Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

222-S Analytical Laboratory

Project: 242-A - EVAPORATOR FEED CHARACTERIZATION

Tank: 102AW

Customer Id. Number: 2291-1-4, 2291-2-4, 2291-3-4, 2291-4-4

Report Revision: 0

Date Printed: May 27, 1992

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Hanford Operations and Engineering Contractor for the US Department of Energy

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SIGNATURE PAGE

I have reviewed the Inorganic and Radiochemistry results reported in this data package (when applicable). The results meet the requirements of "242-A Evaporator Feed Characterization Project - Statement of Work" - WHC-SOW-91-0002. This data is an accurate representation of the data generated for the requested laboratory analyses performed.

J. H. Tillman
242-A Evaporator Project Manager

9/5/92
Date

I have reviewed the compiled report and certify that this data package meets the document standards of the RCRA Data Packaging Procedure LO-150-151. This data package is complete and contains the data generated from the requested laboratory analysis performed on this sample.

L. R. Webb
Records Management Specialist
Data Coordinator

09/5/92
Date

I have reviewed this report and certify that this data package meets the requirements of "Quality Assurance Project Plan for the Chemical Analysis of Highly Radioactive Samples in Support of Environmental Activities on the Hanford Site" - WHC-SD-CP-QAPP-002, unless superseded by the Statement of Work or Waste Characterization Plan. This data package is a complete and accurate representation of the data generated from the requested laboratory analyses performed on this sample based on the QA Review Process.

L. P. Markel
Laboratory Q.A. Officer

09/12/92
Date

The data contained in this hardcopy data package has been approved and authorized for release by the Laboratory Manager or Manager's designee as verified by the following signature.

M. A. Bell
Manager
Processing and Analytical Laboratories

9-14-92
Date

NARRATIVE

P.O. Box 1970 Richland, WA 99352

242-EVAPORATOR FEED CHARACTERIZATION

INORGANIC CASE NARRATIVE

Introduction

The analysis of samples in support of the 242-A Evaporator Feed Characterization Project for Fiscal Year 1991, was performed by the 222-S Laboratory during the last quarter of 1991 and completed during the first quarter of 1992. Samples received and analyzed for the inorganic and conventional parameters were performed using methods specified in the Statement of Work (SOW), WHC-SOW-91-0002 Westinghouse Hanford Company, 242-A Evaporator Feed Characterization Project Fiscal Year 1991, September 1991.

Samples submitted to the laboratory were identified as:

1. TK-102-AW (referred to as 102AW in the remainder of this report) the feed tank prior to the evaporator.

2. TK-106-AW (referred to as 106AW in the remainder of this report) one of the candidate feed tanks into 102AW.

3. TK-103-AP (referred to as 103AP in the remainder of this report) the other candidate feed tank into 102AW.

The inorganic constituents requested for analysis on the three tanks were divided into the following categories; metals by Inductively Coupled Plasma (ICP), metals by Atomic Absorption Spectroscopy (AAS), and conventional parameters by specified methods. The results were obtained using approved methods as specified in Table I of the SOW. Quality analyses, including number and frequency, were performed in accordance to guidance found in Table 2 of the SOW. The parameters analyzed for from the three tanks are:

Metals by ICP

Silver	Ag
Aluminum	Al
Barium	Ba
Cadmium	Cd
Chromium	Cr
Iron	Fe
Magnesium	Mg
Manganese	Mn
Sodium	Na
Lead	Pb
Zinc	Zn

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242-EVAPORATOR FEED CHARACTERIZATION

INORGANICS CASE NARRATIVE

Problems encountered:

Samples from the two candidate and one feed tank into the evaporator were received into the 222-S laboratory during the laboratory's transition period from process to environmental analysis. This transition period signaled a change in the analytical protocols required to meet different, and in some cases, more stringent conditions. Most of the problems encountered during this work effort can be attributed to the response of the laboratory to these changing requirements. Nevertheless, the data generated for these samples was obtained using the best available laboratory practice at the time of sample analysis. The following problems were observed to have occurred throughout the samples submitted from tanks 102AW, 103AP, and 106AW:

(1) In a few cases, the analytical data cards are not corrected with one line, an initial and a date. Also, due to insufficient training, the chemists signed the analytical data card in the incorrect location. Though the analytical data cards were signed by the cognizant chemists, they were often signed in the inappropriate location on the card. This indicated the need for appropriate training to address this problem. This training effort has begun.

The Extension "1621" on the data cards represent an old extension which specifically denotes "TOC" analysis.

(2) Instrument Detection Limits (IDL). Detection limits for the parameters determined were obtained using the method prescribed by the US EPA. The instrument detection limits for the metals determined by Inductively Coupled Plasma (ICP), Atomic Absorption (AA), Ion Chromatograph (IC) and classical methods are obtained from an aqueous matrix. The instrument detection limits for the analytes on actual evaporator feed or candidate tanks would probably be higher due to matrix efforts. The standards used to prepare the solutions for the detection limit determinations were obtained from bonifide and reliable sources. The procedure basically requires the analysis of seven replicates of the analyte at a concentration two times the noise level for the instrument. Following this protocol, the instrument detection limits were met or exceeded when compared to the IDC's in the Request for Special Analyses (RSA). Typical instrument detection limits obtained during this work effort are listed below:

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Detection Limits of Radionuclides

Listed below are the detection limits for indicated radionuclides for samples R9415, R9416, R9417, and R9418.

Radionuclide	DL uCi/L
Pu-239	7.6×10^{-3}
Sr-90	6.6×10^{-1}
Total Beta	$5.7 \times 10^{+1}$
Total Alpha	3.7×10^{-1}
H-3	7.7×10^{-3}
Total U	4.0×10^{-4} g/L
Co-60	$5.0 \times 10^{+0}$
Cs-134	$6.0 \times 10^{+0}$
Cs-137	$9.0 \times 10^{+0}$
Ce-144	$4.5 \times 10^{+1}$
Eu-154	$1.8 \times 10^{+1}$
Eu-155	$1.1 \times 10^{+1}$
Nb-94	$5.0 \times 10^{+0}$
Ra-226*	$1.8 \times 10^{+1}$
Ru-106	$1.1 \times 10^{+2}$
Sn-113	$6.0 \times 10^{+0}$

*Based on the gamma peak of daughter Bi-204

The gamma limits are based on the background spectrum of the Ge detector which was used for counting of the above mentioned samples. The data reduction of the background gamma spectrum was done under the same parameters (sample size, sample geometry, and counting time) as used for the samples. Note that the limits will change in the sample depending on the presence of other radionuclides, their gamma-ray energies, intensities, and their levels of activity.

samples. The check standards run for this batch of samples for the Differential Scanning Calorimetry (DSC) indicate good reproducibility.

Radiochemical Analysis

Customer Sample#	Lab I.D.#
2291-1-4	R9415
2291-2-4	R9416
2291-3-4	R9417
2291-4-4	R9418

Radiochemical analysis was run on the above samples. Insufficient sample was found for the analysis of americium 241 for all of these samples. The americium 241 was analyzed on the riser sample submitted later during this work effort (see results for samples 2AW-BD-1 (R332) and 2AW-BD-2 (R333)). Duplicates were run on sample 2291-1-4 (R9415) and selected radionuclides were run in duplicate for samples 2291-2-4 (R416) and 2291-3-4 (R9417). The samplers, in an attempt to get the smallest sample possible, failed to get enough sample to perform all radiochemical analyses. Check standards results for cesium 137 on 2291-1-4 (R9415) were 101.1 and 102.5%. The RPD for the duplicates were within the limits. The spike recovery values for cesium 137 was 105.7%, Total Beta was 97.1% and Total Alpha was 94.8%. These values imply good precision and accuracy of the method.

Metals Analysis

Customer Sample #	Lab I.D. #
2291-1-1	R9394
2291-2-1	R9395
2291-3-1	R9396
2291-4-1	R3997

Inductively Coupled Plasma (ICP) was used to analyze for eleven metals in the above samples. Sample 2291-1-1 (R9394) was run in duplicate. The RPD for magnesium was 143%. The check standards were 110 and 111% respectively. This could imply matrix interference or contamination problems. The RPD for iron was 122% with check standard results at 150 and 162%. The high bias of the check standards imply contamination or spectral problems. Also, aluminum and sodium produced data showing extremely high check standard results, before and after sample analysis. These high values appear for all samples within this batch and imply contamination problems.

	Check Standard #1	Check Standard #2
aluminum	141.2%	139.8%
sodium	194.4%	196.5%

Riser #22A Radiochemical Analysis

Customer I.D. #	Lab I.D.#
2AW-BD-1 (R332)	R1626
2AW-BD-2 (R333)	R1627

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Internal Memo

From: Office of Sample Management 16500-90-090
Phone: 3-3869 MO-346/200W T6-08
Date: November 26, 1990
Subject: RECOMMENDATIONS FOR TANK FARM WASTE ANALYSES

To: T. D. Blankenship R1-62

cc: J. D. Briggs T6-14
J. A. Eacker R1-51
D. L. Halgren R1-51
J. H. Kessner T6-08
E. J. Kosiancic SO-61
C. R. Stroup T6-07
RLW File/LB

Reference: Internal Memo, T. D. Blankenship to E. J. Kosiancic, "Tank Farm Waste Analysis Requirements," dated September 10, 1990.

The referenced Internal Memo requests information regarding laboratory analytical capacity for a variety of analytes to support Tank Farm and Evaporator operations. Specific comments and suggestions for each have been prepared along with information on suggested minimum quantitation limits (MQLs) for the needed analyses and recommended reporting formats. With the exception of Nb^{94}, all requested analyses are currently performed on-site. Laboratory capacity exists to support these programs if sufficient prescheduling of activities is done to coordinate with times of high sample throughput in the laboratory (e.g., single shell tank sampling).

The discussions that follow are based on the assumption that the laboratory will be performing "standard" regulatory type analysis. Analysis MQLs are based on proven laboratory experience, turnaround times are based on requirements in the Tri-Party agreement, and reporting/validation formats based on WHC-CM-5-3, Section 2.0, "Data Validation for RCRA Analyses." This information is summarized in the following attached tables:

Table 1	MQLs for Inorganic Analysis
Table 2	MQLs for Radionuclide Analysis
Table 3	MQLs for Organic Analysis (these are CLP requirements but will form the basis for all organic analysis)
Table 4	Sample Turnaround Times
Table 5	Result Reporting/Validation
Table 6	Validation Criteria - Generic Data Quality Objectives (DQOs)

If specific needs different from this standard are required for a given program, these needs must be defined in the program's Waste Analysis Plan (WAP) or equivalent documentation and negotiated with the laboratory to assure

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Samples having greater than normal Pu^{238} (e.g., associated with previous irradiated thorium processing) activity will be detectable using the current procedures. In these cases, Pu^{238} activity can be quantified either using a special analysis or through determination of isotopic ratios based on mass spectral analysis.

Analysis of Samples for the 242-A Evaporator:

All analyses identified in the Internal Memo appear to be for hazardous waste designation needs. It should be noted that analysis of the vent stack will require the installation of specialized gas sampling equipment.

General Comments:

Analysis of two major hazardous waste designation groups were not requested for any of the streams; semivolatile organics and Toxicity Characteristic Leaching Procedure (TCLP). If these analyses have not been assessed for inclusion in the requested analysis, it is recommended that they are reviewed for inclusion.

The current schedule for implementation of organic analysis capacity at 222-S Laboratory is for early in 1991, most probably after March 1, 1991. Until capacity becomes available at 222-S Laboratory, organic analyses (VOA and TOX) will be performed by the Pacific Northwest Laboratories (PNL). This will require transhipping of samples sent to 222-S Laboratory, but should not seriously affect result turnaround or quality.

Estimated cost information for the requested analyses is shown in Table 7. These costs are based on analysis of organic components at PNL. When organic capability is available at 222-S Laboratory, costs will be reduced slightly. Addition of semivolatile organic analysis to the lists would increase costs $2000 per analysis. Addition of TCLP to the list would increase analysis costs $1500 for those samples containing greater than 1% solids. For liquid only samples, no additional preparation is required for TCLP and the analytes of concern are already included in the analysis requests.

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TABLE 1
RECOMMENDED ANALYSIS MINIMUM QUANTITATION LEVELS
for TANK FARM WASTE ANALYSES

Analyte	High Salt Liquid or Solid/Slurry	Low Salt Liquid	Analyte	High Salt Liquid or Solid/Slurry	Low Salt Liquid
Analyzed by Inductively Coupled Plasma Spectroscopy (ICP)					
Al	50	0.5	As	20	0.2
Ba	2	0.02	Bi	100	0.5
B	20	0.05	Cd	2	0.02
Ca	0.2	0.002	Ce	100	1
Cr	5	0.05	Co	20	0.2
Cu	20	0.2	Eu	2	0.02
Fe	10	0.01	La	20	0.2
Pb	30	0.3	Li	3	0.03
Mg	0.1	0.001	Mn	2	0.02
Hg	5	0.05	Mo	5	0.05
Nd	250	2.5	Ni	20	0.2
P	50	0.5	K	250	2.5
Sm	200	2	Se	100	1
Si	100	0.5	Ag	30	0.3
Na	60	0.6	Sr	2	0.02
S	60	0.6	Ta	50	0.5
Th	20	0.2	Sn	2	0.02
Ti	30	0.06	W	200	0.5
U	1500	15	Zn	2	0.02
Zr	80	0.1			
Analyzed by Specific Atomic Absorption Techniques					
As	5	0.05	Hg	3	0.03
Se	5	0.05			
Anion Analysis by DIONEX					
F	6000	10	Cl	4000	5
NO_3	20000	10	NO_2	20000	10
PO_4	10000	10	SO_4	10000	10
Specific Analysis					
CO_3	5000	50	TOC(carbon)	5000	50
CN	0.1	0.01	NH_4	5000	50
U	100	1	TOX(chlorine)	100	10
OH	0.2	0.002	DSC	*	*

Values for solids are as ug/g
Values for liquids are as ug/ml
*DSC will be used to screen for the presence of exothermic reactions.
Specific quantitation limits are not required for this screening

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TABLE 3

TARGET COMPOUND LIST (TCL) AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)

Pesticides/Aroclors	CAS Number	Quantitation Limits* Water ug/L	Soil ug/Kg	On Column (pg)
98. alpha-BHC	319-84-6	0.05	1.7	5
99. beta-BHC	319-85-7	0.05	1.7	5
100. delta-BHC	319-86-8	0.05	1.7	5
101. gamma-BHC (Lindane)	58-89-9	0.05	1.7	5
102. Heptachlor	76-44-8	0.05	1.7	5
103. Aldrin	309-00-2	0.05	1.7	5
104. Heptachlor epoxide	1024-57-3	0.05	1.7	5
105. Endosulfan I	959-98-8	0.05	1.7	5
106. Dieldrin	60-57-1	0.10	3.3	10
107. 4,4'-DDE	72-55-9	0.10	3.3	10
108. Endrin	72-20-8	0.10	3.3	10
109. Endosulfan II	33213-65-9	0.10	3.3	10
110. 4,4'-DDD	72-54-8	0.10	3.3	10
111. Endosulfan sulfate	1031-07-8	0.10	3.3	10
112. 4,4'-DDT	50-29-3	0.10	3.3	10
113. Methoxychlor	72-43-5	0.50	17.0	50
114. Endrin ketone	53494-70-5	0.10	3.3	10
115. Endrin aldehyde	7421-36-3	0.10	3.3	10
116. alpha-Chlordane	5103-71-9	0.05	1.7	5
117. gamma-Chlordane	5103-74-2	0.05	1.7	5
118. Toxaphene	8001-35-2	5.0	170.0	500
119. Aroclor-1016	12674-11-2	1.0	33.0	100
120. Aroclor-1221	11104-28-2	1.0	33.0	100
121. Aroclor-1232	11141-16-5	2.0	67.0	200
122. Aroclor-1242	53469-21-9	1.0	33.0	100
123. Aroclor-1248	12672-29-6	1.0	33.0	100
124. Aroclor-1254	11097-69-1	1.0	33.0	100
125. Aroclor-1260	11096-82-5	1.0	33.0	100

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

There is no differentiation between the preparation of low and medium soil samples in this method for the analysis of Pesticides/Aroclors.

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TABLE 3 (cont)

TARGET COMPOUND LIST (TCL) AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)

Semivolatiles	CAS Number	Quantitation Limits* Water ug/L	Low Soil ug/Kg	Med. Soil ug/Kg	On Column (ng)
34. Phenol	108-95-2	10	330	10000	(20)
35. bis(2-Chloroethyl) ether	111-44-4	10	330	10000	(20)
36. 2-Chlorophenol	95-57-8	10	330	10000	(20)
37. 1,3-Dichlorobenzene	541-73-1	10	330	10000	(20)
38. 1,4-Dichlorobenzene	106-46-7	10	330	10000	(20)
39. 1,2-Dichlorobenzene	95-50-1	10	330	10000	(20)
40. 2-Methylphenol	95-48-7	10	330	10000	(20)
41. 2,2'-oxybis (1-Chloropropane)*	108-60-1	10	330	10000	(20)
42. 4-Methylphenol	106-44-5	10	330	10000	(20)
43. N-Nitroso-di-n-dipropylamine	621-64-7	10	330	10000	(20)
44. Hexachloroethane	67-72-1	10	330	10000	(20)
45. Nitrobenzene	98-95-3	10	330	10000	(20)
46. Isophorone	78-59-1	10	330	10000	(20)
47. 2-Nitrophenol	88-75-5	10	330	10000	(20)
48. 2,4-Dimethylphenol	105-67-9	10	330	10000	(20)
49. bis(2-Chloroethoxy) methane	111-91-1	10	330	10000	(20)
50 2,4-Dichlorophenol	120-83-2	10	330	10000	(20)
51. 1,2,4-Trichlorobenzene	120-82-1	10	330	10000	(20)
52. Naphthalene	91-20-3	10	330	10000	(20)
53. 4-Chloroaniline	106-47-8	10	330	10000	(20)
54. Hexachlorobutadiene	87-68-3	10	330	10000	(20)
55. 4-Chloro-3-methylphenol	59-50-7	10	330	10000	(20)
56. 2-Methylnaphthalene	91-57-6	10	330	10000	(20)
57. Hexachlorocyclopentadiene	77-47-4	10	330	10000	(20)
58. 2,4,6-Trichlorophenol	88-06-2	10	330	10000	(20)
59. 2,4,5-Trichlorophenol	95-95-4	50	1700	50000	(100)
60. 2-Chloronaphthalene	91-58-7	10	330	10000	(20)
61. 2-Nitroaniline	88-74-4	50	1700	50000	(100)
62. Dimethylphthalate	131-11-3	10	330	10000	(20)
63. Acenaphthylene	208-96-8	10	330	10000	(20)
64. 2,6-Dinitrotoluene	606-20-2	10	330	10000	(20)
65. 3-Nitroaniline	99-09-2	50	1700	50000	(100)
66. Acenaphthene	83-32-9	10	330	10000	(20)
67. 2,4-Dinitrophenol	51-28-5	50	1700	50000	(100)
68. 4-Nitrophenol	100-02-7	50	1700	50000	(100)

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* Previously known by the name bis(2-Chloroisopropyl) ether

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TABLE 4
SAMPLE RESULT TURNAROUND TIMES

Laboratory analysis and quality assurance documentation, excluding validation, shall be limited to the following schedule:

Transuranic and hot cell analyses - 100 days annual average, but not to exceed 140 days

Low-level and mixed waste (up to 100 mr/hr) analyses - 75 days annual average, but not to exceed 90 days

Nonradioactive waste analyses - 50 days

Validated data packages will be issued within 21 days of receipt of the results by the Office of Sample Management.

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TABLE 6
VALIDATION CRITERIA - GENERIC DATA QUALITY OBJECTIVES

1. REQUESTED VERSUS REPORTED ANALYSES

   All requested analyses shall be reported of accounted for.

2. HOLDING TIMES

   Holding times shall be equivalent to RCRA defined times. If no RCRA holding time exists, holding times will be 6 months unless specifically defined in project specific documentation.

3. SURROGATE RECOVERY

   Sample and blank surrogate recoveries must be between 80 and 120%.

4. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

   A matrix spike or matrix spike duplicate must be analyzed with every analytical batch of every 20 samples, whichever is more frequent. Control limits will be between 75 and 125% with ±20% relative percent differences.

5. DUPLICATE ANALYSIS

   Duplicate analysis must be performed with every analytical batch or every 20 samples, whichever is more frequent. Control limits will be ±20%. If both sample and duplicate results are below the method detection limit of sample quantitation limit, then no control limit applies.

6. ANALYTICAL BLANKS

   A minimum of one analytical blank must be analyzed for every batch or every 20 samples, whichever is more frequent. No contaminants should be detected in the blanks.

7. INITIAL AND CONTINUING CALIBRATION

   Analytical instrumentation shall be calibrated in accordance with requirements specific to the instrumentation and methods of procedures employed.

8. GC/MS TUNE

   Ion abundance results and tuning frequency requirements must be as specified in the method employed for analysis.

9. INTERNAL STANDARDS

   Internal Standard area counts and retention time differences from the associated calibration standard must be within the control limits specified by the methods or procedure used.

TABLE 7
ESTIMATED COSTS

CHARACTERIZATION OF WASTE STREAMS DICHSRGED TO DOUBLE SHELL TANKS	
Analysis for processing parameters	$500/sample
Analysis for hazwaste designation	$5000/sample
DOUBLE SHELL TANK CHARACTERIZATION	
Analysis for hazewaste designation	$10000/sample
ANALYSIS OF SAMPLES FROM 242-A EVAPORTOR	
Analysis of feed tank	$5000/sample
Analysis of Process Condensate	$2500/sample
Analysis of Slurry Product	$5000/sample
Analysis of Steam Condensate	$4000/sample
Analysis of Cooling Water	$4000/sample
Analysis of Vent Gases	$2000/sample

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SINGLE SHELL TANK PROJECT
Analytical Detection Limits
October 12, 1990

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

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

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

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

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

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

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

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

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

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

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

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

Instrument Detection Limit ppm.

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

TANK FARM PLANT OPERATING PROCEDURE

WHC-SD-WM-DP-025
Addendum 4 Rev 0

CHAIN OF CUSTODY

Company Contact	Paul Haigh	Telephone	373-4655
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	B-Plant Sample Truck		
Shipped to	222-S Lab		

SAMPLING INFORMATION

Sample Collected by:	Rich Lemos	Date	11-13-91	Time	2140
Sample Locations	TK 102-AW, Riser #22A		Custody Seal #	4246	
Remarks	NA				
Ice Chest or Sample Pig No.	B-18	Field Logbook and Page No.	N/A		

SUPERVISION REVIEW: [signature] DATE: 11-13-91

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW-BD-1 R-332	242-A Statement of Work WHC-SOW-91-0002

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: [signature]	Date/Time: 11-16-91/0050
Relinquished by: [signature]	Received by: R. AKITA Raymond Akita	Date/Time: 11-16/91/0140
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

WHC-SD-WM-DP-025
Addendum 4 Rev 0

CHAIN OF CUSTODY

Company Contact	Paul Haigh	Telephone	373-4655
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	B-Plant Sample Truck		
Shipped to	222-S Lab		

SAMPLING INFORMATION

Sample Collected by	Rich Lemos	Date	11-13-91	Time	2120
Sample Locations	TK 102-AW, Riser #22A		Custody Seal #	4247	
Remarks	NA				
Ice Chest or Sample Pig No.	G-6	Field Logbook and Page No.	N/A		

SUPERVISION REVIEW: [signature] DATE: 11-13-91

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW-BD-2 R-333	242-A Statement of Work WHC-SOW-91-0002

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: [signature]	Date/Time: 11-16-91 / 0050
Relinquished by: [signature]	Received by: R. Akita Raymond Akita	Date/Time: 11-16-91 / 0140
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

DON'T SAY IT --- *Write It!* WHC-SD-WM-DP-025 Addendum 4 Rev 0

DATE 6/10/91

TO

FROM Vida Johansen

Received 2 pig overpacks @ 1500 hrs on 6/10/91. The paper work for sample # 2AW52291-2 was correct. The paper work for sample # 2AW52291-4 was correct, but the inside pig was labeled 2AW52291-3. I contacted Carol Pittkoff after putting the sample on a 24 hr holding time according to procedure 20-090-101. I notified Dan Thornton of the discrepancy and Jim Atterbury. This will invalidate the sample chain of custody. Because of the late time of day I couldn't locate QSR.

"TO MAKE LIFE LAST, PUT SAFETY FIRST"

DON'T SAY IT --- *Write It!*

DATE 6/11/91

TO

FROM Vida Johansen

Contacted Carol Pittkoff at 0750 hrs to remind her of the problem. She is contacted the field personell to prevent a similar problem with the next sample.
Rick Wein informed of mishap

6/11/91 0900 Customer requested sample disposal. They will resample

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"TO MAKE LIFE LAST, PUT SAFETY FIRST"

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)
WHC-SD-WM-DP-025
Addendum 4 Rev 0

241-A Evaporator

Date/Time Received 6/10/91 1445 Client Name Hank Jarm

Project/Client # 241-AW- 102AW Batch or Case # 102-AW RISER 22-A

Cooler ID (if noted on outside of cooler) TF-5 Seal # 4212

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - ____ tape
   - X custody seals
   - NO appropriate sample labels
   - ____ hazard labels
   - Sample & paperwork do not agree
9. Samples are:
   - ____ in good condition
   - ____ leaking
   - ____ broken
   - ____ have air bubbles
   - ____ other
10. Samples received at N/A °C. Coolant type N/A
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) Yes -
    Request for Analysis #(s) ____
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [X] No [ ]
13. Memos have been initiated for all anomalies identified above? Yes [X] attached

Printed Name/Signature VIDA JOHANSEN Date/Time 6/10/91 1530

Page 1 of 2

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	B.C. Wyer	Date 6-12-91		Time	0930
Sample Locations	241-AW, Tank 102-AW, Riser # 22A				
Remarks	Seal #4215				
Ice Chest ~~or Sample Pig~~ No.	TF-1	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW61191-3	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: BC Wyer	Received by: [illegible]	Date/Time: 6-12-91 / 1310
Relinquished by: [illegible]	Received by: Veda Johansen	Date/Time: 6.12.91 / 1410
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

(1 Per Shipping Container)
WHC-SD-WM-DP-025
Addendum 4 Rev 0

Date/Time Received 6/12/91 1400 Client Name tank farm

2AW61191-3

Project/Client # 241-102-AW Batch or Case # RISER 22A

Cooler ID (if noted on outside of cooler) TF-1

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [✓] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ___ clips (in cans)
   - X custody seals
   - ___ hazard labels
   - ___ tape
   - X appropriate sample labels
9. Samples are:
   - ___ in good condition
   - ___ broken
   - ___ other
   - ___ leaking
   - ___ have air bubbles
10. Samples received at N/A °C. Coolant type ___
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) yes
    Request for Analysis #(s) yes
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ]

Printed Name/Signature Vida Johansen / Vida Johansen Date/Time 6/12/91 1445

Page 1 of 2

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WHC-SD-WM-DP-025
Addendum 4 Rev 0

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CL Gearney	Date	6-5-91	Time	1545
Sample Locations	241-AW - TANK 102-AW RISER # 22A				
Remarks	N/A				
Ice Chest or Sample Pig No.	B-1B ~~2AW52291-1~~ Bewyer	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-1	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: Chris Winkler CL Wk	Received by: John J Uroic	Date/Time: 6-7-91/0115
Relinquished by: John J Uroic	Received by: J.A. Duri	Date/Time: 6/7/91 0215
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship # R9227

Document No.	Rev/Mod	Page
TO-080-030	C-1	15

Date/Time Received 6-7-91 / 0210 hrs Client Name C.C. Pitkoff

Project/Client # 241-AW-TANK Batch or Case # 102-AW RISER #22A
Company Contact: C.C. Pitkoff Sample No. 2AW52291-1

Cooler ID (if noted on outside of cooler) PIG B-18

1. Condition of shipping container? Good
2. Custody Seals on ~~cooler~~ Pig intact? Yes [ ] No [ ] none
3. Custody Seals dated and signed? Yes [ ] No [ ] none
4. Chain of Custody record is ~~taped on inside of cooler lid~~? hand carried Yes [✓] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - NA clips (in cans)
   - NA tape
   - NO custody seals
   - ✓ appropriate sample labels
   - ✓ hazard labels
9. Samples are:
   - ✓ in good condition
   - NO leaking
   - NA broken
   - NA have air bubbles
   - NA other
10. Samples received at NA °C. Coolant type NA
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) C of C present
    Request for Analysis #(s) yes
    Airbill # NA Carrier Truck
12. Have any anomalies been identified above? Yes [ ] No [✓]
13. Memos have been initiated for all anomalies identified above? Yes [NA]

Printed Name/Signature DOT HONAKER / Dot Honaker Date/Time 6-7-91
for J.A. Zuerin

Page 1 of 2

TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CL Kenney	Date 6-5-91		Time	1545
Sample Locations	241-AW - TANK 102-AW RISER # 22A				
Remarks	N/A				
Ice Chest or Sample Pig No.	B-1B ~~2AW52291-1~~ Bewyer	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-1	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: Chris Winkler CL Wk	Received by: John J Uroic	Date/Time: 6-7-91/0115
Relinquished by: John J Uroic	Received by: J.A. Dwin	Date/Time: 6/7/91 0215
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship# 9277
RyB 7/11/91

Document No.	Rev/Mod	Page
TO-080-030	C-1	15

SAMPLE CHECK-IN LIST

SAMPLE NUMBER MATRIX

WHC-SD-WM-DP-025
Addendum 4 Rev 0

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
R 9227 DLB 7/11/91	2AW 52291-1 DLB 7/11/91		

1372, 9402, 9409, 9416
9422, 9423

LABORATORY ID	Date Sampled	Time Sampled

Sample Site or Sampling ID	Date Received at 222-S	Time Received at 222-S
AW52291-2 (R9229) 102-AW	6/13/91	1315

Received by (Signature)	RPT Release (Signature)	Dose Rate
[signature]	J. Valdez	200 mRAD/hr

Custodian (Signature)	Date Analysis Complete	Disposal Date
Vida Johansen		

Comments

Stored in QB ref. #1, 2, 3

Scroll No.	Tech/Receiver (Signature)	Date	Entry Code	Comments
	INORGANIC 1	R9395		
	2	R9402		
	3	R9409		
	4	R9416		
	SVOA 1	R9423		
	2	R		
	VOA 1	~~R9423~~		
	2	R9422		

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BD-6000-347 (10/89)

000595

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC-SD-WM-DP-025
Addendum 4 Rev 0

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
R 9229	2AW52291-2		yes
INORGANIC 1	R9395		
2	9402		
3	9409		
4	9416		
SEMI VOA			
1 and 2	R 9423		
VOA			
1 and	R9422		

Page 2 of 2

9 3 1 2 3 3 3 9 5 0

(1 Per Shipping Container)
WHC-SD-WM-DP-025
Addendum 4 Rev 0

242-A Evaporator

Date/Time Received 6/10/91 Client Name Hand Farm

Project/Client # 241-AW -102AW Batch or Case # Riser 22-A 102-AW

Cooler ID (if noted on outside of cooler) G Seal 4210

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ___ clips (in cans)
   - X custody seals
   - ___ hazard labels
   - ___ tape
   - X appropriate sample labels
9. Samples are:
   - ___ in good condition
   - ___ broken
   - ___ other
   - ___ leaking
   - ___ have air bubbles
10. Samples received at N/A °C. Coolant type ___
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) Yes —
    Request for Analysis #(s) —
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ]

Printed Name/Signature Vida Johansen Vida Johansen Date/Time 6/10/91 1530

Page 1 of 2

9 3 1 2 1 3 1 9 5 2

TANK FARM PLANT OPERATING PROCEDURE

WHC-SD-WM-DP-025
Addendum 4 Rev 0

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CKearney	Date 6-5-91		Time	1615
Sample Locations	241-AW - TANK 102-AW, RISER # 22-A				
Remarks	N/A				
Ice Chest or Sample Pig No.	TF-5	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-4	FSS-T-630-00001, FD-A, Routine 2

* Sample in pig marked 2AW52291-3

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: T.L. Bacon	Date/Time: 6/10/91 / 1405
Relinquished by: Troy L. Bacon	Received by: Vida Johanson	Date/Time: 6/10/91 / 15:05
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship. # R9228

Per customer request:
Sample disposed of 6/11/91 1030

Document No.	Rev/Mod	Page
TO-080-030	C-1	15

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC-SD-WM-DP-025
Addendum 4 Rev 0

WHC ID NUMBER	SAMPLE LABEL NUMBER	C of C ~~PNL ID~~ NUMBER	AGREEMENT OF INFORMATION?
R 9228	2AW52291-3 VJ	2AW52291-4	NO —

Customer wants
Sample disposal —
Will resample
6/11/91
Johanson

Page 2 of 2

9 3 1 2 0 3 0 9 6 6

9397, 9404, 9411, 9418
R9426, 9427, LABORATORY ID

Date Sampled	Time Sampled

Sample Site or Sampling ID	Date Received at 222-S	Time Received at 222-S
2AW52291-4 (R 9372) 102AW	6/13/91	1315

Delivered by (Signature)	RPT Release (Signature)	Dose Rate
[signature]	[signature]	200 mrad/hr

Custodian (Signature)	Date Analysis Complete	Disposal Date
Vida Johansen		

Comments

Stored in ref. 1,2,3

Payroll No.	Tech/Receiver (Signature)	Date	Entry Code	Comments
	INORGANIC 1	R9397		
	2	R9404		
	3	R9411		
	4	R9418		
			R9427	
	SVOA 1		~~R9423~~	
	" 2			
	VOA 1		~~R9422~~	
	" 2		R9426	

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BD-6000-347 (10/89)

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC-SD-WM-DP-025
Addendum 4 Rev 0

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
R9372	2AW 61191-4		yes
INORGANIC 1	R9397		
2	9404		
3	9411		
4	9418		
SEMI VOA			
1 and 2	R 9427		
4			
VOA			
1 and 2	R 9426		

9 3 1 2 3 3 0 9 7 2

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SUMMARY DATA REPORT

Project: 242-A EVAPORATOR FEED CHARACTERIZATION
Tank: 102AW
Customer ID: 2291-1-4, 2291-2-4, 2291-3-4, 2291-4-4

Undigested Sample Results

	Sample R9415		Sample Duplicate R9415	
Am 241	INSUFFICIENT SAMPLE		INSUFFICIENT SAMPLE	
GEA (Cs 137)	1.46E+4	uCi/L	1.49E+4	uCi/L
Eu 154	<1.75E1	uCi/L	<2.26E1	uCi/L
Eu 155	<3.82E1	uCi/L	<3.79E1	uCi/L
Sn 113	<2.73E1	uCi/L	<2.99E1	uCi/L
Cs 134	1.74E2	uCi/L	1.73E2	uCi/L
Ru 103	<2.14E1	uCi/L	<2.32E1	uCi/L
RuRh 106	<2.81E2	uCi/L	5.34E2	uCi/L
Co 60	<6.77	uCi/L	<6.41	uCi/L
Nb 94	<5.49	uCi/L	<5.70	uCi/L
CePr 144	<1.57E2	uCi/L	<1.60E2	uCi/L
Ra 226	<3.16E2	uCi/L	<3.13E2	uCi/L
Pu 239/240	7.78E-2	uCi/L	NA	
Sr 90 (08-22-91)	NA		NA	
Sr 90 (10-08-91)	10.31	uCi/L	9.41	uCi/L
Total Beta	1.44E+4	uCi/L	1.47E+4	uCi/L
Total Alpha	<1.44	uCi/L	<2.08	uCi/L
H3	5.88	uCi/L	NA	
U	4.49E-3	g/L	NA	

9 3 1 2 8 3 0 9 7 4

	Sample R9417		Sample Duplicate R9417	
Ru 103	<1.15E1	uCi/L	NA	
RuRh 106	4.78E2	uCi/L	NA	
Co 60	<2.57	uCi/L	NA	
Nb 94	<2.97	uCi/L	NA	
CePr 144	<7.67E1	uCi/L	NA	
Ra 226	3.07E2	uCi/L	NA	
Pu 239/240	1.29	uCi/L	NA	
Sr 90 (10-08-91)	10.31	uCi/L	9.41	uCi/L
Total Beta	1.47E+4	uCi/L	NA	
Total Alpha	<2.16	uCi/L	NA	
H3	5.56	uCi/L	5.83	uCi/L
U	4.62E-3	g/L	4.26E-3	g/L

	Sample R9418		Sample Duplicate R9418
Am 241	INSUFFICIENT SAMPLE		INSUFFICIENT SAMPLE
GEA (Cs 137)	1.51E+4	uCi/L	NA
Eu 154	<3.69E+1	uCi/L	NA
Eu 155	<7.10E1	uCi/L	NA
Sn 113	<3.95E1	uCi/L	NA
Cs 134	1.62E2	uCi/L	NA
Ru 103	<2.93E1	uCi/L	NA
RuRh 106	<4.33E2	uCi/L	NA
Co 60	<8.19	uCi/L	NA
Nb 94	<7.55	uCi/L	NA
CePr 144	<2.30E2	uCi/L	NA
Ra 226	<4.12E2	uCi/L	NA

UNDIGESTED SAMPLE ANALYSIS RESULTS

9 3 1 2 1 3 1 9 7 8

Tank: 102AW
Core: NA
Sample No.: R9415
Customer ID: 2291-1-4

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
CePr 144					<1.57E2	uCi/L	<1.60E2	uCi/L				
Ra 226					<3.16E2	uCi/L	<3.13E2	uCi/L				
Lab ID:	R9413		R9414		R9415		NA		NA		R9419	
Pu 239/40 (07-16-91)	109.95	%	<7.64E-3	uCi/L	7.78E-2	uCi/L					111.4	%
Lab ID:	R9413		R9414		R9415-5786		R9415-5886		NA		R9419	
Sr 90 (10-08-91)	99.9	%	<3.28E-3	uCi/L	10.31	uCi/L	9.41	uCi/L			92.9	%
Lab ID:	R9413		R9414		R9415-5720		R9415-5820		NA		R9419	
Total Beta (06-20-91)	99	%	9.58E-3	uCi/L	1.44E+4	uCi/L	1.47E+4	uCi/L			102.4	%
Lab ID:	R9413		R9414		R9415-5725		R9415-5825		NA		R9419	
Total Alpha (06-20-91)	110.54	%	<9.23E-4	uCi/L	<1.44	uCi/L	<2.08	uCi/L			97.8	%
Lab ID:	R9413		R9414		R9415		NA		NA		R9419	
H3 (10-04-91)	69.51	%	6.31E-1	uCi/L	5.88	uCi/L					101.72	%
Lab ID:	R9413		R9414		R9415		NA		NA		R9419	
Uranium (10-08-91)	97.8	%	<3.99E-7	g/L	4.49E-3	g/L					97.8	%

Tank: 102AW
Core: NA
Sample No.: R9416
Customer ID: 2291-2-4

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
CePr 144					<1.53E+2	uCi/L						
Ra 226					<3.15E+2	uCi/L						
Lab ID:	R9413		R9414		R9416-5781		R9416-5881		NA		R9419	
Pu 239/40 (07-16-91)	109.95	%	<7.64E-3	uCi/L	3.69E-2	uCi/L	3.67E-2	uCi/L			111.4	%
Lab ID:	R9413		R9414		NA		NA		NA		R9419	
Sr 90 (08-22-91)	96.5	%	<3.49E-3	uCi/L							90.3	%
Lab ID:	R9413		R9414		R9416		NA		NA		R9419	
Sr 90 (10-08-91)	99.9	%	<3.28E-3	uCi/L	8.10	uCi/L					92.9	%
Lab ID:	R9413		R9414		R9416		NA		R9416		R9419	
Total Beta (06-21-91)	99	%	9.58E-3	uCi/L	1.32E+4	uCi/L			97.1	%	102.4	%
Lab ID:	R9413		R9414		R9416		NA		R9416		R9419	
Total Alpha (06-20-91)	110.54	%	<9.23E-4	uCi/L	1.68	uCi/L			94.8	%	97.8	%
Lab ID:	R9413		R9414		R9416		NA		NA		R9419	
H3 (10-04-91)	69.51	%	6.31E-1	uCi/L	5.65	uCi/L					101.72	%
Lab ID:	R9413		R9414		R9416		NA		NA		R9419	
Uranium (10-08-91)	97.8	%	<3.99E-7	g/L	1.88E-3	g/L					97.8	%

Tank: 102AW
Core: NA
Sample No.: R9417
Customer ID: 2291-3-4

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
CePr 144					<7.67E+1	uCi/L						
Ra 226					3.07E+2	uCi/L						
Lab ID:	R9413		R9414		R9417		NA		NA		R9419	
Pu 239/40 (07-16-91)	109.95	%	<7.64E-3	uCi/L	1.29	uCi/L					111.4	%
Lab ID:	R9413		R9414		R9417-5786		R9417-5886		NA		R9419	
Sr 90 (08-22-91)	96.5	%	<3.49E-3	uCi/L	2.01E+1	uCi/L	2.50E+1	uCi/L			90.3	%
Lab ID:	R9413		R9414		NA		NA		NA		R9419	
Sr 90 (10-08-91)	99.9	%	<3.28E-3	uCi/L		uCi/L					92.9	%
Lab ID:	R9413		R9414		R9417		NA		NA		R9419	
Total Beta (06-21-91)	99	%	9.58E-3	uCi/L	1.47E+4	uCi/L					102.4	%
Lab ID:	R9413		R9414		R9417		NA		NA		R9419	
Total Alpha (06-20-91)	110.54	%	<9.23E-4	uCi/L	<2.16	uCi/L					97.8	%
Lab ID:	R9413		R9414		R9417-5787		R9417-5887		NA		R9419	
H3 (10-04-91)	69.51	%	6.31E-1	uCi/L	5.56	uCi/L	5.83	uCi/L			101.72	%
Lab ID:	R9413		R9414		R9417-5740		R9417-5840		NA		R9419	
Uranium (10-08-91)	97.8	%	<3.99E-7	g/L	4.62E-3	g/L	4.26E-3	g/L			97.8	%

Tank: 102AW
Core: NA
Sample No.: R9418
Customer ID: 2291-4-4

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
CePr 144					<2.30E+2	uCi/L						
Ra 226					<4.12E+2	uCi/L						
Lab ID:	R9413		R9414		R9418		NA		NA		R9419	
Pu 239/40 (07-16-91)	109.95	%	<7.64E-3	uCi/L	4.03E-2	uCi/L					111.4	%
Lab ID:	R9413		R9414		R9418		NA		NA		R9419	
Sr 90 (08-22-91)	96.5	%	<3.49E-3	uCi/L	1.53E+2	uCi/L					90.3	%
Lab ID:	R9413		R9414		NA		NA		NA		R9419	
Sr 90 (10-08-91)	99.9	%	<3.28E-3	uCi/L							92.9	%
Lab ID:	R9413		R9414		R9418		NA		NA		R9419	
Total Beta (06-21-91)	99	%	9.58E-3	uCi/L	2.02E+4	uCi/L					102.4	%
Lab ID:	R9413		R9414		R9418		NA		NA		R9419	
Total Alpha (06-20-91)	110.54	%	<9.23E-4	uCi/L	<2.16	uCi/L					97.8	%
Lab ID:	R9413		R9414		R9418-5787		NA		R9418-5987		R9419	
H3 (10-04-91)	69.51	%	6.31E-1	uCi/L	5.64	uCi/L			107.7	%	101.72	%
Lab ID:	R9413		R9414		R9418-5740		NA		R9418-5940		R9419	
Uranium (10-08-91)	97.8	%	<3.99E-7	g/L	3.87E-3	g/L			79.1	%	97.8	%

VISUAL CHECK AND OVER-THE-TOP READING ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
Addendum 4 Rev 0

Serial No	Sample Point	Date	Time Issued	Priority
R 9394.-5000	102AW	6-14-91	10:41	26

Determination	Method/Standard	Result Units	Charge Code	Retests
APPEAR	LA-519-151		WIRED	0

Sample Size	Customer ID
?	2291-1-1

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
some solids settled
on bottom of vial

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS59				
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/14/91	Time Completed			

Serial No	Sample Point	Date	Time Issued	Priority
R 9415.-5000	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Retests
APPEAR	LA-519-151		WIRED	0

Sample Size	Customer ID
?	2291-2-4

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
small amount of solids
settled on vial bottom

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS59				
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/14/91	Time Completed			

Serial No	Sample Point	Date	Time Issued	Priority
R 9416.-5000	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Retests
APPEAR	LA-519-151		WIRED	0

Sample Size	Customer ID
?	2291-2-4

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
no solids present

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS59				
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/14/91	Time Completed			

Serial No	Sample Point	Date	Time Issued	Priority
R 9417.-5000	102AW	6-14-91	13:10	26

Determination	Method/Standard	Result Units	Charge Code	Retests
APPEAR	LA-519-151		WIRED	0

Sample Size	Customer ID
?	2291-3-4

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
aqueous solution
light tint yellow
clarity-clear
solids settled on
bottom of vial

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS59				
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/14/91	Time Completed			

Serial No	Sample Point	Date	Time Issued	Priority
R 9418.-5000	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Retests
APPEAR	LA-519-151		WIRED	0

Sample Size	Customer ID
?	2291-4-4

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no organic solution
light tint yellow
aqueous solution
clarity-clear
solids-present

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS59				
Hrs	Hrs	Hrs	Hrs	Hrs
Date 6/14/91	Time Completed			

1+2

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5525	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	WIDEO	1

Sample Size: ? 10ml — Customer ID: BTD

Remarks, Calculations, Results:
5510 EV-CRD
STD# 18B49 RESULT 1.48E-2
STD VAL 1.33896 -2 %REC 110.5470

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]		[signature]	
Mary Frady				

Date: 6-20-91 — Time Completed: — Lab Unit Mgr: [signature] [signature]

14/2 R9413-5525 6-21 [initials]

758/10 — Alpha Calculation by MAX on 06-21-1991 at 06:28:07
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

745/10 — Mount # 1

758/10 - 0.4 = 1.4936E-02 uCi/L alpha

Mount # 2

745/10 - 0.4 = 1.4678E-02 uCi/L alpha

3+4

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5625	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCI/G	WIDEO	1

Sample Size: ? 1ml — Customer ID: REG. DL

Remarks, Calculations, Results:
COUNT AS uCI/L
USE 13,14,15 OR 16

<9.23E-4 uCi/L

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			
Mary Frady				

Date: 6-20-91 — Time Completed: — Lab Unit Mgr: [signature] [signature]

14/2 R9414-5625 6-21 [initials]

3/10 -.4 — Alpha Calculation by MAX on 06-21-1991 at 06:27:38
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 1 mL Dilution : 1

1/10 — Mount # 1

3/10 - 0.4 < 9.2309E-04 uCi/L alpha

Mount # 2

1/10 - 0.4 < 9.2309E-04 uCi/L alpha

5+6

Serial No.	Sample Point	Date	Time Issued	Priority
R 9415.-5725	102AW	6-14-91	13:14	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCI/G	WIDEO	1

Sample Size: ? .100 -10 -.250 — Customer ID: 2291-1-4

Remarks, Calculations, Results:
COUNT AS uCI/L
USE 13,14,15 OR 16

<1.44 uCi/L

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			
Mary Frady				

Date: 6-20-91 — Time Completed: — Lab Unit Mgr: [signature] [signature]

14/2 R9415-5725 6-21 [initials]

24/10 -.4 — Alpha Calculation by MAX on 06-21-1991 at 06:27:11
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .25 mL Dilution : 101

20/10 — Mount # 1

24/10 - 0.4 = 1.6005E+00 uCi/L alpha

Mount # 2

20/10 - 0.4 = 1.2804E+00 uCi/L alpha

1.44

9312 3 0990

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
Addendum 4 Rev 0

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5520	102AW	6-14-91	13:18	26

Determination	Method/Standard	Result Units	Charge Code	Return
TB	LA-508-101	% RECOVERY	WIDEO	1

Sample Size: ? 10ml
Customer ID: STD

RERUN

Remarks, Calculations, Results:
5516 EV-CRD
STDW 18B49 RESULT 1.341E-1 uci/ml
STD VAL 235406-1 %REC 99.070

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	S Schroer			
Mary Frady				

Date: 6-21-91 Time Completed: [signature] [signature]

1812 R9413-5520

9643/10 -6

Beta Calculation by SZC on 06-21-1991 at 14:22:48
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9643/10 - 6.0 = 1.3699E-01 uCi/L beta

9242/10 -6

Mount # 2

9242/10 - 6.0 = 1.3126E-01 uCi/L beta

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5620	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Return
TB	LA-508-101	uCi/G	WIDEO	1

Sample Size: ? 1ml
Customer ID: REG. BL

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

RERUN

9.58E-3 uci/ml

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	S Schroer			
Mary Frady				

Date: 6-21-91 Time Completed: [signature] [signature]

1812 R9414-5620

104/10 -6

Beta Calculation by SZC on 06-21-1991 at 15:00:28
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 1

Mount # 1

104/10 - 6.0 = 6.2900E-03 uCi/L beta

150/10 -6

Mount # 2

150/10 - 6.0 = 1.2866E-02 uCi/L beta

Serial No.	Sample Point	Date	Time Issued	Priority
R 9415.-5720	102AW	6-14-91	13:14	26

Determination	Method/Standard	Result Units	Charge Code	Return
TB	LA-508-101	uCi/G	WIDEO	1

Sample Size: ? .100-10-.200-10-.500
Customer ID: 2291-1-4

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

RERUN

1.44E4 uci/ml

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	S Schroer			
Mary Frady				

Date: 6-21-91 Time Completed: [signature] [signature]

1812 R9415-5720

9848/10 -

Beta Calculation by SZC on 06-21-1991 at 15:39:28
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 10302

Mount # 1

9848/10 - 6.0 = 1.4415E+04 uCi/L beta

9784/10

Mount # 2

9784/10 - 6.0 = 1.4321E+04 uCi/L beta

9312831992

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9415	Customer ID: 2291-1-4
Analysis: GEA	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-548-121/D-0
Technologist: C. JOHNSON	Date: 7-31-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5530	11		
2	REAGENT BLANK	R9414-5630	12		
3	SAMPLE 2291-1-4	R9415-5730	13		
4	SAM DUP OF 2291-1-4	R9415-5830	14		
5	FINAL LMCS CHECK STD	R9419-5530	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	141B46/0.5 mL			N/A

A-6000-881 (03/92)

9 3 1 2 1 3 0 9 9 4

BEST AVAILABLE COPY

BEST AVAILABLE COPY

ZR-95	LLD<2.32E+00	LLD<2.32E+00	756.28
ZR-97	LLD<1.29E+00	LLD<1.29E+00	743.38
TOTAL	4.18E+02 +-9.07E+00	4.18E+02 +-9.07E+00	

STANDARD DEVIATION = 0.03

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.20E-09 UC/LI
TOTAL MEASURED ACTIVITY = 4.18E+02 (+-9.07E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 80.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.24	563.09	446.	13.1	1.98E+01
1139.41	569.17	845.	10.7	3.79E+01
1604.58	801.74	364.	12.6	2.21E+01
2731.06	1365.04	99.	22.5	9.26E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC

BEST AVAILABLE COPY

9 5 1 2 3 3 1 0 9 2

BEST AVAILABLE COPY

9 3 1 2 8 3 1 0 0 4

BEST AVAILABLE COPY

9312310025

BEST AVAILABLE COPY

9 3 1 2 3 3 1 0 9 8

BEST AVAILABLE COPY

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

01-AUG-9100:59:32

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

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

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

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

SAMPLE DESCRIPTION: R9415-5830
GEOMETRY DESCRIPTION: 22ML LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 4.9505E-03
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 1-AUG-91 AT 00:09:23

COLLECT LIVE TIME: 3003. SECONDS
REAL TIME: 3003. SECONDS
DEAD TIME: 00.00 %

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

ENERGY CALIBRATION PERFORMED 28-JUN-91
EFFICIENCY CALIBRATION PERFORMED 23-MAY-91

01-AUG-9100:59:32

SAMPLE: R9415-5830
COLLECTED ON 1-AUG-91 AT 00:09:23
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<2.33E+01		LLD<2.33E+01		911.07	
AC-228A	LLD<2.33E+01		LLD<2.33E+01		911.10	
AC-228B	LLD<1.29E+02		LLD<1.29E+02		338.40	
AG-108M	LLD<2.31E+01		LLD<2.31E+01		433.94	
AG-110M	LLD<2.15E+02		LLD<2.15E+02		657.76	
AM-241	LLD<9.29E+01		LLD<9.29E+01		59.54	
AM-243	LLD<2.74E+01		LLD<2.74E+01		74.67	
AM-243A	LLD<2.74E+01		LLD<2.74E+01		74.67	
AM-243B	LLD<2.98E+03		LLD<2.98E+03		43.10	
AR-41	LLD<7.82E+00		LLD<7.82E+00		1293.64	
AU-198	LLD<2.04E+01		LLD<2.04E+01		411.80	
BA-133	LLD<2.64E+01		LLD<2.64E+01		356.02	
BA-139	LLD<4.78E+01		LLD<4.78E+01		165.85	
BA-140	LLD<6.82E+01		LLD<6.82E+01		537.27	
BA-141	LLD<5.42E+01		LLD<5.42E+01		190.23	
BE-7	LLD<2.36E+02		LLD<2.36E+02		477.59	
BI-207	LLD<1.32E+01		LLD<1.32E+01		569.70	
2	LLD<5.02E+01		LLD<5.02E+01		727.27	
BI-214	LLD<4.41E+01		LLD<4.41E+01		609.32	
BI-214A	LLD<4.41E+01		LLD<4.41E+01		609.32	
BI-214B	LLD<3.49E+01		LLD<3.49E+01		1120.28	
BI-214C	LLD<4.11E+01		LLD<4.11E+01		1764.51	
CD-109	LLD<3.45E+02		LLD<3.45E+02		88.03	
CE-139	LLD<1.09E+01		LLD<1.09E+01		165.85	
CE-141	LLD<1.81E+01		LLD<1.81E+01		145.44	
CEPR144	LLD<1.60E+02		LLD<1.60E+02		133.51	
CO-56	LLD<6.19E+00		LLD<6.19E+00		846.76	
CO-57	LLD<1.02E+01		LLD<1.02E+01		122.06	
CO-58	LLD<4.86E+00		LLD<4.86E+00		810.75	
CO-60	LLD<6.41E+00		LLD<6.41E+00		1332.50	
CR-51	LLD<1.34E+02		LLD<1.34E+02		320.09	
CS-134	1.73E+02	+-1.71E+01	1.73E+02	+-1.71E+01	795.84	-0.27
					604.70	-0.26
CS-136	LLD<5.73E+00		LLD<5.73E+00		818.51	
CS-137	1.49E+04	+-2.27E+02	1.49E+04	+-2.27E+02	661.65	-0.29
CS-138	LLD<1.54E+01		LLD<1.54E+01		1435.86	
EU-152	LLD<2.20E+01		LLD<2.20E+01		1408.01	
EU-154	LLD<2.26E+01		LLD<2.26E+01		1274.45	
EU-155	LLD<3.79E+01		LLD<3.79E+01		105.31	
FE-59	LLD<1.13E+01		LLD<1.13E+01		1099.25	
HF-181	LLD<2.78E+01		LLD<2.78E+01		482.20	
HG-203	LLD<1.69E+01		LLD<1.69E+01		279.20	
I-	LLD<2.06E+01		LLD<2.06E+01		364.48	
	LLD<8.83E+00		LLD<8.83E+00		667.69	
I-133	LLD<2.03E+01		LLD<2.03E+01		529.69	
I-134	LLD<8.87E+00		LLD<8.87E+00		847.03	
I-135	LLD<2.34E+01		LLD<2.34E+01		1260.41	

W-187	LLD<2.18E+01	LLD<2.18E+01	685.74
XE-131M	LLD<5.12E+02	LLD<5.12E+02	163.98
XE-133	LLD<3.59E+01	LLD<3.59E+01	81.00
XE-133M	LLD<1.19E+02	LLD<1.19E+02	233.21
[illegible]35	LLD<1.53E+01	LLD<1.53E+01	249.79
X[illegible]38	LLD<1.17E+02	LLD<1.17E+02	258.41
Y-88	LLD<6.00E+00	LLD<6.00E+00	1836.06
Y-91	LLD<2.64E+03	LLD<2.64E+03	1204.90
Y-91M	LLD<2.03E+01	LLD<2.03E+01	555.60
ZN-65	LLD<2.19E+01	LLD<2.19E+01	1115.55
ZR-95	LLD<9.38E+00	LLD<9.38E+00	756.73
ZR-97	LLD<7.29E+00	LLD<7.29E+00	743.33
TOTAL	1.56E+04 +-3.50E+02	1.56E+04 +-3.50E+02	

STANDARD DEVIATION = 0.15

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 4.75E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.56E+04 (+-3.50E+02) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1024.17	511.56	237.	36.0	9.65E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2921.95	1460.51	166.	15.8	1.64E+01

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 04:14:13

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

WHC-SD-WM-DP-025
Addendum 4 Rev 0

	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	55.12	27.67	1.16	1703.	930.	14.2	SB/TE-X
2	951.50	475.54	1.61	2949.	501.	33.9	CS-134
3C	1127.41	563.46	1.48	2132.	2450.	7.2	CS-134, EU-152
4C	1139.56	569.54	1.48	2150.	4459.	5.5	CS-134, BI-207
5	1210.31	604.90	1.59	2237.	28183.	1.3	CS-134
6	1324.13	661.80	1.61	1495.	24331.	1.4	CS-137
6B		661.38			251.	9.7	
7?	1592.44	795.94	1.68	1133.	20598.	2.1	CS-134
8?	1604.68	802.06	1.68	1078.	1879.	15.3	CS-134
9?	2336.04	1167.82	1.84	641.	350.	88.3	CS-134
10?	2346.79	1173.19	1.84	591.	14512.	2.8	CO-60
11	2664.84	1332.30	2.44	191.	13049.	1.8	CO-60
12	2730.27	1365.04	2.19	131.	487.	12.2	CS-134
13C	2799.41	1399.64	1.48	53.	131.	22.2	I-132
14C	2802.59	1401.23	1.48	58.	121.	22.9	BI-214
15	2921.09	1460.53	2.60	56.	771.	7.9	K-40
15B		1460.72			581.	4.7	

ERROR QUOTATION AT 1.96 SIGMA
CONFIDENCE LEVEL AT 85.0%

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

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 11-DEC-90 AT 10:00:00
BACKGROUND LIVE TIME: 11292. SECONDS

I-135	LLD<2.02E-01		LLD<2.02E-01	1260.41	
K-40	1.82E+00	+-6.35E-01	1.82E+00 +-6.35E-01	1460.75	-0.22
KR-85	LLD<1.61E+01		LLD<1.61E+01	513.99	
KR-85M	LLD<3.83E-02		LLD<3.83E-02	151.17	
[illegible]7	LLD<1.64E-01		LLD<1.64E-01	402.58	
K[illegible]9	LLD<2.27E+00		LLD<2.27E+00	220.90	
LA-140	LLD<4.29E-02		LLD<4.29E-02	1596.20	
LA-142	LLD<1.57E-01		LLD<1.57E-01	641.83	
MN-54	LLD<7.23E-02		LLD<7.23E-02	834.83	
MN-56	LLD<8.47E-02		LLD<8.47E-02	846.76	
NA-22	LLD<4.78E-02		LLD<4.78E-02	1274.55	
NA-24	LLD<3.85E-02		LLD<3.85E-02	1368.60	
NB-94	LLD<6.46E-02		LLD<6.46E-02	702.63	
NB-95	LLD<6.89E-02		LLD<6.89E-02	765.78	
NB-97	LLD<3.86E-01		LLD<3.86E-01	657.92	
NP-237	LLD<2.79E-01		LLD<2.79E-01	86.50	
NP-238	LLD<3.41E-01		LLD<3.41E-01	984.45	
NP-239	LLD<3.15E-01		LLD<3.15E-01	277.60	
PA-233	LLD<1.36E-01		LLD<1.36E-01	311.98	
PA-234M	LLD<1.54E+01		LLD<1.54E+01	1001.03	
PB-210	LLD<6.23E+00		LLD<6.23E+00	46.50	
PB-212	LLD<1.02E-01		LLD<1.02E-01	239.00	
PB-212A	LLD<1.02E-01		LLD<1.02E-01	239.00	
PB-212B	LLD<1.48E+00		LLD<1.48E+00	300.10	
PB-214	LLD<1.48E-01		LLD<1.48E-01	351.92	
PB-214A	LLD<1.48E-01		LLD<1.48E-01	351.92	
PB-214B	LLD<2.49E-01		LLD<2.49E-01	295.21	
PO-210	LLD<6.21E+03		LLD<6.21E+03	804.00	
PO-214	LLD<2.25E+03		LLD<2.25E+03	799.70	
PO-216	LLD<3.97E+03		LLD<3.97E+03	804.90	
[illegible]9	LLD<4.14E+02		LLD<4.14E+02	129.30	
PU-241	LLD<1.44E+04		LLD<1.44E+04	148.57	
RA-224	LLD<1.07E+00		LLD<1.07E+00	240.99	
RA-226	LLD<9.53E-01		LLD<9.53E-01	186.10	
RB-88	LLD<4.30E-01		LLD<4.30E-01	1836.00	
RB-89	LLD<4.04E-01		LLD<4.04E-01	1031.88	
RN-220	LLD<5.91E+01		LLD<5.91E+01	549.73	
RU-103	LLD<7.04E-02		LLD<7.04E-02	497.08	
RURH106	LLD<1.36E+00		LLD<1.36E+00	621.80	
SB-124	LLD<1.68E-01		LLD<1.68E-01	602.72	
SB-125	LLD<4.53E-01		LLD<4.53E-01	176.33	
SC-46	LLD<9.86E-02		LLD<9.86E-02	1120.45	
SE-75	LLD<7.01E-02		LLD<7.01E-02	264.66	
SN-113	LLD<1.00E-01		LLD<1.00E-01	391.67	
SR-85	LLD<7.07E-02		LLD<7.07E-02	513.99	
SR-91	LLD<1.32E-01		LLD<1.32E-01	555.60	
SR-92	LLD<5.10E-02		LLD<5.10E-02	1383.94	
TA-182	LLD<2.80E-01		LLD<2.80E-01	1121.30	
TC-99M	LLD<3.11E-02		LLD<3.11E-02	140.51	
TE-123M	LLD<3.61E-02		LLD<3.61E-02	159.00	
TE-125M	LLD<9.91E+00		LLD<9.91E+00	109.27	
TE-132	LLD<4.40E-02		LLD<4.40E-02	228.16	
TH-228	LLD<3.27E+00		LLD<3.27E+00	84.37	
TH-234	LLD<6.13E-01		LLD<6.13E-01	92.50	
TH-234A	LLD<6.13E-01		LLD<6.13E-01	92.50	
TH-234B	LLD<2.16E+00		LLD<2.16E+00	63.30	
[illegible]8	LLD<9.11E-02		LLD<9.11E-02	583.14	
U-235	LLD<6.19E-02		LLD<6.19E-02	185.71	
U-235A	LLD<6.19E-02		LLD<6.19E-02	185.71	
U-235B	LLD<2.51E-01		LLD<2.51E-01	143.76	

SAMPLE STATUS REPORT FOR R 9415. 102AW 2291-1-4 TIME: 5/26/92 14:56
DISPATCHED: 6/14/91 13:16 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/14/91 13:30

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5000	APPEAR	CLEAR LIGHT YELLOW SOLIDS			W1BEO
5000	APPEAR	NO VISIBLE ORGANIC			W1BEO
5000	APPEAR	SMALL AMOUNT SETTLED SOLIDS			W1BEO
5720	TB	OUT FOR RERUN			W1BEO
5720	TB	1.44000E 04 uCI/L			W1BEO
5725	AT	OUT FOR RERUN			W1BEO
5725	AT	<1.44000E 00 uCI/L			W1BEO
5730	GEA	1.46000E 04 uCI/L Cs-137			W1BEO
5730	GEA	<3.82000E 01 uCI/L Eu-155			W1BEO
5730	GEA	<2.73000E 01 uCI/L Sn-113			W1BEO
5730	GEA	1.74000E 02 uCI/L Cs-134			W1BEO
5730	GEA	<2.14000E 01 uCI/L Ru-103			W1BEO
5730	GEA	< 2.81000E 02 uCI/L RuRh-106			W1BEO
5730	GEA	< 6.77000 uCI/L Co-60			W1BEO
5730	GEA	< 5.49000 UCI/L Nb-94			W1BEO
5730	GEA	< 1.57000E 02 uCI/L CePr-144			W1BEO
5730	GEA	< 3.16000E 02 uCI/L Ra-226			W1BEO
5740	U	OUT FOR RERUN			W1BEO
5740	U	OUT FOR RERUN			W1BEO
5740	U	INSUFFICIENT SAMPLE			W1BEO
5740	U	4.49000E-03 G/L			W1BEO
[illegible]1	PU239/40	OUT FOR RERUN			W1BEO
[illegible]1	PU239/40	7.78000E-02 uCI/L			W1BEO
5782	AM241	OUT FOR RERUN			W1BEO
5782	AM241	OUT FOR RERUN			W1BEO
5782	AM241	<2.3100E-02 uCI/L INSUF. SAMPLE RAN R9401 SPLIT			W1BEO
5786	SR90	OUT FOR RERUN			W1BEO
5786	SR90	OUT FOR RERUN			W1BEO
5786	SR90	1.03000E 01 uCI/L			W1BEO
5787	H3	OUT FOR RERUN			W1BEO
5787	H3	OUT FOR RERUN			W1BEO
5787	H3	5.88000E 00 uCI/L			W1BEO
5820	TB	1.47000E 04 uCI/L			W1BEO
5820	TB	1.47000E 04 uCI/L			W1BEO
5825	AT	<2.08000E 00 uCI/L			W1BEO
5825	AT	<2.08000E 00 uCI/L			W1BEO
5830	GEA	1.49000E 04 uCI/L Cs-137			W1BEO
5830	GEA	<3.79000E 01 uCI/L Eu-155			W1BEO
5830	GEA	<2.99000E 01 uCI/L Sn-113			W1BEO
5830	GEA	1.73000E 02 uCI/L Cs-134			W1BEO
5830	GEA	<2.32000E 01 uCI/L Ru-103			W1BEO
5830	GEA	5.34000E 02 uCI/L RuRh-106			W1BEO
5830	GEA	< 6.41000 uC/L Co-60			W1BEO
5830	GEA	< 5.70000 uCI/L Nb-94			W1BEO
5830	GEA	< 1.60000E 02 uCI/L CePr-144			W1BEO
5830	GEA	< 3.13000E 02 uCI/L Ra-226			W1BEO
[illegible]96	SR90	OUT FOR RERUN			W1TE2
[illegible]6	SR90	OUT FOR RERUN			W1TE2
[illegible]886	SR90	9.44000E 00 uCI/L			W1TE2

END OF REPORT

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5540	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Result	Charge Code	Results
U	LA-925-106	RERUN	WIBED	3

Sample Size: 100-10-100ml
Customer ID: STD

Remarks, Calculations, Results

S267 UF16 (1) (2)
STDN 85888 RESULT 3.07E-2 Sampl = .16 - .12
STD VAL 3.14E-2 REC 97.8% Sampl+Spk = .48 - .36
SPIKE ID/VAL 90838
SPIKE VOL. 100-10-100

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
EC269				
Initials	Initials	Initials	Initials	Initials
Date 10-8-91	Time Completed	Lab Use Only		

R9413-5540 -

$$\frac{[(.16)(.982)](.1)(6.25E^{-4})(1010)}{.48-[(.16)(.982)]} = 3.07E^{-2}\ g/l$$

$$\frac{(.12)(.982)(6.25E^{-4})(.1)(1010)}{.36-[(.982)(.12)]} = 3.07E^{-2}\ g/l$$

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5640	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result	Charge Code	Results
U	LA-925-106	RERUN	WIBED	3

Sample Size: ? 1 ml
Customer ID: REG. BL

Remarks, Calculations, Results

REAGENT BLANK

$$\frac{(<.02)(.985)(5.68E^{-5})(.1)(1)}{.30-[(.02)(.985)]} = < 3.99E^{-7}\ g/l$$

BLK = .01
Blk+Spk = .30
Spk Vol/Std = 6.68E-5/10.0 ml
Spk Vol = .100-10-100 ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
EC269				
Initials	Initials	Initials	Initials	Initials
Date 10-8-91	Time Completed	Lab Use Only		

Serial No	Sample Point	Date	Time Issued	Priority
R 9415.-5740	102AW	6-14-91	13:14	26

Determination	Method/Standard	Result	Charge Code	Results
U	LA-925-106	RERUN	WIBED	3

Sample Size: ? .100-10-.100 ml
Customer ID: 2291-1-4

Remarks, Calculations, Results

(1) - (2)
Sampl = .16 - .18
Sampl+Spk = .36 - .40
Spk Vol/Std = 9.0838/5.68E-5
Spk Vol = .100-10-.100 ml

4.49E-3 g/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
EC269				
Initials	Initials	Initials	Initials	Initials
Date 10-8-91	Time Completed	Lab Use Only		

R9415-5740.

$$\frac{(.16)(.982)(5.68E^{-5})(.1)(1010)}{.36-[(.16)(.982)]} = 4.44E^{-3}\ g/l$$

$$\frac{(.18)(.982)(5.68E^{-5})(.1)(1010)}{.40-[(.18)(.982)]} = 4.54E^{-3}$$

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9415	Customer ID: 2291-1-4
Analysis: PLUTONIUM 239/240	Sample Prep: UNDIGESTED

Instrument: WB57237	Procedure/Rev: LA-503-156/C-3
Technologist: M. BIERMAN	Date: 7-16-91
Starting Time: 08:00	Temperature: 25degC
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5581	11		
2	REAGENT BLANK	R9414-5681	12		
3	SAMPLE 2291-1-4	R9415-5781	13		
4	FINAL LMCS CHECK STD	R9419-5581	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	43B43/0.1 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

PLUTONIUM ANALYSIS - UNDIGESTED SAMPLE

H.V 6002

Serial No	Sample Point	Date	Time Issued	Priority
R 9419.-5581	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Returns
PU239/40	LA-503-156	% RECOVERY	W1BEO	1

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

Remarks, Calculations, Results

EDP R211 AR001
STD# 43B43 RESULT 1.004E²
STD VAL. 9.0N4E¹ %REC 111.4%
Pu236 (43B43) .050 ml
1 ml 8 M HNO3
99% train

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6559	[signature]			[signature]
Hrs	Hrs	Hrs	Hrs	Hrs
[signature]				[signature]

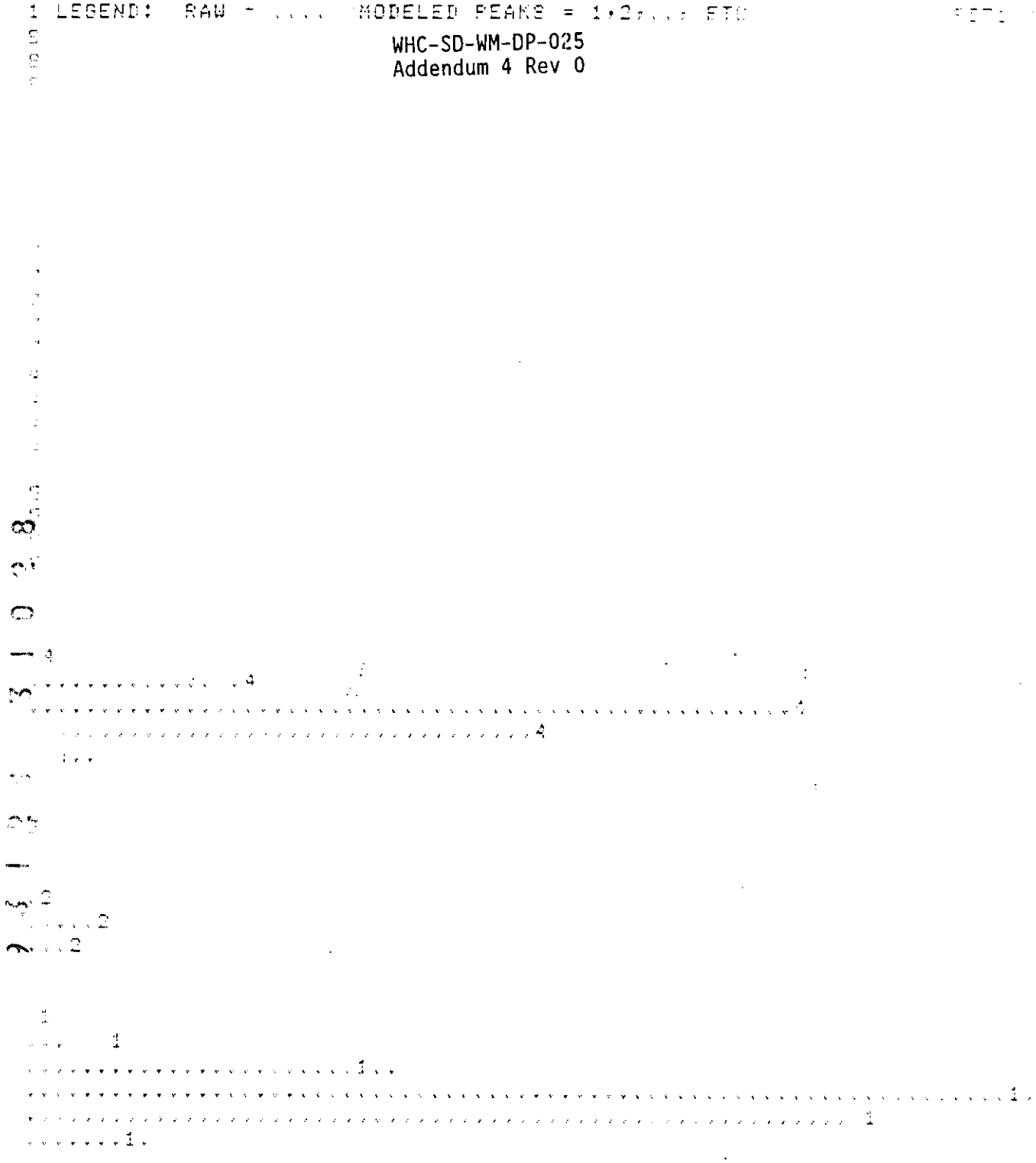
Date	Time Completed	Lab Unit Mgr	
7/16/91		[signature]	[signature]

#1 7-8-91 R9419-5581

1477
5 -10

$$\frac{(285.4)(2)(.5633)}{325.49} = 99\%$$

9 3 1 2 3 3 1 0 2 6



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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. 1.10

DATA REDUCTION REPORT

SAMPLE
R-9414-5681
File ID: SD3679.SPC

Counted on: 7/19/91 0 1[illegible]
Detector/Geometry number: 3, [illegible]
Count time: 30000. 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	1527.6	1617.7	364.921	364.921	20.000	13.777	10.000	7.371
2	50.8	49.0	305.971	305.971	24.000	14.941	12.000	6.99[illegible]
3	7.5	7.6	266.307	266.307	24.000	13.787	12.000	6.77[illegible]
4	4.1	3.2	263.227	233.227	20.000	13.220	10.000	0.957

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Pu238	0.9787	5.756	5.772	-0.016	0.07	30.85	156.32	0.704E-04
	Cm243		5.786	5.772	0.014				0.945E-04
2	Pu238	0.0309	5.499	5.489	0.010	0.07	0.99	6.84	0.308E-05
	Am241		5.480	5.489	-0.009				0.236E-05
3		0.0046		5.290		0.07	0.15	0.73	0.330E-06
4	Pu239	0.0059	5.143	5.139	0.004	0.06	0.19	0.94	0.423E-06
	Pu240		5.144	5.139	0.005				0.423E-06

DETECTOR CALIBRATION
Energy(MEV) 4.020 + (0.0048)*Channel
Energy range (MeV): 4.020 TO 6.477
Efficiency 0.2014 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	15951.0	100.000
Smoothed	15951.0	100.000
Composite fit	16090.7	100.87[illegible]
Residuals	-139.7	-0.87[illegible]

Analyzed by: _____
61453

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Raw Data Dump for AEA Spectrum: SP:SD3679.SPC

9 3 1 2 3 3 1 0 3 2

[illegible]	[illegible]	310.	379.	429.	481.	528.	421.	419.	757.	706.
[illegible]	[illegible]	891.	892.	905.	879.	521.	748.	707.	573.	480.
[illegible]	[illegible]	207.	177.	127.	22.	40.	28.	19.	14.	5.

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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. 1.10

DATA REDUCTION REPORT

SAMPLE
R9419-5581
File ID: SD6002.SPC

Counted on: 7/18/91 8131 0
Detector/Geometry number: 6/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	T Initial	T Final
1	3844.2	3946.6	364.776	364.776	20.000	10.579	10.000	[illegible]
2	324.7	334.3	306.748	306.748	20.000	11.165	10.000	[illegible]
3	250.3	49.2	268.828	268.828	12.000	3.780	6.000	[illegible]
4	2763.8	2764.6	234.003	234.003	20.000	10.618	10.000	[illegible]

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Pu239	0.5633	5.756	5.772	-0.016	0.05	71.64	0.01	0.506E-08
	Cm243		5.786	5.772	0.014				0.679E-08
2	Pu238	0.0511	5.499	5.499	0.000	0.05	6.50	0.00	0.621E-07
	Am241		5.480	5.499	-0.019				0.478E-09
3		0.0038		5.321		0.02	0.48	0.00	0.331E-10
4	Pu239	0.3819	5.143	5.157	-0.014	0.05	48.57	0.01	0.336E-08
	Pu240		5.144	5.157	-0.013				0.336E-08

DETECTOR CALIBRATION
Energy(MEV) = 4.057 + (0.0047)*Channel
Energy range (MeV): 4.057 TO 6.464
Efficiency ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	63420.0	100.000
Smoothed	63419.9	100.000
Composite fit	63592.4	100.272
Residuals	-172.4	-0.272

Analyzed by: _____
63099

BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: SP:SD6002.SPC

1	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]	[illegible]
11	1.	0.	0.	0.	1.	2.	0.	1.	[illegible]	[illegible]
21	1.	1.	1.	0.	0.	0.	0.	1.	[illegible]	[illegible]
31	0.	0.	3.	3.	2.	1.	0.	[illegible]	[illegible]	[illegible]
[illegible]	0.	1.	0.	1.	2.	0.	0.	[illegible]	[illegible]	[illegible]
[illegible]	1.	0.	1.	0.	2.	0.	0.	1.	1.	[illegible]
[illegible]	1.	1.	2.	0.	2.	0.	1.	1.	0.	[illegible]
71	2.	0.	1.	4.	0.	0.	1.	2.	2.	[illegible]
81	0.	0.	1.	0.	1.	1.	0.	[illegible]	[illegible]	[illegible]
91	1.	2.	2.	0.	1.	0.	0.	1.	0.	[illegible]
101	1.	2.	2.	0.	0.	1.	0.	1.	0.	[illegible]
111	3.	4.	2.	2.	0.	2.	0.	1.	3.	1.
121	1.	2.	2.	1.	0.	2.	1.	0.	1.	[illegible]
131	1.	1.	0.	7.	0.	2.	2.	0.	4.	[illegible]
141	1.	2.	1.	0.	2.	1.	1.	1.	5.	3.
151	2.	1.	2.	3.	0.	4.	3.	4.	7.	[illegible]
161	2.	6.	1.	2.	4.	5.	2.	6.	4.	[illegible]
171	7.	6.	4.	3.	7.	6.	7.	6.	10.	3.
181	12.	10.	13.	9.	8.	9.	6.	12.	5.	7.
191	10.	10.	14.	7.	11.	11.	11.	15.	19.	[illegible]
201	22.	21.	19.	30.	25.	35.	37.	47.	45.	62.
211	81.	99.	111.	124.	156.	170.	229.	277.	325.	[illegible]
221	464.	536.	631.	727.	832.	891.	937.	1157.	1281.	[illegible]
231	[illegible]	[illegible]	1629.	[illegible]	[illegible]	1269.	1080.	862.	642.	[illegible]
241	280.	173.	108.	63.	26.	11.	5.	10.	7.	[illegible]
251	10.	9.	7.	9.	12.	10.	21.	9.	11.	[illegible]
261	8.	21.	20.	20.	23.	26.	21.	25.	25.	20.
271	24.	20.	11.	14.	9.	9.	8.	6.	9.	[illegible]
281	7.	12.	14.	14.	25.	27.	23.	26.	44.	26.
291	48.	70.	62.	62.	91.	93.	118.	122.	122.	137.
[illegible]	153.	166.	182.	162.	177.	185.	180.	184.	174.	128.
311	101.	74.	73.	48.	30.	20.	17.	9.	10.	7.
321	14.	14.	19.	15.	17.	21.	21.	22.	17.	21.
331	22.	20.	38.	29.	40.	49.	46.	60.	63.	[illegible]
341	100.	124.	143.	169.	213.	258.	328.	403.	448.	584.
351	692.	787.	924.	1020.	1209.	1294.	1440.	1602.	1584.	1831.
361	1925.	2113.	2192.	2337.	2227.	2036.	1797.	1521.	1232.	824.
371	568.	327.	202.	83.	43.	16.	6.	2.	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.	0.	1.	0.	0.	0.	1.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	2.	1.	0.	0.	0.
431	0.	0.	0.	0.	1.	0.	2.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
461	0.	1.	0.	1.	0.	0.	0.	0.	0.	1.
471	1.	0.	0.	0.	0.	0.	0.	1.	1.	0.
481	1.	2.	1.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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STRONTIUM 90 ANALYSIS - UNDIGESTED SAMPLE

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5586	102AW	6-14-91	13:10	26

Determination	Method/Standard	Charge Code	Rerun
SR90	LA-220-101 RERUN RECOVERY	W1TE2	5

Sample Size: ? [illegible] Customer ID: STD

Remarks, Calculations, Results

COUNT ON DETECTOR#11 150B46
S376 ITS
STD# RESULT 7.70E-1
STD VAL 7.71E-1 %REC 99.9%
Sep Time: 18:55
Sep Date: 10-8-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
[illegible]				
6C916				

Date: 10-8-91 Time Completed: Lab Unit Mgr: [illegible]

11 2" 10-8-91 R 2310 R9413-5586 ΔT=4.25

6373/10 — 12

6520/10 —

Sr Calculation by DM on 10-09-1991 at 02:41:02
Det #11 2-inch mount Sr eff : .3919 Y eff : .4443

Sample size : 1 mL Dilution : 1 Method : 1

W1 : 8.0070 8.3112
Mount # 1 Decay time = 4.25 hrs

W2 : 6373/10 - 12.0 = 6.8387E-01 uCi/L strontium 8.4019 7.68E1
.890

Mount # 2 Decay time = 4.25 hrs 7.72E-1

6520/10 - 12.0 = 6.9995E-01 uCi/L strontium
.907

R9413-5586

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5686	102AW	6-14-91	13:13	26

Determination	Method/Standard	Charge Code	Rerun
SR90	LA-220-101 RERUN	W1TE2	5

Sample Size: ? [illegible] Customer ID: REG. BL

Remarks, Calculations, Results

REAGENT BLANK
COUNT AS uCI/L <3.28E3 uci/L
Sep Time: 18:55
Sep Date: 10-8-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
[illegible]				
6C916				

Date: 10-8-91 Time Completed: Lab Unit Mgr: [illegible]

12 2" 10-8-91 R 2310 ΔT=4.25

106/10 — 10 R9414-5686

125/10 —

Sr Calculation by DM on 10-09-1991 at 02:43:26
Det #12 2-inch mount Sr eff : .4233 Y eff : .4719

W1 Sample size : 1 mL Dilution : 1 Method : 1 8.1657 8.0549

Mount # 1 Decay time = 4.25 hrs 8.2574 8.1422

W2 106/10 - 10.0 = 3.0079E-03 uCi/L strontium
.917

Mount # 2 Decay time = 4.25 hrs

125/10 - 10.0 = 2.5334E-03 uCi/L strontium

.917 .873

R9414-5686

Serial No.	Sample Point	Date	Time Issued	Priority
R 9415.-5786	102AW	6-14-91	13:14	26

Determination	Method/Standard	Charge Code	Rerun
SR90	LA-220-101 RERUN	W1DEO	2

Sample Size: ? .050-1 uml-1 Customer ID: 2291-1-4

Remarks, Calculations, Results

COUNT AS uCI/L 2291-1-2
Sep. Time: 19:00 10.31 uci/L
Sep Date: 10-8-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
[illegible]				
6C916				

Date: 10-8-91 Time Completed: Lab Unit Mgr: [illegible]

10 2" 10-8-91 R 2310 ΔT=4.17

551/10 -16 R9415-5786

597/10 -

Sr Calculation by DM on 10-09-1991 at 02:37:28
Det #10 2-inch mount Sr eff : .3792 Y eff : .4213

W1 : Sample size : 1 mL Dilution : 201 Method : 1 8.2536

Mount # 1 Decay time = 4.17 hrs

W2 551/10 - 16.0 = 8.8994E+00 uCi/L strontium 8.4558 7.14609.80
.908

Mount # 2 Decay time = 4.17 hrs

597/10 - 16.0 = 9.9464E+00 uCi/L strontium 1.08E1
.924

.908 .924

R9415-5786

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9415	Customer ID: 2291-1-4
Analysis: TRITIUM	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-218-113/B-0
Technologist: V. MASSIE	Date: 10-04-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5587	11		
2	REAGENT BLANK	R9414-5687	12		
3	SAMPLE 2291-1-4	R9415-5787	13		
4	FINAL LMCS CHECK STD	R9419-5587	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	34B49/1.0 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

Serial No	Sample Point	Date	Time Issued	Priority
R 9419.-5587	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Control Code	Results
13	A-218 113	RECOVERY	WIPED	

Sample Size	Customer ID
1ml	STD

Remarks, Calculations, Results
FDP R907 ENVSTD
STD# 34849 RESULT 6.57E-1
STD VAL 6.4591E-1 %REC 101.7240

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Calvin H Manning 82016	69549			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Use Only
10-4-91		

R9419-5587
$\frac{(1459.220)(1000)}{(1)(2.22E6)}$ 2

9 3 1 2 9 3 1 0 4 6

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VISUAL CHECK AND OVER-THE-TOP READING ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
Addendum 4 Rev 0

Serial No	Sample Point	Date	Time Issued	Priority
R 9394.-5000	102AW	6-14-91	10:41	26

Determination	Method/Standard	Result Units	Charge Code	Returns
APPEAR	LA-519-151		W1HED	0

Sample Size: ?
Customer ID: 2291-1-1

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-U=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
some solids settled
on bottom of vial

Analyst-1: 6C559 | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Hrs | Hrs | Hrs | Hrs | Hrs
Date: 6/14/91 | Time Completed | Verified by

Serial No	Sample Point	Date	Time Issued	Priority
R 9415.-5000	102AW	6-14-91	13:10	26

Determination	Method/Standard	Result Units	Charge Code	Returns
APPEAR	LA-519-151		W1HED	0

Sample Size: ?
Customer ID: 2291-2-1

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-U=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
small amount of solids
settled on vial bottom

Analyst-1: 6C559 | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Hrs | Hrs | Hrs | Hrs | Hrs
Date: 6/14/91 | Time Completed | Verified by

Serial No	Sample Point	Date	Time Issued	Priority
R 9416.-5000	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Returns
APPEAR	LA-519-151		W1HED	0

Sample Size: ?
Customer ID: 2291-2-4

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-U=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
no solids present

Analyst-1: 6C559 | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Hrs | Hrs | Hrs | Hrs | Hrs
Date: 6/14/91 | Time Completed | Verified by

Serial No	Sample Point	Date	Time Issued	Priority
R 9417.-5000	102AW	6-14-91	13:30	26

Determination	Method/Standard	Result Units	Charge Code	Returns
APPEAR	LA-519-151		W1HED	0

Sample Size: ?
Customer ID: 2291-3-4

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-U=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
aqueous solution
light tint yellow
clarity-clear
solids settled on
bottom of vial

Analyst-1: 6C559 | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Hrs | Hrs | Hrs | Hrs | Hrs
Date: 6/14/91 | Time Completed | Verified by

Serial No	Sample Point	Date	Time Issued	Priority
R 9418.-5000	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Returns
APPEAR	LA-519-151		W1HED	0

Sample Size: ?
Customer ID: 2291-4-4

Remarks, Calculations, Results

A. JAR IDH
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-U=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no organic solution
light tint yellow
aqueous solution
clarity-clear
solids-present

Analyst-1: 6C559 | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Hrs | Hrs | Hrs | Hrs | Hrs
Date: 6/14/91 | Time Completed | Verified by

152

Serial No.	Sample Point	Date	Time Issued	Priority
K 9413.-5525	102AW	6-14-91	13:10	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	W1DEU	1

Sample Size: 10ml
Customer ID: STD

Remarks, Calculations, Results:
SSID EV-CKD
STD# 18849 RESULT 1.48E-2
STD VAL 1.33896-2 %REC 110.5470

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Fraley				

Date: 6-20-91

R9413-5525 6-21

758/10 — Alpha Calculation by NAI on 06-21-1991 at 06:20:07
Std 814 2 -tech amount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

745/10 — Count # 1

$\frac{758}{10} \cdot 0.4 = 1.4936E-02$ uCi/L alpha

Count # 2

$\frac{745}{10} \cdot 0.4 = 1.4678E-02$ uCi/L alpha

344

Serial No.	Sample Point	Date	Time Issued	Priority
K 9414.-5625	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G	W1DEU	1

Sample Size: 1ml
Customer ID: REG. BL

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

<9.23E-4 uCi/L

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Fraley				

Date: 6-20-91

R9414-5625 6-21

3/10 — Alpha Calculation by NAI on 06-21-1991 at 06:27:38
Std 814 2 -tech amount Alpha eff. : .2274
Sample size : 1 mL Dilution : 1

1/10 — Count # 1

$\frac{3}{10} \cdot 0.4 = 9.2309E-04$ uCi/L alpha

Count # 2

$\frac{1}{10} \cdot 0.4 = 9.2309E-04$ uCi/L alpha

9410

Serial No.	Sample Point	Date	Time Issued	Priority
K 9416.-5725	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G	W1DEU	1

Sample Size: 2.100-10-.250
Customer ID: 2291-2-4

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

1.68 uCi/L

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Fraley				

Date: 6-20-91

R9416-5725 6-21

29/10 — Alpha Calculation by NAI on 06-21-1991 at 06:28:30
Std 814 2 -tech amount Alpha eff. : .2274
Sample size : .25 mL Dilution : 101

21/10 — Count # 1

$\frac{29}{10} \cdot 0.4 = 2.0007E+00$ uCi/L alpha

Count # 2

$\frac{21}{10} \cdot 0.4 = 1.3605E+00$ uCi/L alpha

1-2

Sample No	Sample Point	Date	Time Sampled	Priority
R 9416-5920	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Results
TD	LA-508-101	% RECOVERY	W1DEU	1

Sample Size	Customer ID
100-10-.200-10-300	2991-2-4

Remarks, Calculations, Results:
SAMPLE SPIKED ID 9416-1
SPIKE ID 18849
SPIKE VOLUME 10 ml

RERUN

~~98.20%~~ 9/24/91
97.1%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GC269				
Company Trans	Hrs	Hrs	Hrs	Hrs
Date 6-21-91	Time Completed			

1-2 6-21-91 R9416-5920 DF 10302

$\frac{18087}{10} - 6$

$\frac{18358}{10} - 6$

Beta Calculation by ALJ on 06-21-1991 at 18:24:49
Det 818 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 10302

Count # 1

$\frac{18087}{10} \cdot 6.0 \cdot 2.6549E+04$ uCi/L beta

Count # 2

$\frac{18358}{10} \cdot 6.0 \cdot 2.6946E+04$ uCi/L beta

$\frac{\left(\frac{2.6756e^{4}}{10302} - \frac{1.326e^{4}}{10302}\right)}{10} = 1.315e^{-1} / 1.354e^{-1}$

1-2

Sample No	Sample Point	Date	Time Sampled	Priority
R 9419-5520	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Results
TD	LA-508-101	% RECOVERY	W1DEU	1

Sample Size	Customer ID
10 ml	STD

Remarks, Calculations, Results:
STD EV-CRB
STD# 18849 RESULT 1.386e-1 uCi/ml
STD VAL 1.354x10-1 %REC 102.4%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
GC269				
Company Trans	Hrs	Hrs	Hrs	Hrs
Date 6-21-91	Time Completed			

1-2 R9419-5520 10 ml

$\frac{9992}{10} - 6$

$\frac{9518}{10}$

Beta Calculation by ALJ on 06-21-1991 at 18:29:53
Det 818 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Count # 1

$\frac{9992}{10} \cdot 6.0 \cdot 1.4198E-01$ uCi/L beta

Count # 2

$\frac{9518}{10} \cdot 6.0 \cdot 1.3521E-01$ uCi/L beta

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9416	Customer ID: 2291-2-4
Analysis: GEA	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-548-121/D-0
Technologist: C. JOHNSON	Date: 7-31-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5530	11		
2	REAGENT BLANK	R9414-5630	12		
3	SAM DUP OF 2291-1-4	R9415-5830	13		
4	SAMPLE 2291-2-4	R9416-5730	14		
5	SPIKE OF SAMPLE 2291-2-4	R9416-5930	15		
6	FINAL LMCS CHECK STD	R9419-5530	16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	141B46/0.5 mL			N/A
SPIKE	141B46/0.5 mL			N/A

A-6000-881 (03/92)

GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
Addendum 4 Rev 0

4176

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419-5550	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	W1DEU	0

Sample Size	Customer ID
7.500 ml	STD

Remarks, Calculations, Results

COLX STD# 141846
R901 STD VAL/4047
RESULT 1.44E1 % REC 102.5%
R905 STD VAL/2.169
RESULT 1.24E1 % REC 101.9%

Long Form
Cs 137
Eu 155
Sn 119
Ru 103

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Thee Johnson				
Pos	Pos	Pos	Pos	Pos
82376				

Date	Time Completed	Approved by
7/31/91		Todd Rod Dyann Smithick

[illegible]

[illegible]

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[illegible]	[illegible]	LLD 9.43E-01	[illegible]
[illegible]	[illegible]	LLD 3.22E+00	[illegible]
[illegible]	[illegible]	LLD 1.41E+00	[illegible]
[illegible]	[illegible]	LLD 1.33E+00	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	LLD 1.19E+00	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	LLD 5.07E+00	[illegible]
[illegible]	[illegible]	LLD 6.47E+00	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	LLD 7.71E+00	[illegible]
[illegible]	[illegible]	LLD 7.77E+00	[illegible]
[illegible]	[illegible]	LLD 2.83E+02	[illegible]
[illegible]	[illegible]	LLD 1.63E+02	[illegible]
FB-213	LLD 1.73E+00	LLD 1.73E+00	237.[illegible]
FB-213A	LLD 1.72E+00	LLD 1.72E+00	239.[illegible]
[illegible]	[illegible]	LLD 2.82E+01	[illegible]
[illegible]	[illegible]	LLD 2.90E+00	351.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	LLD 3.06E+00	[illegible]
[illegible]	[illegible]	[illegible]	304.[illegible]
[illegible]	[illegible]	LLD 6.44E+04	[illegible]
[illegible]	[illegible]	LLD 1.23E+03	[illegible]
[illegible]	[illegible]	LLD 3.27E+03	127.[illegible]
[illegible]	[illegible]	[illegible]	145.[illegible]
[illegible]	[illegible]	LLD 3.11E+01	[illegible]
[illegible]	[illegible]	[illegible]	136.[illegible]
[illegible]	[illegible]	LLD 7.11E+00	1836.[illegible]
[illegible]	[illegible]	LLD 7.78E+00	1031.[illegible]
[illegible]	[illegible]	LLD 1.17E+03	547.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	LLD 2.61E+01	621.[illegible]
[illegible]	LLD 4.32E+00	[illegible]	602.[illegible]
[illegible]	[illegible]	[illegible]	174.[illegible]
[illegible]	LLD 1.36E+00	LLD 1.36E+00	1120.[illegible]
[illegible]	LLD 1.41E+00	LLD 1.41E+00	264.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LLD 1.37E+00	[illegible]	317.[illegible]
[illegible]	LLD 1.46E+00	[illegible]	555.[illegible]
[illegible]	[illegible]	[illegible]	1383.[illegible]
[illegible]	[illegible]	LLD 4.63E+00	1121.[illegible]
[illegible]	[illegible]	[illegible]	140.[illegible]
[illegible]	[illegible]	LLD 7.66E-01	[illegible]
[illegible]	LLD 2.00E+02	LLD 2.00E+02	107.[illegible]
[illegible]	[illegible]	[illegible]	228.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LLD 1.40E+01	LLD 1.40E+01	[illegible]
[illegible]	LLD 1.40E+01	LLD 1.40E+01	[illegible]
[illegible]	LLD 4.36E+01	LLD 4.36E+01	[illegible]
[illegible]	LLD 1.68E+00	LLD 1.68E+00	383.[illegible]
[illegible]	LLD 1.35E+00	LLD 1.35E+00	[illegible]
[illegible]	LLD 1.37E+00	LLD 1.37E+00	[illegible]
[illegible]	[illegible]	LLD 5.67E+00	143.[illegible]
[illegible]	LLD 3.71E+00	LLD 3.71E+00	308.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	LLD 2.43E+00	81.0[illegible]
[illegible]	[illegible]	[illegible]	233.[illegible]
[illegible]	[illegible]	LLD 1.04E+00	[illegible]
[illegible]	[illegible]	LLD 7.79E+00	[illegible]
[illegible]	LLD 6.72E-01	[illegible]	1836.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

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

[illegible]

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

[illegible]

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[illegible]-JUL-91 [illegible]

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE: [illegible]414-[illegible]
DATA COLLECTED ON 31-JUL-91 AT [illegible]
DECAYED TO 0. DAYS 0.0000 HOURS BEFORE THE START OF COLLECTION

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/L: MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON: ENERGY	[illegible]
AC-228	LLD 7.36E-02		LLD 7.36E-02		911	
AC-228A	LLD 7.36E-02		LLD 7.36E-02		911.1	
AC-228B	LLD 1.37E-01		LLD 1.37E-01		338.[illegible]	
AG-108M	LLD [illegible]		LLD [illegible]		433.[illegible]	
AG-110M	LLD 4.[illegible]E-02		LLD 4.[illegible]E-02		657.[illegible]	
AM-241	LLD 1.17E-01		LLD 1.17E-01		59.[illegible]	
AM-243	LLD 4.71E-02		LLD 4.71E-02		74.[illegible]	
AM-243A	LLD 4.71E-02		LLD 4.71E-02		74.[illegible]	
AM-243B	LLD 4.19E+00		LLD 4.19E+00		43.[illegible]	
AR-41	LLD 2.83E-02		LLD 2.83E-02		1293.[illegible]	
AU-198	LLD [illegible].17E-02		LLD [illegible].17E-02		411.8[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
BA-140	LLD [illegible]		LLD [illegible]		537.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]-214A	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]-214B	LLD 1.[illegible]E-01		LLD 1.[illegible]E-01		[illegible]	
[illegible]-214C	LLD 2.[illegible]E-02		LLD 2.[illegible]E-02		[illegible]	
[illegible]	LLD 4.[illegible]E-01		LLD 4.[illegible]E-01		[illegible]	
[illegible]	LLD 1.[illegible]E-02		LLD 1.[illegible]E-02		[illegible]	
[illegible]	LLD 2.[illegible]E-02		LLD 2.[illegible]E-02		[illegible]	
CEPR144	LLD 2.[illegible]E-01		LLD 2.[illegible]E-01		133.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]-58	LLD [illegible]		LLD [illegible]		810.[illegible]	
[illegible]-60	LLD 2.[illegible]E-02		LLD 2.[illegible]E-02		1332.[illegible]	
[illegible]-51	LLD 1.[illegible]E-01		LLD 1.[illegible]E-01		320.[illegible]	
CS-134	LLD [illegible]E-02		LLD [illegible]E-02		795.[illegible]	
[illegible]	LLD [illegible]E-02		LLD [illegible]E-02		[illegible]	
[illegible]	LLD [illegible]E-02		LLD [illegible]E-02		661.[illegible]	
[illegible]	LLD [illegible]E-01		LLD [illegible]E-01		1435.[illegible]	
EU-152	LLD [illegible]E-01		LLD [illegible]E-01		1408.[illegible]	
EU-154	LLD [illegible]E-02		LLD [illegible]E-02		1274.[illegible]	
EU-155	LLD [illegible]E-02		LLD [illegible]E-02		105.[illegible]	
FE-59	LLD [illegible]E-02		LLD [illegible]E-02		1099.[illegible]	
HF-181	LLD [illegible]E-02		LLD [illegible]E-02		482.[illegible]	
HG-203	LLD [illegible]E-02		LLD [illegible]E-02		279.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]E-01		LLD [illegible]E-01		[illegible]	
K-40	LLD [illegible]E-01		LLD [illegible]E-01		1460.[illegible]	
KR-85	LLD [illegible]E+00		LLD [illegible]E+00		[illegible]	
KR-85M	LLD [illegible]E-02		LLD [illegible]E-02		[illegible]	
KR-87	LLD [illegible]E-02		LLD [illegible]E-02		[illegible]	
[illegible]	[illegible]		[illegible]		[illegible]	

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
          G A M M A   S P E C T R U M   A N A L Y S I S               *
                                                                      *
*   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                                          WHC-SD-WM-DP-025
CANBERRA SPECTRAN-F V2.06  SOFTWARE       ADDENDUM 4 REV 0

01-AUG-9104:09:00


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

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

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
  ALYZED BY:        MAX

S...LE DESCRIPTION: R9416-5730
GEOMETRY DESCRIPTION:  22ML LIQ
SAMPLE SIZE:   1.0000E-03 LI       / CONVERSION FACTOR: 4.9505E-03
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON  1-AUG-91 AT 03:18:45

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

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

ENERGY CALIBRATION PERFORMED 28-JUN-91
EFFICIENCY CALIBRATION PERFORMED 23-MAY-91
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SAMPLE: R9416-5730
COLLECTED ON 1-AUG-91 AT 03:18:45
DELAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<2.38E+01		LLD<2.38E+01		911.07	
AC-228A	LLD<2.38E+01		LLD<2.38E+01		911.10	
AC-228B	LLD<1.27E+02		LLD<1.27E+02		338.40	
AG-108M	LLD<2.33E+01		LLD<2.33E+01		433.94	
AG-110M	LLD<2.14E+02		LLD<2.14E+02		657.76	
AM-241	LLD<9.23E+01		LLD<9.23E+01		59.54	
AM-243	LLD<2.77E+01		LLD<2.77E+01		74.67	
AM-243A	LLD<2.77E+01		LLD<2.77E+01		74.67	
AM-243B	LLD<2.93E+03		LLD<2.93E+03		43.10	
AR-41	LLD<6.32E+00		LLD<6.32E+00		1293.64	
AU-198	LLD<2.09E+01		LLD<2.09E+01		411.80	
BA-133	LLD<2.58E+01		LLD<2.58E+01		356.02	
BA-139	LLD<4.79E+01		LLD<4.79E+01		165.85	
BA-140	LLD<6.36E+01		LLD<6.36E+01		537.27	
BA-141	LLD<5.40E+01		LLD<5.40E+01		190.23	
BE-7	LLD<2.39E+02		LLD<2.39E+02		477.59	
BI-207	LLD<1.30E+01		LLD<1.30E+01		569.70	
[illegible]2	LLD<4.42E+01		LLD<4.42E+01		727.27	
BI-214	LLD<4.58E+01		LLD<4.58E+01		609.32	
BI-214A	LLD<4.58E+01		LLD<4.58E+01		609.32	
BI-214B	LLD<5.41E+01		LLD<5.41E+01		1120.28	
BI-214C	LLD<4.45E+00		LLD<4.45E+00		1764.51	
CD-109	LLD<3.46E+02		LLD<3.46E+02		88.03	
CE-139	LLD<1.08E+01		LLD<1.08E+01		165.85	
CE-141	LLD<1.86E+01		LLD<1.86E+01		145.44	
CEPR144	LLD<1.53E+02		LLD<1.53E+02		133.51	
CO-56	LLD<5.49E+00		LLD<5.49E+00		846.76	
CO-57	LLD<1.01E+01		LLD<1.01E+01		122.06	
CO-58	LLD<6.00E+00		LLD<6.00E+00		810.75	
CO-60	LLD<5.19E+00		LLD<5.19E+00		1332.50	
CR-51	LLD<1.34E+02		LLD<1.34E+02		320.09	
CS-134	1.89E+02	+-1.79E+01	1.89E+02	+-1.79E+01	795.84	-0.24
					604.70	-0.18
CS-136	LLD<6.19E+00		LLD<6.19E+00		818.51	
CS-137	1.50E+04	+-2.29E+02	1.50E+04	+-2.29E+02	661.65	-0.24
CS-138	LLD<1.13E+01		LLD<1.13E+01		1435.86	
EU-152	LLD<2.76E+01		LLD<2.76E+01		1408.01	
EU-154	LLD<2.10E+01		LLD<2.10E+01		1274.45	
EU-155	LLD<3.90E+01		LLD<3.90E+01		105.31	
FE-59	LLD<1.17E+01		LLD<1.17E+01		1099.25	
HF-181	LLD<2.74E+01		LLD<2.74E+01		482.20	
HG-203	LLD<1.71E+01		LLD<1.71E+01		279.20	
I[illegible]	LLD<2.01E+01		LLD<2.01E+01		364.48	
[illegible]2	LLD<1.07E+01		LLD<1.07E+01		667.69	
I-133	LLD<1.94E+01		LLD<1.94E+01		529.69	
I-134	LLD<8.43E+00		LLD<8.43E+00		847.03	
I-135	LLD<1.80E+01		LLD<1.80E+01		1260.41	

W-187	LLD<2.32E+01	LLD<2.32E+01	685.74
XE-131M	LLD<4.97E+02	LLD<4.97E+02	163.98
XE-133	LLD<3.48E+01	LLD<3.48E+01	81.00
[illegible] 133M	LLD<1.17E+02	LLD<1.17E+02	233.21
[illegible]35	LLD<1.50E+01	LLD<1.50E+01	249.79
X[illegible]8	LLD<1.13E+02	LLD<1.13E+02	258.41
Y-88	LLD<6.00E+00	LLD<6.00E+00	1836.06
Y-91	LLD<2.80E+03	LLD<2.80E+03	1204.90
Y-91M	LLD<1.94E+01	LLD<1.94E+01	555.60
ZN-65	LLD<1.94E+01	LLD<1.94E+01	1115.55
ZR-95	LLD<1.10E+01	LLD<1.10E+01	756.73
ZR-97	LLD<6.77E+00	LLD<6.77E+00	743.33
TOTAL	1.52E+04 +-2.30E+02	1.52E+04 +-2.30E+02	

STANDARD DEVIATION = 0.04

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 9.85E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.52E+04 (+-2.30E+02) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1023.81	511.38	153.	57.7	6.23E+00
1138.94	568.94	143.	36.5	6.43E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.21	1460.64	215.	14.3	2.13E+01

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 01:20:02

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

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

	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.16	563.21	1.51	647.	423.	19.4	CS-134, EU-152
2C	1139.36	569.31	1.51	639.	771.	15.7	CS-134, BI-207
3	1210.24	604.74	1.61	672.	4465.	3.4	CS-134
4	1324.20	661.72	1.65	441.	37152.	1.0	CS-137
4B		661.85			36.	13.9	
5C	1592.56	795.87	1.70	174.	3402.	3.9	CS-134
6C	1604.70	801.94	1.70	155.	298.	12.0	CS-134
7	2347.50	1173.30	2.03	142.	1949.	4.9	CO-60
8	2666.16	1332.63	2.15	28.	1789.	4.7	CO-60
8B		1332.24			9.	37.4	
9	2730.79	1364.94	2.27	18.	87.	26.8	CS-134
10C	2922.88	1460.98	2.51	5.	151.	16.7	K-40
10B		1460.85			156.	3.8	
11	3531.56	1765.32	1.90	4.	19.	59.2	BI-214C
11B		1764.55			14.	17.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

ULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

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

I-135	LLD<5.52E+01	LLD<5.52E+01	1260.41
K-40	LLD<2.03E+02	LLD<2.03E+02	1460.75
KR-85	LLD<7.42E+03	LLD<7.42E+03	513.99
[illegible] 85M	LLD<2.12E+01	LLD<2.12E+01	151.17
[illegible]	LLD<7.57E+01	LLD<7.57E+01	402.58
K[illegible]	LLD<1.09E+03	LLD<1.09E+03	220.90
LA-140	LLD<1.25E+01	LLD<1.25E+01	1596.20
LA-142	LLD<6.95E+01	LLD<6.95E+01	641.83
MN-54	LLD<2.12E+01	LLD<2.12E+01	834.83
MN-56	LLD<2.48E+01	LLD<2.48E+01	846.76
NA-22	LLD<1.47E+01	LLD<1.47E+01	1274.55
NA-24	LLD<1.61E+01	LLD<1.61E+01	1368.60
NB-94	LLD<2.00E+01	LLD<2.00E+01	702.63
NB-95	LLD<2.02E+01	LLD<2.02E+01	765.78
NB-97	LLD<3.22E+02	LLD<3.22E+02	657.92
NP-237	LLD<1.75E+02	LLD<1.75E+02	86.50
NP-238	LLD<8.66E+01	LLD<8.66E+01	984.45
NP-239	LLD<1.60E+02	LLD<1.60E+02	277.60
PA-233	LLD<6.11E+01	LLD<6.11E+01	311.98
PA-234M	LLD<4.15E+03	LLD<4.15E+03	1001.03
PB-210	LLD<4.82E+03	LLD<4.82E+03	46.50
PB-212	LLD<4.81E+01	LLD<4.81E+01	239.00
PB-212A	LLD<4.79E+01	LLD<4.79E+01	239.00
PB-212B	LLD<7.09E+02	LLD<7.09E+02	300.10
PB-214	LLD<6.46E+01	LLD<6.46E+01	351.92
PB-214A	LLD<6.46E+01	LLD<6.46E+01	351.92
PB-214B	LLD<1.20E+02	LLD<1.20E+02	295.21
PO-210	LLD<1.62E+06	LLD<1.62E+06	804.00
PO-214	LLD<9.17E+05	LLD<9.17E+05	799.70
PO-216	LLD<1.32E+06	LLD<1.32E+06	804.90
[illegible] 9	LLD<2.56E+05	LLD<2.56E+05	129.30
PU-241	LLD<8.14E+06	LLD<8.14E+06	148.57
RA-224	LLD<5.20E+02	LLD<5.20E+02	240.99
RA-226	LLD<4.98E+02	LLD<4.98E+02	186.10
RB-88	LLD<1.00E+02	LLD<1.00E+02	1836.00
RB-89	LLD<1.14E+02	LLD<1.14E+02	1031.88
RN-220	LLD<2.66E+04	LLD<2.66E+04	549.73
RU-103	LLD<3.42E+01	LLD<3.42E+01	497.08
RURH106	LLD<5.61E+02	LLD<5.61E+02	621.80
SB-124	LLD<4.74E+01	LLD<4.74E+01	602.72
SB-125	LLD<2.61E+02	LLD<2.61E+02	176.33
SC-46	LLD<2.47E+01	LLD<2.47E+01	1120.45
SE-75	LLD<3.81E+01	LLD<3.81E+01	264.66
SN-113	LLD<4.65E+01	LLD<4.65E+01	391.67
SR-85	LLD<3.25E+01	LLD<3.25E+01	513.99
SR-91	LLD<5.35E+01	LLD<5.35E+01	555.60
SR-92	LLD<1.75E+01	LLD<1.75E+01	1383.94
TA-182	LLD<7.50E+01	LLD<7.50E+01	1121.30
TC-99M	LLD<1.74E+01	LLD<1.74E+01	140.51
TE-123M	LLD<2.01E+01	LLD<2.01E+01	159.00
TE-125M	LLD<5.76E+03	LLD<5.76E+03	109.27
TE-132	LLD<2.29E+01	LLD<2.29E+01	228.16
TH-228	LLD<2.06E+03	LLD<2.06E+03	84.37
TH-234	LLD<3.50E+02	LLD<3.50E+02	92.50
TH-234A	LLD<3.50E+02	LLD<3.50E+02	92.50
TH-234B	LLD<1.32E+03	LLD<1.32E+03	63.30
[illegible] 3	LLD<3.34E+01	LLD<3.34E+01	583.14
U-235	LLD<3.50E+01	LLD<3.50E+01	185.71
U-235A	LLD<3.50E+01	LLD<3.50E+01	185.71
U-235B	LLD<1.55E+02	LLD<1.55E+02	143.76

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                                        WHC-SD-WM-DP-025
CA[illegible]RRA SPECTRAN-F V2.06  SOFTWARE   ADDENDUM 4 REV 0

222-S COUNTING ROOM WESTINGHOUSE HANFORD          01-AUG-91  04:14:13

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

MCA UNIT NUMBER:   1     /     ADC UNIT NUMBER: 1.0
DETECTOR NUMBER:    4    /     GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:     5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANO:
ANALYZED BY:        MAX

    [illegible]E DESCRIPTION: R9419-5530
GE[illegible]RY DESCRIPTION:  134B40-A 22/LIQ
SAMPLE SIZE:   1.0000E-03 LI       / CONVERSION FACTOR: 5.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON  1-AUG-91 AT 03:23:45

COLLECT LIVE TIME:    3000. SECONDS
        REAL TIME:    3018. SECONDS
        DEAD TIME:     0.60 %

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 14-MAR-91
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222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 04:14:13

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE: R9419-5530
DATA COLLECTED ON 1-AUG-91 AT 03:23:45
[illegible]ED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<3.08E-01		LLD<3.08E-01		911.07	
AC-228A	LLD<3.08E-01		LLD<3.08E-01		911.10	
AC-228B	LLD<4.34E-01		LLD<4.34E-01		338.40	
AG-108M	LLD<6.85E-02		LLD<6.85E-02		433.94	
AG-110M	LLD<3.39E-01		LLD<3.39E-01		657.76	
AM-241	LLD<2.63E-01		LLD<2.63E-01		59.54	
AM-243	LLD<8.24E-02		LLD<8.24E-02		74.67	
AM-243A	LLD<8.24E-02		LLD<8.24E-02		74.67	
AM-243B	LLD<7.36E+00		LLD<7.36E+00		43.10	
AR-41	LLD<6.67E-02		LLD<6.67E-02		1293.64	
AU-198	LLD<7.09E-02		LLD<7.09E-02		411.80	
BA-133	LLD<8.82E-02		LLD<8.82E-02		356.02	
BA-139	LLD<1.59E-01		LLD<1.59E-01		165.85	
BA-140	LLD<2.64E-01		LLD<2.64E-01		537.27	
BA-141	LLD<1.65E-01		LLD<1.65E-01		190.23	
BE-7	LLD<6.50E-01		LLD<6.50E-01		477.59	
BI-207	LLD<7.24E-02		LLD<7.24E-02		569.70	
BI-212	LLD<5.51E-01		LLD<5.51E-01		727.27	
4	LLD<7.00E-01		LLD<7.00E-01		609.32	
BI-214A	LLD<7.00E-01		LLD<7.00E-01		609.32	
BI-214B	LLD<6.55E-01		LLD<6.55E-01		1120.28	
BI-214C	LLD<2.64E-01		LLD<2.64E-01		1764.51	
CD-109	LLD<1.05E+00		LLD<1.05E+00		88.03	
CE-139	LLD<3.61E-02		LLD<3.61E-02		165.85	
CE-141	LLD<5.99E-02		LLD<5.99E-02		145.44	
CEPR144	LLD<4.70E-01		LLD<4.70E-01		133.51	
CO-56	LLD<7.50E-02		LLD<7.50E-02		846.76	
CO-57	LLD<3.10E-02		LLD<3.10E-02		122.06	
CO-58	LLD<6.91E-02		LLD<6.91E-02		810.75	
CO-60	1.24E+01	+-2.34E-01	1.24E+01	+-2.34E-01	1332.50	-0.20
					1173.24	-0.04
CR-51	LLD<4.95E-01		LLD<4.95E-01		320.09	
CS-134	1.45E+01	+-3.19E-01	1.45E+01	+-3.19E-01	795.84	0.09
					604.70	0.20
CS-136	LLD<7.65E-02		LLD<7.65E-02		818.51	
CS-137	1.44E+01	+-2.23E-01	1.44E+01	+-2.23E-01	661.65	0.15
CS-138	LLD<7.96E-02		LLD<7.96E-02		1435.86	
EU-152	LLD<3.62E-01		LLD<3.62E-01		1408.01	
EU-154	LLD<1.35E-01		LLD<1.35E-01		1274.45	
EU-155	LLD<1.33E-01		LLD<1.33E-01		105.31	
FE-59	LLD<1.68E-01		LLD<1.68E-01		1099.25	
HF-181	LLD<8.14E-02		LLD<8.14E-02		482.20	
HG-203	LLD<5.59E-02		LLD<5.59E-02		279.20	
I- [illegible]	LLD<6.95E-02		LLD<6.95E-02		364.48	
[illegible]	LLD<2.61E-01		LLD<2.61E-01		667.69	
I-133	LLD<7.43E-02		LLD<7.43E-02		529.69	
I-134	LLD<1.09E-01		LLD<1.09E-01		847.03	

U-237	LLD<1.87E-01	LLD<1.87E-01	208.00
W-187	LLD<2.35E-01	LLD<2.35E-01	685.74
XE-131M	LLD<1.65E+00	LLD<1.65E+00	163.98
XE-133	LLD<1.04E-01	LLD<1.04E-01	81.00
[illegible] 133M	LLD<3.90E-01	LLD<3.90E-01	233.21
[illegible]5	LLD<5.00E-02	LLD<5.00E-02	249.79
XE [illegible]8	LLD<3.76E-01	LLD<3.76E-01	258.41
Y-88	LLD<4.07E-02	LLD<4.07E-02	1836.06
Y-91	LLD<2.37E+01	LLD<2.37E+01	1204.90
Y-91M	LLD<1.00E-01	LLD<1.00E-01	555.60
ZN-65	LLD<2.01E-01	LLD<2.01E-01	1115.55
ZR-95	LLD<1.23E-01	LLD<1.23E-01	756.73
ZR-97	LLD<7.04E-02	LLD<7.04E-02	743.33
TOTAL	4.31E+01 +-7.81E-01	4.31E+01 +-7.81E-01	

STANDARD DEVIATION = 0.18

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.27E-09 UC/LI
TOTAL MEASURED ACTIVITY = 4.31E+01 (+-7.81E-01) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
55.12	27.67	930.	14.2	5.15E+02
951.50	475.54	501.	33.9	3.50E+00
1127.41	563.46	2450.	7.2	1.99E+01
1139.56	569.54	4459.	5.5	3.66E+01
1604.68	802.06	1879.	15.3	2.11E+01
2336.04	1167.82	350.	88.3	5.50E+00
2730.27	1365.04	487.	12.2	8.73E+00
2799.41	1399.64	131.	22.2	2.40E+00
2802.59	1401.23	121.	22.9	2.22E+00

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5540	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Reason	Charge Code	Results
U	LA-925-106	RERUN RECOVERY	W1BED	3

Sample Size: ? .100-.10-.100 ml

Customer ID: STD

Remarks, Calculations, Results

S267 LFIC
STD11 858 88 RESULT 3.07E-2
STD VAL 3.14E-2 REC 97.80
SPIKE ID/VAL 90.838
SPIKE VOL. .100-.10-.100

(1) (2)
Sample = .16 - .12
Sample Spk = .48 - .36

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
Initials	Hrs	Hrs	Hrs	Hrs
Date 10-8-91	Time Completed	Date Verified		

R9413-5540 -

$$\frac{[(.16)(.982)](.1)(6.25E^{-4})(1010)}{.48-[(.16)(.982)]} = 3.07E^{-2}\ g/l$$

$$\frac{(.12)(.982)(6.25E^{-4})(.1)(1010)}{.36-[(.982)(.12)]} = 3.07E^{-2}\ g/l$$

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5640	102AW	6-14-91	13:11	26

Determination	Method/Standard	Reason	Charge Code	Results
U	LA-925-106	G/U RERUN	W1BED	3

Sample Size: ? 1 ml

Customer ID: REG. BL

Remarks, Calculations, Results

REAGENT BLANK

$$\frac{(<.02)(.985)(5.68E^{-5})(.1)(1)}{.30-[(.02)(.985)]} = < 3.99E^{-7}\ g/l$$

BLK = .01
Blk + Spk = .30
Spk Vol/Conc = 6.68E-5/[illegible]
Spk Vol = .100-10-.100

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
Initials	Hrs	Hrs	Hrs	Hrs
Date 10-8-91	Time Completed	Date Verified		

Serial No	Sample Point	Date	Time Issued	Priority
R 9416.-5740	102AW	6-14-91	13:16	26

Determination	Method/Standard	Reason	Charge Code	Results
U	LA-925-106	RERUN G/U	W1BED	3

Sample Size: ? .100-.10-.100 ml

Customer ID: 2291-2-4

Remarks, Calculations, Results

(1) - (2)
Sample = .07 - .09
Sample Spk = .32 - .32
Spk ID/Vol = 90.838/5.68E-5
Spk Vol = .100-.10-.100

1.88E-3 g/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
Initials	Hrs	Hrs	Hrs	Hrs
Date 10-8-91	Time Completed	Date Verified		

R9416 - 5740

$$\frac{(.07)(.982)(5.68E^{-5})(.1)(1010)}{.32-[(.07)(.982)]} = 1.57E^{-3}\ g/l$$

$$\frac{(.09)(.982)(5.68E^{-5})(.1)(1010)}{.32-[(.09)(.982)]} = 2.19E^{-3}\ g/l$$

1.8795E-3

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9416	Customer ID: 2291-2-4
Analysis: PLUTONIUM 239/240	Sample Prep: UNDIGESTED

Instrument: WB57237	Procedure/Rev: LA-503-156/C-3
Technologist: M. BIERMAN	Date: 7-16-91
Starting Time: 08:00	Temperature: 25degC
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5581*	11		
2	REAGENT BLANK	R9414-5681*	12		
3	SAMPLE 2291-2-4	R9416-5781*	13		
4	SAM DUP OF 2291-2-4	R9416-5881	14		
5	FINAL LMCS CHECK STD	R9419-5581*	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	43B43/0.1 mL			N/A
*THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

4.1 5756

Serial No.	Sample Point	Date	Time Issued	Priority
R 9416.-5881	102AW	6-14-91	13:17	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	uCI/G	W18TC	0

Sample Size: ? 1 ml

Customer ID: 2221-2-4

Remarks, Calculations, Results:

DUPLICATE SAMPLE

"AEA-480 MIN"
ATTACH PRINT OUT

COUNT AS uCI/L
Pu236 (40B43) .050 ml
1 ml 8M HNO3
con

3.67E-2 uci/l

89% trans

Analyst - 1: 6L559 Analyst - 2: Rubio Analyst - 3: Analyst - 4: Analyst - 5:

Date: 7/16/91 Time Completed: Lab Unit Mgr: CR Pulicicchio

#1 7-18-91 R9416 - 5881

$\frac{1010}{5} - 10$

$$\frac{(192.0)(2)(.7568)}{325.49} = 89\%$$

4.2 6002

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5881	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	% RECOVERY	W18ED	1

Sample Size: ? .100-10 - .100 ml

Customer ID: STD

Remarks, Calculations, Results:

EDP R211 AR001

STDN 43843 RESULT 1.00E2

STD VAL. 9.04E1 %REC 111.4%

Pu236 (40B43) .050 ml

1 ml 8M HNO3

99% trans

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst - 1: 6L559 Analyst - 2: Rubio Analyst - 3: Analyst - 4: Analyst - 5:

Date: 7/16/91 Time Completed: Lab Unit Mgr: CR Pulicicchio

#1 7-18-91 R9419 - 5581

$\frac{1477}{5} - 10$

$$\frac{(285.4)(2)(.5633)}{325.49} = 99\%$$

9312310036

1	0.	0.	0.	0.	0.	0.	4.	2.	2.	4.
11	0.	4.	2.	0.	2.	1.	3.	5.	2.	2.
21	3.	4.	0.	4.	3.	0.	2.	0.	1.	2.
31	3.	2.	2.	7.	0.	3.	1.	1.	3.	2.
41	3.	2.	2.	2.	3.	2.	4.	3.	2.	5.
[illegible]	2.	5.	4.	3.	2.	1.	2.	3.	3.	0.
[illegible]	5.	0.	2.	2.	2.	1.	1.	3.	2.	2.
71	2.	1.	0.	3.	1.	0.	0.	1.	4.	2.
81	1.	2.	0.	0.	3.	3.	2.	1.	0.	1.
91	1.	1.	4.	2.	4.	1.	2.	4.	1.	2.
101	4.	4.	2.	2.	3.	1.	0.	0.	1.	1.
111	2.	1.	2.	2.	2.	3.	1.	2.	3.	2.
121	0.	1.	0.	4.	1.	2.	1.	0.	0.	2.
131	1.	1.	2.	2.	0.	0.	3.	4.	1.	3.
141	2.	0.	5.	2.	3.	2.	1.	0.	2.	3.
151	2.	1.	0.	3.	2.	0.	0.	1.	4.	2.
161	3.	1.	3.	0.	3.	0.	4.	0.	1.	1.
171	3.	5.	2.	3.	3.	5.	2.	5.	2.	0.
181	3.	2.	3.	4.	0.	3.	1.	1.	1.	1.
191	6.	4.	6.	3.	3.	5.	3.	6.	6.	5.
201	2.	7.	10.	9.	9.	6.	13.	12.	12.	17.
211	22.	39.	68.	52.	85.	111.	152.	176.	269.	292.
221	308.	434.	494.	606.	761.	955.	1168.	1255.	1368.	1421.
231	1347.	1161.	998.	816.	560.	371.	223.	141.	68.	30.
241	13.	11.	2.	0.	1.	1.	0.	1.	2.	1.
251	1.	1.	2.	0.	4.	3.	0.	0.	2.	1.
261	2.	2.	1.	3.	1.	4.	3.	4.	2.	3.
271	3.	4.	1.	1.	4.	1.	1.	3.	1.	2.
281	4.	5.	4.	9.	10.	10.	23.	26.	31.	32.
291	31.	51.	55.	56.	82.	79.	94.	106.	121.	152.
[illegible]	163.	163.	156.	154.	142.	94.	65.	41.	31.	17.
[illegible]	6.	3.	4.	2.	4.	4.	3.	4.	3.	7.
321	3.	2.	7.	7.	6.	10.	8.	10.	6.	13.
331	6.	10.	14.	12.	8.	22.	16.	11.	30.	39.
341	48.	78.	139.	190.	245.	403.	494.	592.	680.	729.
351	773.	813.	909.	1025.	1178.	1415.	1511.	1807.	1830.	1945.
361	1765.	1474.	1046.	798.	546.	285.	176.	92.	41.	11.
371	7.	0.	0.	2.	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.	1.	0.	0.	0.
421	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	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.	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.								

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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. 1.10

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

DATA REDUCTION REPORT

SAMPLE
R-9114-7691
File ID: 9D3679.SPC

Counted on: 7/19/91 @ 11:0
Detector/Geometry number: 3/ 1
Count time: 70000. 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	1527.6	1417.7	361.921	361.921	20.000	13.777	10.000	7.371
2	50.9	49.0	305.971	305.971	21.000	11.941	12.000	6.9[illegible]
3	7.5	7.4	266.307	266.707	21.000	13.783	12.000	6.771
4	4.1	3.2	243.227	233.22[illegible]	20.000	13.220	10.000	0.95[illegible]

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/[illegible]
1	Pu236	0.9587	5.756	5.772	-0.016	0.07	30.85	156.32	0.704E-0[illegible]
	Cm243		5.786	5.773	0.011				0.915E-0[illegible]
	Pu239	0.0308	5.499	5.489	0.010	0.07	0.99	6.81	0.308E-0[illegible]
	Am241		5.490	5.489	-0.009				0.236E-0[illegible]
2		0.0016		5.299		0.07	0.13	0.73	0.330E-0[illegible]
3	Pu238	0.0059	5.143	5.139	0.001	0.06	0.19	0.91	0.423E-0[illegible]
	Pu240		5.141	5.139	0.005				0.423E-0[illegible]

DETECTOR CALIBRATION
Energy(MEV) = 1.020 + (0.0018)*Channel
Energy range (MeV): 1.020 TO 5.177
Efficiency = 0.2014 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	15951.0	100.000
Smoothed	15951.0	100.000
Composite fit	15950.7	100.876
Residuals	-139.7	-0.876

Analyzed by: _____
61453

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1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
41	0.	0.	0.	0.	1.	0.	0.	1.	1.	1.
[illegible]	1.	1.	0.	0.	1.	1.	0.	0.	1.	1.
[illegible]	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.
81	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.
91	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
101	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
111	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	1.	0.	0.	2.	0.	0.	0.	0.	0.
131	1.	0.	1.	1.	0.	1.	0.	0.	0.	1.
141	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.
151	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
161	0.	0.	1.	1.	1.	0.	1.	0.	0.	0.
171	0.	0.	0.	0.	1.	3.	0.	0.	0.	0.
181	2.	1.	2.	1.	3.	1.	1.	0.	0.	1.
191	0.	0.	2.	1.	2.	1.	1.	0.	0.	0.
201	0.	0.	0.	1.	1.	1.	3.	2.	1.	1.
211	3.	0.	1.	0.	0.	1.	1.	1.	0.	0.
221	1.	1.	1.	3.	0.	0.	2.	2.	2.	4.
231	2.	2.	4.	1.	0.	5.	2.	0.	0.	0.
241	0.	1.	1.	1.	0.	0.	2.	0.	0.	2.
251	1.	2.	1.	0.	1.	4.	0.	3.	2.	3.
261	4.	7.	6.	3.	5.	4.	4.	2.	7.	1.
271	3.	4.	2.	2.	3.	3.	0.	0.	1.	3.
281	3.	3.	3.	0.	3.	3.	1.	6.	8.	5.
291	7.	12.	10.	11.	12.	10.	11.	15.	18.	22.
[illegible]	24.	26.	30.	30.	31.	30.	28.	17.	23.	13.
[illegible]	15.	14.	11.	11.	12.	8.	7.	1.	6.	2.
321	2.	1.	2.	2.	0.	2.	4.	1.	5.	5.
331	6.	5.	8.	6.	5.	17.	1.	11.	23.	16.
341	22.	36.	46.	51.	76.	99.	112.	159.	130.	204.
351	275.	310.	379.	429.	480.	528.	621.	649.	759.	786.
361	852.	881.	892.	905.	879.	921.	748.	709.	572.	480.
371	370.	230.	177.	127.	82.	40.	28.	19.	11.	5.
381	3.	0.	1.	0.	0.	0.	1.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
411	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
421	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
431	2.	0.	0.	0.	0.	0.	0.	0.	1.	0.
441	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	1.	0.	0.	3.	0.	0.	0.	0.
471	0.	0.	2.	0.	1.	0.	3	0.	0.	0.
481	0.	1.	2.	1.	2.	0.	1	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

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SAMPLE STATUS REPORT FOR R 9416. 102AW 2291-2-4 TIME: 5/26/92 14:57
DISPATCHED: 6/14/91 13:17 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/14/91 13:31

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5000	APPEAR	CLEAR LIGHT YELLOW AQUEOUS			W1BEO
5000	APPEAR	NO VISIBLE ORGANIC			W1BEO
5000	APPEAR	NO VISIBLE SOLIDS			W1BEO
5720	TB	OUT FOR RERUN			W1BEO
5720	TB	1.32000E 04 uCI/L			W1BEO
5725	AT	OUT FOR RERUN			W1BEO
5725	AT	1.680000E 00 uCI/L			W1BEO
5730	GEA	1.54000E 04 uCI/L Cs-137			W1BEO
5730	GEA	<3.90000E 01 uCI/L Eu-155			W1BEO
5730	GEA	<2.87000E 01 uCI/L Sn-113			W1BEO
5730	GEA	1.89000E 02 uCI/L Cs-134			W1BEO
5730	GEA	<2.19000E 01 uCI/L Ru-103			W1BEO
5730	GEA	< 2.73000E 02 uCI/L RuRh-106			W1BEO
5730	GEA	< 1.53000E 02 uCI/L Cepr-144			W1BEO
5730	GEA	< 6.02000 uCI/L Nb-94			W1BEO
5730	GEA	< 3.15000E 02 uCI/L Ra-226			W1BEO
5740	U	OUT FOR RERUN			W1BEO
5740	U	OUT FOR RERUN			W1BEO
5740	U	INSUFFICIENT SAMPLE			W1BEO
5740	U	1.88000E-03 G/L			W1BEO
5781	PU239/40	OUT FOR RERUN			W1BEO
1	PU239/40	3.69000E-02 uCI/L			W1BEO
2	AM241	OUT FOR RERUN			W1BEO
5782	AM241	OUT FOR RERUN			W1BEO
5782	AM241	<2.370E-02 uCI/L INSUF. SAMPLE RAN R9402 SPLIT			W1BEO
5786	SR90	OUT FOR RERUN			W1BEO
5786	SR90	OUT FOR RERUN			W1BEO
5786	SR90	8.10000E 00 uCI/L			W1BEO
5787	H3	OUT FOR RERUN			W1BEO
5787	H3	OUT FOR RERUN			W1BEO
5787	H3	5.65000E 00 uCI/L			W1BEO
5881	PU239/40	3.67000E-01 uCI/L			W18TC
5920	TB	OUT FOR RERUN			W1BEO
5920	TB	9.71000E 01 % RECOVERY	N	Y	W1BEO
5925	AT	OUT FOR RERUN			W1BEO
5925	AT	9.48000E 01 % RECOVERY	N	Y	W1BEO
5930	GEA	1.05700E 02 % RECOVERY Cs-137	N	Y	W1BEO
5930	GEA	9.68000E 01 % RECOVERY Co-60	N	Y	W1BEO

END OF REPORT

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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. 1.10

DATA REDUCTION REPORT

SAMPLE
BP419-5381
File ID: SD6002.SPC

Counted on: 7/18/91 @13: 0
Detector/Geometry number: 6/ 1
Count time: 30000. 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	3844.2	3946.6	364.776	364.776	20.000	10.579	10.000	1.737
2	324.7	334.3	306.748	306.748	20.000	11.165	10.000	1.310
3	250.3	49.2	268.828	268.828	12.000	3.780	6.000	4.539
4	2765.8	2744.6	234.003	234.003	20.000	10.618	10.000	5.304

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ml
1	Pu239	0.5633	5.774	5.772	-0.016	0.05	71.61	0.01	0.506E-08
	Cm243		5.786	5.772	0.014				0.679E-08
	Pu238	0.0511	5.499	5.499	0.000	0.05	6.50	0.00	0.621E-09
	Am241		5.480	5.499	-0.019				0.478E-09
2		0.0038		5.321		0.02	0.48	0.00	0.331E-10
4	Pu239	0.3919	5.143	5.157	-0.014	0.05	49.57	0.01	0.336E-09
	Pu240		5.144	5.157	-0.013				0.336E-09

DETECTOR CALIBRATION

Energy(MEV) = 4.057 + (0.0047)*Channel
Energy range (MeV): 4.057 TO 6.461
Efficiency ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	63420.0	100.000
Smoothed	63419.9	100.000
Composite fit	63592.4	100.272
Residuals	-172.4	-0.272

Analyzed by: _____
63099

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9 3 1 2 3 1 1 0

1	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
11	1.	0.	0.	0.	1.	2.	0.	1.	0.	0.
21	1.	1.	1.	0.	0.	0.	0.	1.	0.	0.
31	0.	0.	3.	3.	2.	1.	0.	0.	1.	1.
41	0.	1.	0.	1.	2.	0.	0.	0.	0.	2.
[illegible]	1.	0.	1.	0.	2.	0.	0.	1.	1.	0.
[illegible]	1.	1.	2.	0.	2.	0.	0.	1.	0.	1.
71	2.	0.	1.	4.	0.	0.	1.	2.	2.	0.
81	0.	0.	1.	0.	1.	1.	0.	4.	1.	0.
91	1.	2.	2.	0.	1.	0.	0.	1.	0.	2.
101	1.	2.	2.	0.	0.	1.	0.	1.	0.	0.
111	3.	1.	2.	2.	0.	2.	0.	1.	3.	1.
121	1.	2.	2.	1.	0.	2.	1.	0.	1.	0.
131	1.	1.	0.	7.	0.	2.	2.	0.	4.	3.
141	1.	2.	1.	0.	2.	1.	1.	1.	5.	3.
151	2.	1.	2.	3.	0.	4.	3.	4.	7.	3.
161	2.	6.	1.	2.	4.	5.	2.	6.	4.	4.
171	7.	6.	4.	3.	7.	6.	7.	6.	10.	8.
181	12.	10.	13.	9.	9.	9.	6.	12.	3.	7.
191	10.	10.	14.	7.	11.	11.	11.	15.	19.	20.
201	22.	21.	18.	30.	25.	35.	37.	47.	45.	62.
211	81.	99.	111.	124.	156.	170.	228.	277.	325.	386.
221	464.	536.	631.	727.	832.	891.	937.	1157.	1281.	1467.
231	1545.	1535.	1629.	1577.	1543.	1269.	1080.	862.	642.	120.
241	280.	173.	108.	63.	26.	11.	5.	10.	7.	6.
251	10.	8.	7.	9.	12.	10.	21.	9.	14.	11.
261	8.	21.	20.	20.	23.	26.	21.	25.	25.	20.
271	24.	20.	11.	14.	9.	9.	8.	6.	9.	8.
281	7.	12.	11.	14.	25.	27.	23.	26.	44.	26.
291	48.	70.	62.	62.	81.	83.	119.	122.	122.	137.
[illegible]	153.	166.	182.	162.	177.	185.	190.	184.	174.	128.
[illegible]	101.	74.	73.	48.	30.	20.	17.	9.	10.	7.
321	14.	16.	19.	15.	17.	21.	21.	22.	17.	21.
331	22.	20.	38.	29.	10.	19.	46.	60.	63.	71.
341	100.	124.	143.	169.	213.	258.	328.	403.	418.	584.
351	682.	787.	924.	1020.	1209.	1291.	1440.	1602.	1584.	1831.
361	1925.	2113.	2192.	2337.	2227.	2036.	1797.	1521.	1232.	824.
371	568.	327.	202.	83.	43.	16.	6.	2.	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.	0.	1.	0.	0.	0.	1.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	2.	1.	0.	0.	0.
431	0.	0.	0.	0.	1.	0.	2.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
461	0.	1.	0.	1.	0.	0.	0.	0.	0.	1.
471	1.	0.	0.	0.	0.	0.	0.	1.	1.	0.
481	1.	2.	1.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5586	102AW	6-14-91	13:10	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	RECOVERY	W1TE2	5

RERUN

Sample Size: ? [illegible] & [illegible] Sr Carrier — Customer ID: STD

Remarks, Calculations, Results

COUNT ON DETECTOR#11 150B46
S376 ITS
STD# RESULT 7.70E-1
STD VAL 7.71E-1 %REC 99.9%
Sep Time: 18:55
Sep Date: 10-8-91

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Sue Lai				
Hrs 6C916	Hrs	Hrs	Hrs	Hrs

Date: 10-8-91 — Time Completed — Lab Use Only

11 2" 10-8-91 R 2310 R9413-5586 ΔT=4.25

6373/10 — 12

6520/10 —

Sr Calculation by DM on 10-09-1991 at 02:41:02
Det #11 2-inch mount Sr eff : .3519 Y eff : .4443

Sample size : 1 mL Dilution : 1 Method : 1

W1 : 8.0070 8.3112

Mount # 1 Decay time = 4.25 hrs

8.4019 7.68E-1

W2 : 6373/10 - 12.0 = 6.8387E-01 uCi/L strontium .890

Mount # 2 Decay time = 4.25 hrs 7.72E-1

6520/10 - 12.0 = 6.9995E-01 uCi/L strontium .907

R9413-5586

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5686	102AW	6-14-91	13:13	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	[illegible]	W1TE2	5

RERUN

Sample Size: ? [illegible] & [illegible] Sr Carrier — Customer ID: REG. BL

Remarks, Calculations, Results

REAGENT BLANK
COUNT AS uCI/L <3.28E-3 uci/l
Sep Time: 18:55
Sep Date: 10-8-91

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Sue Lai				
Hrs 6C916	Hrs	Hrs	Hrs	Hrs

Date: 10-8-91 — Time Completed — Lab Use Only

12 2" 10-8-91 R 2310 ΔT=4.25

106/10 — 10 R9414-5686

125/10 —

Sr Calculation by DM on 10-09-1991 at 02:43:26
Det #12 2-inch mount Sr eff : .4233 Y eff : .4719

W1 8.1657 8.0549

Sample size : 1 mL Dilution : 1 Method : 1

Mount # 1 Decay time = 4.25 hrs 8.1422

W2 8.2574

106/10 - 10.0 = 3.6079E-03 uCi/L strontium .917

Mount # 2 Decay time = 4.25 hrs

125/10 - 10.0 = 2.5334E-03 uCi/L strontium

.917 .873 R9414-5686

Serial No	Sample Point	Date	Time Issued	Priority
R 9416.-5786	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	uCI/G	W1BED	2

RERUN

Sample Size: ? .050 - 16m9 - 1 — Customer ID: 2291-2-4

Remarks, Calculations, Results

COUNT AS uCI/L 2291-2-2
Sep Time: 19:05 8.10 uci/l
Sep Date: 10-8-91

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Sue Lai	[illegible]			
Hrs 6C916	Hrs	Hrs	Hrs	Hrs

Date: 10-8-91 — Time Completed — Lab Use Only

11/2 10-9-91 @ 0030 DM R9416-5786 ΔT=5.42

511/10 - 12

419/10

Sr Calculation by DM on 10-09-1991 at 02:39:[illegible]
Det #11 2-inch mount Sr eff : .3519 Y eff : .4443

Sample size : 1 mL Dilution : 201 Method : 1

W1 7.8436 7.8724

Mount # 1 Decay time = 5.42 hrs

7.1061 9.06

W2 7.1345

419/10 - 12.0 = 8.4853E+00 uCi/L strontium .937

Mount # 2 Decay time = 5.42 hrs 7.14

419/10 - 12.0 = 6.4888E+00 uCi/L strontium .909

.909 .937 R9416-5786

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9416	Customer ID: 2291-2-4
Analysis: TRITIUM	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-218-113/B-0
Technologist: V. MASSIE	Date: 10-04-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5587	11		
2	REAGENT BLANK	R9414-5687	12		
3	SAMPLE 2291-2-4	R9416-5787	13		
4	FINAL LMCS CHECK STD	R9419-5587	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	34B49/1.0 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

TRITIUM ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

9

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5587	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
13	LA-218-113	RECOVERY	WIRED	

Sample Size	Customer ID
1 ml	STD

Remarks, Calculations, Results

EDP R907 ENVSTD
STD# 34849 RESULT 6.57E-1
STD VAL 6.4591E-1 %REC 101.72%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[signature] 82016	[signature] 69549			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
10-4-91		[signature]

R9419 - 5587

$$\frac{(1459.220)(1000)}{(1)(2.22E6)} = 2$$

9 3 1 2 3 3 1 1 0 8

SAN	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCH%	CP
5	**	1	5526.00	0.85	10.00	64.58	93.0	0.00	**
	ISO1	%EFF	CH1:44.64				ISO1	DPM	:12[illegible]
[illegible]	**	1	58[illegible]	0.8[illegible]	10.00	75.[illegible]	[illegible]	0.[illegible]	**
	ISO1	%EFF	CH1:44.89				ISO1	DPM	:1[illegible]
[illegible]	**	[illegible]	561[illegible]	[illegible].84	10.00	[illegible]	[illegible]	0.[illegible]	**
	ISO1	%EFF	CH1:44.[illegible]				ISO1	DPM	:1[illegible]
[illegible]	**	10	1	[illegible]	10.00	[illegible]	[illegible]	0.00	**
	ISO1	%EFF	CH1:14.[illegible]				ISO1	DPM	:11[illegible]
9	**	11	1	650.10	[illegible].4[illegible]	10.00	107.68	99.0	0.28 **
	ISO1	%EFF	CH1:4[illegible]				ISO1	DPM	:145[illegible].220

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

9 3 1 2 3 3 1 1 1 0

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VISUAL CHECK AND OVER-THE-TOP READING ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
K 9415.-5000	10%AW	6-14-91	10:41	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
APPEAR	LA-514-151 JK 4-2-92		WIHEO	0

Sample Size: 2

Customer ID: 2291-1-1

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
some solids settled
on bottom of vial

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 6/14/91 Time Completed: Lab Supervisor: Kelly Hendrickson

Serial No	Sample Point	Date	Time Issued	Priority
K 9415.-5000	10%AW	6-14-91	10:10	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
APPEAR	LA-514-151 JK 4-3-92		WIHEO	0

Sample Size: 2

Customer ID: 2291-1-1

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
small amount of solids
settled on vial bottom

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 6/14/91 Time Completed: Lab Supervisor: Kelly Hendrickson

Serial No	Sample Point	Date	Time Issued	Priority
K 9416.-5000	10%AW	6-14-91	10:16	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
APPEAR	LA-514-151 JK 4-3-92		WIHEO	0

Sample Size: 2

Customer ID: 2291-2-1

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity-clear
no solids present

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 6/14/91 Time Completed: Lab Supervisor: Kelly Hendrickson

Serial No	Sample Point	Date	Time Issued	Priority
K 9417.-5000	10%AW	6-14-91	10:18	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
APPEAR	LA-514-151 JK 4-3-92		WIHEO	0

Sample Size: 2

Customer ID: 2291-3-1

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
aqueous solution
light tint yellow
clarity-clear
solids settled on
bottom of vial

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 6/14/91 Time Completed: Lab Supervisor: Kelly Hendrickson

Serial No	Sample Point	Date	Time Issued	Priority
K 9418.-5000	10%AW	6-14-91	10:20	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
APPEAR	LA-514-151 JK 4-3-92		WIHEO	0

Sample Size: 2

Customer ID: 2291-4-1

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-D=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no organic solution
light tint yellow
aqueous solution
clarity-clear
solids-present

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 6/14/91 Time Completed: Lab Supervisor: Kelly Hendrickson

9312312

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE
WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

1+2

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5525	102AW	6-14-91	13:10	26

Determination	Method/Standard	Result Units	Charge Code	Returns
AT	LA-508-101	% RECOVERY	WIDEO	1

Sample Size: ? 10ml — Customer ID: STD

Remarks, Calculations, Results:
SSID EV-CRD
STD# 18B49 RESULT 1.48E-2
STD VAL 1.33896E-2 %REC 110.5470

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			[signature]
Mary Fraley				

Date: 6-20-91 — Time Completed: — Lab Unit Mgr: [signature] [signature]

14/2 R9413-5525 6-21-91

758/10 — Alpha Calculation by MAI on 06-21-1991 at 06:28:07
Det #14 2-inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

745/10 — Mount # 1

758/10 = 0.4 = 1.4936E-02 uCi/L alpha

Mount # 2

745/10 = 0.4 = 1.4678E-02 uCi/L alpha

3+4

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5625	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Returns
AT	LA-508-101	uCi/L	WIDEO	1

Sample Size: ? 1ml — Customer ID: REG. DL

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

<9.23E-4 uCi/L

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			[signature]
Mary Fraley				

Date: 6-20-91 — Time Completed: — Lab Unit Mgr: [signature] [signature]

14/2 R9414-5625 6-21-91

3/10 — .4
Alpha Calculation by MAI on 06-21-1991 at 06:27:38
Det #14 2-inch mount Alpha eff. : .2274
Sample size : 1 mL Dilution : 1

1/10 — Mount # 1

3/10 = 0.4 < 9.2309E-04 uCi/L alpha

Mount # 2

1/10 = 0.4 < 9.2309E-04 uCi/L alpha

3+4

Serial No.	Sample Point	Date	Time Issued	Priority
R 9417.-5725	102AW	6-14-91	13:10	26

Determination	Method/Standard	Result Units	Charge Code	Returns
AT	LA-508-101	uCi/L	WIDEO	1

Sample Size: ? .100-10-.250 — Customer ID: 2291-3-4

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

<2.16 uCi/L

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			[signature]
Mary Fraley				

Date: 6-20-91 — Time Completed: — Lab Unit Mgr: [signature] [signature]

14/2 R9417-5725 6-21-91

28/10 — Alpha Calculation by MAI on 06-21-1991 at 07:02:03
Det #14 2-inch mount Alpha eff. : .2274
Sample size : .25 mL Dilution : 101

34/10 — Mount # 1

28/10 = 0.4 = 1.9207E+00 uCi/L alpha

Mount # 2

34/10 = 0.4 = 2.4008E+00 uCi/L alpha

9 3 1 2 3 3 1 1 1 4

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

12

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5520	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-508-101	% RECOVERY	WIDEO	1

Sample Size: 10ml
Customer ID: STD

Remarks, Calculations, Results:
5516 EV-CRD
STD# 18B49 RESULT 1.341E-1 uCi/ml
STD VAL 2.35406E-1 %REC 99.070

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269 Mary Franz	S Schroe			
Date: 6-21-91	Time Completed:	Lab Manager:		

18/2 R9413-5520

9643/10 -6

Beta Calculation by SIC on 06-21-1991 at 14:22:40
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9643/10 - 6.0 = 1.3699E-01 uCi/L beta

9242/10 -6

Mount # 2

9242/10 - 6.0 = 1.3126E-01 uCi/L beta

6-6

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5620	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-508-101	uCi/G	WIDEO	1

Sample Size: 1ml
Customer ID: REG. DL

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

RERUN

9.58E-3 uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269 Mary Franz	S Schroe			
Date: 6-21-91	Time Completed:	Lab Manager:		

18/2 R9414-5620

104/10 -6

Beta Calculation by SIC on 06-21-1991 at 15:00:28
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 1

Mount # 1

104/10 - 6.0 = 6.2900E-03 uCi/L beta

150/10 -6

Mount # 2

150/10 - 6.0 = 1.2866E-02 uCi/L beta

7-8

Serial No.	Sample Point	Date	Time Issued	Priority
R 9417.-5720	102AW	6-14-91	13:18	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-508-101	uCi/G	WIDEO	1

Sample Size: .100-10-.200-10-.500
Customer ID: 2291-3-4

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

RERUN

1.473E4 uCi/ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269 Mary Franz	[signature]			
Date: 6-21-91	Time Completed:	Lab Manager:		

08/2 7-8 6-21-91 DF 10302

9864/10 -6

Beta Calculation by ALJ on 06-21-1991 at 18:28:04
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 10302

10259/10 -6

Mount # 1

9864/10 - 6.0 = 1.4439E+04 uCi/L beta

Mount # 2

10259/10 - 6.0 = 1.5020E+04 uCi/L beta

9312311 6

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9417	Customer ID: 2291-3-4
Analysis: GEA	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-548-121/D-0
Technologist: C. JOHNSON	Date: 7-31-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5530	11		
2	REAGENT BLANK	R9414-5630	12		
3	SAMPLE 2291-3-4	R9417-5730	13		
4	FINAL LMCS CHECK STD	R9419-5530	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	141B46/0.5 mL			N/A

A-6000-881 (03/92)

9 3 1 2 3 3 1 1 1 3

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

[illegible] SPECTRAN-R [illegible] SOFTWARE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

[illegible] JUL-[illegible]

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

MCA UNIT NUMBER: 2 [illegible] UNIT NUMBER: [illegible]
DETECTOR NUMBER: 1 GEOMETRY NUMBER: [illegible]
SPECTRUM SIZE: [illegible] CHANNELS
ORDER OF SMOOTHING FUNCTION: [illegible]
NUMBER OF BACKGROUND CHANNELS: [illegible] ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: [illegible]
IDENTIFICATION ENERGY WINDOW: [illegible] KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

[illegible] BACKGROUND SUBTRACTED
[illegible] CALCULATION PERFORMED
[illegible] ENERGY DIFFERENCES LISTED
[illegible] ANALYSIS PERFORMED

[illegible] DATA READ DIRECTLY FROM [illegible] ANALYZER [illegible]
[illegible] EMS

[illegible] DESCRIPTION [illegible]
[illegible] DESCRIPTION [illegible]
[illegible] VERSION [illegible]
[illegible]
[illegible] LIBRARY FILE: [illegible]

[illegible] STARTED ON [illegible]

[illegible] LIVE [illegible]
[illegible]
[illegible]

[illegible] BEFORE THE START OF COUNT

[illegible] CALIBRATION PERFORMED [illegible]
[illegible] CALIBRATION PERFORMED [illegible]

9 3 1 2 3 3 1 1 2 0

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[illegible]-JUL-91 [illegible]

[illegible]

DATA COLLECTED ON 31-JUL-91 AT [illegible]

SAMPLE ID [illegible] DATE: 0.0000 HOURS BEFORE THE START OF COLLECT.

[illegible] NUCLIDE ANALYSIS REPORT

NUCLIDE	ACTIVITY CONCENTRATION IN UCI/L MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY [illegible] EXPECT	[illegible]
[illegible]-228	LLD 5.[illegible]E+00		LLD [illegible]E+00		[illegible]	
AG-108A	LLD 5.[illegible]E+00		LLD 5.[illegible]E+00		911.[illegible]	
[illegible]	LLD 5.[illegible]E+00		LLD 5.[illegible]E+00		[illegible]	
[illegible]-137	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]-110M	LLD 6.[illegible]E+00		LLD 6.[illegible]E+00		[illegible]	
[illegible]	LLD 6.[illegible]E+00		LLD 6.[illegible]E+00		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]-[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]-[illegible]	LLD 7.[illegible]E+02		LLD [illegible]E+01		[illegible]	
[illegible]-41	LLD 8.[illegible]E-01		LLD 8.[illegible]E-01		1293.[illegible]	
[illegible]-126	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		911.[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	LLD 5.[illegible]E+00		LLD 5.[illegible]E+00		[illegible]	
[illegible]	LLD 7.[illegible]E+00		LLD 7.[illegible]E+00		[illegible]	
[illegible]	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	LLD 2.[illegible]E+01		LLD [illegible]E+01		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	1.[illegible]E+02 +-[illegible]		1.[illegible]E+01	+-2.17E+00	[illegible]	[illegible]
[illegible]					[illegible]	[illegible]
[illegible]-[illegible]	LLD [illegible]E+00		LLD [illegible]E+00		[illegible]	
[illegible]	1.[illegible]E+02 +-[illegible]		1.[illegible]E+02	+-2.70E+00	[illegible]	[illegible]
[illegible]					[illegible]	[illegible]
[illegible]-[illegible]	LLD [illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	1.[illegible]E+02 +-4.21E+00		1.[illegible]E+02	+-4.21E+00	[illegible]	[illegible]
[illegible]-[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]-137	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]-134	LLD 2.[illegible]E+00		LLD 2.[illegible]E+00		[illegible]	
[illegible]-[illegible]	LLD [illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	LLD 3.[illegible]E+00		LLD 3.[illegible]E+00		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]-[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]-[illegible]	LLD 1.[illegible]E+00		LLD 1.[illegible]E+00		[illegible]	
[illegible]-[illegible]	LLD 2.[illegible]E+00		LLD 2.[illegible]E+00		[illegible]	
[illegible]-[illegible]	LLD 3.[illegible]E+00		LLD 3.[illegible]E+00		[illegible]	
[illegible]-40	LLD 1.[illegible]E+01		LLD 1.[illegible]E+01		1460.[illegible]	
[illegible]	LLD [illegible]E+00		LLD [illegible]E+00		[illegible]	

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	LLD 1.2 E+00	LLD 1.2 E+00
TOTAL	4.18E+02 +-9.07E+00	4.18E+02 +-9.07E+00

STANDARD DEVIATION [illegible]

[illegible] = ***** NEW DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = [illegible] UC/L
TOTAL MEASURED ACTIVITY [illegible] (+-9.07E+00) UC/L
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 [illegible]
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
[illegible]	[illegible]	446.	13.1	1.[illegible]E+01
[illegible]	[illegible]	[illegible]	[illegible]	2.[illegible]E+01
[illegible]	801.[illegible]	364.	12.[illegible]	2.21E+01
[illegible]	1365.[illegible]	[illegible]	22.[illegible]	[illegible]

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC

9 3 1 2 3 3 1 1 2 4

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	20.	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]			[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	8.	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]			[illegible]	[illegible]	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE [illegible]
BACKGROUND DESCRIPTION: [illegible]
BACKGROUND COLLECT STARTED ON [illegible] AT [illegible]
BACKGROUND LIVE TIME: [illegible] SECONDS

93123 31126

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MN-34	LLD=2.69E-02	LLD=2.69E-02	[illegible]
MN-36	LLD=2.98E-02	LLD=2.98E-02	[illegible]
MN-33	LLD=2.48E-02	LLD=2.48E-02	[illegible]
MN-34	LLD=3.70E-02	LLD=3.70E-02	[illegible]
MN-[illegible]	LLD=2.30E-02	LLD=2.30E-02	[illegible]
[illegible]	LLD=2.76E-02	LLD=2.76E-02	[illegible]
[illegible]	LLD=1.12E-02	LLD=1.12E-02	[illegible]
[illegible]	LLD=1.43E-01	LLD=1.43E-01	24.[illegible]
[illegible]	LLD=1.47E-01	LLD=1.47E-01	984.4[illegible]
NP-238	LLD=1.09E-01	LLD=1.09E-01	[illegible]
NP-239	LLD=1.21E-01	LLD=1.21E-01	311.[illegible]
NA-24	LLD=2.08E-02	LLD=2.08E-02	1091.[illegible]
NA-24M	LLD=3.19E+00	LLD=3.19E+00	[illegible]
PB-210	LLD=3.32E+00	LLD=3.32E+00	[illegible]
PB-212	LLD=2.93E-02	LLD=2.93E-02	[illegible]
PB-212A	LLD=3.96E-02	LLD=3.96E-02	[illegible]
PB-212B	LLD=2.21E-01	LLD=2.21E-01	309.[illegible]
PB-214	LLD=4.77E-02	LLD=4.77E-02	351.[illegible]
PB-214A	LLD=4.77E-02	LLD=4.77E-02	351.[illegible]
PB-214B	LLD=6.13E-02	LLD=6.13E-02	[illegible]
PD-210	LLD=7.29E+02	LLD=7.29E+02	[illegible]
PD-214	LLD=2.69E+03	LLD=2.69E+03	[illegible]
PD-216	LLD=1.41E+03	LLD=1.41E+03	125.[illegible]
PM-[illegible]	LLD=1.73E+02	LLD=1.73E+02	149.[illegible]
[illegible]	LLD=2.27E+03	LLD=2.27E+03	[illegible]
[illegible]	LLD=1.34E-01	LLD=1.34E-01	[illegible]
[illegible]	LLD=1.87E-01	LLD=1.87E-01	[illegible]
[illegible]	LLD=1.97E-01	LLD=1.97E-01	1332.[illegible]
[illegible]	LLD=1.47E-01	LLD=1.47E-01	1071.[illegible]
[illegible]	LLD=2.11E+01	LLD=2.11E+01	749.[illegible]
[illegible]	LLD=2.33E-02	LLD=2.33E-02	487.[illegible]
[illegible]	LLD=4.79E-01	LLD=4.79E-01	631.[illegible]
[illegible]	LLD=1.82E-01	LLD=1.82E-01	607.[illegible]
[illegible]	LLD=7.46E-01	LLD=7.46E-01	174.[illegible]
[illegible]	LLD=2.20E-02	LLD=2.20E-02	1120.[illegible]
[illegible]	LLD=1.37E-02	LLD=1.37E-02	364.[illegible]
[illegible]	LLD=3.29E-02	LLD=3.29E-02	381.[illegible]
[illegible]	LLD=1.67E-01	LLD=1.67E-01	514.[illegible]
[illegible]	LLD=4.55E-02	LLD=4.55E-02	700.[illegible]
[illegible]	LLD=4.26E-01	LLD=4.26E-01	1393.[illegible]
[illegible]	LLD=7.33E-01	LLD=7.33E-01	1131.[illegible]
[illegible]	LLD=1.47E-01	LLD=1.47E-01	140.[illegible]
[illegible]	LLD=1.09E-02	LLD=1.09E-02	159.[illegible]
[illegible]	LLD=1.47E+00	LLD=1.47E+00	103.[illegible]
[illegible]	LLD=1.44E-02	LLD=1.44E-02	228.[illegible]
[illegible]	LLD=1.25E+00	LLD=1.25E+00	34.[illegible]
[illegible]	LLD=1.34E-01	LLD=1.34E-01	[illegible]
[illegible]	LLD=2.54E-01	LLD=2.54E-01	[illegible]
[illegible]	LLD=2.51E-01	LLD=2.51E-01	[illegible]
[illegible]	LLD=1.63E-02	LLD=1.63E-02	237.[illegible]
[illegible]	LLD=1.50E-02	LLD=1.50E-02	182.[illegible]
[illegible]	LLD=2.50E-02	LLD=2.50E-02	193.[illegible]
[illegible]	LLD=1.01E-01	LLD=1.01E-01	147.[illegible]
[illegible]	LLD=7.16E-02	LLD=7.16E-02	295.[illegible]
[illegible]	LLD=2.79E-02	LLD=2.79E-02	689.[illegible]
[illegible]	LLD=4.88E-01	LLD=4.88E-01	162.[illegible]
[illegible]	LLD=3.76E-02	LLD=3.76E-02	81.[illegible]
[illegible]	LLD=1.54E-01	LLD=1.54E-01	233.[illegible]
[illegible]	LLD=2.11E-02	LLD=2.11E-02	219.[illegible]
[illegible]	LLD=1.42E-01	LLD=1.42E-01	278.[illegible]
[illegible]	LLD=1.87E-02	LLD=1.87E-02	1535.[illegible]
[illegible]	LLD=1.19E+01	LLD=1.19E+01	1204.[illegible]
[illegible]	LLD=7.49E-02	LLD=7.49E-02	[illegible]
[illegible]	LLD=1.54E-01	LLD=1.54E-01	1115.[illegible]

BEST AVAILABLE COPY

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 03:10:17

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

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	55.19	27.70	1.16	4427.	2262.	9.4	SB/TE-X
2	372.43	186.18	1.26	9723.	603.	47.4	U-235,RA-226
3	1024.53	512.04	1.50	6026.	1210.	20.7	TL-208,NA-22,
3B		510.74			241.	11.0	ZN-65,RH-106
4C	1127.18	563.35	1.26	2042.	248.	43.6	CS-134, EU-152
5C	1139.37	569.44	1.26	1986.	470.	40.2	CS-134, BI-207
6	1210.27	604.88	1.55	2579.	3433.	5.7	CS-134
7	1244.84	622.16	1.43	2346.	483.	32.3	RH-106
8	1324.05	661.76	1.63	1615.	266023.	0.4	CS-137
8B		661.38			251.	9.7	
9C	1592.38	795.91	1.66	196.	2454.	5.4	CS-134
10C	1604.69	802.06	1.66	166.	246.	25.1	CS-134
11	2921.16	1460.56	2.53	36.	782.	7.5	K-40
11B		1460.72			581.	4.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

MULTIPLET ANALYSIS CONVERGED NORMALLY
NVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 11-DEC-90 AT 10:00:00
BACKGROUND LIVE TIME: 11292. SECONDS

K-40	1.95E+02	+-6.26E+01	1.95E+02	+-6.26E+01	1460.75	-0.19
KR-85	LLD<2.43E+03		LLD<2.43E+03		513.99	
KR-85M	LLD<6.09E+00		LLD<6.09E+00		151.17	WHC-SD-WM-DP-025
[illegible]87	LLD<2.70E+01		LLD<2.70E+01		402.58	ADDENDUM 4 REV 0
[illegible]9	LLD<3.61E+02		LLD<3.61E+02		220.90	
L[illegible]40	LLD<2.07E+00		LLD<2.07E+00		1596.20	
LA-142	LLD<2.12E+01		LLD<2.12E+01		641.83	
MN-54	LLD<2.75E+00		LLD<2.75E+00		834.83	
MN-56	LLD<3.22E+00		LLD<3.22E+00		846.76	
NA-22	LLD<3.14E+00		LLD<3.14E+00		1274.55	
NA-24	LLD<3.26E+00		LLD<3.26E+00		1368.60	
NB-94	LLD<2.97E+00		LLD<2.97E+00		702.63	
NB-95	LLD<3.01E+00		LLD<3.01E+00		765.78	
NB-97	LLD<1.27E+02		LLD<1.27E+02		657.92	
NP-237	LLD<4.45E+01		LLD<4.45E+01		86.50	
NP-238	LLD<1.16E+01		LLD<1.16E+01		984.45	
NP-239	LLD<5.09E+01		LLD<5.09E+01		277.60	
PA-233	LLD<2.16E+01		LLD<2.16E+01		311.98	
PA-234M	LLD<5.42E+02		LLD<5.42E+02		1001.03	
PB-210	LLD<1.01E+03		LLD<1.01E+03		46.50	
PB-212	LLD<1.60E+01		LLD<1.60E+01		239.00	
PB-212A	LLD<1.59E+01		LLD<1.59E+01		239.00	
PB-212B	LLD<2.32E+02		LLD<2.32E+02		300.10	
PB-214	LLD<2.34E+01		LLD<2.34E+01		351.92	
PB-214A	LLD<2.34E+01		LLD<2.34E+01		351.92	
PB-214B	LLD<3.94E+01		LLD<3.94E+01		295.21	
PO-210	LLD<2.17E+05		LLD<2.17E+05		804.00	
PO-214	LLD<8.15E+04		LLD<8.15E+04		799.70	
PO-216	LLD<1.50E+05		LLD<1.50E+05		804.90	
[illegible]239	LLD<6.55E+04		LLD<6.55E+04		129.30	
[illegible]1	LLD<2.29E+06		LLD<2.29E+06		148.57	
RA-224	LLD<1.72E+02		LLD<1.72E+02		240.99	
RA-226	3.07E+02	+-1.46E+02	3.07E+02	+-1.46E+02	186.10	0.08
RB-88	LLD<2.99E+01		LLD<2.99E+01		1836.00	
RB-89	LLD<1.47E+01		LLD<1.47E+01		1031.88	
RN-220	LLD<7.19E+03		LLD<7.19E+03		549.73	
RU-103	LLD<1.15E+01		LLD<1.15E+01		497.08	
RURH106	4.78E+02	+-1.55E+02	4.78E+02	+-1.55E+02	621.80	0.36
SB-124	LLD<9.96E+00		LLD<9.96E+00		602.72	
SB-125	LLD<7.06E+01		LLD<7.06E+01		176.33	
SC-46	LLD<3.96E+00		LLD<3.96E+00		1120.45	
SE-75	LLD<1.09E+01		LLD<1.09E+01		264.66	
SN-113	LLD<1.65E+01		LLD<1.65E+01		391.67	
SR-85	LLD<1.07E+01		LLD<1.07E+01		513.99	
SR-91	LLD<1.54E+01		LLD<1.54E+01		555.60	
SR-92	LLD<4.85E+00		LLD<4.85E+00		1383.94	
TA-182	LLD<1.10E+01		LLD<1.10E+01		1121.30	
TC-99M	LLD<5.02E+00		LLD<5.02E+00		140.51	
TE-123M	LLD<5.86E+00		LLD<5.86E+00		159.00	
TE-125M	LLD<1.59E+03		LLD<1.59E+03		109.27	
TE-132	LLD<6.96E+00		LLD<6.96E+00		228.16	
TH-228	LLD<5.17E+02		LLD<5.17E+02		84.37	
TH-234	LLD<9.65E+01		LLD<9.65E+01		92.50	
TH-234A	LLD<9.65E+01		LLD<9.65E+01		92.50	
TH-234B	LLD<3.46E+02		LLD<3.46E+02		63.30	
[illegible]8	LLD<9.62E+00		LLD<9.62E+00		583.14	
[illegible]	LLD<1.00E+01		LLD<1.00E+01		185.71	
U-235A	1.99E+01	+-9.44E+00	1.99E+01	+-9.44E+00	185.71	0.47
U-235B	LLD<4.01E+01		LLD<4.01E+01		143.76	
U-237	LLD<3.10E+01		LLD<3.10E+01		208.00	

SAMPLE STATUS REPORT FOR R 9417. 102AW 2291-3-4 TIME: 5/26/92 14:57
DISPATCHED: 6/14/91 13:19 SAMPLE HAS NOT BEEN SLURPED
ECEIVED: 6/14/91 13:31

EXT.	DETER.	RESULTS OR STATUS		OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********		***	***	******
5000	APPEAR	CLEAR LIGHT YELLOW AQUEOUS				W1BEO
5000	APPEAR	NO VISIBLE ORGANIC				W1BEO
5000	APPEAR	SOME SETTLED SOLIDS				W1BEO
5720	TB	OUT FOR RERUN				W1BEO
5720	TB	1.470000E 04 uCI/L				W1BEO
5725	AT	OUT FOR RERUN				W1BEO
5725	AT	<2.16000E 00 uCI/L				W1BEO
5730	GEA	1.61000E 04 uCI/L	Cs-137			W1BEO
5730	GEA	<2.10000E 01 uCI/L	Eu-155			W1BEO
5730	GEA	1.65000E 01 uCI/L	Sn-113			W1BEO
5730	GEA	1.75000E 02 uCI/L	Cs-134			W1BEO
5730	GEA	<1.15000E 01 uCI/L	Ru-103			W1BEO
5730	GEA	4.78000E 02 uCI/L	RuRh-106			W1BEO
5730	GEA	< 2.5700 uCI/L	Co-60			W1BEO
5730	GEA	< 2.97000 uCI/L	Nb-94			W1BEO
5730	GEA	< 7.6700E 01 uCI/l	CePr-144			W1BEO
5730	GEA	3.0700E 02 uCI/L	Ra-226			W1BEO
5740	U	OUT FOR RERUN				W1BEO
5740	U	OUT FOR RERUN				W1BEO
5740	U	INSUFFICIENT SAMPLE				W1BEO
5740	U	4.62000E-03 G/L				W1BEO
[illegible]1	PU239/40	OUT FOR RERUN				W1BEO
1	PU239/40	1.29000E 00 uCI/L				W1BEO
5782	AM241	OUT FOR RERUN				W1BEO
5782	AM241	OUT FOR RERUN				W1BEO
5782	AM241	8.5000E-01 uCI/L INSUF. SAMPLE RAN R9403 SPLIT				W1BEO
5786	SR90	OUT FOR RERUN				W1BEO
5786	SR90	OUT FOR RERUN				W1BEO
5786	SR90	2.01000E 01 uCI/L				W1BEO
5787	H3	OUT FOR RERUN				W1BEO
5787	H3	OUT FOR RERUN				W1BEO
5787	H3	5.56000E 00 uCI/L				W1BEO
5840	U	OUT FOR RERUN				W1BEO
5840	U	OUT FOR RERUN				W1BEO
5840	U	INSUFFICIENT SAMPLE				W1BEO
5840	U	4.26000E-03 G/L				W1BEO
5881	PU239/40	OUT FOR RERUN				W1BEO
5881	PU239/40	DID NOT RERUN, RAN R9416 DUP. INSTEAD				W1BEO
5882	AM241	OUT FOR RERUN				W1BEO
5882	AM241	OUT FOR RERUN				W1BEO
5882	AM241	7.6700E-01 uCI/L INSUF. SAMPLE RAN R9403 SPLIT				W1BEO
5886	SR90	OUT FOR RERUN				W1BEO
5886	SR90	OUT FOR RERUN				W1BEO
5886	SR90	2.50000E 01 uCI/L				W1BEO
5887	H3	OUT FOR RERUN				W1BEO
5887	H3	OUT FOR RERUN				W1BEO
5887	H3	5.83000E 00 uCI/L				W1BEO

END OF REPORT

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

	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	55.12	27.67	1.16	1703.	930.	14.2	SB/TE-X
2	951.50	475.54	1.61	2949.	501.	33.9	CS-134
3C	1127.41	563.46	1.48	2132.	2450.	7.2	CS-134, EU-152
4C	1139.56	569.54	1.48	2150.	4459.	5.5	CS-134, BI-207
5	1210.31	604.90	1.59	2237.	28183.	1.3	CS-134
6	1324.13	661.80	1.61	1495.	24331.	1.4	CS-137
6B		661.38			251.	9.7	
7?	1592.44	795.94	1.68	1133.	20598.	2.1	CS-134
8?	1604.68	802.06	1.68	1078.	1879.	15.3	CS-134
9?	2336.04	1167.82	1.84	641.	350.	88.3	CS-134
10?	2346.79	1173.19	1.84	591.	14512.	2.8	CO-60
11	2664.84	1332.30	2.44	191.	13049.	1.8	CO-60
12	2730.27	1365.04	2.19	131.	487.	12.2	CS-134
13C	2799.41	1399.64	1.48	53.	131.	22.2	I-132
14C	2802.59	1401.23	1.48	58.	121.	22.9	BI-214
15	2921.09	1460.53	2.60	56.	771.	7.9	K-40
15B		1460.72			581.	4.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

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

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 11-DEC-90 AT 10:00:00
BACKGROUND LIVE TIME: 11292. SECONDS

I-135	LLD<2.02E-01		LLD<2.02E-01		1260.41	
K-40	1.82E+00	+-6.35E-01	1.82E+00	+-6.35E-01	1460.75	-0.22
KR-85	LLD<1.61E+01		LLD<1.61E+01		513.99	
KR-85M	LLD<3.83E-02		LLD<3.83E-02		151.17	
KR-87	LLD<1.64E-01		LLD<1.64E-01		402.58	
[illegible]	LLD<2.27E+00		LLD<2.27E+00		220.90	
L[illegible]	LLD<4.29E-02		LLD<4.29E-02		1596.20	
LA-142	LLD<1.57E-01		LLD<1.57E-01		641.83	
MN-54	LLD<7.23E-02		LLD<7.23E-02		834.83	
MN-56	LLD<8.47E-02		LLD<8.47E-02		846.76	
NA-22	LLD<4.78E-02		LLD<4.78E-02		1274.55	
NA-24	LLD<3.85E-02		LLD<3.85E-02		1368.60	
NB-94	LLD<6.46E-02		LLD<6.46E-02		702.63	
NB-95	LLD<6.89E-02		LLD<6.89E-02		765.78	
NB-97	LLD<3.86E-01		LLD<3.86E-01		657.92	
NP-237	LLD<2.79E-01		LLD<2.79E-01		86.50	
NP-238	LLD<3.41E-01		LLD<3.41E-01		984.45	
NP-239	LLD<3.15E-01		LLD<3.15E-01		277.60	
PA-233	LLD<1.36E-01		LLD<1.36E-01		311.98	
PA-234M	LLD<1.54E+01		LLD<1.54E+01		1001.03	
PB-210	LLD<6.23E+00		LLD<6.23E+00		46.50	
PB-212	LLD<1.02E-01		LLD<1.02E-01		239.00	
PB-212A	LLD<1.02E-01		LLD<1.02E-01		239.00	
PB-212B	LLD<1.48E+00		LLD<1.48E+00		300.10	
PB-214	LLD<1.48E-01		LLD<1.48E-01		351.92	
PB-214A	LLD<1.48E-01		LLD<1.48E-01		351.92	
PB-214B	LLD<2.49E-01		LLD<2.49E-01		295.21	
PO-210	LLD<6.21E+03		LLD<6.21E+03		804.00	
PO-214	LLD<2.25E+03		LLD<2.25E+03		799.70	
PO-216	LLD<3.97E+03		LLD<3.97E+03		804.90	
PU-239	LLD<4.14E+02		LLD<4.14E+02		129.30	
[illegible]1	LLD<1.44E+04		LLD<1.44E+04		148.57	
RA-[illegible]4	LLD<1.07E+00		LLD<1.07E+00		240.99	
RA-226	LLD<9.53E-01		LLD<9.53E-01		186.10	
RB-88	LLD<4.30E-01		LLD<4.30E-01		1836.00	
RB-89	LLD<4.04E-01		LLD<4.04E-01		1031.88	
RN-220	LLD<5.91E+01		LLD<5.91E+01		549.73	
RU-103	LLD<7.04E-02		LLD<7.04E-02		497.08	
RU-RH106	LLD<1.36E+00		LLD<1.36E+00		621.80	
SB-124	LLD<1.68E-01		LLD<1.68E-01		602.72	
SB-125	LLD<4.53E-01		LLD<4.53E-01		176.33	
SC-46	LLD<9.86E-02		LLD<9.86E-02		1120.45	
SE-75	LLD<7.01E-02		LLD<7.01E-02		264.66	
SN-113	LLD<1.00E-01		LLD<1.00E-01		391.67	
SR-85	LLD<7.07E-02		LLD<7.07E-02		513.99	
SR-91	LLD<1.32E-01		LLD<1.32E-01		555.60	
SR-92	LLD<5.10E-02		LLD<5.10E-02		1383.94	
TA-182	LLD<2.80E-01		LLD<2.80E-01		1121.30	
TC-99M	LLD<3.11E-02		LLD<3.11E-02		140.51	
TE-123M	LLD<3.61E-02		LLD<3.61E-02		159.00	
TE-125M	LLD<9.91E+00		LLD<9.91E+00		109.27	
TE-132	LLD<4.40E-02		LLD<4.40E-02		228.16	
TH-228	LLD<3.27E+00		LLD<3.27E+00		84.37	
TH-234	LLD<6.13E-01		LLD<6.13E-01		92.50	
TH-234A	LLD<6.13E-01		LLD<6.13E-01		92.50	
TH-234B	LLD<2.16E+00		LLD<2.16E+00		63.30	
TI-208	LLD<9.11E-02		LLD<9.11E-02		583.14	
	LLD<6.19E-02		LLD<6.19E-02		185.71	
U-235A	LLD<6.19E-02		LLD<6.19E-02		185.71	
U-235B	LLD<2.51E-01		LLD<2.51E-01		143.76	

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9417	Customer ID: 2291-3-4
Analysis: URANIUM	Sample Prep: UNDIGESTED

Instrument: WB88807	Procedure/Rev: LA-925-106/A-2
Technologist: M. FRANZ	Date: 10-08-91
Starting Time: 16:00	Temperature: 24degC
Ending Time: 23:00	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5540	11		
2	REAGENT BLANK	R9414-5640	12		
3	SAMPLE 2291-3-4	R9417-5740	13		
4	SAM DUP OF 2291-3-4	R9417-5840	14		
5	FINAL LMCS CHECK STD	R9419-5540	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	85B38/0.1 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

9 3 1 2 3 3 1 1 4 0

URANIUM BY LASER ANALYSIS - UNDIGESTED SAMPLE

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5540	102AW	6-14-91	13:21	26

Determination	Method Standard	Result Units	Charge Code	Results
U	LA-925-106	% RECOVERY	W1BEU	3

RERUN

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

Remarks, Calculations, Results

S267 UF1C
STD# 83838 RESULT 3.07E-2 g/l Sampl: .12
STD VAL 3.10E-2 %REC 97.8 Sampl+Spk: .36
SPIKE ID/VAL 6.25-4/90838
SPIKE VOL. .100-10-.100 ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
[signature]			[signature]	
Date 10-8-91	Time Completed	Lab Unit Mgr	[signature]	

9 3 1 2 3 3 1 1 4 2

PLUTONIUM ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

4.2 7448

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5581	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	% RECOVERY	W1BED	1

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

Remarks, Calculations, Results:
EDP R211 AR001
STD# 2 43 B 43 RESULT 9.90E
STD VAL. 9.01E' %REC 109.95%
Pu236 (40 B 43) .050 ml
1 ml 8M HNO3
95% trace

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LC559	[signature]			
[signature]				

Date: 7/16/91 Time Completed: Lab Unit Mgr: [signature]

#1 7-18-91 R9413-5581

$\frac{1414}{5}$ -10

$\frac{(272.8)(2)(.5645)}{325.49} = 95\%$

3.3 3679

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5681	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	uCI/G	W1BED	1

Sample Size: ? 0-1
Customer ID: REG. BL

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L
Pu236 (40 B 43) .050 ml
1 ml 8M HNO3 <7.64E-3 uci/l
50% trace

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LC559	[signature]	[signature]		
[signature]				

Date: 7/16/91 Time Completed: Lab Unit Mgr: [signature]

#3 7-18-91 R9414-5681

$\frac{481}{5}$ -12

$\frac{(84.20)(2)(.9587)}{325.27} = 50\%$

3.3 3677

Serial No	Sample Point	Date	Time Issued	Priority
R 9417.-5781	102AW	6-14-91	13:10	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	uCI/G	W1BED	1

Sample Size: ? 09/09/92 .500 ml
Customer ID: 2291-3-4

Remarks, Calculations, Results:
COUNT AS uCI/L
Pu236 (40 B 43) .050 ml
09/09/92 Con HNO3
.500 ml
~~1.29E-3~~
1.29 uci/l

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LC559	[signature]			
[signature]				

Date: 7/16/91 Time Completed: Lab Unit Mgr: [signature]

#3 7-18-91 R9417-5781

$\frac{4618}{5}$ -12

$\frac{(911.60)(2)(.1670)}{} = 94\%$

9 3 1 2 3 3 1 1 4 4

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. 1.10

DATA REDUCTION REPORT

SAMPLE
R9413-5881
File ID: SD7418.SPC

Counted on: 7/18/91 @13: 0
Detector/Geometry number: 7/ 1
Count time: 30000. 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	2984.3	2963.9	360.265	360.265	20.000	8.554	10.000	4.659
2	264.8	263.6	303.206	303.206	16.000	8.316	8.000	4.643
3	33.2	8.5	270.274	270.274	12.000	0.304	6.000	4.651
4	2173.0	2166.7	231.160	231.160	16.000	8.414	8.000	6.595
5	6.0	4.9	177.100	177.100	56.000	2.000	28.000	0.200
6	2.6	1.9	143.658	143.658	20.000	12.140	10.000	0.417
7	3.4	2.7	101.187	101.187	16.000	13.533	8.000	1.791
8	5.2	4.4	51.722	51.722	24.000	32.402	12.000	1.233
9	1.0	0.1	21.205	21.205	12.000	0.200	6.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Pu236	0.5645	5.756	5.764	-0.008	0.04	47.04	311.88	0.140E-03
2	Pu238	0.0493	5.499	5.496	0.003	0.04	4.11	37.11	0.167E-04
	Am241		5.480	5.496	-0.016				0.128E-04
3		0.0003		5.341		0.00	0.02	0.15	0.662E-07
4	Pu239	0.3777	5.143	5.158	-0.015	0.04	31.47	204.51	0.921E-04
	Pu240		5.144	5.158	-0.014				0.921E-04
5		0.0023		4.904		0.01	0.20	1.27	0.572E-06
6		0.0019		4.746		0.06	0.16	1.05	0.472E-06
7		0.0012		4.547		0.06	0.10	0.65	0.292E-06
8		0.0027		4.314		0.15	0.23	1.47	0.660E-06
9		0.0000		4.171		0.00	0.00	0.00	0.139E-09

DETECTOR CALIBRATION

Energy(MEV) 4.071 + (0.0047)*Channel
Energy range (MeV): 4.071 TO 6.478
Efficiency = 0.1539 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	41640.0	100.000
Smoothed	41638.6	99.997
Composite fit	41665.5	100.061
Residuals	-26.9	-0.065

Analyzed by: _____
63099

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Raw Data Dump for AEA Spectrum: SP:SW7448.SPC

1	0.	0.	0.	0.	0.	0.	4.	2.	2.	4.
11	0.	4.	2.	0.	2.	1.	3.	5.	2.	2.
21	3.	4.	0.	4.	3.	0.	2.	0.	1.	2.
31	3.	2.	2.	7.	0.	3.	1.	4.	3.	2.
41	3.	2.	2.	2.	3.	2.	4.	3.	2.	5.
51	2.	5.	4.	3.	2.	1.	2.	3.	3.	0.
61	5.	0.	2.	2.	2.	1.	1.	3.	2.	2.
71	2.	1.	0.	3.	1.	0.	0.	1.	4.	2.
81	1.	2.	0.	0.	3.	3.	2.	1.	0.	1.
91	1.	1.	4.	2.	4.	1.	2.	4.	1.	2.
101	4.	4.	2.	2.	3.	1.	0.	0.	1.	1.
111	2.	1.	2.	2.	2.	3.	1.	2.	3.	2.
121	0.	1.	0.	4.	1.	2.	1.	0.	0.	2.
131	1.	1.	2.	2.	0.	0.	3.	4.	1.	3.
141	2.	0.	5.	2.	3.	2.	1.	0.	2.	3.
151	2.	1.	0.	3.	2.	0.	0.	1.	4.	2.
161	3.	1.	3.	0.	3.	0.	4.	0.	1.	1.
171	3.	5.	2.	3.	3.	5.	2.	5.	2.	0.
181	3.	2.	3.	4.	0.	3.	1.	1.	1.	1.
191	6.	4.	6.	3.	3.	5.	3.	6.	6.	5.
201	2.	7.	10.	9.	9.	6.	13.	12.	12.	17.
211	22.	39.	68.	52.	85.	111.	152.	176.	269.	292.
221	308.	434.	494.	606.	761.	955.	1168.	1255.	1368.	1421.
231	1347.	1161.	998.	816.	560.	371.	223.	141.	68.	30.
241	13.	11.	2.	0.	1.	1.	0.	1.	2.	1.
251	1.	1.	2.	0.	4.	3.	0.	0.	2.	1.
261	2.	2.	1.	3.	1.	4.	3.	4.	2.	3.
271	3.	4.	1.	1.	4.	1.	1.	3.	1.	2.
281	4.	5.	4.	9.	10.	10.	23.	26.	31.	32.
291	51.	51.	55.	56.	82.	79.	94.	106.	121.	152.
301	163.	163.	156.	154.	142.	94.	65.	41.	31.	17.
311	6.	3.	4.	2.	4.	4.	3.	4.	3.	7.
321	3.	2.	7.	7.	6.	10.	8.	10.	6.	13.
331	6.	10.	14.	12.	8.	22.	16.	11.	30.	39.
341	48.	78.	139.	190.	245.	403.	494.	592.	680.	729.
351	773.	813.	909.	1025.	1178.	1415.	1541.	1807.	1830.	1845.
361	1765.	1473.	1046.	798.	546.	285.	176.	92.	41.	11.
371	7.	0.	0.	2.	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.	1.	0.	0.	0.
421	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	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.	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.								

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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. 1.10

DATA REDUCTION REPORT

SAMPLE
P9417-0781
File ID: SD3677.SPC

Counted on: 7/18/91 @13: 0
Detector/Geometry number: 3/ 1
Count time: 30000. 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	3102.4	3198.8	364.732	364.732	24.000	13.548	12.000	7.318
2	1756.8	1779.6	307.348	307.348	20.000	13.490	10.000	8.263
3	14817.0	14883.7	234.932	234.932	24.000	13.029	12.000	8.834
4	63.6	57.6	157.240	157.240	28.000	42.976	14.000	13.143
5	7.2	5.9	96.562	96.562	36.000	146.009	18.000	32.311
6	3.5	3.0	66.189	66.189	20.000	11.816	10.000	11.011
7	3.9	3.5	41.712	41.712	36.000	27.231	18.000	18.459

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/uc
1	Pu236	0.1670	5.756	5.771	-0.015	0.07	40.43	306.16	0.138E-03
	Cm243		5.786	5.771	0.015				0.185E-03
2	Pu238	0.0906	5.499	5.495	0.004	0.06	32.80	226.22	0.102E-03
	Am241		5.480	5.495	-0.015				0.781E-04
3	Pu239	0.7357	5.143	5.148	-0.005	0.06	266.23	1321.88	0.595E-03
	Pu240		5.144	5.148	-0.004				0.595E-03
4	Np237	0.0053	4.781	4.775	0.006	0.21	1.93	11.04	0.497E-05
5	U 235	0.0010	4.396	4.483	-0.087	0.70	0.35	3.06	0.138E-05
6		0.0001		4.338		0.06	0.05	0.24	0.110E-06
7	U 238	0.0002	4.200	4.220	-0.020	0.13	0.09	0.57	0.258E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.020 + (0.0048)*Channel
Energy range (MeV): 4.020 TO 6.477
Efficiency 0.2014 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	180486.0	100.000
Smoothed	180486.0	100.000
Composite fit	180939.8	100.251
Residuals	-453.8	-0.251

Analyzed by: _____
63099

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9 3 1 2 3 3 1 1 5 2

Raw Data Dump for MEA Spectrum: SP:8[illegible]

1	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
11	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
21	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
31	1.	4.	1.	2.	2.	2.	0.	[illegible]	3.	[illegible]
[illegible]	1.	2.	2.	2.	2.	1.	[illegible]	3.	[illegible]	[illegible]
[illegible]	2.	2.	3.	4.	3.	2.	3.	2.	[illegible]	[illegible]
61	1.	4.	5.	2.	5.	1.	4.	3.	[illegible]	[illegible]
71	2.	4.	1.	1.	4.	1.	4.	4.	1.	5.
81	3.	2.	0.	5.	2.	5.	2.	1.	2.	[illegible]
91	2.	7.	3.	5.	4.	2.	3.	4.	2.	[illegible]
101	4.	2.	4.	1.	4.	3.	3.	0.	3.	[illegible]
111	1.	7.	0.	3.	5.	4.	3.	1.	[illegible]	0.
121	6.	5.	4.	4.	8.	6.	7.	10.	8.	[illegible]
131	9.	8.	3.	9.	4.	8.	6.	8.	9.	9.
141	12.	11.	15.	14.	10.	14.	26.	30.	28.	[illegible]
151	27.	33.	37.	39.	27.	41.	26.	24.	[illegible]	[illegible]
161	30.	20.	27.	20.	11.	10.	15.	9.	16.	19.
171	3.	14.	9.	10.	10.	9.	7.	8.	9.	9.
181	11.	10.	11.	12.	9.	10.	9.	15.	10.	9.
191	21.	13.	16.	13.	20.	14.	23.	16.	27.	27.
201	27.	27.	33.	50.	40.	56.	70.	99.	93.	108.
211	141.	211.	279.	363.	406.	581.	724.	922.	1230.	1487.
221	1826.	2264.	2690.	3241.	3811.	4623.	5267.	6031.	6910.	7294.
231	7978.	8332.	8667.	8626.	8407.	7682.	6837.	6109.	5090.	4088.
241	3168.	2294.	1675.	1139.	747.	461.	282.	195.	107.	69.
251	21.	16.	11.	7.	11.	4.	1.	1.	3.	3.
261	2.	2.	2.	6.	8.	5.	7.	4.	3.	11.
271	7.	8.	8.	6.	11.	4.	9.	9.	10.	3.
281	20.	25.	20.	29.	22.	31.	56.	77.	86.	118.
[illegible]	154.	205.	225.	276.	314.	392.	437.	529.	603.	747.
[illegible]	903.	941.	915.	1031.	957.	1010.	931.	885.	907.	807.
311	707.	558.	448.	332.	214.	187.	97.	76.	49.	37.
321	19.	11.	7.	6.	9.	4.	3.	5.	5.	11.
331	9.	4.	12.	13.	9.	14.	15.	26.	26.	34.
341	39.	54.	66.	107.	162.	172.	212.	318.	360.	425.
351	512.	646.	790.	949.	976.	1148.	1177.	1317.	1401.	1557.
361	1852.	1814.	1795.	1753.	1772.	1627.	1487.	1270.	1024.	904.
371	662.	434.	342.	219.	101.	94.	55.	22.	22.	7.
381	2.	3.	0.	0.	0.	0.	1.	0.	0.	0.
391	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
401	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
411	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
421	0.	1.	1.	1.	1	1.	0.	0.	0.	0.
431	0.	0.	0.	1.	1.	0.	0.	0.	0.	2.
441	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	2.	0.	2.	0.	0.	2.	0.	0.	1.	0.
471	1.	0.	0.	1.	2	0.	8.	0.	2.	[illegible]
481	3.	1.	0.	3.	0.	1.	1.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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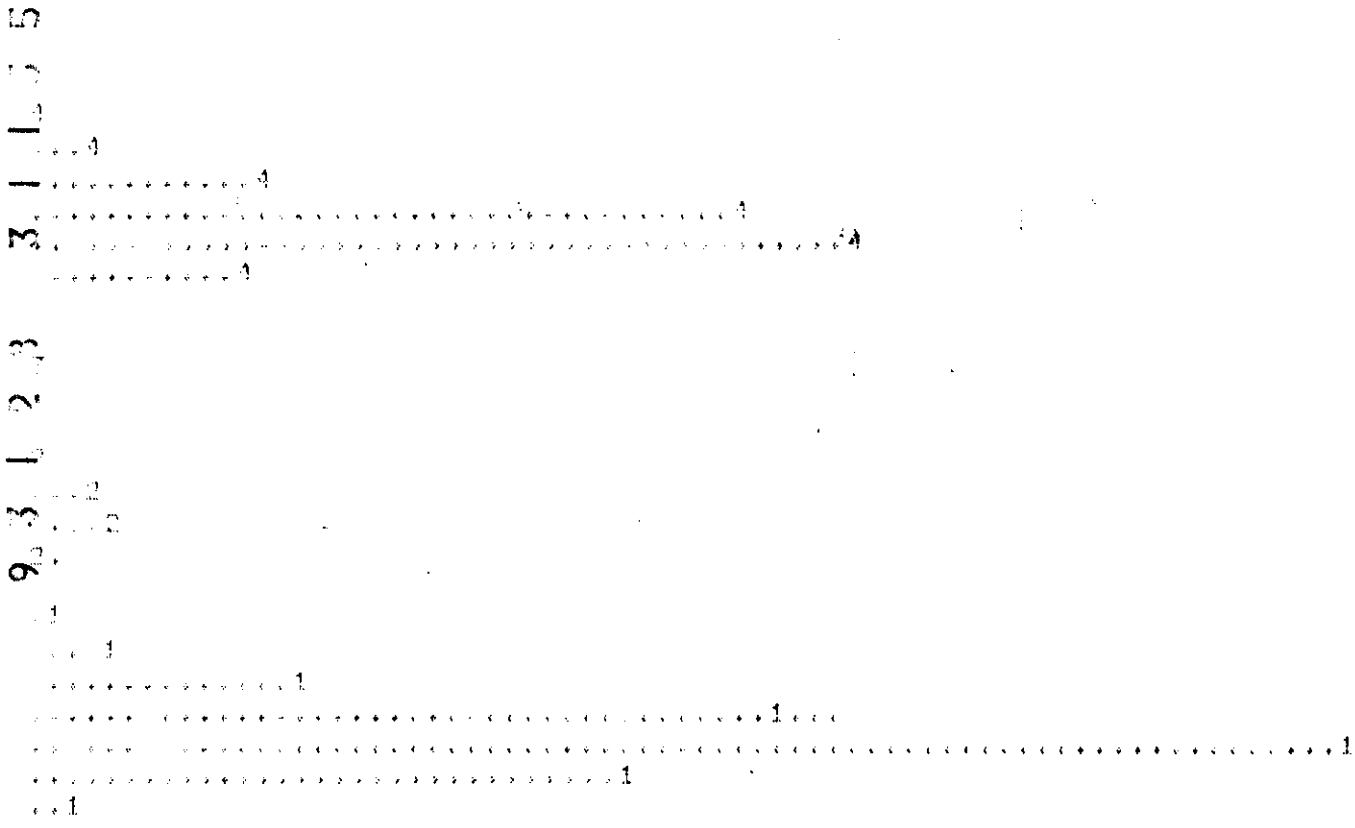

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WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9417	Customer ID: 2291-3-4
Analysis: STRONTIUM 90	Sample Prep: UNDIGESTED

Instrument: WB26870, WB27812, WB27811	Procedure/Rev: LA-220-101/D-0
Technologist: T. LEE	Date: 08-22-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5586	11		
2	REAGENT BLANK	R9414-5686	12		
3	SAMPLE 2291-3-4	R9417-5786	13		
4	SAM DUP OF 2291-3-4	R9417-5886	14		
5	FINAL LMCS CHECK STD	R9419-5786	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	150B46/1 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

9 3 1 2 3 3 1 1 3 7

Serial No.	Sample Point	Date	Time Issued	Priority
R 9417.-5886	102AW	6-14-91	13:18	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	uCI/G	W1BED	2

Sample Size: ? .050-10ml-1 & 1ml Carrier
Customer ID: 2291-3-4

Remarks, Calculations, Results:
DUPLICATE SAMPLE
COUNT AS uCI/L

RERUN

2.50E1 uci/L

SEP. DATE - 08-22-91
SEP. TIME - 13:40

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82580	[signature]			
Tania Lee				

Date: 08-22-91 | Time Completed: | Lab Unit Mgr: [signature]

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5586	102AW	6-14-91	13:23	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	% RECOVERY	W1TE2	3

Sample Size: ? 1ml & 1ml Sr Carrier
Customer ID: STD

Remarks, Calculations, Results:
COUNT ON DETECTOR#11
S376 ITS
STD# 150846 RESULT 6.98E-1
STD VAL 7.73E-1 %REC 90.3%

RERUN

SEP. TIME - 14:05
SEP. DATE - 08-22-91

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82580	[signature]			
Tania Lee			[signature]	

Date: 08-22-91 | Time Completed: | Lab Unit Mgr: [signature]

R9417-5886 11/2 S-22 @ 1920. ΔT = 5.66 DF = 201

A
G - 7.2484
r - 7.~~[illegible]~~ 1667 8-22-91
N - .0817 g

898/10 - 10
1112/10

Sr Calculation by NAC on 08-22-1991 at 19:58:25
Set #11 2-inch mount Sr eff : .3919 I eff : .444

Sample size : 1 mL Dilution : 201 Method : 1

Mount # 1 Decay time = 5.66 hrs

B
G - 7.1058
r - 7.0310
N - .0748 g

898/10 - 10.0 = 1.7273E+01 uCi/L strontium 2.31E1 .748

Mount # 2 Decay time = 5.66 hrs

1112/10 - 10.0 = 2.1905E+01 uCi/L strontium 2.68E1 .817

R9419-5586 11/2 S-22 @ 1805. ΔT = 4.0

A
G - 7.1488
r - 7.0543
N - .0945

6558/10 - 10
5720/10

Sr Calculation by NAC on 08-22-1991 at 20:00:13
Set #11 2-inch mount Sr eff : .3919 I eff : [illegible]

Sample size : 1 mL Dilution : 1 Method : 1

B
G - 7.1020
r - 7.0067
N - .0953

Mount # 1 Decay time = 4 hrs

6558/10 - 10.0 = 7.0827E-01 uCi/L strontium 7.43E-1 .953

Mount # 2 Decay time = 4 hrs

5720/10 - 10.0 = 6.1636E-01 uCi/L strontium 6.52E-1 .945

9 3 1 2 3 3 1 1 9

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5587	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
H3	LA-218-113	% RECOVERY	W1BED	2

Sample Size: 1 ml — Customer ID: STD

Remarks, Calculations, Results:
EDP R907 ENVSTD
STD# 34849 RESULT 4.49E-1
STD VAL. 6.4591E-1 %REC 69.51%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 10-4-91 — Time Completed — Lab Unit Mgr

R9413-5587

$$\frac{(996.3416)(1000)}{(1)(2.22E6)} =$$

2

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5687	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
H3	LA-218-113	uCi/L	W1BED	2

Sample Size: 1 ml — Customer ID: REG. DL

Remarks, Calculations, Results:
READERT BLANK
COUNT AS uCi/L

RERUN

6.31E-1 uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 10-4-91 — Time Completed — Lab Unit Mgr

R9414-5687

$$\frac{(1399.776)(1000)}{(1)(2.22E6} =$$

5

Serial No.	Sample Point	Date	Time Issued	Priority
R 9417.-5787	102AW	6-14-91	13:18	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
H3	LA-218-113	uCi/L	W1BED	

Sample Size: 1 ml — Customer ID: 2291-3-4

Remarks, Calculations, Results:
COUNT AS uCi/L

5.56E uci/l

RERUN
used sample #
R-9396
2291-3-1

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 10-4-91 — Time Completed — Lab Unit Mgr

R9417-5787

$$\frac{(12336.99)(1000)}{(1)(2.22E6} =$$

9 3 1 2 3 3 1 1 6 1

USER: 1 ID:H-3 TRITIUM PRESET TIME: 10.00 FRI 04 OCT 1991 12:[illegible]
SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
[illegible] MONITOR:Y POST CHECK VIAL:6 VOLUME:1
[illegible]
[illegible]

[illegible] SEP 19 ON 10 SEP 1990 [illegible]

[illegible] BACKGROUND [illegible]
[illegible] FACTOR [illegible]
[illegible] UNITS [illegible]
[illegible] CORRECTION:N
CHLORTOXUL [illegible] FACTOR:N BACKGROUND QUENCH CURVES:[illegible]
STANDARD ID:PACKARD 4002501 85% QUENCH LIMITS LOW:0.000 HIGH:[illegible]
HALF LIFE(DAYS) ISOL: 4503.900
STANDARD DPM ISOL: 46100.0

SAMPLE	PROCEDURE	CPM	DPM	TIME	EL TIME	AVG CPM	DPM%	SP	[illegible]
01	** 1 1	12.40	14.11	10.00	10.65	93.6	1.05	**	

[illegible] QUENCH CURVE: [illegible]

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

[illegible]
[illegible]
[illegible] 10.00000 [illegible] 100.000000 [illegible]

[illegible] QUENCH CURVE CORRELATION TABLE

[illegible]	CPM	CALCULATED CPM	PERCENT DIFF.	FLAG
[illegible]	[illegible]	19.00	0.00	

[illegible] LIMIT: [illegible] LOW:[illegible] HIGH:[illegible]

SAMPLE	PROCEDURE	CPM	DPM	TIME	EL TIME	AVG CPM	DPM%	SP	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**	
	[illegible] CH: [illegible]						[illegible] DPM		:[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**	
	[illegible] CH:[illegible]						[illegible] DPM		:[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**	
	[illegible] CH:[illegible]						[illegible] DPM		:[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	**	
	[illegible] CH:[illegible]						[illegible] DPM		:[illegible]

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WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9418	Customer ID: 2291-4-4
Analysis: VISUAL CHECK AND OVER-THE-TOP READING	Sample Prep: UNDIGESTED

Instrument: N/A	Procedure/Rev: LA-519-151/D-1
Technologist: M. BIERMAN	Date: 6-14-91
Starting Time: 13:30	Temperature: 25degC
Ending Time: 15:00	Chemist: N/A

	Description	Lab ID		Description	Lab ID
1	SAMPLE 2291-1-1	R9394-5000	11		
2	SAMPLE 2291-1-4	R9415-5000	12		
3	SAMPLE 2291-2-4	R9416-5000	13		
4	SAMPLE 2291-3-4	R9417-5000	14		
5	SAMPLE 2291-4-4	R9418-5000	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
N/A				N/A

A-6000-881 (03/92)

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9418	Customer ID: 2291-4-4
Analysis: TOTAL ALPHA/TOTAL BETA	Sample Prep: UNDIGESTED

Instrument: WB27809, WB27807	Procedure/Rev: LA-508-101/C-2
Technologist: M. FRANZ	Date: 06-20-91/06-21-91
Starting Time: 08:00	Temperature: N/A
Ending Time: 10:30	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5520	11		
2	REAGENT BLANK	R9414-5620	12		
3	SAMPLE 2291-4-4	R9418-5720	13		
4	FINAL LMCS CHECK STD	R9419-5520	14		
5	INITIAL LMCS CHECK STD	R9413-5525	15		
6	REAGENT BLANK	R9414-5625	16		
7	SAMPLE 2291-4-4	R9418-5725	17		
8	FINAL LMCS CHECK STD	R9419-5525	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	18B49/10.0 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

9 3 1 2 3 3 1 1 5 7

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

7 of 8

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5525	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-500-101	% RECOVERY	WIDEO	1

Sample Size	Customer ID
? 10 ml	STD

Remarks, Calculations, Results:
SS15 EV-CRD
STDN 18B49 RESULT 1.31 @ -2 mill
STD VAL 1.3389 2 %REC 97.8%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Cassidy Green				

Date	Time Completed	Lab Unit Mgr.	
6-20-91		[signature]	[signature]

14/2 R9419-5525 6-21-91

667/10 Alpha Calculation by MAZ on 06-21-1991 at 07:01:07
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Mount # 1

664/10 $\frac{667}{10}$ - 0.4 = 1.3133E-02 uCi/L alpha

Mount # 2

$\frac{664}{10}$ - 0.4 = 1.3074E-02 uCi/L alpha

9 3 1 2 8 3 1 1 5 9

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

T52

Serial No	Sample Point	Date	Time Issued	Priority
R 9419-5520	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	% RECOVERY	WIDEU	1

Sample Size	Customer ID
7 10ml	STD

Remarks, Calculations, Results:
5510 EV-CRD
STDN 18B49 RESULT 1.386 c^{-1} mill
STD VAL 1.354 x 10^{-1} %REC 102.4%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269	[signature]			
[signature]				

Date	Time Completed	Lab Manager	
6-21-91		[signature]	[signature]

18/2 R9419-5520 10ml

9992/10 - 6

9518/10

Beta Calculation by ALJ on 06-21-1991 at 18:29:53
Det 018 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9992/10 - 6.0 = 1.4198E-01 uCi/L beta

Mount # 2

9518/10 - 6.0 = 1.3521E-01 uCi/L beta

93123171

GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

1679

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5530	102AW	6-14-91	13:18	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	WIDEO	0

Sample Size	Customer ID
? .500 ml	STD

Remarks, Calculations, Results

CDLX STD# 141846
R901 STD VAL 1.4047E1
RESULT % REC 101.1%
R905 STD VAL 12.17
RESULT 1.25E2 % REC 102.7%

Long Form
Cs 137 - 1.41E2
Eu 155
Sn 113
Ru 103

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Cynthia Johnson	Em Bacca			
82376			Dyann Southrick	

Date	Time Completed	Lab Mgr
7/31/91		Todd A. Rod Dyann Southrick

1680

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5630	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G	WIDEO	0

Sample Size	Customer ID
? 1ml	REG. BL

Remarks, Calculations, Results

COUNT AS uCi/L
LASER PRINTOUT
Long Form
Cs 137 - <4.41E-2 ug/l Ru 103 - <2.33E-2
Eu 155 - <5.58E-2
Sn 113 - <3.26E-2

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Cynthia Johnson	Em Bacca			
82376				

Date	Time Completed	Lab Mgr
7/31/91		Todd A. Rod Dyann Southrick

2313

Serial No	Sample Point	Date	Time Issued	Priority
R 9418.-5730	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G	WIDEO	0

Sample Size	Customer ID
? 100-10-500	2291-4-4

Remarks, Calculations, Results

COUNT AS uCi/L
LASER PRINTOUT
Long Form
Cs 137 - 1.51E4 ug/l
Eu 155 - <7.10E1
Sn 113 - <3.95E1
Ru 103 - <2.93E1
Cs 134 - 1.62X10²
Ru 106 <4.33E⁰⁰
Co 60 <8.19
Nb 99 <7.55
Ce 144 <2.30E⁰⁰
Eu 154 <3.69E⁰¹
Ru 106 <4.12E⁰⁰

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Cynthia Johnson				David R. Gold
82376				

Date	Time Completed	Lab Mgr
7/31/91		Todd A. Rod Dyann Southrick

4176

Serial No	Sample Point	Date	Time Issued	Priority
R 9419.-5930	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	WIDEO	0

Sample Size	Customer ID
? .500 ml	STD

Remarks, Calculations, Results

CDLX STD# 141846
R901 STD VAL 14.047
RESULT 1.44E1 % REC 102.5%
R905 STD VAL 12.169
RESULT 1.24E1 % REC 101.9%

Long Form
Cs 137
Eu 155
Sn 113
Ru 103

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Cynthia Johnson				
82376				

Date	Time Completed	Lab Mgr
7/31/91		Todd A. Rod Dyann Southrick

PEAK ANALYSIS

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	267.	[illegible]	[illegible]	CS-[illegible] RU-[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	303.	[illegible]	[illegible]	CS-[illegible]
4	[illegible]	661.47	[illegible]	205.	4357.	3.1	CS-137
4P		661.82			[illegible]	[illegible]	
5C	1590.81	795.65	1.44	166.	[illegible]	3.6	CS-134
6C	1604.58	801.74	1.44	152.	364.	12.2	CS-134
7	[illegible]	1173.07	1.61	125.	[illegible]	[illegible]	CO-60
8	[illegible]	1332.28	[illegible]	34.	[illegible]	[illegible]	CO-60
9	[illegible]	1365.04	[illegible]	11.	[illegible]	[illegible]	CS-134
10	[illegible]	1460.71	[illegible]	15.	[illegible]	[illegible]	K-40
10P		1461.77			[illegible]	[illegible]	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT [illegible]

[illegible]

BACKGROUND SUBTRACTION [illegible]
[illegible]
BACKGROUND [illegible]
BACKGROUND LIVE TIME [illegible]

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LA-149	LLD 9.43E-01	LLD 9.43E-01	1576.2
LA-142	LLD 3.22E+00	LLD 3.22E+00	641.0
MN-54	LLD 1.41E+00	LLD 1.41E+00	[illegible]
MN-56	LLD 1.60E+00	LLD 1.60E+00	94.[illegible]
MO-99	LLD 7.95E-01	LLD 7.95E-01	1278.[illegible]
NA-24	LLD 2.00E+00	LLD 2.00E+00	1368.4
NB-95	LLD 1.14E+00	LLD 1.14E+00	765.[illegible]
NB-97	LLD 1.30E+00	LLD 1.30E+00	785.[illegible]
NI-63	LLD 5.09E+00	LLD 5.09E+00	657.[illegible]
NP-237	LLD 6.47E+00	LLD 6.47E+00	86.[illegible]
PA-233	LLD 4.03E+00	LLD 4.03E+00	534.[illegible]
PB-203	LLD 3.51E+00	LLD 3.51E+00	279.[illegible]
PD-107	LLD 2.77E+00	LLD 2.77E+00	311.[illegible]
PD-109M	LLD 2.83E+02	LLD 2.83E+02	1401.[illegible]
PB-210	LLD 1.63E+02	LLD 1.63E+02	46.[illegible]
PB-212	LLD 1.73E+00	LLD 1.73E+00	239.[illegible]
PB-212A	LLD 1.72E+00	LLD 1.72E+00	239.[illegible]
PB-212B	LLD 2.82E+01	LLD 2.82E+01	300.[illegible]
PB-214	LLD 2.70E+00	LLD 2.70E+00	351.[illegible]
PB-214A	LLD 2.70E+00	LLD 2.70E+00	351.[illegible]
PB-214B	LLD 5.06E+00	LLD 5.06E+00	295.[illegible]
PD-112	LLD 1.49E+03	LLD 1.49E+03	304.[illegible]
PD-114	LLD 6.44E+01	LLD 6.44E+01	799.[illegible]
PD-116	LLD 1.25E+03	LLD 1.25E+03	504.[illegible]
PD-117	LLD 5.29E+03	LLD 5.29E+03	129.[illegible]
PD-121	LLD 3.23E+03	LLD 3.23E+03	143.[illegible]
PM-144	LLD 2.11E+01	LLD 2.11E+01	[illegible]
PM-147	LLD 2.06E+01	LLD 2.06E+01	196.[illegible]
PO-210	LLD [illegible].11E+00	LLD [illegible].11E+00	1836.[illegible]
PR-142	LLD 7.78E+00	LLD 7.78E+00	1031.[illegible]
PR-143	LLD 1.17E+03	LLD 1.17E+03	548.[illegible]
PR-144	LLD 1.33E+00	LLD 1.33E+00	477.[illegible]
PR-144M	LLD 7.61E+01	LLD 2.61E+01	621.[illegible]
PT-193	LLD 4.32E+00	LLD 4.32E+00	402.[illegible]
PT-197	LLD [illegible].77E+00	LLD [illegible].77E+00	176.[illegible]
PU-238	LLD 1.36E+00	LLD 1.36E+00	1120.[illegible]
PU-239	LLD 1.41E+00	LLD 1.41E+00	264.[illegible]
PU-240	LLD 1.37E+00	LLD 1.37E+00	271.[illegible]
PU-241	LLD 1.37E+00	LLD 1.37E+00	217.[illegible]
PU-242	LLD 1.44E+00	LLD 1.44E+00	255.[illegible]
RA-226	LLD 8.77E-01	LLD 8.77E-01	1387.[illegible]
RA-228	LLD 4.63E+00	LLD 4.63E+00	1121.[illegible]
RB-87	LLD [illegible].33E-01	LLD [illegible].33E-01	140.[illegible]
RE-187	LLD [illegible].66E-01	LLD [illegible].66E-01	154.[illegible]
RE-188M	LLD 2.03E+03	LLD 2.03E+03	107.[illegible]
RH-102	LLD 7.12E-01	LLD 7.12E-01	223.[illegible]
RH-106	LLD 4.47E+01	LLD 4.47E+01	[illegible]
RH-103	LLD 1.40E+01	LLD 1.40E+01	[illegible]
RH-103M	LLD 1.40E+01	LLD 1.40E+01	[illegible]
RH-105M	LLD 4.52E+01	LLD 4.52E+01	[illegible]
RU-106	LLD 1.65E+00	LLD 1.65E+00	387.[illegible]
S-35	LLD 1.35E+00	LLD 1.35E+00	167.[illegible]
S-35A	LLD 1.35E+00	LLD 1.35E+00	167.[illegible]
S-35B	LLD 3.27E+00	LLD 3.27E+00	147.[illegible]
S-35C	LLD 3.71E+00	LLD 3.71E+00	208.[illegible]
SB-124	LLD 4.47E+00	LLD 4.47E+00	683.[illegible]
SB-125M	LLD 3.40E+01	LLD 3.40E+01	167.[illegible]
SE-75	LLD 2.47E+00	LLD 2.47E+00	91.[illegible]
SE-173M	LLD 2.24E+00	LLD 2.24E+00	233.[illegible]
SE-135	LLD 1.04E+00	LLD 1.04E+00	249.[illegible]
SE-138	LLD 7.79E+00	LLD 7.79E+00	258.41
SM-151	LLD 6.77E-01	LLD 6.77E-01	1836.[illegible]
SN-121	LLD 7.48E+00	LLD 7.48E+00	1204.[illegible]
SN-123	LLD 4.51E+00	[illegible]	[illegible]

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GAMMA SPECTRUM ANALYSIS

CANBERRA SPECTRAN-F [illegible] SOFTWARE

[illegible]

ANALYSIS PARAMETERS

MCA UNIT NUMBER: 2 MCA ADC NUMBER: 1[illegible]
DETECTOR NUMBER: 1 GEOMETRY NUMBER: 12
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: [illegible]
NUMBER OF BACKGROUND CHANNELS: [illegible] ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: [illegible]
IDENTIFICATION ENERGY WINDOW: [illegible]
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
[illegible] CALCULATION PERFORMED
[illegible] ENERGY DIFFERENCE [illegible]
[illegible]

[illegible] CHANNEL ANALYZER [illegible]
[illegible]

[illegible]

SAMPLE COLLECTED ON 21-JUL-[illegible]

[illegible]
REAL TIME: [illegible] SECONDS
[illegible] TIME: [illegible]

[illegible] HOURS BEFORE THE START OF COLLECT[illegible]

ENERGY CALIBRATION PERFORMED [illegible]
EFFICIENCY CALIBRATION PERFORMED [illegible]

9312331179

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31-JUL-91 [illegible]

SAMPLE: 91-414-5630
DATA COLLECTED ON 31-JUL-91 AT [illegible]
DECAYED TO 0. DAYS- 0.0000 HOURS BEFORE THE START OF COLLECT

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

NUCLIDE	ACTIVITY CONCENTRATION IN UCI/L MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD 7.56E-02		LLD 7.56E-02		911.[illegible]	
AC-228A	LLD 7.56E-02		LLD 7.56E-02		911.1[illegible]	
AC-228B	LLD 1.37E-01		LLD 1.37E-01		338.[illegible]	
AG-108M	LLD [illegible].19E-02		LLD 2.19E-02		433.[illegible]	
AG-110M	LLD 4.02E-02		LLD 4.02E-02		657.7[illegible]	
AM-241	LLD 1.27E-01		LLD 1.27E-01		59.54	
AM-243	LLD 4.71E-02		LLD 4.71E-02		74.[illegible]	
AM-243A	LLD 4.71E-02		LLD 4.71E-02		74.67	
AM-243B	LLD 4.12E+00		LLD 4.12E+00		43.[illegible]	
AR-41	LLD 2.83E-02		LLD 2.83E-02		1293.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		911.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		14[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		53[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		1[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		58[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		60[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		11[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		17[illegible]	
[illegible]	LLD [illegible]		LLD 4.[illegible]E-01		88.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		1[illegible]	
[illegible]	LLD [illegible]		LLD 2.[illegible]E-02		145.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		133.5[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		34[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		122.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		810.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		1332.[illegible]	
[illegible]	LLD 1.[illegible]E-01		LLD 1.[illegible]E-01		320.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		795.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD 4.41E-02		LLD [illegible].41E-02		661.[illegible]	
[illegible]	LLD 7.40E-02		LLD 5.40E-02		1435.[illegible]	
EU-152	LLD 1.[illegible]E-01		LLD 1.[illegible]E-01		140[illegible]	
EU-154	LLD 4.[illegible]E-02		LLD [illegible]		1274.[illegible]	
EU-155	LLD [illegible]E-02		LLD 7.[illegible]E-02		105.31	
FE-59	LLD [illegible]		LLD [illegible]		1099.[illegible]	
[illegible]	LLD [illegible]		LLD 2.[illegible]E-02		35[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		279.2[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		364.48	
[illegible]	LLD [illegible]		LLD [illegible]		667.[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		529.[illegible]	
[illegible]	LLD [illegible]		LLD 3.[illegible]E-02		847.[illegible]	
[illegible]	LLD 1.0[illegible]E-01		LLD 1.03E-01		1260.[illegible]	
K-40	LLD 9.[illegible]E-01		LLD 9.[illegible]E-01		1460.[illegible]	
KR-85	LLD [illegible]E+00		LLD [illegible]E+00		513.[illegible]	
KR-85M	LLD 1.[illegible]E-02		LLD 1.[illegible]E-02		151.[illegible]	
KR-87	LLD 4.[illegible]E-02		LLD 4.[illegible]E-02		402.[illegible]	
[illegible]	[illegible]		[illegible]		[illegible]	

BEST AVAILABLE COPY

9 3 1 2 3 3 1 1 3 1

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 03:16:42

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 2.0
DETECTOR NUMBER: 2 / GEOMETRY NUMBER: 42
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AND:
ANALYZED BY: MAX

SAMPLE DESCRIPTION: R9418-5730
GEOMETRY DESCRIPTION: 22ML LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 4.9505E-03
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 1-AUG-91 AT 02:26:27

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

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

ENERGY CALIBRATION PERFORMED 17-MAR-89
EFFICIENCY CALIBRATION PERFORMED 16-MAY-91

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 03:16:42

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

`MPLE: R9418-5730
` COLLECTED ON 1-AUG-91 AT 02:26:27
L /ED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<2.91E+01		LLD<2.91E+01		911.07	
AC-228A	LLD<2.91E+01		LLD<2.91E+01		911.10	
AC-228B	LLD<1.70E+02		LLD<1.70E+02		338.40	
AG-108M	LLD<3.51E+01		LLD<3.51E+01		433.94	
AG-110M	LLD<2.73E+02		LLD<2.73E+02		657.76	
AM-241	LLD<1.52E+02		LLD<1.52E+02		59.54	
AM-243	LLD<4.15E+01		LLD<4.15E+01		74.67	
AM-243A	LLD<4.15E+01		LLD<4.15E+01		74.67	
AM-243B	LLD<4.47E+03		LLD<4.47E+03		43.10	
AR-41	LLD<1.35E+01		LLD<1.35E+01		1293.64	
AU-198	LLD<2.91E+01		LLD<2.91E+01		411.80	
BA-133	LLD<3.74E+01		LLD<3.74E+01		356.02	
BA-139	LLD<8.37E+01		LLD<8.37E+01		165.85	
BA-140	LLD<9.73E+01		LLD<9.73E+01		537.27	
BA-141	LLD<7.92E+01		LLD<7.92E+01		190.23	
BE-7	LLD<3.12E+02		LLD<3.12E+02		477.59	
BI-207	LLD<2.15E+01		LLD<2.15E+01		569.70	
`2	LLD<8.47E+01		LLD<8.47E+01		727.27	
BI-214	LLD<7.41E+01		LLD<7.41E+01		609.32	
BI-214A	LLD<7.41E+01		LLD<7.41E+01		609.32	
BI-214B	LLD<7.37E+01		LLD<7.37E+01		1120.28	
BI-214C	LLD<4.86E+01		LLD<4.86E+01		1764.51	
CD-109	LLD<4.97E+02		LLD<4.97E+02		88.03	
CE-139	LLD<1.89E+01		LLD<1.89E+01		165.85	
CE-141	LLD<2.94E+01		LLD<2.94E+01		145.44	
CEPR144	LLD<2.30E+02		LLD<2.30E+02		133.51	
CO-56	LLD<9.40E+00		LLD<9.40E+00		846.76	
CO-57	LLD<1.47E+01		LLD<1.47E+01		122.06	
CO-58	LLD<1.06E+01		LLD<1.06E+01		810.75	
CO-60	LLD<8.19E+00		LLD<8.19E+00		1332.50	
CR-51	LLD<2.06E+02		LLD<2.06E+02		320.09	
CS-134	1.62E+02	+-2.10E+01	1.62E+02	+-2.10E+01	795.84	0.00
					604.70	-0.01
CS-136	LLD<9.94E+00		LLD<9.94E+00		818.51	
CS-137	1.51E+04	+-3.48E+02	1.51E+04	+-3.48E+02	661.65	0.03
CS-138	LLD<2.26E+01		LLD<2.26E+01		1435.86	
EU-152	LLD<4.64E+01		LLD<4.64E+01		1408.01	
EU-154	LLD<3.69E+01		LLD<3.69E+01		1274.45	
EU-155	LLD<7.10E+01		LLD<7.10E+01		105.31	
FE-59	LLD<1.77E+01		LLD<1.77E+01		1099.25	
HF-181	LLD<3.74E+01		LLD<3.74E+01		482.20	
HG-203	LLD<2.17E+01		LLD<2.17E+01		279.20	
`1	LLD<2.81E+01		LLD<2.81E+01		364.48	
2	LLD<1.28E+02		LLD<1.28E+02		667.69	
I-133	LLD<2.72E+01		LLD<2.72E+01		529.69	
I-134	LLD<1.49E+01		LLD<1.49E+01		847.03	
I-135	LLD<4.99E+01		LLD<4.99E+01		1260.41	

W-187	LLD<3.59E+01	LLD<3.59E+01	685.74
XE-131M	LLD<7.76E+02	LLD<7.76E+02	163.98
XE-133	LLD<5.87E+01	LLD<5.87E+01	81.00
XE-133M	LLD<1.73E+02	LLD<1.73E+02	233.21
XE-135	LLD<1.99E+01	LLD<1.99E+01	249.79
XE-138	LLD<1.52E+02	LLD<1.52E+02	258.41
Y-88	LLD<1.08E+01	LLD<1.08E+01	1836.06
Y-91	LLD<5.25E+03	LLD<5.25E+03	1204.90
Y-91M	LLD<3.10E+01	LLD<3.10E+01	555.60
ZN-65	LLD<2.87E+01	LLD<2.87E+01	1115.55
ZR-95	LLD<1.25E+01	LLD<1.25E+01	756.73
ZR-97	LLD<1.01E+01	LLD<1.01E+01	743.33
TOTAL	1.55E+04 +-4.01E+02	1.55E+04 +-4.01E+02	

STANDARD DEVIATION = 0.19

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.02E-08 UC/LI
TOTAL MEASURED ACTIVITY = 1.55E+04 (+-4.01E+02) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

DETECTED PEAKS WERE USED IN THE ANALYSIS

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*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                                          WHC-SD-WM-DP-025
CANBERRA SPECTRAN-F V2.06  SOFTWARE       ADDENDUM 4 REV 0

222-S COUNTING ROOM WESTINGHOUSE HANFORD          01-AUG-91  04:14:13


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

MCA UNIT NUMBER:   1     /     ADC UNIT NUMBER: 1.0
DETECTOR NUMBER:    4    /     GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:     5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANO:
ANALYZED BY:        MAX

[illegible] DESCRIPTION: R9419-5530
[illegible]RY DESCRIPTION:  134B40-A 22/LIQ
SAMPLE SIZE:   1.0000E-03 LI       / CONVERSION FACTOR: 5.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON  1-AUG-91 AT 03:23:45

COLLECT LIVE TIME:    3000. SECONDS
        REAL TIME:    3018. SECONDS
        DEAD TIME:     0.60 %

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 14-MAR-91
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222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 04:14:13

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE: R9419-5530
DATA COLLECTED ON 1-AUG-91 AT 03:23:45
[illegible]ED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<3.08E-01		LLD<3.08E-01		911.07	
AC-228A	LLD<3.08E-01		LLD<3.08E-01		911.10	
AC-228B	LLD<4.34E-01		LLD<4.34E-01		338.40	
AG-108M	LLD<6.85E-02		LLD<6.85E-02		433.94	
AG-110M	LLD<3.39E-01		LLD<3.39E-01		657.76	
AM-241	LLD<2.63E-01		LLD<2.63E-01		59.54	
AM-243	LLD<8.24E-02		LLD<8.24E-02		74.67	
AM-243A	LLD<8.24E-02		LLD<8.24E-02		74.67	
AM-243B	LLD<7.36E+00		LLD<7.36E+00		43.10	
AR-41	LLD<6.67E-02		LLD<6.67E-02		1293.64	
AU-198	LLD<7.09E-02		LLD<7.09E-02		411.80	
BA-133	LLD<8.82E-02		LLD<8.82E-02		356.02	
BA-139	LLD<1.59E-01		LLD<1.59E-01		165.85	
BA-140	LLD<2.64E-01		LLD<2.64E-01		537.27	
BA-141	LLD<1.65E-01		LLD<1.65E-01		190.23	
BE-7	LLD<6.50E-01		LLD<6.50E-01		477.59	
BI-207	LLD<7.24E-02		LLD<7.24E-02		569.70	
BI-212	LLD<5.51E-01		LLD<5.51E-01		727.27	
[illegible]	LLD<7.00E-01		LLD<7.00E-01		609.32	
[illegible]4A	LLD<7.00E-01		LLD<7.00E-01		609.32	
BI-214B	LLD<6.55E-01		LLD<6.55E-01		1120.28	
BI-214C	LLD<2.64E-01		LLD<2.64E-01		1764.51	
CD-109	LLD<1.05E+00		LLD<1.05E+00		88.03	
CE-139	LLD<3.61E-02		LLD<3.61E-02		165.85	
CE-141	LLD<5.99E-02		LLD<5.99E-02		145.44	
GEPR144	LLD<4.70E-01		LLD<4.70E-01		133.51	
CO-56	LLD<7.50E-02		LLD<7.50E-02		846.76	
CO-57	LLD<3.10E-02		LLD<3.10E-02		122.06	
CO-58	LLD<6.91E-02		LLD<6.91E-02		810.75	
CO-60	1.24E+01	+-2.34E-01	1.24E+01	+-2.34E-01	1332.50	-0.20
					1173.24	-0.04
CR-51	LLD<4.95E-01		LLD<4.95E-01		320.09	
CS-134	1.45E+01	+-3.19E-01	1.45E+01	+-3.19E-01	795.84	0.09
					604.70	0.20
CS-136	LLD<7.65E-02		LLD<7.65E-02		818.51	
CS-137	1.44E+01	+-2.23E-01	1.44E+01	+-2.23E-01	661.65	0.15
CS-138	LLD<7.96E-02		LLD<7.96E-02		1435.86	
EU-152	LLD<3.62E-01		LLD<3.62E-01		1408.01	
EU-154	LLD<1.35E-01		LLD<1.35E-01		1274.45	
EU-155	LLD<1.33E-01		LLD<1.33E-01		105.31	
FE-59	LLD<1.68E-01		LLD<1.68E-01		1099.25	
HF-181	LLD<8.14E-02		LLD<8.14E-02		482.20	
HG-203	LLD<5.59E-02		LLD<5.59E-02		279.20	
I-[illegible]	LLD<6.95E-02		LLD<6.95E-02		364.48	
	LLD<2.61E-01		LLD<2.61E-01		667.69	
I-133	LLD<7.43E-02		LLD<7.43E-02		529.69	
I-134	LLD<1.09E-01		LLD<1.09E-01		847.03	

U-237	LLD<1.87E-01	LLD<1.87E-01	208.00
W-187	LLD<2.35E-01	LLD<2.35E-01	685.74
XE-131M	LLD<1.65E+00	LLD<1.65E+00	163.98
XE-133	LLD<1.04E-01	LLD<1.04E-01	81.00
133M	LLD<3.90E-01	LLD<3.90E-01	233.21
5	LLD<5.00E-02	LLD<5.00E-02	249.79
XE 8	LLD<3.76E-01	LLD<3.76E-01	258.41
Y-88	LLD<4.07E-02	LLD<4.07E-02	1836.06
Y-91	LLD<2.37E+01	LLD<2.37E+01	1204.90
Y-91M	LLD<1.00E-01	LLD<1.00E-01	555.60
ZN-65	LLD<2.01E-01	LLD<2.01E-01	1115.55
ZR-95	LLD<1.23E-01	LLD<1.23E-01	756.73
ZR-97	LLD<7.04E-02	LLD<7.04E-02	743.33
TOTAL	4.31E+01 +-7.81E-01	4.31E+01 +-7.81E-01	

STANDARD DEVIATION = 0.18

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.27E-09 UC/LI
TOTAL MEASURED ACTIVITY = 4.31E+01 (+-7.81E-01) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
55.12	27.67	930.	14.2	5.15E+02
951.50	475.54	501.	33.9	3.50E+00
1127.41	563.46	2450.	7.2	1.99E+01
1139.56	569.54	4459.	5.5	3.66E+01
1604.68	802.06	1879.	15.3	2.11E+01
2336.04	1167.82	350.	88.3	5.50E+00
2730.27	1365.04	487.	12.2	8.73E+00
2799.41	1399.64	131.	22.2	2.40E+00
2802.59	1401.23	121.	22.9	2.22E+00

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5540	102AW	6-14-91	13:8	26

Determination	Method/Standard	Result Unit	Charge Code	Reruns
U	LA-925-106	RERUN	W1BEO	3

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

Remarks, Calculations, Results:
S267 UF1C
STD# 85B08 RESULT 3.07E-2
STD VAL 3.14E-2 %REC 97.8%
SPIKE ID/VAL 90B38
SPIKE VOL. .100-10-.100

Sampl = .16 - .12
Sampl Spk = .48 - .36

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Franz				

Date: 10-8-91
Time Completed:
Lab Unit Sign:

R9413-5540 -

$$\frac{[(.16)(.982)](.1)(6.25E^{-4})(1010)}{.48-[(.16)(.982)]} = 3.07E^{-2}\ g/l$$

$$\frac{(.12)(.982)(6.25E^{-4})(.1)(1010)}{.36-[(.982)(.12)]} = 3.07E^{-2}\ g/l$$

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5640	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Unit	Charge Code	Reruns
U	LA-925-106	G/G RERUN	W1BEO	3

Sample Size: ? 1 ml
Customer ID: REG. BL

Remarks, Calculations, Results:
REAGENT BLANK

$$\frac{(<.02)(.985)(5.68E^{-5})(.1)(1)}{.30-[(.02)(.985)]} = < 3.99E^{-7}\ g/l$$

BLK = .01
Blk+Spk = .30
↓ Spk Val/Gd = 5.68-5/90B38
Spk Vol = .100-10-.100

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Franz				

Date: 10-8-91
Time Completed:
Lab Unit Sign:

Serial No	Sample Point	Date	Time Issued	Priority
R 9418.-5740	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Unit	Charge Code	Reruns
U	LA-925-106	G/G RERUN	W1BEO	3

Sample Size: ? .100-10-.100 ml
Customer ID: 2291-4-4

Remarks, Calculations, Results:
Sampl = .16
Sampl+Spk = .39
Spk Val = 5.68-5
Spk Vol = .100-10-.100 ml
3.87E-3 g/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
Mary Franz				

Date: 10-8-91
Time Completed:
Lab Unit Sign:

R9418-5740

$$\frac{(.16)(.982)(5.68E^{-5})(.1)(1010)}{.39-[(.982)(.16)]}$$

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9418	Customer ID: 2291-4-4
Analysis: PLUTONIUM 239/240	Sample Prep: UNDIGESTED

Instrument: WB57237	Procedure/Rev: LA-503-156/C-3
Technologist: M. BIERMAN	Date: 7-16-91
Starting Time: 08:00	Temperature: 25degC
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5581	11		
2	REAGENT BLANK	R9414-5681	12		
3	SAMPLE 2291-4-4	R9418-5781	13		
4	FINAL LMCS CHECK STD	R9419-5581	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	43B43/0.1 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

H.V. 6002

Sample No.	Sample Point	Date	Time Issued	Priority
R 9419.-5501	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Return
PU239/40	LA-503-156	% RECOVERY	W1BEQ	1

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

Remarks, Calculations, Results

EDP R211 AR001
STD# 43043 RESULT 1.004E²
STD VAL. 2.0N4E¹ %REC 111.4%
Pu 236 (43043) .050 ml
1 ml 8 ml HNO3
99% trace

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6559	[signature]		[signature]	
[signature]				

Date	Time Completed	Last Use Only	
7/14/91		[signature]	[signature]

#1 7-8-91 R 9419-5591

$\frac{1477}{5} - 10$

$\frac{(285.4)(2)(.5633)}{325.49} = 99\%$

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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. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE
R-9114-5691
File ID: SD3679.SPC

Counted on: 7/19/91 @ 11:0
Detector/Geometry number: 3, 1
Count time: 30000. 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	1507.6	1617.7	344.921	344.921	20.000	13.722	10.000	7.371
2	50.8	49.0	305.971	305.971	24.000	14.941	12.000	6.920
3	7.5	7.6	266.307	266.307	24.000	13.783	12.000	6.771
4	4.1	3.2	233.227	233.227	20.000	13.220	10.000	6.257

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/g.
1	Pu238	0.9587	5.756	5.772	-0.016	0.07	70.05	156.32	0.701E-04
	Cm243		5.786	5.772	0.014				0.915E-04
	Pu239	0.0308	5.499	5.489	0.010	0.07	0.99	6.84	0.308E-05
	Am241		5.490	5.489	-0.009				0.236E-05
2		0.0016		5.298		0.07	0.15	0.73	0.330E-06
3	Pu239	0.0059	5.113	5.139	0.001	0.06	0.19	0.94	0.423E-06
	Pu240		5.141	5.139	0.005				0.423E-06

DETECTOR CALIBRATION
Energy(MEV) 1.020 + (0.0018)*Channel
Energy range (MeV): 1.020 TO 6.477
Efficiency = 0.2014 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	15951.0	100.000
Smoothed	15951.0	100.000
Composite fit	16090.7	100.876
Residuals	-139.7	-0.876

Analyzed by: _____
61453

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1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
41	0.	0.	0.	0.	1.	0.	0.	1.	1.	1.
[illegible]	1.	1.	0.	0.	1.	1.	0.	0.	1.	1.
[illegible]	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.
81	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.
91	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
101	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
111	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	1.	0.	0.	2.	0.	0.	0.	0.	0.
131	1.	0.	1.	1.	0.	1.	0.	0.	0.	1.
141	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.
151	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
161	0.	0.	1.	1.	1.	0.	1.	0.	0.	0.
171	0.	0.	0.	0.	1.	3.	0.	0.	0.	0.
181	2.	1.	2.	1.	3.	1.	1.	0.	0.	1.
191	0.	0.	2.	1.	2.	1.	1.	0.	0.	0.
201	0.	0.	0.	1.	1.	1.	3.	2.	1.	1.
211	3.	0.	1.	0.	0.	1.	1.	1.	0.	0.
221	1.	1.	1.	3.	0.	0.	2.	2.	2.	4.
231	2.	2.	4.	1.	0.	5.	2.	0.	0.	0.
241	0.	1.	1.	1.	0.	0.	2.	0.	0.	2.
251	1.	2.	1.	0.	1.	4.	0.	2.	2.	3.
261	4.	7.	6.	3.	5.	4.	4.	2.	7.	1.
271	3.	4.	2.	2.	3.	3.	0.	0.	1.	3.
281	3.	3.	3.	0.	3.	3.	1.	6.	8.	5.
291	7.	12.	10.	11.	12.	10.	11.	15.	18.	22.
[illegible]	24.	26.	30.	30.	31.	30.	28.	17.	23.	13.
[illegible]	15.	14.	11.	11.	12.	8.	7.	1.	6.	2.
321	2.	1.	2.	2.	0.	2.	4.	1.	5.	5.
331	6.	5.	8.	6.	5.	17.	4.	11.	23.	16.
341	22.	36.	46.	51.	76.	90.	117.	159.	130.	204.
351	275.	310.	379.	429.	480.	528.	621.	649.	759.	786.
361	852.	881.	892.	905.	879.	821.	748.	709.	572.	480.
371	370.	220.	177.	127.	82.	40.	28.	19.	11.	5.
381	3.	0.	1.	0.	0.	0.	1.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
411	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
421	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
431	2.	0.	0.	0.	0.	0.	0.	0.	1.	0.
441	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	1.	0.	0.	3.	0.	0.	0.	0.
471	0.	0.	2.	0.	1.	0.	3.	0.	0.	0.
481	0.	1.	2.	1.	2.	0.	1.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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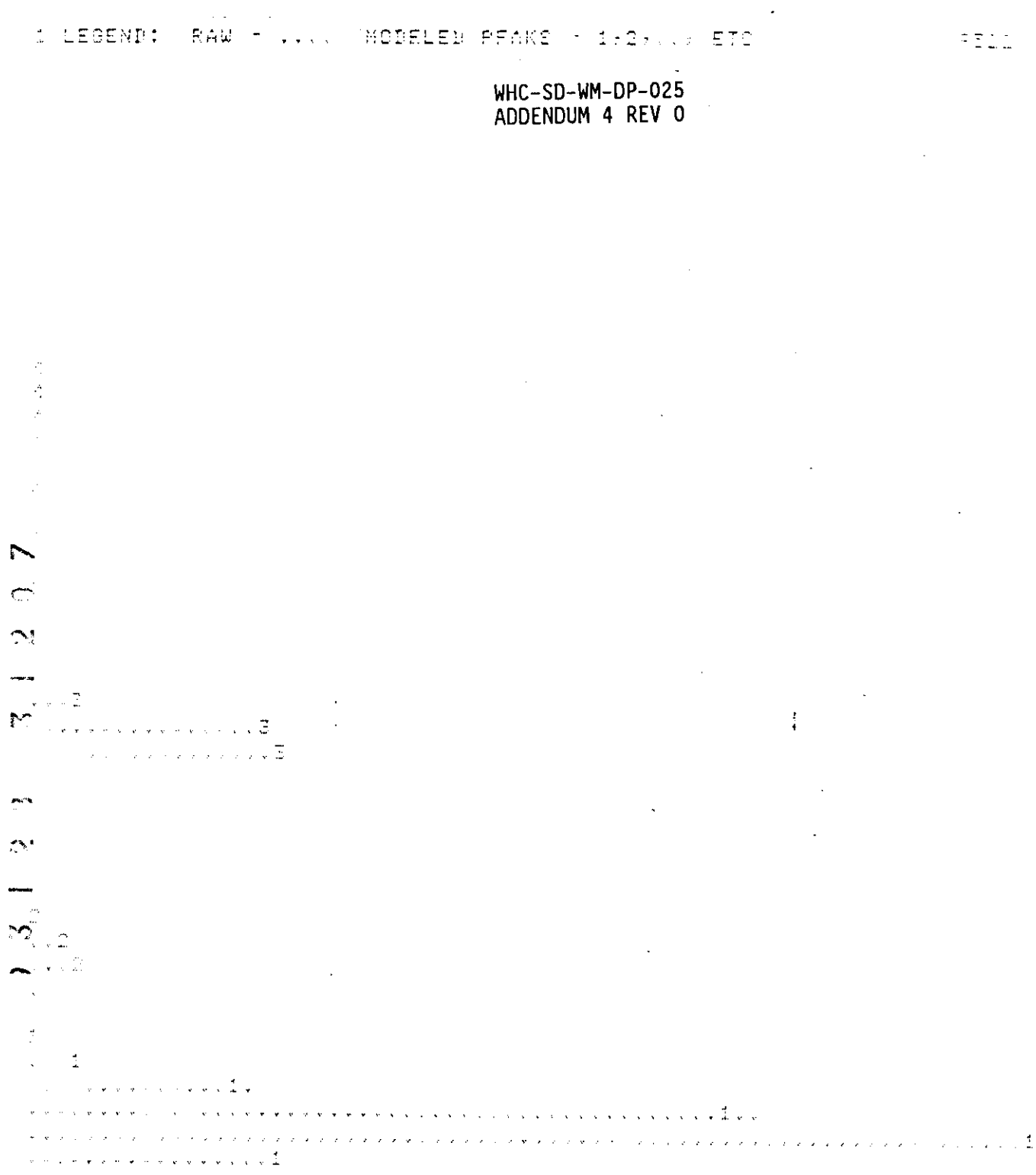

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G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 1.10

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

DATA REDUCTION REPORT

SAMPLE
R9419-5581
File ID: SD6002.SPC

Counted on: 7/18/91 @13: 0
Detector/Geometry number: 6/ 1
Count time: 30000. 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	3844.2	3946.6	364.776	364.776	20.000	10.579	10.000	4.737
2	324.7	334.3	306.749	306.749	20.000	11.165	10.000	4.340
3	250.3	49.2	268.828	268.828	12.000	3.780	6.000	4.539
4	2765.8	2764.6	234.003	234.003	20.000	10.618	10.000	5.304

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ml
1	Pu239	0.5633	5.756	5.772	-0.016	0.05	71.64	0.01	0.506E-08
	Cm243		5.786	5.772	0.014				0.679E-08
	Pu238	0.0511	5.499	5.499	0.000	0.03	6.50	0.00	0.621E-09
	Am241		5.480	5.499	-0.019				0.478E-09
3		0.0039		5.321		0.02	0.49	0.00	0.331E-10
4	Pu239	0.3919	5.143	5.157	-0.014	0.05	49.57	0.01	0.336E-08
	Pu240		5.144	5.157	-0.013				0.336E-08

DETECTOR CALIBRATION
Energy(MEV) = 4.057 + (0.0047)*Channel
Energy range (MeV): 4.057 TO 6.464
Efficiency ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	63120.0	100.000
Smoothed	63119.9	100.000
Composite fit	63292.4	100.272
Residuals	-172.4	-0.272

Analyzed by: _____
63099

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1	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
11	1.	0.	0.	0.	1.	2.	0.	1.	0.	0.
21	1.	1.	1.	0.	0.	0.	0.	1.	0.	0.
31	0.	0.	3.	3.	2.	1.	0.	0.	1.	1.
41	0.	1.	0.	1.	2.	0.	0.	0.	0.	2.
[illegible]	1.	0.	1.	0.	2.	0.	0.	1.	1.	0.
[illegible]	1.	1.	2.	0.	2.	0.	0.	1.	0.	1.
71	2.	0.	1.	4.	0.	0.	1.	2.	2.	0.
81	0.	0.	1.	0.	1.	1.	0.	4.	1.	0.
91	1.	2.	2.	0.	1.	0.	0.	1.	0.	2.
101	1.	2.	2.	0.	0.	1.	0.	1.	0.	0.
111	3.	4.	2.	2.	0.	2.	0.	1.	3.	1.
121	1.	2.	2.	1.	0.	2.	1.	0.	1.	0.
131	1.	1.	0.	7.	0.	2.	2.	0.	4.	2.
141	1.	2.	1.	0.	2.	1.	1.	1.	5.	3.
151	2.	1.	2.	3.	0.	4.	3.	4.	7.	3.
161	2.	6.	1.	2.	6.	5.	2.	6.	4.	4.
171	7.	6.	4.	3.	7.	6.	7.	6.	10.	8.
181	12.	10.	13.	9.	8.	9.	6.	12.	5.	7.
191	10.	10.	14.	7.	11.	11.	11.	15.	19.	20.
201	22.	21.	18.	30.	25.	35.	37.	47.	45.	62.
211	81.	99.	111.	124.	156.	170.	228.	277.	325.	386.
221	464.	536.	631.	727.	832.	894.	937.	1157.	1281.	1467.
231	1549.	1535.	1629.	1577.	1543.	1269.	1080.	862.	642.	420.
241	280.	173.	108.	63.	26.	11.	5.	10.	7.	6.
251	10.	8.	7.	8.	12.	10.	21.	9.	14.	11.
261	8.	21.	20.	20.	23.	26.	21.	25.	25.	20.
271	24.	20.	11.	14.	9.	9.	8.	6.	9.	8.
281	7.	12.	14.	14.	25.	27.	23.	24.	41.	26.
291	48.	70.	62.	62.	81.	83.	118.	122.	122.	137.
[illegible]	153.	166.	182.	162.	177.	185.	180.	184.	174.	128.
[illegible]	101.	74.	73.	48.	30.	20.	17.	9.	10.	7.
321	14.	14.	19.	15.	17.	21.	21.	22.	17.	21.
331	22.	20.	38.	29.	40.	49.	46.	60.	63.	71.
341	100.	124.	143.	169.	213.	258.	328.	403.	418.	584.
351	692.	787.	924.	1020.	1209.	1294.	1440.	1602.	1584.	1831.
361	1925.	2113.	2192.	2337.	2227.	2036.	1797.	1521.	1232.	824.
371	568.	327.	202.	83.	43.	16.	6.	2.	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.	0.	1.	0.	0.	0.	1.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	2.	1.	0.	0.	0.
431	0.	0.	0.	0.	1.	0.	2.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
461	0.	1.	0.	1.	0.	0.	0.	0.	0.	1.
471	1.	0.	0.	0.	0.	0.	0.	1.	1.	0.
481	1.	2.	1.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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STRONTIUM 90 ANALYSIS - UNDIGESTED SAMPLE
WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5586	102AW	6-14-91	13:10	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
SR90	LA-220-101	% RECOVERY	W1TE2	3

Sample Size: 2 1ml & 1ml Sr Carrier — Customer ID: STD

Remarks, Calculations, Results:

COUNT ON DETECTOR#11 — 145I-E — RERUN
S376 ITS — Book Number
STD# 150846 RESULT 7.46E-1
STD VAL 7.7341E-1 %REC 96.570
SEP. TIME - ~~13:30~~ 14:05
SEP. DATE - 08-22-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82580	[signature]		[signature]	
Tania Lee				

Date: 08-22-91 — Time Completed: — Lab Unit Chg: [signature]

A. R9413-5586 11/2 8-22 @ 1855 DT=4.83
G - 7.1238 (T.L.)
T - 7.0292
N - .0946
6578/10 - 10
6666/10
Sr Calculation by MAC on 08-22-1991 at 19:59:32
Det #11 2-inch mount Sr eff : .3919 Y eff : .444
Sample size : 1 mL Dilution : 1 Method : 1

B
G - 7.1278
T - 7.0324
N - .0954
Mount # 1 Decay time = 4.83 hrs
6578/10 = 10.0 = 7.0394E-01 uCi/L strontium — 7.44E-1 — .946
Mount # 2 Decay time = 4.83 hrs
6666/10 = 10.0 = 7.1351E-01 uCi/L strontium — 7.48E-1 — .954

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5686	102AW	6-14-91	13:13	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
SR90	LA-220-101	uCI/G	W1TE2	3

Sample Size: 2 1ml & 1ml Sr Carrier — Customer ID: REG. BL

Remarks, Calculations, Results:

REAGENT BLANK — RERUN
COUNT AS uCI/L
<3.49E-3 uci/l
SEP. TIME - 13:30
SEP. DATE - 08-22-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82580	[signature]			
Tania Lee				

Date: 08-22-91 — Time Completed: — Lab Unit Chg: [signature]

A R9414-5686 12/2 8-22 @ 1855 DT=5.42
G - 7.1057
T - 7.0180
N - .0877
113/10 - 12
127/10
Sr Calculation by MAC on 08-22-1991 at 19:55:27
Det #12 2-inch mount Sr eff : .4233 Y eff : .4719
Sample size : 1 mL Dilution : 1 Method : 1

B
G - 7.0954
T - 7.0009
N - .0945
Mount # 1 Decay time = 5.42 hrs
113/10 = 12.0 < 2.5539E-03 uCi/L strontium
Mount # 2 Decay time = 5.42 hrs
127/10 = 12.0 < 3.2952E-03 uCi/L strontium — .945

Serial No.	Sample Point	Date	Time Issued	Priority
R 9418.-5786	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
SR90	LA-220-101	uCI/G	W1BE0	2

Sample Size: 2.05E-1 1ml-1 & 1ml Carrier — Customer ID: 2291-4-4

Remarks, Calculations, Results:

COUNT AS uCI/L — RERUN
1.53E2 uci/l
SEP TIME - 13:30
SEP. DATE - 08-22-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82580	[signature]			
Tania Lee				

Date: 08-22-91 — Time Completed: — Lab Unit Chg: [signature]

A 12/2 8-22 @ 1819 DT=4.5 DF=201
G - 7.0893
T - 6.9975
N - .0918
7015/10 - 12
6981/10
Sr Calculation by MAC on 08-22-1991 at 19:52:40
Det #12 2-inch mount Sr eff : .4233 Y eff : .4719
Sample size : 1 mL Dilution : 201 Method : 1

B
G - 8.0037
T - 7.9124
N - .0913
Mount # 1 Decay time = 4.5 hrs
1.53E2
6981/10 = 12.0 = 1.4012E+02 uCi/L strontium — .918
Mount # 2 Decay time = 4.5 hrs
6981/10 = 12.0 = 1.3937E+02 uCi/L strontium — 1.53E2 — .913

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9418	Customer ID: 2291-4-4
Analysis: TRITIUM	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-218-113/B-0
Technologist: V. MASSIE	Date: 10-04-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5587	11		
2	REAGENT BLANK	R9414-5687	12		
3	SAMPLE 2291-4-4	R9418-5787	13		
4	SPIKE OF SAMPLE 2291-4-4	R9418-5987	14		
5	FINAL LMCS CHECK STD	R9419-5587	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	34B49/1.0 mL			N/A
SPIKE	34B49/5.0 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

8

Serial No.	Sample Point	Date	Time Issued	Priority
R 9418.-5987	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Status Code	Rerun
13	EA-210-T13	RECOVERY		

Sample Size	Customer ID
1 ml	2291-4-1

Remarks, Calculations, Results

SAMPLE SPIKED ID

SPIKE ID ENVSTD 34849

SPIKE VOLUME 5 ml

COUNT AS uCI/L

RERUN

used sample # R-9397 2291-4-1

107.7%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			

Date	Time Completed	Lab Use Only
10-4-91		

9

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5587	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Status Code	Rerun
13	EA-210-T13	RECOVERY		

Sample Size	Customer ID
1 ml	STD

Remarks, Calculations, Results

FDP R907 ENVSTD

STDN 34849 RESULT 6.57E-1

STD VAL 6.4591E-1 %REC 101.72%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			

Date	Time Completed	Lab Use Only
10-4-91		

R9418-5487

~~(11721.21)(2) - (12529.71)(1000)~~ / ~~4/1/92 SPCALC~~

~~(11721.21)(1000)~~ / ~~(1)(2.22E6)~~ ~~4/1/92 SPCALC~~ = ~~(5.28E) - (5.64E) = 3.60E-1~~ / 6.459E-1

(11721.21)(1000)(6/5) / (1)(2.22x10^6) = 6.34 uCi/L

6.34 - 5.64 = 6.96 x10^-1

107.7%

R9419-5587

(1459.220)(1000) / (1)(2.22E6) = 2

CAN	POS	CH	SPM	ESIGN	TIME	EL TIME	AVG	[illegible]	RCHK	[illegible]
5	**	1	5524.80	0.95	10.00	64.58	93.0		[illegible]	
	ISO1	XEFF	CH1:14.64					ISO1	DPM	[illegible]
[illegible]	**	[illegible]	58.4[illegible]	0.93	10.00	[illegible]	[illegible]		[illegible]	**
	ISO1	XEFF	CH1:44.58					ISO1	DPM	[illegible]
[illegible]	**	[illegible]	5417.80	0.94	10.00	[illegible]	93.0		[illegible]	**
	ISO1	XEFF	CH1:44.64					ISO1	DPM	[illegible]
9	**	10	1	5251.90	[illegible]	10.00	[illegible]	93.0		0.00 **
	ISO1	XEFF	CH1:14.6[illegible]					ISO1	DPM	[illegible]
9	**	11	1	650.10	[illegible]	10.00	107.68	93.0		[illegible] **
	ISO1	XEFF	CH1:[illegible]					ISO1	DPM	[illegible]

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

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USER: 1 ID:H-3 TRITIUM PRESET TIME: 10.00

SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N

HB 1 ADDSY OFF:N DPL:Y 1 PHOSI MONITOR:Y POST CUR:N MIAL:6 VOLUMES:1

[illegible]

[illegible]

PRELIMINARY [illegible] 10 SEP 1990 [illegible]

PRELIMINARY [illegible] TRITIUM PRELIMIN REPORTER: [illegible]

PRELIMIN NORM FACTOR ISD1=[illegible]

PRELIMIN UNITS ISD1=DPM

PRELIMIN HALF LIFE CODE:[illegible]

OPTIONAL PRELIMIN NORM FACTOR:1 BACKGROUND MINUTES [illegible]

STANDARD ID:P-32GRP 3002291 BSA QUENCH UNITS [illegible]

HALF LIFE(DAYS) ISD1: 4563.000

STANDARD DPM ISD1: 160100.0

CAN	POS	CH	CPM	2SIGS	TIME	EL TIME	AVG HB	DCPM	SP
01	**	1	1	10.00	14.11	10.00	10.65	93.0	1.05 **

POSTSCRIPT OPTION CHANGES [illegible]

CHANNEL 1

QUENCH CURVE COEFFICIENTS

[illegible] 12.00000 B=0.0000000 [illegible] D=0.0000000000

BALANCED QUENCH TIME CORRELATION TABLE

CHS	HB	CPM	CALCULATED CPM	PERCENT DIFF.	FLAG
[illegible]	[illegible]	[illegible]	12.00	0.00	

[illegible] QUENCH TIME: [illegible] LISD:[illegible]

DELAY QUENCH TIME: [illegible] HICM:[illegible]

CAN	POS	CH	CPM	2SIGS	TIME	EL TIME	AVG HB	DCPM	SP
[illegible]	**	[illegible]	1	[illegible]	[illegible]	10.00	[illegible]	[illegible]	[illegible] **
								ISD1 DPM	:[illegible]
[illegible]	**	[illegible]	1	[illegible]	[illegible]	10.00	[illegible]	[illegible]	[illegible] **
								ISD1 DPM	:[illegible]
[illegible]	**	[illegible]	1	[illegible]	[illegible]	10.00	[illegible]	[illegible]	[illegible] **
								ISD1 DPM	:[illegible]
[illegible]	**	[illegible]	1	[illegible]	[illegible]	10.00	[illegible]	[illegible]	[illegible] **
								ISD1 DPM	:[illegible]

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TRITIUM ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5587	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
13	LA-210-113	% RECOVERY	W1BED	2

Sample Size: 1 ml — Customer ID: STD

Remarks, Calculations, Results:
EDP R907 ENVSTD
STD# 34849 RESULT 4.49E-1
STD VAL. 6.4591E-1 %REC 69.51%

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82016	69549			

Date: 10-4-91 — Time Completed — Lab Unit Mgr

R9413-5587

$$\frac{(996.3416)(1000)}{(1)(2.22E6)} =$$

=

2

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5687	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
13	LA-210-113	NCI/G	W1BED	2

Sample Size: 1 ml — Customer ID: REM. DL

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L

RERUN

6.31E-1 uci/l

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82016	69549			

Date: 10-4-91 — Time Completed — Lab Unit Mgr

R9414-5687

$$\frac{(1399.776)(1000)}{(1)(2.22E6} =$$

7

Serial No	Sample Point	Date	Time Issued	Priority
R 9418.-5787	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
13	LA-210-113	NCI/G	W1BED	

Sample Size: 1 ml — Customer ID: 2291-4-4

Remarks, Calculations, Results:
COUNT AS NCI/L

WAS R-9397
2291-4-1

RERUN

5.64E uci/l

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82016	69549			

Date: 10-4-91 — Time Completed — Lab Unit Mgr

R9418-5787

$$\frac{(12529.71)(1000)}{(1)(2.22E6} =$$

STRONTIUM 90 ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5586	102AW	6-14-91	13:23	26

Determination	Method/Standard	Result Units	Charge Code	Returns
SR90	LA-220-101	% RECOVERY	W1TE2	3

Sample Size: ? 1ml & 1ml Sr. Carrier — Customer ID: STD

Remarks, Calculations, Results:

COUNT ON DETECTOR#11
S376 ITS
STD# 150846 RESULT 6.98E-1
STD VAL 7.73E-1 %REC 90.3%

RERUN

SEP. TIME - 14:05
SEP. DATE - 08-22-91

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82580	[signature]			

Date	Time Completed	Lab Unit Mgr
08-22-91		[signature]

R9419-5586 11/2 5-22 ATC @ 1805 DT= 4.0

A G - 7.1488
r - 7.0543
N - .0945

6558 / 10 - 10
5720

Sr Calculation by MAC on 08-22-1991 at 20:00:13
Det #11 2-inch count Sr eff : .3919 Y eff : [illegible]

Sample size : 1 mL Dilution : 1 Method : 1

B G - 7.1020
r - 7.0067
N - .0953

Mount # 1 Decay time = 4 hrs

6558 / 10 = 10.0 = 7.0827E-01 uCi/L strontium 7.43E-1 .953

Mount # 2 Decay time = 4 hrs

5720 / 10 = 10.0 = 6.1636E-01 uCi/L strontium 6.52E-1 .945

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

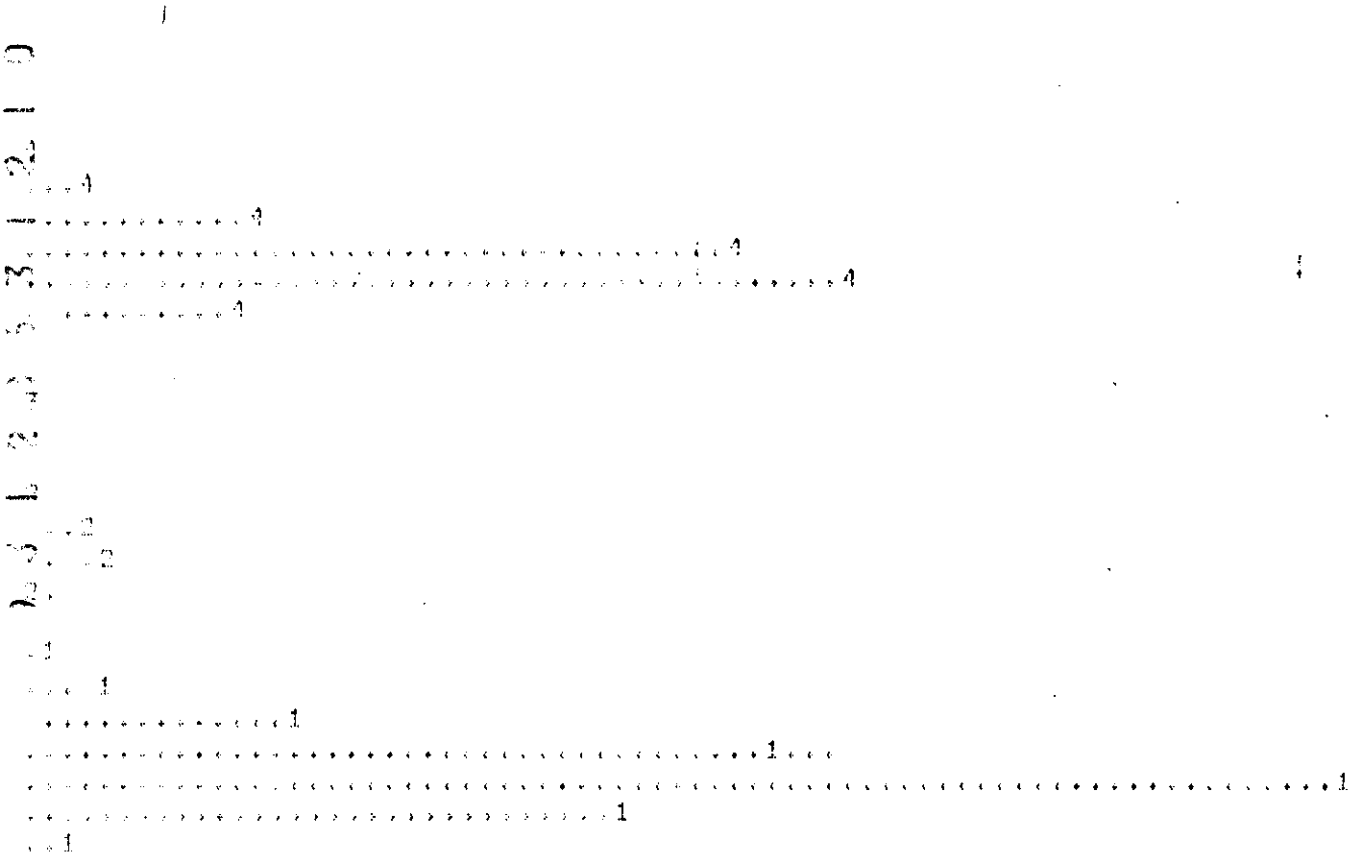
Lab Segment Serial No.: R9418	Customer ID: 2291-4-4
Analysis: STRONTIUM 90	Sample Prep: UNDIGESTED

Instrument: WB26870, WB27812, WB27811	Procedure/Rev: LA-220-101/D-0
Technologist: T. LEE	Date: 08-22-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5586	11		
2	REAGENT BLANK	R9414-5686	12		
3	SAMPLE 2291-4-4	R9418-5586	13		
4	FINAL LMCS CHECK STD	R9419-5786	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	150B46/1 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)



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Raw Data Dump for MEA Spectrum: SP18D1790.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	1.	0.	1.	1.	0.	0.	0.	0.	0.
91	1.	0.	0.	1.	1.	0.	1.	0.	1.	1.
101	0.	0.	1.	0.	1.	0.	0.	0.	1.	1.
111	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
121	1.	0.	2.	2.	1.	1.	1.	0.	1.	1.
131	1.	0.	2.	1.	2.	2.	2.	0.	1.	1.
141	0.	0.	2.	1.	2.	1.	1.	1.	2.	4.
151	2.	4.	2.	3.	1.	6.	1.	2.	2.	1.
161	2.	2.	2.	1.	1.	0.	1.	1.	2.	1.
171	0.	1.	0.	1.	1.	1.	0.	3.	2.	1.
181	1.	3.	1.	6.	1.	3.	2.	3.	3.	1.
191	6.	10.	8.	0.	2.	5.	2.	3.	1.	2.
201	5.	4.	8.	7.	4.	5.	3.	6.	1.	1.
211	4.	6.	9.	14.	19.	31.	28.	42.	61.	8[illegible]
221	93.	124.	143.	187.	221.	228.	204.	315.	172.	1[illegible]
231	197.	470.	504.	501.	405.	281.	204.	126.	122.	1[illegible]
241	30.	17.	6.	6.	2.	1.	1.	2.	0.	[illegible]
251	1.	0.	2.	0.	2.	0.	2.	1.	1.	2.
261	4.	1.	1.	4.	1.	5.	3.	2.	5.	4.
271	4.	2.	1.	5.	1.	2.	1.	2.	3.	2.
281	2.	1.	3.	8.	1.	6.	8.	6.	11.	1[illegible]
291	20.	20.	24.	41.	35.	37.	40.	42.	65.	3[illegible]
301	75.	96.	100.	105.	95.	121.	102.	79.	62.	3[illegible]
311	27.	20.	11.	6.	4.	5.	3.	3.	8.	9.
321	9.	15.	7.	10.	6.	17.	12.	9.	21.	18.
331	19.	23.	13.	21.	15.	20.	22.	21.	28.	18.
341	24.	32.	42.	79.	95.	141.	221.	303.	501.	480.
351	705.	402.	771.	800.	850.	891.	1014.	1081.	1338.	1551.
361	1646.	1742.	1717.	1511.	1233.	893.	661.	387.	201.	108.
371	70.	13.	5.	3.	1.	0.	1.	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.	1.	0.	0.	0.	0.	0.	0.	0.
421	1.	0.	1.	0.	0.	0.	1.	0.	1.	0.
431	0.	2.	0.	0.	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.	0.	1.	0.	0.	0.	0.	0.
471	0.	1.	0.	0.	1.	1.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

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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
Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE
R9418-5781
File [illegible]

Counted on: 7/18/91 @13: [illegible]
Detector/Geometry number: 4/ [illegible]
Count time: 30000. 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	[illegible]	[illegible]	362.870	362.870	16.000	8.431	9.000	[illegible]
2	180.0	177.6	306.008	306.008	20.000	8.871	10.000	[illegible]
3	825.1	814.4	233.170	233.170	16.000	8.681	[illegible]	[illegible]
4	5.5	3.8	153.542	153.542	28.000	133.817	14.000	19.71[illegible]

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Pu236	0.7420	5.756	5.772	-0.016	0.04	44.07	344.35	0.155E-[illegible]
	Cm243		5.786	5.772	0.014				0.209E-[illegible]
2	Pu238	0.0495	5.499	5.505	-0.006	0.04	2.94	31.27	0.111E-[illegible]
	Am241		5.480	5.505	-0.025				0.108E-[illegible]
3	Pu239	0.2040	5.143	5.162	-0.019	0.04	12.11	92.73	0.418E-[illegible]
	Pu240		5.144	5.162	-0.018				0.418E-[illegible]
4	Np237	0.0040	4.640	4.788	-0.148	0.63	0.24	30.24	0.136E-[illegible]
	Np237		4.781	4.788	-0.007				0.939E-[illegible]

DETECTOR CALIBRATION
Energy(MEV) 4.066 + (0.0047)*Channel
Energy range (MeV): 4.066 TO 6.473
Efficiency 0.1306 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	29672.0	100.000
Smoothed	29672.0	100.000
Composite fit	29677.0	100.020
Residuals	-6.0	-0.020

Analyzed by: _____
63099

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1	0.	0.	0.	0.	0.	0.	4.	2.	2.	4.
11	0.	4.	2.	0.	2.	1.	3.	5.	2.	2.
21	3.	4.	0.	4.	3.	0.	2.	0.	1.	2.
31	3.	2.	2.	7.	0.	3.	1.	4.	3.	2.
41	3.	2.	2.	2.	3.	2.	4.	3.	2.	5.
1	2.	5.	4.	3.	2.	1.	2.	3.	3.	0.
1	5.	0.	2.	2.	2.	1.	1.	3.	2.	2.
71	2.	1.	0.	3.	1.	0.	0.	1.	4.	2.
81	1.	2.	0.	0.	3.	3.	2.	1.	0.	1.
91	1.	1.	4.	2.	4.	1.	2.	4.	1.	2.
101	4.	4.	2.	2.	3.	1.	0.	0.	1.	1.
111	2.	1.	2.	2.	2.	3.	1.	2.	3.	2.
121	0.	1.	0.	4.	1.	2.	1.	0.	0.	2.
131	1.	1.	2.	2.	0.	0.	3.	4.	1.	3.
141	2.	0.	5.	2.	3.	2.	1.	0.	2.	3.
151	2.	1.	0.	3.	2.	0.	0.	1.	4.	2.
161	3.	1.	3.	0.	3.	0.	4.	0.	1.	1.
171	3.	5.	2.	3.	3.	5.	2.	5.	2.	0.
181	3.	2.	3.	4.	0.	3.	1.	1.	1.	1.
191	6.	4.	6.	3.	3.	5.	3.	6.	6.	5.
201	2.	7.	10.	9.	9.	6.	13.	12.	12.	17.
211	22.	39.	68.	52.	85.	111.	152.	176.	269.	292.
221	308.	434.	494.	606.	761.	955.	1168.	1255.	1368.	1421.
231	1347.	1161.	998.	814.	560.	371.	223.	141.	68.	30.
241	13.	11.	2.	0.	1.	1.	0.	1.	2.	1.
251	1.	1.	2.	0.	4.	3.	0.	0.	2.	1.
261	2.	2.	1.	3.	1.	4.	3.	4.	2.	3.
271	3.	4.	1.	1.	4.	1.	1.	3.	1.	2.
281	4.	5.	4.	9.	10.	10.	23.	26.	31.	32.
291	31.	51.	55.	56.	82.	79.	94.	106.	121.	152.
1	163.	163.	156.	154.	142.	94.	65.	41.	31.	17.
1	6.	3.	4.	2.	4.	4.	3.	4.	3.	7.
321	3.	2.	7.	7.	6.	10.	8.	10.	6.	13.
331	6.	10.	14.	12.	8.	22.	16.	11.	30.	39.
341	48.	78.	139.	190.	245.	403.	494.	592.	680.	729.
351	773.	913.	909.	1025.	1178.	1415.	1541.	1807.	1830.	1845.
361	1745.	1473.	1046.	798.	546.	285.	176.	92.	41.	11.
371	7.	0.	0.	2.	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.	1.	0.	0.	0.
421	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	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.	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.								

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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. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE
R9413-5891
File ID: SD7418.SPC

Counted on: 7/18/91 @13: 0
Detector/Geometry number: 7/ 1
Count time: 30000. 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	2984.3	2963.9	360.265	360.265	20.000	8.554	10.000	4.659
2	264.8	263.6	303.206	303.206	16.000	8.316	8.000	4.643
3	33.2	8.5	270.274	270.274	12.000	0.304	6.000	4.651
4	2173.0	2166.7	231.160	231.160	16.000	8.414	8.000	6.595
5	6.0	4.9	177.100	177.100	56.000	2.000	20.000	0.200
6	2.6	1.9	143.658	143.658	20.000	12.140	10.000	0.417
7	3.4	2.7	101.189	101.189	16.000	13.533	8.000	1.791
8	5.2	4.4	51.722	51.722	24.000	32.402	12.000	1.232
9	1.0	0.1	21.205	21.205	12.000	0.200	6.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Pu236	0.5645	5.756	5.764	-0.008	0.04	47.04	311.88	0.140E-03
2	Pu238	0.0493	5.499	5.496	0.003	0.04	4.11	37.11	0.167E-04
	Am241		5.480	5.496	-0.016				0.128E-04
3		0.0003		5.341		0.00	0.02	0.15	0.662E-07
4	Pu239	0.3777	5.143	5.158	-0.015	0.04	31.47	284.51	0.921E-04
	Pu240		5.144	5.158	-0.014				0.921E-04
5		0.0023		4.904		0.01	0.20	1.27	0.572E-06
6		0.0019		4.746		0.06	0.16	1.05	0.472E-06
7		0.0012		4.547		0.06	0.10	0.65	0.292E-06
8		0.0027		4.314		0.15	0.23	1.47	0.660E-06
9		0.0000		4.171		0.00	0.00	0.00	0.139E-08

DETECTOR CALIBRATION
Energy(MEV) 4.071 + (0.0047)*Channel
Energy range (MeV): 4.071 TO 6.478
Efficiency 0.1539 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	41640.0	100.000
Smoothed	41638.6	99.997
Composite fit	41665.5	100.061
Residuals	-26.9	-0.065

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Analyzed by: _____
63099

Result No.	Sample Point	Date	Time Reported	Priority
R 9413.-5581	102AW	6-14-91	13:8	26

Description	Analysis/Sequence	Result Units	Charge Code	Results
PU239/40	LA-503-156	% RECOVERY	W1BEO	1

Sample Size: ? .100-10-100 = 1
Customer ID: STD

Remarks, Calculations, Results:
EDP R211 AR001
STDN 27.643 REBULT 9.91E-1
STD VAL. 9.01E-1 %REC 109.95%
Pu236 (40 643) .050 = 1
1 = 1 8M HNO3
95% tracer

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst 1: LC559 Analyst 2: Rubio Analyst 3: Analyst 4: Analyst 5:
Date: 7/16/91 Time Completed: Data Line Mgr: AR Pilnick

#1 7-18-91 R9413-5581

$\frac{1414}{5} = 10$

$\frac{(272.8)(2)(.5645)}{325.49} = 9.5\%$

3.J JG79

Result No.	Sample Point	Date	Time Reported	Priority
R 9414.-5681	102AW	6-14-91	13:11	26

Description	Analysis/Sequence	Result Units	Charge Code	Results
PU239/40	LA-503-156	uCI/G	W1BEO	1

Sample Size: ? 0 = 1
Customer ID: REG. BL

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L
Pu236 (40 643) .050 = 1
1 = 1 8M HNO3 <7.64E-3 mil
50% tracer

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst 1: LC559 Analyst 2: Rubio Analyst 3: DKAustin Analyst 4: Analyst 5:
Date: 7/16/91 Time Completed: Data Line Mgr: AR Pilnick

#3 7-18-91 R9414-5681

$\frac{481}{5} = 12$

$\frac{(94.20)(2)(.9587)}{325.27} = 5.0\%$

3.4 4795

Result No.	Sample Point	Date	Time Reported	Priority
R 9418.-5781	102AW	6-14-91	13:20	26

Description	Analysis/Sequence	Result Units	Charge Code	Results
PU239/40	LA-503-156	uCI/G	W1BEO	1

Sample Size: ? 1 = 1
Customer ID: 2291-4-4

Remarks, Calculations, Results:
COUNT AS uCI/L
Pu236 (40 643) .050 = 1
1 = 1 Con HNO3
4.03E-2 mil
93% tracer

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst 1: LC559 Analyst 2: Rubio Analyst 3: Analyst 4: Analyst 5:
Date: 7/16/91 Time Completed: Data Line Mgr: AR Pilnick

#2 7-18-91 R9418-5781

$\frac{1177}{5} = 12$

$\frac{(203.4)(2)(.7425)}{325.49} = 9.3\%$

Serial No	Sample Point	Date	Time Issued	Priority
R 9418.-5940	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	RECOVERY	W1BED	3

Sample Size: ? .100-10-.100 ml

Customer ID: 2291-4-4

Remarks, Calculations, Results:

SAMPLE SPIKED ID
SPIKE ID ~~90B38~~ (M) (M) 9/17/92 Sampl = .12 - .13 (1) (2)
SPIKE VOLUME ~~.100-10-.100~~ Sampl+Spk = .36 - .38
↑ .100 ml into .100-10 ml sample #-4
UFIC 85B38 (DA 1.1)
Spk ID/Val: 90B38/6.25-4
Spk Vol: .100-10-.100 ml

79.1%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
Frady				

Date: 10-8-91 | Time Completed | Lab Unit Mgr

R9418-5940

$$\frac{(.12)(.982)(6.25E^{-4})(.1)(1020)}{.36-[(.12)(.982)]} = 2.87E^{-2}$$

$$\frac{(.13)(.982)(6.25E^{-4})(.1)(1020)}{.38-[(.13)(.982)]} = 2.87E^{-2}$$

$$\frac{\left(\frac{2.87E^{-2}}{1020} - \frac{3.87E^{-3}}{1020}\right)1020}{3.04E^{-2}} \times 100 = 79.1\%$$

Serial No	Sample Point	Date	Time Issued	Priority
R 9419.-5540	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	% RECOVERY	W1BED	3

Sample Size: ? .100-10-.100 ml

Customer ID: STD

Remarks, Calculations, Results:

S267 UFIC
STD# 85B38 RESULT 3.07E-2 g/l Sampl: .12
STD VAL 3.10E-2 %REC 97.8 Sampl+Spk: .36
SPIKE ID/VAL 6.25-4/90B38
SPIKE VOL. .100-10-.100 ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
Frady				

Date: 10-8-91 | Time Completed | Lab Unit Mgr

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9418	Customer ID: 2291-4-4
Analysis: URANIUM	Sample Prep: UNDIGESTED

Instrument: WB88807	Procedure/Rev: LA-925-106/A-2
Technologist: M. FRANZ	Date: 10-08-91
Starting Time: 16:00	Temperature: 24degC
Ending Time: 23:00	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5540	11		
2	REAGENT BLANK	R9414-5640	12		
3	SAMPLE 2291-4-4	R9418-5740	13		
4	SPIKE OF SAMPLE 2291-4-4	R9418-5940	14		
5	FINAL LMCS CHECK STD	R9419-5540	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	85B38/0.1 mL			N/A
SPIKE	85B38/0.1 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

I-135	LLD<2.02E-01		LLD<2.02E-01		1260.41	
K-40	1.82E+00	+-6.35E-01	1.82E+00	+-6.35E-01	1460.75	-0.22
KR-85	LLD<1.61E+01		LLD<1.61E+01		513.99	
KR-85M	LLD<3.83E-02		LLD<3.83E-02		151.17	
KR-87	LLD<1.64E-01		LLD<1.64E-01		402.58	
KR-88	LLD<2.27E+00		LLD<2.27E+00		220.90	
LA-140	LLD<4.29E-02		LLD<4.29E-02		1596.20	
LA-142	LLD<1.57E-01		LLD<1.57E-01		641.83	
MN-54	LLD<7.23E-02		LLD<7.23E-02		834.83	
MN-56	LLD<8.47E-02		LLD<8.47E-02		846.76	
NA-22	LLD<4.78E-02		LLD<4.78E-02		1274.55	
NA-24	LLD<3.85E-02		LLD<3.85E-02		1368.60	
NB-94	LLD<6.46E-02		LLD<6.46E-02		702.63	
NB-95	LLD<6.89E-02		LLD<6.89E-02		765.78	
NB-97	LLD<3.86E-01		LLD<3.86E-01		657.92	
NP-237	LLD<2.79E-01		LLD<2.79E-01		86.50	
NP-238	LLD<3.41E-01		LLD<3.41E-01		984.45	
NP-239	LLD<3.15E-01		LLD<3.15E-01		277.60	
PA-233	LLD<1.36E-01		LLD<1.36E-01		311.98	
PA-234M	LLD<1.54E+01		LLD<1.54E+01		1001.03	
PB-210	LLD<6.23E+00		LLD<6.23E+00		46.50	
PB-212	LLD<1.02E-01		LLD<1.02E-01		239.00	
PB-212A	LLD<1.02E-01		LLD<1.02E-01		239.00	
PB-212B	LLD<1.48E+00		LLD<1.48E+00		300.10	
PB-214	LLD<1.48E-01		LLD<1.48E-01		351.92	
PB-214A	LLD<1.48E-01		LLD<1.48E-01		351.92	
PB-214B	LLD<2.49E-01		LLD<2.49E-01		295.21	
PO-210	LLD<6.21E+03		LLD<6.21E+03		804.00	
PO-214	LLD<2.25E+03		LLD<2.25E+03		799.70	
PO-216	LLD<3.97E+03		LLD<3.97E+03		804.90	
PU-239	LLD<4.14E+02		LLD<4.14E+02		129.30	
PU-241	LLD<1.44E+04		LLD<1.44E+04		148.57	
RA-224	LLD<1.07E+00		LLD<1.07E+00		240.99	
RA-226	LLD<9.53E-01		LLD<9.53E-01		186.10	
RB-88	LLD<4.30E-01		LLD<4.30E-01		1836.00	
RB-89	LLD<4.04E-01		LLD<4.04E-01		1031.88	
RN-220	LLD<5.91E+01		LLD<5.91E+01		549.73	
RU-103	LLD<7.04E-02		LLD<7.04E-02		497.08	
RURH106	LLD<1.36E+00		LLD<1.36E+00		621.80	
SB-124	LLD<1.68E-01		LLD<1.68E-01		602.72	
SB-125	LLD<4.53E-01		LLD<4.53E-01		176.33	
SC-46	LLD<9.86E-02		LLD<9.86E-02		1120.45	
SE-75	LLD<7.01E-02		LLD<7.01E-02		264.66	
SN-113	LLD<1.00E-01		LLD<1.00E-01		391.67	
SR-85	LLD<7.07E-02		LLD<7.07E-02		513.99	
SR-91	LLD<1.32E-01		LLD<1.32E-01		555.60	
SR-92	LLD<5.10E-02		LLD<5.10E-02		1383.94	
TA-182	LLD<2.80E-01		LLD<2.80E-01		1121.30	
TC-99M	LLD<3.11E-02		LLD<3.11E-02		140.51	
TE-123M	LLD<3.61E-02		LLD<3.61E-02		159.00	
TE-125M	LLD<9.91E+00		LLD<9.91E+00		109.27	
TE-132	LLD<4.40E-02		LLD<4.40E-02		228.16	
TH-228	LLD<3.27E+00		LLD<3.27E+00		84.37	
TH-234	LLD<6.13E-01		LLD<6.13E-01		92.50	
TH-234A	LLD<6.13E-01		LLD<6.13E-01		92.50	
TH-234B	LLD<2.16E+00		LLD<2.16E+00		63.30	
TL-208	LLD<9.11E-02		LLD<9.11E-02		583.14	
U-238	LLD<6.19E-02		LLD<6.19E-02		185.71	
U-235A	LLD<6.19E-02		LLD<6.19E-02		185.71	
U-235B	LLD<2.51E-01		LLD<2.51E-01		143.76	

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	55.12	27.67	1.16	1703.	930.	14.2	SB/TE-X
2	951.50	475.54	1.61	2949.	501.	33.9	CS-134
3C	1127.41	563.46	1.48	2132.	2450.	7.2	CS-134, EU-152
4C	1139.56	569.54	1.48	2150.	4459.	5.5	CS-134, BI-207
5	1210.31	604.90	1.59	2237.	28183.	1.3	CS-134
6	1324.13	661.80	1.61	1495.	24331.	1.4	CS-137
6B		661.38			251.	9.7	
7?	1592.44	795.94	1.68	1133.	20598.	2.1	CS-134
8?	1604.68	802.06	1.68	1078.	1879.	15.3	CS-134
9?	2336.04	1167.82	1.84	641.	350.	88.3	CS-134
10?	2346.79	1173.19	1.84	591.	14512.	2.8	CO-60
11	2664.84	1332.30	2.44	191.	13049.	1.8	CO-60
12	2730.27	1365.04	2.19	131.	487.	12.2	CS-134
13C	2799.41	1399.64	1.48	53.	131.	22.2	I-132
14C	2802.59	1401.23	1.48	58.	121.	22.9	BI-214
15	2921.09	1460.53	2.60	56.	771.	7.9	K-40
15B		1460.72			581.	4.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

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

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 11-DEC-90 AT 10:00:00
BACKGROUND LIVE TIME: 11292. SECONDS

SAMPLE STATUS REPORT FOR R 9418. 102AW 2291-4-4 TIME: 5/26/92 14:57
DISPATCHED: 6/14/91 13:21 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/14/91 13:31 WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

EXT.	DETER.	RESULTS OR STATUS		OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********		***	***	******
5000	APPEAR	NO ORGANIC SOLUTION				W1BEO
5000	APPEAR	CLEAR LIGHT YELLOW AQUEOUS				W1BEO
5000	APPEAR	SOLIDS PRESENT				W1BEO
5720	TB	OUT FOR RERUN				W1BEO
5720	TB	2.02000E 04 uCI/L				W1BEO
5725	AT	OUT FOR RERUN				W1BEO
5725	AT	<2.16000E 00 uCI/L				W1BEO
5730	GEA	1.51000E 04 uCI/L	Cs-137			W1BEO
5730	GEA	<7.10000E 01 uCI/L	Eu-155			W1BEO
5730	GEA	<3.95000E 01 uCI/L	Sn-113			W1BEO
5730	GEA	1.62000E 02 uCI/L	Cs-134			W1BEO
5730	GEA	<2.93000E 01 uCI/L	Ru-103			W1BEO
5730	GEA	<4.33000E 02 uCI/L	RuRh-106			W1BEO
5730	GEA	<8.19000 uCI/L	Co-60			W1BEO
5730	GEA	<7.55000 uCI/L	Nb-94			W1BEO
5730	GEA	<2.30000E 02 uCI/L	CePr-144			W1BEO
5730	GEA	<4.12000E 02 uCI/L	Ra-226			W1BEO
5740	U	OUT FOR RERUN				W1BEO
5740	U	OUT FOR RERUN				W1BEO
5740	U	INSUFFICIENT SAMPLE				W1BEO
5740	U	3.87000E-03 G/L				W1BEO
5[illegible]1	PU239/40	OUT FOR RERUN				W1BEO
5[illegible]1	PU239/40	4.03000E-02 uCI/L				W1BEO
5782	AM241	OUT FOR RERUN				W1BEO
5782	AM241	OUT FOR RERUN				W1BEO
5782	AM241	1.7500E-01 uCI/L INSUF. SAMPLE RAN R9404 SPLIT				W1BEO
5786	SR90	OUT FOR RERUN				W1BEO
5786	SR90	OUT FOR RERUN				W1BEO
5786	SR90	1.53000E 02 uCI/L				W1BEO
5787	H3	OUT FOR RERUN				W1BEO
5787	H3	OUT FOR RERUN				W1BEO
5787	H3	5.64000E 00 uCI/L				W1BEO
5940	U	OUT FOR RERUN				W1BEO
5940	U	OUT FOR RERUN				W1BEO
5940	U	INSUFFICIENT SAMPLE				W1BEO
5940	U	7.91000E 01 % RECOVERY		N	Y	W1BEO
5987	H3	OUT FOR RERUN				W1BEO
5987	H3	OUT FOR RERUN				W1BEO
5987	H3	1.07700E 02 % RECOVERY		N	Y	W1BEO

END OF REPORT

K-40	2.69E+02 +-1.99E+02	2.69E+02 +-1.99E+02	1460.75	0.39	
KR-85	LLD<6.57E+03	LLD<6.57E+03	513.99		
KR-85M	LLD<1.86E+01	LLD<1.86E+01	151.17		
KR-87	LLD<6.46E+01	LLD<6.46E+01	402.58		
K[illegible]	LLD<9.17E+02	LLD<9.17E+02	220.90		
LA-140	LLD<7.11E+00	LLD<7.11E+00	1596.20		
LA-142	LLD<5.59E+01	LLD<5.59E+01	641.83		
MN-54	LLD<7.94E+00	LLD<7.94E+00	834.83		
MN-56	LLD<1.06E+01	LLD<1.06E+01	846.76		
NA-22	LLD<1.31E+01	LLD<1.31E+01	1274.55		
NA-24	LLD<7.66E+00	LLD<7.66E+00	1368.60		
NB-94	LLD<7.55E+00	LLD<7.55E+00	702.63		
NB-95	LLD<8.23E+00	LLD<8.23E+00	765.78		
NB-97	LLD<3.09E+02	LLD<3.09E+02	657.92		
NP-237	LLD<1.55E+02	LLD<1.55E+02	86.50		
NP-238	LLD<3.13E+01	LLD<3.13E+01	984.45		
NP-239	LLD<1.34E+02	LLD<1.34E+02	277.60		
PA-233	LLD<5.18E+01	LLD<5.18E+01	311.98		
PA-234M	LLD<1.55E+03	LLD<1.55E+03	1001.03		
PB-210	LLD<4.06E+03	LLD<4.06E+03	46.50		
PB-212	LLD<4.04E+01	LLD<4.04E+01	239.00		
PB-212A	LLD<4.02E+01	LLD<4.02E+01	239.00		
PB-212B	LLD<6.07E+02	LLD<6.07E+02	300.10		
PB-214	LLD<5.61E+01	LLD<5.61E+01	351.92		
PB-214A	LLD<5.61E+01	LLD<5.61E+01	351.92		
PB-214B	LLD<1.03E+02	LLD<1.03E+02	295.21		
PO-210	LLD<7.08E+05	LLD<7.08E+05	804.00		
PO-214	LLD<2.93E+05	LLD<2.93E+05	799.70		
PO-216	LLD<5.25E+05	LLD<5.25E+05	804.90		
PU-239	LLD<2.16E+05	LLD<2.16E+05	129.30		
P[illegible] 1	LLD<6.66E+06	LLD<6.66E+06	148.57		
RA-224	LLD<4.38E+02	LLD<4.38E+02	240.99		
RA-226	LLD<4.12E+02	LLD<4.12E+02	186.10		
RB-88	LLD<1.14E+02	LLD<1.14E+02	1836.00		
RB-89	LLD<4.66E+01	LLD<4.66E+01	1031.88		
RN-220	LLD<1.99E+04	LLD<1.99E+04	549.73		
RU-103	LLD<2.93E+01	LLD<2.93E+01	497.08		
RURH106	LLD<4.33E+02	LLD<4.33E+02	621.80		
SB-124	LLD<2.63E+01	LLD<2.63E+01	602.72		
SB-125	LLD<2.19E+02	LLD<2.19E+02	176.33		
SC-46	LLD<1.11E+01	LLD<1.11E+01	1120.45		
SE-75	LLD<3.21E+01	LLD<3.21E+01	264.66		
SN-113	LLD<3.95E+01	LLD<3.95E+01	391.67		
SR-85	LLD<2.88E+01	LLD<2.88E+01	513.99		
SR-91	LLD<4.09E+01	LLD<4.09E+01	555.60		
SR-92	LLD<1.08E+01	LLD<1.08E+01	1383.94		
TA-182	LLD<3.83E+01	LLD<3.83E+01	1121.30		
TC-99M	LLD<1.45E+01	LLD<1.45E+01	140.51		
TE-123M	LLD<1.73E+01	LLD<1.73E+01	159.00		
TE-125M	LLD<4.81E+03	LLD<4.81E+03	109.27		
TE-132	LLD<1.96E+01	LLD<1.96E+01	228.16		
TH-228	LLD<1.76E+03	LLD<1.76E+03	84.37		
TH-234	LLD<3.05E+02	LLD<3.05E+02	92.50		
TH-234A	LLD<3.05E+02	LLD<3.05E+02	92.50		
TH-234B	LLD<1.18E+03	LLD<1.18E+03	63.30		
TI 8	LLD<2.55E+01	LLD<2.55E+01	583.14		
U-[illegible]	LLD<2.88E+01	LLD<2.88E+01	185.71		
U-235A	LLD<2.88E+01	LLD<2.88E+01	185.71		
U-235B	LLD<1.34E+02	LLD<1.34E+02	143.76		
U-237	LLD<7.90E+01	LLD<7.90E+01	208.00		

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 03:16:42

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

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	1210.13	604.69	1.60	432.	484.	16.0	CS-134
2	1324.14	661.68	1.68	195.	34003.	1.1	CS-137
2B		661.85			36.	13.9	
3	1592.51	795.85	1.83	41.	311.	12.8	CS-134
4	2923.20	1461.14	1.86	8.	196.	14.8	K-40
4B		1460.85			156.	3.8	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

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

MN-36	LLD=2.98E-02	LLD=2.98E-02	[illegible]
NA-23	LLD=2.48E-02	LLD=2.48E-02	1274.[illegible]
NA-24	LLD=3.70E-02	LLD=3.70E-02	1366.[illegible]
NP-94	LLD=2.30E-02	LLD=2.30E-02	[illegible]
[illegible]	LLD=2.76E-02	LLD=2.76E-02	[illegible]
[illegible]	LLD=2.12E-02	LLD=2.12E-02	[illegible]
[illegible]	LLD=1.47E-01	LLD=1.47E-01	[illegible]
[illegible]	LLD=1.05E-01	LLD=1.05E-01	934.[illegible]
[illegible]	LLD=1.21E-01	LLD=1.21E-01	[illegible]
PA-231	LLD=2.08E-02	LLD=2.08E-02	311.[illegible]
PA-234M	LLD=5.19E+00	LLD=5.19E+00	1001.[illegible]
PB-210	LLD=3.32E+00	LLD=3.32E+00	[illegible]
PB-212	LLD=2.92E-02	LLD=2.92E-02	[illegible]
PB-212A	LLD=3.90E-02	LLD=3.90E-02	[illegible]
PB-214B	LLD=3.21E-01	LLD=3.21E-01	300.[illegible]
PB-211	LLD=4.77E-02	LLD=4.77E-02	[illegible]
PB-214A	LLD=4.77E-02	LLD=4.77E-02	[illegible]
PB-214B	LLD=3.43E-02	LLD=3.43E-02	[illegible]
PD-210	LLD=2.19E+03	LLD=2.29E+03	[illegible]
PD-214	LLD=2.68E+03	LLD=2.68E+03	[illegible]
PD-216	LLD=1.41E+03	LLD=1.41E+03	[illegible]
PD-[illegible]	LLD=1.73E+02	LLD=1.73E+02	[illegible]
PU-241	LLD=6.29E+03	LLD=6.29E+03	148.[illegible]
[illegible]	LLD=4.34E-01	LLD=4.34E-01	[illegible]
[illegible]	LLD=3.87E-01	LLD=3.87E-01	[illegible]
[illegible]	LLD=1.97E-01	LLD=1.97E-01	183.[illegible]
[illegible]	LLD=1.47E-01	LLD=1.47E-01	1031.[illegible]
[illegible]	LLD=2.11E+01	LLD=2.11E+01	[illegible]
[illegible]	LLD=2.36E-[illegible]	LLD=2.36E-[illegible]	[illegible]
[illegible]	LLD=4.78E-01	LLD=4.78E-01	[illegible]
[illegible]	LLD=1.92E-01	LLD=1.92E-01	[illegible]
[illegible]	LLD=7.41E-01	LLD=7.41E-01	[illegible]
[illegible]	LLD=1.20E-[illegible]	LLD=1.20E-[illegible]	1130.[illegible]
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[illegible]	LLD=2.50E-02	LLD=2.50E-02	187.[illegible]
[illegible]	LLD=2.50E-02	LLD=2.50E-[illegible]	183.[illegible]
[illegible]	LLD=1.04E-01	LLD=1.04E-[illegible]	[illegible]
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[illegible]	LLD=5.79E-02	LLD=5.79E-[illegible]	635.[illegible]
[illegible]	LLD=4.87E-01	LLD=4.87E-01	[illegible]
[illegible]	LLD=3.76E-02	LLD=3.76E-02	[illegible]
[illegible]	LLD=1.54E-01	LLD=1.54E-01	[illegible]
[illegible]	LLD=2.11E-02	LLD=2.11E-02	249.[illegible]
[illegible]	LLD=1.42E-01	LLD=1.42E-01	202.[illegible]
[illegible]	LLD=1.87E-02	LLD=1.87E-02	1636.[illegible]
[illegible]	LLD=1.18E+01	LLD=1.18E+01	1204.[illegible]
[illegible]	LLD=3.27E-[illegible]	LLD=3.27E-[illegible]	[illegible]
[illegible]	LLD=1.43E-01	LLD=1.43E-01	1115.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

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

PI	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDE
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]			[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5		[illegible]			[illegible]	[illegible]	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE [illegible]
BACKGROUND DESCRIPTION: [illegible]
BACKGROUND COLLECT STARTED ON [illegible]-85 AT [illegible]
BACKGROUND LIVE TIME: [illegible] SECONDS

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PEAKS NOT USED IN ANALYSIS

ISOTOPIC GAMMA	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

ISOTOPIC GAMMA	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC

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[illegible]	LLD 5.57E+00	LLD 5.57E+00		[illegible]
[illegible]	LLD 5.57E+00	LLD 5.57E+00		511.1[illegible]
[illegible]	LLD [illegible]	LLD [illegible]		335.[illegible]
[illegible]	LLD 1.74E+00	LLD 1.3[illegible]E+00		[illegible]
[illegible]	LLD 6.47E+00	LLD 6.47E+00		[illegible]
[illegible]	LLD 2.54E+00	LLD 2.54E+00		[illegible]
[illegible]	LLD 1.37E+00	LLD 1.37E+00		[illegible]
[illegible]	LLD 1.37E+00	LLD 1.37E+00		[illegible]
[illegible]	LLD [illegible]	LLD [illegible]		[illegible]
[illegible]	LLD [illegible]	LLD 8.195E-01		1273.[illegible]
[illegible]	LLD 1.23E+00	LLD 1.23E+00		411.[illegible]
[illegible]	LLD 1.31E+00	LLD 1.31E+00		374
[illegible]	LLD 1.32E+00	LLD 1.32E+00		141.[illegible]
[illegible]	LLD 5.51E+00	LLD 5.51E+00		337.[illegible]
[illegible]	LLD 3.33E+00	LLD 3.33E+00		190.[illegible]
[illegible]	LLD 1.34E+01	LLD 1.34E+01		477.[illegible]
[illegible]	LLD 1.19E+00	LLD 1.19E+00		567.[illegible]
[illegible]	LLD [illegible]	LLD [illegible]		[illegible]
214	LLD 1.01E+01	LLD 1.01E+01		605.[illegible]
2144	LLD 1.01E+01	LLD 1.01E+01		205.[illegible]
[illegible]	LLD 1.04E+01	LLD 1.04E+01		1120.[illegible]
[illegible]	LLD 4.85E+00	LLD 4.85E+00		174[illegible]
[illegible]	LLD 2.35E+01	LLD 2.35E+01		[illegible]
[illegible]	LLD [illegible]	LLD [illegible]		169.[illegible]
[illegible]	LLD 1.25E+00	LLD 1.25E+00		145.[illegible]
[illegible]	LLD 1.07E+01	LLD 1.07E+01		132.[illegible]
[illegible]	LLD 1.14E+00	LLD 1.14E+00		646.[illegible]
[illegible]	LLD 6.47E-01	LLD 6.47E-01		132.[illegible]
[illegible]	LLD 1.55E+00	LLD 1.55E+00		810.[illegible]
[illegible]	1.23E+02 +-3 [illegible]	1.22E+02 +-3 [illegible]		1332.[illegible]
				1173.[illegible]
[illegible]	LLD 2.55E+00	LLD 2.55E+00		336.[illegible]
[illegible]	1.50E+02 +-3 [illegible]	[illegible] +-3.70E+00		795.[illegible]
				404.[illegible]
[illegible]	LLD [illegible]	LLD [illegible]		618.[illegible]
[illegible]	1.42E+02 +-4 [illegible]	1.42E+02 +-4 [illegible]		651.[illegible]
[illegible]	LLD 1.17E+00	LLD 1.17E+00		1435.[illegible]
[illegible]	LLD 2.19E+00	LLD 2.19E+00		1408.[illegible]
[illegible]	LLD 2.24E+00	LLD 2.24E+00		1274.[illegible]
[illegible]	LLD [illegible]	LLD [illegible]		107.[illegible]
[illegible]	LLD 2.37E+00	LLD 2.37E+00		1079.[illegible]
[illegible]	LLD 1.41E+00	LLD 1.41E+00		482.[illegible]
[illegible]	LLD 1.16E+00	LLD 1.16E+00		375.[illegible]
[illegible]	LLD 1.38E+00	LLD 1.38E+00		341.[illegible]
[illegible]	LLD 1.52E+00	LLD 1.52E+00		467.[illegible]
[illegible]	LLD 1.47E+00	LLD 1.47E+00		535.[illegible]
[illegible]	LLD 2.34E+00	LLD 2.34E+00		547.[illegible]
[illegible]	LLD 3.09E+00	LLD 3.09E+00		1260.[illegible]
[illegible]	LLD 1.58E+01	LLD 1.58E+01		1460.[illegible]
[illegible]	LLD 1.19E+02	LLD 1.19E+02		313.[illegible]

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WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9418	Customer ID: 2291-4-4
Analysis: GEA	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-548-121/D-0
Technologist: C. JOHNSON	Date: 7-31-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5530	11		
2	REAGENT BLANK	R9414-5630	12		
3	SAMPLE 2291-4-4	R9418-5730	13		
4	FINAL LMCS CHECK STD	R9419-5530	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	141B46/0.5 mL			N/A

A-6000-881 (03/92)

9 3 1 2 3 5 3 1 1 7 2

TOTAL BETA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5520	102AW	6-14-91	13:8	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	% RECOVERY	WIDED	1

Sample Size: ? 10ml — Customer ID: STD

Remarks, Calculations, Results: RERUN

5515 EV-CRD
STD# 18B49 RESULT 1.341E-1 uCi/ml
STD VAL 1.3540E-1 %REC 99.070

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			
Mary Franz				

Date: 6-21-91 — Time Completed: — Last Print Date: [signature] — [signature]

5-6

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5620	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/G	WIDED	1

Sample Size: ? 1ml — Customer ID: REG. BL

Remarks, Calculations, Results: RERUN

COUNT AS uCi/L
USE 13,14,15 OR 16

9.58E-3 uCi/ml

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			
Mary Franz				

Date: 6-21-91 — Time Completed: — Last Print Date: [signature] — [signature]

9-10

Serial No	Sample Point	Date	Time Issued	Priority
R 9418.-5720	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/G	WIDED	1

Sample Size: ? .100 -10- .200 -10- .500 — Customer ID: 2291-4-4

Remarks, Calculations, Results: RERUN

COUNT AS uCi/L
USE 13,14,15 OR 16

2.02 E4 uCi/ml

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			
Mary Franz				

Date: 6-21-91 — Time Completed: — Last Print Date: [signature] — [signature]

18/2 R9413-5520

9643/10 -6

Beta Calculation by SZC on 06-21-1991 at 14:22:40
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9242/10 -6

9643/10 - 6.0 = 1.3699E-01 uCi/L beta

Mount # 2

9242/10 - 6.0 = 1.3126E-01 uCi/L beta

18/2 R9414-5620

104/10 -6

Beta Calculation by SZC on 06-21-1991 at 15:00:28
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 1

Mount # 1

150/10 -6

104/10 - 6.0 = 6.2900E-03 uCi/L beta

Mount # 2

150/10 - 6.0 = 1.2866E-02 uCi/L beta

9-10 R9418-5720 DF 10302

18/2 6-21-91

13904/10 -6

Beta Calculation by ALJ on 06-21-1991 at 18:28:45
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 10302

13603/10 -6

Mount # 1

13904/10 - 6.0 = 2.0388E+04 uCi/L beta

Mount # 2

13603/10 - 6.0 = 1.9945E+04 uCi/L beta

TOTAL ALPHA ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5525	102AW	6-14-91	13: 0	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT	LA-508-101	% RECOVERY	WIDEO	1

Sample Size: ? 10ml — Customer ID: STD

Remarks, Calculations, Results:
S510 EV-CRD
STDN 18B49 RESULT 1.48E-2
STD VAL 1.33896-2 %REC 110.5470

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269 Mary Frahy				

Date: 6-20-91 — Time Completed: — Lab Unit No.:

14/2 R9413-5525 6-21-91

758/10 — Alpha Calculation by MAI on 06-21-1991 at 06:28:07
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

745/10 — Mount # 1

758/10 - 0.4 = 1.4936E-02 uCi/L alpha

Mount # 2

745/10 - 0.4 = 1.4678E-02 uCi/L alpha

3 & 4

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5625	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT	LA-508-101	uCi/G	WIDEO	1

Sample Size: ? 1ml — Customer ID: REG. DL

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

<9.23E-4 uci/l

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269 Mary Frahy				

Date: 6-20-91 — Time Completed: — Lab Unit No.:

14/2 R9414-5625 6-21-91

3/10 - .4 — Alpha Calculation by MAI on 06-21-1991 at 06:27:38
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 1 mL Dilution : 1

1/10 — Mount # 1

3/10 - 0.4 = 9.2309E-04 uCi/L alpha

Mount # 2

1/10 - 0.4 = 9.2309E-04 uCi/L alpha

5 & 6

Serial No.	Sample Point	Date	Time Issued	Priority
R 9418.-5725	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT	LA-508-101	uCi/G	WIDEO	1

Sample Size: ? .100 -10 - .250 — Customer ID: 2291-4-4

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

<2.16 uci/l

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269 Mary Frahy				

Date: 6-20-91 — Time Completed: — Lab Unit No.:

14/2 R9418-5725 6-21-91

34/10 — Alpha Calculation by MAI on 06-21-1991 at 07:01:45
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : .25 mL Dilution : 101

Mount # 1

28/10 - 34/10 - 0.4 = 2.4008E+00 uCi/L alpha

Mount # 2

28/10 - 0.4 = 1.9207E+00 uCi/L alpha

VISUAL CHECK AND OVER-THE-TOP READING ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

Serial No	Sample Point	Date	Time Issued	Priority
R 9394.-5000	102AW	6-14-91	10:41	26

Determination	Method/Standard	Result Units	Charge Code	Rerunn
APPEAR	LA-519-151 ~~[illegible]~~ JH 4-2-92		W1BE0	0

Sample Size	Customer ID
?	2291-1-1

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-B=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity - clear
some solids settled
on bottom of vial

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Last Chg Mgr
6/14/91		[signature]

54-6600-051 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
R 9415.-5000	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Rerunn
APPEAR	LA-519-151 ~~[illegible]~~ JH 4-3-92		W1BE0	0

Sample Size	Customer ID
?	2291-1-2

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-B=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity - clear
small amount of solids
settled on vial bottom

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Last Chg Mgr
6/14/91		[signature]

54-6600-051 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
R 9416.-5000	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Rerunn
APPEAR	LA-519-151 ~~[illegible]~~ JH 4-3-92		W1BE0	0

Sample Size	Customer ID
?	2291-2-4

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-B=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
light tint yellow
aqueous solution
clarity - clear
no solids present

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Last Chg Mgr
6/14/91		[signature]

54-6600-051 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
R 9417.-5000	102AW	6-14-91	13:18	26

Determination	Method/Standard	Result Units	Charge Code	Rerunn
APPEAR	LA-519-151 ~~[illegible]~~ JH 4-3-92		W1BE0	0

Sample Size	Customer ID
?	2291-3-4

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-B=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no visible organic
aqueous solution
light tint yellow
clarity - clear
solids settled on
bottom of vial

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Last Chg Mgr
6/14/91		[signature]

54-6600-051 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
R 9418.-5000	102AW	6-14-91	13:20	26

Determination	Method/Standard	Result Units	Charge Code	Rerunn
APPEAR	LA-519-151 ~~[illegible]~~ JH 4-3-92		W1BE0	0

Sample Size	Customer ID
?	2291-4-4

Remarks, Calculations, Results

A. JAR ID#
B. JAR TARE WT.
C. JAR TOTAL WT.
D. C-B=
E. EST. VOL./LENGTH
F. VISUAL REMARKS

no organic solution
light tint yellow
aqueous solution
clarity - clear
solids - present

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C559				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Last Chg Mgr
6/14/91		[signature]

54-6600-051 (R-10-83)

[illegible]	[illegible]	[illegible]	TIME	FL TIME	AVG HR	[illegible]
[illegible]	[illegible]	[illegible]	10.00	[illegible]	[illegible]	[illegible]
					TSOI DPM	[illegible]
[illegible]	[illegible]	[illegible]	10.00	[illegible]	[illegible]	[illegible]
					TSOI DPM	[illegible]
[illegible]	[illegible]	[illegible]	10.00	[illegible]	[illegible]	[illegible]
					TSOI DPM	[illegible]
[illegible]	[illegible]	[illegible]	10.00	[illegible]	[illegible]	[illegible]
					TSOI DPM	[illegible]
[illegible]	650.10	[illegible]	10.00	102.68	23.0	0.78 [illegible]
TSOI [illegible]	[illegible]				TSOI DPM	:1477.220

9 3 1 2 3 5 3 1 1 5 4

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

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R9417.-5887	102AW	6-14-91	13:10	26
13	A-210-T13	RECOVERY		
1 ml			2291-3-4	

UNPLICATE SAMPLE
COUNT AS uCI/L 5.83E

RERUN
used sample #
R-9396
2291-3-1

82016	69549			
10-4-91				

R9417-5887

$$\frac{(12936.23)(1000)}{(1)(2.22E^{6}} =$$

R9419.-5587	102AW	6-14-91	13:21	26
13	A-210-T13	RECOVERY		
1 ml			STD	

FDP R907 ENVSTD
STD# 34849 RESULT 6.57E-1
STD VAL 6.4591E-1 REC 101.72%

RERUN

82016	69549			
10-4-91				

R9419-5587

$$\frac{(1459.220)(1000)}{(1)(2.22E^{6})} =$$

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9417	Customer ID: 2291-3-4
Analysis: TRITIUM	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-218-113/B-0
Technologist: V. MASSIE	Date: 10-04-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5587	11		
2	REAGENT BLANK	R9414-5687	12		
3	SAMPLE 2291-3-4	R9417-5787	13		
4	SAM DUP OF 2291-3-4	R9417-5887	14		
5	FINAL LMCS CHECK STD	R9419-5587	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	34B49/1.0 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

STRONTIUM 90 ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025;
ADDENDUM 4 REV 0)

Sample No.	Sample Point	Date	Time Sampled	Priority
R 9413.-5586	102AW	6-14-91	13:10	26
Chemistry	Analytical Procedure	Result Units	Charge Code	Records
SR90	LA-220-101	% RECOVERY	W1TE2	3
Sample Size			Comment ID	
2 1ml & 1ml Sr Carrier			STD	

COUNT ON DETECTOR#11 1151-E RERUN
S376 ITS Book Number
STD# 150846 RESULT 7.46E-1
STD VAL 7.5416E-1 %REC 96.570
SEP. TIME - 14:05
SEP. DATE - 06-22-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82540				
Date	Time Completed	Lab Manager		
06-22-91				

A. R9413-5586 4/2 8-26 mm @ 1722 DT=4.53
T.L.
G 7.1238 — 6578 / 10
1 7.0292 — 6666 / 10
N - .0946

Sr Calculation by NAC on 06-22-1991 at 19:50:32
Det 111 2 -inch count Sr eff : .3117 Y eff : .4443
Sample size : 1 ml Dilution : 1 Method : 1
Count # 1 Decay time = 4.83 hrs
6578/10 = 10.0 = 7.0394E-01 uCi/L strontium .946 — 7.44E-1
Count # 2 Decay time = 4.83 hrs
6666/10 = 10.0 = 7.1351E-01 uCi/L strontium .954 — 7.48E-1

B
G - 7.1278
1 - 7.0324
N - .0954

Sample No.	Sample Point	Date	Time Sampled	Priority
R 9414.-5686	102AW	6-14-91	13:13	26
Chemistry	Analytical Procedure	Result Units	Charge Code	Records
SR90	LA-220-101	uCi/G	W1TE2	3
Sample Size			Comment ID	
2 1ml & 1ml Sr Carrier			REQ. DL	

REAGENT BLANK RERUN
COUNT AS uCi/L
<3.49E-3 uCi/L
SEP. TIME - 13:30
SEP. DATE - 06-22-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82540				
Date	Time Completed	Lab Manager		
06-22-91				

A R9414-5686 12/2 8-22 mm @ 1855. DT=5.42
G - 7.1057 — 113 / 10 - 12
1 - 7.0180 — 127 / 10 -
N - .0877

Sr Calculation by NAC on 06-22-1991 at 19:55:23
Det 112 2 -inch count Sr eff : .4233 Y eff : .4719
Sample size : 1 ml Dilution : 1 Method : 1
Count # 1 Decay time = 5.42 hrs
113/10 = 12.0 = 2.5539E-01 uCi/L strontium
Count # 2 Decay time = 5.42 hrs
127/10 = 12.0 = 3.2952E-01 uCi/L strontium .945

B
G - 7.0954
1 - 7.0009
N - .0945

Sample No.	Sample Point	Date	Time Sampled	Priority
R 9417.-5786	102AW	6-14-91	13:18	26
Chemistry	Analytical Procedure	Result Units	Charge Code	Records
SR90	LA-220-101	uCi/G	W1BE0	2
Sample Size			Comment ID	
2.050-1ml-1 & 1ml Carrier			2291-7-4	

COUNT AS uCi/L RERUN
2.01E1 uCi/L
SEP. DATE - 06-22-91
SEP. TIME - 13:40

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82540				
Date	Time Completed	Lab Manager		
06-22-91				

A R9417-5786 12/2 8-22 mm @ 1920 DT=5.66 DF=201
G - 7.1020 — 1011 / 10 - 12
1 - 7.8119 — 1201 / 10 -
N - .0901

Sr Calculation by NAC on 06-22-1991 at 19:54:01
Det 112 2 -inch count Sr eff : .4233 Y eff : .4719
Sample size : 1 ml Dilution : 201 Method : 1
Count # 1 Decay time = 5.66 hrs
1011/10 = 12.0 = 1.7874E+01 uCi/L strontium .901 — 1.98E1
Count # 2 Decay time = 5.66 hrs
1201/10 = 12.0 = 2.1686E+01 uCi/L strontium .1064 — 2.04E1

B
G - 7.1222
1 - 7.0158
N - .1064

1	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
11	1.	0.	0.	0.	1.	2.	0.	1.	0.	0.
21	1.	1.	1.	0.	0.	0.	0.	1.	0.	0.
31	0.	0.	3.	3.	2.	1.	0.	0.	1.	1.
41	0.	1.	0.	1.	2.	0.	0.	0.	0.	2.
51	1.	0.	1.	0.	2.	0.	0.	1.	1.	0.
61	1.	1.	0.	0.	3.	0.	0.	1.	0.	1.
71	2.	0.	1.	4.	0.	0.	1.	2.	2.	0.
81	0.	0.	1.	0.	1.	1.	0.	1.	1.	0.
91	1.	2.	2.	0.	1.	0.	0.	1.	0.	2.
101	1.	2.	2.	0.	0.	1.	0.	1.	0.	0.
111	3.	1.	2.	2.	0.	2.	0.	1.	3.	1.
121	1.	2.	2.	1.	0.	2.	1.	0.	1.	0.
131	1.	1.	0.	7.	0.	2.	2.	0.	1.	3.
141	1.	2.	1.	0.	2.	1.	1.	1.	5.	3.
151	2.	1.	2.	3.	0.	4.	3.	4.	7.	3.
161	2.	6.	1.	2.	6.	5.	2.	6.	4.	4.
171	7.	6.	4.	3.	7.	6.	7.	6.	10.	8.
181	12.	10.	13.	9.	9.	9.	6.	12.	3.	7.
191	10.	10.	14.	7.	11.	11.	11.	15.	19.	20.
201	22.	21.	18.	30.	25.	35.	37.	47.	45.	62.
211	91.	99.	111.	124.	156.	170.	228.	277.	325.	396.
221	464.	536.	631.	727.	832.	894.	937.	1157.	1291.	1167.
231	1547.	1535.	1629.	1577.	1313.	1269.	1080.	862.	642.	420.
241	280.	173.	108.	63.	26.	11.	5.	10.	7.	6.
251	10.	9.	7.	9.	12.	10.	21.	9.	14.	11.
261	9.	21.	20.	20.	23.	26.	21.	25.	25.	20.
271	24.	20.	11.	14.	9.	9.	8.	6.	9.	8.
281	7.	12.	14.	14.	25.	27.	23.	26.	44.	26.
291	48.	70.	62.	62.	81.	83.	118.	122.	122.	137.
301	153.	166.	182.	162.	177.	185.	180.	184.	174.	128.
311	101.	74.	73.	48.	30.	20.	17.	9.	10.	7.
321	14.	16.	19.	15.	17.	21.	21.	22.	17.	21.
331	22.	20.	38.	29.	40.	49.	46.	60.	63.	74.
341	100.	124.	143.	169.	213.	258.	328.	403.	448.	584.
351	692.	787.	924.	1020.	1209.	1294.	1440.	1602.	1584.	1831.
361	1925.	2113.	2192.	2337.	2227.	2036.	1797.	1521.	1232.	824.
371	548.	327.	202.	83.	43.	16.	6.	2.	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.	0.	1.	0.	0.	0.	1.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	2.	1.	0.	0.	0.
431	0.	0.	0.	0.	1.	0.	2.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
461	0.	1.	0.	1.	0.	0.	0.	0.	0.	1.
471	1.	0.	0.	0.	0.	0.	0.	1.	1.	0.
481	1.	2.	1.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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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. 1.10

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

DATA REDUCTION REPORT

SAMPLE
P9419-5581
File ID: SD6002.SPC

Counted on: 7/18/91 @13: 0
Detector/Geometry number: 6/ 1
Count time: 30000. 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	3844.2	3946.6	364.776	364.776	20.000	10.579	10.000	1.737
2	324.7	334.3	306.748	306.748	20.000	11.165	10.000	4.310
3	250.3	49.2	268.828	268.828	12.000	3.780	6.000	4.539
4	2763.8	2764.6	234.003	234.003	20.000	10.618	10.000	5.301

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Meas.	Peak Centroid Nbc.	Peak Centroid Diff.	FWHM	Count Rate c/m	Count d/m	Activity uCi/cc
1	Pu234	0.5633	5.756	5.772	-0.016	0.05	71.64	0.01	0.506E-09
	Cm243		5.786	5.772	0.014				0.679E-09
	Pu238	0.0511	5.499	5.499	0.000	0.05	6.50	0.00	0.621E-1[illegible]
	Am241		5.480	5.499	-0.019				0.478E-09
3		0.0039		5.321		0.02	0.18	0.00	0.331E-10
4	Pu239	0.3919	5.143	5.157	-0.014	0.05	48.57	0.01	0.336E-09
	Pu240		5.144	5.157	-0.013				0.336E-09

DETECTOR CALIBRATION
Energy(MEV) = 4.057 + (0.0047)*Channel
Energy range (MeV): 4.057 TO 6.464
Efficiency ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	63420.0	100.000
Smoothed	63419.9	100.000
Composite fit	63592.4	100.272
Residuals	-172.4	-0.272

Analyzed by: _____
63099

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1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
41	0.	0.	0.	0.	1.	0.	0.	1.	1.	1.
	1.	1.	0.	0.	1.	1.	0.	0.	1.	1.
	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	1.	2.	0
81	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.
91	0.	0.	0.	0.	1.	0.	0.	0.	1	0.
101	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
111	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	1.	0.	0.	2.	0.	0.	0.	0.	0.
131	1.	0.	1.	1.	0.	1.	0.	0.	0.	1.
141	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.
151	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
161	0.	0.	1.	1.	1.	0.	1.	0.	0.	0.
171	0.	0.	0.	0.	1.	3.	0.	0.	0.	0.
181	2.	1.	2.	1.	3.	1.	1.	0.	0.	1.
191	0.	0.	2.	1.	2.	1.	1.	0.	0.	0.
201	0.	0.	0.	1.	1.	1.	3.	2.	1.	1.
211	3.	0.	1.	0.	0.	1.	1.	1.	0.	0.
221	1.	1.	1.	3.	0.	0.	2.	2.	2.	0.
231	2.	2.	4.	1.	0.	5.	2.	0.	0.	0.
241	0.	1.	1.	1.	0.	0.	2.	0.	0.	2.
251	1.	2.	1.	0.	1.	4.	0.	3.	2.	3.
261	4.	7.	6.	3.	5.	4.	4.	2.	7.	1.
271	3.	4.	2.	2.	3.	3.	0.	0.	1.	3.
281	3.	3.	3.	0.	3.	3.	1.	6.	8.	5.
291	7.	12.	10.	11.	12.	10.	11.	15.	18.	22.
301	24.	26.	30.	30.	31.	30.	28.	17.	23.	13.
	15.	11.	11.	11.	12.	8.	7.	1.	6.	2.
321	2.	1.	2.	2.	0.	2.	4.	1.	5.	5.
331	6.	5.	8.	6.	5.	17.	4.	11.	23.	16.
341	22.	36.	46.	54.	76.	99.	112.	139.	130.	204.
351	275.	310.	379.	429.	480.	528.	621.	649.	759.	786.
361	952.	881.	892.	905.	879.	821.	718.	709.	572.	480.
371	370.	230.	179.	127.	82.	40.	29.	19.	14.	5.
381	2.	0.	1.	0.	0.	0.	1.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
411	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
421	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
431	2.	0.	0.	0	0.	0.	0.	0.	1.	0.
441	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	1.	0.	0.	3.	0.	0.	0.	0.
471	0.	0.	2.	0.	1.	0.	3	0.	0.	0.
481	0.	1.	2.	1.	2.	0.	1.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

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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. 1.10

DATA REDUCTION REPORT WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE
R-9114-5691
File ID: SD3679.SPC

Counted on: 7/19/91 @ 11:0
Detector/Geometry number: 3/ 1
Count time: 30000. 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	1507.6	1617.7	364.921	364.921	20.000	13.772	10.000	7.371
2	50.8	49.0	305.971	305.971	24.000	14.941	12.000	6.[illegible]
3	7.5	7.6	266.307	266.307	24.000	13.783	12.000	6.771
4	4.1	3.2	243.227	233.227	20.000	13.220	10.000	0.[illegible]

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/g
1	Pu238	0.9787	5.756	5.772	-0.016	0.07	30.85	156.32	0.701E-0[illegible]
	Cm243		5.784	5.772	0.011				0.915E-0[illegible]
	Pu239	0.0309	5.499	5.489	0.010	0.07	0.99	6.84	0.309E-0[illegible]
	Am241		5.490	5.489	-0.009				0.236E-0[illegible]
3		0.0016		5.299		0.07	0.15	0.73	0.330E-0[illegible]
4	Pu239	0.0059	5.143	5.139	0.001	0.06	0.19	0.94	0.423E-0[illegible]
	Pu240		5.141	5.139	0.005				0.423E-0[illegible]

DETECTOR CALIBRATION
Energy(MEV) 4.020 + (0.0018)*Channel
Energy range (MeV): 4.020 TO 6.477
Efficiency = 0.2014 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	15951.0	100.000
Smoothed	15951.0	100.000
Composite fit	16090.7	100.876
Residuals	-139.7	-0.876

Analyzed by: _____
61453

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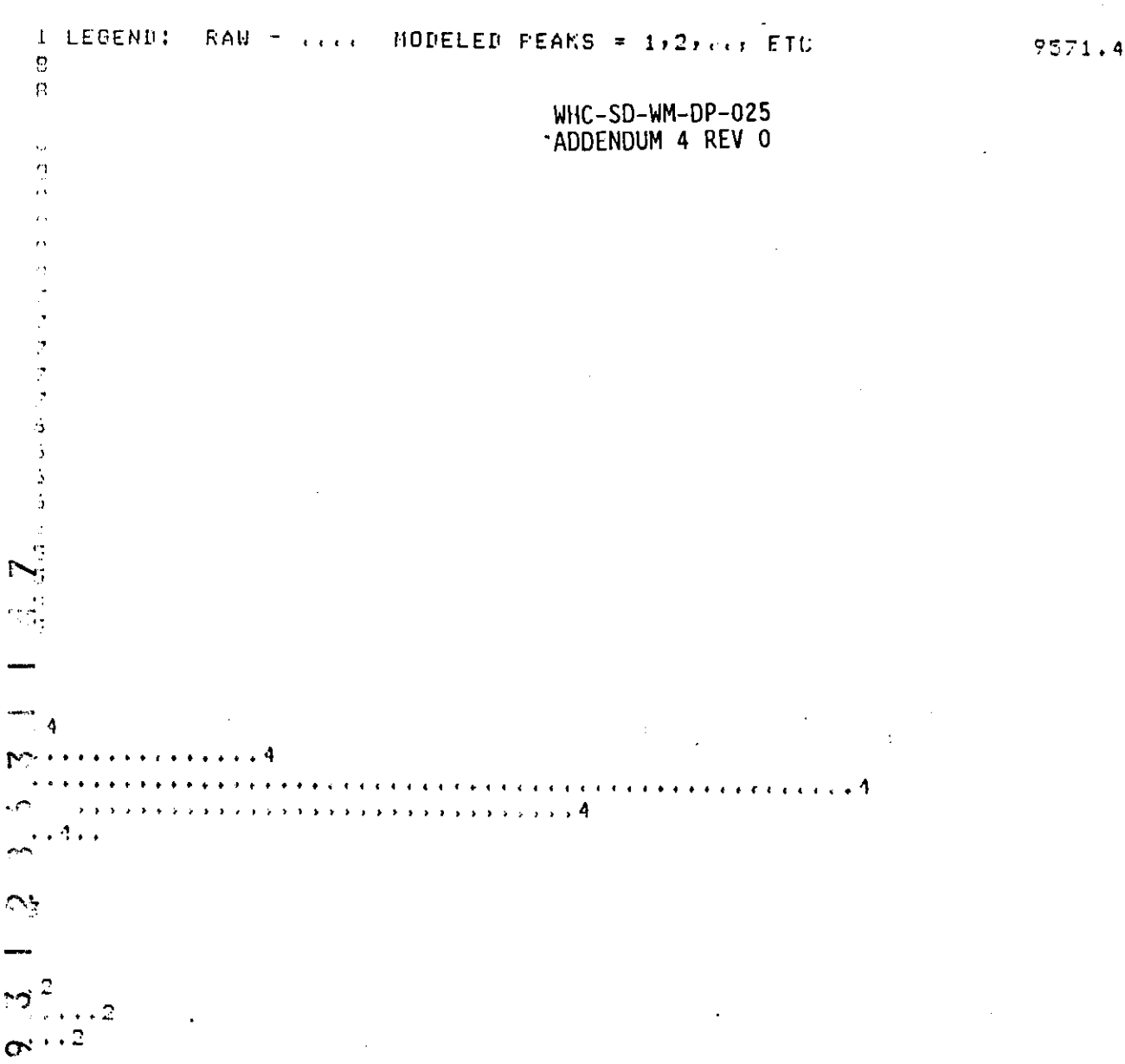

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H.V 6002

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5601	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Results
PU239/40	LA-503-156	% RECOVERY	W1BEO	1

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

Remarks, Calculations, Results:
EDP R211 AR001
STDN ~~[illegible]~~ 93B43 RESULT 1.004E²
STD VAL. 9.0N4E¹ %REC 111.4%
Pu236 (40B43) .050 ml
1 ml 8 ml HNO3
99% train

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6559	[illegible]		[illegible]	
[illegible]			[illegible]	

Date	Time Completed	Last Line Test	
7/14/91		[illegible]	[illegible]

#1 7-18-91 R9419-5581

1477/5 -10

$$\frac{(285.4)(2)(.5633)}{325.49} = 99\%$$

9 3 1 2 9 5 3 1 1 4 5

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9417	Customer ID: 2291-3-4
Analysis: PLUTONIUM 239/240	Sample Prep: UNDIGESTED

Instrument: WB57237	Procedure/Rev: LA-503-156/C-3
Technologist: M. BIERMAN	Date: 7-16-91
Starting Time: 08:00	Temperature: 25degC
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5581	11		
2	REAGENT BLANK	R9414-5681	12		
3	SAMPLE 2291-3-4	R9417-5781	13		
4	FINAL LMCS CHECK STD	R9419-5581	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	43B43/0.1 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5540	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Results Units	Charge Code	Results
U	LA-925-106	RERUN	W1BED	3

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

Remarks, Calculations, Results:
S267 UF15 STDH 858 88 RESULT 3.07E-2
STD VAL 3.14E-2 REC 97.8%
SPIKE ID/VAL 90 ASS
SPIKE VOL. .100-10-.100
(1) Sampl = .16 - .12
(2) Sample Spk - .48 - .36

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
	Hrs	Hrs	Hrs	Hrs

Date: 10-8-91 Time Completed: Lab Manager:

R9413-5540 -

$$\frac{[(.16)(.982)](.1)(6.25E^{-4})(1010)}{.48-[(.16)(.982)]} = 3.07E^{-2}\ g/l$$

$$\frac{(.12)(.982)(6.25E^{-4})(.1)(1010)}{.36-[(.982)(.12)]} = 3.07E^{-2}\ g/l$$

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5640	102AW	6-14-91	13:11	26

Determination	Method/Standard	Results Units	Charge Code	Results
U	LA-925-106	RERUN G/L	W1BED	3

Sample Size: ? 1ml
Customer ID: REG. BL

Remarks, Calculations, Results:
REAGENT BLANK

$$\frac{(<.02)(.985)(5.68E^{-5})(.1)(1)}{.30-[(.02)(.985)]} = < 3.99E^{-7}\ g/l$$

BLK = .01
Blk+Spk = .30
Spk Vol/Std: 5.68E-5/40838
Spk Vol = .100-10-.100

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
	Hrs	Hrs	Hrs	Hrs

Date: 10-8-91 Time Completed: Lab Manager:

Serial No	Sample Point	Date	Time Issued	Priority
R 9417.-5740	102AW	6-14-91	13:18	26

Determination	Method/Standard	Results Units	Charge Code	Results
U	LA-925-106	RERUN G/L	W1BED	3

Sample Size: ? .100-10-.100 ml
Customer ID: 2291-3-4

Remarks, Calculations, Results:

$$\frac{(.20)(.982)(5.68E^{-5})(.1)(1010)}{.44-[(.982)(.20)]} = 4.62E^{-3}\ g/l$$

(1) Sampl = .20 - .20
(2) Sample Spk .44 - .44
Spk Vol/Std: 5.68E-5/40838
Spk Vol: .100-10-.100 ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
	Hrs	Hrs	Hrs	Hrs

Date: 10-8-91 Time Completed: Lab Manager:

Serial No	Sample Point	Date	Time Issued	Priority
R 9417.-5840	102AW	6-14-91	13:18	26

Determination	Method/Standard	Results Units	Charge Code	Results
U	LA-925-106 RERUN	G/L	W1BED	3

Sample Size: ? .100-10-.100 ml
Customer ID: 2291-3-4

Remarks, Calculations, Results:
DUPLICATE SAMPLE

4.26E-3 g/l

(1) Sampl = .19 - .20
(2) Sample Spk .44 - .44
Spk Vol/ID = 5.68E-5/40838
Spk Vol: .100-10-.100

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC269				
	Hrs	Hrs	Hrs	Hrs

Date: 10-8-91 Time Completed: Lab Manager:

R9417-5840

$$\frac{(.19)(.982)(5.68E^{-5})(.1)(1010)}{.46-[(.20)(.982)]} = 3.91E^{-3}\ g/l$$

$$\frac{(.20)(.982)(5.68E^{-5})(.1)(1010)}{.44-[(.20)(.982)]} = 4.62E^{-3}\ g/l$$

U-237	LLD<1.87E-01	LLD<1.87E-01	208.00
W-187	LLD<2.35E-01	LLD<2.35E-01	685.74
XE-131M	LLD<1.65E+00	LLD<1.65E+00	163.98
XE-133	LLD<1.04E-01	LLD<1.04E-01	81.00
XE-133M	LLD<3.90E-01	LLD<3.90E-01	233.21
XE-135	LLD<5.00E-02	LLD<5.00E-02	249.79
XE-138	LLD<3.76E-01	LLD<3.76E-01	258.41
Y-88	LLD<4.07E-02	LLD<4.07E-02	1836.06
Y-91	LLD<2.37E+01	LLD<2.37E+01	1204.90
Y-91M	LLD<1.00E-01	LLD<1.00E-01	555.60
ZN-65	LLD<2.01E-01	LLD<2.01E-01	1115.55
ZR-95	LLD<1.23E-01	LLD<1.23E-01	756.73
ZR-97	LLD<7.04E-02	LLD<7.04E-02	743.33
TOTAL	4.31E+01 +-7.81E-01	4.31E+01 +-7.81E-01	

STANDARD DEVIATION = 0.18

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.27E-09 UC/LI
TOTAL MEASURED ACTIVITY = 4.31E+01 (+-7.81E-01) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
55.12	27.67	930.	14.2	5.15E+02
951.50	475.54	501.	33.9	3.50E+00
1127.41	563.46	2450.	7.2	1.99E+01
1139.56	569.54	4459.	5.5	3.66E+01
1604.68	802.06	1879.	15.3	2.11E+01
2336.04	1167.82	350.	88.3	5.50E+00
2730.27	1365.04	487.	12.2	8.73E+00
2799.41	1399.64	131.	22.2	2.40E+00
2802.59	1401.23	121.	22.9	2.22E+00

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 04:14:13

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE: R9419-5530
DATA COLLECTED ON 1-AUG-91 AT 03:23:45
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<3.08E-01		LLD<3.08E-01		911.07	
AC-228A	LLD<3.08E-01		LLD<3.08E-01		911.10	
AC-228B	LLD<4.34E-01		LLD<4.34E-01		338.40	
AG-108M	LLD<6.85E-02		LLD<6.85E-02		433.94	
AG-110M	LLD<3.39E-01		LLD<3.39E-01		657.76	
AM-241	LLD<2.63E-01		LLD<2.63E-01		59.54	
AM-243	LLD<8.24E-02		LLD<8.24E-02		74.67	
AM-243A	LLD<8.24E-02		LLD<8.24E-02		74.67	
AM-243B	LLD<7.36E+00		LLD<7.36E+00		43.10	
AR-41	LLD<6.67E-02		LLD<6.67E-02		1293.64	
AU-198	LLD<7.09E-02		LLD<7.09E-02		411.80	
BA-133	LLD<8.82E-02		LLD<8.82E-02		356.02	
BA-139	LLD<1.59E-01		LLD<1.59E-01		165.85	
BA-140	LLD<2.64E-01		LLD<2.64E-01		537.27	
BA-141	LLD<1.65E-01		LLD<1.65E-01		190.23	
BE-7	LLD<6.50E-01		LLD<6.50E-01		477.59	
BI-207	LLD<7.24E-02		LLD<7.24E-02		569.70	
BI-212	LLD<5.51E-01		LLD<5.51E-01		727.27	
BI-214	LLD<7.00E-01		LLD<7.00E-01		609.32	
BI-214A	LLD<7.00E-01		LLD<7.00E-01		609.32	
BI-214B	LLD<6.55E-01		LLD<6.55E-01		1120.28	
BI-214C	LLD<2.64E-01		LLD<2.64E-01		1764.51	
CD-109	LLD<1.05E+00		LLD<1.05E+00		88.03	
CE-139	LLD<3.61E-02		LLD<3.61E-02		165.85	
CE-141	LLD<5.99E-02		LLD<5.99E-02		145.44	
CERR144	LLD<4.70E-01		LLD<4.70E-01		133.51	
CO-56	LLD<7.50E-02		LLD<7.50E-02		846.76	
CO-57	LLD<3.10E-02		LLD<3.10E-02		122.06	
CO-58	LLD<6.91E-02		LLD<6.91E-02		810.75	
CO-60	1.24E+01	+-2.34E-01	1.24E+01	+-2.34E-01	1332.50	-0.20
					1173.24	-0.04
CR-51	LLD<4.95E-01		LLD<4.95E-01		320.09	
CS-134	1.45E+01	+-3.19E-01	1.45E+01	+-3.19E-01	795.84	0.09
					604.70	0.20
CS-136	LLD<7.65E-02		LLD<7.65E-02		818.51	
CS-137	1.44E+01	+-2.23E-01	1.44E+01	+-2.23E-01	661.65	0.15
CS-138	LLD<7.96E-02		LLD<7.96E-02		1435.86	
EU-152	LLD<3.62E-01		LLD<3.62E-01		1408.01	
EU-154	LLD<1.35E-01		LLD<1.35E-01		1274.45	
EU-155	LLD<1.33E-01		LLD<1.33E-01		105.31	
FE-59	LLD<1.68E-01		LLD<1.68E-01		1099.25	
HF-181	LLD<8.14E-02		LLD<8.14E-02		482.20	
HG-203	LLD<5.59E-02		LLD<5.59E-02		279.20	
I-[illegible]	LLD<6.95E-02		LLD<6.95E-02		364.48	
I-[illegible]	LLD<2.61E-01		LLD<2.61E-01		667.69	
I-133	LLD<7.43E-02		LLD<7.43E-02		529.69	
I-134	LLD<1.09E-01		LLD<1.09E-01		847.03	

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*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
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                                                WHC-SD-WM-DP-025
CANBERRA SPECTRAN-F V2.06  SOFTWARE             ADDENDUM 4 REV 0

222-S COUNTING ROOM WESTINGHOUSE HANFORD            01-AUG-91  04:14:13


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

MCA UNIT NUMBER:   1     /     ADC UNIT NUMBER: 1.0
DETECTOR NUMBER:    4    /     GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:     5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANO:
ANALYZED BY:        MAX

SAMPLE DESCRIPTION: R9419-5530
GEOMETRY DESCRIPTION:  134B40-A 22/LIQ
SAMPLE SIZE:   1.0000E-03 LI       / CONVERSION FACTOR: 5.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON  1-AUG-91 AT 03:23:45

COLLECT LIVE TIME:    3000. SECONDS
        REAL TIME:    3018. SECONDS
        DEAD TIME:     0.60 %

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 14-MAR-91
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W-187	LLD<1.14E+01	LLD<1.14E+01	685.74
XE-131M	LLD<2.61E+02	LLD<2.61E+02	163.98
XE-133	LLD<1.69E+01	LLD<1.69E+01	81.00
XE-133M	LLD<6.19E+01	LLD<6.19E+01	233.21
X[illegible]35	LLD<7.80E+00	LLD<7.80E+00	249.79
X[illegible]38	LLD<6.01E+01	LLD<6.01E+01	258.41
Y-88	LLD<2.82E+00	LLD<2.82E+00	1836.06
Y-91	LLD<1.19E+03	LLD<1.19E+03	1204.90
Y-91M	LLD<1.17E+01	LLD<1.17E+01	555.60
ZN-65	LLD<8.85E+00	LLD<8.85E+00	1115.55
ZR-95	LLD<5.02E+00	LLD<5.02E+00	756.73
ZR-97	LLD<2.84E+00	LLD<2.84E+00	743.33
TOTAL	1.72E+04 +-2.58E+02	1.72E+04 +-2.58E+02	

STANDARD DEVIATION = 0.21

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 5.37E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.72E+04 (+-2.58E+02) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
55.19	27.70	2262.	9.4	1.24E+03
1024.53	512.04	968.	26.0	7.23E+00
1127.18	563.35	248.	43.6	2.02E+00
1139.37	569.44	470.	40.2	3.85E+00
1604.69	802.06	246.	25.1	2.76E+00

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 03:10:17

SAMPLE: R9417-5730 WHC-SD-WM-DP-025
D[illegible] COLLECTED ON 1-AUG-91 AT 02:19:31 ADDENDUM 4 REV 0
D[illegible]ED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<1.30E+01		LLD<1.30E+01		911.07	
AC-228A	LLD<1.30E+01		LLD<1.30E+01		911.10	
AC-228B	LLD<6.90E+01		LLD<6.90E+01		338.40	
AG-108M	LLD<1.26E+01		LLD<1.26E+01		433.94	
AG-110M	LLD<1.12E+02		LLD<1.12E+02		657.76	
AM-241	LLD<4.23E+01		LLD<4.23E+01		59.54	
AM-243	LLD<1.29E+01		LLD<1.29E+01		74.67	
AM-243A	LLD<1.29E+01		LLD<1.29E+01		74.67	
AM-243B	LLD<1.15E+03		LLD<1.15E+03		43.10	
AR-41	LLD<3.85E+00		LLD<3.85E+00		1293.64	
AU-198	LLD<1.18E+01		LLD<1.18E+01		411.80	
BA-133	LLD<1.40E+01		LLD<1.40E+01		356.02	
BA-139	LLD<2.60E+01		LLD<2.60E+01		165.85	
BA-140	LLD<3.52E+01		LLD<3.52E+01		537.27	
BA-141	LLD<2.77E+01		LLD<2.77E+01		190.23	
BE-7	LLD<1.26E+02		LLD<1.26E+02		477.59	
BI-207	LLD<7.54E+00		LLD<7.54E+00		569.70	
B[illegible] 2	LLD<2.64E+01		LLD<2.64E+01		727.27	
B[illegible]14	LLD<3.05E+01		LLD<3.05E+01		609.32	
BI-214A	LLD<3.05E+01		LLD<3.05E+01		609.32	
BI-214B	LLD<2.63E+01		LLD<2.63E+01		1120.28	
BI-214C	LLD<2.08E+01		LLD<2.08E+01		1764.51	
CD-109	LLD<1.64E+02		LLD<1.64E+02		88.03	
CE-139	LLD<5.86E+00		LLD<5.86E+00		165.85	
CE-141	LLD<9.70E+00		LLD<9.70E+00		145.44	
CEPR144	LLD<7.67E+01		LLD<7.67E+01		133.51	
CO-56	LLD<2.85E+00		LLD<2.85E+00		846.76	
CO-57	LLD<4.91E+00		LLD<4.91E+00		122.06	
CO-58	LLD<2.76E+00		LLD<2.76E+00		810.75	
CO-60	LLD<2.57E+00		LLD<2.57E+00		1332.50	
CR-51	LLD<7.82E+01		LLD<7.82E+01		320.09	
CS-134	1.75E+02	+-9.43E+00	1.75E+02	+-9.43E+00	795.84	0.06
					604.70	0.18
CS-136	LLD<2.65E+00		LLD<2.65E+00		818.51	
CS-137	1.61E+04	+-1.31E+02	1.61E+04	+-1.31E+02	661.65	0.11
CS-138	LLD<6.30E+00		LLD<6.30E+00		1435.86	
EU-152	LLD<1.93E+01		LLD<1.93E+01		1408.01	
EU-154	LLD<8.85E+00		LLD<8.85E+00		1274.45	
EU-155	LLD<2.10E+01		LLD<2.10E+01		105.31	
FE-59	LLD<4.93E+00		LLD<4.93E+00		1099.25	
HF-181	LLD<1.50E+01		LLD<1.50E+01		482.20	
HG-203	LLD<8.86E+00		LLD<8.86E+00		279.20	
I-[illegible]	LLD<1.09E+01		LLD<1.09E+01		364.48	
I-[illegible]	LLD<8.19E+01		LLD<8.19E+01		667.69	
I-133	LLD<1.06E+01		LLD<1.06E+01		529.69	
I-134	LLD<4.08E+00		LLD<4.08E+00		847.03	
I-135	LLD<1.17E+01		LLD<1.17E+01		1260.41	

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*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
*   * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                                          WHC-SD-WM-DP-025
CANBERRA SPECTRAN-F V2.06  SOFTWARE       ADDENDUM 4 REV 0

222-S COUNTING ROOM WESTINGHOUSE HANFORD          01-AUG-91  03:10:17


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

MCA UNIT NUMBER:   1     /     ADC UNIT NUMBER: 1.0
DETECTOR NUMBER:    4    /     GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:     5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AND:
ANALYZED BY:        MAX

SAMPLE DESCRIPTION: R9417-5730
GEOMETRY DESCRIPTION:  134B40-A 22/LIQ
SAMPLE SIZE:   1.0000E-03 LI       / CONVERSION FACTOR: 4.9505E-03
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON  1-AUG-91 AT 02:19:31

COLLECT LIVE TIME:    3000. SECONDS
        REAL TIME:    3037. SECONDS
        DEAD TIME:     1.22 %

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 14-MAR-91
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BEST AVAILABLE COPY

[illegible]

[illegible]

MCA ROI NUMBER: [illegible] CUTOFF NUMBER: [illegible]
DETECTOR NUMBER: 1 ANALYSIS NUMBER: [illegible]
SPECTRUM SIZE: 4096 CHANNELS
TYPE OF SMOOTHING FUNCTION: [illegible]
NUMBER OF BACKGROUND CHANNELS: [illegible] ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: [illegible]
IDENTIFICATION ENERGY WINDOW: [illegible]
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

[illegible] BACKGROUND SUBTRACTED
[illegible]
[illegible]
[illegible]

[illegible] MULTICHANNEL ANALYZER [illegible]
ANALYZED BY: [illegible]

SAMPLE DESCRIPTION: [illegible]
[illegible]
[illegible] CONVERSION FACTOR: [illegible]
[illegible]
ANALYSIS LIBRARY FILE: [illegible]

COLLECT [illegible] ON [illegible]

[illegible] TIME: [illegible] SECONDS
[illegible] TIME: [illegible] SECONDS
DEAD TIME: [illegible]

[illegible] HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED [illegible]
EFFICIENCY CALIBRATION PERFORMED [illegible]

93123531125

BEST AVAILABLE COPY

LA-140	LLD=9.43E-01	LLD=9.43E-01	[illegible]
LA-142	LLD=3.22E+00	LLD=3.22E+00	841.[illegible]
MN-54	LLD=1.41E+00	LLD=1.41E+00	834.[illegible]
MN-56	LLD=1.60E+00	LLD=1.60E+00	846.[illegible]
MO-99	LLD=7.95E-01	LLD=7.95E-01	1294.[illegible]
[illegible]	LLD=2.00E+00	LLD=2.00E+00	1366.[illegible]
[illegible]	LLD=1.14E+00	LLD=1.14E+00	702.[illegible]
[illegible]	LLD=1.30E+00	LLD=1.30E+00	765.[illegible]
[illegible]	LLD=8.09E+00	LLD=8.09E+00	657.[illegible]
[illegible]	LLD=6.47E+00	LLD=6.47E+00	86.[illegible]
[illegible]	LLD=6.03E+00	LLD=6.03E+00	594.[illegible]
[illegible]	LLD=3.51E+00	LLD=3.51E+00	277.[illegible]
[illegible]	LLD=2.77E+00	LLD=2.77E+00	311.[illegible]
[illegible]	LLD=2.93E+02	LLD=2.93E+02	1001.[illegible]
[illegible]	LLD=1.63E+02	LLD=1.63E+02	[illegible]
PB-212	LLD=1.73E+00	LLD=1.73E+00	237.[illegible]
[illegible]	LLD=1.52E+00	LLD=1.52E+00	[illegible]
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[illegible]	LLD=2.90E+00	LLD=2.90E+00	351.[illegible]
[illegible]	LLD=2.90E+00	LLD=2.90E+00	351.[illegible]
[illegible]	LLD=3.06E+00	LLD=3.06E+00	295.[illegible]
[illegible]	LLD=1.40E+05	LLD=1.40E+05	804.[illegible]
[illegible]	LLD=6.44E+04	LLD=6.44E+04	799.[illegible]
[illegible]	LLD=1.25E+05	LLD=1.25E+05	804.[illegible]
[illegible]	LLD=3.29E+05	LLD=3.29E+05	129.[illegible]
[illegible]	LLD=3.23E+05	LLD=3.23E+05	148.[illegible]
[illegible]	LLD=2.11E+01	LLD=2.11E+01	[illegible]
[illegible]	LLD=1.06E+01	LLD=1.06E+01	186.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LLD=7.79E+00	LLD=7.79E+00	1031.[illegible]
[illegible]	LLD=1.17E+03	LLD=1.17E+03	547.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LLD=1.36E+00	LLD=1.36E+00	1130.[illegible]
[illegible]	LLD=1.41E+00	LLD=1.41E+00	264.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	LLD=2.46E+00	LLD=2.46E+00	255.[illegible]
[illegible]	LLD=6.32E-01	LLD=6.32E-01	1367.[illegible]
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[illegible]	[illegible]	LLD=7.36E-01	140.[illegible]
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[illegible]	[illegible]	LLD=7.12E-01	223.[illegible]
[illegible]	[illegible]	LLD=5.67E+01	[illegible]
[illegible]	LLD=1.40E+01	LLD=1.40E+01	[illegible]
[illegible]	LLD=1.40E+01	LLD=1.40E+01	[illegible]
[illegible]	LLD=4.56E+01	LLD=4.56E+01	[illegible]
[illegible]	LLD=1.68E+00	LLD=1.68E+00	367.[illegible]
[illegible]	LLD=1.30E+00	LLD=1.30E+00	185.[illegible]
[illegible]	LLD=1.35E+00	LLD=1.35E+00	183.[illegible]
[illegible]	LLD=3.67E+00	LLD=3.67E+00	143.[illegible]
[illegible]	LLD=3.71E+00	LLD=3.71E+00	208.[illegible]
[illegible]	[illegible]	[illegible]	685.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LLD=1.04E+00	LLD=1.04E+00	248.[illegible]
[illegible]	LLD=7.79E+00	LLD=7.79E+00	358.41
[illegible]	[illegible]	[illegible]	1836.[illegible]
[illegible]	[illegible]	[illegible]	1704.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

BEST AVAILABLE COPY

#	CENTROID CHANNEL	ENERGY (KV)	FWHM (KV)	BACKGND COUNTS	NET AREA COUNTS	E-ROR %	NUCLIDE
[illegible]	[illegible]	[illegible]	[illegible]	285.	149.	13.1	CS-134. EU-152
[illegible]	1125.41	745.17	1.22	267.	813.	10.7	CS-134. RI-207
[illegible]	1210.28	804.37	1.12	302.	[illegible]	1.8	CS-137
4	1324.06	881.42	1.22	205.	4387.	3.1	CS-137
4A		941.82			70.	46.4	
5C	1792.11	1207.62	1.44	166.	3438.	3.6	CS-137
6C	1904.58	1281.71	1.44	112.	354.	12.1	CS-137
[illegible]	2347.17	1573.07	1.41	125.	2774	1.2	CO-60
8	2462.34	1652.22	1.37	34.	7313.	1.0	CO-60
9	2731.05	1837.04	1.37	11.	17.	22.5	CS-137
10	2820.23	1920.71	1.41	15.	171.	18.3	[illegible]
[illegible]		1481.77			150	11.7	

[illegible] QUANTITATION AT 1.96 SIGMA
IN A CONFIDENCE LEVEL OF 95.00%

MULTIPLET ANALYSIS COMPUTED OVERALL
EXPERIMENTAL BACKGROUND USED

[illegible] SUBTRACTION EFFICIENCY USING FILE [illegible]
[illegible] DESCRIPTIONS [illegible]
BACKGROUND COLLECT START DATE / TIME [illegible]
BACKGROUND LIVE TIME [illegible]

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1679

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5530	102AW	6-14-91	1311 U	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	WIDEO	0

Sample Size	Customer ID
1.200 ml	STD

Remarks, Calculations, Results

CULX STDH 141846 Long Form
K901 STD VAL 1.4047E1 Cs 137 - 1.46E2
RESULT % REC 101.1%
K905 STD VAL 12.17 Eu 155
RESULT 1.25E2 % REC 102.7% Sn 113
Ru 103

Cynthia Johnson | Analyst - 2: Eva Buck | Analyst - 3 | Analyst - 4 | Analyst - 5
PIN 82376 | PIN | PIN | PIN | PIN
Date 7/31/91 | Time Completed | Supervisor Sign: Dyna Smithick

1680

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5630	102AW	6-14-91	1311	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	UCI/G	WIDEO	0

Sample Size	Customer ID
1 lab	REG. BL.

Remarks, Calculations, Results

CULX AS UCI/L
LASER PRINTOUT
Long Form
Cs 137 - <4.41E-2 ug/L Ru 103 - <2.33E-2
Eu 155 - <5.58E-2
Sn 113 - <3.26E-2

Cynthia Johnson | Analyst - 2: Eva Buck | Analyst - 3 | Analyst - 4 | Analyst - 5
PIN 82376 | PIN | PIN | PIN | PIN
Date 7/31/91 | Time Completed | Supervisor Sign: Dyna Smithick

4175

Serial No	Sample Point	Date	Time Issued	Priority
R 9412.-5528	102AW	6-14-91	1311 U	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	UCI/G	WIDEO	0

Sample Size	Customer ID
100-10-500	[illegible]

Remarks, Calculations, Results

CULX AS UCI/L
LASER PRINTOUT
Long Form
Cs 137 - 1.61E4 ug/L
Eu 155 - <2.10E1
Sn 113 - <1.65E1
Ru 103 - <1.15E1
Cs 134 - 1.75 X 10^2
Ru 106 4.72E4 Eu 154 <8.85
Co 60 <4.59
Nb 94 <4.97
CLEANUP 47.692%
Ru 106 3.07E4

Cynthia Johnson | Analyst - 2 | Analyst - 3 | Analyst - 4 | Analyst - 5
PIN 82376 | PIN | PIN | PIN | PIN
Date 7/31/91 | Time Completed | Supervisor Sign: Dyna Smithick

4176

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5529	102AW	6-14-91	1312 U	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	WIDEO	0

Sample Size	Customer ID
1.500 ml	STD

Remarks, Calculations, Results

CULX STDH 141846 Long Form
K901 STD VAL 14.047 Cs 137
RESULT 1.44E1 % REC 102.5%
K905 STD VAL 12.169 Eu 155
RESULT 1.24E1 % REC 101.9% Sn 113
Ru 103

Cynthia Johnson | Analyst - 2 | Analyst - 3 | Analyst - 4 | Analyst - 5
PIN 82376 | PIN | PIN | PIN | PIN
Date 7/31/91 | Time Completed | Supervisor Sign: Dyna Smithick

1 & 2

Serial No	Sample Point	Date	Time Issued	Priority
R 9419-5520	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
1B	LA-50B-101	% RECOVERY	WIDED	1

Sample Size	Customer ID
? 10ml	STD

Remarks, Calculations, Results

RERUN

5510 EV-CRD

STDIF 18B49 RESULT 1.386 E^{-1} uCi/ml

STD VAL 1.354 x 10^{-1} %REC 102.4%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269	[signature]			
[signature]				

Date	Time Completed	Lab Signature	
6-21-91		[signature]	[signature]

18/2 R9419-5520 10ml

9992/10 - 6

9518/10

Beta Calculation by ALJ on 06-21-1991 at 10:29:53
Det #10 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9992/10 - 6.0 = 1.4198E-01 uCi/L beta

Mount # 2

9518/10 - 6.0 = 1.3521E-01 uCi/L beta

9 3 1 2 3 5 3 1 1 1 7

7 of 8

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419-5525	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	WIDEO	1

Sample Size	Customer ID
10 ml	STD

Remarks, Calculations, Results

5515 EV-CRD

STD# 18B49 RESULT 1.31 e^{-2} mill

STD VAL 1.3389 ^{2} %REC 97.8%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
[signature]				

Date	Time Completed	Lab Unit Mgr.	
6-20-91		[signature]	[signature]

14/2 R9419-5525 6-21-91

667/10 — Alpha Calculation by MAI on 06-21-1991 at 07:01:07
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Mount # 1

664/10 — 667/10 - 0.4 = 1.3133E-02 uCi/L alpha

Mount # 2

664/10 — 664/10 - 0.4 = 1.3074E-02 uCi/L alpha

9 3 1 2 3 5 3 1 1 1 5

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9417	Customer ID: 2291-3-4
Analysis: TOTAL ALPHA/TOTAL BETA	Sample Prep: UNDIGESTED

Instrument: WB27809, WB27807	Procedure/Rev: LA-508-101/C-2
Technologist: M. FRANZ	Date: 06-20-91/06-21-91
Starting Time: 08:00	Temperature: N/A
Ending Time: 10:30	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5520	11		
2	REAGENT BLANK	R9414-5620	12		
3	SAMPLE OF 2291-3-4	R9417-5720	13		
4	FINAL LMCS CHECK STD	R9419-5520	14		
5	INITIAL LMCS CHECK STD	R9413-5525	15		
6	REAGENT BLANK	R9414-5625	16		
7	SAMPLE OF 2291-3-4	R9417-5725	17		
8	FINAL LMCS CHECK STD	R9419-5525	18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	18B49/10.0 mL			N/A
SPIKE	18B49/10.0 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9417	Customer ID: 2291-3-4
Analysis: VISUAL CHECK AND OVER-THE-TOP READING	Sample Prep: UNDIGESTED

Instrument: N/A	Procedure/Rev: LA-519-151/D-1
Technologist: M. BIERMAN	Date: 6-14-91
Starting Time: 13:30	Temperature: 25degC
Ending Time: 15:00	Chemist: N/A

	Description	Lab ID		Description	Lab ID
1	SAMPLE 2291-1-1	R9394-5000	11		
2	SAMPLE 2291-1-4	R9415-5000	12		
3	SAMPLE 2291-2-4	R9416-5000	13		
4	SAMPLE 2291-3-4	R9417-5000	14		
5	SAMPLE 2291-4-4	R9418-5000	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
N/A				N/A

A-6000-881 (03/92)

USER: 1 ID:H-3 TRITIUM PRESET TIME: 10.00 [illegible]
SAMPLE PERIOD: 1 CYCLE REPEAT: 1 SCR:N RS232:N
[illegible]
[illegible]
[illegible]

[illegible]

[illegible] DATE [illegible] PRESET REPLICATES: 1
[illegible]
[illegible]
[illegible]
[illegible] BACKGROUND QUENCH CURVES:
[illegible] QUENCH LIMITS LOW:0.000 HIGH:252.0
[illegible]
[illegible]

[illegible]	[illegible]	CPM	[illegible]	TIME	EL TIME	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	10.00	10.65	[illegible]	[illegible]

[illegible] QUENCH CURVE [illegible]

[illegible]
[illegible]
[illegible]

RAILGERMANIUM QUENCH CURVE CORRELATION TABLE

[illegible]	[illegible]	[illegible] CPM.	CALCULATED CPM.	PERCENT DIFF.	FLAG
[illegible]	[illegible]	11.00	19.90	0.00	

[illegible] QUENCH LIMITS: LOW: 0.000 HIGH: 1000.
[illegible] QUENCH LIMITS: LOW: 0.000 HIGH: 252.0

[illegible]	[illegible]	CPM	[illegible]	TIME	EL TIME	[illegible]	[illegible]
[illegible]	[illegible]	473.60	[illegible]	10.00	21.55	96.0	0.18 **
[illegible]	[illegible]	CH: [illegible]				[illegible] DPM	:[illegible] 3416
[illegible]	[illegible]	534.0	[illegible]	10.00	22.74	96.0	[illegible] **
[illegible]	[illegible]	CH:[illegible]				[illegible] DPM	:[illegible]
[illegible]	5	1	[illegible]	[illegible]	10.00	42.10	94.0	0.02 **
[illegible]	[illegible]	CH:[illegible]				[illegible] DPM	:[illegible] 54
[illegible]	6	1	[illegible]	[illegible]	10.00	53.81	94.0	0.02 **
[illegible]	[illegible]	CH: 11.30				[illegible] DPM	:17536.41

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

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1

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5587	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
H3	LA-218-113	% RECOVERY	W1BEO	2

Sample Size: 1 ml
Customer ID: STD

Remarks, Calculations, Results:
EDP R907 ENVSTD
STD# 34849 RESULT 4.49E-1
STD VAL. 6.4591E-1 %REC 69.51%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			

Date: 10-4-91
Time Completed:
Lab Unit Mgr:

R9413-5587.

$$\frac{(996.3416)(1000)}{(1)(2.22E6)} =$$

2

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5687	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
H3	LA-218-113	uCi/G	WIBEO	

Sample Size: 1 ml
Customer ID: REG. BL

Remarks, Calculations, Results:
READERT BLANK
COUNT AS uCI/L

RERUN

6.31E-1 uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			

Date: 10-4-91
Time Completed:
Lab Unit Mgr:

R9414-5687

$$\frac{(1399.776)(1000)}{(1)(2.22E6} =$$

4

Serial No	Sample Point	Date	Time Issued	Priority
R 9416.-5787	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
H3	LA-218-113	uCi/G		

Sample Size: 1 ml
Customer ID: 2291-2-4

Remarks, Calculations, Results:
COUNT AS uCI/L

RERUN

5.65E uci/l

used sample #
R-9395
2291-2-1

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			

Date: 10-4-91
Time Completed:
Lab Unit Mgr:

R9416-5787.

$$\frac{(12536.41)(1000)}{(1)(2.22E6)} =$$

9 5 1 2 5 5 3 1 1 0 7

Serial No	Sample Point	Date	Time Issued	Priority
R 9419.-5586	102AW	6-14-91	13:23	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
SR90	LA-220-101	% RECOVERY	W11E2	5

RERUN

Sample Size	Customer ID
? [illegible]	STD

Remarks, Calculations, Results

COUNT ON DETECTOR#11
S376 ITS 150846
STD# RESULT 7.16E-1
STD VAL 7.71E-1 %REC 92.9%
Sep Time: 19:05
Sep Det: 10-8-91

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[illegible]	[illegible]		[illegible]	
Hrs	Hrs	Hrs	Hrs	Hrs
1C916				

Date	Time Completed	Lab Unit Mgr
10-8-91		[illegible]

12/2 10-9-91 @ 0050 DM R9419-5586 ΔT=5.42

6575/10 -10

6800/10

A B

Sr Calculation by DM on 10-09-1991 at 02:43:56
Det 812 2 -inch count Sr eff : .4233 Y eff : .4719

W1 7.0097 7.0307

Sample size : 1 uL Dilution : 1 Method : 1

Count # 1 Decay time = 5.42 hrs 7.1225

W2 7.1022 7.07E-1

6575/10 - 10.0 = 6.4789E-01 uCi/L strontium .916

Count # 2 Decay time = 5.42 hrs 7.25E-1

6800/10 - 10.0 = 6.7040E-01 uCi/L strontium .925

.925 .916 R9419.-5586

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

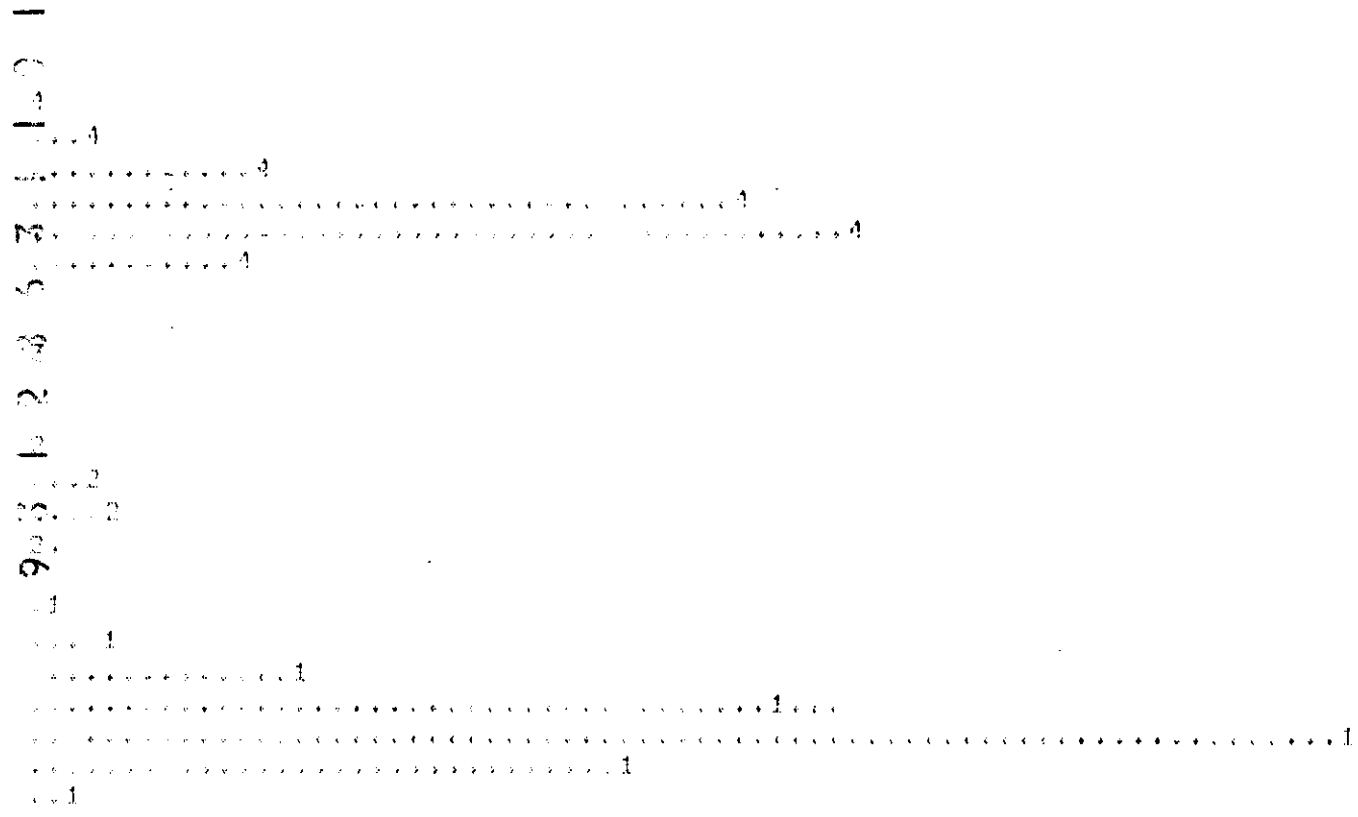
Lab Segment Serial No.: R9416	Customer ID: 2291-2-4
Analysis: STRONTIUM 90	Sample Prep: UNDIGESTED

Instrument: WB26870, WB27812, WB27811	Procedure/Rev: LA-220-101/D-0
Technologist: S. LAI	Date: 10-08-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5586	11		
2	REAGENT BLANK	R9414-5686	12		
3	SAMPLE 2291-2-4	R9416-5786	13		
4	FINAL LMCS CHECK STD	R9419-5586	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	150B46/1 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)



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Raw Data Dump for AEA Spectrum: SP:9D5756.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
11	0.	2.	0.	0.	0.	1.	0.	0.	[illegible]	[illegible]
21	0.	0.	1.	0.	1.	1.	2.	0.	[illegible]	[illegible]
31	0.	0.	0.	0.	0.	0.	0.	1.	[illegible]	[illegible]
	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
[illegible]	1.	0.	2.	1.	1.	0.	0.	0.	[illegible]	[illegible]
61	1.	1.	0.	1.	0.	3.	0.	0.	0.	[illegible]
71	0.	1.	2.	0.	2.	0.	0.	0.	0.	[illegible]
81	1.	3.	3.	0.	2.	0.	0.	1.	0.	[illegible]
91	0.	2.	2.	1.	0.	0.	0.	0.	0.	[illegible]
101	1.	0.	2.	2.	1.	0.	0.	3.	1.	[illegible]
111	0.	2.	1.	0.	4.	1.	0.	2.	1.	[illegible]
121	1.	0.	3.	2.	3.	0.	2.	0.	[illegible]	[illegible]
131	1.	3.	1.	3.	3.	0.	2.	1.	2.	[illegible]
141	1.	2.	1.	1.	2.	1.	5.	2.	2.	[illegible]
151	4.	5.	7.	6.	9.	4.	3.	3.	[illegible]	[illegible]
161	4.	3.	3.	1.	8.	4.	2.	1.	[illegible]	[illegible]
171	3.	4.	2.	1.	6.	1.	4.	4.	[illegible]	[illegible]
181	4.	2.	5.	4.	6.	4.	2.	1.	[illegible]	[illegible]
191	2.	6.	9.	2.	10.	6.	5.	6.	[illegible]	[illegible]
201	9.	7.	7.	6.	9.	12.	10.	15.	5.	[illegible]
211	14.	20.	33.	25.	30.	40.	51.	73.	[illegible]	[illegible]
221	149.	198.	204.	238.	285.	326.	381.	460.	510.	515.
231	570.	625.	619.	580.	497.	462.	324.	246.	208.	[illegible]
241	56.	36.	24.	19.	7.	4.	2.	2.	1.	[illegible]
251	2.	1.	3.	0.	2.	1.	2.	1.	4.	3.
261	4.	3.	2.	3.	1.	4.	3.	3.	10.	6.
271	5.	8.	6.	1.	4.	8.	3.	2.	2.	9.
281	9.	5.	9.	7.	10.	16.	19.	22.	20.	34.
[illegible]	33.	41.	46.	65.	45.	93.	75.	92.	101.	[illegible]
	110.	119.	137.	164.	155.	141.	137.	117.	[illegible]	[illegible]
311	17.	20.	20.	13.	14.	11.	16.	20.	10.	11.
321	15.	10.	19.	19.	9.	17.	24.	22.	13.	[illegible]
331	23.	14.	29.	19.	17.	30.	49.	43.	[illegible]	[illegible]
341	109.	121.	150.	205.	289.	347.	428.	511.	661.	910.
351	948.	1070.	1299.	1342.	1329.	1533.	1614.	1091.	2129.	2182.
361	2223.	2334.	2171.	1901.	1572.	1188.	778.	491.	297.	132.
371	25.	26.	14.	5.	2.	0.	1.	1.	0.	0.
381	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
391	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
401	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
421	1.	0.	0.	0.	0.	0.	1.	1.	1.	1.
431	0.	0.	0.	2.	0.	0.	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.	1.	0.	0.	1.	3.	1.	[illegible]
471	0.	2.	1.	1.	0.	0.	1.	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.								

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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. 1.10

DATA REDUCTION REPORT

SAMPLE
R9416-5881
File ID: 8D5756.SPC

Counted on: 7/18/91 @13: 0
Detector/Geometry number: 5/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	T[illegible] Initial	T[illegible] Final
1	3871.7	4910.8	342.133	342.133	20.000	9.543	10.000	4.695
2	259.9	258.0	305.888	305.888	20.000	9.681	10.000	4.241
3	1026.4	1020.6	233.524	233.524	20.000	10.122	10.000	5.102
4	7.8	4.3	132.148	132.148	112.000	2.000	56.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Cm244 Pu 226	0.7560	5.796	5.783	0.013	0.05	66.51	0.01	0.438E-0[illegible]
	Cm243		5.786	5.783	0.003				0.600E-0[illegible]
2	Pu238	0.0522	5.499	5.513	-0.014	0.05	4.58	0.00	0.420E-0[illegible]
	Am241		5.490	5.513	-0.033				0.321E-0[illegible]
3	Pu239	0.1892	5.143	5.165	-0.022	0.05	16.62	0.00	0.110E-0[illegible]
	Pu240		5.144	5.165	-0.021				0.110E-0[illegible]
4	Np237	0.0019	4.640	4.679	-0.039	0.01	0.17	0.00	0.183E-0[illegible]

DETECTOR CALIBRATION
Energy(MEV) = 4.044 + (0.0048)*Channel
Energy range (MeV): 4.044 TO 6.502
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	43838.0	100.000
Smoothed	43838.0	100.000
Composite fit	43941.1	100.235
Residuals	-103.1	-0.235

Analyzed by: _____
63099

9 3 1 2 3 5 3 1 0 0 7

BEST AVAILABLE C[illegible]

Raw Data Dump for AEA Spectrum: [illegible]

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
161	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
171	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
181	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
191	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
201	0.	0.	0.	0.	0.	12.	13.	10.	0.	0.
211	23.	31.	47.	57.	60.	70.	79.	91.	101.	112.
221	178.	197.	203.	208.	213.	316.	388.	443.	487.	474.
231	199.	187.	182.	119.	111.	271.	307.	296.	231.	179.
241	135.	99.	79.	40.	28.	20.	11.	9.	3.	5.
251	5.	2.	0.	3.	5.	4.	5.	1.	0.	0.
261	0.	1.	2.	2.	3.	3.	0.	0.	0.	0.
271	6.	2.	6.	7.	9.	6.	7.	6.	0.	0.
281	0.	0.	14.	17.	12.	19.	22.	20.	21.	21.
291	35.	41.	50.	55.	62.	63.	66.	70.	72.	86.
301	104.	102.	117.	113.	119.	114.	119.	114.	92.	81.
311	58.	41.	42.	34.	30.	23.	24.	22.	17.	20.
321	12.	15.	14.	14.	17.	13.	17.	7.	10.	11.
331	22.	23.	27.	20.	26.	23.	20.	23.	93.	80.
341	107.	104.	170.	202.	270.	301.	410.	476.	746.	692.
351	784.	958.	936.	1118.	1171.	1260.	1166.	1211.	1197.	1720.
361	1800.	1840.	1793.	1659.	1071.	1122.	1317.	1113.	720.	740.
371	570.	421.	318.	254.	142.	80.	53.	27.	14.	17.
381	4.	4.	0.	1.	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.	0.
411	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	0.	0.	0.	0.	3.	1.	1.	0.
471	0.	0.	1.	1.	0.	1.	0.	0.	1.	0.
481	0.	1.	0.	0.	0.	0.	1.	0.	0.	0.
491	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.
501	0.	0.								

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

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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. 1.10

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

DATA REDUCTION REPORT

SAMPLE
R-9416-5701
File ID: SD2906.BPC

Counted on: 7/19/91 @ 11:1
Detector/Geometry number: 2/ 1
Count time: 30000 Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	T[illegible] Initial	T[illegible] Final
1	3227.3	3264.4	363.248	363.248	24.000	15.897	12.000	[illegible]
2	212.4	211.7	306.223	306.223	24.000	14.677	12.000	[illegible]
3	849.7	858.1	233.071	233.071	24.000	15.295	[illegible]	[illegible]
4	8.4	6.2	155.673	155.673	32.000	297.043	16.000	34.45[illegible]

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Pu236	0.7573	5.756	5.767	-0.011	0.07	66.33	0.01	0.458E-[illegible]
	Cm243		5.786	5.767	0.019				0.615E-[illegible]
2	Pu238	0.0509	5.499	5.499	-0.000	0.07	4.42	0.00	0.421E-[illegible]
	Am241		5.480	5.499	-0.019				0.323E-0[illegible]
3	Pu239	0.1896	5.143	5.155	-0.012	0.07	16.70	0.00	0.113E-00
	Pu240		5.144	5.155	-0.011				0.113E-00
4	Np237	0.0062	4.640	4.792	-0.152	1.40	0.54	0.00	0.613E-0[illegible]
	Np237		4.781	4.792	-0.011				0.423E-10

DETECTOR CALIBRATION
Energy(MEV) 4.060 + (0.0017)*Channel
Energy range (MeV): 4.060 TO 6.166
Efficiency - ****** CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	43799.0	100.000
Smoothed	43799.0	100.000
Composite fit	44022.4	100.510
Residuals	-223.3	-0.510

Analyzed by: _____
61453

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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. 1.10

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

DATA REDUCTION REPORT

SAMPLE
R9413-5881
File ID: SD7418.SPC

Counted on: 7/18/91 @13: 0
Detector/Geometry number: 7/ 1
Count time: 30000. 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	2984.3	2963.9	360.265	360.265	20.000	8.554	10.000	4.659
2	264.8	263.6	303.206	303.206	16.000	8.316	8.000	4.643
3	33.2	8.5	270.274	270.274	12.000	0.304	6.000	4.651
4	2173.0	2166.7	231.160	231.160	16.000	8.414	8.000	6.595
5	6.0	4.9	177.100	177.100	56.000	2.000	28.000	0.200
6	2.6	1.9	143.658	143.658	20.000	12.140	10.000	0.417
7	3.4	2.7	101.189	101.189	16.000	13.533	8.000	1.791
8	5.2	4.4	51.722	51.722	24.000	32.402	12.000	1.233
9	1.0	0.1	21.205	21.205	12.000	0.200	6.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Pu236	0.5645	5.756	5.764	-0.008	0.04	47.04	311.88	0.140E-03
2	Pu238	0.0493	5.499	5.496	0.003	0.04	4.11	37.11	0.167E-04
	Am241		5.180	5.496	-0.016				0.128E-04
3		0.0003		5.341		0.00	0.02	0.15	0.662E-07
4	Pu239	0.3777	5.143	5.158	-0.015	0.04	31.47	204.51	0.921E-04
	Pu240		5.144	5.158	-0.014				0.921E-04
5		0.0023		4.904		0.01	0.20	1.27	0.572E-06
6		0.0019		4.746		0.06	0.16	1.05	0.472E-06
7		0.0012		4.547		0.06	0.10	0.65	0.292E-06
8		0.0027		4.314		0.15	0.23	1.47	0.660E-06
9		0.0000		4.171		0.00	0.00	0.00	0.139E-08

DETECTOR CALIBRATION
Energy(MEV) 4.071 + (0.0047)*Channel
Energy range (MeV): 4.071 TO 6.478
Efficiency 0.1539 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	41640.0	100.000
Smoothed	41638.6	99.997
Composite fit	41665.5	100.061
Residuals	-26.9	-0.065

Analyzed by: _____
63099

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Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5581	102AW	6-14-91	13:8	26
Determination	Method/Standard	Result Units	Charge Code	Returns
PU239/40	LA-503-156	% RECOVERY	W1BEO	1
Sample Size			Customer ID	
? .100-10-.100 ml			STD	

Remarks, Calculations, Results:
EDP R211 AR001
STDN 2.4343 RESULT 9.901E
STD VAL. 9.014E %REC 109.95%
Pu236 (40 ml) .050 ml
1 ml 8M HNO3
95% trace

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst 1: LC559 | Analyst 2: [illegible] | Analyst 3 | Analyst 4 | Analyst 5
Date: 7/16/91 | Time Completed | Lab Unit Mgr: [illegible]

#1 7-18-91 R9413-5581

$\frac{1414}{5} - 10$

$\frac{(272.9)(2)(.5645)}{325.49} = 9.5\%$

3.3 3679

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5681	102AW	6-14-91	13:11	26
Determination	Method/Standard	Result Units	Charge Code	Returns
PU239/40	LA-503-156	uCI/G	W1BEO	1
Sample Size			Customer ID	
? 0 ml			REG. BL	

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L
Pu236 (40 ml) .050 ml
1 ml 8M HNO3
<7.44E-3 uCi/L
50% trace

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst 1: LC559 | Analyst 2: [illegible] | Analyst 3: DHMitchin | Analyst 4 | Analyst 5
Date: 7/16/91 | Time Completed | Lab Unit Mgr: [illegible]

#3 7-18-91 R9414-5681

$\frac{461}{5} - 12$

$\frac{(84.20)(2)(.9587)}{325.27} = 50\%$

3.2 2996

Serial No.	Sample Point	Date	Time Issued	Priority
R 9416.-5781	102AW	6-14-91	13:16	26
Determination	Method/Standard	Result Units	Charge Code	Returns
PU239/40	LA-503-156	uCI/G	W1BEO	1
Sample Size			Customer ID	
? 1 ml			2291-2-4	

Remarks, Calculations, Results:
COUNT AS uCI/L
Pu236 (40 ml) .050 ml
1 ml Conc HNO3
3.69E-2 uCi/L
94% trace

RERUN
"AEA-480 MIN"
ATTACH PRINT OUT

Analyst 1: LC559 | Analyst 2: [illegible] | Analyst 3: DHMitchin | Analyst 4 | Analyst 5
Date: 7/16/91 | Time Completed | Lab Unit Mgr: [illegible]

#1 7-18-91 R9416-5781

$\frac{1061}{5} - 10$

$\frac{(202.2)(2)(.7533)}{325.27} = 94\%$

URANIUM BY LASER ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
R 9419.-5540	102AW	6-14-91	13:21	26

Determinants	Method/Standard	Result Units	Charge Code	Rerun
U	LA-925-106	% RECOVERY	WIBEO	3

RERUN

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

Remarks, Calculations, Results

S267 UFIC
STD# 85838 RESULT 3.07E-2 g/l Sampl: .12
STD VAL 3.10E-2 %REC 97.8 Sampl+Spk: .36
SPIKE ID/VAL 6.25-4/90838
SPIKE VOL. .100-10-.100 ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
[signature]			[signature]	

Date	Time Completed	Lab Unit Mgr
10-8-91		[signature]

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9416	Customer ID: 2291-2-4
Analysis: URANIUM	Sample Prep: UNDIGESTED

Instrument: WB88807	Procedure/Rev: LA-925-106/A-2
Technologist: M. FRANZ	Date: 10-08-91
Starting Time: 16:00	Temperature: 24degC
Ending Time: 23:00	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5540	11		
2	REAGENT BLANK	R9414-5640	12		
3	SAMPLE 2291-2-4	R9416-5740	13		
4	FINAL LMCS CHECK STD	R9419-5540	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	85B38/0.1 mL			NA
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

I-135	LLD<2.02E-01		LLD<2.02E-01		1260.41	
K-40	1.82E+00	+-6.35E-01	1.82E+00	+-6.35E-01	1460.75	-0.22
KR-85	LLD<1.61E+01		LLD<1.61E+01		513.99	
KR-85M	LLD<3.83E-02		LLD<3.83E-02		151.17	
KR-87	LLD<1.64E-01		LLD<1.64E-01		402.58	
KR-88	LLD<2.27E+00		LLD<2.27E+00		220.90	
L[illegible] 0	LLD<4.29E-02		LLD<4.29E-02		1596.20	
LA-142	LLD<1.57E-01		LLD<1.57E-01		641.83	
MN-54	LLD<7.23E-02		LLD<7.23E-02		834.83	
MN-56	LLD<8.47E-02		LLD<8.47E-02		846.76	
NA-22	LLD<4.78E-02		LLD<4.78E-02		1274.55	
NA-24	LLD<3.85E-02		LLD<3.85E-02		1368.60	
NB-94	LLD<6.46E-02		LLD<6.46E-02		702.63	
NB-95	LLD<6.89E-02		LLD<6.89E-02		765.78	
NB-97	LLD<3.86E-01		LLD<3.86E-01		657.92	
NP-237	LLD<2.79E-01		LLD<2.79E-01		86.50	
NP-238	LLD<3.41E-01		LLD<3.41E-01		984.45	
NP-239	LLD<3.15E-01		LLD<3.15E-01		277.60	
PA-233	LLD<1.36E-01		LLD<1.36E-01		311.98	
PA-234M	LLD<1.54E+01		LLD<1.54E+01		1001.03	
PB-210	LLD<6.23E+00		LLD<6.23E+00		46.50	
PB-212	LLD<1.02E-01		LLD<1.02E-01		239.00	
PB-212A	LLD<1.02E-01		LLD<1.02E-01		239.00	
PB-212B	LLD<1.48E+00		LLD<1.48E+00		300.10	
PB-214	LLD<1.48E-01		LLD<1.48E-01		351.92	
PB-214A	LLD<1.48E-01		LLD<1.48E-01		351.92	
PB-214B	LLD<2.49E-01		LLD<2.49E-01		295.21	
PO-210	LLD<6.21E+03		LLD<6.21E+03		804.00	
PO-214	LLD<2.25E+03		LLD<2.25E+03		799.70	
PO-216	LLD<3.97E+03		LLD<3.97E+03		804.90	
PU-239	LLD<4.14E+02		LLD<4.14E+02		129.30	
PU-241	LLD<1.44E+04		LLD<1.44E+04		148.57	
RA-224	LLD<1.07E+00		LLD<1.07E+00		240.99	
RA-226	LLD<9.53E-01		LLD<9.53E-01		186.10	
RB-88	LLD<4.30E-01		LLD<4.30E-01		1836.00	
RB-89	LLD<4.04E-01		LLD<4.04E-01		1031.88	
RN-220	LLD<5.91E+01		LLD<5.91E+01		549.73	
RU-103	LLD<7.04E-02		LLD<7.04E-02		497.08	
RURH106	LLD<1.36E+00		LLD<1.36E+00		621.80	
SB-124	LLD<1.68E-01		LLD<1.68E-01		602.72	
SB-125	LLD<4.53E-01		LLD<4.53E-01		176.33	
SC-46	LLD<9.86E-02		LLD<9.86E-02		1120.45	
SE-75	LLD<7.01E-02		LLD<7.01E-02		264.66	
SN-113	LLD<1.00E-01		LLD<1.00E-01		391.67	
SR-85	LLD<7.07E-02		LLD<7.07E-02		513.99	
SR-91	LLD<1.32E-01		LLD<1.32E-01		555.60	
SR-92	LLD<5.10E-02		LLD<5.10E-02		1383.94	
TA-182	LLD<2.80E-01		LLD<2.80E-01		1121.30	
TC-99M	LLD<3.11E-02		LLD<3.11E-02		140.51	
TE-123M	LLD<3.61E-02		LLD<3.61E-02		159.00	
TE-125M	LLD<9.91E+00		LLD<9.91E+00		109.27	
TE-132	LLD<4.40E-02		LLD<4.40E-02		228.16	
TH-228	LLD<3.27E+00		LLD<3.27E+00		84.37	
TH-234	LLD<6.13E-01		LLD<6.13E-01		92.50	
TH-234A	LLD<6.13E-01		LLD<6.13E-01		92.50	
TH-234B	LLD<2.16E+00		LLD<2.16E+00		63.30	
TI-208	LLD<9.11E-02		LLD<9.11E-02		583.14	
U-[illegible]	LLD<6.19E-02		LLD<6.19E-02		185.71	
U-235A	LLD<6.19E-02		LLD<6.19E-02		185.71	
U-235B	LLD<2.51E-01		LLD<2.51E-01		143.76	

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	55.12	27.67	1.16	1703.	930.	14.2	SB/TE-X
2	951.50	475.54	1.61	2949.	501.	33.9	CS-134
3C	1127.41	563.46	1.48	2132.	2450.	7.2	CS-134, EU-152
4C	1139.56	569.54	1.48	2150.	4459.	5.5	CS-134, BI-207
5	1210.31	604.90	1.59	2237.	28183.	1.3	CS-134
6	1324.13	661.80	1.61	1495.	24331.	1.4	CS-137
6B		661.38			251.	9.7	
7?	1592.44	795.94	1.68	1133.	20598.	2.1	CS-134
8?	1604.68	802.06	1.68	1078.	1879.	15.3	CS-134
9?	2336.04	1167.82	1.84	641.	350.	88.3	CS-134
10?	2346.79	1173.19	1.84	591.	14512.	2.8	CO-60
11	2664.84	1332.30	2.44	191.	13049.	1.8	CO-60
12	2730.27	1365.04	2.19	131.	487.	12.2	CS-134
13C	2799.41	1399.64	1.48	53.	131.	22.2	I-132
14C	2802.59	1401.23	1.48	58.	121.	22.9	BI-214
15	2921.09	1460.53	2.60	56.	771.	7.9	K-40
15B		1460.72			581.	4.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

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

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 11-DEC-90 AT 10:00:00
BACKGROUND LIVE TIME: 11292. SECONDS

U-237	LLD<9.27E+01	LLD<9.27E+01	208.00
W-187	LLD<6.70E+01	LLD<6.70E+01	685.74
XE-131M	LLD<9.15E+02	LLD<9.15E+02	163.98
XE-133	LLD<6.67E+01	LLD<6.67E+01	81.00
XE-133M	LLD<2.02E+02	LLD<2.02E+02	233.21
XE-135	LLD<2.33E+01	LLD<2.33E+01	249.79
XE-138	LLD<1.75E+02	LLD<1.75E+02	258.41
Y-88	LLD<9.49E+00	LLD<9.49E+00	1836.06
Y-91	LLD<6.86E+03	LLD<6.86E+03	1204.90
Y-91M	LLD<4.05E+01	LLD<4.05E+01	555.60
ZN-65	LLD<5.24E+01	LLD<5.24E+01	1115.55
ZR-95	LLD<3.43E+01	LLD<3.43E+01	756.73
ZR-97	LLD<2.05E+01	LLD<2.05E+01	743.33
TOTAL	1.94E+04 +-3.90E+02	1.94E+04 +-3.90E+02	

STANDARD DEVIATION = 0.04

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 3.83E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.94E+04 (+-3.90E+02) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.16	563.21	423.	19.4	2.50E+01
1139.36	569.31	771.	15.7	4.60E+01
1604.70	801.94	298.	12.0	2.45E+01
2730.79	1364.94	87.	26.8	1.09E+01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.88	1460.98	151.	16.7	1.98E+01
3531.56	1765.32	19.	59.2	2.83E+00

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 01:20:02

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

SAMPLE: R9416-5930
D' COLLECTED ON 1-AUG-91 AT 00:28:50
D. ED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<8.68E+01		LLD<8.68E+01		911.07	
AC-228A	LLD<8.68E+01		LLD<8.68E+01		911.10	
AC-228B	LLD<1.99E+02		LLD<1.99E+02		338.40	
AG-108M	LLD<4.07E+01		LLD<4.07E+01		433.94	
AG-110M	LLD<2.84E+02		LLD<2.84E+02		657.76	
AM-241	LLD<1.85E+02		LLD<1.85E+02		59.54	
AM-243	LLD<4.73E+01		LLD<4.73E+01		74.67	
AM-243A	LLD<4.73E+01		LLD<4.73E+01		74.67	
AM-243B	LLD<5.13E+03		LLD<5.13E+03		43.10	
AR-41	LLD<1.87E+01		LLD<1.87E+01		1293.64	
AU-198	LLD<3.37E+01		LLD<3.37E+01		411.80	
BA-133	LLD<4.34E+01		LLD<4.34E+01		356.02	
BA-139	LLD<9.60E+01		LLD<9.60E+01		165.85	
BA-140	LLD<1.19E+02		LLD<1.19E+02		537.27	
BA-141	LLD<9.04E+01		LLD<9.04E+01		190.23	
BE-7	LLD<3.50E+02		LLD<3.50E+02		477.59	
BI-207	LLD<2.95E+01		LLD<2.95E+01		569.70	
B 2	LLD<1.67E+02		LLD<1.67E+02		727.27	
BI-214	LLD<1.80E+02		LLD<1.80E+02		609.32	
BI-214A	LLD<1.80E+02		LLD<1.80E+02		609.32	
BI-214B	LLD<1.64E+02		LLD<1.64E+02		1120.28	
BI-214C	LLD<7.28E+01		LLD<7.28E+01		1764.51	
CD-109	LLD<5.96E+02		LLD<5.96E+02		88.03	
CE-139	LLD<2.17E+01		LLD<2.17E+01		165.85	
CE-141	LLD<3.36E+01		LLD<3.36E+01		145.44	
CEPR144	LLD<2.70E+02		LLD<2.70E+02		133.51	
CO-56	LLD<2.20E+01		LLD<2.20E+01		846.76	
CO-57	LLD<1.74E+01		LLD<1.74E+01		122.06	
CO-58	LLD<1.91E+01		LLD<1.91E+01		810.75	
CO-60	1.19E+03	+-6.08E+01	1.19E+03	+-6.08E+01	1332.50	0.13
					1173.24	0.07
CR-51	LLD<2.46E+02		LLD<2.46E+02		320.09	
CS-134	1.77E+03	+-7.78E+01	1.77E+03	+-7.78E+01	795.84	0.03
					604.70	0.04
CS-136	LLD<2.09E+01		LLD<2.09E+01		818.51	
CS-137	1.65E+04	+-3.77E+02	1.65E+04	+-3.77E+02	661.65	0.07
CS-138	LLD<2.10E+01		LLD<2.10E+01		1435.86	
EU-152	LLD<7.12E+01		LLD<7.12E+01		1408.01	
EU-154	LLD<4.13E+01		LLD<4.13E+01		1274.45	
EU-155	LLD<8.24E+01		LLD<8.24E+01		105.31	
FE-59	LLD<4.61E+01		LLD<4.61E+01		1099.25	
HF-181	LLD<4.26E+01		LLD<4.26E+01		482.20	
HG 3	LLD<2.55E+01		LLD<2.55E+01		279.20	
I-	LLD<3.33E+01		LLD<3.33E+01		364.48	
I-132	LLD<1.39E+02		LLD<1.39E+02		667.69	
I-133	LLD<3.28E+01		LLD<3.28E+01		529.69	
I-134	LLD<3.34E+01		LLD<3.34E+01		847.03	

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*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
*    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                                        WHC-SD-WM-DP-025
CANBERRA SPECTRAN-F V2.06  SOFTWARE     ADDENDUM 4 REV 0

222-S COUNTING ROOM WESTINGHOUSE HANFORD          01-AUG-91  01:20:02


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

MCA UNIT NUMBER:   1     /     ADC UNIT NUMBER: 2.0
DETECTOR NUMBER:    2    /     GEOMETRY NUMBER:  42
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:     5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANO:
ANALYZED BY:        MAX

SAMPLE DESCRIPTION: R9416-5930
GEOMETRY DESCRIPTION:  22ML LIQ
SAMPLE SIZE:   1.0000E-03 LI       / CONVERSION FACTOR: 4.9505E-03
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON  1-AUG-91 AT 00:28:50

COLLECT LIVE TIME:    3000. SECONDS
        REAL TIME:    3007. SECONDS
        DEAD TIME:     0.23 %

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

ENERGY CALIBRATION PERFORMED 17-MAR-89
EFFICIENCY CALIBRATION PERFORMED 16-MAY-91
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K-40	LLD<1.97E+02	LLD<1.97E+02	1460.75
KR-85	LLD<4.95E+03	LLD<4.95E+03	513.99
KR-85M	LLD<1.31E+01	LLD<1.31E+01	151.17
KR-87	LLD<5.24E+01	LLD<5.24E+01	402.58
K[illegible]9	LLD<6.04E+02	LLD<6.04E+02	220.90
L[illegible]40	LLD<8.68E+00	LLD<8.68E+00	1596.20
LA-142	LLD<3.60E+01	LLD<3.60E+01	641.83
MN-54	LLD<6.63E+00	LLD<6.63E+00	834.83
MN-56	LLD<6.20E+00	LLD<6.20E+00	846.76
NA-22	LLD<7.47E+00	LLD<7.47E+00	1274.55
NA-24	LLD<8.21E+00	LLD<8.21E+00	1368.60
NB-94	LLD<6.02E+00	LLD<6.02E+00	702.63
NB-95	LLD<6.59E+00	LLD<6.59E+00	765.78
NB-97	LLD<2.59E+02	LLD<2.59E+02	657.92
NP-237	LLD<9.35E+01	LLD<9.35E+01	86.50
NP-238	LLD<2.53E+01	LLD<2.53E+01	984.45
NP-239	LLD<8.75E+01	LLD<8.75E+01	277.60
PA-233	LLD<4.09E+01	LLD<4.09E+01	311.98
PA-234M	LLD<1.05E+03	LLD<1.05E+03	1001.03
PB-210	LLD<2.39E+03	LLD<2.39E+03	46.50
PB-212	LLD<2.73E+01	LLD<2.73E+01	239.00
PB-212A	LLD<2.72E+01	LLD<2.72E+01	239.00
PB-212B	LLD<3.86E+02	LLD<3.86E+02	300.10
PB-214	LLD<4.37E+01	LLD<4.37E+01	351.92
PB-214A	LLD<4.37E+01	LLD<4.37E+01	351.92
PB-214B	LLD<7.44E+01	LLD<7.44E+01	295.21
PO-210	LLD<5.93E+05	LLD<5.93E+05	804.00
PO-214	LLD<2.25E+05	LLD<2.25E+05	799.70
PO-216	LLD<4.86E+05	LLD<4.86E+05	804.90
PU-239	LLD<1.18E+05	LLD<1.18E+05	129.30
P[illegible]1	LLD<4.75E+06	LLD<4.75E+06	148.57
RA-224	LLD<2.99E+02	LLD<2.99E+02	240.99
RA-226	LLD<3.15E+02	LLD<3.15E+02	186.10
RB-88	LLD<6.33E+01	LLD<6.33E+01	1836.00
RB-89	LLD<2.66E+01	LLD<2.66E+01	1031.88
RN-220	LLD<1.35E+04	LLD<1.35E+04	549.73
RU-103	LLD<2.19E+01	LLD<2.19E+01	497.08
RURH106	LLD<2.73E+02	LLD<2.73E+02	621.80
SB-124	LLD<1.84E+01	LLD<1.84E+01	602.72
SB-125	LLD<1.47E+02	LLD<1.47E+02	176.33
SC-46	LLD<8.14E+00	LLD<8.14E+00	1120.45
SE-75	LLD<2.05E+01	LLD<2.05E+01	264.66
SN-113	LLD<2.87E+01	LLD<2.87E+01	391.67
SR-85	LLD<2.17E+01	LLD<2.17E+01	513.99
SR-91	LLD<2.57E+01	LLD<2.57E+01	555.60
SR-92	LLD<7.16E+00	LLD<7.16E+00	1383.94
TA-182	LLD<2.14E+01	LLD<2.14E+01	1121.30
TC-99M	LLD<1.04E+01	LLD<1.04E+01	140.51
TE-123M	LLD<1.11E+01	LLD<1.11E+01	159.00
TE-125M	LLD<2.87E+03	LLD<2.87E+03	109.27
TE-132	LLD<1.30E+01	LLD<1.30E+01	228.16
TH-228	LLD<9.38E+02	LLD<9.38E+02	84.37
TH-234	LLD<2.04E+02	LLD<2.04E+02	92.50
TH-234A	LLD<2.04E+02	LLD<2.04E+02	92.50
TH-234B	LLD<6.92E+02	LLD<6.92E+02	63.30
T[illegible]8	LLD<1.45E+01	LLD<1.45E+01	583.14
U-[illegible]	LLD<2.06E+01	LLD<2.06E+01	185.71
U-235A	LLD<2.06E+01	LLD<2.06E+01	185.71
U-235B	LLD<8.36E+01	LLD<8.36E+01	143.76
U-237	LLD<5.22E+01	LLD<5.22E+01	208.00

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

	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	1023.81	511.38	1.22	797.	227.	37.9	RN-222,I-133,
1B		510.84			74.	27.6	TL-208,NA-22, ZN-65,RH-106
2	1138.94	568.94	1.49	268.	143.	36.5	CS-134, BI-207
3	1210.12	604.52	1.38	288.	566.	11.9	CS-134
4	1323.91	661.41	1.40	215.	45589.	0.9	CS-137
4B		661.82			35.	46.4	
5	1592.31	795.60	1.56	26.	490.	9.4	CS-134
6	2922.21	1460.64	1.99	11.	215.	14.3	K-40
6B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

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

[illegible]	LLD [illegible]	LLD 1.67E-01	[illegible]
[illegible]	LLD 7.98E-02	LLD 3.99E-02	[illegible]
[illegible]	LLD 2.43E-02	LLD 2.43E-02	[illegible]
[illegible]	LLD 3.70E-02	LLD 3.70E-02	[illegible]
[illegible]	LLD [illegible]	LLD 2.30E-02	[illegible]
[illegible]	LLD [illegible]	LLD 3.76E-02	[illegible]
[illegible]	LLD [illegible]	LLD 3.12E-02	[illegible]
[illegible]	LLD 1.47E-01	LLD 1.47E-01	[illegible]
[illegible]	LLD 1.[illegible]E-01	LLD 1.0[illegible]E-01	594.[illegible]
[illegible]	LLD 1.[illegible]E-01	LLD 1.21E-01	[illegible]
[illegible]	LLD 7.[illegible]E-02	LLD 7.08E-02	[illegible]
[illegible]	LLD [illegible]E+00	LLD 5.17E+00	1031.[illegible]
[illegible]	LLD [illegible]E+00	LLD 1.33E+00	[illegible]
[illegible]	LLD 3.[illegible]E-02	LLD 3.[illegible]E-02	[illegible]
FB-2124	LLD 3.90E-02	LLD 3.90E-02	[illegible]
FB-2128	LLD 3.21E-01	LLD 3.21E-01	300.[illegible]
FB-214	LLD 4.77E-02	LLD 4.77E-02	351.[illegible]
FB-2144	LLD 4.77E-02	LLD 4.77E-02	351.[illegible]
FB-214B	LLD 2.43E-02	LLD 2.43E-02	2[illegible].[illegible]
FD-210	LLD 2.29E+03	LLD 2.29E+03	804.[illegible]
FD-214	LLD 2.69E+03	LLD 2.69E+03	7[illegible].[illegible]
FD-21A	LLD 1.41E+03	LLD 1.41E+03	204.[illegible]
FH-[illegible]	LLD 1.73E+02	LLD 1.73E+02	12[illegible].[illegible]
FH-141	LLD 6.2[illegible]E+02	LLD 6.2[illegible]E+02	14[illegible].[illegible]
[illegible]	LLD 3.34E-01	LLD 3.34E-01	1[illegible].[illegible]
[illegible]	LLD 3.87E-01	LLD 3.87E-01	18[illegible].[illegible]
[illegible]	LLD 1.[illegible]E-01	LLD 1.[illegible]E-01	1[illegible].[illegible]
[illegible]	LLD 1.47E-01	LLD 1.47E-01	1031.[illegible]
[illegible]	LLD 2.11E+01	LLD 2.11E+01	34[illegible].[illegible]
[illegible]	LLD 2.33E-02	LLD 2.33E-02	[illegible].[illegible]
[illegible]	LLD [illegible].78E-01	LLD [illegible].78E-01	621.[illegible]
[illegible]-114	LLD 1.72E-01	LLD 1.72E-01	602.[illegible]
[illegible]-133	LLD 2.04E-01	LLD 2.04E-01	174.[illegible]
[illegible]-44	LLD 2.20E-02	LLD 2.20E-02	1130.[illegible]
[illegible]-77	LLD 2.37E-02	LLD 2.37E-02	264.[illegible]
[illegible]-117	LLD 3.26E-02	LLD 3.26E-02	391.[illegible]
[illegible]-90	LLD 3.63E-02	LLD 3.63E-02	312.[illegible]
[illegible]-91	LLD 4.89E-02	LLD 4.89E-02	355.[illegible]
[illegible]-92	LLD 4.26E-02	LLD 4.26E-02	1393.[illegible]
[illegible]-132	LLD 7.93E-02	LLD 7.93E-02	1121.[illegible]
[illegible]-99M	LLD 1.47E-02	LLD 1.47E-02	140.[illegible]
[illegible]E-133M	LLD 1.63E-02	LLD 1.63E-02	159.[illegible]
[illegible]E-133M	LLD 4.47E+00	LLD 4.47E+00	10[illegible].[illegible]
[illegible]E-132	LLD 1.64E-02	LLD 1.64E-02	228.[illegible]
[illegible]H-228	LLD 1.37E+00	LLD 1.37E+00	84.[illegible]
[illegible]H-234	LLD 2.94E-01	LLD 2.94E-01	[illegible]
[illegible]H-234A	LLD 2.94E-01	LLD 2.94E-01	[illegible]
[illegible]H-234B	LLD 2.34E-01	LLD 2.34E-01	[illegible]
[illegible] 200	LLD 1.63E-02	LLD 1.63E-02	333.[illegible]
[illegible]-237	LLD 1.50E-02	LLD 1.50E-02	150.[illegible]
[illegible]-235A	LLD 2.50E-02	LLD 2.50E-02	192.[illegible]
[illegible]-235B	LLD 1.04E-01	LLD 1.04E-01	147.[illegible]
[illegible]-237	LLD 7.16E-02	LLD 7.16E-02	208.[illegible]
[illegible]-187	LLD 2.72E-02	LLD 2.72E-02	685.[illegible]
XE-131M	LLD 6.89E-01	LLD 6.89E-01	163.[illegible]
[illegible]E-133	LLD 3.76E-02	LLD 3.76E-02	81.[illegible]
[illegible]-133M	LLD 1.54E-01	LLD 1.54E-01	233.[illegible]
[illegible] 133	LLD 2.11E-02	LLD 2.11E-02	249.[illegible]
[illegible]E-135	LLD 1.42E-01	LLD 1.42E-01	238.[illegible]
[illegible]-88	LLD 1.87E-02	LLD 1.87E-02	1836.[illegible]
[illegible]-91	LLD 1.16E+01	LLD 1.16E+01	1204.[illegible]
[illegible]-91M	LLD 3.69E-02	LLD 3.69E-02	[illegible]
[illegible]-95	LLD 1.01E-01	LLD 1.01E-01	1115.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

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PEAK ANALYSIS

PEAK CONFIDENCE LEVEL AT [illegible]

E - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE [illegible]
BACKGROUND DESCRIPTION: [illegible]
BACKGROUND COLLECT STARTED ON [illegible]-JUN-85 AT [illegible]
BACKGROUND LIVE TIME: [illegible] SECONDS

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ZR-97 LLD<1.29E+00 LLD<1.29E+00 743.3[illegible]

TOTAL 4.18E+02 +-9.07E+00 4.18E+02 +-9.07E+00

WHC-SD-WM-DP-025
ADDENDUM 4 REV 0

STANDARD DEVIATION [illegible]

[illegible] = ***** NEW DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.[illegible] UC LI
TOTAL MEASURED ACTIVITY 4.18E+02 (+-9.07E+00) UC LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.[illegible] [illegible]
LLD CONFIDENCE LEVEL AT [illegible]

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
[illegible]	[illegible]	44[illegible]	[illegible]	1.[illegible]E+01
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	501.[illegible]	364	[illegible]	2.21E+01
[illegible]	1343.04	[illegible]	[illegible]	[illegible]

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC

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[illegible]

[illegible]

[illegible]

[illegible]

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

NUCLIDE	ACTIVITY CONCENTRATION IN UCI/L OR AD				ENERGY [illegible]	
	MEASURED	ERROR	CORRECTED	ERROR	EXPECT	[illegible]
[illegible]	LLD 3.37E+00		LLD 3.93E+00		[illegible]	
AL-[illegible]	LLD 5.32E+00		LLD 5.82E+00		811.1	
[illegible]	LLD 9.83E+00		LLD 9.83E+00		339.[illegible]	
[illegible]	LLD 1.36E+00		LLD 1.36E+00		[illegible]	
[illegible]	LLD 6.87E+00		LLD 6.87E+00		[illegible]	
[illegible]	LLD 6.36E+00		LLD 6.36E+00		[illegible]	
[illegible]	LLD 1.37E+00		LLD 1.37E+00		[illegible]	
[illegible]	LLD 1.37E+00		LLD 1.37E+00		[illegible]	
[illegible]	LLD [illegible]		LLD [illegible]		[illegible]	
[illegible]	LLD 8.18E-01		LLD 8.18E-01		1273.[illegible]	
[illegible]	LLD 1.32E+00		LLD 1.32E+00		511.9	
[illegible]	LLD 1.31E+00		LLD 1.31E+00		334.[illegible]	
[illegible]	LLD 3.22E+00		LLD 3.22E+00		162.[illegible]	
[illegible]	LLD 5.51E+00		LLD 5.51E+00		537.[illegible]	
[illegible]	LLD 3.37E+00		LLD 3.37E+00		[illegible]	
[illegible]	LLD 1.34E+01		LLD 1.34E+01		[illegible]	
[illegible]	LLD 1.10E+00		LLD 1.10E+00		569.[illegible]	
[illegible]	LLD 1.08E+01		LLD 1.08E+01		[illegible]	
[illegible]	LLD 1.01E+01		LLD 1.01E+01		[illegible]	
[illegible]	LLD 1.01E+01		LLD 1.01E+01		[illegible]	
[illegible]	LLD 1.04E+01		LLD 1.04E+01		1130.[illegible]	
[illegible]	LLD 4.28E+00		LLD 4.28E+00		1764.[illegible]	
[illegible]	LLD 3.32E+01		LLD 3.32E+01		[illegible]	
[illegible]	LLD 7.32E-01		LLD 7.32E-01		147.[illegible]	
[illegible]	LLD 1.28E+00		LLD 1.28E+00		147.[illegible]	
[illegible]	LLD 1.07E+01		LLD 1.02E+01		133.[illegible]	
[illegible]	LLD 1.46E+00		LLD 1.46E+00		846.[illegible]	
[illegible]	LLD 6.49E-01		LLD 6.49E-01		[illegible]	
[illegible]	LLD 1.49E+00		LLD 1.32E+00		810.[illegible]	
[illegible]	1.37E+02 +-2.17E+0[illegible]		1.37E+02 +-2.17E+00		1311.[illegible]	[illegible]
					1173.[illegible]	[illegible]
[illegible]-31	LLD 5.55E+00		LLD 5.55E+00		320.[illegible]	
[illegible]-134	1.50E+02 +-5.70E+00		1.50E+02 +-5.70E+00		795.[illegible]	[illegible]
					604.[illegible]	[illegible]
[illegible]-136	LLD 1.13E+00		LLD 1.13E+00		818.[illegible]	
[illegible]-137	1.42E+02 +-4.31E+00		1.42E+02 +-4.31E+00		661.[illegible]	[illegible]
[illegible]-139	LLD 1.12E+00		LLD 1.12E+00		1197.[illegible]	
EU-152	LLD 2.19E+00		LLD 2.19E+00		1408.[illegible]	
EU-154	LLD 2.24E+00		LLD 2.24E+00		1274.[illegible]	
EU-155	LLD 2.66E+00		LLD 2.66E+00		105.[illegible]	
[illegible]E-[illegible]	LLD 3.37E+00		LLD 3.37E+00		1099.[illegible]	
[illegible]-181	LLD 1.41E+00		LLD 1.41E+00		482.[illegible]	
[illegible]-[illegible]	LLD 1.16E+00		LLD 1.16E+00		279.[illegible]	
[illegible]-[illegible]	LLD 1.35E+00		LLD 1.35E+00		340.[illegible]	
[illegible]-[illegible]	LLD 1.55E+00		LLD 1.55E+00		647.[illegible]	
[illegible]-[illegible]	LLD 1.49E+00		LLD 1.49E+00		[illegible]	
[illegible]-[illegible]	LLD 2.24E+00		LLD 2.24E+00		847.[illegible]	
[illegible]-[illegible]	LLD 3.20E+00		LLD 3.20E+00		1260.[illegible]	
[illegible]-40	LLD 1.72E+01		LLD 1.72E+01		1460.[illegible]	
[illegible]-[illegible]	LLD 1.18E+02		LLD 1.18E+02		717.[illegible]	
[illegible]	[illegible]		[illegible]		[illegible]	

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

[illegible] SPECTRAMAN [illegible] SOFTWARE

[illegible]

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

MCA UNIT NUMBER: 2 ADC UNIT NUMBER: [illegible]
DETECTOR NUMBER: 1 GEOMETRY NUMBER: [illegible]
SPECTRUM SIZE: [illegible] CHANNELS
ORDER OF SMOOTHING FUNCTION: [illegible]
NUMBER OF BACKGROUND CHANNELS: [illegible] ON EACH SIDE OF PEAK
[illegible] CONFIDENCE FACTOR: [illegible]
IDENTIFICATION ENERGY WINDOW: [illegible] KEV
[illegible] QUANTITATION: 1.96 SIGMA UNCERTAINTY

ENVIRONMENTAL BACKGROUND SUBTRACTED
[illegible] CALCULATION PERFORMED
[illegible] ENERGY DIFFERENCES LISTED
[illegible] ANALYSIS PERFORMED

[illegible]

[illegible] DESCRIPTION [illegible]
[illegible] DESCRIPTION [illegible]
[illegible]
[illegible]
[illegible] LIBRARY FILE: [illegible]

[illegible]

[illegible]

[illegible] HOURS BEFORE THE START OF COUNT

[illegible] PERFORMED [illegible]
[illegible]

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GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
Addendum 4 Rev 0

1679

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5530	102AW	6-14-91	13:10	26

Determination	Method Standard	Result Units	Charge Code	Recurs
GEA	LA-540-121	% RECOVERY	WIDEO	0

Sample Size: ? 500ml
Customer ID: STD

Remarks, Calculations, Results:
COLX STD# 141846
RV01 STD VAL 1.4047E1
RESULT % REC 101.1%
RV05 STD VAL 12.17
RESULT 1.25E2 % REC 102.7%

Long Form
Cs 137 - 1.46E2
Eu 155
Sn 113
Ru 103

Analyst 1: Gwynne Johnson
Analyst 2: [illegible]
Analyst 3:
Analyst 4:
Analyst 5:
Date: 7/31/91
Time Completed:
Signature: [illegible]

1682

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5630	102AW	6-14-91	13:11	26

Determination	Method Standard	Result Units	Charge Code	Recurs
GEA	LA-540-121	GC1/G	WIDEO	0

Sample Size: ? 1ml
Customer ID: REG. DL

Remarks, Calculations, Results:
COUNT AS GC1/L
LASER PRINTOUT
Long Form
Cs 137 - <4.41E-2 4ml
Ru 103 - <2.33E-2
Eu 155 - <5.58E-2
Sn 113 - <3.26E-2

Analyst 1: Gwynne Johnson
Analyst 2:
Analyst 3:
Analyst 4:
Analyst 5:
Date: 7/31/91
Time Completed:
Signature: [illegible]

1684 7-16-92

Serial No	Sample Point	Date	Time Issued	Priority
R 9416.-5730	102AW	6-14-91	13:16	26

Determination	Method Standard	Result Units	Charge Code	Recurs
GEA	LA-540-121	GC1/G	WIDEO	0

Sample Size: ? 100-10-500
Customer ID: 2291-2-4

Remarks, Calculations, Results:
COUNT AS GC1/L
LASER PRINTOUT
Long Form
Cs 137 - 1.50E4 4ml
Eu 155 - <3.90E1
Sn 113 - <2.87E1
RuRH106 <2.73E12
CePR144 <1.53E12
Nb 44 <6.0L
Ru 103 - <2.19E1
Cs 134 - 1.89X10²
Ru 126 <3.15E12
Eu 154 <2.10E11
Co 60 <5.19

Analyst 1: Gwynne Johnson
Analyst 2:
Analyst 3:
Analyst 4:
Analyst 5: [illegible] 5-5-92
Date: 7/31/91
Time Completed:
Signature: [illegible]

2312

Serial No	Sample Point	Date	Time Issued	Priority
R 9416.-5930	102AW	6-14-91	13:16	26

Determination	Method Standard	Result Units	Charge Code	Recurs
GEA	LA-540-121	% RECOVERY	WIDEO	0

Sample Size: ? 100-10-500 ? 500ml spike
Customer ID: 2291-2-4

Remarks, Calculations, Results:
SAMPLE SPIKED ID:
SPIKE ID 141846
SPIKE VOLUME 500ml
Long Form
Cs 137
Sn 113
Eu 155
Ru 103

Analyst 1: Gwynne Johnson
Analyst 2:
Analyst 3:
Analyst 4:
Analyst 5:
Date: 7/31/91
Time Completed:
Signature: [illegible]

$\frac{1.65E4}{202} - \frac{1.50E4}{202} \times 2 / 14.047 = 105.7\%$ Cs137 R9416-5930

$\frac{1.19\times10^3}{202} - \frac{<5.19}{202} \times 2 / 11.78 / 12.17 = 96.8\%$ Co60

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5520	102AW	6-14-91	13:8	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-508-101	% RECOVERY	W1DEU	1

Sample Size: 10ml
Customer ID: STD

RERUN

Remarks, Calculations, Results:
5516 EV-CRD
STD# 18B49 RESULT 1.341E-1 uCi/ml
STD VAL 1.3540E-1 %REC 99.070

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	S Gilchrist			
Mary Frazy				

Date: 6-21-91
Time Completed:

5-6

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5620	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-508-101	uCi/G	W1DEU	1

Sample Size: 1ml
Customer ID: REG. BL

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

RERUN

9.58E-3 uCi/ml

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	S Gilchrist			
Mary Frazy				

Date: 6-21-91
Time Completed:

9-10

Serial No.	Sample Point	Date	Time Issued	Priority
R 9416.-5720	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
TB	LA-508-101	uCi/G	W1DEU	1

Sample Size: .100 - 10 - .200 - 10 - .500
Customer ID: 2291-2-4

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16

RERUN

1.32E4 uCi/ml

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	S Gilchrist			
Mary Frazy				

Date: 6-21-91
Time Completed:

10/1 R9413-5520

9643/10 -6

Beta Calculation by SIC on 06-21-1991 at 14:22:48
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9242/10 -6

9643/10 - 6.0 = 1.3699E-01 uCi/L beta

Mount # 2

9242/10 - 6.0 = 1.3126E-01 uCi/L beta

18/2 R9414-5620

104/10 -6

Beta Calculation by SIC on 06-21-1991 at 15:00:28
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 1

Mount # 1

150/10 -6

104/10 - 6.0 = 6.2900E-03 uCi/L beta

Mount # 2

150/10 - 6.0 = 1.2866E-02 uCi/L beta

18/2 R9416-5720

9082/10 -6

Beta Calculation by SIC on 06-21-1991 at 15:41:12
Det #18 2 -inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 10302

Mount # 1

8974/10 -6

9082/10 - 6.0 = 1.3287E+04 uCi/L beta

Mount # 2

8974/10 - 6.0 = 1.3128E+04 uCi/L beta

1 of 2

Serial No.	Sample Point	Date	Time Issued	Priority
R 9416.-5925	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Returns
AT	LA-500-101	% RECOVERY	WIDEO	1

Sample Size: ? .100 - 10 - .250 — Customer ID: 2291-2-4

Remarks, Calculations, Results:
SAMPLE SPIKED ID 9416-1
SPIKE ID 18B49
SPIKE VOLUME 10 ml

RERUN

94.8%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269 Cooper Freely	[illegible]			
Date: 6-20-91	Time Completed	Last Unit Hold	[illegible]	[illegible]

7 of 8

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5525	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Returns
AT	LA-500-101	% RECOVERY	WIDEO	1

Sample Size: ? 10 ml — Customer ID: STD

Remarks, Calculations, Results:
SS15 EV-CRD
STD# 18B49 RESULT 1.31 e-2 mill
STD VAL 1.3389 e-2 %REC 97.8%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269 Cooper Freely				
Date: 6-20-91	Time Completed	Last Unit Hold	[illegible]	[illegible]

14/2 R9416-5925 6-21 [illegible]

690/10 - .4

643/10

Alpha Calculation by MAI on 06-21-1991 at 07:02:23
Set #14 2 -inch mount Alpha eff. : .2274
Sample size : .25 mL Dilution : 101

Mount # 1

690/10 - 0.4 = 5.4899E+01 uCi/L alpha

Mount # 2

643/10 - 0.4 = 5.1137E+01 uCi/L alpha

5.3018e-1 / 404 - 1.68 mill / 404 = 1.270 e-2 / 1.3389 e-2

14/2 R9419-5525 6-21 [illegible]

667/10

Alpha Calculation by MAI on 06-21-1991 at 07:01:07
Set #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Mount # 1

664/10

667/10 - 0.4 = 1.3133E-02 uCi/L alpha

Mount # 2

664/10 - 0.4 = 1.3074E-02 uCi/L alpha

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9416	Customer ID: 2291-2-4
Analysis: TOTAL ALPHA/TOTAL BETA	Sample Prep: UNDIGESTED

Instrument: WB27809, WB27807	Procedure/Rev: LA-508-101/C-2
Technologist: M. FRANZ	Date: 06-20-91/06-21-91
Starting Time: 08:00	Temperature: N/A
Ending Time: 10:30	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5520	11		
2	REAGENT BLANK	R9414-5620	12		
3	SAMPLE 2291-2-4	R9416-5720	13		
4	SPIKE OF 2291-2-4	R9416-5920	14		
5	FINAL LMCS CHECK STD	R9419-5520	15		
6	INITIAL LMCS CHECK STD	R9413-5525	16		
7	REAGENT BLANK	R9414-5625	17		
8	SAMPLE 2291-2-4	R9416-5725	18		
9	SAM DUP OF 2291-2-4	R9416-5925	19		
10	FINAL LMCS CHECK STD	R9419-5525	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	18B49/10.0 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9416	Customer ID: 2291-2-4
Analysis: VISUAL CHECK AND OVER-THE-TOP READING	Sample Prep: UNDIGESTED

Instrument: N/A	Procedure/Rev: LA-519-151/D-1
Technologist: M. BIERMAN	Date: 6-14-91
Starting Time: 13:30	Temperature: 25degC
Ending Time: 15:00	Chemist: N/A

	Description	Lab ID		Description	Lab ID
1	SAMPLE 2291-1-1	R9394-5000	11		
2	SAMPLE 2291-1-4	R9415-5000	12		
3	SAMPLE 2291-2-4	R9416-5000	13		
4	SAMPLE 2291-3-4	R9417-5000	14		
5	SAMPLE 2291-4-4	R9418-5000	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
N/A				N/A

A-6000-881 (03/92)

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TRITIUM ANALYSIS - UNDIGESTED SAMPLE

1

Serial No	Sample Point	Date	Time Issued	Priority
R 9413.-5587	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
H3	LA-218-113	% RECOVERY	W1BED	2

Sample Size: 1 ml
Customer ID: STD

Remarks, Calculations, Results:
EDP R907 ENVSTD
STD# 34B49 RESULT 4.49E-1
STD VAL. 6.4591E-1 %REC 69.51%

RERUN

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 10-4-91
Time Completed:
Lab Unit Mgr:

R9413-5587.

$$\frac{(996.3416)(1000)}{(1)(2.22E6)} =$$

2

Serial No	Sample Point	Date	Time Issued	Priority
R 9414.-5687	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
H3	LA-218-113	uCI/G	W1BED	2

Sample Size: 1 ml
Customer ID: REG. BL

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L

RERUN

6.31E-1 uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 10-4-91
Time Completed:
Lab Unit Mgr:

R9414-5687

$$\frac{(1399.776)(1000)}{(1)(2.22E6)} =$$

3

Serial No	Sample Point	Date	Time Issued	Priority
R 9415.-5787	102AW	6-14-91	13:14	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
H3	LA-218-113	uCI/G	W1BED	2

Sample Size: 1 ml
Customer ID: 2291-1-4

Remarks, Calculations, Results:
COUNT AS uCI/L

RERUN
used Sample #
R-9394
2291-1-1

5.88E uci/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82016	69549			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 10-4-91
Time Completed:
Lab Unit Mgr:

R9415-5787.

$$\frac{(13062.54)(1000)}{(1)(2.22E6)} =$$

Serial No	Sample Point	Date	Time Issued	Priority
R 9415.-5886	102AW	6-14-91	13:16	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	uCi/L	W1TE2	2

RERUN

Sample Size: ? , 050-1 [illegible] -1 — Customer ID: 2291-1-4

Remarks, Calculations, Results: 2291-1-2

DUPLICATE SAMPLE
COUNT AS uCI/L
Sep Time: 19:00
Sep Date: 10-8-91
9.41 [illegible] uCi/L 10/8/91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
[illegible]	[illegible]			
6C916				

Date: 10-8-91 — Time Completed — Lab Unit Key: [illegible]

Serial No	Sample Point	Date	Time Issued	Priority
R 9419.-5586	102AW	6-14-91	13:23	26

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	% [illegible]ERY	W1TE2	5

RERUN

Sample Size: [illegible] — Customer ID: STD

Remarks, Calculations, Results:
COUNT ON DETECTOR#11
S376 ITS 150846
STD# RESULT 7.16E-1
STD VAL 7.71E-1 %REC 92.9%
Sep Time: 19:00
Sep Date: 10-8-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
[illegible]	[illegible]			
6C916				

Date: 10-8-91 — Time Completed — Lab Unit Key: [illegible]

10/2 10-9-91 @ 0030 Dm R9415-5886 ΔT= 5.50

551/10 -16

548/10

Sr Calculation A C by DM on 10-09-1991 at 02:38:31 B D
Det #10 2-inch count Sr eff : .3792 Y eff : .4215

W1 Sample size : 1 mL Dilution : 201 Method : 1 7.0262 7.9988

Mount # 1 Decay time = 5.5 hrs 7.1112 8.0925

W2 551/10 - 16.0 = 8.7724E+00 uCi/L strontium .937 9.36

Mount # 2 Decay time = 5.5 hrs 9.46

548/10 - 16.0 = 8.7051E+00 uCi/L strontium .920

.920 .937

R9415-5886

12/2 10-9-91 @ 0030 Dm R9419-5586 ΔT=5.42

6575/10 -10

6800/10

Sr Calculation A by DM on 10-09-1991 at 02:43:56 B
Det #12 2-inch count Sr eff : .4233 Y eff : .4719

W1 Sample size : 1 mL Dilution : 1 Method : 1 7.0097 7.0309

Mount # 1 Decay time = 5.42 hrs 7.1022 7.1225

W2 6575/10 - 10.0 = 6.4789E-01 uCi/L strontium .916 7.07E-1

Mount # 2 Decay time = 5.42 hrs 7.25E-1

6800/10 - 10.0 = 6.7040E-01 uCi/L strontium .925

.925 .916

R9419-5586

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

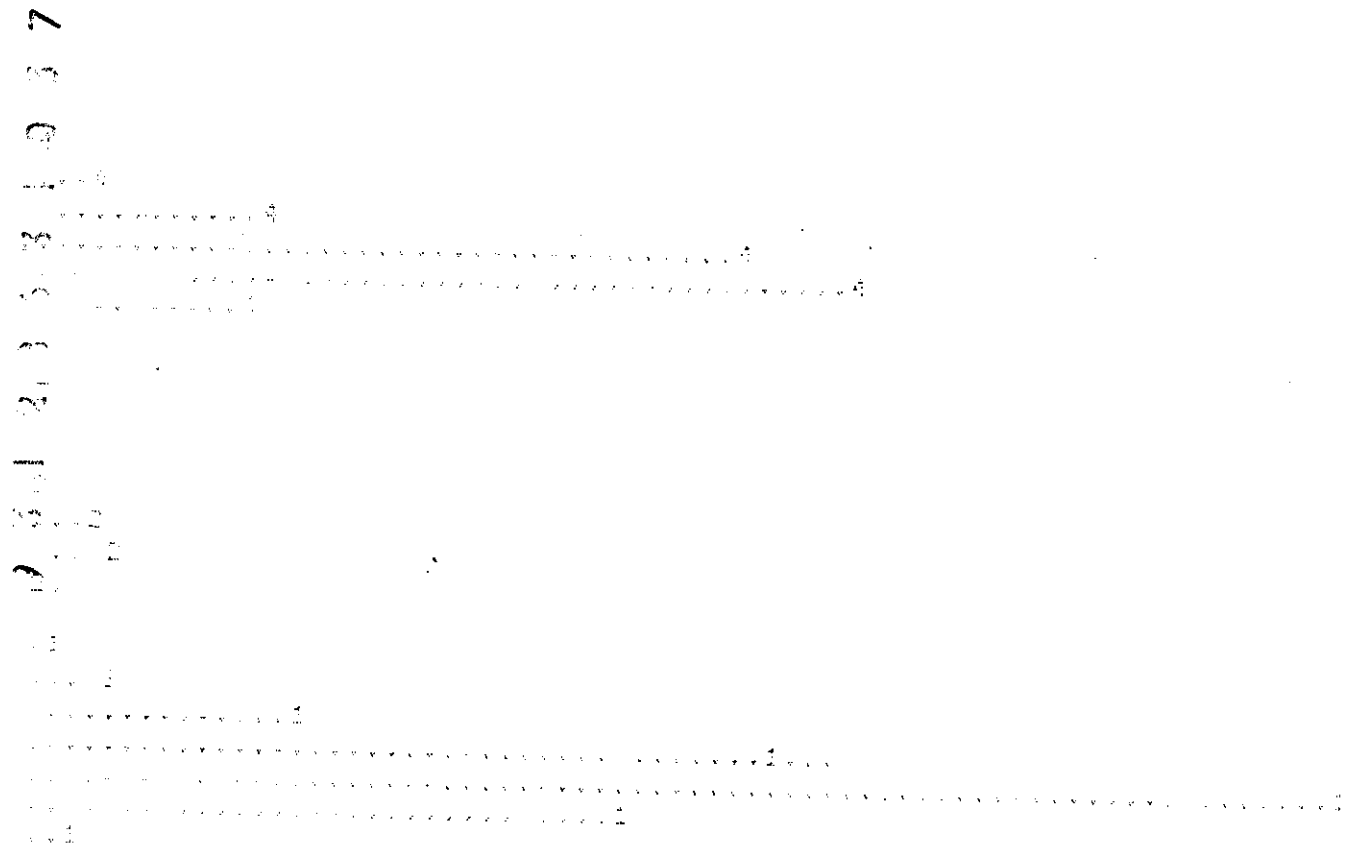
Lab Segment Serial No.: R9415	Customer ID: 2291-1-4
Analysis: STRONTIUM 90	Sample Prep: UNDIGESTED

Instrument: WB26870, WB27812, WB27811	Procedure/Rev: LA-220-101/D-0
Technologist: S. LAI	Date: 10-08-91
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5586	11		
2	REAGENT BLANK	R9414-5686	12		
3	SAMPLE 2291-1-4	R9415-5786	13		
4	SAM DUP OF 2291-1-4	R9415-5886	14		
5	FINAL LMCS CHECK STD	R9419-5586	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	150B46/1 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)



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Raw Data Dump for AEA Spectrum: SP:SD0710.SPC

1	0.	0.	0.	0.	0.	0.	1.	3.	[illegible]	[illegible]
11	1.	1.	0.	1.	1.	1.	0.	[illegible]	[illegible]	[illegible]
21	2.	0.	0.	0.	3.	2.	1.	0.	[illegible]	[illegible]
31	0.	0.	0.	0.	2.	0.	1.	[illegible]	[illegible]	[illegible]
[illegible]	1.	1.	0.	0.	0.	1.	1.	0.	0.	[illegible]
[illegible]	0.	1.	0.	0.	0.	0.	0.	0.	[illegible]	[illegible]
61	0.	1.	1.	0.	0.	0.	1.	0.	1.	[illegible]
71	0.	2.	2.	0.	0.	0.	1.	0.	0.	[illegible]
81	0.	0.	0.	0.	2.	0.	0.	0.	0.	[illegible]
91	0.	0.	0.	0.	1.	0.	0.	0.	0.	[illegible]
101	0.	1.	0.	0.	0.	0.	0.	0.	0.	[illegible]
111	0.	0.	1.	0.	0.	0.	0.	0.	1.	[illegible]
121	2.	0.	2.	0.	2.	0.	1.	1.	1.	[illegible]
131	2.	0.	1.	2.	1.	0.	1.	0.	1.	[illegible]
141	2.	1.	1.	2.	1.	2.	7.	0.	1.	8.
151	7.	2.	9.	3.	4.	7.	3.	3.	2.	7.
161	4.	3.	1.	3.	0.	1.	4.	2.	0.	[illegible]
171	2.	0.	1.	0.	0.	1.	0.	0.	2.	[illegible]
181	0.	2.	1.	0.	1.	1.	2.	0.	1.	[illegible]
191	0.	1.	0.	2.	5.	3.	1.	2.	1.	[illegible]
201	2.	2.	1.	0.	3.	3.	2.	5.	7.	[illegible]
211	2.	9.	5.	13.	6.	8.	9.	29.	20.	27.
221	39.	46.	62.	82.	98.	122.	171.	179.	214.	[illegible]
231	312.	379.	488.	520.	622.	673.	729.	694.	609.	[illegible]
241	474.	409.	306.	219.	100.	94.	50.	34.	20.	8.
251	5.	1.	1.	0.	0.	1.	0.	1.	1.	1.
261	1.	2.	2.	1.	0.	1.	0.	2.	1.	1.
271	1.	2.	3.	5.	0.	1.	2.	0.	2.	1.
281	0.	1.	0.	2.	3.	1.	1.	3.	1.	1.
291	4.	2.	3.	6.	5.	4.	15.	13.	10.	26.
	29.	50.	71.	65.	65.	61.	75.	110.	111.	147.
311	143.	113.	112.	100.	87.	43.	10.	22.	22.	11.
321	4.	3.	2.	3.	1.	0.	2.	0.	5.	1.
331	2.	3.	7.	4.	3.	10.	3.	10.	9.	5.
341	13.	7.	12.	10.	20.	25.	39.	58.	74.	112.
351	161.	220.	312.	392.	446.	568.	579.	736.	792.	932.
361	1044.	1280.	1329.	1489.	1524.	1298.	1086.	729.	539.	318.
371	149.	62.	34.	10.	3.	0.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
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.	1.	0.	0.	2.	0.	0.	1.	1.
421	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
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.
501	0.	0.								

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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. 1.10

DATA REDUCTION REPORT

SAMPLE
R9415-5781
File ID: SD9740.SPC

Counted on: 7/18/91 0131 [illegible]
Detector/Geometry number: 8/ 1
Count time: 30000. 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	2283.8	2271.1	365.107	365.107	16.000	7.919	8.000	5.41[illegible]
2	210.8	207.6	312.221	312.221	20.000	8.991	10.000	[illegible]
3	118.3	0.0	273.049	273.049	12.000	12.122	[illegible]	[illegible]
4	1125.8	1119.7	238.799	238.799	20.000	9.760	10.000	7.101
5	8.8	7.9	155.028	155.028	20.000	31.254	14.000	[illegible]

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	N d/m	Activity uCi/cc
1	Pu236	0.6124	5.756	5.774	-0.018	0.04	63.03	195.83	0.882E-[illegible]
	Cm243		5.786	5.774	0.012				0.118E-[illegible]
2	Pu238	0.0585	5.499	5.525	-0.026	0.04	3.16	25.47	0.115E-[illegible]
3		0.0000		5.341		0.06	0.00	0.00	0.000E+00
4	Pu239	0.3248	5.143	5.180	-0.037	0.05	17.52	101.81	0.459E-[illegible]
	Pu240		5.144	5.180	-0.036				0.459E-[illegible]
5	Np237	0.0043	4.781	4.787	-0.006	0.15	0.23	1.54	0.693E-[illegible]

DETECTOR CALIBRATION
Energy(MEV) = 4.058 + (0.0047)*Channel
Energy range (MeV): 4.058 TO 6.464
Efficiency 0.1721 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	27139.0	100.000
Smoothed	27138.0	99.99[illegible]
Composite fit	26968.0	99.370
Residuals	169.9	0.626

Analyzed by: _____
63099

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Raw Data Dump for AEA Spectrum: GP:SN7418.SPC

1	0.	0.	0.	0.	0.	0.	1.	0.	0.	[illegible]
11	0.	4.	2.	0.	2.	1.	3.	5.	[illegible]	[illegible]
21	3.	4.	0.	4.	3.	0.	2.	0.	[illegible]	[illegible]
31	3.	2.	[illegible]	7.	0.	3.	1.	[illegible]	[illegible]	[illegible]
[illegible]	3.	2.	2.	2.	3.	2.	4.	3.	[illegible]	[illegible]
[illegible]	2.	5.	4.	3.	2.	1.	2.	3.	[illegible]	[illegible]
61	3.	0.	2.	2.	2.	1.	1.	3.	2.	[illegible]
71	2.	1.	0.	3.	1.	0.	0.	1.	4.	[illegible]
81	1.	2.	0.	0.	3.	3.	2.	1.	0.	[illegible]
91	1.	1.	4.	2.	4.	1.	2.	1.	1.	[illegible]
101	4.	4.	2.	2.	3.	1.	0.	0.	1.	[illegible]
111	2.	1.	2.	2.	2.	3.	1.	2.	3.	[illegible]
121	0.	1.	0.	4.	1.	2.	1.	0.	0.	[illegible]
131	1.	1.	2.	2.	0.	0.	3.	4.	1.	3.
141	2.	0.	5.	2.	3.	2.	1.	0.	2.	3.
151	2.	1.	0.	3.	2.	0.	0.	1.	[illegible]	[illegible]
161	3.	1.	3.	0.	3.	0.	4.	0.	1.	[illegible]
171	3.	5.	2.	3.	3.	5.	2.	5.	2.	[illegible]
181	3.	2.	3.	4.	0.	3.	1.	1.	1.	[illegible]
191	6.	4.	6.	3.	3.	5.	3.	6.	6.	[illegible]
201	2.	7.	10.	9.	9.	6.	13.	12.	12.	17.
211	22.	39.	68.	52.	85.	111.	132.	176.	269.	292.
221	308.	434.	491.	606.	761.	955.	1168.	1255.	1368.	1121.
231	1347.	1161.	998.	816.	560.	371.	223.	141.	69.	30.
241	13.	11.	2.	0.	1.	1.	0.	1.	2.	1.
251	1.	1.	2.	0.	4.	3.	0.	0.	[illegible]	1.
261	2.	2.	1.	3.	1.	4.	3.	4.	2.	3.
271	3.	4.	1.	1.	4.	1.	1.	3.	1.	2.
281	4.	5.	4.	9.	10.	10.	23.	28.	21.	28.
291	51.	51.	35.	56.	82.	79.	91.	106.	121.	152.
[illegible]	163.	163.	156.	154.	142.	91.	65.	41.	31.	17.
311	6.	3.	4.	2.	4.	4.	3.	4.	3.	[illegible]
321	3.	2.	7.	7.	6.	10.	8.	10.	6.	17.
331	6.	10.	11.	12.	8.	22.	16.	11.	30.	38.
341	48.	78.	139.	190.	215.	403.	494.	592.	680.	720.
351	773.	913.	909.	1025.	1179.	1415.	1511.	1007.	1030.	1910.
361	1767.	1473.	1016.	799.	346.	283.	176.	92.	41.	11.
371	7.	0.	0.	2.	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.	1.	0.	0.	0.
421	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	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.	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.
501	0.	0.								

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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. 1.10

DATA REDUCTION REPORT

SAMPLE
R9413-5881
File ID: SD7448.SPC

Counted on: 7/18/91 @13: 6
Detector/Geometry number: 7/ 1
Count time: 30000. 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	2984.3	2963.9	360.265	360.265	20.000	8.554	10.000	4.659
2	264.8	263.6	303.206	303.206	16.000	8.316	8.000	4.[illegible]
3	33.2	8.5	270.274	270.274	12.000	6.304	6.000	4.[illegible]
4	2173.0	2166.7	231.160	231.160	16.000	8.414	8.000	6.595
5	6.0	4.9	177.100	177.100	56.000	8.000	[illegible]	[illegible]
6	2.6	1.9	143.658	143.658	20.000	12.140	10.000	[illegible]
7	3.4	2.7	101.189	101.189	16.000	13.537	8.000	1.791
8	5.2	4.4	51.722	51.722	24.000	32.400	12.000	1.[illegible]
9	1.0	0.1	21.205	21.205	12.000	10.200	6.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/cc
1	Pu236	0.5640	5.756	5.764	-0.008	0.04	47.04	311.88	0.140E-03
2	Pu238	0.0493	5.499	5.496	0.003	0.04	4.11	37.11	0.167E-04
	Am241		5.480	5.496	-0.016				0.128E-04
3		0.0003		5.341		0.00	0.02	0.15	0.662E-07
4	Pu239	0.3777	5.143	5.158	-0.015	0.04	31.47	204.51	0.921E-04
	Pu240		5.144	5.158	-0.014				0.921E-04
5		0.0023		4.904		0.01	0.20	1.27	0.572E-06
6		0.0019		4.746		0.06	0.16	1.05	0.472E-06
7		0.0012		4.547		0.06	0.10	0.65	0.292E-06
8		0.0027		4.314		0.15	0.23	1.47	0.660E-06
9		0.0000		4.171		0.00	0.00	0.00	0.139E-08

DETECTOR CALIBRATION

Energy(MEV) 4.071 + (0.0047)*Channel
Energy range (MeV): 4.071 TO 6.478
Efficiency 0.1539 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	41640.0	100.000
Smoothed	41638.6	99.997
Composite fit	41665.5	100.061
Residuals	-26.9	-0.065

Analyzed by: _____
63099

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4.2 7448

Serial No.	Sample Point	Date	Time Issued	Priority
R 9413.-5581	102AW	6-14-91	13: 8	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	% RECOVERY	W1BEO	1

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

Remarks, Calculations, Results:
EDP R211 AR001
STD# ~~24843~~ 43843 RESULT 9.90E'
STD VAL. 9.014E' %REC 109.95%
Pu236 (40B43) .050 ml
1 ml 8M HNO3
95% trace

RERUN "AEA-480 MIN" ATTACH PRINT OUT

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LC559	[signature]			
[signature]				

Date: 7/16/91 Time Completed: Lab Unit Mgr: AR Pulicik [signature]

#1 4-18-91 R9413-5581

$\frac{1414}{5}$ -10

$\frac{(272.8)(2)(.5645)}{325.49} = 95\%$

3.3 3679

Serial No.	Sample Point	Date	Time Issued	Priority
R 9414.-5681	102AW	6-14-91	13:11	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	uCI/G	W1BEO	1

Sample Size: ? ~~0~~ 1
Customer ID: REG. BL

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L
Pu236 (40B43) .050 ml
1 ml 8M HNO3 <7.64E-3 uCi/l
50% trace

RERUN "AEA-480 MIN" ATTACH PRINT OUT

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LC559	[signature]	DH Militia		
[signature]				

Date: 7/16/91 Time Completed: Lab Unit Mgr: AR Pulicik [signature]

#3 7-18-91 R9414-5681

$\frac{481}{5}$ -12

$\frac{(84.20)(2)(.9587)}{325.27} = .50\%$

4.4 8740

Serial No.	Sample Point	Date	Time Issued	Priority
R 9415.-5781	102AW	6-14-91	13:14	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	uCI/G	W1BEO	1

Sample Size: ? 1 ml
Customer ID: 2291-1-4

Remarks, Calculations, Results:
COUNT AS uCI/L
Pu236 (40B43) .050 ml
1 ml Con HNO3 7.78E-2
~~7.72E-2~~ uCi/l
37% trace 5/10/92

RERUN "AEA-480 MIN" ATTACH PRINT OUT

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
LC559	[signature]			
[signature]				

Date: 7/16/91 Time Completed: Lab Unit Mgr: AR Pulicik [signature]

#2 7-18-91 R9415-5781

$\frac{548}{5}$ -12

$\frac{(97.6)(2)(.6124)}{325.49} =$

URANIUM BY LASER ANALYSIS - UNDIGESTED SAMPLE

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5540	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	% RELIABILITY	WIDED	3

RERUN

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

Remarks, Calculations, Results

S267 UFIC
STD# 85838 RESULT 3.07E-2 g/l Sampl: .12
STD VAL 3.10E-2 %REC 97.8 Smpl+Spk: .36
SPIKE ID/VAL 6.25-4/90838
SPIKE VOL. .100-10-.100 ml

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6C269				
[illegible]	PIN	PIN	PIN	PIN
Date 10-8-91	Time Completed	Lab Unit Mgr		

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9415	Customer ID: 2291-1-4
Analysis: URANIUM	Sample Prep: UNDIGESTED

Instrument: WB88807	Procedure/Rev: LA-925-106/A-2
Technologist: M. FRANZ	Date: 10-08-91
Starting Time: 16:00	Temperature: 24degC
Ending Time: 23:00	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5540	11		
2	REAGENT BLANK	R9414-5640	12		
3	SAMPLE 2291-1-4	R9415-5740	13		
4	FINAL LMCS CHECK STD	R9419-5540	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	85B38/0.1 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

U-237	LLD<1.87E-01	LLD<1.87E-01	208.00
W-187	LLD<2.35E-01	LLD<2.35E-01	685.74
XE-131M	LLD<1.65E+00	LLD<1.65E+00	163.98
XE-133	LLD<1.04E-01	LLD<1.04E-01	81.00
XE-133M	LLD<3.90E-01	LLD<3.90E-01	233.21
XE-135	LLD<5.00E-02	LLD<5.00E-02	249.79
XE-138	LLD<3.76E-01	LLD<3.76E-01	258.41
Y-88	LLD<4.07E-02	LLD<4.07E-02	1836.06
Y-91	LLD<2.37E+01	LLD<2.37E+01	1204.90
Y-91M	LLD<1.00E-01	LLD<1.00E-01	555.60
ZN-65	LLD<2.01E-01	LLD<2.01E-01	1115.55
ZR-95	LLD<1.23E-01	LLD<1.23E-01	756.73
ZR-97	LLD<7.04E-02	LLD<7.04E-02	743.33
TOTAL	4.31E+01 +-7.81E-01	4.31E+01 +-7.81E-01	

STANDARD DEVIATION = 0.18

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.27E-09 UC/LI
TOTAL MEASURED ACTIVITY = 4.31E+01 (+-7.81E-01) UC/LI
%TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
55.12	27.67	930.	14.2	5.15E+02
951.50	475.54	501.	33.9	3.50E+00
1127.41	563.46	2450.	7.2	1.99E+01
1139.56	569.54	4459.	5.5	3.66E+01
1604.68	802.06	1879.	15.3	2.11E+01
2336.04	1167.82	350.	88.3	5.50E+00
2730.27	1365.04	487.	12.2	8.73E+00
2799.41	1399.64	131.	22.2	2.40E+00
2802.59	1401.23	121.	22.9	2.22E+00

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 04:14:13

SAMPLE: R9419-5530
C COLLECTED ON 1-AUG-91 AT 03:23:45
D. .YED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<3.08E-01		LLD<3.08E-01		911.07	
AC-228A	LLD<3.08E-01		LLD<3.08E-01		911.10	
AC-228B	LLD<4.34E-01		LLD<4.34E-01		338.40	
AG-108M	LLD<6.85E-02		LLD<6.85E-02		433.94	
AG-110M	LLD<3.39E-01		LLD<3.39E-01		657.76	
AM-241	LLD<2.63E-01		LLD<2.63E-01		59.54	
AM-243	LLD<8.24E-02		LLD<8.24E-02		74.67	
AM-243A	LLD<8.24E-02		LLD<8.24E-02		74.67	
AM-243B	LLD<7.36E+00		LLD<7.36E+00		43.10	
AR-41	LLD<6.67E-02		LLD<6.67E-02		1293.64	
AU-198	LLD<7.09E-02		LLD<7.09E-02		411.80	
BA-133	LLD<8.82E-02		LLD<8.82E-02		356.02	
BA-139	LLD<1.59E-01		LLD<1.59E-01		165.85	
BA-140	LLD<2.64E-01		LLD<2.64E-01		537.27	
BA-141	LLD<1.65E-01		LLD<1.65E-01		190.23	
BE-7	LLD<6.50E-01		LLD<6.50E-01		477.59	
BI-207	LLD<7.24E-02		LLD<7.24E-02		569.70	
E 2	LLD<5.51E-01		LLD<5.51E-01		727.27	
BI-214	LLD<7.00E-01		LLD<7.00E-01		609.32	
BI-214A	LLD<7.00E-01		LLD<7.00E-01		609.32	
BI-214B	LLD<6.55E-01		LLD<6.55E-01		1120.28	
BI-214C	LLD<2.64E-01		LLD<2.64E-01		1764.51	
CD-109	LLD<1.05E+00		LLD<1.05E+00		88.03	
CE-139	LLD<3.61E-02		LLD<3.61E-02		165.85	
CE-141	LLD<5.99E-02		LLD<5.99E-02		145.44	
CEPR144	LLD<4.70E-01		LLD<4.70E-01		133.51	
CO-56	LLD<7.50E-02		LLD<7.50E-02		846.76	
CO-57	LLD<3.10E-02		LLD<3.10E-02		122.06	
CO-58	LLD<6.91E-02		LLD<6.91E-02		810.75	
CO-60	1.24E+01	+-2.34E-01	1.24E+01	+-2.34E-01	1332.50	-0.20
					1173.24	-0.04
CR-51	LLD<4.95E-01		LLD<4.95E-01		320.09	
CS-134	1.45E+01	+-3.19E-01	1.45E+01	+-3.19E-01	795.84	0.09
					604.70	0.20
CS-136	LLD<7.65E-02		LLD<7.65E-02		818.51	
CS-137	1.44E+01	+-2.23E-01	1.44E+01	+-2.23E-01	661.65	0.15
CS-138	LLD<7.96E-02		LLD<7.96E-02		1435.86	
EU-152	LLD<3.62E-01		LLD<3.62E-01		1408.01	
EU-154	LLD<1.35E-01		LLD<1.35E-01		1274.45	
EU-155	LLD<1.33E-01		LLD<1.33E-01		105.31	
FE-59	LLD<1.68E-01		LLD<1.68E-01		1099.25	
HF-181	LLD<8.14E-02		LLD<8.14E-02		482.20	
H 3	LLD<5.59E-02		LLD<5.59E-02		279.20	
I- 1	LLD<6.95E-02		LLD<6.95E-02		364.48	
I-132	LLD<2.61E-01		LLD<2.61E-01		667.69	
I-133	LLD<7.43E-02		LLD<7.43E-02		529.69	
I-134	LLD<1.09E-01		LLD<1.09E-01		847.03	

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD 01-AUG-91 04:14:13

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 4 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANO:
ANALYZED BY: MAX

SAMPLE DESCRIPTION: R9419-5530
GEOMETRY DESCRIPTION: 134B40-A 22/LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 5.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 1-AUG-91 AT 03:23:45

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3018. SECONDS
DEAD TIME: 0.60 %

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 14-MAR-91

K-40	LLD<1.92E+02		LLD<1.92E+02		1460.75	
KR-85	LLD<4.93E+03		LLD<4.93E+03		513.99	
KR-85M	LLD<1.26E+01		LLD<1.26E+01		151.17	
KR-87	LLD<5.23E+01		LLD<5.23E+01		402.58	
K[illegible]9	LLD<6.45E+02		LLD<6.45E+02		220.90	
L[illegible]40	LLD<8.67E+00		LLD<8.67E+00		1596.20	
LA-142	LLD<3.47E+01		LLD<3.47E+01		641.83	
MN-54	LLD<6.13E+00		LLD<6.13E+00		834.83	
MN-56	LLD<6.98E+00		LLD<6.98E+00		846.76	
NA-22	LLD<8.02E+00		LLD<8.02E+00		1274.55	
NA-24	LLD<1.03E+01		LLD<1.03E+01		1368.60	
NB-94	LLD<5.70E+00		LLD<5.70E+00		702.63	
NB-95	LLD<6.26E+00		LLD<6.26E+00		765.78	
NB-97	LLD<2.65E+02		LLD<2.65E+02		657.92	
NP-237	LLD<9.33E+01		LLD<9.33E+01		86.50	
NP-238	LLD<2.40E+01		LLD<2.40E+01		984.45	
NP-239	LLD<8.97E+01		LLD<8.97E+01		277.60	
PA-233	LLD<4.13E+01		LLD<4.13E+01		311.98	
PA-234M	LLD<8.97E+02		LLD<8.97E+02		1001.03	
PB-210	LLD<2.41E+03		LLD<2.41E+03		46.50	
PB-212	LLD<2.80E+01		LLD<2.80E+01		239.00	
PB-212A	LLD<2.78E+01		LLD<2.78E+01		239.00	
PB-212B	LLD<4.04E+02		LLD<4.04E+02		300.10	
PB-214	LLD<4.36E+01		LLD<4.36E+01		351.92	
PB-214A	LLD<4.36E+01		LLD<4.36E+01		351.92	
PB-214B	LLD<7.57E+01		LLD<7.57E+01		295.21	
PO-210	LLD<5.83E+05		LLD<5.83E+05		804.00	
PO-214	LLD<2.19E+05		LLD<2.19E+05		799.70	
PO-216	LLD<4.73E+05		LLD<4.73E+05		804.90	
PU-239	LLD<1.24E+05		LLD<1.24E+05		129.30	
P[illegible]1	LLD<4.82E+06		LLD<4.82E+06		148.57	
RA[illegible]24	LLD<3.11E+02		LLD<3.11E+02		240.99	
RA-226	LLD<3.13E+02		LLD<3.13E+02		186.10	
RB-88	LLD<6.32E+01		LLD<6.32E+01		1836.00	
RB-89	LLD<2.42E+01		LLD<2.42E+01		1031.88	
RN-220	LLD<1.36E+04		LLD<1.36E+04		549.73	
RU-103	LLD<2.32E+01		LLD<2.32E+01		497.08	
RURH106	5.34E+02	+-2.66E+02	5.34E+02	+-2.66E+02	621.80	0.03
SB-124	LLD<1.80E+01		LLD<1.80E+01		602.72	
SB-125	LLD<1.48E+02		LLD<1.48E+02		176.33	
SC-46	LLD<5.25E+00		LLD<5.25E+00		1120.45	
SE-75	LLD<2.13E+01		LLD<2.13E+01		264.66	
SN-113	LLD<2.99E+01		LLD<2.99E+01		391.67	
SR-85	LLD<2.19E+01		LLD<2.19E+01		513.99	
SR-91	LLD<2.66E+01		LLD<2.66E+01		555.60	
SR-92	LLD<8.60E+00		LLD<8.60E+00		1383.94	
TA-182	LLD<1.77E+01		LLD<1.77E+01		1121.30	
TC-99M	LLD<1.04E+01		LLD<1.04E+01		140.51	
TE-123M	LLD<1.14E+01		LLD<1.14E+01		159.00	
TE-125M	LLD<2.93E+03		LLD<2.93E+03		109.27	
TE-132	LLD<1.38E+01		LLD<1.38E+01		228.16	
TH-228	LLD<1.01E+03		LLD<1.01E+03		84.37	
TH-234	LLD<2.08E+02		LLD<2.08E+02		92.50	
TH-234A	LLD<2.08E+02		LLD<2.08E+02		92.50	
TH-234B	LLD<7.09E+02		LLD<7.09E+02		63.30	
TI[illegible]8	LLD<1.66E+01		LLD<1.66E+01		583.14	
U-[illegible]	LLD<2.08E+01		LLD<2.08E+01		185.71	
U-235A	LLD<2.08E+01		LLD<2.08E+01		185.71	
U-235B	LLD<8.62E+01		LLD<8.62E+01		143.76	
U-237	LLD<5.56E+01		LLD<5.56E+01		208.00	

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

	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	1024.17	511.56	1.52	695.	311.	26.7	I-133,TL-208,
1B		510.84			74.	27.6	NA-22,ZN-65, RH-106
2	1209.96	604.44	1.26	269.	592.	11.3	CS-134
3	1244.73	621.83	0.80	236.	99.	49.8	AG-110M, RH-106
4	1323.81	661.36	1.39	203.	45223.	0.9	CS-137
4B		661.82			35.	46.4	
5	1592.26	795.58	1.57	23.	449.	9.8	CS-134
6	2921.95	1460.51	1.20	5.	166.	15.8	K-40
6B		1461.77			182.	11.2	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

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

BEST AVAILABLE COPY

9 3 1 2 1 5 3 1 0 9 7

BEST AVAILABLE COPY

BEST AVAILABLE COPY

BEST AVAILABLE COPY

BEST AVAILABLE COPY

BEST AVAILABLE COPY

BEST AVAILABLE COPY

GAMMA ENERGY ANALYSIS - UNDIGESTED SAMPLE

WHC-SD-WM-DP-025
Addendum 4 Rev 0

1679

Serial No	Sample Point	Date	Time Issued	Priority
K 9415.-5530	102AW	6-14-91	13:18	26

Determination	Method Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	WIBEU	0

Sample Size	Customer ID
7.200 mL	STD

Remarks, Calculations, Results

Long Form
CULX STDN 141846
K901 STD VAL 1.4047E1
RESULT % REC 101.1%
K905 STD VAL 12.17
RESULT 1.25E2 % REC 102.7%

Cs^{137} - 1.46E2
Eu^{155}
Sn^{113}
Ru^{103}

Analyst: Cynthia Johnson
Analyst - 2: Eric Bass
Analyst - 3
Analyst - 4
Analyst - 5
Pos: 82376
Date: 7/31/91
Time Completed
Technical Review: Dyann Smithick

1680

Serial No	Sample Point	Date	Time Issued	Priority
K 9414.-5630	102AW	6-14-91	13:11	26

Determination	Method Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	uCi/G	WIBEU	0

Sample Size	Customer ID
7 mL	REG. 14

Remarks, Calculations, Results

COUNT AS uCi/L
LASER PRINTOUT
Long Form
Cs^{137} - <4.41E-2 u/L
Ru^{103} - <2.33E-2
Eu^{155} - <5.58E-2
Sn^{113} - <3.26E-2

Analyst: Cynthia Johnson
Analyst - 2: Eric Bass
Analyst - 3
Analyst - 4
Analyst - 5
Pos: 82376
Date: 7/31/91
Time Completed
Technical Review: Dyann Smithick

1681

Serial No	Sample Point	Date	Time Issued	Priority
K 9415.-5730	102AW	6-14-91	13:14	26

Determination	Method Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	uCi/G	WIBEU	0

Sample Size	Customer ID
7 100-10-500	202-1-4

Remarks, Calculations, Results

COUNT AS uCi/L
LASER PRINTOUT
Long Form
Cs^{137} - 1.46E4 u/L
Eu^{155} - <3.82E1
Sn^{113} - <2.73E1
Ru^{103} - <2.14E1
Mn^{54} <5.49
Ce^{144} <1.57E2
Ru^{106} <3.14E2
Co^{60} <4.77
Cs^{134} - 1.74 X10^{2}

Analyst: Cynthia Johnson
Analyst - 2: Eric Bass
Analyst - 3
Analyst - 4
Analyst - 5: 5-5-92
Pos: 82376
Date: 7/31/91
Time Completed
Technical Review: Dyann Smithick

1683

Serial No	Sample Point	Date	Time Issued	Priority
K 9415.-5830	102AW	6-14-91	13:14	26

Determination	Method Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	uCi/G	WIBEU	0

Sample Size	Customer ID
7 100-10-500	202-1-4

Remarks, Calculations, Results

Duplicate
COUNT AS uCi/L
LASER PRINTOUT
Long Form
Cs^{137} -1.49E4 u/L
Eu^{155} - <3.79E1
Sn^{113} - <2.99E1
Ru^{103} - <2.32E1
Ru^{106} 5.34E2
Co^{60} 4.41
Mn^{54} <5.70
Ce^{144} <1.40E2
Ru^{106} <3.86E2
Eu^{154} <2.46E1
Cs^{134} - 1.73 X10^{2}

Analyst: Cynthia Johnson
Analyst - 2: Eric Bass
Analyst - 3
Analyst - 4
Analyst - 5: Irma K. Lee
Pos: 82376
Date: 7/31/91
Time Completed
Technical Review: Dyann Smithick

4176

Serial No	Sample Point	Date	Time Issued	Priority
K 9415.-5930	102AW	6-14-91	13:21	26

Determination	Method Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	WIBEU	0

Sample Size	Customer ID
7 .500 mL	STD

Remarks, Calculations, Results

Long Form
CULX STDN 141846
K901 STD VAL 1.4047
RESULT 1.44E1 % REC 102.5%
K905 STD VAL 12.17
RESULT 1.24E1 % REC 101.9%

Cs^{137}
Eu^{155}
Sn^{113}
Ru^{103}

Analyst: Cynthia Johnson
Analyst - 2
Analyst - 3
Analyst - 4
Analyst - 5
Pos: 82376
Date: 7/31/91
Time Completed
Technical Review: Dyann Smithick

7-8

Serial No	Sample Point	Date	Time Issued	Priority
R 9415.-5820	102AW	6-14-91	13:14	26

Determination	Method/Standard	Result Units	Charge Code	Returns
TB	LA-508-101	uCi/G	W1DEO	1

Sample Size: .100-10-.200-10-.500
Customer ID: 2291-1-4

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16
Duplicate
1.47 E4 uCi/L

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			
[signature]	Hrs	Hrs	Hrs	Hrs

Date: 6-21-91
Time Completed:
Lab Manager: [signature]

18/2

R9415-5820

10073/10 -6

Beta Calculation by SZC on 06-21-1991 at 15:40:15
Det #18 2-inch mount Beta eff. : .3151
Sample size : 1 mL Dilution : 10302

Mount # 1

10073/10 - 6.0 = 1.4746E+04 uCi/L beta

10065/10 -6

Mount # 2

10065/10 - 6.0 = 1.4735E+04 uCi/L beta

152

Serial No	Sample Point	Date	Time Issued	Priority
R 9419.-5520	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Returns
TB	LA-508-101	% RECOVERY	W1DEO	1

Sample Size: 10ml
Customer ID: STD

Remarks, Calculations, Results:
-5510 EV-CRB
STD# 18B49 RESULT 1.386 E-1 uCi/L
STD VAL 1.354x10^-1 %REC 102.4%

RERUN

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
6C269	[signature]			
[signature]	Hrs	Hrs	Hrs	Hrs

Date: 6-21-91
Time Completed:
Lab Manager: [signature]

18/2

R9419-5520 10ml

9992/10 -6

9518/10

Beta Calculation by ALJ on 06-21-1991 at 18:29:53
Det #18 2-inch mount Beta eff. : .3151
Sample size : 10 mL Dilution : 1

Mount # 1

9992/10 - 6.0 = 1.4198E-01 uCi/L beta

Mount # 2

9518/10 - 6.0 = 1.3521E-01 uCi/L beta

9312253099 3

748

Serial No.	Sample Point	Date	Time Issued	Priority
R 9415.-5825	102AW	6-14-91	13:14	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G	WIDEO	1

Sample Size: ? .100 - 10 - .250

Customer ID: 2291-1-4

Remarks, Calculations, Results:
COUNT AS uCi/L
USE 13,14,15 OR 16
Duplicate

RERUN

<2.08 uCi/L

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

Date	Time Completed	Lab Unit Mgr	
6-20-91		[illegible]	[illegible]

14/2 R9415-5825 6-21 [illegible]

30/10 — Alpha Calculation by MAX on 06-21-1991 at 06:26:48
Det #14 2 -inch count Alpha eff. : .2274
Sample size : .25 mL Dilution : 101

30/10 — Count # 1

30/10 - 0.4 = 2.0087E+00 uCi/L alpha

Count # 2

30/10 - 0.4 = 2.0087E+00 uCi/L alpha

748

Serial No.	Sample Point	Date	Time Issued	Priority
R 9419.-5525	102AW	6-14-91	13:21	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	WIDEO	1

Sample Size: ? 10 ml

Customer ID: STD

Remarks, Calculations, Results:
8515 EV-CRD
STD# 18B49 RESULT 1.31 @ -2 uCi/L
STD VAL 1.3389 ? %REC 97.8%

RERUN

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

Date	Time Completed	Lab Unit Mgr	
6-20-91		[illegible]	[illegible]

14/2 R9419-5525 6-21 [illegible]

667/10 — Alpha Calculation by MAX on 06-21-1991 at 07:01:07
Det #14 2 -inch count Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

664/10 — Count # 1

667/10 - 0.4 = 1.3133E-02 uCi/L alpha

Count # 2

664/10 - 0.4 = 1.3074E-02 uCi/L alpha

9 3 1 2 9 5 3 0 9 9

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9415	Customer ID: 2291-1-4
Analysis: TOTAL ALPHA/TOTAL BETA	Sample Prep: UNDIGESTED

Instrument: WB27809, WB27807	Procedure/Rev: LA-508-101/C-2
Technologist: M. FRANZ	Date: 06-20-91/06-21-91
Starting Time: 08:00	Temperature: N/A
Ending Time: 10:30	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R9413-5520	11		
2	REAGENT BLANK	R9414-5620	12		
3	SAMPLE 2291-1-4	R9415-5720	13		
4	SAM DUP OF 2291-1-4	R9415-5820	14		
5	FINAL LMCS CHECK STD	R9419-5520	15		
6	INITIAL LMCS CHECK STD	R9413-5525	16		
7	REAGENT BLANK	R9414-5625	17		
8	SAMPLE 2291-1-4	R9415-5725	18		
9	SAM DUP 2291-1-4	R9415-5825	19		
10	FINAL LMCS CHECK STD	R9419-5525	20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	18B49/10.0 mL			N/A
THESE SAMPLES WERE RERUN.				

A-6000-881 (03/92)

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R9415	Customer ID: 2291-1-4
Analysis: VISUAL CHECK AND OVER-THE-TOP READING	Sample Prep: UNDIGESTED

Instrument: N/A	Procedure/Rev: LA-519-151/D-1
Technologist: M. BIERMAN	Date: 6-14-91
Starting Time: 13:30	Temperature: 25degC
Ending Time: 15:00	Chemist: N/A

	Description	Lab ID		Description	Lab ID
1	SAMPLE 2291-1-1	R9394-5000	11		
2	SAMPLE 2291-1-4	R9415-5000	12		
3	SAMPLE 2291-2-4	R9416-5000	13		
4	SAMPLE 2291-3-4	R9417-5000	14		
5	SAMPLE 2291-4-4	R9418-5000	15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
N/A				N/A

A-6000-881 (03/92)

UNDIGESTED SAMPLE RESULTS

Tank: 102AW
Core: NA
Sample No.: R9418
Customer ID: 2291-4-4

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:					R9418							
Appearance of R9418 (06-14-91): Clear; light yellow; aqueous. No visible organic. Solids present.												
Lab ID:	NA		NA		INSUFFICIENT SAMPLE		INSUFFICENT SAMPLE		INSUFFICENT SAMPLE		NA	
Americium 241												
Lab ID:	R9413		R9414		R9418		NA		NA		R9419	
GEA (07-31-91)												
Cs 137	101.1	%	<4.41E-2	uCi/L	1.51E+4	uCi/L	NA		NA		102.5	%
Eu 154	NA		NA		<3.69E+1	uCi/L	NA		NA		NA	
Eu 155	NA		NA		<7.10E+1	uCi/L	NA		NA		NA	
Sn 113	NA		NA		<3.95E+1	uCi/L	NA		NA		NA	
Cs 134	NA		NA		1.62E+2	uCi/L	NA		NA		NA	
Ru 103	NA		NA		<2.93E+1	uCi/L	NA		NA		NA	
RuRh 106	NA		NA		<4.33E+2	uCi/L	NA		NA		NA	
Co 60	NA		NA		<8.19	uCi/L	NA		NA		NA	
Nb 94	NA		NA		<7.55	uCi/L	NA		NA		NA	

UNDIGESTED SAMPLE RESULTS

Tank: 102AW
Core: NA
Sample No.: R9417
Customer ID: 2291-3-4

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:					R9417							
Appearance of R9417 (06-14-91): Clear; light yellow; aqueous. No visible organic. Solids on bottom of vial.												
Lab ID:	NA		NA		INSUFFICIENT SAMPLE		INSUFFICENT SAMPLE		INSUFFICENT SAMPLE		NA	
Americium 241												
Lab ID:	R9413		R9414		R9417		NA		NA		R9419	
GEA (07-31-91)												
Cs 137	101.1	%	<4.41E-2	uCi/L	1.61E+4	uCi/L	NA		NA		102.5	%
Eu 154	NA		NA		<8.85	uCi/L	NA		NA		NA	
Eu 155	NA		NA		<2.10E+1	uCi/L	NA		NA		NA	
Sn 113	NA		NA		<1.65E+1	uCi/L	NA		NA		NA	
Cs 134	NA		NA		1.75E+2	uCi/L	NA		NA		NA	
Ru 103	NA		NA		<1.15E+1	uCi/L	NA		NA		NA	
RuRh 106	NA		NA		4.78E+2	uCi/L	NA		NA		NA	
Co 60	NA		NA		<2.57	uCi/L	NA		NA		NA	
Nb 94	NA		NA		<2.97	uCi/L	NA		NA		NA	

UNDIGESTED SAMPLE RESULTS

Tank: 102AW
Core: NA
Sample No.: R9416
Customer ID: 2291-2-4

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:					R9416-5000							
Appearance of R9416 (06-14-91): Clear; light yellow; aqueous. No visible organic. No solids present.												
Lab ID:	NA		NA		INSUFFICIENT SAMPLE		INSUFFICENT SAMPLE		INSUFFICENT SAMPLE		NA	
Americium 241												
Lab ID:	R9413		R9414		R9416-5730		NA		R9416		R9419	
GEA (07-31-91)												
Cs 137	101.1	%	<4.41E-2	uCi/L	1.50E+4	uCi/L	NA		105.7	%	102.5	%
Eu 154	NA		NA		<2.10E+1	uCi/L	NA		NA		NA	
Eu 155	NA		NA		<3.90E+1	uCi/L	NA		NA		NA	
Sn 113	NA		NA		<2.87E+1	uCi/L	NA		NA		NA	
Cs 134	NA		NA		1.89E+2	uCi/L	NA		NA		NA	
Ru 103	NA		NA		<2.19E+1	uCi/L	NA		NA		NA	
RuRh 106	NA		NA		<2.73E+2	uCi/L	NA		NA		NA	
Co 60	NA		NA		<5.19	uCi/L	NA		NA		NA	
Nb 94	NA		NA		<6.02	uCi/L	NA		NA		NA	

UNDIGESTED SAMPLE RESULTS

Tank: 102AW
Core: NA
Sample No.: R9415
Customer ID: 2291-1-4

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:					R9415-5000							
Appearance of R9415 (06-14-91): Clear; light yellow; aqueous. No visible organic. Small amount of solids on vial bottom.												
Lab ID:	NA		NA		INSUFFICIENT SAMPLE		INSUFFICENT SAMPLE		INSUFFICENT SAMPLE		NA	
Americium 241												
Lab ID:	R9413		R9414		R9415-5730		R9415-5830		NA		R9419	
GEA (07-31-91)												
Cs 137	101.1	%	<4.41E-2	uCi/L	1.46E+4	uCi/L	1.49E+4	uCi/L	NA		102.5	%
Eu 154	NA		NA		<1.75E+1	uCi/L	<2.26E+1	uCi/L	NA		NA	
Eu 155	NA		NA		<3.82E+1	uCi/L	<3.79E+1	uCi/L	NA		NA	
Sn 113	NA		NA		<2.73E+1	uCi/L	<2.99E+1	uCi/L	NA		NA	
Cs 134	NA		NA		1.74E+2	uCi/L	1.73E+2	uCi/L	NA		NA	
Ru 103	NA		NA		<2.14E+1	uCi/L	<2.32E+1	uCi/L	NA		NA	
RuRh 106	NA		NA		<2.81E+2	uCi/L	5.34E+2	uCi/L	NA		NA	
Co 60	NA		NA		<6.77	uCi/L	<6.41	uCi/L	NA		NA	
Nb 94	NA		NA		<5.49	uCi/L	<5.70	uCi/L	NA		NA	

	Sample R9418		Sample Duplicate R9418
Pu 239/240	4.03E−2	uCi/L	NA
Sr 90 (08−22−91)	1.53E+2	uCi/L	NA
Sr 90 (10−08−91)	NA		NA
Total Beta	2.02E+4	uCi/L	NA
Total Alpha	<2.16	uCi/L	NA
H3	5.64	uCi/L	NA
U	3.87E−3	g/L	NA

	Sample R9416		Sample Duplicate R9416	
Am 241	INSUFFICIENT SAMPLE		INSUFFICIENT SAMPLE	
GEA (Cs 137)	1.50E+4	uCi/L	NA	
Eu 134	<2.10E1	uCi/L	NA	
Eu 155	<3.90E1	uCi/L	NA	
Sn 113	<2.87E1	uCi/L	NA	
Cs 134	1.89E2	uCi/L	NA	
Ru 103	<2.19E1	uCi/L	NA	
RuRh 106	<2.73E2	uCi/L	NA	
Co 60	<5.19	uCi/L	NA	
Nb 94	<6.02	uCi/L	NA	
CePr 144	<1.53E2	uCi/L	NA	
Ra 226	<3.15E2	uCi/L	NA	
Pu 239/240	3.69E−2	uCi/L	3.67E−2	uCi/L
Sr 90 (08−22−91)	NA		NA	
Sr 90 (10−08−91)	8.10	uCi/L	NA	
Total Beta	1.32E+4	uCi/L	NA	
Total Alpha	1.68	uCi/L	NA	
H3	5.65	uCi/L	NA	
U	1.88E−3	g/L	NA	

	Sample R9417		Sample Duplicate R9417
Am 241	INSUFFICIENT SAMPLE		INSUFFICIENT SAMPLE
GEA (Cs 137)	1.61E4	uCi/L	NA
Eu 154	<8.85	uCi/L	NA
Eu 155	<2.10E1	uCi/L	NA
Sn 113	<1.65E1	uCi/L	NA
Cs 134	1.75E2	uCi/L	NA

SAMPLE DATA SUMMARY

9 3 1 2 1 5 3 1 9 7 3

102HW

COPY

SAMPLE CHECKOUT LIST

Sample ID	Tech.sign./pyrl	Sample out	Sample in	Date/Time	Custodian/ date time
R9415, 11, 18, 16, 09 R9410, 17, 08,	Mary Frary 6C269	1100	1115	6-18-91	Vida Johansen 6/18/91 1115
9394 - 9401 9395 - 9402 9397 - 9404 9396 - 9403	McBurnett 6C559	1100	1115	6/18/91	Vida Johansen 6/18/91 1115
R9415, 16, 17, 18	6C269 Mary Frary	115	1350	6/18-91	Vida Johansen 6/18/91 1350
R9417	6C275 Dave R Jackson	14:10	14:30	6-18-91	Vida Johansen 6/19/91 0830
R-9408 - 11	80028 Ed Cohn	0830	1330	6-19-91	Vida Johansen 6/19/91 1045

9312330971

Date/Time Received 6/12/91 1400 Client Name tank farms

Project/Client # 241-102 AW Batch or Case # RISER 22A 2AW61191-

Cooler ID (if noted on outside of cooler) TF-11 seal 4214

1. Condition of shipping container? Good
2. Custody Seals on ~~cooler~~ intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] N/A
6. Each sample is in a plastic bag? Yes [ ] No [ ] N/A
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - X custody seals
   - ____ hazard labels
   - ____ tape
   - ____ appropriate sample labels
9. Samples are:
   - ____ in good condition
   - ____ broken
   - ____ other
   - ____ leaking
   - ____ have air bubbles
10. Samples received at N/A °C. Coolant type _____
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) yes
    Request for Analysis #(s) yes
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ]

Printed Name/Signature Vida Johansen Vida Johansen Date/Time 6/12/91 1445

Page 1 of 2

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	BCWyn	Date 6-12-91		Time	0945
Sample Locations	241-AW, 102-AW, Riser # 22A				
Remarks					Seal #4214
Ice Chest or Sample Pig No.	TF-11	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW61191-4	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: BCWyn	Received by: [signature]	Date/Time: 6-12-91 / 1310
Relinquished by: [signature]	Received by: [signature]	Date/Time: 6-12-91 / 1410
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

CHECK-IN LIST

(1 Per Shipping Container)
WHC-SD-WM-DP-025
Addendum 4 Rev 0

242-A Evaporator

Date/Time Received 6/10/91 1445 Client Name Steel Farm

Project/Client # 241-AW-102AW Batch or Case # 102-AW RISER 22-A

Cooler ID (if noted on outside of cooler) TF-5 Seal # 4212

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ____ clips (in cans)
   - X custody seals
   - ____ hazard labels
   - ____ tape
   - NO appropriate sample labels
   - Sample & paperwork do not agree
9. Samples are:
   - ____ in good condition
   - ____ broken
   - ____ other
   - ____ leaking
   - ____ have air bubbles
10. Samples received at N/A °C. Coolant type N/A
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) Yes -
    Request for Analysis #(s)
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [X] No [ ]
13. Memos have been initiated for all anomalies identified above? Yes [X] attached

Printed Name/Signature VIDA JOHANSEN Date/Time 6/10/91 1530

Page 1 of 2

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SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
A 9229	2AW52291-2		yes

TANK FARM PLANT OPERATING PROCEDURE

Copy

WHC-SD-WM-DP-025
Addendum 4 Rev 0

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CCPitkoff	Date 6-5-91		Time	1555
Sample Locations	241-AW -TANK 102-AW Riser # 22A				
Remarks	N/A				
Ice Chest or Sample Pig No.	G	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-2	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: T.L. Bacon	Date/Time: 6/10/91 1405
Relinquished by: Troy L. Bacon	Received by: [signature]	Date/Time: 6/10/91 15:05
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship #R9229

Document No.	Rev/Mod	Page
TO-080-030	C-1	15

(1 Per Shipping Container)
WHC-SD-WM-DP-025
Addendum 4 Rev 0

R 40

Date/Time Received 6/10/91 Client Name Hand Farm 242-A Evaporator

Project/Client # 241-AW-102AW Batch or Case # Riser 22-A 102-AW

Cooler ID (if noted on outside of cooler) G Seal 4210

1. Condition of shipping container? Good
2. Custody Seals on cooler intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Chain of Custody record is taped on inside of cooler lid? Yes [ ] No [ ] NA
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - ___ clips (in cans)
   - X custody seals
   - ___ hazard labels
   - ___ tape
   - X appropriate sample labels
9. Samples are:
   - ___ in good condition
   - ___ broken
   - ___ other
   - ___ leaking
   - ___ have air bubbles
10. Samples received at N/A °C. Coolant type ___
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) Yes —
    Request for Analysis #(s) —
    Airbill # N/A Carrier hand carried
12. Have any anomalies been identified above? Yes [ ] No [X]
13. Memos have been initiated for all anomalies identified above? Yes [ ]

Printed Name/Signature Vida Johansen Vida Johansen Date/Time 6/10/91 1530

Page 1 of 2

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13

30

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CCPitkoff	Date 6-5-91		Time	1555
Sample Locations	241-AW -TANK 102-AW RISER # 22A				
Remarks	N/A				
Ice Chest or Sample Pig No.	G	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-2	FSS-T-630-00001, FD-A, Routine 2

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: T.L. Bacon	Date/Time: 6/10/91 1405
Relinquished by: Troy L. Bacon	Received by: [signature]	Date/Time: 6/10/91 15:05
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship #R9229

SAMPLE CHECK-IN LIST

(1 Per Shipping Container)

WHC-SD-WM-DP-025
Addendum 4 Rev 0

Date/Time Received 6-7-91 / 0210 hrs Client Name C.C. Pitkoff

Project/Client # 241-AW-TANK Batch or Case # 102-AW RISER # 22A

Company Contact: C.C. Pitkoff Sample No. 2AW52291-1

~~Cooler~~ PIG ID (if noted on outside of cooler) B-18

1. Condition of shipping container? Good
2. Custody Seals on ~~cooler~~ Pig intact? Yes [ ] No [ ] none
3. Custody Seals dated and signed? Yes [ ] No [ ] none
4. Chain of Custody record is ~~taped on inside of cooler lid~~ hand carried? Yes [✓] No [ ]
5. Vermiculite/packing material is: Wet [ ] Dry [ ] NA
6. Each sample is in a plastic bag? Yes [ ] No [ ] NA
7. Number of sample containers in cooler: 1
8. Samples have:
   - NA clips (in cans)
   - NA tape
   - NO custody seals
   - ✓ appropriate sample labels
   - ✓ hazard labels
9. Samples are:
   - ✓ in good condition
   - NO leaking
   - NA broken
   - NA have air bubbles
   - NA other
10. Samples received at NA °C. Coolant type NA
11. The following paperwork should be accounted for (N/A if not applicable):
    Chain of Custody #(s) C of C present
    Request for Analysis #(s) yes
    Airbill # NA Carrier Truck
12. Have any anomalies been identified above? Yes [ ] No [✓]
13. Memos have been initiated for all anomalies identified above? Yes [NA]

Printed Name/Signature DOT HONAKER / Dot Honaker for J.A. Zuerin Date/Time 6-7-91

Page 1 of 2

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
INORGANIC 1	R9394		
2	R 9401		
3	R 9408		
4	R 9413		
Semi VOA ORGANIC			
1, And 2	R9420		
VOA -			
1 And 2	R9421		

9394, 9401, 9408 9415
9420, 9421

WHC-SD-WM-DP-025
Addendum 4 Rev. 0

LABORATORY ID	Date Sampled	Time Sampled

Sample Site or Sampling ID	Date Received at 222-S	Time Received at 222-S
ORGANIC (R9227) INORGANIC (2AW52291-1 02AW)	6/13/91	1315

Delivered by (Signature)	RPT Release (Signature)	Dose Rate
[signature]	[signature]	200 mR/hr

Custodian (Signature)	Date Analysis Complete	Disposal Date
[signature]		

Comments: Stored in 2B Refr. #1, 2.

Payroll No.	Tech/Receiver (Signature)	Date	Entry Code	Comments
	INORGANIC 1	R9394		
	" 2	R9401		
	" 3	R9408		
	" 4	R9415		
	SEMI VOA OR 1	R9420		
	2			
	VOA 1	R9421		
	2			
				22

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BD-6000-347

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC-SD-WM-DP-025
Addendum 4 Rev 0

WHC ID NUMBER	SAMPLE LABEL NUMBER	PNL ID NUMBER	AGREEMENT OF INFORMATION?
R9371	2AW61191-3		yes
INORGANIC 1	R9396		
2	9403		
3	9410		
4	9417		
SEMI-VOA			
1 AND 2	R9424		
VOA			
1 and 2	R9425		

9396, 9403, 9410, 9417
R9424, 9425

LABORATORY ID

Date Sampled	Time Sampled

Sample Site or Sampling ID	Date Received at 222-S	Time Received at 222-S
2AW52291-3 (R9371) 102AW	6/13/91	1315

Delivered by (Signature)	RPT Release (Signature)	Dose Rate
[signature]	[signature]	200 mR/hr

Custodian (Signature)	Date Analysis Complete	Disposal Date
Veda Johansen		

Comments: Stored in ref. 1,2

Payroll No.	Tech/Receiver (Signature)	Date	Entry Code	Comments
	INORGANIC 1	R9396		
	2	R9403		
	3	R9410		
	4	R9417		
	SVOA 1	R9424		
	2			
	VOA 1	R9425		
	2			
	BEST AVAILABLE COPY			
				18

BD-6000-347R (

SAMPLE CHECK-IN LIST
SAMPLE NUMBER MATRIX

WHC ID NUMBER	SAMPLE LABEL NUMBER	C SC ~~PNL ID~~ NUMBER	AGREEMENT OF INFORMATION?
R 9228	2AW52291-3 VJ	2AW52291-4	NO —

CHAIN OF CUSTODY

Company Contact	C. C. Pitkoff	Telephone	3-2408
Bill of Lading No.	N/A	Offsite Property No.	N/A
Method of Shipment	Sample Truck		
Shipped to	222-S		

SAMPLING INFORMATION

Sample Collected by	CKearney	Date	6-5-91	Time	1615
Sample Locations	241-AW-TANK 102-AW, RISER # 22-A				
Remarks	N/A				
Ice Chest or Sample Pig No.	TF-5	Field Logbook and Page No.	N/A		

SAMPLE IDENTIFICATION

Sample Number	Sample Schedule Number
2AW52291-4	FSS-T-630-00001, FD-A, Routine 2

* Sample in pig marked 2AW52291-3

CHAIN OF POSSESSION

Relinquished by: [signature]	Received by: T. L. Bacon	Date/Time: 6/10/91 / 1405
Relinquished by: Troy L. Bacon	Received by: Vida Johanson	Date/Time: 6/10/91 / 15:05
Relinquished by:	Received by:	Date/Time:
Relinquished by:	Received by:	Date/Time:

Ship. # R9228

SAMPLE CHECK IN LIST

Date/Time Received 11-16-91 0140 Sample ID 2AW-BD-2

Project TK 102AW Client Tank Farms

Shipping Container ID# G-10 Shipping # R 333

1. Condition of Shipping container? Good
2. Custody Seals on container intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [X] No [ ]
4. Custody Seals ID # 4247
5. Condition of Samples: ✓ in good condition
   ____ broken
   ____ leaking
6. Samples have: ____ custody seals
   ✓ appropriate sample labels
7. The following paperwork should be accounted for (N/A if not applicable):
   Chain of Custody #(s) N/A
   Request for Special Analysis #(s) ____
8. Have any anomalies been identified? Yes [ ] No [X]
9. Memos have been initiated for all anomalies identified? Yes [ ]

Printed Name Vina Johansen

Signature Vina Johansen

Date/Time 11-18-91 1050

Please send copy to Office of Sample Management Data Administrator, T6-08

SAMPLE CHECK IN LIST

Date/Time Received 11-16-91 0140 Sample ID 2AW-BD-1

Project TK102AW Client TANK FARMS

Shipping Container ID# B-15 Shipping # R332

1. Condition of Shipping container? Good
2. Custody Seals on container intact? Yes [X] No [ ]
3. Custody Seals dated and signed? Yes [ ] No [ ]
4. Custody Seals ID # 4246
5. Condition of Samples: ✓ in good condition
   ____ broken
   ____ leaking
6. Samples have: ____ custody seals
   ✓ appropriate sample labels
7. The following paperwork should be accounted for (N/A if not applicable):
   Chain of Custody #(s) Yes
   Request for Special Analysis #(s) no
8. Have any anomalies been identified? Yes [ ] No [X]
9. Memos have been initiated for all anomalies identified? Yes [ ]

Printed Name Vida Johansen

Signature Vida Johansen

Date/Time 11-18-91 - 1050

Please send copy to Office of Sample Management Data Administrator, T6-08

SAMPLING AND CUSTODY DATA

Procedure LA-533-105
Anion Analysis on Dionex Model 40001

Typical sample dilution was 0.000099g/mL

Fluoride
Detection Limit in solution = 0.09 ppm.

Chloride
Detection Limit in solution = 0.04 ppm.

Nitrate
Detection Limit in solution = 0.24 ppm.

Phosphate
Detection Limit in solution = 0.13 ppm.

Sulfate
Detection Limit in solution = 0.13 ppm.

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

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

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

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

Procedure LA-695-101
Cyanide = 0.1 ppm CN in solution
Spectrophotometric Determination of Cyanide

Procedure LA-634-102
Ammonia = 0.1 ppm NH_4^+ in solution
Ammonia by Kjeldahl

Procedure LA-645-001
Nitrite = 0.184 ppm NO_2 in solution
Spectrophotometric Determination of Nitrite

Procedure LA-265-101
Chromium VI = 0.1004 ppm Cr^{6+} in solution
Spectrophotometric Determination of Hexavalent Chromium

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TABLE 6 (cont)

10. LABORATORY CONTROL SAMPLE

All Laboratory Control Sample recoveries must be within 80-120% for all sample matrices.

11. INTERFERENCE CHECK SAMPLE

Frequency of analysis and all Interference Check Sample solution results must meet the requirements specified in the procedure used.

12. OTHER QUALITY CONTROL CHECKS

As specified in project specific documentation.

TABLE 5
RESULT REPORTING/VALIDATION

The RCRA validation documentation package consists of the Office of Sample Management Data Validation cover sheet (different sheets for Level A, B, or C validation), supplemental Quality Control (QC) attachment pages, a copy of the Chain of Custody, and all sample data. One documentation package is completed for each sample or delivery group.

Three levels of validation are offered:

Level A The minimum requirement for all RCRA data. The primary application is for data used in waste designation/disposal. The additional QC required by SW-846 will be assessed through laboratory audits and Performance Evaluation (PE) samples.

- Review Requirements:

  - o Requested Versus Reported Analyses
  - o Analysis Holding Times

Level B Provides a more in-depth review for programs whose data are compiled for use in later reports.

Review Requirements in Addition to Those Listed for Level A:

- o Matrix Spike/Matrix Spike Duplicate Analysis
- o Surrogate Recoveries
- o Duplicate Analysis
- o Analytical Blank Analysis

Level C Requires that the data be reported in Sample Delivery Group (SDG) data packages and is applicable to RCRA governed programs requiring Contract Laboratory Program (CLP) quality data from analytical work done in non-CLP laboratories

Review Requirements in Addition to Those Above:

- o Initial and Continuing Instrument Calibrations
- o Gas Chromatography - Mass Spectrograph (GC/MS) Tune Criteria
- o Internal Standards for Gas Chromatograph Analysis
- o Laboratory Control Samples
- o Interference Check Samples (for ICP analysis)
- o Any Other QC Checks Performed or Required by the Methods of Analysis

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TABLE 3 (cont)

TARGET COMPOUND LIST (TCL) AND CONTRACT REQUIRED QUANTITATION LIMITS (CRQL)

Volatiles	CAS Number	Quantitation Limits* Water ug/L	Low Soil ug/Kg	Med. Soil ug/Kg	On Column (ng)
1. Chloromethane	74-87-3	10	10	1200	(50)
2. Bromomethane	74-83-9	10	10	1200	(50)
3. Vinyl Chloride	75-01-4	10	10	1200	(50)
4. Chloroethane	75-00-3	10	10	1200	(50)
5. Methylene Chloride	75-09-2	10	10	1200	(50)
6. Acetone	67-64-1	10	10	1200	(50)
7. Carbon Disulfide	75-15-0	10	10	1200	(50)
8. 1,1-Dichloroethene	75-35-4	10	10	1200	(50)
9. 1,1-Dichloroethane	75-34-3	10	10	1200	(50)
10. 1,2-Dichloroethene (total)	540-59-0	10	10	1200	(50)
11. Chloroform	67-66-3	10	10	1200	(50)
12. 1,2-Dichloroethane	107-06-2	10	10	1200	(50)
13. 2-Butanone	78-93-3	10	10	1200	(50)
14. 1,1,1-Trichloroethane	71-55-6	10	10	1200	(50)
15. Carbon Tetrachloride	56-23-5	10	10	1200	(50)
16. Bromodichloromethane	75-27-4	10	10	1200	(50)
17. 1,2-Dichloropropane	78-87-5	10	10	1200	(50)
18. cis-1,3-Dichloropropene	10061-01-5	10	10	1200	(50)
19. Trichloroethene	79-01-6	10	10	1200	(50)
20. Dibromochloromethane	124-48-1	10	10	1200	(50)
21. 1,1,2-Trichloroethane	79-00-5	10	10	1200	(50)
22. Benzene	71-43-2	10	10	1200	(50)
23. trans-1,3-Dichloropropene	10061-02-6	10	10	1200	(50)
24. Bromoform	75-25-2	10	10	1200	(50)
25. 4-Methyl-2-pentanone	108-10-1	10	10	1200	(50)
26. 2-Hexanone	591-78-6	10	10	1200	(50)
27. Tetrachloroethene	127-18-4	10	10	1200	(50)
28. Toluene	108-88-3	10	10	1200	(50)
29. 1,1,2,2-Tetrachloroethane	79-34-5	10	10	1200	(50)
30. Chlorobenzene	108-90-7	10	10	1200	(50)
31. Ethyl Benzene	100-41-4	10	10	1200	(50)
32. Styrene	100-42-5	10	10	1200	(50)
33. Xylenes (Total)	1330-20-7	10	10	1200	(50)

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

TABLE 3 (cont)

(continued)

Semivolatiles	CAS Number	Quantitation Limits* Water ug/L	Low Soil ug/Kg	Med. Soil ug/Kg	On Column (ng)
69. Dibenzofuran	132-64-9	10	330	10000	(20)
70. 2,4-Dinitrotoluene	121-14-2	10	330	10000	(20)
71. Diethylphthalate	84-66-2	10	330	10000	(20)
72. 4-Chlorophenyl-phenyl ether	7005-72-3	10	330	10000	(20)
73. Fluorene	86-73-7	10	330	10000	(20)
74. 4-Nitroaniline	100-01-6	50	1700	50000	(100)
75. 4,6-Dinitro-2-methylphenol	534-52-1	50	1700	50000	(100)
76. N-nitrosodiphenylamine	86-30-6	10	330	10000	(20)
77. 4-Bromophenyl-phenylether	101-55-3	10	330	10000	(20)
78. Hexachlorobenzene	118-74-1	10	330	10000	(20)
79. Pentachlorophenol	87-86-5	50	1700	50000	(100)
80. Phenanthrene	85-01-8	10	330	10000	(20)
81. Anthracene	120-12-7	10	330	10000	(20)
82. Carbazole	86-74-8	10	330	10000	(20)
83. Di-n-butylphthalate	84-74-2	10	330	10000	(20)
84. Fluoranthene	206-44-0	10	330	10000	(20)
85. Pyrene	129-00-0	10	330	10000	(20)
86. Butylbenzylphthalate	85-68-7	10	330	10000	(20)
87. 3,3'-Dichlorobenzidine	91-94-1	10	330	10000	(20)
88. Benzo(a)anthracene	56-55-3	10	330	10000	(20)
89. Chrysene	218-01-9	10	330	10000	(20)
90. bis(2-Ethylhexyl)phthalate	117-81-7	10	330	10000	(20)
91. Di-n-octylphthalate	117-84-0	10	330	10000	(20)
92. Benzo(b)fluoranthene	205-99-2	10	330	10000	(20)
93. Benzo(k)fluoranthene	207-08-9	10	330	10000	(20)
94. Benzo(a)pyrene	50-32-8	10	330	10000	(20)
95. Indeno(1,2,3-cd)pyrene	193-39-5	10	330	10000	(20)
96. Dibenz(a,h)anthracene	53-70-3	10	330	10000	(20)
97. Benzo(g,h,i)perylene	191-24-2	10	330	10000	(20)

* Quantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

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TABLE 2
RECOMMENDED ANALYSIS MINIMUM QUANTITATION LEVELS
for TANK FARM WASTE ANALYSES

Analyte	Solid/Slurry	High Salt Liquid	Low Salt Liquid
Alpha Total	100	1	0.01
Beta Total	350	3.5	0.035
Radionuclides Analyzed by Gamma Energy Analysis			
Co^{60}	4	4	0.04
Cs^{137}	5	5	0.05
$RuRh^{106}$	50	50	0.5
Radionuclides Analyzed by Separation with Beta Counting			
H^{3}	75	1.5	1.5
C^{14}	50	0.5	0.25
Nb^{94}	*	*	*
Se^{79}	50	0.5	0.25
Sr^{90}	150	1.5	0.015
Tc^{99}	250	2.5	0.025
I^{129}	900	9	0.09
Radionuclides Analyzed by Separation with Alpha Counting/Alpha Energy Analysis			
Pu^{238}	200[1]	2[1]	0.02[1]
$Pu^{239/240}$	50	0.5	0.005
Am^{241}	100	1	0.01
Cm^{244}	100	1	0.01

Values for solids are as pCi/g
Values for liquids are as pCi/ml

* No current analysis capacity for Nb^{94}
[1]Potential interferrence on Pu^{238} analysis from contamination in Pu^{236} spike added to the analysis

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If you need any additional information or have any questions, please call me on 3-3869.

Richard L. Weiss

R. L. Weiss, Principal Scientist
Office of Sample Management

jmd

Attachments - 7

CONCURRENCE:

Curtis R. Stroup Date 11/28/90
C. R. Stroup, Manager
Analytical Laboratories

J. D. Briggs for Date 11/29/90
J. D. Briggs, Manager
222-S Analytical Laboratory Complex

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compliance. While it is expected that in most cases specific needs will be more stringent, if less stringent requirements are appropriate, these should also be defined in the WAP. This could significantly reduce analytical costs and turnaround times.

Characterization of Waste Streams Discharged to Double Shell Tanks (DSTs):

These streams are from ongoing operations of the site and will need analysis for two requirements; verification of compliance to tank farm storage specifications (processing parameters), and determination of composition for regulatory based designation of the waste (hazardous waste designation). Processing parameter based analysis will be equivalent to current practice and should be predefined using laboratory "routine set" analysis. The analysis will be performed under the quality assurance requirements of NQA-1 with typical result turnarounds of 1 to 5 days. Results will be available via the laboratory reporting system (LCCS).

Analysis of the samples to meet the needs for hazardous waste designation will require more stringent quality assurance than for processing parameters. Those components that fall under both needs will likely be required to be analyzed by both protocols. Unfortunately, analysis turnaround times for designation will likely exceed needs for normal processing parameters. If processing parameter analysis results show a component to significantly exceed a hazardous waste designation limit (e.g., a sample is sufficiently caustic to qualify as a extremely hazardous waste based on corrosiveness) reanalysis of the sample under the more stringent protocols would not be necessary. In no case will analysis performed to processing parameter protocols be suitable for designation as an intermediate level or as nonhazardous waste.

DST Characterization Analysis:

All of these analyses will be required to be performed to hazardous waste designation protocols. Currently, no analytical capacity exists to perform Nb^{94} analysis. This long lived ($2x10^4$ y) beta emitter is not expected to be present in significant quantities and will require development efforts to analyze for. Addition of total beta (TB) analysis to the analysis request should allow for screening for significant levels of unaccounted for beta activity and assessment of the needs for additional specific beta emitting radionuclide component quantification.

Analysis for Pu^{238} at the 222-S Laboratory is complicated by the presence of this isotope in the spike (Pu^{236}) added to the analysis to allow correction for overall yield in the procedure. For most expected samples, Pu^{238} activity will be only a small fraction of the $Pu^{239/240}$ activity and may be approximated using isotopic ratios based on historical irradiated uranium processing.

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These samples were used to determine americium 241 and several other radionuclides because of concern for criticality. Isotopic analysis for uranium was accomplished using Alpha Total/Alpha Energy Analysis.

The sample was run in duplicate except for the isotopic uranium. The precision and accuracy data were within the limits of control. An additive of the isotopic uranium data agrees well with the total uranium results.

For no apparent reason, the spikes were not run for Tritium with this batch of samples.

9/9/92

John H. Tillman, Manager
Inorganic Chemistry PAL

P.O. Box 1970 Richland, WA 99352

242-EVAPORATOR FEED CHARACTERIZATION

INORGANICS CASE NARRATIVE

TANK: 102AW

Metals, anion, inorganic, and radionuclides data review for the 242-A Evaporator Feed Characterization Project Fiscal Year 1991.

Tank: 102AW (referred to as 102AW in the remainder of this report)

These samples appeared aqueous with no visible organic layer. All samples had a light yellow tint and 2291-4-3 (R9411) had solids present. Most check standards were within control limits except for some metals; i.e., aluminum, iron, and sodium. Also some of the radionuclides in the check standards were outside the control limits.

Ion Chromatography (IC) Anions and Conventional Parameters

Customer Sample #	Lab. I.D. #
2291-1-3	R9408
2291-2-3	R9409
2291-3-3	R9410
2291-4-3	R9411

Anions are determined on the undigested samples that are diluted if necessary. IC is used to determine fluoride, chloride, nitrate, nitrite, phosphate, and sulfate anions. All duplicates were within the control limits of 20% relative percent difference (RPD). The results were consistent over all samples analyzed for this batch of samples. The sulfate spike recovery data was biased high due to matrix interferences and the high ion content of the sample. The spike recovery data was bracketed by check standards that were within the limits. Some of the parameters for sample 2291-1-3 (R9408) were run in duplicate as a quality check of the method. The RPD for sulfate, phosphate, nitrate, and nitrite were within the defined control limits.

Duplicate cyanide analyses were run on sample 2291-1-3 (R9408). The RPD for this sample was within the control limit and the spike recovery value was about 95%. The results of the check standards run before and after the sample were 100.5 and 99.1% respectively. The check standards run before and after Total Inorganic Carbon (TIC) and Total Organic Carbon (TOC) indicate good accuracy for these analytes. No exotherm was detected for this batch of

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Hanford Operations and Engineering Contractor for the US Department of Energy

Analyte	Detection Limit (ppm) Required	Actual
Arsenic (As)	5	.005
Cyanide (CN)	.10	.010
Mercury (Hg)	.20	.002
Ammonia (NH4)	500	.100
Hydroxide (OH-)	1700	17.000
Selenium (Se)	1	.005
Total Inorganic Carbon (TIC)	5000	5.000
Total Organic Carbon (TOC)	500	5.500
Fluoride (F)	6000	.090
Nitrate (NO3)	5000	.240
Chloride (Cl)	4000	.040
Nitrite (NO2)	5000	.180
Phosphate (PO4)	10000	.130
Sulfate (SO4)	10000	.130
Aluminum (Al)	50	.075
Barium (Ba)	2	.003
Cadmium (Cd)	1	.004
Chromium (Cr)	5	.004
Iron (Fe)	10	.007
Lead (Pb)	5	.030
Magnesium (Mg)	1	.0001
Manganese (Mn)	2	.001
Silver (Ag)	5	.018
Sodium (Na)	60	.048
Zinc (Zn)	2	.002

Detection limits for the analytes required in the Statement of Work are listed for each set of samples. These instrument detection limits vary according to the analyte and instrument and were generated in accordance with the Request for Special Analysis (RSA), the internal memo, "Recommendations for Tank Farm Waste Analysis" by T. D. Blankenship, dated November 26, 1990, and references the document, "Detection Limit Package, Appendix B" for the 241-U-110 Single Shell Tank Waste Characterization data package, dated August 9, 1991. The detection limit study performed for Core 5 followed recommended EPA protocol.

J. H. Tillman 9/5/92

J. H. Tillman, Manager
Inorganic Chemistry PAL

6.3

Metals (AAS)

Arsenic	As
Selenium	Se
Mercury	Hg

Conventionals (IC)

Fluoride	F
Chloride	Cl
Nitrite	NO2
Nitrate	NO3
Phosphate	PO4
Sulfate	SO4

Conventional (Specified Methods)

Total Organic Carbon	TOC
Total Inorganic Carbon	TIC
Cyanide	CN
Hydroxide	OH
Ph	
Specific Gravity	SpG
Differential Scanning Calorimetry	DSC

The analysis of the samples for Cyanide, Total Ammonia, Total Inorganic Carbon (TIC), Specific Gravity, and Differential Scanning Calorimetry (DSC) were performed using methods traceable to ASTM or EPA. All other analytes were determined based on EPA SW-846 methods or current approved WHC golden rod procedures.

The Quality Objectives and requirements for this work effort were set to achieve the highest quality data. Factors relevant to sample matrix and the applicability of the methods to these complex matrices of samples from the evaporator candidate and feed tanks may have lead to biased results for some analytes of concern. The Quality Objectives were:

1. Matrix Spike and Matrix Spike Duplicate per batch or for no more than 20 samples which ever is less. The calculated Percent Recovery for these analyses to be within 75 to 125% and the Relative Percent Difference (RPD) must not exceed ± 20%.

2. One sample in twenty was to be analyzed in duplicate where specified. The duplicate results must agree with an RPD of ± 20%.

3. A blank must be run for each batch or for every 20 samples.

John H. Tillman 9/5/92

J. H. Tillman, Manager
Inorganic Chemistry PAL

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Plutonium 239/240 Analysis 214
Strontium 90 Analysis 229
Tritium Analysis 232

Sample R9418

Visual Check and Over-the-Top Reading Analysis 236
Total Alpha/Total Beta Analysis 238
Gamma Energy Analysis 243
Uranium Analysis 265
Plutonium 239/240 Analysis 268
Strontium 90 Analysis 283
Tritium Analysis 286

This report consists of pages 1 through 290, and pages 6.1-6.21, 7.1-7.3 and 235.1.

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