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START

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:	7
Segment:	3
Customer Id. Number:	89-048
Report Revision:	2
Date Printed:	August 29, 1991

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APPROVED FOR PUBLIC RELEASE

V. Bullard 4/10/92

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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.

Acid Digestion Test Results.....113

ICP Data Summary.....114
Acid Digestion Analysis.....115
Inductively Coupled Plasma Spectrographic Analysis.....116
ICP Raw Data Summary.....118

Appendix A, Analytical Cards.....165

Physical Properties Test.....A1
Undigested Sample Analysis.....A2-A5
KOH Fusion Analysis.....A6-A19
Water Digestion Analysis.....A20-A32
Acid Digestion Analysis.....A33-A35

Appendix B, Analytical Detection Limits.....166

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

This report consists of pages 1-166, plus pages 16.1, 67.1-67.5, 83.1, 106.1, 122.1, and 122.2.
Appendix A consists of pages A1-A35, with the addition of page A33.1.
Appendix B consists of pages B1-B3.

NOTE:

Due to re-evaluation of ICP data, the following pages have been revised: 12, 114, 116-122, 122.1, and 122.2.

Due to re-evaluation of initial source data, the following pages have been revised: 1-4, 6, 7, 28, 29, 31, 80, 81, 106, 166, with the addition of pages 67.1-67.5 and Appendix A pages A7, A9, A11, A13, A16, A31 and A32, and A33.

The following pages have been recopied to correct poor copy quality: 17-20, and 107-112.

REVISION 2 OF CORE 7 SEGMENT 3

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 A. Pagh Date Sept 11, 1991
for
Data Coordinator

Daniel M. Thornton Date Sept 6, 1991
Daniel M. Thornton
Unit Manager

Larry P. Markel Date Sept 6, 1991
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 3 from core 7 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-025-89 (2) Sample Number 89-048 (3) Supervisor D.C. Hartley

(4) Tank 110U (5) Riser #7 (6) Segment #3 (7) Cask Serial Number 1014C

Radiation Survey Data:	(8) FIELD	(20) LABORATORY
Over Top Dose Rate	.8 mr/hr	.8 mR/hr
Side Dose Rate	.5 mr/hr	2 mR/hr
Bottom Dose Rate	2.0 mr/hr	2 mR/hr
Smearable Contamination	LDET. (alpha)	LDET (alpha)
	LDET. (beta gamma)	LDET (beta-gamma)
	RPT [signature] (Signature)	RPT D. Arnold (Signature)

(9) Shipment Description:	
A. Work Package Number	2W89-00955-W
B. Cask Seal Number	For Future Use
C. Sampler Number Used	52
D. Date and Time Sampler Unseated	11-16-89, 1419
E. Expected Liquid Content	20%
F. Expected Solid Content	80%
G. Dose Rate Through Drill String	110 mr/hr
H. Expected Sample Length	19'

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

Core #007, 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	D.C. Hartley / DC Hartley	11-17-89 0930	2225 LABS. [signature]	Vida Boyle / Vida Boyle	11/17/89 10:00 AM

(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

Single Shell Tank Waste Characterization
Summary of Core Sample

Tank ID:	241-U-110
Riser ID:	7
Core ID:	#7

Date Sampling Initiated:	11-15-89
Date Sampling Completed:	11-16-89

Segment		
1	Lab Serial No.	F0197
	Customer ID No.	89-046
	Last Segment?	NO
2	Lab Serial No.	F0125
	Customer ID No.	89-047
	Last Segment?	NO
3	Lab Serial No.	F0149
	Customer ID No.	89-048
	Last Segment?	NO
4	Lab Serial No.	F-0173
	Customer ID No.	89-049
	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

Tank:	241-U-110
Core:	7
Segment:	3
Customer ID:	89-048

Undigested Sample Results

	Sample	Duplicate
pH	12.54	12.79
%Water	47.20%	47.70%

Fusion Dissolution Results

	Sample		Duplicate	
Fusion Digestion	1.98	g/L	2.22	g/L
Total Alpha	3.18	uci/g	2.50	uci/g
Total Beta	1.56E+03	uci/g	1.59E+03	uci/g
GEA Cs-137	22.42	uci/g	23.29	uci/g
Uranium	<5.25E+03	ug/g	<5.00E+03	ug/g

Water Digestion Results

	Sample		Duplicate	
Water Digestion	9.32	g/L	7.78	g/L
Ion Chromatograph				
Fluoride	3.43E+03	ug/g	2.62E+03	ug/g
Chloride	<1.08E+03	ug/g	<1.30E+03	ug/g
Nitrate	3.95E+04	ug/g	4.01E+04	ug/g
Phosphate	2.25E+04	ug/g	1.44E+04	ug/g
Sulfate	<1.08E+04	ug/g	<1.30E+04	ug/g
Total Carbon	2.09E+03	ug/g	2.44E+03	ug/g

Acid Digestion

ICP Results

	Sample	Duplicate
Aluminum	76209 ug/g	91743 ug/g
Antimony	455 ug/g	321 LT
Barium	45 ug/g	17 ug/g
Beryllium	2 ug/g	1 LT
Bismuth	12709 ug/g	12057 ug/g
Boron	30 LT	28 LT
Cadmium	14 LT	13 LT
Calcium	568 ug/g	761 ug/g
Cerium	484 LT	459 LT
Chromium	450 ug/g	492 ug/g
Copper	1012 ug/g	1357 ug/g
Europium	9 LT	8 LT
Iron	12131 ug/g	13308 ug/g
Lanthanum	50 LT	48 LT
Lead	742 ug/g	352 ug/g
Lithium	11 LT	11 LT
Magnesium	1155 ug/g	13743 ug/g
Manganese	5823 ug/g	5851 ug/g
Mercury	13 LT	12 LT
Molybdenum	25 ug/g	17 LT
Nickel	151 ug/g	105 ug/g
Potassium	756 LT	717 LT
Samarium	543 LT	516 LT
Selenium	517 ug/g	213 LT
Silver	65 LT	62 LT
Sodium	86006 ug/g	85640 ug/g
Strontium	578 ug/g	593 ug/g
Sulfur	321 ug/g	2043 ug/g
Tantalum	97 LT	92 LT
Thallium	783 ug/g	148 LT
Thorium	162 ug/g	41 LT
Tin	73 ug/g	49 LT
Titanium	27 ug/g	12 LT
Uranium	6091 ug/g	3856 LT
Vanadium	47 ug/g	42 LT
Zinc	242 ug/g	627 ug/g
Zirconium	50 LT	48 LT

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

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Single Shell Tank
Extrusion of Segment -- Physical Tests

Lab Segment Serial #: F0149 Customer ID: 89-048

Analyst: Richard L. Weiss Date Extruded: November 21, 1989

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: 8.0 in.	Calculated Volume: 4.7 in^3	
Remarks	None		

Appearance of Solids: Sample dark brown except for bottom chunk (which is medium brown) of about 3/4 inches. Granular texture throughout the sample with some hard "bits". Semi-cohesive consistency with bottom portion much less cohesive than rest of sample, almost runny.

Penetrometer	9.37 lbs/sq in	Remarks: None

Homogenization

Procedure: T038A-00712 Revision: F		Quantity of Material: 118.09	Grams
Date Homogenized: 12-29-89		Time Homogenized: 5.0	Minutes
Operator: John R. Smith			

Laboratory Notebook Reference	WHC-N-313-4	14
	Notebook No.	Page No.

SST-3 Rev. D 9/7/90 Interim

Single Shell Tank
Segment -- Subsamples

Lab Segment Serial #:	F0149	Customer ID:	89-048

Volatile Organic Analysis

VOA Sample	Lab Serial #: 89-048-77	Date Sampled: 11-21-89

Sample shipped to PNL

Particle Size Distribution Analysis

Particle Size Sample	Lab Serial #: F0149	Date Sampled: 11-21-89

Homogenized Solids

Undigested Solids Analysis

Laboratory Serial Number For Sample:	F0149	Date Sampled: 12-29-89
Laboratory Serial Number of Duplicate Sample:	F0150	

Fusion Analysis of Solids

Laboratory Serial Number of Sample:	F0154	Date Sampled: 12-29-89
Laboratory Serial Number of Duplicate Sample:	F0155	
Laboratory Serial Number of Spiked Sample:	F0156	

Acid Digestion Analysis of Solids

Laboratory Serial Number of Sample:	F0164	Date Sampled: 12-29-89
Laboratory Serial Number of Duplicate Sample:	F0165	
Laboratory Serial Number of Spiked Sample:	F0166	

Water Digestion Analysis of Solids

Laboratory Serial Number of Sample:	F0159	Date Sampled: 12-29-89
Laboratory Serial Number of Duplicate Sample:	F0160	
Laboratory Serial Number of Spiked Sample:	F0161	

Laboratory Notebook Reference	WHC-N-313-4	14
	Notebook No.	Page No.

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

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B r i n k m a n n

Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS VIA BRINKMANN 2010

STATISTICS

SAMPLE NAME : SST,B000076,F0149,H2O,SBK
FILE NAME : F0149.002

DATE	: 30/11/1989	ACQ. RANGE	: 0.5-60	COUNTS	: 77089
TIME	: 13:59	ACQ. MODE	: SAMPLE	S.N.F.	: 0.56
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 385 SEC	S.D.U.	: 5199
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.7E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 1.6E-02 %

	MEAN Diameter	S.D.
Number, Length :	1.49 µm	1.64 µm
Number, Area :	2.22 µm	1.79 µm
Number, Volume :	3.59 µm	2.66 µm
Length, Area :	3.29 µm	4.48 µm
Length, Volume :	5.56 µm	5.02 µm
Area, Volume :	9.40 µm	12.09 µm
Volume, Moment :	24.94 µm	18.19 µm

	MEDIAN Diameter	MODE	CONFIDENCE
Number :	0.93 µm	0.55 µm	100.00%
Area :	4.81 µm	4.86 µm	90.77%
Volume :	21.80 µm	41.93 µm	99.70%

Brown suspension – some balled up in cuvette corners.
Particles disperse well in H_2O – nil agglomeration
All particles < 150 µ

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UNDIGESTED SAMPLE ANALYSIS

Single Shell Tank Project

Untreated Sample Results

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID 89-048

	Check Standard	Blank	Sample	Sample Duplicate	Check Standard
Laboratory ID:	F0100	F0121	F0149	F0150	F0292
pH	101.00%	6.83	12.54	12.79	100.90%
Laboratory ID:	F0100	F0309	F0149	F0150	F0292
%Water	96.63%	6.5 mg	47.20%	47.70%	96.80%

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KOH FUSION ANALYSIS

Single Shell Tank Project

Fusion Analysis
Laboratory Results Of Solids
Units Are Sample Wet Weight

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID: 89-048

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample	Check Standard
Laboratory ID:	N/A	F0168		F0154		F0155		N/A	N/A
Fusion Digestion	N/A	Complete		1.98	g/L	2.22	g/L	N/A	N/A
Laboratory ID:	F0105	F0308		F0154		F0155		F0296	F0297
Total Alpha	111.90%	<1.00E-04	uci/L	3.18	uci/g	2.50	uci/g	97.00%	100.30%
Total Beta	98.80%	<2.58E-04	uci/L	1.56E+03	uci/g	1.59E+03	uci/g	*	96.50%
Laboratory ID:	F0129	F0308		F0154		F0155		F0296	F0297
GEA Cs-137	98.10%	2.49E-01	uci/L	22.42	uci/g	23.29	uci/g	99.15%	99.10%
Laboratory ID:	F0105	F0120		F0154		F0155		F0108	F0297
Uranium	98.70%	<1.04E+04	ug	<5.25E+03	ug/g	<5.00E+03	ug/g	1.71%	108.30%

* Spike Too Low To Calculate.

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Single Shell Tank Project

Fusion Analysis
Results of the Laboratory Digestions

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID: 89-048

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample	Check Standard
Laboratory ID:	N/A	F0168		F0154		F0155		N/A	N/A
Fusion Digestion	N/A	Complete		1.98	g/L	2.22	g/L	N/A	N/A
Laboratory ID:	F0105	F0308		F0154		F0155		F0296	F0297
Total Alpha	111.90%	<1.00E-04	uci/L	6.30	uci/L	5.54	uci/L	97.00%	100.30%
Total Beta	98.80%	<2.58E-04	uci/L	3.09E+03	uci/L	3.53E+03	uci/L	*	96.50%
Laboratory ID:	F0129	F0308		F0154		F0155		F0296	F0297
GEA Cs-137	98.10%	2.49E-01	uci/L	44.40	uci/L	51.70	uci/L	99.15%	99.10%
Laboratory ID:	F0105	F0120		F0154		F0155		F0108	F0297
Uranium	98.70%	<1.04E+04	ug	<1.04E-02	g/L	<1.11E-02	g/L	1.71%	108.30%

* Spike Too Low To Calculate.

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WATER DIGESTION TEST ANALYSIS

Single Shell Tank Project

Water Digestion
Laboratory Results of Solids
Units are Sample Wet Weight

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID: 89-048

Laboratory Segment Serial No.: F0149

	Check Standard	Blank	Sample	Sample Duplicate	Spike of Sample	Check Standard
Laboratory ID:	F0158	F0170	F0159	F0160	F0161	F0742
Water Digestion	N/A	N/A	9.32 g/L	7.78 g/L	7.87 g/L	N/A
Laboratory ID:	F0158	F0170	F0159	F0160	F0741	F0742
Ion Chromatograph						
Fluoride	95.50%	<0.1 ppm	3.43E+03 ug/g	2.62E+03 ug/g	108.40%	92.70%
Chloride	107.80%	<0.1 ppm	<1.08E+03 ug/g	<1.30E+03 ug/g	110.90%	101.20%
Nitrate	103.10%	<1.0 ppm	3.95E+04 ug/g	4.01E+04 ug/g	106.70%	98.20%
Phosphate	96.70%	<1.0 ppm	2.25E+04 ug/g	1.44E+04 ug/g	104.80%	94.70%
Sulfate	99.20%	<1.0 ppm	<1.08E+04 ug/g	<1.30E+04 ug/g	107.70%	94.10%
Laboratory ID:	F0158	F0170	F0159	F0160	F0161	F0162
Total Carbon	98.10%	3.70 ug	2.09E+03 ug/g	2.44E+03 ug/g	90.70%	100.50%

Single Shell Tank Project

Water Digestion
Sample Results on Laboratory Digestion

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID: 89-048

Laboratory Segment Serial No.: F0149

	Check Standard	Blank	Sample	Sample Duplicate	Spike of Sample	Check Standard
Laboratory ID:	**N/A**	**F0170**	**F0159**	**F0160**	**F0161**	**F0742**
Water Digestion	N/A	Completed	9.32 g/L	7.78 g/L	7.87 g/L	N/A
Laboratory ID:	**F0158**	**F0170**	**F0159**	**F0160**	**F0741**	**F0742**
Ion Chromatograph						
Fluoride	95.50%	<0.1 ppm	3.20E+01 ppm	2.04E+01 ppm	108.40%	92.70%
Chloride	107.80%	<0.1 ppm	<1.01E+01 ppm	<1.01E+01 ppm	110.90%	101.20%
Nitrate	103.10%	<1.0 ppm	3.68E+02 ppm	3.12E+02 ppm	106.70%	98.20%
Phosphate	96.70%	<1.0 ppm	2.10E+02 ppm	1.12E+02 ppm	104.80%	94.70%
Sulfate	99.20%	<1.0 ppm	<1.01E+02 ppm	<1.01E+02 ppm	107.70%	94.10%
Laboratory ID:	**F0158**	**F0170**	**F0159**	**F0160**	**F0161**	**F0162**
Total Carbon	98.10%	3.70 ug	1.95E-02 g/L	1.90E-02 g/L	90.70%	100.50%

ACID DIGESTION TEST ANALYSIS

ICP DATA SUMMARY

Acid Digestion

Date Analyzed: April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	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	99.98%		0.11 LT	76209	91743	NOT CALC.	100.63%	100.78%
Antimony	103.50%		0.14 LT	455	321 LT			105.02%
Barium	102.40%		0.00 LT	45	17	103.28%	92.28%	99.56%
Beryllium	96.97%		0.00 LT	2	1 LT			98.05%
Bismuth	106.71%	102.12%	0.13 LT	12709	12057	NOT CALC.		109.03%
Boron	99.14%	94.43%	0.03	30 LT	28 LT	134.81%		96.83%
Cadmium	98.49%	93.46%	0.01 LT	14 LT	13 LT	89.97%		97.75%
Calcium	104.77%	102.58%	0.09	568	761	146.72%		101.53%
Cerium	90.42%		0.20 LT	484 LT	459 LT	15.40%	88.66%	92.18%
Chromium	93.24%		0.01 LT	450	492	235.92%	84.79%	91.92%
Copper	103.21%	99.09%	0.02 LT	1012	1357	100.71%		101.11%
Europium	97.97%		0.00 LT	9 LT	8 LT			97.72%
Iron	101.68%		0.03	12131	13308	NOT CALC.	94.41%	99.61%
Lanthanum	93.47%	91.05%	0.02 LT	50 LT	48 LT	89.51%		93.84%
Lead	105.24%	99.04%	0.04 LT	742	352	93.18%		107.33%
Lithium	103.05%		0.00 LT	11 LT	11 LT	91.11%	93.39%	99.74%
Magnesium	102.66%	97.56%	0.02	1155	13743	4138.61%		100.47%
Manganese	100.82%		0.01	5823	5851	NOT CALC.	92.70%	98.92%
Mercury	100.82%		0.01 LT	13 LT	12 LT			100.39%
Molybdenum	96.06%	93.73%	0.01 LT	25	17 LT	85.72%		96.93%
Nickel	99.55%		0.02 LT	151	105	98.98%	92.68%	98.62%
Potassium	97.56%	82.65%	0.32 LT	756 LT	717 LT	94.06%		98.69%
Samarium	96.12%		0.23 LT	543 LT	516 LT			100.19%
Selenium	103.71%		0.09 LT	517	213 LT			104.80%
Silver	106.46%		0.03 LT	65 LT	62 LT	57.08%		107.84%
Sodium	100.29%	94.66%	0.07 LT	86006	85640	NOT CALC.		99.08%
Strontium	104.00%	100.02%	0.00 LT	578	593	86.77%		101.11%
Sulfur	106.83%		0.03	321	2043			101.62%
Tantalum	94.99%		0.04 LT	97 LT	92 LT	35.47%	73.62%	96.37%
Thallium	104.72%		0.07 LT	783	148 LT			106.69%
Thorium	105.11%		0.02 LT	162	41 LT			106.32%
Tin	99.38%		0.02 LT	73	49 LT	102.74%	93.54%	99.14%
Titanium	100.59%		0.13	27	12 LT	90.61%	92.17%	100.87%
Uranium	102.73%		1.71 LT	6091	3856 LT			107.92%
Vanadium	99.30%		0.02 LT	47	42 LT			101.25%
Zinc	99.24%	93.05%	0.23	242	627	66.80%		98.76%
Zirconium	99.66%		0.02 LT	50 LT	48 LT	46.04%	93.47%	99.94%

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

ICP RAW DATA SUMMARY

Acid Digestion

Date Analyzed: April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	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	99.98%		0.11 LT	76209	91743	NOT CALC.	100.63%	100.78%
Antimony	103.50%		0.14 LT	455	321 LT			105.02%
Arsenic	114.41% #		0.03 LT	82	75 LT			114.33% #
Barium	102.40%		0.00 LT	45	17	103.28%	92.28%	99.56%
Beryllium	96.97%		0.00 LT	2	1 LT			98.05%
Bismuth	106.71%	102.12%	0.13 LT	12709	12057	NOT CALC.		109.03%
Boron	99.14%	94.43%	0.03	30 LT	28 LT	134.81%		96.83%
Cadmium	98.49%	93.46%	0.01 LT	14 LT	13 LT	89.97%		97.75%
Calcium	104.77%	102.58%	0.09	568	761	146.72%		101.53%
Cerium	90.42%		0.20 LT	484 LT	459 LT	15.40%	88.66%	92.18%
Chromium	93.24%		0.01 LT	450	492	235.92%	84.79%	91.92%
Cobalt	91.88%		0.04 LT	88 LT	83 LT	85.08%	86.00%	81.23% #
Copper	103.21%	99.09%	0.02 LT	1012	1357	100.71%		101.11%
Europium	97.97%		0.00 LT	9 LT	8 LT			97.72%
Iron	101.68%		0.03	12131	13308	NOT CALC.	94.41%	99.61%
Lanthanum	93.47%	91.05%	0.02 LT	50 LT	48 LT	89.51%		93.84%
Lead	105.24%	99.04%	0.04 LT	742	352	93.18%		107.33%
Lithium	103.05%		0.00 LT	11 LT	11 LT	91.11%	93.39%	99.74%
Magnesium	102.66%	97.56%	0.02	1155	13743	4138.61%		100.47%
Manganese	100.82%		0.01	5823	5851	NOT CALC.	92.70%	98.92%
Mercury	100.82%		0.01 LT	13 LT	12 LT			100.39%
Molybdenum	96.06%	93.73%	0.01 LT	25	17 LT	85.72%		96.93%
Neodymium	85.58% #		0.32 LT	759 LT	720 LT	4.68%	77.36%	80.11% #
Nickel	99.55%		0.02 LT	151	105	98.98%	92.68%	98.62%
Phosphorou	114.91% #	93.37%	0.11	14347	12990	NOT CALC.		99.24%
Potassium	97.56%	82.65%	0.32 LT	756 LT	717 LT	94.06%		98.69%
Samarium	96.12%		0.23 LT	543 LT	516 LT			100.19%
Selenium	103.71%		0.09 LT	517	213 LT			104.80%
Silicon	89.48% #	75.18%	0.63	3780	4807	0.00%		90.19%
Silver	106.46%		0.03 LT	65 LT	62 LT	57.08%		107.84%
Sodium	100.29%	94.66%	0.07 LT	86006	85640	NOT CALC.		99.08%
Strontium	104.00%	100.02%	0.00 LT	578	593	86.77%		101.11%
Sulfur	106.83%		0.03	321	2043			101.62%
Tantalum	94.99%		0.04 LT	97 LT	92 LT	35.47%	73.62%	96.37%
Thallium	104.72%		0.07 LT	783	148 LT			106.69%
Thorium	105.11%		0.02 LT	162	41 LT			106.32%
Tin	99.38%		0.02 LT	73	49 LT	102.74%	93.54%	99.14%
Titanium	100.59%		0.13	27	12 LT	90.61%	92.17%	100.87%
Tungsten	82.47% #		0.04 LT	208	92 LT			82.74% #
Uranium	102.73%		1.71 LT	6091	3856 LT			107.92%
Vanadium	99.30%		0.02 LT	47	42 LT			101.25%
Zinc	99.24%	93.05%	0.23	242	627	66.80%		98.76%
Zirconium	99.66%		0.02 LT	50 LT	48 LT	46.04%	93.47%	99.94%

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

ICP Raw Data

Date Analyzed: April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	F1083	F1084

	SST-1	SST-2	Starting LMCS Instrument Standard ppm SST-3	Standard Recovery %	LMCS Acid Digestion Standard ppm	Acid Digestion Standard Recovery %	Reagent Blank ppm
Aluminum			49.99	99.98%			0.07 LT
Antimony	10.35			103.50%			-0.01 LT
Arsenic			57.21	114.41% #			-0.02 LT
Barium	10.24			102.40%			-0.01 LT
Beryllium			9.70	96.97%			0.00 LT
Bismuth		53.46		106.71%	10.21	102.12%	-0.01 LT
Boron	9.91			99.14%	9.44	94.43%	0.03
Cadmium	9.85			98.49%	9.35	93.46%	0.00 LT
Calcium	10.48			104.77%	10.26	102.58%	0.09
Cerium	9.04			90.42%			-0.31 LT
Chromium	9.32			93.24%			-0.03 LT
Cobalt	9.19			91.88%			0.02 LT
Copper	10.32			103.21%	9.91	99.09%	-0.01 LT
Europium		9.80		97.97%			-0.01 LT
Iron	10.17			101.68%			0.03
Lanthanum		46.83		93.47%	9.11	91.05%	-0.02 LT
Lead		52.72		105.24%	9.90	99.04%	0.01 LT
Lithium	10.31			103.05%			-0.01 LT
Magnesium	10.27			102.66%	9.76	97.56%	0.02
Manganese	10.08			100.82%			0.01
Mercury			25.21	100.82%			-0.05 LT
Molybdenum			48.03	96.06%	9.35	93.73%	-0.00 LT
Neodymium	8.56			85.58% #			-0.64 LT
Nickel	9.96			99.55%			-0.01 LT
Phosphorou			57.45	114.91% #	9.34	93.37%	0.11
Potassium	24.39			97.56%	8.27	82.65%	-0.53 LT
Samarium		9.61		96.12%			-0.35 LT
Selenium			51.86	103.71%			-0.06 LT
Silicon			44.74	89.48% #	7.52	75.18%	0.63
Silver		10.65		106.46%	7.42		-0.02 LT
Sodium	25.07			100.29%	9.47	94.66%	0.06 LT
Strontium	10.40			104.00%	10.00	100.02%	-0.00 LT
Sulfur			53.41	106.83%			0.03
Tantalum			47.50	94.99%			-0.04 LT
Thallium			52.36	104.72%			-0.33 LT
Thorium		52.66		105.11%			-0.18 LT
Tin	49.69			99.38%			0.02 LT
Titanium			50.30	100.59%			0.13
Tungsten			20.62	82.47% #			-0.02 LT
Uranium		51.47		102.73%			-2.40 LT
Vanadium			9.93	99.30%			-0.02 LT
Zinc	9.92			99.24%	9.31	93.05%	0.23
Zirconium			49.83	99.66%			-0.04 LT
	1.00	1.00	1.00	Dilution Factor	10.00		1.00

ICP Raw Data

Date Analyzed: April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	F0164			F0165		
Digestion Weight	0.4420 g			0.4659 g		
Volume	50.00 mL			50.00 mL		
	Sample	Sample		Sample Duplicate	Sample Duplicate	Sample Duplicate
	Dilution Three ppm	Dilution Two ppm	Dilution One ppm	Dilution Three ppm	Dilution Two ppm	Dilution One ppm
Aluminum		673.69	694.48		854.86	804.13
Antimony		2.98	4.03		2.98	1.14 LT
Arsenic		-0.80	0.73		-1.61	-0.02 LT
Barium		-0.38	0.40		0.15	0.16
Beryllium		-0.01	0.02		-0.04	-0.01 LT
Bismuth		112.35	123.11		112.35	116.60
Boron		-0.36	0.20 LT		0.43	-0.01 LT
Cadmium		-0.54	-0.00 LT		-0.67	-0.13 LT
Calcium		5.02	4.65		7.09	5.31
Cerium		-24.26	0.58 LT		-32.46	-10.02 LT
Chromium		-0.39	3.98		4.59	4.15
Cobalt		1.13	0.58 LT		-0.25	-0.63 LT
Copper		7.42	8.95		11.59	12.64
Europium		-0.50	0.01 LT		-0.62	-0.19 LT
Iron		107.24	108.35		124.00	117.39
Lanthanum		-0.78	0.38 LT		-0.65	-0.43 LT
Lead		8.61	6.56		10.76	3.28
Lithium		-1.12	-0.03 LT		-1.56	-0.51 LT
Magnesium		10.21	2.78		128.06	8.24
Manganese		51.47	51.69		54.52	53.14
Mercury		-4.13	-0.55 LT		-3.95	-0.58 LT
Molybdenum		-0.47	0.22		-0.47	-0.05 LT
Neodymium		-80.50	-8.41 LT		-70.44	-19.45 LT
Nickel		0.10	1.34		-0.02	0.97
Phosphorou		126.83	128.58		121.04	106.57
Potassium		-50.85	-3.19 LT		-56.80	-17.64 LT
Samarium		-28.29	0.20 LT		-38.55	-12.05 LT
Selenium		-1.29	4.57		-2.57	1.87 LT
Silicon		30.11	33.41		44.80	33.17
Silver		-1.68	0.10 LT		-2.07	-0.62 LT
Sodium		760.29	777.17		797.99	779.70
Strontium		5.11	5.41		5.53	5.61
Sulfur		2.04	2.84		19.04	2.65
Tantalum		-3.95	0.25 LT		-3.92	-1.36 LT
Thallium		-11.99	6.93		-40.33	-4.43 LT
Thorium		-14.87	1.44		-21.24	-6.79 LT
Tin		-1.04	0.64		0.03	0.25 LT
Titanium		-0.86	0.24		-0.77	-0.12 LT
Tungsten		-1.71	1.84		-1.23	0.72 LT
Uranium		-140.20	53.84		-192.90	-10.27 LT
Vanadium		-0.76	0.42		-1.68	-0.06 LT
Zinc		2.14	1.35		5.84	1.53
Zirconium		-2.20	0.34 LT		-2.95	-0.73 LT
		101.00	21.00 Dilution Factor		101.00	21.00

ICP Raw Data

Date Analyzed:	April 19, 1990	Acid Digested Standard	F1083
Procedure:	LA-505-151/A-0	Reagent Blank	F1084
Analyst:	J. A. White	Sample	F0164
		Duplicate	F0165
		Spike	F1087
		Digested Acid Standard	F1088

		F1087			F1088	
Digestion Weight	0.5143 g					
Volume	50.00 mL					
	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		507.09	473.99	NOT CALC.	10.06	100.63%
Antimony		13.40	14.24			
Arsenic		-0.58	1.02			
Barium		10.83	10.57	103.28%	9.23	92.28%
Beryllium		0.02	0.03			
Bismuth		160.79	176.36	NOT CALC.		
Boron		14.10	10.25	134.81%		
Cadmium		9.00	10.03	89.97%		
Calcium		20.40	14.91	146.72%		
Cerium		-30.01	1.54 LT	15.40%	8.87	88.66%
Chromium		30.54	19.37	235.92%	8.56	84.79%
Cobalt		8.30	9.83	85.08%	8.60	86.00%
Copper		9.26	10.82	100.71%		
Europium		-0.57	0.04 LT			
Iron		218.35	212.56	NOT CALC.	9.44	94.41%
Lanthanum		7.16	9.85	89.51%		
Lead		17.21	20.87	93.18%		
Lithium		9.24	10.65	91.11%	9.34	93.39%
Magnesium		416.09	37.95	4138.61%		
Manganese		56.88	57.54	NOT CALC.	9.27	92.70%
Mercury		-2.46	-0.27 LT			
Molybdenum		8.93	9.87	85.72%		
Neodymium		-66.75	0.47 LT	4.68%	7.74	77.36%
Nickel		9.91	11.36	98.98%	9.27	92.68%
Phosphorou		116.71	118.22	NOT CALC.		
Potassium		-34.01	9.41	94.06%		
Samarium		-36.47	0.62 LT			
Selenium		7.17	9.37			
Silicon		42.19	25.60	0.00%		
Silver		4.89	5.71	57.08%		
Sodium		838.67	827.74	NOT CALC.		
Strontium		14.46	14.97	86.77%		
Sulfur		67.98	12.69			
Tantalum		-0.70	3.53	35.47%	7.33	73.62%
Thallium		-18.49	7.30			
Thorium		-19.12	2.21			
Tin		14.05	10.97	102.74%	9.35	93.54%
Titanium		9.35	9.90	90.61%	9.23	92.17%
Tungsten		-2.06	1.00			
Uranium		-175.80	60.96		5.01	
Vanadium		-0.93	0.32 LT			
Zinc		25.48	13.50	66.80%		
Zirconium		1.83	5.97	46.04%	9.33	93.47%
		101.00	21.00	Dilution Factor	10.00	

ICP Raw Data

		Acid Digested Standard	F1083
Date Analyz	April 19, 1990	Reagent Blank	F1084
Procedure:	LA-505-151/A-0	Sample	F0164
Analyst:	J. A. White	Duplicate	F0165
		Spike	F1087
		Digested Acid Standard	F1088

	SST-1	SST-2	SST-3	Ending LMCS Standard	Standard Recovery %	
Aluminum				50.39	100.78%	
Antimony	10.50				105.02%	
Arsenic				57.16	114.33%	#
Barium	9.96				99.56%	
Beryllium				9.81	98.05%	
Bismuth		54.63			109.03%	
Boron	9.68				96.83%	
Cadmium	9.78				97.75%	
Calcium	10.15				101.53%	
Cerium	9.22				92.18%	
Chromium	9.19				91.92%	
Cobalt	8.12				81.23%	#
Copper	10.11				101.11%	
Europium		9.77			97.72%	
Iron	9.96				99.61%	
Lanthanum		47.01			93.84%	
Lead		53.77			107.33%	
Lithium	9.97				99.74%	
Magnesium	10.05				100.47%	
Manganese	9.89				98.92%	
Mercury				25.10	100.39%	
Molybdenum				48.47	96.93%	
Neodymium	8.81				88.11%	#
Nickel	9.86				98.62%	
Phosphorou				49.62	99.24%	
Potassium	24.67				98.69%	
Samarium		10.02			100.19%	
Selenium				52.40	104.80%	
Silicon				45.09	90.19%	
Silver		10.78			107.84%	
Sodium	24.77				99.08%	
Strontium	10.11				101.11%	
Sulfur				50.81	101.62%	
Tantalum				48.18	96.37%	
Thallium				53.35	106.69%	
Thorium		53.27			106.32%	
Tin	49.57				99.14%	
Titanium				50.44	100.87%	
Tungsten				20.68	82.74%	#
Uranium		54.07			107.92%	
Vanadium				10.13	101.25%	
Zinc	9.88				98.76%	
Zirconium				49.97	99.94%	
	1.00	1.00	1.00			

ICP Raw Data

Date Analyz April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	Spike Standard LMCS ppm added	Spike Standard ID Book # 34C11CO 34C11CK	SST-1	SST-2	LMCS Standards Values ppm SST-3	LMCS Standard IDs Book # 78C11J 82B38F 77C11I	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	10.00		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	10.00				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			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	10.00				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	

ICP Raw Data

		Acid Digested Standard	F1083
Date Analyzed:	April 19, 1990	Reagent Blank	F1084
Procedure:	LA-505-151/A-0	Sample	F0164
Analyst:	J. A. White	Duplicate	F0165
		Spike	F1087
		Digested Acid Standard	F1088

	Calc. Sample F0164 ug/mL	Calc. Duplicate F0165 ug/mL	Calc. Spike F1087 ug/mL	RPD from Summary	IDL (2 sigma)
Aluminum	674	855	507	18.5%	0.0745
Antimony	4	1	14		0.0949
Arsenic	1	-0	1		0.0223
Barium	0	0	11	92.0%	0.0026
Beryllium	0	-0	0		0.0004
Bismuth	112	112	161	5.3%	0.0839
Boron	0	-0	14		0.0083
Cadmium	-0	-0	9		0.0039
Calcium	5	7	20	29.2%	0.0002
Cerium	1	-10	2		0.1359
Chromium	4	5	31	9.0%	0.0039
Cobalt	1	-1	10		0.0246
Copper	9	13	11	29.1%	0.0158
Europium	0	-0	0		0.0024
Iron	107	124	218	9.2%	0.0073
Lanthanum	0	-0	10		0.0141
Lead	7	3	21	71.3%	0.0273
Lithium	-0	-1	9		0.0032
Magnesium	10	128	416	169.0%	0.0001
Manganese	51	55	57	0.5%	0.0011
Mercury	-1	-1	-0		0.0036
Molybdenum	0	-0	9		0.0049
Neodymium	-8	-19	0		0.2130
Nickel	1	1	11	36.6%	0.0147
Phosphorou	127	121	117	9.9%	0.0308
Potassium	-3	-18	9		0.2122
Samarium	0	-12	1		0.1525
Selenium	5	2	9		0.0631
Silicon	33	45	42	23.9%	0.0314
Silver	0	-1	6		0.0183
Sodium	760	798	839	0.4%	0.0483
Strontium	5	6	14	2.5%	0.0010
Sulfur	3	19	68	145.7%	0.0163
Tantalum	0	-1	4		0.0273
Thallium	7	-4	7		0.0437
Thorium	1	-7	2		0.0122
Tin	1	0	11		0.0144
Titanium	0	-0	9		0.0035
Tungsten	2	1	1		0.0273
Uranium	54	-10	61		1.1405
Vanadium	0	-0	0		0.0124
Zinc	2	6	25	88.6%	0.0017
Zirconium	0	-1	6		0.0141

9413324.2609

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		

9213324.2612

OSM RCRA DATA ASSESSMENT

DATE 3-30-92

REVIEWED BY RL Shaver

LABORATORY 222-S

CASE # SST-241-U-110

SDG # Core 7, Seq 3, 89-048

SAMPLES/MATRIX

Raw Sample	F0149
KOH Fusion	F0154
Water Digestion	F0159
Acid Digestion	F0164

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	X	O	O
7. Duplicate Analysis	X	X	O
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:

NOTES:

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

9319924.2613

OSM RCRA DATA ASSESSMENT

DATE 3-30-92

REVIEWED BY RLShaver

LABORATORY 222-S

CASE # SST-241-U-110

SDG # Core 7, Seg 3, 89-048

SAMPLES/MATRIX	
Raw Sample	F0149
KOH Fusion	F0154
Water Digestion	F0159
Acid Digestion	F0164

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.

9413324.2614

Summary Data Report

Reported results are wet sample weight.

Single Shell Tank Project

Tank:	241-U-110
Core:	7
Segment:	3
Customer ID:	89-048

Undigested Sample Results

	Sample	Duplicate
pH	12.54 J	12.79
%Water	47.20%	47.70%

Fusion Dissolution Results

	Sample		Duplicate	
Fusion Digestion	1.98	g/L	2.22	g/L
Total Alpha	3.18	uci/g	2.50	uci/g
Total Beta	1.56E+03	uci/g	1.59E+03	uci/g
GEA Cs-137	22.42	uci/g	23.29	uci/g
Uranium	<5.25E+03	ug/g	<5.00E+03	ug/g

Water Digestion Results

	Sample		Duplicate	
Water Digestion	9.32	g/L	7.78	g/L
Ion Chromatograph				
Fluoride	3.43E+03	ug/g J	2.62E+03	ug/g
Chloride	<1.08E+03	ug/g UJ	<1.30E+03	ug/g
Nitrate	3.95E+04	ug/g J	4.01E+04	ug/g
Phosphate	2.25E+04	ug/g J	1.44E+04	ug/g
Sulfate	<1.08E+04	ug/g UJ	<1.30E+04	ug/g
Total Carbon	2.09E+03	ug/g J	2.44E+03	ug/g

Acid Digestion

ICP Results

	Sample		Duplicate	
Aluminum	76209	ug/g J	91743	ug/g
Antimony	455	ug/g J	321	LT
Barium	45	ug/g J	17	ug/g
Beryllium	2	ug/g J	1	LT
Bismuth	12709	ug/g J	12057	ug/g
Boron	30	LT UJ	28	LT
Cadmium	14	LT	13	LT
Calcium	568	ug/g J	761	ug/g
Cerium	484	LT UJ	459	LT
Chromium	450	ug/g J	492	ug/g
Copper	1012	ug/g J	1357	ug/g
Europium	9	LT UJ	8	LT
Iron	12131	ug/g J	13308	ug/g
Lanthanum	50	LT	48	LT
Lead	742	ug/g J	352	ug/g
Lithium	11	LT	11	LT
Magnesium	1155	ug/g J	13743	ug/g
Manganese	5823	ug/g J	5851	ug/g
Mercury	13	LT UJ	12	LT
Molybdenum	25	ug/g J	17	LT
Nickel	151	ug/g J	105	ug/g
Potassium	756	LT	717	LT
Samarium	543	LT UJ	516	LT
Selenium	517	ug/g J	213	LT
Silver	65	LT UJ	62	LT
Sodium	86006	ug/g J	85640	ug/g
Strontium	578	ug/g	593	ug/g
Sulfur	321	ug/g J	2043	ug/g
Tantalum	97	LT UJ	92	LT
Thallium	783	ug/g J	148	LT
Thorium	162	ug/g J	41	LT
Tin	73	ug/g J	49	LT
Titanium	27	ug/g J	12	LT
Uranium	6091	ug/g J	3856	LT
Vanadium	47	ug/g J	42	LT
Zinc	242	ug/g J	627	ug/g
Zirconium	50	LT UJ	48	LT

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.

RL Shaver
3-16-92

RCRA QC

Name RLShaver Date 3-16-92

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: estimated (J for positive, UJ for non-detects), or unusable (R).

sample #	constituent	value/qual
F0149	pH	J
F0159	TOC	J
	F	J
	Cl	J
	NO3	J
	SO3	J
	PO4	J

sample #	constituent	value/qual

9513324.2616

RCRA QC

Name R L Shaver Date 3-16-92

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 3-16-92

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 3-16-92

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: estimated (J for positive, UJ for non-detects), or unusable (R).

sample #	constituent	value/qual
F0164		
	Antimony	J
	Beryllium	J
	Europium	UJ
	Mercury	UJ

sample #	constituent	value/qual
F0164		
	Samarium	UJ
	Selenium	J
	Silver	UJ
	Sulfur	J
	Tantalum	UJ
	Thallium	J
	Thorium	J
	Uranium	J
	Vanadium	J

RCRA QC

Name RL Shaver Date 3-16-92

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 3-16-92

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: estimated (J for positive, UJ for non-detects), or unusable (R).

sample #	constituent	value/qual	sample #	constituent	value/qual
F0164			F0164		
	Aluminum	J		Samarium	UJ
	Antimony	J		Selenium	J
	Bismuth	J		Silver	UJ
	Boron	UJ		Sodium	J
	Calcium	J		Sulfur	J
	Cerium	UJ		Tantalum	UJ
	Chromium	J		Thallium	J
	Europium	UJ		Thorium	J
	Iron	J		Uranium	J
	Magnesium	J		Vanadium	J
	Manganese	J		Zinc	J
	Mercury	UJ		Zirconium	UJ

RCRA QC

Name R L Shaver Date 3-16-92

QC Check: Duplicate Analysis

COMMENTS: Duplicate Analyses were within control limits for pH, TOC and % water. The ICP, and IC analytes which were out of control limits are listed below. The relative percent difference is in parenthesis, with a RPD < 20 being out of control limits.

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

sample #	constituent	value/qual
F0159		
	F	J (44)
	PO4	J (61)
F0164		
	Antimony	J (35)
	Barium	J (90)
	Beryllium	J (67)
	Calcium	J (30)
	Copper	J (32)
	Lead	J (71)
	Magnesium	J (169)
F0164		
	Molybdenum	J (38)
	Nickel	J (36)
	Selenium	J (83)
	Sulfur	J (153)
	Thallium	J (136)
	Thorium	J (119)
	Tin	J (39)
	Titanium	J (75)
	Uranium	J (45)
	Zinc	J (89)

9513324.2622

OFFICE OF SAMPLE MANAGEMENT DATA PACKAGE VERIFICATION CHECKLIST

VER-92-0171
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

9513324.2623

OFFICE OF SAMPLE MANAGEMENT DATA PACKAGE VERIFICATION FORM

VER-92-0171
Verification Number

VERIFICATION DATE: 03-18-92

NCR NUMBER:

DATE DATA PACKAGE RECEIVED: 9-26-91

SAMPLE DELIVERY GROUP: 222-S, 89-048, CORE 7, SEGMENT 3, REV. 2

SAMPLE NUMBERS: 89-048.

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 (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

9503324.2624

DATA PACKAGE DEFICIENCIES
222-S
CORE 7, SEGMENT 3, REV. 2, 89-048

1. GENERAL COMMENT Core 7, Segment 3, Rev. 2, 89-048 : Request for Analysis and Laboratory Chain of Custody are not present in the data package. Please submit and paginate as part of the data package.
2. Page 125 - Bottom of page cut off. Please resubmit.
3. Page 128 - Bottom of page cut off. Please resubmit.
4. Page 131 - Bottom of page cut off. Please resubmit.
5. Page 134 - Bottom of page cut off. Please resubmit.
6. Page 135 - Top of page cut off. Please resubmit.
7. Page 155 - Data printed on top of data. Please resubmit.
8. Page A-2 - Cross-Out not signed and dated.
9. Page A-4 - Cross-Out not signed and dated.
10. Page A-6 - Cross-Out not signed and dated.
11. Page A-7 - Cross-Out not signed and dated.
12. Page A-8 - Cross-Out not signed and dated.
13. Page A-9 - Cross-Out not signed and dated.
14. Page A-11 - Cross-Out not signed and dated.
15. Page A-13 - Data printed on top of data. Please resubmit.
16. Page A-15 - Cross-Out not signed and dated.
17. Page A-16 - Data printed on top of data. Please resubmit.
18. Page A-17 - Cross-Out not signed and dated.
19. Page A-20 - Cross-Out not signed and dated.
20. Page A-29 - Cross-Out not signed and dated.
21. Page A-31 - Cross-Out not signed and dated.
22. Page A-33 - Cross-Out not signed and dated.

DATA PACKAGE DEFICIENCIES
222-S
CORE 7, SEGMENT 3, REV. 2, 89-048

23. Page A-33.1 - Poor copy quality (too light). Please resubmit.

9215924.2626

OSM RCRA DATA ASSESSMENT

DATE 3-30-92

REVIEWED BY RL Shaver

LABORATORY 222-S

CASE # SST-241-U-110

SDG # Core 7, Seq 3, 89-048

SAMPLES/MATRIX	
Raw Sample	F0149
KOH Fusion	F0154
Water Digestion	F0159
Acid Digestion	F0164

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	X	O	O
7.	Duplicate Analysis	X	X	O
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:

NOTES:

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

9523924.2627

OSM RCRA DATA ASSESSMENT

DATE 3-30-92

REVIEWED BY RL Shaver

LABORATORY 222-S

CASE # SST-241-U-110

SDG # Core 7, Seg 3, 89-048

SAMPLES/MATRIX	
Raw Sample	F0149
KOH Fusion	F0154
Water Digestion	F0159
Acid Digestion	F0164

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.

9213924.2628

Summary Data Report

Reported results are wet sample weight.

Single Shell Tank Project

Tank:	241-U-110
Core:	7
Segment:	3
Customer ID:	89-048

Undigested Sample Results

	Sample	Duplicate
pH	12.54 J	12.79
%Water	47.20%	47.70%

Fusion Dissolution Results

	Sample		Duplicate	
Fusion Digestion	1.98	g/L	2.22	g/L
Total Alpha	3.18	uci/g	2.50	uci/g
Total Beta	1.56E+03	uci/g	1.59E+03	uci/g
GEA Cs-137	22.42	uci/g	23.29	uci/g
Uranium	<5.25E+03	ug/g	<5.00E+03	ug/g

Water Digestion Results

	Sample		Duplicate	
Water Digestion	9.32	g/L	7.78	g/L
Ion Chromatograph				
Fluoride	3.43E+03	ug/g J	2.62E+03	ug/g
Chloride	<1.08E+03	ug/g UJ	<1.30E+03	ug/g
Nitrate	3.95E+04	ug/g J	4.01E+04	ug/g
Phosphate	2.25E+04	ug/g J	1.44E+04	ug/g
Sulfate	<1.08E+04	ug/g UJ	<1.30E+04	ug/g
Total Carbon	2.09E+03	ug/g J	2.44E+03	ug/g

Acid Digestion

ICP Results

	Sample		Duplicate	
Aluminum	76209	ug/g J	91743	ug/g
Antimony	455	ug/g J	321	LT
Barium	45	ug/g J	17	ug/g
Beryllium	2	ug/g J	1	LT
Bismuth	12709	ug/g J	12057	ug/g
Boron	30	LT UJ	28	LT
Cadmium	14	LT	13	LT
Calcium	568	ug/g J	761	ug/g
Cerium	484	LT UJ	459	LT
Chromium	450	ug/g J	492	ug/g
Copper	1012	ug/g J	1357	ug/g
Europium	9	LT UJ	8	LT
Iron	12131	ug/g J	13308	ug/g
Lanthanum	50	LT	48	LT
Lead	742	ug/g J	352	ug/g
Lithium	11	LT	11	LT
Magnesium	1155	ug/g J	13743	ug/g
Manganese	5823	ug/g J	5851	ug/g
Mercury	13	LT UJ	12	LT
Molybdenum	25	ug/g J	17	LT
Nickel	151	ug/g J	105	ug/g
Potassium	756	LT	717	LT
Samarium	543	LT UJ	516	LT
Selenium	517	ug/g J	213	LT
Silver	65	LT UJ	62	LT
Sodium	86006	ug/g J	85640	ug/g
Strontium	578	ug/g	593	ug/g
Sulfur	321	ug/g J	2043	ug/g
Tantalum	97	LT UJ	92	LT
Thallium	783	ug/g J	148	LT
Thorium	162	ug/g J	41	LT
Tin	73	ug/g J	49	LT
Titanium	27	ug/g J	12	LT
Uranium	6091	ug/g J	3856	LT
Vanadium	47	ug/g J	42	LT
Zinc	242	ug/g J	627	ug/g
Zirconium	50	LT UJ	48	LT

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.

RL Shaver
3-16-92

RCRA QC

Name RLShaver Date 3-16-92

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: estimated (J for positive, UJ for non-detects), or unusable (R).

sample #	constituent	value/qual
F0149	pH	J
F0159	TOC	J
	F	J
	Cl	J
	NO3	J
	SO3	J
	PO4	J

sample #	constituent	value/qual

RCRA QC

Name RL Shaver Date 3-16-92

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 3-16-92

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 3-16-92

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: estimated (J for positive, UJ for non-detects), or unusable (R).

sample #	constituent	value/qual	sample #	constituent	value/qual
F0164			F0164		
	Antimony	J		Samarium	UJ
	Beryllium	J		Selenium	J
	Europium	UJ		Silver	UJ
	Mercury	UJ		Sulfur	J
				Tantalum	UJ
				Thallium	J
				Thorium	J
				Uranium	J
				Vanadium	J

RCRA QC

Name RL Shaver **Date** 3-16-92

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 3-16-92

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: estimated (J for positive, UJ for non-detects), or unusable (R).

sample #	constituent	value/qual	sample #	constituent	value/qual
F0164			F0164		
	Aluminum	J		Samarium	UJ
	Antimony	J		Selenium	J
	Bismuth	J		Silver	UJ
	Boron	UJ		Sodium	J
	Calcium	J		Sulfur	J
	Cerium	UJ		Tantalum	UJ
	Chromium	J		Thallium	J
	Europium	UJ		Thorium	J
	Iron	J		Uranium	J
	Magnesium	J		Vanadium	J
	Manganese	J		Zinc	J
	Mercury	UJ		Zirconium	UJ

RCRA QC

Name R L Shaver Date 3-16-92

QC Check: Duplicate Analysis

COMMENTS: Duplicate Analyses were within control limits for pH, TOC and % water. The ICP, and IC analytes which were out of control limits are listed below. The relative percent difference is in parenthesis, with a RPD < 20 being out of control limits.

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

sample #	constituent	value/qual
F0159		
	F	J (44)
	PO4	J (61)
F0164		
	Antimony	J (35)
	Barium	J (90)
	Beryllium	J (67)
	Calcium	J (30)
	Copper	J (32)
	Lead	J (71)
	Magnesium	J (169)

sample #	constituent	value/qual
F0164		
	Molybdenum	J (38)
	Nickel	J (36)
	Selenium	J (83)
	Sulfur	J (153)
	Thallium	J (136)
	Thorium	J (119)
	Tin	J (39)
	Titanium	J (75)
	Uranium	J (45)
	Zinc	J (89)

9121324.2656

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:	7
Segment:	3
Customer Id. Number:	89-048
Report Revision:	2
Date Printed:	August 29, 1991

54-7600-075

Hanford Operations and Engineering Contractor for the US Department of Energy

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 7 Segment 3....16
- Particle Size Analysis....17

Undigested Sample Analysis....23

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

KOH Fusion Results....27

- Fusion Analysis Results Summary of Solids....28
- Fusion Analysis of Laboratory Solutions....29
- Fusion Dissolution....30
- Total Alpha and Beta Analysis....31
- GEA Analysis....36
- Uranium Analysis....78

Water Digestion Test Results....79

- Water Digestion Results Summary of Solids....80
- Water Digestion Analysis of Laboratory Solutions....81
- Water Digestion 82
- Ion Chromatographic Analysis....83
- Total Carbon Analysis....106

9513324.2658

Acid Digestion Test Results.....113

ICP Data Summary.....114
Acid Digestion Analysis.....115
Inductively Coupled Plasma Spectrographic Analysis.....116
ICP Raw Data Summary.....118

Appendix A, Analytical Cards.....165

Physical Properties Test.....A1
Undigested Sample Analysis.....A2-A5
KOH Fusion Analysis.....A6-A19
Water Digestion Analysis.....A20-A32
Acid Digestion Analysis.....A33-A35

Appendix B, Analytical Detection Limits.....166

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

This report consists of pages 1-166, plus pages 16.1, 67.1-67.5, 83.1, 106.1, 122.1, and 122.2.
Appendix A consists of pages A1-A35, with the addition of page A33.1.
Appendix B consists of pages B1-B3.

NOTE:

Due to re-evaluation of ICP data, the following pages have been revised: 12, 114, 116-122, 122.1, and 122.2.

Due to re-evaluation of initial source data, the following pages have been revised: 1-4, 6, 7, 28, 29, 31, 80, 81, 106, 166, with the addition of pages 67.1-67.5 and Appendix A pages A7, A9, A11, A13, A16, A31 and A32, and A33.

The following pages have been recopied to correct poor copy quality: 17-20, and 107-112.

REVISION 2 OF CORE 7 SEGMENT 3

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.

Date Sept 11, 1991

for
Data Coordinator

Date Sept 6, 1991

Daniel M. Thornton
Unit Manager

Date Sept 6, 1991

Larry P. Markel
Laboratory Q.A. Officer

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 3 from core 7 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.

9513324.2643

SAMPLING AND CUSTODY DATA

CHAIN-OF-CUSTODY RECORD FOR CORE SAMPLING

(1) Shipment Number S-025-89 (2) Sample Number 89-048 (3) Supervisor D.C. Hartley

(4) Tank 110U (5) Riser #7 (6) Segment #3 (7) Cask Serial Number 1014C

Radiation Survey Data:	(8) FIELD	(20) LABORATORY
Over Top Dose Rate	.8 mr/hr	.8 mR/hr
Side Dose Rate	.5 mr/hr	2 mR/hr
Bottom Dose Rate	2.0 mr/hr	2 mR/hr
Smearable Contamination	< Det. (alpha)	< Det (alpha)
	< Det. (beta-gamma)	< Det (beta-gamma)
	RPT [signature] (Signature)	RPT D. Arnold (Signature)

(9) Shipment Description:	
A. Work Package Number	2W89-00955-W
B. Cask Seal Number	For Future Use
C. Sampler Number Used	52
D. Date and Time Sampler Unseated	11-16-89, 1419
E. Expected Liquid Content	20%
F. Expected Solid Content	80%
G. Dose Rate Through Drill String	110 mr/hr
H. Expected Sample Length	19"

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

Core #007, 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	D.C. Hartley / DC Hartley	11-17-89 0930	2225 LABS. 200 abs A	Vida Boyle / Vida Boyle	11/17/89 10:20 AM

(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

Single Shell Tank Waste Characterization
Summary of Core Sample

TANK ID:	241-U-110
RISER ID:	7
CORE ID:	#7

DATE SAMPLING INITIATED:	11-15-89
DATE SAMPLING COMPLETED:	11-16-89

SEGMENT		
1	Lab Serial No.	F0197
	Customer ID No.	89-046
	Last Segment?	NO
2	Lab Serial No.	F0125
	Customer ID No.	89-047
	Last Segment?	NO
3	Lab Serial No.	F0149
	Customer ID No.	89-048
	Last Segment?	NO
4	Lab Serial No.	F-0173
	Customer ID No.	89-049
	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

Tank:	241-U-110
Core:	7
Segment:	3
Customer ID:	89-048

Undigested Sample Results

	Sample	Duplicate
pH	12.54	12.79
%Water	47.20%	47.70%

Fusion Dissolution Results

	Sample		Duplicate	
Fusion Digestion	1.98	g/L	2.22	g/L
Total Alpha	3.18	uci/g	2.50	uci/g
Total Beta	1.56E+03	uci/g	1.59E+03	uci/g
GEA Cs-137	22.42	uci/g	23.29	uci/g
Uranium	<5.25E+03	ug/g	<5.00E+03	ug/g

Water Digestion Results

	Sample		Duplicate	
Water Digestion	9.32	g/L	7.78	g/L
Ion Chromatograph				
Fluoride	3.43E+03	ug/g	2.62E+03	ug/g
Chloride	<1.08E+03	ug/g	<1.30E+03	ug/g
Nitrate	3.95E+04	ug/g	4.01E+04	ug/g
Phosphate	2.25E+04	ug/g	1.44E+04	ug/g
Sulfate	<1.08E+04	ug/g	<1.30E+04	ug/g
Total Carbon	2.09E+03	ug/g	2.44E+03	ug/g

Acid Digestion

ICP Results

	Sample		Duplicate	
Aluminum	76209	ug/g	91743	ug/g
Antimony	455	ug/g	321	LT
Barium	45	ug/g	17	ug/g
Beryllium	2	ug/g	1	LT
Bismuth	12709	ug/g	12057	ug/g
Boron	30	LT	28	LT
Cadmium	14	LT	13	LT
Calcium	568	ug/g	761	ug/g
Cerium	484	LT	459	LT
Chromium	450	ug/g	492	ug/g
Copper	1012	ug/g	1357	ug/g
Europium	9	LT	8	LT
Iron	12131	ug/g	13308	ug/g
Lanthanum	50	LT	48	LT
Lead	742	ug/g	352	ug/g
Lithium	11	LT	11	LT
Magnesium	1155	ug/g	13743	ug/g
Manganese	5823	ug/g	5851	ug/g
Mercury	13	LT	12	LT
Molybdenum	25	ug/g	17	LT
Nickel	151	ug/g	105	ug/g
Potassium	756	LT	717	LT
Samarium	543	LT	516	LT
Selenium	517	ug/g	213	LT
Silver	65	LT	62	LT
Sodium	86006	ug/g	85640	ug/g
Strontium	578	ug/g	593	ug/g
Sulfur	321	ug/g	2043	ug/g
Tantalum	97	LT	92	LT
Thallium	783	ug/g	148	LT
Thorium	162	ug/g	41	LT
Tin	73	ug/g	49	LT
Titanium	27	ug/g	12	LT
Uranium	6091	ug/g	3856	LT
Vanadium	47	ug/g	42	LT
Zinc	242	ug/g	627	ug/g
Zirconium	50	LT	48	LT

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.

PHYSICAL TEST RESULTS

9513324.2649

Single Shell Tank
Extrusion of Segment -- Physical Tests

Lab Segment Serial #: F0149 Customer ID: 89-048

Analyst: Richard L. Weiss Date Extruded: November 21, 1989

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: 6.0 in.	Calculated Volume: 4.7 in^3	
Remarks	None		

Appearance of Solids: Sample dark brown except for bottom chunk (which is medium brown) of about 3/4 inches. Granular texture throughout the sample with some hard "bits". Semi-cohesive consistency with bottom portion much less cohesive than rest of sample, almost runny.

Penetrometer	9.37 lbs/sq in	Remarks: None

Homogenization

Procedure: T038A-00712 Revision: F		Quantity of Material: 118.09	Grams
Date Homogenized: 12-29-89		Time Homogenized: 5.0	Minutes
Operator: John R. Smith			

Laboratory Notebook Reference	WHC-N-313-4	14
	Notebook No.	Page No.

SST-3 Rev. D 9/7/90 Interim

9513324.2650

Single Shell Tank
Segment -- Subsamples

Lab Segment Serial #:	F0149	Customer ID: 89-048

Volatile Organic Analysis

VOA Sample	Lab Serial #: 89-048-77	Date Sampled: 11-21-89

Sample shipped to PNL

Particle Size Distribution Analysis

Particle Size Sample	Lab Serial #: F0149	Date Sampled: 11-21-89

Homogenized Solids

Undigested Solids Analysis

Laboratory Serial Number For Sample:	F0149	Date Sampled: 12-29-89
Laboratory Serial Number of Duplicate Sample:	F0150	

Fusion Analysis of Solids

Laboratory Serial Number of Sample:	F0154	Date Sampled: 12-29-89
Laboratory Serial Number of Duplicate Sample:	F0155	
Laboratory Serial Number of Spiked Sample:	F0156	

Acid Digestion Analysis of Solids

Laboratory Serial Number of Sample:	F0164	Date Sampled: 12-29-89
Laboratory Serial Number of Duplicate Sample:	F0165	
Laboratory Serial Number of Spiked Sample:	F0166	

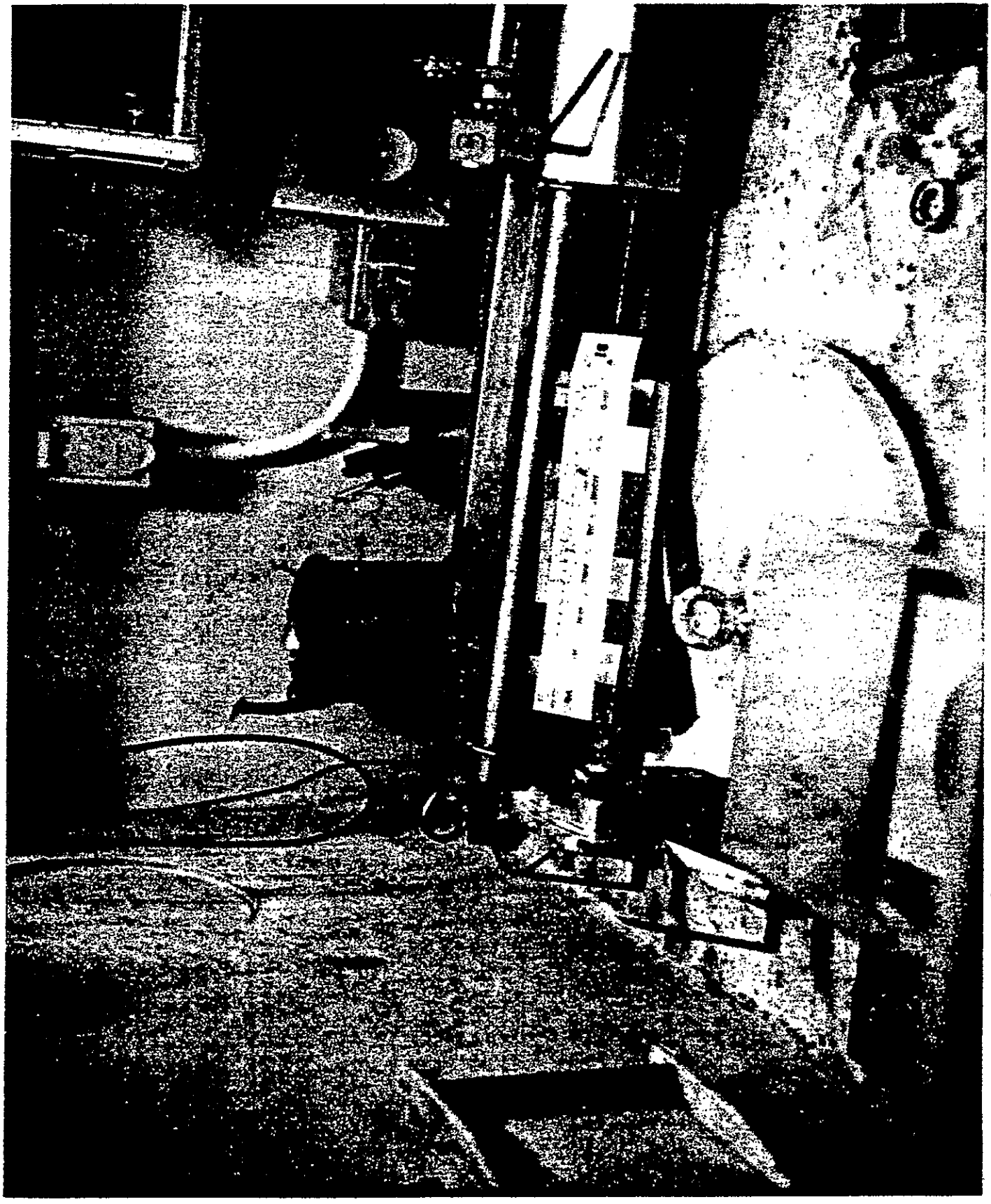
Water Digestion Analysis of Solids

Laboratory Serial Number of Sample:	F0159	Date Sampled: 12-29-89
Laboratory Serial Number of Duplicate Sample:	F0160	
Laboratory Serial Number of Spiked Sample:	F0161	

Laboratory Notebook Reference	WHC-N-313-4	14
	Notebook No.	Page No.

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

9513324.2651



TANK 241-U-110 CORE 7 SEGMENT 3

95A3324.2652

The photocopies on the following pages 17 to 20 are the best copy available from originals of poor reproducible quality.

B r i n k m a n n

Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS VIA BRINKMANN 2010

STATISTICS

SAMPLE NAME : SST,B000076,F0149,H20,SBK
FILE NAME : F0149.002

DATE	: 30/11/1989	ACQ. RANGE	: 0.5-60	COUNTS	: 77089
TIME	: 13:59	ACQ. MODE	: SAMPLE	S.N.F.	: 0.56
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 385 SEC	S.D.U.	: 5199
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.7E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 1.6E-02 %

	MEAN Diameter	S.D.
Number, Length :	1.49 µm	1.64 µm
Number, Area :	2.22 µm	1.79 µm
Number, Volume :	3.59 µm	2.66 µm
Length, Area :	3.29 µm	4.48 µm
Length, Volume :	5.56 µm	5.02 µm
Area, Volume :	9.40 µm	12.09 µm
Volume, Moment :	24.94 µm	18.19 µm

	MEDIAN Diameter	MODE	CONFIDENCE
Number :	0.93 µm	0.55 µm	100.00%
Area :	4.81 µm	4.86 µm	90.77%
Volume :	21.80 µm	41.93 µm	99.70%

Brown suspension - some balled up in cuvette corners.
Particles disperse well in H_2O - nil agglomeration
All particles < 150 µ

9513324.2654

B r i n k m a n n

Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS
VIA BRINKMANN 2010

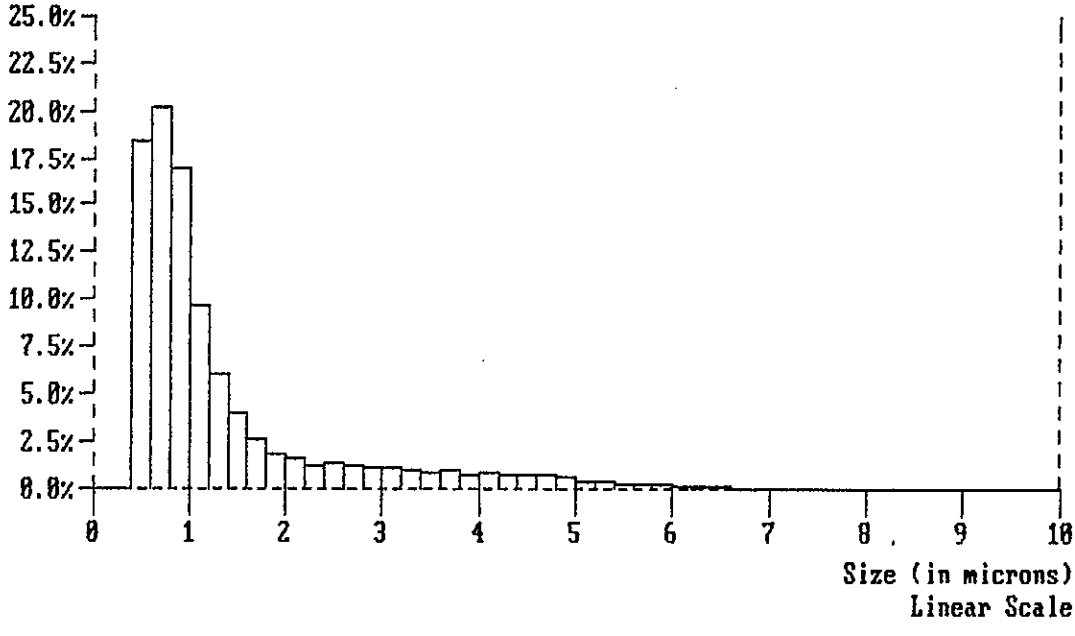
SAMPLE NAME : SST,B000076,F0149,H20,SBK
FILE NAME : F0149.002

DATE	: 30/11/1989	ACQ. RANGE	: 0.5-60	COUNTS	: 77089
TIME	: 13:59	ACQ. MODE	: SAMPLE	S.N.F.	: 0.56
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 385 SEC	S.D.U.	: 5199
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.7E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 1.6E-02 %

PROBABILITY NUMBER DENSITY GRAPH

Name: SST,B000076,F0149,H20,SBK
6.7E+06 #/ml(99.7%)
Mode at 0.70 µm
<< SCALE RANGE (µm): 0 - 10 >>

Local Median : 0.93µm
Local Mean(nl): 1.44µm
Local S.D.(nl): 1.32µm
Local Conf(nl):100.00 %



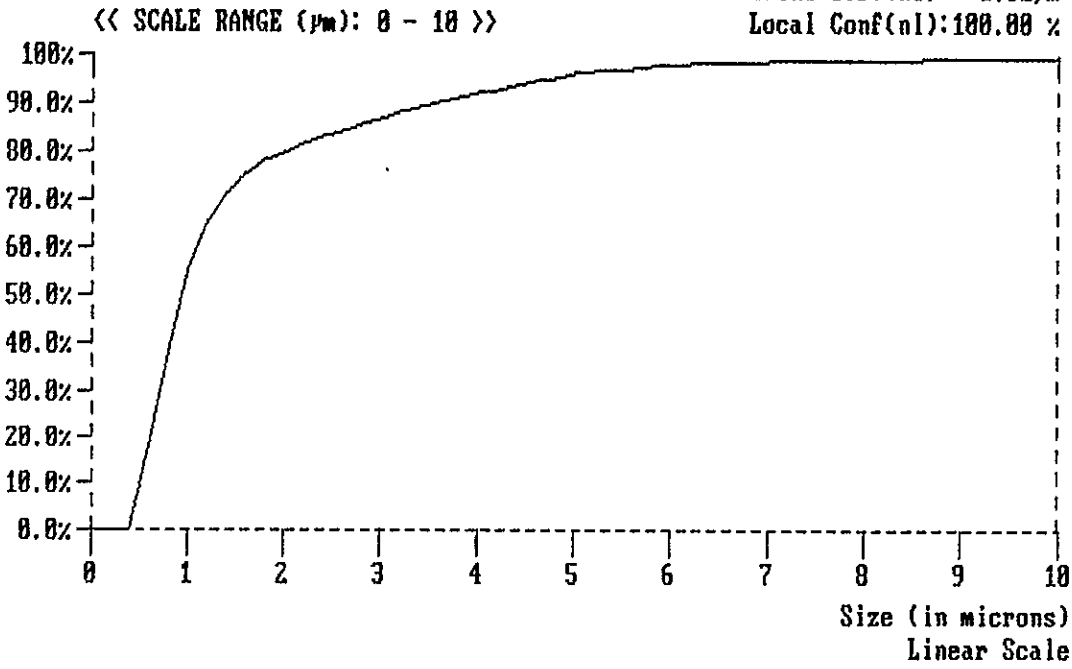
SAMPLE NAME : SST,B000076,F0149,H20,SBK
FILE NAME : F0149.002

DATE	: 30/11/1989	ACQ. RANGE	: 0.5-60	COUNTS	: 77089
TIME	: 13:59	ACQ. MODE	: SAMPLE	S.N.F.	: 0.56
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 385 SEC	S.D.U.	: 5199
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.7E+06 #/ml
SAMPLE TYPE	: REGULAR	REG. CONF.	: 95.00%(V)	SOLIDS	: 1.6E-02 %

PROBABILITY NUMBER DISTRIBUTION GRAPH

Name: SST,B000076,F0149,H20,SBK
6.7E+06 #/ml(99.7%)

Local Median : 0.93µm
Local Mean(nl): 1.44µm
Local S.D.(nl): 1.32µm
Local Conf(nl):100.00 %



STATISTICS

SAMPLE NAME : SST,B000076,F0149,H20,SBK
FILE NAME : F0149.001

DATE	: 30/11/1989	ACQ. RANGE	: 0.5-150	COUNTS	: 82012
TIME	: 13:46	ACQ. MODE	: SAMPLE	S.N.F.	: 0.62
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 411. SEC	S.D.U.	: 4978
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.1E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 2.2E-02 %

	MEAN Diameter	S.D.
Number, Length :	1.54 µm	1.74 µm
Number, Area :	2.33 µm	1.91 µm
Number, Volume :	4.07 µm	3.07 µm
Length, Area :	3.51 µm	5.60 µm
Length, Volume :	6.61 µm	6.39 µm
Area, Volume :	12.43 µm	17.87 µm
Volume, Moment :	38.13 µm	30.56 µm

	MEDIAN Diameter	MODE	CONFIDENCE
Number :	0.94 µm	0.75 µm	100.00%
Area :	5.22 µm	4.75 µm	86.78%
Volume :	37.14 µm	45.76 µm	99.31%

Brinkmann
Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS VIA BRINKMANN 2010

SAMPLE NAME : SST,B000076,F0149,H20,SBK
FILE NAME : F0149.001

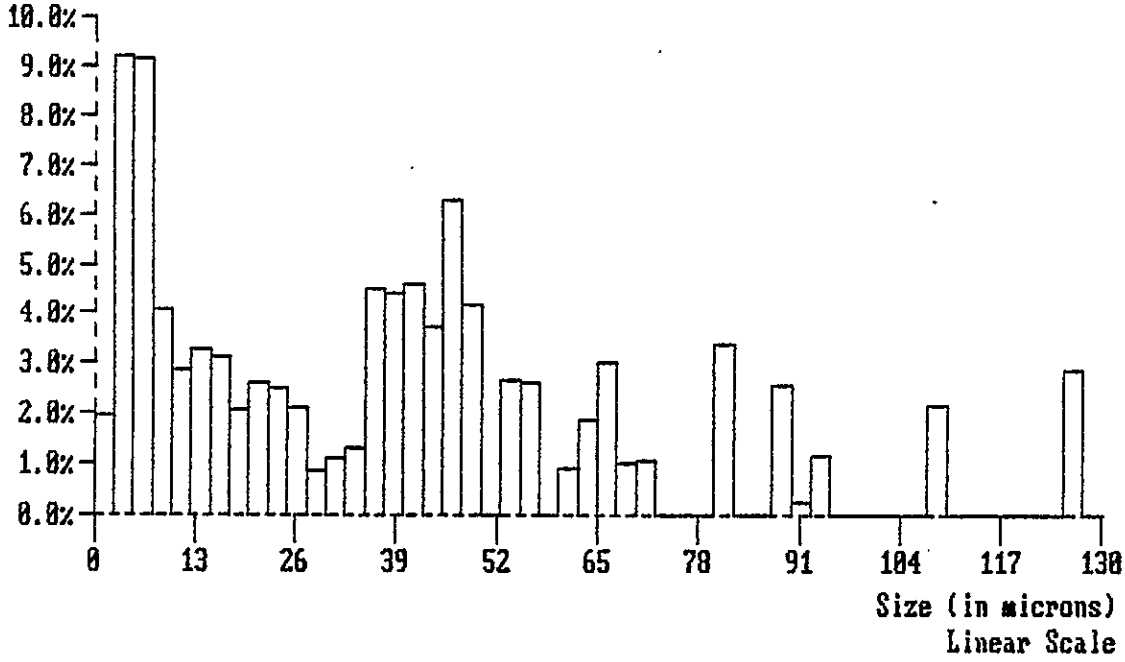
DATE	: 30/11/1989	ACQ. RANGE	: 0.5-150	COUNTS	: 82012
TIME	: 13:46	ACQ. MODE	: SAMPLE	S.N.F.	: 0.62
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 411 SEC	S.D.U.	: 4978
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.1E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 2.2E-02 %

PROBABILITY VOLUME DENSITY GRAPH

Name: SST,B000076,F0149,H20,SBK
2.2E-04 cc/ml(100.0%)
Mode at 3.75 µm
<< SCALE RANGE (µm): ADJUSTED >>

Mean(nv): 4.07µm
S.D.(nv): 3.07µm

Median : 37.14µm
Mean(vm): 38.13µm
S.D.(vm): 30.56µm
Conf(vm): 99.31 %



9513324.2658

B r i n k m a n n

Particle Size Analyzer

PROCESS CHEMISTRY LABS PARTICLE ANALYSIS
VIA BRINKMANN 2010

SAMPLE NAME : SST,B000076,F0149,H20,SBK
FILE NAME : F0149.001

DATE	: 30/11/1989	ACQ. RANGE	: 0.5-150	COUNTS	: 82012
TIME	: 13:46	ACQ. MODE	: SAMPLE	S.N.F.	: 0.62
CONFIG.	: 1 (0.7 S1)	ACQ. TIME	: 411 SEC	S.D.U.	: 4978
CELL TYPE	: MAGNETIC (3)	SAMPLE SIZE	: 4	CONCENTR.	: 6.1E+06 #/ml
SAMPLE TYPE	: REGULAR	REQ. CONF.	: 95.00%(V)	SOLIDS	: 2.2E-02 %

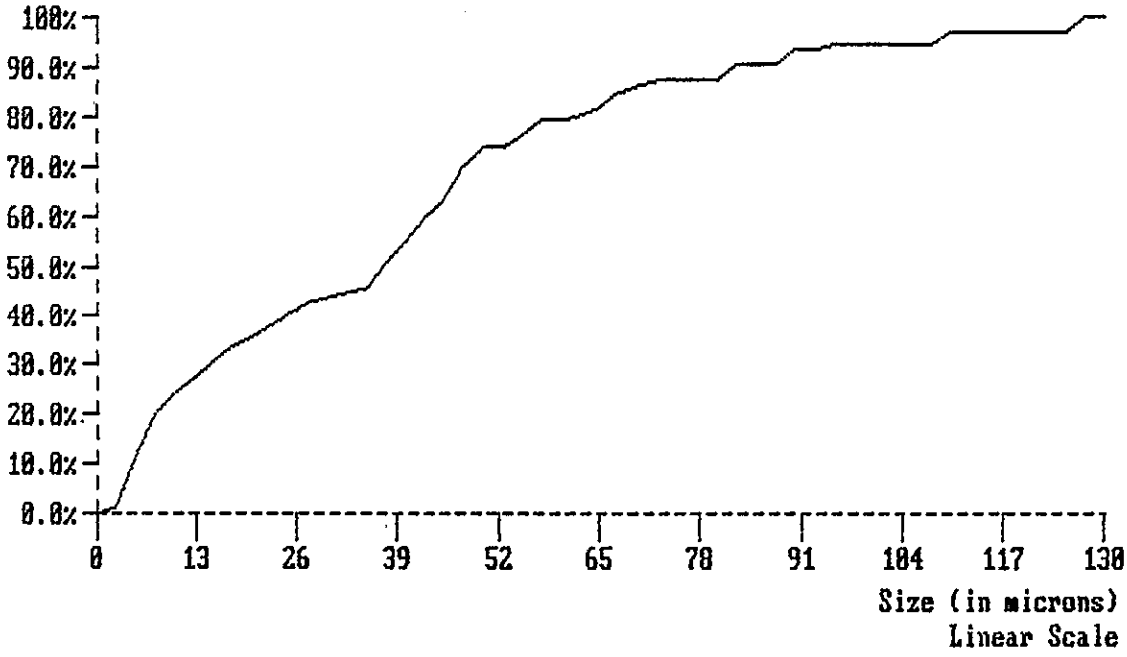
PROBABILITY VOLUME DISTRIBUTION GRAPH

Name: SST,B000076,F0149,H20,SBK
2.2E-04 cc/ml(100.0%)

Mean(nv): 4.07µm
S.D.(nv): 3.07µm

Median : 37.14µm
Mean(vm): 38.13µm
S.D.(vm): 30.56µm
Conf(vm): 99.31 %

<< SCALE RANGE (µm): ADJUSTED >>



UNDIGESTED SAMPLE ANALYSIS

Single Shell Tank Project

Untreated Sample Results

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID 89-048

	Check Standard	Blank	Sample	Sample Duplicate	Check Standard
Laboratory ID:	F0100	F0121	F0149	F0150	F0292
pH	101.00%	6.83	12.54	12.79	100.90%
Laboratory ID:	F0100	F0309	F0149	F0150	F0292
%Water	96.63%	6.5 mg	47.20%	47.70%	96.80%

9513324.2661

Analytical Batch

LAB SEGMENT SERIAL #:F0149

CUSTOMER ID:89-048

INSTRUMENT	N/A
PROCEDURE/REV	LA-212-103/A-0
TECHNOLOGIST	Mary Franz
DATE	January 02, 1990
TEMPERATURE	23.6 C
STARTING TIME	1530
ENDING TIME	2000
CHEMIST	R. E. Brandt

pH Analysis of the Solid Samples

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0100
2	Reagent Blank		F0121
3	Sample	89-045	F0101
4	Duplicate Sample	89-045	F0102
5	Sample	89-047	F0125
6	Duplicate Sample	89-047	F0126
7	Sample	89-048	F0149
8	Duplicate Sample	89-048	F0150
9	Sample	89-050	F0289
10	Duplicate Sample	89-050	F0290
11	Final LMCS Check Std.		F0292

	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	72C11A/5.0ml			5.0 ml

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

Analytical Batch

Lab Segment Serial #:F0149

Customer ID:89-048

% Water in Sample

Instrument	N/A
Procedure/Rev	LA-564-101/D-0
Technologist	R. D. Hale
Date	January 3, 1990
Temperature	120 C
Starting Time	1100 01-02-90
Ending Time	1100 01-03-90
Chemist	R. E. Brandt

	Description	Lab ID
1	Initial LMCS Check Std.	F0100
2	Reagent Blank	F0309
3	Sample 89-047	F0125
4	Duplicate Sample 89-047	F0126
5	Sample 89-048	F0149
6	Duplicate Sample 89-048	F0150
7	Sample 89-050	F0289
8	Duplicate Sample 89-050	F0290
9	Sample 89-045	F0101
10	Duplicate Sample 89-045	F0102
11	Final LMCS Check Std.	F0292

	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	11C11AG/1.0ml			1.0 ml

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

9543324.2663

KOH FUSION ANALYSIS

Single Shell Tank Project

Fusion Analysis
Laboratory Results Of Solids
Units Are Sample Wet Weight

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID: 89-048

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample	Check Standard
Laboratory ID:	N/A	F0168		F0154		F0155		N/A	N/A
Fusion Digestion	N/A	Complete		1.98	g/L	2.22	g/L	N/A	N/A
Laboratory ID:	F0105	F0308		F0154		F0155		F0296	F0297
Total Alpha	111.90%	<1.00E-04	uci/L	3.18	uci/g	2.50	uci/g	97.00%	100.30%
Total Beta	98.80%	<2.58E-04	uci/L	1.56E+03	uci/g	1.59E+03	uci/g	*	96.50%
Laboratory ID:	F0129	F0308		F0154		F0155		F0296	F0297
GEA Cs-137	98.10%	2.49E-01	uci/L	22.42	uci/g	23.29	uci/g	99.15%	99.10%
Laboratory ID:	F0105	F0120		F0154		F0155		F0108	F0297
Uranium	98.70%	<1.04E+04	ug	<5.25E+03	ug/g	<5.00E+03	ug/g	1.71%	108.30%

* Spike Too Low To Calculate.

Single Shell Tank Project

Fusion Analysis
Results of the Laboratory Digestions

Tank:	241-U-110
Core:	7
Segment:	3
Customer ID:	89-048

	Check Standard	Blank		Sample		Sample Duplicate		Spike of Sample	Check Standard
Laboratory ID:	**N/A**	**F0168**		**F0154**		**F0155**		**N/A**	**N/A**
Fusion Digestion	N/A	Complete		1.98	g/L	2.22	g/L	N/A	N/A
Laboratory ID:	**F0105**	**F0308**		**F0154**		**F0155**		**F0296**	**F0297**
Total Alpha	111.90%	<1.00E-04	uci/L	6.30	uci/L	5.54	uci/L	97.00%	100.30%
Total Beta	98.80%	<2.58E-04	uci/L	3.09E+03	uci/L	3.53E+03	uci/L	*	96.50%
Laboratory ID:	**F0129**	**F0308**		**F0154**		**F0155**		**F0296**	**F0297**
GEA Cs-137	98.10%	2.49E-01	uci/L	44.40	uci/L	51.70	uci/L	99.15%	99.10%
Laboratory ID:	**F0105**	**F0120**		**F0154**		**F0155**		**F0108**	**F0297**
Uranium	98.70%	<1.04E+04	ug	<1.04E-02	g/L	<1.11E-02	g/L	1.71%	108.30%

* Spike Too Low To Calculate.

Analytical Batch

LAB SEGMENT SERIAL #:F0149

CUSTOMER ID:89-048

INSTRUMENT	N/A
PROCEDURE/REV	LA-549-141/A-0
TECHNOLOGIST	R. D. Hale
DATE	January 03, 1990
TEMPERATURE	23 C
STARTING TIME	1000
ENDING TIME	1200
CHEMIST	S. A. Catlow

Fusion Dissolution

	DESCRIPTION		LAB ID
1	Reagent Blank		F0168
2	Sample	89-045	F0106
3	Duplicate Sample	89-045	F0107
4	Sample	89-047	F0130
5	Duplicate Sample	89-047	F0131
6	Sample	89-048	F0154
7	Duplicate Sample	89-048	F0155
8	Sample	89-050	F0294
9	Duplicate Sample	89-050	F0295
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				

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

Analytical Batch

Lab Segment Serial #: F0149

Customer ID: 89-048

Instrument	WA93415
Procedure/Rev	LA-508-101 / C-1 *
Technologist	J.A. Hopkins
Date	01-05-90
Temperature	70 F
Starting Time	09:30
Ending Time	14:00
Chemist	S.A. Catlow

TOTAL ALPHA & TOTAL BETA

FUSION DISSOLUTION ANALYSIS

Detector #18

* Stds. and/or Samples relating to this procedure may have been prepared according to LA-548-101 due to varying sample mount size.

	Description	Lab ID
1	INITIAL LMCS CHECK STANDARD	F0105
2	REAGENT BLANK	F0308
3	SAMPLE 89-045	F0106
4	DUPLICATE SAMPLE 89-045	F0107
5	SAMPLE 89-047	F0130
6	DUPLICATE OF SAMPLE 89-047	F0131
7	SAMPLE 89-048	F0154
8	DUPLICATE OF SAMPLE 89-048	F0155
9	SAMPLE 89-050	F0294
10	DUPLICATE OF SAMPLE 89-050	F0295
11	SPIKE OF SAMPLE 89-050	F0296

	Description	Lab ID
12	FINAL LMCS CHECK STANDARD	F0297
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		

Standard Type	Primary Book # & Aliquot Vol.	Second Book # & Aliquot Vol.	Third Book # & Aliquot Vol.	Final Vol. of Std.
LMCS CHECK STD	83B44 / 10 mL			N/A
SPIKE OF 89-050	83B44 / 10 mL	F0294 / .100 mL		N/A

SST-102 Rev. I 10/2/90 Interim

Single Shell Tank

Calibration Record

ANALYTE:	Co^{60}		
PROCEDURE:	LQ-508-002	REVISION:	A-0
INSTRUMENT:	Detector #18	PROPERTY NUMBER:	WA93415
TECHNOLOGIST:	R.A. Jones	PAYROLL NUMBER:	65801
DATE:	June 28, 1989		
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. 18

		2",5" STD	TIME ZERO DATE (HD):	15883
RADIONUCLIDE:	Co-60	1" STD	TIME ZERO DATE (HD):	16573
HALF LIFE:	1925		DATE COUNTED (HD):	16347
COUNT TIME:	5		DATE COUNTED 1" (HD)	
CPM BKG:	5			
CPM 1" BKG:				

CALIBRATED BY: RA JONES HD 0 = 09/25/44

NOTE: Date of calibration for two inch and five inch size discs is a counting room error. It should read 06-28-89 not 06-28-80.

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
32B40A4	2	06/28/80	1510	95552	95030	96367	94943
32B40B3	2	06/28/80	1515	179993	179923	180564	179845
32B40C4	2	06/28/80	1521	266251	266109	266791	262848
32B40A5	5	06/28/80	1526	80056	79664	81559	79720
32B40B6	5	06/28/80	1531	159760	162820	161429	163674
32B40C5	5	06/28/80	1536	234482	235955	237348	236432

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
100B40A2	1"	67290	0	0.00	0	0.0000
100B40B1	1"	137800	0	0.00	0	0.0000
100B40C1	1"	199700	0	0.00	0	0.0000

AVERAGE, 1" = 0.0000 +/- @95% 0.0000 ERR % ON 06/28/89

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A4	2"	70480	19090	1.18	22561	0.3201
32B40B3	2"	135100	36011	1.18	42560	0.3150
32B40C4	2"	202400	53095	1.18	62750	0.3100

AVERAGE, 2" = 0.3151 +/- @95% 0.0099 3.13 % ON 06/28/89

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A5	5"	70160	16045	1.18	18963	0.2703
32B40B6	5"	135700	32379	1.18	38267	0.2820
32B40C5	5"	201900	47206	1.18	55790	0.2763

AVERAGE, 5" = 0.2762 +/- @95% 0.0115 4.16 % ON 06/28/89

NEW EFFS FOR DET 18 Co-60 1" = 0.0000 2" = 0.3151

5" = 0.2762

Single Shell Tank

Calibration Record

Analyte:	Am^{241}		
Procedure:	LQ-508-002	Revision:	A-0
Instrument:	Detector #18	Property Number:	WA93415
Technologist:	R.A. Jones	Payroll Number:	65801
Date:	June 28, 1989		

Calibration Standard ID: 36B40A3; 36B40B3; 36B40C3; 36B40A6; 36B40B6; 36B40C5; 36B40A8; 36B40B7; 36B40C7

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. 18

RADIONUCLIDE: Am-241
HALF LIFE: 154497
COUNT TIME: 5
CPM BKG: 0.2

TIME ZERO DATE (HD): 15897

DATE COUNTED (HD): 16347

CALIBRATED BY: RA JONES HD 0 = 09/25/44

NOTE: Date of calibration for two inch and five inch size discs is a counting room error. It should read 06-28-89 not 06-28-80.

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A3	2	06/28/80	1542	67207	66768	67025	66645
36B40B3	2	06/28/80	1547	115573	116337	116289	116143
36B40C3	2	06/28/80	1552	162269	162819	162370	161593
36B40A6	5	06/28/80	1558	61627	62404	61970	61272
36B40B6	5	06/28/80	1603	118582	119217	118566	119430
36B40C5	5	06/28/80	1608	164322	165699	166216	166176

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A8	1"	60570	0	1.00	0	0.0000
36B40B7	1"	109900	0	1.00	0	0.0000
36B40C7	1"	159700	0	1.00	0	0.0000

AVERAGE, 1" = 0.0000 +/- @95% 0.0000 -97.62 % ON 06/28/89

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	13382	1.00	13409	0.2170
36B40B3	2"	110700	23217	1.00	23264	0.2102
36B40C3	2"	161400	32452	1.00	32518	0.2015

AVERAGE, 2" = 0.2095 +/- @95% 0.0152 7.27 % ON 06/28/89

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	12363	1.00	12388	0.2083
36B40B6	5"	109800	23790	1.00	23838	0.2171
36B40C5	5"	160100	33120	1.00	33187	0.2073

AVERAGE, 5" = 0.2109 +/- @95% 0.0106 5.01 % ON 06/28/89

NEW EFFS FOR DET 18 Am-241 1" = 0.0000 2" = 0.2095

5" = 0.2109

Analytical Batch

LAB SEGMENT SERIAL #:F0149

CUSTOMER ID:89-048

INSTRUMENT	401934/WA77228
PROCEDURE/REV	LA-548-121/C-1
TECHNOLOGIST	D. M. Southwick
DATE	January 09, 1990
TEMPERATURE	72 F
STARTING TIME	1230
ENDING TIME	1400
CHEMIST	S. A. Catlow

GEA Analysis
Fusion Dissolution
Detectors 1, 2, 3, & 4
Samples are prepared in batch, but counted randomly.

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0129
2	Reagent Blank		F0308
3	Sample	89-047	F0130
4	Duplicate Sample	89-047	F0131
5	Sample	89-048	F0154
6	Duplicate Sample	89-048	F0155
7	Sample	89-050	F0294
8	Duplicate Sample	89-050	F0295
9	Spike of Sample	89-050	F0296
10	Final LMCS Check Std		F0297
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	89B44/.5mL			22mL
Spike	89B44/.1mL	F0294/1.0ml		22mL

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:	See attached sheets		

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
```

Single Shell Tank Calibration Record

Analyte:	Mixed Isotope Standards		
Procedure:	LQ-508-003	Revision:	A-3
Instrument:	GEA Detector #2	Property Number:	401934
Technologist:	J. L. Anderson	Payroll Number:	61413
Date:	See attached sheets		

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: 2
GEOMETRY CODE: 42
GEOMETRY DECSRIPTION: 22 ML LIQUID, POS 2
CALIBRATION DATE: 21-Oct-88
ANALYST(S): J. L. ANDERSON/M. R. DOWELL
STANDARD ID: 56840 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	3.417000E-03
88.032	1.090000E-02
122.0614	1.408000E-02
165.853	1.516000E-02
279.1967	9.929000E-03
391.668	7.578000E-03
513.99	5.875000E-03
661.65	4.927000E-03
898.021	3.727000E-03
1173.237	3.085000E-03
1332.501	2.683000E-03
1836.129	2.102000E-03

EQUATION 0-122 KEV

```
LOG(EFF) =    -6.654070E+01
          +    2.583780E+01 *LOG(ENERGY)
          +   -2.677550E+00 *LOG(ENERGY)^2
```

EQUATION 122-1836 KEV

```
LOG(EFF) =    -1.050740E+02
          +    6.428950E+01 *LOG(ENERGY)
          +   -1.503170E+01 *LOG(ENERGY)^2
          +    1.533670E+00 *LOG(ENERGY)^3
          +   -5.838530E-02 *LOG(ENERGY)^4
```

GEA CALIBRATION RECORD PROCEDURE LQ-508-003

DETECTOR: 2
GEOMETRY CODE: 43
GEOMETRY DECSRIPTION: 22 ML LIQUID, POS 3
CALIBRATION DATE: 28-Sep-88
ANALYST(S): J. L. ANDERSON/M. R. DOWELL
STANDARD ID: 56840 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	1.476000E-03
88.032	4.721000E-03
122.0614	6.589000E-03
165.853	6.613000E-03
279.1967	4.692000E-03
391.668	3.542000E-03
513.99	2.810000E-03
661.65	2.327000E-03
898.021	1.790000E-03
1173.237	1.437000E-03
1332.501	1.277000E-03
1836.129	9.824000E-04

EQUATION 0-165 KEV

```
LOG(EFF) =    -5.826830E+01
          +    2.165450E+01 *LOG(ENERGY)
          +   -2.198930E+00 *LOG(ENERGY)^2
```

EQUATION 165-1836 KEV

```
LOG(EFF) =    -2.233890E+01
          +    1.174520E+01 *LOG(ENERGY)
          +   -2.739550E+00 *LOG(ENERGY)^2
          +    2.655450E-01 *LOG(ENERGY)^3
          +   -9.668420E-03 *LOG(ENERGY)^4
```

Single Shell Tank
Calibration Record

Analyte:	Mixed Isotope Standards		
Procedure:	LQ-508-003	Revision:	A-3
Instrument:	GEA Detector #3	Property Number:	401934
Technologist:	J. L. Anderson	Payroll Number:	61413
Date:	July 02, 1989		

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: 3
GEOMETRY CODE: 41
GEOMETRY DECSRIPTION: 22 ML LIQUID, POS 1
CALIBRATION DATE: 2-Jul-89
ANALYST(S): J. L. ANDERSON/M. R. DOWELL
STANDARD ID: 56840 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	2.833765E-02
88.032	2.881764E-02
122.0614	2.756557E-02
165.853	2.270614E-02
279.1967	
391.668	1.285730E-02
513.99	
661.65	7.841011E-03
898.021	5.779292E-03
1173.237	4.773005E-03
1332.501	4.278530E-03
1836.129	3.371238E-03

EQUATION 0-165 KEV

```
LOG(EFF) =   -1.113845E+01
         +    3.484260E+00 *LOG(ENERGY)
         +   -3.990659E-01 *LOG(ENERGY)^2
```

EQUATION 165-1836 KEV

```
LOG(EFF) =   -2.052334E+01
         +    9.121738E+00 *LOG(ENERGY)
         +   -1.553578E+00 *LOG(ENERGY)^2
         +    8.018036E-02 *LOG(ENERGY)^3
```

GEA CALIBRATION RECORD PROCEDURE LQ-508-003

DETECTOR: 3
GEOMETRY CODE: 42
GEOMETRY DECSRIPTION: 22 ML LIQUID, POS 2
CALIBRATION DATE: 2-Jul-89
ANALYST(S): J. L. ANDERSON/M. R. DOWELL
STANDARD ID: 56840 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	7.455306E-03
88.032	7.462748E-03
122.0614	7.578302E-03
165.853	6.965814E-03
279.1967	
391.668	3.596591E-03
513.99	
661.65	2.318396E-03
898.021	1.824191E-03
1173.237	1.461179E-03
1332.501	1.321243E-03
1836.129	1.011332E-03

954 5524.2681

EQUATION 0-165 KEV

```
LOG(EFF) =    -6.838496E+00
           +   8.819509E-01 *LOG(ENERGY)
           +  -9.970528E-02 *LOG(ENERGY)^2
```

EQUATION 165-1836 KEV

```
LOG(EFF) =     3.082260E-01
           +  -1.410839E+00 *LOG(ENERGY)
           +   1.042898E-01 *LOG(ENERGY)^2
           +  -5.874725E-03 *LOG(ENERGY)^3
```

GEA CALIBRATION RECORD PROCEDURE LQ-508-003

DETECTOR: 3
GEOMETRY CODE: 43
GEOMETRY DECSRIPTION: 22 ML LIQUID, POS 3
CALIBRATION DATE: 2-Jul-89
ANALYST(S): J. L. ANDERSON/M. R. DOWELL
STANDARD ID: 56B40 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	2.020462E-03
88.032	1.924344E-03
122.0614	2.027231E-03
165.853	1.712371E-03
279.1967	
391.668	1.056509E-03
513.99	
661.65	7.115743E-04
898.021	5.243928E-04
1173.237	4.551585E-04
1332.501	4.223636E-04
1836.129	3.139091E-04

EQUATION 0-165 KEV

```
LOG(EFF) =    -5.300788E+00
           +  -3.550643E-01 *LOG(ENERGY)
           +   3.272635E-02 *LOG(ENERGY)^2
```

EQUATION 165-1836 KEV

```
LOG(EFF) =    -9.815549E+00
           +   2.402920E+00 *LOG(ENERGY)
           +  -4.428877E-01 *LOG(ENERGY)^2
           +   2.059131E-02 *LOG(ENERGY)^3
```

Single Shell Tank Calibration Record

Analyte:	Mixed Isotope Standards		
Procedure:	LQ-508-003	Revision:	A-0
Instrument:	GEA Detector #4	Property Number:	401934
Technologist:	J. L. Anderson	Payroll Number:	61413
Date:	September 01, 1989		

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

GEA CALIBRATION RECORD PROCEDURE LQ-508-003

DETECTOR: 4
GEOMETRY CODE: 41
GEOMETRY DECSRIPTION: 22 ML LIQUID, POS 1
CALIBRATION DATE: 1-Sep-89
ANALYST(S): J. L. ANDERSON/M. R. DOWELL
STANDARD ID: 56840 D1

ENERGY (KEV)	EFFICIENCY (COUNTS/GAMMA)
59.536	2.682446E-02
88.032	8.210956E-02
122.0614	1.118411E-01
165.853	1.066653E-01
279.1967	
391.668	5.704220E-02
513.99	
661.65	3.685958E-02
898.021	2.541629E-02
1173.237	2.161710E-02
1332.501	1.973393E-02
1836.129	1.484468E-02

EQUATION 0-165 KEV

```
LOG(EFF) =   -5.844056E+01
         +    2.310700E+01 *LOG(ENERGY)
         +    2.371355E+00 *LOG(ENERGY)^2
```

EQUATION 165-1836 KEV

```
LOG(EFF) =   -1.718967E+01
         +    8.164155E+00 *LOG(ENERGY)
         +   -1.384196E+00 *LOG(ENERGY)^2
         +    7.025985E-02 *LOG(ENERGY)^3
```

GEA CALIBRATION RECORD PROCEDURE LQ-508-003

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                   *
*          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 WESTINGHOUSE HANFORD 27-AUG-90 10:12:00

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 4 / GEOMETRY NUMBER: 41
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: SD4885
ANALYZED BY: VR

SAMPLE DESCRIPTION: F129 SEGMENT 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 10-JAN-90 AT 07:02:02

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3032. SECONDS
DEAD TIME: 1.06 %

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

ENERGY CALIBRATION PERFORMED 26-DEC-89
EFFICIENCY CALIBRATION PERFORMED 1-SEP-89

222-S COUNTING ROOM WESTINGHOUSE HANFORD 27-AUG-90 10:12:00

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	53.64	27.00	1.09	2713.	1439.	11.3	
1B		27.06			123.	34.3	
2	951.26	475.55	1.69	4680.	813.	25.0	CS-134
3C	1126.89	563.35	1.52	3130.	3613.	5.7	CS-134, EU-152
4C	1139.08	569.44	1.52	3058.	6581.	4.5	CS-134, BI-207
5	1209.84	604.81	1.58	3039.	41942.	1.0	CS-134
6	1323.69	661.73	1.64	1970.	65129.	0.8	CS-137
6B		661.35			379.	12.7	
7?	1591.95	795.86	1.72	1709.	30466.	1.5	CS-134
8?	1604.14	801.95	1.72	1656.	2943.	9.1	CS-134
9?	2335.95	1167.96	2.04	1036.	578.	28.6	CS-134
10?	2346.41	1173.19	2.04	916.	27276.	1.5	CO-60
11	2664.98	1332.57	2.28	257.	24755.	1.3	CO-60
12	2730.39	1365.30	2.46	111.	796.	8.2	CS-134
13	2801.12	1400.69	2.37	109.	399.	13.1	BI-214
14	2921.56	1460.96	2.47	90.	813.	7.9	K-40
14B		1460.80			854.	7.1	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
? - MULTIPLET ANALYSIS CONVERGED BUT GFIT > 4
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 8-SEP-89 AT 12:00:00
BACKGROUND LIVE TIME: 3000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 27-AUG-90 10:12:00

SAMPLE: F129 SEGMENT F
DATA COLLECTED ON 10-JAN-90 AT 07:02:02
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<3.89E-01		LLD<3.89E-01		911.07	
AG-108M	LLD<8.41E-02		LLD<8.41E-02		433.94	
AG-110M	LLD<4.06E-01		LLD<4.06E-01		657.76	
AM-241	LLD<3.93E-01		LLD<3.93E-01		59.54	
AM-243	LLD<9.32E-02		LLD<9.32E-02		74.67	
AR-41	LLD<6.76E-02		LLD<6.76E-02		1293.64	
AU-198	LLD<8.50E-02		LLD<8.50E-02		411.80	
BA-133	LLD<1.05E-01		LLD<1.05E-01		356.02	
BA-139	LLD<2.09E-01		LLD<2.09E-01		165.85	
BA-140	LLD<3.11E-01		LLD<3.11E-01		537.27	
BA-141	LLD<2.03E-01		LLD<2.03E-01		190.23	
BE-7	LLD<8.10E-01		LLD<8.10E-01		477.59	
BI-207	LLD<8.03E-02		LLD<8.03E-02		569.70	
BI-212	LLD<1.09E+00		LLD<1.09E+00		727.27	
BI-214	LLD<6.01E-01		LLD<6.01E-01		609.32	
CD-109	LLD<1.30E+00		LLD<1.30E+00		88.03	
CE-139	LLD<4.73E-02		LLD<4.73E-02		165.85	
CE-141	LLD<7.07E-02		LLD<7.07E-02		145.44	
CEPR144	LLD<6.03E-01		LLD<6.03E-01		133.51	
CO-56	LLD<8.80E-02		LLD<8.80E-02		846.76	
CO-57	LLD<3.83E-02		LLD<3.83E-02		122.06	
CO-58	LLD<8.01E-02		LLD<8.01E-02		810.75	
CO-60	2.28E+01	+-3.30E-01	2.28E+01	+-3.30E-01	1332.50	0.07
					1173.24	-0.04
CR-51	LLD<5.78E-01		LLD<5.78E-01		320.09	
CS-134	2.08E+01	+-3.56E-01	2.08E+01	+-3.56E-01	795.84	0.02
					604.70	0.12
CS-136	LLD<7.79E-02		LLD<7.79E-02		818.51	
CS-137	3.74E+01	+-4.12E-01	3.74E+01	+-4.12E-01	661.65	0.08
CS-138	LLD<8.08E-02		LLD<8.08E-02		1435.86	
EU-152	LLD<2.08E-01		LLD<2.08E-01		1408.01	
EU-154	LLD<1.58E-01		LLD<1.58E-01		1274.45	
EU-155	LLD<1.65E-01		LLD<1.65E-01		105.31	
FE-59	LLD<1.99E-01		LLD<1.99E-01		1099.25	
HF-181	LLD<9.82E-02		LLD<9.82E-02		482.20	
HG-203	LLD<6.67E-02		LLD<6.67E-02		279.20	
I-131	LLD<8.12E-02		LLD<8.12E-02		364.48	
I-132	LLD<9.54E-02		LLD<9.54E-02		667.69	
I-133	LLD<8.96E-02		LLD<8.96E-02		529.69	
I-134	LLD<1.18E-01		LLD<1.18E-01		847.03	
I-135	LLD<2.16E-01		LLD<2.16E-01		1260.41	
K-40	LLD<9.13E-01		LLD<9.13E-01		1460.75	
KR-85	LLD<1.67E+01		LLD<1.67E+01		513.99	
KR-85M	LLD<4.95E-02		LLD<4.95E-02		151.17	
KR-87	LLD<1.81E-01		LLD<1.81E-01		402.58	
KR-89	LLD<2.57E+00		LLD<2.57E+00		220.90	
LA-140	LLD<3.10E-02		LLD<3.10E-02		1596.20	

LA-142	LLD<1.84E-01	LLD<1.84E-01	641.83
MN-54	LLD<8.70E-02	LLD<8.70E-02	834.83
MN-56	LLD<9.93E-02	LLD<9.93E-02	846.76
NA-22	LLD<5.24E-02	LLD<5.24E-02	1274.55
NA-24	LLD<7.27E-02	LLD<7.27E-02	1368.60
NB-94	LLD<6.95E-02	LLD<6.95E-02	702.63
NB-95	LLD<8.08E-02	LLD<8.08E-02	765.78
NB-97	LLD<5.79E-01	LLD<5.79E-01	657.92
NP-238	LLD<3.64E-01	LLD<3.64E-01	984.45
NP-239	LLD<3.80E-01	LLD<3.80E-01	277.60
PA-233	LLD<1.61E-01	LLD<1.61E-01	311.98
PA-234M	LLD<1.85E+01	LLD<1.85E+01	1001.03
PB-210	LLD<1.97E+00	LLD<1.97E+00	465.03
PB-212	LLD<1.30E-01	LLD<1.30E-01	239.00
PB-214	LLD<1.76E-01	LLD<1.76E-01	351.92
PO-210	LLD<7.29E+03	LLD<7.29E+03	804.00
PO-214	LLD<3.77E+03	LLD<3.77E+03	799.70
PO-216	LLD<6.39E+03	LLD<6.39E+03	804.90
PU-239	LLD<5.16E+02	LLD<5.16E+02	129.30
PU-241	LLD<1.85E+04	LLD<1.85E+04	148.57
RA-224	LLD<1.31E+00	LLD<1.31E+00	240.99
RA-226	LLD<1.31E+00	LLD<1.31E+00	186.10
RB-88	LLD<4.01E-01	LLD<4.01E-01	1836.00
RB-89	LLD<4.47E-01	LLD<4.47E-01	1031.88
RN-220	LLD<6.99E+01	LLD<6.99E+01	549.73
RU-103	LLD<8.31E-02	LLD<8.31E-02	497.08
RURH106	LLD<1.46E+00	LLD<1.46E+00	621.80
SB-124	LLD<2.01E-01	LLD<2.01E-01	602.72
SB-125	LLD<5.67E-01	LLD<5.67E-01	176.33
SC-46	LLD<1.10E-01	LLD<1.10E-01	1120.45
SE-75	LLD<9.00E-02	LLD<9.00E-02	264.66
SN-113	LLD<1.10E-01	LLD<1.10E-01	391.67
SR-85	LLD<7.34E-02	LLD<7.34E-02	513.99
SR-91	LLD<1.43E-01	LLD<1.43E-01	555.60
SR-92	LLD<4.88E-02	LLD<4.88E-02	1383.94
TA-182	LLD<2.99E-01	LLD<2.99E-01	1121.30
TC-99M	LLD<3.95E-02	LLD<3.95E-02	140.51
TE-123M	LLD<4.32E-02	LLD<4.32E-02	159.00
TE-125M	LLD<1.25E+01	LLD<1.25E+01	109.27
TE-132	LLD<5.77E-02	LLD<5.77E-02	228.16
TH-228	LLD<4.03E+00	LLD<4.03E+00	84.37
TL-208	LLD<9.94E-02	LLD<9.94E-02	583.14
U-235	LLD<7.27E-02	LLD<7.27E-02	185.71
U-237	LLD<2.34E-01	LLD<2.34E-01	208.00
W-187	LLD<2.38E-01	LLD<2.38E-01	685.74
XE-131M	LLD<1.97E+00	LLD<1.97E+00	163.98
XE-133	LLD<1.46E-01	LLD<1.46E-01	81.00
XE-133M	LLD<4.71E-01	LLD<4.71E-01	233.21
XE-135	LLD<5.38E-02	LLD<5.38E-02	249.79
XE-138	LLD<4.52E-01	LLD<4.52E-01	258.41
Y-88	LLD<3.78E-02	LLD<3.78E-02	1836.06
Y-91	LLD<2.46E+01	LLD<2.46E+01	1204.90
Y-91M	LLD<1.08E-01	LLD<1.08E-01	555.60
ZN-65	LLD<2.35E-01	LLD<2.35E-01	1115.55
ZR-95	LLD<1.36E-01	LLD<1.36E-01	756.73
ZR-97	LLD<7.81E-02	LLD<7.81E-02	743.33
TOTAL	8.10E+01 +-6.36E-01	8.10E+01 +-6.36E-01	

STANDARD DEVIATION = 0.06

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.45E-09 UC/LI
TOTAL MEASURED ACTIVITY = 8.10E+01 (+-6.36E-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
53.64	27.00	1316.	12.8	1.37E+03
951.26	475.55	813.	25.0	5.46E+00
1126.89	563.35	3613.	5.7	2.83E+01
1139.08	569.44	6581.	4.5	5.21E+01
1604.14	801.95	2943.	9.1	3.19E+01
2335.95	1167.96	578.	28.6	8.80E+00
2730.39	1365.30	796.	8.2	1.39E+01
2801.12	1400.69	399.	13.1	7.10E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2921.56	1460.96	813.	7.9	1.50E+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 WESTINGHOUSE HANFORD 27-AUG-90 09:55:27

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: 3.0
DETECTOR NUMBER: 3 / 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: 95.0%
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: SD3888
ANALYZED BY: DM

SAMPLE DESCRIPTION: F-308 SEGMENT-U
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 10-JAN-90 AT 09:24:49

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3003. SECONDS
DEAD TIME: 0.10 %

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

ENERGY CALIBRATION PERFORMED 17-OCT-89
EFFICIENCY CALIBRATION PERFORMED 31-JUL-89

222-S COUNTING ROOM WESTINGHOUSE HANFORD 27-AUG-90 09:55:27

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	2921.30	1460.75	1.81	32.	603.	8.6	K-40
1B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 27-AUG-90 09:55:27

SAMPLE: F-308 SEGMENT-U
DATA COLLECTED ON 10-JAN-90 AT 09:24:49
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<1.18E+00		LLD<1.18E+00		911.07	
AG-108M	LLD<1.95E-01		LLD<1.95E-01		433.94	
AG-110M	LLD<2.98E-01		LLD<2.98E-01		657.76	
AM-241	LLD<2.89E-01		LLD<2.89E-01		59.54	
AM-243	LLD<2.27E-01		LLD<2.27E-01		74.67	
AR-41	LLD<3.19E-01		LLD<3.19E-01		1293.64	
AU-198	LLD<1.82E-01		LLD<1.82E-01		411.80	
BA-133	LLD<3.07E-01		LLD<3.07E-01		356.02	
BA-139	LLD<7.16E-01		LLD<7.16E-01		165.85	
BA-140	LLD<8.17E-01		LLD<8.17E-01		537.27	
BA-141	LLD<7.54E-01		LLD<7.54E-01		190.23	
BE-7	LLD<1.74E+00		LLD<1.74E+00		477.59	
BI-207	LLD<1.90E-01		LLD<1.90E-01		569.70	
BI-212	LLD<3.10E+00		LLD<3.10E+00		727.27	
BI-214	LLD<6.11E-01		LLD<6.11E-01		609.32	
CD-109	LLD<3.62E+00		LLD<3.62E+00		88.03	
CE-139	LLD<1.62E-01		LLD<1.62E-01		165.85	
CE-141	LLD<2.83E-01		LLD<2.83E-01		145.44	
CEPR144	LLD<2.49E+00		LLD<2.49E+00		133.51	
CO-56	LLD<2.15E-01		LLD<2.15E-01		846.76	
CO-57	LLD<1.57E-01		LLD<1.57E-01		122.06	
CO-58	LLD<2.19E-01		LLD<2.19E-01		810.75	
CO-60	LLD<2.64E-01		LLD<2.64E-01		1332.50	
CR-51	LLD<1.62E+00		LLD<1.62E+00		320.09	
CS-134	LLD<2.57E-01		LLD<2.57E-01		795.84	
CS-136	LLD<2.05E-01		LLD<2.05E-01		818.51	
CS-137	LLD<3.20E-01		LLD<3.20E-01		661.65	
CS-138	LLD<4.38E-01		LLD<4.38E-01		1435.86	
EU-152	LLD<1.35E+00		LLD<1.35E+00		1408.01	
EU-154	LLD<7.68E-01		LLD<7.68E-01		1274.45	
EU-155	LLD<6.08E-01		LLD<6.08E-01		105.31	
FE-59	LLD<5.21E-01		LLD<5.21E-01		1099.25	
HF-181	LLD<2.30E-01		LLD<2.30E-01		482.20	
HG-203	LLD<1.85E-01		LLD<1.85E-01		279.20	
I-131	LLD<2.15E-01		LLD<2.15E-01		364.48	
I-132	LLD<2.06E-01		LLD<2.06E-01		667.69	
I-133	LLD<2.14E-01		LLD<2.14E-01		529.69	
I-134	LLD<3.02E-01		LLD<3.02E-01		847.03	
I-135	LLD<9.96E-01		LLD<9.96E-01		1260.41	
K-40	LLD<7.39E+00		LLD<7.39E+00		1460.75	
KR-85	LLD<5.58E+01		LLD<5.58E+01		513.99	
KR-85M	LLD<2.13E-01		LLD<2.13E-01		151.17	
KR-87	LLD<4.19E-01		LLD<4.19E-01		402.58	
KR-89	LLD<7.87E+00		LLD<7.87E+00		220.90	
LA-140	LLD<2.91E-01		LLD<2.91E-01		1596.20	
LA-142	LLD<4.85E-01		LLD<4.85E-01		641.83	
MN-54	LLD<2.31E-01		LLD<2.31E-01		834.83	

MN-56	LLD<2.43E-01	LLD<2.43E-01	846.76
NA-22	LLD<3.03E-01	LLD<3.03E-01	1274.55
NA-24	LLD<2.20E-01	LLD<2.20E-01	1368.60
NB-94	LLD<2.23E-01	LLD<2.23E-01	702.63
NB-95	LLD<2.03E-01	LLD<2.03E-01	765.78
NB-97	LLD<3.61E-01	LLD<3.61E-01	657.92
NP-238	LLD<9.29E-01	LLD<9.29E-01	984.45
NP-239	LLD<1.13E+00	LLD<1.13E+00	277.60
PA-233	LLD<4.34E-01	LLD<4.34E-01	311.98
PA-234M	LLD<4.11E+01	LLD<4.11E+01	1001.03
PB-210	LLD<4.80E+00	LLD<4.80E+00	465.03
PB-212	LLD<3.88E-01	LLD<3.88E-01	239.00
PB-214	LLD<6.20E-01	LLD<6.20E-01	351.92
PO-210	LLD<1.58E+04	LLD<1.58E+04	804.00
PO-214	LLD<2.01E+03	LLD<2.01E+03	799.70
PO-216	LLD<1.05E+04	LLD<1.05E+04	804.90
PU-239	LLD<2.07E+03	LLD<2.07E+03	129.30
PU-241	LLD<7.12E+04	LLD<7.12E+04	148.57
RA-224	LLD<4.28E+00	LLD<4.28E+00	240.99
RA-226	LLD<4.43E+00	LLD<4.43E+00	186.10
RB-88	LLD<2.61E+00	LLD<2.61E+00	1836.00
RB-89	LLD<1.19E+00	LLD<1.19E+00	1031.88
RN-220	LLD<1.84E+02	LLD<1.84E+02	549.73
RU-103	LLD<2.00E-01	LLD<2.00E-01	497.08
RURH106	LLD<3.92E+00	LLD<3.92E+00	621.80
SB-124	LLD<1.84E-01	LLD<1.84E-01	602.72
SB-125	LLD<1.98E+00	LLD<1.98E+00	176.33
SC-46	LLD<3.85E-01	LLD<3.85E-01	1120.45
SE-75	LLD<2.71E-01	LLD<2.71E-01	264.66
SN-113	LLD<2.69E-01	LLD<2.69E-01	391.67
SR-85	LLD<2.45E-01	LLD<2.45E-01	513.99
SR-91	LLD<3.54E-01	LLD<3.54E-01	555.60
SR-92	LLD<4.47E-01	LLD<4.47E-01	1383.94
TA-182	LLD<8.15E-01	LLD<8.15E-01	1121.30
TC-99M	LLD<1.58E-01	LLD<1.58E-01	140.51
TE-123M	LLD<1.57E-01	LLD<1.57E-01	159.00
TE-125M	LLD<4.71E+01	LLD<4.71E+01	109.27
TE-132	LLD<1.81E-01	LLD<1.81E-01	228.16
TH-228	LLD<9.83E+00	LLD<9.83E+00	84.37
TL-208	LLD<3.02E-01	LLD<3.02E-01	583.14
U-235	LLD<2.71E-01	LLD<2.71E-01	185.71
U-237	LLD<7.54E-01	LLD<7.54E-01	208.00
W-187	LLD<7.58E-01	LLD<7.58E-01	685.74
XE-131M	LLD<6.93E+00	LLD<6.93E+00	163.98
XE-133	LLD<3.12E-01	LLD<3.12E-01	81.00
XE-133M	LLD<1.60E+00	LLD<1.60E+00	233.21
XE-135	LLD<1.71E-01	LLD<1.71E-01	249.79
XE-138	LLD<1.38E+00	LLD<1.38E+00	258.41
Y-88	LLD<2.48E-01	LLD<2.48E-01	1836.06
Y-91	LLD<9.78E+01	LLD<9.78E+01	1204.90
Y-91M	LLD<2.67E-01	LLD<2.67E-01	555.60
ZN-65	LLD<6.72E-01	LLD<6.72E-01	1115.55
ZR-95	LLD<3.79E-01	LLD<3.79E-01	756.73
ZR-97	LLD<2.26E-01	LLD<2.26E-01	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 95.0%

9513324.2695

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2921.30	1460.75	603.	8.6	1.64E+02

9513524.2694

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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 08:53:04

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: SD1008
ANALYZED BY: DM

SAMPLE DESCRIPTION: F-154 SEGMENT-G
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 10-JAN-90 AT 08:13:24

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3002. SECONDS
DEAD TIME: 0.07 %

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 08:53:04

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	1022.34	510.66	2.15	61.	99.	29.8	RN-222,I-133,
1B		510.84			74.	27.6	TL-208,NA-22, ZN-65,RH-106
2	1218.75	608.83	0.89	41.	56.	42.9	BI-214,
2B		609.26			49.	31.5	RU-103
3	1323.47	661.17	1.53	51.	1465.	5.3	CS-137
3B		661.82			35.	46.4	
4	2921.31	1460.46	1.88	2.	183.	14.6	K-40
4B		1461.77			182.	11.2	
5	3528.28	1764.37	0.92	9.	15.	80.6	BI-214

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 08:53:04

SAMPLE: F-154 SEGMENT-G
DATA COLLECTED ON 10-JAN-90 AT 08:13:24
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<1.87E+00		LLD<1.87E+00		911.07	
AG-108M	LLD<7.54E-01		LLD<7.54E-01		433.94	
AG-110M	LLD<3.70E+00		LLD<3.70E+00		657.76	
AM-241	LLD<4.45E+00		LLD<4.45E+00		59.54	
AM-243	LLD<1.31E+00		LLD<1.31E+00		74.67	
AR-41	LLD<6.11E-01		LLD<6.11E-01		1293.64	
AU-198	LLD<6.28E-01		LLD<6.28E-01		411.80	
BA-133	LLD<1.02E+00		LLD<1.02E+00		356.02	
BA-139	LLD<2.58E+00		LLD<2.58E+00		165.85	
BA-140	LLD<2.11E+00		LLD<2.11E+00		537.27	
BA-141	LLD<2.45E+00		LLD<2.45E+00		190.23	
BE-7	LLD<7.03E+00		LLD<7.03E+00		477.59	
BI-207	LLD<6.47E-01		LLD<6.47E-01		569.70	
BI-212	LLD<8.62E+00		LLD<8.62E+00		727.27	
BI-214	LLD<1.69E+00		LLD<1.69E+00		609.32	
CD-109	LLD<1.85E+01		LLD<1.85E+01		88.03	
CE-139	LLD<5.83E-01		LLD<5.83E-01		165.85	
CE-141	LLD<9.07E-01		LLD<9.07E-01		145.44	
CEPR144	LLD<8.28E+00		LLD<8.28E+00		133.51	
CO-56	LLD<5.94E-01		LLD<5.94E-01		846.76	
CO-57	LLD<5.40E-01		LLD<5.40E-01		122.06	
CO-58	LLD<5.89E-01		LLD<5.89E-01		810.75	
CO-60	LLD<5.64E-01		LLD<5.64E-01		1332.50	
CR-51	LLD<5.09E+00		LLD<5.09E+00		320.09	
CS-134	LLD<5.85E-01		LLD<5.85E-01		795.84	
CS-136	LLD<5.92E-01		LLD<5.92E-01		818.51	
CS-137	4.44E+01	+-2.53E+00	4.44E+01	+-2.53E+00	661.65	-0.48
CS-138	LLD<1.07E+00		LLD<1.07E+00		1435.86	
EU-152	LLD<3.41E+00		LLD<3.41E+00		1408.01	
EU-154	LLD<1.93E+00		LLD<1.93E+00		1274.45	
EU-155	LLD<2.22E+00		LLD<2.22E+00		105.31	
FE-59	LLD<9.64E-01		LLD<9.64E-01		1099.25	
HF-181	LLD<7.16E-01		LLD<7.16E-01		482.20	
HG-203	LLD<6.21E-01		LLD<6.21E-01		279.20	
I-131	LLD<7.20E-01		LLD<7.20E-01		364.48	
I-132	LLD<6.42E-01		LLD<6.42E-01		667.69	
I-133	LLD<7.83E-01		LLD<7.83E-01		529.69	
I-134	LLD<9.26E-01		LLD<9.26E-01		847.03	
I-135	LLD<2.22E+00		LLD<2.22E+00		1260.41	
K-40	LLD<1.80E+01		LLD<1.80E+01		1460.75	
KR-85	LLD<1.99E+02		LLD<1.99E+02		513.99	
KR-85M	LLD<6.06E-01		LLD<6.06E-01		151.17	
KR-87	LLD<1.40E+00		LLD<1.40E+00		402.58	
KR-89	LLD<2.94E+01		LLD<2.94E+01		220.90	
LA-140	LLD<5.72E-01		LLD<5.72E-01		1596.20	
LA-142	LLD<1.26E+00		LLD<1.26E+00		641.83	
MN-54	LLD<6.53E-01		LLD<6.53E-01		834.83	

MN-56	LLD<6.70E-01	LLD<6.70E-01	846.76
NA-22	LLD<7.05E-01	LLD<7.05E-01	1274.55
NA-24	LLD<4.32E-01	LLD<4.32E-01	1368.60
NB-94	LLD<6.37E-01	LLD<6.37E-01	702.63
NB-95	LLD<6.36E-01	LLD<6.36E-01	765.78
NB-97	LLD<4.48E+00	LLD<4.48E+00	657.92
NP-238	LLD<2.26E+00	LLD<2.26E+00	984.45
NP-239	LLD<4.02E+00	LLD<4.02E+00	277.60
PA-233	LLD<1.65E+00	LLD<1.65E+00	311.98
PA-234M	LLD<1.21E+02	LLD<1.21E+02	1001.03
PB-210	LLD<1.76E+01	LLD<1.76E+01	465.03
PB-212	LLD<1.23E+00	LLD<1.23E+00	239.00
PB-214	LLD<1.59E+00	LLD<1.59E+00	351.92
PO-210	LLD<4.07E+04	LLD<4.07E+04	804.00
PO-214	LLD<4.75E+03	LLD<4.75E+03	799.70
PO-216	LLD<2.85E+04	LLD<2.85E+04	804.90
PU-239	LLD<6.94E+03	LLD<6.94E+03	129.30
PU-241	LLD<2.41E+05	LLD<2.41E+05	148.57
RA-224	LLD<1.44E+01	LLD<1.44E+01	240.99
RA-226	LLD<1.35E+01	LLD<1.35E+01	186.10
RB-88	LLD<6.32E+00	LLD<6.32E+00	1836.00
RB-89	LLD<2.49E+00	LLD<2.49E+00	1031.88
RN-220	LLD<4.39E+02	LLD<4.39E+02	549.73
RU-103	LLD<7.08E-01	LLD<7.08E-01	497.08
RURH106	LLD<1.21E+01	LLD<1.21E+01	621.80
SB-124	LLD<5.48E-01	LLD<5.48E-01	602.72
SB-125	LLD<6.69E+00	LLD<6.69E+00	176.33
SC-46	LLD<4.94E-01	LLD<4.94E-01	1120.45
SE-75	LLD<9.46E-01	LLD<9.46E-01	264.66
SN-113	LLD<8.00E-01	LLD<8.00E-01	391.67
SR-85	LLD<8.74E-01	LLD<8.74E-01	513.99
SR-91	LLD<1.04E+00	LLD<1.04E+00	555.60
SR-92	LLD<5.99E-01	LLD<5.99E-01	1383.94
TA-182	LLD<1.88E+00	LLD<1.88E+00	1121.30
TC-99M	LLD<5.59E-01	LLD<5.59E-01	140.51
TE-123M	LLD<5.36E-01	LLD<5.36E-01	159.00
TE-125M	LLD<1.68E+02	LLD<1.68E+02	109.27
TE-132	LLD<5.87E-01	LLD<5.87E-01	228.16
TH-228	LLD<5.84E+01	LLD<5.84E+01	84.37
TL-208	LLD<6.96E-01	LLD<6.96E-01	583.14
U-235	LLD<9.04E-01	LLD<9.04E-01	185.71
U-237	LLD<2.46E+00	LLD<2.46E+00	208.00
W-187	LLD<2.08E+00	LLD<2.08E+00	685.74
XE-131M	LLD<2.50E+01	LLD<2.50E+01	163.98
XE-133	LLD<2.03E+00	LLD<2.03E+00	81.00
XE-133M	LLD<5.19E+00	LLD<5.19E+00	233.21
XE-135	LLD<6.35E-01	LLD<6.35E-01	249.79
XE-138	LLD<4.60E+00	LLD<4.60E+00	258.41
Y-88	LLD<6.00E-01	LLD<6.00E-01	1836.06
Y-91	LLD<2.63E+02	LLD<2.63E+02	1204.90
Y-91M	LLD<7.87E-01	LLD<7.87E-01	555.60
ZN-65	LLD<1.78E+00	LLD<1.78E+00	1115.55
ZR-95	LLD<1.06E+00	LLD<1.06E+00	756.73
ZR-97	LLD<5.45E-01	LLD<5.45E-01	743.33
TOTAL	4.44E+01 +-2.53E+00	4.44E+01 +-2.53E+00	

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI
TOTAL MEASURED ACTIVITY = 4.44E+01 (+-2.53E+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
3528.28	1764.37	15.	80.6	1.68E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1022.34	510.66	99.	29.8	3.93E+00
1218.75	608.83	56.	42.9	2.54E+00
2921.31	1460.46	183.	14.6	1.74E+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                                  27-AUG-90  09:40:44

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

MCA UNIT NUMBER:   1     /     ADC UNIT NUMBER: 2.0
DETECTOR NUMBER:    2    /     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: SD2748
ANALYZED BY:        DM

SAMPLE DESCRIPTION: F-155 SEGMENT-H
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 10-JAN-90 AT 08:15:08

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 17-MAR-89
EFFICIENCY CALIBRATION PERFORMED 21-OCT-88
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222-S COUNTING ROOM 27-AUG-90 09:40:44

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	1324.36	661.79	1.67	36.	1233.	5.8	CS-137
1B		661.85			36.	13.9	
2	2921.65	1460.37	2.31	10.	146.	17.8	K-40
2B		1460.85			156.	3.8	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0012
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 30-AUG-88 AT 16:46:00
BACKGROUND LIVE TIME: 60000. SECONDS

222-S COUNTING ROOM 27-AUG-90 09:40:44

SAMPLE: F-155 SEGMENT-H
DATA COLLECTED ON 10-JAN-90 AT 08:15:08
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<3.92E+00		LLD<3.92E+00		911.07	
AG-108M	LLD<1.06E+00		LLD<1.06E+00		433.94	
AG-110M	LLD<5.11E+00		LLD<5.11E+00		657.76	
AM-241	LLD<7.16E+00		LLD<7.16E+00		59.54	
AM-243	LLD<1.93E+00		LLD<1.93E+00		74.67	
AR-41	LLD<1.14E+00		LLD<1.14E+00		1293.64	
AU-198	LLD<8.84E-01		LLD<8.84E-01		411.80	
BA-133	LLD<1.24E+00		LLD<1.24E+00		356.02	
BA-139	LLD<3.28E+00		LLD<3.28E+00		165.85	
BA-140	LLD<3.47E+00		LLD<3.47E+00		537.27	
BA-141	LLD<3.05E+00		LLD<3.05E+00		190.23	
BE-7	LLD<9.71E+00		LLD<9.71E+00		477.59	
BI-207	LLD<8.57E-01		LLD<8.57E-01		569.70	
BI-212	LLD<1.35E+01		LLD<1.35E+01		727.27	
BI-214	LLD<1.78E+00		LLD<1.78E+00		609.32	
CD-109	LLD<2.51E+01		LLD<2.51E+01		88.03	
CE-139	LLD<7.41E-01		LLD<7.41E-01		165.85	
CE-141	LLD<1.35E+00		LLD<1.35E+00		145.44	
CEPR144	LLD<1.12E+01		LLD<1.12E+01		133.51	
CO-56	LLD<6.69E-01		LLD<6.69E-01		846.76	
CO-57	LLD<7.20E-01		LLD<7.20E-01		122.06	
CO-58	LLD<9.16E-01		LLD<9.16E-01		810.75	
CO-60	LLD<9.93E-01		LLD<9.93E-01		1332.50	
CR-51	LLD<7.21E+00		LLD<7.21E+00		320.09	
CS-134	LLD<1.07E+00		LLD<1.07E+00		795.84	
CS-136	LLD<7.75E-01		LLD<7.75E-01		818.51	
CS-137	5.17E+01	+-3.15E+00	5.17E+01	+-3.15E+00	661.65	0.14
CS-138	LLD<2.07E+00		LLD<2.07E+00		1435.86	
EU-152	LLD<4.57E+00		LLD<4.57E+00		1408.01	
EU-154	LLD<2.98E+00		LLD<2.98E+00		1274.45	
EU-155	LLD<3.39E+00		LLD<3.39E+00		105.31	
FE-59	LLD<1.65E+00		LLD<1.65E+00		1099.25	
HF-181	LLD<9.96E-01		LLD<9.96E-01		482.20	
HG-203	LLD<8.25E-01		LLD<8.25E-01		279.20	
I-131	LLD<9.09E-01		LLD<9.09E-01		364.48	
I-132	LLD<2.66E+00		LLD<2.66E+00		667.69	
I-133	LLD<8.89E-01		LLD<8.89E-01		529.69	
I-134	LLD<1.06E+00		LLD<1.06E+00		847.03	
I-135	LLD<3.61E+00		LLD<3.61E+00		1260.41	
K-40	LLD<1.94E+01		LLD<1.94E+01		1460.75	
KR-85	LLD<2.25E+02		LLD<2.25E+02		513.99	
KR-85M	LLD<8.21E-01		LLD<8.21E-01		151.17	
KR-87	LLD<1.98E+00		LLD<1.98E+00		402.58	
KR-89	LLD<3.55E+01		LLD<3.55E+01		220.90	
LA-140	LLD<1.07E+00		LLD<1.07E+00		1596.20	
LA-142	LLD<1.97E+00		LLD<1.97E+00		641.83	
MN-54	LLD<7.65E-01		LLD<7.65E-01		834.83	

MN-56	LLD<7.55E-01	LLD<7.55E-01	846.76
NA-22	LLD<1.06E+00	LLD<1.06E+00	1274.55
NA-24	LLD<8.31E-01	LLD<8.31E-01	1368.60
NB-94	LLD<7.52E-01	LLD<7.52E-01	702.63
NB-95	LLD<7.95E-01	LLD<7.95E-01	765.78
NB-97	LLD<5.78E+00	LLD<5.78E+00	657.92
NP-238	LLD<3.73E+00	LLD<3.73E+00	984.45
NP-239	LLD<5.02E+00	LLD<5.02E+00	277.60
PA-233	LLD<1.74E+00	LLD<1.74E+00	311.98
PA-234M	LLD<1.60E+02	LLD<1.60E+02	1001.03
PB-210	LLD<2.15E+01	LLD<2.15E+01	465.03
PB-212	LLD<1.59E+00	LLD<1.59E+00	239.00
PB-214	LLD<2.08E+00	LLD<2.08E+00	351.92
PO-210	LLD<7.88E+04	LLD<7.88E+04	804.00
PO-214	LLD<8.29E+03	LLD<8.29E+03	799.70
PO-216	LLD<4.74E+04	LLD<4.74E+04	804.90
PU-239	LLD<9.88E+03	LLD<9.88E+03	129.30
PU-241	LLD<3.08E+05	LLD<3.08E+05	148.57
RA-224	LLD<1.53E+01	LLD<1.53E+01	240.99
RA-226	LLD<1.68E+01	LLD<1.68E+01	186.10
RB-88	LLD<8.48E+00	LLD<8.48E+00	1836.00
RB-89	LLD<4.62E+00	LLD<4.62E+00	1031.88
RN-220	LLD<6.94E+02	LLD<6.94E+02	549.73
RU-103	LLD<8.78E-01	LLD<8.78E-01	497.08
RURH106	LLD<1.69E+01	LLD<1.69E+01	621.80
SB-124	LLD<7.16E-01	LLD<7.16E-01	602.72
SB-125	LLD<9.41E+00	LLD<9.41E+00	176.33
SC-46	LLD<1.11E+00	LLD<1.11E+00	1120.45
SE-75	LLD<1.23E+00	LLD<1.23E+00	264.66
SN-113	LLD<1.25E+00	LLD<1.25E+00	391.67
SR-85	LLD<9.89E-01	LLD<9.89E-01	513.99
SR-91	LLD<1.49E+00	LLD<1.49E+00	555.60
SR-92	LLD<1.47E+00	LLD<1.47E+00	1383.94
TA-182	LLD<2.97E+00	LLD<2.97E+00	1121.30
TC-99M	LLD<7.14E-01	LLD<7.14E-01	140.51
TE-123M	LLD<7.21E-01	LLD<7.21E-01	159.00
TE-125M	LLD<2.38E+02	LLD<2.38E+02	109.27
TE-132	LLD<7.61E-01	LLD<7.61E-01	228.16
TH-228	LLD<8.03E+01	LLD<8.03E+01	84.37
TL-208	LLD<1.05E+00	LLD<1.05E+00	583.14
U-235	LLD<1.12E+00	LLD<1.12E+00	185.71
U-237	LLD<2.97E+00	LLD<2.97E+00	208.00
W-187	LLD<3.21E+00	LLD<3.21E+00	685.74
XE-131M	LLD<3.25E+01	LLD<3.25E+01	163.98
XE-133	LLD<2.88E+00	LLD<2.88E+00	81.00
XE-133M	LLD<6.71E+00	LLD<6.71E+00	233.21
XE-135	LLD<7.27E-01	LLD<7.27E-01	249.79
XE-138	LLD<5.74E+00	LLD<5.74E+00	258.41
Y-88	LLD<8.05E-01	LLD<8.05E-01	1836.06
Y-91	LLD<3.61E+02	LLD<3.61E+02	1204.90
Y-91M	LLD<1.12E+00	LLD<1.12E+00	555.60
ZN-65	LLD<2.99E+00	LLD<2.99E+00	1115.55
ZR-95	LLD<1.40E+00	LLD<1.40E+00	756.73
ZR-97	LLD<9.09E-01	LLD<9.09E-01	743.33
	---	---	
TOTAL	5.17E+01 +-3.15E+00	5.17E+01 +-3.15E+00	

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI
TOTAL MEASURED ACTIVITY = 5.17E+01 (+-3.15E+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
2921.65	1460.37	146.	17.8	1.91E+01

95/3324.2704

The photocopies on the following pages 67.2 to 67.5 are the best copy available from originals of poor reproducible quality.

9513324.2705

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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 WESTINGHOUSE HANFORD 10-JAN-90 09:11:05

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: 3.0
DETECTOR NUMBER: 3 / 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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: DM

SAMPLE DESCRIPTION: F-294 SEGMENT-G
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 10-JAN-90 AT 08:20:54

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3004. SECONDS
DEAD TIME: 0.13 %

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

ENERGY CALIBRATION PERFORMED 17-OCT-89
EFFICIENCY CALIBRATION PERFORMED 31-JUL-89

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	1021.40	510.79	1.91	118.	137.	28.2	RN-222,I-133,
1B		510.96			145.	6.8	TL-208,NA-22, ZN-65,RH-106
2	1218.84	609.45	1.12	109.	139.	28.0	BI-214,
2B		609.49			150.	8.3	RU-103
3	1323.00	661.50	1.32	85.	252.	16.6	CS-137
3B		661.78			26.	28.6	
4	2921.39	1460.79	1.97	34.	584.	8.8	K-40
4B		1460.97			648.	1.8	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BACKGROUND
BACKGROUND COLLECT STARTED ON 28-JUN-89 AT 15:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

9743324.2707

222-S COUNTING ROOM WESTINGHOUSE HANFORD 1.-JAN-90 09:11:05

SAMPLE: F-294 SEGMENT-G
DATA COLLECTED ON 10-JAN-90 AT 08:20:54
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
AM-241	LLD<1.88E-01		LLD<1.88E-01		59.54	
AM-243	LLD<1.39E-01		LLD<1.39E-01		74.67	
BA-133	LLD<1.76E-01		LLD<1.76E-01		356.02	
BA-140	LLD<4.97E-01		LLD<4.97E-01		537.27	
CEPR144	LLD<1.49E+00		LLD<1.49E+00		133.51	
CO-60	LLD<1.32E-01		LLD<1.32E-01		1332.50	
CR-51	LLD<9.62E-01		LLD<9.62E-01		320.09	
CS-134	LLD<1.77E-01		LLD<1.77E-01		795.84	
CS-137	1.03E+00	+-1.95E-01	1.03E+00	+-1.95E-01	661.65	-0.15
EU-152	LLD<9.42E-01		LLD<9.42E-01		1408.01	
EU-154	LLD<4.53E-01		LLD<4.53E-01		1274.45	
EU-155	LLD<3.89E-01		LLD<3.89E-01		105.31	
FE-59	LLD<3.00E-01		LLD<3.00E-01		1099.25	
I-131	LLD<1.34E-01		LLD<1.34E-01		364.48	
K-40	LLD<4.20E+00		LLD<4.20E+00		1460.75	
LA-140	LLD<1.51E-01		LLD<1.51E-01		1596.20	
MN-54	LLD<1.51E-01		LLD<1.51E-01		834.84	
NA-22	LLD<1.65E-01		LLD<1.65E-01		1274.55	
NB-95	LLD<1.50E-01		LLD<1.50E-01		765.78	
NP-237	LLD<6.16E-01		LLD<6.16E-01		86.50	
PU-239	LLD<1.34E+03		LLD<1.34E+03		129.30	
PU-241	LLD<4.44E+04		LLD<4.44E+04		148.57	
RA-224	LLD<2.86E+00		LLD<2.86E+00		240.99	
RA-226	LLD<2.86E+00		LLD<2.86E+00		186.10	
RU-103	LLD<1.34E-01		LLD<1.34E-01		497.08	
RU103	LLD<1.41E-01		LLD<1.41E-01		497.08	
RURH106	LLD<2.70E+00		LLD<2.70E+00		621.80	
SB-125	LLD<1.32E+00		LLD<1.32E+00		176.33	
SE-75	LLD<1.70E-01		LLD<1.70E-01		264.66	
SN-113	LLD<1.76E-01		LLD<1.76E-01		391.67	
SR-85	LLD<1.65E-01		LLD<1.65E-01		513.99	
TH-228	LLD<6.72E+00		LLD<6.72E+00		84.37	
U-235	LLD<1.71E-01		LLD<1.71E-01		185.71	
Y-88	LLD<1.28E-01		LLD<1.28E-01		1836.06	
ZN-65	LLD<4.37E-01		LLD<4.37E-01		1115.55	
ZR-95	LLD<2.55E-01		LLD<2.55E-01		756.73	
TOTAL	1.03E+00	+-1.95E-01	1.03E+00	+-1.95E-01		

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI
TOTAL MEASURED ACTIVITY = 1.03E+00 (+-1.95E-01) 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
1021.40	510.79	137.	28.2	1.60E+01
1218.84	609.45	139.	29.0	1.87E+01
2921.39	1460.79	584.	8.8	1.59E+02

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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 09:32:44

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: SD1009
ANALYZED BY: DM

SAMPLE DESCRIPTION: F-296 SEGMENT-I
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 10-JAN-90 AT 09:18:56

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3002. SECONDS
DEAD TIME: 0.07 %

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 09:32:44

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	1126.55	562.75	1.40	158.	198.	21.1	CS-134, EU-152
2C	1138.99	568.97	1.40	143.	321.	18.3	CS-134, BI-207
3C	1209.70	604.31	1.41	135.	1733.	5.8	CS-134
4C	1218.83	608.87	1.41	126.	36.	33.0	BI-214, RU-103
5	1323.55	661.22	1.57	105.	3132.	3.6	CS-137
5B		661.82			35.	46.4	
6C	1591.90	795.38	1.54	68.	1260.	6.4	CS-134
7C	1604.08	801.47	1.54	70.	118.	13.7	CS-134
8	2346.30	1172.70	1.78	66.	1128.	6.2	CO-60
9	2664.77	1332.06	1.93	7.	1107.	5.9	CO-60
10	2730.32	1364.87	2.34	11.	31.	49.8	CS-134
11	2921.09	1460.35	1.56	5.	166.	15.8	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

9513324.2711

222-S COUNTING ROOM 27-AUG-90 09:32:44

SAMPLE: F-296 SEGMENT-I
DATA COLLECTED ON 10-JAN-90 AT 09:18:56
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<2.18E-01		LLD<2.18E-01		911.07	
AG-108M	LLD<6.07E-02		LLD<6.07E-02		433.94	
AG-110M	LLD<2.70E-01		LLD<2.70E-01		657.76	
AM-241	LLD<2.65E-01		LLD<2.65E-01		59.54	
AM-243	LLD<6.45E-02		LLD<6.45E-02		74.67	
AR-41	LLD<3.67E-02		LLD<3.67E-02		1293.64	
AU-198	LLD<5.20E-02		LLD<5.20E-02		411.80	
BA-133	LLD<8.08E-02		LLD<8.08E-02		356.02	
BA-139	LLD<1.65E-01		LLD<1.65E-01		165.85	
BA-140	LLD<2.00E-01		LLD<2.00E-01		537.27	
BA-141	LLD<1.61E-01		LLD<1.61E-01		190.23	
BE-7	LLD<5.10E-01		LLD<5.10E-01		477.59	
BI-207	LLD<5.12E-02		LLD<5.12E-02		569.70	
BI-212	LLD<6.79E-01		LLD<6.79E-01		727.27	
BI-214	LLD<2.38E-01		LLD<2.38E-01		609.32	
CD-109	LLD<1.03E+00		LLD<1.03E+00		88.03	
CE-139	LLD<3.73E-02		LLD<3.73E-02		165.85	
CE-141	LLD<5.54E-02		LLD<5.54E-02		145.44	
CEPR144	LLD<4.71E-01		LLD<4.71E-01		133.51	
CO-56	LLD<5.17E-02		LLD<5.17E-02		846.76	
CO-57	LLD<3.12E-02		LLD<3.12E-02		122.06	
CO-58	LLD<5.26E-02		LLD<5.26E-02		810.75	
CO-60	2.63E+00	+-1.59E-01	2.63E+00	+-1.59E-01	1332.50	-0.44
					1173.24	-0.54
CR-51	LLD<4.26E-01		LLD<4.26E-01		320.09	
CS-134	2.27E+00	+-1.49E-01	2.27E+00	+-1.49E-01	795.84	-0.47
					604.70	-0.39
CS-136	LLD<4.99E-02		LLD<4.99E-02		818.51	
CS-137	4.81E+00	+-1.88E-01	4.81E+00	+-1.88E-01	661.65	-0.43
CS-138	LLD<6.42E-02		LLD<6.42E-02		1435.86	
EU-152	LLD<1.30E-01		LLD<1.30E-01		1408.01	
EU-154	LLD<9.67E-02		LLD<9.67E-02		1274.45	
EU-155	LLD<1.22E-01		LLD<1.22E-01		105.31	
FE-59	LLD<1.11E-01		LLD<1.11E-01		1099.25	
HF-181	LLD<5.98E-02		LLD<5.98E-02		482.20	
HG-203	LLD<4.99E-02		LLD<4.99E-02		279.20	
I-131	LLD<6.21E-02		LLD<6.21E-02		364.48	
I-132	LLD<5.81E-02		LLD<5.81E-02		667.69	
I-133	LLD<5.73E-02		LLD<5.73E-02		529.69	
I-134	LLD<7.22E-02		LLD<7.22E-02		847.03	
I-135	LLD<1.49E-01		LLD<1.49E-01		1260.41	
K-40	LLD<9.06E-01		LLD<9.06E-01		1460.75	
KR-85	LLD<1.31E+01		LLD<1.31E+01		513.99	
KR-85M	LLD<3.55E-02		LLD<3.55E-02		151.17	
KR-87	LLD<1.31E-01		LLD<1.31E-01		402.58	
KR-89	LLD<2.02E+00		LLD<2.02E+00		220.90	
LA-140	LLD<3.91E-02		LLD<3.91E-02		1596.20	

LA-142	LLD<1.28E-01	LLD<1.28E-01	641.83
MN-54	LLD<5.15E-02	LLD<5.15E-02	834.83
MN-56	LLD<5.83E-02	LLD<5.83E-02	846.76
NA-22	LLD<3.24E-02	LLD<3.24E-02	1274.55
NA-24	LLD<5.26E-02	LLD<5.26E-02	1368.60
NB-94	LLD<4.51E-02	LLD<4.51E-02	702.63
NB-95	LLD<4.59E-02	LLD<4.59E-02	765.78
NB-97	LLD<3.27E-01	LLD<3.27E-01	657.92
NP-238	LLD<1.94E-01	LLD<1.94E-01	984.45
NP-239	LLD<2.84E-01	LLD<2.84E-01	277.60
PA-233	LLD<1.19E-01	LLD<1.19E-01	311.98
PA-234M	LLD<1.01E+01	LLD<1.01E+01	1001.03
PB-210	LLD<1.41E+00	LLD<1.41E+00	465.03
PB-212	LLD<9.29E-02	LLD<9.29E-02	239.00
PB-214	LLD<1.31E-01	LLD<1.31E-01	351.92
PO-210	LLD<5.05E+03	LLD<5.05E+03	804.00
PO-214	LLD<1.93E+03	LLD<1.93E+03	799.70
PO-216	LLD<4.01E+03	LLD<4.01E+03	804.90
PU-239	LLD<4.03E+02	LLD<4.03E+02	129.30
PU-241	LLD<1.49E+04	LLD<1.49E+04	148.57
RA-224	LLD<9.95E-01	LLD<9.95E-01	240.99
RA-226	LLD<8.94E-01	LLD<8.94E-01	186.10
RB-88	LLD<3.69E-02	LLD<3.69E-02	1836.00
RB-89	LLD<2.54E-01	LLD<2.54E-01	1031.88
RN-220	LLD<4.40E+01	LLD<4.40E+01	549.73
RU-103	LLD<5.29E-02	LLD<5.29E-02	497.08
RURH106	LLD<8.84E-01	LLD<8.84E-01	621.80
SB-124	LLD<6.69E-02	LLD<6.69E-02	602.72
SB-125	LLD<4.61E-01	LLD<4.61E-01	176.33
SC-46	LLD<5.84E-02	LLD<5.84E-02	1120.45
SE-75	LLD<6.48E-02	LLD<6.48E-02	264.66
SN-113	LLD<7.31E-02	LLD<7.31E-02	391.67
SR-85	LLD<5.75E-02	LLD<5.75E-02	513.99
SR-91	LLD<9.13E-02	LLD<9.13E-02	555.60
SR-92	LLD<2.99E-02	LLD<2.99E-02	1383.94
TA-182	LLD<1.52E-01	LLD<1.52E-01	1121.30
TC-99M	LLD<3.11E-02	LLD<3.11E-02	140.51
TE-123M	LLD<3.60E-02	LLD<3.60E-02	159.00
TE-125M	LLD<8.79E+00	LLD<8.79E+00	109.27
TE-132	LLD<4.28E-02	LLD<4.28E-02	228.16
TH-228	LLD<3.13E+00	LLD<3.13E+00	84.37
TL-208	LLD<6.31E-02	LLD<6.31E-02	583.14
U-235	LLD<5.90E-02	LLD<5.90E-02	185.71
U-237	LLD<1.67E-01	LLD<1.67E-01	208.00
W-187	LLD<1.59E-01	LLD<1.59E-01	685.74
XE-131M	LLD<1.58E+00	LLD<1.58E+00	163.98
XE-133	LLD<1.11E-01	LLD<1.11E-01	81.00
XE-133M	LLD<3.83E-01	LLD<3.83E-01	233.21
XE-135	LLD<4.23E-02	LLD<4.23E-02	249.79
XE-138	LLD<3.23E-01	LLD<3.23E-01	258.41
Y-88	LLD<3.50E-03	LLD<3.50E-03	1836.06
Y-91	LLD<1.32E+01	LLD<1.32E+01	1204.90
Y-91M	LLD<6.90E-02	LLD<6.90E-02	555.60
ZN-65	LLD<1.33E-01	LLD<1.33E-01	1115.55
ZR-95	LLD<9.94E-02	LLD<9.94E-02	756.73
ZR-97	LLD<4.96E-02	LLD<4.96E-02	743.33
TOTAL	9.71E+00 +-2.87E-01	9.71E+00 +-2.87E-01	

STANDARD DEVIATION = 0.05

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.53E-09 UC/LI
TOTAL MEASURED ACTIVITY = 9.71E+00 (+-2.87E-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
1126.55	562.75	198.	21.1	8.47E+00
1138.99	568.97	321.	18.3	1.39E+01
1604.08	801.47	118.	13.7	6.74E+00
2730.32	1364.87	31.	49.8	2.75E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.83	608.87	36.	33.0	1.63E+00
2921.09	1460.35	166.	15.8	1.58E+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 27-AUG-90 09:45:56

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 2.0
DETECTOR NUMBER: 2 / 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: SD2749
ANALYZED BY: DM

SAMPLE DESCRIPTION: F-297 SEGMENT-J
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 10-JAN-90 AT 09:21:40

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 17-MAR-89
EFFICIENCY CALIBRATION PERFORMED 21-OCT-88

222-S COUNTING ROOM 27-AUG-90 09:45:56

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	1127.84	563.55	1.49	552.	502.	14.2	CS-134, EU-152
2C	1139.68	569.47	1.49	485.	956.	11.6	CS-134, BI-207
3	1210.48	604.86	1.70	502.	5996.	2.8	CS-134
4	1324.35	661.79	1.70	366.	8782.	2.2	CS-137
4B		661.85			36.	13.9	
5C	1592.56	795.87	1.70	266.	4293.	3.7	CS-134
6C	1604.64	801.91	1.70	270.	387.	12.5	CS-134
7	2347.01	1173.06	1.94	221.	3775.	3.4	CO-60
8	2665.46	1332.27	2.16	36.	3437.	3.4	CO-60
8B		1332.24			9.	37.4	
9	2731.09	1365.09	2.99	19.	113.	22.4	CS-134
10	2921.55	1460.32	2.32	22.	128.	21.3	K-40
10B		1460.85			156.	3.8	

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 BK0012
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 30-AUG-88 AT 16:46:00
BACKGROUND LIVE TIME: 60000. SECONDS

222-S COUNTING ROOM 27-AUG-90 09:45:56

SAMPLE: F-297 SEGMENT-J
DATA COLLECTED ON 10-JAN-90 AT 09:21:40
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<1.12E+00		LLD<1.12E+00		911.07	
AG-108M	LLD<2.84E-01		LLD<2.84E-01		433.94	
AG-110M	LLD<1.35E+00		LLD<1.35E+00		657.76	
AM-241	LLD<1.32E+00		LLD<1.32E+00		59.54	
AM-243	LLD<3.41E-01		LLD<3.41E-01		74.67	
AR-41	LLD<2.19E-01		LLD<2.19E-01		1293.64	
AU-198	LLD<2.56E-01		LLD<2.56E-01		411.80	
BA-133	LLD<3.36E-01		LLD<3.36E-01		356.02	
BA-139	LLD<7.17E-01		LLD<7.17E-01		165.85	
BA-140	LLD<1.03E+00		LLD<1.03E+00		537.27	
BA-141	LLD<6.88E-01		LLD<6.88E-01		190.23	
BE-7	LLD<2.47E+00		LLD<2.47E+00		477.59	
BI-207	LLD<2.57E-01		LLD<2.57E-01		569.70	
BI-212	LLD<3.76E+00		LLD<3.76E+00		727.27	
BI-214	LLD<2.05E+00		LLD<2.05E+00		609.32	
CD-109	LLD<4.30E+00		LLD<4.30E+00		88.03	
CE-139	LLD<1.62E-01		LLD<1.62E-01		165.85	
CE-141	LLD<2.59E-01		LLD<2.59E-01		145.44	
CEPR144	LLD<2.06E+00		LLD<2.06E+00		133.51	
CO-56	LLD<2.46E-01		LLD<2.46E-01		846.76	
CO-57	LLD<1.33E-01		LLD<1.33E-01		122.06	
CO-58	LLD<2.38E-01		LLD<2.38E-01		810.75	
CO-60	2.25E+01	+-8.14E-01	2.25E+01	+-8.14E-01	1332.50	-0.23
					1173.24	-0.18
CR-51	LLD<1.94E+00		LLD<1.94E+00		320.09	
CS-134	2.16E+01	+-8.27E-01	2.16E+01	+-8.27E-01	795.84	0.03
					604.70	0.16
CS-136	LLD<2.71E-01		LLD<2.71E-01		818.51	
CS-137	3.78E+01	+-9.55E-01	3.78E+01	+-9.55E-01	661.65	0.14
CS-138	LLD<2.37E-01		LLD<2.37E-01		1435.86	
EU-152	LLD<4.57E-01		LLD<4.57E-01		1408.01	
EU-154	LLD<4.77E-01		LLD<4.77E-01		1274.45	
EU-155	LLD<6.04E-01		LLD<6.04E-01		105.31	
FE-59	LLD<5.62E-01		LLD<5.62E-01		1099.25	
HF-181	LLD<2.98E-01		LLD<2.98E-01		482.20	
HG-203	LLD<2.09E-01		LLD<2.09E-01		279.20	
I-131	LLD<2.65E-01		LLD<2.65E-01		364.48	
I-132	LLD<7.54E-01		LLD<7.54E-01		667.69	
I-133	LLD<2.71E-01		LLD<2.71E-01		529.69	
I-134	LLD<3.69E-01		LLD<3.69E-01		847.03	
I-135	LLD<5.49E-01		LLD<5.49E-01		1260.41	
K-40	LLD<2.21E+00		LLD<2.21E+00		1460.75	
KR-85	LLD<5.81E+01		LLD<5.81E+01		513.99	
KR-85M	LLD<1.64E-01		LLD<1.64E-01		151.17	
KR-87	LLD<5.89E-01		LLD<5.89E-01		402.58	
KR-89	LLD<8.53E+00		LLD<8.53E+00		220.90	
LA-140	LLD<1.40E-01		LLD<1.40E-01		1596.20	

LA-142	LLD<5.70E-01	LLD<5.70E-01	641.83
MN-54	LLD<2.34E-01	LLD<2.34E-01	834.83
MN-56	LLD<2.78E-01	LLD<2.78E-01	846.76
NA-22	LLD<1.69E-01	LLD<1.69E-01	1274.55
NA-24	LLD<2.34E-01	LLD<2.34E-01	1368.60
NB-94	LLD<2.25E-01	LLD<2.25E-01	702.63
NB-95	LLD<2.39E-01	LLD<2.39E-01	765.78
NB-97	LLD<1.53E+00	LLD<1.53E+00	657.92
NP-238	LLD<1.05E+00	LLD<1.05E+00	984.45
NP-239	LLD<1.26E+00	LLD<1.26E+00	277.60
PA-233	LLD<5.16E-01	LLD<5.16E-01	311.98
PA-234M	LLD<5.09E+01	LLD<5.09E+01	1001.03
PB-210	LLD<6.30E+00	LLD<6.30E+00	465.03
PB-212	LLD<3.92E-01	LLD<3.92E-01	239.00
PB-214	LLD<5.51E-01	LLD<5.51E-01	351.92
PO-210	LLD<2.06E+04	LLD<2.06E+04	804.00
PO-214	LLD<9.92E+03	LLD<9.92E+03	799.70
PO-216	LLD<1.55E+04	LLD<1.55E+04	804.90
PU-239	LLD<1.98E+03	LLD<1.98E+03	129.30
PU-241	LLD<6.31E+04	LLD<6.31E+04	148.57
RA-224	LLD<4.15E+00	LLD<4.15E+00	240.99
RA-226	LLD<3.73E+00	LLD<3.73E+00	186.10
RB-88	LLD<1.02E+00	LLD<1.02E+00	1836.00
RB-89	LLD<1.28E+00	LLD<1.28E+00	1031.88
RN-220	LLD<2.12E+02	LLD<2.12E+02	549.73
RU-103	LLD<2.59E-01	LLD<2.59E-01	497.08
RURH106	LLD<4.54E+00	LLD<4.54E+00	621.80
SB-124	LLD<5.40E-01	LLD<5.40E-01	602.72
SB-125	LLD<2.03E+00	LLD<2.03E+00	176.33
SC-46	LLD<2.87E-01	LLD<2.87E-01	1120.45
SE-75	LLD<3.02E-01	LLD<3.02E-01	264.66
SN-113	LLD<3.62E-01	LLD<3.62E-01	391.67
SR-85	LLD<2.55E-01	LLD<2.55E-01	513.99
SR-91	LLD<4.78E-01	LLD<4.78E-01	555.60
SR-92	LLD<1.72E-01	LLD<1.72E-01	1383.94
TA-182	LLD<8.32E-01	LLD<8.32E-01	1121.30
TC-99M	LLD<1.37E-01	LLD<1.37E-01	140.51
TE-123M	LLD<1.53E-01	LLD<1.53E-01	159.00
TE-125M	LLD<4.21E+01	LLD<4.21E+01	109.27
TE-132	LLD<1.84E-01	LLD<1.84E-01	228.16
TH-228	LLD<1.44E+01	LLD<1.44E+01	84.37
TL-208	LLD<3.02E-01	LLD<3.02E-01	583.14
U-235	LLD<2.48E-01	LLD<2.48E-01	185.71
U-237	LLD<7.17E-01	LLD<7.17E-01	208.00
W-187	LLD<8.09E-01	LLD<8.09E-01	685.74
XE-131M	LLD<6.84E+00	LLD<6.84E+00	163.98
XE-133	LLD<4.89E-01	LLD<4.89E-01	81.00
XE-133M	LLD<1.64E+00	LLD<1.64E+00	233.21
XE-135	LLD<1.85E-01	LLD<1.85E-01	249.79
XE-138	LLD<1.42E+00	LLD<1.42E+00	258.41
Y-88	LLD<9.63E-02	LLD<9.63E-02	1836.06
Y-91	LLD<6.86E+01	LLD<6.86E+01	1204.90
Y-91M	LLD<3.62E-01	LLD<3.62E-01	555.60
ZN-65	LLD<6.91E-01	LLD<6.91E-01	1115.55
ZR-95	LLD<4.14E-01	LLD<4.14E-01	756.73
ZR-97	LLD<2.41E-01	LLD<2.41E-01	743.33
TOTAL	8.19E+01 +-1.50E+00	8.19E+01 +-1.50E+00	

STANDARD DEVIATION = 0.18

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.44E-09 UC/LI
TOTAL MEASURED ACTIVITY = 8.19E+01 (+-1.50E+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
1127.84	563.55	502.	14.2	2.96E+01
1139.68	569.47	956.	11.6	5.69E+01
1604.64	801.91	387.	12.5	3.10E+01
2731.09	1365.09	113.	22.4	1.40E+01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2921.55	1460.32	128.	21.3	1.68E+01

Analytical Batch

LAB SEGMENT SERIAL #:F0149

CUSTOMER ID:89-048

INSTRUMENT	WA77344
PROCEDURE/REV	LA-925-106/A-1
TECHNOLOGIST	M. Franz
DATE	January 05, 1990
TEMPERATURE	N/A
STARTING TIME	0800
ENDING TIME	1500
CHEMIST	S. A. Catlow

Uranium Analysis
Fusion Dissolution

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0105
2	Reagent Blank		F0120
3	Sample	89-045	F0106
4	Duplicate Sample	89-045	F0107
5	Spike of Sample	89-045	F0108
6	Sample	89-047	F0130
7	Duplicate Sample	89-047	F0131
8	Sample	89-048	F0154
9	Duplicate Sample	89-048	F0155
10	Sample	89-050	F0294
11	Duplicate Sample	89-050	F0295

	DESCRIPTION	LAB ID
12	Final LMCS Check Std	F0297
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	58B38/100 uL			5.7 mL
Spike	58B38/100 uL	F0106/100 uL		5.80 mL

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

9516324.2720

WATER DIGESTION TEST ANALYSIS

Single Shell Tank Project

Water Digestion
Laboratory Results of Solids
Units are Sample Wet Weight

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID: 89-048

Laboratory Segment Serial No.: F0149

	Check Standard	Blank	Sample	Sample Duplicate	Spike of Sample	Check Standard
Laboratory ID:	**F0158**	**F0170**	**F0159**	**F0160**	**F0161**	**F0742**
Water Digestion	N/A	N/A	9.32 g/L	7.78 g/L	7.87 g/L	N/A
Laboratory ID:	**F0158**	**F0170**	**F0159**	**F0160**	**F0741**	**F0742**
Ion Chromatograph						
Fluoride	95.50%	<0.1 ppm	3.43E+03 ug/g	2.62E+03 ug/g	108.40%	92.70%
Chloride	107.80%	<0.1 ppm	<1.08E+03 ug/g	<1.30E+03 ug/g	110.90%	101.20%
Nitrate	103.10%	<1.0 ppm	3.95E+04 ug/g	4.01E+04 ug/g	106.70%	98.20%
Phosphate	96.70%	<1.0 ppm	2.25E+04 ug/g	1.44E+04 ug/g	104.80%	94.70%
Sulfate	99.20%	<1.0 ppm	<1.08E+04 ug/g	<1.30E+04 ug/g	107.70%	94.10%
Laboratory ID:	**F0158**	**F0170**	**F0159**	**F0160**	**F0161**	**F0162**
Total Carbon	98.10%	3.70 ug	2.09E+03 ug/g	2.44E+03 ug/g	90.70%	100.50%

Single Shell Tank Project

Water Digestion
Sample Results on Laboratory Digestion

Tank: 241-U-110
Core: 7
Segment: 3
Customer ID: 89-048

Laboratory Segment Serial No.: F0149

	Check Standard	Blank	Sample	Sample Duplicate	Spike of Sample	Check Standard
Laboratory ID:	**N/A**	**F0170**	**F0159**	**F0160**	**F0161**	**F0742**
Water Digestion	N/A	Completed	9.32 g/L	7.78 g/L	7.87 g/L	N/A
Laboratory ID:	**F0158**	**F0170**	**F0159**	**F0160**	**F0741**	**F0742**
Ion Chromatograph						
Fluoride	95.50%	<0.1 ppm	3.20E+01 ppm	2.04E+01 ppm	108.40%	92.70%
Chloride	107.80%	<0.1 ppm	<1.01E+01 ppm	<1.01E+01 ppm	110.90%	101.20%
Nitrate	103.10%	<1.0 ppm	3.68E+02 ppm	3.12E+02 ppm	106.70%	98.20%
Phosphate	96.70%	<1.0 ppm	2.10E+02 ppm	1.12E+02 ppm	104.80%	94.70%
Sulfate	99.20%	<1.0 ppm	<1.01E+02 ppm	<1.01E+02 ppm	107.70%	94.10%
Laboratory ID:	**F0158**	**F0170**	**F0159**	**F0160**	**F0161**	**F0162**
Total Carbon	98.10%	3.70 ug	1.95E-02 g/L	1.90E-02 g/L	90.70%	100.50%

Analytical Batch

LAB SEGMENT SERIAL #:F0149

CUSTOMER ID:89-048

INSTRUMENT	N/A
PROCEDURE/REV	LA-504-101/A-1
TECHNOLOGIST	L. Hughes
DATE	January 04, 1990
TEMPERATURE	25 C
STARTING TIME	2200 01-04-90
ENDING TIME	0500 01-05-90
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		F0170
2	Sample	89-048	F0159
3	Duplicate Sample	89-048	F0160
4	Spike of Sample	89-048	F0161
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 #:F0149

CUSTOMER ID:89-048

INSTRUMENT	WB24721
PROCEDURE/REV	LA-533-105/A-3
TECHNOLOGIST	N. E. Wright
DATE	January 05, 1990
TEMPERATURE	23 C
STARTING TIME	1330
ENDING TIME	1600
CHEMIST	H. S. Rich

Ion Chromatograph Analysis from Water Digestion

	DESCRIPTION		LAB ID
1	Initial LMCS Check Std.		F0158
2	Reagent Blank		F0170
3	Sample	89-048	F0159
4	Duplicate Sample	89-048	F0160
5	Sample	89-083	F0739
6	Duplicate Sample	89-083	F0740
7	Spike	89-083	F0741
8	Final LMCS Check Std		F0742
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 Std.	6C11HF/100 uL			10.1 mL
Spike	35C9-61/300 uL	F0739/50 uL		5.3 mL

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

9413324.2725

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:	January 02, 1990		

Calibration Standard ID: 35C9-61 issued 12-08-89

Analyte Concentration: F 50.0 Cl 61.0 NO_3 501.0 PO_4 509.0 SO_4 501.0

Type of Calibration: Linear

Comments:

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

83.1

DIONEX METHOD PARAMETERS - GROUT01.MET

Detector Parameters

Number of Detectors	1
Detector 1 Type	CDM-1

Report Options

Run Time (minutes)	10.00
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: c:\dx\data\89120102.d09	
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

9516624.2727

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

GpmFile: C:\WINDOWS\AI400\METHOD\GROUT01.GPM
Lo Pressure Limit = 200
Hi Pressure Limit = 2000
Eluant 1 - DI WATER
Eluant 2 - BICARBONATE
Eluant 3 - CARBONATE
Eluant 4 -

Time	Flow	%1	%2	%3	%4	Comment
0.0	2.0	84	8	8	0	
15.8	2.0	84	8	8	0	

Component # 1 FLUORIDE Retention Time 0.98
Reference Peak FLUORIDE Window Size 5.00%
Least Squares Slope = 2.85664E-004
Least Squares Intercept = 4.60391E-002
Ka = -7.01211E-010

Level	Amount	Area	Height
1	1.00000E-001	1236	247
2	2.49000E-001	3682	744
3	4.96000E-001	7741	1533
4	9.82000E-001	16531	3180
5	1.92700E+000	37370	6795
6	3.71100E+000	81106	13242

Component # 2 CHLORIDE Retention Time 1.62
Reference Peak FLUORIDE Window Size 7.00%
Least Squares Slope = 5.69042E-004
Least Squares Intercept = -2.52994E-002
Ka = -1.42372E-008

Level	Amount	Area	Height
1	1.20000E-001	1170	210
2	2.99000E-001	3427	592
3	5.95000E-001	6474	1222
4	1.17900E+000	13307	2165
5	2.31200E+000	27960	4657
6	4.45200E+000	58342	10771

Component # 3 NITRITE Retention Time 2.00
Reference Peak FLUORIDE Window Size 7.00%
Least Squares Slope = 8.19167E-004
Least Squares Intercept = 3.87713E-001
Ka = 4.24548E-009

Level	Amount	Area	Height
1	1.00000E+000	6728	955
2	2.49250E+000	17398	2609
3	4.96040E+000	36144	5455
4	9.82350E+000	72479	10242
5	1.92690E+001	156757	21248
6	3.71110E+001	299406	37444

Component # 4 NITRATE Retention Time 4.03
Reference Peak FLUORIDE Window Size 10.00%
Least Squares Slope = 1.69781E-003
Least Squares Intercept = -3.38014E-003
Ka = 1.19273E-008

Level	Amount	Area	Height
1	9.99000E-001	6114	614
2	2.49000E+000	15873	1479
3	4.95500E+000	31781	2811
4	9.81400E+000	66164	5536
5	1.92500E+001	137582	10594
6	3.70740E+001	285670	19231

Component # 5 PHOSPHATE Retention Time 5.35
Reference Peak FLUORIDE Window Size 7.00%
Least Squares Slope = 4.52311E-003
Least Squares Intercept = 2.58616E-001
Ka = -6.53030E-008

Level	Amount	Area	Height
1	9.99000E-001	2494	179
2	2.49000E+000	7725	511
3	4.95500E+000	16061	1043
4	9.81400E+000	33837	2134
5	1.92500E+001	71926	4526
6	3.70740E+001	156060	9414

Component # 6 SULFATE Retention Time 7.10
Reference Peak FLUORIDE Window Size 10.00%
Least Squares Slope = 1.96810E-003
Least Squares Intercept = 2.30818E-001
Ka = -1.00806E-008

Level	Amount	Area	Height
1	9.99000E-001	7667	464
2	2.49000E+000	19957	1147
3	4.95500E+000	41209	2360
4	9.81400E+000	86948	4959
5	1.92500E+001	178459	10251
6	3.70740E+001	375814	20962

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

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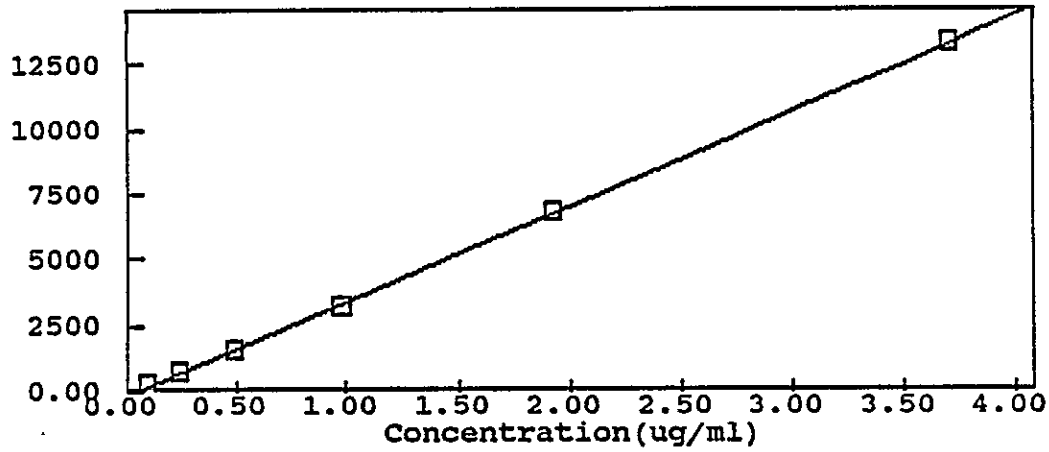
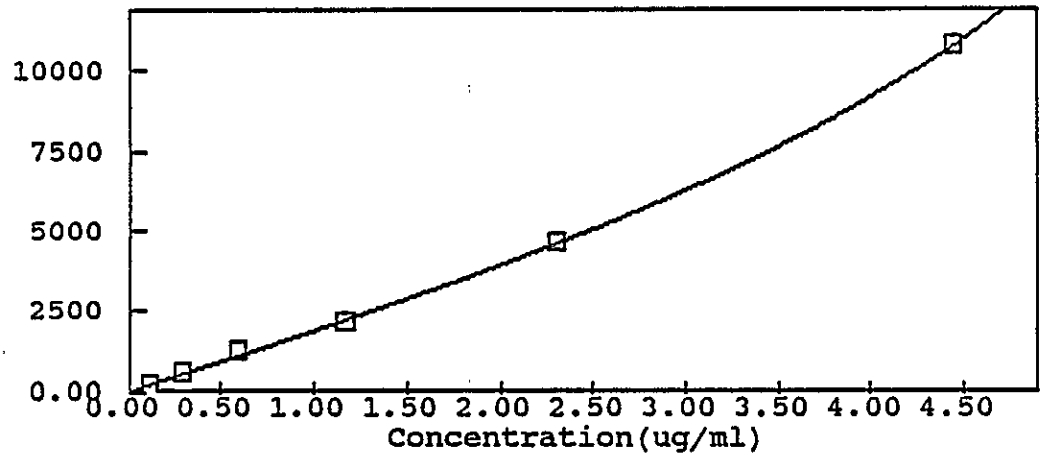
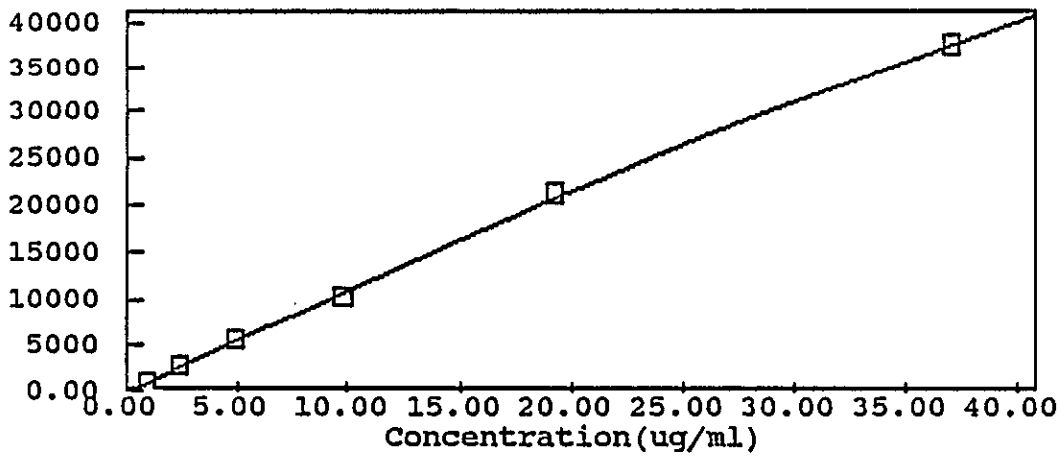


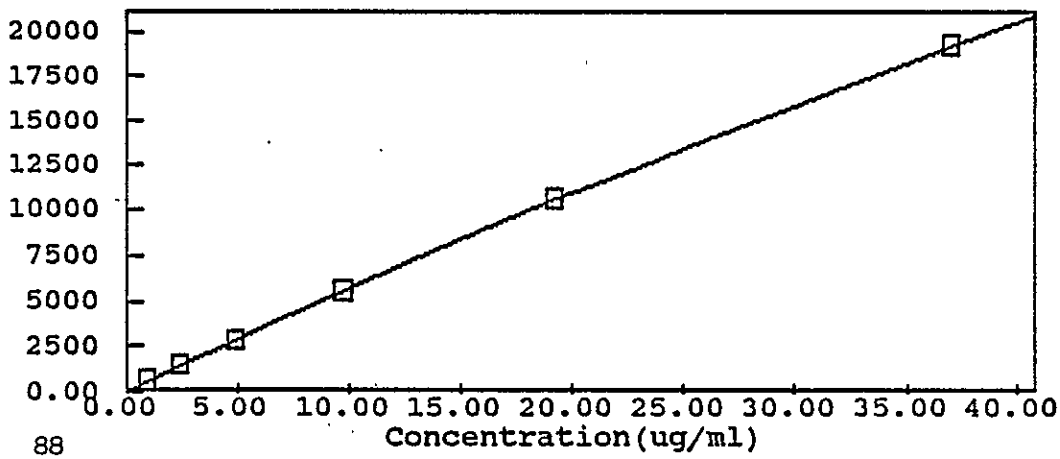
Component: *FLUOR*
Fit Type: Quadr
Conc = (-7.012105e-
(2.856637e-004 * Res
Standardization:
Calibration: Heigh



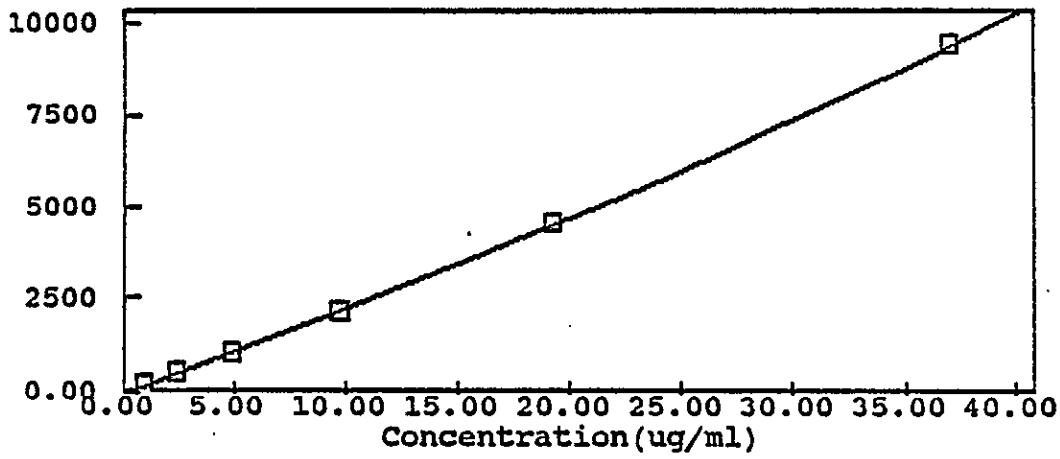
Component: CHLOR
Fit Type: Quadr
Conc = (-1.423720e-
(5.690421e-004 * Res
Standardization:
Calibration: Heigh



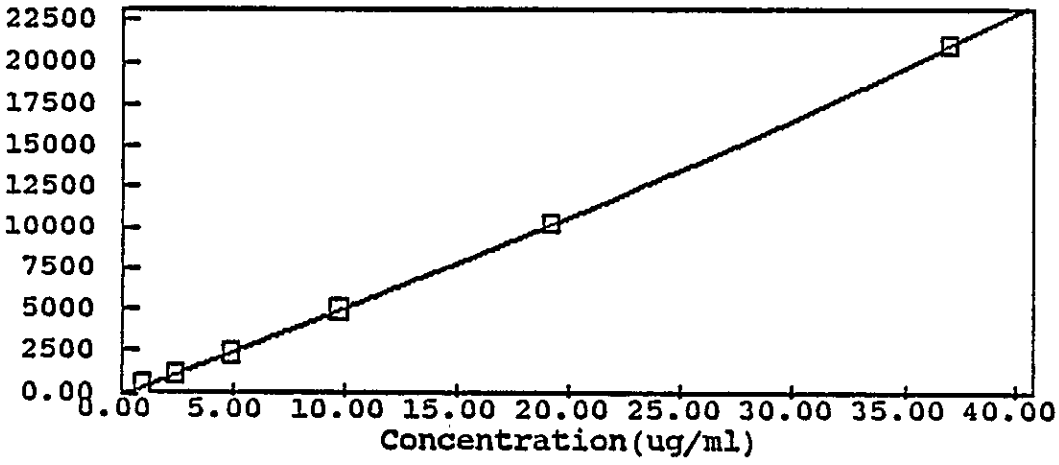
Component: NITRI
Fit Type: Quadr
Conc = (4.245484e-0
(8.191672e-004 * Res
Standardization:
Calibration: Heigh



Component: NITRA
Fit Type: Quadr
Conc = (1.192733e-0
(1.697806e-003 * Res
Standardization:
Calibration: Heigh



Component: PHOSI
Fit Type: Quadr
Conc = (-6.530302e-
(4.523107e-003 * Res
Standardization:
Calibration: Heigh



Component: SULFA
Fit Type: Quadr
Conc = (-1.008059e-
(1.968097e-003 * Res
Standardization:
Calibration: Heigh

DATA REPROCESSED ON Tue Jun 05 18:26:12 1990

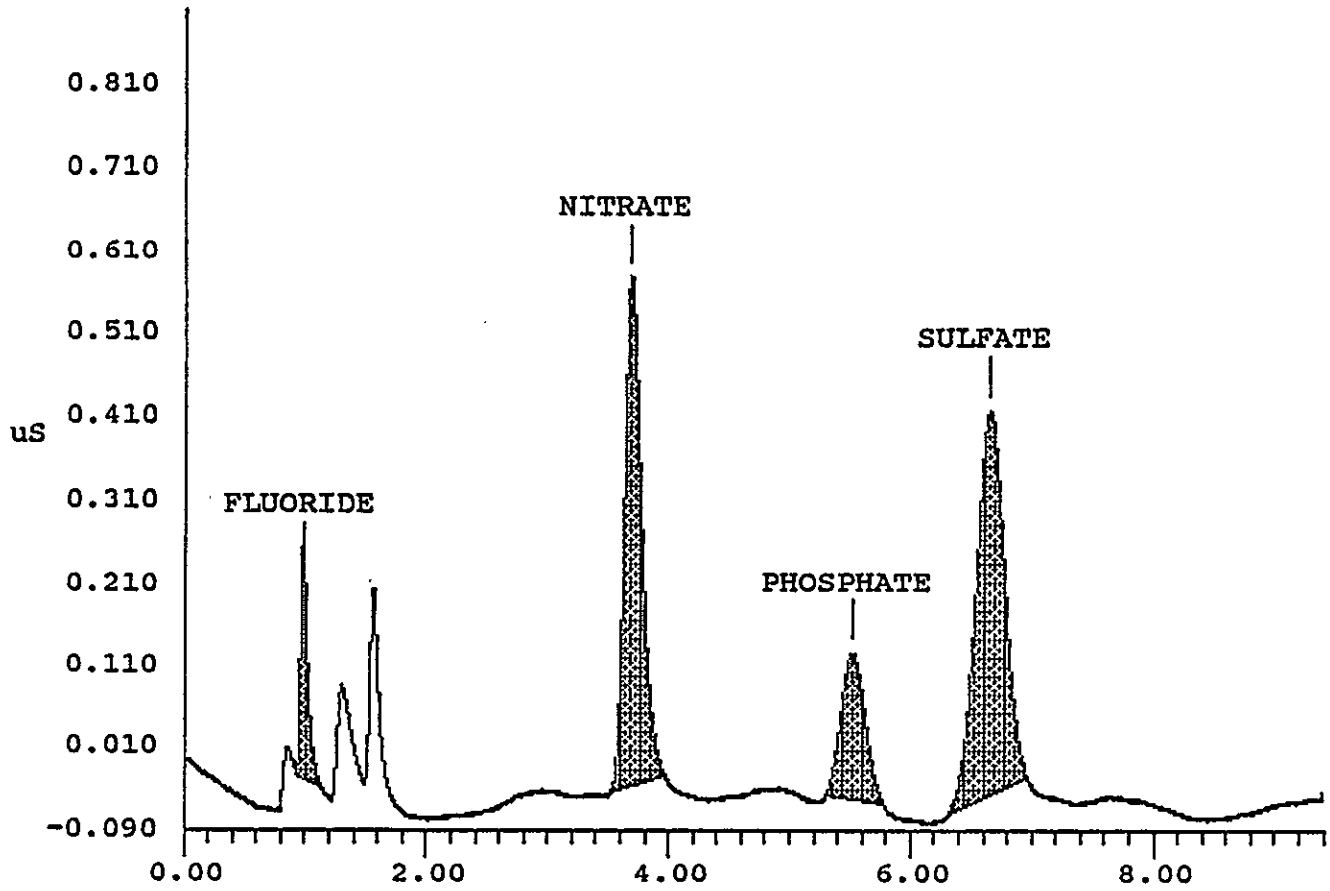
Sample Name: AUTOCAL1R Date: Tue Jan 02 10:21:45 1990
Data File : A:\90010200.D03
Method : c:\windows\ai400\method\GROUT01.met
ACI Address: 1 System : 1 Inject#: 3 Detector: CDM

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

Stop time = 9.40 Minutes Number of Data Points = 2820
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	1.000e-001	1.236e+003	247	1	0	0.00%
2	3.68	NITRATE	9.990e-001	6.114e+003	614	1	0	0.00%
3	5.52	PHOSPHATE	9.990e-001	2.494e+003	179	1	0	0.00%
4	6.65	SULFATE	9.990e-001	7.667e+003	464	1	0	0.00%

File: A:\90010200.D03 Sample: AUTOCAL1R



DATA REPROCESSED ON Tue Jun 05 18:10:27 1990

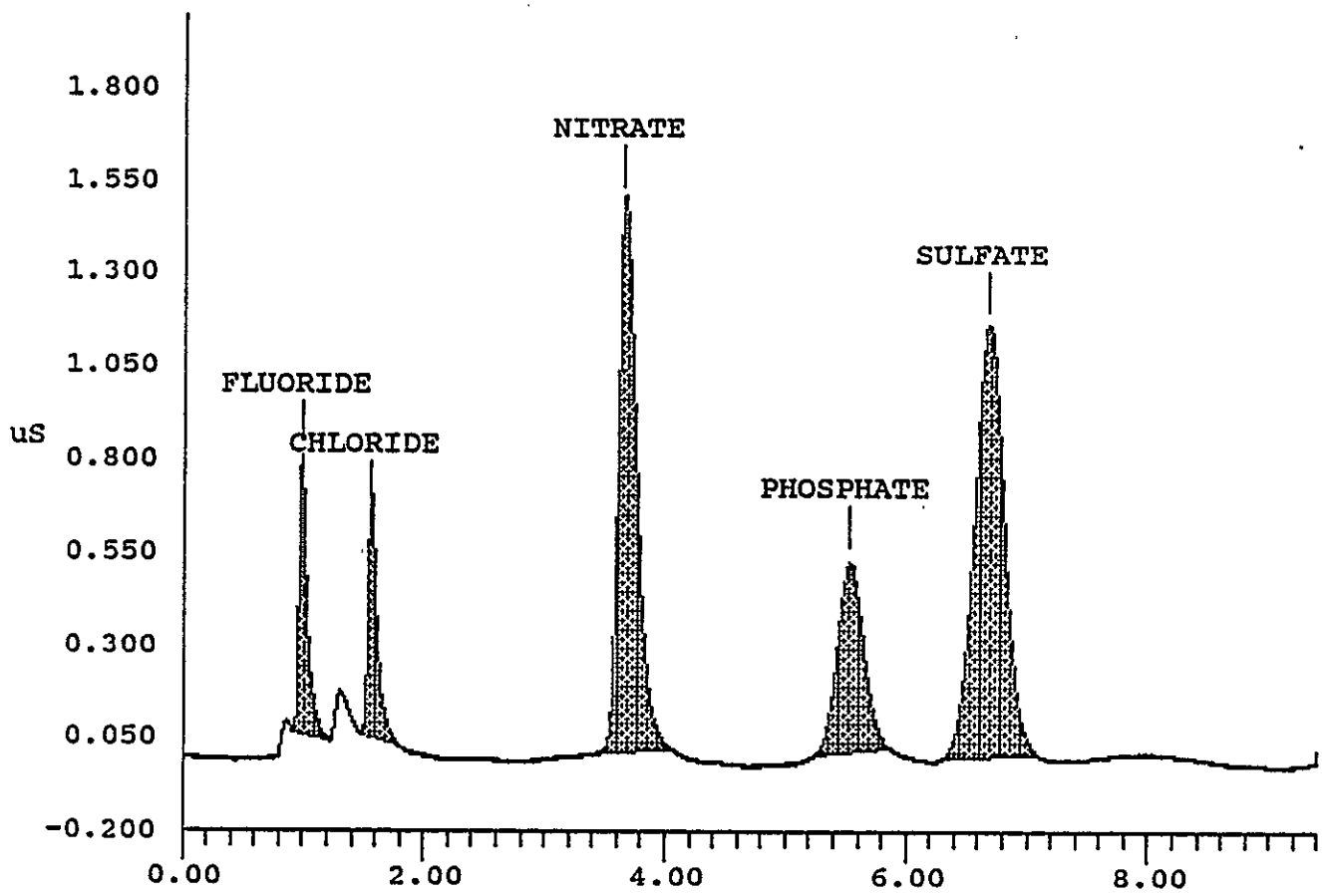
Sample Name: AUTOCAL2R Date: Tue Jan 02 10:31:54 1990
Data File : A:\90010200.D04
Method : c:\windows\ai400\method\GROUT01.met
ACI Address: 1 System : 1 Inject#: 4 Detector: CDM

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

Stop time = 9.40 Minutes Number of Data Points = 2821
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	0.98	FLUORIDE	2.490e-001	3.682e+003	744	1	0	0.00%
2	1.55	CHLORIDE	2.990e-001	3.427e+003	592	1	0	0.00%
3	3.65	NITRATE	2.490e+000	1.587e+004	1479	1	0	0.00%
4	5.53	PHOSPHATE	2.490e+000	7.725e+003	511	1	0	0.00%
5	6.67	SULFATE	2.490e+000	1.996e+004	1147	1	0	0.00%

File: A:\90010200.D04 Sample: AUTOCAL2R



DATA REPROCESSED ON Tue Jun 05 18:09:08 1990

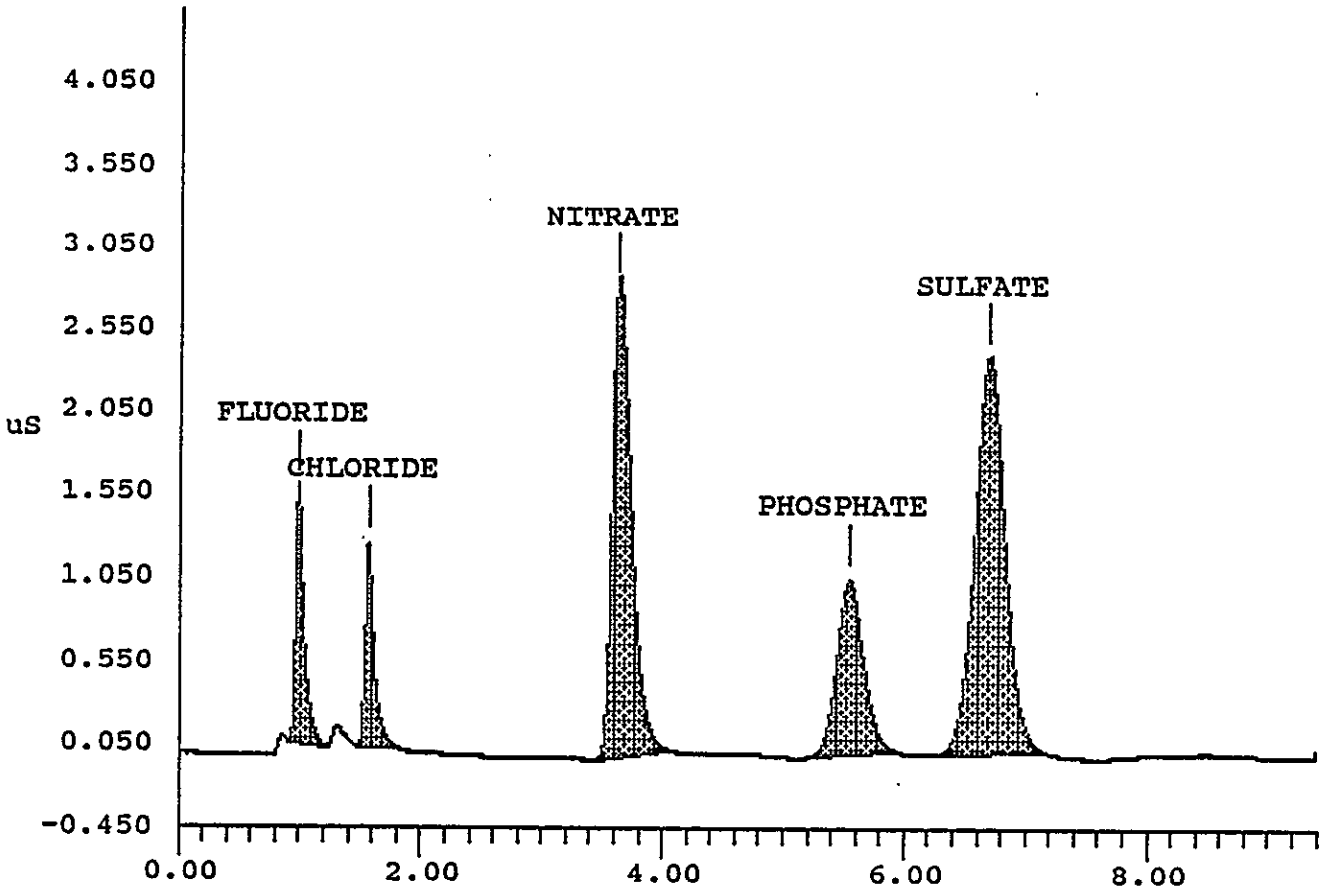
Sample Name: AUTOCAL3R Date: Tue Jan 02 10:42:02 1990
Data File : A:\90010200.D05
Method : c:\windows\ai400\method\GROUT01.met
ACI Address: 1 System : 1 Inject#: 5 Detector: CDM

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

Stop time = 9.40 Minutes Number of Data Points = 2820
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	0.98	FLUORIDE	4.960e-001	7.741e+003	1533	1	0	0.00%
2	1.57	CHLORIDE	5.950e-001	6.474e+003	1222	1	0	0.00%
3	3.62	NITRATE	4.955e+000	3.178e+004	2811	1	0	0.00%
4	5.53	PHOSPHATE	4.955e+000	1.606e+004	1043	1	0	0.00%
5	6.68	SULFATE	4.955e+000	4.121e+004	2360	1	0	0.00%

File: A:\90010200.D05 Sample: AUTOCAL3R



DATA REPROCESSED ON Tue Jun 05 18:06:54 1990

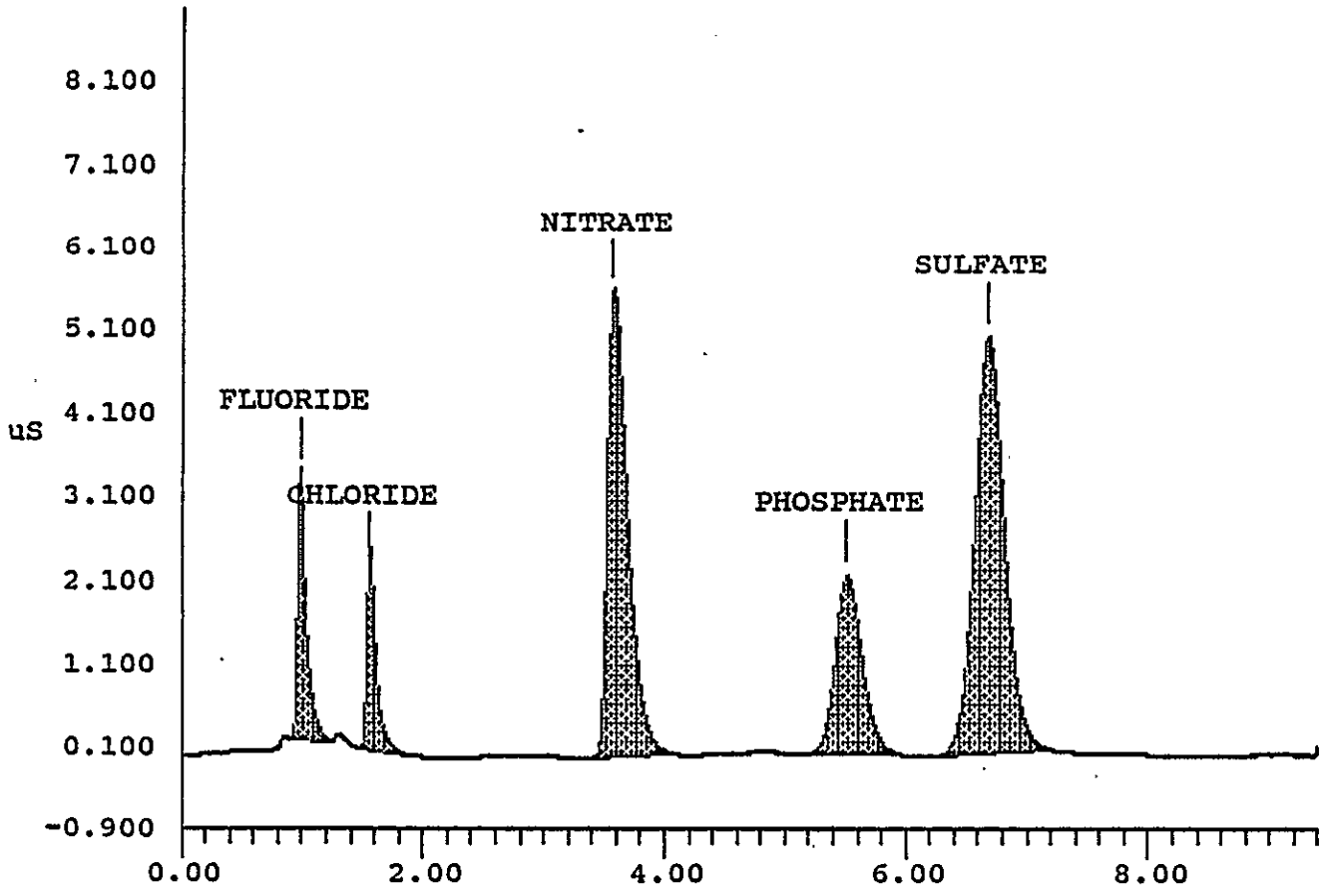
Sample Name: AUTOCAL4R Date: Tue Jan 02 10:52:10 1990
Data File : A:\90010200.D06
Method : c:\windows\ai400\method\GROUT01.met
ACI Address: 1 System : 1 Inject#: 6 Detector: CDM

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

Stop time = 9.40 Minutes Number of Data Points = 2821
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	0.98	FLUORIDE	9.820e-001	1.653e+004	3180	1	0	0.00%
2	1.55	CHLORIDE	1.179e+000	1.331e+004	2165	1	0	0.00%
3	3.57	NITRATE	9.814e+000	6.616e+004	5536	1	0	0.00%
4	5.50	PHOSPHATE	9.814e+000	3.384e+004	2134	1	0	0.00%
5	6.67	SULFATE	9.814e+000	8.695e+004	4959	1	0	0.00%

File: A:\90010200.D06 Sample: AUTOCAL4R



DATA REPROCESSED ON Tue Jun 05 18:04:22 1990

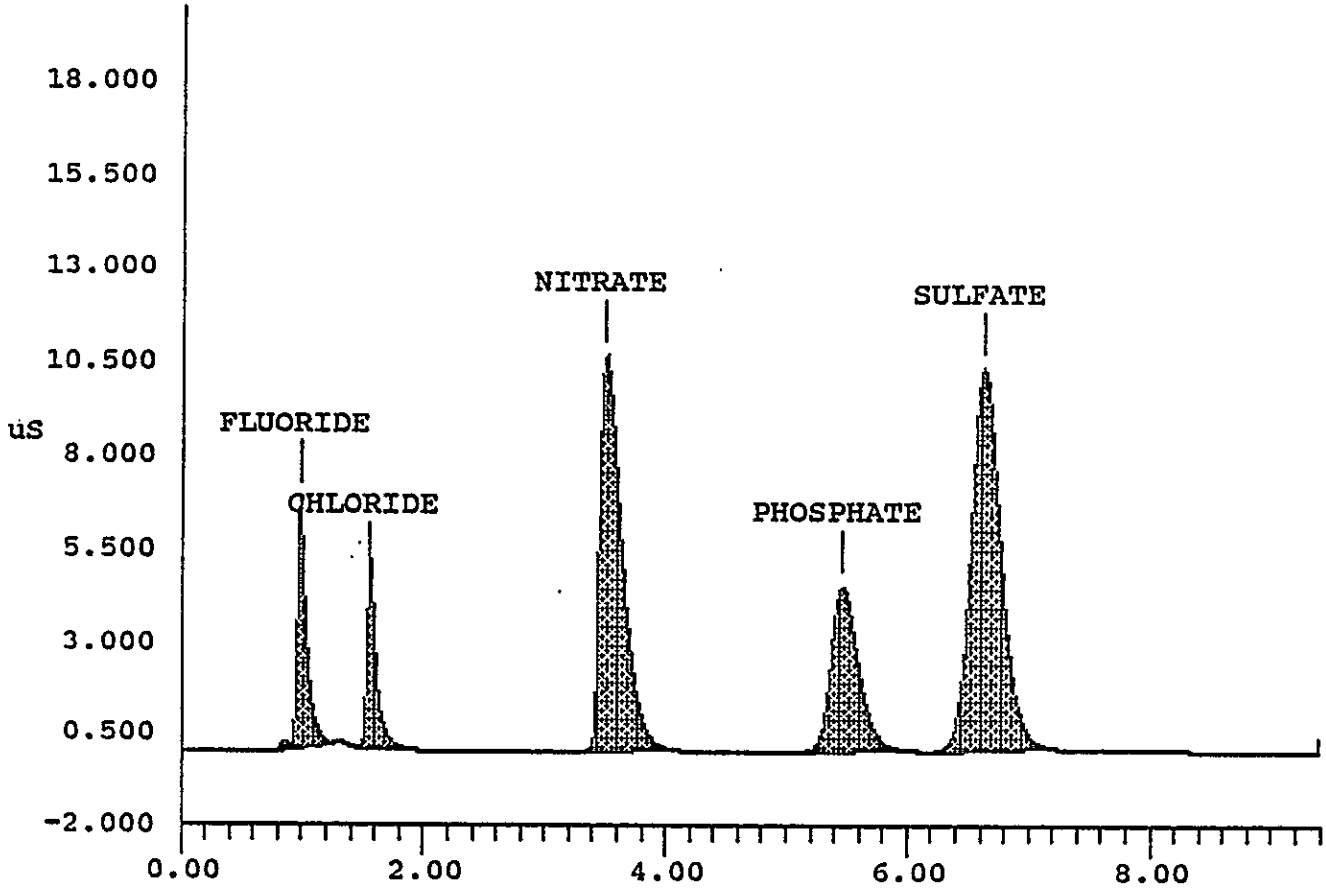
Sample Name: AUTOCAL5R Date: Tue Jan 02 11:02:18 1990
Data File : A:\90010200.D07
Method : c:\windows\ai400\method\GROUT01.met
ACI Address: 1 System : 1 Inject#: 7 Detector: CDM

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

Stop time = 9.40 Minutes Number of Data Points = 2820
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	0.98	FLUORIDE	1.927e+000	3.737e+004	6795	1	0	0.00%
2	1.55	CHLORIDE	2.312e+000	2.796e+004	4657	1	0	0.00%
3	3.50	NITRATE	1.925e+001	1.376e+005	10594	1	0	0.00%
4	5.47	PHOSPHATE	1.925e+001	7.193e+004	4526	1	0	0.00%
5	6.63	SULFATE	1.925e+001	1.785e+005	10251	1	0	0.00%

File: A:\90010200.D07 Sample: AUTOCAL5R



DATA REPROCESSED ON Tue Jun 05 18:30:16 1990

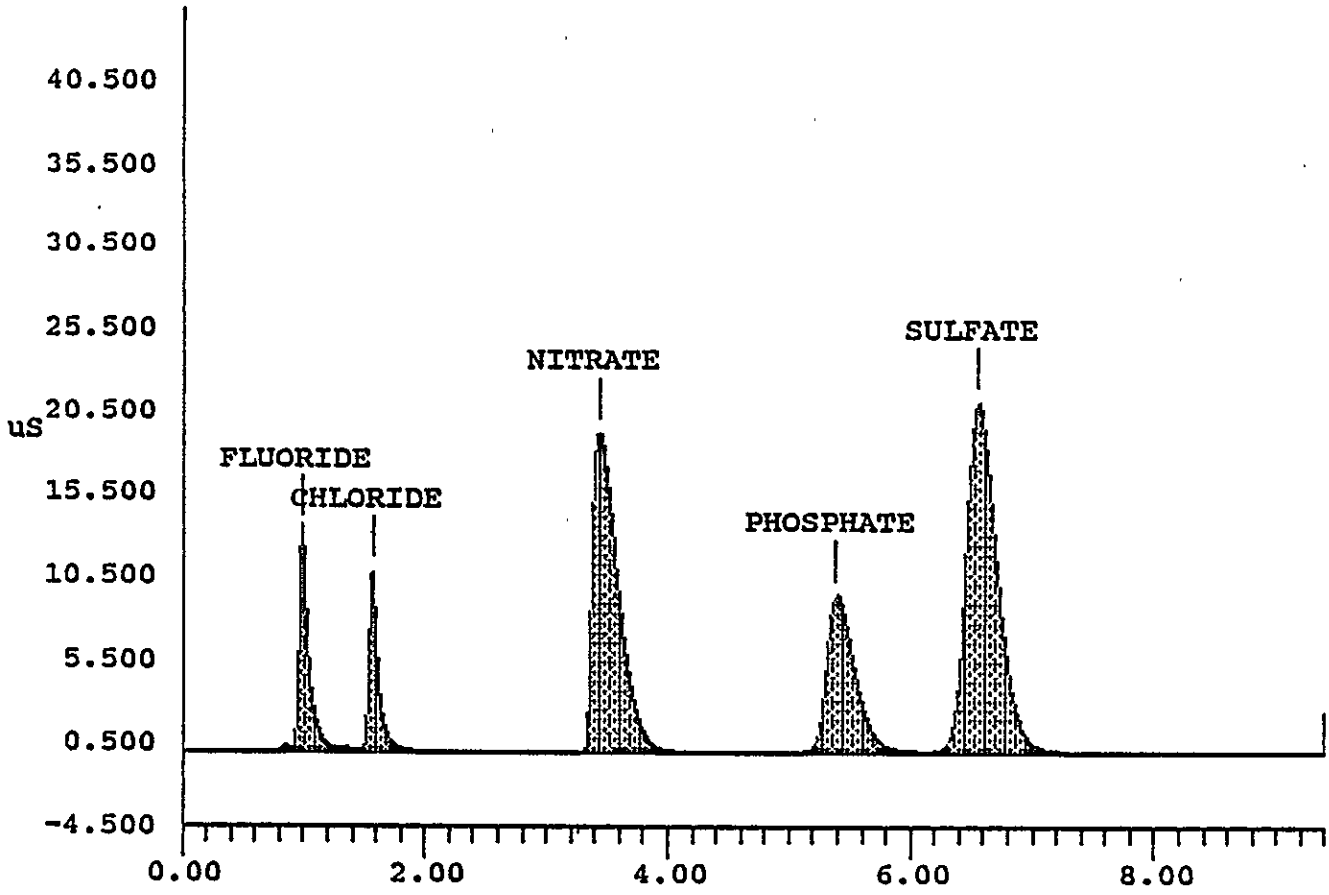
Sample Name: AUTOCAL6R Date: Tue Jan 02 11:12:31 1990
Data File : A:\90010200.D08
Method : c:\windows\ai400\method\GROUT01.met
ACI Address: 1 System : 1 Inject#: 8 Detector: CDM

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

Stop time = 9.40 Minutes Number of Data Points = 2821
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	0.98	FLUORIDE	3.711e+000	8.111e+004	13242	2	0	0.00%
2	1.57	CHLORIDE	4.452e+000	5.834e+004	10771	2	0	0.00%
3	3.43	NITRATE	3.707e+001	2.857e+005	19231	1	0	0.00%
4	5.38	PHOSPHATE	3.707e+001	1.561e+005	9414	2	0	0.00%
5	6.55	SULFATE	3.707e+001	3.758e+005	20962	2	0	0.00%

File: A:\90010200.D08 Sample: AUTOCAL6R



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DIONEX SCHEDULE - A:\90010500.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/6C11HF	c:\windows\ai	c:\windows\ai	1	101	0
4	LMCS/73C11F	c:\windows\ai	c:\windows\ai	1	101	0
5	170b	c:\windows\ai	c:\windows\ai	1	1	0
6	159	c:\windows\ai	c:\windows\ai	1	101	0
7	160d	c:\windows\ai	c:\windows\ai	1	101	0
8	739	c:\windows\ai	c:\windows\ai	1	101	0
9	740d	c:\windows\ai	c:\windows\ai	1	101	0
10	741s	c:\windows\ai	c:\windows\ai	1	101	0
11	LMCS/6C11HF	c:\windows\ai	c:\windows\ai	1	101	0
12	LMCS/73C11F	c:\windows\ai	c:\windows\ai	1	101	0

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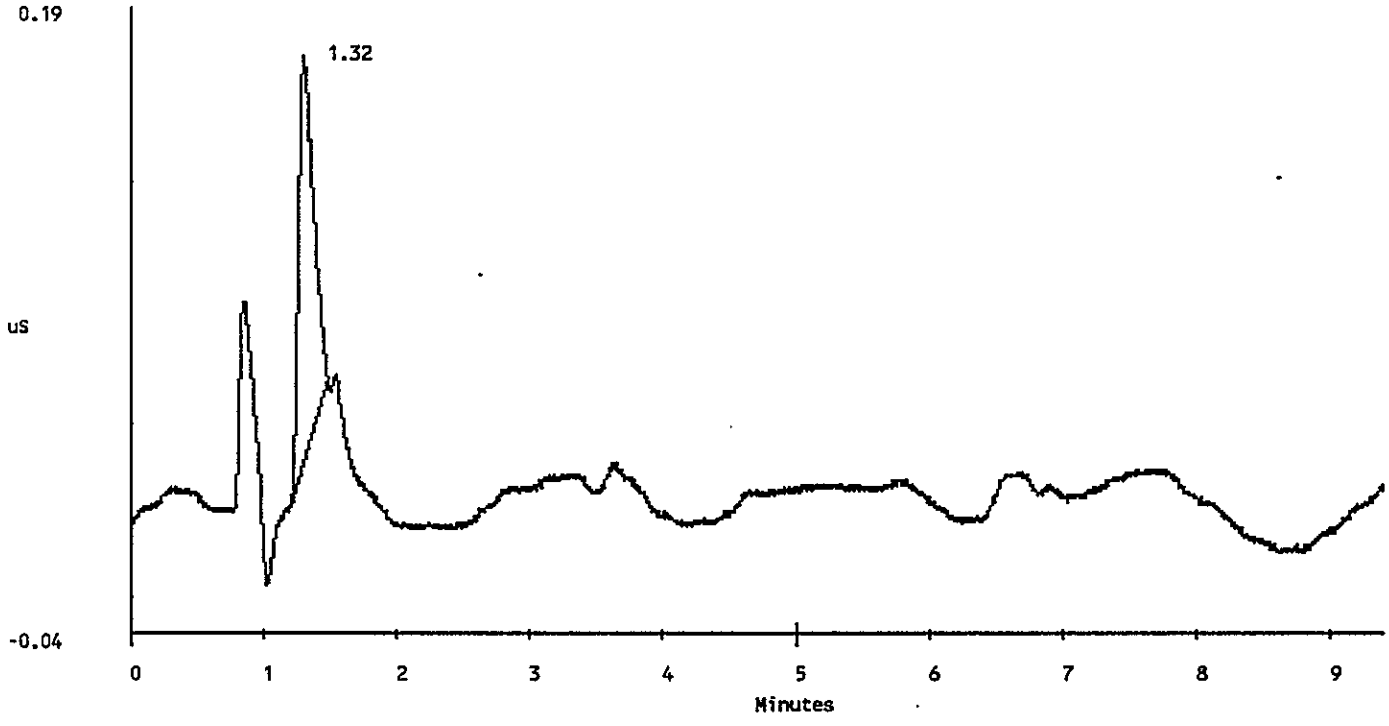
Sample Name: BLANK	Date: Fri Jan 05 14:20:21 1990
Data File : 90010500.D02	
Method : c:\windows\ai400\method\GROUT01.met	
CIM Address: 1 System : 1 Cycle#: 2	Detector: CDM

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

Start Time = 0.00 minutes Stop time = 9.40 Minutes
Number of Data Points = 2820 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	1.32		0.000e+000	1.107e+003	137	1		

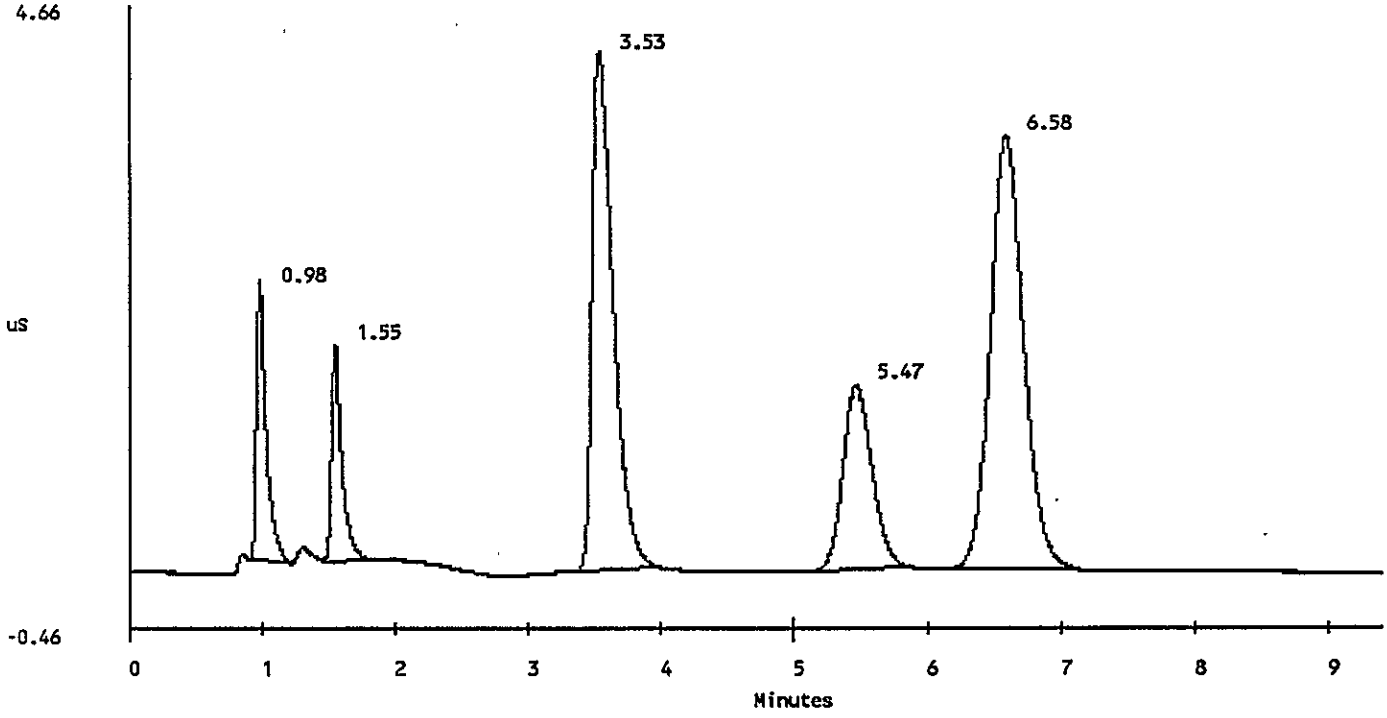


Sample Name: LMCS/6C11HF Date: Fri Jan 05 14:30:25 1990
Data File : 90010500.D03
Method : c:\windows\ai400\method\GROUT01.met
CIM Address: 1 System : 1 Cycle#: 3 Detector: CDM

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

Start Time = 0.00 minutes Stop time = 9.40 Minutes
Number of Data Points = 2821 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	0.98	FLUORIDE	6.878e+001	1.141e+004	2235	1	0	0.00%
2	1.55	CHLORIDE	9.382e+001	9.250e+003	1754	1	0	-1.06%
3	3.53	NITRATE	7.443e+002	4.666e+004	4218	1	0	2.91%
4	5.47	PHOSPHATE	6.981e+002	2.279e+004	1504	1	0	1.55%
5	6.58	SULFATE	7.159e+002	6.074e+004	3549	1	0	0.51%

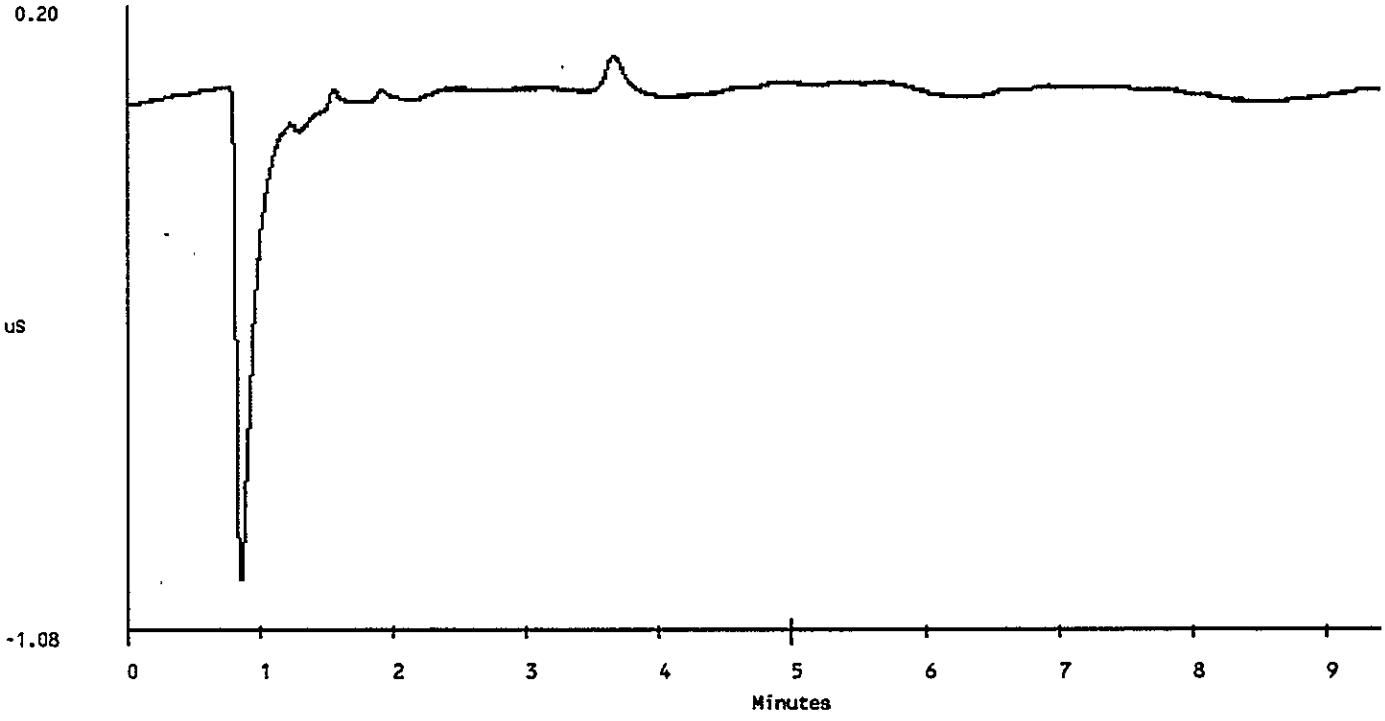


Sample Name: 170B Date: Fri Jan 05 14:50:34 1990
Data File : 90010500.D05
Method : c:\windows\ai400\method\GROUT01.met
CIM Address: 1 System : 1 Cycle#: 5 Detector: CDM

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

Start Time = 0.00 minutes Stop time = 9.40 Minutes
Number of Data Points = 2821 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

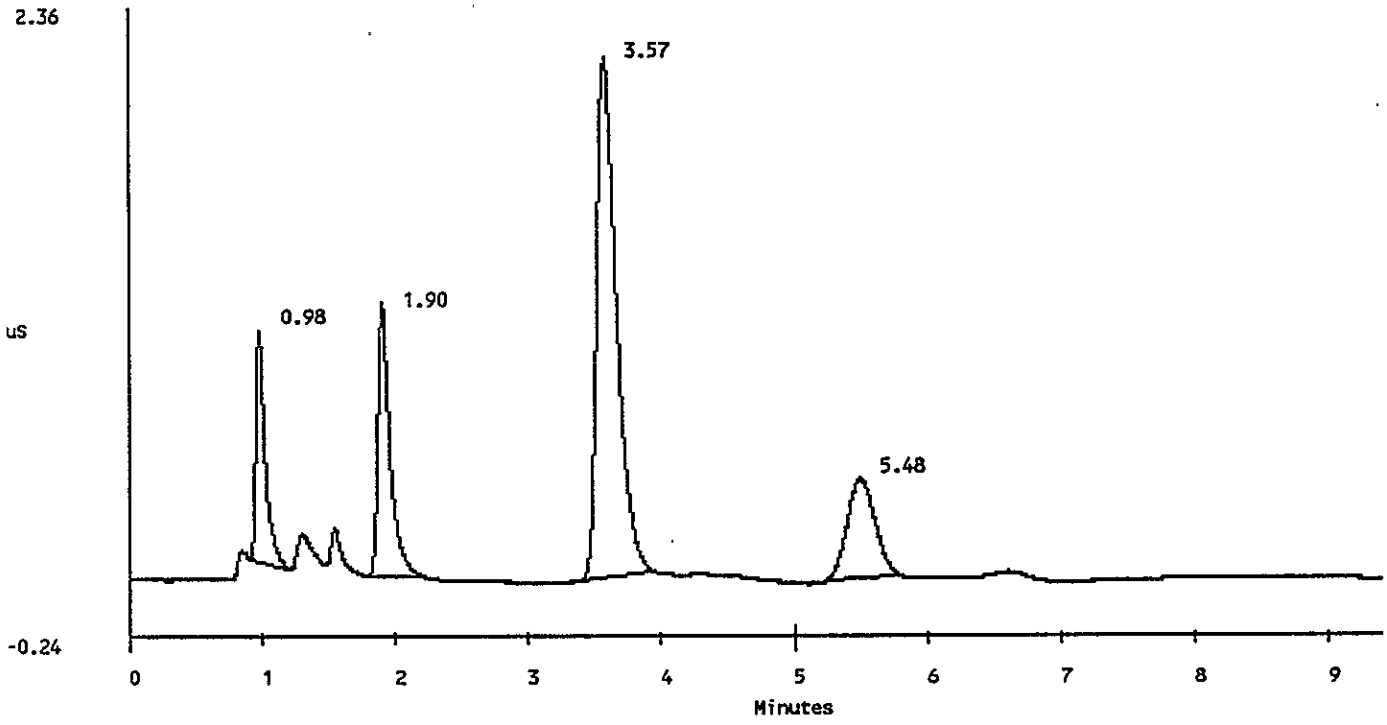


Sample Name: 159 Date: Fri Jan 05 15:00:37 1990
Data File : 90010500.D06
Method : c:\windows\ai400\method\GROUT01.met
CIM Address: 1 System : 1 Cycle#: 6 Detector: CDM

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

Start Time = 0.00 minutes Stop time = 9.40 Minutes
Number of Data Points = 2820 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	0.98	FLUORIDE	3.204e+001	4.652e+003	952	1	0	0.00%
2	1.90	NITRITE	1.188e+002	6.986e+003	1076	1	0	-3.39%
3	3.57	NITRATE	3.685e+002	2.202e+004	2120	1	0	3.88%
4	5.48	PHOSPHATE	2.103e+002	5.947e+003	406	1	0	1.86%



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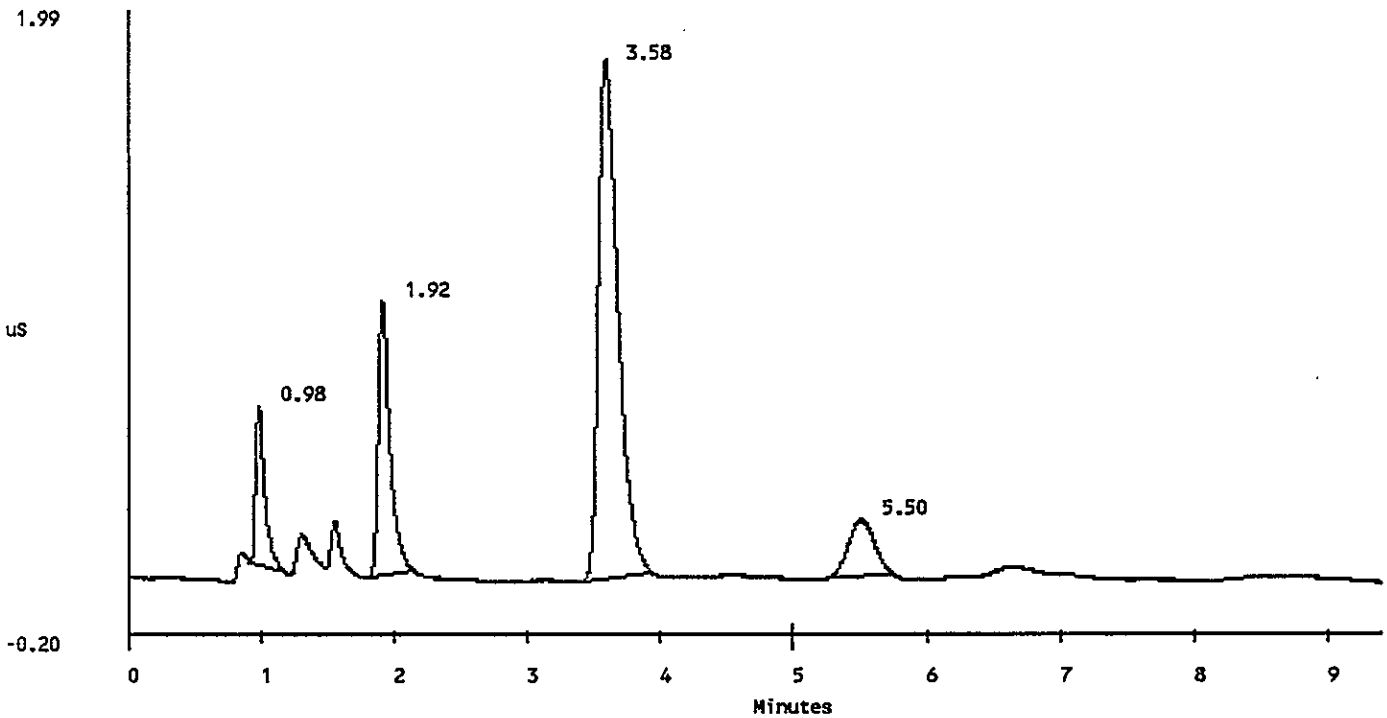
Sample Name: 160D Date: Fri Jan 05 15:10:41 1990
Data File : 90010500.D07
Method : c:\windows\ai400\method\GROUT01.met
CIM Address: 1 System : 1 Cycle#: 7 Detector: CDM

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

Start Time = 0.00 minutes Stop time = 9.40 Minutes
Number of Data Points = 2821 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	0.98	FLUORIDE	2.039e+001	2.622e+003	547	1	0	0.00%
2	1.92	NITRITE	1.084e+002	5.834e+003	945	1	0	-2.54%
3	3.58	NITRATE	3.118e+002	1.859e+004	1797	1	0	4.37%
4	5.50	PHOSPHATE	1.120e+002	2.612e+003	189	1	0	2.17%

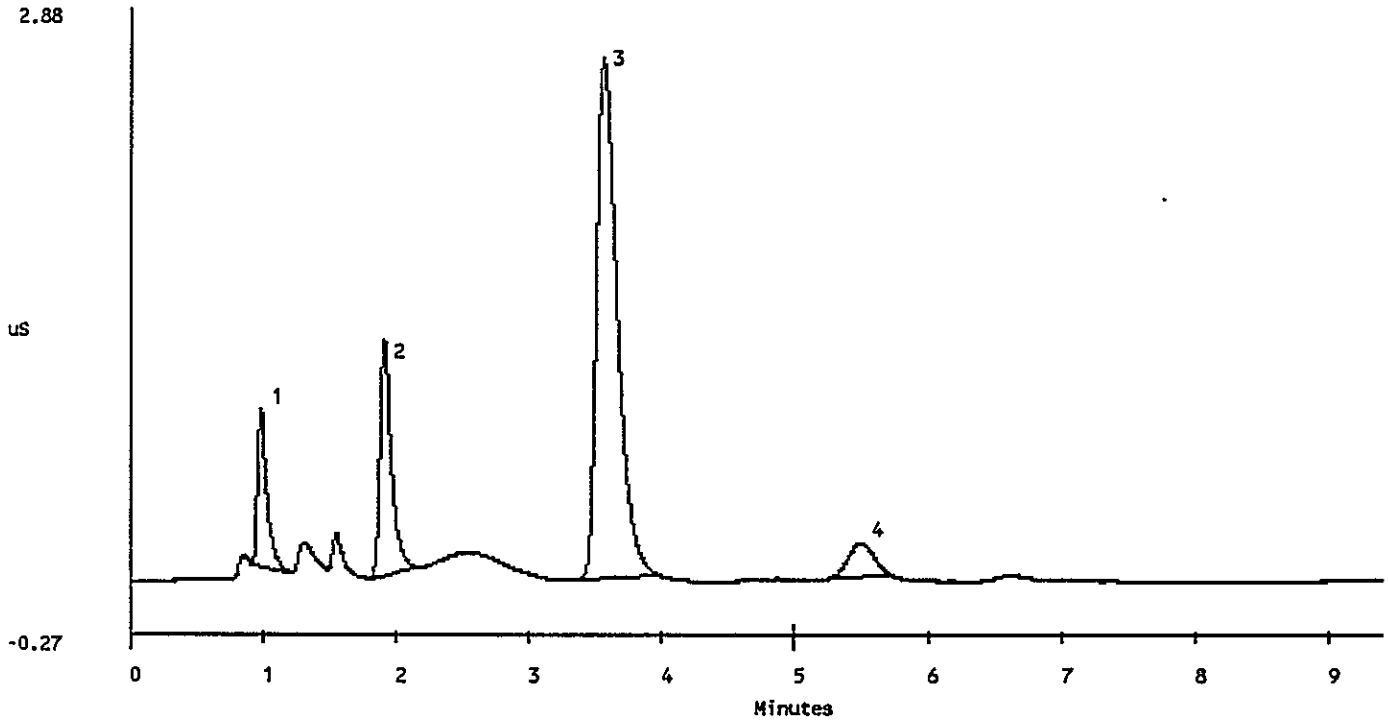


Sample Name: 739 Date: Fri Jan 05 15:20:44 1990
Data File : 90010500.D08
Method : c:\windows\ai400\method\GROUT01.met
CIM Address: 1 System : 1 Cycle#: 8 Detector: CDM

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

Start Time = 0.00 minutes Stop time = 9.40 Minutes
Number of Data Points = 2821 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	0.98	FLUORIDE	2.707e+001	3.749e+003	779	1	0	0.00%
2	1.90	NITRITE	1.169e+002	6.884e+003	1052	1	0	-3.39%
3	3.55	NITRATE	4.432e+002	2.792e+004	2542	1	0	3.40%
4	5.50	PHOSPHATE	1.033e+002	2.324e+003	170	1	0	2.17%

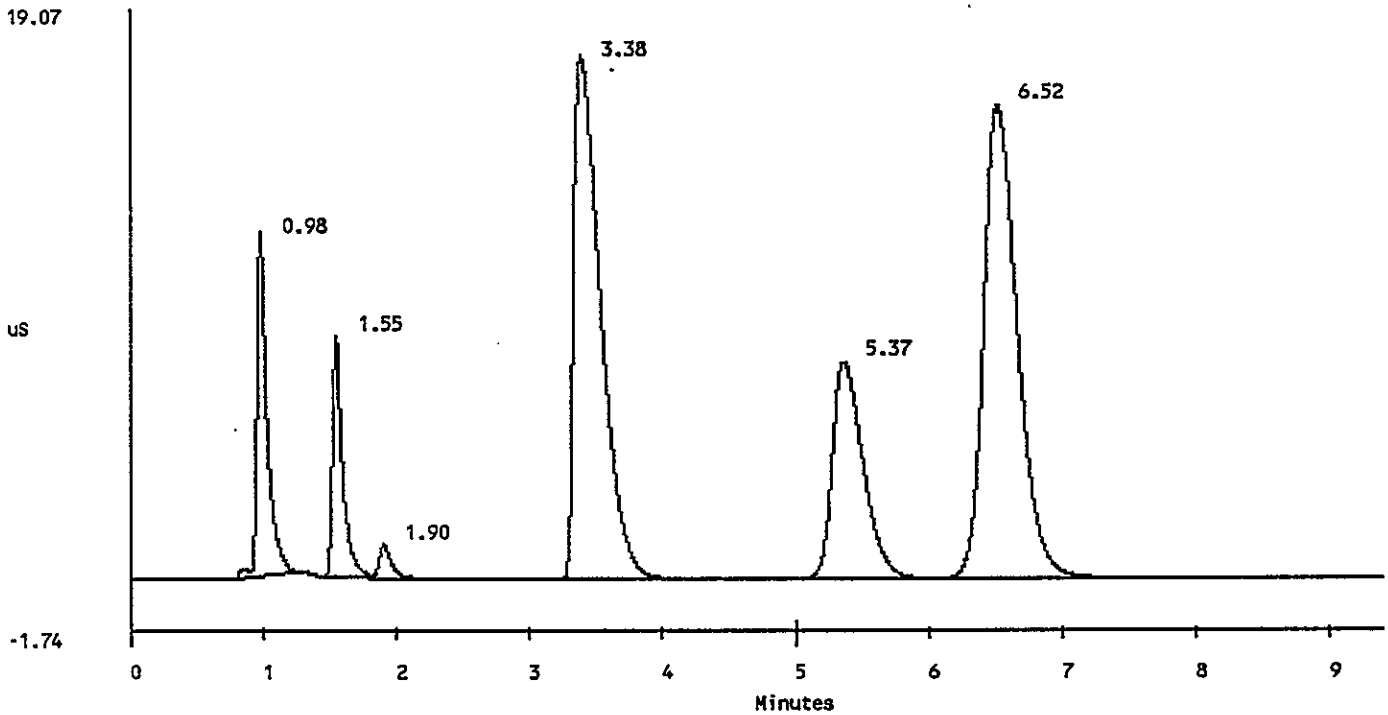


Sample Name: 741S Date: Fri Jan 05 15:40:49 1990
Data File : 90010500.D10
Method : c:\windows\ai400\method\GROUT01.met
CIM Address: 1 System : 1 Cycle#: 10 Detector: CDM

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

Start Time = 0.00 minutes Stop time = 9.40 Minutes
Number of Data Points = 2820 One Data Point per 0.2 seconds
Arearejject = 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	0.98	FLUORIDE	3.191e+002	6.123e+004	11205	1	0	0.00%
2	1.55	CHLORIDE	3.650e+002	4.194e+004	7995	2	0	-1.06%
3	1.90	NITRITE	1.206e+002	7.129e+003	1098	2	0	-3.39%
4	3.38	NITRATE	3.316e+003	2.433e+005	17250	1	0	-1.46%
5	5.37	PHOSPHATE	2.983e+003	1.157e+005	7225	1	0	-0.31%
6	6.52	SULFATE	2.909e+003	2.746e+005	15796	1	0	-0.51%



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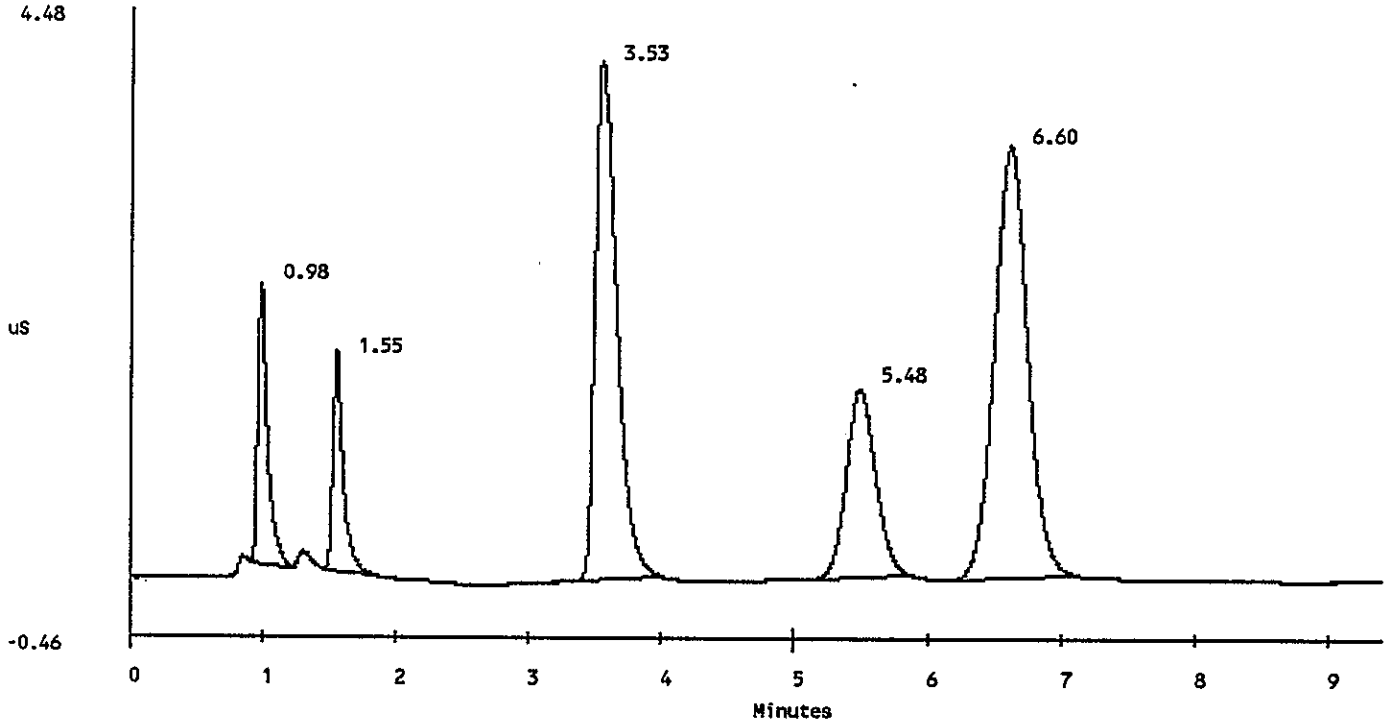
Sample Name: LMCS/6C11HF Date: Fri Jan 05 15:50:55 1990
Data File : 90010500.D11
Method : c:\windows\ai400\method\GROUT01.met
CIM Address: 1 System : 1 Cycle#: 11 Detector: CDM

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

Start Time = 0.00 minutes Stop time = 9.40 Minutes
Number of Data Points = 2821 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	0.98	FLUORIDE	6.677e+001	1.091e+004	2165	1	0	0.00%
2	1.55	CHLORIDE	8.805e+001	8.942e+003	1644	1	0	-1.06%
3	3.53	NITRATE	7.092e+002	4.572e+004	4025	1	0	2.91%
4	5.48	PHOSPHATE	6.838e+002	2.252e+004	1471	1	0	1.86%
5	6.60	SULFATE	6.792e+002	5.798e+004	3358	1	0	0.76%



Analytical Batch

LAB SEGMENT SERIAL #: F0149

CUSTOMER ID: 89-048

INSTRUMENT	WB39937
PROCEDURE/REV	LA-344-105/A-1
TECHNOLOGIST	E. Colvin
DATE	January 16, 1990
TEMPERATURE	Not Reported
STARTING TIME	0800
ENDING TIME	1130
CHEMIST	R. E. Brandt

Total Carbon Analysis

Water Digestion

Samples were not acidified before analysis.

Results reported are TOC and Carbonate combined.

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	F0158
2	Reagent Blank	F0170
3	Sample 89-048	F0159
4	Duplicate Sample 89-048	F0160
5	Spike of Sample 89-048	F0161
6	Final LMCS Check Std.	F0162
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 BOOK # & ALIQUOT VOL.	FINAL VOL. OF STD.
LMCS Check Std.	70C11B/200uL			2.2 mL
Spike of 89-048	70C11B/100uL	F0159/200uL		.3 mL

SST-102 Rev. I 10/2/90 Interim

9413524.2749

The photocopies on the following pages 107 to 112 are the best copy available from originals of poor reproducible quality.

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-158 Date: 01-16-1990 Time: 08:40:43

Blank = .528134 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	31.10	100.00
3	3.01	44.10	29.48
4	4.01	50.20	12.15
5	5.01	53.90	6.86
6	6.01	55.70	3.23
7	7.01	57.20	2.62

(57.2 - 3.699936)(11)/(200) = 2.942504 g/L Carbon

(57.2 - 3.699936)(11)/(200)(12) = .2452086 Molar Carbon

Sample Run By: 80028_____

BEST AVAILABLE COPY

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-170 Date: 01-16-1990 Time: 08:32:05

Blank = N/A
% Difference = 10

Sample Size = 200 Dilution Factor = 1
Min Readings = 7 Max Readings = 7

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	1.01	0.50	%-1100.00
2	2.01	1.10	54.55
3	3.01	1.60	31.25
4	4.01	2.10	23.81
5	5.01	2.70	22.22
6	6.01	3.30	18.18
7	7.01	3.70	10.81

BLANK VALUE = 3.7 / 7.005799 = .528134 ug/minute

Sample Run By: 80028_____

BEST AVAILABLE COPY

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-159 Date: 01-16-1990 Time: 09:41:19

Blank = .528134 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	2.70	100.00
3	3.01	4.40	38.64
4	4.01	5.50	20.00
5	5.01	6.30	12.70
6	6.01	7.00	10.00
7	7.01	7.60	7.89

(7.6 - 3.699936)(1)/(200) = 1.950032E-02 g/L Carbon

(7.6 - 3.699936)(1)/(200)(12) = 1.625027E-03 Molar Carbon

Sample Run By: 80028_____

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COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-160 Date: 01-16-1990 Time: 10:09:05

Blank = .528134 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	2.90	100.00
3	3.01	4.30	32.56
4	4.01	5.30	18.87
5	5.01	6.10	13.11
6	6.01	6.80	10.29
7	7.01	7.50	9.33

(7.5 - 3.700033)(1)/(200) = 1.899984E-02 g/L Carbon

(7.5 - 3.700033)(1)/(200)(12) = 1.58332E-03 Molar Carbon

Sample Run By: 80028_____

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COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-161 Date: 01-16-1990 Time: 10:24:14

Blank = .528134 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	84.10	100.00
3	3.01	144.20	41.68
4	4.00	168.30	14.32
5	5.01	179.90	6.45
6	6.01	185.50	3.02
7	7.01	188.40	1.54

(188.4 - 3.699936)(1)/(200) = .9235003 g/L Carbon

(188.4 - 3.699936)(1)/(200)(12) = 7.695836E-02 Molar Carbon

Sample Run By: 80028_____

BEST AVAILABLE COPY

COULOMETER ANALYSIS REPORT
TICTOC Rev. 0

Sample: F-162 Date: 01-16-1990 Time: 10:42:43

Blank = .528134 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	32.50	100.00
3	3.01	46.00	29.35
4	4.01	52.30	12.05
5	5.01	55.50	5.77
6	6.01	57.20	2.97
7	7.01	58.50	2.22

(58.5 - 3.700451)(11)/(200) = 3.013975 g/L Carbon

(58.5 - 3.700451)(11)/(200)(12) = .2511646 Molar Carbon

Sample Run By: 80028_____

BEST AVAILABLE COPY

951 3324.2756

ACID DIGESTION TEST ANALYSIS

ICP DATA SUMMARY

Acid Digestion

Date Analyzed: April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	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	99.98%		0.11 LT	76209	91743	NOT CALC.	100.63%	100.78%
Antimony	103.50%		0.14 LT	455	321 LT			105.02%
Barium	102.40%		0.00 LT	45	17	103.28%	92.28%	99.56%
Beryllium	96.97%		0.00 LT	2	1 LT			98.05%
Bismuth	106.71%	102.12%	0.13 LT	12709	12057	NOT CALC.		109.03%
Boron	99.14%	94.43%	0.03	30 LT	28 LT	134.81%		96.83%
Cadmium	98.49%	93.46%	0.01 LT	14 LT	13 LT	89.97%		97.75%
Calcium	104.77%	102.58%	0.09	568	761	146.72%		101.53%
Cerium	90.42%		0.20 LT	484 LT	459 LT	15.40%	88.66%	92.18%
Chromium	93.24%		0.01 LT	450	492	235.92%	84.79%	91.92%
Copper	103.21%	99.09%	0.02 LT	1012	1357	100.71%		101.11%
Europium	97.97%		0.00 LT	9 LT	8 LT			97.72%
Iron	101.68%		0.03	12131	13308	NOT CALC.	94.41%	99.61%
Lanthanum	93.47%	91.05%	0.02 LT	50 LT	48 LT	89.51%		93.84%
Lead	105.24%	99.04%	0.04 LT	742	352	93.18%		107.33%
Lithium	103.05%		0.00 LT	11 LT	11 LT	91.11%	93.39%	99.74%
Magnesium	102.66%	97.56%	0.02	1155	13743	4138.61%		100.47%
Manganese	100.82%		0.01	5823	5851	NOT CALC.	92.70%	98.92%
Mercury	100.82%		0.01 LT	13 LT	12 LT			100.39%
Molybdenum	96.06%	93.73%	0.01 LT	25	17 LT	85.72%		96.93%
Nickel	99.55%		0.02 LT	151	105	98.98%	92.68%	98.62%
Potassium	97.56%	82.65%	0.32 LT	756 LT	717 LT	94.06%		98.69%
Samarium	96.12%		0.23 LT	543 LT	516 LT			100.19%
Selenium	103.71%		0.09 LT	517	213 LT			104.80%
Silver	106.46%		0.03 LT	65 LT	62 LT	57.08%		107.84%
Sodium	100.29%	94.66%	0.07 LT	86006	85640	NOT CALC.		99.08%
Strontium	104.00%	100.02%	0.00 LT	578	593	86.77%		101.11%
Sulfur	106.83%		0.03	321	2043			101.62%
Tantalum	94.99%		0.04 LT	97 LT	92 LT	35.47%	73.62%	96.37%
Thallium	104.72%		0.07 LT	783	148 LT			106.69%
Thorium	105.11%		0.02 LT	162	41 LT			106.32%
Tin	99.38%		0.02 LT	73	49 LT	102.74%	93.54%	99.14%
Titanium	100.59%		0.13	27	12 LT	90.61%	92.17%	100.87%
Uranium	102.73%		1.71 LT	6091	3856 LT			107.92%
Vanadium	99.30%		0.02 LT	47	42 LT			101.25%
Zinc	99.24%	93.05%	0.23	242	627	66.80%		98.76%
Zirconium	99.66%		0.02 LT	50 LT	48 LT	46.04%	93.47%	99.94%

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

Analytical Batch

LAB SEGMENT SERIAL #: F0149

CUSTOMER ID: 89-048

ACID DIGESTION OF SAMPLE 89-048

INSTRUMENT	N/A
PROCEDURE/REV	LA-505-159 / A-0
TECHNOLOGIST	D.M. Southwick
DATE	02-01-90
TEMPERATURE	72 C
STARTING TIME	08:00
ENDING TIME	14:00
CHEMIST	S.A. Jones

	DESCRIPTION	LAB ID
1	REAGENT BLANK	F0147
2	SAMPLE 89-047	F0140
3	DUPLICATE SAMPLE 89-047	F0141
4	SPIKE OF SAMPLE 89-047	F0142
5	SAMPLE 89-048	F0164
6	DUPLICATE SAMPLE 89-048	F0165
7		
8		
9		
10		
11		

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

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BOOK # & ALIQUOT VOL.	FINAL VOL. OF STD.
SPIKE OF 89-047	103C15C / 5mL	104C15D / 5 mL		50 mL

SST-102 Rev. I 10/2/90 Interim

Analytical Batch

LAB SEGMENT SERIAL #: F0149

CUSTOMER ID: 89-048

INSTRUMENT	WB39939
PROCEDURE/REV	LA-505-151/A-0
TECHNOLOGIST	J. A. White
DATE	April 19, 1990
TEMPERATURE	70 F
STARTING TIME	0747
ENDING TIME	1500
CHEMIST	S. A. Jones

ICP Analysis

Acid Digestion

Only data directly related to the analysis of 89-048 will be included in this package.

No inter-element corrections were made on this data.

	DESCRIPTION	LAB ID
1	Initial LMCS Check Std.	N/A
2	Digested Std. (81C11A)	F1083
3	Reagent Blank	F1084
4	Sample Comp. Core 13	F1085
5	Duplicate of Core 13	F1086
6	Spike of F1085	F1087
7	Digested Std. (82C11A)	F1088
8	LMCS Check Std.	N/A
9	Sample Comp. Core 5	F0899
10	Duplicate Core 5	F0900
11	Acid Blank	N/A

	DESCRIPTION	LAB ID
12	Sample 89-043	F0068
13	Duplicate Sample 89-043	F0069
14	Sample 89-044	F0092
15	Duplicate Sample 89-044	F0093
16	LMCS Check Std.	N/A
17	Sample 89-047	F0140
18	Duplicate Sample 89-047	F0141
19	Sample 89-048	F0164
20	Duplicate Sample 89-048	F0165
21	Sample Comp. Core 8	F0959
22	Duplicate of Core 8	F0960

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BOOK # & ALIQUOT VOL.	FINAL VOL. OF STD.
LMCS Check Std.	78C11J/1.0 mL	82B38F/1.0 mL	77C11I/1.0 mL	DIRECT
Digested LMCS (1)	81C11A/5.0 mL			50.0 mL
Digested LMCS (2)	82C11A/5.0 mL			50.0 mL
Spike F0187	34C11CO/5.0 mL	35C11CK/5.0 mL	F1085/0.5143g	50.0 mL

9413324.2760

Analytical Batch

LAB SEGMENT SERIAL #: F0149

CUSTOMER ID: 89-048

INSTRUMENT	WB39939
PROCEDURE/REV	LA-505-151/A-0
TECHNOLOGIST	J. A. White
DATE	April 19, 1990
TEMPERATURE	70 F
STARTING TIME	0747
ENDING TIME	1500
CHEMIST	S. A. Jones

ICP Analysis

Acid Digestion

Only data directly related to the analysis of 89-048 will be included in this package.

No inter-element corrections were made on this data.

	DESCRIPTION	LAB ID
1	LMCS Check Std.	N/A
2	Sample Comp. Core 15	F1037
3	Duplicate Core 15	F1038
4	Closing LMCS Check Std.	N/A
5		
6		
7		
8		
9		
10		
11		

	DESCRIPTION	LAB ID
12		
13		
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17		
18		
19		
20		
21		
22		

STANDARD TYPE	PRIMARY BOOK # & ALIQUOT VOL.	SECOND BOOK # & ALIQUOT VOL.	THIRD BOOK # & ALIQUOT VOL.	FINAL VOL. OF STD.
LMCS Check Std.	78C11J/1.0 mL	82B38F/1.0 mL	77C11I/1.0 mL	DIRECT
Digested LMCS (1)	81C11A/5.0 mL			50.0 mL
Digested LMCS (2)	82C11A/5.0 mL			50.0 mL
Spike F0187	34C11CO/5.0 mL	35C11CK/5.0 mL	F1085/0.5143g	50.0 mL

ICP RAW DATA SUMMARY
Acid Digestion

Date Analyzed:	April 19, 1990	Acid Digested Standard	F1083
Procedure:	LA-505-151/A-0	Reagent Blank	F1084
Analyst:	J. A. White	Sample	F0164
		Duplicate	F0165
		Spike	F1087
		Digested Acid Standard	F1088

	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	99.98%		0.11	LT	76209		91743		NOT CALC.	100.63%	100.78%	
Antimony	103.50%		0.14	LT	455		321	LT			105.02%	
Arsenic	114.41% #		0.03	LT	82		75	LT			114.33%	#
Barium	102.40%		0.00	LT	45		17		103.28%	92.28%	99.56%	
Beryllium	96.97%		0.00	LT	2		1	LT			98.05%	
Bismuth	106.71%	102.12%	0.13	LT	12709		12057		NOT CALC.		109.03%	
Boron	99.14%	94.43%	0.03		30	LT	28	LT	134.81%		96.83%	
Cadmium	98.49%	93.46%	0.01	LT	14	LT	13	LT	89.97%		97.75%	
Calcium	104.77%	102.58%	0.09		568		761		146.72%		101.53%	
Cerium	90.42%		0.20	LT	484	LT	459	LT	15.40%	88.66%	92.18%	
Chromium	93.24%		0.01	LT	450		492		235.92%	84.79%	91.92%	
Cobalt	91.88%		0.04	LT	88	LT	83	LT	85.08%	86.00%	81.23%	#
Copper	103.21%	99.09%	0.02	LT	1012		1357		100.71%		101.11%	
Europium	97.97%		0.00	LT	9	LT	8	LT			97.72%	
Iron	101.68%		0.03		12131		13308		NOT CALC.	94.41%	99.61%	
Lanthanum	93.47%	91.05%	0.02	LT	50	LT	48	LT	89.51%		93.84%	
Lead	105.24%	99.04%	0.04	LT	742		352		93.18%		107.33%	
Lithium	103.05%		0.00	LT	11	LT	11	LT	91.11%	93.39%	99.74%	
Magnesium	102.66%	97.56%	0.02		1155		13743		4138.61%		100.47%	
Manganese	100.82%		0.01		5823		5851		NOT CALC.	92.70%	98.92%	
Mercury	100.82%		0.01	LT	13	LT	12	LT			100.39%	
Molybdenum	96.06%	93.73%	0.01	LT	25		17	LT	85.72%		96.93%	
Neodymium	85.58% #		0.32	LT	759	LT	720	LT	4.68%	77.36%	88.11%	#
Nickel	99.55%		0.02	LT	151		105		98.98%	92.68%	98.62%	
Phosphorou	114.91% #	93.37%	0.11		14347		12990		NOT CALC.		99.24%	
Potassium	97.56%	82.65%	0.32	LT	756	LT	717	LT	94.06%		98.69%	
Samarium	96.12%		0.23	LT	543	LT	516	LT			100.19%	
Selenium	103.71%		0.09	LT	517		213	LT			104.80%	
Silicon	89.48% #	75.18%	0.63		3780		4807		0.00%		90.19%	
Silver	106.46%		0.03	LT	65	LT	62	LT	57.08%		107.84%	
Sodium	100.29%	94.66%	0.07	LT	86006		85640		NOT CALC.		99.08%	
Strontium	104.00%	100.02%	0.00	LT	578		593		86.77%		101.11%	
Sulfur	106.83%		0.03		321		2043				101.62%	
Tantalum	94.99%		0.04	LT	97	LT	92	LT	35.47%	73.62%	96.37%	
Thallium	104.72%		0.07	LT	783		148	LT			106.69%	
Thorium	105.11%		0.02	LT	162		41	LT			106.32%	
Tin	99.38%		0.02	LT	73		49	LT	102.74%	93.54%	99.14%	
Titanium	100.59%		0.13		27		12	LT	90.61%	92.17%	100.87%	
Tungsten	82.47% #		0.04	LT	208		92	LT			82.74%	#
Uranium	102.73%		1.71	LT	6091		3856	LT			107.92%	
Vanadium	99.30%		0.02	LT	47		42	LT			101.25%	
Zinc	99.24%	93.05%	0.23		242		627		66.80%		98.76%	
Zirconium	99.66%		0.02	LT	50	LT	48	LT	46.04%	93.47%	99.94%	

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

ICP Raw Data

Date Analyzed: April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	SST-1	SST-2	SST-3	Starting LMCS Instrument Standard ppm	Standard Recovery %		LMCS Acid Digestion Standard ppm	Acid Digestion Standard Recovery %	Reagent Blank ppm	
							F1083		F1084	
Aluminum				49.99	99.98%				0.07	LT
Antimony	10.35				103.50%				-0.01	LT
Arsenic				57.21	114.41%	#			-0.02	LT
Barium	10.24				102.40%				-0.01	LT
Beryllium				9.70	96.97%				0.00	LT
Bismuth		53.46			106.71%		10.21	102.12%	-0.01	LT
Boron	9.91				99.14%		9.44	94.43%	0.03	
Cadmium	9.85				98.49%		9.35	93.46%	0.00	LT
Calcium	10.48				104.77%		10.26	102.58%	0.09	
Cerium	9.04				90.42%				-0.31	LT
Chromium	9.32				93.24%				-0.03	LT
Cobalt	9.19				91.88%				0.02	LT
Copper	10.32				103.21%		9.91	99.09%	-0.01	LT
Europium		9.80			97.97%				-0.01	LT
Iron	10.17				101.68%				0.03	
Lanthanum		46.83			93.47%		9.11	91.05%	-0.02	LT
Lead		52.72			105.24%		9.90	99.04%	0.01	LT
Lithium	10.31				103.05%				-0.01	LT
Magnesium	10.27				102.66%		9.76	97.56%	0.02	
Manganese	10.08				100.82%				0.01	
Mercury				25.21	100.82%				-0.05	LT
Molybdenum				48.03	96.06%		9.35	93.73%	-0.00	LT
Neodymium	8.56				85.58%	#			-0.64	LT
Nickel	9.96				99.55%				-0.01	LT
Phosphorou				57.45	114.91%	#	9.34	93.37%	0.11	
Potassium	24.39				97.56%		8.27	82.65%	-0.53	LT
Samarium		9.61			96.12%				-0.35	LT
Selenium				51.86	103.71%				-0.06	LT
Silicon				44.74	89.48%	#	7.52	75.18%	0.63	
Silver		10.65			106.46%		7.42		-0.02	LT
Sodium	25.07				100.29%		9.47	94.66%	0.06	LT
Strontium	10.40				104.00%		10.00	100.02%	-0.00	LT
Sulfur				53.41	106.83%				0.03	
Tantalum				47.50	94.99%				-0.04	LT
Thallium				52.36	104.72%				-0.33	LT
Thorium		52.66			105.11%				-0.18	LT
Tin	49.69				99.38%				0.02	LT
Titanium				50.30	100.59%				0.13	
Tungsten				20.62	82.47%	#			-0.02	LT
Uranium		51.47			102.73%				-2.40	LT
Vanadium				9.93	99.30%				-0.02	LT
Zinc	9.92				99.24%		9.31	93.05%	0.23	
Zirconium				49.83	99.66%				-0.04	LT
	1.00	1.00	1.00		Dilution Factor		10.00		1.00	

ICP Raw Data

Date Analyzed: April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	F0164			F0165		
Digestion Weight	0.4420	g		0.4659	g	
Volume	50.00	mL		50.00	mL	
	Sample	Sample		Sample Duplicate	Sample Duplicate	Sample Duplicate
	Dilution Three ppm	Dilution Two ppm	Dilution One ppm	Dilution Three ppm	Dilution Two ppm	Dilution One ppm
Aluminum	673.69	694.48		854.86	804.13	
Antimony	2.98	4.03		2.98	1.14	LT
Arsenic	-0.80	0.73		-1.61	-0.02	LT
Barium	-0.38	0.40		0.15	0.16	
Beryllium	-0.01	0.02		-0.04	-0.01	LT
Bismuth	112.35	123.11		112.35	116.60	
Boron	-0.36	0.20	LT	0.43	-0.01	LT
Cadmium	-0.54	-0.00	LT	-0.67	-0.13	LT
Calcium	5.02	4.65		7.09	5.31	
Cerium	-24.26	0.58	LT	-32.46	-10.02	LT
Chromium	-0.39	3.98		4.59	4.15	
Cobalt	1.13	0.58	LT	-0.25	-0.63	LT
Copper	7.42	8.95		11.59	12.64	
Europium	-0.50	0.01	LT	-0.62	-0.19	LT
Iron	107.24	108.35		124.00	117.39	
Lanthanum	-0.78	0.38	LT	-0.65	-0.43	LT
Lead	8.61	6.56		10.76	3.28	
Lithium	-1.12	-0.03	LT	-1.56	-0.51	LT
Magnesium	10.21	2.78		128.06	8.24	
Manganese	51.47	51.69		54.52	53.14	
Mercury	-4.13	-0.55	LT	-3.95	-0.58	LT
Molybdenum	-0.47	0.22		-0.47	-0.05	LT
Neodymium	-80.50	-8.41	LT	-70.44	-19.45	LT
Nickel	0.10	1.34		-0.02	0.97	
Phosphorou	126.83	128.58		121.04	106.57	
Potassium	-50.85	-3.19	LT	-56.80	-17.64	LT
Samarium	-28.29	0.20	LT	-38.55	-12.05	LT
Selenium	-1.29	4.57		-2.57	1.87	LT
Silicon	30.11	33.41		44.80	33.17	
Silver	-1.68	0.10	LT	-2.07	-0.62	LT
Sodium	760.29	777.17		797.99	779.70	
Strontium	5.11	5.41		5.53	5.61	
Sulfur	2.04	2.84		19.04	2.65	
Tantalum	-3.95	0.25	LT	-3.92	-1.36	LT
Thallium	-11.99	6.93		-40.33	-4.43	LT
Thorium	-14.87	1.44		-21.24	-6.79	LT
Tin	-1.04	0.64		0.03	0.25	LT
Titanium	-0.86	0.24		-0.77	-0.12	LT
Tungsten	-1.71	1.84		-1.23	0.72	LT
Uranium	-140.20	53.84		-192.90	-10.27	LT
Vanadium	-0.76	0.42		-1.68	-0.06	LT
Zinc	2.14	1.35		5.84	1.53	
Zirconium	-2.20	0.34	LT	-2.95	-0.73	LT
	101.00	21.00	Dilution Factor	101.00	21.00	

ICP Raw Data

Date Analyzed: April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	F1087				F1088	
Digestion Weight	0.5143	g				
Volume	50.00	mL				
	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	507.09	473.99		NOT CALC.	10.06	100.63%
Antimony	13.40	14.24				
Arsenic	-0.58	1.02				
Barium	10.83	10.57		103.28%	9.23	92.28%
Beryllium	0.02	0.03				
Bismuth	160.79	176.36		NOT CALC.		
Boron	14.10	10.25		134.81%		
Cadmium	9.00	10.03		89.97%		
Calcium	20.40	14.91		146.72%		
Cerium	-30.01	1.54	LT	15.40%	8.87	88.66%
Chromium	30.54	19.37		235.92%	8.56	84.79%
Cobalt	8.30	9.83		85.08%	8.60	86.00%
Copper	9.26	10.82		100.71%		
Europium	-0.57	0.04	LT			
Iron	218.35	212.56		NOT CALC.	9.44	94.41%
Lanthanum	7.16	9.85		89.51%		
Lead	17.21	20.87		93.18%		
Lithium	9.24	10.65		91.11%	9.34	93.39%
Magnesium	416.09	37.95		4138.61%		
Manganese	56.88	57.54		NOT CALC.	9.27	92.70%
Mercury	-2.46	-0.27	LT			
Molybdenum	8.93	9.87		85.72%		
Neodymium	-66.75	0.47	LT	4.68%	7.74	77.36%
Nickel	9.91	11.36		98.98%	9.27	92.68%
Phosphorou	116.71	118.22		NOT CALC.		
Potassium	-34.01	9.41		94.06%		
Samarium	-36.47	0.62	LT			
Selenium	7.17	9.37				
Silicon	42.19	25.60		0.00%		
Silver	4.89	5.71		57.08%		
Sodium	838.67	827.74		NOT CALC.		
Strontium	14.46	14.97		86.77%		
Sulfur	67.98	12.69				
Tantalum	-0.70	3.53		35.47%	7.33	73.62%
Thallium	-18.49	7.30				
Thorium	-19.12	2.21				
Tin	14.05	10.97		102.74%	9.35	93.54%
Titanium	9.35	9.90		90.61%	9.23	92.17%
Tungsten	-2.06	1.00				
Uranium	-175.80	60.96			5.01	
Vanadium	-0.93	0.32	LT			
Zinc	25.48	13.50		66.80%		
Zirconium	1.83	5.97		46.04%	9.33	93.47%
	101.00	21.00		Dilution Factor	10.00	

ICP Raw Data

		Acid Digested Standard	F1083
Date Analyz	April 19, 1990	Reagent Blank	F1084
Procedure:	LA-505-151/A-0	Sample	F0164
Analyst:	J. A. White	Duplicate	F0165
		Spike	F1087
		Digested Acid Standard	F1088

	SST-1	SST-2	Ending LMCS Standard SST-3	Standard Recovery %	
Aluminum			50.39	100.78%	
Antimony	10.50			105.02%	
Arsenic			57.16	114.33%	#
Barium	9.96			99.56%	
Beryllium			9.81	98.05%	
Bismuth		54.63		109.03%	
Boron	9.68			96.83%	
Cadmium	9.78			97.75%	
Calcium	10.15			101.53%	
Cerium	9.22			92.18%	
Chromium	9.19			91.92%	
Cobalt	8.12			81.23%	#
Copper	10.11			101.11%	
Europium		9.77		97.72%	
Iron	9.96			99.61%	
Lanthanum		47.01		93.84%	
Lead		53.77		107.33%	
Lithium	9.97			99.74%	
Magnesium	10.05			100.47%	
Manganese	9.89			98.92%	
Mercury			25.10	100.39%	
Molybdenum			48.47	96.93%	
Neodymium	8.81			88.11%	#
Nickel	9.86			98.62%	
Phosphorou			49.62	99.24%	
Potassium	24.67			98.69%	
Samarium		10.02		100.19%	
Selenium			52.40	104.80%	
Silicon			45.09	90.19%	
Silver		10.78		107.84%	
Sodium	24.77			99.08%	
Strontium	10.11			101.11%	
Sulfur			50.81	101.62%	
Tantalum			48.18	96.37%	
Thallium			53.35	106.69%	
Thorium		53.27		106.32%	
Tin	49.57			99.14%	
Titanium			50.44	100.87%	
Tungsten			20.68	82.74%	#
Uranium		54.07		107.92%	
Vanadium			10.13	101.25%	
Zinc	9.88			98.76%	
Zirconium			49.97	99.94%	
	1.00	1.00	1.00		

ICP Raw Data

Date Analyz April 19, 1990
Procedure: LA-505-151/A-0
Analyst: J. A. White

Acid Digested Standard F1083
Reagent Blank F1084
Sample F0164
Duplicate F0165
Spike F1087
Digested Acid Standard F1088

	Spike Standard LMCS ppm added	Spike Standard ID Book #	SST-1	SST-2	LMCS Standards Values ppm SST-3	LMCS Standard IDs Book #	ACID DIGESTION LMCS STANDARD VALUES ppm In Sample	ACID DIGEST. LMCS IDs Book #
		34C11CO 34C11CK				78C11J 82B38F 77C11I		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	10.00		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	10.00				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			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	10.00				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	

ICP Raw Data

		Acid Digested Standard	F1083
Date Analyzed:	April 19, 1990	Reagent Blank	F1084
Procedure:	LA-505-151/A-0	Sample	F0164
Analyst:	J. A. White	Duplicate	F0165
		Spike	F1087
		Digested Acid Standard	F1088

	Calc. Sample F0164 ug/mL	Calc. Duplicate F0165 ug/mL	Calc. Spike F1087 ug/mL	RPD from Summary	IDL (2 sigma)
Aluminum	674	855	507	18.5%	0.0745
Antimony	4	1	14		0.0949
Arsenic	1	-0	1		0.0223
Barium	0	0	11	92.0%	0.0026
Beryllium	0	-0	0		0.0004
Bismuth	112	112	161	5.3%	0.0839
Boron	0	-0	14		0.0083
Cadmium	-0	-0	9		0.0039
Calcium	5	7	20	29.2%	0.0002
Cerium	1	-10	2		0.1359
Chromium	4	5	31	9.0%	0.0039
Cobalt	1	-1	10		0.0246
Copper	9	13	11	29.1%	0.0158
Europium	0	-0	0		0.0024
Iron	107	124	218	9.2%	0.0073
Lanthanum	0	-0	10		0.0141
Lead	7	3	21	71.3%	0.0273
Lithium	-0	-1	9		0.0032
Magnesium	10	128	416	169.0%	0.0001
Manganese	51	55	57	0.5%	0.0011
Mercury	-1	-1	-0		0.0036
Molybdenum	0	-0	9		0.0049
Neodymium	-8	-19	0		0.2130
Nickel	1	1	11	36.6%	0.0147
Phosphorou	127	121	117	9.9%	0.0308
Potassium	-3	-18	9		0.2122
Samarium	0	-12	1		0.1525
Selenium	5	2	9		0.0631
Silicon	33	45	42	23.9%	0.0314
Silver	0	-1	6		0.0183
Sodium	760	798	839	0.4%	0.0483
Strontium	5	6	14	2.5%	0.0010
Sulfur	3	19	68	145.7%	0.0163
Tantalum	0	-1	4		0.0273
Thallium	7	-4	7		0.0437
Thorium	1	-7	2		0.0122
Tin	1	0	11		0.0144
Titanium	0	-0	9		0.0035
Tungsten	2	1	1		0.0273
Uranium	54	-10	61		1.1405
Vanadium	0	-0	0		0.0124
Zinc	2	6	25	88.6%	0.0017
Zirconium	0	-1	6		0.0141

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ICP Calibration April 19, 1990

```
19-Apr-90        07:39:21

Condition     Value                Min      /  Max

VACUUM   =    16.74                7.000    /  50.00
SPTEMP   =    38.70                37.00    /  39.00
MAINS    =    235.8                220.0    /  247.0
-1000V   =    -1005                -1010    /  -990
CTEMP    =    23.65                19.00    /  35.00
+5V      =    5.160                4.750    /  5.250
+12V     =    12.14                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     PM       ALPHA    BETA     ALPHA    BETA     ALPHA    BETA
         POS'N             SLIT     SLIT     LAMBDA1  LAMBDA1  LAMBDA2  LAMBDA2
Previous data :
INSTR    0.00000  586.483  1.00096  -0.3843  1.00009  -0.0675  0.00000  0.00000
Current data  :
INSTR    0.00000  587.525  1.00102  0.31641  1.00009  -0.0667  0.00000  0.00000
START THE PLASMA NOW, PLEASE.19-Apr-90        07:47:14
```

ICP Calibration April 19, 1990

Sample name : SST0
Programme : SST 19-Apr-90 08:12:00

NAME	MV INT	RSD
AL	2.02	0.96
SB	0.38	1.41
AS	1.10	1.16
BA	4.06	1.19
BE	0.70	0.99
BI	3.93	1.41
B	4.65	1.82
CD	2.38	1.48
CA	0.49	0.82
CE	5.47	1.21
CR	1.49	3.91
CO	0.26	0.58
CU	3.01	1.11
EU	4.24	1.30
FE	1.67	1.92
LA	0.36	0.48
PB	0.27	0.94
LI	4.07	0.98
MG	0.46	0.77
MN	0.78	0.84
HG	4.63	0.23
MO	1.71	0.90
ND	5.87	0.99
NI	3.48	1.25
P	1.28	2.59
K	3.43	0.69
SM	5.25	1.20
SE	1.77	0.54
SI	3.37	1.05
AG	15.51	1.25
NA	5.63	1.34
SR	3.77	1.02
S	0.75	1.80
TA	3.80	1.41
TL	4.43	1.33
TH	1.10	1.05
SN	1.25	3.05
TI	3.63	1.19
W	1.38	1.82
U	5.31	1.19
V1	4.42	1.18
ZN	2.42	0.91
ZR	4.76	1.07

Sample name : SST1
Programme : SST 19-Apr-90 08:16:04

NAME	MV INT	RSD
LI	417.24	1.20
K	13.63	0.90
NA	60.13	1.10

Sample name : SST2
Programme : SST 19-Apr-90 08:18:03

ICP Calibration April 19, 1990

NAME	MV INT	RSD
BA	278.36	0.28
BE	483.17	0.26
CD	321.93	0.52
CA	391.86	0.23
CR	67.99	2.97
CO	5.62	0.30
CU	94.95	0.39
FE	123.57	0.44
MG	418.22	0.28
MN	269.40	0.50
NI	157.96	0.48
AG	443.38	0.51
SR	491.83	0.29
VI	166.57	0.26
ZN	614.54	0.39

Sample name : SST3
Programme : SST 19-Apr-90 08:20:44

NAME	MV INT	RSD
AL	21.20	0.57
B	656.56	0.52
HG	769.40	0.79
MO	294.93	0.47
P	61.19	1.41
SI	77.63	0.49
S	40.45	0.07
TA	124.10	0.63
TI	435.43	0.60
W	64.46	0.68
ZR	152.16	0.53

Sample name : SST4
Programme : SST 19-Apr-90 08:22:54

NAME	MV INT	RSD
SB	7.16	1.20
AS	122.50	1.01
BI	102.90	1.08
PB	4.96	1.03
SE	51.55	0.68
TL	43.76	1.40
TH	13.78	1.01
SN	237.10	0.91
U	12.39	0.65

Sample name : SST5
Programme : SST 19-Apr-90 08:25:27

NAME	MV INT	RSD
CE	15.66	0.48
EU	442.41	0.60
LA	5.53	0.60
ND	16.65	0.23
SM	12.65	0.42

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ICP Calibration April 19, 1990

Programme name : SST Channel name : AL Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.9228	22.261	-0.527706E+01	0.260724E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	2.0240	0.0000	0.0000	-0.000	-0.000		CRV1
SST3	0	21.201	50.000	50.000	50.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : SB1 Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.3572	7.5166	-0.554354E+01	0.147435E+02		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	0.3760	0.0000	0.0000	0.0000	0.0000		CRV1
SST4	0	7.1587	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : AS Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.0472	128.63	-0.908003E+00	0.823710E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	1.1023	0.0000	0.0000	-0.000	-0.000		CRV1
SST4	0	122.50	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : BA Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.8602	292.27	-0.296277E+00	0.729147E-01		

ICP Calibration April 19, 1990

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	4.0633	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	278.36	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : BE1 Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.6697	507.33	-0.292248E-01	0.414536E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	0.7050	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	483.17	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : BI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.7316	108.05	-0.396876E+01	0.101038E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	3.9280	0.0000	0.0000	0.0000	0.0000		CRV1
SST4	0	102.90	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : B Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	4.4166	689.39	-0.356566E+00	0.766975E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	4.6490	0.0000	0.0000	0.0000	0.0000		CRV1
SST3	0	656.56	50.000	50.000	50.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : CD Polynomial type : CC

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ICP Calibration April 19, 1990

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.2588	338.03	-0.148813E+00	0.625878E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	2.3777	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	321.93	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : CA Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.4645	411.45	-0.249891E-01	0.511025E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	0.4890	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	391.86	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : CE Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	5.1981	16.440	-0.107442E+02	0.196361E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	5.4717	0.0000	0.0000	0.0000	0.0000		CRV1
SST5	0	15.657	20.000	20.000	20.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : CR Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.4123	71.394	-0.447064E+00	0.300716E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	1.4867	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	67.885	20.000	20.000	20.000	-0.000	-0.000	CRV1

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ICP Calibration April 19, 1990

Programme name : SST Channel name : CO Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.2492	5.8975	-0.979891E+00	0.373529E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	0.2623	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	5.6167	20.000	20.000	20.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : CU Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.8560	99.693	-0.653979E+00	0.217534E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	3.0063	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	94.946	20.000	20.000	20.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : EU Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	4.0261	464.53	-0.193441E+00	0.456443E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	4.2380	0.0000	0.0000	0.0000	0.0000		CRV1
SST5	0	442.41	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : FE Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.5878	129.75	-0.274221E+00	0.164073E+00		

ICP Calibration April 19, 1990

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	1.6713	0.0000	0.0000	-0.000	-0.000		CRV1
SST2	0	123.57	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : LA Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.3420	5.8083	-0.139220E+01	0.386723E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	0.3600	0.0000	0.0000	0.0000	0.0000		CRV1
SST5	0	5.5317	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : PB Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.2530	5.2094	-0.567270E+01	0.212993E+02		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	0.2663	0.0000	0.0000	-0.000	-0.000		CRV1
SST4	0	4.9613	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : LI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.8693	438.10	-0.492900E+00	0.121017E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	4.0730	0.0000	0.0000	-0.000	-0.000		CRV1
SST1	0	417.24	50.000	50.000	50.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : MG Polynomial type : CC

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ICP Calibration April 19, 1990

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.4326	439.14	-0.217983E-01	0.478733E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SSI0	0	0.4553	0.0000	0.0000	-0.000	-0.000		CRV1
SSI2	0	418.22	20.000	20.000	20.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : MN Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.7388	282.87	-0.579004E-01	0.744540E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SSI0	0	0.7777	0.0000	0.0000	0.0000	0.0000		CRV1
SSI2	0	269.40	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : HG Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	4.3982	807.87	-0.302682E+00	0.653788E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SSI0	0	4.6297	0.0000	0.0000	-0.000	-0.000		CRV1
SSI3	0	769.40	50.000	50.000	50.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : MO Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.6201	309.67	-0.290791E+00	0.170519E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SSI0	0	1.7053	0.0000	0.0000	-0.000	-0.000		CRV1
SSI3	0	294.92	50.000	50.000	50.000	0.0000	0.0000	CRV1

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ICP Calibration April 19, 1990

Programme name : SST Channel name : ND Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	5.5790	17.478	-0.109022E+02	0.185644E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	5.8727	0.0000	0.0000	0.0000	0.0000		CRV1
SST5	0	16.646	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : NI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.3022	165.86	-0.450011E+00	0.129462E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	3.4760	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	157.96	20.000	20.000	20.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : P Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.2138	64.234	-0.106655E+01	0.834761E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	1.2777	0.0000	0.0000	0.0000	0.0000		CRV1
SST3	0	61.175	50.000	50.000	50.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : K Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.2604	14.309	-0.168307E+02	0.490405E+01		

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ICP Calibration April 19, 1990

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	3.4320	0.0000	0.0000	0.0000	0.0000		CRV1
SST1	0	13.628	50.000	50.000	50.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : SM Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	4.9904	14.337	-0.125057E+02	0.238067E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	5.2530	0.0000	0.0000	-0.000	-0.000		CRV1
SST5	0	13.654	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : SE Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.6825	54.131	-0.355749E+01	0.200874E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	1.7710	0.0000	0.0000	-0.000	-0.000		CRV1
SST4	0	51.553	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : SI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.2028	81.507	-0.227014E+01	0.673364E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	3.3713	0.0000	0.0000	0.0000	0.0000		CRV1
SST3	0	77.625	50.000	50.000	50.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : AG Polynomial type : CC

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ICP Calibration April 19, 1990

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	14.739	465.55	-0.725194E+00	0.467435E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	15.514	0.0000	0.0000	-0.000	-0.000		CRV1
SST2	0	443.38	20.000	20.000	20.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : NA Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	5.3441	63.140	-0.516007E+01	0.917291E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	5.6253	0.0000	0.0000	0.0000	0.0000		CRV1
SST1	0	60.134	50.000	50.000	50.000	0.0000	0.0000	CRV1

Programme name : SST Channel name : SR Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.5802	516.42	-0.154433E+00	0.409782E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	3.7687	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	491.83	20.000	20.000	20.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : S Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	0.7166	42.473	-0.950130E+00	0.125956E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	0.7543	0.0000	0.0000	0.0000	0.0000		CRV1
SST2	0	40.451	50.000	50.000	50.000	-0.000	-0.000	CRV1

ICP Calibration April 19, 1990

Programme name : SST Channel name : TA Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.6113	130.30	-0.157996E+01	0.415634E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	3.8013	0.0000	0.0000	0.0000	0.0000		CRV1
SST3	0	124.10	50.000	50.000	50.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : TL2 Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	4.2129	45.944	-0.112779E+02	0.254313E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	4.4347	0.0000	0.0000	-0.000	-0.000		CRV1
SST4	0	43.756	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : TH Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.0418	14.465	-0.864879E+01	0.788644E+01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	1.0967	0.0000	0.0000	0.0000	0.0000		CRV1
SST4	0	13.777	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : SN Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.1919	248.95	-0.531989E+00	0.424008E+00		

ICP Calibration April 19, 1990

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	1.2547	0.0000	0.0000	-0.000	-0.000		CRV1
SST4	0	237.10	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : TI Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	3.4453	457.20	-0.419948E+00	0.115795E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	3.6267	0.0000	0.0000	0.0000	0.0000		CRV1
SST3	0	435.43	50.000	50.000	50.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : W Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	1.3075	67.678	-0.109096E+01	0.792657E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	1.3763	0.0000	0.0000	0.0000	0.0000		CRV1
SST3	0	64.455	50.000	50.000	50.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : U Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	5.0432	13.014	-0.749247E+02	0.141137E+02		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SST0	0	5.3087	0.0000	0.0000	0.0000	0.0000		CRV1
SST4	0	12.394	100.00	100.00	100.00	0.0000	0.0000	CRV1

Programme name : SST Channel name : V1 Polynomial type : CC

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ICP Calibration April 19, 1990

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	4.1949	174.90	-0.544610E+00	0.123336E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SSI0	0	4.4157	0.0000	0.0000	-0.000	-0.000		CRV1
SSI2	0	166.57	20.000	20.000	20.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : ZN Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	2.2965	645.27	-0.789814E-01	0.326729E-01		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SSI0	0	2.4173	0.0000	0.0000	0.0000	0.0000		CRV1
SSI2	0	614.54	20.000	20.000	20.000	-0.000	-0.000	CRV1

Programme name : SST Channel name : ZR Polynomial type : CC

Curve	Min Int	Max Int	Curve Coefficients C0	C1	C2	C3
CRV1	4.5261	159.77	-0.161619E+01	0.339226E+00		

Name	Number	Int. (X)	Conc (Y)	True (Y)	Calc Conc	Conc Error	% Error	Curve
SSI0	0	4.7643	0.0000	0.0000	0.0000	0.0000		CRV1
SSI3	0	152.16	50.000	50.000	50.000	-0.000	-0.000	CRV1

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ICP Data Report - Acid Blank - (File 1)

Sample name : HNO3
Programme : SST 19-Apr-90 08:44:13

NAME	MV INT	CONCEN	RSD
Al	1.95	-0.199	-21.62
Sb	0.37	-0.039	-57.28
As	1.07	-0.031	-35.43
Ba	3.85	(-0.015	-13.46
Be	0.69	-0.001	-22.94
Bi	3.76	-0.167	-9.26
B	4.49	-0.013	-14.19
Cd	2.28	-0.006	-3.54
Ca	0.48	-0.000	-37.80
Ce	5.20	-0.534	-14.27
Cr	1.29	(-0.058	-5.90
Co	0.26	0.000	*******
Cu	2.88	-0.028	-14.78
Eu	4.02	(-0.010	-11.14
Fe	1.60	-0.012	-22.18
La	0.35	-0.032	-18.33
Pb	0.26	-0.043	-144.34
Li	4.01	-0.007	-68.58
Mg	0.44	-0.001	-18.92
Mn	0.75	-0.002	-13.86
Hg	3.89	(-0.049	-7.27
Mo	1.64	-0.012	-21.56
Nd	5.38	(-0.906	-8.91
Ni	3.33	-0.020	-11.69
P	1.27	-0.004	-531.46
K	3.27	-0.775	-14.72
Sm	4.99	-0.623	-14.98
Se	1.70	-0.139	-26.84
Si	3.23	-0.092	-17.41
Ag	14.76	-0.035	-15.37
Na	5.35	-0.253	-15.23
Sr	3.62	-0.006	-14.57
S	0.72	-0.044	-1.67
Ta	3.63	-0.073	-14.82
Tl	4.16	(-0.701	-13.24
Th	1.05	-0.376	-21.29
Sn	1.21	-0.018	-20.97
Ti	3.46	-0.020	-13.00
W	1.30	(-0.059	-20.24
U	5.04	-3.735	-13.04
V	4.16	(-0.031	-11.46
Zn	2.34	-0.003	-39.44
Zr	4.59	-0.058	-14.15

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ICP Data Report - LMCS Check Standard 78C11J - (File 2)

Sample name : 78C11J
Sample code 1 : SST1
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 08:48:34

18300

NAME	MV INT	CONCEN	RSD
Al	2.02	-0.013	-393.95
Sb	1.08	10.306	1.08
As	1.17	0.057	24.65
Ba	143.20	10.145	0.69
Be	0.72	0.001	30.70
Bi	3.92	-0.009	-390.64
B	134.59	9.966	0.37
Cd	160.15	9.875	0.17
Ca	204.52	10.427	0.74
Ce	10.07	9.035	0.59
Cr	32.84	9.427	0.43
Co	2.89	9.818	0.57
Cu	50.17	10.260	0.51
Eu	4.60	0.016	11.83
Fe	63.21	10.098	0.40
La	0.37	0.048	20.40
Pb	0.27	0.028	43.30
Li	89.66	10.357	0.50
Mg	214.58	10.251	0.47
Mn	136.15	10.079	0.34
Hg	3.95	(-0.044	-7.94
Mo	1.75	0.008	48.40
Nd	10.71	8.972	2.24
Ni	80.53	9.975	0.19
P	1.35	0.061	36.28
K	8.43	24.525	0.30
Sm	5.01	-0.575	-22.70
Se	3.40	3.272	0.48
Si	3.31	-0.040	-45.96
Ag	14.91	-0.028	-26.79
Na	32.79	24.917	0.33
Sr	254.70	10.283	0.68
S	0.91	0.200	8.19
Ta	3.70	-0.043	-44.43
Tl	4.39	-0.106	-120.98
Th	1.09	-0.053	-167.03
Sn	117.72	49.380	0.22
Ti	3.49	-0.016	-24.97
W	1.60	0.175	7.38
U	5.39	1.077	66.40
V	4.28	-0.017	-33.23
Zn	305.53	9.904	0.18
Zr	4.65	-0.038	-36.27

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ICP Data Report - LMCS Check Standard 82B38F - (File 3)

Sample name : 82B38F
Sample code 1 : SST2
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 08:52:57

18226

NAME	MV INT	CONCEN	RSD
Al	3.67	4.283	1.52
Sb	0.42	0.659	5.63
As	2.98	1.548	2.05
Ba	4.30	0.017	14.28
Be	0.74	0.001	27.77
Bi	57.46	54.091	0.47
B	5.40	0.058	3.39
Cd	2.48	0.007	10.95
Ca	0.73	0.012	1.25
Ce	5.75	0.550	14.46
Cr	1.68	0.058	5.97
Co	0.28	0.062	6.00
Cu	4.10	0.238	1.78
Eu	217.80	9.748	0.28
Fe	2.08	0.067	27.96
La	12.43	)46.675	0.17
Pb	2.77	53.326	0.33
Li	4.43	0.044	19.70
Mg	0.59	0.006	0.74
Mn	0.91	0.010	2.54
Hg	4.56	-0.005	-52.91
Mo	1.83	0.022	7.87
Nd	6.12	0.465	22.94
Ni	3.69	0.027	19.97
P	1.65	0.308	7.52
K	3.40	-0.167	-32.75
Sm	9.47	10.049	0.83
Se	1.93	0.319	5.03
Si	4.21	0.563	3.60
Ag	244.24	10.691	0.28
Na	5.66	0.036	89.17
Sr	3.95	0.008	12.55
S	0.87	0.140	11.23
Ta	4.22	0.173	9.35
Tl	6.75	5.881	1.93
Th	7.80	52.868	0.36
Sn	1.44	0.080	3.41
Ti	4.14	0.059	6.67
W	1.42	0.038	72.86
U	9.18	54.596	1.19
V	6.31	0.233	1.69
Zn	2.69	0.009	9.21
Zr	5.15	0.132	7.08

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ICP Data Report - LMCS Check Standard 77C11I - (File 4)

Sample name : 77C11I
Sample code 1 : SST3
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 09:02:22 18244

NAME	MV INT	CONCEN	RSD
Al	21.57	50.973	0.24
Sb	0.46	1.263	5.26
As	71.94	58.350	0.32
Ba	4.29	0.017	10.32
Be	244.28	10.097	1.63
Bi	4.89	0.971	1.41
B	5.42	0.059	5.14
Cd	2.61	0.015	11.90
Ca	0.75	0.013	0.67
Ce	5.51	0.073	85.92
Cr	1.50	0.005	95.47
Co	0.29	0.115	6.52
Cu	3.27	0.058	6.13
Eu	4.27	0.002	74.28
Fe	1.95	0.046	3.70
La	0.37	0.027	24.74
Pb	0.28	0.390	8.33
Li	4.13	0.007	40.18
Mg	0.52	0.003	1.60
Mn	1.04	0.019	1.02
Hg	399.37	25.808	0.58
Mo	293.51	49.758	0.43
Nd	5.79	-0.158	-100.24
Ni	7.41	0.510	0.95
P	66.26	)54.245	1.07
K	3.40	-0.132	-80.12
Sm	5.31	0.147	53.52
Se	28.39	53.466	0.71
Si	72.02	46.228	0.06
Ag	22.28	0.316	0.94
Na	5.78	0.146	19.94
Sr	3.87	0.004	21.45
S	42.73	)52.876	0.82
Ta	122.84	49.478	0.72
Tl	25.50	53.560	0.57
Th	1.22	0.983	4.04
Sn	1.71	0.193	0.76
Ti	447.29	51.373	0.16
W	28.21	21.266	0.47
U	6.19	12.420	1.28
V	86.99	10.184	2.07
Zn	3.56	0.037	2.26
Zr	154.39	50.756	0.11

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ICP Data Report - Acid Digested Standard 81C11A - (File 5)

Sample name : F1083
Sample code 1 : 81C11A
Sample code 2 : DIRECT
Sample code 3 : DIGEST
Programme : SST 19-Apr-90 09:07:31

NAME	MV INT	CONCEN	RSD
Al	2.11	0.228	31.49
Sb	0.37	-0.049	-180.83
As	1.44	0.275	9.55
Ba	3.83	(-0.017	-20.65
Be	0.70	-0.000	-141.52
Bi	14.03	10.212	0.64
B	127.77	9.443	0.82
Cd	151.70	9.346	1.27
Ca	201.23	10.258	0.57
Ce	5.08	(-0.772	-15.81
Cr	1.39	(-0.030	-21.13
Co	0.26	-0.012	-51.96
Cu	48.56	9.909	0.71
Eu	3.88	(-0.016	-17.94
Fe	1.84	0.028	23.66
La	2.71	9.105	0.51
Pb	0.73	9.904	1.43
Li	3.82	(-0.031	-22.41
Mg	204.24	9.756	0.53
Mn	0.89	0.008	16.27
Hg	3.96	(-0.043	-19.37
Mo	56.56	9.354	0.88
Nd	5.41	(-0.864	-24.79
Ni	3.28	(-0.025	-31.55
P	12.46	9.337	3.79
K	5.12	8.265	0.63
Sm	4.80	(-1.072	-13.13
Se	1.70	-0.151	-53.17
Si	14.54	7.518	6.68
Ag	174.24	7.419	0.59
Na	15.94	9.466	0.71
Sr	247.86	10.002	0.60
S	0.93	0.222	5.59
Ta	3.50	(-0.126	-22.37
Tl	4.00	(-1.116	-14.91
Th	1.02	(-0.573	-16.68
Sn	1.47	0.092	9.79
Ti	4.84	0.140	3.27
W	1.52	0.110	21.00
U	4.90	(-5.829	-16.47
V	4.04	(-0.046	-11.84
Zn	287.21	9.305	0.41
Zr	4.46	(-0.105	-14.92

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ICP Data Report - Reagent Blank - (File 6)

Sample name : F1084
Sample code 1 : REAGEN
Sample code 2 : DIRECT
Sample code 3 : 000013
Programme : SST 19-Apr-90 09:12:39

NAME	MV INT	CONCEN	RSD
Al	2.05	0.068	59.96
Sb	0.38	-0.005	-916.63
As	1.08	-0.022	-50.24
Ba	3.96	-0.008	-35.37
Be	0.71	0.000	28.39
Bi	3.92	-0.006	-797.45
B	5.08	0.033	2.92
Cd	2.38	0.000	6376.32
Ca	2.16	0.085	0.70
Ce	5.32	-0.306	-35.66
Cr	1.39	(-0.029	-12.21
Co	0.27	0.022	34.69
Cu	2.95	-0.011	-37.31
Eu	4.09	-0.007	-27.58
Fe	1.87	0.032	14.36
La	0.35	-0.022	-50.94
Pb	0.27	0.014	150.01
Li	3.99	-0.010	-47.62
Mg	0.78	0.015	7.20
Mn	0.92	0.011	4.16
Hg	3.83	(-0.053	-9.08
Mo	1.69	-0.003	-74.48
Nd	5.53	(-0.640	-21.86
Ni	3.42	-0.008	-60.28
P	1.41	0.114	12.79
K	3.32	-0.528	-24.44
Sm	5.10	-0.354	-30.58
Se	1.74	-0.064	-26.70
Si	4.31	0.631	16.43
Ag	15.13	-0.018	-28.50
Na	5.69	0.059	76.28
Sr	3.70	-0.003	-40.42
S	0.78	0.034	6.50
Ta	3.72	-0.035	-47.06
Tl	4.30	-0.331	-21.52
Th	1.07	-0.176	-43.95
Sn	1.29	0.016	107.80
Ti	4.74	0.129	2.06
W	1.35	-0.019	-35.11
U	5.14	-2.399	-29.80
V	4.29	-0.016	-21.91
Zn	9.48	0.231	1.22
Zr	4.66	-0.036	-34.15

ICP Data Report - Sample F1085 - (File 7)

Sample name : F1085
Sample code 1 : SAMPLE
Sample code 2 : 100-10
Sample code 3 : 000013
Programme : SST 19-Apr-90 09:17:05

NAME	MV INT	CONCEN	DILCOR	RSD
Al	4.10	5.418	547.20✓	0.81
Sb	0.39	0.172	17.373	26.19
As	1.12	0.018	1.858	22.98
Ba	4.18	0.009	0.869	19.07
Be	0.74	0.001	0.134	6.25
Bi	5.40	1.487	150.15✓	0.66
B	4.98	0.025	2.561	3.21
Cd	2.39	0.001	0.072	49.13
Ca	1.52	0.053	5.321✓	1.22
Ce	5.59	0.232	23.469	27.20
Cr	1.70	0.064	6.459✓	5.18
Co	0.27	0.045	4.527	19.24
Cu	3.08	0.017	1.706	17.32
Eu	4.31	0.003	0.324	42.80
Fe	9.83	1.338	135.13✓	0.88
La	0.37	0.024	2.474	18.23
Pb	0.28	0.234	23.663	20.99
Li	4.15	0.009	0.949	34.77
Mg	0.88	0.021	2.071✓	14.02
Mn	8.02	0.540	54.494✓	1.44
Hg	4.11	(-0.034	(-3.456	-7.45
Mo	1.76	0.009	0.878	11.15
Nd	5.72	-0.292	-29.50	-43.58
Ni	3.64	0.021	2.105	5.99
P	2.14	0.719	72.620✓	2.26
K	3.47	0.186	18.822	42.10
Sm	5.35	0.236	23.804	30.12
Se	1.83	0.123	12.444	2.49
Si	4.10	0.494	49.851✓	6.26
Ag	15.84	0.015	1.525	30.69
Na	13.44	7.173	724.43✓	0.45
Sr	5.07	0.053	5.376✓	0.58
S	0.83	0.100	10.050	22.51
Ta	3.86	0.025	2.561	59.21
Tl	4.57	0.337	33.990	23.79
Th	1.12	0.200	20.179✓	21.98
Sn	1.30	0.021	2.141	26.56
Ti	3.70	0.008	0.850	22.37
W	1.42	0.035	3.496	22.08
U	5.45	1.924	194.34	20.58
V	4.55	0.016	1.657	20.90
Zn	7.71	0.173	17.465✓	0.60
Zr	4.86	0.032	3.278	26.87

Dilution factor : 101.000

ICP Data Report - Sample F1085 - (File 8)

Sample name : F1085
Sample code 1 : SAMPLE
Sample code 2 : 500-10
Sample code 3 : 000013
Programme : SST 19-Apr-90 09:21:46

NAME	MV INT	CONCEN	DILCOR	RSD
Al	11.60	24.956	524.07	0.56
Sb	0.39	0.260	5.470✓	16.34
As	1.15	0.039	0.813✓	8.06
Ba	4.37	0.022	0.467✓	12.31
Be	0.74	0.001	0.031✓	4.81
Bi	10.44	6.584	138.27	0.67
B	5.01	0.027	0.574✓	6.67
Cd	2.42	0.003	0.060✓	20.70
Ca	4.15	0.187	3.925	0.36
Ce	5.57	0.193	4.055✓	58.07
Cr	2.94	0.438	9.193	1.38
Co	0.28	0.059	1.229✓	38.30
Cu	3.16	0.033	0.700✓	13.37
Ru	4.30	0.003	0.058	65.98
Fe	40.70	6.404	134.48	0.23
La	0.37	0.040	0.839✓	24.35
Pb	0.29	0.511	10.735✓	9.62
Li	4.12	0.006	0.124	69.90
Mg	1.83	0.066	1.386	0.29
Mn	35.10	2.555	53.656	0.20
Hg	4.19	(-0.029	(-0.601	-9.82
Mo	1.80	0.016	0.335✓	13.38
Nd	5.69	-0.342	-7.186✓	-44.51
Ni	3.97	0.065	1.356✓	11.66
P	4.85	2.984	62.670	2.21
K	3.45	0.092	1.922✓	144.38
Sm	5.32	0.163	3.416✓	77.57
Se	1.92	0.308	6.468✓	13.53
Si	5.65	1.533	32.198	3.75
Ag	15.85	0.016	0.331✓	51.32
Na	42.19	33.545	704.44	0.20
Sr	9.71	0.243	5.110	0.21
S	1.07	0.402	8.438✓	1.10
Ta	3.88	0.035	0.730✓	17.69
Tl	4.58	0.371	7.797✓	35.95
Th	1.12	0.163	3.423	66.05
Sn	1.33	0.031	0.644✓	24.10
Ti	3.74	0.013	0.264✓	30.83
W	1.45	0.057	1.193✓	6.08
U	5.59	3.938	82.692✓	18.67
V	4.54	0.015	0.325✓	42.05
Zn	5.64	0.105	2.214	0.59
Zr	4.94	0.061	1.278✓	17.58

Dilution factor : 21.0000

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ICP Data Report - Spike of Sample F1085 - (File 11)

Sample name : F1087
Sample code 1 : SPIKE
Sample code 2 : 100-10
Sample code 3 : 000013
Programme : SST 19-Apr-90 09:33:58

NAME	MV INT	CONCEN	DILCOR	RSD
Al	3.95	5.021	507.09	0.42
Sb	0.39	0.133	13.402	29.40
As	1.10	-0.006	-0.582	-151.41
Ba	5.53	0.107	10.831	1.87
Be	0.71	0.000	0.020	152.03
Bi	5.50	1.592	160.79	3.06
B	6.47	0.140	14.099	0.83
Cd	3.80	0.089	8.997	1.16
Ca	4.44	0.202	20.399	1.38
Ce	5.32	-0.297	-30.01	-40.41
Cr	2.49	0.302	30.544	0.76
Co	0.28	0.082	8.300	9.46
Cu	3.43	0.092	9.264	5.83
Eu	4.12	-0.006	-0.566	-43.79
Fe	14.85	2.162	218.35	1.12
La	0.38	0.071	7.161	15.75
Pb	0.27	0.170	17.210	14.43
Li	4.83	0.092	9.244	4.74
Mg	86.51	4.120	416.09	1.10
Mn	8.34	0.563	56.883	1.21
Hg	4.26	(-0.024	(-2.461	-12.56
Mo	2.22	0.088	8.933	1.90
Nd	5.52	(-0.661	(-66.75	-21.22
Ni	4.23	0.098	9.907	5.58
P	2.66	1.156	116.71	3.69
K	3.36	-0.337	-34.01	-45.88
Sm	5.10	-0.361	-36.47	-40.03
Se	1.81	0.071	7.169	63.81
Si	3.99	0.418	42.189	4.24
Ag	16.55	0.048	4.889	84.71
Na	14.68	8.304	838.67	0.63
Sr	7.26	0.143	14.464	0.43
S	1.29	0.673	67.976	0.29
Ta	3.78	-0.007	-0.700	-235.49
Tl	4.36	-0.183	-18.49	-62.27
Th	1.07	-0.189	-19.12	-43.37
Sn	1.58	0.139	14.047	4.75
Ti	4.43	0.093	9.345	3.03
W	1.35	-0.020	-2.055	-73.65
U	5.19	-1.741	-175.8	-51.50
V	4.34	-0.009	-0.926	-39.04
Zn	10.14	0.252	25.479	0.53
Zr	4.82	0.018	1.827	70.96

Dilution factor : 101.000

Sample name : F1087
Sample code 1 : SPIKE
Sample code 2 : 500-10
Sample code 3 : 000013
Programme : SST 19-Apr-90 09:38:10

NAME	MV INT	CONCEN	DILCOR	RSD
Al	10.68	22.571	473.99	0.53

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ICP Data Report - Spike of F1085 - (File 12)

Sample name : F1087
Sample code 1 : SPIKE
Sample code 2 : 500-10
Sample code 3 : 000013
Programme : SST 19-Apr-90 09:38:10

NAME	MV INT	CONCEN	DILCOR	RSD
Al	10.68	23.571	473.99	0.53
Sb	0.42	0.678	14.242	4.35
As	1.16	0.049	1.021	14.61
Ba	10.96	0.503	10.565	0.24
Be	0.74	0.001	0.028	8.84
Bi	12.24	8.398	176.36	0.47
B	11.02	0.488	10.254	1.00
Cd	10.01	0.477	10.026	0.88
Ca	14.39	0.710	14.914	0.51
Ce	5.51	0.073	1.540	73.99
Cr	4.55	0.922	19.370	0.03
Co	0.39	0.468	9.831	5.31
Cu	5.38	0.515	10.824	0.23
Eu	4.28	0.002	0.040	45.94
Fe	63.36	10.122	212.56	0.37
La	0.48	0.469	9.854	1.26
Pb	0.31	0.994	20.873	0.00
Li	8.26	0.507	10.652	0.10
Mg	38.20	1.807	37.950	0.31
Mn	37.58	2.740	57.543	0.62
Hg	4.44	-0.013	-0.265	-7.65
Mo	4.46	0.470	9.871	1.15
Nd	5.88	0.022	0.468	646.39
Ni	7.65	0.541	11.358	0.70
P	8.02	5.630	118.22	1.18
K	3.52	0.448	9.406	8.78
Sm	5.27	0.029	0.617	172.07
Se	1.99	0.446	9.365	1.19
Si	5.18	1.219	25.604	0.66
Ag	21.33	0.272	5.708	16.77
Na	48.60	39.416	827.74	0.16
Sr	21.16	0.713	14.969	0.35
S	1.23	0.604	12.688	1.78
Ta	4.21	0.168	3.529	0.14
Tl	4.57	0.348	7.299	14.95
Th	1.11	0.105	2.208	41.76
Sn	2.49	0.522	10.967	0.69
Ti	7.70	0.471	9.897	0.32
W	1.44	0.048	0.999	11.10
U	5.51	2.903	60.957	11.26
V	4.54	0.015	0.319	23.24
Zn	22.10	0.643	13.503	0.69
Zr	5.60	0.284	5.970	1.20

Dilution factor : 21.0000

ICP Data Report - Acid Digested Standard 82C11A - (File 13)

Sample name : F1088
Sample code 1 : DIGEST
Sample code 2 : DIRECT
Sample code 3 : 000013
Programme : SST 19-Apr-90 09:43:08

NAME	MV INT	CONCEN	RSD
Al	5.88	10.063	1.45
Sb	0.39	0.246	18.33
As	1.42	0.262	2.83
Ba	130.62	9.228	1.74
Be	0.79	0.004	4.42
Bi	4.21	0.280	13.02
B	5.31	0.050	11.73
Cd	2.52	0.009	21.14
Ca	5.75	0.269	1.89
Ce	9.99	8.866	0.56
Cr	29.93	8.555	1.83
Co	2.56	8.600	3.63
Cu	3.10	0.019	29.28
Eu	4.70	0.021	4.16
Fe	59.21	9.441	1.52
La	0.38	0.083	9.76
Pb	0.28	0.341	18.04
Li	81.25	9.339	2.39
Mg	2.33	0.090	1.83
Mn	125.29	9.270	1.65
Hg	4.47	-0.010	-47.80
Mo	1.89	0.031	8.35
Nd	10.04	7.736	4.51
Ni	75.07	9.268	1.53
P	1.49	0.176	8.13
K	3.38	-0.263	-50.60
Sm	5.22	-0.067	-135.85
Se	3.23	2.921	2.60
Si	4.33	0.645	4.64
Ag	16.78	0.059	8.32
Na	6.25	0.577	9.74
Sr	3.96	0.008	11.46
S	0.92	0.207	6.34
Ta	21.42	7.325	0.93
Tl	4.59	0.384	38.16
Th	1.14	0.352	21.51
Sn	23.32	9.354	1.21
Ti	83.30	9.226	1.68
W	2.31	0.739	3.69
U	5.66	5.010	11.19
V	4.42	0.000	
Zn	4.55	0.070	2.50
Zr	32.26	9.328	1.63

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ICP Data Report - Acid Blank - (File 14)

Sample name : HNO3
Programme : SST 19-Apr-90 09:48:24

NAME	MV INT	CONCEN	RSD
Al	1.96	-0.169	-16.21
Sb	0.37	-0.044	-66.67
As	1.07	-0.029	-17.39
Ba	3.86	-0.015	-9.37
Be	0.69	-0.000	-43.59
Bi	3.79	-0.139	-34.05
B	4.67	0.001	332.54
Cd	2.26	-0.007	-9.03
Ca	0.47	-0.001	-13.58
Ce	5.23	-0.467	-12.83
Cr	1.29	(-0.060	-7.45
Co	0.26	-0.020	-56.25
Cu	2.88	-0.027	-9.05
Eu	4.04	-0.009	-10.82
Fe	1.61	-0.010	-3.63
La	0.35	-0.030	-32.83
Pb	0.27	0.071	45.83
Li	4.08	0.001	551.09
Mg	0.45	-0.000	-29.04
Mn	0.75	-0.002	-35.38
Hg	4.19	(-0.029	-10.54
Mo	1.63	-0.012	-5.72
Nd	5.42	(-0.847	-9.40
Ni	3.33	-0.019	-24.70
P	1.29	0.012	168.99
K	3.29	-0.696	-9.86
Sm	5.02	-0.546	-12.21
Se	1.71	-0.129	-19.31
Si	3.26	-0.078	-8.60
Ag	14.89	-0.029	-14.95
Na	5.38	-0.227	-11.66
Sr	3.64	-0.005	-12.98
S	0.72	-0.038	-13.19
Ta	3.62	-0.074	-10.21
Tl	4.19	(-0.628	-10.05
Th	1.05	-0.334	-16.76
Sn	1.21	-0.021	-39.90
Ti	3.47	-0.018	-12.54
W	1.31	-0.051	-12.88
U	5.07	-3.387	-10.46
V	4.21	-0.025	-0.48
Zn	2.33	-0.003	-6.18
Zr	4.61	-0.053	-9.39

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ICP Data Report - LMCS Check Standard 78C11J - (File 15)

Sample name : 78C11J
Sample code 1 : SST1
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 09:52:37

NAME	MV INT	CONCEN	RSD
Al	2.00	-0.068	-15.38
Sb	1.09	10.591	1.18
As	1.16	0.044	18.97
Ba	146.91	10.416	0.54
Be	0.71	0.000	123.72
Bi	3.84	-0.088	-28.18
B	137.29	10.173	0.55
Cd	162.34	10.013	0.92
Ca	209.66	10.689	0.86
Ce	10.14	9.175	1.22
Cr	33.25	9.551	1.09
Co	2.87	9.727	0.57
Cu	51.35	10.517	0.88
Eu	4.54	0.014	7.31
Fe	64.73	10.346	0.71
La	0.37	0.036	30.93
Pb	0.27	0.078	0.00
Li	91.73	10.608	0.70
Mg	219.35	10.479	0.97
Mn	138.86	10.281	0.91
Hg	4.09	(-0.035	-11.09
Mo	1.73	0.004	36.37
Nd	10.76	9.076	3.51
Ni	81.91	10.154	0.63
P	1.34	0.051	34.41
K	8.51	24.914	1.12
Sm	4.93	(-0.775	-4.39
Se	3.42	3.316	2.26
Si	3.27	-0.067	-9.81
Ag	14.68	(-0.039	-6.98
Na	33.43	25.503	0.87
Sr	261.95	10.580	0.96
S	0.93	0.217	4.65
Ta	3.65	-0.062	-5.75
Tl	4.31	-0.328	-16.88
Th	1.07	-0.189	-23.69
Sn	120.18	50.427	0.94
Ti	3.43	(-0.023	-5.57
W	1.55	0.136	8.71
U	5.30	-0.080	-351.61
V	4.20	-0.026	-17.47
Zn	311.25	10.091	0.84
Zr	4.60	-0.057	-6.57

ICP Data Report - LMCS Check Standard 82B38F - (File 16)

Sample name : 82B38F
Sample code 1 : SST2
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 09:57:20

NAME	MV INT	CONCEN	RSD
Al	3.63	4.198	1.58
Sb	0.41	0.506	1.68
As	3.96	1.528	0.96
Ba	4.20	0.010	17.94
Be	0.72	0.001	34.69
Bi	57.66	54.288	0.85
B	5.47	0.063	4.91
Cd	2.42	0.003	40.50
Ca	0.73	0.012	0.64
Ce	5.63	0.314	13.05
Cr	1.63	0.044	11.62
Co	0.27	0.024	9.12
Cu	4.03	0.224	1.56
Eu	220.96	9.892	0.09
Fe	1.97	0.048	5.86
La	12.55	>47.153	0.49
Pb	2.77	53.426	0.77
Li	4.28	0.025	17.91
Mg	0.59	0.006	0.89
Mn	0.91	0.010	2.66
Hg	4.89	0.017	14.65
Mo	1.79	0.014	15.81
Nd	6.00	0.235	35.15
Ni	3.65	0.022	14.24
P	1.62	0.286	5.77
K	3.33	-0.487	-21.53
Sm	9.43	9.936	0.75
Se	1.88	0.226	5.77
Si	4.16	0.531	3.11
Ag	246.50	10.797	0.49
Na	5.53	-0.091	-31.98
Sr	3.89	0.005	13.79
S	0.86	0.134	10.36
Ta	4.16	0.147	3.21
Tl	6.65	5.646	1.78
Th	7.85	53.294	0.50
Sn	1.42	0.070	6.68
Ti	4.05	0.049	6.51
W	1.39	0.009	92.71
U	9.10	53.477	1.11
V	6.20	0.220	3.16
Zn	2.64	0.007	7.86
Zr	5.07	0.105	8.25

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ICP Data Report - LMCS Check Standard 77C11I - (File 17)

Sample name : 77C11I
Sample code 1 : SST3
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 10:01:41

NAME	MV INT	CONCEN	RSD
Al	21.27	50.184	0.81
Sb	0.47	1.322	7.83
As	71.23	57.765	0.66
Ba	4.34	0.020	13.08
Be	238.03	9.838	0.55
Bi	4.97	1.052	3.17
B	5.56	0.070	0.75
Cd	2.62	0.015	10.58
Ca	0.74	0.013	0.23
Ce	5.58	0.221	45.03
Cr	1.50	0.004	99.35
Co	0.30	0.153	3.73
Cu	3.30	0.064	8.80
Eu	4.33	0.004	37.48
Fe	1.97	0.049	13.03
La	0.37	0.030	45.81
Pb	0.29	0.454	9.76
Li	4.23	0.019	2.23
Mg	0.52	0.003	4.16
Mn	1.04	0.019	4.69
Hg	395.71	25.568	0.10
Mo	286.55	48.572	0.80
Nd	5.81	-0.108	-91.66
Ni	7.35	0.501	0.75
P	70.59	>57.863	1.02
K	3.45	0.082	129.01
Sm	5.39	0.318	32.27
Se	27.91	52.507	0.60
Si	70.49	45.198	0.49
Ag	22.48	0.326	0.77
Na	5.87	0.220	21.74
Sr	3.92	0.006	18.45
S	42.86	>53.038	0.68
Ta	119.75	48.190	0.68
Tl	25.27	52.995	1.13
Th	1.24	1.117	6.33
Sn	1.74	0.205	5.94
Ti	439.15	50.431	0.96
W	27.78	20.931	0.68
U	6.29	13.916	4.64
V	84.95	9.932	0.54
Zn	3.56	0.037	0.71
Zr	152.09	49.976	0.95

9513324.2798

ICP Data Report (File 37)

Sample name : HNO3
Programme : SST 19-Apr-90 12:36:00

NAME	MV INT	CONCEN	RSD
Al	1.98	-0.121	-61.06
Sb	0.38	0.039	229.13
As	1.08	-0.018	-58.08
Ba	3.91	-0.011	-34.26
Be	0.70	-0.000	-93.21
Bi	3.79	-0.142	-70.02
B	4.70	0.004	89.35
Cd	2.26	-0.007	-25.36
Ca	0.48	-0.001	-36.56
Ce	5.29	-0.355	-40.04
Cr	1.31	(-0.054	-11.57
Co	0.26	-0.005	-129.91
Cu	2.91	-0.020	-40.44
Eu	4.09	-0.007	-39.54
Fe	1.63	-0.007	-59.99
La	0.36	-0.006	-34.64
Pb	0.27	0.156	20.83
Li	3.93	-0.017	-37.97
Mg	0.45	-0.000	-40.91
Mn	0.76	-0.001	-69.74
Hg	4.90	0.018	24.67
Mo	1.66	-0.007	-58.20
Nd	5.46	(-0.764	-20.76
Ni	3.37	-0.014	-59.19
P	1.29	0.011	114.84
K	3.31	-0.613	-27.52
Sm	5.09	-0.398	-39.00
Se	1.73	-0.089	-53.58
Si	3.27	-0.071	-40.22
Ag	15.01	-0.023	-43.80
Na	5.42	-0.193	-38.50
Sr	3.67	-0.004	-40.53
S	0.74	-0.016	-37.95
Ta	3.68	-0.049	-58.11
Tl	4.25	-0.478	-32.09
Th	1.07	-0.242	-38.44
Sn	1.23	-0.012	-40.91
Ti	3.50	-0.014	-38.20
W	1.33	-0.035	-63.19
U	5.12	-2.724	-34.93
V	4.24	-0.021	-35.74
Zn	2.34	-0.003	-21.27
Zr	4.65	-0.039	-38.62

96/3324.2799

ICP Data Report (File 38)

Sample name : 78C11J
Sample code 1 : SST1
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 12:39:42

NAME	MV INT	CONCEN	%SD
Al	1.99	-0.092	-25.68
Sb	1.08	10.350	0.43
As	1.15	0.040	22.48
Ba	144.51	10.240	0.57
Be	0.70	-0.000	-91.65
Bi	3.84	-0.089	-16.62
B	133.91	9.914	0.63
Cd	159.73	9.849	0.88
Ca	205.51	10.477	0.59
Ce	10.08	9.042	0.85
Cr	32.49	9.324	0.98
Co	2.72	9.188	1.00
Cu	50.45	10.321	0.57
Eu	4.53	0.013	7.90
Fe	63.64	10.168	0.68
La	0.37	0.037	21.53
Pb	0.27	0.142	0.00
Li	89.23	10.305	0.47
Mg	214.90	10.266	0.54
Mn	136.19	10.082	0.76
Hg	4.29	<-0.022	-6.90
Mo	1.72	0.002	13.89
Nd	10.48	8.558	3.38
Ni	80.37	9.955	0.82
P	1.35	0.063	13.62
K	8.41	24.389	0.77
Sm	4.92	<-0.783	-5.86
Se	3.36	3.198	2.36
Si	3.25	-0.080	-9.44
Ag	14.67	<-0.039	-11.17
Na	32.96	25.072	0.50
Sr	257.56	10.400	0.50
S	0.92	0.206	1.54
Ta	3.64	-0.065	-7.96
Tl	4.30	-0.342	-4.10
Th	1.07	-0.184	-8.92
Sn	118.45	49.692	0.70
Ti	3.42	<-0.024	-5.64
W	1.57	0.151	6.32
U	5.28	-0.400	-80.66
V	4.18	<-0.029	-9.68
Zn	306.15	9.924	0.71
Zr	4.59	-0.059	-11.49

95/3324.2800

ICP Data Report (File 39)

Sample name : 82B38F 82B38F
Sample code 1 : SST2
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 12:43:44

NAME	MV INT	CONCEN	RSD
Al	3.58	4.046	1.01
Sb	0.41	0.457	8.53
As	2.91	1.488	1.44
Ba	4.13	0.005	75.45
Be	0.71	0.000	45.07
Bi	56.84	53.462	0.68
B	5.35	0.054	3.87
Cd	2.37	-0.001	-351.23
Ca	0.72	0.012	0.88
Ce	5.53	0.121	117.90
Cr	1.60	0.035	12.26
Co	0.26	0.004	152.75
Cu	3.98	0.212	2.93
Eu	218.88	9.797	0.88
Fe	1.93	0.042	9.34
La	12.47	46.826	0.99
Pb	2.74	52.723	0.75
Li	4.28	0.025	15.72
Mg	0.58	0.006	2.16
Mn	0.89	0.009	7.88
Hg	4.60	-0.002	-153.15
Mo	1.76	0.009	39.66
Nd	5.93	0.101	69.28
Ni	3.55	0.010	56.20
P	1.57	0.241	6.10
K	3.27	-0.790	-23.63
Sm	9.29	9.612	1.24
Se	1.87	0.203	24.01
Si	4.08	0.477	5.05
Ag	243.27	10.646	0.69
Na	5.43	-0.183	-37.88
Sr	3.83	0.003	63.96
S	0.84	0.106	17.84
Ta	4.06	0.106	16.02
Tl	6.60	5.505	2.11
Th	7.77	52.658	0.91
Sn	1.40	0.064	14.15
Ti	3.99	0.042	10.67
W	1.37	-0.002	-1124.2
U	8.96	51.468	1.34
V	6.17	0.217	1.42
Zn	2.58	0.005	13.15
Zr	5.01	0.082	19.98

95/3324.2B01

ICP Data Report (File 40)

Sample name : 77C11I
Sample code 1 : SST3
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 12:47:53

NAME	MV INT	CONCEN	RSD
Al	21.20	49.990	1.32
Sb	0.46	1.258	13.58
As	70.55	57.205	1.86
Ba	4.24	0.013	22.42
Be	234.64	9.697	1.29
Bi	4.85	0.934	4.18
B	5.44	0.061	5.26
Cd	2.55	0.011	9.93
Ca	0.74	0.013	2.24
Ce	5.45	-0.046	-247.41
Cr	1.48	-0.003	-150.11
Co	0.29	0.117	10.26
Cu	3.23	0.048	11.84
Eu	4.23	-0.000	-533.50
Fe	1.92	0.041	9.00
La	0.36	0.013	86.60
Pb	0.28	0.327	13.58
Li	4.15	0.009	8.68
Mg	0.51	0.003	8.30
Mn	1.01	0.018	8.26
Hg	390.16	25.206	1.86
Mo	283.36	48.028	1.95
Nd	5.65	-0.407	-3.82
Ni	7.29	0.493	1.22
P	70.10	)57.453	2.76
K	3.37	-0.322	-40.13
Sm	5.26	0.013	949.24
Se	27.59	51.855	2.29
Si	69.82	44.741	1.97
Ag	22.33	0.319	0.46
Na	5.71	0.082	74.29
Sr	3.84	0.003	46.78
S	43.16	)53.413	2.69
Ta	118.08	47.496	2.28
Tl	25.02	52.358	0.82
Th	1.21	0.928	8.17
Sn	1.71	0.192	3.42
Ti	437.99	50.297	0.94
W	27.39	20.618	1.97
U	6.17	12.086	3.49
V	84.93	9.930	1.63
Zn	3.49	0.035	3.27
Zr	151.66	49.832	1.06

ICP Data Report (File 45)

Sample name : F164
Sample code 1 : SAMPLE
Sample code 2 : 100-10
Sample code 3 : 89043
Programme : SST 19-Apr-90 13:09:14

NAME	MV INT	CONCEN	DILCOR	RSD
Al	4.58	6.670	673.69	0.95
Sb	0.38	0.029	2.978	50.00
As	1.09	-0.008	-0.804	-60.62
Ba	4.01	-0.004	-0.383	-47.47
Be	0.70	-0.000	-0.011	-263.40
Bi	5.03	1.112	112.35	3.94
B	4.60	-0.004	-0.364	-58.54
Cd	2.29	-0.005	-0.535	-11.39
Ca	1.46	0.050	5.017	0.41
Ce	5.35	-0.240	-24.26	-21.01
Cr	1.47	-0.004	-0.385	-93.08
Co	0.27	0.011	1.132	38.49
Cu	3.34	0.073	7.419	4.65
Eu	4.13	-0.005	-0.496	-23.21
Fe	8.14	1.062	107.24	0.86
La	0.36	-0.008	-0.781	-50.00
Pb	0.27	0.085	8.605	14.43
Li	3.98	-0.011	-1.120	-18.13
Mg	2.57	0.101	10.214	0.73
Mn	7.62	0.510	51.473	0.62
Hg	4.00	(-0.041	(-4.127	-1.12
Mo	1.68	-0.005	-0.471	-32.52
Nd	5.44	(-0.797	(-80.50	-12.59
Ni	3.48	0.001	0.096	630.41
P	2.78	1.256	126.83	2.81
K	3.33	-0.503	-50.85	-10.68
Sm	5.14	-0.280	-28.29	-26.83
Se	1.76	-0.013	-1.285	-237.54
Si	3.81	0.298	30.106	3.39
Ag	15.16	-0.017	-1.682	-29.17
Na	13.83	7.528	760.29	0.96
Sr	5.00	0.051	5.113	1.67
S	0.77	0.020	2.035	75.35
Ta	3.71	-0.039	-3.946	-21.50
Tl	4.39	-0.119	-11.99	-61.32
Th	1.08	-0.147	-14.87	-28.35
Sn	1.23	-0.010	-1.042	-62.37
Ti	3.55	-0.009	-0.862	-23.55
W	1.36	-0.017	-1.708	-47.57
U	5.21	-1.388	-140.2	-32.55
V	4.35	-0.007	-0.756	-47.80
Zn	3.07	0.021	2.141	5.37
Zr	4.70	-0.022	-2.204	-17.31

Dilution factor : 101.000

9513324.2805

ICP Data Report (File 46)

Sample name : F164
Sample code 1 : SAMPLE
Sample code 2 : 500-10
Sample code 3 : 89043
Programme : SST 19-Apr-90 13:13:19

NAME	MV INT	CONCEN	DILCOR	RSD
Al	14.71	33.070	694.48	0.18
Sb	0.39	0.192	4.025	15.38
As	1.14	0.035	0.727	29.39
Ba	4.32	0.019	0.400	4.09
Be	0.72	0.001	0.017	13.92
Bi	9.73	5.862	123.11	0.51
B	4.77	0.010	0.201	7.62
Cd	2.38	-0.000	-0.002	-681.69
Ca	4.83	0.222	4.654	0.07
Ce	5.49	0.027	0.577	35.23
Cr	2.12	0.189	3.976	2.64
Co	0.27	0.027	0.575	20.83
Cu	4.96	0.426	8.946	0.34
Eu	4.25	0.001	0.012	60.09
Fe	33.12	5.160	108.35	0.21
La	0.36	0.018	0.379	24.74
Pb	0.28	0.312	6.560	11.81
Li	4.06	-0.001	-0.027	-54.13
Mg	3.22	0.132	2.776	0.12
Mn	33.84	2.461	51.691	0.33
Hg	4.23	(-0.026	(-0.548	-2.09
Mo	1.77	0.010	0.218	17.53
Nd	5.66	-0.400	-8.408	-22.23
Ni	3.97	0.064	1.338	4.98
P	8.61	6.123	128.58	1.36
K	3.40	-0.152	-3.193	-53.10
Sm	5.26	0.010	0.200	239.17
Se	1.88	0.218	4.570	18.97
Si	5.73	1.591	33.414	0.78
Ag	15.62	0.005	0.101	14.49
Na	45.97	37.008	777.17	0.22
Sr	10.06	0.258	5.414	0.13
S	0.86	0.135	2.839	3.27
Ta	3.83	0.012	0.250	38.84
Tl	4.56	0.330	6.925	26.82
Th	1.11	0.068	1.435	24.02
Sn	1.33	0.031	0.644	11.97
Ti	3.73	0.011	0.240	9.20
W	1.49	0.087	1.837	10.11
U	5.49	2.564	53.844	3.87
V	4.58	0.020	0.416	9.32
Zn	4.38	0.064	1.349	1.33
Zr	4.81	0.016	0.340	7.27

Dilution factor : 21.0000

95/3324.2B04

ICP Data Report (File 47)

Sample name : F165
Sample code 1 : DUPSAM
Sample code 2 : 100-10
Sample code 3 : 89043
Programme : SST 19-Apr-90 13:17:32

NAME	MV INT	CONCEN	DILCOR	RSD
Al	5.27	8.464	854.86	1.48
Sb	0.38	0.029	2.978	278.39
As	1.08	-0.016	-1.608	-117.49
Ba	4.08	0.001	0.145	286.38
Be	0.70	-0.000	-0.036	-99.48
Bi	5.03	1.112	112.35	6.46
B	4.71	0.004	0.434	116.07
Cd	2.27	-0.007	-0.672	-17.48
Ca	1.86	0.070	7.093	0.48
Ce	5.31	-0.321	-32.46	-43.34
Cr	1.64	0.045	4.586	12.43
Co	0.26	-0.002	-0.252	-173.21
Cu	3.53	0.115	11.593	7.78
Eu	4.10	-0.006	-0.615	-42.16
Fe	9.15	1.228	124.00	0.70
La	0.36	-0.006	-0.651	-227.15
Pb	0.27	0.106	10.756	41.63
Li	3.95	-0.015	-1.560	-45.47
Mg	26.94	1.268	128.06	0.47
Mn	8.03	0.540	54.521	0.82
Hg	4.03	(-0.039	(-3.951	-8.07
Mo	1.68	-0.005	-0.471	-66.76
Nd	5.50	(-0.697	(-70.44	-32.67
Ni	3.47	-0.000	-0.017	-3243.6
P	2.71	1.198	121.04	5.39
K	3.32	-0.562	-56.80	-35.49
Sm	5.09	-0.382	-38.55	-44.10
Se	1.76	-0.025	-2.570	-138.18
Si	4.03	0.444	44.796	6.97
Ag	15.07	-0.021	-2.074	-48.38
Na	14.24	7.901	797.99	1.13
Sr	5.10	0.055	5.527	3.41
S	0.90	0.189	19.040	3.72
Ta	3.71	-0.039	-3.918	-79.00
Tl	4.28	-0.399	-40.33	-35.16
Th	1.07	-0.210	-21.24	-56.62
Sn	1.26	0.000	0.029	2176.10
Ti	3.56	-0.008	-0.772	-71.46
W	1.36	-0.012	-1.228	-193.14
U	5.17	-1.910	-192.9	-56.44
V	4.28	-0.017	-1.682	-34.84
Zn	4.19	0.058	5.844	3.21
Zr	4.68	-0.029	-2.946	-56.47

Dilution factor : 101.000

9413324.2805

ICP Data Report (File 48)

Sample name : F165
Sample code 1 : DUPSAM
Sample code 2 : 500-10
Sample code 3 : 89043
Programme : SST 19-Apr-90 13:26:28

NAME	MV INT	CONCEN	DILCOR	RSD
Al	16.71	38.292	804.13	0.93
Sb	0.38	0.054	1.135	68.63
As	1.10	-0.001	-0.017	-1876.9
Ba	4.17	0.007	0.156	52.11
Be	0.69	-0.000	-0.009	-72.63
Bi	9.42	5.552	116.60	1.15
B	4.64	-0.001	-0.013	-956.87
Cd	2.28	-0.006	-0.133	-13.83
Ca	5.44	0.253	5.310	0.59
Ce	5.23	-0.477	-10.02	-29.25
Cr	2.14	0.197	4.147	1.99
Co	0.25	-0.030	-0.628	-19.09
Cu	5.77	0.602	12.643	0.91
Eu	4.04	-0.009	-0.194	-27.06
Fe	35.74	5.590	117.39	0.69
La	0.35	-0.021	-0.433	-60.27
Pb	0.27	0.156	3.280	15.75
Li	3.87	-0.024	-0.507	-23.57
Mg	8.65	0.392	8.241	0.60
Mn	34.76	2.530	53.140	0.37
Hg	4.21	(-0.027	(-0.577	-6.05
Mo	1.69	-0.002	-0.048	-190.18
Nd	5.37	(-0.926	(-19.45	-20.45
Ni	3.83	0.046	0.974	20.45
P	7.36	5.075	106.57	3.06
K	3.26	-0.840	-17.64	-20.80
Sm	5.01	-0.574	-12.05	-30.30
Se	1.82	0.089	1.870	91.80
Si	5.72	1.579	33.169	1.94
Ag	14.88	-0.030	-0.620	-35.52
Na	46.10	37.129	779.70	0.58
Sr	10.28	0.267	5.607	0.61
S	0.85	0.126	2.645	8.02
Ta	3.65	-0.065	-1.359	-31.90
Tl	4.35	-0.211	-4.433	-75.98
Th	1.06	-0.323	-6.790	-29.30
Sn	1.28	0.012	0.246	23.24
Ti	3.58	-0.006	-0.118	-100.05
W	1.42	0.034	0.721	74.61
U	5.27	-0.489	-10.27	-193.85
V	4.39	-0.003	-0.061	-138.53
Zn	4.65	0.073	1.534	0.58
Zr	4.66	-0.035	-0.727	-53.24

Dilution factor : 21.0000

9513324.2806

ICP Data Report (File 53)

Sample name : HNO3
Programme : SSI 19-Apr-90 13:48:24

NAME	MV INT	CONCEN	RSD
Al	1.94	-0.217	-13.27
Sb	0.37	-0.108	-20.83
As	1.05	-0.040	-34.56
Ba	3.84	(-0.016	-12.45
Be	0.68	-0.001	-18.65
Bi	3.77	-0.157	-19.92
B	4.43	-0.017	-11.21
Cd	2.21	(-0.010	-7.71
Ca	0.48	-0.001	-93.91
Ce	5.20	-0.531	-13.75
Cr	1.27	(-0.065	-10.08
Co	0.26	-0.017	-24.74
Cu	2.87	-0.030	-13.27
Eu	4.02	(-0.010	-11.03
Fe	1.59	-0.013	-8.62
La	0.35	-0.037	-26.03
Pb	0.27	-0.007	-299.98
Li	3.87	(-0.025	-10.93
Mg	0.44	-0.001	-13.95
Mn	0.75	-0.002	-6.52
Hg	4.30	(-0.022	-6.99
Mo	1.62	-0.014	-13.01
Nd	5.34	(-0.989	-5.38
Ni	3.30	(-0.023	-18.26
P	1.29	0.011	60.93
K	3.26	(-0.866	-13.12
Sm	5.00	-0.613	-13.78
Se	1.70	-0.143	-8.45
Si	3.23	-0.096	-8.74
Ag	14.75	-0.036	-13.45
Na	5.33	(-0.269	-13.62
Sr	3.62	-0.006	-15.42
S	0.72	-0.042	-17.50
Ta	3.63	-0.071	-15.41
Tl	4.23	-0.522	-18.94
Th	1.05	-0.336	-15.37
Sn	1.21	-0.021	-21.35
Ti	3.44	(-0.021	-12.53
W	1.30	(-0.058	-24.90
U	5.02	(-4.051	-11.71
V	4.24	-0.022	-22.21
Zn	2.29	(-0.004	-22.92
Zr	4.59	-0.058	-14.76

9513324.2807

ICP Data Report (File 54)

Sample name : 78C11J
Sample code 1 : SST1
Sample code 3 : DIRECT
Programme : SST 19-Apr-90 13:52:03

NAME	MV INT	CONCEN	RSD
Al	2.07	0.114	10.33
Sb	1.09	10.502	1.18
As	1.21	0.086	8.59
Ba	140.61	9.956	0.63
Be	0.73	0.001	15.55
Bi	4.00	0.069	15.57
B	130.90	9.683	0.64
Cd	158.55	9.775	0.59
Ca	199.16	10.153	0.58
Ce	10.17	9.218	1.07
Cr	32.06	9.192	0.39
Co	2.44	8.123	1.71
Cu	49.49	10.111	0.60
Eu	4.70	0.021	3.05
Fe	62.38	9.961	0.77
La	0.38	0.068	3.27
Pb	0.27	0.177	18.33
Li	86.49	9.974	0.53
Mg	210.33	10.047	0.71
Mn	133.64	9.892	0.51
Hg	4.27	(-0.024	-7.96
Mo	1.77	0.012	10.50
Nd	10.62	8.811	1.65
Ni	79.65	9.862	0.72
P	1.40	0.101	11.89
K	8.46	24.672	0.83
Sm	5.15	-0.244	-10.77
Se	3.40	3.268	1.25
Si	3.39	0.010	53.25
Ag	15.34	-0.008	-8.95
Na	32.63	24.771	0.73
Sr	250.52	10.111	0.70
S	0.94	0.229	4.96
Ta	3.81	0.003	326.86
Tl	4.53	0.250	23.46
Th	1.12	0.179	10.19
Sn	118.16	49.570	0.80
Ti	3.56	-0.008	-2.20
W	1.62	0.196	8.95
U	5.50	2.677	4.61
V	4.40	-0.002	-145.01
Zn	304.68	9.876	0.52
Zr	4.74	-0.007	-13.01

954 3324.2808

ICP Data Report (File 55)

Sample name : 82B38F
Sample code 1 : SST2
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 13:55:57

NAME	MV INT	CONCEN	RSD
Al	3.67	4.304	0.97
Sb	0.42	0.659	1.29
As	2.97	1.541	1.05
Ba	4.27	0.015	11.38
Be	0.73	0.001	3.45
Bi	57.99	54.625	0.79
B	5.35	0.053	7.92
Cd	2.43	0.003	21.32
Ca	0.74	0.013	1.01
Ce	5.71	0.475	14.37
Cr	1.64	0.046	9.32
Co	0.27	0.015	38.19
Cu	4.07	0.231	0.73
Eu	218.34	9.768	1.03
Fe	1.99	0.053	1.64
La	12.52	47.013	0.90
Pb	2.79	53.774	0.84
Li	4.25	0.021	8.55
Mg	0.59	0.006	1.28
Mn	0.91	0.010	1.12
Hg	4.92	0.019	19.05
Mo	1.82	0.019	2.74
Nd	6.03	0.290	42.95
Ni	3.66	0.024	15.89
P	1.62	0.289	6.22
K	3.37	-0.325	-35.49
Sm	9.46	10.019	0.67
Se	1.90	0.256	7.88
Si	4.18	0.545	1.31
Ag	246.22	10.784	0.85
Na	5.62	-0.007	-271.53
Sr	3.94	0.007	11.47
S	0.85	0.125	4.55
Ta	4.19	0.163	9.57
Tl	6.74	5.853	0.54
Th	7.85	53.265	0.92
Sn	1.44	0.077	4.00
Ti	4.11	0.057	3.53
W	1.41	0.024	7.70
U	9.14	54.069	0.91
V	6.28	0.230	1.16
Zn	2.65	0.007	2.91
Zr	5.13	0.124	5.71

95/3324.2809

ICP Data Report (File 56)

Sample name : 77C11I
Sample code 1 : SST3
Sample code 2 : DIRECT
Programme : SST 19-Apr-90 13:59:49

NAME	MV INT	CONCEN	RSD
Al	21.35	50.388	1.01
Sb	0.46	1.268	7.07
As	70.50	57.163	1.04
Ba	4.22	0.011	25.80
Be	237.25	9.805	0.17
Bi	4.80	0.877	6.79
B	5.27	0.047	8.63
Cd	2.54	0.010	8.92
Ca	0.74	0.013	0.61
Ce	5.41	-0.117	-98.48
Cr	1.46	-0.008	-50.01
Co	0.28	0.072	2.99
Cu	3.22	0.046	13.81
Eu	4.20	-0.002	-108.01
Fe	1.93	0.043	12.06
La	0.36	0.012	88.19
Pb	0.28	0.305	4.03
Li	4.10	0.003	236.49
Mg	0.51	0.003	5.22
Mn	1.02	0.018	3.71
Hg	388.50	25.097	1.04
Mo	285.93	48.465	0.99
Nd	5.62	-0.476	-20.54
Ni	7.25	0.489	0.55
P	60.72	49.620	2.58
K	3.36	-0.378	-39.41
Sm	5.23	-0.060	-208.36
Se	27.86	52.398	0.75
Si	70.34	45.093	1.22
Ag	22.22	0.313	1.57
Na	5.69	0.056	89.49
Sr	3.81	0.002	66.66
S	41.10	50.812	1.90
Ta	119.73	48.183	0.79
Tl	25.41	53.347	2.93
Th	1.20	0.836	8.56
Sn	1.69	0.184	4.81
Ti	439.19	50.435	1.33
W	27.47	20.684	1.21
U	6.07	10.811	6.66
V	86.51	10.125	0.56
Zn	3.49	0.035	1.48
Zr	152.07	49.971	1.17

95/3324.2B10

APPENDIX A
ANALYTICAL ANALYSIS CARDS

9513324.2811

APPENDIX B

ANALYTICAL DETECTION LIMITS

Physical Properties

Serial No.	Sample Point	Date	Time Issued	Priority
F 149.-5001	SEGMENT-B	11-17-89	10:14	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
VOA SAMP	LI-000-200	NONE	WB75L	0

Sample Size	Customer ID
?	89-048

Remarks, Calculations, Results: Bottle 77

DUPLICATE SAMPLE

SAMPLE + Bottle wt. 24.44
TARE wt. 22.38
SAMPLE wt. 2.06g

Sent to PNL

WHC N 313 3

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
RLW KJP JRS	6A297 61300 65286			
Hrs 11-21-89	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
			DMS

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 149.-5002	SEGMENT-B	11-17-89	10:14	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
PRT-SIZE	LI-000-200	NONE	WB75L	0

Sample Size	Customer ID
?	89-048

Remarks, Calculations, Results: Bottle 76

PARTICLE SIZE DISTRIBUTION

Sample + Bottle wt. 22.51
TARE wt.
Sample wt.

Results:
Disperses well into water - no agglom.
brown suspension - some of which balled up in corners
All particles < 150 μ
See attached sheets (6)

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
12-5-89 R.B. Bechtold				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 149.-5000	SEGMENT-B	11-17-89	10:14	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LI-000-200	NONE	WB75L	0

Sample Size	Customer ID
? WHC N 313 4	89-048

Remarks, Calculations, Results:

Penetrometer (RHS) = 150

A. JAR ID# 58
B. JAR TARE WT. 221.15
C. JAR TOTAL WT. 334.95
D. C-B= 113.80
E. EST. VOL./LENGTH ~6 inches
F. VISUAL REMARKS Sample dark brown except for bottom chunk of about 3/4" granular throughout sample w/ some hard bits. semi-cohesive consistency with bottom chunk less cohesive than rest of sample. About 150 ml of Liquid in Sampler

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
RLW KJP JRS	6A297 61300 65286			
Hrs 11-21-89	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
		[signature]	DMS

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 149.-5003	SEGMENT-B	11-17-89	10:14	16

Determination	Method/Standard	Result Units	Charge Code	Reruns
HOMOGZT	LI-000-200	NONE	WB75L	0

Sample Size	Customer ID
?	89-048

Remarks, Calculations, Results:

Homogenization complete

fac# 133

12-29-89 WHC N 313 4 pg 14

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
RLW KJP FNJ	6A297 61300 68090			
Hrs 12-29-89	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
			DMS

54-6600-061 (R-10-83)

95 3324.2812

pH Analysis of Solid Sample

Serial No.	Sample Point	Date	Time Issued	Priority
F 150.-5115	SEGMENT-C	11-17-89	10:15	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
pH	LA-212-103	NONE	WB75L	0

Sample Size: ? 2.051g / 2.051 ml

Customer ID: 089048

Remarks, Calculations, Results:
pH 12.79
SAMPLE TEMP 23.7

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269				R E Bennett
Mary Franz	Hrs	Hrs	Hrs	Hrs

Date: 1-2-90 | Time Completed: | Lab Unit Mgr: [signature]

54-6600-061 (R-10-83)

F944

Serial No.	Sample Point	Date	Time Issued	Priority
F 292.-5515	SEGMENT-E	11-21-89	8:30	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
pH	LA-212-103	% RECOVERY	WB75L	0

Sample Size: ?

Customer ID: 089050

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
pH FOUND 10.09
STD ID NCCH-A
SAMPLE TEMP 23.8

10.09/10.0 100.9%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269				R E Bennett
Mary Franz	Hrs	Hrs	Hrs	Hrs

Date: 1-2-90 | Time Completed: | Lab Unit Mgr: [signature]

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 121.-5315	SEGMENT-22	11-15-89	10:58	18

Determination	Method/Standard	Result Units	Charge Code	Rerune
pH	LA-212-103	NONE	WB75L	0

Sample Size: ?

Customer ID: 089045

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
pH FOUND
STD ID
SAMPLE TEMP

Reagent Blank = 6.83

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269				R E Bennett
Mary Franz	Hrs	Hrs	Hrs	Hrs

Date: 1-2-90 | Time Completed: | Lab Unit Mgr: [signature]

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 149.-5015	SEGMENT-B	11-17-89	10:14	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
pH	LA-212-103	NONE	WB75L	0

Sample Size: ? 2.665g / 2.665 ml

Customer ID: 089048

Remarks, Calculations, Results:
pH 12.54 #213 8.46 grams
SAMPLE TEMP 23.7

WHC N 313 4

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269				R E Bennett
Mary Franz	Hrs	Hrs	Hrs	Hrs

Date: 1-2-90 | Time Completed: | Lab Unit Mgr: [signature]

54-6600-061 (R-10-83)

pH Analysis of Solid Sample

Serial No.	Sample Point	Date	Time Issued	Priority
F 100.-5515	SEGMENT-1	11-15-89	10:55	19

Determination	Method/Standard	Result Units	Charge Code	Returns
pH	LA-212-103	% RECOVERY	WB75L	0

Sample Size	Customer ID
?	089045

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
pH FOUND 10.10
STD ID 72C11-A
SAMPLE TEMP 22C

10.10/10.00 101.0%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				R Bennett
[illegible]	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
1-2-90		[illegible]

54-8800-061 (R-18-83)

Percent Water Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 150.-5110	SEGMENT-C	11-17-89	10:15	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	%	WB75L	0

Sample Size: ?

Customer ID: 089048

Remarks, Calculations, Results:

DUPLICATE SAMPLE

G. 22.8521
T. 22.0811
W1 22.4844
W2 22.4841

47.7%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6B598/RH				R E Burnett
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-3-90 | Time Completed: | Lab Unit Mgr: [signature]

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

Really F939 Seg Comp 8

Serial No.	Sample Point	Date	Time Issued	Priority
F 292.-5510	SEGMENT-E	11-21-89	8:29	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	% RECOVERY	WB75L	0

Sample Size: ? 1mL

Customer ID: 089050

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 11C11AG

58.2% 57.2%

@ 22.9125 G. @ 23.2933
21.5294 T. 21.9143
22.1071 W1 22.5044
22.1011 W2 22.4941

96.80% resorg

57.7%

59.61

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6B598/RH				R E Burnett
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-3-90 1-5-90 | Time Completed: 19:59 | Lab Unit Mgr: [signature]

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

Really F940 Seg Comp #8

Serial No.	Sample Point	Date	Time Issued	Priority
F 309.-5310	SEGMENT-V	11-21-89	8:32	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	X	WB75L	0

Sample Size: ?

Customer ID: 089050

Remarks, Calculations, Results:

REAGENT BLANK

@ 22.0121 G @ 21.4901
22.0121 T. 21.4901
22.0054 W1 21.4836
22.0051 W2 21.4836

~~.67~~ ~~.65~~ 6.5 -3

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6B598/RH				R E Burnett
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-3-90 | Time Completed: | Lab Unit Mgr: Cary M Seidel [signature]

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 149.-5010	SEGMENT-B	11-17-89	10:14	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
% H2O	LA-564-101	%	WB75L	0

Sample Size: ?

Customer ID: 089048

Remarks, Calculations, Results:

#224 3.36 grams

G. 22.7370
T. 21.6856
W1 22.2408
W2 22.2405 WHC N 3134

47.2%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6B598/RH				R E Burnett
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-3-90 | Time Completed: | Lab Unit Mgr: [signature]

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

Percent Water Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 100.-5510	SEGMENT-1	11-15-89	10:54	19

Determination	Method/Standard	Result Units	Charge Code	Returns
% H20	LA-564-101	% RECOVERY	WB75L	0

Sample Size: ? 1mL

Customer ID: 089045

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 11C 11AG

57.59%

96.63% recov

23.1834	G.	23.2273	
21.8182	T.	21.8485	
57.6% 22.3970	W1	22.4333	57.6%
22.3860	W2	22.4227	59.61

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6.3598/RH				R E Brandt
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1-2-90	20:03	[signature]	[signature]

1-5-90

SR-6600-961 (R-19-83)

Fusion Dissolution

Serial No.	Sample Point	Date	Time Issued	Priority
F 154.-6000	SEGMENT-G	11-17-89	10:15	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	WB75L	0

Sample Size: ?

Customer ID: 089048

Remarks, Calculations, Results:

GRAMS SAMPLE .4985 #21
VOLUME ON COMPLETION 250 mL
1.98 -3 g/ml
~~1.98 -6 g/l~~ 1.98 g/L
WHC N 3/34.

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6 B598/RH				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
1-3-90		

54-6600-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 155.-6100	SEGMENT-H	11-17-89	10:15	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
FUSION	LA-549-141	G/L	WB75L	0

Sample Size: ?

Customer ID: 089048

Remarks, Calculations, Results:

DUPLICATE ANALYSIS
GRAMS SAMPLE .5549
VOLUME ON COMPLETION 250 mL
2.22 -3 g/ml
~~2.22 -6 g/l~~ 2.22 g/L

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6 B598/RH				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
1-3-90		

54-6600-081 (R-10-83)

* Total Alpha Analysis on the Fusion Dissolution

Serial No.	Sample Point	Date	Time Issued	Priority
F 296.-6220	SEGMENT-I	11-21-89	8:30	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT	LA-~~548~~-101	% RECOVERY	WB75L	0

Sample Size: ? 100 L

Customer ID: 089050

Remarks, Calculations, Results:

SPIKE SAMPLE
SPIKE ID 83844
SPIKE VOLUME 10 ml

~~97.1%~~ $9.71^{-3}/1.0001^{-2}$

~~$9.901^{-1} - 1.935^{-2} = 9.708^{-1}/100$~~

See back of Card

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J Hopkins				
Date 1-5-90	Time Completed	Lab Unit Mgr		

S4-6800-081 (R-10-83)

Original card lost - this is a copy

Serial No.	Sample Point	Date	Time Issued	Priority
F 297.-6520	SEGMENT-J	11-21-89	8:30	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT	LA-548-101	% RECOVERY	WB75L	0

Sample Size: ? 10 ml

Customer ID: 89-050

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 83844

100.3%

$1.003^{-2}/1.0001^{-2}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
Date 1-5-90	Time Completed	Lab Unit Mgr		

S4-6800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 154.-6020	SEGMENT-G	11-17-89	10:15	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 100-10-100

Customer ID: 089048

Remarks, Calculations, Results:

6.298 uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J Hopkins				
Date 1-5-90	Time Completed	Lab Unit Mgr		

S4-6800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 155.-6120	SEGMENT-H	11-17-89	10:15	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 100-10-100

Customer ID: 089048

Remarks, Calculations, Results:

DUPLICATE SAMPLE

5.538 uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J Hopkins				
Date 1-5-90	Time Completed	Lab Unit Mgr		

S4-6800-081 (R-10-83)

* Refer to batch sheet for this analysis.

Total Alpha Analysis on the Fusion Dissolution

18/2

27/10 - .3

30/10

Alpha Calculation by AJ on 01-05-1990 at 18:18:20
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : .1 mL Dilution : 101

Mount # 1

27/10 - 0.3 = 5.2119E+00 uCi/L alpha

Mount # 2

30/10 - 0.3 = 5.8634E+00 uCi/L alpha

F 155.-6120

18/2

30/10 - .3

34/10

Alpha Calculation by AJ on 01-05-1990 at 18:19:21
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : .1 mL Dilution : 101

Mount # 1

30/10 - 0.3 = 5.8634E+00 uCi/L alpha

Mount # 2

34/10 - 0.3 = 6.7320E+00 uCi/L alpha

F 154.-6020

2" 1-6-90 VR

473/10 - .3

466/10 -

Alpha Calculation by VR on 01-06-1990 at 00:46:14
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : 10 mL Dilution : 1

Mount # 1

473/10 - 0.3 = 1.0106E-02 uCi/L alpha

Mount # 2

466/10 - 0.3 = 9.9581E-03 uCi/L alpha

297.-6620 AT

18/2

$$\frac{[(9.901^{-1})(.0001) - (1.935^{-2})(.0001)](100)}{(.010)(1.001^{-2})}$$

$= \cancel{99.88\%}$ = 97.0%

482/10 - .3

445/10

Alpha Calculation by AJ on 01-05-1990 at 18:21:53
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : .1 mL Dilution : 1

Mount # 1

482/10 - 0.3 = 1.0299E+00 uCi/L alpha

Mount # 2

445/10 - 0.3 = 9.5035E-01 uCi/L alpha

F 296.-6220 AT

9713324.2819

* Total Alpha Analysis on the Fusion Dissolution

Serial No.	Sample Point	Date	Time Issued	Priority
F 105.-6520	SEGMENT-6	11-15-89	10:55	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-~~548~~ 508-101	% RECOVERY	WB75L	0

Sample Size: ? 10ml

Customer ID: 089045

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID_____

111.9%

1.119-2 / ~~1.119-2~~ 1.001-2

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J. Hopkins				

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	GMS

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 308.-6320	SEGMENT-U	11-21-89	8:32	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-548-101	uCI/L	WB75L	0

Sample Size: ? 10ml

Customer ID: 089050

Remarks, Calculations, Results:
REAGENT BLANK

<.100 -4 ucil

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J. Hopkins				

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	GMS

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

* Refer to batch sheet for this analysis.

9513324.2821

Total Alpha Analysis on the Fusion Dissolution

18 2" 1-6-90 VR

$\frac{4}{10}$ - .4

$\frac{1}{10}$ -

Alpha Calculation by VR on 01-06-1990 at 02:38:47
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : 1 ea Dilution : 1

Mount # 1

$\frac{4}{10}$ - 0.4 (1.0034E-06 uCi/ea alpha /100

Mount # 2

$\frac{1}{10}$ - 0.4 (1.0020E-06 uCi/ea alpha /100

F 308.-6320 AT

18 2" 1-6-90 VR

$\frac{500}{10}$ - .3

$\frac{547}{10}$ -

Alpha Calculation by VR on 01-06-1990 at 00:41:44
Det #18 2 -inch mount Alpha eff. : .2095
Sample size : 10 aL Dilution : 1

Mount # 1

$\frac{500}{10}$ - 0.3 = 1.0686E-02 uCi/L alpha

Mount # 2

$\frac{547}{10}$ - 0.3 = 1.1697E-02 uCi/L alpha

F 105.-6520

* Total Beta Analysis on the Fusion Dissolution

7,8 F944 See Comp 8

Serial No.	Sample Point	Date	Time Issued	Priority
F 296.-6225	SEGMENT-I	11-21-89	8:30	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
TB	LA-~~548~~-101 508	% RECOVERY	WB75L	0

Sample Size: ? 100 ml

Customer ID: 089050

Remarks, Calculations, Results:
SPIKE SAMPLE F294
SPIKE ID 83844
SPIKE VOLUME 10 ml

~~118%~~

2.154' - 5.493 = 1.60' / 100 = 1.60⁻¹ / 1.3904⁻¹

See back of card

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J. Hopkins				

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	DMS

54-6600-061 (R-10-83)

1 & 2 F950 See Comp 8

Serial No.	Sample Point	Date	Time Issued	Priority
F 297.-6525	SEGMENT-J	11-21-89	8:30	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
TB	LA-~~548~~-101 508	% RECOVERY	WB75L	0

Sample Size: ? 10 ml

Customer ID: 83844 089050

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID _____

96.5%

1.344⁻¹ / 1.3923⁻¹

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J. Hopkins				

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	DMS

54-6600-061 (R-10-83)

5,6

Serial No.	Sample Point	Date	Time Issued	Priority
F 154.-6025	SEGMENT-G	11-17-89	10:15	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
TB	LA-~~548~~-101 508	uCI/L	WB75L	0

Sample Size: ? 100-10-100

Customer ID: 089048

Remarks, Calculations, Results:

3.091³ uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J. Hopkins				

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	DMS

54-6600-061 (R-10-83)

3,4

Serial No	Sample Point	Date	Time Issued	Priority
F 155.-6125	SEGMENT-H	11-17-89	10:15	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
TB	LA-~~548~~-101 508	uCI/L	WB75L	0

Sample Size: ? 100-10-100

Customer ID: 089048

Remarks, Calculations, Results:
DUPLICATE SAMPLE

3.533³ uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J. Hopkins				

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	DMS

54-6600-061 (R-10-83)

* Refer to batch sheet for this analysis.

Total Beta Analysis on the Fusion Dissolution

8/2

DF 101

.100

24555 / 10 − 6

24503 / 10

Beta Calculation by AJ on 01-05-1990 at 18:18:18
Dst 818 2 -inch mount Beta eff. : .3151
Sample size : .1 mL Dilution : 101

Mount # 1

24555 / 10 − 6.0 = 3.5367E+03 uCi/L beta

Mount # 2

24503 / 10 − 6.0 = 3.5292E+03 uCi/L beta

F 155.-6125

18/2

21211 / 10 − 6

21722 / 10

DF 101

.100

Beta Calculation by AJ on 01-05-1990 at 18:19:19
Dst 818 2 -inch mount Beta eff. : .3151
Sample size : .1 mL Dilution : 101

Mount # 1

21211 / 10 − 6.0 = 3.0539E+03 uCi/L beta

Mount # 2

21722 / 10 − 6.0 = 3.1277E+03 uCi/L beta

F 154.-6025

18 2" 1-6-90 LR

9410 / 10 − 6

9517 / 10

Beta Calculation by VR on 01-06-1990 at 08:44:12
Dst 818 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9410 / 10 − 6.0 = 1.3544E-01 uCi/L beta

Mount # 2

9517 / 10 − 6.0 = 1.3681E-01 uCi/L beta

F 297.-6526 TB

18/2

Spike too low to calculate

.100

15124 / 10 − 6

14892 / 10

Beta Calculation by AJ on 01-05-1990 at 18:21:51
Dst 818 2 -inch mount Beta eff. : .3151
Sample size : .1 mL Dilution : 1

Mount # 1

15124 / 10 − 6.0 = 2.1535E+01 uCi/L beta

Mount # 2

14892 / 10 − 6.0 = 2.1203E+01 uCi/L beta

F 296.-6225 TB

9 & 10

Serial No.	Sample Point	Date	Time Issued	Priority
F 105.-6525	SEGMENT-6	11-15-89	10:55	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
TB	LA-~~548~~ 508-101	% RECOVERY	WB75L	0

Sample Size	Customer ID
? 10 ml	089045 83B44 End Cal

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 83B44

1.376-1 / 1.3923-1 98.8%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J. Hopkins				

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	[signature]

54-0000-061 (R-10-83)

7-8 F9486 Seg Com 8

Serial No	Sample Point	Date	Time Issued	Priority
F 308.-6325	SEGMENT-U	11-21-89	8:32	18

Determination	Method/Standard	Result Units	Charge Code	Rerune
TB	LA-~~548~~ 508-101	uCI/L	WB75L	0

Sample Size	Customer ID
? 10 ml	089050

Remarks, Calculations, Results:
REAGENT BLANK

<2.58-4 uCi/L

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6A543				
Hrs	Hrs	Hrs	Hrs	Hrs
J. Hopkins				

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	[signature]

54-0000-061 (R-10-83)

* Total Beta Analysis on the Fusion Dissolution

* Refer to batch sheet for this analysis.

Total Beta Analysis on the Fusion Dissolution

8 2" 1-6-90 VR

56/10 - 6

50/10 -

Beta Calculation by VR on 01-06-1990 at 02:38:45
Det BIB 2 -inch mount Beta eff. : .3151
Sample size : 1 ea Dilution : 1

Mount # 1

56/10 - 6.0 (2.5801E-06 uCi/ea beta /100

Mount # 2

50/10 - 6.0 (2.5801E-06 uCi/ea beta /100

F 308.-6325 TB

18 2" 1-6-90 VR.

9489/10 -

9879/10 -

Beta Calculation by VR on 01-06-1990 at 00:41:41
DET BIB 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9489/10 - 6.0 = 3.3479E-01 uCi/L beta

Mount # 2

9879/10 - 6.0 = 1.4037E-01 uCi/L beta

F 105.-6325

1009 F949 Seg. Comp 8

Serial No.	Sample Point	Date	Time Issued	Priority
F 296.-6230	SEGMENT-I	11-21-89	8:30	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	WB75L	0

Sample Size: ? 1ml

Customer ID: 089050

Remarks, Calculations, Results:
SPIKE SAMPLE F294
SPIKE ID 89B44
SPIKE VOLUME 100λ

4.81 - 1.03 = (3.78/3.813) KT

3.78/3.8123 99.1%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
69769/DMS				[illegible]
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1-9-90		[illegible]	DMS

54-6600-061 (R-10-83)

2749 F950 Seg Comp 8

Serial No.	Sample Point	Date	Time Issued	Priority
F 297.-6530	SEGMENT-J	11-21-89	8:30	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	WB75L	0

Sample Size: ? 500λ

Customer ID:

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 89B44

Cs137 3.78'/3.813' 99.1%

Co60 2.25'/2.34' 101.1%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
DMS/69769				[illegible]
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1-9-90		[illegible]	DMS

54-6600-061 (R-10-83)

1008

Serial No.	Sample Point	Date	Time Issued	Priority
F 154.-6030	SEGMENT-G	11-17-89	10:15	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	uCI/L	WB75L	0

Sample Size: ? 50λ

Customer ID: 089048

Remarks, Calculations, Results:
Cs137 4.44' ucif/l

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
69769/DMS				[illegible]
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1-9-90			DMS

54-6600-061 (R-10-83)

2748

Serial No.	Sample Point	Date	Time Issued	Priority
F 155.-6130	SEGMENT-H	11-17-89	10:15	19

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	uCI/L	WB75L	0

Sample Size: ? 50λ

Customer ID: 089048

Remarks, Calculations, Results:
DUPLICATE SAMPLE
Cs137 5.17' ucif/l

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
69769/DMS				[illegible]
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1-9-90			DMS

54-6600-061 (R-10-83)

4885

Serial No	Sample Point	Date	Time Issued	Priority
F 129.-6530	SEGMENT-F	11-17-89	10:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	F215C	0

Sample Size: ? 500 L Li .001 2

Customer ID:

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 89844

Co^{60} 2.28'/2.2255' 102.4%

Cs^{137} 3.74'/3.813' 98.1%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
69769/DMS				[illegible]
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
1-9-90		Cary M Seidel DMS

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

3888 F 946 Seg Comp

Serial No.	Sample Point	Date	Time Issued	Priority
F 308.-6330	SEGMENT-U	11-21-89	8:32	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCI/L	WB75L	0

Sample Size: ? 1 ml

Customer ID: 089050

Remarks, Calculations, Results:
REAGENT BLANK

Cs^{137} 2.49-! ± 62%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
69769/DMS				[illegible]
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
1-9-90		Cary M Seidel DMS

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

3887 Really F947 Seg Comp 8

Serial No	Sample Point	Date	Time Issued	Priority
F 294.-6030	SEGMENT-G	11-21-89	8:30	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCI/L	WB75L	0

Sample Size: ? 1 ml

Customer ID: 089050

Remarks, Calculations, Results:

Cs^{137} 1.03 uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
69769/DMS				[illegible]
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
1-9-90		DMS

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

Uranium Analysis on the Fusion Dissolution

Serial No.	Sample Point	Date	Time Issued	Priority
F 108.-6240	SEGMENT-9	11-15-89	10:56	23

Determination	Method/Standard	Result Units	Charge Code	Rerune
U	LA-925-106	% RECOVERY	WB75L	0

Sample Size: ? 100-10-100 — Customer ID: 89-045

Remarks, Calculations, Results:
SPIKE SAMPLE F106 — Smp: .20
SPIKE ID 58B38 — Smp+SpK: .46
SPIKE VOLUME 100-10-100
SpK Vol: 100x
SpK ID: 5.113-5

$$\frac{(.00099)(.00516)(.20)}{(.00099)\left[.46\left(\frac{5.8}{5.7}\right)-.20\right]} = \frac{.001032 - (.00099)(3.34)}{.00099} \times 100 = \boxed{117.6\%}$$

$\boxed{1.7\%}$

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

Date: 1-5-90 — Time Completed: — Lab Unit Mgr: [signature]

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 297.-6540	SEGMENT-J	11-21-89	8:30	23

Determination	Method/Standard	Result Units	Charge Code	Rerune
U	LA-925-106	% RECOVERY	WB75L	0

Sample Size: ? 100-10-100 — Customer ID: 089050

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 58B38
Spk Vol: 100x
Spk ID: 5.62-4
Sample: 17
Sample+Spk: 46

$$\frac{(.17)(5.624)(.1)(1010)}{(.46-.17)} = 3.33^{-2}$$

(over for recalculation)

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269 [signature]				[signature]
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-5-90 — Time Completed: — Lab Unit Mgr: [signature]

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 154.-6040	SEGMENT-G	11-17-89	10:15	23

Determination	Method/Standard	Result Units	Charge Code	Rerune
U	LA-925-106	G/L	WB75L	0

Sample Size: ? 100-10ml-100 — Customer ID: 089048

Remarks, Calculations, Results:
spike Vol: ~~100ml~~ 100-10ml-100
Sample: .06
Sample + spike: .38
Spike ID: 54B38

$$\frac{(.06)(9.9^{-4})(5.68^{-2})}{(9.9^{-4})\left[(.38)\left(\frac{5.7}{5.6}\right)-(.06)\right]} = <1.04 \times 10^{-2}\ g/L$$

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269 [signature]			[signature]	
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-5-90 — Time Completed: — Lab Unit Mgr: [signature]

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 155.-6140	SEGMENT-H	11-17-89	10:15	23

Determination	Method/Standard	Result Units	Charge Code	Rerune
U	LA-925-106	G/L	WB75L	0

Sample Size: ? 100-10ml-100 — Customer ID: 089048

Remarks, Calculations, Results:
DUPLICATE SAMPLE
Sample: .06
Sample + spike: .36
Spike Vol.: 100-10ml-100
Spike ID: 54B38

$$\frac{(.06)(9.9^{-4})(5.68^{-2})}{(9.9^{-4})\left[(.36)\left(\frac{5.7}{5.6}\right)-(.06)\right]} = <1.11 \times 10^{-2}\ g/L$$

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269 [signature]			[signature]	
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-5-90 — Time Completed: — Lab Unit Mgr: [signature]

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

Uranium Analysis on the Fusion Dissolution

$$\frac{(.00099)(5.676E\text{-}02)(.17)}{(.00099)\left[.46\left(\frac{5.7}{5.6}\right)-.17\right]} = 3.24E\text{-}02$$

$$\frac{3.24E\text{-}02}{2.99E\text{-}02} = 108.30\%$$

F 297.6540

$$\frac{(.00099)(.00516)(.20)}{(.00099)\left[.46\left(\frac{5.8}{5.7}\right)-.20\right]} = \frac{.001032}{.268} = \frac{(.00099)(3.34E\text{-}03)}{(.00099)}$$

$$3.85E\text{-}03 - 3.34E\text{-}03 = 5.11E\text{-}4$$

$$\frac{5.11E\text{-}04}{2.99E\text{-}02} = 1.71\%$$

F 108.-6240

Water Digestion

Serial No.	Sample Point	Date	Time Issued	Priority
F 160.-7100	SEGMENT-M	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
H2O-DGST	LA-504-101	G/L	WB75L	0

Sample Size: ?

Customer ID: 089048

Remarks, Calculations, Results:

DUPLICATE ANALYSIS
GRAMS SAMPLE ~~[illegible]~~ .3891
VOLUME ON
COMPLETION 50ml

7.78^{-3} g/ml

Filtered by analyst-2 ~~7.78^{-6} g/l~~

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
81098	80725			Chemist 94171
Hrs	Hrs	Hrs	Hrs	Hrs
20 min	10 min			

Date	Time Completed	Lab Unit Mgr
1/4/90		

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 161.-7200	SEGMENT-N	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
H2O-DGST	LA-504-101	% RECOVERY	WB75L	0

Sample Size: ?

Customer ID: 089048

Remarks, Calculations, Results:

SPIKED ANALYSIS
GRAMS SAMPLE ~~[illegible]~~ .3937
VOLUME ON
COMPLETION 50ml
VOLUME SPIKE
SPIKE ID

7.87^{-3} g/ml

Filtered by analyst-2 ~~7.87^{-6} g/l~~

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
81098	80725			Chemist 94171
Hrs	Hrs	Hrs	Hrs	Hrs
20 min	10 min			

Date	Time Completed	Lab Unit Mgr
1/4/90		

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 159.-7000	SEGMENT-L	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
H2O-DGST	LA-504-101	G/L	WB75L	0

Sample Size: ?

Customer ID: 089048

Remarks, Calculations, Results:

GRAMS SAMPLE .1660 #220 2.91 grams
VOLUME ON
COMPLETION 50ml

9.32^{-3} g/ml

Filtered by analyst-2 ~~9.32^{-6} g/l~~

WHC N 3134

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
81098	80725			Chemist 94171
Hrs	Hrs	Hrs	Hrs	Hrs
20 min	10 min			

Date	Time Completed	Lab Unit Mgr
1/4/90		

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 120.-6340	SEGMENT-21	11-15-89	10:58	1B

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/L	WB75L	0

Sample Size	Customer ID
? .100ml - 10ml - .100ml	089045

Remarks, Calculations, Results: REAGENT BLANK Spike 54B38 Value 5.62E-4 g/l
Volume .100ml

$$\frac{(.982)(.06)(5.62E^{-4})(.1)(1010)}{.38 - [(.982)(.06)]} = 1.04E^{-2}\ g/l$$

.06
.38

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Hrs	Hrs	Hrs	Hrs	Hrs
Date 1-5-90	Time Completed	Lab Unit Mgr		

54-8600-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 105.-6540	SEGMENT-6	11-15-89	10:55	2A

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	WB75L	0

Sample Size	Customer ID
? 100-10-100	89-045

Remarks, Calculations, Results: Spk Vol: 100A Smpl: .76
LMCS CHECK SAMPLE
LMCS ID 58838 + Spk ID: 562-4 Smpl+Spk: .46

$$(.00099)(5.676E-02)(.16) = 2.95E-02$$

$$(.00099)\left[\left[(.46)\left(\frac{5.7}{5.6}\right)\right] - .16\right]$$

$$\frac{2.95E-02}{2.99E-02}$$

98.7%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
Date 1-5-90	Time Completed	Lab Unit Mgr		

54-8600-081 (R-10-83)

Ion Chromatographic Analysis of the Water Digestion - Fluoride Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 741.-7271	SEGMENT-N	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	% RECOVERY	WB75L	0

Sample Size: ? 100-10 mL

Customer ID: 089083

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 35C9-61
SPIKE VOLUME .300/5mL

$$\frac{\frac{5.3}{5.0}(319) - (27.1)\left(\frac{10.1\,\%}{9.65\,\%}\right)}{\frac{.300\,mL\,(50\,ppm)}{5.3\,mL}(101)} \times 100 = 108.4\%$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature]
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	[signature]

84-6800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 742.-7571	SEGMENT-O	12-11-89	9: 5	26

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 6C17HF

92.7%

6.677' ppm/72

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

84-6800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 159.-7071	SEGMENT-L	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID: 089048

Remarks, Calculations, Results:

3.20' ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

84-6800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
F 160.-7171	SEGMENT-M	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID: 089048

Remarks, Calculations, Results:
DUPLICATE SAMPLE

2.04' ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

84-6800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 158.-7571	SEGMENT-K	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID: 085048

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 6C11HF

68.78/72

95.5%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/WW				
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90			LMS

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

Serial No	Sample Point	Date	Time Issued	Priority
F 170.-7571	SEGMENT-W	11-17-89	10:18	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
F	LA-533-105	PPM	WB75L	0

Sample Size: ? Direct

Customer ID: 085048

Remarks, Calculations, Results:

REAGENT BLANK

<.1ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/WW				
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90			LMS

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

Ion Chromatographic Analysis of the Water Digestion - Chloride Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 741.-7272	SEGMENT-N	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
CL	LA-533-105	% RECOVERY	WB75L	0

Sample Size	Customer ID
? 100-10 mL	089083

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 35C9-61
SPIKE VOLUME .300/5mL

$$\frac{5.3}{5.0}(8.365\,ppm)-(0\,ppm) \times 100 = 110.9\%$$

$$\frac{.300(61)}{5.3}(101)$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature]
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	[signature]

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 742.-7572	SEGMENT-O	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
CL	LA-533-105	% RECOVERY	WB75L	0

Sample Size	Customer ID
100-10	

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 6C11AF

101.2%

8.805'/87

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 159.-7072	SEGMENT-L	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
CL	LA-533-105	PPM	WB75L	0

Sample Size	Customer ID
? 100-10	089048

Remarks, Calculations, Results:

<1.01' ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 160.-7172	SEGMENT-M	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
CL	LA-533-105	PPM	WB75L	0

Sample Size	Customer ID
? 100-10	089048

Remarks, Calculations, Results:
DUPLICATE SAMPLE

<1.01' ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

54-6600-061 (R-10-83)

Ion Chromatographic Analysis of the Water Digestion - Chloride Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 158.-7572	SEGMENT-K	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
CL	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID: 089048

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 6C11AF

107.8%

93.82/87.

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 (Chemist)
6B107/WEW				94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90			AMS

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 170.-7372	SEGMENT-W	11-17-89	10:18	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
CL	LA-533-105	PPM	WB75L	0

Sample Size: ? Direct

Customer ID: 089048

Remarks, Calculations, Results:

REAGENT BLANK

<.1ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5 (Chemist)
6B107/WEW				94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90			AMS

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

Ion Chromatographic Analysis of the Water Digestion - Nitrate Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 160.-7173	SEGMENT-M	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
NO3	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID: 089048

Remarks, Calculations, Results:

DUPLICATE SAMPLE

3.12^2 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date: 1/5/90 | Time Completed: | Lab Unit Mgr: [signature] | DMS

54-5600-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 742.-7573	SEGMENT-O	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Rerune
NO3	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID:

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 6C11AF

98.2%

$7.092^2/722$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date: 1/5/90 | Time Completed: | Lab Unit Mgr: [signature] | DMS

54-5600-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 159.-7073	SEGMENT-L	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
NO3	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID: 089048

Remarks, Calculations, Results:

3.68^2 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date: 1/5/90 | Time Completed: | Lab Unit Mgr: [signature] | DMS

54-5600-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 741.-7273	SEGMENT-N	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Rerune
NO3	LA-533-105	% RECOVERY	WB75L	0

Sample Size: ? .100-10mL

Customer ID: 089083

Remarks, Calculations, Results:

SPIKE SAMPLE
SPIKE ID 35C9-61
SPIKE VOLUME .300/5mL

$$\frac{(5.3/5.0)(3320) - (443)\left(\frac{10.1}{9.65}\right)}{\frac{.300(501)}{5.3}(101)} \times 100 = 106.7\%$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature]
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date: 1-5-90 | Time Completed: | Lab Unit Mgr: [signature] | [signature]

54-5600-081 (R-10-83)

Ion Chromatographic Analysis of the Water Digesiton - Nitrate Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 170.-7373	SEGMENT-W	11-17-89	10:18	18

Determination	Method/Standard	Result Units	Charge Code	Rerune
NO3	LA-533-105	PPM	WB75L	0

Sample Size	Customer ID
? Direct	089048

Remarks, Calculations, Results:

REAGENT BLANK

<1ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				Chemist 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

54-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 158.-7573	SEGMENT-K	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
NO3	LA-533-105	% RECOVERY	WB75L	0

Sample Size	Customer ID
100-10	089048

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 6C11AP

103.1%

744.3/722

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				Chemist 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

54-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 741.-7274	SEGMENT-N	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: ? .100 - 10 ml
Customer ID: 089083

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 3509-61
SPIKE VOLUME .300/5mL

$$\frac{\left(\frac{5.3}{5.0}\right)(2980) - (103)\left(\frac{10.1}{5.65}\right)}{\frac{.300\,(509)}{5.3}\,(101)} \times 100 = 104.8\%$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				
Hrs: 16:00	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
1-5-90		

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 742.-7574	SEGMENT-O	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10
Customer ID:

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID EC11AF

94.7%

$6.838^2/722$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				
Hrs: 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90			DMS

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 159.-7074	SEGMENT-L	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10
Customer ID: 089048

Remarks, Calculations, Results:

2.10^2 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				
Hrs: 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90			DMS

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 160.-7174	SEGMENT-M	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
PO4	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10
Customer ID: 089048

Remarks, Calculations, Results:
DUPLICATE SAMPLE

1.12^2 ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				
Hrs: 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90			DMS

54-6600-061 (R-10-83)

Ion Chromatographic Analysis of the Water Digestion - Phosphate Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 158.-7574	SEGMENT-K	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
PO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size	Customer ID
100-10	089048

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 6C11HF

96.7%

698.1/722

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6S107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 170.-7374	SEGMENT-W	11-17-89	10:18	18

Determination	Method/Standard	Result Units	Charge Code	Rerune
PO4	LA-533-105	PPM	WB75L	0

Sample Size	Customer ID
? Direct	089048

Remarks, Calculations, Results:

REAGENT BLANK

<1ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6S107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

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

Ion Chromatographic Analysis of the Water Digestion - Sulphate Analysis

Serial No.	Sample Point	Date	Time Issued	Priority
F 741.-7275	SEGMENT-N	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Rerune
SO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: ? .100-10mL

Customer ID: 089083

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 35C9-61
SPIKE VOLUME .300/5mL

$$\frac{(5.3/5.0)(2910) - 0\,ppm}{\frac{.300(501)}{5.3}(101)} \times 100 = 107.7$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature]
Hrs 16:00	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1-5-90		[signature]	[signature]

54-6600-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
F 742.-7575	SEGMENT-O	12-11-89	9: 5	26

Determination	Method/Standard	Result Units	Charge Code	Rerune
SO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size: 100-10

Customer ID:

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 6C11HF

94.1%

~~5.958~~ 6.792² / 722

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 159.-7075	SEGMENT-L	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
SO4	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID: 089048

Remarks, Calculations, Results:

<1.01² ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

54-6600-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 160.-7175	SEGMENT-M	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
SO4	LA-533-105	PPM	WB75L	0

Sample Size: ? 100-10

Customer ID: 089048

Remarks, Calculations, Results:
DUPLICATE SAMPLE

<1.01² ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				[signature] 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

54-6600-061 (R-10-83)

Ion Chromatogrpahic Analysis of the Water Digestion - Sulphate Analysis

Serial No	Sample Point	Date	Time Issued	Priority
F 158.-7575	SEGMENT-K	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
SO4	LA-533-105	% RECOVERY	WB75L	0

Sample Size	Customer ID
100-10	089048

Remarks, Calculations, Results:

LMCS CHECK SAMPLE
LMCS ID 6C11HF

715.9/722 99.2%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				Chemical 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

84-8800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
F 170.-7375	SEGMENT-W	11-17-89	10:18	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
SO4	LA-533-105	PPM	WB75L	0

Sample Size	Customer ID
? Direct	089048

Remarks, Calculations, Results:

REAGENT BLANK

<1ppm

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6B107/NEW				Chemical 94171
Hrs 1600	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
1/5/90		[signature]	DMS

84-8800-061 (R-10-83)

*Total Carbon
(Total ~~Organic~~ Carbon) Analysis on the Water Digestion - Not Acidified

Serial No.	Sample Point	Date	Time Issued	Priority
F 162.-7526	SEGMENT-O	11-17-89	10:17	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
TOC	LA-344-105	% RECOVERY	WB75L	0

Sample Size: ? 200uL-2ml-200uL
Customer ID: 089048

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 70C11B

3.014/3.00 100.5%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				R E Bennett
Hrs: Ed Cohn	Hrs	Hrs	Hrs	Hrs

Date: 1-16-90 | Time Completed: | Lab Unit Mgr: [signature] KJ

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 170.-7326	SEGMENT-W	11-17-89	10:18	18

Determination	Method/Standard	Result Units	Charge Code	Rerune
TOC	LA-344-105	G/L	WB75L	0

Sample Size: ? 200uL
Customer ID: 089048

Remarks, Calculations, Results:
REAGENT BLANK

.528 ug/min
7 min
3.696 mg

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				R E Bennett
Hrs: Ed Cohn	Hrs	Hrs	Hrs	Hrs

Date: 1-16-90 | Time Completed: | Lab Unit Mgr: [signature] KJ

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 160.-7126	SEGMENT-M	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
TOC	LA-344-105	G/L	WB75L	0

Sample Size: ? 200uL
Customer ID: 089048

Remarks, Calculations, Results:
DUPLICATE SAMPLE

1.90 -2 g/l

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				R E Bennett
Hrs: Ed Cohn	Hrs	Hrs	Hrs	Hrs

Date: 1-16-90 | Time Completed: | Lab Unit Mgr: [signature]

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 161.-7226	SEGMENT-N	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Rerune
TOC	LA-344-105	% RECOVERY	WB75L	0

Sample Size: ? 200uL
Customer ID: 089048

Remarks, Calculations, Results:
SPIKE SAMPLE
SPIKE ID 70C11B
SPIKE VOLUME 100uL

~~90.2% Chg~~

~~188.4~~ 184.7-420 90.7%

200x see back of card

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				R E Bennett
Hrs: Ed Cohn	Hrs	Hrs	Hrs	Hrs

Date: 1-16-90 | Time Completed: | Lab Unit Mgr: [signature]

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

*Refer to batch sheet for this analysis

*Total Carbon
(Total ~~Organic~~ Carbon)Analysis on the Water Digestion- Not Acidified

Serial No.	Sample Point	Date	Time Issued	Priority
F 158.-7526	SEGMENT-K	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	% RECOVERY	WB75L	0

Sample Size: ? 200uL-2mL-200uL
Customer ID: 089048

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 70C11B

2.9425/3.00 98.1%

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				R E Barnett
Hrs	Hrs	Hrs	Hrs	Hrs
Ed Cohen				

Date	Time Completed	Lab Unit Mgr
1-16-90		[signature]

84-6800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 159.-7026	SEGMENT-L	11-17-89	10:16	19

Determination	Method/Standard	Result Units	Charge Code	Reruns
TOC	LA-344-105	G/L	WB75L	0

Sample Size: ? 200uL
Customer ID: 089048

Remarks, Calculations, Results:

1.95^{-2} g/L

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
80028				R E Barnett
Hrs	Hrs	Hrs	Hrs	Hrs
Ed Cohen				

Date	Time Completed	Lab Unit Mgr
1-16-90		[signature]

84-6800-061 (R-10-83)

*Refer to batch sheet for this analysis

Acid Digestion

Serial No.	Sample Point	Date	Time Issued	Priority
F 164.-8000	SEGMENT-Q	11-17-89	10:17	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD-DGST	LA-505-159	~~E/L~~ g/ml SJ	WB75L	0

Sample Size: ?

Customer ID: 059048

Remarks, Calculations, Results:

GRAMS SAMPLE _____ #223 3.78 grams
VOLUME ON COMPLETION 50ml
8.84 -3 g/ml

WHC N 3134

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
69769				
Hrs	Hrs	Hrs	Hrs	Hrs
K. Southwick			[signature]	

Date: 2/1/90 Time Completed: Lab Unit Mgr: [signature]

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 147.-8300	SEGMENT-X	11-17-89	10:14	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD-DGST	LA-505-159	~~E/L~~ g/ml	WB75L	0

Sample Size: ?

Customer ID: 059047

Remarks, Calculations, Results:

REAGENT BLANK
VOLUME ON COMPLETION 50ml

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
69769				
Hrs	Hrs	Hrs	Hrs	Hrs
K. Southwick				

Date: 2/1/90 Time Completed: Lab Unit Mgr: [signature]

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 142.-8200	SEGMENT-S	11-17-89	10:13	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD-DGST	LA-505-158	~~% RECOVERY~~ g/ml SJ	WB75L	0

Sample Size: ?

Customer ID: 0890-17

Remarks, Calculations, Results: sample + spike

GRAMS SAMPLE _____ 103C15 C
VOLUME ON COMPLETION 50ml 104C15 D
8.98 -3 g/ml

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
69769				
Hrs	Hrs	Hrs	Hrs	Hrs
K. Southwick				

Date: 2/1/90 Time Completed: Lab Unit Mgr: [signature]

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

Serial No.	Sample Point	Date	Time Issued	Priority
F 165.-8100	SEGMENT-R	11-17-89	10:17	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD-DGST	LA-505-159	~~E/L~~ g/ml SJ	WB75L	0

Sample Size: ?

Customer ID: 059048

Remarks, Calculations, Results:

DUPLICATE ANALYSIS
GRAMS SAMPLE _____
VOLUME ON COMPLETION 50ml
9.32 -3 g/ml

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
69769				
Hrs	Hrs	Hrs	Hrs	Hrs
K. Southwick				

Date: 2/1/90 Time Completed: Lab Unit Mgr: [signature]

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

F164.-8000

SEQUENCE # : 9
WT 1: 82.5982
WT 2: 83.0402

NET WEIGHT:

---> 0.4420 GRAMS

02/01/90 @ 08:17:48

Data was reproduced to provide legible copy.

SEQUENCE # : 9
WT 1: 82.5982
WT 2: 83.0402

NET WEIGHT:

---> 0.4420 GRAMS

02/01/90 @ 08:17:48

F 142.-8200

SEQUENCE # : 8
WT 1: 82.8975
WT 2: 83.3463

NET WEIGHT:

---> 0.4488 GRAMS

02/01/90 @ 08:13:55

Data has been reproduced to provide the most legible copy.

SEQUENCE # : 8
WT 1: 82.8975
WT 2: 83.3463

NET WEIGHT:

---> 0.4488 GRAMS

02/01/90 @ 08:13:55

F 165.-8100

SEQUENCE # : 10
WT 1: 82.7429
WT 2: 83.2088

NET WEIGHT:

---> 0.4659 GRAMS

02/01/90 @ 08:20:46

Data was reproduced to provide legible copy.

SEQUENCE # : 10
WT 1: 82.7429
WT 2: 83.2088

NET WEIGHT:

---> 0.4659 GRAMS

02/01/90 @ 08:20:46

ICP Analysis

Serial No	Sample Point	Date	Time Issued	Priority
F 1087.-8250	SEG.COMP#23	2-16-90	8:16	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	PPM	E21D1	0

Sample Size: ? 100-10 & 500-10

Customer ID: 000013

Remarks, Calculations, Results:
SPIKE SAMPLE ?
SPIKE ID
SPIKE VOLUME

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
J White				
Date	Time Completed	Lab Unit Mgr		
4-19-90				

54-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 1088.-8550	SEG.COMP#24	2-16-90	8:16	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	E21D1	0

Sample Size: ? Direct

Customer ID: 000013

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 8 2C11A

Digested STD.
Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
J White				
Date	Time Completed	Lab Unit Mgr		
4-19-90				

54-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 1083.-8550	SEG.COMP#19	2-16-90	8:15	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	E21D1	0

Sample Size: ? Direct

Customer ID: 000013

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 8 1C11A

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
4-19-90				
Date	Time Completed	Lab Unit Mgr		
J White				

54-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 1085.-8050	SEG.COMP#21	2-16-90	8:16	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	PPM	E21D1	0

Sample Size: ? 100-10 & 500-10

Customer ID: 000013

Remarks, Calculations, Results:

Complete

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
J. White				
Date	Time Completed	Lab Unit Mgr		
4-19-90				

54-8800-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 165.-8150	SEGMENT-R	11-17-89	10:17	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	PPM	WB75L	0

Sample Size: ? 100-10 & 500-10

Customer ID: 89048

Remarks, Calculations, Results:
DUPLICATE SAMPLE

RERUN

Complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
J. White				
Date	Time Completed	Lab Unit Mgr		
4-19-90		OP		

S4-8600-081 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
F 164.-8050	SEGMENT-Q	11-17-89	10:17	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	PPM	WB75L	0

Sample Size: ? 100-10 & 500-10

Customer ID: 89048

Remarks, Calculations, Results:

RERUN

Complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
J. White				
Date	Time Completed	Lab Unit Mgr		
4-19-90		OP		

S4-8600-081 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
F 1084.-8350	SEG.COMP#20	2-16-90	8:16	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	PPM	E21D1	0

Sample Size: ? Direct

Customer ID: 000013

Remarks, Calculations, Results:
REAGENT BLANK

Complete

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
65283				
Hrs	Hrs	Hrs	Hrs	Hrs
J. White				
Date	Time Completed	Lab Unit Mgr		
4-19-90		OP		

S4-8600-081 (R-10-83)

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		