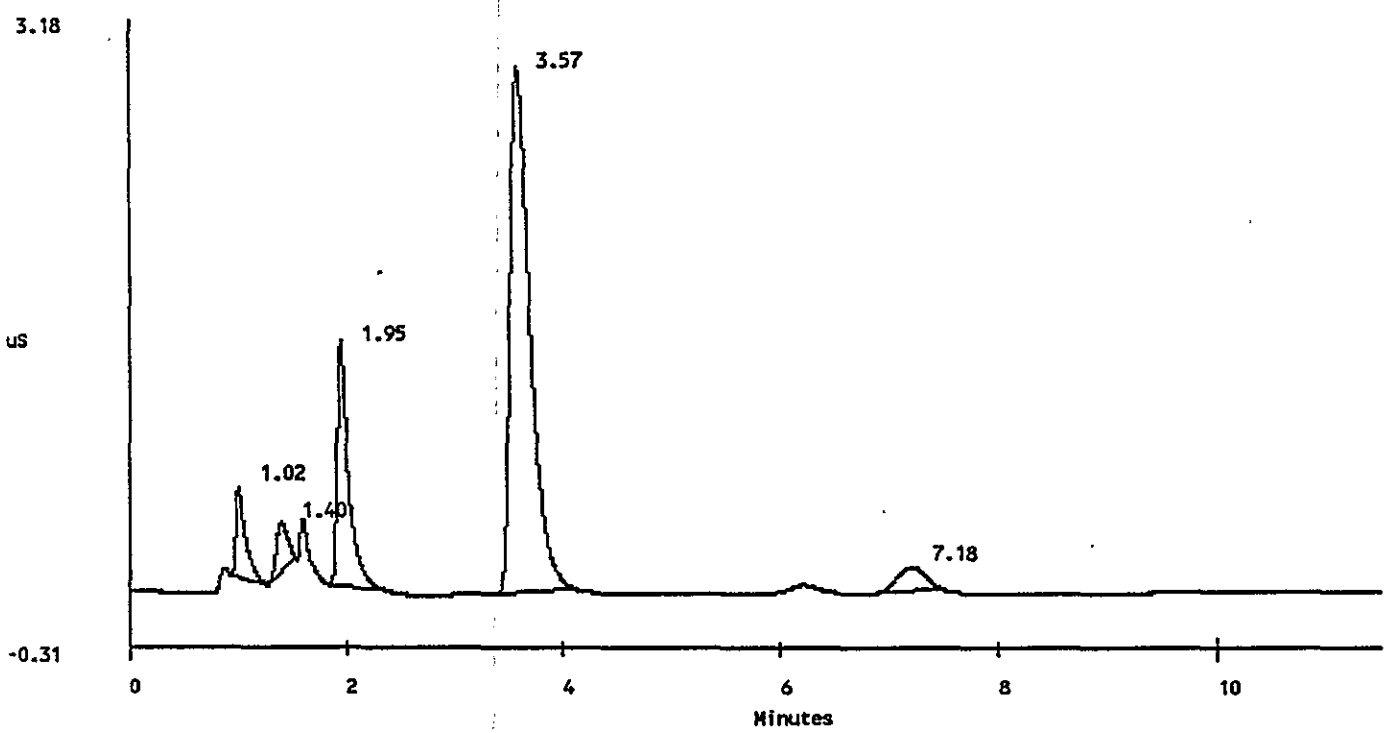


Sample Name: 475 Date: Thu Apr 12 12:59:25 1990
Data File : 90041200.D10
Method : c:\windows\ai400\method\sst.met
CIM Address: 1 System : 1 Cycle#: 10 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Start Time = 0.00 minutes Stop time = 11.50 Minutes
Number of Data Points = 3451 One Data Point per 0.2 seconds
Arearject = 1000
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.865e+001	3.115e+003	504	1	0	1.67%
2	1.40		0.000e+000	1.978e+003	272	1		
3	1.95	NITRITE	1.252e+002	9.586e+003	1320	1	0	0.00%
4	3.57	NITRATE	5.706e+002	3.677e+004	2872	1	0	5.42%
5	7.18	SULFATE	3.209e+001	2.443e+003	137	1	0	4.87%

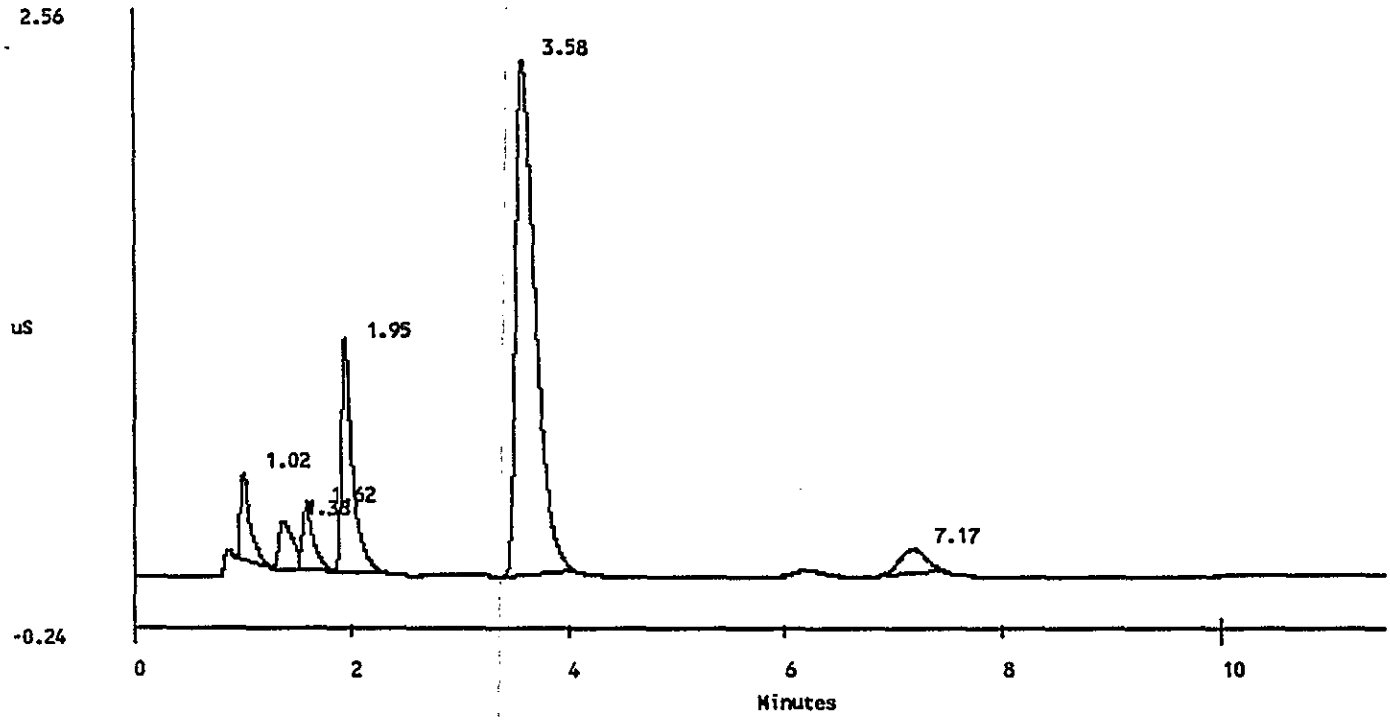


Sample Name: 476D Date: Thu Apr 12 13:11:40 1990
Data File : 90041200.D11
Method : c:\windows\ai400\method\sst.met
CIM Address: 1 System : 1 Cycle#: 11 Detector: CDM

********** EXTERNAL STANDARD REPORT **********

Start Time = 0.00 minutes Stop time = 11.50 Minutes
Number of Data Points = 3450 One Data Point per 0.2 seconds
Areareject = 1000
Amount Injected = 1 Dilution factor = 101

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.02	FLUORIDE	1.419e+001	2.435e+003	384	1	0	1.67%
2	1.38		0.000e+000	1.818e+003	213	2		
3	1.62	CHLORIDE	1.368e+001	2.012e+003	277	2	0	1.04%
4	1.95	NITRITE	1.030e+002	7.316e+003	1020	2	0	0.00%
5	3.58	NITRATE	4.549e+002	2.918e+004	2317	1	0	5.91%
6	7.17	SULFATE	2.548e+001	1.902e+003	108	1	0	4.62%



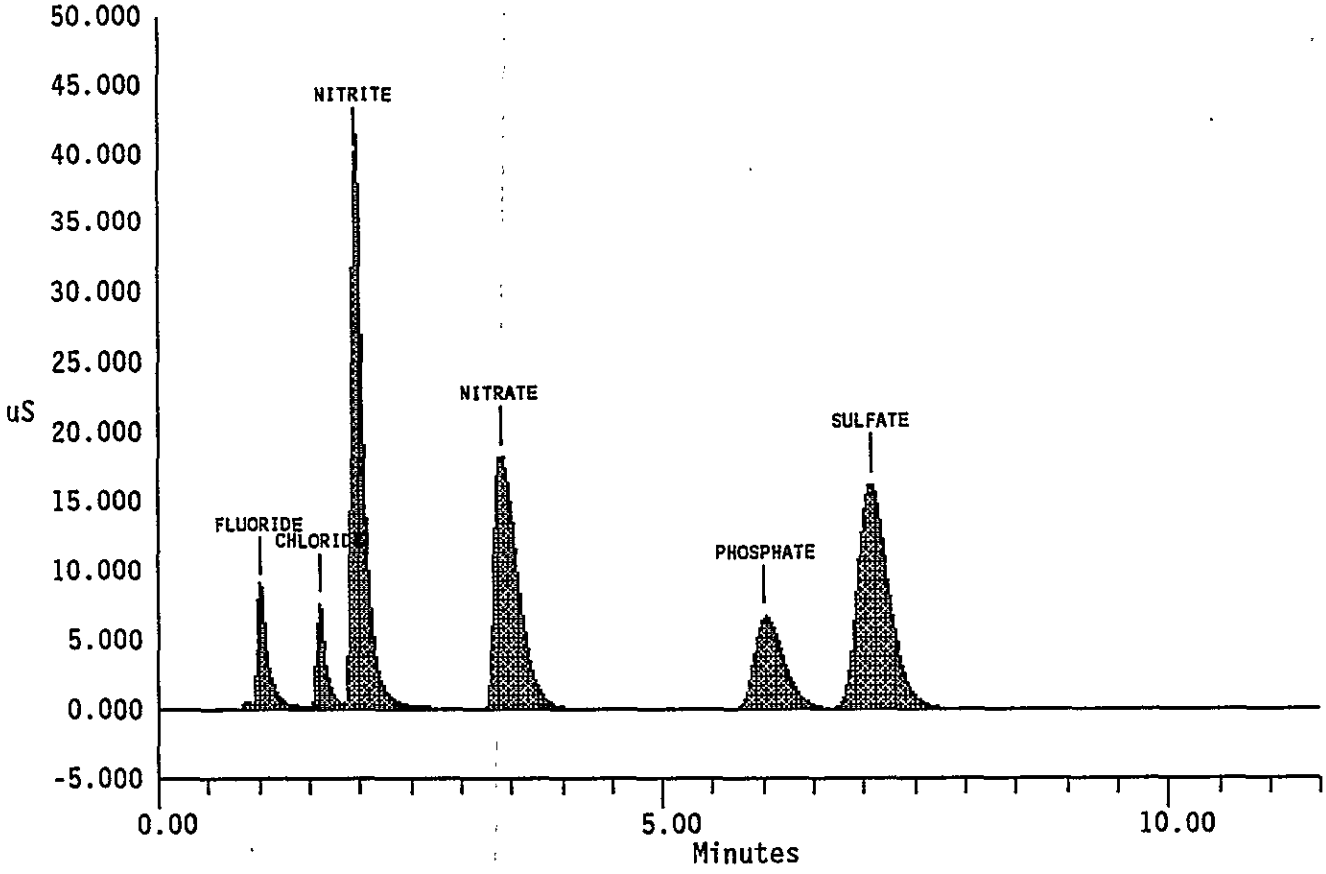
DATA REPROCESSED ON Mon Oct 08 08:11:35 1990

Sample Name: 429S Date: Thu Apr 12 13:22:35 1990
Data File : A:\90041200.D07
Method : c:\windows\ai400\method\sst.met
ACI Address: 1 System : 1 Inject#: 7 Detector: CDM-1

REPORT	VOLUME	DILUTION	POINTS	RATE	START	STOP	AREA REJ
External	1	101	3450	5Hz	0.00	11.50	1000

Pk. Num	Ret Time	Component Name	Concentration	Height	Area	Bl. Code	%Delta
1	1.00	FLUORIDE	292.080	8669	67713	2	0.00
2	1.60	CHLORIDE	394.323	7505	48260	2	0.00
3	1.95	NITRITE	3479.557	39647	336532	2	0.00
4	3.38	NITRATE	3747.008	18071	293247	1	0.00
5	6.02	PHOSPHATE	3360.118	6632	135640	2	0.00
6	7.07	SULFATE	3334.760	16122	343503	2	0.00

File: A:\90041200.D07 Sample: 429S



9513325.2507

Sample Name: 6C11HO Date: Thu Apr 12 14:21:13 1990
Data File : 900-5485.D01
Method : C:\WINDOWS\AI400\METHOD\SST.MET
CIM Address: 1 System : 1 Cycle#: 1 Detector: CDM

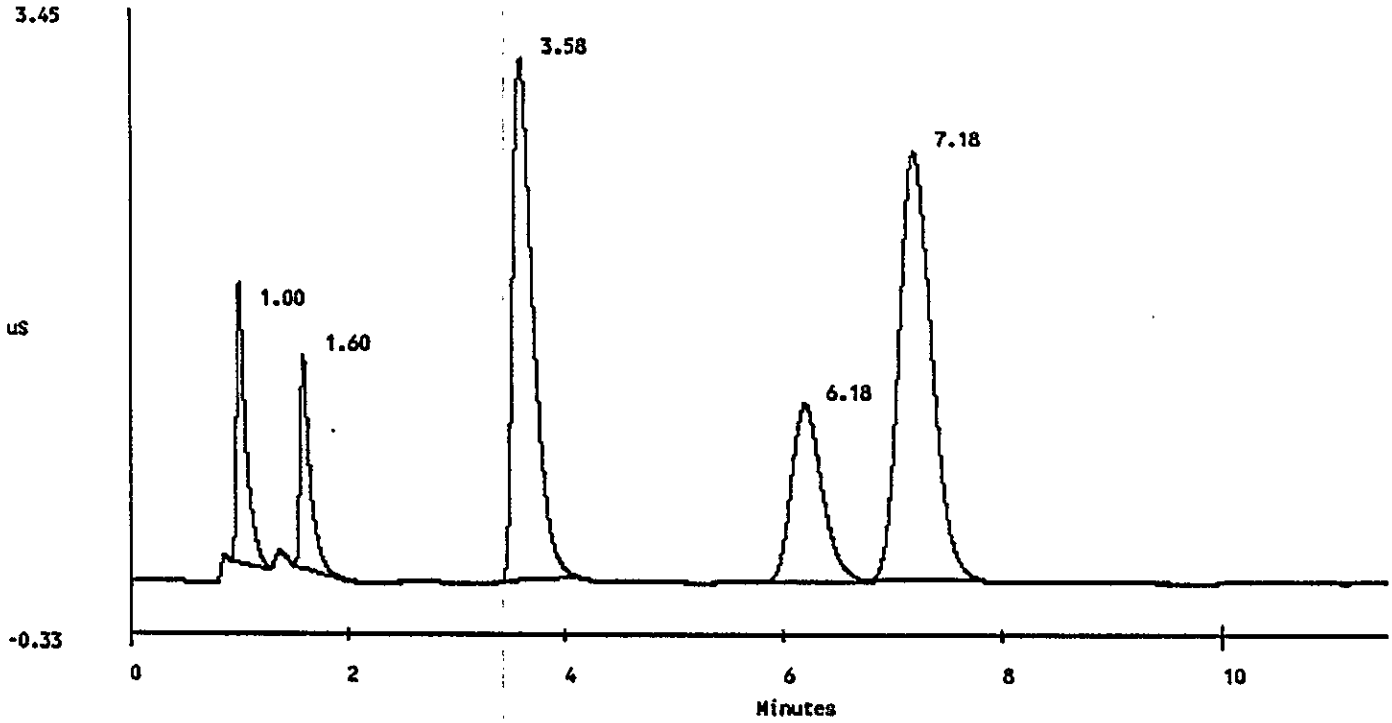
********** EXTERNAL STANDARD REPORT **********

Start Time = 0.00 minutes Stop time = 11.50 Minutes
Number of Data Points = 3451 One Data Point per 0.2 seconds
Areareject = 1000
Amount Injected = 1 Dilution factor = 1

PEAK NUM	RET TIME	PEAK NAME	CONC. in ug/ml	AREA	HEIGHT	BL	REF PEAK	% DELTA RET TIME
1	1.00	FLUORIDE	5.455e-001	9.806e+003	1506	1	0	0.00%
2	1.60	CHLORIDE	7.267e-001	7.884e+003	1267	1	0	0.00%
3	3.58	NITRATE	6.182e+000	4.031e+004	3130	1	0	5.91%
4	6.18	PHOSPHATE	5.669e+000	2.050e+004	1043	2	0	6.61%
5	7.18	SULFATE	5.724e+000	5.282e+004	2564	2	0	4.87%

101

x101



Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	WB39937
PROCEDURE/REV	LA-344-105/A-3
TECHNOLOGIST	E. Colvin
DATE	March 15, 1990
TEMPERATURE	N/A
STARTING TIME	0800
ENDING TIME	1100
CHEMIST	R. E. Brandt

Total Organic Carbon from water digestion.

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0474
2	Reagent Blank		F0486
3	Sample	89-072	F0475
4	Duplicate Sample	89-072	F0476
5	Spike of Sample	89-072	F0477
6	Final LMCS Check Std.		F0478
7			
8			
9			
10			
11			

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
LMCS Check Standard	70C11C/200 uL			2.2 mL
Spike	80C11/200 uL	F0475/200 uL		0.5 mL

SST-102 Rev. F 9/7/90 Interim

95/3325.2509

The photocopies on the following pages 125 to 130 are the best copy available from originals of poor reproducible quality.

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-474 Date: 03-15-1990 Time: 06:04:30

Blank = .3711292 Sample Size = 200 Dilution Factor = 11
% Difference = 10 Min Readings = 7 Max Readings = 7

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	1.01	0.00	0.00
2	2.01	37.00	100.00
3	3.01	50.20	26.29
4	4.01	53.60	6.34
5	5.01	54.90	2.37
6	6.01	55.40	0.90
7	7.01	55.80	0.72

(55.8 - 2.600068)(11)/(200) = 2.925996 g/L Carbon

(55.8 - 2.600068)(11)/(200)(12) = .243833 Molar Carbon

Sample Run By: 80028_____

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-486 Date: 03-15-1990 Time: 05:56:27

Blank = N/A Sample Size = 200 Dilution Factor = 1
% Difference = 10 Min Readings = 7 Max Readings = 7

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	1.01	0.00	0.00
2	2.01	0.80	100.00
3	3.01	1.40	42.86
4	4.01	1.80	22.22
5	5.01	2.10	14.29
6	6.01	2.30	8.70
7	7.01	2.60	11.54

BLANK VALUE = 2.6 / 7.005646 = .3711292 ug/minute

Sample Run By: 80028_____

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-475 Date: 03-15-1990 Time: 06:25:31

Blank = .3711292 Sample Size = 200 Dilution Factor = 1.1
% Difference = 10 Min Readings = 7 Max Readings = 7

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	1.01	0.30	%-18366.67
2	2.01	1.80	83.33
3	3.01	2.60	30.77
4	4.01	3.10	16.13
5	5.01	3.60	13.89
6	6.01	4.00	10.00
7	7.01	4.20	4.76

(4.2 - 2.600362)(1.1)/(200) = 8.798007E-03 g/L Carbon

(4.2 - 2.600362)(1.1)/(200)(12) = 7.331672E-04 Molar Carbon

Sample Run By: 80028_____

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-476 Date: 03-15-1990 Time: 06:34:09

Blank = .3711292 Sample Size = 200 Dilution Factor = 1.1
% Difference = 10 Min Readings = 7 Max Readings = 7

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	1.01	0.00	0.00
2	2.01	1.50	100.00
3	3.01	2.30	34.78
4	4.01	2.80	17.86
5	5.01	3.30	15.15
6	6.01	3.60	8.33
7	7.01	3.90	7.69

(3.9 - 2.600374)(1.1)/(200) = 7.147947E-03 g/L Carbon

(3.9 - 2.600374)(1.1)/(200)(12) = 5.956622E-04 Molar Carbon

Sample Run By: 80028_____

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-477 Date: 03-15-1990 Time: 06:42:34

Blank = .3711292 Sample Size = 200 Dilution Factor = 1.1
% Difference = 10 Min Readings = 7 Max Readings = 7

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	1.01	0.00	0.00
2	2.01	75.90	100.00
3	3.01	103.00	26.31
4	4.01	113.10	8.93
5	5.01	117.00	3.33
6	6.01	118.80	1.52
7	7.01	119.80	0.83

(119.8 - 2.600011)(1.1)/(200) = .6446 g/L Carbon

(119.8 - 2.600011)(1.1)/(200)(12) = 5.371666E-02 Molar Carbon

Sample Run By: 80028_____

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-478 Date: 03-15-1990 Time: 06:56:54

Blank = .3711292 Sample Size = 200 Dilution Factor = 11
% Difference = 10 Min Readings = 7 Max Readings = 7

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	1.01	0.00	0.00
2	2.01	35.70	100.00
3	3.01	44.70	20.13
4	4.01	49.40	9.51
5	5.01	52.30	5.54
6	6.01	54.10	3.33
7	7.01	55.30	2.17

(55.3 - 2.600374)(11)/(200) = 2.898479 g/L Carbon

(55.3 - 2.600374)(11)/(200)(12) = .24154 Molar Carbon

Sample Run By: 80028_____

9513325.2516

ACID DIGESTION TEST RESULTS

ICP DATA SUMMARY

Acid Digestion

Date Analyzed: March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Instrument Starting LMCS Standard %	Acid Digest. LMCS Standard %	Reagent BLANK ppm	Wet Weight Sample ug/g	Wet Weight Sample Duplicate ug/g	Spike Recovery %	LMCS ACID Digestion %	Closing LMCS Standard %
Aluminum	101.78%		0.17	36826	48263	NOT CALC.	88.04%	106.89%
Arsenic	104.53%		0.03 LT	165	89 LT			105.48%
Barium	96.48%		0.00 LT	78	51	135.89%	81.31%	99.54%
Beryllium	95.14%		0.00	5	3			98.55%
Bismuth	102.68%	100.08%	0.35	6354	5393	NOT CALC.		106.10%
Boron	98.70%	87.77%	0.16	968	66	0.00%		101.92%
Cadmium	95.29%	90.21%	0.01	28	16 LT	40.63%		103.35%
Calcium	99.48%	91.28%	0.08	492	515	37.09%		102.80%
Cerium	95.82%		0.20 LT	1272	543 LT	0.00%	77.25%	101.33%
Chromium	94.02%		0.01 LT	794	825	144.51%	78.04%	100.28%
Copper	97.48%	88.42%	0.02 LT	112	63 LT	24.07%		100.98%
Europium	97.82%		0.00 LT	21	10 LT			101.23%
Iron	97.36%		0.05	6842	8395	NOT CALC.	82.27%	102.65%
Lanthanum	93.19%	84.28%	0.09	129	56 LT	20.59%		96.47%
Lead	99.82%	97.96%	0.16	675	175	246.48%		103.03%
Lithium	97.10%		0.01	39	13 LT	141.46%	81.06%	98.78%
Magnesium	98.54%	91.03%	0.02	1155	173	0.00%		104.28%
Manganese	96.33%		0.02	5412	6982	NOT CALC.	81.24%	102.18%
Mercury	99.31%		0.02	1477	1374			96.81%
Molybdenum	100.25%	97.08%	0.01	58	22	25.32%		101.70%
Nickel	96.28%		0.02 LT	234	166	160.17%	80.69%	103.50%
Phosphorous	103.15%	94.46%	0.13	2159	1567	148.31%		94.76%
Potassium	97.96%	92.02%	0.32 LT	1560	848 LT	0.00%		102.77%
Samarium	100.65%		0.23 LT	1239	610 LT			103.81%
Selenium	100.93%		0.10	1188	703			102.21%
Silver	101.65%		0.03 LT	98	73 LT			104.62%
Sodium	96.97%	90.36%	0.27	43084	56657	NOT CALC.		99.99%
Strontium	98.01%	89.46%	0.00	526	656	45.91%		101.61%
Sulfur	99.04%		0.17	928	708			98.43%
Tantalum	94.15%		0.04 LT	256	109 LT	12.90%	79.69%	94.36%
Thallium	99.75%		0.08	5297	1093			103.48%
Thorium	103.25%		0.06	2829	185			106.80%
Tin	99.41%		0.06	141	69	181.10%	83.10%	108.40%
Titanium	98.09%		0.06	61	24	147.92%	82.38%	103.28%
Uranium	106.26%		1.71 LT	15299	8549			109.55%
Vanadium	96.43%		0.02 LT	100	52			100.11%
Zinc	95.88%	87.80%	0.13	104	56	35.82%		102.09%
Zirconium	98.54%		0.02 LT	260	129	187.34%	83.90%	103.64%

LT: Less Than
NC: Not Calibrated
NOT CALC: Not Calculated

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	N/A
PROCEDURE/REV	LA-505-159/ A-0
TECHNOLOGIST	J. White
DATE	March 07, 1990
TEMPERATURE	N/A
STARTING TIME	03-06-90
ENDING TIME	03-06-90
CHEMIST	S. A. Jones

Acid Digestion

NOTE: Sample is not spiked prior to digestion. This procedure provides a sample to be spiked later with the appropriate element.

	DESCRIPTION		LAB ID
1	Reagent Blank		F0487
2	Sample	89-072	F0480
3	Duplicate Sample	89-072	F0481
4	Spike of sample	89-072	F0482
5			
6			
7			
8			
9			
10			
11			

	DESCRIPTION	LAB ID
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
N/A				
Spike	104C15B/5 mL	103C15D/5 mL		50 mL

SST-102 Rev. F 9/7/90 Interim

Analytical Batch

LAB SEGMENT SERIAL #:F0465

CUSTOMER ID:89-072

INSTRUMENT	ICP
PROCEDURE/REV	LA-505-151 / A-1
TECHNOLOGIST	Janice A. White
DATE	March 31, 1990
TEMPERATURE	N/A
STARTING TIME	0748
ENDING TIME	1415
CHEMIST	S. A. Jones

ICP Analysis of 89-072

Sample analysis after Acid Digestion

	DESCRIPTION		LAB ID
1	LMCS Check Std.		N/A
2	Digested Std.		F0479
3	Reagent Blank		F0487
4	Sample	89-072	F0480
5	Duplicate Sample	89-072	F0481
6	Spike of Sample	89-072	F0482
7	Digested Std.		F0483
8	LMCS Check Std.		N/A
9	Sample Core Comp. 6		F0935
10	Duplicate Core Comp. 6		F0936
11	Sample Core Comp. 5		F0911

	DESCRIPTION		LAB ID
12	Duplicate Core Comp. 5		F0912
13	LMCS Check Std.		N/A
14	Sample	89-083	F0744
15	Duplicate Sample	89-083	F0745
16	Sample	89-084	F0768
17	Duplicate Sample	89-084	F0769
18	Acid Digest Std.		F0771
19	LMCS Check Std.		
20			
21			
22			

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BK# & ALQT. VOL.	FINAL VOL. OF STD.
LMCS Check Standard	78C11F/1.0 mL	82B38C/1.0 mL	77C11F/1.0 mL	11.00 mL
Digested LMCS (1)	81C11A/5.0 mL			50.00 mL
Digested LMCS (2)	82C11A/5.0 mL			50.00 mL
Spike	103C15C/5.0 mL	10415D/5.0 mL	89-072/.3935 g	50.00 mL

SST-102 Rev. F 9/7/90 Interim

ICP RAW DATA SUMMARY

Date Analyzed: March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Instrument Starting LMCS Standard %	Acid Digest. LMCS Standard %	Reagent BLANK ppm	Wet Weight Sample ug/g	Wet Weight Sample Duplicate ug/g	Spike Recovery %	LMCS ACID Digestion %	Closing LMCS Standard %
Aluminum	101.78%		0.17	36826	48263	NOT CALC.	88.04%	106.89%
Antimony	102.26%		0.24	974	444			110.63% #
Arsenic	104.53%		0.03 LT	165	89 LT			105.48%
Barium	96.48%		0.00 LT	78	51	135.89%	81.31%	99.54%
Beryllium	95.14%		0.00	5	3			98.55%
Bismuth	102.68%	100.08%	0.35	6354	5393	NOT CALC.		106.10%
Boron	98.70%	87.77%	0.16	968	66	0.00%		101.92%
Cadmium	95.29%	90.21%	0.01	28	16 LT	40.63%		103.35%
Calcium	99.48%	91.28%	0.08	492	515	37.09%		102.80%
Cerium	95.82%		0.20 LT	1272	543 LT	0.00%	77.25%	101.33%
Chromium	94.02%		0.01 LT	794	825	144.51%	78.04%	100.28%
Cobalt	85.78% #		0.04	493	98 LT	265.91%	69.56%	87.77% #
Copper	97.48%	88.42%	0.02 LT	112	63 LT	24.07%		100.98%
Europium	97.82%		0.00 LT	21	10 LT			101.23%
Iron	97.36%		0.05	6842	8395	NOT CALC.	82.27%	102.65%
Lanthanum	93.19%	84.28%	0.09	129	56 LT	20.59%		96.47%
Lead	99.82%	97.96%	0.16	675	175	246.48%		103.03%
Lithium	97.10%		0.01	39	13 LT	141.46%	81.06%	98.78%
Magnesium	98.54%	91.03%	0.02	1155	173	0.00%		104.28%
Manganese	96.33%		0.02	5412	6982	NOT CALC.	81.24%	102.18%
Mercury	99.31%		0.02	1477	1374			96.81%
Molybdenum	100.25%	97.08%	0.01	58	22	25.32%		101.70%
Neodymium	89.33% #		0.32 LT	792	851 LT	381.28%	74.65%	95.03%
Nickel	96.28%		0.02 LT	234	166	160.17%	80.69%	103.50%
Phosphorous	103.15%	94.46%	0.13	2159	1567	148.31%		94.76%
Potassium	97.96%	92.02%	0.32 LT	1560	848 LT	0.00%		102.77%
Samarium	100.65%		0.23 LT	1239	610 LT			103.81%
Selenium	100.93%		0.10	1188	703			102.21%
Silicon	82.30% #	56.97%	0.21	3791	2084	0.00%		85.22% #
Silver	101.65%		0.03 LT	98	73 LT			104.62%
Sodium	96.97%	90.36%	0.27	43084	56657	NOT CALC.		99.99%
Strontium	98.01%	89.46%	0.00	526	656	445.91%		101.61%
Sulfur	99.04%		0.17	928	708			98.43%
Tantalum	94.15%		0.04 LT	256	109 LT	12.90%	79.69%	94.36%
Thallium	99.75%		0.08	5297	1093			103.48%
Thorium	103.25%		0.06	2829	185			106.80%
Tin	99.41%		0.06	141	69	181.10%	83.10%	108.40%
Titanium	98.09%		0.06	61	24	147.92%	82.38%	103.28%
Tungsten	84.26% #		0.04 LT	243	118			84.98% #
Uranium	106.26%		1.71 LT	15299	8549			109.55%
Vanadium	96.43%		0.02 LT	100	52			100.11%
Zinc	95.88%	87.80%	0.13	104	56	35.82%		102.09%
Zirconium	98.54%		0.02 LT	260	129	187.34%	83.90%	103.64%

LT: Less Than
NC: Not Calibrated
NOT CALC: Not Calculated
Instrument Standards Outside Control Limits

ICP Raw Data

Date Analyzed: March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	SST-1	SST-2	Starting LMCS Instrument Standard ppm	Standard Recovery %		F0479 LMCS Acid Digestion Standard ppm	Acid Digestion Standard Recovery %	F0487 Reagent Blank ppm
Aluminum			50.89	101.78%				0.17
Antimony	10.23			102.26%				0.24
Arsenic			52.26	104.53%				0.02 LT
Barium	9.65			96.48%				0.00 LT
Beryllium			9.51	95.14%				0.00
Bismuth		51.44		102.68%		10.01	100.08%	0.35
Boron	9.87			98.70%		8.78	87.77%	0.16
Cadmium	9.53			95.29%		9.02	90.21%	0.01
Calcium	9.95			99.48%		9.13	91.28%	0.08
Cerium	9.58			95.82%				0.07 LT
Chromium	9.40			94.02%				0.00 LT
Cobalt	8.58			85.78%	#			0.04
Copper	9.75			97.48%		8.84	88.42%	0.01 LT
Europium		9.78		97.82%				0.00 LT
Iron	9.74			97.36%				0.05
Lanthanum		46.69		93.19%		8.43	84.28%	0.09
Lead		50.01		99.82%		9.80	97.96%	0.16
Lithium	9.71			97.10%				0.01
Magnesium	9.85			98.54%		9.10	91.03%	0.02
Manganese	9.63			96.33%				0.02
Mercury			24.83	99.31%				0.02
Molybdenum			50.13	100.25%		9.69	97.08%	0.01
Neodymium	8.93			89.33%	#			-0.09 LT
Nickel	9.63			96.28%				0.02 LT
Phosphorous			51.57	103.15%		9.45	94.46%	0.13
Potassium	24.49			97.96%		9.20	92.02%	0.12 LT
Samarium		10.07		100.65%				0.06 LT
Selenium			50.46	100.93%				0.10
Silicon			41.15	82.30%	#	5.70	56.97%	0.21
Silver		10.17		101.65%		7.22		0.01 LT
Sodium	24.24			96.97%		9.04	90.36%	0.27
Strontium	9.80			98.01%		8.95	89.46%	0.00
Sulfur			49.52	99.04%				0.17
Tantalum			47.08	94.15%				0.02 LT
Thallium			49.88	99.75%				0.08
Thorium		51.73		103.25%				0.06
Tin	49.70			99.41%				0.06
Titanium			49.05	98.09%				0.06
Tungsten			21.07	84.26%	#			0.04 LT
Uranium		53.24		106.26%				0.27 LT
Vanadium			9.64	96.43%				0.00 LT
Zinc	9.59			95.88%		8.78	87.80%	0.13
Zirconium			49.27	98.54%				0.01 LT
Dilution Factor	1.00	1.00	1.00			10.00		1.00

9513325.2522

ICP Raw Data

Date Analyzed: 31-Mar-90
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Digestion Weight	.4820 g		Digestion Weight	.3935 g	
	Volume	F0480	F0480	Volume	50 mL	F0481
	Sample	Sample	Sample	Sample	Sample	Sample
				Duplicate	Duplicate	Duplicate
	Dilution	Dilution	Dilution	Dilution	Dilution	Dilution
	Three	Two	One	Three	Two	One
	ppm	ppm	ppm	ppm	ppm	ppm
Aluminum		355.00	485.38		380.31	361.71
Antimony		24.03	9.39		23.55	3.5
Arsenic		3.99	1.59		2.90	0.50 LT
Barium		1.83	0.75		0.68	0.40
Beryllium		0.14	0.05		0.10	0.02
Bismuth		64.27	61.25		56.94	42.5
Boron		9.33	1.27		2.84	0.52
Cadmium		0.84	0.27		0.35	0.06 LT
Calcium		4.74	4.41		4.06	3.42
Cerium		35.82	12.26		14.76	1.66 LT
Chromium		7.65	10.03		6.5	7.26
Cobalt		10.88	4.75		9.8	0.23 LT
Copper		2.76	1.08		1.28	0.43 LT
Europium		0.59	0.21		0.24	0.03 LT
Iron		65.96	87.62		66.15	63.41
Lanthanum		2.36	1.25		1.36	0.28 LT
Lead		11.32	6.51		15.98	1.38
Lithium		1.14	0.37		0.29	-0.01 LT
Magnesium		11.14	1.61		1.36	1.17
Manganese		52.17	69.98		55.02	53.07
Mercury		14.24	3.6		10.83	1.70
Molybdenum		1.27	0.56		0.68	0.17
Neodymium		17.92	7.63		-4.33	-1.54 LT
Nickel		3.58	2.26		2.73	1.31
Phosphorous		21.71	20.81		21.18	12.35
Potassium		44.64	15.03		12.45	0.68 LT
Samarium		35.42	11.94		13.51	1.40 LT
Selenium		20.48	11.45		11.28	5.54
Silicon		36.55	19.06		24.14	16.42
Silver		2.59	0.95		1.04	0.18 LT
Sodium		415.33	540.11		446.46	432.63
Strontium		5.07	6.36		5.17	4.90
Sulfur		9.48	8.95		8.24	5.58
Tantalum		7.44	2.47		3.26	0.44 LT
Thallium		51.06	21.98		29.86	8.61
Thorium		27.27	9.14		11.66	1.46
Tin		3.67	1.36		1.71	0.54
Titanium		1.52	0.59		0.76	0.19
Tungsten		6.21	2.34		3.55	0.93
Uranium		266.22	147.48		142.49	67.37
Vanadium		2.15	0.96		1.25	0.41
Zinc		1.17	1		0.77	0.44
Zirconium		5.12	2.5		2.54	1.02
Dilution Factor		101.00	21.00		101.00	21.00

ICP Raw Data

Date Analyzed: 31-Mar-90
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Digestion Weight .3946 g Volume 50.00 Spike of Sample Dilution Three ppm	Spike of Sample Dilution Two ppm	Spike of Sample Dilution One ppm		Spike Recovery %	Standard LMCS Acid Digestion ppm	Acid Digestion Standard Recovery %
Aluminum							
Antimony		421.18	366.06		NOT CALC	8.80	88.04%
Arsenic		39.89	4.20				
Barium		5.81	1.03				
Beryllium		14.20	11.84		135.89%	8.13	81.31%
Bismuth		0.18	0.02				
Boron		78.01	40.75		NOT CALC		
Cadmium		5.87	3.04		-45.79%		
Calcium		4.28	2.84		40.63%		
Cerium		7.58	6.54		37.09%		
Chromium		58.97	4.73		-52.79%	7.73	77.25%
Cobalt		20.83	17.25		144.51%	7.87	78.04%
Copper		30.47	10.41		265.91%	6.96	69.56%
Europium		6.50	3.29		24.07%		
Iron		0.91	0.06	LT			
Lanthanum		76.17	5.20		NOT CALC	8.23	82.27%
Lead		7.71	3.08		20.59%		
Lithium		29.96	6.65		246.48%		
Magnesium		14.45	11.83		141.46%	8.11	81.06%
Manganese		4.89	4.13		-42.04%		
Mercury		68.16	58.65		NOT CALC	8.12	81.24%
Molybdenum		5.97	0.51				
Neodymium		2.72	2.98		25.32%		
Nickel		42.04	44.36		381.28%	7.47	74.65%
Phosphorous		17.86	12.36		160.17%	8.07	80.69%
Potassium		31.82	16.00		148.31%		
Samarium		69.67	4.05	LT	-82.24%		
Selenium		54.36	1.59	LT			
Silicon		32.07	10.02			3.27	
Silver		26.16	11.16		-186.81%		
Sodium		7.19	3.12				
Strontium		448.44	388.06		NOT CALC		
Sulfur		8.73	7.37		45.91		
Tantalum		11.00	5.67				
Thallium		13.21	3.30		12.90%	7.93	79.69%
Thorium		69.83	8.51				
Tin		40.73	1.90				
Titanium		19.22	12.28		181.10%	8.31	83.10%
Tungsten		15.29	12.09		147.92%	8.25	82.38%
Uranium		8.15	0.86				
Vanadium		392.78	68.61			5.42	
Zinc		2.76	0.37	LT			
Zirconium		4.4	3.27		35.82%		
		20.74	12.72		187.34%	8.37	83.90%
			2.5				
Dilution Factor		101.00	21.00			10.00	

ICP Raw Data

Date Analyz March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	SST-1	SST-2	Ending LMCS Standard SST-3	Standard Recovery %
Aluminum			53.44	106.89%
Antimony	11.06			110.63% #
Arsenic			52.74	105.48%
Barium	9.95			99.54%
Beryllium			9.86	98.55%
Bismuth		53.16		106.10%
Boron	10.19			101.92%
Cadmium	10.34			103.35%
Calcium	10.28			102.80%
Cerium	10.13			101.33%
Chromium	10.03			100.28%
Cobalt	8.78			87.77% #
Copper	10.10			100.98%
Europium		10.12		101.23%
Iron	10.27			102.65%
Lanthanum		48.33		96.47%
Lead		51.62		103.03%
Lithium	9.88			98.78%
Magnesium	10.43			104.28%
Manganese	10.22			102.18%
Mercury			24.20	96.81%
Molybdenum			50.85	101.70%
Neodymium	9.50			95.03%
Nickel	10.35			103.50%
Phosphorou			47.38	94.76%
Potassium	25.69			102.77%
Samarium		10.38		103.81%
Selenium			51.11	102.21%
Silicon			42.61	85.22% #
Silver		10.46		104.62%
Sodium	25.00			99.99%
Strontium	10.16			101.61%
Sulfur			49.21	98.43%
Tantalum			47.18	94.36%
Thallium			51.74	103.48%
Thorium		53.51		106.80%
Tin	54.20			108.40%
Titanium			51.64	103.28%
Tungsten			21.25	84.98% #
Uranium		54.89		109.55%
Vanadium			10.01	100.11%
Zinc	10.21			102.09%
Zirconium			51.82	103.64%
	1.00	1.00	1.00	

ICP Raw Data

Date Analyz March 31.1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F0479
Reagent Blank F0487
Sample F0480
Duplicate F0481
Spike F0482
Digested Acid Standard F0483

	Spike Standard LMCS ppm added	Spike Standard ID Book # 5.0 mL 103C15C + 5.0 mL 104C15D	SST-1	SST-2	LMCS Standards Values ppm SST-3	LMCS Standard IDs Book # 78C11D 82B38B 77C11D	ACID DIGESTION LMCS STANDARD VALUES ppm in Sample	ACID DIGEST. LMCS IDs Book # 81C11A 82C11A
Aluminum	10.00				50.00		100.00	
Antimony			10.00					
Arsenic					50.00			
Barium	10.00		10.00				100.00	
Beryllium					10.00			
Bismuth	10.00			50.10			100.00	
Boron	10.00		10.00				100.00	
Cadmium	10.00		10.00				100.00	
Calcium	10.00		10.00				100.00	
Cerium	10.00		10.00				100.00	
Chromium	10.09		10.00				100.90	
Cobalt	10.00		10.00				100.00	
Copper	10.00		10.00				100.00	
Europium				10.00				
Iron	10.00		10.00				100.00	
Lanthanum	10.00			50.10			100.00	
Lead	10.00			50.10			100.00	
Lithium	10.00		10.00				100.00	
Magnesium	10.00		10.00				100.00	
Manganese	10.00		10.00				100.00	
Mercury					25.00			
Molybdenum	9.98				50.00		99.80	
Neodymium	10.00		10.00				100.00	
Nickel	10.00		10.00				100.00	
Phosphorou	10.00				50.00		100.00	
Potassium	10.00		25.00				100.00	
Samarium				10.00				
Selenium					50.00			
Silicon	10.00				50.00		100.00	
Silver				10.00				
Sodium	10.00		25.00				100.00	
Strontium	10.00		10.00				100.00	
Sulfur					50.00			
Tantalum	9.95				50.00		99.50	
Thallium					50.00			
Thorium				50.10				
Tin	10.00		50.00				100.00	
Titanium	10.01				50.00		100.10	
Tungsten					25.00			
Uranium				50.10				
Vanadium					10.00			
Zinc	10.00		10.00				100.00	
Zirconium	9.98				50.00		99.80	
	10.00						10.00	

ICP Raw Data

		Acid Digested Standard	F0479
Date Analyzed:	March 31.1990	Reagent Blank	F0487
Procedure:	LA-505-151/A-0	Sample	F0480
Analyst:	J. A. White	Duplicate	F0481
		Spike	F0482
		Digested Acid Standard	F0483

	Calc. Sample F0480 ug/mL	Calc. Duplicate F0481 ug/mL	Calc. Spike F0482 ug/mL	RPD from Summary	IDL (2 sigma)
Aluminum	355	380	421	26.9%	0.0745
Antimony	9	4	4	74.8%	0.0949
Arsenic	2	1	1		0.0223
Barium	1	0	14	41.8%	0.0026
Beryllium	0	0	0	63.1%	0.0004
Bismuth	61	43	41	16.3%	0.0839
Boron	9	1	3	174.5%	0.0083
Cadmium	0	0	4		0.0039
Calcium	5	4	8	4.6%	0.0002
Cerium	12	2	5		0.1359
Chromium	8	7	21	3.8%	0.0039
Cobalt	5	0	30		0.0246
Copper	1	0	3		0.0158
Europium	0	0	0		0.0024
Iron	66	66	76	20.4%	0.0073
Lanthanum	1	0	3		0.0141
Lead	7	1	30	117.6%	0.0273
Lithium	0	-0	14		0.0032
Magnesium	11	1	5	148.0%	0.0001
Manganese	52	55	68	25.3%	0.0011
Mercury	14	11	6	7.2%	0.0036
Molybdenum	1	0	3	91.0%	0.0049
Neodymium	8	-2	44		0.2130
Nickel	2	1	18	34.0%	0.0147
Phosphorou	21	12	32	31.7%	0.0308
Potassium	15	1	4		0.2122
Samarium	12	1	2		0.1525
Selenium	11	6	10	51.3%	0.0631
Silicon	37	16	11	58.1%	0.0314
Silver	1	0	3		0.0183
Sodium	415	446	448	27.2%	0.0483
Strontium	5	5	9	22.0%	0.0010
Sulfur	9	6	6	26.9%	0.0163
Tantalum	2	0	3		0.0273
Thallium	51	9	70	131.6%	0.0437
Thorium	27	1	41	175.4%	0.0122
Tin	1	1	19	69.2%	0.0144
Titanium	1	0	15	87.2%	0.0035
Tungsten	2	1	1	69.3%	0.0273
Uranium	147	67	69	56.6%	1.1405
Vanadium	1	0	0	62.8%	0.0124
Zinc	1	0	4	60.2%	0.0017
Zirconium	3	1	21	66.9%	0.0141

ICP Calibration Report

Procedure: LA-505-151 Revision: A-0
Instrument: WB39939
Technologist: J. A. White
Date: March 31, 1990

Calibration Standards for ICP Program "SST"

Element	Standard	Element	Standard
Aluminum	SST-3	Antimony	SST-4
Arsenic	SST-4	Barium	SST-2
Beryllium	SST-2	Bismuth	SST-4
Boron	SST-3	Cadmium	SST-2
Calcium	SST-2	Cerium	SST-5
Chromium	SST-2	Cobalt	SST-2
Copper	SST-2	Europium	SST-5
Iron	SST-2	Lanthanum	SST-5
Lead	SST-4	Lithium	SST-1
Magnesium	SST-2	Manganese	SST-2
Mercury	SST-3	Molybdenum	SST-3
Neodymium	SST-5	Nickel	SST-2
Phosphorous	SST-3	Potassium	SST-1
Samarium	SST-5	Selenium	SST-4
Silicon	SST-3	Silver	SST-2
Sodium	SST-1	Strontium	SST-2
Sulfur	SST-3	Tantalum	SST-3
Thallium	SST-4	Thorium	SST-4
Tin	SST-4	Titanium	SST-3
Tungsten	SST-3	Uranium	SST-4
Vanadium	SST-2	Zinc	SST-2
Zirconium	SST-3		

ICP Standard Formulations

SST-0:
Calibration blank, 1 M ultrex HNO3.

SST-1:
Stock solutions from AESAR/John Mathey Inc., Seabrook, NH 03874.
Individual element solutions as follows:

Li $LiCO_3$ 10,000 ppm in 5% HNO_3 Lot# 14394A
K KNO_3 10,000 ppm in 5% HNO_3 Lot# 14379A
Na $NaCO_3$ 10,000 ppm in 5% HNO_3 Lot# 14400A

200 mL of standard made by combining 25 mL HCl/HNO_3 mixed acid, 1 mL each single element standards, and water.

SST-2:
Stock solutions from VHG labs, Inc., 180 Zachary Rd. #5, Manchester, NH 03103. Mixed element standards as follows:

SM-10 Li, Na, K, Rb, Cs, Be, Mg, Ca, Sr, & Ba 100 ppm Lot# 0-119A

SM-20 V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ag, & Cd 100 ppm Lot# 0-119B

50 mL of each mixed standard are added to a 250 mL volumetric flask and diluted to volume with 1 M HNO3.

SST-3:
Stock solutions from AESAR/John Mathey Inc., Seabrook, NH 03874. Individual element solutions as follows:

Al Al 10,000 ppm in 10% HCl Lot# 9-053A
B H_3BO_3 10,000 ppm in 1% NH_4OH Lot# 9-335A
Hg Hg 10,000 ppm in 5% HNO_3 Lot# 8-656S
Mo Mo 10,000 ppm in 5% HCl Lot# 9-159T
P P 10,000 ppm in 5% HNO3 Lot# 9-160A
Si Si 1000 ppm in KOH Lot# 086DM Spex Industries, Edison, NJ
S $(NH_4)_2SO_4$ in H_2O Lot# 9-231M
Ta TaCl5 10,000 ppm in 5% HCl/tr HF Lot# 9-335M
Ti Ti 10,000 ppm in 5% HF Lot# 9-079EE
W W 10,000 ppm in 5% HF/tr HNO_3 Lot# 8-685L
Zr $ZrCl_2O$ 10,100 ppm in 5% HCl Lot# 9-078G

50 mL of each mixed standard are added to a 250 mL volumetric flask and diluted to volume with 1 M HNO33.

SST-4:
Stock solution from VHG labs, Inc., 180 Zachary Rd. #5, Manchester, NH 03103. Mixed element standard as follows:

SM-50 Ga, In, Tl, Ge, Sn, Pb, As, Sb, Bi, Se, Te, Th, & U 100 ppm Lot# 0-119D

Solution is used directly for calibration.

SST-5:
Stock solution from VHG labs, Inc., 180 Zachary Rd. #5, Manchester, NH 03103. Mixed element standard as follows:

SM-60 Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, & Lu 100 ppm Lot# 7-165F

50 mL of SM-60 is added to a 250 mL volumetric flask and diluted to volume with 1 M HNO_3.

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31-Mar-90 07:48:34

Condition		Value	Min	/	Max
VACUUM	=	37.21	7.000	/	50.00
SPTEMP	=	38.60	37.00	/	39.00
MAINS	=	233.2	220.0	/	247.0
-1000V	=	-1005	-1010	/	-990
CTEMP	=	24.20	19.00	/	35.00
+5V	=	5.160	4.750	/	5.250
+12V	=	12.15	11.70	/	12.30
-12V	=	-12.2	-12.3	/	-11.7
+24V	=	23.16	22.50	/	26.50
-100V	=	-100	-101	/	-99.0
+5VSQ	=	5.150	4.750	/	5.250
+15VSQ	=	15.14	14.70	/	15.30
-15VSQ	=	-15.2	-15.3	/	-14.7

Position Calibration in Progress

	SLIT POS'N	PM	ALPHA SLIT	BETA SLIT	ALPHA LAMBDA1	BETA LAMBDA1	ALPHA LAMBDA2	BETA LAMBDA2
Previous data :								
INSTR	0.00000	587.348	1.00106	-0.6934	1.00008	-0.0604	0.00000	0.00000
Current data :								
INSTR	0.00000	587.206	1.00105	-0.6533	1.00009	-0.0612	0.00000	0.00000

START THE PLASMA NOW, PLEASE.31-Mar-90 07:56:28

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Sample name : SST0
Programme : SST 31-Mar-90 08:31:46

NAME	MV INT	RSD
AL	1.27	1.34
SB	0.34	1.04
AS	0.76	1.42
BA	2.12	1.06
BE	0.52	0.29
BI	2.76	1.84
B	2.67	1.44
CD	1.66	1.67
CA	0.36	1.12
CE	3.96	1.21
CR	0.93	5.89
CO	0.19	0.60
CU	1.82	1.03
EU	2.27	1.13
FE	1.05	0.53
LA	0.28	1.07
PB	0.24	0.24
LI	2.32	1.24
MG	0.32	0.91
MN	0.58	1.89
HG	2.94	0.14
MO	1.30	0.12
ND	3.21	1.97
NI	2.41	1.25
P	0.79	2.31
K	1.98	0.99
SM	2.81	1.19
SE	1.23	1.50
SI	2.03	1.09
AG	8.13	1.28
NA	2.95	1.37
SR	2.31	0.87
S	0.54	1.42
TA	2.26	0.91
TL	2.37	0.49
TH	0.69	0.96
SN	0.93	0.54
TI	2.28	0.98
W	0.97	1.89
U	2.80	1.20
V1	2.69	1.00
ZN	2.06	0.71
ZR	3.11	0.78

Sample name : SST1
Programme : SST 31-Mar-90 08:36:20

NAME	MV INT	RSD
LI	649.65	0.82
K	15.37	0.45
NA	75.00	0.49

Sample name : SST2
Programme : SST 31-Mar-90 08:38:24

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NAME	MV INT	RSD
BA	398.40	0.46
BE	618.01	0.42
CD	343.84	1.26
CA	575.15	0.46
CR	79.83	3.81
CO	1.43	1.88
CU	131.69	0.46
FE	166.89	1.17
MG	514.80	1.06
MN	350.10	0.78
NI	184.74	1.10
AG	559.91	0.50
SR	697.07	0.66
VI	237.54	0.48
ZN	669.67	0.89

Sample name : SST3
Programme : SST 31-Mar-90 08:41:31

NAME	MV INT	RSD
AL	25.08	1.54
B	867.34	1.93
HG	703.22	2.73
MO	325.72	2.49
P	55.38	2.45
SI	95.90	2.50
S	42.64	2.41
TA	131.18	2.66
TI	592.48	1.71
W	74.93	2.41
ZR	190.94	1.72

Sample name : SST4
Programme : SST 31-Mar-90 08:44:53

NAME	MV INT	RSD
SB	7.34	0.19
AS	136.47	0.63
BI	116.23	0.63
PB	5.29	0.79
SE	54.98	1.16
TL	54.92	0.81
TH	19.46	0.27
SN	230.98	0.98
U	13.57	0.08

Sample name : SST5
Programme : SST 31-Mar-90 08:48:47

NAME	MV INT	RSD
CE	16.52	0.51
EU	654.69	0.67
LA	7.71	0.57
ND	18.61	0.32

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The photocopies on the following pages 145 to 152 are the best copy available from originals of poor reproducible quality.

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SM 15.72 0.52

Programme name : SST Channel name : AL Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.2081	26.334	-0.267060E+01	0.210008E+01		

Programme name : SST Channel name : SB1 Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.3217	7.7112	-0.483441E+01	0.142748E+02		

Programme name : SST Channel name : AS Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.7220	143.29	-0.560038E+00	0.736892E+00		

Programme name : SST Channel name : BA Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.0184	418.32	-0.107232E+00	0.504699E-01		

Programme name : SST Channel name : BE1 Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.4975	648.91	-0.169612E-01	0.323893E-01		

Programme name : SST Channel name : BI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3

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CRV1    2.6217  122.04  -0.243213E+01  0.881313E+00


Programme name : SST     Channel name : B       Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    2.5403  910.71  -0.154626E+00  0.578258E-01


Programme name : SST     Channel name : CD      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    1.5770  361.03  -0.970258E-01  0.584493E-01


Programme name : SST     Channel name : CA      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    0.3442  603.91  -0.126076E-01  0.347956E-01


Programme name : SST     Channel name : CE      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    2.8164  17.344  -0.437482E+01  0.147565E+01


Programme name : SST     Channel name : CR      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    0.8826  83.827  -0.235470E+00  0.253466E+00


Programme name : SST     Channel name : CO      Polynomial type : CC
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CRV1    0.1821  1.5005  -0.309806E+01  0.161638E+02


Programme name : SST     Channel name : CU      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    1.7293  138.27  -0.280337E+00  0.154003E+00


Programme name : SST     Channel name : EU      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    2.1575  687.43  -0.696175E-01  0.306550E-01


Programme name : SST     Channel name : FE      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    0.9937  175.23  -0.126143E+00  0.120596E+00


Programme name : SST     Channel name : LA      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    0.2701  8.0906  -0.766294E+00  0.269505E+01


Programme name : SST     Channel name : PB      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3

CRV1    0.2255  5.5584  -0.469378E+01  0.197772E+02


Programme name : SST     Channel name : LI      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1             C2             C3
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CRV1 2.2011 582.13 -0.178954E+00 0.772397E-01

Programme name : SST Channel name : MG Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.2005	540.54	-0.122972E-01	0.388743E-01		

Programme name : SST Channel name : MN Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.5542	367.60	-0.333797E-01	0.572223E-01		

Programme name : SST Channel name : HG Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.7886	739.38	-0.209582E+00	0.713996E-01		

Programme name : SST Channel name : HO Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.2385	342.00	-0.200928E+00	0.154125E+00		

Programme name : SST Channel name : ND Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.0466	19.544	-0.416322E+01	0.129817E+01		

Programme name : SST Channel name : NI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3

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Programme name : SST Channel name : P Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.7480	58.149	-0.721094E+00	0.915868E+00		

Programme name : SST Channel name : K Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.8845	16.139	-0.740930E+01	0.373515E+01		

Programme name : SST Channel name : SM Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.6723	16.507	-0.435854E+01	0.154943E+01		

Programme name : SST Channel name : SE Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.1682	57.724	-0.228795E+01	0.186063E+01		

Programme name : SST Channel name : SI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.9241	100.69	-0.107879E+01	0.532650E+00		

Programme name : SST Channel name : AG Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	7.7257	587.91	-0.294766E+00	0.362463E-01		

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CRV1    7.7257  587.91  -0.294766E+00  0.362462E-01


Programme name : SST     Channel name : NA      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1            C2            C3

CRV1    2.8073  78.746  -0.205090E+01  0.694043E+00


Programme name : SST     Channel name : SR      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1            C2            C3

CRV1    2.1970  731.93  -0.665745E-01  0.287869E-01


Programme name : SST     Channel name : S       Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1            C2            C3

CRV1    0.5114  44.770  -0.639361E+00  0.118767E+01


Programme name : SST     Channel name : TA      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1            C2            C3

CRV1    2.1451  137.74  -0.875728E+00  0.387833E+00


Programme name : SST     Channel name : TL2     Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1            C2            C3

CRV1    2.2490  57.661  -0.450506E+01  0.190301E+01


Programme name : SST     Channel name : TH      Polynomial type : CC

Curve   Min Int Max Int                  Curve Coefficients
                              C0            C1            C2            C3
```

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CRV1 0.6596 20.432 -0.370038E+01

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Both Dif

Programme name : SST Channel nam al type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.8879	242.52	-0.406305E+00	0.434706E+00		

Programme name : SST Channel name : TI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.1666	622.10	-0.193213E+00	0.847176E-01		

Programme name : SST Channel name : W Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.9240	78.673	-0.657616E+00	0.676096E+00		

Programme name : SST Channel name : U Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.6568	14.250	-0.259567E+02	0.928132E+01		

Programme name : SST Channel name : V1 Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.5514	249.41	-0.228713E+00	0.851605E-01		

Programme name : SST Channel name : ZN Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3

9513325.2540

CRV1	1.9545	703.16	-0.616323E-01	0.299574E-01

Programme name : SST Channel name : ZR Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients			
			C0	C1	C2	C3
CRV1	2.9580	200.48	-0.828879E+00	0.266207E+00		

Nitric Acid Blank

Sample name : HNO3
Programme : SST 31-Mar-90 09:02:23

NAME	MV INT	CONCEN	RSD
Al	1.44	0.358	6.32
Sb	0.37	0.400	16.88
As	0.85	0.065	14.89
Ba	2.45	0.017	8.90
Be	0.59	0.002	7.62
Bi	3.15	0.341	9.87
B	3.65	0.056	7.96
Cd	1.87	0.013	6.67
Ca	0.39	0.001	12.69
Ce	3.43	0.692	9.55
Cr	0.96	0.008	41.21
Co	0.20	0.210	11.75
Cu	2.07	0.039	8.09
Eu	2.63	0.011	10.43
Fe	1.17	0.015	13.98
La	0.30	0.055	7.51
Pb	0.25	0.303	7.53
Li	2.63	0.024	9.36
Mg	0.34	0.001	9.92
Mn	0.64	0.003	1.04
Hg	4.40	0.105	11.77
Mo	1.45	0.023	7.19
Nd	3.58	0.483	12.56
Ni	2.76	0.039	10.89
P	0.93	0.131	13.35
K	2.22	0.872	7.44
Sm	3.26	0.685	9.49
Se	1.38	0.280	9.85
Si	2.30	0.146	8.86
Ag	9.47	0.048	8.92
Na	3.39	0.300	9.87
Sr	2.59	0.008	8.68
S	0.59	0.063	9.62
Ta	2.59	0.129	13.45
Tl	2.76	0.742	20.40
Th	0.79	0.489	9.51
Sn	1.04	0.046	9.48
Ti	2.57	0.025	8.12
W	1.12	0.098	7.69
U	3.24	4.096	9.36
V	3.03	0.029	16.60
Zn	2.31	0.007	2.91
Zr	3.42	0.082	7.94

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LMCS Check Standard #78C11F

Sample name : 78C11F
Sample code 1 : SST1
Programme : SST 31-Mar-90 09:07:01

NAME	MV INT	CONCEN	RSD
Al	1.46	0.390	7.47
Sb	1.06	10.226	0.14
As	0.93	0.128	6.97
Ba	193.29	9.648	1.71
Be	0.58	0.002	12.30
Bi	3.24	0.420	13.55
B	173.42	9.873	1.37
Cd	164.69	9.529	1.02
Ca	286.26	9.948	1.59
Ce	9.46	9.582	1.08
Cr	38.02	9.402	0.84
Co	0.72	8.578	0.58
Cu	65.12	9.748	1.50
Eu	3.26	0.030	3.72
Fe	81.78	9.736	1.04
La	0.32	0.097	1.60
Pb	0.25	0.323	14.14
Li	128.03	9.710	1.76
Mg	253.81	9.854	1.13
Mn	168.93	9.633	0.97
Hg	3.41	0.034	29.74
Mo	1.48	0.027	17.73
Nd	10.09	8.933	0.47
Ni	90.19	9.628	0.78
P	0.96	0.155	2.39
K	8.54	24.491	1.01
Sm	3.02	0.325	25.14
Se	3.36	3.971	1.47
Si	2.27	0.130	13.41
Ag	8.91	0.028	20.14
Na	37.88	24.242	1.53
Sr	342.78	9.801	1.70
S	0.77	0.277	1.93
Ta	3.49	0.091	12.09
Tl	2.75	0.719	15.08
Th	0.79	0.517	7.87
Sn	115.27	49.704	0.98
Ti	2.45	0.014	18.19
W	1.32	0.235	2.67
U	3.43	5.869	7.57
V	2.90	0.018	12.28
Zn	322.13	9.588	0.94
Zr	3.32	0.055	16.97

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LMCS Check Standard #82B38C

Sample name : 82B38C
Sample code 1 : SSI2
Programme : SSI 31-Mar-90 09:11:44

NAME	MV INT	CONCEN	RSD
Al	3.31	4.282	0.99
Sb	0.38	0.600	11.25
As	2.56	1.325	1.56
Ba	2.56	0.022	8.01
Be	0.57	0.002	9.89
Bi	61.13	51.442	0.28
B	6.26	0.208	15.86
Cd	1.89	0.013	12.22
Ca	0.93	0.020	0.10
Ce	3.48	0.765	9.65
Cr	1.28	0.089	3.41
Co	0.19	0.022	75.00
Cu	3.32	0.231	2.17
Eu	321.38	9.782	0.89
Fe	1.54	0.060	6.99
La	17.61	)46.687	0.52
Pb	2.77	50.010	0.87
Li	2.43	0.009	22.62
Mg	0.55	0.009	1.78
Mn	0.78	0.011	5.54
Hg	3.65	0.051	25.91
Mo	1.46	0.024	8.83
Nd	3.87	0.865	9.37
Ni	2.79	0.042	10.27
P	1.17	0.350	4.61
K	2.03	0.174	61.56
Sm	9.31	10.065	0.41
Se	1.45	0.401	5.87
Si	3.20	0.626	2.77
Ag	288.58	10.165	0.46
Na	3.13	0.124	30.21
Sr	2.65	0.010	9.36
S	0.68	0.164	10.17
Ta	2.83	0.221	6.17
Tl	5.58	6.106	0.30
Th	10.40	51.728	0.46
Sn	1.17	0.101	1.32
Ti	2.94	0.056	5.62
W	1.06	0.060	41.82
U	8.53	53.235	0.28
V	5.54	0.243	0.61
Zn	2.52	0.014	9.47
Zr	3.67	0.149	6.42

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LMCS Check Standard #77C11F

Sample name : 77C11F
Sample code 1 : SST3
Programme : SSI 31-Mar-90 09:16:32

NAME	MV INT	CONCEN	RSD
Al	25.50	50.890	0.28
Sb	0.45	1.575	8.65
As	71.68	52.264	1.43
Ba	2.75	0.031	7.74
Be	294.27	9.514	0.53
Bi	4.24	1.301	1.27
B	5.57	0.167	5.91
Cd	2.17	0.030	1.61
Ca	0.94	0.020	0.56
Ce	3.43	0.687	14.95
Cr	1.12	0.048	9.12
Co	0.21	0.242	20.37
Cu	2.37	0.084	7.14
Eu	2.66	0.012	13.85
Fe	1.54	0.059	5.61
La	0.30	0.049	22.71
Pb	0.26	0.488	8.11
Li	2.62	0.023	18.58
Mg	0.48	0.006	2.18
Mn	0.92	0.019	3.88
Hg	350.66	24.827	1.51
Mo	326.53	50.126	0.66
Nd	3.58	0.485	11.90
Ni	6.98	0.501	2.64
P	57.10	51.574	1.58
K	2.21	0.829	13.37
Sm	3.29	0.736	14.22
Se	28.35	50.463	1.05
Si	79.28	41.148	1.10
Ag	17.64	0.345	2.25
Na	3.61	0.453	9.52
Sr	2.68	0.011	11.35
S	42.23	49.519	1.02
Ta	123.64	47.075	1.01
Tl	28.58	49.876	0.57
Th	0.94	1.318	6.57
Sn	1.57	0.274	1.75
Ti	581.22	49.046	0.25
W	32.13	21.066	1.27
U	4.65	17.177	4.76
V	115.91	9.643	0.95
Zn	3.61	0.047	2.19
Zr	188.19	49.270	0.32

Acid Digested LMCS Standard F0979

Sample name : ~~F0979~~
Sample code 1 : ~~REAGENT~~
Sample code 2 : ~~BLANK~~ ICP-LB STD
Sample code 3 : ~~DIRECT~~ Digested
Programme : SST 31-Mar-90 09:21:55

NAME	MV INT	CONCEN	RSD
Al	1.55	0.585	10.06
Sb	0.37	0.457	9.02
As	1.24	0.355	3.98
Ba	2.50	0.019	12.39
Be	0.60	0.002	8.29
Bi	14.12	10.008	0.91
B	154.46	8.777	1.14
Cd	156.00	9.021	1.06
Ca	262.68	9.128	0.99
Ce	3.39	0.626	15.93
Cr	1.04	0.027	11.80
Co	0.20	0.178	13.89
Cu	59.24	8.842	1.03
Eu	2.56	0.009	16.79
Fe	1.63	0.070	7.41
La	3.41	8.428	0.84
Pb	0.73	9.796	1.46
Li	2.59	0.021	16.39
Mg	234.49	9.103	0.47
Mn	1.07	0.028	2.88
Hg	3.44	0.036	6.03
Mo	64.17	9.689	0.81
Nd	3.70	0.635	11.18
Ni	2.78	0.041	14.82
P	11.10	9.446	4.11
K	4.45	9.202	0.43
Sm	3.12	0.474	20.95
Se	1.40	0.320	15.01
Si	12.72	5.697	2.13
Ag	207.26	7.218	0.65
Na	15.97	9.036	0.52
Sr	313.06	8.946	0.96
S	0.80	0.308	2.51
Ta	3.55	0.112	13.77
Tl	2.72	0.664	10.42
Th	0.78	0.432	16.07
Sn	1.42	0.213	5.24
Ti	3.13	0.072	4.45
W	1.34	0.246	5.04
U	3.18	3.536	17.34
V	3.01	0.028	16.09
Zn	295.15	8.780	0.31
Zr	3.33	0.058	20.65

Reagent Blank F0487

Sample name : F487
Sample code 1 : BLANK
Sample code 2 : 89072
Sample code 3 : DIRECT
Programme : SST 31-Mar-90 09:27:38

NAME	MV INT	CONCEN	RSD
Al	1.35	0.167	10.32
Sb	0.36	0.238	12.49
As	0.78	0.015	57.74
Ba	2.19	0.003	20.16
Be	0.55	0.001	15.95
Bi	3.15	0.348	7.78
B	5.43	0.159	6.29
Cd	1.81	0.009	7.51
Ca	2.77	0.084	0.50
Ce	3.01	0.068	39.39
Cr	0.93	0.001	53.91
Co	0.19	0.043	37.28
Cu	1.91	0.014	15.11
Eu	2.29	0.001	68.88
Fe	1.46	0.050	2.43
La	0.32	0.093	164.90
Pb	0.25	0.158	26.02
Li	2.41	0.007	11.76
Mg	0.81	0.019	0.31
Mn	0.87	0.016	2.35
Hg	3.21	0.020	9.52
Mo	1.35	0.008	43.01
Nd	3.13	-0.094	-41.11
Ni	2.55	0.015	20.42
P	0.93	0.128	11.72
K	2.02	0.121	42.97
Sm	2.85	0.059	54.76
Se	1.28	0.102	14.90
Si	2.42	0.213	9.40
Ag	8.32	0.007	47.07
Na	3.34	0.270	2.68
Sr	2.41	0.003	13.93
S	0.68	0.173	4.58
Ta	2.32	0.024	2.49
Tl	2.41	0.078	42.97
Th	0.71	0.064	38.49
Sn	1.07	0.057	10.29
Ti	2.97	0.058	1.85
W	1.03	0.038	7.22
U	2.83	0.272	70.94
V	2.73	0.004	62.20
Zn	6.43	0.131	0.16
Zr	3.15	0.009	29.30

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Sample 89-072, F0480

Sample name : F480
Sample code 1 : SAMPLE
Sample code 2 : 100-10
Sample code 3 : 89072
Programme : SST 31-Mar-90 09:33:11

NAME	MV INT	CONCEN	DILCOR	RSD
Al	2.95	3.515	355.00	1.81
Sb	0.36	0.238	24.029	28.35
As	0.81	0.040	3.994	25.30
Ba	2.48	0.018	1.825	9.78
Be	0.57	0.001	0.140	7.53
Bi	3.48	0.636	64.267	5.77
B	4.27	0.092	9.327	5.39
Cd	1.80	0.008	0.842	8.18
Ca	1.71	0.047	4.741	0.31
Ce	3.21	0.355	35.820	19.15
Cr	1.23	0.076	7.654	6.27
Co	0.20	0.108	10.884	17.32
Cu	2.00	0.027	2.758	12.47
Eu	2.46	0.006	0.587	20.83
Fe	6.46	0.653	65.956	0.34
La	0.29	0.023	2.359	30.53
Pb	0.24	0.112	11.319	0.00
Li	2.46	0.011	1.139	22.63
Mg	3.15	0.110	11.139	0.56
Mn	9.61	0.517	52.169	0.33
Hg	4.91	0.141	14.238	21.83
Mo	1.39	0.013	1.266	34.16
Nd	3.34	0.177	17.919	45.40
Ni	2.73	0.035	3.579	14.64
P	1.02	0.215	21.707	6.66
K	2.10	0.442	44.641	23.56
Sm	3.04	0.351	35.419	21.23
Se	1.34	0.203	20.484	12.99
Si	2.70	0.362	36.547	4.35
Ag	8.84	0.026	2.586	20.10
Na	8.88	4.112	415.33	0.77
Sr	4.06	0.050	5.070	1.55
S	0.62	0.094	9.476	11.35
Ta	2.45	0.074	7.443	20.99
Tl	2.63	0.506	51.062	16.57
Th	0.75	0.270	27.273	17.21
Sn	1.02	0.036	3.673	18.68
Ti	2.46	0.015	1.517	19.74
W	1.06	0.062	6.214	17.53
U	3.08	2.636	266.22	17.09
V	2.94	0.021	2.145	12.16
Zn	2.45	0.012	1.174	9.00
Zr	3.30	0.051	5.117	18.41

Dilution factor : 101.000

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Sample 89-072, F0480

Sample name : F480
Sample code 1 : 500-10
Sample code 2 : SAMPLE
Sample code 3 : 89072
Programme : SST 31-Mar-90 09:38:34

NAME	MV INT	CONCEN	DILCOR	RSD
Al	12.28	23.113	485.38	2.44
Sb	0.37	0.447	9.393	5.53
As	0.86	0.076	1.594	13.59
Ba	2.83	0.036	0.748	2.75
Be	0.59	0.002	0.047	2.21
Bi	6.07	2.917	61.248	1.66
B	3.72	0.060	1.265	5.96
Cd	1.88	0.013	0.266	4.63
Ca	6.39	0.210	4.406	2.41
Ce	3.36	0.584	12.261	7.67
Cr	2.81	0.478	10.028	2.11
Co	0.21	0.226	4.752	8.25
Cu	2.15	0.052	1.082	3.88
Eu	2.59	0.010	0.205	7.55
Fe	35.65	4.173	87.624	2.34
La	0.31	0.059	1.245	2.62
Pb	0.25	0.310	6.507	6.38
Li	2.55	0.018	0.372	8.96
Mg	2.29	0.077	1.613	2.31
Mn	58.82	3.332	69.976	1.99
Hg	5.34	0.172	3.602	18.06
Mo	1.48	0.026	0.555	7.90
Nd	3.49	0.363	7.633	15.01
Ni	3.39	0.108	2.258	3.27
P	1.87	0.991	20.810	1.70
K	2.18	0.716	15.034	5.75
Sm	3.18	0.569	11.941	8.04
Se	1.52	0.545	11.448	2.74
Si	3.73	0.908	19.064	1.76
Ag	9.38	0.045	0.949	6.83
Na	40.01	25.719	540.11	2.19
Sr	12.83	0.303	6.359	2.35
S	0.90	0.426	8.946	4.84
Ta	2.56	0.117	2.465	9.99
Tl	2.92	1.047	21.980	7.66
Th	0.78	0.435	9.140	7.35
Sn	1.08	0.065	1.360	6.99
Ti	2.61	0.028	0.592	5.48
W	1.14	0.112	2.343	9.85
U	3.55	7.023	147.48	2.94
V	3.22	0.046	0.961	3.57
Zn	3.65	0.048	1.002	1.51
Zr	3.56	0.119	2.503	3.56

Dilution factor : 21.0000

Sample 89-072 Duplicate, F0481

Sample name : F481
Sample code 1 : DUPSAM
Sample code 2 : 100-10
Sample code 3 : 89072
Programme : SST 31-Mar-90 09:43:18

NAME	MV INT	CONCEN	DILCOR	RSD
Al	3.06	3.765	380.31	0.47
Sb	0.36	0.233	23.549	12.24
As	0.80	0.029	2.903	4.44
Ba	2.26	0.007	0.683	15.68
Be	0.56	0.001	0.103	11.51
Bi	3.40	0.564	56.938	5.38
B	3.16	0.028	2.836	12.48
Cd	1.72	0.003	0.350	9.28
Ca	1.52	0.040	4.056	0.35
Ce	3.06	0.146	14.755	27.78
Cr	1.18	0.064	6.502	1.36
Co	0.20	0.097	9.795	41.94
Cu	1.90	0.013	1.281	14.08
Eu	2.35	0.002	0.236	25.07
Fe	6.48	0.655	66.151	0.41
La	0.29	0.013	1.361	30.55
Pb	0.25	0.158	15.980	31.46
Li	2.35	0.003	0.289	55.45
Mg	0.66	0.013	1.360	0.17
Mn	10.10	0.545	55.017	0.20
Hg	4.44	0.107	10.831	34.39
Mo	1.35	0.007	0.680	24.05
Nd	3.17	-0.043	-4.327	-37.85
Ni	2.66	0.027	2.733	10.34
P	1.02	0.210	21.183	18.60
K	2.02	0.123	12.449	26.48
Sm	2.90	0.134	13.510	31.28
Se	1.29	0.112	11.275	8.39
Si	2.47	0.239	24.137	2.48
Ag	8.42	0.010	1.036	25.07
Na	9.32	4.420	446.46	0.39
Sr	4.09	0.051	5.169	0.55
S	0.61	0.082	8.237	3.85
Ta	2.34	0.032	3.264	9.32
Tl	2.52	0.296	29.856	24.90
Th	0.72	0.115	11.662	23.98
Sn	0.97	0.017	1.712	18.19
Ti	2.37	0.008	0.764	22.97
W	1.02	0.035	3.551	17.45
U	2.95	1.411	142.49	15.49
V	2.83	0.012	1.250	17.56
Zn	2.31	0.008	0.766	7.42
Zr	3.21	0.025	2.536	17.06

Dilution factor : 101.000

Sample 89-072 Duplicate, F0481

Sample name : F481
Sample code 1 : 500-10
Sample code 2 : DUPSAM
Sample code 3 : 89072
Programme : SST 31-Mar-90 09:48:33

NAME	MV INT	CONCEN	DILCOR	RSD
Al	9.47	17.224	361.71	0.52
Sb	0.35	0.167	3.497	13.09
As	0.79	0.024	0.495	40.63
Ba	2.51	0.019	0.404	12.36
Be	0.55	0.001	0.017	42.74
Bi	5.06	2.024	42.500	2.38
B	3.10	0.025	0.521	21.16
Cd	1.71	0.003	0.063	30.33
Ca	5.04	0.163	3.415	0.70
Ce	3.02	0.079	1.663	127.44
Cr	2.29	0.346	7.262	1.95
Co	0.19	0.011	0.226	229.13
Cu	1.95	0.020	0.429	24.85
Eu	2.31	0.001	0.026	144.06
Fe	26.09	3.020	63.413	0.36
La	0.29	0.013	0.283	80.83
Pb	0.24	0.066	1.384	17.32
Li	2.31	-0.001	-0.013	-617.37
Mg	1.75	0.056	1.172	0.44
Mn	44.75	2.527	53.072	0.34
Hg	4.07	0.081	1.701	20.49
Mo	1.36	0.008	0.169	44.44
Nd	3.15	-0.069	-1.454	-159.46
Ni	2.98	0.062	1.308	12.15
P	1.43	0.588	12.354	6.91
K	1.99	0.032	0.680	455.80
Sm	2.86	0.067	1.399	145.68
Se	1.37	0.264	5.535	16.54
Si	3.49	0.782	16.421	3.11
Ag	8.37	0.008	0.177	83.30
Na	32.64	20.601	432.63	0.67
Sr	10.42	0.233	4.899	0.34
S	0.76	0.266	5.578	3.82
Ta	2.31	0.021	0.437	89.78
Tl	2.58	0.410	8.605	38.25
Th	0.71	0.069	1.455	85.77
Sn	0.99	0.026	0.536	34.15
Ti	2.39	0.009	0.188	40.07
W	1.04	0.044	0.928	23.86
U	3.14	3.208	67.373	17.94
V	2.91	0.020	0.410	20.30
Zn	2.75	0.021	0.438	5.06
Zr	3.30	0.048	1.017	23.70

Dilution factor : 21.0000

Spike of Sample 89-072, F0482

Sample name : F482
Sample code 1 : 100-10
Sample code 2 : SPIKE
Sample code 3 : 89072
Programme : SST 31-Mar-90 09:57:14

NAME	MV INT	CONCEN	DILCOR	RSD
Al	3.26	4.170	421.18	1.14
Sb	0.37	0.395	39.889	4.17
As	0.84	0.057	5.805	0.00
Ba	4.91	0.141	14.200	0.33
Be	0.58	0.002	0.184	11.64
Bi	3.64	0.772	78.005	3.98
B	3.68	0.058	5.872	1.27
Cd	2.38	0.042	4.276	1.05
Ca	2.52	0.075	7.578	0.51
Ce	3.36	0.584	58.971	1.39
Cr	1.74	0.206	20.830	1.54
Co	0.21	0.302	30.474	3.09
Cu	2.24	0.064	6.502	0.73
Eu	2.57	0.009	0.912	1.60
Fe	7.30	0.754	76.167	0.76
La	0.31	0.076	7.712	4.08
Pb	0.25	0.297	29.962	10.18
Li	4.17	0.143	14.445	0.41
Mg	1.56	0.048	4.891	0.49
Mn	12.38	0.675	68.159	0.73
Hg	3.76	0.059	5.969	12.03
Mo	1.64	0.052	5.272	1.78
Nd	3.53	0.416	42.044	11.98
Ni	4.02	0.177	17.860	1.82
P	1.13	0.315	31.821	1.75
K	2.17	0.690	69.665	2.56
Sm	3.16	0.538	54.355	1.59
Se	1.40	0.318	32.072	3.53
Si	2.51	0.259	26.164	1.44
Ag	10.10	0.071	7.190	2.61
Na	9.35	4.440	448.44	0.43
Sr	5.31	0.086	8.738	0.29
S	0.63	0.109	10.996	8.66
Ta	2.60	0.131	13.214	4.32
Tl	2.73	0.691	69.834	18.77
Th	0.77	0.403	40.728	0.00
Sn	1.37	0.190	19.216	1.65
Ti	4.07	0.151	15.293	0.51
W	1.09	0.081	8.149	9.52
U	3.22	3.889	392.78	1.31
V	3.01	0.027	2.758	15.11
Zn	3.51	0.044	4.395	1.01
Zr	3.89	0.205	20.739	0.22

Dilution factor : 101.000

Spike of Sample 89-072, F0482

Sample name : F482
Sample code 1 : 500-10
Sample code 2 : SPIKE
Sample code 3 : 89072
Programme : SST 31-Mar-90 10:03:05

NAME	MV INT	CONCEN	DILCOR	RSD
Al	9.57	17.431	366.06	0.75
Sb	0.35	0.200	4.197	22.96
As	0.83	0.049	1.026	7.74
Ba	13.30	0.564	11.839	0.43
Be	0.56	0.001	0.023	13.90
Bi	4.96	1.941	40.754	1.27
B	5.17	0.145	3.035	2.42
Cd	3.98	0.135	2.843	1.67
Ca	9.31	0.311	6.536	0.39
Ce	3.12	0.225	4.731	20.68
Cr	4.17	0.821	17.251	0.79
Co	0.22	0.496	10.409	6.79
Cu	2.84	0.157	3.290	1.76
Eu	2.36	0.003	0.059	24.12
Fe	26.79	3.105	65.199	0.33
La	0.34	0.146	3.075	1.06
Pb	0.25	0.316	6.645	7.22
Li	9.61	0.563	11.831	0.24
Mg	5.37	0.197	4.129	0.80
Mn	49.39	2.793	58.645	0.51
Hg	3.28	0.024	0.510	3.83
Mo	2.22	0.142	2.981	0.98
Nd	4.83	2.113	44.364	136.07
Ni	7.78	0.589	12.359	1.52
P	1.62	0.762	16.002	3.16
K	2.04	0.193	4.053	31.53
Sm	2.86	0.076	1.594	58.87
Se	1.49	0.477	10.016	4.60
Si	3.02	0.531	11.156	1.88
Ag	12.23	0.148	3.116	2.23
Na	29.58	18.479	388.06	0.41
Sr	14.50	0.351	7.369	0.51
S	0.77	0.270	5.670	3.99
Ta	2.66	0.157	3.296	5.67
Tl	2.58	0.405	8.512	21.03
Th	0.71	0.091	1.903	32.40
Sn	2.28	0.585	12.284	2.78
Ti	9.08	0.576	12.091	1.09
W	1.03	0.041	0.861	8.13
U	3.15	3.267	68.607	8.32
V	2.89	0.018	0.374	1.38
Zn	7.26	0.156	3.274	0.54
Zr	5.39	0.606	12.724	1.22

Dilution factor : 21.0000

95/3325.2553

Acid Digested LMCS Check Standard

Sample name : ICP2B
Sample code 1 : DIGEST
Sample code 2 : DIRECT
Sample code 3 : 89072
Programme : SST 31-Mar-90 10:08:11

NAME	MV INT	CONCEN	RSD
Al	5.46	8.804	3.01
Sb	0.36	0.266	29.50
As	1.10	0.254	3.10
Ba	163.24	8.131	1.45
Be	0.63	0.003	12.32
Bi	3.27	0.448	16.94
B	3.38	0.041	13.12
Cd	1.95	0.017	1.21
Ca	9.14	0.306	1.74
Ce	8.20	7.725	4.45
Cr	31.99	7.874	3.17
Co	0.62	6.956	5.71
Cu	1.94	0.018	44.11
Eu	3.02	0.023	11.86
Fe	69.27	8.227	2.83
La	0.31	0.057	24.05
Pb	0.25	0.158	31.46
Li	107.26	8.106	1.54
Mg	2.19	0.073	3.25
Mn	142.55	8.124	2.83
Hg	3.22	0.020	5.99
Mo	1.52	0.033	16.07
Nd	8.96	7.465	1.44
Ni	75.97	8.069	3.54
P	1.00	0.194	19.87
K	1.99	0.034	657.59
Sm	2.86	0.075	202.98
Se	2.99	3.273	4.66
Si	3.11	0.578	7.39
Ag	9.71	0.057	19.17
Na	3.35	0.272	24.59
Sr	2.49	0.005	34.85
S	0.74	0.235	9.11
Ta	22.70	7.929	4.62
Tl	2.77	0.768	17.25
Th	0.77	0.393	27.55
Sn	20.05	8.310	4.73
Ti	99.62	8.246	2.28
W	1.07	0.067	31.08
U	3.38	5.420	17.82
V	2.93	0.021	27.16
Zn	3.86	0.054	4.01
Zr	34.56	8.373	2.59

9513325.2554

Nitric Acid Blank

Sample name : HNO3
Programme : SST 31-Mar-90 10:12:36

NAME	MV INT	CONCEN	RSD
Al	1.38	0.227	4.38
Sb	0.36	0.314	13.12
As	0.81	0.040	14.90
Ba	2.32	0.010	3.79
Be	0.57	0.001	2.51
Bi	3.06	0.266	5.43
B	3.00	0.019	6.04
Cd	1.80	0.008	8.83
Ca	0.38	0.001	5.36
Ce	3.26	0.441	3.58
Cr	0.92	-0.002	-198.70
Co	0.20	0.167	9.68
Cu	1.98	0.025	3.06
Eu	2.50	0.007	2.46
Fe	1.15	0.013	5.81
La	0.30	0.037	14.63
Pb	0.25	0.171	0.00
Li	2.51	0.015	2.85
Mg	0.34	0.001	10.17
Mn	0.62	0.002	16.04
Hg	3.04	0.008	45.67
Mo	1.39	0.014	2.77
Nd	4.61	1.825	156.22
Ni	2.68	0.029	5.00
P	0.93	0.133	16.93
K	2.12	0.524	6.80
Sm	3.09	0.436	3.65
Se	1.33	0.189	15.02
Si	2.31	0.099	4.50
Ag	8.98	0.031	4.97
Na	3.20	0.170	3.19
Sr	2.49	0.005	3.54
S	0.58	0.046	19.58
Ta	2.47	0.084	11.41
Tl	2.66	0.553	4.17
Th	0.76	0.332	4.90
Sn	1.02	0.039	1.92
Ti	2.47	0.016	4.81
W	1.07	0.063	9.28
U	3.07	2.549	3.65
V	2.96	0.024	13.91
Zn	2.25	0.006	11.51
Zr	3.31	0.053	4.33

LMCS Check Standard #78C11F

Sample name : 78C11F
Sample code 1 : SST1
Programme : SSI 31-Mar-90 10:16:39

NAME	MV INT	CONCEN	RSD
Al	1.51	0.493	10.46
Sb	1.11	11.063	1.20
As	0.97	0.155	6.74
Ba	199.34	9.954	0.69
Be	0.61	0.003	11.35
Bi	3.27	0.453	14.62
B	178.94	10.192	0.64
Cd	178.48	10.335	2.22
Ca	295.80	10.280	0.77
Ce	9.83	10.133	1.99
Cr	40.49	10.028	1.46
Co	0.73	8.777	2.50
Cu	67.39	10.098	0.69
Eu	3.40	0.035	4.28
Fe	86.17	10.265	1.51
La	0.33	0.115	6.20
Pb	0.26	0.363	8.33
Li	130.20	9.878	0.27
Mg	268.57	10.428	1.63
Mn	179.15	10.218	1.44
Hg	3.32	0.028	19.89
Mo	1.34	0.037	13.13
Nd	10.53	9.503	1.12
Ni	96.77	10.350	1.88
P	1.00	0.199	14.13
K	8.86	25.693	1.06
Sm	3.15	0.520	17.60
Se	3.58	4.366	1.68
Si	3.35	0.171	12.28
Ag	9.31	0.043	14.45
Na	38.97	24.998	0.90
Sr	355.29	10.161	0.84
S	0.82	0.329	6.38
Ta	2.61	0.136	14.32
Tl	2.88	0.984	12.87
Th	0.82	0.673	8.83
Sn	125.60	54.193	2.35
Ti	2.53	0.021	15.34
W	1.40	0.288	8.76
U	3.58	7.261	7.98
V	3.01	0.028	24.23
Zn	342.85	10.209	1.62
Zr	3.41	0.079	13.71

Standard solution for analysis std F911, F912

9513326.2556

LMCS Check Standard #82B38C

Sample name : 82B38C
Sample code 1 : SST2
Programme : SST 31-Mar-90 10:20:55

NAME	MV INT	CONCEN	RSD
Al	3.38	4.428	0.14
Sb	0.39	0.723	3.01
As	2.62	1.370	0.50
Ba	2.55	0.021	1.30
Be	0.57	0.002	6.47
Bi	63.07	53.156	0.29
B	5.27	0.150	10.48
Cd	1.87	0.012	4.50
Ca	0.95	0.021	0.17
Ce	3.46	0.732	1.41
Cr	1.28	0.088	2.89
Co	0.20	0.070	23.08
Cu	3.33	0.233	0.23
Eu	332.48	10.123	0.16
Fe	1.59	0.065	6.20
La	18.22	48.331	0.16
Pb	2.85	51.618	0.24
Li	2.41	0.007	19.97
Mg	0.56	0.009	0.83
Mn	0.78	0.011	3.03
Hg	3.49	0.040	3.38
Mo	1.47	0.026	10.88
Nd	3.82	0.802	7.20
Ni	2.76	0.039	11.20
P	1.19	0.365	2.69
K	2.01	0.098	21.14
Sm	9.51	10.381	0.13
Se	1.44	0.397	4.87
Si	3.22	0.635	0.34
Ag	296.78	10.462	0.27
Na	3.09	0.093	9.48
Sr	2.64	0.010	3.27
S	0.67	0.158	3.04
Ta	2.83	0.222	1.83
Tl	5.72	6.374	1.69
Th	10.73	53.508	0.07
Sn	1.19	0.111	3.05
Ti	2.95	0.057	0.67
W	1.08	0.070	4.76
U	8.71	54.887	0.16
V	5.65	0.252	0.37
Zn	2.56	0.015	3.51
Zr	3.68	0.150	1.07

9213325.2557

LMCS Check Standard #77C11F

Sample name : 77C11F
Sample code 1 : SST3
Programme : SST 31-Mar-90 10:25:16

NAME	MV INT	CONCEN	RSD
Al	26.72	53.443	0.73
Sb	0.44	1.408	11.88
As	72.33	52.741	1.99
Ba	2.53	0.020	12.72
Be	304.80	9.855	0.74
Bi	3.99	1.087	3.98
B	5.07	0.138	10.87
Cd	2.02	0.021	6.66
Ca	0.96	0.021	1.09
Ce	3.10	0.194	55.22
Cr	1.04	0.029	26.43
Co	0.20	0.108	17.32
Cu	2.20	0.059	10.57
Eu	2.40	0.004	46.94
Fe	1.43	0.047	4.02
La	0.29	0.014	47.19
Pb	0.26	0.349	5.66
Li	2.37	0.004	94.73
Mg	0.46	0.006	3.84
Mn	0.90	0.018	3.40
Hg	341.91	24.203	2.40
Mo	331.23	50.850	1.36
Nd	3.24	0.044	207.49
Ni	6.74	0.474	3.75
P	52.52	47.379	4.36
K	2.02	0.138	103.21
Sm	2.96	0.235	45.30
Se	28.70	51.106	1.07
Si	82.03	42.612	3.11
Ag	17.03	0.323	3.17
Na	3.28	0.224	22.29
Sr	2.50	0.005	24.27
S	41.98	49.214	1.48
Ta	123.91	47.179	1.44
Tl	29.56	51.742	0.30
Th	0.89	1.018	9.40
Sn	1.51	0.251	5.21
Ti	611.81	51.638	1.02
W	32.40	21.245	2.32
U	4.46	15.450	7.26
V	120.24	10.011	0.89
Zn	3.42	0.041	3.79
Zr	197.78	51.822	1.12

9513325.2558

APPENDIX A
ANALYTICAL ANALYSIS CARDS

Serial No	Sample Point	Date	Time Issued	Priority
F 465.-5001	SEGMENT-B	11-30-89	8:31	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
VOA SAMP	LI-000-200	NONE	WB75L	0

Sample Size: ?

Customer ID: 89-072

Remarks, Calculations, Results:
DUPLICATE SAMPLE Bottle # 278
Gross 31.63
Tare 21.05
Sample 10.58 WHC N 3133

Analyst-1 RLW KJP JRS | Analyst-2 [illegible] 61300 [illegible] | Analyst-3 | Analyst-4 | Analyst-5

Hrs 1-27-90 | Hrs | Hrs | Hrs | Hrs

Date | Time Completed | Lab Unit Mgr

54-6600-001 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 465.-5000	SEGMENT-B	11-30-89	8:31	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LI-000-200	NONE	WB75L	0

Sample Size: ?

Customer ID: 89-072

Remarks, Calculations, Results:
WHC N 3133
A. JAR ID# 258 penetrometer 150 psi
B. JAR TARE WT. 220.5
C. JAR TOTAL WT. 400.92
D. C-B= 180.42
E. EST. VOL./LENGTH 10"
F. VISUAL REMARKS Light brown solids. Upper 1.5 inches medium brown. Very smooth appearance

Analyst-1 RLW KJP JRS | Analyst-2 [illegible] 61300 [illegible] 60090 | Analyst-3 | Analyst-4 | Analyst-5

Hrs 1-27-90 | Hrs | Hrs | Hrs | Hrs

Date | Time Completed | Lab Unit Mgr

54-6600-001 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 465.-5003	SEGMENT-B	11-30-89	8:31	16

Determination	Method/Standard	Result Units	Charge Code	Reruns
HOMOGZT	LI-000-200	NONE	WB75L	0

Sample Size: ?

Customer ID: 89-072

Remarks, Calculations, Results:
Homogenization Complete
Jar # 258
WHC N 3134 Pg 26

Analyst-1 [illegible] 61300 [illegible] | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5

Hrs | Hrs | Hrs | Hrs | Hrs

Date 2/14/90 | Time Completed | Lab Unit Mgr

54-6600-001 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 465.-5002	SEGMENT-B	11-30-89	8:31	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
PRT-SIZE	LI-000-200	NONE	WB75L	0

Sample Size: ?

Customer ID: 89-072

Remarks, Calculations, Results:
PARTICLE SIZE DISTRIBUTION Bottle # 279
Gross 22.54
Tare 21.63
0.91
Sample
Results: see attached (6)

Analyst-1 RLW KJP JRS | Analyst-2 [illegible] 2-26-90 | Analyst-3 | Analyst-4 | Analyst-5

Hrs 1-27-90 | Hrs | Hrs | Hrs | Hrs

Date | Time Completed | Lab Unit Mgr [signature] | AMS

54-6600-001 (R-10-83)

9517325.2559

pH Analysis of Solid Sample

Serial No	Sample Point	Date	Time Issued	Priority
F 485.-5315	SEGMENT-V	11-30-89	8:38	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
pH	LA-212-103	NONE	WB75L	0

Sample Size: ? 1 ml

Customer ID: 089072

Remarks, Calculations, Results:
~~LMCS CHECK SAMPLE~~ Reagent Blank
pH FOUND ~~9.92~~
STD ID
SAMPLE TEMP ~~21.9~~

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				R E Barnett
Hrs	Hrs	Hrs	Hrs	Hrs

Date 3-6-90 | Time Completed 3/8 1150 | Lab Unit Mgr | mrd

S4-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 464.-5515	SEGMENT-A	11-30-89	8:31	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
pH	LA-212-103	% RECOVERY	WB75L	0

Sample Size: ? 1 ml

Customer ID: 089072

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
pH FOUND ~~12.08~~
STD ID ~~12CM-13~~
SAMPLE TEMP 22.0

KT

10.08 / 10.00 100.8%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				R E Barnett
Hrs	Hrs	Hrs	Hrs	Hrs

Date 3-6-90 | Time Completed 3/8 1152 | Lab Unit Mgr | mrd

S4-6600-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
F 466.-5115	SEGMENT-C	11-30-89	8:32	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
pH	LA-212-103	NONE	WB75L	0

Sample Size: ? 2.467g / 2.467ml

Customer ID: 89072

Remarks, Calculations, Results:
pH 12.53
SAMPLE TEMP 22.0

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				R E Barnett
Hrs	Hrs	Hrs	Hrs	Hrs

Date 3-6-90 | Time Completed 3/8 1152 | Lab Unit Mgr | mrd

S4-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 465.-5015	SEGMENT-B	11-30-89	8:31	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
pH	LA-212-103	NONE	WB75L	0

Sample Size: ? 2.542g / 2.542 ml

Customer ID: 89072

Remarks, Calculations, Results:
pH 12.53 #364 9.98g
SAMPLE TEMP 21.9

WHC N 313 4

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				R E Barnett
Hrs	Hrs	Hrs	Hrs	Hrs

Date 3-6-90 | Time Completed 3/8 1157 | Lab Unit Mgr | mrd

S4-6600-061 (R-10-83)

pH Analysis of Solid Sample

Serial No.	Sample Point	Date	Time Issued	Priority
F 468.-5515	SEGMENT-E	11-30-89	8:33	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
pH	LA-212-103	% RECOVERY	WB75L	0

Sample Size	Customer ID
? 1 mL	089072

Remarks, Calculations, Results:

LMCS CHECK SAMPLE 9
pH FOUND 10.09
STD ID 7211-B
SAMPLE TEMP 21.9

100.9%

10.09/10.00

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GC269				RE [illegible]
[illegible]	Hrs	Hrs	Hrs	Hrs
Date 3-6-90	Time Completed 3/8 1149	Lab Unit Mgr [illegible]	[illegible]	

84-8600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 437.-5310	SEGMENT-V	11-30-89	8: 9	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	% g	WB75L	0

Sample Size: ?

Customer ID: 689070

Remarks, Calculations, Results:

REAGENT BLANK

0 .0065 0 .0059

21.5642 G 21.6807 .0062 g

21.5642 T. 21.6807

21.5578 W1 21.6748

21.5576 W2 21.6746

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6 BS98/RH				RBennett
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-2-90		

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 416.-5510	SEGMENT-A	11-30-89	8: 5	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	% RECOVERY	WB75L	0

Sample Size: ?

Customer ID: 89-070

Remarks, Calculations, Results:

LMCS CHECK SAMPLE

LMCS ID HCLLAB

0 57.76 0

22.8786 G 22.8859 98.3%

SP.16 21.4798 T. 21.5004 57.96/58.98

22.0651 W1 22.0857

22.0632 W2 22.0811

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6 BS98/RH				RBennett
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-2-90		

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 466.-5110	SEGMENT-C	11-30-89	8:32	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	%	WB75L	0

Sample Size: ?

Customer ID: 89072

Remarks, Calculations, Results:

DUPLICATE SAMPLE

G 21.9696 ~~44.43~~

T. 21.2286

W1 21.6409 44.36%

W2 21.6402

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6 BS98/RH				RBennett
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-2-90		

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 465.-5010	SEGMENT-B	11-30-89	8:31	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	%	WB75L	0

Sample Size: ?

Customer ID: 89072

Remarks, Calculations, Results:

369 3.61g

G. 22.~~10~~85

T. 21.4278 44.10%

W1 21.8083

W2 21.8077 HC N 313 4

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6 BS98/RH				RBennett
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-2-90		

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

Percent Water Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 564.-5510	SEGMENT-E	12- 1-89	11:34	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	% RECOVERY	WB75L	0

Sample Size	Customer ID
?	089076

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 112/4/11

	57.18% / 58.98	
① 57.77	② 56.58	
G, 22.9823	22.9187	96.95%
T, 21.59560	21.5377	
W1 22.1812	22.1374	
W2 22.1780	22.1310	

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GASSE				[illegible]
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr.
3-2-90		[illegible]

84-8800-861 (R-10-83)

Fusion Dissolution

or F465

Serial No.	Sample Point	Date	Time Issued	Priority
F 470.-6000	SEGMENT-G	11-30-89	8:33	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	WB75L	0

Sample Size: ?

Customer ID: 89072

Remarks, Calculations, Results:

GRAMS SAMPLE .5754
VOLUME ON COMPLETION 200ml

2.88 $^{-3}$ g/ml

SEQUENCE # 1.63
WT 1: 43.7549
WT 2: 44.3303
NET WEIGHT:
---> 0.5754 GRAMS
03/09/90 @ 14:35:03

WHC ~ 3/13/4

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6 BS98/AH				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-10-90			

S4-6000-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 471.-6100	SEGMENT-H	11-30-89	8:34	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	WB75L	0

Sample Size: ?

Customer ID:

Remarks, Calculations, Results:

DUPLICATE ANALYSIS
GRAMS SAMPLE .7039
VOLUME ON COMPLETION 200 mL

3.52 $^{-3}$ g/ml

SEQUENCE # 1 64
WT 1: 40.5933
WT 2: 41.2972
NET WEIGHT:
---> 0.7039 GRAMS
03/09/90 @ 14:37:17

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6 BS98/AH				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-10-90			

S4-6000-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 436.-6300	SEGMENT-U	11-30-89	8: 8	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	WB75L	0

Sample Size: ? 200 mL

Customer ID: G89070

Remarks, Calculations, Results:

REAGENT BLANK

complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6 BS98/AH				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-10-90			

S4-6000-061 (R-10-83)

F0470.-6000

F0470.-6000

SEQUENCE # : 63
WT 1: 43.7549
WT 2: 44.3303

NET WEIGHT:
---> 0.5754

03/09/90 @ 14:35:03

*DATA HAS BEEN REPRODUCED TO PROVIDE THE BEST READIBLE COPY.

F0471.-6100

F0471.-6100

SEQUENCE # : 64
WT 1: 40.5933
WT 2: 41.2972

NET WEIGHT:
---> 0.7039

03/09/90 @ 14:37:17

*DATA HAS BEEN REPRODUCED TO PROVIDE THE BEST READIBLE COPY.

* Total Alpha Analysis on the Fusion Dissolution

Serial No.	Sample Point	Date	Time Issued	Priority
F 484.-6320	SEGMENT-U	11-30-89	8:37	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 10ml
Customer ID: 689072

Remarks, Calculations, Results:
REAGENT BLANK
H2O

~~<7.65 neill~~
<7.63^{-5} neil/l (AP)

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Franz	Hrs	Hrs	Hrs	Hrs
Date: 3-29-90	Time Completed	Lab Unit Mgr: AP		

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 469.-6520	SEGMENT-F	11-30-89	8:33	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-548-101	% RECOVERY	WB75L	0

Sample Size: ? 10 ml
Customer ID: 689072

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 132844

9.38^{-3} / 9.6538^{-3} 97.2%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Franz	Hrs	Hrs	Hrs	Hrs
Date: 3-29-90	Time Completed	Lab Unit Mgr: AP		

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 471.-6120	SEGMENT-H	11-30-89	8:34	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 100-10-100
Customer ID: 689072

Remarks, Calculations, Results:
DUPLICATE SAMPLE

<1.76 neill

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Franz	Hrs	Hrs	Hrs	Hrs
Date: 3-29-90	Time Completed	Lab Unit Mgr: AP		

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 470.-6020	SEGMENT-G	11-30-89	8:33	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 100-10-100
Customer ID: 689072

Remarks, Calculations, Results:

1.72 neill

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Franz	Hrs	Hrs	Hrs	Hrs
Date: 3-29-90	Time Completed	Lab Unit Mgr: AP		

54-6600-061 (R-10-83)

* Refer to Batch page for this analysis.

15/2

Alpha Calculation by MAX on 03-29-1990 at 19:17:55
Set #15 2 -inch mount Alpha eff. : .2381
Sample size : 10 mL Dilution : 1

0/10 .3

Mount # 1

1/10 - 0 / 10 - 0.3 (7.4349E-05 uCi/L alpha

Mount # 2

1 / 10 - 0.3 (7.4349E-05 uCi/L alpha

F454

15/2

Alpha Calculation by MAX on 03-29-1990 at 19:18:31
Set #15 2 -inch mount Alpha eff. : .2381
Sample size : 10 mL Dilution : 1

513/10 .3

Mount # 1

485/10 - 513 / 10 - 0.3 = 9.6485E-03 uCi/L alpha

Mount # 2

485 / 10 - 0.3 = 9.1187E-03 uCi/L alpha

F469

15/2

7/10

Alpha Calculation by MAX on 03-29-1990 at 17:21:07
Set #15 2 -inch mount Alpha eff. : .2381
Sample size : .1 mL Dilution : 101

Mount # 1

9/10 - 7 / 10 - 0.3 (1.7613E+00 uCi/L alpha

Mount # 2

9 / 10 - 0.3 = 1.1465E+00 uCi/L alpha

F471

15/2

Alpha Calculation by MAX on 03-29-1990 at 19:19:13
Set #15 2 -inch mount Alpha eff. : .2381
Sample size : .1 mL Dilution : 101

13/10 .3

Mount # 1

11/10 - 13 / 10 - 0.3 = 1.9188E+00 uCi/L alpha

Mount # 2

11 / 10 - 0.3 = 1.5286E+00 uCi/L alpha

F470

Serial No.	Sample Point	Date	Time Issued	Priority
F 473.-6520	SEGMENT-J	11-30-89	8:34	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-548-101	% RECOVERY	WB75L	0

Sample Size: ? 10 mL

Customer ID: C89072

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 732844

9.21 / 9.6538 -3

95.4%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GC269				GW
Mary Franks	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-29-90		

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

Serial No	Sample Point	Date	Time Issued	Priority
F 472.-6220	SEGMENT-I	11-30-89	8:34	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-548-101	% RECOVERY	WB75L	0

Sample Size: ? 100-10-100 (F470)

Customer ID: C89072

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 732844
SPIKE VOLUME 10 mL

~~103.3%~~ ~~98.1%~~ (90)

$\left(\frac{102.2}{1010} - \frac{1.22}{1010}\right)(\cdot 1)(100) = 103.1\%$

9.6538x10-3

~~9.97~~ 9.95x10-3 ~~9.97~~

9.6538 -3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GC269				GW
Mary Franks	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-29-90		

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

* Total Alpha Analysis on the Fusion Dissolution

* Refer to Batch page for this analysis.

15/2

Alpha Calculation by MAX on 03-29-1990 at 17:19:19
Det 815 2 -inch mount Alpha eff. : .2381
Sample size : 10 mL Dilution : 1

483/10

Mount # 1

$$\frac{483}{10} - 0.3 = 9.0809E\text{-}03 \text{ uCi/L alpha}$$

497/10

Mount # 2

$$\frac{497}{10} - 0.3 = 9.3458E\text{-}03 \text{ uCi/L alpha}$$

F473

15/2

Alpha Calculation by MAX on 03-29-1990 at 17:20:27
Det 815 2 -inch mount Alpha eff. : .2381
Sample size : .1 mL Dilution : 101

539/10

Mount # 1

$$\frac{539}{10} - 0.3 = 1.0242E\text{+}02 \text{ uCi/L alpha}$$

537/10

Mount # 2

$$\frac{537}{10} - 0.3 = 1.0204E\text{+}02 \text{ uCi/L alpha}$$

F472

* Total Beta Analysis on the Fusion Dissolution

5&6

Serial No	Sample Point	Date	Time Issued	Priority
F 484.-6325	SEGMENT-U	11-30-89	8:37	18

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 10 ml
Customer ID: 089072

Remarks, Calculations, Results:
REAGENT BLANK H_2O
Count on 13, 14 or 15
4.40^{-4} uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				SC
Mary Franz	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-29-90		QP

54-8600-061 (R-10-83)

1&2

Serial No.	Sample Point	Date	Time Issued	Priority
F 469.-6525	SEGMENT-F	11-30-89	8:33	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-548-101	% RECOVERY	WB75L	0

Sample Size: ? 10 ml
Customer ID: 089072

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 132B44
Count on 13, 14 or 15
100.9%
1.314^{-1} / 1.3022^{-1}

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				SC
Mary Franz	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-29-90		QP

54-8600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 471.-6125	SEGMENT-H	11-30-89	8:34	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 100-10-100
Customer ID: 089072

Remarks, Calculations, Results:
DUPLICATE SAMPLE
Count on 13, 14 or 15
6.96^{3} uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				SC
Mary Franz	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-29-90		QP

54-8600-061 (R-10-83)

3&4

Serial No.	Sample Point	Date	Time Issued	Priority
F 470.-6025	SEGMENT-G	11-30-89	8:33	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 100-10-100
Customer ID: 089072

Remarks, Calculations, Results:
Count on 13, 14 or 15
5.91^{3} uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				SC
Mary Franz	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-29-90		QP

54-8600-061 (R-10-83)

* Refer to Batch page for this analysis.

15/2 3-29-4

91/10 - 62/10

Beta Calculation by MAX on 03-29-1990 at 19:17:53
Det #15 2 -inch mount Beta eff. : .3173
Sample size : 10 mL Dilution : 1

Mount # 1

91 / 16 - 6.0 = 4.4009E-04 uCi/L beta

Mount # 2

62 / 16 - 6.0 = 2.8712E-04 uCi/L beta

F454

15/2 3-29-4

9677/10 - 8960/10

Beta Calculation by MAX on 03-29-1990 at 19:18:29
Det #15 2 -inch mount Beta eff. : .3173
Sample size : 10 mL Dilution : 1

Mount # 1

9677 / 16 - 6.0 = 1.3653E-01 uCi/L beta

Mount # 2

8960 / 10 - 6.0 = 1.2635E-01 uCi/L beta

F469

15/2 3-29-4

48936/10 - 48222/10

Beta Calculation by MAX on 03-29-1990 at 17:21:05
Det #15 2 -inch mount Beta eff. : .3173
Sample size : .1 mL Dilution : 101

Mount # 1

48936 / 10 - 6.0 = 7.0080E+03 uCi/L beta

Mount # 2

48222 / 10 - 6.0 = 6.9056E+03 uCi/L beta

F471

15/2

41896/10 - 40600/10

Beta Calculation by MAX on 03-29-1990 at 19:19:11
Det #15 2 -inch mount Beta eff. : .3173
Sample size : .1 mL Dilution : 101

Mount # 1

41896 / 10 - 6.0 = 5.9986E+03 uCi/L beta

Mount # 2

40600 / 10 - 6.0 = 5.8128E+03 uCi/L beta

F470

* Total Beta Analysis on the Fusion Dissolution

Serial No.	Sample Point	Date	Time Issued	Priority
F 473.-6525	SEGMENT-J	11-30-89	8:34	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
TB	LA-548-101	% RECOVERY	WB75L	0

Sample Size: ? 10 ml

Customer ID: 089072

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 132844

Count on 13, 14 or 15

1.296^{-1} / 1.3022^{-1} 99.5%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
Hrs	Hrs	Hrs	Hrs	Hrs
3-29-90	Time Completed	Lab Unit Mgr		

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 472.-6225	SEGMENT-I	11-30-89	8:34	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
TB	LA-548-101	% RECOVERY	WB75L	0

Sample Size: ? 100-10-100 (E 470)

Customer ID: 089072

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 132844
SPIKE VOLUME 10ml

Count on 13, 14 or 15

~~7.385~~ 3 - 5.91 #1 112.1%

1.46^{-1} / 1.3022^{-1}

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
Hrs	Hrs	Hrs	Hrs	Hrs
3-29-90	Time Completed	Lab Unit Mgr		

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

* Refer to Batch page for this analysis.

15/2

9343/10

Beta Calculation by MAX on 03-29-1990 at 17:19:17
Det #15 2 -inch mount Beta eff. : .3173
Sample size : 10 mL Dilution : 1

Mount # 1

9041/10

$$\frac{9343}{10} \times 6.0 = 1.3178E-01 \text{ uCi/L beta}$$

Mount # 2

$$\frac{9041}{10} \times 6.0 = 1.2750E-01 \text{ uCi/L beta}$$

F473

15/2

51570/10

Beta Calculation by MAX on 03-29-1990 at 17:20:25
Det #15 2 -inch mount Beta eff. : .3173
Sample size : .1 mL Dilution : 101

Mount # 1

51567/10

$$\frac{51570}{10} \times 6.0 = 7.3857E+03 \text{ uCi/L beta}$$

Mount # 2

$$\frac{51567}{10} \times 6.0 = 7.3852E+03 \text{ uCi/L beta}$$

F472

1071

Serial No.	Sample Point	Date	Time Issued	Priority
F 436.-6330	SEGMENT-U	11-30-89	8: 9	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCI/L	WB75L	0

Sample Size: ? 1mL

Customer ID: 689070

Remarks, Calculations, Results:
REAGENT BLANK

Co^{60} < 3.73 $^{-4}$ uci/l

Cs^{137} < 481 $^{-4}$ uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GBS98/RH				gal
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-14-90		AP	BMS

54-6600-061 (R-10-83)

1070

Serial No.	Sample Point	Date	Time Issued	Priority
F 421.-6530	SEGMENT-F	11-30-89	8: 5	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	WB75L	0

Sample Size: ? 500λ Li .001 2

Customer ID: 689070

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 122694

Co^{60} 2.14' / 2.0933' 102.2%

Cs^{137} 2.85' / 2.8979' 98.3%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GBS98/RH				gal
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-14-90		AP	BMS

54-6600-061 (R-10-83)

1079

Serial No.	Sample Point	Date	Time Issued	Priority
F 471.-6130	SEGMENT-H	11-30-89	8:34	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCI/L	WB75L	0

Sample Size: ? 25λ

Customer ID: 689072

Remarks, Calculations, Results:
DUPLICATE SAMPLE

Co^{60} < 1.49 uci/l

Cs^{137} 7.87' uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GBS98/RH				gal
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-14-90		AP	BMS

54-6600-061 (R-10-83)

1077

Serial No	Sample Point	Date	Time Issued	Priority
F 470.-6030	SEGMENT-G	11-30-89	8:34	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCI/L	WB75L	0

Sample Size: ? 25λ

Customer ID: 689072

Remarks, Calculations, Results:

Co^{60} < 1.21 uci/l

Cs^{137} 6.79' uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GBS98/RH				gal
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-14-90		AP	BMS

54-6600-061 (R-10-83)

1087

Serial No.	Sample Point	Date	Time Issued	Priority
F 569.-6530	SEGMENT-J	12- 1-89	11:35	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
GEA	LA-548-121	% RECOVERY	WB75L	0

Sample Size: ? 500 l

Customer ID: 089076

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 122844

KP

Co^{60} 2.07'/2.0932' 98.9%

Cs^{137} 2.82'/2.8979' 97.3%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68598/RI				one
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
2-14-90		AP	RMS

84-5800-081 (R-10-83)

1084

Serial No.	Sample Point	Date	Time Issued	Priority
F 568.-6230	SEGMENT-I	12- 1-89	11:35	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
GEA	LA-548-121	% RECOVERY	WB75L	0

Sample Size: ? 500 l

Customer ID: 089076

Remarks, Calculations, Results:

SPIKE SAMPLE F447
SPIKE ID 122844
SPIKE VOLUME 300

93.5%

2.04' - 6.85 = 13.55 x 2 = 2.71'/2.8979'

~~$4.08^2 - 1.37^2 = 2.71^2$~~

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68598/RI				one
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-14-90		AP	RMS

84-5800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 484.-6340	SEGMENT-U	11-30-89	8:38	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/L	WB75L	0

Sample Size: ? 50 λ

Customer ID: G89072

Remarks, Calculations, Results:
REAGENT BLANK F 748
spike ID/vol = 54838 over
5.62E-4
Spike vol: 100 λ
(.02)(5.62E-4)(1)(20) = 7.49E-5 g/l
.320 - .02

.02
0.000
0.320

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
Sue Lai			L A Heath	
Hrs 6.916	Hrs	Hrs	Hrs	Hrs

Date: 6-22-90 | Time Completed | Lab Unit Mgr

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 469.-6540	SEGMENT-F	11-30-89	8:33	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	WB75L	0

Sample Size: ? 100-10-100

Customer ID: G89072

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID ff838
spike ID/vol: 54838 SEE Reverse Side 0.190 ~~86.0%~~
5.62-4
spike vol: 100 λ (.190)(5.62E-4)(.1)(1010) = 2.57E-2 g/l
.610 - .190

0.610

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
Sue Lai			L A Heath	Lynne Sue Li
Hrs 6.916	Hrs	Hrs	Hrs	Hrs

Date: 6-22-90 | Time Completed | Lab Unit Mgr

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 471.-6140	SEGMENT-H	11-30-89	8:34	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/L	WB75L	0

Sample Size: ? 100-10-100

Customer ID: G89072

Remarks, Calculations, Results:
DUPLICATE SAMPLE
spike: 54838 SEE Reverse Side 0.160
5.62-4
100 λ (.160)(5.62E-4)(.1)(1010) = 2.39E-2 g/l
.540 - .160

0.540

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
Sue Lai			L A Heath	
Hrs 6.916	Hrs	Hrs	Hrs	Hrs

Date: 6-22-90 | Time Completed | Lab Unit Mgr

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 470.-6040	SEGMENT-G	11-30-89	8:34	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/L	WB75L	0

Sample Size: ? 100-10-100

Customer ID: G89072

Remarks, Calculations, Results:
spike: 5.62-4 See Reverse Side 0.145
54838
100 λ
(.145)(5.62E-4)(.1)(1010) = 2.17E-2 g/l
.525 - .145

0.145
0.525

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
Sue Lai			L A Heath	
Hrs 6.916	Hrs	Hrs	Hrs	Hrs

Date: 6-22-90 | Time Completed | Lab Unit Mgr

54-6600-061 (R-10-83)

FO469.-6540

$$\frac{(.190)(5.62E-4)(.1)(1010)}{\left(\left(\frac{5.7}{5.6}\right)(.61) - .195\right)} = 2.50\ g/L$$

85.7 %

2.50 g/L

2.50E-2 g/L

FO470-6040

$$\frac{(.145)(5.62E-4)(.1)(1010)}{\left(\left(\frac{5.7}{5.6}\right)(.525) - .145\right)} = 2.11\times10^{-2}\ g/L$$

FO471.-6140

$$\frac{.16\,(5.62E-4)(.1)(1010)}{\left(\left(\frac{5.7}{5.6}\right)(.54) - .16\right)}$$

~~2.33 g/L~~

2.33×10^{-2} g/L

FO484.-6340

$$\frac{2.02\,(5.62E-4)(.1)(20)}{\left(\frac{5.65}{5.55}\right)(.32) - .02} = 27.4E-05$$

951.3675.2577

Serial No.	Sample Point	Date	Time Issued	Priority
F 472.-6240	SEGMENT-I	11-30-89	8:34	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	WB75L	0

Sample Size: ? 100λ sample > 10 ml water → 100λ 100λ CTD

Customer ID: 689072

Remarks, Calculations, Results:

SPIKE SAMPLE F 470 Sample
SPIKE ID 54838
SPIKE VOLUME 100λ

0.330

$$\frac{.33-(5.62E-4)(.1)(1020)}{((\frac{5.7}{5.6})(.645)-.33)} = 5.796\text{-}2\ g/L$$

0.645

123.2%

5.796-2 g/L - 2.11 g/L = 3.68E-2 / 2.79E-2

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
See Lai				
Hrs 6.0 9 16	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-22-90		

54-9600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 473.-6540	SEGMENT-J	11-30-89	8:34	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	WB75L	0

Sample Size: ? 100-10-100

Customer ID: 689072

Remarks, Calculations, Results:

LMCS CHECK SAMPLE See Reverse Side
LMCS ID 54838

0.195

spike ID/vol: 54838
5.62-4

0.120

spike vol 100λ (.195)(5.62E-4)(.1)(1020) / .1020 = .196

2.12 g/L

2.99E-2

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
See Lai				
Hrs 6.0 9 16	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-22-90		

54-9600-061 (R-10-83)

Uranium Analysis on the Fusion Dissolution

F0473.-6540

$$\frac{\left(\frac{2.5}{.3965}\right)(.1020) - .1965}{(.1965)(.5192)(.1)(.1010)} = 2.5454 \times 2.3161 = 8.5\%$$

Serial No.	Sample Point	Date	Time Issued	Priority
F 476.-7100	SEGMENT-M	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
H2O-DGST	LA-504-101	G/L	WB75L	0

Sample Size: ?

Customer ID:

Remarks, Calculations, Results: F476

DUPLICATE ANALYSIS
GRAMS SAMPLE .5008
VOLUME ON COMPLETION 50ml

1.00^{-2} g/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
80725/A.C.				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-7-90			AMS

S4-6800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 477.-7200	SEGMENT-N	11-30-89	8:36	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
H2O-DGST	LA-504-101	% RECOVERY	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results: F477

SPIKED ANALYSIS
GRAMS SAMPLE .5044
VOLUME ON COMPLETION 50 ml
VOLUME SPIKE
SPIKE ID

1.02^{-2} g/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
80725/A.C.				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-7-90			AMS

S4-6800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 486.-7300	SEGMENT-W	11-30-89	8:38	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
H2O-DGST	LA-504-101	G/L	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results:

REAGENT BLANK

complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
80725/A.C.				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-7-90			AMS

S4-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
F 475.-7000	SEGMENT-L	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
H2O-DGST	LA-504-101	G/L	WB75L	0

Sample Size: ?

Customer ID: 89072

Remarks, Calculations, Results:

GRAMS SAMPLE .4886
VOLUME ON COMPLETION 50 ml

361
475

9.80^{-3} g/ml

WHC

Analyst - 1	Analyst - 2	Analyst - 3		
80725/A.C.				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
3-7-90			AMS

S4-6800-061 (R-10-83)

F0476.-7100

F0476.-7100

SEQUENCE # : 19
WT 1: 119.7290
WT 2: 120.2300

NET WEIGHT:
---> 0.5008

03/06/90 @ 13:39:27

*DATA HAS BEEN REPRODUCED TO PROVIDE THE BEST READIBLE COPY.

F476

F 476.-7100

F0477.-7200

F0477.-7200

SEQUENCE # : 20
WT 1: 119.5580
WT 2: 120.0670

NET WEIGHT:
---> 0.5094

03/06/90 @ 13:42:51

*DATA HAS BEEN REPRODUCED TO PROVIDE THE BEST READIBLE COPY.

F477

F 477.-7200

F0475.-7000

F0475.-7000

WT 1: 119.7460
WT 2: 120.2350

NET WEIGHT:
---> 0.4886

03/06/90 @ 13:34:15

*DATA HAS BEEN REPRODUCED TO PROVIDE THE BEST READIBLE COPY.

F475

F 475.-7000

Ion Chromatograph Analysis on the Water Digestion - Chloride Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 438.-7372	SEGMENT-W	11-30-89	8: 9	18

Determination	Method/Standard	Result Units	Charge Code	Rerun
CL	LA-533-105	PPM	WB75L	0

Sample Size: ? Direct
Customer ID: 089070

Remarks, Calculations, Results:
REAGENT BLANK
.202 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68107/KW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date: 4/5/90 | Time Completed: | Lab Unit Mgr: QP

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 426.-7572	SEGMENT-K	11-30-89	8: 7	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
CL	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10
Customer ID: 089070

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 62110
KT
71.81/72.00
99.7%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68107/KW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date: 4/5/90 | Time Completed: | Lab Unit Mgr: QP

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 476.-7172	SEGMENT-M	11-30-89	8:36	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
CL	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10
Customer ID: 089072

Remarks, Calculations, Results:
DUPLICATE SAMPLE
1.65 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68107/KW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date: 4/5/90 | Time Completed: | Lab Unit Mgr: QP

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 475.-7072	SEGMENT-L	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
CL	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10
Customer ID: 089072

Remarks, Calculations, Results:
<1.01 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68107/KW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date: 4/5/90 | Time Completed: | Lab Unit Mgr: QP

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 574.-7572	SEGMENT-D	12- 1-89	11:36	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
CL	LA-533-105	% RECOVERY	WB75L	0

Sample Size	Customer ID
100-10	089076

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID EC11A0

70.21/72.0 97.5%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GB107/REW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		

54-5600-081 (R-10-89)

Serial No.	Sample Point	Date	Time Issued	Priority
F 429.-7272	SEGMENT-N	11-30-89	8: 8	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
CL	LA-533-105	% RECOVERY	WB75L	0

Sample Size	Customer ID
? 100-10	089[illegible]

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 35C9-77
SPIKE VOLUME 300/5ml

See Reverse Side

$\frac{[(4.348^2 - 17.0)]}{434.5} \times 100 = 103.9\%$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GB107/REW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		

54-5600-081 (R-10-89)

Cl

$$\frac{(1.06)(435) - (17.6)\left(\frac{9.746}{10.39}\right)}{\frac{(.300)(76)}{5.3}\ (101)} \times 100 =$$

$$= 102.4\%$$

8-23-90

F 429.-7272

Ion Chromatograph Analysis on the Water Digestion - Nitrate Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 438.-7373	SEGMENT-W	11-30-89	8: 9	18

Determination	Method/Standard	Result Units	Charge Code	Rerun
NO3	LA-533-105	PPM	WB75L	0

Sample Size: ? Direct
Customer ID: 089070

Remarks, Calculations, Results:
REAGENT BLANK

<1 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/REW				
Hrs: .5	Hrs	Hrs	Hrs	Hrs

Date: 4/5/90 | Time Completed | Lab Unit Mgr

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 426.-7573	SEGMENT-K	11-30-89	8: 7	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
NO3	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10
Customer ID: 089070

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 6C110

101.9%

616.6/599

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/REW				
Hrs: .5	Hrs	Hrs	Hrs	Hrs

Date: 4/5/90 | Time Completed | Lab Unit Mgr: AP

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 476.-7173	SEGMENT-M	11-30-89	8:36	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
NO3	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10
Customer ID: 089072

Remarks, Calculations, Results:
DUPLICATE SAMPLE

4.70[2] ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/REW				
Hrs: .5	Hrs	Hrs	Hrs	Hrs

Date: 4/5/90 | Time Completed | Lab Unit Mgr

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 475.-7073	SEGMENT-L	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
NO3	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10
Customer ID: 089072

Remarks, Calculations, Results:

5.98[2]

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/REW				
Hrs: .5	Hrs	Hrs	Hrs	Hrs

Date: 4/5/90 | Time Completed | Lab Unit Mgr

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 429.-7273	SEGMENT-N	11-30-89	8: 8	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
NO3	LA-533-105	% RECOVERY	WB75L	0

Sample Size: ? 100-10

Customer ID: 089070

Remarks, Calculations, Results:

SPIKE SAMPLE
SPIKE ID 3529-77
SPIKE VOLUME 300/5ml

See Reverse Side →

4P

$1.07 \left[\frac{(3.84^3 - 3.03^2)}{3493.1}\right] 100 = 109.4\%$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68107/1420				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		4P

54-6600-061 (R-10-89)

Serial No.	Sample Point	Date	Time Issued	Priority
F 574.-7573	SEGMENT-O	12- 1-89	11:37	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
NO3	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID: 089076

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 60110

615.4/599 102.7%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68107/1420				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		4P

54-6600-061 (R-10-89)

NO_3

$$\frac{(1.06)(3840) - (303)\left(\frac{9.746}{10.39}\right)}{\frac{.300(611)}{5.3}(101)} \times 100 =$$

$$= 108.4\%$$

Charlene Rich
8-23-90

F 429.-7273

Serial No.	Sample Point	Date	Time Issued	Priority
F 438.-7374	SEGMENT-W	11-30-89	8: 9	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	PPM	WB75L	0

Sample Size: ? Direct
Customer ID: 089070

Remarks, Calculations, Results:
REAGENT BLANK

<1 ppm

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
68107/NEW				34171
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		

54-0800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 426.-7574	SEGMENT-K	11-30-89	8: 7	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10
Customer ID: 089070

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 6C1170

100.8% *

603.8/599

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
68107/NEW				34171
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		

54-0800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 476.-7174	SEGMENT-M	11-30-89	8:36	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10
Customer ID: 089072

Remarks, Calculations, Results:
DUPLICATE SAMPLE

<1.01 ppm

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
68107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		

54-0800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 475.-7074	SEGMENT-L	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10
Customer ID: 089072

Remarks, Calculations, Results:

<1.01 ppm

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
68107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		

54-0800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 574.-7574	SEGMENT-D	12- 1-89	11:37	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID: 089076

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 6C1140

KP

607.9 / 599 101.5%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		QP

54-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 429.-7274	SEGMENT-N	11-30-89	8: 8	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: ? 100-10

Customer ID: 089070

Remarks, Calculations, Results:

SPIKE SAMPLE
SPIKE ID 3569-77
SPIKE VOLUME 300/5 ml

See Reverse Side

QP

$\frac{1.01(3.452^3)}{3464.5} \times 100 = 101.0\%$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		QP

54-8800-081 (R-10-83)

PO_4

$$\frac{(1.06)(3450) - 0}{\frac{.300(606)}{5.3}\cdot(101)} \times 100 = 105.6\%$$

Stephen Reel
8-23-90

F 429.-7274

051326.2590

Ion Chromatograph Analysis on the Water Digestion - Sulphate Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 438.-7375	SEGMENT-W	11-30-89	8: 9	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
SO4	LA-533-105	PPM	WB75L	0

Sample Size: ? Direct

Customer ID: 689070

Remarks, Calculations, Results:
REAGENT BLANK

<1 ppm

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
68107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date 4/5/90 | Time Completed | Lab Unit Mgr

84-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 426.-7575	SEGMENT-K	11-30-89	8: 7	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
SO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID: 689070

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID GC/HO

100.8%

6268/622

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
68107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date 4/5/90 | Time Completed | Lab Unit Mgr

84-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 476.-7175	SEGMENT-M	11-30-89	8:36	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
SO4	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID: 689072

Remarks, Calculations, Results:
DUPLICATE SAMPLE

3.56 ppm

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
68107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date 4/5/90 | Time Completed | Lab Unit Mgr

84-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 475.-7075	SEGMENT-L	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
SO4	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID: 689072

Remarks, Calculations, Results:

4.08 ppm

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
68107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date 4/5/90 | Time Completed | Lab Unit Mgr

84-8800-081 (R-10-83)

Ion Chromatograph Analysis on the Water Digestion - Sulphate Analysis

Serial No	Sample Point	Date	Time Issued	Priority
F 574.-7575	SEGMENT-0	12- 1-89	11:37	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
SO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID: 089076

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 10C1143

625.2/622 100.5%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
WB107/KCW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		AP

S4-8880-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 429.-7275	SEGMENT-N	11-30-89	8: 8	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
SO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: ? 100-10

Customer ID: 089070

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 3509-72
SPIKE VOLUME 300/5ml

See Reverse Side

AP

$\frac{1.07(3.527^3 - 3.01^1)}{3355.9}$ ~~x100 = 111.5%~~

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
WB107/KCW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/5/90		AP

S4-8880-081 (R-10-83)

SO_4

$$\frac{(1.06)(3530) - (30.1)\left(\frac{9.746}{10.39}\right)}{\frac{.300(589)}{5.3}\ (101)} \times 100 =$$

$$= 110.3\%$$

08-23-90

F 429.-7275

95173725.2593

Ion Chromatograph Analysis on the Water Digestion - Fluoride Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 475.-7071	SEGMENT-L	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID:

Remarks, Calculations, Results:

1.87'

~~1.865~~ ppm

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
WB107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/12/90	4/16	9P

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 426.-7371	SEGMENT-K	11-30-89	8: 7	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID:

Remarks, Calculations, Results:

LMCS CHECK SAMPLE

LMCS ID ~~EC11-40~~

54.5/60.0 90.8%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
WB107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/12/90	4/16	9P

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 429.-7271	SEGMENT-N	11-30-89	8: 8	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	% RECOVERY	WB75L	0

Sample Size: ? 100-10

Customer ID:

Remarks, Calculations, Results:

SPIKE SAMPLE

SPIKE ID ~~2509-79~~

SPIKE VOLUME ~~500~~/5ml

See Reverse Side

RERUN

9P

$\frac{1.9(2.921^2 - 1.72')}{286.13} \times 100 = 105.0\%$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
WB107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/12/90	4/16	9P

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 476.-7171	SEGMENT-M	11-30-89	8:36	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID:

Remarks, Calculations, Results:

DUPLICATE SAMPLE

1.42'

~~1.419~~ ppm

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
WB107/NEW				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/12/90	4/16	9P

54-6600-061 (R-10-83)

Ion Chromatograph Analysis on the Water Digestion - Fluoride Analysis

F429.

$$\frac{5.3\,mL}{2.0\,mL}\left(\frac{292}{305}\right) - \frac{(17.2)\left(\frac{9.746\ g/L}{10.39\ g/L}\right)}{\frac{(.300\,mL)(40\,gm)}{5.3\,mL}}(101) \times 100 =$$

$$= 85.6\%$$

8-23-90

Serial No.	Sample Point	Date	Time Issued	Priority
F 438.-7371	SEGMENT-W	11-30-89	8: 9	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	PPM	WB75L	0

Sample Size: ? Direct

Customer ID:

Remarks, Calculations, Results:
REAGENT BLANK

RERUN

<1 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68107/new				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/12/90	4/16	

54-8800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 574.-7571	SEGMENT-O	12- 1-89	11:36	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID:

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 6C11-40

RERUN

55.1/60.0 91.8%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
68107/new				
Hrs .5	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4/12/90	4/16	

54-8800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 476.-7126	SEGMENT-M	11-30-89	8:36	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
TOC	LA-344-105	G/L	WB75L	0

Sample Size: ? 1mL + 100uL, 5mH2SO4 - 200uL
Customer ID: 089072
Remarks, Calculations, Results:
DUPLICATE SAMPLE
7.15-3 g/L C

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				RBrunette
Hrs	Hrs	Hrs	Hrs	Hrs
El Cl				

Date	Time Completed	Lab Unit Mgr
3-15-90		

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 478.-7526	SEGMENT-O	11-30-89	8:36	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
TOC	LA-344-105	% RECOVERY	WB75L	0

Sample Size: ? 200uL-2mL-200uL
Customer ID: 089072
Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 70611C
2.900/3.000
96.7%
BMS

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				RBrunette
Hrs	Hrs	Hrs	Hrs	Hrs
El Cl				

Date	Time Completed	Lab Unit Mgr
3-15-90		

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 486.-7326	SEGMENT-W	11-30-89	8:38	18

Determination	Method/Standard	Result Units	Charge Code	Rerun
TOC	LA-344-105	G/L	WB75L	0

Sample Size: ? 200uL
Customer ID: 089072
Remarks, Calculations, Results:
REAGENT BLANK
2.6 mg

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				RBrunette
Hrs	Hrs	Hrs	Hrs	Hrs
El Cl				

Date	Time Completed	Lab Unit Mgr
3-15-90		

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 475.-7026	SEGMENT-L	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
TOC	LA-344-105	G/L	WB75L	0

Sample Size: ? 1mL + 100uL, 5mH2SO4 - 200uL
Customer ID: 089072
Remarks, Calculations, Results:
8.80-3 g/L

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				RBrunette
Hrs	Hrs	Hrs	Hrs	Hrs
El Cl				

Date	Time Completed	Lab Unit Mgr
3-15-90		

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 477.-7226	SEGMENT-N	11-30-89	8:33	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	WB75L	0

Sample Size: ? 200uL + 100uL .5m H_2SO_4 - 200uL

Customer ID: 689072

Remarks, Calculations, Results:

SPIKE SAMPLE
SPIKE ID 80C11
SPIKE VOLUME 200uL

SEE Reverse Side

* see back of cord

96.28%

~~(119.8-2.6) - (1.2-2.6) ÷ 119.7 = 96.4%~~ 8/29/90

10.13

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80023				
Hrs	Hrs	Hrs	Hrs	Hrs
Ed Cohen				

Date	Time Completed	Lab Unit Mgr
3-15-90		

54-6600-061 (R-10-88)

Serial No.	Sample Point	Date	Time Issued	Priority
F 474.-7526	SEGMENT-K	11-30-89	8:35	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	WB75L	0

Sample Size: ? 200uL - 2.0mL - 200uL

Customer ID: 689072

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 70C11C

2.924/3.000

97.5%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80023				
Hrs	Hrs	Hrs	Hrs	Hrs
Ed Cohen				

Date	Time Completed	Lab Unit Mgr
3-15-90		

54-6600-061 (R-10-88)

F0477.-7226

F477 TOC spike

$$\frac{\left[117.2\ \mu g - (1.6\ \mu g)\left(\frac{10.2\ g/l}{.995\ l}\right)\right] 100}{\left(\frac{300\ \mu g}{.5\ ml}\right)(.2\ ml)} = 96.28\ \%\ rec$$

R E Barnett

dh 8/29/90

TOC II = 1.499 g/l ≈ 1500 µg/ml

(1500 µg/ml)(.2 ml) = 300 µg

Serial No.	Sample Point	Date	Time Issued	Priority
F 480.-8000	SEGMENT-Q	11-30-89	8:37	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD-DGST	LA-505-159	G/L	WB75L	0

Sample Size: ?

Customer ID: 89072

Remarks, Calculations, Results:

GRAMS SAMPLE 0.4820
VOLUME ON COMPLETION 50 ml

#365 3.60g

~~9.6 -3 g/ml~~
9.6 -3 g/L

WAC

SEQUENCE # : 15
WT 1: 82.7495
WT 2: 82.8315

NET WEIGHT:
---> : 0.4820 GRAMS

03/06/90 @ 10:37:53

Analyst-1	Analyst-2	Analyst-3
65283		
J White		
Hrs	Hrs	

Date	Time Completed	Lab Unit Mgr
3-7-90	3/8 1124	

S4-8820-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 482.-8200	SEGMENT-S	11-30-89	8:37	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD-DGST	LA-505-159	% RECOVERY	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results:

SPIKED ANALYSIS
GRAMS SAMPLE 0.3935
VOLUME ON COMPLETION ~~500~~ 50 ml
VOLUME SPIKE 5 ml + 5 ml
SPIKE ID/ 1,4-DICLOB + GARBON

~~7.87 -3 g/ml~~
7.87 g/L

NET WEIGHT:
0.3935 GRAMS

03/06/90 @ 11:06:24

Analyst-1	Analyst-2	Analyst-3		
65283				
J White				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-7-90	3/8 1130	

S4-8820-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 487.-8300	SEGMENT-X	11-30-89	8:38	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD-DGST	LA-505-159	G/L	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results:

REAGENT BLANK
VOLUME ON COMPLETION 50 ml

complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
J White				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-7-90	3/8 1120	

S4-8820-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 481.-8100	SEGMENT-R	11-30-89	8:37	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD-DGST	LA-505-159	G/L	WB75L	0

Sample Size: ?

Customer ID:

Remarks, Calculations, Results:

DUPLICATE ANALYSIS
GRAMS SAMPLE 0.5940
VOLUME ON COMPLETION 50 ml

~~7.88 -3 g/ml~~
7.88 g/L

SEQUENCE # : 16
WT 1: 82.6014
WT 2: 82.9954

NET WEIGHT:
0.3940 GRAMS

03/06/90 @ 11:03:36

Analyst-1	Analyst-2	Analyst-3		
65283				
J White				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
3-7-90	3/8 1120	

S4-8820-081 (R-10-83)

F0480.-8000

F0480.-8000

SEQUENCE # : 15

WT 1: 82.3495
WT 2: 82.8315

NET WEIGHT:
---> 0.4820

03/06/90 @ 10:57:53

*DATA HAS BEEN REPRODUCED TO PROVIDE THE BEST READIBLE COPY.

F0482.-8200

F0482.-8200

SEQUENCE # : 17
WT 1: 82.8984
WT 2: 83.2919

NET WEIGHT:
---> 0.3935

03/06/90 @ 11:06:24

*DATA HAS BEEN REPRODUCED TO PROVIDE THE BEST READIBLE COPY.

F0481.-8100

F0481.-8100

SEQUENCE # : 16
WT 1: 82.6014
WT 2: 82.9954

NET WEIGHT:
---> 0.3940

03/06/90 @ 11:03:36

*DATA HAS BEEN REPRODUCED TO PROVIDE THE BEST READIBLE COPY.

ICP Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 479.-8550	SEGMENT-P	11-30-89	8:37	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	WB75L	0

Sample Size: ? DIRECT

Customer ID: 089072

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID
78C11F
82B38C
77C11F

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
Hrs. J. White	Hrs	Hrs	Hrs	Hrs
Date 3-31-90	Time Completed	Lab Unit Mgr		

84-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 481.-8150	SEGMENT-R	11-30-89	8:37	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	PPM	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results:
DUPLICATE SAMPLE

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
Hrs. J. White	Hrs	Hrs	Hrs	Hrs
Date 3-31-90	Time Completed	Lab Unit Mgr		

84-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 480.-8050	SEGMENT-Q	11-30-89	8:37	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	PPM	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results:

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
Hrs. J. White	Hrs	Hrs	Hrs	Hrs
Date 3-31-90	Time Completed	Lab Unit Mgr		

84-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 487.-8350	SEGMENT-X	11-30-89	8:38	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	PPM	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results:
REAGENT BLANK

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
Hrs. J. White	Hrs	Hrs	Hrs	Hrs
Date 3-31-90	Time Completed	Lab Unit Mgr		

84-8800-081 (R-10-83)

ICP Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 483.-8550	SEGMENT-T	11-30-89	8:37	23

Determination	Method/Standard	Result Units	Charge Code	Rerune
ICP	LA-505-151	% RECOVERY	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID_____

78C11F
82B38C
77C11F

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
J White				
Date	Time Completed	Lab Unit Mgr		
3-31-90				

54-6600-001 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
F 482.-8250	SEGMENT-B	11-30-89	8:37	23

Determination	Method/Standard	Result Units	Charge Code	Rerune
ICP	LA-505-151	PPM	WB75L	0

Sample Size: ?

Customer ID: 089072

Remarks, Calculations, Results:

SPIKE SAMPLE
SPIKE ID_____
SPIKE VOLUME_____

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
J White				
Date	Time Completed	Lab Unit Mgr		
3-31-90				

54-6600-001 (R-10-83)

9513325.2604

APPENDIX B

ANALYTICAL DETECTION LIMITS

9513325.2605

SINGLE SHELL TANK PROJECT
Analytical Detection Limits
October 12, 1990

The following detection limits are derived on ideal matrices. These values were derived by using either calibration standards or pure matrix standards. Detection limits on actual single shell tank samples are likely to be much higher. No information regarding procedure detection limits is available for procedures not listed in this report.

Procedure LA-355-131
Arsenic Analysis by Hydride Generation Atomic Absorption

Detection Limit = 0.005 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.

Procedure LA-325-102
Mercury Analysis by Atomic Absorption Manual Cold Vapor Technique

Detection Limit = 0.002 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.
Solids were analyzed directly.

Procedure LA-362-131
Selenium Analysis by Hydride Generation Atomic Absorption

Detection Limit = 0.005 ppm in solution
Typical sample dilution for the Fusion Dissolution was 0.0025g/mL.
Typical sample dilution for the Water Digestion was 0.010g/mL.
Typical sample dilution for the acid Digestion was 0.010g/mL.

Procedure LA-533-105
Anion Analysis on Dionex Model 4000i

Typical sample dilution was 0.000099g/mL

Fluoride
Detection Limit in solution = 0.09 ppm.

Chloride
Detection Limit in solution = 0.04 ppm.

Nitrate
Detection Limit in solution = 0.24 ppm.

Phosphate
Detection Limit in solution = 0.13 ppm.

Sulfate
Detection Limit in solution = 0.13 ppm.

Procedure LA-622-102
Determination of Carbonate in Solutions by Coulometry

Detection Limit = 5 ppm in solution
Typical sample dilution was 0.01g/mL

Procedure LA-344-105
Total Organic Carbon
Determination of Carbon Insolation by Combustion and Coulometry

Detection Limit = 5.5 ppm in solution
Typical sample dilution was 0.01g/mL

Procedure: LA-505-151 (Nominal Detection Limits)

Inductively Coupled Plasma (ICP) Emission Spectrometer Operations and Analysis.

Typical sample dilution for the Fusion Dissolution was 0.00019 g/mL.

Typical sample dilution for the Water Digestion was 0.000476 g/mL.

Typical sample dilution for the Acid Digestion was 0.000476 g/mL

Instrument Detection Limit ppm.

Aluminum	0.0745	Antimony	0.1424
Arsenic	0.0223	Barium	0.0026
Beryllium	0.0006	Bismuth	0.0839
Boron	0.0083	Cadmium	0.0039
Calcium	0.0002	Cerium	0.1359
Chromium	0.0039	Cobalt	0.0246
Copper	0.0158	Europium	0.0024
Iron	0.0073	Lanthanum	0.0141
Lead	0.0273	Lithium	0.0032
Magnesium	0.0001	Manganese	0.0011
Mercury	0.0036	Molybdenum	0.0049
Neodymium	0.2130	Nickel	0.0147
Phosphorous	0.0308	Potassium	0.2122
Samarium	0.1525	Selenium	0.0631
Silicon	0.0314	Silver	0.0183
Sodium	0.0483	Strontium	0.0010
Sulfur	0.0163	Tantalum	0.0273
Thallium	0.0646	Thorium	0.0122
Tin	0.0144	Titanium	0.0035
Tungsten	0.0273	Uranium	1.1405
Vanadium	0.0186	Zinc	0.0017
Zirconium	0.0141		