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Tank 241-ER-311, Grab Samples, ER311-98-1, ER311-98-2, ER311-98-3 Analytical Results for the Final Report

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WASTE MANAGEMENT LABORATORY

TANK 241-ER-311 GRAB SAMPLES, ER311-98-1, ER311-98-2, ER311-98-3 ANALYTICAL RESULTS FOR THE FINAL REPORT

Project Coordinator: Keith Fuller

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

by

222-S Laboratory
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Richland, Washington

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TABLE OF CONTENTS

Narrative 1

ER-311 Sample Breakdown (Attachment 1) 11

Sample Data Summary 14

Chain of Custody Forms 19

Sample Handling 25
Breakdown Worklist # 25656 (2422, 2423, 2424) 27

Inorganic Analyses 29

Differential Scanning Calorimetry (DSC)
DSC Worklist # 25683 (2422, 2423, 2424) 31
DSC Worklist # 26395 (2422, 2423, 2424) 38.1

Thermogravimetric Analysis (TGA)
TGA Worklist # 25684 (2422, 2423, 2424) 39

Specific Gravity Analysis (SpG)
SpG Worklist # 25685 (2422, 2423, 2424) 47

pH Analysis (pH)
pH Worklist # 25682 (2422, 2423, 2424) 55

Hydroxide Analysis (OH)
OH Worklist # 25686 (2422, 2423, 2424) 56

Ion Chromatography Analysis (IC)
IC Worklist # 25687 (2422, 2423, 2424) 67
IC Worklist # 25860 (2422) 80

Inductively Coupled Plasma Spectrophic Analysis (ICP)
ICP Worklist # 25774 (2422, 2423, 2424) 89

Inductively Coupled Plasma by Mass Spec Analysis (ICP/MS)
ICP/MS Worklist # 26268 (2422, 2423, 2424) 97

Total Inorganic Carbon / Total Organic Carbon Analysis (TICTOC)
TICTOC Worklist # 25689 (2422, 2423, 2424) 132

Total Organic Carbon Analysis (TOC)
TOC Worklist # 25688 (2422, 2423, 2424) 163

TABLE OF CONTENTS (Contents)

Uranium Analysis (U)
U Worklist # 25692 (2422, 2423, 2424) 184

Radiochemical Analyses 198

Gamma Energy Analysis (GEA)
GEA Worklist # 25694 (2422, 2423, 2424) 200

Strontium 90 Analysis (Sr90)
Sr90 Worklist # 25691 (2422, 2423, 2424) 234

Americium 241 Analysis (Am241)
Am241 Worklist # 25970 (2424) 244
Am241 Worklist # 25690 (2422, 2423, 2424) 262

Plutonium 239 Analysis (Pu239)
Pu239 Worklist # 25693 (2422, 2423, 2424) 290

Opportunistic Analytes 330

This document consists of pages 1 to 334. Pages ii, 2, 12, 15, 20, 26, 30, 199 and 331 were intentionally left blank.

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NARRATIVE

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222-S ANALYTICAL SERVICES

TANK 241-ER-311 GRAB SAMPLES, ER311-98-1, ER311-98-2, ER311-98-3 ANALYTICAL RESULTS FOR THE FINAL REPORT

This document is the final report for catch tank 241-ER-311 grab samples. Three grab samples ER311-98-1, ER311-98-2 and ER311-98-3 were taken from East riser of tank 241-ER-311 on August 4, 1998 and received by the 222-S Laboratory on August 4, 1998. Analyses were performed in accordance with the *Compatibility Grab Sampling and Analysis Plan* (TSAP) (Sasaki, 1998) and the *Data Quality Objectives for Tank Farms Waste Compatibility Program* (DQO) (Mulkey and Miller, 1997). The analytical results are presented in the data summary report (Table 1). No notification limits were exceeded.

Appearance and Sample Handling

Attachment 1 is provided as a cross-reference for relating the tank farm customer identification numbers with the 222-S Laboratory sample numbers and the portion of sample analyzed. Table 2 provides the appearance information.

Table 2: Appearance Information for Tank 241-ER-311 Grab Samples

Sample Number	Date Sampled	Date Received	% Settled Solids	Sample Description
ER311-98-1	8/04/98	8/04/98	<1 %	Light yellow, clear liquid; no organic layer was observed.
ER311-98-2	8/04/98	8/04/98	<1 %	Light yellow, clear liquid; no organic layer was observed.
ER311-98-3	8/04/98	8/04/98	<1 %	Light yellow, clear liquid; no organic layer was observed.

Analytical Results Summary

The data summary report (Table 1) included in this report compiles the analytical results that comply with the applicable DQO.

Compatibility Program Concerns

DSC - Differential Scanning Calorimetry - Energetics Decision Rule

The DSC analyses were performed in duplicate on direct sample aliquots. The average of the TGA result for each subsample was used in the dry weight correction for that subsample. No exotherms were observed. The standard recoveries for this analysis were within the required limits. Since the results were all reported as 0.00 Joules/g, the relative percent difference (RPD) calculation was not applicable. However, the RPDs were reported as "0" in Table 1 because of software limitations. For waste compatibility energetics decision concerns for safe waste transfers, the ratio of exothermic energy to endotherm energy must be less than one (1). Since the results were all reported as 0.00 Joules/g, the ratio of exotherm/endotherm was also 0.0 and the requirement was satisfied for all samples

Nitrate (NO_3^-), Hydroxide (OH^-) and Nitrite (NO_2^-) - Corrosion Decision Rule

Waste compatibility corrosion rules do not apply for Tank 241-ER-311 because this is a catch tank.

$^{239/240}$Pu - Plutonium-239/240 - Criticality Decision Rule

$^{239/240}$Pu concentration is used to evaluate criticality safety for waste transfers. The analysis was performed on direct sample aliquots. The standard recovery for this analysis was within the required limits. The highest reported result was 7.59e-06 µCi/mL, which is well below both the immediate notification limit of 61.5 µCi/mL and the criticality prevention concern level of 0.001g/L (6.2e-02 µCi/mL) stated in the TSAP (Sasaki, 1997) and the Compatibility DQO (Mulkey and Miller, 1997).

Uranium (U) – Criticality Decision Rule

U analysis was performed in duplicate on direct subsamples to evaluate criticality safety for waste transfers. No attempt was made to reconcile the U concentration with the ^{239}Pu equivalents.

Inorganic Analyses

TGA - Thermogravimetric Analysis

The TGA analysis was performed on direct sample aliquots. Standard recoveries and RPDs were within the required limits. Typically the TGA results are determined by summing the weight loss steps which occur below 250°C. More information may be obtained by examining the thermograms. The results ranged from 99.27 to 99.94% moisture.

pH

The pH analysis was performed on direct sample aliquots. The results ranged from 8.03 to 8.18. The standard value measured and RPDs for this analysis were within the required limits.

Specific Gravity (Sp.G.)

Specific gravity analysis was performed in duplicate on direct liquid subsamples. The results ranged from .893 g/mL to 1.032 g/mL. The standard recoveries and RPDs were within the control limits of the laboratory.

Hydroxide – OH^-

The OH^- analysis was performed on direct sample aliquots. The standard recoveries were within in the required limits for this analysis. The RPDs are reported as "n/a" since all the results were reported as a less than.

IC - Ion Chromatography

The ion chromatography (IC) analysis was performed on direct sample aliquots. The required analytes were fluoride (F^-), chloride (Cl^-), nitrate (NO_3^-), nitrite (NO_2^-), phosphate (PO_4^{-3}) and sulfate (SO_4^{-2}). The results for bromide (Br^-) and oxalate are considered "opportunistic" and are provided in Appendix A.

Sample ER311-98-1 (S98T002422) was reanalyzed at a higher dilution due to a poor spike recovery. The standard recoveries, spike recoveries and RPDs for the required analytes were all within the required limits with the exception noted below.

The chloride results were more than four times the concentration of the spike added resulting in a spike recovery outside of the 75%-125%. It was a marginal spike failure of 126.2%. No reanalysis was requested.

ICP - Inductively Coupled Plasma Spectrophotometry

The liquid subsamples were prepared for analysis by an acid adjustment of the direct subsample. This is indicated by a "D" in the A# column in Table 1. The results for the ICP analytes are included in Table 1. However, the QC review discussed in this report is limited to Aluminum (Al), Chromium (Cr), Iron (Fe), Manganese (Mn), Nickel (Ni), Sodium (Na), and Zirconium (Zr). All other analyte results are presented in Appendix A. The results for all other analytes are considered "opportunistic" and are provided in Appendix A. The standard recoveries, spike recoveries and RPDs met the requested criteria, with the exception noted below.

The Na results were more than four times the concentration of the spike added resulting in spike recoveries outside of the 75% - 125% recovery range requested. Typically, with high analyte concentrations it is difficult to add sufficient spike to perform a meaningful analysis. A second sample aliquot was spiked with a higher concentration of Na and reported in the raw data as a post-digest spike. The post-digest spike recovery was 93.5%. The assessment of the accuracy of the measurement for this analyte was also made by comparison of the sample results to those of a serial dilution of the sample. The serial dilution was performed by preparing and analyzing an additional five-fold dilution of the sample. The results obtained from this analysis were within ±10% of the undiluted sample result and, therefore, are acceptable. Table 3 presents the results of the original undiluted sample, the serial dilution and the percent difference between the two results.

The Fe and Zr spike results were also outside of the 75% - 125% recovery range using a 1 ppm spike level. A second sample aliquot was spiked with a higher concentration of Fe and Zr (10 ppm) and reported in the raw data as a post digest spike. The post-digest spike recovery for Fe and Zr were 92.6% and 97.6% respectively.

There was a marginal RPD failure (20.3%) for Ni on sample S98T002424.

Table 3: ICP Serial Dilution Results for Tank 241-ER-311

Sample ID	Analyte	Undiluted Sample Result (µg/mL)	Serial Dilution Result (µg/mL)	Percent Difference (%)
S98T002422 (ER311-98-1)	Na	421.8	436.0	3.36

Percent Difference = [| Sample - Serial Dilution | /Sample] X 100

Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)

Uranium by ICP-MS was performed on each sample. The liquid subsamples were prepared for analysis by an acid adjustment of the direct subsamples as indicated by an "A" in the A# column in Table 1. The results for the ICP/MS isotopic uranium are included in Table 1. The RPDs were less than 20%, the standard recoveries for U238 were within the required limits of 80%-120% and the spike recoveries were within the required limits of 75%-125%. Also, U analysis by phosphorescence was performed on each sample for comparison. The results can be found in the opportunistic analysis table in Appendix A.

TIC/TOC - Total Inorganic/Organic Carbon

The TIC/TOC analysis was performed on direct sample aliquots using the persulfate oxidation method. None of the subsamples submitted for TOC analysis exceeded the notification limit.

For the TIC/TOC analysis, an Analysis Report worksheet is included for each sample as raw data. Due to programming limitations with the instrument software, the sample size listed on the worksheet is incorrect. This value is not used in the final calculations and has no bearing on the results in Table 1.

The blank is considered a reagent blank. The value was within the acceptance limits and all results were corrected for the concentration found in the blank. The standard recoveries, spike recoveries and RPD criteria were met for this analysis.

Radionuclide Analyses

GEA - Gamma Energy Analysis

GEA analysis was performed for ^{137}Cs on direct sample aliquots. The standard recoveries and RPDs for ^{137}Cs were within the required limits.

^{90}Sr - Strontium-90

^{90}Sr analysis was performed on direct sample aliquots. The standard recoveries and RPDs were within the required limits. ^{90}Sr was detected in the method blank for this analysis. However, the level of contamination was insignificant with respect to the sample results and does not affect the usability of these results. No reruns were requested.

^{241}Am - Americium-241

^{241}Am analysis was performed on direct sample aliquots. The standard recovery and RPDs were within the required limits.

Procedures

Table 4 lists the analytical procedures used for performing the analyses.

Table 4: Analytical Procedures

Analysis	Preparation Procedure	Analysis Procedure
Inorganic Analyses		
% Settled Solids	Direct Analysis	LA-519-151 Rev. F-0
DSC	Direct Analysis	LA-514-114 Rev. D-1
TGA	Direct Analysis	LA-514-114 Rev. D-1
Sp.G.	Direct Analysis	LA-510-112 Rev. D-1
pH	Direct Analysis	LA-212-106 Rev. C-2
OH^-	Direct Analysis	LA-211-102 Rev. D-0
IC	Direct Analysis	LA-533-105 Rev. E-0
ICP	Acid Dilution	LA-505-161 Rev. C-2
ICP-MS	Direct Analysis	LA-506-101 Rev. A-0
TIC/TOC	Direct Analysis	LA-342-100 Rev. F-1
Radionuclide Analyses		
GEA	Direct Analysis	LA-548-121 Rev. F-0
^{90}Sr	Direct Analysis	LA-220-101 Rev. E-3
^{241}Am	Direct Analysis	LA-953-104 Rev. B-0
$^{239/240}Pu$	Direct Analysis	LA-953-104 Rev. B-0

Abbreviations:

DSC = differential scanning calorimetry
TGA = thermogravimetric analysis
Sp.G. = specific gravity
OH^- = hydroxide
IC = ion chromatography
ICP = inductively coupled plasma
TOC = total organic carbon
ICP-MS = inductively coupled plasma-mass spectrometer
TIC = total inorganic carbon
GEA = gamma energy analysis
^{90}Sr = strontium 90
^{241}Am = americium 241
$^{239/240}Pu$ = plutonium 239/240

References

Mulkey, C. H., and M. S. Miller, 1997, *Data Quality Objectives for Tank Farms Waste Compatibility Program*, WHC-SD-WM-DQO-001, Rev. 2, Lockheed Martin Hanford Corporation, Richland, WA 99352.

Sasaki, L. M., 1998, *Compatibility Grab Sampling and Analysis Plan*, HNF-SD-WM-TSAP-150, Rev. 1, Lockheed Martin Hanford Corporation, Richland, WA 99352.

Markel, L. P., 1997, *Quality Assurance Plan for the 222-S Laboratories*, HNF-SD-CP-QAPP-016, Rev. 2, Rust Federal Services of Hanford, Inc., Richland, WA 99352

ER-311 SAMPLE BREAKDOWN

(ATTACHMENT 1)

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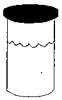
ER-311 Grab Samples

ER311-98-1
S98T002422

pH
DSC
TGA
Sp.G.
OH
IC: Anions
ICP: Al, Cr, Fe, Mn,
Na, Ni, Zr
TIC/TOC: Persulfate

Sr-90
Am-241
Uranium by ICP/MS
Pu-239/240
GEA: Cs-137

ER311-98-2
S98T002423



pH
DSC
TGA
Sp.G.
OH
IC: Anions
ICP: Al, Cr, Fe, Mn,
Na, Ni, Zr
TIC/TOC: Persulfate

Sr-90
Am-241
Uranium by ICP/MS
Pu-239/240
GEA: Cs-137

ER311-98-3
S98T002424

pH
DSC
TGA
Sp.G.
OH
IC: Anions
ICP: Al, Cr, Fe, Mn,
Na, Ni, Zr
TIC/TOC: Persulfate

Sr-90
Am-241
Uranium by ICP/MS
Pu-239/240
GEA: Cs-137

SAMPLE DATA SUMMARY

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Final Report for ER-311 Grab Samples
ER-311 GRAB

CORE NUMBER: n/a
SEGMENT #: ER311-98-1

SEGMENT PORTION: Supernate

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98T002422			DSC Exotherm Dry Calculated	Joules/g Dry	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S98T002422			DSC Exotherm on Perkin Elmer	Joules/g	95.85	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S98T002422			OH- by Pot. Titration	ug/mL	100.6	<2500.0	<2500	<2500	n/a	n/a	n/a	2.50e+03	n/a
S98T002422			pH Direct	pH	99.88	n/a	8.130	8.180	8.155	0.61	n/a	1.00e-02	n/a
S98T002422			Specific Gravity	Sp.G.	99.57	n/a	8.93e-01	9.88e-01	9.41e-01	10.1	n/a	1.00e-03	n/a
S98T002422			% Water by TGA on Perkin Elmer	%	98.37	n/a	99.79	99.94	99.87	0.15	n/a	n/a	n/a
S98T002422			TIC by Acid/Coulometry	ug/mL	101.5	1.900	1.75e+02	174.0	174.5	0.57	99.80	5.000	n/a
S98T002422			TOC by Persulfate/Coulometry	ug/mL	93.67	7.100	1.07e+02	113.0	110.0	5.45	100.0	40.00	n/a
S98T002422			Strontium-89/90 High Level	uCi/mL	106.7	3.69e-04	1.030	1.030	1.030	0.00	n/a	4.70e-04	6.93E-01
S98T002422			Pu-239/240 by TRU-SPEC Resin	uCi/mL	117.0	<3.26e-06	7.04e-06	7.19e-06	7.12e-06	2.11	n/a	3.68e-06	5.33E+00
S98T002422		A	Uranium-233 by ICP/MS Acid Add	ug/mL	n/a	<2.31e-05	<2.36e-01	<2.36e-1	n/a	n/a	n/a	2.36e-01	n/a
S98T002422		A	Uranium-234 by ICP/MS Acid Add	ug/mL	n/a	<4.41e-05	<4.50e-01	<4.50e-1	n/a	n/a	n/a	4.50e-01	n/a
S98T002422		A	Uranium-235 by ICP/MS Acid Add	ug/mL	n/a	<2.94e-05	2.317	2.540	2.429	9.05	n/a	3.00e-01	n/a
S98T002422		A	Uranium-236 by ICP/MS Acid Add	ug/mL	n/a	<3.22e-05	<3.29e-01	<3.29e-1	n/a	n/a	n/a	3.29e-01	n/a
S98T002422		A	Uranium-238 by ICP/MS Acid Add	ug/mL	98.00	<1.57e-05	3.56e+02	382.0	368.9	7.05	95.83	1.61e-01	n/a
S98T002422		D	Aluminium-ICP-Acid Dil.	ug/mL	97.80	<5.00e-02	2.720	2.750	2.735	1.10	94.30	1.00e-01	n/a
S98T002422		D	Chromium-ICP-Acid Dil.	ug/mL	99.20	<1.00e-02	1.36e-01	4.38e-02	8.99e-02	103	90.70	2.00e-02	n/a
S98T002422		D	Iron-ICP-Acid Dil.	ug/mL	96.40	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	-9.090e1	1.00e-01	n/a
S98T002422		D	Manganese-ICP-Acid Dil.	ug/mL	98.40	<1.00e-02	2.25e-01	2.21e-01	2.23e-01	1.79	94.00	2.00e-02	n/a
S98T002422		D	Sodium-ICP-Acid Dil.	ug/mL	105.6	<1.00e-01	4.22e+02	425.0	423.5	0.71	-1.970e2	2.00e-01	n/a
S98T002422		D	Nickel-ICP-Acid Dil.	ug/mL	100.4	<2.00e-02	2.66e-01	2.54e-01	2.60e-01	4.62	95.10	4.00e-02	n/a
S98T002422		D	Zirconium-ICP-Acid Dil.	ug/mL	99.00	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	73.00	2.00e-02	n/a
S98T002422			Fluoride-IC-Dionex 4000/4500	ug/mL	99.84	<1.20e-02	1.776	1.890	1.833	5.99	110.3	1.32e-01	n/a
S98T002422			Chloride-IC-Dionex 4000/4500	ug/mL	101.4	<1.70e-02	72.42	73.80	73.11	1.92	126.2	3.57e-01	n/a
S98T002422			Nitrite-IC - Dionex 4000/4500	ug/mL	96.32	<1.08e-01	< 1.188	<1.19e0	n/a	n/a	98.28	1.188	n/a
S98T002422			Nitrate by IC-Dionex 4000/4500	ug/mL	103.3	<1.39e-01	2.599	2.770	2.684	6.33	97.64	1.529	n/a
S98T002422			Phosphate-IC-Dionex 4000/4500	ug/mL	95.09	<1.20e-01	1.635	<1.32e0	n/a	n/a	99.45	1.320	n/a
S98T002422			Sulfate by IC-Dionex 4000/4500	ug/mL	99.00	<1.38e-01	18.95	19.50	19.23	3.13	97.96	1.518	n/a
S98T002422			Cesium-137 by GEA	uCi/mL	102.4	<3.98e-05	2.630	2.630	2.630	0.00	n/a	n/a	0.170
S98T002422			Volume % Settled Solids	%	n/a	n/a	<1	n/a	n/a	n/a	n/a	1.00e-01	n/a
S98T002422			Organic Vol Present/sampleprep	mL	n/a	n/a	0.00e+00	n/a	n/a	n/a	n/a	n/a	n/a
S98T002422			Am-241 by Extraction	uCi/mL	94.27	<2.76e-06	1.30e-05	1.29e-05	1.29e-05	0.77	n/a	4.39e-06	4.37E+00

Final Report for ER-311 Grab Samples
ER-311 GRAB

CORE NUMBER: n/a
SEGMENT #: ER311-98-2

SEGMENT PORTION: Supernate

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98T002423			DSC Exotherm Dry Calculated	Joules/g Dry	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S98T002423			DSC Exotherm on Perkin Elmer	Joules/g	95.85	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S98T002423			OH- by Pot. Titration	ug/mL	100.6	<2500.0	<2500	<2500	n/a	n/a	n/a	2.50e+03	n/a
S98T002423			pH Direct	pH	99.88	n/a	8.030	8.050	8.040	0.25	n/a	1.00e-02	n/a
S98T002423			Specific Gravity	Sp.G.	99.57	n/a	9.87e-01	9.88e-01	9.88e-01	0.10	n/a	1.00e-03	n/a
S98T002423			% Water by TGA on Perkin Elmer	%	98.37	n/a	99.32	99.63	99.47	0.31	n/a	n/a	n/a
S98T002423			TIC by Acid/Coulometry	ug/mL	101.5	1.900	1.68e+02	166.0	167.0	1.20	n/a	5.000	n/a
S98T002423			TOC by Persulfate/Coulometry	ug/mL	93.67	7.100	1.09e+02	111.0	110.0	1.82	n/a	40.00	n/a
S98T002423			Strontium-89/90 High Level	uCi/mL	106.7	3.69e-04	9.40e-01	9.33e-01	9.36e-01	0.75	n/a	4.73e-04	7.27E-01
S98T002423			Pu-239/240 by TRU-SPEC Resin	uCi/mL	117.0	<3.26e-06	6.72e-06	6.79e-06	6.76e-06	1.04	n/a	3.39e-06	5.42E+00
S98T002423	A		Uranium-233 by ICP/MS Acid Add	ug/mL	n/a	<2.31e-05	<2.36e-01	<2.36e-1	n/a	n/a	n/a	2.36e-01	n/a
S98T002423	A		Uranium-234 by ICP/MS Acid Add	ug/mL	n/a	<4.41e-05	<4.50e-01	<4.50e-1	n/a	n/a	n/a	4.50e-01	n/a
S98T002423	A		Uranium-235 by ICP/MS Acid Add	ug/mL	n/a	<2.94e-05	2.350	2.320	2.335	1.28	n/a	3.00e-01	n/a
S98T002423	A		Uranium-236 by ICP/MS Acid Add	ug/mL	n/a	<3.22e-05	<3.29e-01	<3.29e-1	n/a	n/a	n/a	3.29e-01	n/a
S98T002423	A		Uranium-238 by ICP/MS Acid Add	ug/mL	98.00	<1.57e-05	3.65e+02	359.0	362.1	1.66	n/a	1.61e-01	n/a
S98T002423	D		Aluminium-ICP-Acid Dil.	ug/mL	97.80	<5.00e-02	2.570	2.530	2.550	1.57	n/a	1.00e-01	n/a
S98T002423	D		Chromium-ICP-Acid Dil.	ug/mL	99.20	<1.00e-02	<2.00e-02	8.82e-02	n/a	n/a	n/a	2.00e-02	n/a
S98T002423	D		Iron-ICP-Acid Dil.	ug/mL	96.40	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002423	D		Manganese-ICP-Acid Dil.	ug/mL	98.40	<1.00e-02	2.09e-01	2.15e-01	2.12e-01	2.83	n/a	2.00e-02	n/a
S98T002423	D		Sodium-ICP-Acid Dil.	ug/mL	105.6	<1.00e-01	3.73e+02	376.0	374.5	0.80	n/a	2.00e-01	n/a
S98T002423	D		Nickel-ICP-Acid Dil.	ug/mL	100.4	<2.00e-02	2.13e-01	1.85e-01	1.99e-01	14.1	n/a	4.00e-02	n/a
S98T002423	D		Zirconium-ICP-Acid Dil.	ug/mL	99.00	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	n/a	2.00e-02	n/a
S98T002423			Fluoride-IC-Dionex 4000/4500	ug/mL	99.84	<1.20e-02	1.704	1.700	1.702	0.00	n/a	1.32e-01	n/a
S98T002423			Chloride-IC-Dionex 4000/4500	ug/mL	101.1	<1.70e-02	66.71	66.60	66.66	0.15	n/a	1.87e-01	n/a
S98T002423			Nitrite-IC - Dionex 4000/4500	ug/mL	96.32	<1.08e-01	< 1.188	<1.19e0	n/a	n/a	n/a	1.188	n/a
S98T002423			Nitrate by IC-Dionex 4000/4500	ug/mL	103.3	<1.39e-01	< 1.529	<1.53e0	n/a	n/a	n/a	1.529	n/a
S98T002423			Phosphate-IC-Dionex 4000/4500	ug/mL	95.09	<1.20e-01	< 1.320	<1.32e0	n/a	n/a	n/a	1.320	n/a
S98T002423			Sulfate by IC-Dionex 4000/4500	ug/mL	99.00	<1.38e-01	19.89	19.90	19.89	0.00	n/a	1.518	n/a
S98T002423			Cesium-137 by GEA	uCi/mL	102.4	<3.98e-05	2.400	2.380	2.390	0.84	n/a	n/a	0.180
S98T002423			Volume % Settled Solids	%	n/a	n/a	<1	n/a	n/a	n/a	n/a	1.00e-01	n/a
S98T002423			Organic Vol Present/sampleprep	mL	n/a	n/a	0.00e+00	n/a	n/a	n/a	n/a	n/a	n/a
S98T002423			Am-241 by Extraction	uCi/mL	94.27	<2.76e-06	1.20e-05	1.20e-05	1.20e-05	0.00	n/a	3.31e-06	4.25E+00

17

Final Report for ER-311 Grab Samples
ER-311 GRAB

CORE NUMBER: n/a
SEGMENT #: ER311-98-3

SEGMENT PORTION: Supernate

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98T002424			DSC Exotherm Dry Calculated	Joules/g Dry	n/a	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S98T002424			DSC Exotherm on Perkin Elmer	Joules/g	95.85	n/a	0.00e+00	0.00e+00	0.00e+00	0.00	n/a	n/a	n/a
S98T002424			OH- by Pot. Titration	ug/mL	100.6	<2500.0	<2500	<2500	n/a	n/a	n/a	2.50e+03	n/a
S98T002424			pH Direct	pH	99.88	n/a	8.050	8.060	8.055	0.12	n/a	1.00e-02	n/a
S98T002424			Specific Gravity	Sp.G.	99.57	n/a	1.032	9.89e-01	1.010	4.26	n/a	1.00e-03	n/a
S98T002424			% Water by TGA on Perkin Elmer	%	98.37	n/a	99.27	99.53	99.40	0.26	n/a	n/a	n/a
S98T002424			TIC by Acid/Coulometry	ug/mL	101.5	1.900	1.73e+02	177.0	175.0	2.29	n/a	5.000	n/a
S98T002424			TOC by Persulfate/Coulometry	ug/mL	93.67	7.100	1.15e+02	118.0	116.5	2.58	n/a	40.00	n/a
S98T002424			Strontium-89/90 High Level	uCi/mL	106.7	3.69e-04	9.69e-01	9.70e-01	9.70e-01	0.10	n/a	4.66e-04	7.11E-01
S98T002424			Pu-239/240 by TRU-SPEC Resin	uCi/mL	117.0	<3.26e-06	7.59e-06	7.52e-06	7.55e-06	0.93	n/a	3.65e-06	5.20E+00
S98T002424	A		Uranium-233 by ICP/MS Acid Add	ug/mL	n/a	<2.31e-05	<2.36e-01	<2.36e-1	n/a	n/a	n/a	2.36e-01	n/a
S98T002424	A		Uranium-234 by ICP/MS Acid Add	ug/mL	n/a	<4.41e-05	<4.50e-01	<4.50e-1	n/a	n/a	n/a	4.50e-01	n/a
S98T002424	A		Uranium-235 by ICP/MS Acid Add	ug/mL	n/a	<2.94e-05	2.413	2.400	2.406	0.42	n/a	3.00e-01	n/a
S98T002424	A		Uranium-236 by ICP/MS Acid Add	ug/mL	n/a	<3.22e-05	<3.29e-01	<3.29e-1	n/a	n/a	n/a	3.29e-01	n/a
S98T002424	A		Uranium-238 by ICP/MS Acid Add	ug/mL	98.00	<1.57e-05	3.70e+02	358.0	364.1	3.30	n/a	1.61e-01	n/a
S98T002424	D		Aluminium-ICP-Acid Dil.	ug/mL	97.80	<5.00e-02	2.660	2.640	2.650	0.75	n/a	1.00e-01	n/a
S98T002424	D		Chromium-ICP-Acid Dil.	ug/mL	99.20	<1.00e-02	2.05e-02	<2.00e-2	n/a	n/a	n/a	2.00e-02	n/a
S98T002424	D		Iron-ICP-Acid Dil.	ug/mL	96.40	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002424	D		Manganese-ICP-Acid Dil.	ug/mL	98.40	<1.00e-02	2.18e-01	2.15e-01	2.16e-01	1.39	n/a	2.00e-02	n/a
S98T002424	D		Sodium-ICP-Acid Dil.	ug/mL	105.6	<1.00e-01	3.83e+02	385.0	384.0	0.52	n/a	2.00e-01	n/a
S98T002424	D		Nickel-ICP-Acid Dil.	ug/mL	100.4	<2.00e-02	1.74e-01	1.42e-01	1.58e-01	20.3	n/a	4.00e-02	n/a
S98T002424	D		Zirconium-ICP-Acid Dil.	ug/mL	99.00	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	n/a	2.00e-02	n/a
S98T002424			Fluoride-IC-Dionex 4000/4500	ug/mL	99.84	<1.20e-02	1.734	1.720	1.727	0.58	n/a	1.32e-01	n/a
S98T002424			Chloride-IC-Dionex 4000/4500	ug/mL	101.1	<1.70e-02	67.06	67.30	67.18	0.30	n/a	1.87e-01	n/a
S98T002424			Nitrite-IC - Dionex 4000/4500	ug/mL	96.32	<1.08e-01	< 1.188	<1.19e0	n/a	n/a	n/a	1.188	n/a
S98T002424			Nitrate by IC-Dionex 4000/4500	ug/mL	103.3	<1.39e-01	1.582	1.720	1.651	8.48	n/a	1.529	n/a
S98T002424			Phosphate-IC-Dionex 4000/4500	ug/mL	95.09	<1.20e-01	< 1.320	1.590	n/a	n/a	n/a	1.320	n/a
S98T002424			Sulfate by IC-Dionex 4000/4500	ug/mL	99.00	<1.38e-01	19.51	19.60	19.55	0.51	n/a	1.518	n/a
S98T002424			Cesium-137 by GEA	uCi/mL	102.4	<3.98e-05	2.480	2.480	2.480	0.00	n/a	n/a	0.170
S98T002424			Volume % Settled Solids	%	n/a	n/a	<1	n/a	n/a	n/a	n/a	1.00e-01	n/a
S98T002424			Organic Vol Present/sampleprep	mL	n/a	n/a	0.00e+00	n/a	n/a	n/a	n/a	n/a	n/a
S98T002424			Am-241 by Extraction	uCi/mL	90.31	<5.51e-06	1.29e-05	1.39e-05	1.34e-05	7.46	n/a	6.44e-06	5.83E+00

CHAIN OF CUSTODY

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CHAIN-OF-CUSTODY RECORD FOR CPO

(1) Sample Number: ER311-98-1

(2) Supervisor/Sampler: JAMES Sickels

(3) Tank: ER-311

(4) Riser: EAST

(5) Cask/Pig Serial No.: B-23

(6) Shipment Description:

A. Work Package Number: ES-98-00248

B. Cask/Pig Seal Number: 12261

C. Date Sample Collected: 8-4-98

D. Time Sample Collected: 1013

(7) Sampling Date

	Y	N
- Lithium Bromide	☐	☐
Amount		
Concentration		
- X-Ray	☐	☐
- Partial Sample	☐	☐
- Retrieved Partial Sample Stroke Length		

N/A

(8) Field Comments:

Truck/Ha Contract

(9) Seal Intact Upon Release? ☒ Yes ☐ No

(10) Seal Intact Upon Receipt? ☒ Yes ☐ No

(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 6b) ☒ Yes ☐ No

(12) Laboratory Comments:

(13) Relinquished By (Sign and PRINT)	(14) Received By (Sign and PRINT)	(15) Date/Time	(16) Receiver Comments
Robert J Prazwik	BWATKINS	11:40 AM 8-4-98	
(17) Relinquished By (Sign and PRINT)	(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
BWATKINS	RL Chambers/RLChambers	1200 8-4-98	
(21) Relinquished By (Sign and PRINT)	(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
(25) Relinquished By (Sign and PRINT)	(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

BC-6001-326 (07/97)

21

HNF-1645 REV. 0

CHAIN-OF-CUSTODY RECORD FOR CPO

(1) Sample Number: ER311-98-2

(2) Supervisor/Sampler: JAMES Sickels James Sickels

(3) Tank: ER 311

(4) Riser: EAST

(5) Cask/Pig Serial No.: G-5

(6) Shipment Description:

A. Work Package Number: ES-98-00248

B. Cask/Pig Seal Number: 12262

C. Date Sample Collected: 8-4-98

D. Time Sample Collected: 1017

(7) Sampling Data

	Y	N
- Lithium Bromide	☐	☐
Amount		
Concentration		
- X-Ray	☐	☐
- Partial Sample	☐	☐
- Retrieved Partial Sample Stroke Length		

N

A

(8) Field Comments:

Tm R/Ku Contact

(9) Seal Intact Upon Release? ☒ Yes ☐ No

(10) Seal Intact Upon Receipt? ☒ Yes ☐ No

(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 8b) ☒ Yes ☐ No

(12) Laboratory Comments:

(13) Relinquished By (Sign and PRINT)	(14) Received By (Sign and PRINT)	(15) Date/Time	(16) Receiver Comments
Robert J Franzwik	[signature]	11:37 AM 8-4-98	
(17) Relinquished By (Sign and PRINT)	(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
[signature]	RL Chambers/RL Chambers	1200 8-4-98	
(21) Relinquished By (Sign and PRINT)	(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
(25) Relinquished By (Sign and PRINT)	(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

22

HNF-1645 REV. 0

CHAIN-OF-CUSTODY RECORD FOR CPO

(1) Sample Number: ER311-98-3

(2) Supervisor/Sampler: JAMES Sickels James Sickels

(3) Tank: ER311

(4) Riser: EAST

(5) Cask/Pig Serial No.: TF-8

(6) Shipment Description:

A. Work Package Number: ES-98-00248

B. Cask/Pig Seal Number: 12263

C. Date Sample Collected: 8-4-98

D. Time Sample Collected: 1022

(7) Sampling Data

	Y	N
- Lithium Bromide	☐	☐
Amount		
Concentration		
- X-Ray	☐	☐
- Partial Sample	☐	☐
- Retrieved Partial Sample Stroke Length		

N

A

(8) Field Comments: 15mR/hr Contact

(9) Seal Intact Upon Release? ☒ Yes ☐ No

(10) Seal Intact Upon Receipt? ☒ Yes ☐ No

(11) Seal Number AND Cask/Pig SERIAL Number consistent with this record? (Block 5 & 6b) ☒ Yes ☐ No

(12) Laboratory Comments:

23

(13) Relinquished By (Sign and PRINT) Robert A Pazynski	(14) Received By (Sign and PRINT) James Sickels	(15) Date/Time 1120 8-4-98	(16) Receiver Comments
(17) Relinquished By (Sign and PRINT) James Sickels	(18) Received By (Sign and PRINT)	(19) Date/Time 1125 8-4-98	(20) Receiver Comments
(21) Relinquished By (Sign and PRINT)	(22) Received By (Sign and PRINT) RL Chambers	(23) Date/Time 1330 8-4-98	(24) Receiver Comments
(25) Relinquished By (Sign and PRINT)	(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

Laboratory Copy - Sampling Operations

BC-6001-326 (07/97)

HNF-1845 REV. 0

HNF-1645 REV. 0

REQUEST FOR SAMPLE ANALYSIS (RSA)

Group ID No. (For lab use only)

Sample Origin	2. Date Sampled	4. Requestor's Name	6. TPCN	7. Org. Code
41-ER-311	07/98	Leela M. Sasaki	1MDR6Z	7A120

Customer/Project Code

3. Submitted By: CPO

5. Requestor's Phone/MSIN/FAX: 373-1027 R2-12 373-6955

8. Customer ID No.	9. Laboratory Sample No.	10. Volume of Sample	11. Matrix of Sample	12. Requested Analyses	13. Expected Range
				See TSAP HNF-SD-WM-TSAP-150, Rev. 1A	

4. Does sample have a MSDS?

- [ ] Yes HEHF assigned MSDS No. _____
- [X] No Description of process that produced waste/sample:

See TSAP

5. Is this sample RCRA listed? [X] Yes [ ] No

Applicable Listed Waste Codes:

- [ ] Yes [ ] No P Codes: (list) RCRA Permit
- [ ] Yes [ ] No U Codes: (list) DOE/RL-88-21
- [ ] Yes [ ] No K Codes: (list) _____
- [ ] Yes [ ] No F Codes: (list) _____

Applicable Characteristic Codes:

- [ ] Yes [ ] No D001: (how determined) _____ Ignitable
- [ ] Yes [ ] No D002: (how determined) _____ Corrosive
- [ ] Yes [ ] No D003: (how determined) _____ Reactive
- [ ] Yes [ ] No Toxic: (list codes) _____

PCB: Does this waste/sample contain PCBs?

- [ ] Yes Over 500 ppm
- [ ] Yes Over 50 ppm
- [ ] Yes PCBs are suspected
- [X] No PCBs are suspected

If YES, what is the source of the PCBs?

- [ ] Transformer, capacitor, or ballast
- [ ] Other, specify _____
- [ ] Unknown

6. Sample Disposition

- [X] Return to Customer
- [ ] Samples found to contain PCBs will be returned to the customer.
- [ ] Dispose of per facility procedures with applicable charges for analyses and disposal

Sample(s) Does Rate at Contact

HPT Signature

7. QC Required [ ] Per 222-S Laboratory Quality Assurance Plan (HNF-SD-CP-QAPP-016)

[X] Other (list reference document or attach) See TSAP

8. Special Instructions (Special Storage Requirements, Reporting format, holding times, etc.)

See TSAP

19. Requested Turnaround Time

[ ] 2 Weeks [ ] 4 Weeks

[ ] Other _____

20. Sample Received By

Date Time

21. Chain of Custody

[ ] No [X] Yes 24

Number: _____

SAMPLE HANDLING

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worklist.rpt Version 2.1 05/15/95
08/17/93 10:45

LABCORE Data Entry Template for Worklist# 25656

Analyst: PLC **Instrument:** NONE _____ **Book #** _____

Method: LA-519-151 Rev/Mod F-0

Worklist Comment: ER-311 GRAB, @BRKDWN1, tdm

GROUP	PROJECT	S TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
98000453	ER-311 GRAB	1 SAMPLE	S98T002422	0		@BRKDWN1 DOSERATE	LIQUID	N/A	30		mrad/hour
98000453	ER-311 GRAB	1 SAMPLE	S98T002422	0		@BRKDWN1 SEALNUM	LIQUID	N/A	12261		
98000453	ER-311 GRAB	1 SAMPLE	S98T002422	0		@BRKDWN1 ETCHNUM	LIQUID	N/A	NA		
98000453	ER-311 GRAB	1 SAMPLE	S98T002422	0		@BRKDWN1 APPEARO2	LIQUID	N/A	Liquid		
98000453	ER-311 GRAB	1 SAMPLE	S98T002422	0		@BRKDWN1 SAMPAMT2	LIQUID	N/A	125		mL
98000453	ER-311 GRAB	1 SAMPLE	S98T002422	0		@BRKDWN1 STLSLD01	LIQUID	N/A	<1		%
98000453	ER-311 GRAB	1 SAMPLE	S98T002422	0		@BRKDWN1 COLOR-01	LIQUID	N/A	Lt yellow		
98000453	ER-311 GRAB	1 SAMPLE	S98T002422	0		@BRKDWN1 ORGVOL02	LIQUID	N/A	0		mL
98000453	ER-311 GRAB	2 SAMPLE	S98T002423	0		@BRKDWN1 DOSERATE	LIQUID	N/A	25		mrad/hour
98000453	ER-311 GRAB	2 SAMPLE	S98T002423	0		@BRKDWN1 SEALNUM	LIQUID	N/A	12262		
98000453	ER-311 GRAB	2 SAMPLE	S98T002423	0		@BRKDWN1 ETCHNUM	LIQUID	N/A	NA		
98000453	ER-311 GRAB	2 SAMPLE	S98T002423	0		@BRKDWN1 APPEARO2	LIQUID	N/A	Liquid		
98000453	ER-311 GRAB	2 SAMPLE	S98T002423	0		@BRKDWN1 SAMPAMT2	LIQUID	N/A	125		mL
98000453	ER-311 GRAB	2 SAMPLE	S98T002423	0		@BRKDWN1 STLSLD01	LIQUID	N/A	<1		%
98000453	ER-311 GRAB	2 SAMPLE	S98T002423	0		@BRKDWN1 COLOR-01	LIQUID	N/A	Lt. yellow		
98000453	ER-311 GRAB	2 SAMPLE	S98T002423	0		@BRKDWN1 ORGVOL02	LIQUID	N/A	0		mL
98000453	ER-311 GRAB	3 SAMPLE	S98T002424	0		@BRKDWN1 DOSERATE	LIQUID	N/A	35		mrad/hour
98000453	ER-311 GRAB	3 SAMPLE	S98T002424	0		@BRKDWN1 SEALNUM	LIQUID	N/A	12263		

Data Entry Comments:

HPT: Daryl Haines

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95
08/17/98 10:45

LABCORE Data Entry Template for Worklist# 25656

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
98000453	ER-311 GRAB	3	SAMPLE	S98T002424	0		@BRKDWN1 ETCHNUM	LIQUID	N/A	NA		
98000453	ER-311 GRAB	3	SAMPLE	S98T002424	0		@BRKDWN1 APPEAR02	LIQUID	N/A	Liquid		
98000453	ER-311 GRAB	3	SAMPLE	S98T002424	0		@BRKDWN1 SAMPAMT2	LIQUID	N/A	125		mL
98000453	ER-311 GRAB	3	SAMPLE	S98T002424	0		@BRKDWN1 STLSLD01	LIQUID	N/A	<1		%
98000453	ER-311 GRAB	3	SAMPLE	S98T002424	0		@BRKDWN1 COLOR-01	LIQUID	N/A	Lt yellow		
98000453	ER-311 GRAB	3	SAMPLE	S98T002424	0		@BRKDWN1 ORGVOL02	LIQUID	N/A	0		mL

Final page for worklist # 25656

RL Shaver 8-20-98
Analyst Signature Date

RK Fuller 8/20/98
Analyst Signature Date

Validated
8/25/98
RK Fuller

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

INORGANIC ANALYSIS

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worklistrpt Version 2.1 05/15/95
08/19/98 13:33

HNF-1645 REV. 0

LABCORE Data Entry Template for Worklist# 25683

Analyst: SLH **Instrument:** DSC0 3 **Book #** 12N14-B

Method: LA-514-114 Rev/Mod D-1

Worklist Comment: DSC-03 FOR ER-311 GRAB SAMPLES RTS

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	STD				DSC-03	LIQUID	28.45	27.27 ~~27.66~~	8/24/98 N/A	Joules/g
98000453	ER-311 GRAB	2	SAMPLE	S98T002422	0		DSC-03	LIQUID	N/A	0		Joules/g
98000453	ER-311 GRAB	3	DUP	S98T002422	0		DSC-03	LIQUID	0	0	N/A	Joules/g
98000453	ER-311 GRAB	4	SAMPLE	S98T002423	0		DSC-03	LIQUID	N/A	0		Joules/g
98000453	ER-311 GRAB	5	DUP	S98T002423	0		DSC-03	LIQUID	0	0	N/A	Joules/g
98000453	ER-311 GRAB	6	SAMPLE	S98T002424	0		DSC-03	LIQUID	N/A	0		Joules/g
98000453	ER-311 GRAB	7	DUP	S98T002424	0		DSC-03	LIQUID	0	0	N/A	Joules/g

Final page for worklist # 25683

Sandra J Hood Bostrow
Analyst Signature Date 8-23-98

Validated 8/27/98 [illegible]

Analyst Signature Date 8-25-98

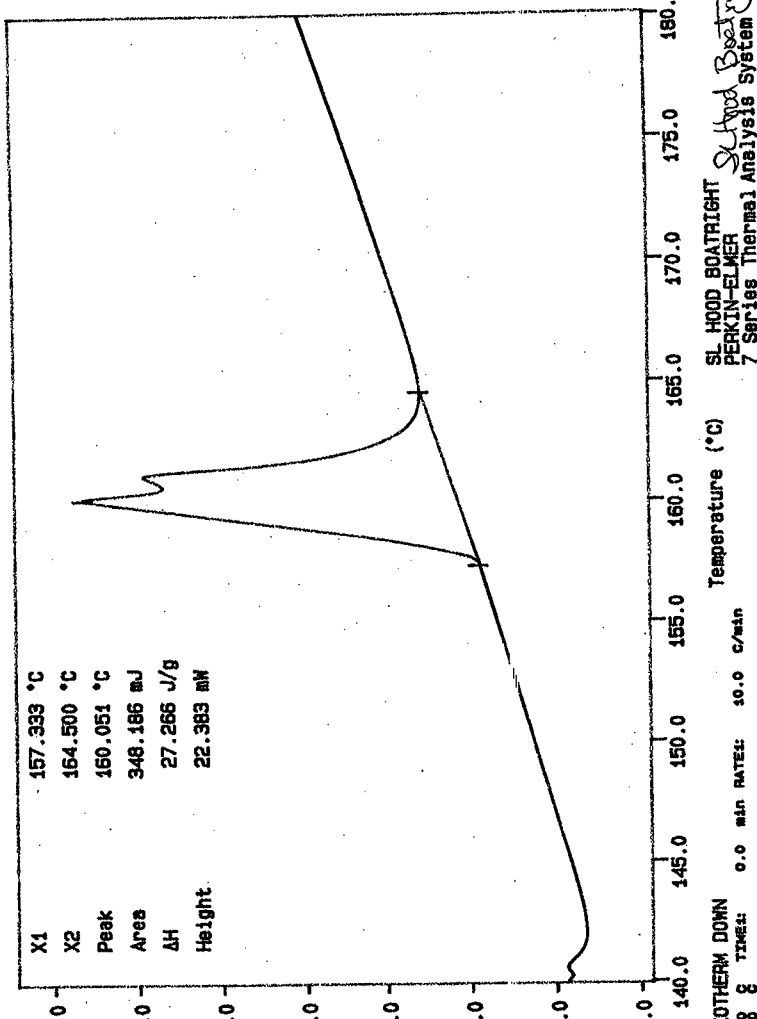
Data Entry Comments: ~~S98T002423 has TRP~~ 8/21/98

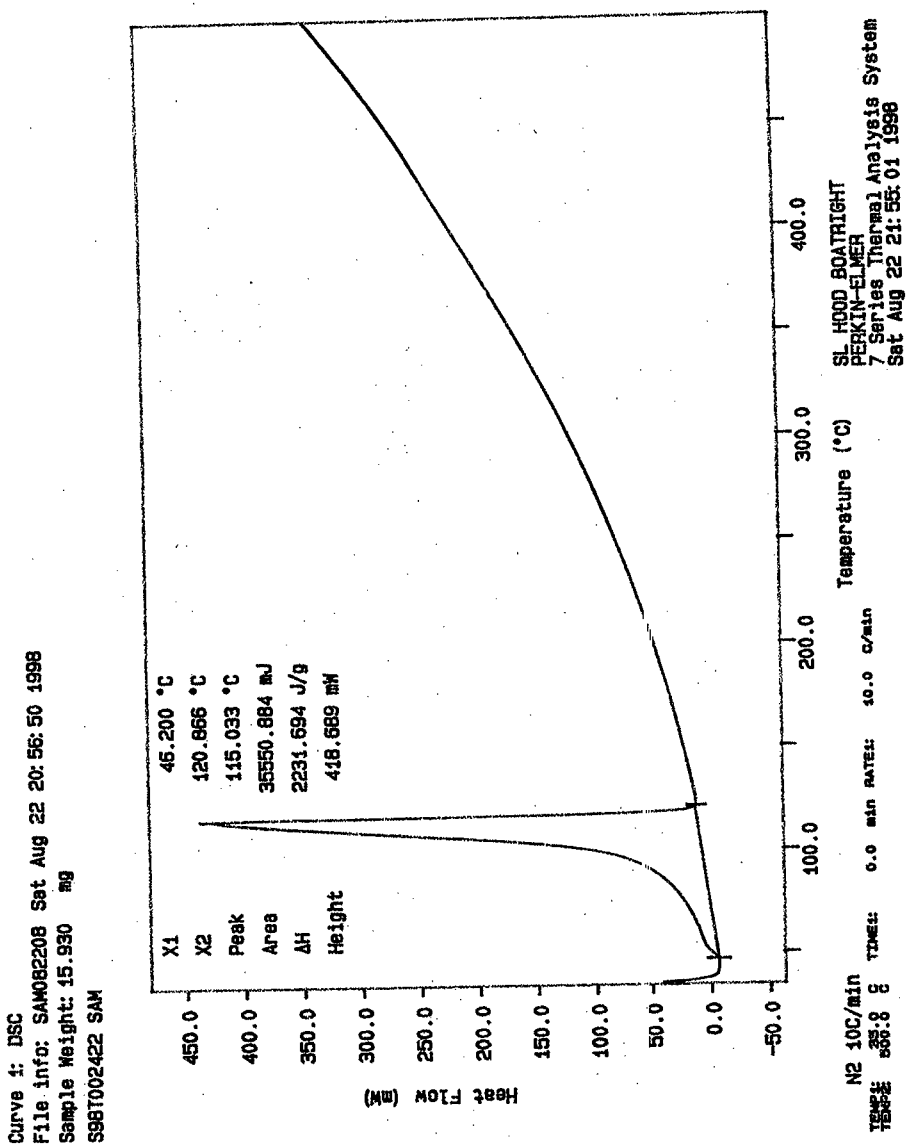
Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

HNF-1645 REV. 0

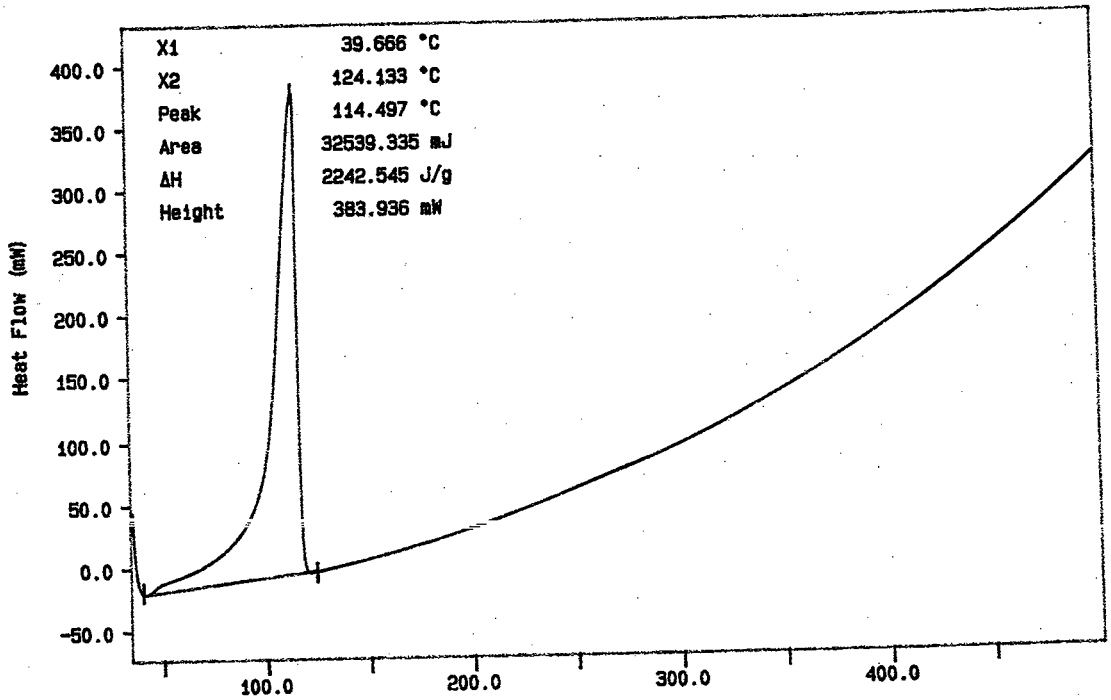
Curve 1: DSC
File info: IND082202 Sat Aug 22 18:49:55 1998
Sample Weight: 12.770 mg
STD 12N14-B

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 32 TO 40



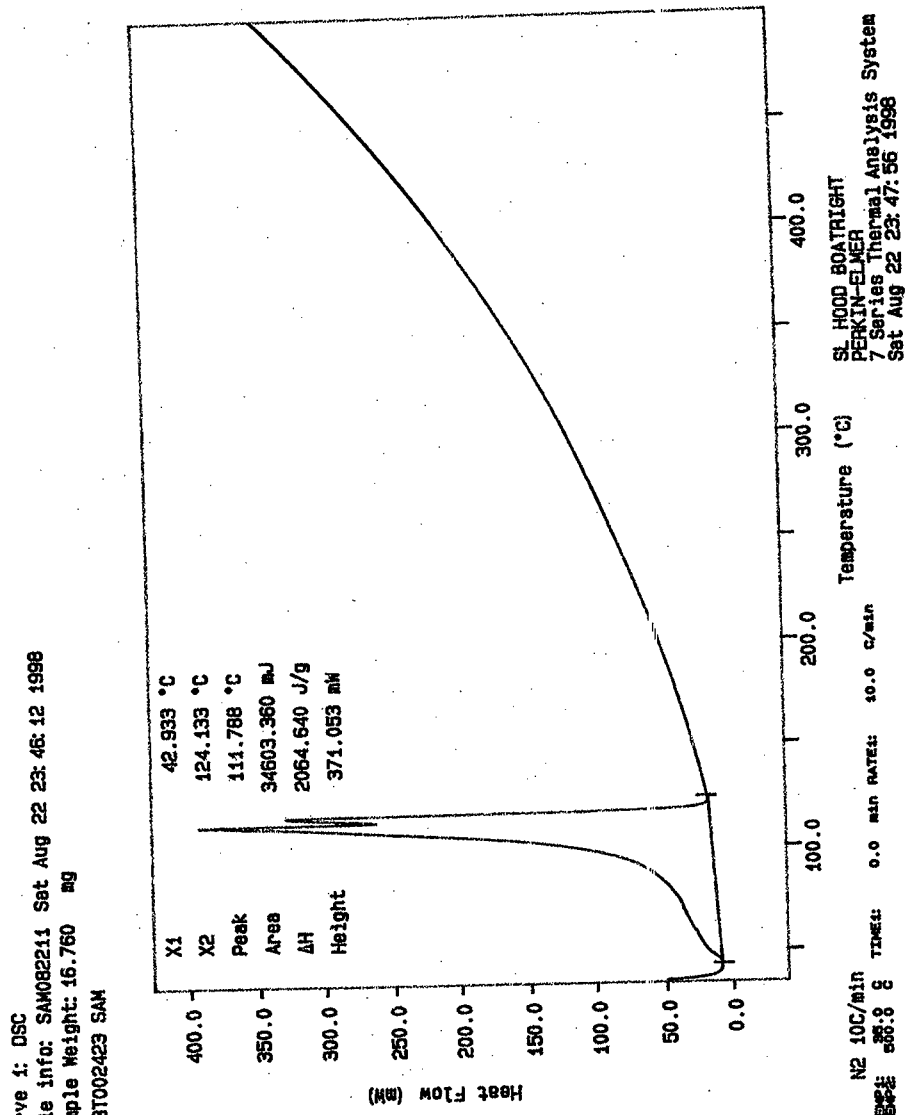

Curve 1: DSC
File Info: SAM082208 Sat Aug 22 20:56:50 1998
Sample Weight: 15.930 mg
S98T002422 SAM
X1 45.200 °C
X2 120.866 °C
Peak 115.033 °C
Area 35550.884 mJ
ΔH 2231.694 J/g
Height 418.689 mW
Heat Flow (mW)
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
-50.0
100.0
200.0
300.0
400.0
Temperature (°C)
N2 10C/min
TEMPS: 25.0 C
TEMPE: 500.0 C
TIMES: 0.0 min RATES: 10.0 C/min
SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sat Aug 22 21:55:01 1998

Curve 1: DSC
File info: SAM082209 Sat Aug 22 22:50:39 1998
Sample Weight: 14.510 mg
S98T002422 DUP

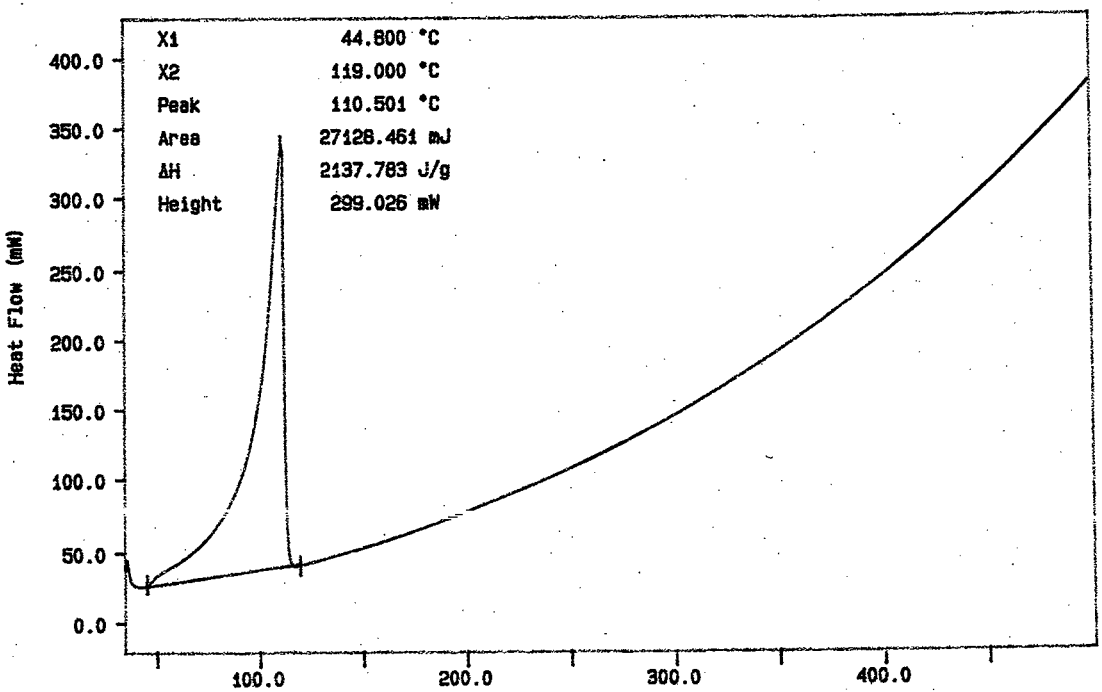


N2 10C/min
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 500.0 C

SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sat Aug 22 22:51:30 1998


Curve 1: DSC
File info: SAM082211 Sat Aug 22 23:46:12 1998
Sample Weight: 16.760 mg
S98T002423 SAM
X1 42.933 °C
X2 124.133 °C
Peak 111.788 °C
Area 34603.360 mJ
ΔH 2064.640 J/g
Height 371.053 mW
Heat Flow (mW)
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
100.0
200.0
300.0
400.0
Temperature (°C)
N2 10C/min
TEMP: 35.0 C
TEMP: 500.0 C
TIME: 0.0 min RATE: 10.0 C/min
SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sat Aug 22 23:47:56 1998

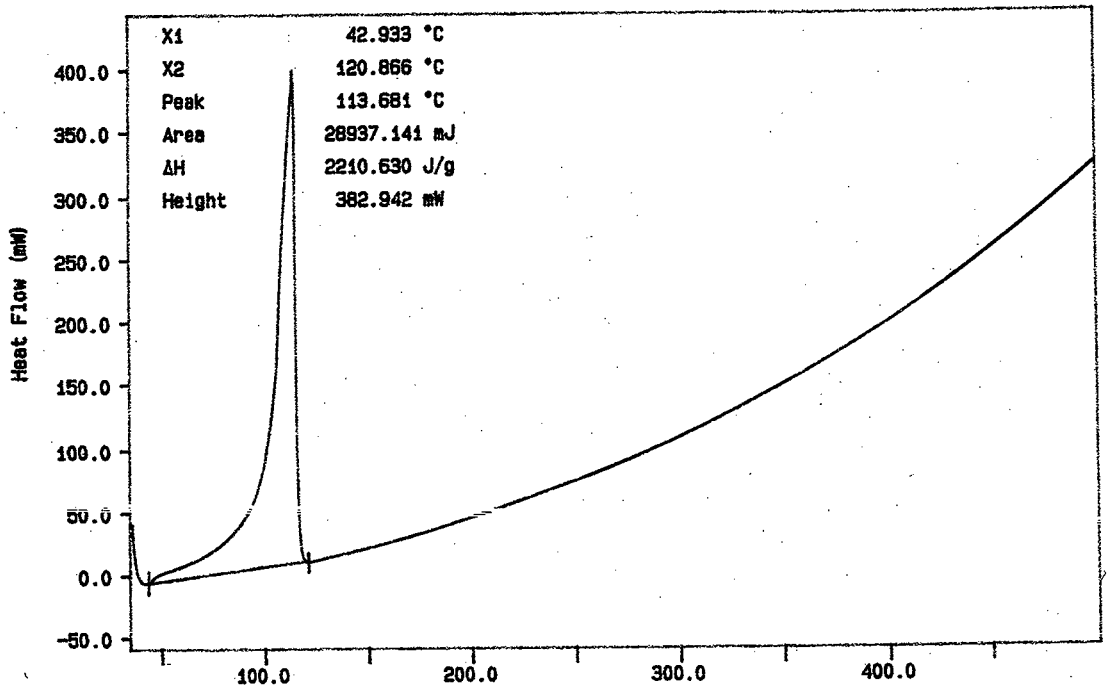
Curve 1: DSC
File info: SAM082301 Sun Aug 23 00:42:48 1998
Sample Weight: 12.690 mg
S98T002423 DUP



N2 10C/min
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 500.0 C

SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sun Aug 23 01:22:43 1998

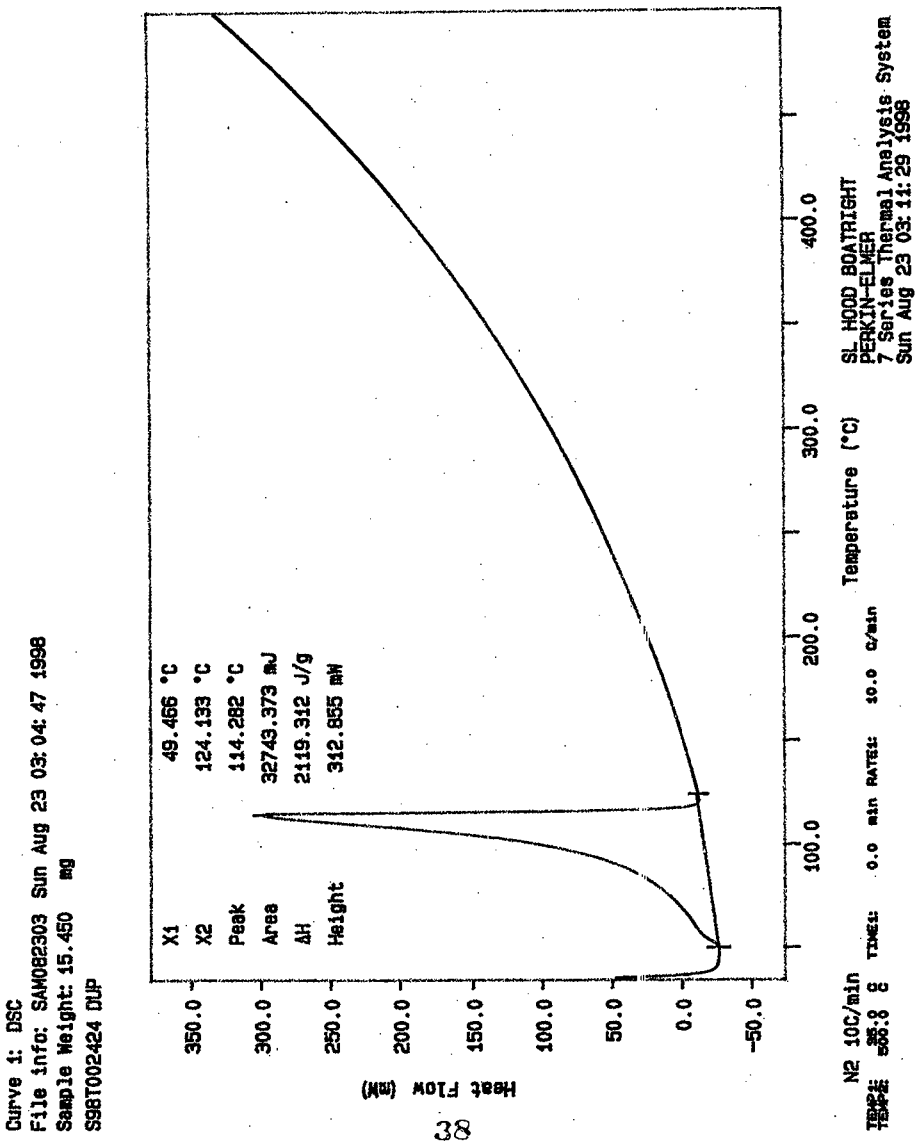
Curve 1: DSC
File info: SAM082302 Sun Aug 23 02:12:30 1998
Sample Weight: 13.090 mg
S98T002424 SAM



N2 10C/min
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 500.0 C

SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sun Aug 23 02:14:57 1998

HNF-1645 REV. 0



HNF-1645 REV. 0

LABCORE Completed Worklist Report for Worklist# 26395

Analyst: ppb **Instrument:** DSC0 **Book#:** NA

Method: LA-514-113 9/29/98 Rev/Mod D-1

Worklist Comment: ER-311 DRY-DSC JRO

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	SAMPLE	S98T002422	0		DSC-02	LIQUID	N/A	0		Joules/g Dry
2	DUP	S98T002422	0		DSC-02	LIQUID	0	0	0.000	RPD
3	SAMPLE	S98T002423	0		DSC-02	LIQUID	N/A	0		Joules/g Dry
4	DUP	S98T002423	0		DSC-02	LIQUID	0	0	0.000	RPD
5	SAMPLE	S98T002424	0		DSC-02	LIQUID	N/A	0		Joules/g Dry
6	DUP	S98T002424	0		DSC-02	LIQUID	0	0	0.000	RPD

Final page for worklist# 26395

Analyst Signature Date

Analyst Signature 9-29-98 Date

Reviewer Signature 9/29/98 Date

Units shown for QC (BLK/BKG) may not reflect the actual units.

HNF-1645 REV. 0

worklistrpt Version 2.1 05/15/95
08/19/98 13:33

LABCORE Data Entry Template for Worklist# 25684

Analyst: SLH **Instrument:** TGA0 3 **Book #** 10318-A

Method: LA-514-114 Rev/Mod D-1

Worklist Comment: TGA-03 FOR ER-311 GRAB SAMPLES RTS

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	STD				TGA-03	LIQUID	59.4	58.43	N/A	%
98000453	ER-311 GRAB	2	SAMPLE	S98T002422	0		TGA-03	LIQUID	N/A	99.79		%
98000453	ER-311 GRAB	3	DUP	S98T002422	0		TGA-03	LIQUID	99.79	99.94	N/A	%
98000453	ER-311 GRAB	4	SAMPLE	S98T002423	0		TGA-03	LIQUID	N/A	99.32		%
98000453	ER-311 GRAB	5	DUP	S98T002423	0		TGA-03	LIQUID	99.32	99.63	N/A	%
98000453	ER-311 GRAB	6	SAMPLE	S98T002424	0		TGA-03	LIQUID	N/A	99.27		%
98000453	ER-311 GRAB	7	DUP	S98T002424	0		TGA-03	LIQUID	99.27	99.53	N/A	%

Final page for worklist # 25684

Sandra L Hood Bootright 8-23-98
Analyst Signature Date

Validated 8/27/98 Bachelor

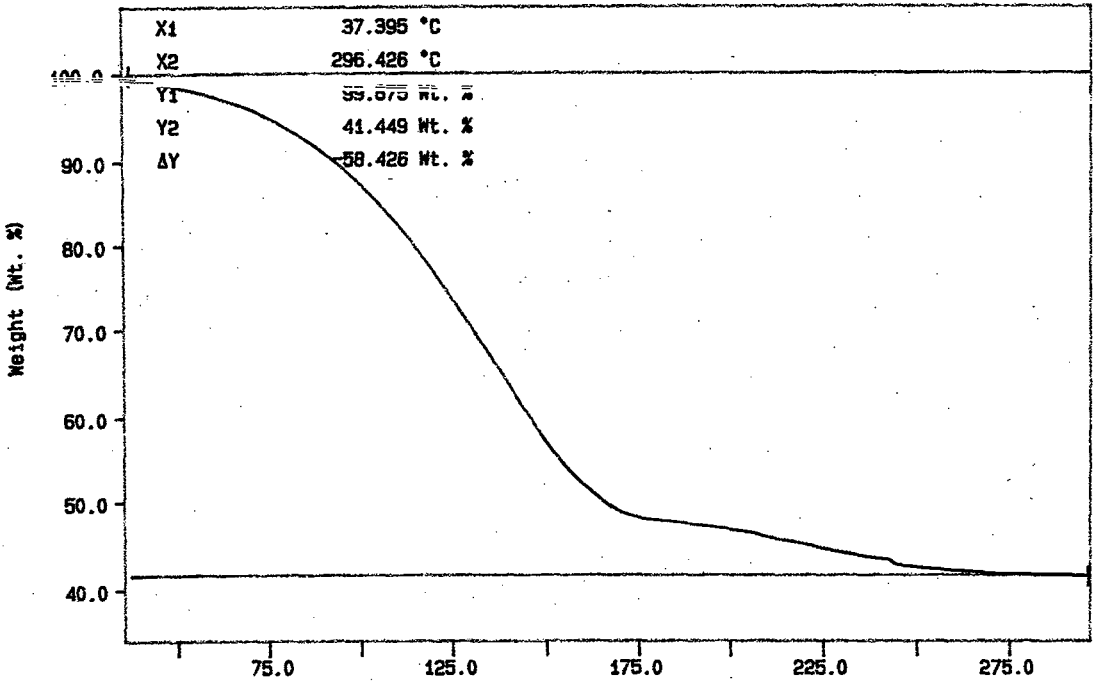
Analyst Signature Date 8-25-98

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

Curve 1: TGA
File info: TER082203 Sat Aug 22 19:58:17 1998
Sample Weight: 17.213 mg
103N8-A STD

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 40 TO 46.

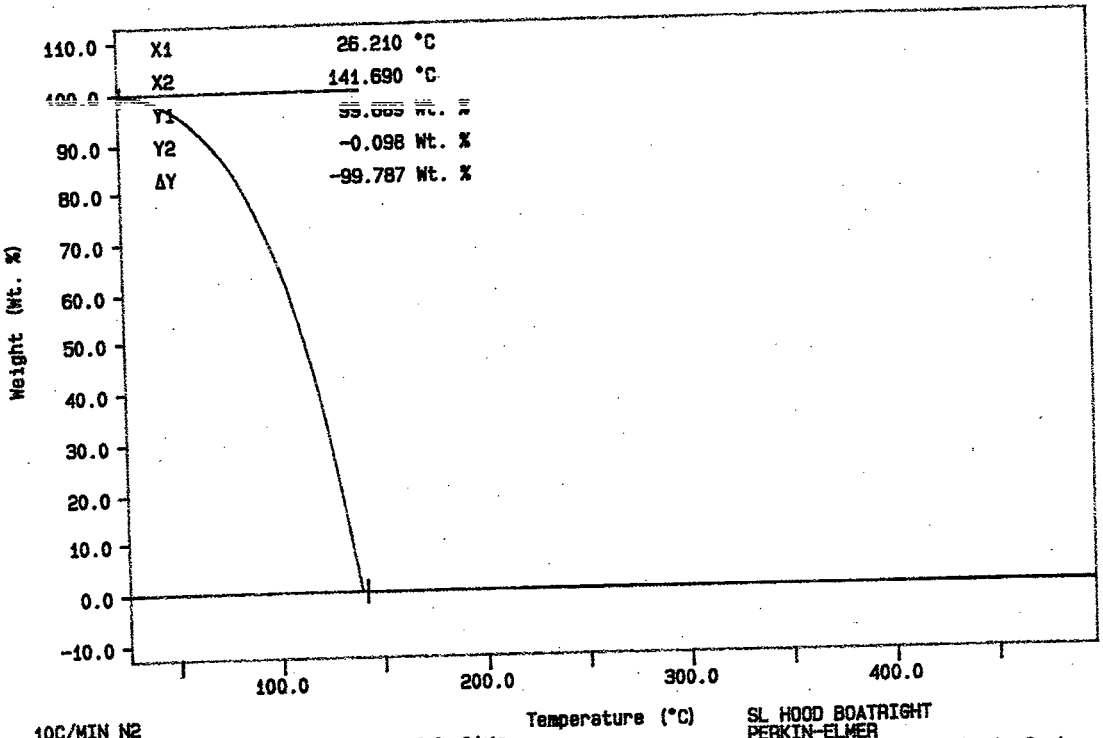


10C/MIN N2
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 300.0 C

SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sat Aug 22 20:00:10 1998

SL Hood Boatright

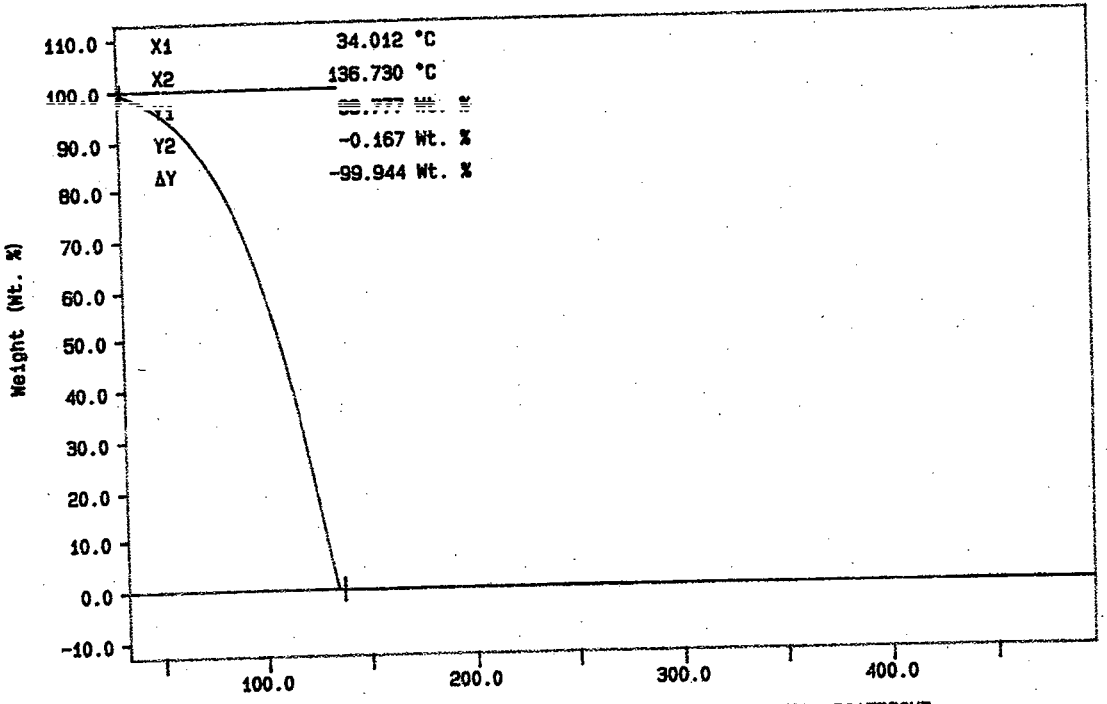
Curve 1: TGA
File info: SAM082302 Sun Aug 23 02:08:26 1998
Sample Weight: 12.215 mg
S98T002422 SAM



10C/MIN N2
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 500.0 C

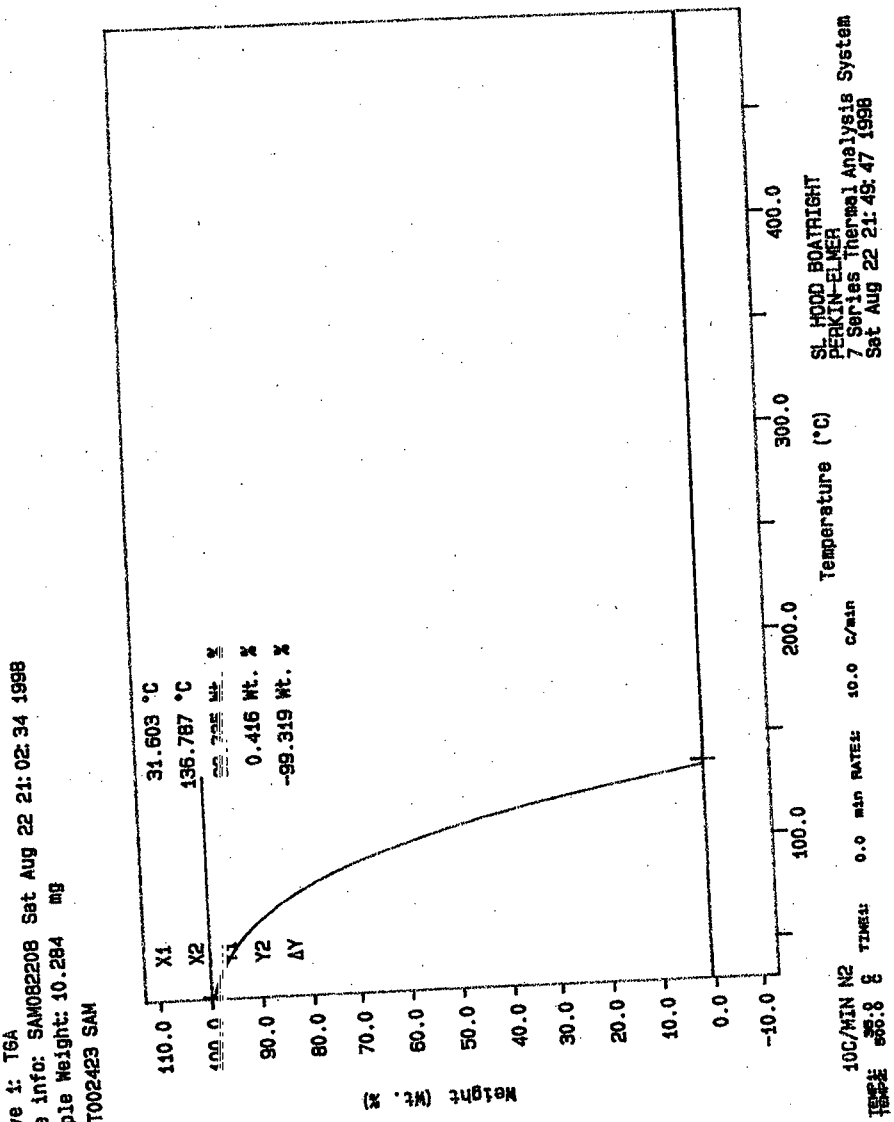
SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sun Aug 23 02:19:18 1998

Curve 1: TGA
File info: SAM082304 Sun Aug 23 03:13:33 1998
Sample Weight: 10.020 mg
S98T002422 DUP

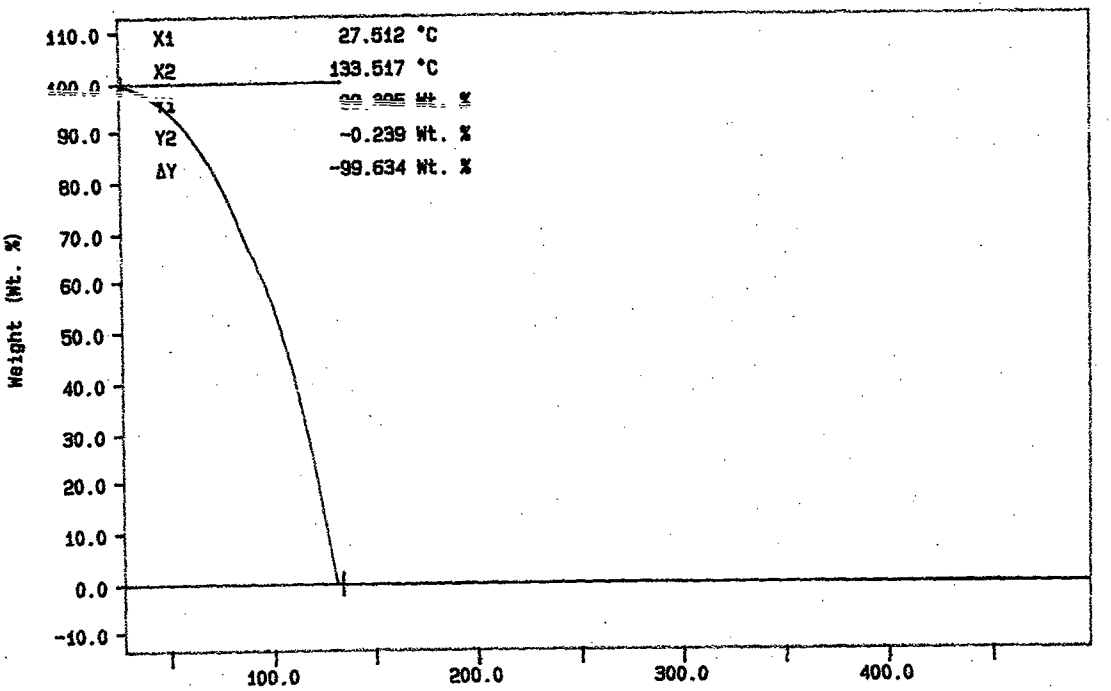


10C/MIN N2
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 500.0 C

SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sun Aug 23 03:18:27 1998


Curve 1: TGA
File info: SAM08220B Sat Aug 22 21:02:34 1998
Sample Weight: 10.284 mg
S98T002423 SAM
X1
X2
Y2
ΔY
31.603 °C
136.787 °C
0.416 Wt. %
-99.319 Wt. %
Weight (Wt. %)
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
100.0
200.0
300.0
400.0
Temperature (°C)
10C/MIN N2
TEMP: 35.8 C TIME: 0.0 min RATE: 10.0 C/min
SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sat Aug 22 21:49:47 1998

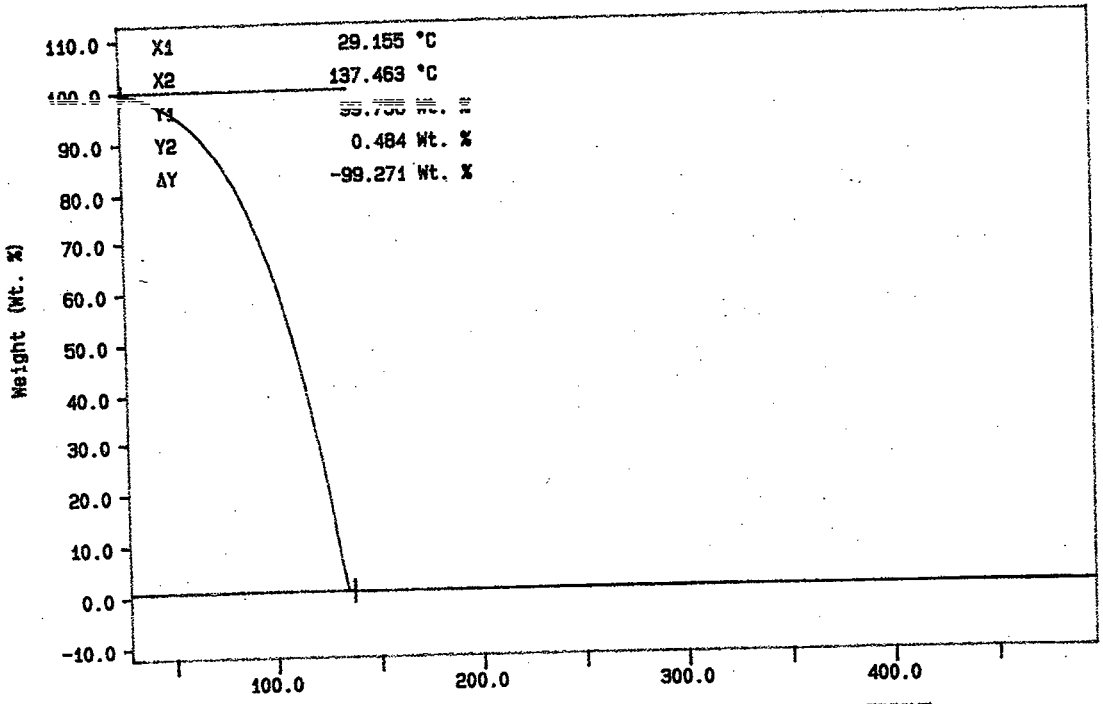
Curve 1: TGA
File info: SAM082209 Sat Aug 22 22:45:27 1998
Sample Weight: 10.226 mg
S98T002423 DUP



10C/MIN N2
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 500.0 C

SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sat Aug 22 22:46:51 1998

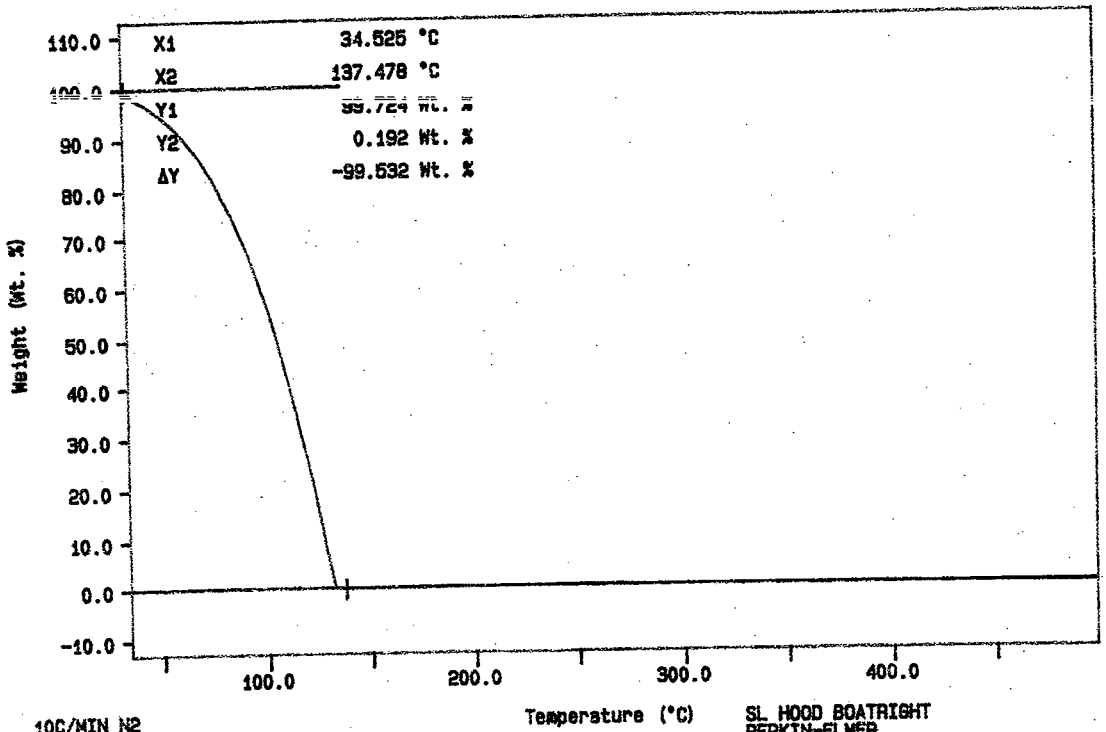
Curve 1: TGA
File info: SAM082210 Sat Aug 22 23:52:47 1998
Sample Weight: 10.180 mg
S98T002424 SAM



10C/MIN N2
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 550.0 C

SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Sat Aug 22 23:57:45 1998

Curve 1: TGA
File info: SAM082301 Sun Aug 23 00:57:38 1998
Sample Weight: 9.992 mg
S98T002424 DUP



10C/MIN N2
TEMP1: 35.0 C TIME1: 0.0 min RATE1: 10.0 C/min
TEMP2: 500.0 C

SL HOOD BOATRIGHT
PERKIN-ELMER
7 Series Thermal Analysis System
Mon Aug 24 09:43:05 1998

worklistrpt Version 2.1 05/15/95
08/19/98 13:34

LABCORE Data Entry Template for Worklist# 25685

Analyst: RJM **Instrument:** BA001 **Book #** 134U16 C

Method: LA-510-112 Rev/Mod D-1

Worklist Comment: SPG-01 FOR ER-311 GRAB SAMPLES RTS

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	STD				SPG-01	LIQUID	1.3779	1.372	N/A	Sp.G.
98000453	ER-311 GRAB	2	SAMPLE	S98T002422	0		SPG-01	LIQUID	N/A	.893		Sp.G.
98000453	ER-311 GRAB	3	DUP	S98T002422	0		SPG-01	LIQUID	.893	.988	N/A	Sp.G.
98000453	ER-311 GRAB	4	SAMPLE	S98T002423	0		SPG-01	LIQUID	N/A	.987		Sp.G.
98000453	ER-311 GRAB	5	DUP	S98T002423	0		SPG-01	LIQUID	.987	.988	N/A	Sp.G.
98000453	ER-311 GRAB	6	SAMPLE	S98T002424	0		SPG-01	LIQUID	N/A	1.032		Sp.G.
98000453	ER-311 GRAB	7	DUP	S98T002424	0		SPG-01	LIQUID	1.032	.989	N/A	Sp.G.

Final page for worklist # 25685

RJ McCown 8/22/98
Analyst Signature **Date**

C.J. Omien 8/26/98
Analyst Signature **Date**

Validated 8/27/98 D. Melchor

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (D-1)

Type		STD	REPLICATE
STD	Gross Weight (W2)	1.4851	1.4696
Work List	Tare Weight (W1)	1.3478	1.3326
25685	Weight of Solution (W2-W1)	0.1373	0.137
Test Code	Volume of Solution µL	100.0000	100.0000
SPG-01	Specific Gravity	1.3730	1.3700
Matrix	Specific Gravity (Average)	1.3715	
LIQUID			
Sample #			
STD			
Instrument Code	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
Analyst			
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
Date			
08/22/98	v RESULT v		
Time	Specific Gravity Average =	1.372	
10:30 AM			

Data Entry by:		Date:	08/26/98
Approved by:	DA Michelon	Date:	8/27/98

Form 510112L1 Rev. 1.1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (D-1)

Type		SAM	REPLICATE
SAM	Gross Weight (W2)	1.4610	0.0000
Work List	Tare Weight (W1)	1.3717	0.0000
25685	Weight of Solution (W2-W1)	0.0893	0
Test Code	Volume of Solution µL	100.0000	0.0000
SPG-01	Specific Gravity	0.8930	NA
Matrix			
LIQUID			
Sample #			
S98T002422			
Instrument Code	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
Analyst			
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
Date			
08/22/98	v RESULT v		
Time	Specific Gravity =	0.893	
10:30 AM			

Data Entry by: Date: 08/26/98

Approved by: B Rochelon Date: 8/27/98

Form 510112L1 Rev. 1.1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (D-1)

Type		DUP	REPLICATE
DUP	Gross Weight (W2)	1.4087	0.0000
Work List	Tare Weight (W1)	1.3099	0.0000
25685	Weight of Solution (W2-W1)	0.0988	0
Test Code	Volume of Solution µL	100.0000	0.0000
SPG-01	Specific Gravity	0.9880	NA
Matrix			
LIQUID			
Sample #			
S98T002422			
Instrument Code	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
Analyst			
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
Date			
08/22/98	v RESULT v		
Time	Specific Gravity =	0.988	
10:30 AM			

Data Entry by:		Date:	08/26/98
Approved by:	Machelor	Date:	8/27/98

Form 510112L1 Rev. 1.1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (D-1)

Type		SAM	REPLICATE
SAM	Gross Weight (W2)	1.3940	0.0000
Work List	Tare Weight (W1)	1.2953	0.0000
25685	Weight of Solution (W2-W1)	0.0987	0
Test Code	Volume of Solution µL	100.0000	0.0000
SPG-01	Specific Gravity	0.9870	NA
Matrix			
LIQUID			
Sample #			
S98T002423			
Instrument Code	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
Analyst			
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
Date			
08/22/98	v RESULT v		
Time	Specific Gravity =	0.987	
10:30 AM			

Data Entry by: Date: 08/26/98

Approved by: [signature] Date: 8/27/98

Form 510112L1 Rev. 1.1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (D-1)

Type		DUP	REPLICATE
DUP	Gross Weight (W2)	1.4387	0.0000
Work List	Tare Weight (W1)	1.3399	0.0000
25685	Weight of Solution (W2-W1)	0.0988	0
Test Code	Volume of Solution µL	100.0000	0.0000
SPG-01	Specific Gravity	0.9880	NA
Matrix			
LIQUID			
Sample #			
S98T002423			
Instrument Code	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
Analyst			
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
Date			
08/22/98	v RESULT v		
Time	Specific Gravity =	0.988	
10:30 AM			

Data Entry by:		Date:	08/26/98
Approved by:	B.K. Machelor	Date:	8/27/98

Form 510112L1 Rev. 1.1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (D-1)

Type		SAM	REPLICATE
SAM	Gross Weight (W2)	1.4498	0.0000
Work List	Tare Weight (W1)	1.3466	0.0000
25685	Weight of Solution (W2-W1)	0.1032	0
Test Code	Volume of Solution µL	100.0000	0.0000
SPG-01	Specific Gravity	1.0320	NA
Matrix			
LIQUID			
Sample #			
S98T002424			
Instrument Code	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
Analyst			
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
Date			
08/22/98	v RESULT v		
Time	Specific Gravity =	1.032	
10:30 AM			

Data Entry by:		Date:	08/26/98
Approved by:	[signature]	Date:	8/27/98

Form 510112L1 Rev. 1.1

Page 1 of 1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (D-1)

Type		DUP	REPLICATE
DUP	Gross Weight (W2)	1.4397	0.0000
Work List	Tare Weight (W1)	1.3408	0.0000
25685	Weight of Solution (W2-W1)	0.0989	0
Test Code	Volume of Solution µL	100.0000	0.0000
SPG-01	Specific Gravity	0.9890	NA
Matrix			
LIQUID			
Sample #			
S98T002424			
Instrument Code	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
Analyst			
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
Date			
08/22/98	v RESULT v		
Time	Specific Gravity =	0.989	
10:30 AM			

Data Entry by:		Date:	08/26/98
Approved by:	R. Rachelle	Date:	8/27/98

Form 510112L1 Rev. 1.1

Page 1 of 1

worklistrpt Version 2.1 05/15/95
08/20/98 13:15

LABCORE Data Entry Template for Worklist# 25682

Analyst: SCH **Instrument:** PH01 **Book #** 18N19-6

Method: LA-212-106 Rev/Mod C-2

Worklist Comment: PH-01 FOR ER-311 GRAB SAMPLES RTS

GROUP	PROJECT	S TYPE	SAMPLE#	R A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 STDPH			PH-01	LIQUID	8.00	7.99	N/A	pH
98000453	ER-311 GRAB	2 SAMPLE	S98T002422	0	PH-01	LIQUID	N/A	8.13		pH
98000453	ER-311 GRAB	3 DUP	S98T002422	0	PH-01	LIQUID		8.18	N/A	pH
98000453	ER-311 GRAB	4 SAMPLE	S98T002423	0	PH-01	LIQUID	N/A	8.03		pH
98000453	ER-311 GRAB	5 DUP	S98T002423	0	PH-01	LIQUID		8.05	N/A	pH
98000453	ER-311 GRAB	6 SAMPLE	S98T002424	0	PH-01	LIQUID	N/A	8.05		pH
98000453	ER-311 GRAB	7 DUP	S98T002424	0	PH-01	LIQUID		8.06	N/A	pH

Final page for worklist # 25682

Analyst Signature Date 8-23-98

Analyst Signature Date 8-25-98

REVIEWER SIGNATURE DATE 8/26/98

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist# 25686

Analyst: SLH **Instrument:** PH01 **Book #** 1111N8

Method: LA-211-102 Rev/Mod D0

Worklist Comment: OH-01 FOR ER-311 GRAB SAMPLES RTS

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	STD				OH-01	LIQUID	1.72e4	1.73E4	N/A	ug/mL
98000453	ER-311 GRAB	2	SAMPLE	S98T002422	0		OH-01	LIQUID	N/A	<2500		ug/mL
98000453	ER-311 GRAB	3	DUP	S98T002422	0		OH-01	LIQUID		<2500	N/A	ug/mL
98000453	ER-311 GRAB	4	SAMPLE	S98T002423	0		OH-01	LIQUID	N/A	<2500		ug/mL
98000453	ER-311 GRAB	5	DUP	S98T002423	0		OH-01	LIQUID		<2500	N/A	ug/mL
98000453	ER-311 GRAB	6	SAMPLE	S98T002424	0		OH-01	LIQUID	N/A	<2500		ug/mL
98000453	ER-311 GRAB	7	DUP	S98T002424	0		OH-01	LIQUID		<2500	N/A	ug/mL

Final page for worklist # 25686

Sandra L Hood Bartrow
Analyst Signature **Date** 8-25-98

Analyst Signature **Date** 8-26-98

REVIEWER SIGNATURE 8/26/98 DATE

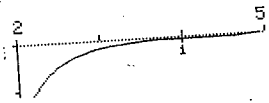
Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

BLK WL 25686

```
date 98-08-24 time 23:32
GET pH          12  #  358
Id.#1         2346
Id.#2        .1934
pH(init)      4.84
          V/ml          pH
EP1        .006        4.00
manual stop
========
```

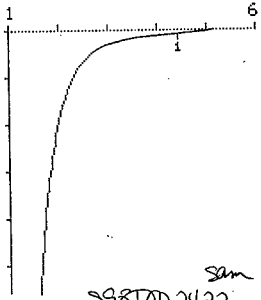
```
date 98-08-24 time 23:32
GET pH          12  #  358
.10ml/div       ΔpH=1/div
start V    .000 ml
```



S98T002422 Sam
.050 ml

```
date 98-08-25 time 00:03
GET pH          12  #  363
Id.#1         2346
Id.#2        .1934
pH(init)      5.02
          V/ml          pH
EP1        .012        4.44
manual stop
========
```

```
date 98-08-25 time 00:03
GET pH          12  #  363
.10ml/div       ΔpH=1/div
start V    .000 ml
```

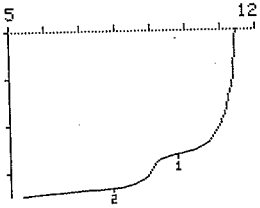


Sam
S98T002422

STD .050 ml
111N8 SAD

```
date 98-08-24 time 23:37
GET pH          12  #  359
Id.#1         2346
Id.#2        .1934
pH(init)     11.40
          V/ml          pH
EP1        .263        9.75
EP2        .335        7.88
stop volt.reached
========
```

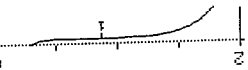
```
date 98-08-24 time 23:39
GET pH          12  #  359
.10ml/div       ΔpH=1/div
start V    .000 ml
```



S98T002422 Sam
.050 ml

```
date 98-08-25 time 00:16
GET pH          12  #  368
Id.#1         2346
Id.#2        .1934
pH(init)      5.29
          V/ml          pH
EP1        .012        4.27
manual stop
========
```

```
date 98-08-25 time 00:16
GET pH          12  #  368
.10ml/div       ΔpH=1/div
start V    .000 ml
```

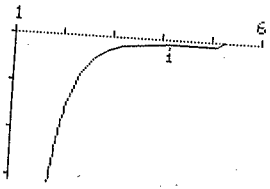


.050ml

S98T002423 Sam

```
date 98-08-25 time 00:32
GET pH          12  #  369
Id.#1          2346
Id.#2         .1934
pH(init)       5.13
          V/ml          pH
EP1       .013        4.14
manual stop
========
```

```
date 98-08-25 time 00:32
GET pH          12  #  369
.10ml/div          ΔpH=1/div
start V     .000 ml
```



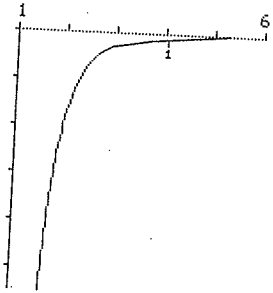
S98T002423 Sam

.050

S98T002423 Dup

```
date 98-08-25 time 00:41
GET pH          12  #  370
Id.#1          2346
Id.#2         .1934
pH(init)       5.16
          V/ml          pH
EP1       .015        4.04
manual stop
========
```

```
date 98-08-25 time 00:41
GET pH          12  #  370
.10ml/div          ΔpH=1/div
start V     .000 ml
```

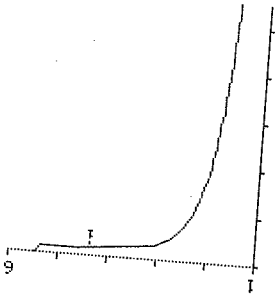


S98T002423 Dup

S98T002424 Sam

```
date 98-08-25 time 00:55
GET pH          12  #  373
Id.#1          2346
Id.#2         .1934
pH(init)       5.34
          V/ml          pH
EP1       .020        4.34
manual stop
========
```

```
date 98-08-25 time 00:56
GET pH          12  #  373
.10ml/div          ΔpH=1/div
start V     .000 ml
```



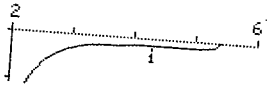
.100ml

S98T002424 Dup

```
date 98-08-25 time 00:58
GET pH          12  #  374
Id.#1          2346
Id.#2         .1934
pH(init)       5.29
          V/ml          pH
EP1       .017        4.29
manual stop
========
```

.100ml

```
date 98-08-25 time 00:58
GET pH          12  #  374
.10ml/div          ΔpH=1/div
start V     .000 ml
```



S98T002424 Dup

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (D-0)

		STD
Type	Sample Size (mL) SS	0.050
STD	Concentration of HNO3 (Molarity)	0.1934
Work List	HNO3 Titrant at OH end-point in mL	0.263
25686	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	1.02E+00
OH-01	OH in Sample in µg/mL (PPM)	1.73E+04
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
111N8		
Instrument Code	Detection Limit (µg/mL)	2.50E+03
PH01		
Analyst	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
08/25/98		
Time		STD
01:00 AM	Concentration of OH in Sample (Molarity)	1.02E+00
	OH in Sample in µg/mL (PPM)	1.73E+04

Data Entry by:		Date:	08/26/98
Approved by:	Leslie Day for MJC	Date:	9/23/98

Form 211102_1 Rev. 1.3

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 59 TO 64.

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (D-0)

		BLK
Type	Sample Size (mL) SS	0.050
BLK	Concentration of HNO3 (Molarity)	0.1934
Work List	HNO3 Titrant at OH end-point in mL	0.006
25686	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	2.32E-02
OH-01	OH in Sample in µg/mL (PPM)	3.95E+02
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
BLK		
Instrument Code	Detection Limit (µg/mL)	2.50E+03
PH01		
Analyst	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
08/25/98		
Time		BLK
01:00 AM	Concentration of OH in Sample (Molarity)	2.32E-02
	OH in Sample in µg/mL (PPM)	<2500

The Result is < Detection Limit

Data Entry by:		Date:	08/26/98
Approved by:		Date:	

Form 211102_1 Rev. 1.3

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (D-0)

		SAM
Type	Sample Size (mL) SS	0.050
SAM	Concentration of HNO3 (Molarity)	0.1934
Work List	HNO3 Titrant at OH end-point in mL	0.012
25686	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	4.64E-02
OH-01	OH in Sample in µg/mL (PPM)	7.89E+02
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
S98T002422		
Instrument Code	Detection Limit (µg/mL)	2.50E+03
PH01		
Analyst	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
08/25/98		
Time		SAM
01:00 AM	Concentration of OH in Sample (Molarity)	4.64E-02
	OH in Sample in µg/mL (PPM)	<2500

The Result is < Detection Limit

Data Entry by:		Date:	08/26/98
Approved by:		Date:	

Form 211102_1 Rev. 1.3

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (D-0)

		DUP
Type	Sample Size (mL) SS	0.050
DUP	Concentration of HNO3 (Molarity)	0.1934
Work List	HNO3 Titrant at OH end-point in mL	0.012
25686	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	4.64E-02
OH-01	OH in Sample in µg/mL (PPM)	7.89E+02
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
S98T002422		
Instrument Code	Detection Limit (µg/mL)	2.50E+03
PH01		
Analyst	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
08/25/98		
Time		DUP
01:00 AM	Concentration of OH in Sample (Molarity)	4.64E-02
	OH in Sample in µg/mL (PPM)	<2500

The Result is < Detection Limit

Data Entry by:		Date:	08/26/98
Approved by:		Date:	

Form 211102_1 Rev. 1.3

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (D-0)

		SAM
Type	Sample Size (mL) SS	0.050
SAM	Concentration of HNO3 (Molarity)	0.1934
Work List	HNO3 Titrant at OH end-point in mL	0.013
25686	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	5.03E-02
OH-01	OH in Sample in µg/mL (PPM)	8.55E+02
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
S98T002423		
Instrument Code	Detection Limit (µg/mL)	2.50E+03
PH01		
Analyst	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
08/25/98		
Time		SAM
01:00 AM	Concentration of OH in Sample (Molarity)	5.03E-02
	OH in Sample in µg/mL (PPM)	<2500

The Result is < Detection Limit

Data Entry by:		Date:	08/26/98
Approved by:		Date:	

Form 211102_1 Rev. 1.3

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (D-0)

		DUP
Type	Sample Size (mL) SS	0.050
DUP	Concentration of HNO3 (Molarity)	0.1934
Work List	HNO3 Titrant at OH end-point in mL	0.015
25686	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	5.80E-02
OH-01	OH in Sample in µg/mL (PPM)	9.86E+02
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
S98T002423		
Instrument Code	Detection Limit (µg/mL)	2.50E+03
PH01		
Analyst	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
08/25/98		
Time		DUP
01:00 AM	Concentration of OH in Sample (Molarity)	5.80E-02
	OH in Sample in µg/mL (PPM)	<2500

The Result is < Detection Limit

Data Entry by:		Date:	08/26/98
Approved by:		Date:	

Form 211102_1 Rev. 1.3

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (D-0)

		SAM
Type	Sample Size (mL) SS	0.050
SAM	Concentration of HNO3 (Molarity)	0.1934
Work List	HNO3 Titrant at OH end-point in mL	0.020
25686	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	7.74E-02
OH-01	OH in Sample in µg/mL (PPM)	1.32E+03
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
S98T002424		
Instrument Code	Detection Limit (µg/mL)	2.50E+03
PH01		
Analyst	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
08/25/98		
Time		SAM
01:00 AM	Concentration of OH in Sample (Molarity)	7.74E-02
	OH in Sample in µg/mL (PPM)	<2500

The Result is < Detection Limit

Data Entry by:		Date:	08/26/98
Approved by:		Date:	

Form 211102_1 Rev. 1.3

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (D-0)

		DUP
Type	Sample Size (mL) SS	0.050
DUP	Concentration of HNO3 (Molarity)	0.1934
Work List	HNO3 Titrant at OH end-point in mL	0.017
25686	Dilution Factor DF	1
Test Code	Concentration of OH in Sample (Molarity)	6.58E-02
OH-01	OH in Sample in µg/mL (PPM)	1.12E+03
Matrix		
LIQUID		
Sample #	Detection Limit = 125µg / SS * DF	
S98T002424		
Instrument Code	Detection Limit (µg/mL)	2.50E+03
PH01		
Analyst	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
Date	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
08/25/98		
Time		DUP
01:00 AM	Concentration of OH in Sample (Molarity)	6.58E-02
	OH in Sample in µg/mL (PPM)	<2500

The Result is < Detection Limit

Data Entry by:		Date:	08/26/98
Approved by:		Date:	

Form 211102_1 Rev. 1.3

LABCORE Completed Worklist Report for Worklist# 25687

Analyst: adp **Instrument:** IC40S2 **Book#** 149N20D

Method: LA-533-105 Rev/Mod E-0

Worklist Comment: @IC-01 FOR ER-311 GRAB SAMPLES RTS

Seq	Type	Sample#	R	A	Test	Matrix	Actual		Found	DL or Yield	Unit
1	CCB		0	@IC-QC	F	QC	1		<1.20e-2		ug/mL
1	CCB		0	@IC-QC	CL	QC	1		<1.70e-2		ug/mL
1	CCB		0	@IC-QC	NO2	QC	1		<1.08e-1		ug/mL
1	CCB		0	@IC-QC	BR	QC	1		<1.25e-1		ug/mL
1	CCB		0	@IC-QC	NO3	QC	1		<1.39e-1		ug/mL
1	CCB		0	@IC-QC	PO4	QC	1		<1.20e-1		ug/mL
1	CCB		0	@IC-QC	SO4	QC	1		<1.38e-1		ug/mL
1	CCB		0	@IC-QC	OXALATE2	QC	1		<1.05e-1		ug/mL
2	ICV		0	@IC-QC	F	QC	5.90e1		6.75e+01	114.407	% Recovery
2	ICV		0	@IC-QC	CL	QC	8.00e1		8.15e+01	101.875	% Recovery
2	ICV		0	@IC-QC	NO2	QC	5.24e2		5.22e+02	99.618	% Recovery
2	ICV		0	@IC-QC	BR	QC	5.86e2		6.10e+02	104.096	% Recovery
2	ICV		0	@IC-QC	NO3	QC	5.92e2		5.98e+02	101.014	% Recovery
2	ICV		0	@IC-QC	PO4	QC	5.47e2		5.22e+02	95.430	% Recovery
2	ICV		0	@IC-QC	SO4	QC	6.38e2		6.41e+02	100.470	% Recovery
2	ICV		0	@IC-QC	OXALATE2	QC	5.26e2		5.36e+02	101.901	% Recovery
3	CCV		0	@IC-QC	F	QC	6.40e1		6.39e+01	99.844	% Recovery
3	CCV		0	@IC-QC	CL	QC	9.00e1		9.10e+01	101.111	% Recovery
3	CCV		0	@IC-QC	NO2	QC	5.43e2		5.23e+02	96.317	% Recovery
3	CCV		0	@IC-QC	BR	QC	6.30e2		6.31e+02	100.159	% Recovery
3	CCV		0	@IC-QC	NO3	QC	6.98e2		7.21e+02	103.295	% Recovery
3	CCV		0	@IC-QC	PO4	QC	6.32e2		6.01e+02	95.095	% Recovery
3	CCV		0	@IC-QC	SO4	QC	6.99e2		6.92e+02	98.999	% Recovery
3	CCV		0	@IC-QC	OXALATE2	QC	5.26e2		5.31e+02	100.951	% Recovery
4	SAMPLE	S98T002422	0	@IC-01	F-02	LIQUID	N/A		1.776e+00	0.132	ug/mL
4	SAMPLE	S98T002422	0	@IC-01	NO2-02	LIQUID	N/A	<	1.188e+00	1.188	ug/mL
4	SAMPLE	S98T002422	0	@IC-01	BR-02	LIQUID	N/A	<	1.375e+00	1.375	ug/mL
4	SAMPLE	S98T002422	0	@IC-01	NO3-02	LIQUID	N/A		2.599e+00	1.529	ug/mL
4	SAMPLE	S98T002422	0	@IC-01	PO4-02	LIQUID	N/A		1.635e+00	1.320	ug/mL
4	SAMPLE	S98T002422	0	@IC-01	SO4-02	LIQUID	N/A		1.895e+01	1.518	ug/mL
4	SAMPLE	S98T002422	0	@IC-01	OXALATE2	LIQUID	N/A	<	1.155e+00	1.155	ug/mL
5	DUP	S98T002422	0	@IC-01	F-02	LIQUID	1.78e+00		1.89e+00	5.995	RPD
5	DUP	S98T002422	0	@IC-01	CL-02	LIQUID	7.04e+01		7.49e+01	6.194	RPD
5	DUP	S98T002422	0	@IC-01	NO2-02	LIQUID	<1.19e0		<1.19e0		RPD
5	DUP	S98T002422	0	@IC-01	BR-02	LIQUID	<1.38e0		<1.38e0		RPD
5	DUP	S98T002422	0	@IC-01	NO3-02	LIQUID	2.60e+00		2.77e+00	6.331	RPD
5	DUP	S98T002422	0	@IC-01	PO4-02	LIQUID	1.64e+00		<1.32e0		RPD
5	DUP	S98T002422	0	@IC-01	SO4-02	LIQUID	1.89e+01		1.95e+01	3.125	RPD
5	DUP	S98T002422	0	@IC-01	OXALATE2	LIQUID	<1.16e0		<1.16e0		RPD
6	SPK	S98T002422	0	@IC-01	F-02	LIQUID	5.90e1		6.51e+01	110.339	% Recovery
6	SPK	S98T002422	0	@IC-01	CL-02	LIQUID	8.00e1		5.51e+01	68.875	% Recovery

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Completed Worklist Report for Worklist# 25687

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
6	SPK	S98T002422	0	@IC-01	NO2-02	LIQUID	5.24e2	5.15e+02	98.282	% Recovery
6	SPK	S98T002422	0	@IC-01	BR-02	LIQUID	5.86e2	5.86e+02	100.000	% Recovery
6	SPK	S98T002422	0	@IC-01	NO3-02	LIQUID	5.92e2	5.78e+02	97.635	% Recovery
6	SPK	S98T002422	0	@IC-01	PO4-02	LIQUID	5.47e2	5.44e+02	99.452	% Recovery
6	SPK	S98T002422	0	@IC-01	SO4-02	LIQUID	6.38e2	6.25e+02	97.962	% Recovery
6	SPK	S98T002422	0	@IC-01	OXALATE2	LIQUID	5.26e2	5.22e+02	99.240	% Recovery
7	SAMPLE	S98T002423	0	@IC-01	F-02	LIQUID	N/A	1.704e+00	0.132	ug/mL
7	SAMPLE	S98T002423	0	@IC-01	CL-02	LIQUID	N/A	6.671e+01	0.187	ug/mL
7	SAMPLE	S98T002423	0	@IC-01	NO2-02	LIQUID	N/A <	1.188e+00	1.188	ug/mL
7	SAMPLE	S98T002423	0	@IC-01	BR-02	LIQUID	N/A <	1.375e+00	1.375	ug/mL
7	SAMPLE	S98T002423	0	@IC-01	NO3-02	LIQUID	N/A <	1.529e+00	1.529	ug/mL
7	SAMPLE	S98T002423	0	@IC-01	PO4-02	LIQUID	N/A <	1.320e+00	1.320	ug/mL
7	SAMPLE	S98T002423	0	@IC-01	SO4-02	LIQUID	N/A	1.989e+01	1.518	ug/mL
7	SAMPLE	S98T002423	0	@IC-01	OXALATE2	LIQUID	N/A <	1.155e+00	1.155	ug/mL
8	DUP	S98T002423	0	@IC-01	F-02	LIQUID	1.70e+00	1.70e+00	0.000	RPD
8	DUP	S98T002423	0	@IC-01	CL-02	LIQUID	6.67e+01	6.66e+01	0.150	RPD
8	DUP	S98T002423	0	@IC-01	NO2-02	LIQUID	<1.19e0	<1.19e0		RPD
8	DUP	S98T002423	0	@IC-01	BR-02	LIQUID	<1.38e0	<1.38e0		RPD
8	DUP	S98T002423	0	@IC-01	NO3-02	LIQUID	<1.53e0	<1.53e0		RPD
8	DUP	S98T002423	0	@IC-01	PO4-02	LIQUID	<1.32e0	<1.32e0		RPD
8	DUP	S98T002423	0	@IC-01	SO4-02	LIQUID	1.99e+01	1.99e+01	0.000	RPD
8	DUP	S98T002423	0	@IC-01	OXALATE2	LIQUID	<1.16e0	<1.16e0		RPD
9	SAMPLE	S98T002424	0	@IC-01	F-02	LIQUID	N/A	1.734e+00	0.132	ug/mL
9	SAMPLE	S98T002424	0	@IC-01	CL-02	LIQUID	N/A	6.706e+01	0.187	ug/mL
9	SAMPLE	S98T002424	0	@IC-01	NO2-02	LIQUID	N/A <	1.188e+00	1.188	ug/mL
9	SAMPLE	S98T002424	0	@IC-01	BR-02	LIQUID	N/A <	1.375e+00	1.375	ug/mL
9	SAMPLE	S98T002424	0	@IC-01	NO3-02	LIQUID	N/A	1.582e+00	1.529	ug/mL
9	SAMPLE	S98T002424	0	@IC-01	PO4-02	LIQUID	N/A <	1.320e+00	1.320	ug/mL
9	SAMPLE	S98T002424	0	@IC-01	SO4-02	LIQUID	N/A	1.951e+01	1.518	ug/mL
9	SAMPLE	S98T002424	0	@IC-01	OXALATE2	LIQUID	N/A <	1.155e+00	1.155	ug/mL
10	DUP	S98T002424	0	@IC-01	F-02	LIQUID	1.73e+00	1.72e+00	0.580	RPD
10	DUP	S98T002424	0	@IC-01	CL-02	LIQUID	6.71e+01	6.73e+01	0.298	RPD
10	DUP	S98T002424	0	@IC-01	NO2-02	LIQUID	<1.19e0	<1.19e0		RPD
10	DUP	S98T002424	0	@IC-01	BR-02	LIQUID	<1.38e0	<1.38e0		RPD
10	DUP	S98T002424	0	@IC-01	NO3-02	LIQUID	1.58e+00	1.72e+00	8.485	RPD
10	DUP	S98T002424	0	@IC-01	PO4-02	LIQUID	<1.32e0	1.59e+00		RPD
10	DUP	S98T002424	0	@IC-01	SO4-02	LIQUID	1.95e+01	1.96e+01	0.512	RPD
10	DUP	S98T002424	0	@IC-01	OXALATE2	LIQUID	<1.16e0	<1.16e0		RPD

Final page for worklist# 25687

Analyst Signature **Date** **Analyst Signature** **Date**

Jason M. Fuge 8/25/98
Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

HNF-1645 REV. 0

08/19/98 13:36
A-0004-1

LABCORE Data Entry Template for Worklist# 25687

Analyst: ADP **Instrument:** IC _____ **Book#** 14 N20-D

Method: LA-533-105 **Rev/Mod** E-0

Worklist Comment: @IC-01 FOR ER-311 GRAB SAMPLES RTS

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	CCB				@IC-QC	QC		
2	ICV				@IC-QC	QC		
3	CCV				@IC-QC	QC		
4	SAMPLE	S98T002422	0		@IC-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			BR-02 , CL-02 , F-02 , NO2-02 , NO3-02 , OXALATE2, PO4-02 , SO4-02			
5	DUP	S98T002422	0		@IC-01	LIQUID		
6	SPK	S98T002422	0		@IC-01	LIQUID		
7	SAMPLE	S98T002423	0		@IC-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			BR-02 , CL-02 , F-02 , NO2-02 , NO3-02 , OXALATE2, PO4-02 , SO4-02			
8	DUP	S98T002423	0		@IC-01	LIQUID		
9	SAMPLE	S98T002424	0		@IC-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			BR-02 , CL-02 , F-02 , NO2-02 , NO3-02 , OXALATE2, PO4-02 , SO4-02			
10	DUP	S98T002424	0		@IC-01	LIQUID		

Final page for worklist # 25687

Anthony Pierantoni 8-23-98
Analyst Signature **Date**

Analyst Signature **Date**

Validated but S98T002422 Cl is rejected due to poor spike recovery

Data Entry Comments: uploaded 8-25-98
John Worrell
25687

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

HNF-1645 REV. 0

Sample Name: 149N20-D Date: 08/21/1998 19:56:09
Data File : C:\DX\DATA\98081831.D02
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 2 Detector:CDM-1
Analyst : Anthony Pumarto Column: AG4A/AS4A anion column

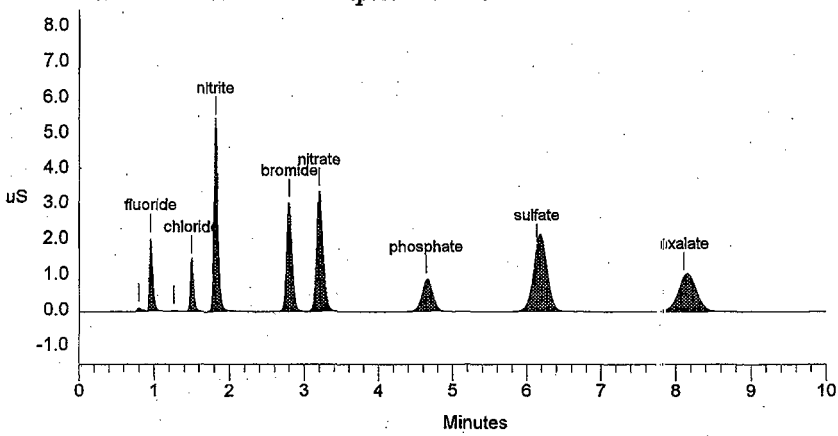
8-23-98

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	101	3000	5Hz	0.00	10.00		30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	84	334	2	
2	0.95	fluoride	67.477 114.37	2024	5849	2	0.35
3	1.26		0.000	20	81	1	
4	1.49	chloride	81.512 101.89	1429	4562	1	-0.88
5	1.81	nitrite	521.798 99.58	5362	20346	1	-0.91
6	2.79	bromide	610.181 104.13	3033	15763	1	-0.59
7	3.19	nitrate	597.802 97.94	3344	20539	1	-0.52
8	4.64	phosphate	522.225 95.47	869	8917	1	0.00
9	6.13	sulfate	641.255 100.51	1771	27230	1	0.00
10	8.11	oxalate	536.376 101.97	980	18013	1	0.66
		Totals	3578.625	18915	121634		

File: 98081831.D02 Sample: 149N20-D



SS .100-10

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 70 TO 79.

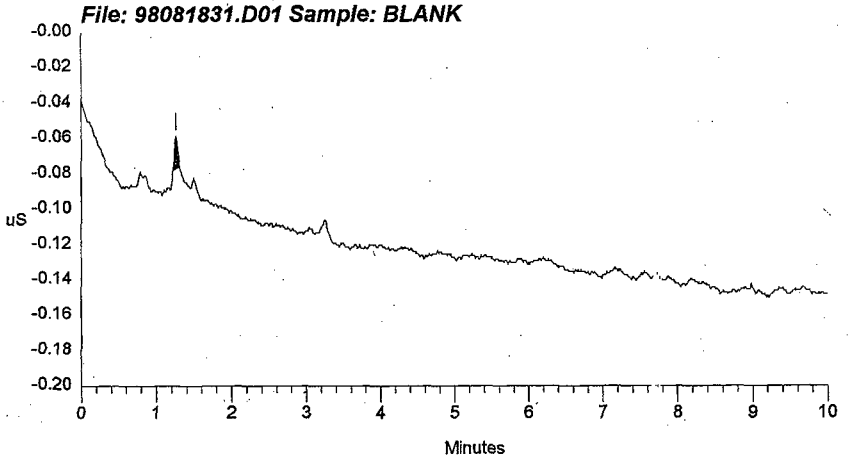
HNF-1645 REV. 0

Sample Name: BLANK Date: 08/21/1998 19:43:13
Data File : C:\DX\DATA\98081831.D01
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 1 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	1.26		0.000	18	58	1	
		Totals	0.000	18	58		



SS 1

HNF-1645 REV. 0

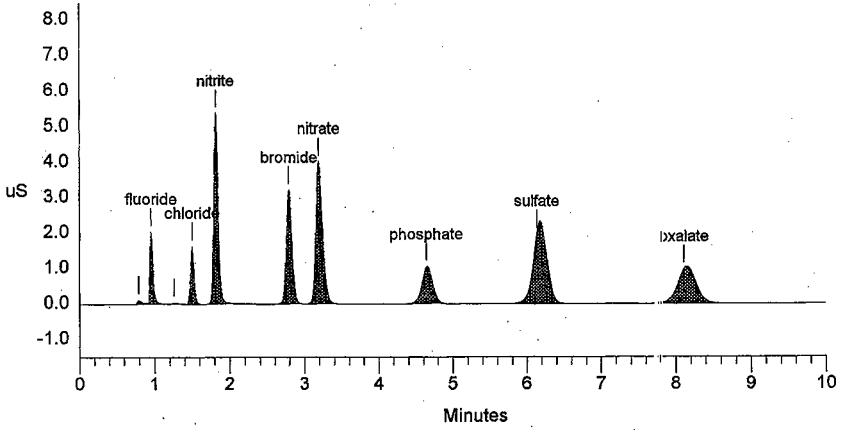
Sample Name: 148N20-D Date: 08/21/1998 20:12:18
Data File : C:\DX\DATA\98082331.D03
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 3 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	101	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	86	347	2	
2	0.95	fluoride	63.940	2013	5537	2	0.35
3	1.26		0.000	19	84	1	
4	1.50	chloride	90.977	1620	5102	1	-0.44
5	1.81	nitrite	522.862	5348	20389	1	-0.91
6	2.79	bromide	630.517	3189	16304	1	-0.83
7	3.19	nitrate	720.651	3998	24900	1	-0.73
8	4.64	phosphate	601.262	1016	10295	1	0.00
9	6.13	sulfate	692.118	1952	29436	1	0.00
10	8.11	oxalate	531.159	962	17837	1	0.66
		Totals	3853.486	20205	130231		

File: 98082331.D03 Sample: 148N20-D



SS.100-10

HNF-1645 REV. 0

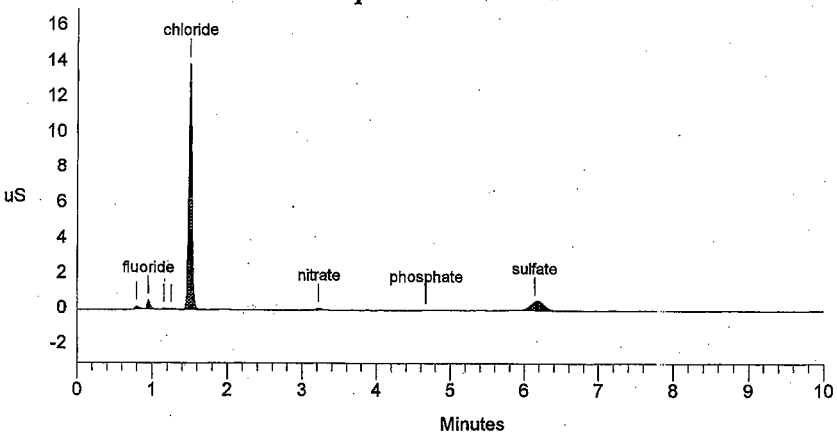
Sample Name: S98T002422 SAM Date: 08/23/1998 23:06:45
Data File : C:\DX\DATA\98082331.D09
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 9 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	11	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	157	585	2	
2	0.95	fluoride	1.776	490	1374	2	-0.35
3	1.15		0.000	53	145	2	
4	1.25		0.000	43	176	2	
5	1.50	chloride	70.368	13911	40886	1	-0.44
6	3.22	nitrate	2.599	97	560	1	0.31
7	4.67	phosphate	1.635	19	196	1	0.57
8	6.13	sulfate	18.953	497	7219	1	0.00
		Totals	95.330	15269	51141		

File: 98082331.D09 Sample: S98T002422 SAM



SS 1-10

HNF-1645 REV. 0

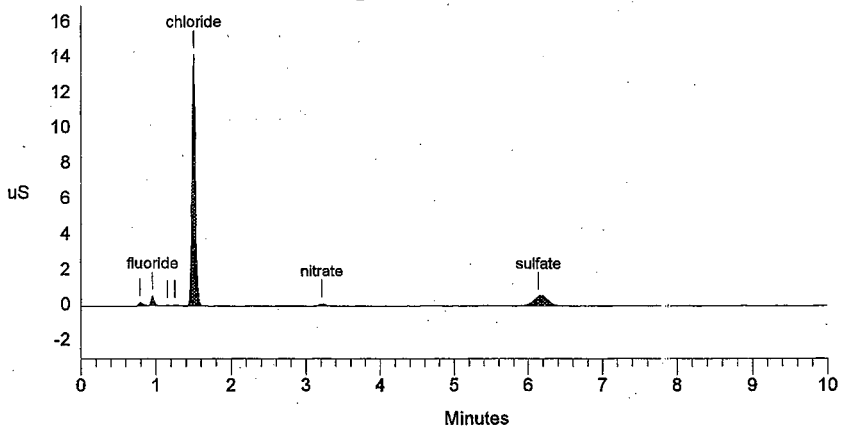
Sample Name: S98T002422 DUP Date: 08/23/1998 23:20:06
Data File : C:\DX\DATA\98082331.D10
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 10 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	11	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	168	696	2	
2	0.95	fluoride	1.890	521	1464	2	0.35
3	1.15		0.000	55	157	2	
4	1.25		0.000	55	278	2	
5	1.50	chloride	74.904	14199	44002	1	-0.44
6	3.21	nitrate	2.766	106	613	1	0.10
7	6.13	sulfate	19.526	513	7442	1	0.00
		Totals	99.085	15618	54652		

File: 98082331.D10 Sample: S98T002422 DUP



SS 1-10

HNF-1645 REV. 0

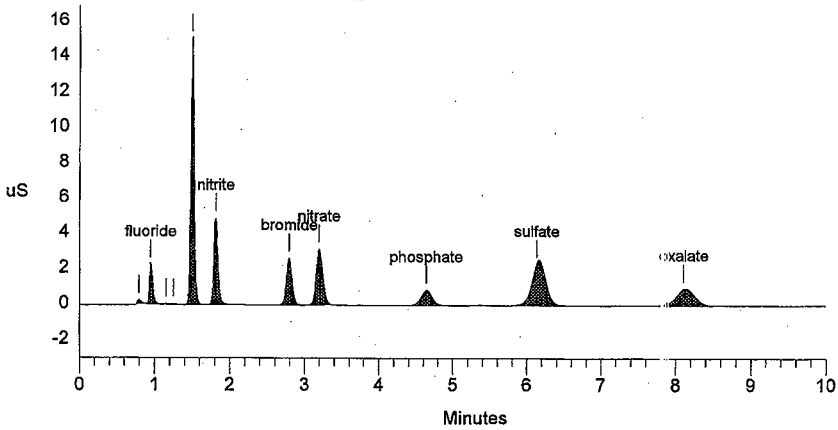
Sample Name: S98T002422 SPK Date: 08/23/1998 22:53:35
Data File : C:\DX\DATA\98082331.D08
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 8 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	11	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	212	781	1	
2	0.95	fluoride	8.281	2215	6607	1	-0.35
3	1.15		0.000	49	123	2	
4	1.25		0.000	35	159	2	
5	1.50	chloride	75.882	15060	44686	1	-0.44
6	1.81	nitrite	51.489	4885	18381	1	-0.91
7	2.79	bromide	58.627	2622	13856	1	-0.59
8	3.19	nitrate	60.361	3133	19000	1	-0.52
9	4.64	phosphate	55.990	839	8775	1	0.00
10	6.13	sulfate	81.408	2293	31844	1	0.00
11	8.11	oxalate	52.170	917	16078	1	0.66
		Totals	444.208	32260	160291		

File: 98082331.D08 Sample: S98T002422 SPK



SS 1-10
SPK # 149N20-1

HNF-1645 REV. 0

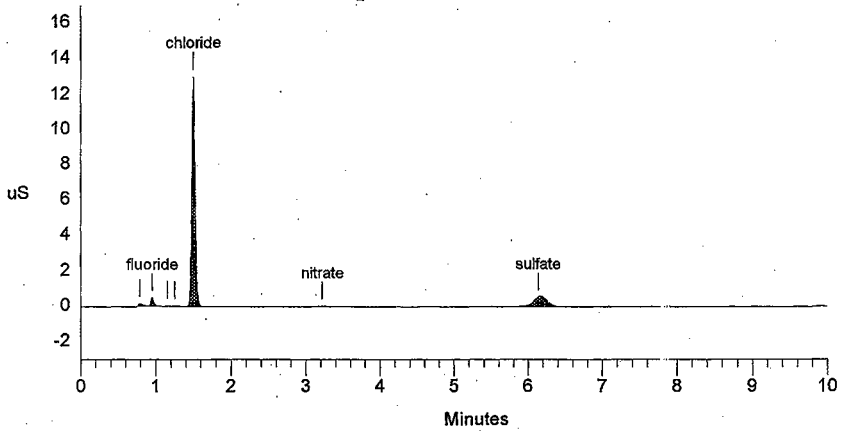
Sample Name: S98T002423 SAM Date: 08/23/1998 23:33:01
Data File : C:\DX\DATA\98082331.D11
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 11 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	11	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	145	605	2	
2	0.95	fluoride	1.704	485	1317	2	0.35
3	1.15		0.000	50	138	2	
4	1.25		0.000	43	182	2	
5	1.50	chloride	66.711	13017	38431	1	-0.44
6	3.22	nitrate	1.519	38	221	1	0.31
7	6.13	sulfate	19.895	550	7585	1	0.00
		Totals	89.828	14328	48479		

File: 98082331.D11 Sample: S98T002423 SAM



SS 1-10

HNF-1645 REV. 0

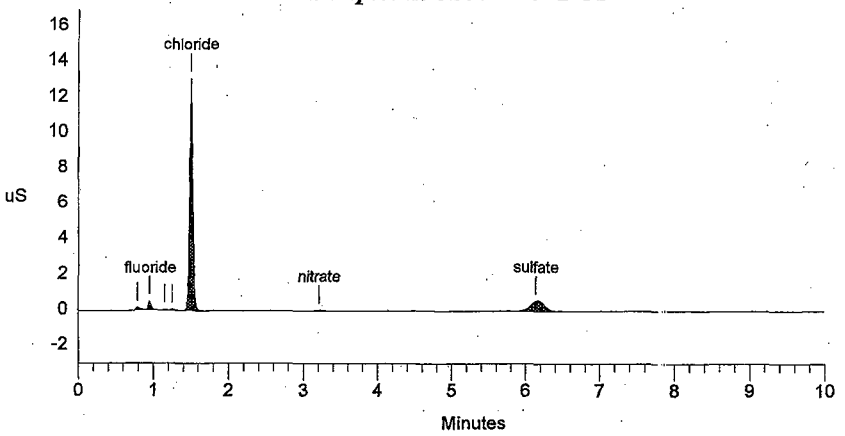
Sample Name: S98T002423 DUP Date: 08/23/1998 23:46:09
Data File : C:\DX\DATA\98082331.D12
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 12 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	11	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	144	586	2	
2	0.95	fluoride	1.697	479	1311	2	0.35
3	1.15		0.000	51	141	2	
4	1.25		0.000	49	231	2	
5	1.50	chloride	66.597	13081	38355	1	-0.44
6	3.21	nitrate	1.452	37	200	1	0.10
7	6.13	sulfate	19.930	557	7599	1	0.00
		Totals	89.677	14399	48423		

File: 98082331.D12 Sample: S98T002423 DUP



SS 1-10

HNF-1645 REV. 0

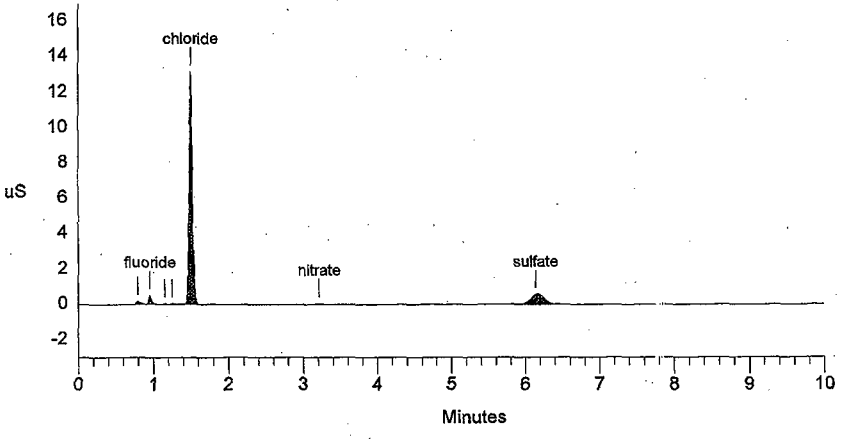
Sample Name: S98T002424 SAM Date: 08/23/1998 23:57:25
Data File : C:\DX\DATA\98082331.D13
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 13 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	11	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	149	613	2	
2	0.95	fluoride	1.734	493	1340	2	0.35
3	1.15		0.000	49	134	2	
4	1.25		0.000	45	205	2	
5	1.50	chloride	67.064	13140	38666	1	-0.44
6	3.21	nitrate	1.582	45	241	1	0.10
7	6.13	sulfate	19.512	542	7436	1	0.00
		Totals	89.891	14462	48635		

File: 98082331.D13 Sample: S98T002424 SAM



SS 1-10

HNF-1645 REV. 0

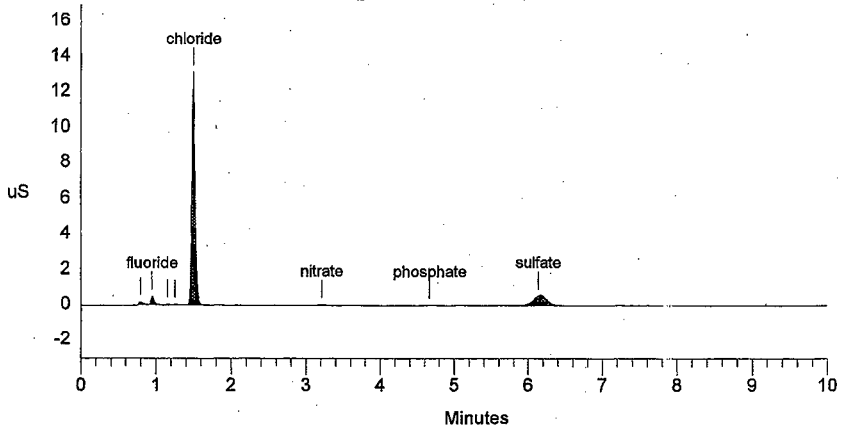
Sample Name: S98T002424 DUP Date: 08/24/1998 00:09:15
Data File : C:\DX\DATA\98082331.D14
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 14 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	11	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	149	592	2	
2	0.95	fluoride	1.719	472	1328	2	-0.35
3	1.15		0.000	51	137	2	
4	1.25		0.000	50	243	2	
5	1.50	chloride	67.260	13158	38797	1	-0.44
6	3.21	nitrate	1.723	51	285	1	0.10
7	4.67	phosphate	1.594	19	189	1	0.57
8	6.13	sulfate	19.634	544	7484	1	0.00
		Totals	91.931	14494	49056		

File: 98082331.D14 Sample: S98T002424 DUP



SS 1-10

LABCORE Completed Worklist Report for Worklist# 25860

Analyst: kjt **Instrument:** IC40S2 **Book#** 21N21A

Method: LA-533-105 Rev/Mod F-0

Worklist Comment: ER-311 @IC-01 Grab Rerun for poor spk recovery; try 21 DF

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	CCB		0	@IC-QC	F	QC	1	<1.20e-2		ug/mL
1	CCB		0	@IC-QC	CL	QC	1	<1.70e-2		ug/mL
1	CCB		0	@IC-QC	NO2	QC	1	<1.08e-1		ug/mL
1	CCB		0	@IC-QC	BR	QC	1	<1.25e-1		ug/mL
1	CCB		0	@IC-QC	NO3	QC	1	<1.39e-1		ug/mL
1	CCB		0	@IC-QC	PO4	QC	1	<1.20e-1		ug/mL
1	CCB		0	@IC-QC	SO4	QC	1	<1.38e-1		ug/mL
1	CCB		0	@IC-QC	OXALATE2	QC	1	<1.05e-1		ug/mL
2	ICV		0	@IC-QC	F	QC	5.90e1	6.63e+01	112.373	% Recovery
2	ICV		0	@IC-QC	CL	QC	8.00e1	8.45e+01	105.625	% Recovery
2	ICV		0	@IC-QC	NO2	QC	5.32e2	5.50e+02	103.383	% Recovery
2	ICV		0	@IC-QC	BR	QC	5.86e2	6.12e+02	104.437	% Recovery
2	ICV		0	@IC-QC	NO3	QC	5.92e2	6.03e+02	101.858	% Recovery
2	ICV		0	@IC-QC	PO4	QC	5.47e2	5.52e+02	100.914	% Recovery
2	ICV		0	@IC-QC	SO4	QC	6.38e2	6.48e+02	101.567	% Recovery
2	ICV		0	@IC-QC	OXALATE2	QC	5.39e2	5.55e+02	102.968	% Recovery
3	CCV		0	@IC-QC	F	QC	6.40e1	6.48e+01	101.250	% Recovery
3	CCV		0	@IC-QC	CL	QC	9.00e1	9.13e+01	101.444	% Recovery
3	CCV		0	@IC-QC	NO2	QC	5.43e2	5.24e+02	96.501	% Recovery
3	CCV		0	@IC-QC	BR	QC	6.30e2	6.48e+02	102.857	% Recovery
3	CCV		0	@IC-QC	NO3	QC	6.98e2	7.44e+02	106.590	% Recovery
3	CCV		0	@IC-QC	PO4	QC	6.32e2	6.48e+02	102.532	% Recovery
3	CCV		0	@IC-QC	SO4	QC	6.99e2	7.06e+02	101.001	% Recovery
3	CCV		0	@IC-QC	OXALATE2	QC	5.28e2	5.41e+02	102.462	% Recovery
4	SAMPLE	S98T002422	0	@IC-01	CL-02	LIQUID	N/A	7.242e+01	0.357	ug/mL
5	DUP	S98T002422	0	@IC-01	F-02	LIQUID	?	1.99e+00		RPD
5	DUP	S98T002422	0	@IC-01	CL-02	LIQUID	7.24e+01	7.38e+01	1.915	RPD
5	DUP	S98T002422	0	@IC-01	NO2-02	LIQUID	?	<2.27e0		RPD
5	DUP	S98T002422	0	@IC-01	BR-02	LIQUID	?	<2.62e0		RPD
5	DUP	S98T002422	0	@IC-01	NO3-02	LIQUID	?	3.42e+00		RPD
5	DUP	S98T002422	0	@IC-01	PO4-02	LIQUID	?	<2.52e0		RPD
5	DUP	S98T002422	0	@IC-01	SO4-02	LIQUID	?	1.93e+01		RPD
5	DUP	S98T002422	0	@IC-01	OXALATE2	LIQUID	?	<2.21e0		RPD
6	SPK	S98T002422	0	@IC-01	F-02	LIQUID	5.90e1	0.00e+00	0.000	% Recovery
6	SPK	S98T002422	0	@IC-01	CL-02	LIQUID	8.00e1	1.01e+02	126.250	% Recovery
6	SPK	S98T002422	0	@IC-01	NO2-02	LIQUID	5.32e2	0.00e+00	0.000	% Recovery
6	SPK	S98T002422	0	@IC-01	BR-02	LIQUID	5.86e2	0.00e+00	0.000	% Recovery
6	SPK	S98T002422	0	@IC-01	NO3-02	LIQUID	5.92e2	0.00e+00	0.000	% Recovery
6	SPK	S98T002422	0	@IC-01	PO4-02	LIQUID	5.47e2	0.00e+00	0.000	% Recovery
6	SPK	S98T002422	0	@IC-01	SO4-02	LIQUID	6.38e2	0.00e+00	0.000	% Recovery
6	SPK	S98T002422	0	@IC-01	OXALATE2	LIQUID	5.39e2	0.00e+00	0.000	% Recovery

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Completed Worklist Report for Worklist# 25860

Seq Type	Sample# R A	Test	Matrix	Actual	Found	DL or Yield	Unit

Final page for worklist# 25860

Analyst Signature **Date** **Analyst Signature** **Date**

Janis M. Fry 8/28/98
Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

HNF-1645 REV. 0

08/26/98 09:14
A-0004-1

LABCORE Data Entry Template for Worklist# 25860

Analyst: KST **Instrument:** IC 4000 sys 2 **Book#** 21N21A

Method: LA-533-105 Rev/Mod E0

Worklist Comment: ER-311 @IC-01 Grab Rerun for poor spk recovery; try 21 DF

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	CCB				@IC-QC	QC		
2	ICV				@IC-QC	QC		
3	CCV				@IC-QC	QC		
4	SAMPLE	S98T002422	0		@IC-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: CL-02						
5	DUP	S98T002422	0		@IC-01	LIQUID		
6	SPK	S98T002422	0		@IC-01	LIQUID		

Final page for worklist # 25860

K S Thomadsen 8-27-98
Analyst Signature Date

Analyst Signature Date

Validated 8/28/97 JMFuge

Data Entry Comments: uploaded 8-28-98
Jack Worrell
25860AUG.CSV

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

HNF-1645 REV. 0

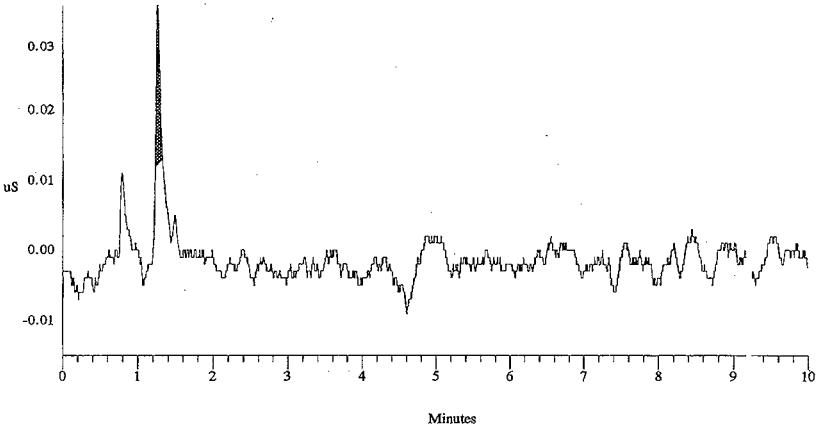
Sample Name: CCB Date: 08/28/1998 09:51:09
Data File : C:\DX\DATA\98082451.D02
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 2 Detector:CDM-1
Analyst Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	1.26		0.000	23	74	1	
		Totals	0.000	23	74		

File: 98082451.D02 Sample: CCB



SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 83 TO 88.

HNF-1645 REV. 0

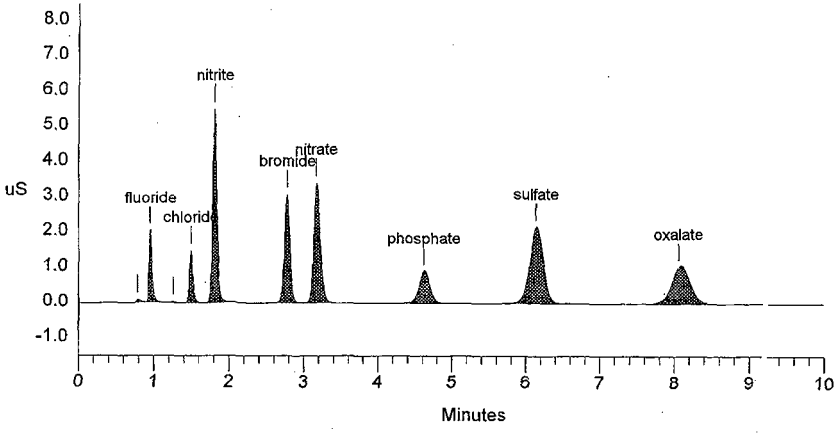
Sample Name: 21N21-A ICV Date: 08/27/1998 15:35:23
Data File : C:\DX\DATA\98082701.D02
Method : C:\DX\METHOD\400ASYS2.met
ACI Address: 1 System: 2 Inject#: 2 Detector: CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	101	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	80	318	2	
2	0.95	fluoride	66.319	2021	5747	2	0.35
3	1.26		0.000	20	86	1	
4	1.49	chloride	84.514	1469	4733	1	-0.88
5	1.81	nitrite	550.435	5489	21496	1	-1.28
6	2.77	bromide	612.476	3069	15824	1	-1.30
7	3.17	nitrate	602.961	3395	20722	1	-1.35
8	4.61	phosphate	551.579	887	9428	1	-0.57
9	6.13	sulfate	648.452	2157	27542	1	0.00
10	8.05	oxalate	555.168	1030	18647	1	0.00
		Totals	3671.903	19616	124543		

File: 98082701.D02 Sample: 21N21-A ICV



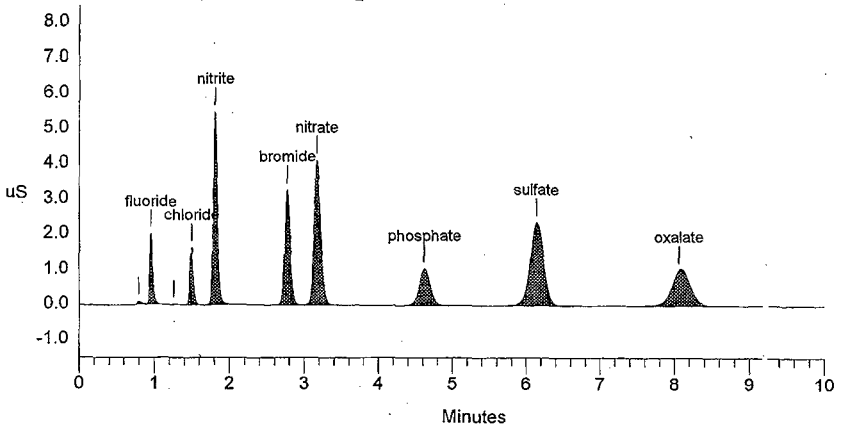
Sample Name: 20N21-A CCV Date: 08/27/1998 15 47:49
Data File : C:\DX\DATA\98082701.D03
Method : C:\DX\METHOD\400ASYS2.met
ACI Address: 1 System: 2 Inject#: 3 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	101	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	87	340	2	
2	0.95	fluoride	64.808	1993	5613	2	0.35
3	1.26		0.000	21	86	1	
4	1.49	chloride	91.292	1621	5120	1	-0.88
5	1.81	nitrite	524.006	5479	20435	1	-1.28
6	2.77	bromide	647.719	3275	16762	1	-1.54
7	3.17	nitrate	744.041	4100	25734	1	-1.35
8	4.61	phosphate	647.570	1041	11105	1	-0.57
9	6.13	sulfate	705.934	2355	30037	1	0.00
10	8.05	oxalate	541.133	1014	18173	1	0.00
		Totals	3966.501	20987	133406		

File: 98082701.D03 Sample: 20N21-A CCV



HNF-1645 REV. 0

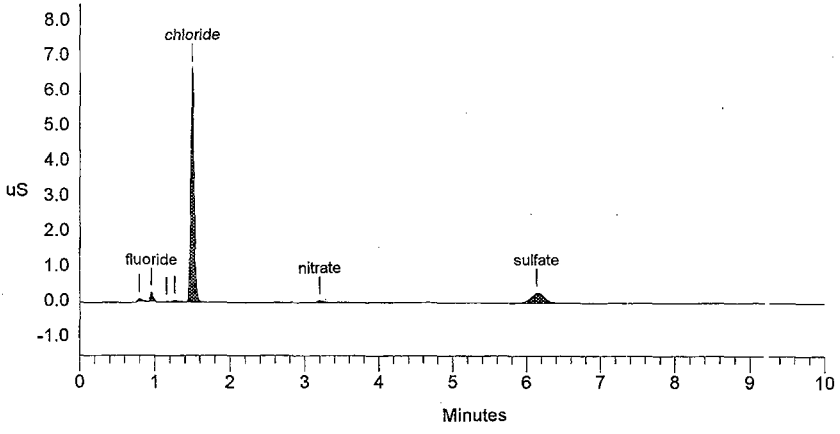
Sample Name: S98T002422 Date: 08/27/1998 16 00:16
Data File : C:\DX\DATA\98082701.D04
Method : C:\DX\METHOD\400ASYS2.met
ACI Address: 1 System: 2 Inject#: 4 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	21	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	82	324	2	
2	0.95	fluoride	1.912	268	759	2	0.35
3	1.15		0.000	28	79	2	
4	1.27		0.000	53	266	2	
5	1.49	chloride	72.425	6673	20573	1	-0.88
6	3.20	nitrate	3.507	56	321	1	-0.31
7	6.13	sulfate	19.269	285	3781	1	0.00
		Totals	97.113	7446	26104		

File: 98082701.D04 Sample: S98T002422



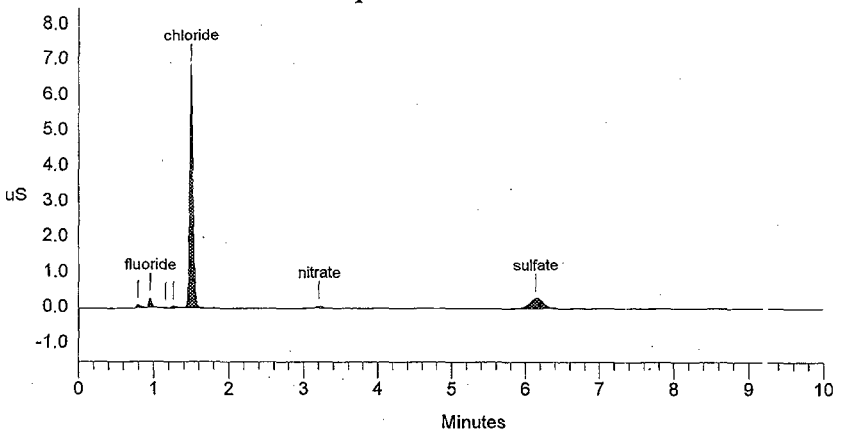
```
==================================================================================
 Sample Name: S98T002422 DUP                    Date: 08/27/1998 16 12:42
 Data File  : C:\DX\DATA\98082701.D05
 Method     : C:\DX\METHOD\400ASYS2.met
 ACI Address: 1  System: 2  Inject#: 5                    Detector:CDM-1
 Analyst    :                Column: AG4A/AS4A anion column
==================================================================================

alibration  Volume   Dilution Points Rate  Start   Stop Area Reject
----------------------------------------------------------------------
xternal          1         21   3000  5Hz   0.00  10.00          30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	87	357	2	
2	0.95	fluoride	1.991	275	792	2	0.35
3	1.16		0.000	26	61	2	
4	1.27		0.000	50	252	2	
5	1.49	chloride	73.755	6769	20979	1	-0.88
6	3.21	nitrate	3.420	57	306	1	-0.10
7	6.13	sulfate	19.282	286	3784	1	0.00
		Totals	98.447	7550	26531		

File: 98082701.D05 Sample: S98T002422 DUP



HNF-1645 REV. 0

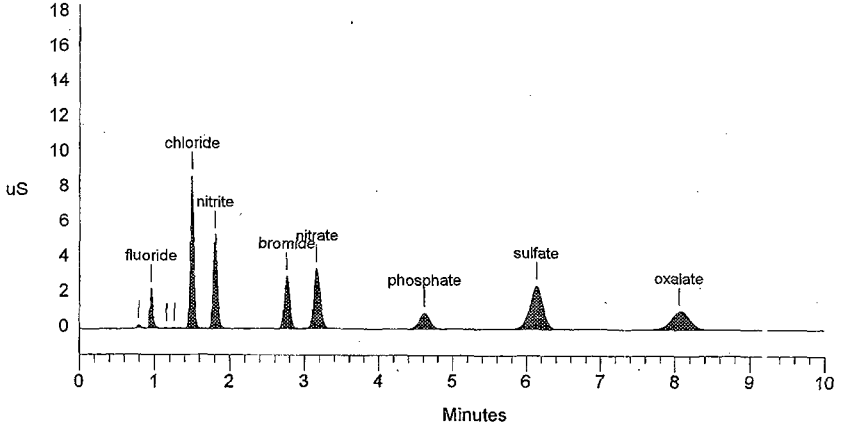
Sample Name: S98T002422 SPIKE Date: 08/28/1998 10 25:53
Data File : C:\DX\DATA\98082451.D03
Method : C:\DX\METHOD\4000SYS2.MET
ACI Address: 1 System: 2 Inject#: 3 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

alibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
xternal	1	21	3000	5Hz	0.00	10.00	30

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

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.79		0.000	158	600	2	
2	0.95	fluoride	15.153	2241	6328	2	0.35
3	1.16		0.000	24	59	1	
4	1.27		0.000	53	252	1	
5	1.49	chloride	92.707	8684	26895	1	-0.88
6	1.80	nitrite	110.225	5333	20681	1	-1.64
7	2.76	bromide	123.578	2977	15342	1	-1.78
8	3.16	nitrate	125.156	3417	20686	1	-1.56
9	4.61	phosphate	111.281	887	9143	1	-0.57
10	6.13	sulfate	151.088	2459	30938	1	0.00
11	8.05	oxalate	114.292	1035	18462	1	0.00
		Totals	843.482	27269	149385		

File: 98082451.D03 Sample: S98T002422 SPIKE



File #: 98082660.TXT

08/20/98 15:54
A-0004-1

HNF-1645 REV. 0

LABCORE Data Entry Template for Worklist# 25774

Analyst: JK 5.40 **Instrument:** ICP01 2 8-26-98 **Book#** 73B48B

Method: LA-505-~~151~~/161 Rev/Mod C-2
8-26-98

Worklist Comment: ICP ER-311 (DIRECT)

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	ICV				@ICP-QC	QC		
2	ICB				@ICP-QC	QC		
3	LLS				@ICP-QC	QC		
4	ICSA				@ICP-QC	QC		
5	ICSAB				@ICP-QC	QC		
6	SERDIL	S98T002422	0	D	@ICP-D01	LIQUID		
7	SAMPLE	S98T002422	0	D	@ICP-D01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			AG-D-01 , AL-D-01 , AS-D-01 , B-D-01 , BA-D-01 , BE-D-01 , BI-D-01 , CA-D-01 , CD-D-01 , CE-D-01 , CO-D-01 , CR-D-01 , CU-D-01 , FE-D-01 , K-D-01 , LA-D-01 , LI-D-01 , MG-D-01 , MN-D-01 , MO-D-01 , NA-D-01 , ND-D-01 , NI-D-01 , P-D-01 , PB-D-01 , S-D-01 , SB-D-01 , SE-D-01 , SI-D-01 , SM-D-01 , SR-D-01 , TI-D-01 , TL-D-01 , U-D-01 , V-D-01 , ZN-D-01 , ZR-D-01			
8	DUP	S98T002422	0	D	@ICP-D01	LIQUID		
9	SPK (1ppm) Sample & Spike CK (10ppm) 8-26-98	S98T002422	0	D	@ICP-D01	LIQUID		
10	CCV				@ICP-QC	QC		
11	CCB				@ICP-QC	QC		
12	SAMPLE	S98T002423	0	D	@ICP-D01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			AG-D-01 , AL-D-01 , AS-D-01 , B-D-01 , BA-D-01 , BE-D-01 , BI-D-01 , CA-D-01 , CD-D-01 , CE-D-01 , CO-D-01 , CR-D-01 , CU-D-01 , FE-D-01 , K-D-01 , LA-D-01 , LI-D-01 , MG-D-01 , MN-D-01 , MO-D-01 , NA-D-01 , ND-D-01 , NI-D-01 , P-D-01 , PB-D-01 , S-D-01 , SB-D-01 , SE-D-01 , SI-D-01 , SM-D-01 , SR-D-01 , TI-D-01 , TL-D-01 , U-D-01 , V-D-01 , ZN-D-01 , ZR-D-01			

Data Entry Comments: uploaded on 8/27/98 by Theresa Mi

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist# 25774

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
13	DUP	S98T002423	0	D	@ICP-D01	LIQUID		
14	SAMPLE	S98T002424	0	D	@ICP-D01	LIQUID	98000453	ER-311 GRAB

Analytes Requested: AG-D-01 , AL-D-01 , AS-D-01 , B-D-01 , BA-D-01 , BE-D-01 , BI-D-01 , CA-D-01 , CD-D-01 , CE-D-01 , CO-D-01 , CR-D-01 , CU-D-01 , FE-D-01 , K-D-01 , LA-D-01 , LI-D-01 , MG-D-01 , MN-D-01 , MO-D-01 , NA-D-01 , ND-D-01 , NI-D-01 , P-D-01 , PB-D-01 , S-D-01 , SB-D-01 , SE-D-01 , SI-D-01 , SM-D-01 , SR-D-01 , TI-D-01 , TL-D-01 , U-D-01 , V-D-01 , ZN-D-01 , ZR-D-01

15	DUP	S98T002424	0	D	@ICP-D01	LIQUID		
16	ICSA				@ICP-QC	QC		
17	ICSAB				@ICP-QC	QC		
18	CCV				@ICP-QC	QC		
19	CCB				@ICP-QC	QC		

Final page for worklist # 25774

Analyst Signature	Date		Analyst Signature	Date
DK [illegible]	08-26-98			
598T002422_L	4-4-2-8	DF 10		
598T002422	4-4	2		
598T002422_D	4-4	2		
598T002422_Q	4-4	2		
598T002422_X	4-4-1-9	20		
598T002422_QX	4-4-1-9	20		
598T002423	4-4	DF 2		
598T002423_D	4-4	2		
598T002424	4-4	DF 2		
598T002424_D	4-4	2		

Data Entry Comments:

Validated by:
Gail R. [illegible]
8/27/98

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

S98T002422

Post Spike:

$$Ag = \frac{\left(\frac{165.91}{20}\right) - \left(\frac{0.15497}{20}\right)}{10} \times 100 = 82.9\%$$

$$Cu = \frac{\left(\frac{185.71}{20}\right) - 0}{10} \times 100 = 92.9\%$$

$$Fe = \frac{\left(\frac{185.19}{20}\right) - 0}{10} \times 100 = 92.6\%$$

$$Na = \frac{\left(\frac{625.83}{20}\right) - \left(\frac{436.29}{20}\right)}{10} \times 100 = 94.8\%$$

$$Se = \frac{\left(\frac{195.11}{20}\right) - (0)}{10} \times 100 = 97.6\%$$

$$Zn = \frac{\left(\frac{195.28}{20}\right) - 0}{10} \times 100 = 97.6\%$$

Pre-spike % Rec:

$$Al\ \%\ Rec = \frac{(4.6024 - 2.7162)}{2 \times 1} \times 100 = 94.3\%$$

HNF-1645 REV. 0

Analysis Report Summary Wed 08-26-98 12:00:44 PM page 1

#	Sample Name	File	Method	Date	Time	OpID	Type	Mode
1	ICV	980826A	ICP2	08/26/98	08:53	DKS	Q	CONC
2	ICB	980826A	ICP2	08/26/98	08:56	DKS	Q	CONC
3	LLS	980826A	ICP2	08/26/98	09:01	DKS	Q	CONC
4	ICSA	980826A	ICP2	08/26/98	09:04	DKS	Q	CONC
5	ICSAB	980826A	ICP2	08/26/98	09:08	DKS	Q	CONC
6	S98T002422_L	980826A	ICP2	08/26/98	09:22	DKS	S	CONC
7	S98T002422_	980826A	ICP2	08/26/98	09:25	DKS	S	CONC
8	S98T002422_D	980826A	ICP2	08/26/98	09:29	DKS	S	CONC
9	S98T002422_A	980826A	ICP2	08/26/98	09:33	DKS	S	CONC
10	S98T002422_X	980826A	ICP2	08/26/98	09:49	DKS	S	CONC
11	S98T002422_AX	980826A	ICP2	08/26/98	09:52	DKS	S	CONC
12	CCV	980826A	ICP2	08/26/98	11:03	DKS	Q	CONC
13	CCB	980826A	ICP2	08/26/98	11:06	DKS	Q	CONC
14	S98T002423	980826A	ICP2	08/26/98	11:10	DKS	S	CONC
~~15~~	~~S98T002423_D~~	~~980826A~~	~~ICP2~~	~~08/26/98~~	~~11:13~~	~~DKS~~	~~S~~	~~CONC~~ DK 8-26-98
16	S98T002423_D	980826A	ICP2	08/26/98	11:18	DKS	S	CONC
17	S98T002424_	980826A	ICP2	08/26/98	11:22	DKS	S	CONC
18	S98T002424_D	980826A	ICP2	08/26/98	11:27	DKS	S	CONC
19	ICSA	980826A	ICP2	08/26/98	11:33	DKS	Q	CONC
20	ICSAB	980826A	ICP2	08/26/98	11:37	DKS	Q	CONC
21	CCV_1	980826A	ICP2	08/26/98	11:53	DKS	Q	CONC
22	CCB_1	980826A	ICP2	08/26/98	11:57	DKS	Q	CONC

DK [illegible]
08-26-98
Worklist # 25774

ER-311
S98T002422
S98T002423
S98T002424

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 92 TO 96.

HNF-1645 REV. 0

Analysis Report Averages Wed 08-26-98 12:00:44 PM page 2

#	Sample Name	Ag	Al	As	B	Ba	Be
1	ICV	4.9275	4.8937	5.0072	4.9238	4.9426	5.0395
2	ICB	.00051	-.00715	-.00189	.00320	-.00003	-.00009
3	LLS	.02341	.10654	.20856	.10173	.09802	.01019
4	ICSA	.00375	246.41	.01420	-.00795	.00023	.00018
5	ICSAB	.95427	242.11	.05200	-.00937	.46148	.47830
6	S98T002422_L	.12217	2.7928	.06716	.14731	.05515	.00245
7	S98T002422	.12209	2.7162	-.04321	.12869	.05509	.00351
8	S98T002422_D	.12577	2.7473	-.04569	.13182	.05558	.00344
9	S98T002422_A	1.2510	4.6024	2.1493	2.0516	1.9768	1.9937
10	S98T002422_X	.15497	2.9078	-.12321	.11913	.05303	.00669
11	S98T002422_AX	165.91	195.82	199.07	197.07	198.79	196.14
12	CCV	4.8296	4.7874	4.9407	4.8089	4.8282	4.9363
13	CCB	.00129	.00175	.01095	.00091	.00000	.00022
14	S98T002423	.10972	2.5722	-.00806	.11689	.05564	.00310
~~15~~	~~S98T002423_D~~	~~.06678~~	~~1.7973~~	~~.03347~~	~~.08690~~	~~.03893~~	~~.00188~~
16	S98T002423_D	.10130	2.5262	-.04770	.11756	.05481	.00265
17	S98T002424	.10401	2.6553	-.00133	.11796	.05129	.00325
18	S98T002424_D	.09790	2.6353	-.01958	.12867	.05193	.00322
19	ICSA	.00258	237.36	.02876	-.00689	.00019	.00018
20	ICSAB	.93612	234.20	.04528	-.01189	.44074	.46280
21	CCV_1	4.9055	4.8929	5.0202	4.9023	4.9405	5.0751
22	CCB_1	.00118	.00867	-.00115	.00511	.00000	.00000

8-26-98

#	Sample Name	Bi	Ca	Cd	Ce	Co	Cr
1	ICV	5.0323	5.0180	5.0342	5.0291	4.9793	4.9638
2	ICB	-.00368	.00531	.00005	.00227	.00085	-.00044
3	LLS	.19735	.23400	.01188	.21344	.04267	.02045
4	ICSA	-.04569	255.55	.00520	.00999	.00166	-.00056
5	ICSAB	-.02853	252.68	.94330	.00912	.45845	.46481
6	S98T002422_L	.92784	7.5444	-.04369	-.01564	-.00722	-.00161
7	S98T002422	.92098	7.3218	-.03939	-.09662	.00922	.13614
8	S98T002422_D	.85679	7.2546	-.03588	-.10501	-.00429	.04381
9	S98T002422_A	2.8141	9.1691	1.9134	1.8857	1.9121	1.9510
10	S98T002422_X	1.4200	7.4708	-.02766	-.02192	-.02628	.02758
11	S98T002422_AX	201.73	206.29	196.29	198.98	196.30	197.44
12	CCV	4.9562	4.8932	4.9158	4.9169	4.8606	4.8487
13	CCB	-.00167	.00708	.00022	.00520	.00182	.00000
14	S98T002423	.82810	8.3260	-.04065	-.08158	.00062	.01492
~~15~~	~~S98T002423_D~~	~~.54661~~	~~6.2667~~	~~-.02839~~	~~-.04220~~	~~-.01525~~	~~-.10583~~
16	S98T002423_D	.87331	8.4688	-.04119	-.09445	.01260	.08818
17	S98T002424	.84329	8.0695	-.04256	-.10114	-.00114	.02053
18	S98T002424_D	.85770	7.9015	-.03948	-.11245	-.00489	.00364
19	ICSA	.01421	254.15	.00448	.00761	.00325	-.00164
20	ICSAB	-.01247	251.25	.92475	.01133	.45347	.45895
21	CCV_1	5.0527	4.9671	5.0341	5.0493	4.9602	4.9386
22	CCB_1	.00703	.00417	.00017	.00202	.00012	-.00096

8-26-98

HNF-1645 REV. 0

Analysis Report Averages Wed 08-26-98 12:00:44 PM page 3

#	Sample Name	Cu	Eu	Fe	K	La	Li
1	ICV	4.7599	.00689	4.8202	5.2246	5.0018	5.0770
2	ICB	-.00041	.00011	.00062	.04716	.00007	.00020
3	LLS	.01749	.00020	.09860	Q.76161	.10329	.02149
4	ICSA	.00301	.01093	93.559	.13943	-.00450	.00222
5	ICSAB	.46732	.01479	91.988	.11916	-.00332	.99304
6	S98T002422_L	-1.0733	-.05477	-3.8143	4.1456	.01300	-.00339
7	S98T002422	-1.0503	-.05436	-3.6450	3.4675	.00515	.00155
8	S98T002422_D	-1.0937	-.05875	-3.8341	3.6366	.00826	-.00065
9	S98T002422_A	.81135	-.05318	-1.8171	5.7275	1.9750	1.9579
10	S98T002422_X	-1.0384	-.06479	-3.7184	5.5123	.01312	-.00720
11	S98T002422_AX	185.71	.22087	185.19	206.18	198.33	197.35
12	CCV	4.6723	.00643	4.6994	4.9599	4.8989	4.8844
13	CCB	.00010	.00002	.00117	.03716	.00055	.00050
14	S98T002423	-.91193	-.04671	-3.3146	3.2571	.00552	.00211
~~15~~	~~S98T002423_D~~	~~-.65138~~	~~-.00868~~	~~-2.3624~~	~~2.4956~~	~~.00304~~	~~.01678~~
16	S98T002423_D	-.89600	-.04350	-3.3292	3.4841	.00540	.00217
17	S98T002424	-.93799	-.04244	-3.4440	3.0459	.00497	.00339
18	S98T002424_D	-.95615	-.04368	-3.5229	3.6885	.00694	.00219
19	ICSA	.00313	.00564	91.358	.21654	-.00468	.00333
20	ICSAB	.44325	.00721	90.009	.26864	-.00335	.92313
21	CCV_1	4.7972	.00621	4.8160	4.9746	5.0231	5.0159
22	CCB_1	-.00005	.00058	.00001	.09168	.00057	.00051

8-26-98

#	Sample Name	Mg	Mn	Mo	Na	Nd	Ni
1	ICV	5.0198	4.9244	4.9997	5.2801	5.0122	5.0168
2	ICB	-.00217	.00006	.00047	.04239	-.00128	-.00092
3	LLS	.21341	.01991	.10074	.21399	.19868	.04049
4	ICSA	252.30	-.00513	-.01234	196.33	.00404	-.00058
5	ICSAB	247.10	.44417	-.01790	192.99	-.00044	.90060
6	S98T002422_L	1.4941	.23099	-.00563	436.03	-.00669	.18936
7	S98T002422	1.4249	.22496	.03850	421.80	.06362	.26600
8	S98T002422_D	1.5348	.22126	.02751	424.62	.01377	.25399
9	S98T002422_A	3.3451	2.1055	1.9633	417.86	1.9464	2.1688
10	S98T002422_X	1.5255	.22447	-.00649	436.29	-.01248	.18945
11	S98T002422_AX	205.04	197.39	196.91	625.83	193.34	196.25
12	CCV	4.9135	4.8098	4.9006	5.0625	4.8923	4.8647
13	CCB	.00097	.00015	.00094	.04802	-.00068	-.00023
14	S98T002423	1.7131	.20854	.02314	373.09	.00363	.21309
~~15~~	~~S98T002423_D~~	~~1.2066~~	~~.16367~~	~~-.00210~~	~~262.15~~	~~-.03798~~	~~.11446~~
16	S98T002423_D	1.6176	.21458	.02864	375.71	.04580	.18506
17	S98T002424	1.5161	.21844	.01633	383.27	.00736	.17400
18	S98T002424_D	1.5047	.21509	.02223	385.21	-.00093	.14175
19	ICSA	242.74	-.00420	-.01896	182.28	-.00051	-.00524
20	ICSAB	239.24	.43744	-.01853	181.15	-.00180	.89897
21	CCV_1	5.0335	4.9137	5.0109	5.2436	5.0477	4.9791
22	CCB_1	.00642	.00030	.00176	.03751	.00154	-.00165

8-26-98

Analysis Report Averages Wed 08-26-98 12:00:44 PM page 4

#	Sample Name	P	Pb	S	Sb	Se	Si
1	ICV	4.8909	4.8625	4.8547	5.0106	4.7248	4.9568
2	ICB	.00862	-.00679	-.00513	.00822	-.00343	.00433
3	LLS	.39839	.20175	.19647	.10461	.19019	Q.13617
4	ICSA	.03811	.01853	-.01432	-.00104	.03913	-.00438
5	ICSAB	.04030	.96461	-.03062	.00633	.03553	-.00281
6	S98T002422_L	.88215	-.00515	6.7697	.09378	.13150	3.9354
7	S98T002422	.95729	.14505	6.6464	.05471	.16924	3.8927
8	S98T002422_D	1.0126	.06037	6.4616	.07745	.21447	3.8417
9	S98T002422_A	3.1108	1.9505	8.2828	2.0055	2.5754	5.9724
10	S98T002422_X	.91413	.09225	6.6296	-.07117	.08827	3.9837
11	S98T002422_AX	197.47	198.32	198.60	199.67	195.11	211.97
12	CCV	4.8749	4.7597	4.7522	4.9229	4.6482	4.8435
13	CCB	-.00083	-.00600	-.00503	-.00051	-.00659	.00303
14	S98T002423	.96058	.08871	6.5403	.04387	.25536	3.7430
~~15~~	~~S98T002423_D~~	~~.69391~~	~~-.03802~~	~~4.7447~~	~~.03629~~	~~.38038~~	~~2.9178~~
16	S98T002423_D	.90721	.12442	6.7376	.06414	.22465	3.8279
17	S98T002424	.88943	.07241	6.5845	.05549	.18136	3.9295
18	S98T002424_D	.96025	.06141	6.4464	.07821	.22686	3.8796
19	ICSA	.05228	.02283	-.03747	.00489	.06770	.00597
20	ICSAB	.04862	.96717	-.01279	.00245	.07468	.00519
21	CCV_1	4.9539	4.8568	4.8664	5.0259	4.7883	5.0217
22	CCB_1	-.00085	-.00129	.00389	.00392	.00099	.00846

8-26-98

#	Sample Name	Sm	Sr	Th	Ti	Tl	U
1	ICV	4.9532	4.9362	.23530	4.9710	4.7365	9.6326
2	ICB	-.00037	.00008	-.00298	-.00046	.00853	.00221
3	LLS	.19422	.01994	.01003	.01982	.41144	.46956
4	ICSA	-.02297	.00189	.00201	.00069	-.03210	-.08953
5	ICSAB	-.02046	.00191	.00635	.00116	-.02884	-.08754
6	S98T002422_L	-.16206	.23167	6.5536	.02321	.12826	362.13
7	S98T002422	-.11663	.22935	6.2242	.03687	-.05606	360.31
8	S98T002422_D	-.14181	.23145	6.1970	.02579	-.03174	367.66
9	S98T002422_A	1.8212	2.1981	6.2050	1.8047	1.7936	365.06
10	S98T002422_X	-.24407	.22947	6.5196	.02060	-.15294	357.97
11	S98T002422_AX	192.18	196.57	15.758	196.18	193.55	729.25
12	CCV	4.8644	4.8302	.23807	4.8633	4.6822	9.4080
13	CCB	.00100	.00004	.00241	.00023	.00749	.00166
14	S98T002423	-.09989	.20990	5.7078	.02679	-.00447	320.12
~~15~~	~~S98T002423_D~~	~~.14939~~	~~.15117~~	~~4.1674~~	~~.01386~~	~~-.00270~~	~~224.24~~
16	S98T002423_D	-.08023	.21043	5.7059	.03326	-.03767	318.93
17	S98T002424	-.06243	.21314	5.9479	.02821	-.01339	326.25
18	S98T002424_D	-.08312	.21369	5.8972	.02707	-.00564	329.80
19	ICSA	-.00483	.00173	.01442	.00189	.00204	-.10932
20	ICSAB	-.00766	.00170	.00737	.00074	-.00146	-.09962
21	CCV_1	4.9997	4.9635	.22106	4.9978	4.8166	9.7202
22	CCB_1	.00281	.00008	-.00248	.00044	.02693	.01252

8-26-98

Analysis Report Averages Wed 08-26-98 12:00:44 PM page 5

#	Sample Name	V	Y	Zn	Zr		
1	ICV	4.9338	.01534	4.7186	4.9513		
2	ICB	.00000	.00000	-.00008	.00022		
3	LLS	.09874	.00003	.01896	.01901		
4	ICSA	-.00011	.00732	-.00434	-.00326		
5	ICSAB	.46248	.00740	.91603	-.00325		
6	S98T002422_L	.03587	-.00579	.31837	-.52679		
7	S98T002422_	.03634	-.00485	.30950	-.50097		
8	S98T002422_D	.02435	-.00766	.30172	-.50623		
9	S98T002422_A	2.0265	-.00374	2.2054	1.4594		
10	S98T002422_X	.02410	-.01264	.30865	-.53975		
11	S98T002422_AX	195.51	.31075	185.87	195.28		
12	CCV	4.8269	.01481	4.6163	4.8496		
13	CCB	-.00018	-.00015	.00050	.00013		
14	S98T002423	.03794	-.00235	.31678	-.45844		
~~15~~	~~S98T002423_D~~	~~.08916~~	~~.01221~~	~~.23516~~	~~-.29768~~		
16	S98T002423_D	.05130	-.00043	.32344	-.45231		
17	S98T002424_	.05591	-.00009	.43898	-.46933		
18	S98T002424_D	.04757	-.00208	.43424	-.46976		
19	ICSA	.00442	.00819	-.00357	-.00213		
20	ICSAB	.45584	.00787	.90970	-.00160		
21	CCV 1	4.9405	.01506	4.7083	4.9728		
22	CCB_1	.00123	.00022	-.00051	.00081		

JK 08-26-98

08-26-98

LABCORE Completed Worklist Report for Worklist# 26268

Analyst: bjg **Instrument:** ICPMS1 **Book#:** 71110-P

Method: LA-506-101 Rev/Mod A-1

Worklist Comment: ICP/MS ER-311 (DIRECT)

Seq	Type	Sample#	R	A		Test	Matrix	Actual		Found	DL or Yield	Unit
1	ICV		0		@MSU238	U238	QC	0.020		1.96e-02	98.000	% Recovery
2	ICB		0		@MSU-QC	U233	QC	1		<2.31e-5		Ratio
2	ICB		0		@MSU-QC	U234	QC	1		<4.41e-5		Ratio
2	ICB		0		@MSU-QC	U235	QC	1		<2.94e-5		Ratio
2	ICB		0		@MSU-QC	U236	QC	1		<3.22e-5		Ratio
2	ICB		0		@MSU-QC	U238	QC	1		<1.57e-5		Ratio
3	SAMPLE	S98T002422	0	A	@MSU-D1	U233-D1	LIQUID	N/A	<	2.358e-01	0.236	ug/mL
3	SAMPLE	S98T002422	0	A	@MSU-D1	U234-D1	LIQUID	N/A	<	4.497e-01	0.450	ug/mL
3	SAMPLE	S98T002422	0	A	@MSU-D1	U235-D1	LIQUID	N/A		2.317e+00	0.300	ug/mL
3	SAMPLE	S98T002422	0	A	@MSU-D1	U236-D1	LIQUID	N/A	<	3.287e-01	0.329	ug/mL
3	SAMPLE	S98T002422	0	A	@MSU-D1	U238-D1	LIQUID	N/A		3.557e+02	0.161	ug/mL
4	DUP	S98T002422	0	A	@MSU-D1	U233-D1	LIQUID	<2.36e-1		<2.36e-1		RPD
4	DUP	S98T002422	0	A	@MSU-D1	U234-D1	LIQUID	<4.50e-1		<4.50e-1		RPD
4	DUP	S98T002422	0	A	@MSU-D1	U235-D1	LIQUID	2.32e+00		2.54e+00	9.053	RPD
4	DUP	S98T002422	0	A	@MSU-D1	U236-D1	LIQUID	<3.29e-1		<3.29e-1		RPD
4	DUP	S98T002422	0	A	@MSU-D1	U238-D1	LIQUID	3.56e+02		3.82e+02	7.046	RPD
5	SPK	S98T002422	0	A	@MSU-D1	U233-D1	LIQUID	?		-9.96e-3		% Recovery
5	SPK	S98T002422	0	A	@MSU-D1	U234-D1	LIQUID	?		3.63e-02		% Recovery
5	SPK	S98T002422	0	A	@MSU-D1	U235-D1	LIQUID	?		3.85e+00		% Recovery
5	SPK	S98T002422	0	A	@MSU-D1	U236-D1	LIQUID	?		1.29e-01		% Recovery
5	SPK	S98T002422	0	A	@MSU-D1	U238-D1	LIQUID	575.0		5.51e+02	95.826	% Recovery
6	SAMPLE	S98T002423	0	A	@MSU-D1	U233-D1	LIQUID	N/A	<	2.358e-01	0.236	ug/mL
6	SAMPLE	S98T002423	0	A	@MSU-D1	U234-D1	LIQUID	N/A	<	4.497e-01	0.450	ug/mL
6	SAMPLE	S98T002423	0	A	@MSU-D1	U235-D1	LIQUID	N/A		2.350e+00	0.300	ug/mL
6	SAMPLE	S98T002423	0	A	@MSU-D1	U236-D1	LIQUID	N/A	<	3.287e-01	0.329	ug/mL
6	SAMPLE	S98T002423	0	A	@MSU-D1	U238-D1	LIQUID	N/A		3.653e+02	0.161	ug/mL
7	DUP	S98T002423	0	A	@MSU-D1	U233-D1	LIQUID	<2.36e-1		<2.36e-1		RPD
7	DUP	S98T002423	0	A	@MSU-D1	U234-D1	LIQUID	<4.50e-1		<4.50e-1		RPD
7	DUP	S98T002423	0	A	@MSU-D1	U235-D1	LIQUID	2.35e+00		2.32e+00	1.285	RPD
7	DUP	S98T002423	0	A	@MSU-D1	U236-D1	LIQUID	<3.29e-1		<3.29e-1		RPD
7	DUP	S98T002423	0	A	@MSU-D1	U238-D1	LIQUID	3.65e+02		3.59e+02	1.657	RPD
8	SAMPLE	S98T002424	0	A	@MSU-D1	U233-D1	LIQUID	N/A	<	2.358e-01	0.236	ug/mL
8	SAMPLE	S98T002424	0	A	@MSU-D1	U234-D1	LIQUID	N/A	<	4.497e-01	0.450	ug/mL
8	SAMPLE	S98T002424	0	A	@MSU-D1	U235-D1	LIQUID	N/A		2.413e+00	0.300	ug/mL
8	SAMPLE	S98T002424	0	A	@MSU-D1	U236-D1	LIQUID	N/A	<	3.287e-01	0.329	ug/mL
8	SAMPLE	S98T002424	0	A	@MSU-D1	U238-D1	LIQUID	N/A		3.702e+02	0.161	ug/mL
9	DUP	S98T002424	0	A	@MSU-D1	U233-D1	LIQUID	<2.36e-1		<2.36e-1		RPD
9	DUP	S98T002424	0	A	@MSU-D1	U234-D1	LIQUID	<4.50e-1		<4.50e-1		RPD
9	DUP	S98T002424	0	A	@MSU-D1	U235-D1	LIQUID	2.41e+00		2.40e+00	0.416	RPD
9	DUP	S98T002424	0	A	@MSU-D1	U236-D1	LIQUID	<3.29e-1		<3.29e-1		RPD
9	DUP	S98T002424	0	A	@MSU-D1	U238-D1	LIQUID	3.70e+02		3.58e+02	3.297	RPD

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Completed Worklist Report for Worklist# 26268

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
10	CCV	0		@MSU238	U238	QC	0.020	2.02e-02	101.000	% Recovery
11	CCB	0		@MSU-QC	U233	QC	1	<2.31e-5		Ratio
11	CCB	0		@MSU-QC	U234	QC	1	<4.41e-5		Ratio
11	CCB	0		@MSU-QC	U235	QC	1	<2.94e-5		Ratio
11	CCB	0		@MSU-QC	U236	QC	1	<3.22e-5		Ratio
11	CCB	0		@MSU-QC	U238	QC	1	<1.57e-5		Ratio

Final page for worklist# 26268

Analyst Signature Date

Analyst Signature Date

Reviewer Signature Date 9/23/98

Units shown for QC (BLK/BKG) may not reflect the actual units.

File # U0922A.TXT

09/23/98 07:01
A-0004-1

HNF-1645 REV. 0

LABCORE Data Entry Template for Worklist# 26268

Analyst: BJG **Instrument:** ICPMS1 **Book#** 7/N10-P

Method: LA-506-101 Rev/Mod A-1

Worklist Comment: ICP/MS ER-311 (DIRECT)

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	ICV				@MSU238	QC		
2	ICB				@MSU-A1	LIQUID		
3	SAMPLE	S98T002422	0	A	@MSU-D1	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: U233-D1 , U234-D1 , U235-D1 , U236-D1 , U238-D1						
4	DUP	S98T002422	0	A	@MSU-D1	LIQUID		
5	SPK	S98T002422	0	A	@MSU-D1	LIQUID		
6	SAMPLE	S98T002423	0	A	@MSU-D1	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: U233-D1 , U234-D1 , U235-D1 , U236-D1 , U238-D1						
7	DUP	S98T002423	0	A	@MSU-D1	LIQUID		
8	SAMPLE	S98T002424	0	A	@MSU-D1	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: U233-D1 , U234-D1 , U235-D1 , U236-D1 , U238-D1						
9	DUP	S98T002424	0	A	@MSU-D1	LIQUID		
10	CCV				@MSU238	QC		
11	CCB				@MSU-A1	LIQUID		

Final page for worklist # 26268

for: Sam M. Parry

Analyst Signature	Date		D.F.	Analyst Signature	Date
BJG	9/22/98				
S98T002422	0.10→10ml,	0.10→10ml	10201		
2422_D	"	"	10201		
2422-A	"	"	10201		
2423	"	"	10201		
2423_D	"	"	10201		
2424	"	"	10201		
2424_D	"	"	10201		

Data Entry Comments:

Validated by: Sam M. Parry 9/22/98

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

ISO_U Method -Definitions and Calculations

Data file requirements:
The method in each section is identified by the line:
Method=ISO_U

The background is identified by the line:
Comment=background
or
Comment=BACKGROUND
The first two sections of the file will contain the background information.

If Mode=IR then the avg column in the Results section contains isotope ratio values. If Mode=CONC, then the avg column contains concentration values for U235 and U238 in ppb; the rest are IR values.

Dilution factors (if not equal to 1.0) are on the comment line for each tray slot.
Comment= x df(or DF) where x is the dilution factor
If the comment is blank, the dilution factor is 1.0.

Concentration calculation:
If the analyte is not U235 or U238, then the calculation for each analyte is as follows:

$$\text{concentration(analyte)} = \frac{\text{concentration (U235)} * [\text{IR(analyte)} - \text{BackgroundIR(analyte)}]}{[\text{IR(U235)} - \text{BackgroundIR(U235)}] * 1000}$$

U235 and U238 results are divided by 1000 to convert the units to ppm.

Detection Limit calculation :
If the result is less than the detection limit, then the result is replaced by the detection limit and the range field is set to '<'.

The detection limit for all analytes is:

$$\text{Detection Limit (analyte x)} = \frac{15 * \text{Background stddev(analyte x)} * [\text{ICV Concentration(U235)}]}{([\text{ICV IR(U235)}] - [\text{BackgroundIR(U235)}]) * 1000}$$

In addition, all calculations are corrected for digest and dilution factors.

Spikes:
Spike results will only be calculated for U238.
The sample contribution to the spike is calculated by the same method used for the Actinide method.

Analysis Report **HNF-1645 REV. 0** 09/22/98 13:40:08 page 1

Method: MS_TUNE Sample Name: ms tune Operator: ojg
Comment:
Run Time: 09/22/98 13:39 Type: Unk Mode: INT Corr.Fact: 1.000000

Elem	In[115]
Line	115/pulse
Units	Cts/S
Avg	57750.
Stddev	1661.
%RSD	2.876
#1	60310.
#2	56960.
#3	57340.
#4	56240.
#5	59350.
#6	57180.
#7	55610.
#8	60330.
#9	56750.
#10	57450.

ER-311
S987002422, 23, 24
File # U0922A.TXT
Saul M Pang
9/22/98

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 101 TO 131.

Analysis Report HNF-1645 REV. 0 09/22/98 13:42:02 page 1

Method: MS_TUNE Sample Name: ms tune Operator: bjg
Comment:
Run Time: 09/22/98 13:41 Type: Unk Mode: INT Corr.Fact: 1.000000

Elem	In[115]
Line	115/pulse
Units	Cts/S
Avg	58860.
Stddev	1233.
%RSD	2.095
#1	60490.
#2	59920.
#3	57480.
#4	58790.
#5	58000.
#6	58770.
#7	58080.
#8	56960.
#9	59850.
#10	60290.

Analysis Report HNF-1645 REV. 0 09/22/98 13:43:22 page 1

Method: MS_TUNE Sample Name: ms tune Operator: bjg

Comment:

Run Time: 09/22/98 13:42 Type: Unk Mode: INT Corr.Fact: 1.000000

Elem	In[115]
Line	115/pulse
Units	Cts/S
Avg	58490.
Stddev	1154.
%RSD	1.972
#1	58750.
#2	58440.
#3	58770.
#4	58190.
#5	56760.
#6	61060.
#7	58650.
#8	57100.
#9	58300.
#10	58850.

Analysis Report HNF-1645 REV. 0 09/22/98 13:48:21 page 1

Method: ISO_U Sample Name: BLANK Operator:
Comment:
Run Time: 09/22/98 13:46 Type: Std Mode: IR Corr.Fact: 1.000000

Elem	U_[235]	U_[238]
Line	235/pulse	238/pulse
Units	Cts/S	Cts/S
Avg	2.985	6.331
Stddev	.683	1.142
%RSD	22.89	18.04
#1	2.033	6.098
#2	3.362	6.616
#3	3.338	4.845
#4	2.517	8.010
#5	3.673	6.087

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.5631
Stddev	.1619
%RSD	3.5487
#1	4.4279
#2	4.6100
#3	4.6435
#4	4.3697
#5	4.7645

Analysis Report **HNF-1645 REV. 0** 09/22/98 13:50:16 page 1

Method: ISO_U Sample Name: U High Std Operator:
Comment:
Run Time: 09/22/98 13:49 Type: Std Mode: IR Corr.Fact: 1.000000

Elem	U_[235]	U_[238]
Line	235/pulse	238/pulse
Units	Cts/S	Cts/S
Avg	262.2	34180.
Stddev	12.3	1342.
%RSD	4.704	3.926
#1	246.7	33350.
#2	258.2	32710.
#3	267.3	35720.
#4	258.8	33640.
#5	279.9	35480.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.5017
Stddev	.1385
%RSD	3.0770
#1	4.6470
#2	4.6346
#3	4.4120
#4	4.4856
#5	4.3294

Analysis Report **HNF-1645 REV. 0** 09/22/98 13:56:14 page 1

Method: ISO_U Sample Name: blank Operator:
Comment: background
Run Time: 09/22/98 13:54 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.738	2.862	2.840	2.559	5.966
Stddev	.565	1.078	.720	.788	.385
%RSD	20.64	37.66	25.35	30.80	6.455
#1	2.074	2.292	2.619	3.602	6.439
#2	3.012	1.896	3.012	1.896	5.466
#3	2.659	3.700	2.081	2.081	6.012
#4	3.541	4.316	3.984	3.209	6.197
#5	2.406	2.105	2.506	2.005	5.713

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.5789
Stddev	.2478
%RSD	5.4115
#1	4.5812
#2	4.4820
#3	4.3243
#4	4.5182
#5	4.9885

Analysis Report HNF-1645 REV. 0 09/22/98 13:56:54 page 1

Method: ISO_U Sample Name: blank Operator:
Comment: background
Run Time: 09/22/98 13:54 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	233/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.738	2.862	-.0004	2.559	-.0011
Stddev	.565	1.078	.0020	.788	.0011
%RSD	20.64	37.66	499.5	30.80	105.4
#1	2.074	2.292	-.0010	3.602	.0003
#2	3.012	1.896	.0001	1.896	-.0025
#3	2.659	3.700	-.0025	2.081	-.0009
#4	3.541	4.316	.0027	3.209	-.0004
#5	2.406	2.105	-.0013	2.005	-.0018

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.5789
Stddev	.2478
%RSD	5.4115
#1	4.5812
#2	4.4820
#3	4.3243
#4	4.5182
#5	4.9885

HNF-1645 REV. 0

Analysis Report 09/22/98 14:00:52 page 1

Method: ISO_U Sample Name: iso_u check standard Operator:
Comment:
Run Time: 09/22/98 13:59 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.951	4.694	265.6	7.988	33660.
Stddev	.631	.518	13.8	.672	1626.
%RSD	21.40	11.04	5.211	8.408	4.832
#1	3.096	4.194	252.7	7.890	31990.
#2	2.460	4.278	288.9	7.379	36160.
#3	3.220	4.976	259.1	8.001	32630.
#4	2.198	5.442	265.9	9.105	34250.
#5	3.784	4.580	261.6	7.567	33250.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.9212
Stddev	.1870
%RSD	3.7991
#1	5.0066
#2	4.6753
#3	5.1246
#4	4.7778
#5	5.0217

Analysis Report **HNF-1645 REV. 0** 09/22/98 14:01:06 page 1

Method: ISO_U Sample Name: iso_u check standard Operator:
Comment:
Run Time: 09/22/98 13:59 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.951	4.694	.7204	7.988	97.78
Stddev	.631	.518	.0380	.672	4.72
%RSD	21.40	11.04	5.270	8.408	4.832
#1	3.096	4.194	.6849	7.890	92.95
#2	2.460	4.278	.7841	7.379	105.0
#3	3.220	4.976	.7026	8.001	94.80
#4	2.198	5.442	.7212	9.105	99.51
#5	3.784	4.580	.7093	7.567	96.61

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.9212
Stddev	.1870
%RSD	3.7991
#1	5.0066
#2	4.6753
#3	5.1246
#4	4.7778
#5	5.0217

Analysis Report HNF-1645 REV. 0 09/22/98 14:09:39 page 1

Method: ISO_U Sample Name: icv Operator: bjg
Comment:
Run Time: 09/22/98 14:07 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	4.110	2.924	25.73	4.946	6739.
Stddev	.625	.438	1.75	.739	286.
%RSD	15.20	14.99	6.801	14.93	4.252
#1	4.389	2.594	25.74	4.489	6728.
#2	4.741	2.612	24.96	4.257	6412.
#3	3.263	2.842	27.47	5.578	7072.
#4	4.508	3.669	27.26	4.508	6975.
#5	3.651	2.902	23.22	5.899	6505.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	5.0081
Stddev	.2545
%RSD	5.0816
#1	5.0124
#2	5.1678
#3	4.7506
#4	4.7696
#5	5.3403

Analysis Report HNF-1645 REV. 0 09/22/98 14:09:50 page 1

Method: ISO_U Sample Name: icv Operator: ojg
Comment:
Run Time: 09/22/98 14:07 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	4.110	2.924	.0624	4.946	19.56
Stddev	.625	.438	.0048	.739	.83
%RSD	15.20	14.99	7.694	14.93	4.256
#1	4.389	2.594	.0624	4.489	19.53
#2	4.741	2.612	.0603	4.257	18.61
#3	3.263	2.842	.0672	5.578	20.53
#4	4.508	3.669	.0666	4.508	20.25
#5	3.651	2.902	.0555	5.899	18.88

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	5.0081
Stddev	.2545
%RSD	5.0816
#1	5.0124
#2	5.1678
#3	4.7506
#4	4.7696
#5	5.3403

Analysis Report 09/22/98 14:14:29 page 1

Method: ISO_U Sample Name: icb Operator: bjg
Comment:
Run Time: 09/22/98 14:13 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.717	2.920	2.400	2.412	4.279
Stddev	.625	.974	.647	.520	.597
%RSD	22.99	33.35	26.97	21.57	13.95
#1	3.216	2.551	2.994	1.885	3.993
#2	2.991	3.323	2.880	2.326	3.988
#3	1.781	2.305	1.991	3.248	5.343
#4	3.216	1.996	2.662	2.107	4.103
#5	2.382	4.424	1.475	2.496	3.970

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.5422
Stddev	.1361
%RSD	2.9962
#1	4.5085
#2	4.5138
#3	4.7722
#4	4.5087
#5	4.4076

HNF-1645 REV. 0

Analysis Report 09/22/98 14:14:38 page 1

Method: ISO_U Sample Name: icb Operator: bjg
Comment:
Run Time: 09/22/98 14:13 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.717	2.920	-.0016	2.412	-.0060
Stddev	.625	.974	.0018	.520	.0017
%RSD	22.99	33.35	110.8	21.57	29.10
#1	3.216	2.551	.0000	1.885	-.0068
#2	2.991	3.323	-.0003	2.326	-.0068
#3	1.781	2.305	-.0027	3.248	-.0029
#4	3.216	1.996	-.0009	2.107	-.0065
#5	2.382	4.424	-.0041	2.496	-.0069

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.5422
Stddev	.1361
%RSD	2.9962
#1	4.5085
#2	4.5138
#3	4.7722
#4	4.5087
#5	4.4076

Analysis Report **HNF-1645 REV. 0** 09/22/98 14:47:12 page 1

Method: ISO_U Sample Name: s98t002422 Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 14:45 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.822	3.442	85.78	6.232	12010.
Stddev	.579	.661	2.21	.551	423.
%RSD	20.50	19.20	2.577	8.837	3.520
#1	2.629	3.603	85.60	5.551	12010.
#2	3.479	3.070	89.03	6.652	11980.
#3	2.487	2.774	82.83	6.695	11320.
#4	2.146	3.271	86.06	6.541	12340.
#5	3.370	4.494	85.38	5.719	12370.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	5.0072
Stddev	.1622
%RSD	3.2390
#1	5.1344
#2	4.8860
#3	5.2278
#4	4.8919
#5	4.8958

Analysis Report 09/22/98 14:47:24 page 1

HNF-1645 REV. 0

Method: ISO_U Sample Name: s98t002422 Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 14:45 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.822	3.442	.2271	6.232	34.87
Stddev	.579	.661	.0061	.551	1.23
%RSD	20.50	19.20	2.670	8.837	3.522
#1	2.629	3.603	.2266	5.551	34.88
#2	3.479	3.070	.2360	6.652	34.81
#3	2.487	2.774	.2190	6.695	32.88
#4	2.146	3.271	.2279	6.541	35.84
#5	3.370	4.494	.2260	5.719	35.93

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	5.0072
Stddev	.1622
%RSD	3.2390
#1	5.1344
#2	4.8860
#3	5.2278
#4	4.8919
#5	4.8958

Analysis Report 09/22/98 14:51:40 page 1

HNF-1645 REV. 0

Method: ISO_U Sample Name: s98t002422_d Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 14:49 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.922	3.783	93.73	6.460	12890.
Stddev	.573	.706	5.16	.734	270.
%RSD	19.61	18.67	5.500	11.36	2.097
#1	2.693	3.935	92.69	6.835	12890.
#2	2.270	4.541	102.2	6.595	13250.
#3	3.815	2.784	90.12	5.259	12710.
#4	3.055	3.383	94.49	7.202	12560.
#5	2.778	4.273	89.20	6.410	13020.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.7129
Stddev	.1201
%RSD	2.5476
#1	4.8281
#2	4.6249
#3	4.8490
#4	4.5823
#5	4.6802

Analysis Report HNF-1645 REV. 0 09/22/98 14:51:49 page 1

Method: ISO_U Sample Name: s98t002422_d Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 14:49 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.922	3.783	.2489	6.460	37.42
Stddev	.573	.706	.0141	.734	.79
%RSD	19.61	18.67	5.681	11.36	2.098
#1	2.693	3.935	.2460	6.835	37.43
#2	2.270	4.541	.2720	6.595	38.49
#3	3.815	2.784	.2390	5.259	36.92
#4	3.055	3.383	.2510	7.202	36.46
#5	2.778	4.273	.2365	6.410	37.82

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.7129
Stddev	.1201
%RSD	2.5476
#1	4.8281
#2	4.6249
#3	4.8490
#4	4.5823
#5	4.6802

Analysis Report **HNF-1645 REV. 0** 09/22/98 14:55:07 page 1

Method: ISO_U Sample Name: s98t002422_a Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 14:53 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.382	4.161	140.6	7.162	18610.
Stddev	.226	.573	8.4	.743	709.
%RSD	9.499	13.77	5.965	10.37	3.813
#1	2.423	4.140	142.5	8.381	18410.
#2	2.718	4.077	129.7	6.699	18780.
#3	2.416	4.430	147.8	6.947	18580.
#4	2.133	3.297	134.3	6.497	17640.
#5	2.218	4.859	148.8	7.288	19610.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.9917
Stddev	.1739
%RSD	3.4845
#1	4.9517
#2	5.1502
#3	4.9662
#4	5.1564
#5	4.7339

Analysis Report **HNF-1645 REV. 0** 09/22/98 14:55:16 page 1

Method: ISO_U Sample Name: s98t002422_a Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 14:53 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.382	4.161	.3775	7.162	54.05
Stddev	.226	.573	.0230	.743	2.06
%RSD	9.499	13.77	6.094	10.37	3.814
#1	2.423	4.140	.3826	8.381	53.48
#2	2.718	4.077	.3476	6.699	54.57
#3	2.416	4.430	.3972	6.947	53.98
#4	2.133	3.297	.3602	6.497	51.25
#5	2.218	4.859	.4000	7.288	56.97

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.9917
Stddev	.1739
%RSD	3.4845
#1	4.9517
#2	5.1502
#3	4.9662
#4	5.1564
#5	4.7339

Spike U_{238} $= \frac{54.05 - 34.87}{20} \times 100 =$

$= 95.9\%$

Analysis Report HNF-1645 REV. 0 09/22/98 14:58:39 page 1

Method: ISO_U Sample Name: s98t002423 Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 14:56 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3.030	3.842	86.97	6.377	12330.
Stddev	.447	.898	8.10	.789	852.
%RSD	14.76	23.37	9.308	12.37	6.913
#1	2.721	2.939	92.19	5.225	13650.
#2	2.926	4.727	90.94	6.303	13290.
#3	3.792	4.529	90.69	6.530	12780.
#4	2.694	4.191	88.32	6.387	11760.
#5	3.014	2.825	72.71	7.440	11170.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.8205
Stddev	.3444
%RSD	7.1449
#1	4.5935
#2	4.4425
#3	4.7470
#4	5.0104
#5	5.3089

Analysis Report HNF-1645 REV. 0 09/22/98 14:58:47 page 1

Method: ISO_U Sample Name: s98t002423 Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 14:56 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	3.030	3.842	.2304	6.377	35.81
Stddev	.447	.898	.0222	.789	2.48
%RSD	14.76	23.37	9.639	12.37	6.916
#1	2.721	2.939	.2447	5.225	36.74
#2	2.926	4.727	.2413	6.303	38.60
#3	3.792	4.529	.2406	6.530	37.13
#4	2.694	4.191	.2341	6.387	34.16
#5	3.014	2.825	.1912	7.440	32.43

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.8205
Stddev	.3444
%RSD	7.1449
#1	4.5935
#2	4.4425
#3	4.7470
#4	5.0104
#5	5.3089

Analysis Report HNF-1645 REV. 0 09/22/98 15:12:33 page 1

Method: ISO_U Sample Name: s98t002423_d Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 15:11 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.976	3.739	85.87	6.103	12120.
Stddev	.220	.691	4.75	1.285	410.
%RSD	7.379	18.47	5.534	21.06	3.388
#1	2.895	2.998	83.64	3.929	12250.
#2	3.366	3.577	89.53	6.417	12500.
#3	2.863	3.606	78.58	7.317	12120.
#4	2.908	3.635	89.73	6.647	12290.
#5	2.847	4.881	87.86	6.202	11420.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.8070
Stddev	.0781
%RSD	1.6242
#1	4.8363
#2	4.7529
#3	4.7148
#4	4.8145
#5	4.9167

HNF-1645 REV. 0

Analysis Report 09/22/98 15:12:42 page 1

Method: ISO_U Sample Name: s98t002423_d Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 15:11 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.976	3.739	.2273	6.103	35.19
Stddev	.220	.691	.0130	1.285	1.19
%RSD	7.379	18.47	5.733	21.06	3.390
#1	2.895	2.998	.2212	3.929	35.58
#2	3.366	3.577	.2374	6.417	36.30
#3	2.863	3.606	.2074	7.317	35.20
#4	2.908	3.635	.2379	6.647	35.68
#5	2.847	4.881	.2328	6.203	33.17

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.8070
Stddev	.0781
%RSD	1.6242
#1	4.8363
#2	4.7529
#3	4.7148
#4	4.8145
#5	4.9167

Analysis Report HNF-1645 REV. 0 09/22/98 15:03:36 page 1

Method: ISO_U Sample Name: s98t002424 Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 15:01 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.955	3.821	89.22	6.613	12500.
Stddev	.551	1.028	3.08	1.313	615.
%RSD	18.66	26.91	3.448	19.85	4.924
#1	3.756	5.008	91.09	6.156	12880.
#2	2.793	2.483	85.15	7.759	12330.
#3	3.118	3.313	89.15	4.677	11480.
#4	2.870	4.677	93.11	6.590	12920.
#5	2.238	3.623	87.59	7.885	12850.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.8306
Stddev	.1784
%RSD	3.6930
#1	4.7919
#2	4.8328
#3	5.1318
#4	4.7042
#5	4.6922

Analysis Report HNF-1645 REV. 0 09/22/98 15:03:44 page 1

Method: ISO_U Sample Name: s98t002424 Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 15:01 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.955	3.821	.2365	6.613	36.29
Stddev	.551	1.028	.0084	1.313	1.79
%RSD	18.66	26.91	3.568	19.85	4.926
#1	3.756	5.008	.2417	6.156	37.42
#2	2.793	2.483	.2254	7.759	35.81
#3	3.118	3.313	.2363	4.677	33.35
#4	2.870	4.677	.2472	6.590	37.54
#5	2.238	3.623	.2321	7.885	37.33

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.8306
Stddev	.1784
%RSD	3.6930
#1	4.7919
#2	4.8328
#3	5.1318
#4	4.7042
#5	4.6922

Analysis Report HNF-1645 REV. 0 09/22/98 15:06:31 page 1

Method: ISO_U Sample Name: s98t002424_d Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 15:04 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3.049	3.453	88.71	6.434	12090.
Stddev	.288	.854	6.63	.881	341.
%RSD	9.449	24.72	7.471	13.70	2.822
#1	3.235	3.039	77.54	5.784	11680.
#2	2.808	2.912	92.57	6.969	12590.
#3	2.754	3.601	92.57	7.732	11930.
#4	3.438	2.831	87.67	5.763	12040.
#5	3.013	4.882	93.18	5.921	12220.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.8773
Stddev	.1484
%RSD	3.0419
#1	5.1007
#2	4.8073
#3	4.7206
#4	4.9450
#5	4.8132

Analysis Report HNF-1645 REV. 0 09/22/98 15:06:42 page 1

Method: ISO_U Sample Name: s98t002424_d Operator: bjg
Comment: 10201 df
Run Time: 09/22/98 15:04 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	3.049	3.453	.2351	6.434	35.12
Stddev	.288	.854	.0182	.881	.99
%RSD	9.449	24.72	7.731	13.70	2.824
#1	3.235	3.039	.2045	5.784	33.92
#2	2.808	2.912	.2457	6.969	36.58
#3	2.754	3.601	.2457	7.732	34.64
#4	3.438	2.831	.2323	5.763	34.98
#5	3.013	4.882	.2474	5.921	35.48

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.8773
Stddev	.1484
%RSD	3.0419
#1	5.1007
#2	4.8073
#3	4.7206
#4	4.9450
#5	4.8132

Method: ISO_U Sample Name: icv Operator: bjg
Comment:
Run Time: 09/22/98 15:18 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	3.669	2.510	25.98	5.103	6948.
Stddev	.358	.232	2.47	.876	150.
%RSD	9.771	9.252	9.494	17.16	2.163
#1	3.802	2.535	28.20	5.175	7174.
#2	3.293	2.367	22.84	4.425	6964.
#3	3.935	2.589	26.82	6.006	6756.
#4	3.281	2.223	23.92	4.022	6949.
#5	4.035	2.835	28.14	5.889	6900.

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.7460
Stddev	.1074
%RSD	2.2623
#1	4.7341
#2	4.8589
#3	4.8284
#4	4.7237
#5	4.5849

Analysis Report HNF-1645 REV. 0 09/22/98 15:20:03 page 1

Method: ISO_U Sample Name: icv Operator: bjg
Comment:
Run Time: 09/22/98 15:18 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	3.669	2.510	.0631	5.103	20.17
Stddev	.358	.232	.0068	.876	.44
%RSD	9.771	9.252	10.73	17.16	2.165
#1	3.802	2.535	.0692	5.175	20.83
#2	3.293	2.367	.0545	4.425	20.22
#3	3.935	2.589	.0654	6.006	19.61
#4	3.281	2.223	.0574	4.022	20.17
#5	4.035	2.835	.0690	5.889	20.03

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.7460
Stddev	.1074
%RSD	2.2623
#1	4.7341
#2	4.8589
#3	4.8284
#4	4.7237
#5	4.5849

Analysis Report HNF-1645 REV. 0 09/22/98 15:22:15 page 1

Method: ISO_U Sample Name: icb Operator: bjg
Comment:
Run Time: 09/22/98 15:20 Type: Unk Mode: IR Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	Cts/S	Cts/S	Cts/S	Cts/S	Cts/S
Avg	2.563	2.780	2.864	2.593	7.215
Stddev	.604	.373	.710	.577	1.819
%RSD	23.58	13.43	24.77	22.24	25.21
#1	3.233	2.930	2.122	3.233	5.567
#2	2.806	2.918	3.031	1.796	10.33
#3	2.525	2.854	3.403	2.744	5.586
#4	2.659	2.127	2.127	2.234	7.020
#5	1.592	3.071	3.640	2.957	5.574

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.6109
Stddev	.2214
%RSD	4.8019
#1	4.9488
#2	4.4545
#3	4.5550
#4	4.7005
#5	4.3958

HNF-1645 REV. 0

ethod: ISO_U Sample Name: icb Operator: bjg

omment:

un Time: 09/22/98 15:20 Type: Unk Mode: CONC Corr.Fact: 1.000000

Elem	U_[233]	U_[234]	U_[235]	U_[236]	U_[238]
Line	233/pulse	234/pulse	235/pulse	236/pulse	238/pulse
Units	ppb	ppb	ppb	ppb	ppb
Avg	2.563	2.780	-.0003	2.593	.0026
Stddev	.604	.373	.0019	.577	.0053
%RSD	23.58	13.43	590.6	22.24	205.8
#1	3.233	2.930	-.0024	3.233	.0007
#2	2.806	2.918	.0001	1.796	.0116
#3	2.525	2.854	.0011	2.744	.0007
#4	2.659	2.127	-.0024	2.234	.0020
#5	1.592	3.071	.0018	2.957	-.0022

Int. Std.	Ir[193]
Line	193/pulse
Units	Cts/S
Avg	4.6109
Stddev	.2214
%RSD	4.8019
#1	4.9488
#2	4.4545
#3	4.5550
#4	4.7005
#5	4.3958

Sam B. Pang
9/22/98

LABCORE Completed Worklist Report for Worklist# 25689

Analyst: slh **Instrument:** CARB2 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: @TICTOC1 FOR ER-311 GRAB SAMPLES RTS

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	BLNK		0		@TICTOC1 TIC-02	LIQUID	1	1.90E+0	1.900	ug/mL
1	BLNK		0		@TICTOC1 TOC-02	LIQUID	1	7.10E+0	7.100	ug/mL
2	STD		0		@TICTOC1 TIC-02	LIQUID	6.02E+02	6.11E+2	101.495	% Recovery
2	STD		0		@TICTOC1 TOC-02	LIQUID	3.00E+03	2.81E+3	93.667	% Recovery
3	SAMPLE	S98T002422	0		@TICTOC1 TIC-02	LIQUID	N/A	1.75E+02	5.000	ug/mL
3	SAMPLE	S98T002422	0		@TICTOC1 TOC-02	LIQUID	N/A	1.07E+02	40.000	ug/mL
4	DUP	S98T002422	0		@TICTOC1 TIC-02	LIQUID	1.75E+2	1.74E+2	0.573	RPD
4	DUP	S98T002422	0		@TICTOC1 TOC-02	LIQUID	1.07E+2	1.13E+2	5.455	RPD
5	SPK	S98T002422	0		@TICTOC1 TIC-02	LIQUID	1.00E+02	9.98E+01	99.800	% Recovery
5	SPK	S98T002422	0		@TICTOC1 TOC-02	LIQUID	1.00E+02	1.00E+02	100.000	% Recovery
6	SAMPLE	S98T002423	0		@TICTOC1 TIC-02	LIQUID	N/A	1.68E+02	5.000	ug/mL
6	SAMPLE	S98T002423	0		@TICTOC1 TOC-02	LIQUID	N/A	1.09E+02	40.000	ug/mL
7	DUP	S98T002423	0		@TICTOC1 TIC-02	LIQUID	1.68E+2	1.66E+2	1.198	RPD
7	DUP	S98T002423	0		@TICTOC1 TOC-02	LIQUID	1.09E+2	1.11E+2	1.818	RPD
8	SAMPLE	S98T002424	0		@TICTOC1 TIC-02	LIQUID	N/A	1.73E+02	5.000	ug/mL
8	SAMPLE	S98T002424	0		@TICTOC1 TOC-02	LIQUID	N/A	1.15E+02	40.000	ug/mL
9	DUP	S98T002424	0		@TICTOC1 TIC-02	LIQUID	1.73E+2	1.77E+2	2.286	RPD
9	DUP	S98T002424	0		@TICTOC1 TOC-02	LIQUID	1.15E+2	1.18E+2	2.575	RPD

Final page for worklist# 25689

Analyst Signature **Date** **Analyst Signature** **Date**

8/31/98

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 25689

Analyst: SLH **Instrument:** CARB2 **Book#** 25N12-D TIC
26N12-E TOC

Method: LA-342-100 Rev/Mod F-1

Worklist Comment: @TICTOC1 FOR ER-311 GRAB SAMPLES RTS

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	BLNK				@TICTOC1	LIQUID		
2	STD				@TICTOC1	LIQUID		
3	SAMPLE	S98T002422	0		@TICTOC1	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			TIC-02	, TOC-02		
4	DUP	S98T002422	0		@TICTOC1	LIQUID		
5	SPK	S98T002422	0		@TICTOC1	LIQUID		
6	SAMPLE	S98T002423	0		@TICTOC1	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			TIC-02	, TOC-02		
7	DUP	S98T002423	0		@TICTOC1	LIQUID		
8	SAMPLE	S98T002424	0		@TICTOC1	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			TIC-02	, TOC-02		
9	DUP	S98T002424	0		@TICTOC1	LIQUID		

Final page for worklist # 25689

S L Hood Bootright
Analyst Signature Date 8-27-98

Mary Fran 8-31-98
Analyst Signature Date

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WORKBOOK PAGE: BLANK1

HNF-1645 REV. 0

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type	Sample Size in mL	(SS)	0.0000	0.0000
BLNK	Dilution Factor	(DF)	1	1
Work List	µg of Carbon in Sample	(C1)	9	26.8
25689	µg of Carbon from Baseline	(C2)	7.1	33.9

Test Code	@TICTOC1
Matrix	LIQUID
Batch Number	98004237
Rerun	0
Sample Prep	N/A
Sample #	BLNK
Instrument Code	CARB2
Prepared By	MF
Chemist	MJL
Analyst	slh
Date Complete	08/31/98
Analysis Date	08/29/98
Analysis Time	03:42 PM
Sample Point	ER-311 GRAB

µg of Carbon = |C1-C2|

	TIC	TOC
Method Detection Limit in µg/mL	5	40
µg of Carbon	1.90E+00	7.10E+00

10/1/98 MJL
10/9/98

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:	N/A	Date:	9/23/98

BLANK.WB1 REV 1.0 342100MJL

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 134 TO 162.

WORKBOOK PAGE: STD2

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type	Sample Size in mL	(SS)	1.0000	0.2000
STD	Dilution Factor	(DF)	1	1
Work List	Final Coulometer Reading in µg	(C1)	618.1	595.2
25689	µg of Carbon from Baseline	(C2)	7.1	33.9
Test Code	Standard Book Number		25N12D	26N12E
@TICTOC1	Standard Value (µg/ml)		602	3000

Matrix: LIQUID
Batch Number: 98004237
Rerun: 0
Sample Prep: N/A
Sample #: STD
Instrument Code: CARB2
Prepared By: MF
Chemist: MJL
Analyst: slh
Date Complete: 08/31/98
Analysis Date: 08/29/98
Analysis Time: 03:42 PM
Sample Point: ER-311 GRAB

QC Actual in µg/mL = Standard Value (µg/mL)

QC Found in µg/mL = (C1 - C2) * DF / SS

QC Found in µg/mL for TIC = 5 if C1 < C2

QC Found in µg/mL for TOC = 40 if C1 < C2

% Recovery = QC Found / QC Actual * 100

	TIC	TOC
Method Detection Limit in µg/mL	5	40
QC Actual in µg/mL	6.02E+02	3.00E+03
QC Found in µg/mL	6.11E+02	2.81E+03
Percent Standard Recovery	101.5	93.6

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:		Date:	

STANDARD.WB1 REV 1.0 342100ML

WORKBOOK PAGE: SAM3

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type	Sample Size in mL	(SS)	1.0000	1.0000
SAMPLE	Dilution Factor	(DF)	1	1
Work List	µg of Carbon in Sample	(C1)	182.3	140.9
25689	µg of Carbon from Baseline	(C2)	7.1	33.9
Test Code				
@TICTOC1				

Matrix	LIQUID
Batch Number	98004237
Rerun	0
Sample Prep	N/A
Sample #	S98T002422
Instrument Code	CARB2
Prepared By	MF
Chemist	MJL
Analyst	slh
Date Complete	08/31/98
Analysis Date	08/29/98
Analysis Time	03:42 PM
Sample Point	ER-311 GRAB

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

	TIC	TOC
Method Detection Limit in µg/mL	5	40
µg of Carbon/mL	1.75E+02	1.07E+02

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 1.0 342100ML

WORKBOOK PAGE: DUP4

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type	Sample Size in mL	(SS)	1.0000	1.0000
DUP	Dilution Factor	(DF)	1	1
Work List	µg of Carbon in Sample	(C1)	180.6	147.2
25689	µg of Carbon from Baseline	(C2)	7.1	33.9
Test Code	Known µg of C from Original Sample		1.75E+2	1.07E+2
@TICTOC1				

Matrix	LIQUID
Batch Number	98004237
Rerun	0
Sample Prep	N/A
Sample #	S98T002422
Instrument Code	CARB2
Prepared By	MF
Chemist	MJL
Analyst	slh
Date Complete	08/31/98
Analysis Date	08/29/98
Analysis Time	03:42 PM
Sample Point	ER-311 GRAB

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

	TIC	TOC
Method Detection Limit in µg/mL	5	40
µg of Carbon/mL	1.74E+02	1.13E+02

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 1.0 342100ML

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WORKBOOK PAGE: SPIKE5

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type	Sample Vial Data			
SPK	Sample Volume in mL	(SS)	1.0000	1.0000
Work List	Final Coulometer Reading in µg	(C1)	182.3	140.9
25689	Spiked Vial Data			
Test Code	Sample Volume in mL	(SPK SS)	1.0000	1.0000
@TICTOC1	Amount of Spike Std. in mL	(SPK VOL)	0.500	0.100
Matrix	Final Coulometer Reading in µg	(C2)	482.6	440.9
LIQUID	Spike Book Number		25N12D	26N12E
Batch Number	Spike Standard Value in µg/ml	(SPK CONC)	602	3000
98004237	µg C in baseline	(BL)	7.1	33.9

Rerun
0
Sample Prep
N/A
Sample #
S98T002422
Instrument Code
CARB2
Prepared By
MF
Chemist
MJL
Analyst
slh
Date Complete
08/31/98
Analysis Date
08/29/98
Analysis Time
03:42 PM
Sample Point
ER-311 GRAB

Percent Spike Recovery = ((C2-BL) - (C1-BL) * (SPK SS) / SS) / ((SPK CONC) * (SPK VOL)) * 100

QC Actual in µg/mL = Spike Value (µg/mL)
QC Found in µg/mL = (Percent Spike Recovery)*(QC Actual) / 100

	TIC	TOC
QC Actual in µg/mL	6.02E+02	3.00E+03
QC Found in µg/mL	6.01E+02	3.00E+03
Percent Spike Recovery	99.8	100.0

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:		Date:	

SPIKE.WB1 REV 1.3 342100ML

WORKBOOK PAGE: SAM6

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type	Sample Size in mL	(SS)	1.0000	1.0000
SAMPLE	Dilution Factor	(DF)	1	1
Work List	µg of Carbon in Sample	(C1)	175.4	143
25689	µg of Carbon from Baseline	(C2)	7.1	33.9
Test Code				
@TICTOC1				

Matrix: LIQUID

Batch Number: 98004237

Rerun: 0

Sample Prep: N/A

Sample #: S98T002423

Instrument Code: CARB2

Prepared By: MF

Chemist: MJL

Analyst: slh

Date Complete: 08/31/98

Analysis Date: 08/29/98

Analysis Time: 03:42 PM

Sample Point: ER-311 GRAB

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

	TIC	TOC
Method Detection Limit in µg/mL	5	40
µg of Carbon/mL	1.68E+02	1.09E+02

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 1.0 342100ML

I:\342100\OUT\25689.WB1 08/31/98 09:22:09

WORKBOOK PAGE: DUP7

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type: DUP	Sample Size in mL	(SS)	1.0000	1.0000
	Dilution Factor	(DF)	1	1
Work List: 25689	µg of Carbon in Sample	(C1)	172.8	144.5
	µg of Carbon from Baseline	(C2)	7.1	33.9
Test Code: @TICTOC1	Known µg of C from Original Sample		1.68E+2	1.09E+2

Matrix: LIQUID
Batch Number: 98004237
Rerun: 0
Sample Prep: N/A
Sample #: S98T002423
Instrument Code: CARB2
Prepared By: MF
Chemist: MJL
Analyst: slh
Date Complete: 08/31/98
Analysis Date: 08/29/98
Analysis Time: 03:42 PM
Sample Point: ER-311 GRAB

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

	TIC	TOC
Method Detection Limit in µg/mL	5	40
µg of Carbon/mL	1.66E+02	1.11E+02

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 1.0 342100ML

WORKBOOK PAGE: SAM8

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type	Sample Size in mL	(SS)	1.0000	1.0000
SAMPLE	Dilution Factor	(DF)	1	1
Work List	µg of Carbon in Sample	(C1)	180.4	148.9
25689	µg of Carbon from Baseline	(C2)	7.1	33.9
Test Code				
@TICTOC1				

Matrix	LIQUID
Batch Number	98004237
Rerun	0
Sample Prep	N/A
Sample #	S98T002424
Instrument Code	CARB2
Prepared By	MF
Chemist	MJL
Analyst	slh
Date Complete	08/31/98
Analysis Date	08/29/98
Analysis Time	03:42 PM
Sample Point	ER-311 GRAB

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

	TIC	TOC
Method Detection Limit in µg/mL	5	40
µg of Carbon/mL	1.73E+02	1.15E+02

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:		Date:	

WORKBOOK PAGE: DUP9

TIC/TOC : LA-342-100 (F-1) LIQUIDS

			TIC	TOC
Type	Sample Size in mL	(SS)	1.0000	1.0000
DUP	Dilution Factor	(DF)	1	1
Work List	µg of Carbon in Sample	(C1)	184.2	151.8
25689	µg of Carbon from Baseline	(C2)	7.1	33.9
Test Code	Known µg of C from Original Sample		1.73E+2	1.15E+2
@TICTOC1				

Matrix: LIQUID

Batch Number: 98004237

Rerun: 0

Sample Prep: N/A

Sample #: S98T002424

Instrument Code: CARB2

Prepared By: MF

Chemist: MJL

Analyst: slh

Date Complete: 08/31/98

Analysis Date: 08/29/98

Analysis Time: 03:42 PM

Sample Point: ER-311 GRAB

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

	TIC	TOC
Method Detection Limit in µg/mL	5	40
µg of Carbon/mL	1.77E+02	1.18E+02

Data Entered By:	MF	Date:	08/31/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 1.0 342100ML

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT

TICTOC REV 2.0

<<< BLANK ANALYSIS >>>

Sample: BASE 1 Date: 08/20/98 Time: 21:36:47

Sample Size = 1 ug carbon
Dil Factor = 1
Blank ID # = BASE 1
Blank Value = N/A

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.20	0.00
2	1.01	0.50	60.00
3	1.51	0.80	37.50
4	2.01	1.20	33.33
5	2.50	1.60	25.00
6	3.00	1.90	15.79
7	3.50	2.30	17.39
8	4.00	2.70	14.81
9	4.50	3.00	10.00
10	5.00	3.30	9.09
11	5.50	3.60	8.33
12	6.00	4.00	10.00
13	6.50	4.20	4.76
14	7.00	4.60	8.70
15	7.50	4.90	6.12
16	8.00	5.20	5.77
17	8.50	5.50	5.45
18	9.00	5.80	5.17
19	9.50	6.10	4.92
20	10.00	6.40	4.69
21	10.50	6.80	5.88
22	11.00	7.10	4.23

BLANK VALUE = 7.1 micrograms carbon
BLANK FACTOR = 7.1 / 10.99805 = +6.5E-01 ug/min Carbon

Sample Run By: SL HOOD 00001

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: BASE 1 Date: 08/20/98 Time: 21:50:06

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

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.00	0.70	57.14
3	1.50	1.60	56.25
4	2.00	5.80	72.41
5	2.50	11.80	50.85
6	3.00	16.30	27.61
7	3.50	19.70	17.26
8	4.00	21.90	10.05
9	4.50	23.70	7.59
10	5.00	25.20	5.95
11	5.50	26.40	4.55
12	6.00	27.40	3.65
13	6.50	28.40	3.52
14	7.00	29.40	3.40
15	7.50	30.00	2.00
16	8.00	30.60	1.96
17	8.50	31.10	1.61
18	9.00	31.80	2.20
19	9.50	32.30	1.55
20	10.00	32.80	1.52
21	10.50	33.40	1.80
22	11.00	33.90	1.47

BLANK VALUE = 33.9 micrograms carbon
BLANK FACTOR = 33.9 / 10.99707 = +3.08E+00 ug/min Carbon

<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: SL HOOD 00001

By:

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD Date: 08/20/98 Time: 22:07:40

Sample Size = 1000 uL
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.40	0.00
2	1.00	0.80	50.00
3	1.50	2.30	65.22
4	2.00	24.50	90.61
5	2.50	115.40	78.77
6	3.00	258.60	55.38
7	3.50	385.30	32.88
8	4.00	472.70	18.49
9	4.50	528.30	10.52
10	5.00	561.30	5.88
11	5.50	581.00	3.39
12	6.00	592.50	1.94
13	6.50	599.60	1.18
14	7.00	605.00	0.89
15	7.50	608.30	0.54
16	8.00	611.10	0.46
17	8.50	613.00	0.31
18	9.00	614.50	0.24
19	9.50	615.60	0.18
20	10.00	616.50	0.15
21	10.50	617.30	0.13
22	11.00	618.10	0.13

USER INPUT BLANK VALUE
BLANK VALUE = 7.148096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(618.1 - 7.147381)(1)/(1000) = +6.110E-01 g/L Carbon
(618.1 - 7.147381)(1)/(1000)(12) = +5.091E-02 Molar Carbon

Sample Run By: SL HOOD 00001

SS=1ml = 25N12-D

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD 1 Date: 08/20/98 Time: 22:23:46

Sample Size = 200 uL
Dil Factor = 1
Blank ID # =
Blank Value = 3.03 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.40	0.00
2	1.01	0.90	55.56
3	1.50	1.80	50.00
4	2.00	20.40	91.18
5	2.50	120.40	83.06
6	3.00	284.80	57.72
7	3.50	406.50	29.94
8	4.00	475.80	14.56
9	4.50	517.50	8.06
10	5.00	542.60	4.63
11	5.50	558.60	2.86
12	6.00	568.50	1.74
13	6.50	575.20	1.16
14	7.00	580.40	0.90
15	7.50	584.20	0.65
16	8.00	586.80	0.44
17	8.50	589.00	0.37
18	9.00	590.70	0.29
19	9.50	592.20	0.25
20	10.00	593.40	0.20
21	10.50	594.30	0.15
22	11.00	595.20	0.15

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.37098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(595.2 - 33.8706)(1)/(200) = +2.807E+00 g/L Carbon
(595.2 - 33.8706)(1)/(200)(12) = +2.339E-01 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: _____
SL HOOD 00001

SS = .200ml = 26A12-E

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: BLK 1 Date: 08/20/98 Time: 22:58:18

Sample Size = 1 ul
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	0.70	57.14
3	1.50	1.40	50.00
4	2.00	2.10	33.33
5	2.50	2.70	22.22
6	3.00	3.20	15.63
7	3.50	3.80	15.79
8	4.00	4.20	9.52
9	4.50	4.60	8.70
10	5.00	5.10	9.80
11	5.50	5.40	5.56
12	6.00	5.70	5.26
13	6.50	6.10	6.56
14	7.00	6.40	4.69
15	7.50	6.80	5.88
16	8.00	7.10	4.23
17	8.50	7.40	4.05
18	9.00	7.70	3.90
19	9.50	8.10	4.94
20	10.00	8.40	3.57
21	10.50	8.70	3.45
22	11.00	9.00	3.33

USER INPUT BLANK VALUE
BLANK VALUE = 7.143096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(9 - 7.146826)(1)/(1) = +1.9E+00 g/L Carbon
(9 - 7.146826)(1)/(1)(12) = +1.5E-01 Molar Carbon

Sample Run By: _____
SL HOOD 00001

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: BLK 1 Date: 08/20/98 Time: 23:11:49

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 3.03 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.40	0.00
2	1.01	0.70	42.86
3	1.51	1.60	56.25
4	2.01	4.40	63.64
5	2.51	8.90	50.56
6	3.00	12.60	29.37
7	3.50	15.20	17.11
8	4.00	17.20	11.63
9	4.50	18.50	7.03
10	5.00	19.80	6.57
11	5.50	20.50	3.41
12	6.00	21.20	3.30
13	6.50	21.90	3.20
14	7.00	22.60	3.10
15	7.50	23.20	2.59
16	8.00	23.80	2.52
17	8.50	24.30	2.06
18	9.00	24.80	2.02
19	9.50	25.30	1.98
20	10.00	25.90	2.32
21	10.50	26.30	1.52
22	11.00	26.80	1.87

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.87098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(26.8 - 33.87962)(1)/(1) = < 5.00 E-3 g/L Carbon
(26.8 - 33.87962)(1)/(1)(12) = < 4.17 E-4 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: _____
SL HOOD 00001

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002422 Date: 08/20/98 Time: 23:33:22

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.70	0.00
2	1.00	1.00	30.00
3	1.50	1.80	44.44
4	2.00	9.70	81.44
5	2.50	38.80	75.00
6	3.00	79.40	51.13
7	3.50	114.60	30.72
8	4.00	139.40	17.79
9	4.50	154.20	9.60
10	5.00	162.80	5.28
11	5.50	168.50	3.38
12	6.00	172.00	2.03
13	6.50	174.20	1.26
14	7.00	176.20	1.14
15	7.50	177.40	0.68
16	8.00	178.60	0.67
17	8.50	179.40	0.45
18	9.00	180.20	0.44
19	9.50	180.80	0.33
20	10.00	181.40	0.33
21	10.50	181.80	0.22
22	11.00	182.30	0.27

USER INPUT BLANK VALUE
BLANK VALUE = 7.148096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(182.3 - 7.148651)(1)/(1) = +1.752E+02 g/L Carbon
(182.3 - 7.148651)(1)/(1)(12) = +1.460E+01 Molar Carbon

Sample Run By: SL HOOD 00001

SS = 1.0264g = 1ml

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002422 Date: 08/21/98 Time: 00:47:01

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 3.08 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.40	0.00
2	1.01	0.90	55.56
3	1.51	1.80	50.00
4	2.00	13.60	86.76
5	2.50	42.30	67.85
6	3.00	71.10	40.51
7	3.50	90.70	21.61
8	4.00	101.60	10.73
9	4.50	109.80	7.47
10	5.00	115.30	4.77
11	5.50	119.20	3.27
12	6.00	122.80	2.93
13	6.50	125.50	2.15
14	7.00	128.30	2.18
15	7.50	130.30	1.53
16	8.00	132.10	1.36
17	8.50	133.70	1.20
18	9.00	135.30	1.18
19	9.50	137.00	1.24
20	10.00	138.30	0.94
21	10.50	139.70	1.00
22	11.00	140.90	0.85

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.87098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(140.9 - 33.87361)(1)/(1) = +1.070E+02 g/L Carbon
(140.9 - 33.87361)(1)/(1)(12) = +8.919E+00 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: _____
SL HOOD 00001

SS = 1ml = 1.0264g

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02422 DUP Date: 08/21/98 Time: 01:13:52

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	0.70	57.14
3	1.50	1.40	50.00
4	2.00	8.50	83.53
5	2.50	38.60	77.98
6	3.00	81.20	52.46
7	3.50	116.90	30.54
8	4.00	140.60	16.86
9	4.50	154.60	9.06
10	5.00	162.10	4.63
11	5.50	167.10	2.99
12	6.00	170.40	1.94
13	6.50	172.70	1.33
14	7.00	174.60	1.09
15	7.50	175.80	0.68
16	8.00	176.70	0.51
17	8.50	177.70	0.56
18	9.00	178.30	0.34
19	9.50	179.00	0.39
20	10.00	179.60	0.33
21	10.50	180.10	0.28
22	11.00	180.60	0.28

USER INPUT BLANK VALUE
BLANK VALUE = 7.148096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(180.6 - 7.147401)(1)/(1) = +1.735E+02 g/L Carbon
(180.6 - 7.147401)(1)/(1)(12) = +1.445E+01 Molar Carbon

Sample Run By: _____
SL HOOD 00001

SS= 1ml = 1.0194g

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02422 DUP Date: 08/21/98 Time: 01:31:06

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 3.0 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.00	0.20	100.00
3	1.50	1.60	87.50
4	2.00	13.80	88.41
5	2.50	44.50	68.99
6	3.00	72.50	38.62
7	3.50	92.40	21.54
8	4.00	103.50	10.72
9	4.50	111.60	7.26
10	5.00	117.70	5.18
11	5.50	122.30	3.76
12	6.00	126.10	3.01
13	6.50	129.60	2.70
14	7.00	132.20	1.97
15	7.50	135.00	2.07
16	8.00	137.30	1.68
17	8.50	139.40	1.51
18	9.00	141.30	1.34
19	9.50	142.90	1.12
20	10.00	144.30	0.97
21	10.50	145.90	1.10
22	11.00	147.20	0.88

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.87098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(147.2 - 33.87589)(1)/(1) = +1.133E+02 g/L Carbon
(147.2 - 33.87589)(1)/(1)(12) = +9.444E+00 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: SL HOOD 00001

SS = 1ml = 1.0194g

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02422 SEK Date: 08/21/98 Time: 01:46:07

Sample Size = 1 ul
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.40	0.00
2	1.01	0.90	55.56
3	1.51	2.10	57.14
4	2.00	21.50	90.23
5	2.50	99.10	78.30
6	3.00	209.20	52.63
7	3.50	300.90	30.48
8	4.00	365.30	17.63
9	4.50	408.70	10.62
10	5.00	435.30	6.11
11	5.50	450.70	3.42
12	6.00	460.20	2.06
13	6.50	466.20	1.29
14	7.00	470.60	0.93
15	7.50	473.50	0.61
16	8.00	476.00	0.53
17	8.50	477.30	0.27
18	9.00	478.70	0.29
19	9.50	479.90	0.25
20	10.00	480.90	0.21
21	10.50	481.80	0.19
22	11.00	482.60	0.17

USER INPUT BLANK VALUE
BLANK VALUE = 7.148096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(482.6 - 7.1487)(1)/(1) = +4.755E+02 g/L Carbon
(482.6 - 7.1487)(1)/(1)(12) = +3.962E+01 Molar Carbon

Sample Run By: _____
SL HOOD 00001

SS = 1ml = 1.0130g + .500 ml spk 25N12-D

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02422 SPK Date: 08/21/98 Time: 02:00:01

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 3.0E ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.60	0.00
2	1.01	1.20	50.00
3	1.50	3.70	67.57
4	2.00	43.90	91.57
5	2.50	153.90	71.47
6	3.00	257.00	40.12
7	3.50	319.70	19.61
8	4.00	356.00	10.20
9	4.50	378.10	5.85
10	5.00	392.40	3.64
11	5.50	402.20	2.44
12	6.00	409.60	1.81
13	6.50	414.90	1.28
14	7.00	419.50	1.10
15	7.50	423.60	0.97
16	8.00	426.90	0.77
17	8.50	429.50	0.61
18	9.00	432.10	0.60
19	9.50	434.70	0.60
20	10.00	436.60	0.44
21	10.50	438.80	0.50
22	11.00	440.90	0.48

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.37098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(440.9 - 33.87074)(1)/(1) = +4.070E+02 g/L Carbon
(440.9 - 33.87074)(1)/(1)(12) = +3.392E+01 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: SL HOOD 00001

SS = 1ml = 1.0130g + .100 ml spk 26N12-E

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002423 Date: 08/21/98 Time: 02:14:22

Sample Size = 1 ul
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.90	0.00
2	1.01	2.00	55.00
3	1.51	3.20	37.50
4	2.01	12.00	73.33
5	2.51	42.00	71.43
6	3.00	82.40	49.03
7	3.50	114.60	28.10
8	4.00	137.00	16.35
9	4.50	149.40	8.30
10	5.00	157.00	4.84
11	5.50	161.80	2.97
12	6.00	164.90	1.88
13	6.50	167.30	1.43
14	7.00	168.90	0.95
15	7.50	170.20	0.76
16	8.00	171.20	0.58
17	8.50	172.20	0.58
18	9.00	172.90	0.40
19	9.50	173.60	0.40
20	10.00	174.20	0.34
21	10.50	174.80	0.34
22	11.00	175.40	0.34

USER INPUT BLANK VALUE :
BLANK VALUE = 7.143096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(175.4 - 7.149241)(1)/(1) = +1.683E+02 g/L Carbon
(175.4 - 7.149241)(1)/(1)(12) = +1.402E+01 Molar Carbon

Sample Run By:
SL HOOD 00001

85 = 1ml = 1.027lg

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002423 Date: 08/21/98 Time: 02:29:10

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 3.08 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.60	0.00
2	1.01	1.20	50.00
3	1.50	3.80	68.42
4	2.00	25.70	85.21
5	2.50	58.30	55.92
6	3.00	79.90	27.03
7	3.50	91.80	12.96
8	4.00	100.50	8.66
9	4.50	106.50	5.63
10	5.00	111.60	4.57
11	5.50	115.80	3.63
12	6.00	119.30	2.93
13	6.50	122.90	2.93
14	7.00	125.80	2.31
15	7.50	128.40	2.02
16	8.00	131.10	2.06
17	8.50	133.20	1.58
18	9.00	135.40	1.62
19	9.50	137.50	1.53
20	10.00	139.30	1.29
21	10.50	141.40	1.49
22	11.00	143.00	1.12

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.87098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(143 - 33.87638)(1)/(1) = +1.091E+02 g/L Carbon
(143 - 33.87638)(1)/(1)(12) = +9.094E+00 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: SL HOOD 00001

SS = 1.027/g = 1ml

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02423 DUP Date: 08/21/98 Time: 02:45:01

Sample Size = 1 ul
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.00	0.00
2	1.01	1.90	47.37
3	1.50	2.80	32.14
4	2.00	6.20	54.84
5	2.50	26.10	76.25
6	3.00	61.20	57.35
7	3.50	96.90	36.84
8	4.00	122.90	21.16
9	4.50	140.00	12.21
10	5.00	150.20	6.79
11	5.50	156.20	3.84
12	6.00	160.40	2.62
13	6.50	163.50	1.90
14	7.00	165.30	1.09
15	7.50	166.90	0.96
16	8.00	168.20	0.77
17	8.50	169.20	0.59
18	9.00	170.10	0.53
19	9.50	170.90	0.47
20	10.00	171.50	0.35
21	10.50	172.20	0.41
22	11.00	172.80	0.35

USER INPUT BLANK VALUE
BLANK VALUE = 7.148096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(172.8 - 7.1487)(1)/(1) = +1.657E+02 g/L Carbon
(172.8 - 7.1487)(1)/(1)(12) = +1.380E+01 Molar Carbon

Sample Run By: SL HOOD 00001

SS = 1ml = 1.0248g 157

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02423 DUP Date: 08/21/98 Time: 02:58:31

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 3.0[illegible] ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.60	0.00
2	1.01	1.00	40.00
3	1.50	1.90	47.37
4	2.00	9.60	80.21
5	2.50	32.70	70.64
6	3.00	61.10	46.48
7	3.50	82.10	25.58
8	4.00	94.60	13.21
9	4.50	103.60	8.69
10	5.00	109.80	5.65
11	5.50	114.90	4.44
12	6.00	119.10	3.53
13	6.50	122.70	2.93
14	7.00	126.00	2.62
15	7.50	129.00	2.33
16	8.00	131.60	1.98
17	8.50	134.40	2.08
18	9.00	136.60	1.61
19	9.50	138.90	1.66
20	10.00	141.00	1.49
21	10.50	142.80	1.26
22	11.00	144.50	1.18

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.87098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(144.5 - 33.87638)(1)/(1) = +1.106E+02 g/L Carbon
(144.5 - 33.87638)(1)/(1)(12) = +9.219E+00 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: _____
SL HOOD 00001

SS = 1.0248g = 1ml

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002424 Date: 08/21/98 Time: 03:12:53

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.40	0.00
2	1.01	2.20	36.36
3	1.51	3.30	33.33
4	2.00	14.10	76.60
5	2.50	47.40	70.25
6	3.00	89.00	46.74
7	3.50	121.80	26.93
8	4.00	143.00	14.83
9	4.50	155.30	7.92
10	5.00	162.60	4.49
11	5.50	167.00	2.63
12	6.00	170.00	1.76
13	6.50	172.20	1.28
14	7.00	173.80	0.92
15	7.50	175.10	0.74
16	8.00	176.20	0.62
17	8.50	177.10	0.51
18	9.00	177.80	0.39
19	9.50	178.60	0.45
20	10.00	179.20	0.33
21	10.50	179.90	0.39
22	11.00	180.40	0.28

USER INPUT BLANK VALUE
BLANK VALUE = 7.143096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(180.4 - 7.149246)(1)/(1) = +1.733E+02 g/L Carbon
(180.4 - 7.149246)(1)/(1)(12) = +1.444E+01 Molar Carbon

Sample Run By: _____
SL HOOD 00001

SS = 1ml = 1.0264g

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002424 Date: 08/21/98 Time: 03:25:23

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = 3.08 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.60	0.00
2	1.01	1.20	50.00
3	1.50	3.50	65.71
4	2.00	21.40	83.64
5	2.50	52.50	59.24
6	3.00	78.00	32.69
7	3.50	93.50	16.58
8	4.00	103.40	9.57
9	4.50	110.20	6.17
10	5.00	116.00	5.00
11	5.50	120.40	3.65
12	6.00	124.30	3.14
13	6.50	127.70	2.66
14	7.00	130.90	2.44
15	7.50	133.80	2.17
16	8.00	136.50	1.98
17	8.50	138.80	1.66
18	9.00	141.30	1.77
19	9.50	143.20	1.33
20	10.00	145.30	1.45
21	10.50	147.20	1.29
22	11.00	148.90	1.14

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.87098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(148.9 - 33.87379)(1)/(1) = +1.150E+02 g/L Carbon
(148.9 - 33.87379)(1)/(1)(12) = +9.586E+00 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: _____
SL HOOD 00001

SS = 1.0264g = 1ml

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02424 DUP Date: 08/21/98 Time: 03:38:06

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = .65 ug/minute C

Analyst : SL HOOD
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.60	0.00
2	1.01	3.10	48.39
3	1.50	4.70	34.04
4	2.00	15.50	69.68
5	2.50	48.60	68.11
6	3.00	89.80	45.88
7	3.50	122.30	27.17
8	4.00	145.50	15.26
9	4.50	158.00	7.91
10	5.00	165.80	4.70
11	5.50	170.30	2.64
12	6.00	173.40	1.79
13	6.50	176.00	1.48
14	7.00	177.40	0.79
15	7.50	178.70	0.73
16	8.00	179.80	0.61
17	8.50	180.80	0.55
18	9.00	181.50	0.39
19	9.50	182.30	0.44
20	10.00	183.00	0.38
21	10.50	183.60	0.33
22	11.00	184.20	0.33

USER INPUT BLANK VALUE
BLANK VALUE = 7.148096 micrograms carbon
BLANK FACTOR = 7.148096 / 10.99707 = +6.5E-01 ug/min Carbon

SAMPLE RESULTS:
(184.2 - 7.148046)(1)/(1) = +1.771E+02 g/L Carbon
(184.2 - 7.148046)(1)/(1)(12) = +1.475E+01 Molar Carbon

Sample Run By: SL HOOD 00001

SS = 1ml = 1.0334g

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02424 DUP Date: 08/21/98 Time: 03:51:23

Sample Size = 1 uL Analyst : SL HOOD
Dil Factor = 1 Min Readings = 22
Blank ID # = Max Readings = 22
Blank Value = 3.08 ug/minute C % Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	1.51	0.80	0.00
2	1.01	1.20	33.33
3	1.51	2.40	50.00
4	2.00	12.40	80.65
5	2.50	40.60	69.46
6	3.00	70.50	42.41
7	3.50	90.30	21.93
8	4.00	101.80	11.30
9	4.50	110.20	7.62
10	5.00	116.40	5.33
11	5.50	121.40	4.12
12	6.00	125.50	3.27
13	6.50	129.60	3.16
14	7.00	133.00	2.56
15	7.50	135.90	2.13
16	8.00	138.60	1.95
17	8.50	141.10	1.77
18	9.00	143.60	1.74
19	9.50	146.00	1.64
20	10.00	148.10	1.42
21	10.50	150.10	1.33
22	11.00	151.80	1.12

USER INPUT BLANK VALUE
BLANK VALUE = 33.87098 micrograms carbon
BLANK FACTOR = 33.87098 / 10.99707 = +3.1E+00 ug/min Carbon

SAMPLE RESULTS:
(151.8 - 33.87079 (1)/(1) = +1.179E+02 g/L Carbon
(151.8 - 33.87079 (1)/(1)(12) = +9.827E+00 Molar Carbon
<<<< WARNING - BLANK VALUE EXCEEDS 1.5 ug/min Carbon!!!!!>>>>

Sample Run By: _____
SL HOOD 00001

SD = 1ml = 1.0334g

LABCORE Completed Worklist Report for Worklist# 25688

Analyst: slh **Instrument:** TOC01 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: TOC-01 FOR ER-311 GRAB SAMPLES RTS

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	BLNK			0	TOC-01	LIQUID	1	1.00E+0	1.000	ug/mL
2	STD			0	TOC-01	LIQUID	3.00E+03	3.00E+3	100.000	% Recovery
3	SAMPLE	S98T002422		0	TOC-01	LIQUID	N/A	3.11E+02	5.500	ug/mL
4	DUP	S98T002422		0	TOC-01	LIQUID	3.11E+2	3.13E+2	0.641	RPD
5	SPK	S98T002422		0	TOC-01	LIQUID	1.00E+02	8.08E+01	80.800	% Recovery
6	SAMPLE	S98T002423		0	TOC-01	LIQUID	N/A	2.62E+02	5.500	ug/mL
7	DUP	S98T002423		0	TOC-01	LIQUID	2.62E+2	2.40E+2	8.765	RPD
8	SAMPLE	S98T002424		0	TOC-01	LIQUID	N/A	2.67E+02	5.500	ug/mL
9	DUP	S98T002424		0	TOC-01	LIQUID	2.67E+2	2.78E+2	4.037	RPD

Final page for worklist# 25688

Analyst Signature Date

Analyst Signature 8-26-98 Date

Reviewer Signature 8/26/98 Date

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 25688

Analyst: SLA **Instrument:** TOC01 _____ **Book#** 26N12-E

Method: LA-344-105 Rev/Mod E-0

Worklist Comment: TOC-01 FOR ER-311 GRAB SAMPLES RTS

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	BLNK				TOC-01	LIQUID		
2	STD				TOC-01	LIQUID		
3	SAMPLE	S98T002422	0		TOC-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: TOC-01						
4	DUP	S98T002422	0		TOC-01	LIQUID		
5	SPK	S98T002422	0		TOC-01	LIQUID		
6	SAMPLE	S98T002423	0		TOC-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: TOC-01						
7	DUP	S98T002423	0		TOC-01	LIQUID		
8	SAMPLE	S98T002424	0		TOC-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: TOC-01						
9	DUP	S98T002424	0		TOC-01	LIQUID		

Final page for worklist # 25688

Sandra Lloyd Boatright
Analyst Signature **Date** 8-25-98

Analyst Signature **Date**

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WORKBOOK PAGE: BLANK1

TOC : LA-344-105 (E-0) LIQUIDS

			BLNK
Type	Sample Volume in mL	(SS)	0.000
BLNK	H2SO4 Volume in mL	(VR)	2.000
Work List	Volume Injected in mL	(VI)	0.200
25688	Dilution Factor (calculated)	(DF)	
Test Code	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Blank	(C1)	3
Matrix	µg of Carbon from Baseline	(C2)	2
LIQUID			
Batch Number			
98004236	µg of Carbon = |C1-C2|		
Rerun			
0	Method Detection Limit (µg/mL) = 1 µg C * DF * DDF / VI		
Sample Prep			
N/A			
Sample #			
blk			
Instrument Code			
TOC01			
Prepared By			
JRO			
Chemist			
MJL			
Analyst			
SLH			
Date Complete			
08/26/98			
Analysis Date			
08/25/98			
Analysis Time	Method Detection Limit in µg/mL		0.00E+00
03:50 AM			
Sample Point	µg of Carbon		1.00E+00
ER-311			

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:	for MJL	Date:	9/23/98

BLANK.WB1 REV 2.0 344105ML

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 165 TO 183.

WORKBOOK PAGE: STD2

TOC : LA-344-105 (E-0) LIQUIDS

			STD
Type	Sample Volume in mL	(SS)	0.200
STD	H2SO4 Volume in mL	(VR)	2.000
Work List	Volume Injected in mL	(VI)	0.200
25688	Dilution Factor (calculated)	(DF)	11.000
Test Code	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon Found	(C1)	56.5
Matrix	µg of Carbon from Baseline	(C2)	2
LIQUID	Standard Book Number		26N12E
Batch Number	Standard Value (µg/ml)		3000
98004236			
Rerun			
0	µg of Carbon/mL = (C1-C2) * DF * DDF / VI		
Sample Prep			
N/A	Method Detection Limit (µg/mL) = 1 µg C * DF * DDF / VI		
Sample #			
Instrument Code			
TOC01			
Prepared By			
JRO			
Chemist			
MJL			
Analyst			
SLH			
Date Complete			
08/26/98			
Analysis Date			
08/25/98			
Analysis Time	Method Detection Limit in µg/mL		5.50E+01
03:50 AM	QC Actual in µg/mL		3.00E+03
Sample Point	QC Found in µg/mL		3.00E+03
ER-311	Percent Standard Recovery		99.9

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:		Date:	

STANDARD.WB1 REV 2.0 344105ML

WORKBOOK PAGE: SAM3

TOC : LA-344-105 (E-0) LIQUIDS

			SAMPLE
Type	Sample Volume in mL	(SS)	2.000
SAMPLE	H2SO4 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
25688	Dilution Factor (calculated)	(DF)	1.100
Test Code	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	58.5
Matrix	µg of Carbon from Baseline	(C2)	2
LIQUID			
Batch Number			
98004236			
Rerun			
0			
Sample Prep			
N/A			
Sample #			
S98T002422			
Instrument Code			
TOC01			
Prepared By			
JRO			
Chemist			
MJL			
Analyst			
SLH			
Date Complete			
08/26/98			
Analysis Date			
08/25/98			
Analysis Time			
03:50 AM			
Sample Point			
ER-311			

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit = 1 µg C * DF * DDF / VI

Method Detection Limit in µg/mL	5.50E+00
µg of Carbon/mL	3.11E+02

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 2.0 344105ML

WORKBOOK PAGE: DUP4

TOC : LA-344-105 (E-0) LIQUIDS

			DUP
Sample Volume in mL	(SS)	2.000
H2SO4 Volume in mL	(VR)	0.200
Volume Injected in mL	(VI)	0.200
Dilution Factor (calculated)	(DF)	1.100
Digest Dilution Factor	(DDF)	1
µg of Carbon in Sample	(C1)	58.9
µg of Carbon from Baseline	(C2)	2
Result from Sample Page		3.11E+2

Type	DUP
Work List	25688
Test Code	TOC-01
Matrix	LIQUID
Batch Number	98004236
Rerun	0
Sample Prep	N/A
Sample #	S98T002422
Instrument Code	TOC01
Prepared By	JRO
Chemist	MJL
Analyst	SLH
Date Complete	08/26/98
Analysis Date	08/25/98
Analysis Time	03:50 AM
Sample Point	ER-311

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit = 1 µg C * DF * DDF / VI

Method Detection Limit in µg/mL	5.50E+00
µg of Carbon/mL	3.13E+02

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 2.0 344105ML

WORKBOOK PAGE: SPIKE5

TOC : LA-344-105 (E-0) LIQUIDS

SPIKE

Type	Sample Vial Data			Spiked Vial Data		
SPK	Sample Volume in mL	(SS)	2.000	Was the sample dilution used? (yes/no)		YES
Work List	H2SO4 Volume in mL	(VR)	0.200	Sample Volume in mL	(SPK SS)	0.400
25688	Volume Injected in mL	(VI)	0.200	H2SO4 Volume in mL	(SPK VR)	0.200
Test Code	µg of Carbon in Sample	(C1)	58.5	Amount of Spike Std. in mL	(SPK VOL)	0.400
TOC-01	µg of Carbon from Baseline	(C2)	2	Volume Injected in mL	(SPK VI)	0.200
Matrix				µg C in Sample + Spike	(C3)	74.3
LIQUID				Pre-Spike Dilution Factor	(PDF)	1.10
Batch Number				Spike Book Number		23N12D
98004236				Spike Value in µg/ml		769

Rerun
0
Sample Prep
N/A
Sample #
S98T002422
Instrument Code
TOC01
Prepared By
JRO
Chemist
MJL
Analyst
SLH
Date Complete
08/26/98
Analysis Date
08/25/98
Analysis Time
03:50 AM
Sample Point
ER-311

Spike Correction Factor (SPK CF) = (SPK SS + SPK VOL + SPK VR) / SPK VI

Sample Correction Factor (SAM CF) = (SS + VR) / (VI)

Sample Size Correction Factor (SS CF) = (SPK SS) / (SS)

QC Actual in µg/mL = Spike Value (µg/mL)

QC Found in µg/mL = [(C3 - C2)(SPK CF) - (C1-C2)(SAM CF)(SS CF)/(PDF)] / (SPK VOL)

Percent Spike Recovery = (QC Found) / (QC Actual) * 100

QC Actual in µg/mL	7.69E+02
QC Found in µg/mL	6.21E+02
Percent Spike Recovery	80.8

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:		Date:	

SPIKE.WB1 REV 2.0 344105ML

WORKBOOK PAGE: SAM6

TOC : LA-344-105 (E-0) LIQUIDS

			SAMPLE
Type	Sample Volume in mL	(SS)	2.000
SAMPLE	H2SO4 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
25688	Dilution Factor (calculated)	(DF)	1.100
Test Code	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	49.7
Matrix	µg of Carbon from Baseline	(C2)	2
LIQUID			
Batch Number			
98004236			
Rerun			
0			
Sample Prep			
N/A			
Sample #			
S98T002423			
Instrument Code			
TOC01			
Prepared By			
JRO			
Chemist			
MJL			
Analyst			
SLH			
Date Complete			
08/26/98			
Analysis Date			
08/25/98			
Analysis Time			
03:50 AM			
Sample Point			
ER-311			

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit = 1 µg C * DF * DDF / VI

Method Detection Limit in µg/mL	5.50E+00
µg of Carbon/mL	2.62E+02

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 2.0 344105ML

WORKBOOK PAGE: DUP7

TOC : LA-344-105 (E-0) LIQUIDS

			DUP
Type	Sample Volume in mL	(SS)	2.000
DUP	H2SO4 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
25688	Dilution Factor (calculated)	(DF)	1.100
Test Code	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	45.6
Matrix	µg of Carbon from Baseline	(C2)	2
LIQUID	Result from Sample Page		2.62E+2
Batch Number			
98004236			
Rerun	µg of Carbon/mL = (C1-C2) * DF * DDF / VI		
0			
Sample Prep	Method Detection Limit = 1 µg C * DF * DDF / VI		
N/A			
Sample #			
S98T002423			
Instrument Code			
TOC01			
Prepared By			
JRO			
Chemist			
MJL			
Analyst			
SLH			
Date Complete			
08/26/98			
Analysis Date			
08/25/98			
Analysis Time	Method Detection Limit in µg/mL		5.50E+00
03:50 AM			
Sample Point	µg of Carbon/mL		2.40E+02
ER-311			

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 2.0 344105ML

2

TOC : LA-344-105 (E-0) LIQUIDS

			SAMPLE
Type	Sample Volume in mL	(SS)	2.000
SAMPLE	H2SO4 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
25688	Dilution Factor (calculated)	(DF)	1.100
Test Code	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	50.5
Matrix	µg of Carbon from Baseline	(C2)	2
LIQUID			
Batch Number			
98004236			
Rerun			
0			
Sample Prep			
N/A			
Sample #			
S98T002424			
Instrument Code			
TOC01			
Prepared By			
JRO			
Chemist			
MJL			
Analyst			
SLH			
Date Complete			
08/26/98			
Analysis Date			
08/25/98			
Analysis Time			
03:50 AM			
Sample Point			
ER-311			

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit = 1 µg C * DF * DDF / VI

Method Detection Limit in µg/mL	5.50E+00
µg of Carbon/mL	2.67E+02

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 2.0 344105ML

WORKBOOK PAGE: DUP9

TOC : LA-344-105 (E-0) LIQUIDS

			DUP
Type	Sample Volume in mL	(SS)	2.000
DUP	H2SO4 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
25688	Dilution Factor (calculated)	(DF)	1.100
Test Code	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	52.6
Matrix	µg of Carbon from Baseline	(C2)	2
LIQUID	Result from Sample Page		2.67E+2
Batch Number			
98004236			
Rerun			
0			
Sample Prep			
N/A			
Sample #			
S98T002424			
Instrument Code			
TOC01			
Prepared By			
JRO			
Chemist			
MJL			
Analyst			
SLH			
Date Complete			
08/26/98			
Analysis Date			
08/25/98			
Analysis Time	Method Detection Limit in µg/mL		5.50E+00
03:50 AM			
Sample Point	µg of Carbon/mL		2.78E+02
ER-311			

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit = 1 µg C * DF * DDF / VI

Data Entered By:	JRO	Date:	08/26/98
Signature of Chemist:		Date:	

SAMPLE.WB1 REV 2.0 344105ML

I:\344105\OUT\25688.WB1 08/26/98 08:43:33

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: BASE Date: 08/24/98 Time: 22:13:05

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

Analyst : SL HOOD
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	0.10	100.00
3	1.51	0.20	50.00
4	2.01	0.70	71.43
5	2.51	0.80	12.50
6	3.01	1.00	20.00
7	3.51	1.10	9.09
8	4.01	1.20	8.33
9	4.51	1.40	14.29
10	5.00	1 50	6.67
11	5.50	1.70	11.76
12	6.00	1.70	0.00
13	6.50	1.80	5.56
14	7.01	2.00	10.00

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

Sample Run By: _____
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD Date: 08/24/98 Time: 22:33:22

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BASE
Blank Value = .2855102 ug/minute C

Analyst : SL HOOD
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	0.20	100.00
3	1.51	9.90	97.98
4	2.01	34.60	71.39
5	2.51	47.00	26.38
6	3.01	51.90	9.44
7	3.51	52.90	3.71
8	4.01	54.90	1.82
9	4.50	55.40	0.90
10	5.00	55.70	0.54
11	5.51	55.90	0.36
12	6.01	56.10	0.36
13	6.51	56.30	0.36
14	7.00	56.50	0.35

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(56.5 - 1.99993)(11)/(200) = +3.00E+00 g/L Carbon
(56.5 - 1.99993)(11)/(200)(12) = +2.50E-01 Molar Carbon

Sample Run By: SL Hood Bloatright
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: BLK Date: 08/24/98 Time: 22:58:35

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BASE
Blank Value = .2855102 ug/minute C

Analyst : SL HOOD
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.20	0.00
2	1.01	0.50	60.00
3	1.51	0.80	37.50
4	2.01	1.10	27.27
5	2.51	1.30	15.38
6	3.01	1.60	18.75
7	3.51	1.80	11.11
8	4.01	1.90	5.26
9	4.51	2.10	9.52
10	5.01	2.30	8.70
11	5.51	2.50	8.00
12	6.01	2.60	3.85
13	6.50	2.80	7.14
14	7.00	3.00	6.67

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(3 - 1.99993)(1)/(200) = +5.0E-03 g/L Carbon
(3 - 1.99993)(1)/(200)(12) = +4.2E-04 Molar Carbon

Sample Run By: _____
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002422 Date: 08/24/98 Time: 23:36:59

Sample Size = 200 uL
Dil Factor = 1.1
Blank ID # = BASE
Blank Value = .2855102 ug/minute C

Analyst : SL HOOD
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.40	0.00
2	1.01	1.50	73.33
3	1.50	20.00	92.50
4	2.00	40.90	51.10
5	2.50	49.10	16.70
6	3.00	53.10	7.53
7	3.50	55.00	3.45
8	4.00	56.20	2.14
9	4.50	56.80	1.06
10	5.00	57.30	0.87
11	5.50	57.70	0.69
12	6.00	57.90	0.35
13	6.50	58.30	0.69
14	7.00	58.50	0.34

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(58.5 - 1.999651)(1.1)/(200) = +3.11E-01 g/L Carbon
(58.5 - 1.999651)(1.1)/(200)(12) = +2.59E-02 Molar Carbon

Sample Run By: _____
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002422 Dup Date: 08/25/98 Time: 02:37:07

Sample Size = 200 uL Analyst : SL HOOD
Dil Factor = 1.1 Min Readings = 14
Blank ID # = BASE Max Readings = 14
Blank Value = .2855102 ug/minute C % Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	5.40	94.44
3	1.51	33.80	84.02
4	2.01	42.50	20.47
5	2.51	47.00	9.57
6	3.01	50.40	6.75
7	3.51	52.50	4.00
8	4.01	54.30	3.31
9	4.51	55.60	2.34
10	5.01	56.60	1.77
11	5.51	57.30	1.22
12	6.01	57.90	1.04
13	6.51	58.40	0.86
14	7.01	58.90	0.85

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(58.9 - 2.000187)(1.1)/(200) = +3.13E-01 g/L Carbon
(58.9 - 2.000187)(1.1)/(200)(12) = +2.61E-02 Molar Carbon

Sample Run By: _____
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02422 SPK Date: 08/25/98 Time: 02:47:09

Sample Size = 200 uL
Dil Factor = 2.5
Blank ID # = BASE
Blank Value = .2855102 ug/minute C

Analyst : SL HOOD
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	9.00	98.89
3	1.51	46.50	80.65
4	2.01	56.20	17.26
5	2.51	61.20	8.17
6	3.01	64.70	5.41
7	3.51	67.20	3.72
8	4.01	69.20	2.89
9	4.51	70.60	1.98
10	5.01	71.70	1.53
11	5.51	72.60	1.24
12	6.01	73.20	0.82
13	6.51	73.90	0.95
14	7.00	74.30	0.54

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(74.3 - 1.999952)(2.5)/(200) = +9.04E-01 g/L Carbon
(74.3 - 1.999952)(2.5)/(200)(12) = +7.53E-02 Molar Carbon

Sample Run By: _____
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002423 Date: 08/24/98 Time: 23:58:14

Sample Size = 200 uL
Dil Factor = 1.1
Blank ID # = BASE
Blank Value = .2855102 ug/minute C

Analyst : SL HOOD
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	2.50	100.00
3	1.51	25.40	90.16
4	2.01	36.50	30.41
5	2.51	41.40	11.84
6	3.01	44.30	6.55
7	3.51	46.10	3.90
8	4.01	47.10	2.12
9	4.51	47.80	1.46
10	5.01	48.40	1.24
11	5.51	48.80	0.82
12	6.01	49.10	0.61
13	6.51	49.50	0.81
14	7.00	49.70	0.40

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(49.7 - 1.99993)(1.1)/(200) = +2.62E-01 g/L Carbon
(49.7 - 1.99993)(1.1)/(200)(12) = +2.19E-02 Molar Carbon

Sample Run By: _____
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02423 DUP Date: 08/25/98 Time: 00:06:55

Sample Size = 200 uL Analyst : SL HOOD
Dil Factor = 1.1 Min Readings = 14
Blank ID # = BASE Max Readings = 14
Blank Value = .2855102 ug/minute C % Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.20	0.00
2	%-1438.99	2.30	91.30
3	%-1438.49	22.40	89.73
4	%-1437.99	33.20	32.53
5	%-1437.49	37.80	12.17
6	%-1436.99	40.70	7.13
7	%-1436.49	42.30	3.78
8	%-1435.99	43.20	2.08
9	%-1435.49	43.80	1.37
10	%-1434.99	44.50	1.57
11	%-1434.49	44.70	0.45
12	%-1433.99	45.00	0.67
13	%-1433.49	45.30	0.66
14	%-1433.00	45.60	0.66

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(45.6 --409.135)(1.1)/(200) = +2.50E+00 g/L Carbon
(45.6 --409.135)(1.1)/(200)(12) = +2.08E-01 Molar Carbon

Sample Run By: _____
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T002424 Date: 08/25/98 Time: 00:24:36

Sample Size = 200 uL
Dil Factor = 1.1
Blank ID # = BASE
Blank Value = .2855102 ug/minute C

Analyst : SL HOOD
Min Readings = 14
Max Readings = 14
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	3.00	96.67
3	1.51	25.50	88.24
4	2.01	37.10	31.27
5	2.51	42.10	11.88
6	3.01	45.20	6.86
7	3.51	46.90	3.62
8	4.00	47.90	2.09
9	4.50	48.70	1.64
10	5.00	49.20	1.02
11	5.50	49.60	0.81
12	6.00	49.90	0.60
13	6.50	50.30	0.80
14	7.00	50.50	0.40

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(50.5 - 1.999713)(1.1)/(200) = +2.67E-01 g/L Carbon
(50.5 - 1.999713)(1.1)/(200)(12) = +2.22E-02 Molar Carbon

Sample Run By: _____
SL HOOD 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: S98T02424 DUP Date: 08/25/98 Time: 02:07:17

Sample Size = 200 uL Analyst : SL HOOD
Dil Factor = 1.1 Min Readings = 14
Blank ID # = BASE Max Readings = 14
Blank Value = .2855102 ug/minute C % Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.30	0.00
2	1.01	3.50	88.00
3	1.51	26.60	90.60
4	2.00	37.10	28.30
5	2.50	42.40	12.50
6	3.00	45.70	7.22
7	3.50	47.60	3.99
8	4.00	48.90	2.66
9	4.50	49.90	2.00
10	5.00	50.70	1.58
11	5.50	51.30	1.17
12	6.00	51.80	0.97
13	6.50	52.30	0.96
14	7.00	52.60	0.57

BLANK VALUE = 2 micrograms carbon
BLANK FACTOR = 2 / 7.005005 = +2.9E-01 ug/min Carbon

SAMPLE RESULTS:
(52.6 - 1.999713)(1.1)/(200) = +2.78E-01 g/L Carbon
(52.6 - 1.999713)(1.1)/(200)(12) = +2.32E-02 Molar Carbon

Sample Run By: _____
SL HOOD 00000

LABCORE Completed Worklist Report for Worklist# 25692

Analyst: jro **Instrument:** U01 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: @U-01 FOR ER-311 GRAB SAMPLES RTS

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@U-01	U-02	LIQUID	6.12E-02	6.07E-02	99.183	% Recovery
1	STD		0	@U-01	U-02E	LIQUID	1	3.05E+00	3.050	Ratio
2	BLNK		0	@U-01	U-02	LIQUID	1	2.99E-3	0.003	ug/mL
2	BLNK		0	@U-01	U-02E	LIQUID	1	6.59E+00	6.590	Ratio
3	SAMPLE	S98T002422	0	@U-01	U-02	LIQUID	N/A	3.68E+02	3.70e-003	ug/mL
3	SAMPLE	S98T002422	0	@U-01	U-02E	LIQUID	N/A	3.07E+00		% Inst Error
4	DUP	S98T002422	0	@U-01	U-02	LIQUID	3.68E+2	3.37E+2	8.794	RPD
4	DUP	S98T002422	0	@U-01	U-02E	LIQUID	1	3.06E+00	3.060	Ratio
5	SPK	S98T002422	0	@U-01	U-02	LIQUID	6.12E+01	0.00E+00	0.000	% Recovery
6	SAMPLE	S98T002423	0	@U-01	U-02	LIQUID	N/A	3.29E+02	3.70e-003	ug/mL
6	SAMPLE	S98T002423	0	@U-01	U-02E	LIQUID	N/A	3.04E+00		% Inst Error
7	DUP	S98T002423	0	@U-01	U-02	LIQUID	3.29E+2	3.44E+2	4.458	RPD
7	DUP	S98T002423	0	@U-01	U-02E	LIQUID	1	3.08E+00	3.080	Ratio
8	SAMPLE	S98T002424	0	@U-01	U-02	LIQUID	N/A	3.22E+02	3.70e-003	ug/mL
8	SAMPLE	S98T002424	0	@U-01	U-02E	LIQUID	N/A	3.11E+00		% Inst Error
9	DUP	S98T002424	0	@U-01	U-02	LIQUID	3.22E+2	3.27E+2	1.541	RPD
9	DUP	S98T002424	0	@U-01	U-02E	LIQUID	1	3.06E+00	3.060	Ratio

Final page for worklist# 25692

Analyst Signature **Date** **Analyst Signature** **Date**

8/24/98

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 25692

Analyst: _____ **Instrument:** U01 _____ **Book#** 33357

Method: LA-925-009 Rev/Mod BO

Worklist Comment: @U-01 FOR ER-311 GRAB SAMPLES RTS

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@U-01	LIQUID		
2	BLNK				@U-01	LIQUID		
3	SAMPLE	S98T002422	0		@U-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			U-02	, U-02E		
4	DUP	S98T002422	0		@U-01	LIQUID		
5	SPK	S98T002422	0		@U-01	LIQUID		
6	SAMPLE	S98T002423	0		@U-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			U-02	, U-02E		
7	DUP	S98T002423	0		@U-01	LIQUID		
8	SAMPLE	S98T002424	0		@U-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			U-02	, U-02E		
9	DUP	S98T002424	0		@U-01	LIQUID		

Final page for worklist # 25692

8-21-98
Analyst Signature **Date**

8/26/98
Analyst Signature **Date**

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

```
Sample ID  33b57                          Date/Time  08/21/98/14:10:49
Description  std                          Cal Y=5.27E+07X-1.95E-03
Ref. Ratio 1.08                           Intensity 2754      (t=  39      us)
Laser Fulses 1000                         Conc 6.07E-05 + 1.85E-06 g/L
Lifetime 284 + 1.056 us                   Dilution Factor 1 mL/mL
*R2 .9994
Integrated 51794              FINAL RESULT  6.07E-05 + 1.85E-06 g/L
Range: HIGH
-----------------------------------------------------------------------------
Sample ID  33b57                          Date/Time  08/21/98/14:11:53
Description  std                          Cal Y=4.04E+09X0
Ref. Ratio 1.1                            Intensity 94320     (t= 247      us)
Laser Fulses 1000                         Conc 5.88E-05 + 7.54E-07 g/L
Lifetime 280 + .746 us                    Dilution Factor 1 mL/mL
R2 .9997
Integrated 1807496            FINAL RESULT  5.88E-05 + 7.54E-07 g/L
Range: LOW
-----------------------------------------------------------------------------
Sample ID  BLANK                          Date/Time  08/21/98/14:13:52
Description  BLK                          Cal Y=4.04E+09X0
Ref. Ratio 1.102                          Intensity 135       (t=  39      us)
Laser Fulses 1000                         Conc 2.99E-08 + 1.97E-09 g/L
Lifetime 303 + 26.992 us                  Dilution Factor 1 mL/mL
R2 .8515
Integrated 1568               FINAL RESULT  2.99E-08 + 1.97E-09 g/L
Range: LOW
-----------------------------------------------------------------------------
Sample ID  S98T002422                     Date/Time  08/21/98/14:17:31
Description  SAM                          Cal Y=5.27E+07X-1.95E-03
Ref. Ratio 1.067                          Intensity 98515     (t= 182      us)
Laser Fulses 1000                         Conc 3.68E-03 + 1.13E-04 g/L
Lifetime 289 + 1.035 us                   Dilution Factor 1 mL/mL
R2 .9994
Integrated 1945285            FINAL RESULT  3.68E-03 + 1.13E-04 g/L
Range: HIGH
-----------------------------------------------------------------------------
```

```
Sample ID  S98T002422                    Date/Time  08/21/98/14:20:21
Description  DUP                         Cal Y=5.27E+07X-1.95E-03
Ref. Ratio 1.062                         Intensity 98775      (t= 156      us)
Laser Pulses 1000                        Conc 3.37E-03 + 1.03E-04 g/L
Lifetime 293 + .869 us                   Dilution Factor 1 mL/mL
R2 .9996
Integrated 1983303            FINAL RESULT  3.37E-03 + 1.03E-04 g/L
Range: HIGH
```

```
Sample ID  S98T002422                    Date/Time  08/21/98/14:23:01
Description  SPK                         Cal Y=5.27E+07X-1.95E-03
Ref. Ratio 1.087                         Intensity 95252      (t= 195      us)
Laser Pulses 1000                        Conc 3.67E-03 + 1.13E-04 g/L
Lifetime 292 + .903 us                   Dilution Factor 1 mL/mL
R2 .9996
Integrated 1878751            FINAL RESULT  3.67E-03 + 1.13E-04 g/L
Range: HIGH
```

```
Sample ID  S98T002424                    Date/Time  08/21/98/14:25:39
Description  SAM                         Cal Y=5.27E+07X-1.95E-03
Ref. Ratio 1.08                          Intensity 98031      (t= 156      us)
Laser Pulses 1000                        Conc 3.29E-03 + 1.00E-04 g/L
Lifetime 297 + .804 us                   Dilution Factor 1 mL/mL
R2 .9997
Integrated 1969353            FINAL RESULT  3.29E-03 + 1.00E-04 g/L
Range: HIGH
```

```
Sample ID  S98T002424                    Date/Time  08/21/98/14:28:23
Description  DUP                         Cal Y=5.27E+07X-1.95E-03
Ref. Ratio 1.091                         Intensity 93938      (t= 182      us)
Laser Pulses 1000                        Conc 3.44E-03 + 1.06E-04 g/L
Lifetime 294 + 1.001 us                  Dilution Factor 1 mL/mL
R2 .9995
Integrated 1859895            FINAL RESULT  3.44E-03 + 1.06E-04 g/L
Range: HIGH
```

```
Sample ID  S98T002423                    Date/Time  08/21/98/14:30:50
Description  SAM                         Cal Y=5.27E+07X-1.95E-03
Ref. Ratio 1.088                         Intensity 94880      (t= 156      us)
Laser Pulses 1000                        Conc 3.22E-03 + 1.00E-04 g/L
Lifetime 290 + 1.289 us                  Dilution Factor 1 mL/mL
R2 .9992
Integrated 1876459          FINAL RESULT  3.22E-03 + 1.00E-04 g/L
Range: HIGH
```

```
Sample ID  S98T002423                    Date/Time  08/21/98/14:33:31
Description  DUP                         Cal Y=5.27E+07X-1.95E-03
Ref. Ratio 1.103                         Intensity 94388      (t= 169      us)
Laser Pulses 1000                        Conc 3.27E-03 + 1.00E-04 g/L
Lifetime 302 + 1.078 us                  Dilution Factor 1 mL/mL
R2 .9994
Integrated 1907951          FINAL RESULT  3.27E-03 + 1.00E-04 g/L
Range: HIGH
```

WORKBOOK PAGE: STD1

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

Type			
STD			STANDARD
Work List	STANDARD BOOK #		33B57
25692	VOLUME OF SAMPLE (mL)	(SS)	10.00
Test Code	DILUTION FACTOR OF SAMPLE	(DF)	1.00
@U-01	PREPARATION FACTOR OF SAMPLE	(PF)	1.00
Matrix	LIFETIME IN MICROSECONDS		284.00
LIQUID	R2 VALUE		0.9994
Batch Number	RANGE (HIGH OR LOW)		HIGH
98004240	INSTRUMENT UNCERTAINTY	(IU)	1.85E-06
Rerun	INSTRUMENT RESULT	(IR)	6.07E-05
0	DETECTION LEVEL (µg/mL)		3.70E-05
Sample Prep			
N/A	RESULT (µg/mL)		6.07E-02
Sample #	VALUE OF STANDARD		6.12E-02
std	%RECOVERY		99.18
Instrument Code	RELATIVE % UNCERTAINTY		3.0
U01			
Prepared By			
CJO			
Chemist			
MJL			
Analyst			
JRO			
Date Complete			
08/26/98			
Analysis Date			
08/21/98			
Analysis Time			
10:00 AM			
Sample Point			
ER-311 GRAB			

Result = DF * PF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * PF * 1000

% Recovery = Result / Value of Standard * 100

Relative % Uncertainty = IU / IR * 100

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

STANDARD.WB1 REV 2.0 925009ML

WORKBOOK PAGE: BLANK2

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

Type			
BLNK			BLANK
Work List	VOLUME OF SAMPLE (mL)	(SS)	0.10
25692	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		303.00
LIQUID	R2 VALUE		0.8515
Batch Number	RANGE (HIGH OR LOW)		LOW
98004240	INSTRUMENT UNCERTAINTY	(IU)	1.97E-09
Rerun	INSTRUMENT RESULT	(IR)	2.99E-08
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A			
Sample #	RESULT (µg/mL)		2.99E-03
BLANK	RELATIVE % UNCERTAINTY		6.6
Instrument Code			
U01			
Prepared By	Result = DF * PF * DDF * IR * 1000		
CJO			
Chemist	Detection Level = 3.70 E-08 * DF * PF * DDF * 1000		
MJL			
Analyst	Relative % Uncertainty = IU / IR * 100		
JRO			
Date Complete			
08/26/98			
Analysis Date			
08/21/98			
Analysis Time			
10:00 AM			
Sample Point			
ER-311 GRAB			

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

BLANK.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SAM3

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

Type			
SAMPLE			SAMPLE
Work List	VOLUME OF SAMPLE (mL)	(SS)	0.10
25692	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		289.00
LIQUID	R2 VALUE		0.9994
Batch Number	RANGE (HIGH OR LOW)		HIGH
98004240	INSTRUMENT UNCERTAINTY	(IU)	1.13E-04
Rerun	INSTRUMENT RESULT	(IR)	3.68E-03
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		3.68E-01
Sample #	RESULT (µg/mL)		3.68E+02
S98T002422	RELATIVE % UNCERTAINTY		3.1
Instrument Code			
U01			
Prepared By			
CJO			
Chemist			
MJL			
Analyst			
JRO			
Date Complete			
08/26/98			
Analysis Date			
08/21/98			
Analysis Time			
10:00 AM			
Sample Point			
ER-311 GRAB			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: DUP4

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

Type			
DUP			DUP
Work List	VOLUME OF SAMPLE (mL)	(SS)	0.10
25692	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		293.00
LIQUID	R2 VALUE		0.9996
Batch Number	RANGE (HIGH OR LOW)		HIGH
98004240	INSTRUMENT UNCERTAINTY	(IU)	1.03E-04
Rerun	INSTRUMENT RESULT	(IR)	3.37E-03
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		3.37E-01
Sample #	RESULT (µg/mL)		3.37E+02
S98T002422	RELATIVE % UNCERTAINTY		3.1
Instrument Code			
U01			
Prepared By			
CJO			
Chemist			
MJL			
Analyst			
JRO			
Date Complete			
08/26/98			
Analysis Date			
08/21/98			
Analysis Time			
10:00 AM			
Sample Point			
ER-311 GRAB			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SPIKE5

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

			SPIKE
Type			
SPK	SPIKE BOOK #		33B67
Work List	VOLUME OF SAMPLE + SPIKE (mL)	(SS)	0.20
25692	DILUTION FACTOR OF SAMPLE + SPIKE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE + SPIKE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR OF SAMPLE	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		292.00
LIQUID	R2 VALUE		0.9998
Batch Number	RANGE (HIGH OR LOW)		HIGH
98004240	INSTRUMENT RESULT	(IR)	3.67E-03
Rerun	CONCENTRATION IN SOLUTION (g/L)	(CONC)	3.67E-01
0	SPIKE VALUE (g/L)	(SV)	6.12E-02
Sample Prep	INITIAL VOLUME OF SPIKE (mL)	(IV)	0.10
N/A	ORIGINAL SAMPLE VOLUME BEFORE PREP (mL)	(OSV)	0.10
Sample Number	CONCENTRATION IN SOLN (g/L) FROM SAMPLE FORM	(SR)	3.68E-01
S98T002422			
Instrument Code			
UI01	Concentration = IR * DF * PF		
Prepared By			
CJO	QC Actual (µg/mL) = SV (g/L) * 1000		
Chemist			
MJL	QC Found (µg/mL) = (CONC - SR) * OSV / IV * 1000		
Analyst			
JRO	% Recovery = QC FOUND / QC ACTUAL		
Date Complete			
08/26/98			
Analysis Date	QC FOUND IS A < VALUE; 0 WILL BE REPORTED TO MLIMS AND DVD		
08/21/98	QC ACTUAL	=	6.12E+01 µg/mL
Analysis Time	QC FOUND	<	-1.00E+00 µg/mL
10:00 AM	% SPIKE RECOVERY	<	-1.6%
Sample Point			
ER-311 GRAB			

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

SPIKE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SAM6

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

Type			
SAMPLE			SAMPLE
Work List	VOLUME OF SAMPLE (mL)	(SS)	0.10
25692	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		297.00
LIQUID	R2 VALUE		0.9997
Batch Number	RANGE (HIGH OR LOW)		HIGH
98004240	INSTRUMENT UNCERTAINTY	(IU)	1.00E-04
Rerun	INSTRUMENT RESULT	(IR)	3.29E-03
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		3.29E-01
Sample #	RESULT (µg/mL)		3.29E+02
S98T002423	RELATIVE % UNCERTAINTY		3.0
Instrument Code			
U01			
Prepared By			
CJO			
Chemist			
MJL			
Analyst			
JRO			
Date Complete			
08/26/98			
Analysis Date			
08/21/98			
Analysis Time			
10:00 AM			
Sample Point			
ER-311 GRAB			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: DUP7

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

Type			DUP
DUP			
Work List	VOLUME OF SAMPLE (mL)	(SS)	0.10
25692	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		294.00
LIQUID	R2 VALUE		0.9995
Batch Number	RANGE (HIGH OR LOW)		HIGH
98004240	INSTRUMENT UNCERTAINTY	(IU)	1.06E-04
Rerun	INSTRUMENT RESULT	(IR)	3.44E-03
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		3.44E-01
Sample #	RESULT (µg/mL)		3.44E+02
S98T002423	RELATIVE % UNCERTAINTY		3.1
Instrument Code			
U01			
Prepared By			
CJG			
Chemist			
MJL			
Analyst			
JRO			
Date Complete			
08/26/98			
Analysis Date			
08/21/98			
Analysis Time			
10:00 AM			
Sample Point			
ER-311 GRAB			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SAM8

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

Type			
SAMPLE			SAMPLE
Work List	VOLUME OF SAMPLE (mL)	(SS)	0.10
25692	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		290.00
LIQUID	R2 VALUE		0.9992
Batch Number	RANGE (HIGH OR LOW)		HIGH
98004240	INSTRUMENT UNCERTAINTY	(IU)	1.00E-04
Rerun	INSTRUMENT RESULT	(IR)	3.22E-03
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		3.22E-01
Sample #	RESULT (µg/mL)		3.22E+02
S98T002424	RELATIVE % UNCERTAINTY		3.1
Instrument Code			
U01			
Prepared By			
CJO			
Chemist			
MJL			
Analyst			
JRO			
Date Complete			
08/26/98			
Analysis Date			
08/21/98			
Analysis Time			
10:00 AM			
Sample Point			
ER-311 GRAB			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: DUP9

Uranium by Phosphorescence: LA-925-009 (B-0) LIQUID/SOLID

Type			
DUP			DUP
Work List	VOLUME OF SAMPLE (mL)	(SS)	0.10
25692	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		302.00
LIQUID	R2 VALUE		0.9994
Batch Number	RANGE (HIGH OR LOW)		HIGH
98004240	INSTRUMENT UNCERTAINTY	(IU)	1.00E-04
Rerun	INSTRUMENT RESULT	(IR)	3.27E-03
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		3.27E-01
Sample #	RESULT (µg/mL)		3.27E+02
S98T002424	RELATIVE % UNCERTAINTY		3.1
Instrument Code			
U01			
Prepared By			
CJO			
Chemist			
MJL			
Analyst			
JRO			
Date Complete			
08/26/98			
Analysis Date			
08/21/98			
Analysis Time			
10:00 AM			
Sample Point			
ER-311 GRAB			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:	JRO	Date:	26-Aug-98
Signature of Chemist:	MJL	Date:	

SAMPLE.WB1 REV 2.0 925009ML

RADIOCHEMICAL ANALYSIS

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LABCORE Completed Worklist Report for Worklist# 25694

Analyst: crj **Instrument:** GEA02 **Book#** 28857

Method: LA-548-121 Rev/Mod F-0

Worklist Comment: @GEA-01 FOR ER-311 GRAB SAMPLES RTS

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@GEA-01	CO60-02	LIQUID	4.663e-03	4.75e-03	101.866	% Recovery
1	STD		0	@GEA-01	CO60-02E	LIQUID	1	3.22	3.220	% Ct Error
1	STD		0	@GEA-01	CS13702	LIQUID	7.491e-03	7.67e-03	102.390	% Recovery
1	STD		0	@GEA-01	CS13702E	LIQUID	1	2.98	2.980	% Ct Error
2	BLNK		0	@GEA-01	CO60-02	LIQUID	1	<1.87e-5		uCi/mL
2	BLNK		0	@GEA-01	CS13702	LIQUID	1	<3.98e-5		uCi/mL
3	SAMPLE	S98T002422	0	@GEA-01	CO60-02	LIQUID	N/A <	6.891e-05	6.89e-005	uCi/mL
3	SAMPLE	S98T002422	0	@GEA-01	CO60-02E	LIQUID	N/A	n/a		% Ct. Error
3	SAMPLE	S98T002422	0	@GEA-01	CS13702	LIQUID	N/A	2.630e+00		uCi/mL
3	SAMPLE	S98T002422	0	@GEA-01	CS13702E	LIQUID	N/A	0.170		% Ct. Error
4	DUP	S98T002422	0	@GEA-01	CO60-02	LIQUID	<6.89e-5	<6.99e-5		RPD
4	DUP	S98T002422	0	@GEA-01	CO60-02E	LIQUID	1	n/a		% Ct Error
4	DUP	S98T002422	0	@GEA-01	CS13702	LIQUID	2.63e+00	2.63e+00	0.000	RPD
4	DUP	S98T002422	0	@GEA-01	CS13702E	LIQUID	1	0.170	0.170	% Ct Error
5	SAMPLE	S98T002423	0	@GEA-01	CO60-02	LIQUID	N/A <	7.538e-05	7.54e-005	uCi/mL
5	SAMPLE	S98T002423	0	@GEA-01	CO60-02E	LIQUID	N/A	n/a		% Ct. Error
5	SAMPLE	S98T002423	0	@GEA-01	CS13702	LIQUID	N/A	2.400e+00		uCi/mL
5	SAMPLE	S98T002423	0	@GEA-01	CS13702E	LIQUID	N/A	0.180		% Ct. Error
6	DUP	S98T002423	0	@GEA-01	CO60-02	LIQUID	<7.54e-5	<6.70e-5		RPD
6	DUP	S98T002423	0	@GEA-01	CO60-02E	LIQUID	1	n/a		% Ct Error
6	DUP	S98T002423	0	@GEA-01	CS13702	LIQUID	2.40e+00	2.38e+00	0.837	RPD
6	DUP	S98T002423	0	@GEA-01	CS13702E	LIQUID	1	0.180	0.180	% Ct Error
7	SAMPLE	S98T002424	0	@GEA-01	CO60-02	LIQUID	N/A <	6.083e-05	6.08e-005	uCi/mL
7	SAMPLE	S98T002424	0	@GEA-01	CO60-02E	LIQUID	N/A	n/a		% Ct. Error
7	SAMPLE	S98T002424	0	@GEA-01	CS13702	LIQUID	N/A	2.480e+00		uCi/mL
7	SAMPLE	S98T002424	0	@GEA-01	CS13702E	LIQUID	N/A	0.170		% Ct. Error
8	DUP	S98T002424	0	@GEA-01	CO60-02	LIQUID	<6.08e-5	<7.02e-5		RPD
8	DUP	S98T002424	0	@GEA-01	CO60-02E	LIQUID	1	n/a		% Ct Error
8	DUP	S98T002424	0	@GEA-01	CS13702	LIQUID	2.48e+00	2.48e+00	0.000	RPD
8	DUP	S98T002424	0	@GEA-01	CS13702E	LIQUID	1	0.170	0.170	% Ct Error

Final page for worklist# 25694

Analyst Signature Date Analyst Signature Date

R Jones 8-26-98
Reviewer Signature Date

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 25694

Analyst: CRJ **Instrument:** GEA00 2 **Book#** 28B57

Method: LA-548-121 Rev/Mod F-0

Worklist Comment: @GEA-01 FOR ER-311 GRAB SAMPLES RTS (1 ml sample size)

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@GEA-01	LIQUID		
2	BLNK				@GEA-01	LIQUID		
3	SAMPLE	S98T002422	0		@GEA-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: CO60-02 , CO60-02E, CS13702 , CS13702E						
4	DUP	S98T002422	0		@GEA-01	LIQUID		
5	SAMPLE	S98T002423	0		@GEA-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: CO60-02 , CO60-02E, CS13702 , CS13702E						
6	DUP	S98T002423	0		@GEA-01	LIQUID		
7	SAMPLE	S98T002424	0		@GEA-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: CO60-02 , CO60-02E, CS13702 , CS13702E						
8	DUP	S98T002424	0		@GEA-01	LIQUID		

Final page for worklist # 25694

Analyst Signature **Date** 8/24/98

Analyst Signature **Date** 8-26-98

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

```
*******************************************************************************
* 222-S Laboratory Counting Room   24-AUG-1998 12:32:00.81                    *
*******************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:             25694
Sample ID:              WL25694-STD                    Removed by:
Sample Size:            1.00000E-03 L
Dilution Factor:        1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:            GEA2                           Verified by:
File Number:            dka300:[spec.GEA2]2g2306.cnf
Geometry:               42
Count Time:             0 00:50:00.00 sec
Real Time:              0 00:50:21.04 sec
Dead Time:              0.7%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:      24-AUG-1998 11:41:09.45
Decayed to:             24-AUG-1998 11:41:09.45
Standard Deviations:    2
Analysis Library:       ENVGEA
Analyst:                MB
Background Subtract:    DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:      16-DEC-1997 11:02:19.60
 Date of last efficiency calibration:  10-NOV-1997 10:04:32.95
*******************************************************************************
```

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.63*	5274	1.50	1323.29	1316	14	3.0		CS-137	7.67
0	1173.19	2383	1.76	2346.55	2337	20	4.7		CO-60	4.73
0	1332.38	2162	1.88	2664.99	2655	17	4.4		CO-60	4.76
0	1460.76*	23	1.58	2921.80	2916	15	97.8		K-40	0.522
0	1764.64*	5	1.15	3529.71	3522	12	148.8			

Summary of Nuclide Activity
Sample ID : WL25694-STD Acquisition date : 24-AUG-1998 11:41:09

Total number of lines in spectrum 5
Number of unidentified lines 0
Number of lines tentatively identified by NID 5 100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~1.28E+09Y~~	~~1.00~~	~~5.225E-01~~	~~5.225E-01~~	~~5.112E-01~~	~~97.84~~	~~LAG~~
CO-60	5.27Y	1.00	4.745E+00	4.745E+00	0.153E+00	3.22	
CS-137	30.00Y	1.00	7.671E+00	7.671E+00	0.229E+00	2.98	
		Total Activity :	1.294E+01	1.294E+01			
		Grand Total Activity :	1.294E+01	1.294E+01			

8-26-98

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Page : 3
Sample ID : WL25694-STD
Acquisition date : 24-AUG-1998 11:41:09

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	260.	477.59	6.9450E-01
NA-22	26.	1274.53	5.6288E-02
NA-24	8.	1368.55	3.6192E-02
AR-41	26.	1293.60	6.6734E-02
SC-46	93.	1120.55	9.0953E-02
CR-51	249.	320.08	4.8066E-01
MN-54	129.	834.83	8.3650E-02
CO-56	131.	846.76	8.5298E-02
CO-57	321.	122.06	4.2813E-02
CO-58	108.	810.78	7.5519E-02
FE-59	108.	1099.25	1.6964E-01
ZN-65	122.	1115.55	2.0298E-01
SE-75	313.	264.66	7.8492E-02
KR-85	214.	514.00	1.6116E+01
SR-85	213.	514.01	7.2826E-02
Y-88	2.	1836.06	2.7939E-02
Y-91	37.	1204.67	2.0816E+01
NB-94	140.	871.09	9.0143E-02
NB-95	123.	765.78	7.6352E-02
ZR-95	124.	756.73	1.3892E-01
ZRNB-95	111.	724.18	3.1747E-01
RU-103	226.	497.08	7.6641E-02
RURH-106	126.	621.93	1.2999E+00
AG-108m	113.	722.94	7.6779E-02
CD-109	287.	88.03	1.3657E+00
AG-110M	212.	657.76	9.1849E-02
SN-113	277.	391.69	9.6009E-02
TE-123m	327.	159.00	4.2393E-02
SB-124	159.	602.73	7.1677E-02
SB-125	271.	427.89	2.2482E-01
TE-125m	296.	109.27	1.3527E+01
I-129	277.	39.60	1.5450E+01
I-131	241.	364.48	6.6297E-02
XE-131m	363.	163.93	1.9249E+00
BA-133	266.	356.02	8.8874E-02
CS-134	171.	604.70	7.4459E-02
CS-136	118.	818.51	7.9244E-02
CS-138	6.	1435.86	7.1982E-02
CE-139	396.	165.85	4.9318E-02
BA-140	151.	537.31	2.5292E-01
LA-140	4.	1596.21	3.1587E-02
CE-141	323.	145.44	7.3098E-02
CE-144	301.	133.51	3.1100E-01
CEPR-144	301.	133.51	6.2150E-01
EU-152	330.	121.78	1.3145E-01
EU-154	26.	1274.51	1.6330E-01
EU-155	279.	86.54	1.5268E-01
HF-181	218.	482.18	8.2804E-02
TA-182	255.	67.75	2.0733E-01
HG-203	291.	279.20	5.6897E-02
BI-207	151.	569.70	6.6577E-02

Minimum Detectable Activity Report (continued) Page : 4
Sample ID : WL25694-STD Acquisition date : 24-AUG-1998 11:41:09

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
TL-208	294.	277.36	7.3301E-01
PB-210	260.	46.50	1.0325E+01
BI-212	115.	727.18	1.0608E+00
PB-212	415.	238.63	1.1138E-01
BI-214	157.	609.31	1.5676E-01
PB-214	263.	351.92	2.7092E-01
RA-224	354.	240.99	1.1448E+00
RA-226	361.	186.10	1.1192E+00
AC-228	186.	911.21	4.0155E-01
TH-228	307.	84.37	4.3388E+00
TH-229	283.	88.47	1.9643E-01
U-232	296.	57.78	7.9815E+01
PA-233	284.	312.17	1.3070E-01
UTH-233	355.	245.34	4.1760E+01
PA-234M	121.	1001.03	1.4454E+01
TH-234	259.	63.29	2.8181E+00
U-235	347.	185.71	6.6738E-02
NP-237	280.	86.48	4.0529E-01
U-237	308.	59.54	4.2050E-01
NP-238	129.	984.45	3.4504E-01
NP-239	276.	106.12	1.6611E-01
PU-239	337.	129.30	5.7367E+02
AM-241	308.	59.54	4.0334E-01
AM-243	286.	74.67	1.1539E-01

```
*****************************************************************************
* 222-S Laboratory Counting Room   24-AUG-1998 15:25:46.50                  *
*****************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:             25694
Sample ID:              WL25694-BLK
Sample Size:            1.00000E-03 L
Dilution Factor:        1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:            GEA2
File Number:            dka300:[spec.GEA2]2g2307.cnf
Geometry:               42
Count Time:             0 02:30:00.00 sec
Real Time:              0 02:30:33.66 sec
Dead Time:              0.4%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:      24-AUG-1998 12:54:44.82
Decayed to:             24-AUG-1998 12:54:44.82
Standard Deviations:    2
Analysis Library:       ENVGEA
Analyst:                GL
Background Subtract:    DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       16-DEC-1997 11:02:19.60
 Date of last efficiency calibration:   10-NOV-1997 10:04:32.95
*****************************************************************************
```

Removed by: [signature]

Verified by: [signature] 8-26-98

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	295.90*	48	1.49	591.78	587	10	109.5			
0	1120.60*	35	1.33	2241.36	2236	13	66.3			
0	1426.16	11	0.86	2852.59	2846	9	92.4			
0	1460.79*	38	1.94	2921.88	2912	15	120.9		K-40	0.280

Summary of Nuclide Activity
Sample ID : WL25694-BLK

Acquisition date : 24-AUG-1998 12:54:44

Total number of lines in spectrum	4	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	3	75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~1.28E+09Y~~	~~1.00~~	~~2.801E-01~~	~~2.801E-01~~	~~3.386E-01~~	~~120.86~~	RA
			---	---			
Total Activity :			2.801E-01	2.801E-01			
Grand Total Activity :			2.801E-01	2.801E-01			

8-26-98

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : WL25694-BLK

Acquisition date : 24-AUG-1998 12:54:44

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	80.	477.59	1.3217E-01
NA-22	31.	1274.53	2.0320E-02
NA-24	16.	1368.55	1.7030E-02
AR-41	34.	1293.60	3.3201E-02
SC-46	65.	1120.55	2.5670E-02
CR-51	142.	320.08	1.2255E-01
MN-54	39.	834.83	1.5887E-02
CO-56	39.	846.76	1.6127E-02
CO-57	196.	122.06	1.1244E-02
CO-58	48.	810.78	1.7207E-02
FE-59	25.	1099.25	2.8953E-02
CO-60	24.	1332.50	1.8702E-02
ZN-65	30.	1115.55	3.5474E-02
SE-75	174.	264.66	1.9721E-02
KR-85	110.	514.00	3.9131E+00
SR-85	110.	514.01	1.7672E-02
Y-88	5.	1836.06	1.3501E-02
Y-91	27.	1204.67	6.0529E+00
NB-94	45.	871.09	1.7649E-02
NB-95	44.	765.78	1.5694E-02
ZR-95	43.	756.73	2.8355E-02
ZRNB-95	59.	724.18	7.8484E-02
RU-103	73.	497.08	1.4966E-02
RURH-106	63.	621.93	3.1304E-01
AG-108m	44.	722.94	1.6495E-02
CD-109	190.	88.03	3.7285E-01
AG-110M	55.	657.76	1.6205E-02
SN-113	99.	391.69	1.9573E-02
TE-123m	208.	159.00	1.1358E-02
SB-124	65.	602.73	1.5645E-02
SB-125	92.	427.89	4.4830E-02
TE-125m	184.	109.27	3.5878E+00
I-129	148.	39.60	3.8064E+00
I-131	109.	364.48	1.5178E-02
XE-131m	178.	163.93	4.5641E-01
BA-133	117.	356.02	1.9953E-02
CS-134	69.	604.70	1.6121E-02
CS-136	32.	818.51	1.4409E-02
CS-137	292.	661.66	3.9832E-02
CS-138	16.	1435.86	7.4677E-02
CE-139	182.	165.85	1.1310E-02
BA-140	88.	537.31	6.5351E-02
LA-140	12.	1596.21	1.7308E-02
CE-141	190.	145.44	1.8867E-02
CE-144	205.	133.51	8.6096E-02
CEPR-144	205.	133.51	1.7205E-01
EU-152	197.	121.78	3.4131E-02
EU-154	31.	1274.51	5.9100E-02
EU-155	180.	86.54	4.1244E-02
HF-181	87.	482.18	1.7824E-02
TA-182	155.	67.75	5.4435E-02

Minimum Detectable Activity Report (continued) Page : 4
Sample ID : WL25694-BLK Acquisition date : 24-AUG-1998 12:54:44

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
HG-203	164.	279.20	1.4385E-02
BI-207	69.	569.70	1.5288E-02
TL-208	142.	277.36	1.7224E-01
PB-210	157.	46.50	2.7068E+00
BI-212	79.	727.18	2.9616E-01
PB-212	231.	238.63	2.7975E-02
BI-214	142.	609.31	4.9938E-02
PB-214	171.	351.92	1.6301E-01
RA-224	204.	240.99	2.9415E-01
RA-226	224.	186.10	2.9594E-01
AC-228	77.	911.21	8.8392E-02
TH-228	202.	84.37	1.1813E+00
TH-229	196.	88.47	5.4942E-02
U-232	152.	57.78	1.9267E+01
PA-233	134.	312.17	3.0429E-02
UTH-233	178.	245.34	9.9735E+00
PA-234M	46.	1001.03	3.0721E+00
TH-234	145.	63.29	7.1145E-01
U-235	217.	185.71	1.7725E-02
NP-237	180.	86.48	1.0919E-01
U-237	142.	59.54	9.7081E-02
NP-238	36.	984.45	6.3860E-02
NP-239	173.	106.12	4.4635E-02
PU-239	187.	129.30	1.4374E+02
AM-241	142.	59.54	9.2793E-02
AM-243	198.	74.67	3.2187E-02

```
*******************************************************************************
* 222-S Laboratory Counting Room   24-AUG-1998 18:28:33.37                    *
*******************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:             25694
Sample ID:              S98T002422-SAM
Sample Size:            1.00000E-03 L
Dilution Factor:        1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:            GEA2
File Number:            dka300:[spec.GEA2]2g2309.cnf
Geometry:               43
Count Time:             0 02:30:00.00 sec
Real Time:              0 02:37:25.46 sec
Dead Time:              4.7%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:      24-AUG-1998 15:50:41.08
Decayed to:             24-AUG-1998 15:50:41.08
Standard Deviations:    2
Analysis Library:       ENVGEA
Analyst:                GL
Background Subtract:    DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:      16-DEC-1997 11:02:19.60
 Date of last efficiency calibration:  10-NOV-1997 10:09:16.15
*******************************************************************************
```

Removed by: Em Borelu

Verified by: 8-26-98

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.63*	1473090	1.47	1323.28	1315	16	0.2		CS-137	2.626E+03
0	1323.01	87	1.17	2646.24	2642	11	31.1			

Summary of Nuclide Activity
Sample ID : S98T002422-SAM

Acquisition date : 24-AUG-1998 15:50:41

Total number of lines in spectrum	2	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	1	50.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.00Y	1.00	2.626E+03	2.626E+03	0.004E+03	0.17	
		Total Activity :	2.626E+03	2.626E+03			
		Grand Total Activity :	2.626E+03	2.626E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : S98T002422-SAM

Acquisition date : 24-AUG-1998 15:50:41

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	44282.	477.59	1.0845E+01
NA-22	37.	1274.53	7.8595E-02
NA-24	12.	1368.55	5.3799E-02
K-40	331.	1460.75	2.3056E+00
AR-41	24.	1293.60	1.0386E-01
SC-46	68.	1120.55	9.4365E-02
CR-51	41342.	320.08	7.5600E+00
MN-54	70.	834.83	7.6432E-02
CO-56	85.	846.76	8.4831E-02
CO-57	46563.	122.06	6.8201E-01
CO-58	96.	810.78	8.7164E-02
FE-59	41.	1099.25	1.3070E-01
CO-60	26.	1332.50	6.8906E-02
ZN-65	38.	1115.55	1.4158E-01
SE-75	45934.	264.66	1.1793E+00
KR-85	22877.	514.00	1.9855E+02
SR-85	22874.	514.01	8.9808E-01
Y-88	7.	1836.06	5.1838E-02
Y-91	36.	1204.67	2.4708E+01
NB-94	75.	871.09	8.1476E-02
NB-95	165.	765.78	1.0734E-01
ZR-95	181.	756.73	2.0330E-01
ZRNB-95	302.	724.18	6.2735E-01
RU-103	27857.	497.08	1.0149E+00
RURH-106	9932.	621.93	1.3545E+01
AG-108m	299.	722.94	1.4970E-01
CD-109	39134.	88.03	2.1294E+01
AG-110M	27973.	657.76	1.2469E+00
SN-113	41887.	391.69	1.4275E+00
TE-123m	47848.	159.00	6.6503E-01
SB-124	10074.	602.73	6.7380E-01
SB-125	47253.	427.89	3.5709E+00
TE-125m	42382.	109.27	2.1494E+02
I-129	34754.	39.60	2.0241E+02
I-131	40101.	364.48	1.0374E+00
XE-131m	47702.	163.93	2.8623E+01
BA-133	40251.	356.02	1.3261E+00
CS-134	9964.	604.70	6.7302E-01
CS-136	93.	818.51	8.6541E-02
CS-138	17.	1435.86	2.8062E-01
CE-139	47377.	165.85	6.9895E-01
BA-140	16784.	537.31	3.1585E+00
LA-140	10.	1596.21	5.6584E-02
CE-141	47577.	145.44	1.1594E+00
CE-144	47808.	133.51	5.1430E+00
CEPR-144	47808.	133.51	1.0277E+01
EU-152	46456.	121.78	2.0629E+00
EU-154	37.	1274.51	2.2821E-01
EU-155	38823.	86.54	2.4041E+00
HF-181	36005.	482.18	1.2687E+00
TA-182	35321.	67.75	3.2194E+00

Minimum Detectable Activity Report (continued) Page : 4
Sample ID : S98T002422-SAM Acquisition date : 24-AUG-1998 15:50:41

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
HG-203	44273.	279.20	8.6614E-01
BI-207	11005.	569.70	6.7014E-01
TL-208	44394.	277.36	1.1132E+01
PB-210	34044.	46.50	1.4617E+02
BI-212	279.	727.18	1.9870E+00
PB-212	49151.	238.63	1.5227E+00
BI-214	10235.	609.31	1.4955E+00
PB-214	39757.	351.92	9.3671E+00
RA-224	49306.	240.99	1.7034E+01
RA-226	60050.	186.10	1.8471E+01
AC-228	104.	911.21	3.6955E-01
TH-228	38815.	84.37	6.5224E+01
TH-229	39213.	88.47	3.0893E+00
U-232	34206.	57.78	1.1118E+03
PA-233	41460.	312.17	1.9361E+00
UTH-233	48401.	245.34	6.1001E+02
PA-234M	55.	1001.03	1.2066E+01
TH-234	34924.	63.29	4.2834E+01
U-235	59278.	185.71	1.1163E+00
NP-237	38870.	86.48	6.3716E+00
U-237	34186.	59.54	5.7974E+00
NP-238	56.	984.45	2.8694E-01
NP-239	41857.	106.12	2.7483E+00
PU-239	47252.	129.30	8.9503E+03
AM-241	34186.	59.54	5.5398E+00
AM-243	36891.	74.67	1.7430E+00

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*******************************************************************************
* 222-S Laboratory Counting Room    24-AUG-1998 21:19:45.64                   *
*******************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              25694
Sample ID:               S98T2422-DUP                    Removed by:
Sample Size:             1.00000E-03 L
Dilution Factor:         1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2                            Verified by:
File Number:             dka300:[spec.GEA2]2g2310.cnf
Geometry:                43
Count Time:              0 02:30:00.00 sec
Real Time:               0 02:37:26.28 sec
Dead Time:               4.7%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       24-AUG-1998 18:41:49.62
Decayed to:              24-AUG-1998 18:41:49.62
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 EMB
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       16-DEC-1997 11:02:19.60
 Date of last efficiency calibration:   10-NOV-1997 10:09:16.15
*******************************************************************************
```

Removed by: Em Barker

Verified by: RHJones 8-28-98

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.65*	1477847	1.46	1323.33	1315	16	0.2		CS-137	2.634E+03
0	1323.23	113	1.72	2646.68	2640	17	30.1			
0	1460.66*	37	2.29	2921.61	2914	15	17.2		K-40	0.982
0	1764.68*	19	2.31	3529.79	3521	14	91.9			

Summary of Nuclide Activity
Sample ID : S98T2422-DUP

Acquisition date : 24-AUG-1998 18:41:49

Total number of lines in spectrum 4
Number of unidentified lines 1
Number of lines tentatively identified by NID 3 75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~1.28E+09Y~~	~~1.00~~	~~9.815E-01~~	~~9.815E-01~~	~~11.51E-01~~	~~117.24~~	
CS-137	30.00Y	1.00	2.634E+03	2.634E+03	0.004E+03	0.17	
			---	---			
	Total Activity :		2.635E+03	2.635E+03			
	Grand Total Activity :		2.635E+03	2.635E+03			

RMJ 98 8-26-98

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : S98T2422-DUP

Acquisition date : 24-AUG-1998 18:41:49

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	44281.	477.59	1.0845E+01
NA-22	38.	1274.53	7.9111E-02
NA-24	20.	1368.55	6.6782E-02
AR-41	22.	1293.60	1.0073E-01
SC-46	67.	1120.55	9.4063E-02
CR-51	41024.	320.08	7.5310E+00
MN-54	74.	834.83	7.8509E-02
CO-56	58.	846.76	7.0623E-02
CO-57	46649.	122.06	6.8264E-01
CO-58	80.	810.78	7.9740E-02
FE-59	44.	1099.25	1.3459E-01
CO-60	27.	1332.50	6.9935E-02
ZN-65	55.	1115.55	1.6790E-01
SE-75	46387.	264.66	1.1851E+00
KR-85	22940.	514.00	1.9882E+02
SR-85	22935.	514.01	8.9927E-01
Y-88	5.	1836.06	4.5041E-02
Y-91	36.	1204.67	2.4936E+01
NB-94	66.	871.09	7.7096E-02
NB-95	171.	765.78	1.0928E-01
ZR-95	157.	756.73	1.9014E-01
ZRNB-95	276.	724.18	6.0088E-01
RU-103	28019.	497.08	1.0178E+00
RURH-106	9916.	621.93	1.3534E+01
AG-108m	272.	722.94	1.4285E-01
CD-109	39044.	88.03	2.1269E+01
AG-110M	26885.	657.76	1.2225E+00
SN-113	41793.	391.69	1.4259E+00
TE-123m	47262.	159.00	6.6095E-01
SB-124	10182.	602.73	6.7740E-01
SB-125	47484.	427.89	3.5796E+00
TE-125m	42518.	109.27	2.1529E+02
I-129	34204.	39.60	2.0081E+02
I-131	40056.	364.48	1.0368E+00
XE-131m	47458.	163.93	2.8550E+01
BA-133	40184.	356.02	1.3250E+00
CS-134	10008.	604.70	6.7448E-01
CS-136	72.	818.51	7.6596E-02
CS-138	23.	1435.86	3.1643E-01
CE-139	47236.	165.85	6.9792E-01
BA-140	16886.	537.31	3.1682E+00
LA-140	14.	1596.21	6.4697E-02
CE-141	47537.	145.44	1.1589E+00
CE-144	47576.	133.51	5.1306E+00
CEPR-144	47575.	133.51	1.0252E+01
EU-152	46542.	121.78	2.0648E+00
EU-154	38.	1274.51	2.2994E-01
EU-155	38810.	86.54	2.4037E+00
HF-181	35985.	482.18	1.2684E+00
TA-182	35643.	67.75	3.2341E+00
HG-203	44510.	279.20	8.6845E-01

Minimum Detectable Activity Report (continued) Page : 4
Sample ID : S98T2422-DUP Acquisition date : 24-AUG-1998 18:41:49

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BI-207	11103.	569.70	6.7309E-01
TL-208	45010.	277.36	1.1208E+01
PB-210	34220.	46.50	1.4655E+02
BI-212	281.	727.18	1.9928E+00
PB-212	49260.	238.63	1.5244E+00
BI-214	10117.	609.31	1.4869E+00
PB-214	39927.	351.92	9.3878E+00
RA-224	49247.	240.99	1.7023E+01
RA-226	59936.	186.10	1.8454E+01
AC-228	91.	911.21	3.4774E-01
TH-228	39036.	84.37	6.5409E+01
TH-229	39192.	88.47	3.0884E+00
U-232	34331.	57.78	1.1138E+03
PA-233	41592.	312.17	1.9392E+00
UTH-233	48657.	245.34	6.1161E+02
PA-234M	51.	1001.03	1.1694E+01
TH-234	34708.	63.29	4.2702E+01
U-235	59167.	185.71	1.1153E+00
NP-237	38807.	86.48	6.3665E+00
U-237	34636.	59.54	5.8353E+00
NP-238	54.	984.45	2.8254E-01
NP-239	41718.	106.12	2.7438E+00
PU-239	47586.	129.30	8.9819E+03
AM-241	34637.	59.54	5.5761E+00
AM-243	36834.	74.67	1.7416E+00

```
*******************************************************************************
* 222-S Laboratory Counting Room   25-AUG-1998 06:57:00.43                    *
*******************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              25694
Sample ID:               S98T2423-SAM
Sample Size:             1.00000E-03 L
Dilution Factor:         1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2
File Number:             dka300:[spec.GEA2]2g2315.cnf
Geometry:                43
Count Time:              0 02:30:00.00 sec
Real Time:               0 02:36:52.41 sec
Dead Time:               4.4%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       25-AUG-1998 04:19:22.09
Decayed to:              25-AUG-1998 04:19:22.09
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 EMB
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       16-DEC-1997 11:02:19.60
 Date of last efficiency calibration:   10-NOV-1997 10:09:16.15
*******************************************************************************
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Removed by: RE Wright

Verified by: RA Jones 8-26-98

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.68*	1348105	1.46	1323.39	1315	16	0.2		CS-137	2.403E+03
0	1323.19	117	2.18	2646.60	2639	17	25.8			
0	1460.97*	43	2.06	2922.22	2914	19	103.0		K-40	1.13

Summary of Nuclide Activity
Sample ID : S98T2423-SAM

Acquisition date : 25-AUG-1998 04:19:22

Total number of lines in spectrum	3	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	2	66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~1.28E+09Y~~	~~1.00~~	~~1.134E+00~~	~~1.134E+00~~	~~1.168E+00~~	~~103.00~~	~~K~~
CS-137	30.00Y	1.00	2.403E+03	2.403E+03	0.004E+03	0.18	
			---	---			
Total Activity :			2.404E+03	2.404E+03			
Grand Total Activity :			2.404E+03	2.404E+03			

8-26-98

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : S98T2423-SAM

Acquisition date : 25-AUG-1998 04:19:22

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	40431.	477.59	1.0364E+01
NA-22	28.	1274.53	6.9090E-02
NA-24	20.	1368.55	6.7031E-02
AR-41	21.	1293.60	9.7609E-02
SC-46	77.	1120.55	1.0038E-01
CR-51	37440.	320.08	7.1955E+00
MN-54	76.	834.83	7.9398E-02
CO-56	72.	846.76	7.8187E-02
CO-57	42257.	122.06	6.4979E-01
CO-58	82.	810.78	8.0687E-02
FE-59	52.	1099.25	1.4600E-01
CO-60	31.	1332.50	7.5384E-02
ZN-65	44.	1115.55	1.5145E-01
SE-75	42359.	264.66	1.1326E+00
KR-85	20736.	514.00	1.8907E+02
SR-85	20736.	514.01	8.5524E-01
Y-88	11.	1836.06	6.2937E-02
Y-91	38.	1204.67	2.5363E+01
NB-94	72.	871.09	7.9915E-02
NB-95	134.	765.78	9.7173E-02
ZR-95	181.	756.73	2.0343E-01
ZRNB-95	253.	724.18	5.7602E-01
RU-103	25461.	497.08	9.7043E-01
RURH-106	9029.	621.93	1.2918E+01
AG-108m	264.	722.94	1.4097E-01
CD-109	35362.	88.03	2.0245E+01
AG-110M	23544.	657.76	1.1443E+00
SN-113	38314.	391.69	1.3655E+00
TE-123m	42982.	159.00	6.3039E-01
SB-124	9257.	602.73	6.4605E-01
SB-125	43282.	427.89	3.4179E+00
TE-125m	38533.	109.27	2.0498E+02
I-129	31455.	39.60	1.9259E+02
I-131	36697.	364.48	9.9253E-01
XE-131m	43104.	163.93	2.7212E+01
BA-133	36456.	356.02	1.2622E+00
CS-134	9189.	604.70	6.4646E-01
CS-136	71.	818.51	7.6318E-02
CS-138	19.	1435.86	2.9365E-01
CE-139	43018.	165.85	6.6611E-01
BA-140	15325.	537.31	3.0188E+00
LA-140	5.	1596.21	4.3737E-02
CE-141	43573.	145.44	1.1096E+00
CE-144	43735.	133.51	4.9197E+00
CEPR-144	43734.	133.51	9.8305E+00
EU-152	42197.	121.78	1.9663E+00
EU-154	28.	1274.51	2.0071E-01
EU-155	35509.	86.54	2.2995E+00
HF-181	32934.	482.18	1.2136E+00
TA-182	32473.	67.75	3.0873E+00
HG-203	40649.	279.20	8.3004E-01

Minimum Detectable Activity Report (continued) Page : 4
Sample ID : S98T2423-SAM Acquisition date : 25-AUG-1998 04:19:22

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BI-207	10198.	569.70	6.4523E-01
TL-208	40959.	277.36	1.0694E+01
PB-210	31625.	46.50	1.4090E+02
BI-212	227.	727.18	1.7980E+00
PB-212	44881.	238.63	1.4553E+00
BI-214	9316.	609.31	1.4272E+00
PB-214	36454.	351.92	8.9416E+00
RA-224	45047.	240.99	1.6283E+01
RA-226	54646.	186.10	1.7622E+01
AC-228	86.	911.21	3.3798E-01
TH-228	35148.	84.37	6.2076E+01
TH-229	35288.	88.47	2.9311E+00
U-232	31365.	57.78	1.0648E+03
PA-233	37777.	312.17	1.8483E+00
UTH-233	44225.	245.34	5.8317E+02
PA-234M	57.	1001.03	1.2253E+01
TH-234	31920.	63.29	4.0956E+01
U-235	54042.	185.71	1.0660E+00
NP-237	35502.	86.48	6.0901E+00
U-237	31563.	59.54	5.5711E+00
NP-238	56.	984.45	2.8737E-01
NP-239	38071.	106.12	2.6213E+00
PU-239	43208.	129.30	8.5599E+03
AM-241	31563.	59.54	5.3237E+00
AM-243	34058.	74.67	1.6749E+00

```
*******************************************************************************
* 222-S Laboratory Counting Room   25-AUG-1998 09:43:09.20                    *
*******************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:             25694
Sample ID:              S98T2423-DUP
Sample Size:            1.00000E-03 L
Dilution Factor:        1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:            GEA2
File Number:            dka300:[spec.GEA2]2g2316.cnf
Geometry:               43
Count Time:             0 02:30:00.00 sec
Real Time:              0 02:36:48.35 sec
Dead Time:              4.3%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:      25-AUG-1998 07:05:30.97
Decayed to:             25-AUG-1998 07:05:30.97
Standard Deviations:    2
Analysis Library:       ENVGEA
Analyst:                NEW
Background Subtract:    DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:      16-DEC-1997 11:02:19.60
 Date of last efficiency calibration:  10-NOV-1997 10:09:16.15
*******************************************************************************
```

Removed by:

Verified by: 8-26-98

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.66*	1334662	1.46	1323.35	1315	16	0.2		CS-137	2.379E+03
0	1323.17	91	2.05	2646.57	2636	16	31.9			
0	1460.82*	25	1.67	2921.93	2913	16	164.8		K-40	0.650

Summary of Nuclide Activity
Sample ID : S98T2423-DUP

Acquisition date : 25-AUG-1998 07:05:30

Total number of lines in spectrum	3	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	2	66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~1.28E+09Y~~	~~1.00~~	~~6.503E-01~~	~~6.503E-01~~	~~10.71E-01~~	~~164.77~~	~~RAJ~~
CS-137	30.00Y	1.00	2.379E+03	2.379E+03	0.004E+03	0.18	
		Total Activity :	2.380E+03	2.380E+03			
		Grand Total Activity :	2.380E+03	2.380E+03			

8-26-98

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : S98T2423-DUP Acquisition date : 25-AUG-1998 07:05:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	40064.	477.59	1.0317E+01
NA-22	35.	1274.53	7.6863E-02
NA-24	15.	1368.55	5.8497E-02
AR-41	34.	1293.60	1.2108E-01
SC-46	60.	1120.55	8.9034E-02
CR-51	36889.	320.08	7.1425E+00
MN-54	95.	834.83	8.8375E-02
CO-56	64.	846.76	7.4394E-02
CO-57	41752.	122.06	6.4592E-01
CO-58	88.	810.78	8.3586E-02
FE-59	30.	1099.25	1.1255E-01
CO-60	24.	1332.50	6.6968E-02
ZN-65	33.	1115.55	1.3275E-01
SE-75	42069.	264.66	1.1287E+00
KR-85	20902.	514.00	1.8982E+02
SR-85	20899.	514.01	8.5858E-01
Y-88	2.	1836.06	3.3322E-02
Y-91	35.	1204.67	2.4427E+01
NB-94	61.	871.09	7.4068E-02
NB-95	141.	765.78	9.9514E-02
ZR-95	189.	756.73	2.0744E-01
ZRNB-95	255.	724.18	5.7769E-01
RU-103	25084.	497.08	9.6324E-01
RURH-106	8865.	621.93	1.2801E+01
AG-108m	269.	722.94	1.4213E-01
CD-109	35621.	88.03	2.0319E+01
AG-110M	23769.	657.76	1.1497E+00
SN-113	37940.	391.69	1.3588E+00
TE-123m	42770.	159.00	6.2884E-01
SB-124	9166.	602.73	6.4288E-01
SB-125	42812.	427.89	3.3994E+00
TE-125m	38670.	109.27	2.0534E+02
I-129	31422.	39.60	1.9249E+02
I-131	36480.	364.48	9.8959E-01
XE-131m	43181.	163.93	2.7236E+01
BA-133	36396.	356.02	1.2612E+00
CS-134	9254.	604.70	6.4874E-01
CS-136	72.	818.51	7.6818E-02
CS-138	21.	1435.86	3.0255E-01
CE-139	42994.	165.85	6.6593E-01
BA-140	15352.	537.31	3.0214E+00
LA-140	9.	1596.21	5.4356E-02
CE-141	43615.	145.44	1.1102E+00
CE-144	43367.	133.51	4.8990E+00
CEPR-144	43366.	133.51	9.7892E+00
EU-152	41581.	121.78	1.9520E+00
EU-154	35.	1274.51	2.2318E-01
EU-155	35219.	86.54	2.2902E+00
HF-181	32682.	482.18	1.2089E+00
TA-182	32145.	67.75	3.0718E+00
HG-203	40679.	279.20	8.3034E-01

Minimum Detectable Activity Report (continued) Page : 4
Sample ID : S98T2423-DUP Acquisition date : 25-AUG-1998 07:05:30

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BI-207	10031.	569.70	6.3995E-01
TL-208	40726.	277.36	1.0663E+01
PB-210	30897.	46.50	1.3927E+02
BI-212	233.	727.18	1.8188E+00
PB-212	45115.	238.63	1.4590E+00
BI-214	9086.	609.31	1.4096E+00
PB-214	36368.	351.92	8.9274E+00
RA-224	44809.	240.99	1.6240E+01
RA-226	54098.	186.10	1.7534E+01
AC-228	105.	911.21	3.7128E-01
TH-228	34951.	84.37	6.1902E+01
TH-229	35712.	88.47	2.9486E+00
U-232	30971.	57.78	1.0581E+03
PA-233	37485.	312.17	1.8412E+00
UTH-233	43580.	245.34	5.7892E+02
PA-234M	57.	1001.03	1.2334E+01
TH-234	31867.	63.29	4.0922E+01
U-235	53304.	185.71	1.0587E+00
NP-237	35194.	86.48	6.0638E+00
U-237	31468.	59.54	5.5627E+00
NP-238	53.	984.45	2.7995E-01
NP-239	37376.	106.12	2.5973E+00
PU-239	43076.	129.30	8.5468E+03
AM-241	31468.	59.54	5.3157E+00
AM-243	33444.	74.67	1.6598E+00

```
*******************************************************************************
* 222-S Laboratory Counting Room   25-AUG-1998 12:37:43.63                    *
*******************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              25694
Sample ID:               S98T2424-SAM
Sample Size:             1.00000E-03 L
Dilution Factor:         1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2
File Number:             dka300:[spec.GEA2]2g2317.cnf
Geometry:                43
Count Time:              0 02:30:00.00 sec
Real Time:               0 02:37:02.96 sec
Dead Time:               4.5%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       25-AUG-1998 09:59:51.76
Decayed to:              25-AUG-1998 09:59:51.76
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 MB
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:      16-DEC-1997 11:02:19.60
 Date of last efficiency calibration:  10-NOV-1997 10:09:16.15
*******************************************************************************
```

Removed by: RE Wright

Verified by: RA Jones 8-26-98

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.64*	1390414	1.46	1323.32	1315	16	0.2		CS-137	2.478E+03
0	1323.29	136	2.05	2646.81	2636	22	24.6			
0	1460.93*	69	1.94	2922.14	2916	16	67.0		K-40	1.82

Summary of Nuclide Activity
Sample ID : S98T2424-SAM

Acquisition date : 25-AUG-1998 09:59:51

Total number of lines in spectrum	3	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	2	66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~K-40~~	~~1.28E+09Y~~	~~1.00~~	~~1.820E+00~~	~~1.820E+00~~	~~1.219E+00~~	~~66.95~~	~~RN~~
CS-137	30.00Y	1.00	2.478E+03	2.478E+03	0.004E+03	0.17	
		Total Activity :	2.480E+03	2.480E+03			

8-26-98

Grand Total Activity : 2.480E+03 2.480E+03

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : S98T2424-SAM

Acquisition date : 25-AUG-1998 09:59:51

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	41800.	477.59	1.0538E+01
NA-22	30.	1274.53	7.1035E-02
NA-24	7.	1368.55	4.3082E-02
AR-41	23.	1293.60	1.0170E-01
SC-46	67.	1120.55	9.3789E-02
CR-51	38700.	320.08	7.3152E+00
MN-54	87.	834.83	8.4502E-02
CO-56	73.	846.76	7.8888E-02
CO-57	43863.	122.06	6.6200E-01
CO-58	86.	810.78	8.2583E-02
FE-59	51.	1099.25	1.4482E-01
CO-60	19.	1332.50	6.0827E-02
ZN-65	52.	1115.55	1.6439E-01
SE-75	43672.	264.66	1.1500E+00
KR-85	21634.	514.00	1.9310E+02
SR-85	21632.	514.01	8.7345E-01
Y-88	7.	1836.06	5.1837E-02
Y-91	30.	1204.67	2.2977E+01
NB-94	87.	871.09	8.7368E-02
NB-95	153.	765.78	1.0342E-01
ZR-95	154.	756.73	1.8834E-01
ZRNB-95	256.	724.18	5.7939E-01
RU-103	26013.	497.08	9.8084E-01
RURH-106	9315.	621.93	1.3120E+01
AG-108m	254.	722.94	1.3822E-01
CD-109	36834.	88.03	2.0661E+01
AG-110M	25384.	657.76	1.1880E+00
SN-113	39552.	391.69	1.3873E+00
TE-123m	44911.	159.00	6.4434E-01
SB-124	9528.	602.73	6.5539E-01
SB-125	44947.	427.89	3.4829E+00
TE-125m	40151.	109.27	2.0922E+02
I-129	32166.	39.60	1.9475E+02
I-131	37802.	364.48	1.0073E+00
XE-131m	44765.	163.93	2.7730E+01
BA-133	37697.	356.02	1.2835E+00
CS-134	9426.	604.70	6.5470E-01
CS-136	67.	818.51	7.3966E-02
CS-138	23.	1435.86	3.1796E-01
CE-139	44657.	165.85	6.7865E-01
BA-140	15737.	537.31	3.0589E+00
LA-140	7.	1596.21	4.8648E-02
CE-141	44941.	145.44	1.1269E+00
CE-144	44800.	133.51	4.9790E+00
CEPR-144	44799.	133.51	9.9491E+00
EU-152	43796.	121.78	2.0031E+00
EU-154	30.	1274.51	2.0649E-01
EU-155	36606.	86.54	2.3347E+00
HF-181	34337.	482.18	1.2391E+00
TA-182	33307.	67.75	3.1266E+00
HG-203	41827.	279.20	8.4194E-01

Minimum Detectable Activity Report (continued) Page : 4
Sample ID : S98T2424-SAM Acquisition date : 25-AUG-1998 09:59:51

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BI-207	10480.	569.70	6.5402E-01
TL-208	42065.	277.36	1.0836E+01
PB-210	31924.	46.50	1.4156E+02
BI-212	245.	727.18	1.8659E+00
PB-212	46136.	238.63	1.4754E+00
BI-214	9474.	609.31	1.4392E+00
PB-214	37894.	351.92	9.1254E+00
RA-224	46030.	240.99	1.6459E+01
RA-226	56341.	186.10	1.7893E+01
AC-228	88.	911.21	3.4138E-01
TH-228	36282.	84.37	6.3066E+01
TH-229	36937.	88.47	2.9986E+00
U-232	32449.	57.78	1.0830E+03
PA-233	38804.	312.17	1.8732E+00
UTH-233	45809.	245.34	5.9349E+02
PA-234M	62.	1001.03	1.2735E+01
TH-234	32985.	63.29	4.1632E+01
U-235	55715.	185.71	1.0823E+00
NP-237	36597.	86.48	6.1831E+00
U-237	32640.	59.54	5.6651E+00
NP-238	55.	984.45	2.8332E-01
NP-239	39450.	106.12	2.6682E+00
PU-239	44912.	129.30	8.7265E+03
AM-241	32640.	59.54	5.4135E+00
AM-243	34918.	74.67	1.6959E+00

```
*******************************************************************************
* 222-S Laboratory Counting Room   25-AUG-1998 17:10:33.63                    *
*******************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              25694
Sample ID:               S98T002424-DUP                  Removed by:
Sample Size:             1.00000E-03 L
Dilution Factor:         1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2                            Verified by:
File Number:             dka300:[spec.GEA2]2g2320.cnf
Geometry:                43
Count Time:              0 02:30:00.00 sec
Real Time:               0 02:37:03.40 sec
Dead Time:               4.5%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       25-AUG-1998 14:32:47.05
Decayed to:              25-AUG-1998 14:32:47.05
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 GL
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       16-DEC-1997 11:02:19.60
 Date of last efficiency calibration:   10-NOV-1997 10:09:16.15
*******************************************************************************
```

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.68*	1392982	1.46	1323.38	1315	16	0.2		CS-137	2.483E+03
0	1322.86	115	1.56	2645.95	2639	16	27.9			

Summary of Nuclide Activity
Page : 2
Sample ID : S98T002424-DUP
Acquisition date : 25-AUG-1998 14:32:47

Total number of lines in spectrum	2	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	1	50.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.00Y	1.00	2.483E+03	2.483E+03	0.004E+03	0.17	
			---	---			
	Total Activity :		2.483E+03	2.483E+03			
	Grand Total Activity :		2.483E+03	2.483E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report
Sample ID : S98T002424-DUP

Acquisition date : 25-AUG-1998 14:32:47

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	41621.	477.59	1.0515E+01
NA-22	28.	1274.53	6.9510E-02
NA-24	20.	1368.55	6.7035E-02
K-40	336.	1460.75	2.3205E+00
AR-41	24.	1293.60	1.0429E-01
SC-46	75.	1120.55	9.8819E-02
CR-51	38561.	320.08	7.3020E+00
MN-54	85.	834.83	8.3676E-02
CO-56	70.	846.76	7.7489E-02
CO-57	43853.	122.06	6.6192E-01
CO-58	100.	810.78	8.8921E-02
FE-59	43.	1099.25	1.3306E-01
CO-60	27.	1332.50	7.0193E-02
ZN-65	46.	1115.55	1.5547E-01
SE-75	43530.	264.66	1.1481E+00
KR-85	21432.	514.00	1.9220E+02
SR-85	21431.	514.01	8.6941E-01
Y-88	7.	1836.06	5.2367E-02
Y-91	40.	1204.67	2.6069E+01
NB-94	76.	871.09	8.2027E-02
NB-95	155.	765.78	1.0428E-01
ZR-95	165.	756.73	1.9474E-01
ZRNB-95	268.	724.18	5.9224E-01
RU-103	26210.	497.08	9.8455E-01
RURH-106	9276.	621.93	1.3092E+01
AG-108m	257.	722.94	1.3920E-01
CD-109	36840.	88.03	2.0662E+01
AG-110M	24009.	657.76	1.1555E+00
SN-113	39700.	391.69	1.3899E+00
TE-123m	44989.	159.00	6.4491E-01
SB-124	9582.	602.73	6.5723E-01
SB-125	44599.	427.89	3.4694E+00
TE-125m	39955.	109.27	2.0872E+02
I-129	32472.	39.60	1.9567E+02
I-131	37821.	364.48	1.0076E+00
XE-131m	44420.	163.93	2.7623E+01
BA-133	37775.	356.02	1.2848E+00
CS-134	9531.	604.70	6.5829E-01
CS-136	86.	818.51	8.3364E-02
CS-138	12.	1435.86	2.3878E-01
CE-139	44630.	165.85	6.7844E-01
BA-140	15874.	537.31	3.0721E+00
LA-140	8.	1596.21	5.1402E-02
CE-141	45296.	145.44	1.1313E+00
CE-144	44621.	133.51	4.9691E+00
CEPR-144	44622.	133.51	9.9295E+00
EU-152	43723.	121.78	2.0015E+00
EU-154	28.	1274.51	2.0219E-01
EU-155	36618.	86.54	2.3351E+00
HF-181	33643.	482.18	1.2265E+00
TA-182	33438.	67.75	3.1327E+00

Minimum Detectable Activity Report (continued) Page : 4
Sample ID : S98T002424-DUP Acquisition date : 25-AUG-1998 14:32:47

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
HG-203	41678.	279.20	8.4044E-01
BI-207	10387.	569.70	6.5113E-01
TL-208	42154.	277.36	1.0848E+01
PB-210	32089.	46.50	1.4192E+02
BI-212	266.	727.18	1.9394E+00
PB-212	46484.	238.63	1.4810E+00
BI-214	9501.	609.31	1.4412E+00
PB-214	37349.	351.92	9.0601E+00
RA-224	46177.	240.99	1.6485E+01
RA-226	56703.	186.10	1.7950E+01
AC-228	110.	911.21	3.7988E-01
TH-228	36603.	84.37	6.3343E+01
TH-229	36777.	88.47	2.9921E+00
U-232	32171.	57.78	1.0783E+03
PA-233	38789.	312.17	1.8729E+00
UTH-233	45623.	245.34	5.9229E+02
PA-234M	54.	1001.03	1.2006E+01
TH-234	33165.	63.29	4.1745E+01
U-235	55919.	185.71	1.0843E+00
NP-237	36637.	86.48	6.1865E+00
U-237	32222.	59.54	5.6289E+00
NP-238	50.	984.45	2.7119E-01
NP-239	39507.	106.12	2.6702E+00
PU-239	44748.	129.30	8.7106E+03
AM-241	32223.	59.54	5.3789E+00
AM-243	34718.	74.67	1.6910E+00

worklistdata Version 1.0 05/15/96
08/26/98 13:01

LABCORE Completed Worklist Report for Worklist# 25691

Analyst: gay **Instrument:** AB10 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: @SR90-01 FOR ER-311 GRAB SAMPLES RTS

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@SR90-01	SR90-01	LIQUID	1.05E-03	1.12E-3	106.667	% Recovery
1	STD		0	@SR90-01	SR90-01C	LIQUID	100	8.10E+01	81.000	% Recovery
1	STD		0	@SR90-01	SR90-01E	LIQUID	1.00	2.13E+00	2.130	% Ct. Erro
2	BLNK		0	@SR90-01	SR90-01	LIQUID	1	3.69E-4	3.690e-004	uCi/mL
2	BLNK		0	@SR90-01	SR90-01C	LIQUID	100	7.98E+01	79.800	% Recovery
2	BLNK		0	@SR90-01	SR90-01E	LIQUID	1.00	1.00E+02	100.000	uCi/mL
3	BLNK/BKG		0	@SR90-01	SR90-01	LIQUID	1	1.32E+00	1.320	BLNK/BKG
4	SAMPLE	S98T002422	0	@SR90-01	SR90-01	LIQUID	N/A	1.03E+00	4.70e-004	uCi/mL
4	SAMPLE	S98T002422	0	@SR90-01	SR90-01C	LIQUID	N/A	8.14E+01		% Recovery
4	SAMPLE	S98T002422	0	@SR90-01	SR90-01E	LIQUID	N/A	6.93E-01		% Ct. Error
5	DUP	S98T002422	0	@SR90-01	SR90-01	LIQUID	1.03E+0	1.03E+0	0.000	RPD
5	DUP	S98T002422	0	@SR90-01	SR90-01C	LIQUID	100	8.07E+01	80.700	% Recovery
5	DUP	S98T002422	0	@SR90-01	SR90-01E	LIQUID	1.00	6.94E-01	0.694	% Cnt Err
6	SAMPLE	S98T002423	0	@SR90-01	SR90-01	LIQUID	N/A	9.40E-01	4.73e-004	uCi/mL
6	SAMPLE	S98T002423	0	@SR90-01	SR90-01C	LIQUID	N/A	8.05E+01		% Recovery
6	SAMPLE	S98T002423	0	@SR90-01	SR90-01E	LIQUID	N/A	7.27E-01		% Ct. Error
7	DUP	S98T002423	0	@SR90-01	SR90-01	LIQUID	9.40E-1	9.33E-1	0.747	RPD
7	DUP	S98T002423	0	@SR90-01	SR90-01C	LIQUID	100	8.01E+01	80.100	% Recovery
7	DUP	S98T002423	0	@SR90-01	SR90-01E	LIQUID	1.00	7.31E-01	0.731	% Cnt Err
8	SAMPLE	S98T002424	0	@SR90-01	SR90-01	LIQUID	N/A	9.69E-01	4.66e-004	uCi/mL
8	SAMPLE	S98T002424	0	@SR90-01	SR90-01C	LIQUID	N/A	8.12E+01		% Recovery
8	SAMPLE	S98T002424	0	@SR90-01	SR90-01E	LIQUID	N/A	7.11E-01		% Ct. Error
9	DUP	S98T002424	0	@SR90-01	SR90-01	LIQUID	9.69E-1	9.70E-1	0.103	RPD
9	DUP	S98T002424	0	@SR90-01	SR90-01C	LIQUID	100	8.35E+01	83.500	% Recovery
9	DUP	S98T002424	0	@SR90-01	SR90-01E	LIQUID	1.00	6.51E-01	0.651	% Cnt Err

Final page for worklist# 25691

Analyst Signature **Date** **Analyst Signature** **Date**

27 Aug 98

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 25691

Analyst: gay **Instrument:** AB00 10 **Book#** 28B57

Method: LA-220-101 Rev/Mod E-3

Worklist Comment: @SR90-01 FOR ER-311 GRAB SAMPLES RTS

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@SR90-01	LIQUID		
2	BLNK				@SR90-01	LIQUID		
3	BLNK/BKG				@SR90-01	LIQUID		
4	SAMPLE	S98T002422	0		@SR90-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: SR90-01 , SR90-01C, SR90-01E						
5	DUP	S98T002422	0		@SR90-01	LIQUID		
6	SAMPLE	S98T002423	0		@SR90-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: SR90-01 , SR90-01C, SR90-01E						
7	DUP	S98T002423	0		@SR90-01	LIQUID		
8	SAMPLE	S98T002424	0		@SR90-01	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: SR90-01 , SR90-01C, SR90-01E						
9	DUP	S98T002424	0		@SR90-01	LIQUID		

Final page for worklist # 25691

G. Mayer 8-25-98
Analyst Signature **Date**

R.E. Wright 8/26/98
Analyst Signature **Date**

D. L. Pl 8/26/98

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WORKBOOK PAGE: STD1

Sr-89/90 : LA-220-101 (E-3), 102 (INACTIVE), 104 (E-5) LIQUIDS

							STANDARD
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL	(CVA)		1.000
STD	TOTAL COUNTS	(TC)	8738	GROSS WEIGHT	(W2)		7.1462
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)		7.0652
25691	BACKGROUND in cpm	(BKG)	8.8	NET WEIGHT	(W3)		0.0810
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)	(DT)		5.18
@SR90-01	DILUTION FACTOR	(DF)	1				
Matrix	DIGEST DILUTION FACTOR	DDF	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	865.00	SR-90 EFFICIENCY FACTO	(C1)		0.4051
Batch Number	CRITICAL LEVEL	(Lc)	1.79	Y-90 EFFICIENCY FACTOR	(C2)		0.4503
98004238	TIME OF SEPARATION	(ST)	09:16	Rmax			N/A
Rerun	DATE OF SEPARATION	(SD)	08/25/98	DETECTION LIMIT	(Ld)		3.67
0	TIME OF COUNT	(TOC)	14:27	Sr-89/90 CONC. in µCi/L			1.1197E+00
Sample Prep	DATE OF COUNT	(DOC)	08/25/98				
N/A	STANDARD BOOK #		28B57				
Sample #	STANDARD VALUE in µCi/mL		1.0485E-03				
WL25691-STD							
Instrument Code							
WB26870							
Prepared By							
NEW							
Chemist							
SAC							
Analyst							
GAY							
Date Complete							
08/26/98							
Analysis Date							
08/25/98							
Analysis Time							
01:35 PM							
Sample Point							
ER-311 GRAB							

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)

Sr-89/90 CONC in µCi/mL REPLACE RS WITH RMAX IF RS<=LcAND RS>=0 OR REPLACE RS WITH Lc IF RS<0

RS*DF*DDF*1000/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)

NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))

Relative Counting Error = The Square Root of ((TC + BKG * CT) / (TC - BKG * CT)*1.96)

Percent Carrier Recovery = (Net Weight / Expected weight) * 100

NOTE: Expected weight = CVA * 0.1

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

Sr-89/90 CONCENTRATION	1.12E-03	µCi/mL
RELATIVE COUNTING ERROR	2.1%	
PERCENT CARRIER RECOVERY	81.0%	

DETECTION LEVEL 4.74E-06 µCi/L

Analyst:	GAY	Date:	26-Aug-98
Signature of Chemist:	SAC	Date:	27 Aug 98

STANDARD.WB1 REV 2.0 22010NML

WORKBOOK PAGE: BLANK2

LA-220-101 / E-3 Sr-89/90 : LA-220-101 (E-3), 102 (INACTIVE), 104 (E-5)

							BLNK
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL		(CVA)	1.000
BLNK	TOTAL COUNTS	(TC)	116	GROSS WEIGHT		(W2)	7.1435
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT		(W1)	7.0637
25691	BACKGROUND in cpm	(BKG)	8.8	NET WEIGHT		(W3)	0.0798
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)		(DT)	5.78
@SR90-01	DILUTION FACTOR	DF	101				
Matrix	DIGEST DILUTION FACTOR	(DDF)	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	2.80	SR-90 EFFICIENCY FACTOR		(C1)	0.4051
Batch Number	CRITICAL LEVEL	(Lc)	1.79	Y-90 EFFICIENCY FACTOR		(C2)	0.4503
98004238	TIME OF SEPARATION	(ST)	09:16	Rmax			N/A
Rerun	DATE OF SEPARATION	(SD)	08/25/98	DETECTION LIMIT		(Ld)	3.67
0	TIME OF COUNT	(TOC)	15:03	Sr-89/90 CONC in µCi/L			3.6922E-01
Sample Prep	DATE OF COUNT	(DOC)	08/25/98				
N/A							
Sample #							
WL25691-BLK							
Instrument Code	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)						
WB26870	Sr-89/90 CONC in µCi/L Replace RS with RMAX if RS<=Lc and RS>=0 or Replace RS with Lc if RS<0						
Prepared By	RS*DF*DDF/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)						
NEW	NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))						
Chemist	Relative Counting Error = (The Square Root of (TC + BKG * CT) / (TC - BKG * CT))*1.96						
SAC	Percent Carrier Recovery = (Net Weight / Expected weight) * 100						
Analyst	NOTE: Expected weight = CVA * 0.1						
GAY	Detection Levels and Less Than Values are determined from Procedure LA-508-002.						
Date Complete	Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100						
08/26/98							
Analysis Date							DETECTION LEVEL
08/25/98	Sr-89/90 CONCENTRATION			3.69E-04		µCi/mL	
Analysis Time							
01:35 PM	RELATIVE COUNTING ERROR			100.0%			4.83E-04 µCi/mL
Sample Point							
ER-311 GRAB	PERCENT CARRIER RECOVERY			79.8%			

Analyst:		GAY	Date:	26-Aug-98
Signature of Chemist:		SAC	Date:	26 Aug 98

BLANK.WB1 REV 2.0 22010NML

WORKBOOK PAGE: SAM4

Sr-89/90 : LA-220-101 (E-3), 102 (INACTIVE), 104 (E-5)

							SAMPLE
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL		(CVA)	1.000
SAMPLE	TOTAL COUNTS	(TC)	80252	GROSS WEIGHT		(W2)	7.1553
WorkList	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT		(W1)	7.0739
25691	BACKGROUND in cpm	(BKG)	8.8	NET WEIGHT		(W3)	0.0814
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)		(DT)	6.47
@SR90-01	DILUTION FACTOR	DF	101				
Matrix	DIGEST DILUTION FACTOR	(DDF)	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	8016.40	SR-90 EFFICIENCY FACTOR		(C1)	0.4051
Batch Number	CRITICAL LEVEL	(Lc)	1.79	Y-90 EFFICIENCY FACTOR		(C2)	0.4503
98004238	TIME OF SEPARATION	(ST)	09:16	Rmax			N/A
Rerun	DATE OF SEPARATION	(SD)	08/25/98	DETECTION LIMIT		(Ld)	3.67
0	TIME OF COUNT	(TOC)	15:44	Sr-89/90 CONC in µCi/L			1.0289E+03
Sample Prep	DATE OF COUNT	(DOC)	08/25/98				
N/A							
Sample #							
S98T002422							

Instrument Code	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
WB26870	Sr-89/90 CONC in µCi/L Replace RS with RMAX if RS<=Lc and RS>=0 or Replace RS with Lc if RS<0
Prepared By	RS*DF*DDF/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)
NEW	NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))
Chemist	Relative Counting Error = (The Square Root of (TC + BKG * CT) / (TC - BKG * CT))*1.96
SAC	Percent Carrier Recovery = (Net Weight / Expected weight) * 100
Analyst	NOTE: Expected weight = CVA * 0.1
GAY	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Date Complete	Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100
08/26/98	
Analysis Date	
08/25/98	
Analysis Time	
01:35 PM	
Sample Point	
ER-311 GRAB	

Sr-89/90 CONCENTRATION	1.03E+00	µCi/mL	DETECTION LEVEL
RELATIVE COUNTING ERROR	0.7%		4.70E-04 µCi/mL
PERCENT CARRIER RECOVERY	81.4%		

Analyst:	GAY	Date:	26-Aug-98
Signature of Chemist:	SAC	Date:	27 Aug 98

SAMPLE.WB1 REV 2.0 22010NML

WORKBOOK PAGE: DUP5

Sr-89/90 : LA-220-101 (E-3), 102 (INACTIVE), 104 (E-5)

							DUP
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL	(CVA)		1.000
DUP	TOTAL COUNTS	(TC)	80065	GROSS WEIGHT	(W2)		7.1358
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)		7.0551
25691	BACKGROUND in cpm	(BKG)	8.8	NET WEIGHT	(W3)		0.0807
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)	(DT)		6.87
@SR90-01	DILUTION FACTOR	DF	101				
Matrix	DIGEST DILUTION FACTOR	(DDF)	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	7997.70	SR-90 EFFICIENCY FACTOR	(C1)		0.4051
Batch Number	CRITICAL LEVEL	(Lc)	1.79	Y-90 EFFICIENCY FACTOR	(C2)		0.4503
98004238	TIME OF SEPARATION	(ST)	09:16	Rmax			N/A
Rerun	DATE OF SEPARATION	(SD)	08/25/98	DETECTION LIMIT	(Ld)		3.67
0	TIME OF COUNT	(TOC)	16:08	Sr-89/90 CONC in µCi/L			1.0311E+03
Sample Prep	DATE OF COUNT	(DOC)	08/25/98				
N/A							
Sample #							
S98T002422							

Instrument Code	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)
WB26870	Sr-89/90 CONC in µCi/L Replace RS with RMAX if RS<=Lc and RS>=0 or Replace RS with Lc if RS<0
Prepared By	RS*DF*DDF/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)
NEW	NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))
Chemist	Relative Counting Error = (The Square Root of (TC + BKG * CT) / (TC - BKG * CT))*1.96
SAC	Percent Carrier Recovery = (Net Weight / Expected weight) * 100
Analyst	NOTE: Expected weight = CVA * 0.1
GAY	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
Date Complete	Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100
08/26/98	
Analysis Date	
08/25/98	
Analysis Time	
01:35 PM	
Sample Point	
ER-311 GRAB	

Sr-89/90 CONCENTRATION	1.03E+00	µCi/mL	DETECTION LEVEL
RELATIVE COUNTING ERROR	0.7%		4.73E-04 µCi/mL
PERCENT CARRIER RECOVERY	80.7%		

Analyst:	GAY	Date:	26-Aug-98
Signature of Chemist:	SAC	Date:	27 Aug 98

SAMPLE.WB1 REV 2.0 22010NML

WORKBOOK PAGE: SAM6

Sr-89/90 : LA-220-101 (E-3), 102 (INACTIVE), 104 (E-5)

							SAMPLE
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL	(CVA)		1.000
SAMPLE	TOTAL COUNTS	(TC)	72948	GROSS WEIGHT	(W2)		7.1356
WorkList	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)		7.0551
25691	BACKGROUND in cpm	(BKG)	8.8	NET WEIGHT	(W3)		0.0805
TestCode	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)	(DT)		7.07
@SR90-01	DILUTION FACTOR	DF	101				
Matrix	DIGEST DILUTION FACTOR	(DDF)	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	7286.00	SR-90 EFFICIENCY FACTOR	(C1)		0.4051
BatchNumber	CRITICAL LEVEL	(Lc)	1.79	Y-90 EFFICIENCY FACTOR	(C2)		0.4503
98004238	TIME OF SEPARATION	(ST)	09:20	Rmax			N/A
Rerun	DATE OF SEPARATION	(SD)	08/25/98	DETECTION LIMIT	(Ld)		3.67
0	TIME OF COUNT	(TOC)	16:24	Sr-89/90 CONC in µCi/L			9.3975E+02
Sample Prep	DATE OF COUNT	(DOC)	08/25/98				
N/A							
Sample #							
S98T002423							
Instrument Code	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)						
WB26870	Sr-89/90 CONC in µCi/L Replace RS with RMAX if RS<=Lc and RS>=0 or Replace RS with Lc if RS<0						
Prepared By	RS*DF*DDF/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)						
NEW	NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))						
Chemist	Relative Counting Error = (The Square Root of (TC + BKG * CT) / (TC - BKG * CT))*1.96						
SAC	Percent Carrier Recovery = (Net Weight / Expected weight) * 100						
Analyst	NOTE: Expected weight = CVA * 0.1						
GAY	Detection Levels and Less Than Values are determined from Procedure LA-508-002.						
Date Complete	Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100						
08/26/98							
Analysis Date							DETECTION LEVEL
08/25/98	Sr-89/90 CONCENTRATION			9.40E-01		µCi/mL	
Analysis Time							
01:35 PM	RELATIVE COUNTING ERROR			0.7%			4.73E-04 µCi/mL
Sample Point							
ER-311 GRAB	PERCENT CARRIER RECOVERY			80.5%			

Analyst:		GAY	Date:	26-Aug-98
Signature of Chemist:		SAC	Date:	27 Aug 98

SAMPLE.WB1 REV 2.0 22010NML

WORKBOOK PAGE: DUP7

Sr-89/90 : LA-220-101 (E-3), 102 (INACTIVE), 104 (E-5)

							DUP
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL	(CVA)		1.000
DUP	TOTAL COUNTS	(TC)	72221	GROSS WEIGHT	(W2)		7.1366
WorkList	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)		7.0565
25691	BACKGROUND in cpm	(BKG)	8.8	NET WEIGHT	(W3)		0.0801
TestCode	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)	(DT)		7.30
@SR90-01	DILUTION FACTOR	DF	101				
Matrix	DIGEST DILUTION FACTOR	(DDF)	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	7213.30	SR-90 EFFICIENCY FACTOR	(C1)		0.4051
BatchNumber	CRITICAL LEVEL	(Lc)	1.79	Y-90 EFFICIENCY FACTOR	(C2)		0.4503
98004238	TIME OF SEPARATION	(ST)	09:20	Rmax			N/A
Rerun	DATE OF SEPARATION	(SD)	08/25/98	DETECTION LIMIT	(Ld)		3.67
0	TIME OF COUNT	(TOC)	16:38	Sr-89/90 CONC in µCi/L			9.3278E+02
SamplePrep	DATE OF COUNT	(DOC)	08/25/98				
N/A							
Sample #							
S98T002423							
Instrument Code	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)						
WB26870	Sr-89/90 CONC in µCi/L Replace RS with RMAX if RS<=Lc and RS>=0 or Replace RS with Lc if RS<0						
Prepared By	RS*DF*DDF/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)						
NEW	NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))						
Chemist	Relative Counting Error = (The Square Root of (TC + BKG * CT) / (TC - BKG * CT))*1.96						
SAC	Percent Carrier Recovery = (Net Weight / Expected weight) * 100						
Analyst	NOTE: Expected weight = CVA * 0.1						
GAY	Detection Levels and Less Than Values are determined from Procedure LA-508-002.						
Date Complete	Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100						
08/26/98							
Analysis Date							DETECTION LEVEL
08/25/98	Sr-89/90 CONCENTRATION			9.33E-01		µCi/mL	
Analysis Time							
01:35 PM	RELATIVE COUNTING ERROR			0.7%			4.74E-04 µCi/mL
Sample Point							
ER-311 GRAB	PERCENT CARRIER RECOVERY			80.1%			

Analyst:		GAY	Date:	26-Aug-98
Signature of Chemist:	SA Cotta	SAC	Date:	27 Aug 98

SAMPLE.WB1 REV 2.0 22010NML

WORKBOOK PAGE: SAM8

Sr-89/90 : LA-220-101 (E-3), 102 (INACTIVE), 104 (E-5)

							SAMPLE
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL	(CVA)		1.000
SAMPLE	TOTAL COUNTS	(TC)	76282	GROSS WEIGHT	(W2)		7.1318
Work List #	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)		7.0506
25691	BACKGROUND in cpm	(BKG)	8.8	NET WEIGHT	(W3)		0.0812
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)	(DT)		7.55
@SR90-01	DILUTION FACTOR	DF	101				
Matrix	DIGEST DILUTION FACTOR	(DDF)	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	7619.40	SR-90 EFFICIENCY FACTOR	(C1)		0.4051
Batch Number	CRITICAL LEVEL	(Lc)	1.79	Y-90 EFFICIENCY FACTOR	(C2)		0.4503
98004238	TIME OF SEPARATION	(ST)	09:20	Rmax			N/A
Rerun #	DATE OF SEPARATION	(SD)	08/25/98	DETECTION LIMIT	(Ld)		3.67
0	TIME OF COUNT	(TOC)	16:53	Sr-89/90 CONC in µCi/L			9.6947E+02
Sample Prep	DATE OF COUNT	(DOC)	08/25/98				
N/A							
Sample #							
S98T002424							
Instrument Code	Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)						
WB26870	Sr-89/90 CONC in µCi/L Replace RS with RMAX if RS<=Lc and RS>=0 or Replace RS with Lc if RS<0						
Prepared By	RS*DF*DDF/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)						
NEW	NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))						
Chemist #	Relative Counting Error = (The Square Root of (TC + BKG * CT) / (TC - BKG * CT))*1.96						
SAC	Percent Carrier Recovery = (Net Weight / Expected weight) * 100						
Analyst	NOTE: Expected weight = CVA * 0.1						
GAY	Detection Levels and Less Than Values are determined from Procedure LA-508-002.						
Date Complete	Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100						
08/26/98							
Analysis Date							DETECTION
08/25/98	Sr-89/90 CONCENTRATION		9.69E-01		µCi/mL		LEVEL
Analysis Time							
01:35 PM	RELATIVE COUNTING ERROR		0.7%				4.66E-04
Sample Point							µCi/mL
ER-311 GRAB	PERCENT CARRIER RECOVERY		81.2%				

Analyst:		GAY	Date:	26-Aug-98
Signature of Chemist:	SACarter	SAC	Date:	27 Aug 98

SAMPLE.WB1 REV 2.0 22010NML

WORKBOOK PAGE: DUP9

Sr-89/90 : LA-220-101 (E-3), 102 (INACTIVE), 104 (E-5)

							DUP
Type	DETECTOR NUMBER		10	CARRIER ADDED in mL		(CVA)	1.000
DUP	TOTAL COUNTS	(TC)	91065	GROSS WEIGHT		(W2)	7.1158
Work List	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT		(W1)	7.0323
25691	BACKGROUND in cpm	(BKG)	9.5	NET WEIGHT		(W3)	0.0835
Test Code	SAMPLE VOLUME in mL	(SS)	1.000	DELTA TIME (HOURS)		(DT)	24.88
@SR90-01	DILUTION FACTOR	DF	101				
Matrix	DIGEST DILUTION FACTOR	(DDF)	1				
LIQUID	SAMPLE COUNT RATE	(Rs)	9097.00	SR-90 EFFICIENCY FACTOR		(C1)	0.4051
Batch Number	CRITICAL LEVEL	(Lc)	1.86	Y-90 EFFICIENCY FACTOR		(C2)	0.4503
98004238	TIME OF SEPARATION	(ST)	09:20	Rmax			N/A
Rerun	DATE OF SEPARATION	(SD)	08/25/98	DETECTION LIMIT		(Ld)	3.80
0	TIME OF COUNT	(TOC)	10:13	Sr-89/90 CONC in µCi/L			9.6961E+02
Sample Prep	DATE OF COUNT	(DOC)	08/26/98				
N/A							
Sample #							
S98T002424							
Instrument Code							
WB26870							
Prepared By							
NEW							
Chemist							
SAC							
Analyst							
GAY							
Date Complete							
08/26/98							
Analysis Date							
08/25/98							
Analysis Time							
01:35 PM							
Sample Point							
ER-311 GRAB							

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)

Sr-89/90 CONC in µCi/L Replace RS with RMAX if RS<=Lc and RS>=0 or Replace RS with Lc if RS<0

RS*DF*DDF/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)

NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))

Relative Counting Error = (The Square Root of (TC + BKG * CT) / (TC - BKG * CT))*1.96

Percent Carrier Recovery = (Net Weight / Expected weight) * 100

NOTE: Expected weight = CVA * 0.1

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

Sr-89/90 CONCENTRATION	9.70E-01	µCi/mL	DETECTION LEVEL
RELATIVE COUNTING ERROR	0.7%		4.06E-04 µCi/mL
PERCENT CARRIER RECOVERY	83.5%		

Analyst:	GAY	Date:	26-Aug-98
Signature of Chemist:	SAC	Date:	27 Aug 98

SAMPLE.WB1 REV 2.0 22010NML

LABCORE Completed Worklist Report for Worklist# 25970

Analyst: akl **Instrument:** AB13 **Book#:** _____

Method: LA-953-104 Rev/Mod _____

Worklist Comment: RERUN OF WL25690 FOR ER-311 GRAB, GLL.

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@AM24101	AM24101	LIQUID	2.27E-04	2.05E-4	90.308	% Recovery
1	STD		0	@AM24101	AM24101E	LIQUID	1.0	1.59E+00	1.590	% Ct Error
1	STD		0	@AM24101	AM24101T	LIQUID	100.	9.44E+01	94.400	% Recovery
2	BLNK		0	@AM24101	AM24101	LIQUID	1	<5.51E-6		uCi/mL
2	BLNK		0	@AM24101	AM24101E	LIQUID	1.0	1.00E+02	100.000	% Ct Error
2	BLNK		0	@AM24101	AM24101T	LIQUID	100.0	9.10E+01	91.000	% Recovery
3	SAMPLE	S98T002424	0	@AM24101	AM24101	LIQUID	N/A	1.29E-05	6.44e-006	uCi/mL
3	SAMPLE	S98T002424	0	@AM24101	AM24101E	LIQUID	N/A	5.83E+00		% Ct. Error
3	SAMPLE	S98T002424	0	@AM24101	AM24101T	LIQUID	N/A	8.99E+01		% Recovery
4	DUP	S98T002424	0	@AM24101	AM24101	LIQUID	1.29E-5	1.39E-5	7.463	RPD
4	DUP	S98T002424	0	@AM24101	AM24101E	LIQUID	1.0	5.54E+00	5.540	% Ct Error
4	DUP	S98T002424	0	@AM24101	AM24101T	LIQUID	100.0	8.42E+01	84.200	% Recovery

Final page for worklist# 25970

Analyst Signature Date

Analyst Signature Date

John Relyea 3 Sept 98
Reviewer Signature Date

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 25970

Analyst: AXL **Instrument:** AM01 13 **Book#** 26B57

Method: LA-953-104 Rev/Mod B0

Worklist Comment: RERUN OF WL25690 FOR ER-311 GRAB, GLL.

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@AM24101	LIQUID		
2	BLNK				@AM24101	LIQUID		
3	SAMPLE	S98T002424	0		@AM24101	LIQUID	98000453	ER-311 GRAB
		Analytes Requested:			AM24101 , AM24101E, AM24101T			
4	DUP	S98T002424	0		@AM24101	LIQUID		

Final page for worklist # 25970

Alita Hudson 9/2/98
Analyst Signature Date

Shana L Hale 9-3-98
Analyst Signature Date

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WORKBOOK PAGE: STD1

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID

Type	Date Counted		SEP-02-98	Am 241 AEA Frac.	(C241)	STD 0.639
STD	Sample Volume in mL	(SS)	1.000	Am 243 AEA Frac.	(C243)	0.29
Worklist	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.	(Cm)	0
25970	Tracer Volume in mL	(SPKV)	0.200	Total AT Counts		6394
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)	(TC)	30
@AM24101	Tracer Book No.		140B43	Background in cpm	(Bkg)	0.1
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm		101.92
LIQUID	Detector Number		13	Am 243 cpm		46.19
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm		0
98004533	Standard Book No		28B57	AEA Count Time	(min)	480
Rerun	Standard Value in µCi/mL		2.270E-04	Am 241 µCi/L =		2.0526E-01
0				Cm 243/244 µCi/L =	<	1.7021E-02

Sample Prep	
N/A	
Sample Number	Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))
WL25970-STD	Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))
Instrument Code	
WB27810	Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100
Prepared By	Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV
SLH2	
Chemist	
JFR	
Analyst	
AKL	
Date Complete	
09/03/98	
Analysis Date	
09/02/98	
Analysis Time	
09:40 AM	
Sample Point	
ER-311 GRAB	

Am 241 µCi/mL	=	2.05E-04	DETECTION LEVELS in µCi/mL
Relative Counting Error	=	1.6%	
NOTE: Cm-243/244 Result is a LESS THAN Value.			Am 241 1.70E-05
Cm 243/244 µCi/mL		< 1.70E-05	
Relative Counting Error	=	100.0%	Cm 243/244 1.70E-05
Am 243 Tracer Recovery	=	94.4%	

Analyst:	AKL	Date:	09/03/98
Signature of Chemist: John Rolyea	JFR	Date:	3 Sept 98

STANDARD.WB1 REV 1.2 953103ML

WORKBOOK PAGE: BLANK2

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID / SO

Type	Date Counted		SEP-02-98	Am 241 AEA Frac.	(C241)	0
BLNK	Sample Volume in mL	(SS)	0.500	Am 243 AEA Frac.	(C243)	0.929
Worklist	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.	(Cm)	0
25970	Tracer Volume in mL	(SPKV)	0.100	Total AT Counts		965
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)	(TC)	30
@AM24101	Tracer Book No.		140B43	Background in cpm	(Bkg)	0.1
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm		0
LIQUID	Detector Number		13	Am 243 cpm		20.3
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm		0
98004533				AEA Count Time	(min)	480
Rerun				Am 241 µCi/L =	<	5.5095E-03
0				Cm 243/244 µCi/L =	<	5.5095E-03
Sample Prep						
N/A						
Sample Number						
WL25970-BLNK						
Instrument Code						
WB27810						
Prepared By						
SLH2						
Chemist						
JFR						
Analyst						
AKL						
Date Complete						
09/03/98						
Analysis Date						
09/02/98						
Analysis Time						
09:40 AM						
Sample Point						
ER-311 GRAB						

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

NOTE: Am-241 Result is a LESS THAN Value.

Am 241 µCi/mL =	< 5.51E-06	DETECTION LEVELS in µCi/mL
Relative Counting Error =	100.0%	
NOTE: Cm-243/244 Result is a LESS THAN Value.		Am 241 5.51E-06
Cm 243/244 µCi/mL	< 5.51E-06	
Relative Counting Error =	100.0%	Cm 243/244 5.51E-06
Am 243 Tracer Recovery =	91.0%	

Analyst:		AKL	Date:	09/03/98
Signature of Chemist:	John Relyea	JFR	Date:	3 Sept 98

BLANK.WB1 REV 1.2 953103ML

WORKBOOK PAGE: SAM3

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID / SO

Type	Date Counted		SEP-02-98	Am 241 AEA Frac.	(C241)	SAMPLE 0.111
SAMPLE	Sample Volume in mL	(SS)	0.500	Am 243 AEA Frac.	(C243)	0.804
Worklist	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.	(Cm)	0
25970	Tracer Volume in mL	(SPKV)	0.100	Total AT Counts		1101
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)	(TC)	30
@AM24101	Tracer Book No.		140B43	Background in cpm	(Bkg)	0.1
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm		2.68
LIQUID	Detector Number		13	Am 243 cpm		19.42
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm		0
98004533				AEA Count Time	(min)	480
Rerun				Am 241 µCi/L =		1.2861E-02
0				Cm 243/244 µCi/L =	<	6.4447E-03
Sample Prep						
N/A						
Sample Number						
S98T002424						
Instrument Code						
WB27810						
Prepared By						
SLH2						
Chemist						
JFR						
Analyst						
AKL						
Date Complete						
09/03/98						
Analysis Date						
09/02/98						
Analysis Time						
09:40 AM						
Sample Point						
ER-311 GRAB						

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

Am 241 µCi/mL =	1.29E-05	
Relative Counting Error =	5.8%	
NOTE: Cm-243/244 Result is a LESS THAN Value.		
Cm 243/244 µCi/mL	< 6.44E-06	
Relative Counting Error =	100.0%	
Am 243 Tracer Recovery =	89.9%	

DETECTION LEVELS in µCi/mL	
Am 241	6.44E-06
Cm 243/244	6.44E-06

Analyst:		AKL	Date:	09/03/98	
Signature of Chemist:	John Relyea	JFR	Date:	3 Sept 98	

SAMPLE.WB1 REV 1.2 953103ML

WORKBOOK PAGE: DUP4

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID / SO

							DUP
Type	Date Counted		SEP-02-98	Am 241 AEA Frac.		(C241)	0.116
DUP	Sample Volume in mL	(SS)	0.500	Am 243 AEA Frac.		(C243)	0.775
Work List	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.		(Cm)	0
25970	Tracer Volume in mL	(SPKV)	0.100	Total AT Counts			1070
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)		(TC)	30
@AM24101	Tracer Book No.		140B43	Background in cpm		(Bkg)	0.1
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm			3
LIQUID	Detector Number		13	Am 243 cpm			19.95
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm			0
98004533				AEA Count Time		(min)	480
Rerun				Am 241 µCi/L =			1.3943E-02
0				Cm 243/244 µCi/L =		<	7.1376E-03
Sample Prep							
N/A							
Sample Number							
S98T002424							
Instrument Code							
WB27810							
Prepared By							
SLH2							
Chemist							
JFR							
Analyst							
AKL							
Date Complete							
09/03/98							
Analysis Date							
09/02/98							
Analysis Time							
09:40 AM							
Sample Point							
ER-311 GRAB							

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

Am 241 µCi/mL =	1.39E-05	DETECTION LEVELS in µCi/mL
Relative Counting Error =	5.5%	
NOTE: Cm-243/244 Result is a LESS THAN Value.		Am 241 7.14E-06
Cm 243/244 µCi/mL	< 7.14E-06	
Relative Counting Error =	100.0%	Cm 243/244 7.14E-06
Am 243 Tracer Recovery =	84.2%	

Analyst:		AKL	Date:	09/03/98
Signature of Chemist:	John Robyn	JFR	Date:	3 Sept 98

SAMPLE.WB1 REV 1.2 953103ML

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
WL25970-STD
File ID: 1a1778.CNF

Counted on: 9/ 2/98 @13:25
Detector: AEA1
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	2552.0	2552.0	300.204	300.204	14.000	6.692	7.000	2.020
2	1141.6	1141.6	254.390	254.285	14.000	6.420	7.000	1.867
3	21.2	21.2	148.241	148.187	168.000	1.000	84.000	0.100
4?	6.0	6.0	112.625	112.038	8.000	14.545	4.000	4.752
5?	4.8	4.8	97.011	96.492	8.000	3.408	4.000	0.417

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	~~Pu238~~	0.639	5.487	5.471	0.0160	0.03	101.92	0.9	572.4	0.258E-03
	Am241		5.479	5.471	0.008				438.4	0.197E-03
2	Am243	0.290	5.266	5.259	0.0070	0.03	46.19	1.4	188.7	0.850E-04
3	~~Np237~~	~~0.011~~	~~4.769~~	~~4.771~~	~~.0020~~	~~.00~~	~~1.68~~	~~6.9~~	~~7.8~~	~~0.352E-05~~
4	JHR 3 Sept 98	????		4.605			0.28	37.6		
5		????		4.533			0.33	26.8		
Totals:		0.939	<--valid peaks only-->				149.80			

DETECTOR CALIBRATION
Energy(MEV) = 4.090 + (0.0046)*Channel
Energy range (MeV): 4.090 TO 6.445
Efficiency = 0.2473 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	76574.0	100.000
Smoothed	76574.0	100.000
Composite fit	72198.2	94.285
Residuals	4375.8	5.714

Analyzed by: SZC

Spectrum 1a1778.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 18230.3

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5
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Raw Data Dump for AEA Spectrum: 1a1778.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	3.	10.	5.
21	5.	4.	0.	5.	3.	5.	3.	4.	5.	5.
31	3.	11.	1.	8.	4.	3.	5.	4.	2.	5.
41	4.	8.	7.	5.	7.	7.	2.	9.	6.	7.
51	2.	5.	5.	5.	6.	7.	8.	8.	2.	8.
61	1.	9.	10.	7.	8.	6.	7.	7.	9.	3.
71	5.	3.	6.	4.	4.	5.	5.	10.	7.	9.
81	7.	9.	7.	5.	8.	10.	11.	10.	7.	10.
91	4.	8.	9.	7.	13.	12.	14.	13.	11.	9.
101	7.	9.	17.	10.	14.	3.	10.	13.	12.	12.
111	13.	15.	13.	15.	10.	14.	9.	10.	14.	18.
121	21.	13.	4.	13.	17.	19.	20.	9.	13.	17.
131	11.	14.	16.	17.	20.	15.	22.	20.	16.	19.
141	14.	20.	20.	17.	25.	19.	22.	18.	26.	19.
151	20.	17.	17.	14.	17.	20.	21.	19.	19.	26.
161	32.	17.	24.	20.	32.	26.	29.	36.	28.	26.
171	37.	30.	23.	35.	39.	33.	38.	43.	43.	37.
181	52.	40.	46.	44.	50.	36.	40.	53.	51.	42.
191	55.	51.	46.	58.	52.	60.	57.	58.	59.	63.
201	61.	78.	72.	60.	75.	78.	86.	69.	85.	82.
211	80.	100.	111.	111.	129.	105.	118.	144.	127.	136.
221	140.	150.	155.	166.	173.	182.	212.	206.	204.	216.
231	218.	224.	237.	267.	315.	321.	317.	374.	390.	442.
241	427.	454.	548.	567.	615.	721.	737.	786.	880.	980.
251	1044.	1169.	1247.	1334.	1324.	1240.	1102.	793.	532.	354.
261	296.	308.	301.	314.	308.	308.	292.	286.	288.	320.
271	340.	343.	358.	361.	395.	429.	440.	473.	483.	536.
281	588.	637.	646.	705.	783.	852.	910.	1036.	1137.	1299.
291	1401.	1484.	1673.	1749.	1946.	2067.	2293.	2492.	2672.	2822.
301	2778.	2650.	2164.	1502.	1003.	758.	528.	466.	371.	330.
311	242.	181.	141.	94.	66.	27.	11.	0.	0.	2.
321	0.	2.	2.	0.	1.	0.	1.	1.	2.	0.
331	0.	1.	0.	1.	0.	1.	0.	1.	0.	0.
341	0.	0.	0.	1.	2.	0.	1.	0.	1.	1.
351	2.	2.	0.	1.	2.	0.	1.	0.	0.	0.
361	1.	1.	1.	1.	2.	1.	0.	0.	0.	1.
371	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.
391	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
401	1.	0.	0.	0.	1.	0.	1.	0.	1.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	1.	1.	0.	0.	0.	0.	1.	0.
431	1.	0.	1.	2.	0.	2.	0.	2.	0.	2.
441	2.	1.	1.	0.	1.	0.	2.	0.	2.	1.
451	2.	1.	1.	2.	0.	0.	1.	0.	0.	0.
461	1.	0.	0.	0.	0.	1.	2.	1.	3.	1.
471	0.	2.	1.	1.	1.	4.	1.	2.	0.	1.
481	0.	2.	1.	0.	1.	1.	0.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
WL25970-BLNK
File ID: 2a2072.CNF

Counted on: 9/ 2/98 @13:26
Detector: AEA2
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	535.9	535.9	254.652	254.652	12.000	5.851	6.000	1.843

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am243	0.929	5.266	5.256	0.010	0.03	20.30	2.0	84.9	0.383E-04
Totals:		0.929	<--valid peaks only-->				20.30			

DETECTOR CALIBRATION
Energy(MEV) = 4.085 + (0.0046)*Channel
Energy range (MeV): 4.085 TO 6.440
Efficiency = 0.2414 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	10492.0	100.000
Smoothed	10492.0	100.000
Composite fit	9744.3	92.874
Residuals	747.7	7.126

Analyzed by: _____
SZC

Spectrum 2a2072.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 3811.9

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Raw Data Dump for AEA Spectrum: 2a2072.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
21	0.	0.	0.	0.	1.	0.	1.	0.	1.	1.
31	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
41	0.	1.	0.	0.	0.	0.	1.	0.	1.	0.
51	0.	0.	0.	1.	1.	0.	0.	1.	1.	1.
61	0.	0.	1.	1.	0.	0.	0.	1.	0.	0.
71	1.	2.	2.	0.	1.	0.	0.	1.	1.	2.
81	1.	2.	0.	0.	1.	1.	1.	1.	0.	1.
91	0.	0.	0.	1.	1.	1.	4.	1.	0.	0.
101	0.	1.	0.	3.	0.	1.	2.	0.	0.	1.
111	0.	1.	2.	2.	2.	0.	1.	1.	1.	2.
121	0.	0.	2.	1.	2.	3.	0.	2.	4.	1.
131	2.	1.	4.	0.	5.	2.	1.	1.	1.	0.
141	4.	2.	3.	0.	2.	1.	4.	0.	2.	0.
151	0.	3.	2.	4.	1.	1.	6.	1.	2.	3.
161	2.	3.	0.	6.	2.	3.	4.	3.	2.	3.
171	5.	2.	1.	3.	5.	2.	6.	3.	5.	4.
181	11.	6.	5.	7.	6.	6.	6.	9.	8.	9.
191	8.	11.	9.	6.	6.	9.	13.	9.	10.	12.
201	14.	3.	11.	12.	17.	15.	16.	15.	18.	29.
211	21.	21.	15.	21.	23.	27.	25.	29.	23.	35.
221	34.	36.	37.	28.	56.	52.	52.	64.	57.	63.
231	67.	76.	84.	103.	113.	110.	123.	114.	133.	169.
241	170.	182.	209.	284.	276.	337.	356.	370.	425.	436.
251	484.	512.	541.	550.	580.	593.	494.	397.	267.	134.
261	90.	56.	52.	42.	32.	42.	26.	30.	35.	15.
271	15.	8.	5.	6.	3.	2.	1.	1.	2.	0.
281	2.	3.	0.	1.	1.	0.	1.	1.	1.	5.
291	1.	2.	2.	8.	5.	4.	3.	4.	3.	2.
301	5.	2.	4.	7.	0.	0.	1.	1.	1.	1.
311	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
341	1.	0.	2.	0.	0.	1.	1.	1.	1.	0.
351	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
361	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
371	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	1.	0.	1.	0.	0.	1.	0.	0.
391	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.
401	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
431	2.	2.	0.	0.	0.	0.	0.	0.	1.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	3.	0.
451	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2424-SAM
File ID: 3a3264.CNF

Counted on: 9/ 2/98 @13:27
Detector: AEA3
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	58.2	58.2	297.650	297.650	16.000	9.552	8.000	2.566
2	456.4	456.4	252.238	252.224	14.000	7.364	7.000	2.063

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.111	5.479	5.463	0.0160	04	2.68	5.5	12.4	0.558E-05
	~~Pu238~~		5.487	5.463	0.024				16.2	0.729E-05
2	Am243	0.804	5.266	5.254	0.0120	03	19.42	2.0	85.1	0.384E-04
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Totals:		0.915	<--valid peaks only-->				22.10			

JAR 3/9/98

DETECTOR CALIBRATION
Energy(MEV) = 4.094 + (0.0046)*Channel
Energy range (MeV): 4.094 TO 6.449
Efficiency = 0.2304 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	11594.0	100.000
Smoothed	11594.0	100.000
Composite fit	10610.7	91.519
Residuals	983.3	8.481

Analyzed by: _____
SZC

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                    Spectrum 3a3264.CNF
1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc     Display Max.:    3404.0

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Raw Data Dump for AEA Spectrum: 3a3264.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
21	0.	1.	1.	1.	2.	0.	2.	2.	0.	0.
31	1.	4.	0.	1.	1.	0.	1.	2.	1.	1.
41	1.	1.	0.	0.	1.	0.	0.	3.	0.	1.
51	0.	0.	0.	2.	0.	1.	1.	1.	1.	1.
61	1.	0.	0.	0.	0.	2.	2.	3.	1.	3.
71	3.	2.	1.	1.	0.	1.	1.	0.	3.	0.
81	2.	1.	1.	3.	2.	1.	2.	1.	1.	0.
91	2.	1.	1.	1.	0.	2.	2.	0.	2.	1.
101	2.	1.	2.	3.	3.	1.	2.	2.	3.	3.
111	4.	3.	5.	5.	0.	2.	2.	3.	1.	1.
121	3.	2.	0.	1.	1.	3.	2.	0.	4.	3.
131	3.	2.	5.	2.	5.	7.	5.	4.	1.	5.
141	3.	2.	4.	4.	6.	1.	5.	6.	3.	7.
151	9.	4.	3.	7.	6.	6.	6.	6.	5.	4.
161	9.	7.	2.	4.	3.	7.	10.	8.	5.	8.
171	7.	11.	11.	8.	2.	4.	9.	10.	8.	6.
181	8.	15.	10.	14.	16.	13.	10.	12.	12.	9.
191	18.	14.	13.	13.	19.	15.	18.	19.	26.	18.
201	15.	23.	23.	27.	30.	25.	31.	26.	30.	35.
211	29.	23.	21.	32.	25.	36.	28.	41.	50.	39.
221	41.	51.	58.	45.	65.	64.	72.	92.	66.	91.
231	103.	80.	123.	130.	125.	114.	150.	170.	191.	177.
241	216.	280.	285.	322.	326.	361.	397.	376.	424.	454.
251	493.	509.	455.	469.	447.	339.	263.	154.	101.	60.
261	38.	33.	43.	41.	36.	48.	25.	23.	20.	18.
271	15.	10.	8.	9.	16.	8.	17.	10.	7.	15.
281	21.	19.	17.	28.	33.	25.	37.	40.	30.	46.
291	44.	42.	45.	63.	47.	65.	52.	73.	49.	51.
301	63.	41.	37.	23.	23.	5.	7.	6.	6.	8.
311	2.	1.	0.	0.	0.	0.	3.	1.	0.	0.
321	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.
331	1.	0.	1.	0.	0.	1.	0.	1.	1.	4.
341	0.	0.	0.	2.	0.	1.	2.	0.	0.	0.
351	1.	1.	0.	0.	0.	0.	2.	2.	2.	1.
361	2.	3.	1.	0.	1.	2.	2.	1.	2.	1.
371	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	1.	0.	0.	0.	0.	2.	0.	0.	0.
411	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
461	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	2.	1.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2424-DUP
File ID: 4a4265.CNF

Counted on: 9/ 2/98 @13:28
Detector: AEA4
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	73.1	73.1	298.053	298.053	14.000	6.266	7.000	1.770
2	511.9	511.9	252.128	252.122	12.000	5.362	6.000	1.565
3	9.8	9.8	169.359	169.021	104.000	1.000	52.000	0.100

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	~~Pu238~~	0.116	5.487	5.462	0.025	0.03	3.00	5.2	17.5	0.790E-05
	Am241		5.479	5.462	0.017				13.4	0.605E-05
2	Am243	0.775	5.266	5.250	0.016	0.02	19.95	2.0	84.9	0.382E-04
3	3/8/35 pt 98	0.030		4.868		0.00	0.78	10.3	3.3	0.149E-05
Totals:		0.921	<--valid peaks only-->				23.73			

DETECTOR CALIBRATION
Energy(MEV) = 4.091 + (0.0046)*Channel
Energy range (MeV): 4.091 TO 6.446
Efficiency = 0.2374 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	12364.0	100.000
Smoothed	12364.1	100.001
Composite fit	11391.5	92.135
Residuals	972.5	7.865

Analyzed by: _____
SZC

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                    Spectrum 4a4265.CNF
1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc     Display Max.:    3628.3

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Raw Data Dump for AEA Spectrum: 4a4265.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.
21	1.	0.	0.	0.	0.	4.	0.	1.	0.	2.
31	1.	1.	0.	2.	1.	0.	0.	2.	0.	1.
41	1.	1.	1.	1.	3.	0.	2.	2.	1.	0.
51	2.	2.	2.	2.	3.	2.	5.	0.	2.	1.
61	2.	0.	0.	0.	1.	2.	3.	3.	1.	1.
71	2.	0.	0.	1.	3.	2.	0.	1.	3.	4.
81	3.	2.	0.	3.	2.	1.	0.	2.	2.	0.
91	4.	2.	1.	1.	2.	2.	3.	0.	1.	3.
101	2.	1.	7.	1.	2.	2.	2.	1.	4.	2.
111	1.	6.	1.	2.	3.	1.	3.	3.	7.	3.
121	0.	3.	0.	6.	3.	4.	3.	2.	7.	0.
131	4.	1.	4.	8.	5.	5.	5.	3.	5.	5.
141	1.	5.	6.	10.	4.	3.	6.	4.	6.	7.
151	5.	6.	9.	3.	3.	5.	8.	4.	7.	7.
161	9.	2.	3.	6.	7.	7.	15.	9.	12.	12.
171	10.	9.	7.	11.	13.	10.	10.	5.	9.	12.
181	7.	12.	9.	13.	8.	15.	16.	15.	19.	17.
191	17.	15.	14.	13.	25.	19.	21.	15.	30.	19.
201	22.	32.	26.	24.	23.	30.	22.	34.	25.	28.
211	44.	42.	31.	48.	44.	45.	41.	39.	47.	40.
221	54.	52.	54.	69.	76.	84.	88.	73.	90.	78.
231	96.	96.	116.	126.	130.	149.	162.	168.	192.	253.
241	244.	257.	294.	333.	305.	398.	435.	440.	463.	474.
251	535.	570.	557.	530.	424.	262.	179.	91.	51.	47.
261	46.	46.	45.	45.	23.	35.	36.	25.	22.	15.
271	15.	14.	11.	11.	11.	10.	16.	17.	16.	16.
281	21.	26.	21.	28.	29.	34.	35.	35.	52.	42.
291	46.	67.	53.	57.	71.	61.	80.	87.	69.	79.
301	53.	40.	30.	11.	14.	11.	12.	8.	10.	4.
311	6.	1.	4.	0.	0.	0.	0.	0.	0.	0.
321	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
331	1.	1.	1.	1.	0.	1.	0.	0.	0.	1.
341	0.	0.	3.	1.	2.	2.	0.	0.	0.	0.
351	1.	1.	3.	1.	1.	0.	1.	1.	1.	2.
361	0.	1.	0.	1.	0.	2.	2.	0.	1.	2.
371	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
391	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
401	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	1.	0.	0.	0.	1.	2.	1.	1.	1.
431	1.	0.	1.	2.	1.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
471	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.
481	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

LABCORE Completed Worklist Report for Worklist# 25690

Analyst: akl **Instrument:** AB13 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: @AM24101 FOR ER-311 GRAB SAMPLES RTS

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@AM24101	AM24101	LIQUID	2.27E-04	2.14E-4	94.273	% Recovery
1	STD		0	@AM24101	AM24101T	LIQUID	100.	9.28E+01	92.800	% Recovery
1	STD		0	@AM24101	AM24101E	LIQUID	1.0	1.60E+00	1.600	% Ct Error
2	BLNK		0	@AM24101	AM24101	LIQUID	1	<2.76E-6		uCi/mL
2	BLNK		0	@AM24101	AM24101T	LIQUID	100.0	9.06E+01	90.600	% Recovery
2	BLNK		0	@AM24101	AM24101E	LIQUID	1.0	1.00E+02	100.000	% Ct Error
3	SAMPLE	S98T002422	0	@AM24101	AM24101	LIQUID	N/A	1.30E-05	4.39e-006	uCi/mL
3	SAMPLE	S98T002422	0	@AM24101	AM24101E	LIQUID	N/A	4.37E+00		% Ct. Error
3	SAMPLE	S98T002422	0	@AM24101	AM24101T	LIQUID	N/A	7.97E+01		% Recovery
4	DUP	S98T002422	0	@AM24101	AM24101	LIQUID	1.30E-5	1.29E-5	0.772	RPD
4	DUP	S98T002422	0	@AM24101	AM24101T	LIQUID	100.0	8.88E+01	88.800	% Recovery
4	DUP	S98T002422	0	@AM24101	AM24101E	LIQUID	1.0	4.23E+00	4.230	% Ct Error
5	SAMPLE	S98T002423	0	@AM24101	AM24101	LIQUID	N/A	1.20E-05	3.31e-006	uCi/mL
5	SAMPLE	S98T002423	0	@AM24101	AM24101E	LIQUID	N/A	4.25E+00		% Ct. Error
5	SAMPLE	S98T002423	0	@AM24101	AM24101T	LIQUID	N/A	9.45E+01		% Recovery
6	DUP	S98T002423	0	@AM24101	AM24101	LIQUID	1.20E-5	1.20E-5	0.000	RPD
6	DUP	S98T002423	0	@AM24101	AM24101T	LIQUID	100.0	1.00E+02	100.000	% Recovery
6	DUP	S98T002423	0	@AM24101	AM24101E	LIQUID	1.0	4.17E+00	4.170	% Ct Error
7	SAMPLE	S98T002424	0	@AM24101	AM24101	LIQUID	N/A	2.31E-05	5.01e-006	uCi/mL
7	SAMPLE	S98T002424	0	@AM24101	AM24101E	LIQUID	N/A	3.67E+00		% Ct. Error
7	SAMPLE	S98T002424	0	@AM24101	AM24101T	LIQUID	N/A	7.02E+01		% Recovery
8	DUP	S98T002424	0	@AM24101	AM24101	LIQUID	2.31E-5	1.35E-5	52.459	RPD
8	DUP	S98T002424	0	@AM24101	AM24101T	LIQUID	100.0	8.71E+01	87.100	% Recovery
8	DUP	S98T002424	0	@AM24101	AM24101E	LIQUID	1.0	4.35E+00	4.350	% Ct Error

Final page for worklist# 25690

Analyst Signature **Date** **Analyst Signature** **Date**

John Relyea 31 Aug 98
Reviewer Signature **Date**

S98T002424 should be rejected but the P.C. needs it for his report and will reject it for the later rerun. Duplicate is representative of the value, sample value was too high. JTR

Units shown for QC (BLK/BKG) may not reflect the actual units.

12

LABCORE Data Entry Template for Worklist# 25690

Analyst: ALL **Instrument:** AM01 13 **Book#** 24857

Method: LA-953-104 Rev/Mod B0

Worklist Comment: @AM24101 FOR ER-311 GRAB SAMPLES RTS

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@AM24101	LIQUID		
2	BLNK				@AM24101	LIQUID		
3	SAMPLE	S98T002422	0		@AM24101	LIQUID	98000453	ER-311 GRAB
	Analytes Requested:				AM24101 , AM24101E, AM24101T			
4	DUP	S98T002422	0		@AM24101	LIQUID		
5	SAMPLE	S98T002423	0		@AM24101	LIQUID	98000453	ER-311 GRAB
	Analytes Requested:				AM24101 , AM24101E, AM24101T			
6	DUP	S98T002423	0		@AM24101	LIQUID		
7	SAMPLE	S98T002424	0		@AM24101	LIQUID	98000453	ER-311 GRAB
	Analytes Requested:				AM24101 , AM24101E, AM24101T			
8	DUP	S98T002424	0		@AM24101	LIQUID		

Final page for worklist # 25690

Alita Hudson 8/25/98
Analyst Signature **Date**

Gregory Z Cahoon 8/28/98
8-28-98
Analyst Signature **Date**

Em Barela 8-28-98

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WORKBOOK PAGE: STD1

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID

Type	Date Counted		AUG-25-98	Am 241 AEA Frac.	(C241)		STD 0.65
STD	Sample Volume in mL	(SS)	1.000	Am 243 AEA Frac.	(C243)		0.283
Work List	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.	(Cm)		0
25690	Tracer Volume in mL	(SPKV)	0.200	Total AT Counts			6441
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)	(TC)		30
@AM24101	Tracer Book No.		140B43	Background in cpm	(Bkg)		0.07
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm			103.38
LIQUID	Detector Number		13	Am 243 cpm			45.07
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm			0
98004239	Standard Book No		28B57	AEA Count Time	(min)		480
Rerun	Standard Value in µCi/mL		2.270E-04	Am 241 µCi/L =			2.1396E-01
0				Cm 243/244 µCi/L =		<	1.7740E-02
Sample Prep							
N/A							
Sample Number							
WL25690							
Instrument Code							
WB27810							
Prepared By							
SZC							
Chemist							
JFR							
Analyst							
AKL							
Date Complete							
08/28/98							
Analysis Date							
08/25/98							
Analysis Time							
02:50 PM							
Sample Point							
ER-311 GRAB							

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

Am 241 µCi/mL =	2.14E-04	DETECTION LEVELS in µCi/mL
Relative Counting Error =	1.6%	
NOTE: Cm-243/244 Result is a LESS THAN Value.		Am 241 1.77E-05
Cm 243/244 µCi/mL	< 1.77E-05	
Relative Counting Error =	100.0%	Cm 243/244 1.77E-05
Am 243 Tracer Recovery =	92.8%	

Analyst:		AKL	Date:	08/28/98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

STANDARD.WB1 REV 1.2 953103ML

WORKBOOK PAGE: BLANK2

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID / SO

QC Type	Date Counted		AUG-25-98	Am 241 AEA Frac.	(C241)	0
BLNK	Sample Volume in mL	(SS)	1.000	Am 243 AEA Frac.	(C243)	0.931
Work List	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.	(Cm)	0
25690	Tracer Volume in mL	(SPKV)	0.100	Total AT Counts		958
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)	(TC)	30
@AM24101	Tracer Book No.		140B43	Background in cpm	(Bkg)	0.07
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm		0
LIQUID	Detector Number		13	Am 243 cpm		21.33
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm		0
98004239				AEA Count Time	(min)	480
Rerun				Am 241 µCi/L =	<	2.7604E-03
0				Cm 243/244 µCi/L =	<	2.7604E-03
Sample Prep						
N/A						
Sample Number						
WL25690						
Instrument Code						
WB27810						
Prepared By						
SZC						
Chemist						
JFR						
Analyst						
AKL						
Date Complete						
08/28/98						
Analysis Date						
08/25/98						
Analysis Time						
02:50 PM						
Sample Point						
ER-311 GRAB						

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

NOTE: Am-241 Result is a LESS THAN Value.

Am 241 µCi/mL	=	< 2.76E-06
Relative Counting Error	=	100.0%

NOTE: Cm-243/244 Result is a LESS THAN Value.

Cm 243/244 µCi/mL		< 2.76E-06
Relative Counting Error	=	100.0%
Am 243 Tracer Recovery	=	90.6%

DETECTION LEVELS in µCi/mL	
Am 241	2.76E-06
Cm 243/244	2.76E-06

Analyst:		AKL	Date:	08/28/98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

BLANK.WB1 REV 1.2 953103ML

WORKBOOK PAGE: SAM3

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID / SO

Type	Date Counted		AUG-25-98	Am 241 AEA Frac.	(C241)	SAMPLE	0.186
SAMPLE	Sample Volume in mL	(SS)	1.000	Am 243 AEA Frac.	(C243)		0.666
Work List	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.	(Cm)		0
25690	Tracer Volume in mL	(SPKV)	0.100	Total AT Counts			1177
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)	(TC)		30
@AM24101	Tracer Book No.		140B43	Background in cpm	(Bkg)		0.07
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm			5.37
LIQUID	Detector Number		13	Am 243 cpm			19.26
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm			0
98004239				AEA Count Time	(min)		480
Rerun				Am 241 µCi/L =			1.3008E-02
0				Cm 243/244 µCi/L =		<	4.3888E-03
Sample Prep							
N/A							
Sample Number							
S98T002422							
Instrument Code							
WB27810							
Prepared By							
SZC							
Chemist							
JFR							
Analyst							
AKL							
Date Complete							
08/28/98							
Analysis Date							
08/25/98							
Analysis Time							
02:50 PM							
Sample Point							
ER-311 GRAB							

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

Am 241 µCi/mL	=	1.30E-05		DETECTION LEVELS in µCi/mL
Relative Counting Error	=	4.4%		
NOTE: Cm-243/244 Result is a LESS THAN Value.				Am 241 4.39E-06
Cm 243/244 µCi/mL		< 4.39E-06		
Relative Counting Error	=	100.0%		Cm 243/244 4.39E-06
Am 243 Tracer Recovery	=	79.7%		

Analyst:		AKL	Date:	08/28/98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

SAMPLE.WB1 REV 1.2 953103ML

WORKBOOK PAGE: DUP4

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID / SO

Type	Date Counted		AUG-25-98	Am 241 AEA Frac.	(C241)	DUP	0.201
DUP	Sample Volume in mL	(SS)	1.000	Am 243 AEA Frac.	(C243)		0.728
Work List	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.	(Cm)		0
25690	Tracer Volume in mL	(SPKV)	0.100	Total AT Counts			1200
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)	(TC)		30
@AM24101	Tracer Book No.		140B43	Background in cpm	(Bkg)		0.07
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm			5.7
LIQUID	Detector Number		13	Am 243 cpm			20.67
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm			0
98004239				AEA Count Time	(min)		480
Rerun				Am 241 µCi/L =			1.2860E-02
0				Cm 243/244 µCi/L =		<	3.6025E-03
Sample Prep							
N/A							
Sample Number							
S98T002422							
Instrument Code							
WB27810							
Prepared By							
SZC							
Chemist							
JFR							
Analyst							
AKL							
Date Complete							
08/28/98							
Analysis Date							
08/25/98							
Analysis Time							
02:50 PM							
Sample Point							
ER-311 GRAB							

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

Am 241 µCi/mL	=	1.29E-05	DETECTION LEVELS in µCi/mL
Relative Counting Error	=	4.2%	
NOTE: Cm-243/244 Result is a LESS THAN Value.			Am 241 3.60E-06
Cm 243/244 µCi/mL		< 3.60E-06	
Relative Counting Error	=	100.0%	Cm 243/244 3.60E-06
Am 243 Tracer Recovery	=	88.8%	

Analyst:		AKL	Date:	08/28/98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

SAMPLE.WB1 REV 1.2 953103ML

WORKBOOK PAGE: SAM5

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID / SO

Type	Date Counted		AUG-25-98	Am 241 AEA Frac.	(C241)	0.191
SAMPLE	Sample Volume in mL	(SS)	1.000	Am 243 AEA Frac.	(C243)	0.744
Work List	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.	(Cm)	0
25690	Tracer Volume in mL	(SPKV)	0.100	Total AT Counts		1250
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)	(TC)	30
@AM24101	Tracer Book No.		140B43	Background in cpm	(Bkg)	0.07
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm		5.58
LIQUID	Detector Number		13	Am 243 cpm		21.74
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm		0
98004239				AEA Count Time	(min)	480
Rerun				Am 241 µCi/L =		1.1957E-02
0				Cm 243/244 µCi/L =	<	3.3110E-03

SAMPLE
Sample Prep
N/A
Sample Number
S98T002423
Instrument Code
WB27810
Prepared By
SZC
Lab Chemist
JFR
Analyst
AKL
Date Complete
08/28/98
Analysis Date
08/25/98
Analysis Time
02:50 PM
Sample Point
ER-311 GRAB

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

Am 241 µCi/mL	=	1.20E-05	DETECTION LEVELS in µCi/mL
Relative Counting Error	=	4.2%	
NOTE: Cm-243/244 Result is a LESS THAN Value.			Am 241
Cm 243/244 µCi/mL		< 3.31E-06	3.31E-06
Relative Counting Error	=	100.0%	Cm 243/244
Am 243 Tracer Recovery	=	94.5%	3.31E-06

Analyst:		AKL	Date:	08/28/98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

SAMPLE.WB1 REV 1.2 953103ML

WORKBOOK PAGE: DUP6

Am 241 and Cm 243/244: LA-953-103 (VOID) or LA-953-104(B-0)) LIQUID / SO

							DUP
Type	Date Counted		AUG-25-98	Am 241 AEA Frac.		(C241)	0.198
DUP	Sample Volume in mL	(SS)	1.000	Am 243 AEA Frac.		(C243)	0.766
Work List	Sample D.F.	(DF)	1	Cm 243/244 AEA Frac.		(Cm)	0
25690	Tracer Volume in mL	(SPKV)	0.100	Total AT Counts			1284
Test Code	Digest D.F.	(DDF)	1.000	AT Count Time (min)		(TC)	30
@AM24101	Tracer Book No.		140B43	Background in cpm		(Bkg)	0.07
Matrix	Am-243 Tracer Value	(dpm/mL)	1034	Am 241 cpm			5.78
LIQUID	Detector Number		13	Am 243 cpm			22.37
Batch Number	Detector Efficiency	(DetEff)	0.3166	Cm 243/244 cpm			0
98004239				AEA Count Time		(min)	480
Rerun				Am 241 µCi/L =			1.2039E-02
0				Cm 243/244 µCi/L =		<	3.0407E-03
Sample Prep							
N/A							
Sample Number							
S98T002423							
Instrument Code							
WB27810							
Prepared By							
SZC							
Chemist							
JFR							
Analyst							
AKL							
Date Complete							
08/28/98							
Analysis Date							
08/25/98							
Analysis Time							
02:50 PM							
Sample Point							
ER-311 GRAB							

Am-241 µCi/L = (C241 * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Cm-243/244 µCi/L = (Cm * Am-243 Tracer Value * SPKV * DF * DDF * (1000mL/L)) / (C243 * SS * (2220000dpm/µCi))

Relative Counting Error = Square Root of [(1/(Am-243 cpm * min)) + (1 / (Am-241 or Cm-243/244 cpm * min))] * 1.96 * 100

Am 243 Tracer Recovery = (Total AT Counts / TC - Bkg) * (1/DetEff) * C243 * 100 / Am-243 Tracer Value * SPKV

Am 241 µCi/mL	=	1.20E-05	DETECTION LEVELS in µCi/mL
Relative Counting Error	=	4.2%	
NOTE: Cm-243/244 Result is a LESS THAN Value.			Am 241 3.04E-06
Cm 243/244 µCi/mL		< 3.04E-06	
Relative Counting Error	=	100.0%	Cm 243/244 3.04E-06
Am 243 Tracer Recovery	=	100.0%	

Analyst:		AKL	Date:	08/28/98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

SAMPLE.WB1 REV 1.2 953103ML

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
WL25690-STD-AM
File ID: 5a5204.CNF

Counted on: 8/25/98 @22:16
Detector: AEA5
Geometry number: 1
Count time: 28807. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	2328.6	2328.6	301.142	301.142	14.000	7.774	7.000	2.064
2	988.2	988.2	255.301	255.127	14.000	6.168	7.000	1.466
3	41.0	41.0	188.881	188.079	54.000	116.973	27.000	43.480
4	14.3	14.3	166.693	165.434	14.000	0.541	7.000	0.021
5?	10.6	10.6	134.599	133.853	34.000	25.208	17.000	17.486
6?	8.2	8.2	108.309	107.975	10.000	6.646	5.000	4.930
7?	5.3	5.3	96.385	92.734	20.000	6.945	10.000	10.297
8?	6.9	6.9	80.766	80.219	30.000	4.102	15.000	15.326
9?	6.9	6.9	69.241	68.918	14.000	3.018	7.000	0.521

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.650	5.479	5.469	0.0100	04	103.38	0.9	454.1	0.205E-03
	~~Pu238~~		5.487	5.469	0.018				592.8	0.267E-03
2	Am243	0.283	5.266	5.257	0.0090	03	45.07	1.4	188.0	0.847E-04
~~3~~	~~Np237~~	~~0.028~~	~~4.769~~	~~4.949~~	~~-.1800~~	~~54~~	~~4.42~~	~~11.5~~	~~21.0~~	~~0.945E-05~~
	~~Pu242~~		4.891	4.949	-.058				18.3	0.822E-05
4	JJR	0.015		4.844		0.00	2.33	7.0	9.6	0.434E-05
5	27 Aug 98	????		4.699			0.53	30.9		
6		????		4.580			0.23	50.0		
7		????		4.510			0.14	72.8		
8		????		4.452			0.14	64.6		
9		????		4.400			0.35	25.8		
		---					---			
Totals:		0.976	<--valid peaks only-->				155.21			

DETECTOR CALIBRATION
Energy(MEV) = 4.083 + (0.0046)*Channel
Energy range (MeV): 4.083 TO 6.439
Efficiency = 0.2422 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	76360.0	100.000
Smoothed	76359.9	100.000
Composite fit	75183.3	98.459
Residuals	1176.7	1.541

Analyzed by: _____
SLH2

Spectrum 5a5204.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 17425.1

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4
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Raw Data Dump for AEA Spectrum: 5a5204.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	4.	4.	4.
21	2.	4.	7.	4.	2.	10.	6.	6.	9.	5.
31	8.	3.	1.	6.	8.	9.	2.	6.	10.	10.
41	8.	3.	7.	5.	6.	8.	7.	7.	6.	8.
51	4.	5.	11.	7.	13.	6.	11.	8.	13.	7.
61	5.	7.	10.	10.	9.	12.	5.	18.	8.	17.
71	8.	11.	8.	13.	5.	10.	12.	9.	12.	10.
81	14.	12.	10.	10.	6.	16.	8.	9.	10.	17.
91	9.	10.	16.	11.	11.	13.	15.	13.	8.	14.
101	10.	12.	10.	12.	11.	19.	14.	17.	22.	15.
111	9.	18.	11.	9.	15.	14.	13.	17.	15.	16.
121	14.	12.	15.	23.	14.	21.	17.	25.	27.	14.
131	13.	19.	24.	25.	21.	21.	21.	20.	23.	17.
141	23.	26.	28.	16.	19.	18.	22.	25.	34.	19.
151	23.	24.	26.	26.	20.	36.	27.	23.	29.	30.
161	40.	27.	21.	30.	28.	48.	38.	31.	30.	36.
171	27.	34.	38.	37.	33.	36.	31.	40.	44.	37.
181	39.	40.	50.	33.	48.	55.	49.	63.	57.	56.
191	46.	51.	54.	54.	61.	54.	58.	74.	73.	67.
201	67.	68.	75.	82.	83.	70.	78.	75.	89.	98.
211	101.	89.	95.	84.	97.	113.	115.	125.	115.	115.
221	137.	143.	151.	166.	145.	186.	187.	187.	196.	210.
231	239.	248.	274.	262.	250.	298.	359.	354.	382.	412.
241	459.	502.	549.	557.	585.	728.	750.	814.	877.	917.
251	955.	915.	1043.	1152.	1151.	1128.	1146.	1002.	750.	496.
261	344.	281.	294.	248.	289.	289.	248.	260.	297.	295.
271	309.	298.	318.	343.	339.	371.	392.	405.	521.	494.
281	545.	576.	657.	725.	781.	843.	909.	980.	1164.	1211.
291	1344.	1426.	1606.	1711.	1919.	1885.	2216.	2168.	2255.	2477.
301	2506.	2417.	2393.	2122.	1665.	1043.	755.	546.	470.	334.
311	324.	248.	179.	131.	96.	56.	37.	23.	4.	3.
321	0.	5.	0.	4.	0.	3.	1.	4.	2.	1.
331	1.	2.	2.	5.	0.	1.	2.	2.	1.	1.
341	2.	2.	4.	2.	0.	1.	2.	3.	1.	3.
351	1.	0.	0.	0.	1.	2.	1.	1.	1.	1.
361	3.	3.	2.	0.	2.	0.	1.	0.	0.	1.
371	2.	1.	2.	2.	0.	0.	0.	1.	0.	1.
381	1.	1.	0.	0.	0.	0.	1.	0.	2.	2.
391	1.	1.	1.	0.	2.	0.	2.	0.	2.	0.
401	2.	0.	0.	0.	0.	1.	0.	1.	2.	0.
411	1.	0.	2.	1.	0.	0.	1.	0.	1.	1.
421	0.	0.	1.	0.	1.	0.	1.	0.	2.	2.
431	1.	1.	2.	0.	1.	2.	0.	3.	3.	2.
441	2.	0.	1.	2.	2.	2.	1.	3.	4.	0.
451	2.	2.	0.	3.	1.	1.	1.	1.	4.	1.
461	2.	2.	2.	2.	5.	0.	2.	1.	1.	3.
471	1.	0.	3.	3.	3.	2.	7.	2.	3.	3.
481	2.	7.	0.	5.	3.	0.	0.	2.	1.	1.
491	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
WL25690-BLNK-AM
File ID: 6a6206.CNF

Counted on: 8/25/98 @22:16
Detector: AEA6
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	576.0	576.0	252.522	252.522	12.000	5.075	6.000	1.583

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am243	0.931	5.266	5.250	0.016	0.02	21.33	1.9	93.9	0.423E-04
Totals:		0.931	<--valid peaks only-->				21.33			

DETECTOR CALIBRATION
Energy(MEV) = 4.089 + (0.0046)*Channel
Energy range (MeV): 4.089 TO 6.444
Efficiency = 0.2294 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	11000.0	100.000
Smoothed	11000.0	100.000
Composite fit	10237.8	93.071
Residuals	762.2	6.929

Analyzed by: _____
SLH2

Spectrum 6a6206.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 4098.2

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Raw Data Dump for AEA Spectrum: 6a6206.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.
21	0.	1.	0.	2.	0.	1.	1.	0.	1.	1.
31	1.	1.	0.	0.	1.	1.	1.	0.	0.	1.
41	1.	1.	1.	0.	0.	0.	1.	2.	2.	1.
51	0.	0.	0.	0.	0.	2.	1.	1.	1.	3.
61	0.	3.	1.	4.	1.	3.	0.	0.	2.	2.
71	1.	1.	1.	0.	3.	0.	2.	1.	2.	0.
81	0.	2.	0.	1.	1.	2.	1.	1.	1.	0.
91	0.	2.	2.	1.	0.	2.	1.	1.	1.	0.
101	1.	1.	3.	2.	1.	1.	2.	3.	2.	1.
111	0.	3.	2.	0.	2.	1.	3.	2.	1.	3.
121	1.	0.	1.	3.	0.	0.	3.	1.	6.	1.
131	1.	3.	1.	0.	0.	4.	2.	2.	1.	4.
141	0.	5.	3.	2.	3.	6.	3.	6.	0.	3.
151	3.	1.	2.	6.	0.	5.	1.	1.	3.	5.
161	4.	7.	7.	3.	7.	2.	6.	4.	4.	5.
171	1.	3.	2.	2.	4.	5.	3.	9.	5.	8.
181	4.	7.	4.	3.	8.	10.	5.	4.	7.	15.
191	9.	12.	7.	7.	7.	7.	8.	19.	11.	11.
201	17.	9.	11.	12.	17.	14.	16.	16.	17.	20.
211	24.	21.	24.	18.	21.	23.	27.	27.	26.	35.
221	50.	38.	42.	42.	53.	50.	58.	66.	72.	86.
231	91.	102.	97.	118.	130.	153.	186.	186.	197.	232.
241	235.	291.	280.	332.	360.	424.	428.	476.	528.	541.
251	570.	595.	648.	605.	544.	374.	180.	111.	56.	53.
261	52.	41.	44.	25.	34.	29.	33.	19.	19.	11.
271	11.	4.	1.	1.	1.	2.	0.	2.	1.	3.
281	2.	2.	4.	4.	0.	2.	1.	0.	1.	1.
291	5.	5.	4.	2.	7.	9.	5.	7.	7.	3.
301	2.	3.	3.	2.	1.	0.	0.	2.	0.	0.
311	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	1.	0.	0.	0.	1.	0.	0.	1.	1.
341	1.	0.	1.	1.	1.	3.	1.	1.	1.	0.
351	0.	1.	1.	0.	0.	0.	0.	1.	0.	0.
361	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
411	0.	0.	1.	1.	0.	1.	0.	0.	0.	0.
421	0.	0.	3.	0.	0.	0.	0.	0.	1.	0.
431	0.	0.	0.	0.	0.	2.	1.	0.	1.	1.
441	1.	1.	1.	0.	1.	0.	0.	1.	1.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	1.	0.	0.	0.	0.	0.	2.	1.	1.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2422-SAM-AM
File ID: 7a7230.CNF

Counted on: 8/25/98 @22:18
Detector: AEA7
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	126.8	126.8	299.339	299.339	14.000	6.605	7.000	1.795
2	510.1	510.1	253.446	253.433	12.000	4.920	6.000	1.473
3	13.3	13.3	158.904	158.847	128.000	1.000	64.000	0.100

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	~~Pu238~~	0.186	5.487	5.475	0.0120	0.03	5.37	3.9	30.7	0.138E-04
	Am241		5.479	5.475	0.004				23.5	0.106E-04
2	Am243	0.666	5.266	5.264	0.002	0.02	19.26	2.1	80.1	0.361E-04
3		0.037		4.829		0.00	1.06	8.7	4.4	0.197E-05
Totals:		0.888	<--valid peaks only-->				25.69			

DTR 27Aug98

DETECTOR CALIBRATION
Energy(MEV) = 4.098 + (0.0046)*Channel
Energy range (MeV): 4.098 TO 6.453
Efficiency = 0.2429 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	13889.0	100.000
Smoothed	13889.0	100.000
Composite fit	12332.7	88.794
Residuals	1556.3	11.206

Analyzed by: _____
SLH2

Spectrum 7a7230.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 3681.3

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Raw Data Dump for AEA Spectrum: 7a7230.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	3.	0.
21	2.	1.	4.	2.	2.	0.	4.	3.	1.	2.
31	2.	0.	0.	2.	2.	1.	3.	1.	2.	2.
41	2.	0.	3.	1.	1.	0.	2.	3.	2.	1.
51	4.	3.	1.	1.	6.	1.	1.	3.	0.	2.
61	2.	5.	2.	2.	1.	4.	3.	3.	1.	6.
71	1.	4.	3.	2.	3.	2.	3.	1.	3.	7.
81	1.	3.	3.	4.	1.	2.	3.	1.	2.	6.
91	6.	1.	2.	5.	4.	5.	5.	2.	3.	2.
101	7.	3.	6.	4.	3.	0.	1.	4.	5.	7.
111	3.	4.	4.	2.	4.	7.	6.	7.	4.	4.
121	5.	2.	2.	8.	8.	4.	9.	6.	9.	6.
131	7.	3.	6.	5.	5.	8.	7.	10.	6.	7.
141	11.	5.	2.	4.	9.	4.	5.	7.	11.	6.
151	11.	5.	13.	7.	8.	15.	14.	16.	10.	17.
161	13.	8.	12.	11.	8.	16.	6.	21.	11.	11.
171	8.	16.	11.	18.	12.	16.	15.	13.	15.	11.
181	15.	14.	18.	14.	16.	20.	24.	18.	18.	20.
191	20.	26.	25.	19.	20.	26.	14.	26.	23.	17.
201	18.	35.	30.	29.	26.	33.	32.	31.	43.	38.
211	43.	48.	39.	39.	49.	40.	38.	49.	58.	69.
221	66.	57.	64.	68.	75.	70.	84.	86.	85.	88.
231	96.	96.	104.	116.	138.	146.	128.	142.	170.	188.
241	185.	237.	213.	256.	309.	348.	359.	379.	408.	431.
251	469.	522.	591.	548.	569.	464.	299.	157.	90.	51.
261	56.	59.	47.	52.	36.	45.	46.	33.	36.	26.
271	25.	23.	22.	23.	18.	24.	20.	29.	33.	35.
281	44.	32.	39.	45.	47.	41.	44.	69.	76.	82.
291	68.	91.	86.	105.	97.	117.	128.	113.	141.	144.
301	133.	101.	86.	44.	29.	36.	18.	21.	17.	23.
311	10.	8.	7.	4.	4.	2.	0.	0.	0.	0.
321	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
331	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
341	2.	0.	0.	2.	2.	1.	1.	1.	1.	1.
351	3.	2.	0.	1.	2.	0.	0.	1.	0.	2.
361	2.	0.	2.	3.	2.	1.	4.	1.	1.	5.
371	3.	3.	2.	0.	0.	1.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
391	0.	2.	0.	1.	1.	0.	0.	0.	0.	0.
401	0.	1.	0.	1.	0.	0.	1.	0.	0.	1.
411	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
421	2.	0.	0.	1.	0.	0.	0.	0.	0.	0.
431	1.	1.	1.	0.	1.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
461	0.	2.	1.	0.	0.	0.	1.	0.	0.	0.
471	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
481	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2422-DUP-AM
File ID: 8a8186.CNF

Counted on: 8/25/98 @22:19
Detector: AEA8
Geometry number: 1
Count time: 28806. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	135.2	135.2	302.475	302.475	12.000	6.453	6.000	1.757
2	525.5	525.5	256.365	256.350	12.000	5.139	6.000	1.460
3	10.9	10.9	187.507	186.899	14.000	25.742	7.000	5.531

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	~~Pu238~~	0.201	5.487	5.472	0.015	0.03	5.70	3.7	35.1	0.158E-04
	Am241		5.479	5.472	0.007				26.9	0.121E-04
2	Am243	0.728	5.266	5.260	0.006	0.02	20.67	2.0	92.6	0.417E-04
~~3~~	~~Np237~~	~~0.025~~	~~4.769~~	~~4.940~~	~~-.171~~	~~0.12~~	~~0.72~~	~~14.8~~	~~3.7~~	~~0.166E-05~~
	~~Pu242~~		4.891	4.940	-.049				3.2	0.144E-05
	JPR 27Aug98	-----					---------			
Totals:		0.954	<--valid peaks only-->				27.09			

DETECTOR CALIBRATION
Energy(MEV) = 4.080 + (0.0046)*Channel
Energy range (MeV): 4.080 TO 6.436
Efficiency = 0.2253 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	13635.0	100.000
Smoothed	13635.0	100.000
Composite fit	13003.8	95.371
Residuals	631.2	4.629

Analyzed by: _____
SLH2

Spectrum 8a8186.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 3431.4

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Raw Data Dump for AEA Spectrum: 8a8186.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
21	1.	0.	0.	0.	1.	0.	0.	0.	1.	1.
31	2.	1.	1.	0.	1.	1.	1.	1.	1.	1.
41	1.	1.	1.	2.	2.	1.	1.	1.	0.	2.
51	2.	2.	0.	0.	0.	1.	2.	1.	0.	3.
61	2.	1.	0.	0.	2.	1.	2.	0.	1.	0.
71	3.	2.	2.	1.	1.	0.	0.	2.	2.	1.
81	1.	1.	3.	0.	0.	0.	2.	0.	1.	3.
91	2.	3.	2.	1.	5.	2.	1.	1.	3.	3.
101	2.	2.	0.	5.	0.	1.	2.	0.	1.	1.
111	0.	2.	1.	2.	4.	3.	5.	4.	1.	4.
121	4.	3.	4.	1.	2.	1.	7.	5.	1.	6.
131	4.	0.	0.	3.	5.	0.	2.	1.	3.	2.
141	2.	5.	1.	1.	2.	4.	1.	5.	5.	3.
151	4.	2.	4.	2.	5.	3.	2.	3.	1.	1.
161	6.	4.	3.	7.	8.	5.	2.	7.	2.	6.
171	3.	9.	4.	7.	8.	9.	8.	10.	6.	9.
181	3.	5.	6.	12.	12.	10.	21.	12.	8.	12.
191	15.	11.	6.	3.	9.	19.	12.	13.	12.	12.
201	9.	17.	22.	13.	19.	23.	23.	23.	26.	19.
211	21.	30.	25.	36.	26.	24.	39.	26.	30.	35.
221	36.	47.	40.	50.	55.	53.	67.	66.	62.	65.
231	80.	80.	108.	90.	94.	118.	117.	118.	125.	169.
241	182.	178.	219.	244.	237.	277.	295.	323.	347.	392.
251	401.	481.	424.	502.	542.	572.	594.	545.	497.	309.
261	165.	117.	60.	52.	49.	39.	40.	38.	35.	32.
271	37.	45.	26.	25.	25.	16.	14.	20.	24.	23.
281	28.	27.	28.	35.	46.	41.	40.	60.	67.	48.
291	67.	70.	84.	81.	87.	92.	121.	120.	116.	123.
301	128.	150.	150.	144.	123.	79.	62.	44.	24.	18.
311	18.	20.	20.	14.	12.	6.	6.	2.	0.	1.
321	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
341	0.	3.	1.	0.	0.	0.	1.	0.	0.	0.
351	2.	2.	2.	2.	2.	0.	2.	1.	0.	4.
361	2.	1.	6.	2.	2.	2.	6.	2.	2.	5.
371	3.	1.	1.	4.	1.	0.	0.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
411	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
421	1.	0.	0.	0.	1.	1.	0.	0.	1.	0.
431	0.	1.	1.	1.	0.	0.	2.	0.	0.	1.
441	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2423-SAM-AM
File ID: 9a9187.CNF

Counted on: 8/25/98 @22:20
Detector: AEA9
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	137.1	137.1	298.597	298.597	14.000	7.056	7.000	2.100
2	571.4	571.4	252.247	252.237	12.000	5.637	6.000	1.739
3	10.3	10.3	191.348	190.719	56.000	48.896	28.000	28.430
4?	2.4	2.4	184.012	180.844	8.000	0.726	4.000	0.657
5?	1.7	1.7	182.543	182.951	4.000	0.000	2.000	3.758

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	~~Pu238~~	0.191	5.487	5.471	0.016	0.03	5.58	3.8	31.7	0.143E-04
	Am241		5.479	5.471	0.008				24.3	0.109E-04
2	Am243	0.744	5.266	5.258	0.008	0.03	21.74	1.9	89.9	0.405E-04
~~3~~	~~Pu242~~	~~0.025~~	~~4.891~~	~~4.975~~	~~-.084~~	~~0.22~~	~~0.72~~	~~23.4~~	~~2.9~~	~~0.133E-05~~
4	JHR 27Aug 98	????		4.930			0.03	168.		
5		????		4.939			0.00	1000.		
Totals:		0.960	<--valid peaks only-->				28.05			

DETECTOR CALIBRATION
Energy(MEV) = 4.098 + (0.0046)*Channel
Energy range (MeV): 4.098 TO 6.453
Efficiency = 0.2444 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	14025.0	100.000
Smoothed	14025.0	100.000
Composite fit	13479.0	96.107
Residuals	546.0	3.893

Analyzed by: SLH2

Spectrum 9a9187.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 4110.4

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Raw Data Dump for AEA Spectrum: 9a9187.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	2.	0.	1.	1.	1.	0.	1.
21	1.	0.	0.	0.	0.	1.	1.	0.	1.	0.
31	0.	0.	1.	0.	0.	1.	0.	0.	2.	0.
41	0.	0.	0.	1.	0.	2.	0.	0.	1.	0.
51	1.	0.	0.	3.	0.	0.	0.	1.	1.	0.
61	0.	2.	1.	2.	0.	0.	1.	0.	0.	1.
71	1.	0.	2.	1.	2.	1.	0.	0.	0.	0.
81	0.	1.	1.	0.	2.	0.	0.	0.	1.	1.
91	0.	1.	2.	1.	1.	1.	2.	1.	1.	0.
101	0.	0.	0.	1.	1.	2.	3.	0.	0.	1.
111	3.	1.	5.	0.	1.	6.	2.	3.	3.	3.
121	3.	2.	2.	6.	1.	1.	1.	2.	9.	5.
131	2.	2.	0.	6.	6.	1.	1.	4.	5.	1.
141	5.	4.	3.	0.	1.	3.	6.	1.	4.	1.
151	4.	6.	6.	5.	3.	7.	2.	3.	8.	2.
161	3.	0.	3.	4.	3.	5.	10.	4.	4.	2.
171	6.	9.	7.	6.	5.	9.	8.	9.	12.	9.
181	16.	10.	14.	12.	8.	14.	12.	7.	9.	11.
191	15.	13.	12.	8.	12.	8.	9.	18.	19.	14.
201	9.	17.	13.	17.	18.	20.	24.	13.	23.	21.
211	20.	16.	27.	28.	32.	40.	40.	42.	41.	38.
221	50.	37.	52.	54.	63.	69.	67.	78.	85.	68.
231	94.	96.	115.	106.	140.	163.	177.	186.	189.	244.
241	249.	292.	297.	355.	428.	469.	444.	466.	529.	561.
251	595.	634.	590.	654.	493.	304.	179.	116.	101.	78.
261	58.	54.	47.	56.	43.	28.	31.	24.	17.	27.
271	11.	19.	15.	18.	20.	20.	26.	18.	33.	26.
281	40.	29.	46.	42.	53.	50.	66.	59.	85.	88.
291	102.	98.	103.	113.	130.	139.	140.	154.	138.	140.
301	149.	107.	55.	38.	31.	30.	19.	24.	17.	10.
311	11.	7.	2.	3.	0.	0.	0.	0.	0.	0.
321	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	1.	1.	0.	0.	1.	0.
341	1.	1.	0.	1.	0.	0.	1.	1.	1.	1.
351	0.	0.	1.	1.	2.	1.	1.	1.	3.	2.
361	3.	1.	1.	6.	5.	0.	1.	0.	8.	4.
371	1.	1.	1.	1.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	1.	0.	0.	0.	0.	2.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
431	2.	1.	0.	2.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

Item	Total	% Recovery
Raw spectrum	63036.0	100.000
Smoothed	63035.8	100.000
Composite fit	62409.6	99.006
Residuals	626.4	0.994

Analyzed by: _____
SLH2

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2423-DUP-AM
File ID: 10a1082.CNF

Counted on: 8/25/98 @22:20
Detector: AEA10
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	133.6	133.6	297.604	297.604	12.000	7.212	6.000	1.951
2	549.9	549.9	251.639	251.622	12.000	5.984	6.000	1.686

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.198	5.479	5.458	0.021	0.03	5.78	3.7	26.4	0.119E-04
	Pu238		5.487	5.458	0.029				34.4	0.155E-04
2	Am243	0.766	5.266	5.247	0.019	0.03	22.37	1.9	96.9	0.437E-04
Totals:		0.963	<--valid peaks only-->				28.15			

DETECTOR CALIBRATION
Energy(MEV) = 4.089 + (0.0046)*Channel
Energy range (MeV): 4.089 TO 6.445
Efficiency = 0.2331 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	14025.0	100.000
Smoothed	14025.0	100.000
Composite fit	13513.0	96.350
Residuals	512.0	3.650

Analyzed by: _____
SLH2

Spectrum 10a1082.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 3925.8

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1..............2..
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Raw Data Dump for AEA Spectrum: 10a1082.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	1.	0.	0.	2.	0.	1.
21	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.
31	1.	0.	0.	1.	2.	0.	2.	0.	0.	2.
41	0.	1.	1.	0.	1.	1.	3.	0.	0.	1.
51	1.	1.	2.	2.	0.	1.	0.	2.	1.	0.
61	2.	0.	1.	1.	0.	0.	1.	0.	1.	2.
71	2.	1.	2.	1.	0.	1.	2.	1.	2.	1.
81	2.	0.	2.	0.	5.	0.	0.	3.	2.	3.
91	1.	2.	0.	0.	3.	1.	2.	0.	0.	1.
101	2.	2.	4.	1.	2.	3.	1.	3.	3.	1.
111	2.	2.	1.	1.	0.	1.	4.	3.	2.	2.
121	0.	3.	1.	2.	3.	2.	1.	1.	1.	1.
131	2.	3.	1.	2.	1.	3.	3.	0.	1.	0.
141	4.	3.	1.	6.	3.	3.	3.	3.	0.	0.
151	5.	1.	5.	4.	2.	2.	3.	4.	4.	1.
161	4.	3.	2.	1.	5.	4.	3.	4.	6.	3.
171	10.	4.	6.	7.	7.	3.	5.	3.	4.	11.
181	9.	6.	7.	6.	4.	12.	5.	8.	12.	12.
191	9.	8.	9.	12.	12.	7.	10.	10.	15.	11.
201	16.	15.	19.	16.	14.	18.	17.	21.	18.	22.
211	19.	20.	23.	39.	39.	25.	28.	37.	29.	27.
221	42.	51.	50.	48.	68.	80.	56.	76.	100.	100.
231	105.	101.	132.	148.	146.	202.	182.	201.	242.	282.
241	319.	282.	384.	358.	441.	433.	523.	480.	525.	535.
251	612.	577.	626.	513.	418.	277.	159.	99.	68.	52.
261	59.	48.	44.	41.	41.	37.	36.	14.	20.	20.
271	19.	18.	24.	28.	32.	18.	27.	24.	42.	38.
281	43.	49.	36.	50.	64.	69.	77.	70.	70.	101.
291	113.	98.	133.	118.	131.	133.	147.	131.	158.	123.
301	102.	68.	46.	32.	26.	18.	25.	14.	9.	12.
311	5.	2.	3.	2.	0.	0.	0.	0.	1.	0.
321	0.	0.	0.	0.	0.	0.	1.	1.	2.	0.
331	0.	0.	0.	1.	1.	0.	0.	0.	1.	0.
341	0.	1.	0.	1.	0.	1.	1.	3.	0.	3.
351	1.	1.	2.	4.	2.	0.	4.	2.	1.	1.
361	3.	3.	5.	2.	2.	5.	1.	2.	3.	2.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	1.	0.	0.	1.	0.	1.	0.
421	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.
431	1.	0.	0.	0.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.
471	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
481	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

LABCORE Completed Worklist Report for Worklist# 25693

Analyst: akl **Instrument:** PU01 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: @PU23901 FOR ER-311 GRAB SAMPLES RTS

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@PU23901	PU23901	LIQUID	1.12E-04	1.31E-4	116.964	% Recovery
1	STD		0	@PU23901	PU23901E	LIQUID	1.00	2.07E+00	2.070	% Ct Error
1	STD		0	@PU23901	PU23901T	LIQUID	100	6.74E+01	67.400	% Recovery
2	BLNK		0	@PU23901	PU23901	LIQUID	1	<3.26E-6		uCi/mL
2	BLNK		0	@PU23901	PU23901T	LIQUID	100	8.73E+01	87.300	% Recovery
2	BLNK		0	@PU23901	PU23901E	LIQUID	1.00	1.00E+02	100.000	uCi/mL
3	SAMPLE	S98T002422	0	@PU23901	PU23901	LIQUID	N/A	7.04E-06	3.68e-006	uCi/mL
3	SAMPLE	S98T002422	0	@PU23901	PU23901T	LIQUID	N/A	8.70E+01		% Recovery
3	SAMPLE	S98T002422	0	@PU23901	PU23901E	LIQUID	N/A	5.33E+00		% Ct. Error
4	DUP	S98T002422	0	@PU23901	PU23901	LIQUID	7.04E-6	7.19E-6	2.108	RPD
4	DUP	S98T002422	0	@PU23901	PU23901T	LIQUID	100	8.87E+01	88.700	% Recovery
4	DUP	S98T002422	0	@PU23901	PU23901E	LIQUID	1.00	5.01E+00	5.010	% Ct Error
5	SAMPLE	S98T002423	0	@PU23901	PU23901	LIQUID	N/A	6.72E-06	3.39e-006	uCi/mL
5	SAMPLE	S98T002423	0	@PU23901	PU23901T	LIQUID	N/A	9.02E+01		% Recovery
5	SAMPLE	S98T002423	0	@PU23901	PU23901E	LIQUID	N/A	5.42E+00		% Ct. Error
6	DUP	S98T002423	0	@PU23901	PU23901	LIQUID	6.72E-6	6.79E-6	1.036	RPD
6	DUP	S98T002423	0	@PU23901	PU23901T	LIQUID	100	9.02E+01	90.200	% Recovery
6	DUP	S98T002423	0	@PU23901	PU23901E	LIQUID	1.00	5.37E+00	5.370	% Ct Error
7	SAMPLE	S98T002424	0	@PU23901	PU23901	LIQUID	N/A	7.59E-06	3.65e-006	uCi/mL
7	SAMPLE	S98T002424	0	@PU23901	PU23901T	LIQUID	N/A	8.66E+01		% Recovery
7	SAMPLE	S98T002424	0	@PU23901	PU23901E	LIQUID	N/A	5.20E+00		% Ct. Error
8	DUP	S98T002424	0	@PU23901	PU23901	LIQUID	7.59E-6	7.52E-6	0.927	RPD
8	DUP	S98T002424	0	@PU23901	PU23901T	LIQUID	100	8.85E+01	88.500	% Recovery
8	DUP	S98T002424	0	@PU23901	PU23901E	LIQUID	1.00	5.11E+00	5.110	% Ct Error

Final page for worklist# 25693

Analyst Signature **Date** **Analyst Signature** **Date**

John Relyea 31 Aug 98
Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 25693

Analyst: AKL **Instrument:** PU01 _____ **Book#** 26857

Method: LA-953-104 Rev/Mod 60

Worklist Comment: @PU23901 FOR ER-311 GRAB SAMPLES RTS

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@PU23901	LIQUID		
2	BLNK				@PU23901	LIQUID		
3	SAMPLE	S98T002422	0		@PU23901	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: PU23901 , PU23901E, PU23901T						
4	DUP	S98T002422	0		@PU23901	LIQUID		
5	SAMPLE	S98T002423	0		@PU23901	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: PU23901 , PU23901E, PU23901T						
6	DUP	S98T002423	0		@PU23901	LIQUID		
7	SAMPLE	S98T002424	0		@PU23901	LIQUID	98000453	ER-311 GRAB
		Analytes Requested: PU23901 , PU23901E, PU23901T						
8	DUP	S98T002424	0		@PU23901	LIQUID		

Final page for worklist # 25693

Alita Huson
Analyst Signature **Date**

Gena Z Chaney 8/27/98
Analyst Signature **Date**

A L. Pl 8-27-98

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WORKBOOK PAGE: STD1

Pu 238 and 239/240 : LA-943-128 (VOID) or LA-953-104(B-0)) LIQUID

Type	DATE COUNTED		AUG-25-98	PU 236 AEA FRAC	(C236)	STD	0.381
STD	SAMPLE VOLUME in mL	SS	1.000	PU 238 AEA FRAC	(C238)		0.011
Work List	SAMPLE DILUTION FACTOR	DF	1.000	PU 239 AEA FRAC	(C239)		0.563
25693	TRACER VOLUME in mL	SPKV	0.100	TOTAL AT COUNTS			3455
Test Code	DIGEST DILUTION FACTOR	DDF	1.000	AT COUNT TIME (MIN)			30
@PU23901	TRACER BOOK NO		145B43	BACKGROUND in cpm	(Bkg)		0.070
Matrix	DETECTOR NUMBER		21	PU 236 cpm			31.190
LIQUID	EFFICIENCY FACTOR	EFF	0.332	PU 238 cpm			0.910
Batch Number	TRACER PREPARATION DATE		01/19/98	PU 239 cpm			46.140
98004241	TRACER PREPARATION VALUE (dpm/mL)		2270.000	AEA COUNT TIME			480
Rerun	PU-236 DECAY CORR'D VALUE (dpm/mL)		1963.283	Pu 239/240 µCi/L			1.3068E-01
0	PU-238 TRACER VALUE (dpm/mL)		0.000				
Sample Prep	STANDARD BOOK NO		28B57				
N/A	STANDARD VALUE in µCi/mL		1.120E-04				

Sample #	
WL25693	
Instrument Code	Decay Time = Date Counted - Tracer Preparation Date
WC16105	Pu-236 Decay Corr'd Value = Pu-236 Preparation Value *[e to the power of {(-ln2 * Decay Time/1040.95)]
Prepared By	Pu 236 Tracer Recovery = (Total AT Counts / TC -Bkg)* 1/EFF *C236*100/Pu-236 Decay Corr'd Value * SPKV
SZC	Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(2220000 dpm/µCi)]
Chemist	Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value *SPKV *Pu 236 Tracer Recovery / 100)
JFR	Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery /100)(2220000 dpm/µCi)(D g/L)(SS)]
Analyst	Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100
AKL	
Date Completed	
08/27/98	
Analysis Date	
08/25/98	
Analysis Time	
03:45 PM	
Sample Point	
ER-113 GRAB	

Pu 239/240 µCi/mL		1.31E-04	DETECTION LEVELS in µCi/mL
Relative Counting Error	=	2.1%	Pu 239/240 1.03E-05
Pu 236 Tracer Recovery	=	67.4%	

Analyst:		AKL	Date:	27-Aug-98
Signature of Chemist:	John Pelyza	JFR	Date:	31 Aug 98

STANDARD.WB1 REV 1.0 943128ML

WORKBOOK PAGE: BLANK2

Pu 238 and 239/240 : LA-943-128 (VOID) or LA-953-104(B-0)) LI

Type	DATE COUNTED		AUG-25-98	PU 236 AEA FRAC (C236)	0.931
BLNK	SAMPLE VOLUME in mL	SS	1.000	PU 238 AEA FRAC (C238)	0.012
Work List	SAMPLE DILUTION FACTOR	DF	1.000	PU 239 AEA FRAC (C239)	0.000
25693	TRACER VOLUME in mL	SPKV	0.100	TOTAL AT COUNTS	1833
Test Code	DIGEST DILUTION FACTOR	DDF	1.0000	AT COUNT TIME (MIN)	30
@PU23901	TRACER BOOK NO		145B43	BACKGROUND in cp (Bkg)	0.070
Matrix	DETECTOR NUMBER		21	PU 236 cpm	39.410
LIQUID	EFFICIENCY FACTOR	EFF	0.3315	PU 238 cpm	0.500
Batch Number	TRACER PREPARATION DATE		01/19/98	PU 239 cpm	0.000
98004241	TRACER PREPARATION VALUE (dpm/mL)		2270.00	AEA COUNT TIME	480
Rerun	PU-236 DECAY CORR'D VALUE	(dpm/mL)	1963.28	Pu 239/240 µCi/L =	< 3.264E-03
0	PU-238 TRACER VALUE	(dpm/m	0.00		

Sample Prep	
N/A	
Sample	Decay Time = Date Counted - Tracer Preparation Date
WL25693	Pu-236 Decay Corr'd Value = Pu-236 Preparation Value *[e to the power of {(-ln2 * Decay Time/1040.95}]
Instrument Code	Pu 236 Tracer Recovery = (Total AT Counts / TC -Bkg)*C236*100/(Pu-236 Decay Corr'd Value * SPKV*EFF)
WC16105	Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]
Prepared By	Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value *SPKV *Pu 236 Tracer Recovery / 100)
SZC	Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery /100)(2220000 dpm/µCi)(D g/L)(SS)]
Chemist	Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100
JFR	
Analyst	
AKL	
Date Complete	
08/27/98	
Analysis Date	
08/25/98	
Analysis Time	
03:45 PM	
Sample Point	
ER-113 GRAB	

Pu 239/240 µCi/mL		< 3.26E-06	DETECTION LEVELS in µCi/mL	
Relative Counting Error	=	100.0%		
NOTE: Pu 238 Result is a LESS THAN Value.			Pu 239/240	
Pu 238 µCimL		< 3.26E-06	3.26E-06	
Relative Counting Error	=	12.7%	Pu 238	
Pu 236 Tracer Recovery	=	87.3%	3.26E-06	

Analyst:		AKL	Date:	27-Aug-98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

BLANK.WB1 REV 1.0 943128ML

WORKBOOK PAGE: SAM3

Pu 238 and 239/240 : LA-943-128 (VOID) or LA-953-104(B-0)) LIQUID /

Analytype	DATE COUNTED		AUG-25-98	PU 236 AEA FRAC	(C236)	SAMPLE	0.829
SAMPLE	SAMPLE VOLUME in mL	SS	1.000	PU 238 AEA FRAC	(C238)		0.042
Work List	SAMPLE DILUTION FACTOR	DF	1.000	PU 239 AEA FRAC	(C239)		0.066
25693	TRACER VOLUME in mL	SPKV	0.100	TOTAL AT COUNTS			2050
Test Code	DIGEST DILUTION FACTOR	DDF	1.0000	AT COUNT TIME (MIN)			30
@PU23901	TRACER BOOK NO		145B43	BACKGROUND in cpm	(Bkg)		0.070
Matrix	DETECTOR NUMBER		21	PU 236 cpm			38.470
LIQUID	EFFICIENCY FACTOR	EFF	0.332	PU 238 cpm			1.950
Batch Number	TRACER PREPARATION DATE		01/19/98	PU 239 cpm			3.040
98004241	TRACER PREPARATION VALUE (dpm/mL)		2270.000	AEA COUNT TIME			480
Rerun	PU-236 DECAY CORR'D VALUE (dpm/mL)		1963.283	Pu 239/240 µCi/L			7.0408E-03
0	PU-238 TRACER VALUE (dpm/mL)		0.000				

Sample Prep	
N/A	
Sample Wt	Decay Time = Date Counted - Tracer Preparation Date
S98T002422	Pu-236 Decay Corr'd Value = Pu-236 Preparation Value *[e to the power of {(-ln2 * Decay Time/1040.95)]
Instrument Code	Pu 236 Tracer Recovery = (Total AT Counts / TC -Bkg) *C236*100/(Pu-236 Decay Corr'd Value * SPKV * EFF)
WC16105	Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]
Prepared By	Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value *SPKV *Pu 236 Tracer Recovery / 100)
SZC	Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery /100)(2220000 dpm/µCi)(D g/L)(SS)]
Chemist	Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100
JFR	
Analyst	
AKL	
Date Complete	
08/27/98	
Analysis Date	
08/25/98	
Analysis Time	
03:45 PM	
Sample Point	
ER-113 GRAB	

Pu 239/240 µCi/mL		7.04E-06	DETECTION LEVELS in µCi/mL	
Relative Counting Error	=	5.3%		
			Pu 239/240	
Pu 238 µCimL		4.48E-06	3.68E-06	
Relative Counting Error	=	6.6%	Pu 238	
Pu 236 Tracer Recovery	=	87.0%	3.68E-06	

Analyst:		AKL	Date:	27-Aug-98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

SAMPLE.WB1 REV 1.0 943128ML

WORKBOOK PAGE: DUP4

Pu 238 and 239/240 : LA-943-128 (VOID) or LA-953-104(B-0)) LIQUID /

Type	DATE COUNTED		AUG-25-98	PU 236 AEA FRAC	(C236)	DUP	
DUP	SAMPLE VOLUME in mL	SS	1.000	PU 238 AEA FRAC	(C238)	0.824	
Work List	SAMPLE DILUTION FACTOR	DF	1.000	PU 239 AEA FRAC	(C239)	0.180	
25693	TRACER VOLUME in mL	SPKV	0.100	TOTAL AT COUNTS		0.067	
Test Code	DIGEST DILUTION FACTOR	DDF	1.0000	AT COUNT TIME (MIN)		2104	
@PU23901	TRACER BOOK NO		145B43	BACKGROUND in cpm	(Bkg)	30	
Matrix	DETECTOR NUMBER		21	PU 236 cpm		0.070	
LIQUID	EFFICIENCY FACTOR	EFF	0.332	PU 238 cpm		42.610	
Batch Number	TRACER PREPARATION DATE		01/19/98	PU 239 cpm		0.910	
98004241	TRACER PREPARATION VALUE (dpm/mL)		2270.000	AEA COUNT TIME		3.440	
Rerun	PU-236 DECAY CORR'D VALUE (dpm/mL)		1963.283	Pu 239/240 µCi/L		480	
0	PU-238 TRACER VALUE (dpm/mL)		0.000			7.1908E-03	

Sample Prep
N/A
Sample #
S98T002422
Instrument Code
WC16105
Prepared By
SZC
Chemist
JFR
Analyst
AKL
Date Complete
08/27/98
Analysis Date
08/25/98
Analysis Time
03:45 PM
Sample Point
ER-113 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value *[e to the power of {(-ln2 * Decay Time/1040.95)]

Pu 236 Tracer Recovery = (Total AT Counts / TC -Bkg) *C236*100/(Pu-236 Decay Corr'd Value * SPKV * EFF)

Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value *SPKV *Pu 236 Tracer Recovery / 100)

Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery /100)(2220000 dpm/µCi)(D g/L)(SS)]

Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100

Pu 239/240 µCi/mL		7.19E-06	DETECTION LEVELS in µCi/mL	
Relative Counting Error	=	5.0%		
			Pu 239/240	
Pu 238 µCimL		1.93E-05	3.63E-06	
Relative Counting Error	=	9.5%	Pu 238	
Pu 236 Tracer Recovery	=	88.7%	3.63E-06	

Analyst:		AKL	Date:	27-Aug-98
Signature of Chemist:	John Rehyea	JFR	Date:	31 Aug 98

SAMPLE.WB1 REV 1.0 943128ML

0.32

Pu 238 and 239/240 : LA-943-128 (VOID) or LA-953-104(B-0)) LIQUID /

							SAMPLE
Type	DATE COUNTED		AUG-25-98	PU 236 AEA FRAC		(C236)	0.868
SAMPLE	SAMPLE VOLUME in mL	SS	1.000	PU 238 AEA FRAC		(C238)	0.010
Work List No	SAMPLE DILUTION FACTOR	DF	1.000	PU 239 AEA FRAC		(C239)	0.066
25693	TRACER VOLUME in mL	SPKV	0.100	TOTAL AT COUNTS			2031
Test Code	DIGEST DILUTION FACTOR	DDF	1.0000	AT COUNT TIME (MIN)			30
@PU23901	TRACER BOOK NO		145B43	BACKGROUND in cpm		(Bkg)	0.070
Matrix	DETECTOR NUMBER		21	PU 236 cpm			38.260
LIQUID	EFFICIENCY FACTOR	EFF	0.332	PU 238 cpm			0.450
Batch Number	TRACER PREPARATION DATE		01/19/98	PU 239 cpm			2.930
98004241	TRACER PREPARATION VALUE (dpm/mL)		2270.000	AEA COUNT TIME			480
Rerun	PU-236 DECAY CORR'D VALUE (dpm/mL)		1963.283	Pu 239/240 µCi/L			6.7244E-03
0	PU-238 TRACER VALUE (dpm/mL)		0.000				

Sample Prep	
N/A	
Sample #	Decay Time = Date Counted - Tracer Preparation Date
S98T002423	Pu-236 Decay Corr'd Value = Pu-236 Preparation Value *[e to the power of {(-ln2 * Decay Time/1040.95)]
Instrument Code	Pu 236 Tracer Recovery = (Total AT Counts / TC -Bkg) *C236*100/(Pu-236 Decay Corr'd Value * SPKV * EFF)
WC16105	Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]
Prepared By	Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value *SPKV *Pu 236 Tracer Recovery / 100)
SZC	Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery /100)(2220000 dpm/µCi)(D g/L)(SS)]
Chemist	Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100
JFR	
Analyst	
AKL	
Date Complete	
08/27/98	
Analysis Date	
08/25/98	
Analysis Time	
03:45 PM	
Sample Point	
ER-113 GRAB	

Pu 239/240 µCi/mL		6.72E-06		DETECTION LEVELS in µCi/mL
Relative Counting Error	=	5.4%		
NOTE: Pu 238 Result is a LESS THAN Value.				Pu 239/240
Pu 238 µCimL		< 3.39E-06		3.39E-06
Relative Counting Error	=	13.4%		Pu 238
Pu 236 Tracer Recovery	=	90.2%		3.39E-06

Analyst:		AKL	Date:	27-Aug-98
Signature of Chemist:	John Rahyea	JFR	Date:	31 Aug 98

SAMPLE.WB1 REV 1.0 943128ML

WORKBOOK PAGE: DUP6

Pu 238 and 239/240 : LA-943-128 (VOID) or LA-953-104(B-0)) LIQUID / DUP

Type	DATE COUNTED		AUG-25-98	PU 236 AEA FRAC	(C236)	0.833
DUP	SAMPLE VOLUME in mL	SS	1.000	PU 238 AEA FRAC	(C238)	0.031
Work List	SAMPLE DILUTION FACTOR	DF	1.000	PU 239 AEA FRAC	(C239)	0.064
25693	TRACER VOLUME in mL	SPKV	0.100	TOTAL AT COUNTS		2117
Test Code	DIGEST DILUTION FACTOR	DDF	1.0000	AT COUNT TIME (MIN)		30
@PU23901	TRACER BOOK NO		145B43	BACKGROUND in cpm	(Bkg)	0.070
Matrix	DETECTOR NUMBER		21	PU 236 cpm		38.700
LIQUID	EFFICIENCY FACTOR	EFF	0.332	PU 238 cpm		1.430
Batch Number	TRACER PREPARATION DATE		01/19/98	PU 239 cpm		2.990
98004241	TRACER PREPARATION VALUE (dpm/mL)		2270.000	AEA COUNT TIME		480
Rerun	PU-236 DECAY CORR'D VALUE	(dpm/mL)	1963.283	Pu 239/240 µCi/L		6.7946E-03
0	PU-238 TRACER VALUE	(dpm/mL)	0.000			

Sample Prep
N/A
Sample #
S98T002423
Instrument Code
WC16105
Prepared By
SZC
Chemist
JFR
Analyst
AKL
Date Complete
08/27/98
Analysis Date
08/25/98
Analysis Time
03:45 PM
Sample Point
ER-113 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value *[e to the power of {(-ln2 * Decay Time/1040.95)]

Pu 236 Tracer Recovery = (Total AT Counts / TC -Bkg) *C236*100/(Pu-236 Decay Corr'd Value * SPKV * EFF)

Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value *SPKV *Pu 236 Tracer Recovery / 100)

Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery /100)(2220000 dpm/µCi)(D g/L)(SS)]

Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100

Pu 239/240 µCi/mL		6.79E-06	DETECTION LEVELS in µCi/mL	
Relative Counting Error	=	5.4%		
NOTE: Pu 238 Result is a LESS THAN Value.			Pu 239/240	
Pu 238 µCimL		< 3.53E-06	3.53E-06	
Relative Counting Error	=	7.6%	Pu 238	
Pu 236 Tracer Recovery	=	90.2%	3.53E-06	

Analyst:		AKL	Date:	27-Aug-98	
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98	

SAMPLE.WB1 REV 1.0 943128ML

WORKBOOK PAGE: SAM7

Pu 238 and 239/240 : LA-943-128 (VOID) or LA-953-104(B-0)) LIQUID / SAMPLE

Type	DATE COUNTED		AUG-25-98	PU 236 AEA FRAC	(C236)	0.839
SAMPLE	SAMPLE VOLUME in mL	SS	1.000	PU 238 AEA FRAC	(C238)	0.021
Work List	SAMPLE DILUTION FACTOR	DF	1.000	PU 239 AEA FRAC	(C239)	0.072
25693	TRACER VOLUME in mL	SPKV	0.100	TOTAL AT COUNTS		2018
Test Code	DIGEST DILUTION FACTOR	DDF	1.0000	AT COUNT TIME (MIN)		30
@PU23901	TRACER BOOK NO		145B43	BACKGROUND in cpm	(Bkg)	0.070
Matrix	DETECTOR NUMBER		21	PU 236 cpm		37.560
LIQUID	EFFICIENCY FACTOR	EFF	0.332	PU 238 cpm		0.950
Batch Number	TRACER PREPARATION DATE		01/19/98	PU 239 cpm		3.210
98004241	TRACER PREPARATION VALUE (dpm/mL)		2270.000	AEA COUNT TIME		480
Reruns	PU-236 DECAY CORR'D VALUE	(dpm/mL)	1963.283	Pu 239/240 µCi/L		7.5893E-03
0	PU-238 TRACER VALUE	(dpm/mL)	0.000			

Sample Prep
N/A
Sample #
S98T002424
Instrument Code
WC16105
Prepared By
SZC
Chemist
JFR
Analyst
AKL
Date Complete
08/27/98
Analysis Date
08/25/98
Analysis Time
03:45 PM
Sample Point
ER-113 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value *[e to the power of {(-ln2 * Decay Time/1040.95)]

Pu 236 Tracer Recovery = (Total AT Counts / TC -Bkg) *C236*100/(Pu-236 Decay Corr'd Value * SPKV * EFF)

Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value *SPKV *Pu 236 Tracer Recovery / 100)

Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery /100)(2220000 dpm/µCi)(D g/L)(SS)]

Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100

Pu 239/240 µCi/mL		7.59E-06		DETECTION LEVELS in µCi/mL
Relative Counting Error	=	5.2%		
NOTE: Pu 238 Result is a LESS THAN Value.				Pu 239/240
Pu 238 µCimL		< 3.65E-06		3.65E-06
Relative Counting Error	=	9.3%		Pu 238
Pu 236 Tracer Recovery	=	86.6%		3.65E-06

Analyst:		AKL	Date:	27-Aug-98
Signature of Chemist:	John Relyea	JFR	Date:	31 Aug 98

SAMPLE.WB1 REV 1.0 943128ML

WORKBOOK PAGE: DUP8

Pu 238 and 239/240 : LA-943-128 (VOID) or LA-953-104(B-0)) LIQUID /

Type	DATE COUNTED		AUG-25-98	PU 236 AEA FRAC	(C236)		DUP
DUP	SAMPLE VOLUME in mL	SS	1.000	PU 238 AEA FRAC	(C238)		0.835
Work List	SAMPLE DILUTION FACTOR	DF	1.000	PU 239 AEA FRAC	(C239)		0.022
25693	TRACER VOLUME in mL	SPKV	0.100	TOTAL AT COUNTS			0.071
Test Code	DIGEST DILUTION FACTOR	DDF	1.0000	AT COUNT TIME (MIN)			2072
@PU23901	TRACER BOOK NO		145B43	BACKGROUND in cpm	(Bkg)		30
Matrix	DETECTOR NUMBER		21	PU 236 cpm			0.070
LIQUID	EFFICIENCY FACTOR	EFF	0.332	PU 238 cpm			39.290
Batch Number	TRACER PREPARATION DATE		01/19/98	PU 239 cpm			1.020
98004241	TRACER PREPARATION VALUE (dpm/mL)		2270.000	AEA COUNT TIME			3.320
Rerun	PU-236 DECAY CORR'D VALUE	(dpm/mL)	1963.283	Pu 239/240 µCi/L			480
0	PU-238 TRACER VALUE	(dpm/mL)	0.000				7.5197E-03

Sample Prep
N/A
Sample # Alt
S98T002424
Instrument Code
WC16105
Prepared By
SZC
Chemist
JFR
Analyst
AKL
Date Complete
08/27/98
Analysis Date
08/25/98
Analysis Time
03:45 PM
Sample Point
ER-113 GRAB

Decay Time = Date Counted - Tracer Preparation Date

Pu-236 Decay Corr'd Value = Pu-236 Preparation Value *[e to the power of {(-ln2 * Decay Time/1040.95)}]

Pu 236 Tracer Recovery = (Total AT Counts / TC -Bkg) *C236*100/(Pu-236 Decay Corr'd Value * SPKV * EFF)

Pu 239/240 µCi/L = (C239)(Pu 236 Decay Corr'd Value)(SPKV)(1000mL/L)(DF)(DDF) / [(C236)(SS)(D g/L)(2220000 dpm/µCi)]

Pu 238 dpm = [(Total AT Counts / TC) - Bkg * 1/EFF * C238] - (Pu-238 Tracer Value *SPKV *Pu 236 Tracer Recovery / 100)

Pu 238 µCi/L = [(Pu 238 dpm)(DF)(DDF)(1000mL/L)] / [(Pu-236 Tracer Recovery /100)(2220000 dpm/µCi)(D g/L)(SS)]

Relative Counting Error = Square Root of [(1/(Pu 236 cpm * min)) + (1 / (Pu 238 or 239/240 cpm * min))] * 1.96 * 100

Pu 239/240 µCi/mL		7.52E-06		DETECTION LEVELS in µCi/mL
Relative Counting Error	=	5.1%		
NOTE: Pu 238 Result is a LESS THAN Value.				Pu 239/240 3.59E-06
Pu 238 µCimL		< 3.59E-06		
Relative Counting Error	=	9.0%		Pu 238 3.59E-06
Pu 236 Tracer Recovery	=	88.5%		

Analyst:	AKL	Date:	27-Aug-98	
Signature of Chemist: John Delgza	JFR	Date:	31 Aug 98	

SAMPLE.WB1 REV 1.0 943128ML

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
WL25693-STD-PU
File ID: 13a1317.CNF

Counted on: 8/25/98 @22:36
Detector: AEA13
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1131.9	1131.9	361.589	361.589	10.000	2.826	5.000	1.187
2	18.8	18.8	303.159	303.037	12.000	4.165	6.000	0.835
3	54.1	54.1	287.125	287.038	10.000	2.067	5.000	1.781
4?	14.7	14.7	269.510	269.220	8.000	2.427	4.000	0.826
5	1969.1	1969.1	228.812	228.811	10.000	2.976	5.000	1.712

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu236	0.381	5.755	5.752	0.0030.01		31.19	1.6	129.0	0.581E-04
2	Pu238	0.011	5.487	5.482	0.0050.02		0.91	9.9	5.1	0.232E-05
	~~Am241~~		5.479	5.482	-.003				3.9	0.177E-05
~~3~~	~~Th228~~	~~0.012~~	~~5.400~~	~~5.409~~	~~-.0090.01~~		~~0.96~~	~~11.3~~	~~5.5~~	~~0.246E-05~~
4	990 27Au98	????		5.327			0.45	17.1		
5	Pu239	0.563	5.147	5.141	0.0060.01		46.14	1.3	187.0	0.842E-04
	Pu240		5.144	5.141	0.003				187.0	0.842E-04
		---					---			
Totals:		0.967	<--valid peaks only-->				79.20			

DETECTOR CALIBRATION
Energy(MEV) = 4.089 + (0.0046)*Channel
Energy range (MeV): 4.089 TO 6.444
Efficiency = 0.2468 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	39308.0	100.000
Smoothed	39308.0	100.000
Composite fit	38235.7	97.272
Residuals	1072.3	2.728

300 Analyzed by: _____

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                    Spectrum 13a1317.CNF
1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc     Display Max.:   12722.9

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Raw Data Dump for AEA Spectrum: 13a1317.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	1.	0.	2.	0.	0.	1.
21	0.	1.	0.	0.	0.	0.	0.	1.	1.	0.
31	0.	1.	1.	1.	1.	0.	0.	1.	1.	0.
41	1.	0.	1.	0.	0.	0.	1.	0.	1.	0.
51	1.	0.	0.	1.	2.	0.	0.	0.	2.	0.
61	0.	1.	0.	0.	0.	0.	0.	1.	0.	1.
71	0.	2.	1.	0.	0.	2.	1.	0.	1.	0.
81	0.	1.	0.	0.	1.	0.	2.	0.	1.	0.
91	1.	0.	1.	0.	1.	1.	1.	2.	0.	0.
101	0.	0.	1.	0.	1.	0.	1.	0.	0.	1.
111	1.	0.	0.	0.	2.	0.	2.	0.	1.	1.
121	1.	1.	0.	0.	2.	0.	2.	1.	0.	1.
131	0.	0.	2.	4.	0.	0.	0.	2.	0.	1.
141	1.	1.	1.	1.	3.	2.	1.	3.	1.	3.
151	2.	1.	1.	1.	3.	1.	2.	0.	3.	2.
161	1.	2.	2.	6.	3.	6.	4.	9.	3.	4.
171	3.	7.	6.	6.	6.	11.	4.	9.	11.	9.
181	10.	15.	10.	10.	13.	14.	16.	12.	12.	17.
191	32.	33.	30.	28.	27.	27.	28.	40.	33.	52.
201	66.	56.	58.	76.	78.	95.	100.	111.	117.	149.
211	157.	194.	204.	251.	281.	345.	434.	498.	565.	602.
221	684.	739.	892.	1016.	1259.	1679.	1825.	2198.	2429.	2288.
231	1686.	975.	369.	86.	18.	2.	3.	0.	1.	1.
241	1.	1.	2.	4.	2.	5.	2.	5.	1.	5.
251	1.	5.	6.	9.	9.	9.	6.	7.	7.	4.
261	8.	7.	11.	12.	13.	19.	16.	18.	20.	21.
271	26.	10.	9.	7.	9.	9.	11.	13.	16.	20.
281	17.	22.	42.	46.	51.	64.	83.	73.	55.	36.
291	16.	7.	2.	13.	11.	9.	12.	12.	20.	16.
301	19.	22.	23.	18.	28.	11.	9.	7.	2.	4.
311	4.	11.	5.	8.	5.	10.	8.	12.	8.	11.
321	7.	10.	12.	16.	26.	19.	15.	23.	25.	32.
331	24.	31.	36.	34.	51.	59.	56.	65.	57.	60.
341	83.	91.	123.	138.	150.	177.	202.	260.	384.	430.
351	502.	564.	588.	573.	544.	575.	599.	765.	903.	1088.
361	1258.	1414.	1265.	916.	395.	120.	13.	2.	0.	0.
371	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	1.	0.	0.	0.	1.	0.	0.	1.
431	0.	1.	0.	1.	0.	0.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	1.	1.	2.	0.
451	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	1.	1.	1.	1.	2.	2.	3.
471	4.	2.	5.	6.	2.	6.	9.	3.	1.	2.
481	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
WL25693-BLNK-PU
File ID: 14a1409.CNF

Counted on: 8/25/98 @22:37
Detector: AEA14
Geometry number: 1
Count time: 28805. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1460.6	1460.6	360.571	360.571	10.000	2.774	5.000	1.198
2	24.8	24.8	301.287	301.112	10.000	1.052	5.000	0.548
3	71.0	71.0	285.691	285.619	10.000	2.815	5.000	2.019
4	19.8	19.8	269.157	268.681	10.000	2.674	5.000	1.385

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu236	0.931	5.755	5.756	-.0010	.01	39.41	1.4	166.4	0.750E-04
2	Pu238	0.012	5.487	5.482	0.0050	.00	0.50	13.3	2.9	0.130E-05
	~~Am241~~		5.479	5.482	-.003				2.2	0.993E-06
~~3~~	~~Th228~~	~~0.035~~	~~5.400~~	~~5.411~~	~~-.011~~	~~0.01~~	~~1.48~~	~~7.8~~	~~8.6~~	~~0.389E-05~~
4	JAR 2 Aug 98	0.011		5.333		0.01	0.48	16.4	2.0	0.888E-06
Totals:		0.989	<--valid peaks only-->				41.87			

DETECTOR CALIBRATION
Energy(MEV) = 4.097 + (0.0046)*Channel
Energy range (MeV): 4.097 TO 6.452
Efficiency = 0.2416 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	20316.0	100.000
Smoothed	20316.0	100.000
Composite fit	20100.7	98.940
Residuals	215.3	1.060

Analyzed by: _____
SLH2

Spectrum 14a1409.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 7573.6

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Raw Data Dump for AEA Spectrum: 14a1409.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
21	0.	0.	0.	2.	0.	0.	0.	0.	1.	0.
31	1.	0.	0.	1.	1.	0.	0.	2.	0.	1.
41	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
51	0.	1.	0.	0.	0.	0.	0.	0.	2.	2.
61	2.	1.	0.	1.	0.	0.	0.	1.	1.	0.
71	1.	0.	0.	0.	0.	1.	0.	1.	0.	1.
81	0.	1.	0.	0.	1.	0.	0.	1.	0.	0.
91	0.	1.	0.	0.	1.	0.	2.	2.	1.	0.
101	0.	1.	0.	0.	0.	0.	0.	1.	0.	1.
111	0.	1.	0.	0.	1.	0.	2.	1.	0.	0.
121	1.	0.	0.	0.	0.	0.	2.	0.	0.	3.
131	0.	1.	1.	0.	0.	0.	0.	0.	1.	0.
141	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
151	1.	1.	0.	0.	2.	0.	0.	0.	0.	0.
161	0.	1.	1.	0.	1.	0.	1.	1.	0.	0.
171	1.	2.	2.	1.	1.	3.	0.	0.	1.	2.
181	2.	0.	0.	0.	2.	0.	0.	3.	0.	2.
191	2.	2.	0.	0.	1.	0.	2.	0.	2.	0.
201	1.	1.	1.	2.	0.	1.	0.	0.	2.	2.
211	0.	1.	1.	2.	4.	2.	0.	0.	2.	5.
221	4.	3.	2.	3.	2.	5.	0.	2.	4.	1.
231	1.	4.	3.	2.	2.	2.	0.	2.	2.	3.
241	3.	3.	2.	1.	1.	3.	5.	1.	5.	3.
251	3.	6.	9.	10.	2.	2.	5.	5.	2.	7.
261	3.	10.	8.	15.	10.	22.	20.	23.	31.	25.
271	23.	11.	12.	12.	15.	14.	16.	22.	23.	25.
281	32.	44.	60.	87.	76.	88.	96.	53.	35.	11.
291	11.	9.	11.	11.	5.	11.	9.	9.	12.	13.
301	20.	13.	18.	8.	10.	6.	6.	6.	6.	5.
311	6.	9.	9.	8.	11.	7.	10.	6.	22.	16.
321	26.	28.	16.	24.	18.	29.	29.	26.	42.	47.
331	34.	42.	41.	59.	52.	68.	70.	93.	110.	97.
341	121.	150.	160.	203.	262.	266.	307.	449.	500.	649.
351	735.	720.	741.	650.	733.	812.	896.	1163.	1386.	1677.
361	1830.	1648.	1129.	482.	145.	19.	1.	0.	0.	0.
371	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
431	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
441	0.	0.	2.	0.	0.	0.	0.	0.	0.	1.
451	1.	1.	0.	0.	0.	2.	0.	0.	0.	1.
461	0.	0.	0.	0.	1.	3.	3.	4.	3.	3.
471	3.	3.	4.	7.	4.	1.	5.	2.	2.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2422-SAM-PU
File ID: 15a1593.CNF

Counted on: 8/25/98 @22:38
Detector: AEA15
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1250.2	1250.2	360.508	360.508	10.000	3.227	5.000	1.181
2	24.4	24.4	302.116	301.789	10.000	3.842	5.000	0.416
3	43.9	43.9	285.980	285.838	10.000	2.295	5.000	1.839
4?	10.1	10.1	269.093	268.363	10.000	1.915	5.000	0.839
5	109.7	109.7	227.512	227.499	10.000	3.973	5.000	1.891
6	34.8	34.8	144.677	144.673	12.000	4.166	6.000	1.367
7	35.0	35.0	20.361	20.361	8.000	2.987	4.000	11.310

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu236	0.829	5.755	5.748	0.0070.01		38.47	1.4	158.0	0.712E-04
2	Pu238	0.042	5.487	5.478	0.0090.02		1.95	6.8	10.9	0.490E-05
	~~Am241~~		5.479	5.478	0.001				8.3	0.376E-05
~~3~~	~~Th228~~	~~0.018~~	~~5.400~~	~~5.405~~	~~-.0050.01~~		~~0.82~~	~~16.4~~	~~4.7~~	~~0.211E-05~~
4	????			5.324			0.25	38.2		
5	Pu239	0.066	5.147	5.136	0.0110.02		3.04	5.4	12.2	0.551E-05
	Pu240		5.144	5.136	0.008				12.2	0.551E-05
~~6~~	~~Np237~~	~~0.026~~	~~4.769~~	~~4.755~~	~~0.0140.02~~		~~1.20~~	~~8.2~~	~~5.6~~	~~0.250E-05~~
~~7~~	~~U 238~~	~~0.013~~	~~4.184~~	~~4.184~~	~~0.0000.01~~		~~0.60~~	~~11.5~~	~~3.1~~	~~0.142E-05~~
		---					---			
Totals:		0.994	<--valid peaks only-->				46.08			

JMR 27Aug98

DETECTOR CALIBRATION
Energy(MEV) = 4.090 + (0.0046)*Channel
Energy range (MeV): 4.090 TO 6.445
Efficiency = 0.2484 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	22263.0	100.000
Smoothed	22263.0	100.000
Composite fit	22240.2	99.898

Residuals	22.8	0.102

Analyzed by: _____
SLH2

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                    Spectrum 15a1593.CNF
1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc     Display Max.:    6983.8


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Raw Data Dump for AEA Spectrum: 15a1593.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	10.	11.	20.	31.	30.	34.	43.
21	47.	36.	21.	9.	0.	0.	0.	1.	0.	0.
31	0.	0.	0.	0.	0.	0.	2.	0.	2.	0.
41	0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
51	2.	0.	1.	1.	0.	1.	0.	2.	1.	4.
61	5.	1.	1.	1.	0.	2.	0.	0.	1.	0.
71	0.	2.	0.	2.	2.	0.	0.	1.	1.	1.
81	2.	4.	2.	3.	1.	2.	0.	1.	1.	1.
91	1.	0.	0.	2.	1.	2.	0.	2.	0.	3.
101	1.	4.	2.	1.	1.	1.	3.	3.	0.	0.
111	2.	2.	2.	3.	3.	6.	3.	1.	0.	3.
121	3.	9.	4.	3.	8.	2.	8.	6.	13.	10.
131	5.	13.	19.	25.	26.	26.	15.	21.	11.	33.
141	19.	25.	26.	45.	48.	28.	31.	22.	9.	7.
151	6.	2.	4.	2.	1.	1.	0.	1.	1.	2.
161	2.	2.	1.	1.	1.	1.	0.	4.	2.	1.
171	1.	1.	3.	0.	1.	1.	2.	2.	2.	1.
181	3.	6.	2.	3.	2.	2.	3.	6.	1.	3.
191	6.	1.	3.	8.	8.	0.	6.	4.	2.	6.
201	5.	5.	7.	10.	12.	7.	14.	12.	9.	13.
211	13.	23.	27.	38.	30.	38.	35.	33.	51.	43.
221	54.	59.	71.	89.	107.	112.	126.	136.	121.	84.
231	67.	49.	16.	5.	4.	4.	3.	1.	5.	2.
241	4.	3.	6.	4.	2.	5.	5.	8.	3.	10.
251	8.	11.	4.	10.	9.	11.	10.	14.	8.	12.
261	11.	13.	10.	14.	14.	19.	19.	24.	24.	20.
271	21.	17.	11.	15.	12.	14.	26.	20.	28.	28.
281	42.	29.	47.	60.	67.	71.	70.	57.	33.	28.
291	11.	19.	13.	19.	21.	23.	24.	18.	23.	27.
301	22.	34.	30.	28.	20.	13.	5.	14.	9.	9.
311	9.	11.	14.	13.	17.	15.	14.	21.	26.	22.
321	32.	25.	29.	32.	30.	27.	52.	47.	50.	46.
331	61.	72.	76.	64.	79.	93.	90.	102.	130.	146.
341	156.	164.	201.	224.	274.	327.	382.	443.	547.	617.
351	668.	699.	684.	653.	679.	798.	901.	1062.	1187.	1432.
361	1524.	1362.	987.	542.	209.	53.	9.	1.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	1.	0.	0.	0.	0.	0.	0.	1.	1.
431	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	2.	1.	0.	0.	0.	3.	0.	2.	3.	3.
471	4.	8.	4.	0.	6.	3.	2.	0.	3.	2.
481	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2422-DUP-PU
File ID: 16a1605.CNF

Counted on: 8/25/98 @22:38
Detector: AEA16
Geometry number: 1
Count time: 28801. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1414.0	1414.0	361.135	361.135	10.000	3.179	5.000	1.198
2	30.5	30.5	302.802	302.534	32.000	9.035	16.000	16.288
3	84.4	84.4	286.609	286.551	12.000	3.155	6.000	1.803
4	16.7	16.7	269.234	267.774	12.000	4.489	6.000	1.039
5	119.7	119.7	228.014	228.000	10.000	4.217	5.000	1.918
6	42.9	42.9	145.549	145.549	10.000	3.113	5.000	1.198
7	39.6	39.6	20.461	20.461	12.000	3.559	6.000	11.521

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu236	0.824	5.755	5.747	0.0080	01	42.61	1.4	163.0	0.734E-04
2	~~Am241~~	0.018	5.479	5.477	0.0020	.04	0.91	11.4	3.6	0.164E-05
	Pu238		5.487	5.477	0.010				4.7	0.213E-05
~~3~~	~~Th228~~	~~0.039~~	~~5.400~~	~~5.404~~	~~-.0040~~	~~.01~~	~~2.01~~	~~6.6~~	~~10.6~~	~~0.479E-05~~
4	8/27/98	0.014		5.317	0.02		0.74	13.9	2.8	0.125E-05
5	Pu239	0.067	5.147	5.134	0.0130	.02	3.44	4.9	12.9	0.581E-05
	Pu240		5.144	5.134	0.010				12.9	0.581E-05
~~6~~	~~Np237~~	~~0.025~~	~~4.769~~	~~4.755~~	~~0.0140~~	~~.01~~	~~1.27~~	~~7.9~~	~~5.5~~	~~0.247E-05~~
~~7~~	~~U 238~~	~~0.014~~	~~4.184~~	~~4.180~~	~~0.0040~~	~~.02~~	~~0.74~~	~~10.4~~	~~3.6~~	~~0.163E-05~~
		---					---			
Totals:		1.000	<--valid peaks only-->				51.74			

DETECTOR CALIBRATION
Energy(MEV) = 4.086 + (0.0046)*Channel
Energy range (MeV): 4.086 TO 6.441
Efficiency = 0.2668 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	24828.0	100.000
Smoothed	24828.0	100.000
Composite fit	24833.8	100.023

Residuals	-5.8	-0.023

Analyzed by: _____
SLH2

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                    Spectrum 16a1605.CNF
1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc     Display Max.:    7554.2

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Raw Data Dump for AEA Spectrum: 16a1605.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	6.	23.	23.	32.	35.	41.	53.
21	42.	45.	27.	23.	6.	1.	0.	1.	1.	1.
31	0.	0.	0.	0.	1.	0.	0.	1.	0.	1.
41	0.	1.	1.	0.	0.	0.	1.	1.	0.	0.
51	0.	1.	0.	2.	0.	0.	2.	1.	2.	0.
61	2.	2.	2.	1.	3.	1.	1.	0.	1.	2.
71	1.	1.	0.	0.	1.	0.	0.	0.	0.	0.
81	0.	1.	0.	0.	2.	1.	0.	0.	0.	2.
91	1.	1.	0.	1.	0.	1.	1.	0.	3.	2.
101	0.	1.	1.	1.	1.	3.	1.	3.	3.	3.
111	3.	3.	1.	1.	1.	1.	2.	1.	4.	3.
121	2.	3.	5.	4.	6.	4.	6.	8.	10.	15.
131	11.	13.	19.	21.	18.	23.	19.	13.	20.	19.
141	26.	24.	29.	45.	52.	53.	50.	29.	18.	6.
151	3.	2.	1.	1.	2.	3.	2.	4.	4.	2.
161	2.	2.	1.	0.	2.	1.	3.	2.	0.	0.
171	0.	1.	1.	0.	1.	2.	3.	0.	1.	0.
181	4.	3.	2.	0.	1.	2.	2.	2.	2.	6.
191	1.	3.	5.	2.	2.	2.	9.	6.	1.	6.
201	8.	6.	3.	7.	10.	4.	8.	11.	12.	16.
211	14.	20.	19.	27.	38.	34.	38.	50.	45.	63.
221	49.	63.	85.	84.	89.	141.	137.	126.	140.	131.
231	86.	42.	33.	16.	7.	5.	2.	1.	5.	4.
241	2.	1.	2.	4.	1.	1.	1.	11.	6.	7.
251	6.	7.	11.	10.	4.	13.	10.	7.	14.	12.
261	16.	14.	16.	23.	14.	22.	16.	26.	28.	17.
271	26.	17.	12.	27.	17.	22.	14.	21.	30.	33.
281	35.	53.	48.	79.	67.	113.	104.	100.	55.	37.
291	27.	15.	13.	18.	22.	12.	21.	22.	30.	26.
301	32.	45.	27.	38.	33.	27.	16.	8.	8.	15.
311	16.	15.	9.	20.	23.	16.	15.	23.	21.	22.
321	29.	14.	29.	33.	24.	42.	42.	41.	42.	50.
331	61.	80.	67.	62.	64.	86.	102.	100.	136.	121.
341	138.	176.	192.	227.	213.	305.	336.	432.	481.	638.
351	707.	752.	824.	803.	770.	838.	875.	1075.	1385.	1447.
361	1637.	1681.	1457.	969.	384.	111.	15.	3.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
421	0.	0.	1.	0.	1.	0.	0.	0.	1.	1.
431	1.	0.	0.	0.	0.	0.	1.	0.	0.	0.
441	0.	0.	0.	0.	0.	1.	0.	1.	1.	0.
451	0.	1.	0.	0.	0.	0.	1.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	2.	3.	1.	1.
471	5.	3.	7.	7.	2.	2.	5.	6.	0.	0.
481	2.	1.	2.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2423-SAM-PU
File ID: 17a1750.CNF

Counted on: 8/25/98 @22:39
Detector: AEA17
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1206.1	1206.1	362.153	362.153	10.000	3.595	5.000	1.295
2?	19.7	19.7	303.045	302.754	30.000	5.260	15.000	15.254
3	62.7	62.7	287.160	287.137	12.000	3.800	6.000	1.981
4?	13.6	13.6	269.881	269.068	8.000	2.312	4.000	0.787
5	99.5	99.5	228.679	228.672	12.000	5.033	6.000	2.402
6	25.6	25.6	145.262	145.261	12.000	6.318	6.000	2.236
7	28.3	28.3	19.915	19.915	12.000	3.477	6.000	11.915

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu236	0.868	5.755	5.758	-.0030	02	38.26	1.4	160.9	0.725E-04
2	Pu238	0.010	5.487	5.485	0.0020	02	0.45	17.4	2.6	0.116E-05
	~~Am241~~		5.479	5.485	-.006				2.0	0.888E-06
~~3~~	~~Th228~~	~~0.037~~	~~5.400~~	~~5.413~~	~~-.0130~~	~~02~~	~~1.64~~	~~7.3~~	~~9.5~~	~~0.429E-05~~
4	JAR 27Aug98	????		5.330			0.42	18.3		
5	Pu239	0.066	5.147	5.144	0.0030	02	2.93	5.3	12.1	0.543E-05
	Pu240		5.144	5.144	0.000				12.1	0.543E-05
~~6~~	~~Np237~~	~~0.021~~	~~4.769~~	~~4.760~~	~~0.0090~~	~~03~~	~~0.92~~	~~9.3~~	~~4.4~~	~~0.197E-05~~
~~7~~	~~U 238~~	~~0.012~~	~~4.184~~	~~4.184~~	~~0.0000~~	~~02~~	~~0.52~~	~~12.4~~	~~2.8~~	~~0.126E-05~~
Totals:		1.015	<--valid peaks only-->				44.72			

DETECTOR CALIBRATION
Energy(MEV) = 4.092 + (0.0046)*Channel
Energy range (MeV): 4.092 TO 6.447
Efficiency = 0.2426 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	21151.0	100.000
Smoothed	21150.9	100.000
Composite fit	21666.9	102.439

Residuals	-515.9	-2.439

Analyzed by: _____
SLH2

Spectrum 17a1750.CNF

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1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc     Display Max.:     6922.4


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Raw Data Dump for AEA Spectrum: 17a1750.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	19.	19.	25.	32.	31.	35.
21	32.	24.	19.	15.	3.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	2.	3.	0.	0.	0.	0.	0.	2.
51	0.	0.	0.	0.	1.	2.	0.	1.	0.	1.
61	1.	0.	2.	2.	1.	1.	0.	0.	2.	0.
71	2.	0.	1.	1.	0.	0.	1.	0.	2.	0.
81	0.	7.	1.	0.	1.	0.	0.	3.	0.	0.
91	0.	0.	0.	0.	2.	2.	1.	0.	1.	0.
101	0.	2.	1.	0.	1.	1.	0.	0.	1.	0.
111	3.	2.	1.	1.	1.	2.	1.	7.	1.	1.
121	1.	3.	5.	2.	2.	2.	6.	3.	4.	3.
131	14.	8.	7.	22.	11.	11.	14.	24.	9.	13.
141	22.	20.	28.	29.	26.	31.	20.	29.	18.	14.
151	7.	3.	0.	3.	1.	2.	1.	3.	0.	0.
161	0.	1.	1.	1.	1.	1.	1.	1.	0.	3.
171	0.	2.	1.	1.	0.	1.	1.	1.	3.	0.
181	1.	1.	2.	1.	0.	0.	1.	1.	1.	1.
191	0.	1.	4.	3.	0.	2.	1.	4.	1.	1.
201	4.	4.	2.	5.	6.	6.	4.	7.	10.	14.
211	15.	14.	16.	14.	17.	23.	34.	30.	29.	43.
221	38.	49.	69.	77.	93.	88.	106.	111.	113.	103.
231	93.	78.	49.	26.	10.	3.	2.	3.	0.	2.
241	1.	1.	5.	2.	0.	3.	5.	4.	1.	3.
251	7.	6.	4.	5.	1.	14.	6.	4.	8.	5.
261	4.	7.	13.	16.	11.	17.	19.	16.	17.	26.
271	23.	13.	12.	14.	13.	14.	16.	23.	22.	26.
281	33.	38.	43.	52.	52.	69.	78.	72.	64.	39.
291	25.	12.	8.	10.	14.	15.	13.	17.	10.	18.
301	20.	24.	29.	25.	22.	15.	11.	7.	3.	3.
311	5.	1.	8.	5.	2.	7.	7.	14.	6.	10.
321	10.	11.	10.	9.	19.	11.	14.	19.	26.	21.
331	26.	21.	52.	39.	26.	44.	65.	54.	68.	63.
341	95.	104.	124.	156.	206.	215.	243.	324.	354.	468.
351	550.	626.	655.	729.	680.	722.	839.	891.	1021.	1138.
361	1271.	1327.	1428.	1255.	888.	475.	138.	40.	5.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
431	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
461	0.	0.	3.	1.	2.	0.	1.	1.	0.	0.
471	1.	0.	6.	2.	3.	5.	3.	11.	4.	2.
481	1.	3.	1.	0.	1.	0.	1.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2423-DUP-PU
File ID: 18a1826.CNF

Counted on: 8/25/98 @22:40
Detector: AEA18
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1438.3	1438.3	359.502	359.502	10.000	2.971	5.000	1.321
2	31.7	31.7	301.291	301.225	12.000	3.526	6.000	0.760
3	57.4	57.4	284.696	284.539	10.000	2.878	5.000	2.119
4?	16.2	16.2	267.567	266.955	10.000	2.476	5.000	1.348
5	113.5	113.5	226.536	226.532	14.000	4.191	7.000	2.274
6	31.4	31.4	143.611	143.611	10.000	4.109	5.000	1.892
7	36.5	36.5	18.852	18.852	10.000	2.020	5.000	9.512

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu236	0.833	5.755	5.747	0.0080	01	38.70	1.4	167.6	0.755E-04
2	Pu238	0.031	5.487	5.479	0.0080	02	1.43	7.7	8.4	0.379E-05
	Am241		5.479	5.479	0.000				6.5	0.291E-05
~~3~~	~~Th228~~	~~0.026~~	~~5.400~~	~~5.402~~	~~-.0020~~	~~01~~	~~1.20~~	~~10.6~~	~~7.1~~	~~0.322E-05~~
4	DHR 27Aug 98 ????			5.321			0.37	21.7		
5	Pu239	0.064	5.147	5.135	0.0120	02	2.99	5.2	12.7	0.572E-05
	Pu240		5.144	5.135	0.009				12.7	0.572E-05
~~6~~	~~Np237~~	~~0.019~~	~~4.769~~	~~4.754~~	~~0.0150~~	~~02~~	~~0.89~~	~~9.5~~	~~4.4~~	~~0.196E-05~~
~~7~~	~~U 238~~	~~0.011~~	~~4.184~~	~~4.180~~	~~0.0040~~	~~01~~	~~0.52~~	~~12.5~~	~~2.8~~	~~0.128E-05~~
Totals:		0.984	<--valid peaks only-->				45.72			

DETECTOR CALIBRATION
Energy(MEV) = 4.093 + (0.0046)*Channel
Energy range (MeV): 4.093 TO 6.449
Efficiency = 0.2356 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	22303.0	100.000
Smoothed	22303.0	100.000
Composite fit	22128.3	99.217

Residuals	174.7	0.783

Analyzed by: _____
SLH2

Spectrum 18a1826.CNF
1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 8381.1

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Raw Data Dump for AEA Spectrum: 18a1826.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	17.	24.	31.	44.	56.	39.
21	24.	14.	5.	0.	0.	0.	0.	1.	0.	0.
31	1.	0.	0.	2.	0.	0.	1.	1.	1.	0.
41	1.	0.	0.	0.	0.	1.	1.	0.	0.	1.
51	0.	2.	0.	1.	1.	1.	2.	1.	0.	2.
61	2.	1.	0.	2.	2.	3.	0.	0.	1.	2.
71	0.	1.	1.	0.	2.	1.	0.	2.	1.	0.
81	2.	2.	0.	1.	1.	0.	1.	1.	0.	1.
91	0.	1.	0.	1.	0.	0.	2.	1.	1.	2.
101	1.	0.	2.	1.	0.	1.	2.	1.	1.	0.
111	3.	0.	1.	0.	1.	3.	2.	4.	3.	5.
121	1.	1.	2.	1.	3.	3.	4.	6.	9.	5.
131	11.	9.	14.	16.	16.	9.	10.	14.	21.	25.
141	27.	32.	34.	39.	33.	26.	19.	6.	5.	3.
151	3.	3.	4.	1.	1.	0.	2.	1.	1.	1.
161	2.	1.	2.	2.	1.	0.	0.	0.	2.	0.
171	0.	2.	0.	1.	2.	0.	1.	0.	2.	1.
181	0.	3.	1.	1.	2.	1.	2.	3.	5.	2.
191	2.	3.	7.	3.	6.	2.	4.	6.	5.	7.
201	5.	7.	7.	9.	8.	7.	5.	7.	6.	18.
211	8.	16.	24.	20.	35.	26.	36.	44.	52.	46.
221	62.	66.	83.	96.	124.	139.	140.	100.	112.	66.
231	41.	19.	7.	4.	1.	0.	2.	2.	2.	2.
241	2.	3.	0.	1.	2.	3.	2.	3.	3.	3.
251	6.	5.	9.	9.	5.	4.	12.	4.	4.	10.
261	10.	12.	14.	16.	22.	19.	30.	25.	21.	19.
271	14.	12.	15.	13.	18.	20.	24.	27.	23.	47.
281	55.	60.	72.	76.	82.	86.	48.	46.	25.	21.
291	13.	10.	25.	17.	19.	18.	23.	31.	25.	29.
301	41.	36.	34.	24.	12.	7.	5.	3.	5.	8.
311	8.	5.	8.	8.	8.	16.	10.	11.	15.	11.
321	22.	19.	19.	18.	13.	24.	28.	26.	32.	33.
331	33.	36.	38.	46.	63.	62.	78.	69.	80.	121.
341	133.	154.	148.	220.	252.	310.	404.	506.	608.	720.
351	764.	701.	678.	676.	755.	998.	1203.	1391.	1728.	1750.
361	1619.	1076.	544.	146.	36.	6.	0.	0.	1.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
391	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
401	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
411	0.	0.	0.	1.	0.	0.	1.	0.	1.	0.
421	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.
431	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
461	1.	0.	1.	2.	0.	4.	1.	1.	4.	4.
471	2.	11.	3.	4.	8.	2.	2.	2.	0.	0.
481	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2424-SAM-PU
File ID: 19a1951.CNF

Counted on: 8/25/98 @22:40
Detector: AEA19
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1320.7	1320.7	362.156	362.156	10.000	2.914	5.000	1.173
2	28.8	28.8	304.337	304.250	10.000	2.453	5.000	0.755
3	58.1	58.1	287.955	287.815	10.000	2.789	5.000	1.941
4	19.1	19.1	270.379	269.913	12.000	3.014	6.000	1.269
5	124.9	124.9	229.941	229.937	12.000	3.649	6.000	1.936
6	30.2	30.2	147.495	147.495	12.000	3.466	6.000	1.483
7	27.5	27.5	23.012	23.012	10.000	3.315	5.000	3.175

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu236	0.839	5.755	5.747	0.0080.01		37.56	1.5	158.7	0.715E-04
2	Pu238	0.021	5.487	5.481	0.0060.01		0.95	9.8	5.5	0.247E-05
	Am241		5.479	5.481	-.002				4.2	0.189E-05
3	~~Th228~~	~~0.027~~	~~5.400~~	~~5.405~~	~~-.0050.01~~		~~1.23~~	~~9.5~~	~~7.2~~	~~0.322E-05~~
4		0.012		5.323	0.01		0.53	15.2	2.2	0.991E-06
5	Pu239	0.072	5.147	5.139	0.0080.02		3.21	5.0	13.3	0.599E-05
	Pu240		5.144	5.139	0.005				13.3	0.599E-05
~~6~~	~~Np237~~	~~0.019~~	~~4.769~~	~~4.760~~	~~0.0090.02~~		~~0.86~~	~~9.7~~	~~4.1~~	~~0.184E-05~~
~~7~~	~~U 238~~	~~0.012~~	~~4.184~~	~~4.187~~	~~-.0030.02~~		~~0.55~~	~~12.1~~	~~3.0~~	~~0.133E-05~~
		---					---			
Totals:		1.002	<--valid peaks only-->				44.89			

DETECTOR CALIBRATION
Energy(MEV) = 4.081 + (0.0046)*Channel
Energy range (MeV): 4.081 TO 6.436
Efficiency = 0.2415 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	21498.0	100.000
Smoothed	21498.0	100.000
Composite fit	21545.2	100.220

Residuals	-47.2	-0.220

Analyzed by: _____
SLH2

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                    Spectrum 19a1951.CNF
1 Legend:  Raw = ....  Modeled Peaks = 1,2,.., etc     Display Max.:    7144.6


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Raw Data Dump for AEA Spectrum: 19a1951.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	10.	14.	15.	9.	12.	21.
21	28.	30.	36.	30.	24.	20.	7.	3.	0.	1.
31	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
41	2.	0.	0.	0.	0.	0.	1.	2.	0.	0.
51	0.	0.	0.	0.	0.	0.	1.	1.	2.	1.
61	0.	1.	1.	1.	6.	0.	2.	1.	0.	3.
71	0.	0.	0.	1.	2.	0.	0.	0.	2.	0.
81	1.	0.	0.	2.	3.	0.	1.	2.	2.	0.
91	2.	1.	0.	0.	0.	0.	0.	1.	2.	0.
101	0.	1.	2.	0.	0.	1.	0.	0.	3.	0.
111	1.	1.	2.	1.	0.	2.	4.	2.	3.	1.
121	3.	3.	5.	5.	4.	4.	3.	2.	2.	1.
131	3.	9.	12.	10.	6.	10.	10.	21.	7.	14.
141	19.	13.	11.	17.	25.	27.	44.	31.	30.	24.
151	15.	8.	1.	2.	1.	1.	2.	1.	3.	0.
161	0.	4.	0.	1.	1.	1.	1.	1.	1.	2.
171	0.	0.	1.	2.	0.	0.	0.	1.	0.	1.
181	2.	1.	1.	0.	1.	0.	2.	1.	0.	3.
191	2.	2.	3.	2.	4.	2.	0.	2.	1.	3.
201	7.	2.	1.	5.	5.	5.	8.	10.	11.	6.
211	9.	12.	10.	10.	25.	27.	23.	27.	44.	27.
221	39.	50.	54.	54.	68.	94.	113.	117.	144.	149.
231	137.	119.	84.	46.	14.	4.	3.	2.	0.	2.
241	2.	1.	3.	1.	3.	1.	2.	4.	2.	3.
251	9.	5.	8.	4.	4.	3.	8.	6.	7.	3.
261	12.	7.	9.	14.	9.	11.	17.	20.	33.	23.
271	23.	27.	20.	10.	8.	14.	13.	18.	15.	11.
281	19.	28.	54.	44.	41.	66.	73.	79.	80.	58.
291	40.	19.	18.	9.	17.	10.	14.	24.	11.	14.
301	16.	22.	35.	40.	34.	37.	19.	7.	2.	6.
311	4.	9.	5.	10.	7.	8.	8.	11.	7.	10.
321	16.	12.	14.	17.	19.	17.	24.	34.	19.	26.
331	37.	32.	33.	49.	36.	50.	66.	64.	73.	66.
341	91.	110.	126.	148.	182.	183.	239.	269.	376.	452.
351	572.	638.	728.	715.	677.	673.	711.	804.	985.	1205.
361	1360.	1554.	1611.	1371.	800.	308.	62.	4.	2.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
441	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
451	2.	0.	0.	0.	1.	0.	0.	0.	0.	0.
461	0.	1.	0.	2.	0.	2.	3.	1.	1.	5.
471	3.	4.	6.	9.	8.	7.	4.	2.	3.	4.
481	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

222-S Analytical Laboraratory
G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.10

DATA REDUCTION REPORT

SAMPLE
S98T2424-DUP-PU
File ID: 20a2019.CNF

Counted on: 8/26/98 @ 8:22
Detector: AEA20
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1?	10.1	10.1	478.297	478.297	14.000	3.686	7.000	2.986
2	1422.5	1422.5	363.530	363.530	10.000	2.812	5.000	1.174
3	28.9	28.9	304.335	304.264	8.000	3.328	4.000	1.001
4	62.8	62.8	288.049	287.898	10.000	3.157	5.000	2.105
5	18.1	18.1	269.945	269.168	12.000	4.605	6.000	2.186
6	130.0	130.0	229.525	229.522	10.000	3.565	5.000	1.890
7	26.0	26.0	145.904	145.904	10.000	3.658	5.000	1.275
8?	26.0	26.0	20.106	20.106	10.000	2.927	5.000	10.783

PEAK RESULTS
Peak Error Limit: 30%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1		????		6.296			0.22	19.1		
2	Pu236	0.835	5.755	5.768	-.0130	.01	39.29	1.4	167.3	0.754E-04
	~~Cm243~~		5.779	5.768	0.011				224.7	0.101E-03
3	Pu238	0.022	5.487	5.495	-.0080	.02	1.02	9.3	5.9	0.266E-05
	~~Am241~~		5.479	5.495	-.016				4.5	0.203E-05
~~4~~	~~Th228~~	~~0.030~~	~~5.400~~	~~5.420~~	~~-.0200~~	~~.01~~	~~1.40~~	~~8.9~~	~~8.2~~	~~0.371E-05~~
5		0.011		5.334	0.02		0.52	16.9	2.2	0.978E-06
6	Pu239	0.071	5.147	5.151	-.0040	.02	3.32	4.9	13.9	0.624E-05
	Pu240		5.144	5.151	-.007				13.9	0.624E-05
~~7~~	~~Np237~~	~~0.018~~	~~4.769~~	~~4.767~~	~~0.0020~~	~~.02~~	~~0.84~~	~~9.7~~	~~4.0~~	~~0.182E-05~~
8		????		4.188			0.44	13.5		
Totals:		0.986	<--valid peaks only-->				46.40			

DETECTOR CALIBRATION
Energy(MEV) = 4.095 + (0.0046)*Channel
Energy range (MeV): 4.095 TO 6.451
Efficiency = 0.2396 CPM/DPM
(Data reduction compression factor: 1.)

TOTAL COUNT DATA:

Item 326 Total % Recovery

Raw spectrum	22591.0	100.000
Smoothed	22591.0	100.000
Composite fit	22589.1	99.991
Residuals	1.9	0.009

Analyzed by: _____
NEW

Spectrum 20a2019.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 8676.2

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Raw Data Dump for AEA Spectrum: 20a2019.CNF

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	11.	25.	18.	24.	26.	32.
21	35.	23.	13.	3.	2.	1.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	1.	0.	0.	0.	1.	1.	1.	0.	1.	0.
51	1.	1.	0.	0.	0.	0.	1.	0.	1.	0.
61	0.	2.	0.	1.	3.	1.	1.	2.	1.	0.
71	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
81	0.	1.	1.	2.	1.	0.	2.	2.	0.	0.
91	0.	0.	0.	0.	1.	0.	1.	2.	0.	0.
101	0.	0.	0.	0.	0.	0.	1.	3.	0.	4.
111	2.	0.	3.	3.	1.	2.	1.	0.	1.	4.
121	1.	0.	1.	6.	3.	4.	2.	5.	6.	6.
131	6.	8.	5.	18.	19.	13.	15.	17.	12.	10.
141	11.	16.	13.	29.	28.	34.	25.	29.	10.	10.
151	3.	3.	0.	4.	0.	2.	1.	1.	1.	0.
161	1.	0.	0.	1.	2.	2.	0.	0.	3.	2.
171	1.	1.	0.	0.	0.	0.	0.	0.	1.	2.
181	0.	1.	0.	3.	2.	3.	3.	3.	2.	0.
191	6.	1.	3.	1.	4.	2.	4.	5.	4.	6.
201	5.	6.	6.	4.	6.	4.	8.	11.	7.	11.
211	12.	10.	12.	18.	25.	20.	28.	20.	40.	44.
221	44.	57.	66.	67.	68.	109.	118.	128.	140.	160.
231	148.	89.	70.	33.	10.	6.	3.	1.	1.	0.
241	2.	2.	2.	3.	0.	0.	1.	3.	3.	4.
251	7.	4.	3.	6.	7.	7.	8.	7.	7.	3.
261	8.	9.	7.	9.	11.	13.	24.	22.	28.	26.
271	20.	21.	21.	12.	14.	23.	14.	14.	24.	17.
281	21.	31.	40.	48.	60.	56.	89.	89.	74.	68.
291	48.	29.	16.	14.	23.	12.	18.	11.	13.	17.
301	29.	15.	43.	22.	40.	36.	16.	11.	4.	8.
311	8.	8.	7.	6.	8.	8.	6.	7.	10.	9.
321	15.	11.	12.	17.	16.	15.	26.	19.	24.	21.
331	19.	33.	33.	52.	47.	51.	53.	65.	66.	95.
341	92.	82.	120.	137.	144.	170.	193.	214.	301.	372.
351	435.	495.	609.	817.	754.	689.	676.	721.	754.	981.
361	1146.	1338.	1641.	1766.	1621.	1047.	480.	129.	25.	0.
371	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.
381	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
401	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
411	0.	0.	1.	0.	0.	0.	0.	0.	0.	1.
421	0.	0.	1.	1.	1.	0.	0.	0.	0.	1.
431	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
451	0.	0.	0.	1.	0.	0.	0.	0.	1.	1.
461	1.	0.	0.	1.	2.	0.	2.	2.	2.	2.
471	5.	1.	5.	4.	7.	5.	17.	10.	12.	12.
481	5.	4.	3.	2.	1.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

OPPORTUNISTIC ANALYTES

APPENDIX A

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Opportunistic Analyses for ER-311 Grab Samples
ER-311 GRAB

CORE NUMBER: n/a
SEGMENT #: ER311-98-1

SEGMENT PORTION: Supernate

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98T002422			Tot. Organic Carbon by Coul.	ug/mL	100.0	1.000	3.11e+02	313.0	312.0	0.64	80.80	5.500	n/a
S98T002422			Uranium by Phosphorescence	ug/mL	99.18	3.00e-03	3.68e+02	337.0	352.5	8.79	n/a	4.00e-03	3.07E+00
S98T002422			U-Phosphorescence Inst. Error	% Inst Error	3.05	6.590	3.070	3.060	3.065	3.06	n/a	n/a	n/a
S98T002422	D		Silver-ICP-Acid Dil.	ug/mL	98.60	<1.00e-02	1.22e-01	1.26e-01	1.24e-01	3.23	56.40	2.00e-02	n/a
S98T002422	D		Arsenic-ICP-Acid Dil.	ug/mL	100.2	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	107.0	2.00e-01	n/a
S98T002422	D		Boron-ICP-Acid Dil.	ug/mL	98.40	<5.00e-02	1.29e-01	1.32e-01	1.31e-01	2.30	96.10	1.00e-01	n/a
S98T002422	D		Barium-ICP-Acid Dil.	ug/mL	98.80	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	98.80	1.00e-01	n/a
S98T002422	D		Beryllium-ICP-Acid Dil.	ug/mL	100.8	<5.00e-03	<1.00e-02	<1.00e-2	n/a	n/a	99.70	1.00e-02	n/a
S98T002422	D		Bismuth-ICP-Acid Dil.	ug/mL	100.6	<1.00e-01	9.21e-01	8.57e-01	8.89e-01	7.20	94.70	2.00e-01	n/a
S98T002422	D		Calcium-ICP-Acid Dil.	ug/mL	100.4	<1.00e-01	7.320	7.250	7.285	0.96	92.40	2.00e-01	n/a
S98T002422	D		Cadmium-ICP-Acid Dil.	ug/mL	100.6	<5.00e-03	<1.00e-02	<1.00e-2	n/a	n/a	95.70	1.00e-02	n/a
S98T002422	D		Cerium-ICP-Acid Dil.	ug/mL	100.6	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	94.30	2.00e-01	n/a
S98T002422	D		Cobalt-ICP-Acid Dil.	ug/mL	99.60	<2.00e-02	<4.00e-02	<4.00e-2	n/a	n/a	95.60	4.00e-02	n/a
S98T002422	D		Copper-ICP-Acid Dil.	ug/mL	95.20	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	40.60	2.00e-02	n/a
S98T002422	D		Potassium-ICP-Acid Dil.	ug/mL	104.4	<5.00e-01	3.470	3.640	3.555	4.78	113.0	1.000	n/a
S98T002422	D		Lanthanum-ICP-Acid Dil.	ug/mL	100.0	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	98.80	1.00e-01	n/a
S98T002422	D		Lithium-ICP-Acid Dil.	ug/mL	101.6	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	97.90	2.00e-02	n/a
S98T002422	D		Magnesium-ICP-Acid Dil.	ug/mL	100.4	<1.00e-01	1.420	1.530	1.475	7.46	96.00	2.00e-01	n/a
S98T002422	D		Molybdenum-ICP-Acid Dil.	ug/mL	100.0	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	98.20	1.00e-01	n/a
S98T002422	D		Neodymium-ICP-Acid Dil.	ug/mL	100.2	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	97.30	2.00e-01	n/a
S98T002422	D		Phosphorus-ICP-Acid Dil.	ug/mL	97.80	<2.00e-01	9.57e-01	1.010	9.84e-01	5.39	108.0	4.00e-01	n/a
S98T002422	D		Lead-ICP-Acid Dil.	ug/mL	97.20	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	97.50	2.00e-01	n/a
S98T002422	D		Sulfur-ICP-Acid Dil.	ug/mL	97.00	<1.00e-01	6.650	6.460	6.555	2.90	81.80	2.00e-01	n/a
S98T002422	D		Antimony-ICP-Acid Dil.	ug/mL	100.2	<6.00e-02	<1.20e-01	<1.20e-1	n/a	n/a	100.0	1.20e-01	n/a
S98T002422	D		Selenium-ICP-Acid Dil.	ug/mL	94.40	<1.00e-01	<2.00e-01	2.14e-01	n/a	n/a	129.0	2.00e-01	n/a
S98T002422	D		Silicon-ICP-Acid Dil.	ug/mL	99.20	<5.00e-02	3.890	3.840	3.865	1.29	104.0	1.00e-01	n/a
S98T002422	D		Samarium-ICP-Acid Dil.	ug/mL	99.00	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	91.10	2.00e-01	n/a
S98T002422	D		Strontium-ICP-Acid Dil.	ug/mL	98.80	<1.00e-02	2.29e-01	2.31e-01	2.30e-01	0.87	98.40	2.00e-02	n/a
S98T002422	D		Titanium-ICP-Acid Dil.	ug/mL	99.40	<1.00e-02	3.69e-02	2.58e-02	3.14e-02	35.4	88.40	2.00e-02	n/a
S98T002422	D		Thallium-ICP-Acid Dil.	ug/mL	94.80	<2.00e-01	<4.00e-01	<4.00e-1	n/a	n/a	89.70	4.00e-01	n/a
S98T002422	D		Uranium-ICP-Acid Dil.	ug/mL	96.30	<5.00e-01	3.60e+02	368.0	364.0	2.20	118.5	1.000	n/a
S98T002422	D		Vanadium-ICP-Acid Dil.	ug/mL	98.60	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	101.0	1.00e-01	n/a
S98T002422	D		Zinc-ICP-Acid Dil.	ug/mL	94.40	<1.00e-02	3.09e-01	3.02e-01	3.05e-01	2.29	94.80	2.00e-02	n/a
S98T002422			Bromide by Ion Chromatograph	ug/mL	100.2	<1.25e-01	< 1.375	<1.38e0	n/a	n/a	100.0	1.375	n/a
S98T002422			Oxalate-IC-Dionex 4000/450	ug/mL	101.0	<1.05e-01	< 1.155	<1.16e0	n/a	n/a	99.24	1.155	n/a
S98T002422			Cobalt-60 by GEA	uCi/mL	101.9	<1.87e-05	<6.89e-05	<6.99e-5	n/a	n/a	n/a	6.89e-05	n/a

Opportunistic Analyses for ER-311 Grab Samples
ER-311 GRAB

CORE NUMBER: n/a
SEGMENT #: ER311-98-2

SEGMENT PORTION: Supernate

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98T002423			Tot. Organic Carbon by Coul.	ug/mL	100.0	1.000	2.62e+02	240.0	251.0	8.76	n/a	5.500	n/a
S98T002423			Uranium by Phosphorescence	ug/mL	99.18	3.00e-03	3.29e+02	344.0	336.5	4.46	n/a	4.00e-03	3.04E+00
S98T002423			U-Phosphorescence Inst. Error	% Inst Error	3.05	6.590	3.040	3.080	3.060	3.08	n/a	n/a	n/a
S98T002423		D	Silver-ICP-Acid Dil.	ug/mL	98.60	<1.00e-02	1.10e-01	1.01e-01	1.06e-01	8.53	n/a	2.00e-02	n/a
S98T002423		D	Arsenic-ICP-Acid Dil.	ug/mL	100.2	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002423		D	Boron-ICP-Acid Dil.	ug/mL	98.40	<5.00e-02	1.17e-01	1.18e-01	1.17e-01	0.85	n/a	1.00e-01	n/a
S98T002423		D	Barium-ICP-Acid Dil.	ug/mL	98.80	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002423		D	Beryllium-ICP-Acid Dil.	ug/mL	100.8	<5.00e-03	<1.00e-02	<1.00e-2	n/a	n/a	n/a	1.00e-02	n/a
S98T002423		D	Bismuth-ICP-Acid Dil.	ug/mL	100.6	<1.00e-01	8.28e-01	8.73e-01	8.51e-01	5.29	n/a	2.00e-01	n/a
S98T002423		D	Calcium-ICP-Acid Dil.	ug/mL	100.4	<1.00e-01	8.330	8.470	8.400	1.67	n/a	2.00e-01	n/a
S98T002423		D	Cadmium-ICP-Acid Dil.	ug/mL	100.6	<5.00e-03	<1.00e-02	<1.00e-2	n/a	n/a	n/a	1.00e-02	n/a
S98T002423		D	Cerium-ICP-Acid Dil.	ug/mL	100.6	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002423		D	Cobalt-ICP-Acid Dil.	ug/mL	99.60	<2.00e-02	<4.00e-02	<4.00e-2	n/a	n/a	n/a	4.00e-02	n/a
S98T002423		D	Copper-ICP-Acid Dil.	ug/mL	95.20	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	n/a	2.00e-02	n/a
S98T002423		D	Potassium-ICP-Acid Dil.	ug/mL	104.4	<5.00e-01	3.260	3.480	3.370	6.53	n/a	1.000	n/a
S98T002423		D	Lanthanum-ICP-Acid Dil.	ug/mL	100.0	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002423		D	Lithium-ICP-Acid Dil.	ug/mL	101.6	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	n/a	2.00e-02	n/a
S98T002423		D	Magnesium-ICP-Acid Dil.	ug/mL	100.4	<1.00e-01	1.710	1.620	1.665	5.41	n/a	2.00e-01	n/a
S98T002423		D	Molybdenum-ICP-Acid Dil.	ug/mL	100.0	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002423		D	Neodymium-ICP-Acid Dil.	ug/mL	100.2	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002423		D	Phosphorus-ICP-Acid Dil.	ug/mL	97.80	<2.00e-01	9.61e-01	9.07e-01	9.34e-01	5.78	n/a	4.00e-01	n/a
S98T002423		D	Lead-ICP-Acid Dil.	ug/mL	97.20	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002423		D	Sulfur-ICP-Acid Dil.	ug/mL	97.00	<1.00e-01	6.540	6.740	6.640	3.01	n/a	2.00e-01	n/a
S98T002423		D	Antimony-ICP-Acid Dil.	ug/mL	100.2	<6.00e-02	<1.20e-01	<1.20e-1	n/a	n/a	n/a	1.20e-01	n/a
S98T002423		D	Selenium-ICP-Acid Dil.	ug/mL	94.40	<1.00e-01	2.55e-01	2.25e-01	2.40e-01	12.5	n/a	2.00e-01	n/a
S98T002423		D	Silicon-ICP-Acid Dil.	ug/mL	99.20	<5.00e-02	3.740	3.830	3.785	2.38	n/a	1.00e-01	n/a
S98T002423		D	Samarium-ICP-Acid Dil.	ug/mL	99.00	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002423		D	Strontium-ICP-Acid Dil.	ug/mL	98.80	<1.00e-02	2.10e-01	2.10e-01	2.10e-01	0.00	n/a	2.00e-02	n/a
S98T002423		D	Titanium-ICP-Acid Dil.	ug/mL	99.40	<1.00e-02	2.68e-02	3.33e-02	3.01e-02	21.6	n/a	2.00e-02	n/a
S98T002423		D	Thallium-ICP-Acid Dil.	ug/mL	94.80	<2.00e-01	<4.00e-01	<4.00e-1	n/a	n/a	n/a	4.00e-01	n/a
S98T002423		D	Uranium-ICP-Acid Dil.	ug/mL	96.30	<5.00e-01	3.20e+02	319.0	319.5	0.31	n/a	1.000	n/a
S98T002423		D	Vanadium-ICP-Acid Dil.	ug/mL	98.60	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002423		D	Zinc-ICP-Acid Dil.	ug/mL	94.40	<1.00e-02	3.17e-01	3.23e-01	3.20e-01	1.88	n/a	2.00e-02	n/a
S98T002423			Bromide by Ion Chromatograph	ug/mL	100.2	<1.25e-01	< 1.375	<1.38e0	n/a	n/a	n/a	1.375	n/a
S98T002423			Oxalate-IC-Dionex 4000/450	ug/mL	101.0	<1.05e-01	< 1.155	<1.16e0	n/a	n/a	n/a	1.155	n/a
S98T002423			Cobalt-60 by GEA	uCi/mL	101.9	<1.87e-05	<7.54e-05	<6.70e-5	n/a	n/a	n/a	7.54e-05	n/a

Opportunistic Analyses for ER-311 Grab Samples
ER-311 GRAB

CORE NUMBER: n/a
SEGMENT #: ER311-98-3

SEGMENT PORTION: Supernate

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S98T002424			Tot. Organic Carbon by Coul.	ug/mL	100.0	1.000	2.67e+02	278.0	272.5	4.04	n/a	5.500	n/a
S98T002424			Uranium by Phosphorescence	ug/mL	99.18	3.00e-03	3.22e+02	327.0	324.5	1.54	n/a	4.00e-03	3.11E+00
S98T002424			U-Phosphorescence Inst. Error	% Inst Error	3.05	6.590	3.110	3.060	3.085	3.06	n/a	n/a	n/a
S98T002424		D	Silver-ICP-Acid Dil.	ug/mL	98.60	<1.00e-02	1.04e-01	9.79e-02	1.01e-01	6.04	n/a	2.00e-02	n/a
S98T002424		D	Arsenic-ICP-Acid Dil.	ug/mL	100.2	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002424		D	Boron-ICP-Acid Dil.	ug/mL	98.40	<5.00e-02	1.18e-01	1.29e-01	1.23e-01	8.91	n/a	1.00e-01	n/a
S98T002424		D	Barium-ICP-Acid Dil.	ug/mL	98.80	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002424		D	Beryllium-ICP-Acid Dil.	ug/mL	100.8	<5.00e-03	<1.00e-02	<1.00e-2	n/a	n/a	n/a	1.00e-02	n/a
S98T002424		D	Bismuth-ICP-Acid Dil.	ug/mL	100.6	<1.00e-01	8.43e-01	8.58e-01	8.51e-01	1.76	n/a	2.00e-01	n/a
S98T002424		D	Calcium-ICP-Acid Dil.	ug/mL	100.4	<1.00e-01	8.070	7.900	7.985	2.13	n/a	2.00e-01	n/a
S98T002424		D	Cadmium-ICP-Acid Dil.	ug/mL	100.6	<5.00e-03	<1.00e-02	<1.00e-2	n/a	n/a	n/a	1.00e-02	n/a
S98T002424		D	Cerium-ICP-Acid Dil.	ug/mL	100.6	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002424		D	Cobalt-ICP-Acid Dil.	ug/mL	99.60	<2.00e-02	<4.00e-02	<4.00e-2	n/a	n/a	n/a	4.00e-02	n/a
S98T002424		D	Copper-ICP-Acid Dil.	ug/mL	95.20	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	n/a	2.00e-02	n/a
S98T002424		D	Potassium-ICP-Acid Dil.	ug/mL	104.4	<5.00e-01	3.050	3.690	3.370	19.0	n/a	1.000	n/a
S98T002424		D	Lanthanum-ICP-Acid Dil.	ug/mL	100.0	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002424		D	Lithium-ICP-Acid Dil.	ug/mL	101.6	<1.00e-02	<2.00e-02	<2.00e-2	n/a	n/a	n/a	2.00e-02	n/a
S98T002424		D	Magnesium-ICP-Acid Dil.	ug/mL	100.4	<1.00e-01	1.520	1.500	1.510	1.32	n/a	2.00e-01	n/a
S98T002424		D	Molybdenum-ICP-Acid Dil.	ug/mL	100.0	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002424		D	Neodymium-ICP-Acid Dil.	ug/mL	100.2	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002424		D	Phosphorus-ICP-Acid Dil.	ug/mL	97.80	<2.00e-01	8.89e-01	9.60e-01	9.24e-01	7.68	n/a	4.00e-01	n/a
S98T002424		D	Lead-ICP-Acid Dil.	ug/mL	97.20	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002424		D	Sulfur-ICP-Acid Dil.	ug/mL	97.00	<1.00e-01	6.580	6.450	6.515	2.00	n/a	2.00e-01	n/a
S98T002424		D	Antimony-ICP-Acid Dil.	ug/mL	100.2	<6.00e-02	<1.20e-01	<1.20e-1	n/a	n/a	n/a	1.20e-01	n/a
S98T002424		D	Selenium-ICP-Acid Dil.	ug/mL	94.40	<1.00e-01	<2.00e-01	2.27e-01	n/a	n/a	n/a	2.00e-01	n/a
S98T002424		D	Silicon-ICP-Acid Dil.	ug/mL	99.20	<5.00e-02	3.930	3.880	3.905	1.28	n/a	1.00e-01	n/a
S98T002424		D	Samarium-ICP-Acid Dil.	ug/mL	99.00	<1.00e-01	<2.00e-01	<2.00e-1	n/a	n/a	n/a	2.00e-01	n/a
S98T002424		D	Strontium-ICP-Acid Dil.	ug/mL	98.80	<1.00e-02	2.13e-01	2.14e-01	2.13e-01	0.47	n/a	2.00e-02	n/a
S98T002424		D	Titanium-ICP-Acid Dil.	ug/mL	99.40	<1.00e-02	2.82e-02	2.71e-02	2.77e-02	3.98	n/a	2.00e-02	n/a
S98T002424		D	Thallium-ICP-Acid Dil.	ug/mL	94.80	<2.00e-01	<4.00e-01	<4.00e-1	n/a	n/a	n/a	4.00e-01	n/a
S98T002424		D	Uranium-ICP-Acid Dil.	ug/mL	96.30	<5.00e-01	3.26e+02	330.0	328.0	1.22	n/a	1.000	n/a
S98T002424		D	Vanadium-ICP-Acid Dil.	ug/mL	98.60	<5.00e-02	<1.00e-01	<1.00e-1	n/a	n/a	n/a	1.00e-01	n/a
S98T002424		D	Zinc-ICP-Acid Dil.	ug/mL	94.40	<1.00e-02	4.39e-01	4.34e-01	4.36e-01	1.15	n/a	2.00e-02	n/a
S98T002424			Bromide by Ion Chromatograph	ug/mL	100.2	<1.25e-01	< 1.375	<1.38e0	n/a	n/a	n/a	1.375	n/a
S98T002424			Oxalate-IC-Dionex 4000/450	ug/mL	101.0	<1.05e-01	< 1.155	<1.16e0	n/a	n/a	n/a	1.155	n/a
S98T002424			Cobalt-60 by GEA	uCi/mL	101.9	<1.87e-05	<6.08e-05	<7.02e-5	n/a	n/a	n/a	6.08e-05	n/a

DISTRIBUTION SHEET

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