Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

222-S Analytical Laboratory

Project: 242-A EVAPORATOR FEED CHARACTERIZATION

Tank: 103AP

Customer Id. Number: 3APR COMP

Report Revision: 0

Date Printed: June 9, 1992

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TABLE OF CONTENTS

Cover Page 1
Table of Contents 2
Signature Page 3
Narrative 4
Detection Limits 5.3
Sampling and Custody Data 7
Sample Data Summary 16
Summary Data Report 17
Undigested Sample Analysis Results 18
Carbon 14 Analysis 20
Gamma Energy Analysis 24
Uranium Analysis 50
Plutonium 239/240 Analysis 52
Americium 241 Analysis 70
Technetium 99 Analysis 88
Iodine 129 Analysis 92
Strontium 89/90 Analysis 109
Selenium 79 Analysis 112
Tritium Analysis 115
Total Alpha/Alpha Energy Analysis 118

This report consists of pages 1 through 122, plus pages 5.1-5.23 and 6.1-6.3.

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S I G N A T U R E P A G E

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

09/05/92
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of Highly Radioactive Samples in Support of Environmental Activities on the Hanford Site" - WHC-SD-CP-QAPP-002, unless superseded by the Statement of Work or Waste Characterization Plan.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. This Data Package has been reviewed by the Laboratory QA Officer or designee.

L. P. Markel
Laboratory Q.A. Officer

9/15/92
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

9-16-92
Date

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NARRATIVE

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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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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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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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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

Detection Limits of Radionuclides

Listed below are the detection limits for indicated radionuclides for sample R949.

Radionuclide	DL uCi/L
C-14	4.5×10^{-4}
Pu-239	7.0×10^{-3}
Am-241	1.1×10^{-2}
Tc-99	4.1×10^{-2}
I-129	5.4×10^{-2}
Sr-90	3.7×10^{-3}
Se-79	5.3×10^{-3}
H-3	3.2×10^{-3}
Total U	6.5×10^{-3} g/L
Co-60	$1.0 \times 10^{+1}$
Cs-134	$9.0 \times 10^{+0}$
Cs-137	$1.2 \times 10^{+1}$
Ce-144	$8.4 \times 10^{+1}$
Eu-154	$2.7 \times 10^{+1}$
Eu-155	$1.9 \times 10^{+1}$
Nb-94	$8.0 \times 10^{+0}$
Ra-226*	$2.3 \times 10^{+1}$
Ru-106	$1.3 \times 10^{+2}$
Sn-113	$9.0 \times 10^{+0}$

*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 sample. 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 sample. 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.

9 3 1 2 3 3 5 5 3 4

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242-EVAPORATOR FEED CHARACTERIZATION

INORGANICS CASE NARRATIVE

TANK: 103AP

Problems encountered:

A Non-Conformance Report (NCR) was generated for three samples from Tank 103AP. The samples involved were 3AP891-1, 3AP891-2 and 3AP891-3. Sample 3AP891-1 and 3AP891-2 were received into the laboratory with the custody seal improperly attached. The client reviewed these sample containers and granted permission to proceed with the analysis for 3AP891-1 and 3AP891-2 because the custody seals were over the locking pin, indicating sample integrity was preserved. Sample 3AP891-3 was resampled and replaced by Sample 3AP1191-1. This sample was analyzed for the parameters stated. Please reference NCR #B06110, dated September 19, 1991. In addition, the custody seal for Sample 3AP891-1 (R933) was not on properly. This sample was approved for analysis after consideration and review by the client.

<u>3APRCOMP (R949)</u>

A spike was not run for Tritium in this sample for no apparent reason.

Method LA-220-102 was approved according to the SOW but method LA-220-101 was used for the analysis of samples for Sr 90. Method LA-220-101 is specific to liquid samples and was applicable to the samples within this project. Method LA-220-102 is specific to Sr 90 analysis of solid samples. Both methods should have been identified and approved for use in the analysis of these samples.

No spike was run for TC 99 for this sample. The data on the back of the card for Sr 90 analysis is the raw data taken from the instrument printout.

<u>Gamma Energy Analysis</u>

Except for Cs 137, Cs 134 and Eu 155, the raw data was not transcribed to the appropriate cards. The results which appear on page 17 are correct and were verified from the raw data.

The Relative Percent Difference (RPD) for Se 79 and C 14 were outside of the control limit of ±25%.

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Alpha Energy Analysis

The Alpha Energy Analysis (AEA) Isotopes and Co 60 were requested, after sample receipt, by the client and analyzed by the laboratory. The results are listed on page 17.

John H. Tillman 9/15/92

John Tillman, Manager
Inorganic Chemistry PAL

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Internal
Memo

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

16500-90-090

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 S0-61
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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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.

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.

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

9312233.0

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

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

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.

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 caltulated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

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)

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

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.

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

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 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 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

Westinghouse Hanford Company — **Internal Memo**

From: Office of Sample Management — 28600-91-121
Phone: 3-4369 MO-346/200W T6-08
Date: September 10, 1991
Subject: SHIPPING ANOMALIES NOTED IN SAMPLES FROM TK-106-AW

To: P. G. Haigh R1-51
D. L. Halgren R1-51

cc: J. D. Briggs T6-14
J. G. Field G2-02
V. V. Johansen T6-20
J. H. Kessner T6-08
R. J. Smith G2-02
W. A. McCormick G2-02
DYB File/LB

The 222-S Sample Custodian, V. V. Johansen, informed the Office of Sample Management that there have been two problem areas identified with samples from Double Shell Tank 241-AW-106.

The custody seals were one area. Some of the custody seals were placed across the pin on the shipping container (pig), so that the normal torque applied by the crane in lifting the container in and out of the B-Plant truck caused strain on the seals. Also, the custody seals were inscribed in pencil or ballpoint pen. This made the seals hard to read because they are silver colored and shiny. In the future, it is recommended that the seals be placed on the side of the pig, across the seam of the lid. It is also recommended that a "Sharpie" marker be used to write on the custody seals.

The second problem was liquid inside the pig or the plastic bag, outside of the bottle of liquid waste. It appeared that the sample bottles were intact, with tight lids, and that no liquid had leaked from them. There was also an instance of a sandy substance mixed in with the liquid that had smearable radioactive contamination over 10,000 disintegrations per minute. This problem poses a contamination hazard to 222-S Laboratory staff and is an As Low As Reasonably Achievable concern.

The Tank Farms procedure for sampling and shipping, "Sample Non-Aging Waste Storage Tanks," (TO-080-030) and the Safety Analysis Report for Packaging, "N-55 Overpack," (WHC-SD-RE-SAP-015) were scrutinized for possible procedure violations. Though none were found, this matter needs to be addressed to prevent another occurrence.

If you have any questions or need additional information, please contact me on 3-4369.

Deborah Y. Bisenius 9/5/92
Deborah Y. Bisenius, Technical Representative
Office of Sample Management

tjn

Westinghouse Hanford Company — **Internal Memo**

From: Office of Sample Management
Phone: 3-4369
Date: September 9, 1991
Subject: SHIPPING ANOMALIES NOTED IN SAMPLES FROM TK-106-AW

To: P. G. Haigh R1-51
D. L. Halgren R1-51

cc: J. D. Briggs T6-14
J. G. Field G2-02
V. V. Johansen T6-20
J. H. Kessner T6-08
R. J. Smith G2-02
W. A. McCormick G2-02

The 222-S Sample Custodian, V. V. Johansen, informed the Office of Sample Management(OSM) that there have been two problem areas identified with samples from Double Shell Tank 241-AW-106.

The custody seals were one area. Some of the custody seals were placed across the pin on the shipping container (pig), so that the normal torque applied by the crane in lifting the container in and out of the B-Plant truck caused strain on the seals. Also, the custody seals were inscribed in pencil or ballpoint pen. This made the seals hard to read because they are silver colored and shiny. In future, it is recommended that the seals be placed on the side of the pig, across the seam of the lid. It is also recommended that a "Sharpie" marker be used to write on the custody seals.

The second problem was liquid inside the shipping container (pig) or the plastic bag, outside of the bottle of liquid waste. It appeared that the sample bottles were intact, with tight lids, and that no liquid had leaked from them. There was also an instance of a sandy substance mixed in with the liquid that had smearable radioactive contamination over 10,000 DPM. This problem poses a contamination hazard to 222-S Laboratory staff and is an ALARA concern.

The Tank Farms procedure for sampling and shipping, "Sample Non-Aging Waste Storage Tanks,"(TO-080-030) and the Safety Analysis Report for Packaging(SARP), "N-55 Overpack,"(WHC-SD-RE-SAP-015) were scrutinized for possible procedure violations. Though none were found, this matter needs to be addressed to prevent another occurrence.

John H. Tillery for Deborah Bisenius 9/4/91

Deborah Y. Bisenius
Technical Representative
Office of Sample Management

tjn

5.22

[22] From: Vida V Johansen at -WHC32 9/4/91 8:13AM (1088 bytes: 15 ln)
To: Paul G Haigh at -WHC216, Deborah Y Bisenius at -WHC169
Receipt Requested
Subject: 106-AW Tank samples

---------- Message Contents ----------

Two of the 106-AW samples we received on 8/01/91 and 8/02/91 were found to have liquid in their shipping container (Pig). The second sample had moisture inside the plastic bag. There was sand(?) mixed in with the liquid and when smeared by the HPT the mixture was found to be over 10,000 DPM. The lids were on tight and the bottles were intact.

The sample numbers are: 6AW791-7A--R9765
6AW791-7B--R9766
6AW791-8A--R9767

We have discontinued removing these samples from their shipping containers until we hear from you. Please contact me at 373-2271 or 373-2435.

Thank you
Vida Johansen
Sample Custodian-222s lab.

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9 3 1 2 3 5 3 3 6 0 5

SINGLE SHELL TANK PROJECT
Analytical Detection Limits
October 12, 1990

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

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

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

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

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

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

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

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

Typical sample dilution was 0.000099g/mL

Fluoride
Detection Limit in solution = 0.09 ppm.

Chloride
Detection Limit in solution = 0.04 ppm.

Nitrate
Detection Limit in solution = 0.24 ppm.

Phosphate
Detection Limit in solution = 0.13 ppm.

Sulfate
Detection Limit in solution = 0.13 ppm.

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

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

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

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

9 3 1 2 3 5 3 5 0 7

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		

SAMPLING AND CUSTODY DATA

9 3 1 2 3 5 3 5 0 9

SAMPLE IN/OUT LOG

DATE	TIME OUT	TIME IN	UNIT #	SAMPLE ID.	TECHNOLOGIST SIGNATURE	PAYROLL NUMBER
12-27-91	07:40	10:00	24	R933, 934	[illegible]	65231
12-27-91	9:40	10:25	40	R888, R889, R890	D.R. [illegible]	6C275
12/27/91	1000	1030	18	R-949	[illegible]	6L559
12/27/91	10:20	14:40	40	R954 – R955	Sue Li	6C916
12-27-91	1600	1630	40 37	R954, R955 R717	Jerry M. Kunkel	80518
12-27-91	1630	1830	11 17	R794 R9742, 9747	Jerry M. Kunkel	80518
12-27-91	2235	2240	25	B 6414	[illegible]	82018
12-28-91	1635	2100	11	B 801, 2, 3, 4, 5, 7, 8, 9	[illegible]	82020
12-29-91 ~~12-28-91~~	1615	1630	5	R 902, ~~903, 904, 906~~ J.K.	Jerry M. Kunkel	80518
12-29-91	1930	1950	18	R 941 – 945	[illegible]	81808
12-29-91	1830	2315		R1002, 1003, 1004, 1005, 1006, 1007	Jerry M. Kunkel	80518
12/30/91	0800	0820	18	R-949	[illegible]	6L559
12/30/91	0815	11:15	5	C 9605	[illegible]	81805
12/30/91	08:30	15:30	40	R 954 – 955	Sue Li	6C916
12-30-91	11:00	15:30	5	R 1179	A. Lee	82580
12-30-91	11:00	15:30	15	R 949	A. Lee	82580
			~~45~~ 8-18-92	~~R 997, 997, 998, 999, 996~~		
12-30-91	1343	[illegible]	40	R811 – R815	D. Hammitt	6C560
12-30-91	1350	1430	shelf	R1004 – 1007	[illegible] Cobb	82583
12-30-91	1400	1525	shelf	R994 – 8	[illegible]	67768
12-30-91	1630	2245	shelf	R994 – 999	Jerry M. Kunkel	80518
12-30-91	1600	1700	18	R-949	[illegible]	82020
12-31-91	0830	1430	shelf	R902 FRIG 3-5, 5	[illegible]	6C823
12-31-91	0830	@930	shelf	R993 → 1007	[illegible]	6C823
12-31-91	08:20	10:50	24	R933 – R934	Sue Li	6C916
12-31-91	08:40	13:30	44	T199 – T201	Sue Li	6C916
12-31-91	10:10	11:00	29	S676	David R. [illegible]	6C275
12-31-91	10:10	11:00	25	B6126, 6159, 6219, 6233	David R. [illegible]	6C275
12 31 91	17:30	~~[illegible]~~ 8-18-92				
1/2/92	0800	0830	Re [illegible]	R-959-60, 61	[illegible]	6L559
1/2/92	0800	0825	18	R949	[illegible]	81805

SAMPLE IN/OUT LOG

DATE	TIME OUT	TIME IN	UNIT #	SAMPLE ID.	TECHNOLOGIST SIGNATURE	PAYROLL NUMBER
1-6-91	0800	11:20	18	R941-945	[illegible]	65731
1-6-91	0800	1430	25	B 6481	Sandra Lefford	82372
1-6-91	0800	1400	Cold	R994-999	Mary Tracy	6C269
1-6-92	0800	1030	5	R-902-906	Ed Cobb	80028
1/6/92	0850	1300	24 & 18	R933 → 937	[illegible]	81805
1/6/92	10:00	11:00	20	R551	Sue Lai	6C916
1/6/92	11:46	12:00	18	R941-945	[illegible]	6C275
1/6/92	1415	1450	18	R949	S A Carlon	64965
01-06-92	1630	1700	5	R960,961	S L Cobb	82583
01-06-92	1830	20:30	5	R1015	S L Cobb	82583
1-6-92	2000	20:10	25	B 6481	Valerie L Massie	82016
01-06-92	18:00	22:45	FRIDGE 5	R-959-967	[illegible]	82580
01-07-92	0100	0415	FRIDGE #2	R-941-5	[illegible]	82577
1-7-92	0820	1030	49	R-929	J. B. Kunkler	60368
1-7-92	0830	1430	24 & 48	R933 → R937	[illegible]	81805
1-7-92	1030	1400	40	54.-786 & 55 651	J. B. Kunkler	60368
1-7-92	14:30	14:50	20	R551	Sue Lai	6C916
1-8-92	0008	0032	18	R919	[illegible]	81808
1-8-92	0015	0030	7	R 783	Jerry M. Kunkel	80518
1-8-92	0015	0030	28	T8526, T8579	Jerry M. Kunkel	80518
1-8-92	0015	0030	Refrig 5	R 1015	Jerry M. Kunkel	80518
1-8-92	0030	0230	18	R-941	Jeff Sollrack	81020
1-8-92	0730	0930	5	R-1021	Ed Cobb	80027
1-8-92	0730	1030	5	R959,60,61	[illegible]	65731
1-8-92	0830	0900	24/48	R933 → 37	Lulama Luyen	6C823
1-8-92	0845	0850	18	R-949	[illegible]	81805
1-8-92	0900	11:00	24/18	R933 → 37	Sue Lai	6C916
1-8-92	0900	0915	48	R941 → 47	Lulama Luyen	6C823
1-8-92	1100	1210	18	R943 → 44	Lulama Luyen	6C823
~~1-8-92~~	~~0900~~	~~11:00~~	~~24/18~~	~~R933 → 937~~	[illegible]	
1-8-92	1315	1510	40	786-651	J. B. Kunkler	60368

COPY

SAMPLE IN/OUT LOG

DATE	TIME OUT	TIME IN	UNIT #	SAMPLE ID.	TECHNOLOGIST SIGNATURE	PAYROLL NUMBER
1-2-92	08:10	11:00	H 44	J213~ J215	Sue Lee	6C916
1-2-92	08:15	1415	Frig 5	R904-906 R965-7 9167	Juleen Luger	6C823
1-2-92	0840	1415	"	R959-7961	Juleen Luger	6C823
~~1-2-92~~	~~08:45~~ JL 8-18-92			~~R994 — R999~~		
1-2-92	08:45	15:00	shelf	R994~ R999	Sue Lee	6C916
1-2-92	10:55	11:05	shelf	S-988	Sandra Lilford	82372
1-2-92	13:30	15:05	shelf	U4562 U4553	Teresa L Frazier	67768
1-2-92	1330	1505	shelf	B1002-7	Teresa L Frazier	67768
1-2-92	13:30	15:05	25	B6499, B6408	Teresa L Frazier	67768
1-3-92	0745	0900	Frig 5	R902 thru 906 959 thru 961 963 - 967	Juleen Luger	6C823
1-3-92	0744	0830	COLD	R-1010-1012	Ed Cobb	80028
1-3-92	0800	0830	18	R949	S L Cobb	64965
1-3-96	0900	1500	Frig 5	R959-7 61	Juleen Luger	6C823
1-3-96	0915	0940	14	R951	Juleen Luger	6C823
1-3-92	15:30	22:10	Frig 5	R 961, 863, 870, 857	A. Lee	82580
01-03-92	1800	1815	18	R949	S L Cobb	82583
1-3-92	18 30	22:10	18	R 949	A. LEE	82580
1-4-92	0010	0030	18	R949	Jerry M Kunkel	80518
1-4-92	0030	0615	Shelf	R994-999	Jerry M. Kunkel	80518
1-4-92	0030	0130	19	R941-945	[illegible]	81808
1-4-92	0245	0310	18	R 949	[illegible]	82020
1-4-92	1800	1830	18	R949	S L Cobb	82583
01-04-92	1930	2045	24	R935, 936, 937	S L Cobb	82583
01-04-92	1930	2045	18	R934	S L Cobb	82583
1-5-92	0015	0645	Refrig 5	R 902-906	Jerry M. Kunkel	80518
1-05-92	0020	0125	REFRIG 5	R965-967	[illegible]	82577
01-05-92	0035	0335	35	S-213, 14, 15	[illegible]	82020
1-5-92	16:30	18:40	Refrig #5	R959	Valerie L Massie	82016
1-5-92	18:40	19:15	Refrig #5	R-960, 961	Valerie L Massie	82016
1-6-92	0012	0020	REFRIG #5	R 1015	[illegible]	82577
1-6-92	~~0021~~ 0215 JL 8-18-92	0600	Refrig 5	R965-967	Jerry M. Kunkel	80518

REQUEST FOR SPECIAL ANALYSIS (RSA)

(1) Sample Point	(2) Date/Time Issued	(3) Date/Time Required	(4) Change Code
D-A 54 Set No. 2		11-26-91	(5) Work Package: 1N1A16ØLØ1

(6) Number of Samples	Dose Rate mRad/Hr	(7) Customer I.D.	(8) Laboratory I.D.	(9) Requester Name/Phone
10		3AP891-1 3AP891-8 3AP891-2 3AP891-9 ~~3AP891-3~~ 3AP891-10 3AP891-4 3AP891-5 3AP891-6 3AP891-7	3AP COMP 949	P. G. Haigh 3-4653

(10) Release: 3AP1191-1 — RPT

(11) Volume of Sample: 100 mL

(12) Determination	(13) Expected Range	(14) Minimum Detection Level	(15) Method
Eu-154/155		3.2 E-2 µCi/sample	
Sn-113		1.5 E-2 µCi/sample	
Ru-106		5.0 E-2 µCi/L	
C-14		5 E-4 µCi/L	
Co-60		4 E-3 µCi/L	
Se-79		5 E-4 µCi/L	
Nb-94		9.8 E+1 µCi/L	
Tc-99		2.5 E-3 µCi/L	
Ce-144		8.5 E+2 µCi/L	
Cm-243/244		1 E-3 µCi/L	
Ra-226		3.3 E+1 µCi/L	

(16) Matrix (Other Metals or Anions Present)
Liquid mixed waste. Radioactive contamination: natural, activation products and reactor fission products. Possible detectable halogenated and non-halogenated organic compounds. Hydroxide - pH = 12.5 or greater. Anions - sodium salts of nitrate, nitrite, phosphate, carbonate and sulfate. Metals - calcium and potassium salts, lead, chromium, cadium.

(17) Radioactivity Level (Actual ☐ Estimated ☐)

Total Alpha _____ µ Ci/L

Total Beta _____ µ Ci/L

Total Gamma _____ µ Ci/L

(18) Additional Information (Measurement Uncertainty or Other Pertinent Information) ± 25% Precision + Accuracy

(19) Estimated Cost

(20) Samples Received: By | From | Date | Time

Laboratory Manager

(21) Distribution of Final Results/Sample Disposal Instructions
Minimum storage time - until April 1992. Customer will direct OSM re: sample disposal

REQUEST FOR SPECIAL ANALYSIS (RSA)

(1) Sample Point: FD-A 54 Set No. 2	(2) Date/Time Issued:	(3) Date/Time Required: 11/26/91	(4) Charge Code:
			(5) Work Package: 1N1A16ØLØ1
(6) Number of Samples: 10 — Dose Rate mRad/Hr	(7) Customer I.D.: 3AP891-1, 3AP891-2, ~~3AP891-3~~, 3AP891-4, 3AP891-5, 3AP891-6, 3AP891-7, 3AP891-8, 3AP891-9, 3AP891-10	(8) Laboratory I.D.:	(9) Requester Name/Phone: P.G. Haigh 3-4655
(10) Release: RPT — 3AP1191-1 gh 8-18-92			(11) Volume of Sample: 100 mL

(12) Determination	(13) Expected Range	(14) Minimum Detection Level	(15) Method
Selenium (Se)		1mg/L	
Arsenic (As)		5 mg/L	
Mercury (Hg)		0.2mg/L	
Differential Scanning Calorimetry (DSC)		Exotherm	
Specific Gravity		1.0 mg/L	
Tritium (H-3)		1.5E-3 µCi/L	
Total Uranium		100mg/L	105AP/C
Sr-90		1.5E-3 µCi/L	3AP60MP
Am-241		1E-3 µCi/L	3AP60MP
Pu-239/240		0.5E-3 µCi/L	
I-129		9E-3 µCi/L	
Cs-134/137		5E-3 µCi/L	

(16) Matrix (Other Metals or Anions Present)
Liquid mixed waste. Radioactive contamination: natural, activation products and reactor fission products. Possible detectable halogenated and non-halogenated organic compounds. Hydroxide - pH = 12.5 or greater. Anions - sodium salts of nitrate, nitrite, phosphate, carbonate and sulfate. Metals - calcium and potassium salts, lead, chromium, cadmium.

(17) Radioactivity Level (Actual ☐ Estimated ☐)
Total Alpha _____ µ Ci/L
Total Beta _____ µ Ci/L
Total Gamma _____ µ Ci/L

(18) Additional Information (Measurement Uncertainty or Other Pertinent Information) ± 25% Precision + Accuracy

(19) Authorized Cost: | By: | From: | Date: | Time:

(20) Samples Received

Laboratory Manager:

(21) Distribution of Final Results/Sample Disposal Instructions
Minimum storage time - until April, 1992. Customer will direct OSM re: sample disposal

REQUEST FOR SPECIAL ANALYSIS (RSA)

(1) Sample Point	(2) Date/Time Issued	(3) Date/Time Required	(4) Charge Code
FD-A 54 Set No. 2		11/26/91	

(5) Work Package: IN1A16ØLØ1

(6) Number of Samples: 10

Dose Rate mRad/Hr

(7) Customer I.D.: 3AP891-1, 3AP891-2, ~~3AP891-3~~ 3AP1191-1, 3AP891-4, 3AP891-5, 3AP891-6, 3AP891-7, 3AP891-8, 3AP891-9, 3AP891-10

(8) Laboratory I.D.:

(9) Requester Name/Phone: P.G. Haigh 3-4655

(10) Release: _____ RPT

(11) Volume of Sample: 100 mL

(12) Determination	(13) Expected Range	(14) Minimum Detection Level	(15) Method
Selenium (Se)		1 mg/L	
Arsenic (As)		5 mg/L	
Mercury (Hg)		0.2 mg/L	
Differential Scanning Calorimetry (DSC)		Exotherm	
Specific Gravity		1.0 mg/L	
Tritium (H-3)		1.5E-3 µCi/L	
Total Uranium		100 mg/L	103 AP
Sr-90		1.5E-3 µCi/L	3APR Comp
Am-241		1E-3 µCi/L	R949
Pu-239/240		0.5E-3 µCi/L	
I-129		9E-3 µCi/L	
Cs-134/137		5E-3 µCi/L	

(16) Matrix (Other Metals or Anions Present)
Liquid mixed waste. Radioactive contamination: natural, activation products and reactor fission products. Possible detectable halogenated and non-halogenated organic compounds. Hydroxide - pH = 12.5 or greater. Anions - sodium salts of nitrate, nitrite, phosphate, carbonate and sulfate. Metals - calcium and potassium salts, lead, chromium, cadmium.

(17) Radioactivity Level (Actual ☐ Estimated ☐)
Total Alpha _____ µ Ci/L
Total Beta _____ µ Ci/L
Total Gamma _____ µ Ci/L

(18) Additional Information (Measurement Uncertainty or Other Pertinent Information) ± 25% Precision + Accuracy

(19) Estimated Cost

(20) Samples Received

By	From	Date	Time

Laboratory Manager

(21) Distribution of Final Results/Sample Disposal Instructions
Minimum storage time - until April, 1992, Customer will direct OSM re: sample disposal

BC-6700-181 (1/87)

REQUEST FOR SPECIAL ANALYSIS (RSA)

(1) Sample Point CD-A54 Set No. 2	(2) Date/Time Issued	(3) Date/Time Required 11-26-91	(4) Charge Code (5) Work Package 1N1A16ØLØ1
(6) Number of Samples 10 Dose Rate mRad/Hr 8-18-92 3AP1191-1	(7) Customer I.D. 3AP891-1 3AP891-8 3AP891-2 3AP891-9 ~~3AP891-3~~ 3AP891-10 3AP891-4 3AP891-5 3AP891-6 3AP891-7	(8) Laboratory I.D.	(9) Requester Name/Phone P.G. Haigh 3-4655
(10) Release RPT			(11) Volume of Sample 100 mL

(12) Determination	(13) Expected Range	(14) Minimum Detection Level	(15) Method
Silver (Ag)		5 mg/L	
Aluminum (AL)		50 mg/L	
Barium (Ba)		2 mg/L	
Cadmium (Cd)		1 mg/L	
Chromium (Cr)		5 mg/L	
Iron (Fe)		10 mg/L	
Magnesium (Mg)		1 mg/L	
Manganese (Mn)		2 mg/L	
Sodium (Na)		60 mg/L	
Lead (Pb)		5 mg/L	
Zinc (Zn)		2 mg/L	
Total Inorganic Carbon		5000 mg/L	

(16) Matrix (Other Metals or Anions Present)
Liquid mixed waste. Radioactive contamination; natural, activation products and reactor fission products. Possible detectable halogenated and non-halogenated organic compounds. Hydroxide - pH = 12.5 or greater. Anions - sodium salts of nitrate, nitrite, phosphate, carbonate and sulfate. Metals - calcium and potassium salts, lead, chromium, cadmium.

(17) Radioactivity Level (Actual ☐ Estimated ☐)
Total Alpha _____ µ Ci/L
Total Beta _____ µ Ci/L
Total Gamma _____ µ Ci/L

(18) Additional Information (Measurement Uncertainty or Other Pertinent Information)
±25% Precision + Accuracy

(20) Samples Received
From

(21) Distribution of Final Results/Sample Disposal Instructions
Minimum storage time - until April, 1992. Customer will direct OSM re: sample

REQUEST FOR SPECIAL ANALYSIS (RSA)

(1) Sample Point	(2) Date/Time Issued	(3) Date/Time Required	(4) Charge Code
FD-A54 Set No.2		11-26-91	(5) Work Package: IN/A16ØLØ1

(6) Number of Samples	Dose Rate mRad/Hr	(7) Customer I.D.	(8) Laboratory I.D.	(9) Requester Name/Phone
10		3AP891H, 3AP891-2, ~~3AP891-3~~, 3AP891-4, 3AP891-5, 3AP891-6, 3AP891-7, 3AP891-8, 3AP891-9, 3AP891-10		P.G. Haigh 3-4655

(10) Release	(11) Volume of Sample
RPT	100 mL

(12) Determination	(13) Expected Range	(14) Minimum Detection Level	(15) Method
Total Ammonia		500 mg/L	3AP891-1-R933
Fluoride by IC		6,000 mg/L	3AP891-2-R934
Chloride by IC		4,000 mg/L	3AP891-3-R935
Nitrite by IC		5000 mg/L	3AP891-4-R936
Nitrate by IC		5000 mg/L	3AP891-5-R937
Phosphate by IC		10,000 mg/L	3AP891-6-R938
Sulfate by IC		10,000 mg/L	3AP891-7-R939
Hydroxide		0.1 M	3AP891-8-R940
Total Organic Carbon		500 mg/L	3AP891-9-R941
Volatile Organic Analysis		Exhibit C, CLP-SOW Organics 3/90	3AP891-10-R942
Semi-Volatile (A/B/N)		Exhibit C, CLP-SOW Organics 3/90	
Cyanide (CN-)		0.01 mg/L	

(16) Matrix (Other Metals or Anions Present)
Liquid mixed waste. Radioactive contamination: natural, activation product and reactor fission products. Possible detectable halogenated and non-halogenated organic compounds. Hydroxide - pH = 12.5 or greater. Anions - sodium salts of nitrate, nitrite, phosphate, carbonate and sulfate. Metals - calcium and potassium salts, lead, chromium, cadmium.

(17) Radioactivity Level (Actual ☐ Estimated ☐)

Total Alpha _____ µ Ci/L

Total Beta _____ µ Ci/L

Total Gamma _____ µ Ci/L

(18) Additional Information (Measurement Uncertainty or Other Pertinent Information) ± 25% Precision & Accuracy

(19) Submitted Known

(20) Samples Received

From	Date	Time

(21) Distribution of Final Results/Sample Disposal Instructions
Minimum storage time - until April 1992. Customer will direct OSM re: sample

SAMPLE DATA SUMMARY

9 3 1 2 3 3 3 5 1 3

SUMMARY DATA REPORT

Project: 242-A EVAPORATOR FEED CHARACTERIZATION
Tank: 103AP
Customer ID: 3APR COMP

Undigested Sample Results

		Sample R949		Sample Duplicate R949	
GEA	(01-08-92)				
Cs 137		6.03E+3	uCi/L	5.99E+3	uCi/L
Cs 134		<9.15E+0	uCi/L	<9.89E+0	uCi/L
Eu 154		<2.48E+1	uCi/L	<2.71E+1	uCi/L
Eu 155		<2.52E+1	uCi/L	<2.55E+1	uCi/L
Sn 113		<1.76E+1	uCi/L	<1.76E+1	uCi/L
RuRh 106		<1.89E+2	uCi/L	<1.95E+2	uCi/L
Co 60		<9.60E+0	uCi/L	<9.32E+0	uCi/L
Nb 95		<7.84E+0	uCi/L	<8.25E+0	uCi/L
CePr 144		<9.67E+1	uCi/L	<9.46E+1	uCi/L
Ra 226		<2.47E+2	uCi/L	<2.41E+2	uCi/L
Pu 239/240	(01-04-92)	<6.97E-3	uCi/L	<6.97E-3	uCi/L
Am 241	(12-27-91)	<1.14E-2	uCi/L	<1.13E-2	uCi/L
Tc 99	(12-30-91)	1.12E+0	uCi/L	1.04E+0	uCi/L
I 129	(01-08-92)	<3.03E-2	uCi/L	<3.34E-2	uCi/L
Sr 90	(01-03-92)	2.62E+0	uCi/L	2.62E+0	uCi/L
Se 79	(01-07-92)	1.32E-2	uCi/L	9.10E-3	uCi/L
H3	(01-04-92)	5.23E+0	uCi/L	5.25E+0	uCi/L
C 14	(01-03-92)	6.33E-3	uCi/L	2.61E-3	uCi/L
U	(01-08-92)	3.90E-3	g/L	3.48E-3	g/L
U 234	(06-04-92)	1.05E-6	g/L	NA	
U 235	(06-04-92)	1.57E-4	g/L	NA	
U 238	(06-04-92)	3.74E-3	g/L	NA	

UNDIGESTED SAMPLE ANALYSIS RESULTS

UNDIGESTED SAMPLE RESULTS

Tank: 103AP
Sample No.: R949
Customer ID: 3APR COMP

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:	R947		R948		R949		R949		R949		R950	
Lab ID: GEA (1-08-92)					R949-5730		R949-5830		R949-5930			
Cs 137	99.5	%	<2.69E-3	uCi/L	6.03E+3	uCi/L	5.99E+3	uCi/L	101	%	105	%
Cs 134	NA		<1.92E-3	uCi/L	<9.15E+0	uCi/L	<9.89E+0	uCi/L	NA		NA	
Eu 154	NA		<5.71E-3	uCi/L	<2.48E+1	uCi/L	<2.71E+1	uCi/L	NA		NA	
Eu 155	NA		<4.03E-3	uCi/L	<2.52E+1	uCi/L	<2.55E+1	uCi/L	NA		NA	
Sn 113	NA		<1.69E-3	uCi/L	<1.76E+1	uCi/L	<1.76E+1	uCi/L	NA		NA	
RuRh 106	NA		<2.52E-2	uCi/L	<1.89E+2	uCi/L	<1.95E+2	uCi/L	NA		NA	
Co 60	94	%	<2.03E-3	uCi/L	<9.60E+0	uCi/L	<9.32E+0	uCi/L	102.1	%	NA	
Nb 95	NA		<1.70E-3	uCi/L	<7.84E+0	uCi/L	<8.25E+0	uCi/L	NA		NA	
CePr 144	NA		<1.55E-2	uCi/L	<9.67E+1	uCi/L	<9.46E+1	uCi/L	NA		NA	
Ra 226	NA		<3.36E-2	uCi/L	<2.47E+2	uCi/L	<2.41E+2	uCi/L	NA		NA	
Lab ID: Plutonium 239/240 (1-04-92)	108.28	%	<6.96E-3	uCi/L	R949-5781 <6.97E-3	uCi/L	R949-5881 <6.97E-3	uCi/L	NA		109.4	%
Lab ID: Americium 241 (12-27-91)	107.8	%	<1.14E-2	uCi/L	R949-5782 <1.14E-2	uCi/L	R949-5882 <1.13E-2	uCi/L	NA		113.8	%
Lab ID: Technetium 99 (12-30-91)	89	%	<4.09E-2	uCi/L	R949-5784 1.12E+0	uCi/L	R949-5884 1.04E+0	uCi/L	NA		87.2	%
Lab ID: Iodine 129 (1-08-92)	122.8	%	<5.43E-2	uCi/L	R949-5785 <3.03E-2	uCi/L	R949-5885 <3.34E-2	uCi/L	NA		106.1	%
Lab ID: Strontium 90	102.5	%	<3.68E-3	uCi/L	R949-5786 2.62E+0	uCi/L	R949-5886 2.62E+0	uCi/L	NA		98	%
Lab ID: Selenium 79 (1-07-92)	NA		<5.32E+3	uCi/L	R949-5789 1.32E-2	uCi/L	R949-5889 9.10E-3	uCi/L	NA		NA	
Lab ID: Tritium (1-04-92)	89.2	%	<3.15E-3	uCi/L	R949-5787 5.23E+0	uCi/L	R949-5887 5.25E+0	uCi/L	NA		93.1	%
Lab ID: Carbon 14 (1-03-92)	94.2	%	<4.50E-4	uCi/L	R949-5788 6.33E-3	uCi/L	R949-5888 2.61E-3	uCi/L	93.6	%	94.7	%
Lab ID: Uranium (1-08-92)	101.1	%	<5.86E-5	g/L	R949-5740 3.90E-3	g/L	R949-5840 3.48E-3	g/L	R949-5940 92.2	%	97.1	%
Uranium 234 (06-04-92)	NA		NA		1.05E-6	g/L	NA		NA		NA	
Uranium 2[illegible] (6-04-92)	NA		NA		1.57E[illegible]	g/L	NA		NA		NA	
Uranium 2[illegible] (6-04-92)	NA		NA		3.74E[illegible]	g/L	NA		NA		NA	

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: CARBON 14	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-348-104/B-0
Technologist: S. CATLOW	Date: 1-03-92
Starting Time: 08:00	Temperature: 24degC
Ending Time: 13:15	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5588	11		
2	REAGENT BLANK	R948-5688	12		
3	SAMPLE 3APR COMP	R949-5788	13		
4	SAM DUP OF 3APR COMP	R949-5888	14		
5	SPIKE OF SAMPLE 3APR COMP	R949-5988	15		
6	FINAL LMCS CHECK STD	R950-5588	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	60B49/1.0 mL			1 mL
SPIKE	60B49/1.0 mL			NA
SAMPLES RERUN				

A-6000-881 (03/92)

CARBON 14 ANALYSIS - UNDIGESTED SAMPLE

1

Sample No	Sample Point	Date	Time Sampled	Priority
K 949.-5588	1306P R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Remarks
C14	LA-348-104	% RECOVERY	N1294W	1

Sample Size: ? 1 mL — RERUN — Customer ID: STD

Remarks, Calculations, Results:
EWP KYOY C14EDTA
STDN 60849 RESULT 1.695 $\frac{376861(1000)(1)}{222000} = 1.698$
STD VAL 1.701 %REC 99.8

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
64965	[signature]		[signature]	
SAC				
Date 1-3-92	Time Completed	Lab Time Mgr	1-6-92 SAC	

2

Sample No	Sample Point	Date	Time Sampled	Priority
K 949.-5688	1306P R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Remarks
C14	LA-348-104	uCI/L	N1294W	1

Sample Size: ? 10 mL — RERUN — Customer ID: BLK

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L
$\frac{2.10(1000)(1)}{2.22000} = 1.4500 \times 10^{-3}$ uCi/L

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
SAC	[signature]			
64965				
Date 1-3-92	Time Completed	Lab Time Mgr	1-6-92 SAC	

3

Sample No	Sample Point	Date	Time Sampled	Priority
K 949.-5788	1306P R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Remarks
C14	LA-348-104	uCI/L	N1294W	1

Sample Size: ? 10 mL — RERUN — Customer ID: 36PKCOMP

Remarks, Calculations, Results:
COUNT AS uCI/L
$\frac{140.58(1000)(.1)}{2.22\times10^6} = 6.33\times10^{-3}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
64965	[signature]			
SAC				
Date 1-3-92	Time Completed	Lab Time Mgr	1-6-92 SAC	

4

Sample No	Sample Point	Date	Time Sampled	Priority
K 949.-5888	1306P R	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Remarks
C14	LA-348-104	uCI/L	N1294W	1

Sample Size: ? 10 ml — RERUN — Customer ID: 36PKCOMP

Remarks, Calculations, Results:
DUPLICATE SAMPLE
COUNT AS uCI/L
$\frac{57.94(1000)(.1)}{2.22\times10^6} = 2.61\times10^{-3}$ uCi/L

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
64965	[signature]			
SAC				
Date 1-3-92	Time Completed	Lab Time Mgr	1-6-92 SAC	

5

Sample No	Sample Point	Date	Time Sampled	Priority
K 949.-5988	1306P R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Remarks
C14	LA-348-104	% RECOVERY	N1294W	0

Sample Size: ? 10 mL — RERUN — Customer ID: 36PKCOMP

Remarks, Calculations, Results:
SAMPLE SPIKED ID R949 $\frac{3386.48(1000)(.1)}{2.22\times10^6} = 1.751\times10^{-3}$
SPIKE ID 60849
SPIKE VOLUME 1 mL
COUNT AS uCI/L
$\frac{1.75\times10^{-3}}{1} - \frac{6.33\times10^{-3}}{1} = \frac{1.687}{1.806} = 93.6\%$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
64965	[signature]			
SAC				
Date 1-3-92	Time Completed	Lab Time Mgr	1-6-92 SAC	

6

Sample No	Sample Point	Date	Time Sampled	Priority
K 950.-5588	1306W R	12-16-91	16:46	25

Determination	Method/Standard	Result Units	Charge Code	Remarks
C14	LA-348-104	% RECOVERY	N1294W	1

Sample Size: ? 1 mL — RERUN — Customer ID: STD

Remarks, Calculations, Results:
EWP KYOY C14EDTA
STDN 60849 RESULT 1.705 $\frac{3790.63(1000)(.1)}{2.22\times10^6} = 1.7075$
STD VAL 1.803 %REC 94.7

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
64965	[signature]		[signature]	
SAC				
Date 1-3-92	Time Completed	Lab Time Mgr	1-6-92 SAC	

[illegible] TIME: [illegible]

[illegible] BKG [illegible]

[illegible] SET UP ON [illegible] DEC 1991 [illegible]

[illegible] FACTOR [illegible]
[illegible] UNITS [illegible]
[illegible] HALF LIFE CORRECTION [illegible]
[illegible] UNKNOWN NORM FACTOR [illegible] BACKGROUND [illegible]
[illegible] QUENCH LIMITS [illegible]

[illegible] DPM [illegible] TIME EL TIME AVG [illegible]

[illegible] 41.30 .04 10.0 [illegible]

[illegible] QUENCH CURVE [illegible]

[illegible]

DAIMOND [illegible] QUENCH CURVE CORRELATION TABLE

[illegible]	H#	MEASURED DPM	CALCULATED DPM	PERCENT DIFF.	[illegible]
	145.0	41.70	41.70	[illegible]	

BACKGROUND QUENCH LIMITS [illegible] HIGH [illegible]
TOTAL QUENCH LIMITS [illegible] HIGH [illegible]

[illegible] DPM [illegible] TIME EL TIME AVG [illegible] NORM [illegible]

[illegible] 1.00 [illegible]
[illegible] DIFF [illegible] DPM [illegible]

[illegible] 10.00 [illegible]
[illegible] DIFF CH1 [illegible] DPM [illegible]

[illegible] 165.00 4.08 10.00 40.00 147.0 0.10 [illegible]
[illegible] DIFF CH1 90.34 [illegible] DPM [illegible]

4 [illegible] 97.60 6.54 10.00 52.79 142.0 1.05 [illegible]
[illegible] DIFF CH1 90.43 1501 DPM [illegible]

22

9 3 1 2 3 3 3 6 2 4

PAGE:

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG HI	RCM%	2P
5	**- 7	1	3548.70	1.06	10.00	64.58	144.0	0.05	**
	ISO1	%EFF	CH1:90.25				ISO1 DPM	:3886.475	
6	**- 8	1	3462.20	1.07	10.00	75.38	144.0	0.04	**
	ISO1	%EFF	CH1:90.25				ISO1 DPM	:3790.626	

BEST AVAILABLE COPY

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: GAMMA ENERGY	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-548-121/D-0
Technologist: L. TEMPLE	Date: 1-08-92
Starting Time: 00:07	Temperature: NA
Ending Time: 00:32	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5530	11		
2	REAGENT BLANK	R948-5630	12		
3	SAMPLE 3APR COMP	R949-5730	13		
4	SAM DUP OF 3APR COMP	R949-5830	14		
5	SPIKE OF SAMPLE 3APR COMP	R949-5930	15		
6	FINAL LMCS CHECK STD	R950-5530	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	48B49/.100 mL			NA
SPIKE	48B49/400 mL			NA
SAMPLES RERUN				

A-6000-881 (03/92)

3743

Sample No	Sample Point	Date	Time Issued	Priority
R 947.-5530	130AP R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	N124W	1

Sample Size: ? .100 l — RERUN — Customer ID: STD

Remarks, Calculations, Results:
COLX STDII 18849
R9014.83E' STD VAL 7.40E'
RESULT % REC 94%
R905 5.92E' STD VAL 5.95E'
RESULT % REC 99.5%

Li 1/10

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
81808	U Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-8-92 — Time Completed: — Lab Unit Mgr: A.K. Smith 01/30/92

3747

Sample No	Sample Point	Date	Time Issued	Priority
R 948.-5630	130AP R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	uCI/L	N124W	1

Sample Size: ? 22 ml H2O — RERUN — Customer ID: BLK

Remarks, Calculations, Results:
COUNT AS uCI/L
LASER PRINTOUT

2.68E-3 uci/l Cs 137
<1.92E-3 uci/l Cs 134
<4.03E-3 uci/l Eu 155

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
81808	D Martinez			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-8-92 — Time Completed: — Lab Unit Mgr: A.K. Smith 01/30/92

3748

Sample No	Sample Point	Date	Time Issued	Priority
R 949.-5730	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	uCI/L	N124W	1

Sample Size: ? .100-10-.500 ml — RERUN — Customer ID: 3APRCOMP

Remarks, Calculations, Results:
COUNT AS uCI/L
LASER PRINTOUT

4.03E3 uci/l Cs 137
<9.15 uci/l Cs 134
<2.52E+1 uci/l Eu 155

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
81808	[illegible]			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-8-92 — Time Completed: — Lab Unit Mgr: A.K. Smith 01/30/92

3749

Sample No	Sample Point	Date	Time Issued	Priority
R 949.-5830	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	uCI/L	N124W	1

Sample Size: ? .100-10-.500 ml — RERUN — Customer ID: 3APRCOMP

Remarks, Calculations, Results:
COUNT AS uCI/L
LASER PRINTOUT

5.99E3 uci/l Cs 137
<9.89 uci/l Cs 134
<4.55E+1 uci/l Eu 155

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
81808	[illegible]			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-8-92 — Time Completed: — Lab Unit Mgr: A.K. Smith 01/30/92

3750

Sample No	Sample Point	Date	Time Issued	Priority
R 949.-5930	130AP R	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	N124W	1

Sample Size: ? .100-10-.500 ml + .400 ml — RERUN — Customer ID: 3APRCOMP

Remarks, Calculations, Results:
SAMPLE SPIKED ID R949
SPIKE ID 18849
SPIKE VOLUME .400 ml

$\left(\frac{1.34 \times 10^4}{202} - \frac{6.03 \times 10^3}{202}\right) 2.5 = 75.1$ uCi/l
Recovery = 101%

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
81808	D Martinez			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-8-92 — Time Completed: — Lab Unit Mgr: A.K. Smith 01/30/92

3744

Sample No	Sample Point	Date	Time Issued	Priority
R 950.-5530	130AP R	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
GEA	LA-548-121	% RECOVERY	N124W	1

Sample Size: ? .100 ml — RERUN — Customer ID: STD

Remarks, Calculations, Results:
COLX STDII 18849
R9017.56E' STD VAL 7.40E'
RESULT % REC 102.1%
R905 5.22E' STD VAL 5.95E'
RESULT % REC 105%

Li 1/10

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
81808	U Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 1-8-92 — Time Completed: — Lab Unit Mgr: A.K. Smith 01/30/92

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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                  *
*                                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

  NBERRA SPECTRAN-F V2.06  SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD              08-JAN-92  03:38:46


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

MCA UNIT NUMBER:    2      /      ADC UNIT NUMBER: 3.0
DETECTOR NUMBER:     3     /      GEOMETRY NUMBER:  42
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 80.0%
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:         VR

SAMPLE DESCRIPTION: R947-3530 130APR
  OMETRY DESCRIPTION:
SAMPLE SIZE:   1.0000E-03 LI        / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON  8-JAN-92 AT 02:48:32

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

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

ENERGY CALIBRATION PERFORMED 23-JUL-91
EFFICIENCY CALIBRATION PERFORMED 31-JUL-89
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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 %	NUCLIDES
1	1126.03	563.27	1.80	212.	147.	32.7	CS-134, EU-152
2	1138.69	569.60	1.24	178.	259.	19.1	CS-134, BI-207
3C	1209.37	604.95	1.40	204.	1486.	7.4	CS-134
4C	1218.58	609.56	1.40	189.	128.	36.1	BI-214A, RU-103
5	1323.30	661.94	1.47	150.	1600.	5.4	CS-137
5B		661.41			81.	28.8	
6C	1591.70	796.17	1.59	137.	1099.	8.3	CS-134
7C	1603.89	802.27	1.59	117.	118.	23.4	CS-134
8	1822.16	911.43	2.02	144.	86.	48.1	AC-228A
8B		910.98			84.	23.3	
9	2346.37	1173.53	1.79	133.	965.	7.4	CO-60
10	2664.80	1332.75	1.89	49.	865.	7.2	CO-60
11	2921.38	1461.02	2.03	19.	597.	8.4	K-40
11B		1460.58			611.	5.5	
12	3528.22	1764.34	1.73	22.	42.	52.1	BI-214C
12B		1764.79			47.	23.0	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 13-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 [illegible]

SAMPLE: R947-5530 130APR
DATA COLLECTED ON 8-JAN-92 AT 02:48:32
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN UCI/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<1.78E+00		LLD<1.78E+00		59.54	
AM-243	LLD<1.52E+00		LLD<1.52E+00		74.67	
BA-133	LLD<2.32E+00		LLD<2.32E+00		356.02	
BA-140	LLD<6.49E+00		LLD<6.49E+00		537.27	
CEPR144	LLD<1.36E+01		LLD<1.36E+01		133.51	
CO-60	5.92E+01	+-4.36E+00	5.92E+01	+-4.36E+00	1332.50	0.25
					1173.24	0.31
CR-51	LLD<1.16E+01		LLD<1.16E+01		320.09	
CS-134	5.78E+01	+-4.88E+00	5.78E+01	+-4.88E+00	795.84	0.33
					604.70	0.25
CS-137	6.93E+01	+-4.29E+00	6.93E+01	+-4.29E+00	661.67	0.29
EU-152	LLD<5.74E+00		LLD<5.74E+00		1408.01	
EU-154	LLD<5.10E+00		LLD<5.10E+00		1274.45	
EU-155	LLD<3.76E+00		LLD<3.76E+00		105.31	
FE-59	LLD<3.80E+00		LLD<3.80E+00		1099.25	
I-131	LLD<1.70E+00		LLD<1.70E+00		364.48	
K-40	LLD<4.71E+01		LLD<4.71E+01		1460.75	
LA-140	LLD<2.10E+00		LLD<2.10E+00		1596.20	
MN-54	LLD<1.76E+00		LLD<1.76E+00		834.83	
NA-22	LLD<1.86E+00		LLD<1.86E+00		1274.53	
NB-95	LLD<1.77E+00		LLD<1.77E+00		765.78	
NP-237	LLD<5.96E+00		LLD<5.96E+00		86.50	
PU-239	LLD<1.32E+04		LLD<1.32E+04		129.30	
PU-241	LLD<4.67E+05		LLD<4.67E+05		148.57	
RA-224	LLD<2.94E+01		LLD<2.94E+01		240.99	
RA-226	LLD<3.11E+01		LLD<3.11E+01		186.10	
RU-103	LLD<1.68E+00		LLD<1.68E+00		497.08	
RU103	LLD<1.77E+00		LLD<1.77E+00		497.08	
RURH106	LLD<2.81E+01		LLD<2.81E+01		621.80	
SB-125	LLD<1.29E+01		LLD<1.29E+01		176.33	
SE-75	LLD<1.90E+00		LLD<1.90E+00		264.66	
SN-113	LLD<2.09E+00		LLD<2.09E+00		391.67	
SR-85	LLD<1.67E+00		LLD<1.67E+00		513.99	
TH-228	LLD<5.53E+01		LLD<5.53E+01		84.37	
U-235	LLD<1.67E+00		LLD<1.67E+00		185.71	
Y-88	LLD<2.23E+00		LLD<2.23E+00		1836.06	
ZN-65	LLD<5.48E+00		LLD<5.48E+00		1115.53	
ZR-95	LLD<2.66E+00		LLD<2.66E+00		756.73	
TOTAL	1.86E+02	+-7.83E+00	1.86E+02	+-7.83E+00		

STANDARD DEVIATION = 0.03

TOAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.26E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.86E+02 (+-7.83E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

28

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1126.03	563.27	147.	32.7	1.85E+01
1138.69	569.60	209.	19.1	3.30E+01
1603.89	802.27	118.	23.4	1.98E+01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.58	609.56	128.	36.1	1.72E+01
1822.16	911.43	86.	46.1	1.60E+01
2921.38	1461.02	597.	8.4	1.63E+02
3528.22	1764.34	42.	52.1	1.34E+01

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 08:58:10

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

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 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 AN1:
ANALYZED BY: 61453

SAMPLE DESCRIPTION: R-948-5630
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 2.2000E-02 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 8-JAN-92 AT 08:08:00

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

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

ENERGY CALIBRATION PERFORMED 23-JUL-91
EFFICIENCY CALIBRATION PERFORMED 31-JUL-89

:22-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 08:58:10

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	1218.50	609.52	1.50	119.	100.	37.5	BI-214A,
1B		609.19			122.	21.0	RU-103
2	1822.37	911.53	1.47	61.	66.	43.3	AC-228A
2B		910.98			84.	23.3	
3	2921.46	1461.06	2.07	21.	573.	8.7	K-40
3B		1460.58			611.	5.5	

:RROR QUOTATION AT 1.96 SIGMA
'EAK CONFIDENCE LEVEL AT 85.0%

3 - ENVIRONMENTAL BACKGROUND PEAK

3ACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
3ACKGROUND DESCRIPTION: BKG
3ACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
3ACKGROUND LIVE TIME: 7000. SECONDS

22-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 08:58:10

AMPLE: R-948-5630
COLLECTED ON 8-JAN-92 AT 08:08:00
D 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

UCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
M-241	LLD<1.81E-03		LLD<1.81E-03		59.54	
M-243	LLD<1.69E-03		LLD<1.69E-03		74.67	
A-133	LLD<2.37E-03		LLD<2.37E-03		356.02	
A-140	LLD<5.55E-03		LLD<5.55E-03		537.27	
EPR144	LLD<1.55E-02		LLD<1.55E-02		133.51	
O-60	LLD<2.03E-03		LLD<2.03E-03		1332.50	
R-51	LLD<1.17E-02		LLD<1.17E-02		320.09	
S-134	LLD<1.92E-03		LLD<1.92E-03		795.84	
S-137	LLD<2.69E-03		LLD<2.69E-03		661.65	
U-152	LLD<1.27E-02		LLD<1.27E-02		1408.01	
U-154	LLD<5.71E-03		LLD<5.71E-03		1274.45	
U-155	LLD<4.03E-03		LLD<4.03E-03		105.31	
E-59	LLD<3.81E-03		LLD<3.81E-03		1099.25	
-131	LLD<1.52E-03		LLD<1.52E-03		364.48	
-40	LLD<6.42E-02		LLD<6.42E-02		1460.75	
A-140	LLD<2.62E-03		LLD<2.62E-03		1596.20	
N 54	LLD<1.54E-03		LLD<1.54E-03		834.83	
	LLD<2.38E-03		LLD<2.38E-03		1274.55	
B-42	LLD<1.70E-03		LLD<1.70E-03		765.78	
P-237	LLD<6.28E-03		LLD<6.28E-03		86.50	
U-239	LLD<1.52E+01		LLD<1.52E+01		129.30	
U-241	LLD<5.30E+02		LLD<5.30E+02		148.57	
A-224	LLD<3.39E-02		LLD<3.39E-02		240.99	
A-226	LLD<3.36E-02		LLD<3.36E-02		186.10	
U-103	LLD<1.52E-03		LLD<1.52E-03		497.08	
U103	LLD<1.60E-03		LLD<1.60E-03		497.08	
URH106	LLD<2.52E-02		LLD<2.52E-02		621.80	
B-125	LLD<1.54E-02		LLD<1.54E-02		176.33	
E-75	LLD<1.91E-03		LLD<1.91E-03		264.66	
N-113	LLD<1.69E-03		LLD<1.69E-03		391.67	
R-85	LLD<1.76E-03		LLD<1.76E-03		513.99	
H-228	LLD<5.66E-02		LLD<5.66E-02		84.37	
-235	LLD<1.85E-03		LLD<1.85E-03		185.71	
-88	LLD<1.79E-03		LLD<1.79E-03		1836.06	
N-65	LLD<5.77E-03		LLD<5.77E-03		1115.55	
R-95	LLD<2.82E-03		LLD<2.82E-03		756.73	
OTAL	0.00E-01	+-0.00E-01	0.00E-01	+-0.00E-01		

RROR QUOTATION AT 1.96 SIGMA
LD CONFIDENCE LEVEL AT 85.0%

LL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

ROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.50	609.52	100.	37.5	3.95E+00
1822.37	911.53	66.	43.3	3.71E+00
2921.46	1461.06	573.	8.7	4.78E+01

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

ANBERRA SPECTRAN-F V2.06  SOFTWARE

22-S COUNTING ROOM WESTINGHOUSE HANFORD          08-JAN-92  10:37:10


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

CA UNIT NUMBER:   2     /     ADC UNIT NUMBER: 3.0
ETECTOR NUMBER:    3    /     GEOMETRY NUMBER:  41
PECTRUM SIZE:  4096 CHANNELS
RDER OF SMOOTHING FUNCTION:     5
UMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
EAK CONFIDENCE FACTOR: 85.0%
DENTIFICATION ENERGY WINDOW: +- 1.50 KEV
RROR QUOTATION: 1.96 SIGMA UNCERTAINTY

NVIRONMENTAL BACKGROUND SUBTRACTED
LD CALCULATION PERFORMED
EASURED ENERGY DIFFERENCES LISTED
ULTIPLET ANALYSIS PERFORMED

PECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
NALYZED BY:        63099

AMPLE DESCRIPTION: R949-5730
EOMETRY DESCRIPTION:
AMPLE SIZE:   1.0000E-03 LI       / CONVERSION FACTOR: 4.9505E-03
TANDARD SIZE: 1.0000E+00 EA
NALYSIS LIBRARY FILE: ANL205

OLLECT STARTED ON  8-JAN-92 AT 09:46:54

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

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

NERGY CALIBRATION PERFORMED 23-JUL-91
FFICIENCY CALIBRATION PERFORMED 31-JUL-89
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22-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 10:37:10

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	1218.87	609.70	1.03	208.	100.	45.7	BI-214A,
1B		609.19			122.	21.0	RU-103
2	1323.37	661.97	1.50	340.	22194.	1.3	CS-137
2B		661.41			81.	28.8	
3	2921.54	1461.10	2.09	23.	591.	8.5	K-40
3B		1460.58			611.	5.5	

RROR QUOTATION AT 1.96 SIGMA
EAK CONFIDENCE LEVEL AT 85.0%

- ENVIRONMENTAL BACKGROUND PEAK

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

:22-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 10:37:10

;AMPLE: R949-5730
COLLECTED ON 8-JAN-92 AT 09:46:54
)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
AM-241	LLD<1.22E+01		LLD<1.22E+01		59.54	
AM-243	LLD<7.96E+00		LLD<7.96E+00		74.67	
BA-133	LLD<1.94E+01		LLD<1.94E+01		356.02	
BA-140	LLD<4.45E+01		LLD<4.45E+01		537.27	
CEPR144	LLD<9.67E+01		LLD<9.67E+01		133.51	
CO-60	LLD<9.60E+00		LLD<9.60E+00		1332.50	
CR-51	LLD<9.47E+01		LLD<9.47E+01		320.09	
CS-134	LLD<9.15E+00		LLD<9.15E+00		795.84	
CS-137	6.03E+03	+-1.17E+02	6.03E+03	+-1.17E+02	661.65	0.32
EU-152	LLD<4.67E+01		LLD<4.67E+01		1408.01	
EU-154	LLD<2.48E+01		LLD<2.48E+01		1274.45	
EU-155	LLD<2.52E+01		LLD<2.52E+01		105.31	
FE-59	LLD<1.43E+01		LLD<1.43E+01		1099.25	
I-131	LLD<1.42E+01		LLD<1.42E+01		364.48	
K-40	LLD<9.81E+01		LLD<9.81E+01		1460.75	
LA-140	LLD<1.32E+01		LLD<1.32E+01		1596.20	
MN-54	LLD<7.94E+00		LLD<7.94E+00		834.83	
[illegible]	LLD<8.04E+00		LLD<8.04E+00		1274.55	
NB-95	LLD<7.84E+00		LLD<7.84E+00		765.78	
NP-237	LLD<3.75E+01		LLD<3.75E+01		86.50	
PU-239	LLD<9.34E+04		LLD<9.34E+04		129.30	
PU-241	LLD<3.38E+06		LLD<3.38E+06		148.57	
RA-224	LLD<2.26E+02		LLD<2.26E+02		240.99	
RA-226	LLD<2.47E+02		LLD<2.47E+02		186.10	
RU-103	LLD<1.45E+01		LLD<1.45E+01		497.08	
RU103	LLD<1.52E+01		LLD<1.52E+01		497.08	
RURH106	LLD<1.89E+02		LLD<1.89E+02		621.80	
SB-125	LLD<1.02E+02		LLD<1.02E+02		176.33	
SE-75	LLD<1.49E+01		LLD<1.49E+01		264.66	
SN-113	LLD<1.76E+01		LLD<1.76E+01		391.67	
SR-85	LLD<1.30E+01		LLD<1.30E+01		513.99	
TH-228	LLD<3.65E+02		LLD<3.65E+02		84.37	
U-235	LLD<1.34E+01		LLD<1.34E+01		185.71	
Y-88	LLD<9.11E+00		LLD<9.11E+00		1836.06	
ZN-65	LLD<2.77E+01		LLD<2.77E+01		1115.55	
ZR-95	LLD<1.44E+01		LLD<1.44E+01		756.73	
TOTAL	6.03E+03	+-1.17E+02	6.03E+03	+-1.17E+02		

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI
TOT'' MEASURED ACTIVITY = 6.03E+03 (+-1.17E+02) UC/LI
% A. 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            *
*                                                                   *
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:ANBERRA SPECTRAN-F V2.06  SOFTWARE

:22-S COUNTING ROOM WESTINGHOUSE HANFORD          08-JAN-92  11:33:36


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

ICA UNIT NUMBER:   2     /     ADC UNIT NUMBER: 3.0
)ETECTOR NUMBER:    3    /     GEOMETRY NUMBER:  41
;PECTRUM SIZE:  4096 CHANNELS
)RDER OF SMOOTHING FUNCTION:     5
IUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
'EAK CONFIDENCE FACTOR: 85.0%
:DENTIFICATION ENERGY WINDOW: +- 1.50 KEV
:RROR QUOTATION: 1.96 SIGMA UNCERTAINTY

:NVIRONMENTAL BACKGROUND SUBTRACTED
.LD CALCULATION PERFORMED
IEASURED ENERGY DIFFERENCES LISTED
IULTIPLET ANALYSIS PERFORMED

;PECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
\N^ ''ZED BY:        63099

;AMPLE DESCRIPTION: R949-5830
;EOMETRY DESCRIPTION:
;AMPLE SIZE:   1.0000E-03 LI       / CONVERSION FACTOR: 4.9505E-03
;TANDARD SIZE: 1.0000E+00 EA
\NALYSIS LIBRARY FILE: ANL205

:OLLECT STARTED ON  8-JAN-92 AT 10:43:23

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

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

:NERGY CALIBRATION PERFORMED 23-JUL-91
:FFICIENCY CALIBRATION PERFORMED 31-JUL-89
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:22-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 11:33:36

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	1218.61	609.58	1.24	231.	97.	50.3	BI-214A,
1B		609.19			122.	21.0	RU-103
2	1323.37	661.97	1.49	320.	22049.	1.3	CS-137
2B		661.41			81.	28.8	
3	1821.97	911.33	1.76	59.	79.	37.4	AC-228A
3B		910.98			84.	23.3	
4	2921.39	1461.02	2.09	23.	576.	8.7	K-40
4B		1460.58			611.	5.5	

:RROR QUOTATION AT 1.96 SIGMA
'EAK CONFIDENCE LEVEL AT 85.0%

3 - ENVIRONMENTAL BACKGROUND PEAK

3ACKGROUND SUBTRACTION PERFORMED USING FILE BK0013
3ACKGROUND DESCRIPTION: BKG
3ACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
3ACKGROUND LIVE TIME: 7000. SECONDS

222-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 11:33:36

SAMPLE: R949-5830
COLLECTED ON 8-JAN-92 AT 10:43:23
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
AM-241	LLD<1.26E+01		LLD<1.26E+01		59.54	
AM-243	LLD<9.41E+00		LLD<9.41E+00		74.67	
BA-133	LLD<1.88E+01		LLD<1.88E+01		356.02	
BA-140	LLD<4.76E+01		LLD<4.76E+01		537.27	
CEPR144	LLD<9.46E+01		LLD<9.46E+01		133.51	
CO-60	LLD<9.32E+00		LLD<9.32E+00		1332.50	
CR-51	LLD<9.56E+01		LLD<9.56E+01		320.09	
CS-134	LLD<9.89E+00		LLD<9.89E+00		795.84	
CS-137	5.99E+03	+-1.17E+02	5.99E+03	+-1.17E+02	661.65	0.32
EU-152	LLD<4.67E+01		LLD<4.67E+01		1408.01	
EU-154	LLD<2.71E+01		LLD<2.71E+01		1274.45	
EU-155	LLD<2.55E+01		LLD<2.55E+01		105.31	
FE-59	LLD<1.72E+01		LLD<1.72E+01		1099.25	
I-131	LLD<1.41E+01		LLD<1.41E+01		364.48	
K-40	LLD<2.85E+02		LLD<2.85E+02		1460.75	
LA-140	LLD<1.12E+01		LLD<1.12E+01		1596.20	
MN-54	LLD<7.45E+00		LLD<7.45E+00		834.83	
[illegible]	LLD<1.04E+01		LLD<1.04E+01		1274.55	
NB-95	LLD<8.25E+00		LLD<8.25E+00		765.78	
NP-237	LLD<3.83E+01		LLD<3.83E+01		86.50	
PU-239	LLD<9.35E+04		LLD<9.35E+04		129.30	
PU-241	LLD<3.25E+06		LLD<3.25E+06		148.57	
RA-224	LLD<2.30E+02		LLD<2.30E+02		240.99	
RA-226	LLD<2.41E+02		LLD<2.41E+02		186.10	
RU-103	LLD<1.44E+01		LLD<1.44E+01		497.08	
RU103	LLD<1.52E+01		LLD<1.52E+01		497.08	
RURH106	LLD<1.95E+02		LLD<1.95E+02		621.80	
SB-125	LLD<1.01E+02		LLD<1.01E+02		176.33	
SE-75	LLD<1.45E+01		LLD<1.45E+01		264.66	
SN-113	LLD<1.76E+01		LLD<1.76E+01		391.67	
SR-85	LLD<1.30E+01		LLD<1.30E+01		513.99	
TH-228	LLD<3.67E+02		LLD<3.67E+02		84.37	
U-235	LLD<1.34E+01		LLD<1.34E+01		185.71	
Y-88	LLD<1.10E+01		LLD<1.10E+01		1836.06	
ZN-65	LLD<2.66E+01		LLD<2.66E+01		1115.55	
ZR-95	LLD<1.29E+01		LLD<1.29E+01		756.73	
TOTAL	5.99E+03	+-1.17E+02	5.99E+03	+-1.17E+02		

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.16E-08 UC/LI
TOTAL MEASURED ACTIVITY = 5.99E+03 (+-1.17E+02) UC/LI
% H. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.61	609.58	97.	50.3	3.81E+00
1821.97	911.33	79.	37.4	4.44E+00
2921.39	1461.02	576.	8.7	4.81E+01

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 12:36:09

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

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 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 AN1:
ANALYZED BY: 61453

SAMPLE DESCRIPTION: R-949-5930
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 4.9505E-03
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 8-JAN-92 AT 11:45:41

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3020. SECONDS
DEAD TIME: 0.66 %

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

ENERGY CALIBRATION PERFORMED 23-JUL-91
EFFICIENCY CALIBRATION PERFORMED 31-JUL-89

222-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 12:36:09

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	1126.50	563.50	1.39	1594.	1732.	7.5	CS-134, EU-152
2C	1138.69	569.60	1.39	1607.	3103.	6.4	CS-134, BI-207
3	1209.48	605.01	1.49	1821.	20060.	1.5	CS-134
4	1323.36	661.97	1.54	1463.	44341.	1.0	CS-137
4B		661.41			81.	28.8	
5C	1591.64	796.15	1.59	993.	13995.	2.2	CS-134
6C	1603.81	802.23	1.59	927.	1306.	11.1	CS-134
7C	2335.95	1168.34	1.83	491.	324.	24.1	CS-134
8C	2346.34	1173.53	1.83	419.	12894.	2.0	CO-60
9	2664.91	1332.81	1.88	214.	11501.	1.9	CO-60
10	2730.68	1365.69	2.01	58.	403.	11.7	CS-134
11	2800.86	1400.77	1.81	50.	207.	17.9	BI-214
12	2921.56	1461.11	2.14	47.	565.	9.2	K-40
12B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

- MULTIPLET ANALYSIS CONVERGED NORMALLY
- ENVIRONMENTAL BACKGROUND PEAK

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

:22-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 12:36:09

;AMPLE: R-949-5930
COLLECTED ON 8-JAN-92 AT 11:45:41
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

IUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
M-241	LLD<2.19E+01		LLD<2.19E+01		59.54	
M-243	LLD<1.46E+01		LLD<1.46E+01		74.67	
A-133	LLD<3.62E+01		LLD<3.62E+01		356.02	
A-140	LLD<1.02E+02		LLD<1.02E+02		537.27	
EPR144	LLD<1.69E+02		LLD<1.69E+02		133.51	
O-60	4.89E+03	+-1.11E+02	4.89E+03	+-1.11E+02	1332.50	0.31
					1173.24	0.30
R-51	LLD<1.84E+02		LLD<1.84E+02		320.09	
S-134	4.49E+03	+-1.17E+02	4.49E+03	+-1.17E+02	795.84	0.30
					604.70	0.31
S-137	1.21E+04	+-2.06E+02	1.21E+04	+-2.06E+02	661.65	0.32
U-152	LLD<1.09E+02		LLD<1.09E+02		1408.01	
U-154	LLD<4.92E+01		LLD<4.92E+01		1274.45	
U-155	LLD<4.35E+01		LLD<4.35E+01		105.31	
E-59	LLD<6.51E+01		LLD<6.51E+01		1099.25	
-131	LLD<2.81E+01		LLD<2.81E+01		364.48	
-40	LLD<2.99E+02		LLD<2.99E+02		1460.75	
)	LLD<1.20E+01		LLD<1.20E+01		1596.20	
N-54	LLD<2.71E+01		LLD<2.71E+01		834.83	
A-22	LLD<1.86E+01		LLD<1.86E+01		1274.55	
B-95	LLD<2.45E+01		LLD<2.45E+01		765.78	
P-237	LLD<6.42E+01		LLD<6.42E+01		86.50	
U-239	LLD<1.62E+05		LLD<1.62E+05		129.30	
U-241	LLD<5.77E+06		LLD<5.77E+06		148.57	
A-224	LLD<4.14E+02		LLD<4.14E+02		240.99	
A-226	LLD<4.38E+02		LLD<4.38E+02		186.10	
U-103	LLD<2.86E+01		LLD<2.86E+01		497.08	
U103	LLD<3.01E+01		LLD<3.01E+01		497.08	
URH106	LLD<4.78E+02		LLD<4.78E+02		621.80	
B-125	LLD<1.80E+02		LLD<1.80E+02		176.33	
E-75	LLD<2.83E+01		LLD<2.83E+01		264.66	
N-113	LLD<3.47E+01		LLD<3.47E+01		391.67	
R-85	LLD<2.52E+01		LLD<2.52E+01		513.99	
H-228	LLD<6.21E+02		LLD<6.21E+02		84.37	
J-235	LLD<2.39E+01		LLD<2.39E+01		185.71	
-88	LLD<1.47E+01		LLD<1.47E+01		1836.06	
N-65	LLD<7.70E+01		LLD<7.70E+01		1115.55	
R-95	LLD<4.26E+01		LLD<4.26E+01		756.73	
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TOTAL	2.14E+04	+-2.62E+02	2.14E+04	+-2.62E+02		

STANDARD DEVIATION = 0.01

E . = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.73E-09 UC/LI
TOTAL MEASURED ACTIVITY = 2.14E+04 (+-2.62E+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
1126.50	563.50	1732.	7.5	6.35E+01
1138.69	569.60	3103.	6.4	1.15E+02
1603.81	802.23	1306.	11.1	6.60E+01
2335.95	1168.34	324.	24.1	2.27E+01
2730.68	1365.69	403.	11.7	3.20E+01
2800.86	1400.77	207.	17.9	1.67E+01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2921.56	1461.11	565.	9.2	4.72E+01

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 08:02:37

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

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 42
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD3744
ANALYZED BY: VR

SAMPLE DESCRIPTION: R950-5530 130APR
GEOMETRY DESCRIPTION:
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 8-JAN-92 AT 03:46:12

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

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

ENERGY CALIBRATION PERFORMED 23-JUL-91
EFFICIENCY CALIBRATION PERFORMED 31-JUL-89

22-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 08:02:37

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	1138.75	569.63	1.23	204.	241.	21.1	CS-134, BI-207
2C	1209.38	604.96	1.46	159.	1540.	6.4	CS-134
3C	1218.60	609.57	1.46	136.	181.	19.3	BI-214A, RU-103
4	1323.39	661.98	1.54	139.	1737.	5.1	CS-137
4B		661.41			81.	28.8	
5C	1591.59	796.12	1.60	120.	1160.	7.7	CS-134
6C	1603.60	802.13	1.60	115.	115.	24.0	CS-134
7	2346.52	1173.62	1.85	110.	966.	7.2	CO-60
8	2664.75	1332.73	1.76	34.	911.	6.8	CO-60
9	2921.46	1461.06	2.15	13.	593.	8.3	K-40
9B		1460.58			611.	5.5	

RROR QUOTATION AT 1.96 SIGMA
EAK CONFIDENCE LEVEL AT 85.0%

- MULTIPLET ANALYSIS CONVERGED NORMALLY
- ENVIRONMENTAL BACKGROUND PEAK

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

22-S COUNTING ROOM WESTINGHOUSE HANFORD 08-JAN-92 08:02:37

AMPLE: R950-5530 130APR
COLLECTED ON 8-JAN-92 AT 03:46:12
D 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

UCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
M-241	LLD<1.81E+00		LLD<1.81E+00		59.54	
M-243	LLD<1.22E+00		LLD<1.22E+00		74.67	
A-133	LLD<2.35E+00		LLD<2.35E+00		356.02	
A-140	LLD<6.42E+00		LLD<6.42E+00		537.27	
EPR144	LLD<1.36E+01		LLD<1.36E+01		133.51	
O-60	6.23E+01	+-4.38E+00	6.23E+01	+-4.38E+00	1332.50	0.23
					1173.24	0.39
R-51	LLD<1.12E+01		LLD<1.12E+01		320.09	
S-134	6.11E+01	+-4.83E+00	6.11E+01	+-4.83E+00	795.84	0.27
					604.70	0.26
S-137	7.56E+01	+-4.43E+00	7.56E+01	+-4.43E+00	661.65	0.33
U-152	LLD<7.30E+00		LLD<7.30E+00		1408.01	
U-154	LLD<4.70E+00		LLD<4.70E+00		1274.45	
U-155	LLD<3.72E+00		LLD<3.72E+00		105.31	
E-59	LLD<4.12E+00		LLD<4.12E+00		1099.25	
-131	LLD<1.70E+00		LLD<1.70E+00		364.48	
-	LLD<1.08E+01		LLD<1.08E+01		1460.75	
	LLD<2.03E+00		LLD<2.03E+00		1596.20	
N-54	LLD<1.76E+00		LLD<1.76E+00		834.83	
A-22	LLD<1.83E+00		LLD<1.83E+00		1274.55	
B-95	LLD<1.76E+00		LLD<1.76E+00		765.78	
P-237	LLD<6.00E+00		LLD<6.00E+00		86.50	
U-239	LLD<1.35E+04		LLD<1.35E+04		129.30	
U-241	LLD<4.48E+05		LLD<4.48E+05		148.57	
A-224	LLD<2.90E+01		LLD<2.90E+01		240.99	
A-226	LLD<3.07E+01		LLD<3.07E+01		186.10	
U-103	LLD<1.65E+00		LLD<1.65E+00		497.08	
U103	LLD<1.73E+00		LLD<1.73E+00		497.08	
URH106	LLD<2.66E+01		LLD<2.66E+01		621.80	
B-125	LLD<1.29E+01		LLD<1.29E+01		176.33	
E-75	LLD<1.89E+00		LLD<1.89E+00		264.66	
N-113	LLD<2.05E+00		LLD<2.05E+00		391.67	
R-85	LLD<1.66E+00		LLD<1.66E+00		513.99	
H-228	LLD<5.70E+01		LLD<5.70E+01		84.37	
-235	LLD<1.70E+00		LLD<1.70E+00		185.71	
-88	LLD<1.69E+00		LLD<1.69E+00		1836.06	
N-65	LLD<5.14E+00		LLD<5.14E+00		1115.55	
R-95	LLD<2.84E+00		LLD<2.84E+00		756.73	
	---		---			
OTAL	1.99E+02	+-7.88E+00	1.99E+02	+-7.88E+00		

STANDARD DEVIATION = 0.06

b... = ***** MEV/DISINTEGRATION
AXIMUM PERMISSABLE ACTIVITY = 1.27E-09 UC/LI
OTAL MEASURED ACTIVITY = 1.99E+02 (+-7.88E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

RROR QUOTATION AT 1.96 SIGMA
LD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

ENTROID HANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1138.75	569.63	241.	21.1	3.07E+01
1218.60	609.57	59.	73.0	7.97E+00
1603.60	802.13	115.	24.0	1.92E+01

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: URANIUM	Sample Prep: UNDIGESTED

Instrument: WB88807	Procedure/Rev: LA-925-106/A-2
Technologist: T. LEE	Date: 1-08-92
Starting Time: NA	Temperature: NA
Ending Time: NA	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5540	11		
2	REAGENT BLANK	R948-5640	12		
3	SAMPLE 3APR COMP	R949-5740	13		
4	SAM DUP OF 3APR COMP	R949-5840	14		
5	SPIKE OF SAMPLE 3APR COMP	R949-5940	15		
6	FINAL LMCS CHECK STD	R950-5540	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	126B38/0.100 mL			NA
SPIKE	90B38/0.100 mL			NA
SAMPLES RERUN.				

A-6000-881 (03/92)

URANIUM BY LASER ANALYSIS - UNDIGESTED SAMPLE

Sample No	Sample Point	Date	Time Issued	Priority
R 947.-5540	130AP R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	% RECOVERY	N124W	2

Sample Size: 2 100 uL - 10 mL - 100 uL
Customer ID: STD

Remarks, Calculations, Results:
S267 UF1C
STDN 126838 RESULT 3.076-2
STD VAL 3.015-2 %REC 101.1
SPIKE ID/VAL 6256-4
SPIKE VOL. 1 mL
RERUN
.14
.42
$\frac{.14(6.256-4)(.1)(1000)}{(\frac{5.7}{5.0})(.42)-.14} = 3.075-2$

Analyst 1: T. LEE
Analyst 2:
Analyst 3:
Analyst 4: Leslie Diaz
Analyst 5:
Hrs: 82580
Date: 01-08-92
Time Completed:
Lab Unit Mgr: 1-8-92 SAPatt

Sample No	Sample Point	Date	Time Issued	Priority
R 948.-5640	130AP R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	G/L	N124W	2

Sample Size: 2 1 mL
Customer ID: MLK

Remarks, Calculations, Results:
REAGENT BLANK
90838/6.25-4 ug/L
RERUN
.0
.25
$\frac{102(6.256-4)(.1)(1)}{(\frac{5.0}{5.0})(.25)-.102} = <5.86\times10^{-5}$

Analyst 1: T. LEE
Analyst 2:
Analyst 3:
Analyst 4: Leslie Diaz
Analyst 5:
Hrs: 82580
Date: 01-08-92
Time Completed:
Lab Unit Mgr: 1-8-92 SAPatt

Sample No	Sample Point	Date	Time Issued	Priority
R 949.-5740	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	G/L	N124W	2

Sample Size: 2 1 mL - 10 mL - 100 uL
Customer ID: 3APRCOMP

Remarks, Calculations, Results:
High/90838/6.25-4 ug/L
.14
.38
$\frac{.14(6.25\times10^{-4})(.1)(110)}{(\frac{5.7}{5.0})(.38)-.14} = 3.90\times10^{-3}$ g/L

Analyst 1: T. LEE
Analyst 2:
Analyst 3:
Analyst 4: Leslie Diaz
Analyst 5:
Hrs: 82580
Date: 01-08-92
Time Completed:
Lab Unit Mgr: 1-8-92 SAPatt

Sample No	Sample Point	Date	Time Issued	Priority
R 949.-5840	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	G/L	N124W	2

Sample Size: 2 1 mL - 10 mL - 100 uL
Customer ID: 3APRCOMP

Remarks, Calculations, Results:
DUPLICATE SAMPLE
High/90838/6.25-4 ug/L
RERUN
.13
.38
$\frac{.13(6.25\times10^{-4})(.1)(110)}{(\frac{5.7}{5.0})(.38)-.13} = 3.48\times10^{-3}$ g/L

Analyst 1: T. LEE
Analyst 2:
Analyst 3:
Analyst 4: Leslie Diaz
Analyst 5:
Hrs: 82580
Date: 01-08-92
Time Completed:
Lab Unit Mgr: 1-8-92 SAPatt

Sample No	Sample Point	Date	Time Issued	Priority
R 949.-5940	130AP R	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	% RECOVERY	N124W	2

Sample Size: 2 250 uL > 10 mL - 100 uL
Customer ID: 3APRCOMP

Remarks, Calculations, Results:
SAMPLE SPIKED ID RW7
SPIKE ID 126838
SPIKE VOLUME 1
90838/6.25-4 ug/L
RERUN
.15
.40
$\frac{.15(6.25\times10^{-4})(.1)(1000)}{(\frac{5.7}{5.0})(.40)-.15} = 1.51\times10^{-2}$
$\left[\frac{1.51\times10^{-2}}{1\times1} - \frac{3.90\times10^{-3}}{1\times1.1}\right]1036 = 2.80\times10^{-2}$ g/L
$\frac{2.80\times10^{-2}}{3.04\times10^{-2}} = 92.2\%$

Analyst 1: T. Lee
Analyst 2:
Analyst 3:
Analyst 4: Leslie Diaz
Analyst 5:
Hrs: 82580
Date: 01-08-92
Time Completed:
Lab Unit Mgr: 1-8-92

Sample No	Sample Point	Date	Time Issued	Priority
R 950.-5540	130AP R	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Results
U	LA-925-106	% RECOVERY	N124W	2

Sample Size: 2 100 - 10 - 100
Customer ID: RR

Remarks, Calculations, Results:
S267 UF1C
STDN 126838 RESULT 2.856-2
STD VAL 3.015-2 %REC 92.1
SPIKE ID/VAL 90838/6.25-4 ug/L
SPIKE VOL. 100 mL
RERUN
.12
.37
$\frac{.12(6.25\times10^{-4})(.1)(1010)}{(\frac{5.7}{5.0})(.37)-.12} = 2.9525-2$

Analyst 1: T. LEE
Analyst 2:
Analyst 3:
Analyst 4: Leslie Diaz
Analyst 5:
Hrs: 82580
Date: 01-08-92
Time Completed:
Lab Unit Mgr: 1-8-92 SAPatt

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: PLUTONIUM 239/240	Sample Prep: UNDIGESTED

Instrument: WB57237	Procedure/Rev: LA-503-156/D-0
Technologist: J. KUNKEL	Date: 1-04-92
Starting Time: 24:00	Temperature: 23degC
Ending Time: NA	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5581	11		
2	REAGENT BLANK	R948-5681	12		
3	SAMPLE 3APR COMP	R949-5781	13		
4	SAM DUP OF 3APR COMP	R949-5881	14		
5	FINAL LMCS CHECK STD	R950-5581	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/.100 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

PLUTONIUM ANALYSIS - UNDIGESTED SAMPLE

3.4 4250

Sample No	Sample Point	Date	Time Issued	Priority
R 947.-5581	130AP R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	% RECOVERY	N124W	1

Sample Size: ? .100-10-100 RERUN — Customer ID: STD

Remarks, Calculations, Results: .050 46843 spike

EDP R211 AR001

STD# 43893 RESULT 9.7576+1

STD VAL. 9.0114+1 %REC 108.28%

Jerry M. Kudel

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
80518	169547	62820		

Date: 1-4-92 — Time Completed: — Lab Unit Mgr: 1-6-92 SACatt

#3 1-4-92 — R 947-5581

1362/5 - 9

Tracer Rec 98.5%

4.1 5195

Sample No	Sample Point	Date	Time Issued	Priority
R 948.-5681	130AP R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	uCI/L	N124W	1

Sample Size: ? 1ml RERUN — Customer ID: BLK

Remarks, Calculations, Results: .050 46893 spike

REAGENT BLANK

COUNT AS uCI/L

$\frac{4.05(290.97)(1)(1000)}{.9901\ (2.22\times10^6)} = 4.96\times10^{-3}$

Jerry M. Kudel

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
80518	169547	62820		

Date: 1-4-92 — Time Completed: — Lab Unit Mgr: 1-6-92 SACatt

#1 1-4-92 — R 948-5681

806/5 - 8

Tracer Rec 97.2

4.2 6223

Sample No	Sample Point	Date	Time Issued	Priority
R 949.-5781	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	uCI/L	N124W	1

Sample Size: ? 1ml RERUN — Customer ID: 3APRCOMP

Remarks, Calculations, Results: .050 46893 spike

COUNT AS uCI/L

$\frac{4.05(290.97)(1000)(1)}{.9901\ (2.22\times10^6)} = 4.97\times10^{-3}$

Jerry M. Kudel

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
80518	169547	62820		

Date: 1-4-92 — Time Completed: — Lab Unit Mgr: 1-6-92 SACatt

#3 1-4-92 — R 949-5781

738/5 - 9

Tracer Rec 89.6%

PLUTONIUM ANALYSIS - UNDIGESTED SAMPLE

4.3 7845

Serial No	Sample Point	Date	Time Issued	Priority
R 949.-5881	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	uCI/L	N124W	1

Sample Size		Customer ID
? 1ml	RERUN	3APRCOMP

Remarks, Calculations, Results

DUPLICATE SAMPLE .050 46843 Spike

COUNT AS uCI/L

$\frac{(.05)(290.92)(1000)(1)}{.9412\ (2.22\times10^6)} = 6.966^{-3}$

Jerry M. Kudel

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
80518	69549			

Date	Time Completed	Lab Unit Mgr
1-4-92		1-6-92

#2 1-4-92 R949-5881

661/5 -11

Tracer Rec 78.4%

4.4 8032

Serial No	Sample Point	Date	Time Issued	Priority
R 950.-5581	130AP R	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
PU239/40	LA-503-156	% RECOVERY	N124W	1

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

Remarks, Calculations, Results

EDP R211 AR001 .050 46843 Spike

STD# 43843 RESULT 98.6

STD VAL. 100.4 %REC 98.4

$\frac{(4031)(290.92)(1000)(100)}{.9412\ (2.22\times10^6)} = 98.6$

Jerry M. Kudel

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
80518	69549			

Date	Time Completed	Lab Unit Mgr
1-4-92		1-6-92

#1 1-4-92 R950-5581

1234/5 -8

Tracer Rec 88.8%

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
R947-5581
File ID: SD4250.SPC

Counted on: 1/ 4/92 @10: 0
Detector/Geometry number: 4/ 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	2234.1	2230.2	363.798	363.798	20.000	8.918	10.000	4.544
2	216.0	218.7	306.670	306.670	20.000	9.083	10.000	4.415
3	260.8	0.0	267.884	267.884	12.000	12.123	6.000	6.102
4	1771.9	1761.3	234.572	234.572	20.000	9.057	10.000	6.186

PEAK RESULTS

Peak	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.5443	5.756	5.761	-0.005	0.04	36.65	252.00	0.114E-03
2	Pu238	0.0545	5.499	5.492	0.007	0.04	3.67	34.36	0.155E-04
	Am241		5.480	5.492	-0.012				0.119E-04
3		0.0000		5.310		0.06	0.00	0.00	0.000E+00
4	Pu239	0.4012	5.143	5.153	-0.010	0.04	27.02	182.07	0.820E-04
	Pu240		5.144	5.153	-0.009				0.820E-04

DETECTOR CALIBRATION

Energy(MEV) = 4.051 + (0.0047)*Channel
Energy range (MeV): 4.051 TO 6.457
Efficiency = 0.1484 CPM/DPM

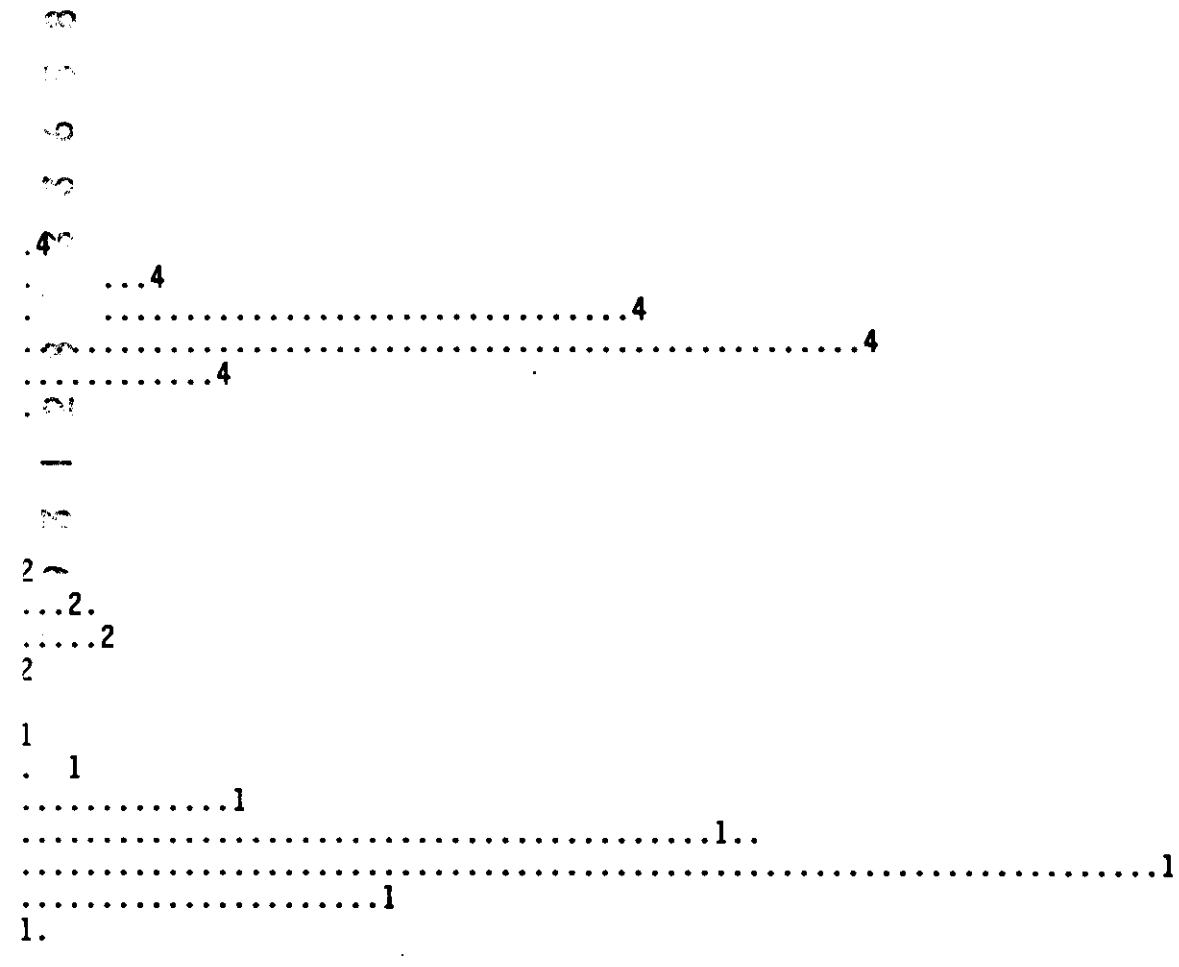
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	33811.0	100.000
Smoothed	33811.0	100.000
Composite fit	33669.7	99.582
Residuals	141.3	0.418

Analyzed by: _____
62820

SPECTRUM SD4250.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,..., ETC 8056.3



Raw Data Dump for AEA Spectrum: SP:SD4250.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
11	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
31	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.
51	0.	1.	1.	0.	0.	0.	1.	0.	1.	1.
61	0.	0.	0.	1.	0.	0.	2.	2.	0.	0.
71	0.	0.	1.	1.	1.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	1.	1.	0.	1.	0.	0.
91	0.	2.	2.	0.	0.	0.	1.	0.	0.	0.
101	1.	0.	1.	0.	0.	1.	0.	0.	0.	0.
111	1.	0.	0.	0.	0.	0.	0.	1.	1.	0.
121	1.	1.	3.	0.	0.	0.	0.	1.	1.	1.
131	3.	1.	3.	0.	0.	1.	0.	0.	1.	0.
141	1.	0.	0.	2.	2.	0.	0.	1.	2.	2.
151	2.	0.	1.	2.	0.	1.	0.	0.	2.	1.
161	1.	0.	0.	1.	0.	3.	1.	1.	2.	0.
171	0.	0.	0.	3.	1.	5.	2.	1.	6.	1.
181	0.	3.	5.	1.	2.	1.	1.	3.	2.	1.
191	5.	7.	5.	7.	6.	3.	12.	6.	5.	6.
201	5.	7.	3.	5.	3.	10.	3.	7.	5.	10.
211	11.	17.	21.	19.	39.	44.	69.	91.	115.	131.
221	172.	195.	250.	295.	393.	461.	560.	638.	712.	837.
231	952.	1064.	1092.	1080.	1058.	863.	798.	520.	355.	277.
241	163.	93.	41.	19.	8.	3.	0.	2.	1.	5.
251	3.	5.	7.	5.	1.	8.	4.	7.	8.	5.
261	7.	6.	10.	5.	12.	9.	8.	10.	9.	9.
271	8.	4.	6.	8.	6.	2.	3.	5.	2.	2.
281	6.	2.	8.	3.	9.	9.	10.	11.	15.	19.
291	18.	25.	34.	40.	35.	51.	59.	70.	75.	81.
301	75.	104.	129.	116.	115.	137.	136.	114.	101.	76.
311	46.	35.	24.	11.	8.	5.	5.	2.	3.	4.
321	7.	4.	5.	12.	6.	12.	14.	10.	5.	9.
331	14.	10.	11.	14.	12.	9.	10.	20.	14.	18.
341	29.	31.	34.	57.	79.	91.	151.	173.	268.	316.
351	430.	512.	567.	604.	664.	705.	748.	829.	1006.	1088.
361	1232.	1312.	1339.	1362.	1212.	1027.	730.	566.	334.	185.
371	111.	42.	24.	1.	6.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	1.	0.	0.	0.	1.	0.	1.	0.	0.
431	1.	1.	0.	0.	0.	0.	0.	0.	1.	0.
441	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.
471	0.	0.	0.	1.	2.	0.	0.	0.	2.	0.
481	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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
R948-5681
File ID: SD5195.SPC

Counted on: 1/ 4/92 @10: 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	Tau Initial	Tau Final
1	3273.9	3338.8	363.050	363.050	20.000	10.242	10.000	4.672
2	133.9	133.1	305.186	305.186	16.000	9.061	8.000	2.679
3	45.5	47.0	266.038	266.038	16.000	6.124	8.000	1.787

PEAK RESULTS

Peak	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
	Pu236	0.9419	5.756	5.768	-0.012	0.05	59.59	274.14	0.123E-03
	Cm243		5.786	5.768	0.018				0.166E-03
2	Pu238	0.0438	5.499	5.502	-0.003	0.04	2.77	17.34	0.781E-05
	Am241		5.480	5.502	-0.022				0.598E-05
3		0.0143		5.322		0.03	0.90	4.08	0.184E-05

DETECTOR CALIBRATION

Energy(MEV) = 4.098 + (0.0046)*Channel
Energy range (MeV): 4.098 TO 6.453
Efficiency = 0.2218 CPM/DPM

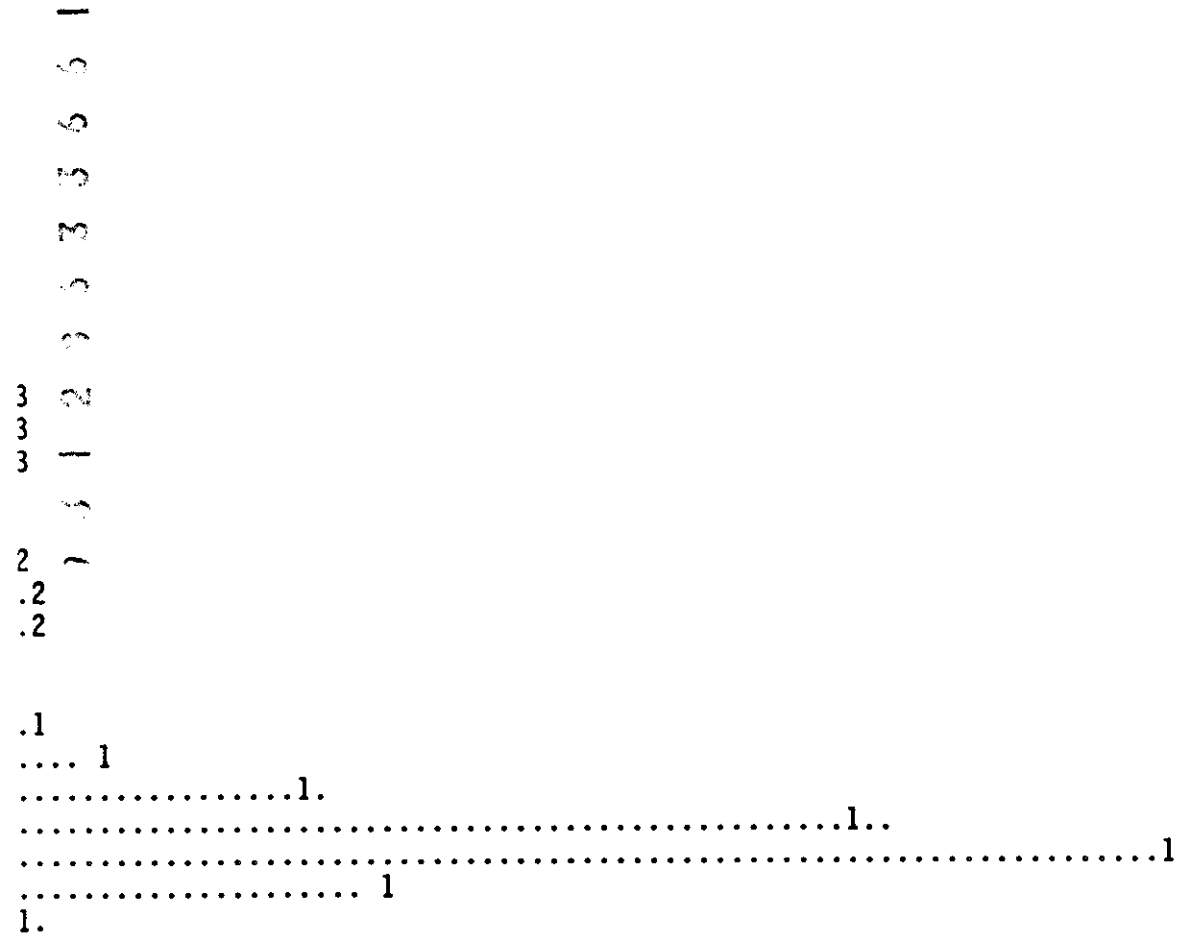
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	31344.0	100.000
Smoothed	31344.0	100.000
Composite fit	31631.1	100.916
Residuals	-287.1	-0.916

Analyzed by: _____
62820

SPECTRUM SD5195.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 11815.1



Raw Data Dump for AEA Spectrum: SP:SD5195.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
21	2.	0.	1.	1.	1.	1.	1.	0.	2.	0.
31	0.	0.	0.	0.	2.	0.	0.	1.	0.	0.
41	0.	0.	0.	0.	1.	1.	1.	0.	0.	0.
51	0.	1.	2.	1.	0.	0.	2.	2.	0.	0.
61	1.	1.	2.	1.	0.	1.	2.	1.	1.	0.
71	0.	1.	1.	1.	0.	0.	2.	0.	1.	1.
81	1.	1.	0.	1.	0.	0.	1.	1.	0.	1.
91	1.	0.	2.	0.	0.	0.	1.	2.	0.	1.
101	1.	0.	0.	1.	0.	1.	1.	0.	2.	0.
111	1.	0.	2.	1.	2.	0.	2.	1.	0.	1.
121	0.	1.	2.	0.	1.	0.	0.	0.	1.	0.
131	0.	0.	1.	2.	0.	0.	0.	0.	1.	0.
141	1.	0.	1.	0.	0.	4.	1.	1.	2.	0.
151	0.	0.	0.	2.	0.	2.	1.	0.	0.	2.
161	0.	3.	0.	0.	1.	0.	0.	0.	1.	1.
171	0.	1.	0.	0.	0.	1.	1.	0.	0.	2.
181	1.	1.	1.	1.	0.	0.	1.	2.	0.	1.
191	1.	0.	0.	0.	1.	1.	0.	1.	1.	1.
201	1.	1.	2.	0.	2.	1.	0.	1.	1.	2.
211	3.	0.	1.	0.	1.	3.	1.	2.	3.	0.
221	1.	2.	2.	3.	1.	3.	3.	3.	2.	1.
231	4.	3.	4.	3.	2.	3.	3.	2.	1.	1.
241	2.	4.	2.	2.	7.	7.	8.	7.	10.	11.
251	11.	13.	12.	17.	11.	11.	12.	17.	25.	25.
261	20.	27.	21.	33.	32.	30.	26.	26.	19.	18.
271	14.	5.	3.	7.	5.	6.	5.	7.	8.	8.
281	8.	19.	13.	13.	17.	21.	24.	17.	15.	29.
291	30.	31.	29.	49.	45.	42.	49.	54.	40.	53.
301	57.	69.	82.	89.	83.	79.	70.	45.	42.	30.
311	18.	13.	16.	10.	11.	6.	13.	8.	13.	12.
321	7.	10.	7.	11.	18.	19.	7.	11.	20.	27.
331	20.	20.	19.	27.	40.	29.	35.	61.	67.	90.
341	78.	120.	165.	194.	250.	284.	338.	435.	521.	619.
351	777.	895.	1002.	1093.	1152.	1255.	1334.	1465.	1591.	1784.
361	1874.	1855.	1931.	1819.	1573.	1402.	1069.	781.	445.	289.
371	172.	61.	34.	21.	3.	1.	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.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	1.	1.	0.	0.	1.	0.	0.	0.	1.
431	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	1.	0.	1.	1.
471	1.	1.	1.	2.	0.	1.	0.	1.	3.	2.
481	0.	1.	1.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
511	0.	0.								

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
R949-5781
File ID: SD6223.SPC

Counted on: 1/ 4/92 @10: 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	2963.5	2996.0	361.509	361.509	20.000	10.435	10.000	4.865
2	128.3	127.6	303.552	303.552	20.000	10.792	10.000	3.704
3	18.0	19.2	267.014	267.014	20.000	6.037	10.000	0.912
4	12.5	12.3	230.207	230.207	16.000	6.843	8.000	8.919
5	5.4	5.2	26.970	26.970	20.000	10.185	10.000	15.669

PEAK RESULTS

ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.9401	5.756	5.761	-0.005	0.05	53.42	292.31	0.132E-03
2	Pu238	0.0455	5.499	5.489	0.010	0.05	2.58	19.25	0.867E-05
	Am241		5.480	5.489	-0.009				0.664E-05
3		0.0103		5.317		0.03	0.58	3.13	0.141E-05
4	Pu239	0.0027	5.143	5.144	-0.001	0.03	0.16	0.83	0.375E-06
	Pu240		5.144	5.144	-0.000				0.375E-06
5	U 238	0.0014	4.200	4.189	0.011	0.05	0.08	0.56	0.251E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.062 + (0.0047)*Channel
Energy range (MeV): 4.062 TO 6.469
Efficiency = 0.1865 CPM/DPM

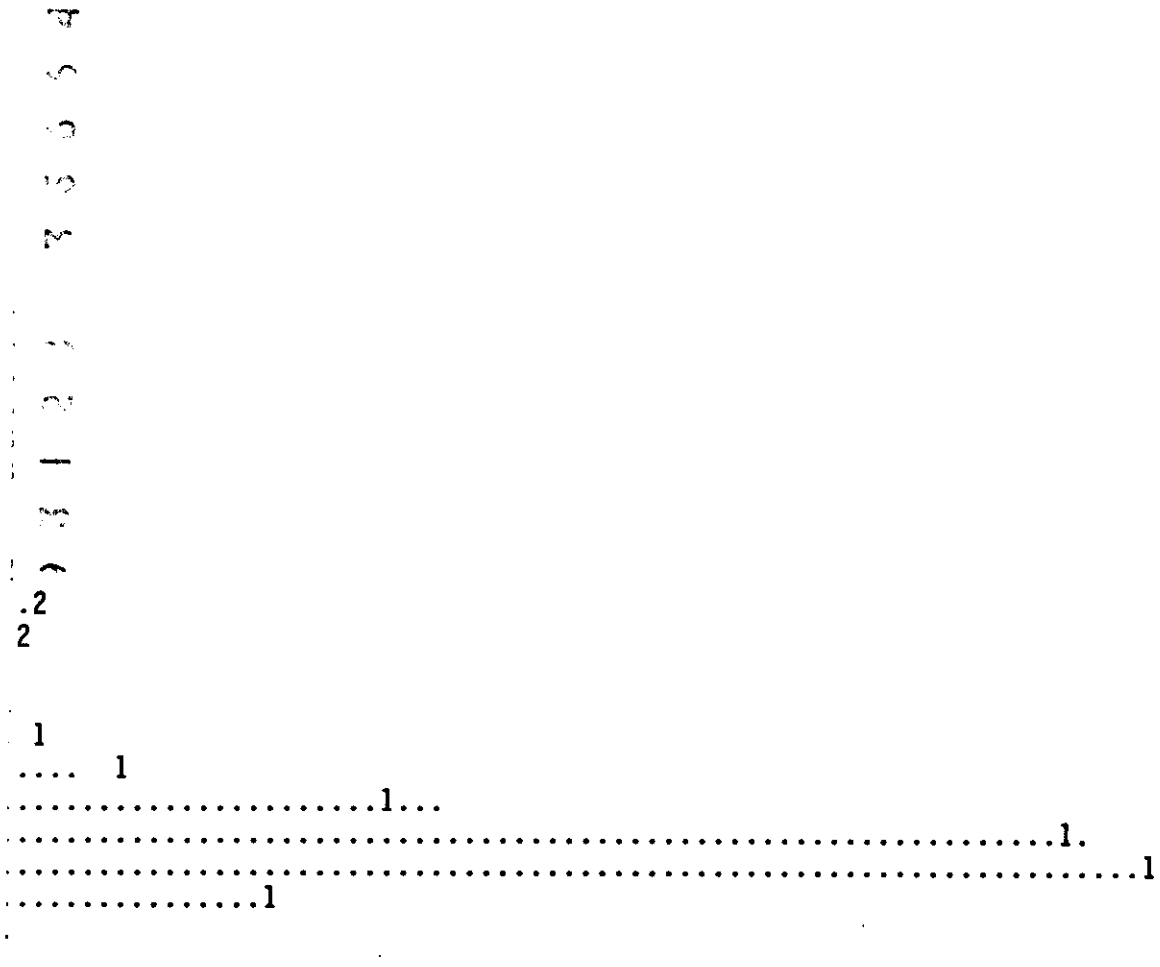
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	28361.0	100.000
Smoothed	28361.0	100.000
Composite fit	28413.6	100.185
Residuals	-52.6	-0.185

Analyzed by: _____
62820

SPECTRUM SD6223.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC



aw Data Dump for AEA Spectrum: SP:SD6223.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	3.	1.	2.	1.	1.
21	3.	2.	4.	1.	3.	5.	3.	2.	4.	1.
31	1.	0.	2.	1.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	2.	2.	1.	1.	0.	0.	1.	0.
61	2.	1.	1.	0.	0.	0.	0.	0.	1.	0.
71	0.	0.	0.	2.	0.	0.	0.	0.	0.	2.
81	0.	2.	1.	1.	3.	2.	0.	0.	0.	1.
91	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
01	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
11	1.	0.	1.	0.	0.	0.	0.	0.	1.	0.
21	1.	0.	1.	0.	0.	2.	1.	0.	1.	0.
31	3.	2.	3.	6.	2.	7.	1.	1.	7.	7.
41	6.	6.	7.	11.	7.	11.	11.	13.	14.	14.
51	5.	9.	8.	7.	8.	6.	10.	10.	7.	10.
61	12.	9.	4.	3.	2.	3.	1.	0.	0.	1.
71	0.	1.	2.	0.	0.	2.	2.	1.	0.	1.
81	0.	1.	0.	0.	1.	1.	0.	2.	0.	0.
91	1.	0.	0.	0.	0.	0.	0.	2.	2.	0.
01	0.	1.	0.	0.	3.	1.	0.	0.	2.	2.
1	2.	1.	0.	1.	1.	1.	2.	2.	1.	8.
[illegible]	6.	5.	3.	7.	8.	9.	10.	7.	12.	7.
231	12.	10.	5.	5.	2.	2.	4.	3.	2.	3.
241	2.	5.	2.	4.	2.	0.	3.	5.	6.	10.
251	2.	8.	11.	5.	13.	7.	15.	6.	14.	10.
261	5.	9.	11.	11.	13.	14.	11.	14.	12.	7.
271	8.	8.	7.	3.	17.	2.	0.	8.	3.	11.
281	9.	12.	15.	11.	14.	17.	22.	25.	20.	29.
291	36.	27.	30.	44.	45.	44.	30.	65.	69.	71.
301	72.	63.	88.	79.	60.	53.	45.	37.	40.	20.
311	14.	11.	15.	5.	13.	5.	9.	9.	13.	7.
321	7.	9.	9.	11.	14.	20.	16.	15.	17.	21.
331	16.	24.	21.	41.	39.	51.	43.	74.	64.	87.
341	124.	140.	180.	234.	275.	342.	480.	504.	560.	765.
351	829.	941.	989.	1091.	1172.	1282.	1379.	1584.	1559.	1724.
361	1699.	1771.	1508.	1221.	1158.	835.	541.	341.	199.	111.
371	61.	25.	10.	3.	2.	0.	0.	0.	0.	0.
381	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
421	0.	0.	0.	0.	1.	1.	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	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	1.	2.	0.	0.	0.	0.	1.	0.	0.	2.
47	1.	1.	3.	1.	1.	0.	2.	1.	0.	2.
48	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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
R949-5881
File ID: SD7845.SPC

Counted on: 1/ 4/92 @10: 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	1490.5	1494.8	363.139	363.139	24.000	23.020	12.000	13.575
2	58.5	60.5	304.492	304.492	28.000	23.397	14.000	6.976
3	12.4	10.4	233.753	233.753	20.000	30.188	10.000	6.952
4	5.2	4.2	151.547	151.547	40.000	64.305	20.000	8.635

PEAK RESULTS

	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm244	0.9412	5.796	5.782	0.014	0.11	34.99	244.48	0.110E-03
	Cm243		5.786	5.782	0.004				0.151E-03
2	Pu238	0.0441	5.499	5.506	-0.007	0.11	1.64	15.90	0.716E-05
	Am241		5.480	5.506	-0.026				0.548E-05
3	Pu239	0.0091	5.143	5.174	-0.031	0.14	0.34	2.35	0.106E-05
	Pu240		5.144	5.174	-0.030				0.106E-05
4	Np237	0.0057	4.640	4.787	-0.147	0.30	0.21	24.80	0.112E-04
	Np237		4.781	4.787	-0.006				0.771E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.075 + (0.0047)*Channel
Energy range (MeV): 4.075 TO 6.481
Efficiency = 0.1431 CPM/DPM

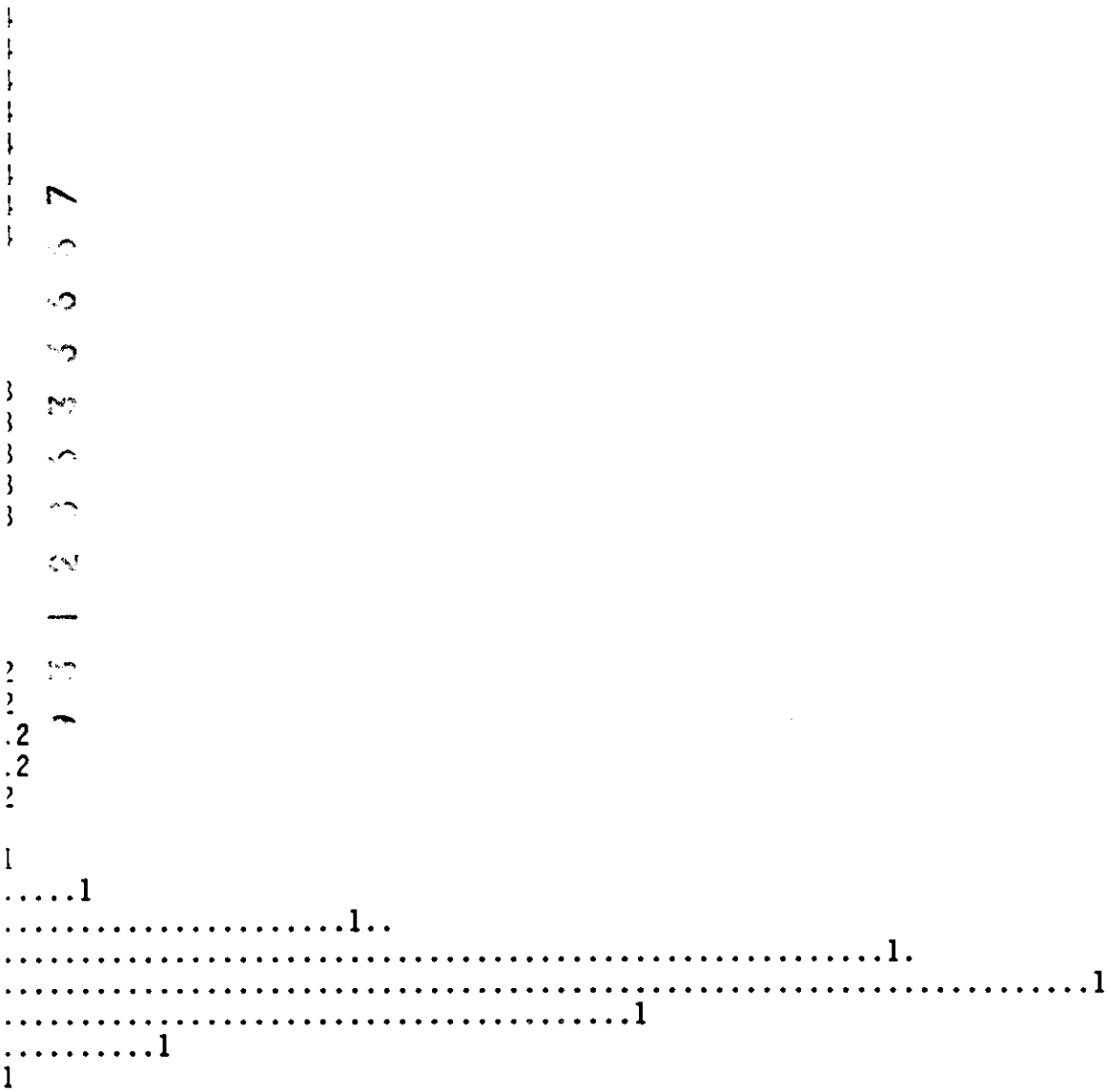
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	18559.0	100.000
Smoothed	18559.0	100.000
Composite fit	18586.4	100.148
Residuals	-27.4	-0.148

Analyzed by: _____
62820

SPECTRUM SD7845.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 5692.7



Raw Data Dump for AEA Spectrum: SP:SD7845.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	1.	1.	0.	0.	0.	2.
21	1.	0.	0.	1.	1.	3.	0.	0.	1.	1.
31	0.	2.	0.	1.	0.	1.	0.	0.	1.	1.
41	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
61	0.	1.	2.	0.	0.	2.	0.	0.	1.	1.
71	1.	0.	1.	0.	1.	0.	1.	0.	0.	0.
81	0.	1.	2.	0.	0.	0.	2.	0.	0.	0.
91	2.	1.	0.	0.	1.	0.	1.	0.	0.	1.
.01	1.	1.	0.	0.	1.	1.	0.	0.	0.	1.
.11	0.	0.	0.	2.	0.	0.	0.	2.	0.	2.
.21	1.	0.	1.	1.	1.	0.	0.	1.	0.	0.
.31	1.	0.	2.	1.	3.	3.	3.	0.	1.	0.
.41	2.	3.	3.	3.	1.	2.	2.	1.	4.	4.
.51	4.	1.	2.	3.	0.	3.	3.	2.	1.	0.
.61	2.	2.	1.	2.	1.	2.	1.	1.	0.	1.
.71	1.	1.	1.	0.	0.	1.	1.	0.	0.	0.
.81	1.	2.	0.	3.	0.	0.	2.	0.	1.	1.
.91	0.	1.	2.	1.	1.	2.	0.	0.	1.	0.
201	2.	0.	0.	0.	0.	1.	1.	1.	4.	0.
211	2.	7.	2.	0.	2.	1.	4.	2.	3.	4.
[illegible]	1.	4.	6.	3.	1.	4.	2.	8.	7.	6.
231	6.	7.	7.	8.	7.	6.	6.	2.	1.	2.
241	1.	3.	2.	4.	3.	2.	4.	3.	2.	2.
251	0.	4.	0.	2.	0.	4.	4.	1.	1.	4.
261	2.	4.	2.	2.	5.	2.	0.	2.	1.	2.
271	3.	2.	5.	1.	6.	2.	2.	7.	6.	8.
281	5.	4.	7.	15.	8.	15.	8.	16.	11.	13.
291	21.	15.	19.	28.	14.	28.	27.	33.	29.	26.
301	39.	29.	25.	34.	29.	35.	26.	24.	24.	26.
311	21.	18.	17.	17.	14.	8.	9.	3.	5.	8.
321	5.	7.	4.	5.	3.	1.	2.	5.	6.	6.
331	11.	6.	11.	12.	14.	27.	33.	33.	56.	65.
341	92.	78.	128.	151.	191.	190.	245.	292.	304.	366.
351	410.	482.	563.	578.	635.	653.	720.	783.	774.	807.
361	803.	804.	783.	804.	698.	690.	603.	589.	542.	427.
371	374.	316.	282.	210.	153.	171.	112.	67.	54.	52.
381	37.	24.	22.	13.	11.	3.	4.	3.	0.	0.
391	1.	1.	0.	0.	0.	0.	0.	0.	1.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	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.
4	1.	0.	0.	0.	0.	0.	1.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
491	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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
R950-5581
File ID: SD8032.SPC

Counted on: 1/ 4/92 @10: 0
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	5730.6	5691.3	365.121	365.121	16.000	7.136	8.000	4.109
2	546.5	536.0	307.395	307.395	16.000	7.602	8.000	3.946
3	147.0	28.5	271.390	271.390	12.000	3.936	6.000	4.028
4	4503.5	4420.0	234.359	234.359	20.000	7.386	10.000	5.223

PEAK RESULTS

Peak	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.5412	5.756	5.771	-0.015	0.03	83.38	246.53	0.111E-03
	Cm243		5.786	5.771	0.015				0.149E-03
2	Pu238	0.0539	5.499	5.500	-0.001	0.04	8.30	33.39	0.150E-04
	Am241		5.480	5.500	-0.020				0.115E-04
3		0.0019		5.331		0.02	0.29	0.84	0.377E-06
4	Pu239	0.4031	5.143	5.157	-0.014	0.03	62.10	179.94	0.811E-04
	Pu240		5.144	5.157	-0.013				0.811E-04

DETECTOR CALIBRATION

Energy(MEV) = 4.055 + (0.0047)*Channel
Energy range (MeV): 4.055 TO 6.462
Efficiency = 0.3451 CPM/DPM

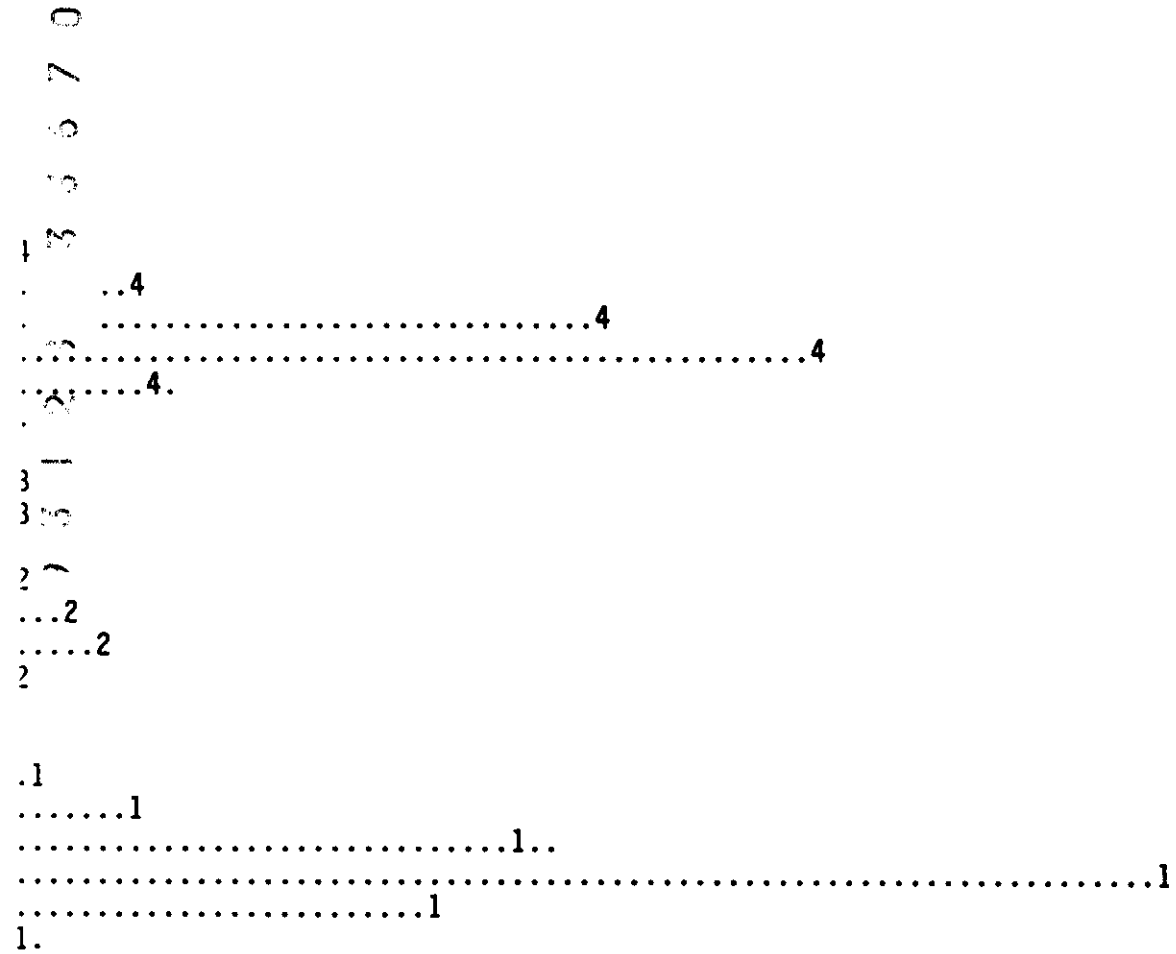
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	78012.0	100.000
Smoothed	78012.0	100.000
Composite fit	77029.5	98.741
Residuals	982.5	1.259

Analyzed by: _____
62820

SPECTRUM SD8032.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 20715.4



Raw Data Dump for AEA Spectrum: SP:SD8032.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	1.	0.	2.	1.	0.	1.	2.	0.	0.	0.
31	1.	0.	1.	1.	0.	0.	1.	0.	1.	1.
41	2.	1.	0.	1.	0.	2.	1.	1.	0.	1.
51	1.	0.	0.	0.	0.	2.	1.	0.	1.	1.
61	2.	2.	0.	0.	0.	0.	0.	0.	1.	2.
71	0.	0.	0.	1.	0.	1.	1.	0.	1.	0.
81	0.	2.	0.	1.	1.	0.	1.	0.	1.	2.
91	0.	3.	0.	2.	1.	0.	2.	1.	0.	2.
101	1.	3.	1.	1.	2.	1.	3.	0.	0.	0.
111	1.	1.	1.	1.	0.	0.	0.	1.	0.	2.
121	1.	1.	1.	1.	0.	1.	0.	2.	2.	3.
131	0.	2.	2.	1.	0.	2.	0.	1.	1.	0.
141	4.	2.	1.	3.	1.	1.	0.	0.	0.	2.
151	0.	1.	0.	0.	2.	1.	2.	2.	4.	2.
161	0.	1.	2.	2.	7.	4.	2.	1.	3.	2.
171	4.	4.	8.	7.	2.	5.	6.	7.	8.	5.
181	4.	1.	2.	7.	6.	7.	6.	9.	8.	10.
191	16.	6.	10.	10.	6.	13.	14.	10.	20.	9.
201	14.	20.	24.	10.	21.	25.	37.	38.	34.	33.
211	39.	62.	58.	87.	91.	132.	144.	188.	241.	285.
221	400.	453.	532.	656.	805.	967.	1194.	1406.	1753.	2101.
231	2422.	2691.	3014.	2973.	2546.	2183.	1554.	1078.	549.	347.
241	150.	54.	24.	9.	0.	1.	2.	2.	6.	4.
251	5.	0.	7.	4.	6.	6.	7.	8.	7.	11.
261	12.	9.	10.	6.	15.	9.	14.	8.	11.	20.
271	13.	12.	14.	7.	13.	6.	10.	7.	14.	6.
281	4.	5.	12.	14.	19.	13.	19.	23.	34.	33.
291	43.	63.	52.	71.	74.	86.	96.	130.	156.	175.
301	176.	217.	207.	269.	331.	330.	377.	328.	276.	205.
311	130.	77.	33.	16.	10.	9.	3.	8.	6.	9.
321	12.	12.	14.	16.	10.	12.	15.	13.	15.	17.
331	25.	20.	34.	38.	28.	38.	30.	40.	43.	41.
341	56.	57.	79.	93.	94.	152.	175.	200.	299.	414.
351	541.	728.	907.	1070.	1269.	1451.	1503.	1691.	1840.	2143.
361	2526.	2942.	3403.	3931.	3768.	3387.	2751.	1856.	1107.	525.
371	205.	78.	13.	6.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	1.	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.	0.	0.	0.	1.	0.	1.	0.	0.	0.
431	1.	0.	1.	0.	0.	0.	0.	1.	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	1.	1.	1.	1.	1.	0.	1.	4.	3.	1.
481	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: AMERCIUM 241	Sample Prep: UNDIGESTED

Instrument: WB57237	Procedure/Rev: LA-503-156/D-0
Technologist: M. BIERMAN	Date: 12-27-91
Starting Time: NA	Temperature: NA
Ending Time: NA	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5582	11		
2	REAGENT BLANK	R948-5682	12		
3	SAMPLE 3APR COMP	R949-5782	13		
4	SAM DUP OF 3APR COMP	R949-5882	14		
5	FINAL LMCS CHECK STD	R950-5582	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	43B43/0.100 mL			NA

A-6000-881 (03/92)

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#1 12-31-91 R947-5582

1897/5 - 9

Sample No. R 947.-5582	Sample Point 130AP R	Date 12-16-91	Time Issued 16:43	Priority 25
Determination AM241	Method/Standard LA-503-156	Result Units % RECOVERY	Center Code N124W	Range 0
Sample Size ? .100-10-1ml			Customer ID STD	

Remarks, Calculations, Results: EDP R201 AR001 "AEA" - 480MIN ATTACH PRINTOUT

STD# 45843 RESULT 31.86

STD VAL 31.00 %REC 102.8

Am243(18843).100ml

$\frac{1206(2.274E^{-3})(1)(1000)(100)}{818} = 33.86$

Alumina 800 HNO3

Analyst - 1 LLS	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Date 12/30/91	Time Completed	Lab Unit Mgr	1-2-92	

#2 12-31-91 R948-5682

901/5 - 11

Sample No. R 948.-5682	Sample Point 130AP R	Date 12-16-91	Time Issued 16:43	Priority 25
Determination AM241	Method/Standard LA-503-156	Result Units uCi/L	Center Code N124W	Range 0
Sample Size ? 0			Customer ID BLK	

Remarks, Calculations, Results: REAGENT BLANK "AEA" - 480MIN ATTACH PRINTOUT

COUNT AS uCi/L

Am243(18843).100ml

1ml 800 HNO3

$\frac{464(2.274E^{-3})(.1)(1000)(1)}{1217} = 1.14E^{-2}$

Analyst - 1 LLS	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Date 12/30/91	Time Completed	Lab Unit Mgr	1-2-92	

#3 12-31-91 R949-5782

267/5 - 9

Sample No. R 949.-5782	Sample Point 130AP R	Date 12-16-91	Time Issued 16:44	Priority 25
Determination AM241	Method/Standard LA-503-156	Result Units uCi/L	Center Code N124W	Range 0
Sample Size ? 1ml			Customer ID 3APRCUMP	

Remarks, Calculations, Results: COUNT AS uCi/L "AEA" - 480MIN ATTACH PRINTOUT

Am243(18843).100ml

1ml Cm HNO3

$\frac{420(2.274E^{-3})(.1)(1000)(1)}{358} = 2.74E^{-2}$

244/246Cm Not Detected

Analyst - 1 LLS	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Date 12/30/91	Time Completed	Lab Unit Mgr	1-2-92	

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

4.4 8025

Serial No	Sample Point	Date	Time Issued	Priority
R 949-5882	130AP R	12-16-91	15:41	25

Determination	Method/Standard	Report Units	Charge Code	Report
AM241	LA-503-156	uCI/L	NY24W	0

Sample Size: ? 1 ml

Customer ID: SAPRCOMP

Remarks, Calculations, Results: DUPLICATE SAMPLE

"AEA" - 450MIN
ATTACH PRINTOUT

COUNT AS uCI/L
Am243 (18643) .100 m 1
1 ml Con HNO3

$\frac{279(2.224E^{-03})(.1)(100)(1)}{1567} = 21.13E^{-3}$

243/247 Con Not Detected

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LLSS				
Date	Time Completed	Lab Unit Mgr		
12/30/91			1-2-92	

#1 / 12-31-91

615/5 -9

R949-5882

3.4 4243

Serial No	Sample Point	Date	Time Issued	Priority
R 950-5582	130AP R	12-16-91	15:45	25

Determination	Method/Standard	Report Units	Charge Code	Report
AM241	LA-503-156	% RECOVERY	NY24W	0

Sample Size: ? .100-10-1 ml

Customer ID: STD

Remarks, Calculations, Results: EMP K201 AR001

STDN 43843 RESULT 3573

STD VAL 34401 %REC 113.8

Am243 (18643) .100 m 1

$\frac{279(2.224E^{-03})(.1)(100)(.01)}{243} = 35.73$

Alumina in 8M HNO3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LLSS				
Date	Time Completed	Lab Unit Mgr		
12/30/91			1-2-92	

#1 12-31-91

337/5 -9

R950-5582

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
R947-5582
File ID: SD7838.SPC

Counted on: 12/31/91 @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	2233.5	2269.2	301.882	301.882	32.000	29.419	16.000	6.860
2	1369.3	1428.0	257.100	257.100	28.000	20.716	14.000	4.536
3	16.8	11.8	121.071	121.071	128.000	2.000	64.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Am241	0.6278	5.480	5.492	-0.012	0.14	72.31	568.16	0.256E-03
	Pu238		5.499	5.492	0.007				0.334E[illegible]
2	Am243	0.3682	5.234	5.281	-0.047	0.10	42.41	2847.65	0.128E-02
3	Np237	0.0039	4.640	4.642	-0.002	0.01	0.45	55.90	0.252E-04

DETECTOR CALIBRATION

Energy(MEV) = 4.073 + (0.0047)*Channel
Energy range (MeV): 4.073 TO 6.479
Efficiency = 0.1354 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	58008.0	100.000
Smoothed	58008.0	100.000
Composite fit	57589.8	99.279
Residuals	418.2	0.721

Analyzed by: _____
63099

```
          SPECTRUM SD7838.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,..,  ETC                    8772.1

3
3
3
3
3
3
3

6
7
0
2
2
..2
...2
   .....2
   ...........2.
.....................2.....
..1.................................2.....
...1...............................2....
..........1......2..........
..2..............1...
..........................1
.................................................1.
.......................................................................1
.......................................................1
.......................1
.....1
```

Raw Data Dump for AEA Spectrum: SP:SD7838.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	1.	3.	0.	1.	3.	1.
21	3.	4.	3.	1.	2.	3.	1.	2.	2.	3.
31	1.	2.	6.	2.	1.	2.	3.	3.	2.	6.
41	0.	2.	3.	2.	4.	1.	1.	4.	2.	4.
51	1.	3.	3.	4.	1.	5.	3.	4.	1.	4.
61	3.	3.	5.	2.	1.	1.	2.	4.	5.	5.
71	5.	3.	2.	2.	3.	4.	3.	2.	3.	3.
81	3.	1.	4.	2.	4.	5.	8.	3.	7.	4.
91	4.	2.	4.	6.	5.	6.	2.	6.	8.	3.
101	6.	8.	3.	3.	7.	5.	7.	5.	7.	7.
111	7.	3.	2.	3.	6.	6.	6.	5.	10.	4.
121	7.	5.	5.	8.	4.	6.	2.	2.	5.	5.
131	5.	5.	8.	8.	5.	4.	10.	12.	16.	7.
141	9.	13.	7.	6.	10.	6.	8.	15.	12.	14.
151	7.	9.	13.	12.	9.	8.	12.	7.	7.	14.
161	13.	16.	10.	16.	14.	14.	16.	19.	5.	16.
171	13.	14.	10.	12.	18.	18.	18.	14.	22.	16.
181	14.	20.	23.	29.	22.	22.	19.	22.	24.	24.
191	36.	27.	27.	26.	24.	30.	35.	36.	41.	35.
201	24.	41.	37.	52.	50.	51.	60.	54.	49.	48.
211	54.	52.	52.	49.	68.	62.	77.	79.	73.	97.
221	89.	95.	94.	133.	135.	129.	140.	169.	185.	183.
231	189.	207.	226.	246.	241.	289.	298.	302.	361.	352.
241	393.	490.	449.	568.	572.	571.	620.	672.	677.	757.
251	787.	771.	746.	765.	802.	803.	818.	776.	800.	702.
261	639.	658.	582.	518.	501.	462.	400.	375.	351.	359.
271	304.	291.	337.	321.	297.	327.	319.	323.	355.	359.
[illegible]	393.	410.	440.	486.	533.	575.	625.	672.	734.	744.
[illegible]	848.	891.	942.	991.	1095.	1112.	1206.	1195.	1166.	1168.
301	1196.	1108.	1097.	1121.	1079.	1010.	930.	836.	787.	650.
311	604.	547.	443.	393.	333.	304.	211.	175.	134.	102.
321	85.	73.	66.	32.	31.	27.	10.	11.	12.	5.
331	3.	3.	2.	1.	3.	0.	0.	1.	0.	1.
341	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
351	2.	0.	0.	1.	0.	1.	0.	0.	1.	1.
361	2.	0.	0.	1.	1.	1.	0.	0.	1.	0.
371	0.	0.	0.	0.	0.	1.	0.	1.	1.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	1.	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.	1.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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-948-5682 AM
File ID: SD2477.SPC

Counted on: 1/ 1/92 @ 0: 0
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	Tau Initial	Tau Final
1	2390.1	2474.6	249.869	249.869	28.000	25.259	14.000	6.249
2	9.2	7.7	147.961	147.961	24.000	29.185	12.000	10.164
3	4.5	4.2	128.410	128.410	12.000	2.720	6.000	0.041

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ee
1	Am243	0.9916	5.234	5.249	-0.015	0.12	73.57	0.11	0.503E-07
2	Np237	0.0027	4.781	4.770	0.011	0.14	0.20	0.00	0.170E-10
3	Np237	0.0057	4.640	4.678	-0.038	0.01	0.42	0.00	0.329E-09

DETECTOR CALIBRATION

Energy(MEV) = 4.074 + (0.0047)*Channel
Energy range (MeV): 4.074 TO 6.481
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	36743.0	100.000
Smoothed	36741.4	99.996
Composite fit	37097.5	100.963
Residuals	-356.2	-0.969

Analyzed by: _____
61433

```
1 LEGEND:  RAW = ....   MODELED PEAKS = 1,2,... ETC                8P50.[illegible]
3
3
3
3
3
3
3
3
3
3
3
3
3
3
3
3
2
2
2
2
9
7
1
.. 1
3.... 1
3........... 1
.......................1.
6......................................1.....
..........................................................................1.
...............................................................................1
4.......................................1
5..........1
1
3
7
```

Raw Data Dump for AEA Spectrum: SF:SD2477.SPC

1	0.	0.	0.	0.	0.	1.	1.	0.	2.	2.
11	0.	0.	1.	1.	0.	0.	0.	2.	2.	0.
21	0.	0.	0.	0.	0.	1.	1.	1.	1.	0.
31	0.	0.	0.	2.	3.	2.	2.	1.	2.	1.
41	2.	0.	2.	1.	0.	1.	3.	1.	4.	1.
51	0.	1.	1.	1.	1.	2.	1.	1.	2.	0.
61	1.	2.	1.	2.	3.	0.	3.	1.	1.	0.
71	4.	2.	1.	1.	1.	0.	3.	2.	3.	2.
81	0.	3.	2.	0.	1.	1.	1.	2.	2.	1.
91	4.	1.	0.	3.	1.	4.	3.	4.	2.	0.
101	0.	1.	0.	4.	3.	1.	3.	3.	2.	2.
111	5.	0.	1.	4.	2.	2.	4.	2.	0.	4.
121	2.	3.	3.	1.	3.	3.	7.	4.	2.	3.
131	2.	2.	3.	1.	3.	3.	4.	2.	3.	3.
141	5.	7.	6.	6.	6.	5.	10.	6.	7.	5.
151	2.	4.	6.	5.	2.	5.	7.	6.	3.	9.
161	2.	4.	7.	1.	9.	7.	9.	9.	8.	9.
171	11.	11.	11.	8.	8.	5.	9.	19.	7.	20.
181	17.	8.	16.	18.	18.	14.	17.	18.	18.	13.
191	19.	22.	13.	23.	35.	30.	39.	42.	34.	35.
201	42.	42.	32.	46.	54.	56.	61.	78.	68.	88.
211	96.	82.	101.	123.	137.	146.	141.	150.	175.	222.
221	207.	254.	263.	294.	344.	351.	393.	434.	436.	462.
231	531.	545.	623.	685.	736.	797.	811.	909.	970.	1048.
241	1063.	1063.	1116.	1155.	1207.	1229.	1277.	1226.	1261.	1246.
251	1211.	1135.	1189.	1070.	924.	854.	735.	600.	575.	431.
261	425.	316.	249.	216.	183.	137.	99.	79.	66.	39.
271	35.	34.	34.	23.	11.	12.	7.	7.	2.	13.
281	2.	4.	3.	4.	4.	6.	4.	3.	4.	6.
291	8.	1.	4.	5.	3.	5.	2.	5.	1.	3.
301	3.	3.	3.	1.	1.	0.	2.	5.	0.	1.
311	0.	1.	0.	0.	0.	0.	1.	1.	0.	0.
321	0.	0.	1.	0.	1.	0.	0.	0.	0.	1.
331	0.	1.	0.	0.	0.	0.	0.	1.	2.	0.
341	0.	3.	2.	1.	1.	0.	0.	1.	4.	0.
351	1.	0.	1.	0.	0.	1.	0.	0.	0.	0.
361	0.	2.	0.	1.	0.	1.	0.	0.	1.	0.
371	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
381	0.	0.	1.	0.	0.	0.	1.	1.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
421	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	1.	0.	0.	0.	0.	0.	0.	1.	0.	1.
461	0.	1.	0.	0.	2.	0.	0.	1.	0.	0.
471	0.	0.	1.	1.	4.	1.	2.	1.	0.	1.
481	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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-949-5782 AM
File ID: SD3149.SPC

Counted on: 1/ 1/92 @ 0: 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	18.7	8.3	302.760	302.760	12.000	5.906	6.000	0.000
2	688.6	687.6	258.371	258.371	24.000	15.312	12.000	6.902

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Am241	0.1501	5.480	5.473	0.007	0.03	2.51	13.25	0.597E-05
2	Am243	0.8499	5.234	5.260	-0.026	0.07	14.20	640.78	0.289E-03

DETECTOR CALIBRATION

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

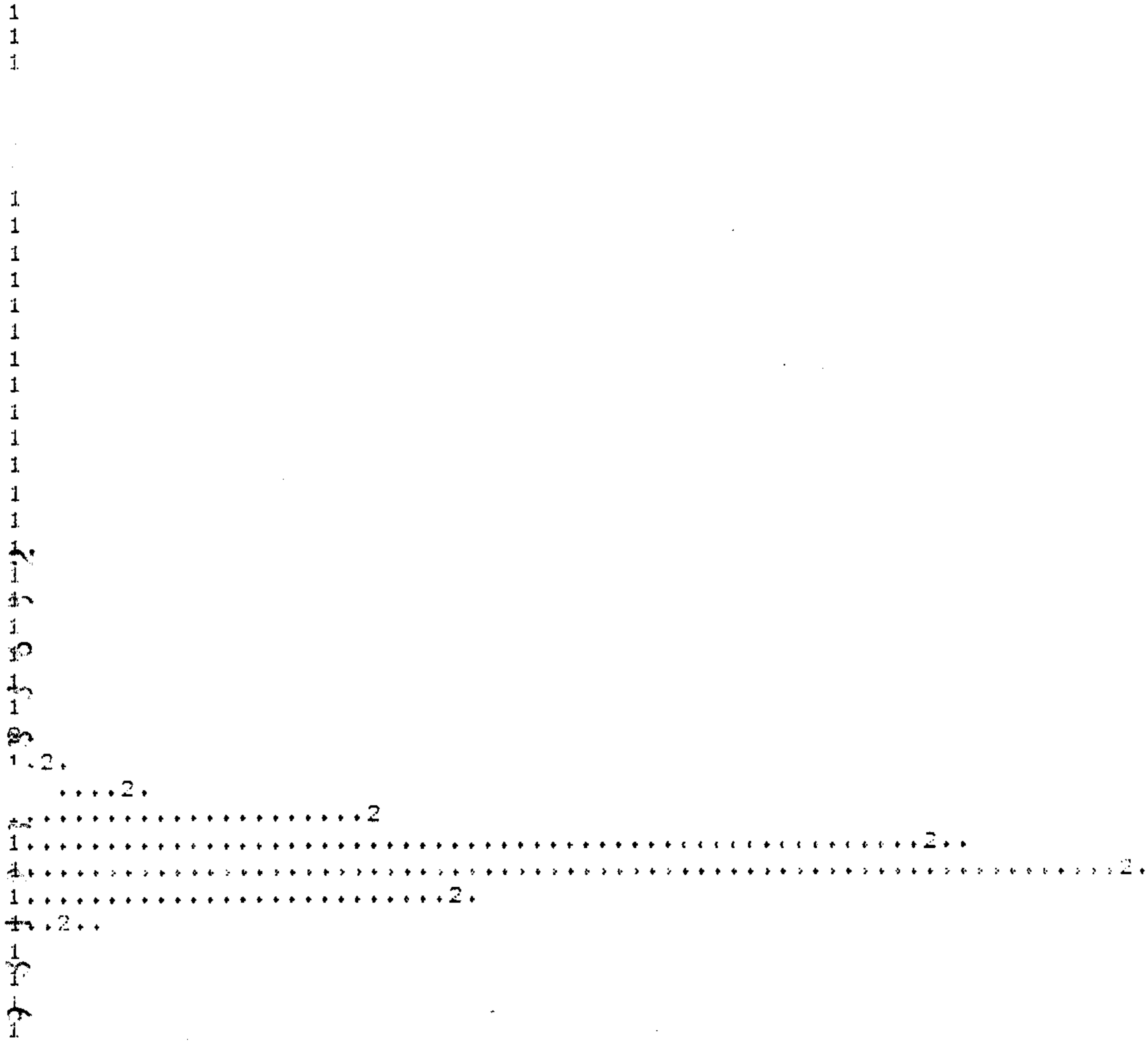
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	7787.0	100.000
Smoothed	7786.7	99.996
Composite fit	8351.7	107.252
Residuals	-565.0	-7.256

Analyzed by: _____
61453

SPECTRUM SD3149.SPC Addendum 15 Rev 0

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,..., ETC 2318.7



Raw Data Dump for AEA Spectrum: SP:SD3149.SPC

1	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
21	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
31	0.	1.	0.	0.	2.	0.	0.	1.	1.	0.
41	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	2.	1.	0.	0.	1.	0.	1.	0.	0.
61	1.	2.	0.	0.	0.	0.	1.	0.	0.	0.
71	0.	1.	1.	0.	0.	1.	1.	1.	0.	1.
81	1.	3.	1.	0.	0.	3.	0.	0.	0.	1.
91	0.	0.	1.	2.	1.	0.	1.	0.	0.	1.
101	2.	1.	1.	0.	3.	0.	0.	0.	1.	1.
111	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.
121	1.	1.	0.	1.	0.	0.	1.	2.	1.	1.
131	0.	0.	1.	0.	0.	1.	0.	0.	2.	1.
141	1.	1.	1.	0.	1.	1.	1.	3.	0.	1.
151	0.	1.	2.	0.	1.	0.	1.	1.	1.	1.
161	0.	1.	2.	2.	0.	1.	1.	1.	2.	2.
171	0.	4.	3.	0.	1.	1.	2.	0.	3.	3.
181	0.	1.	1.	1.	3.	2.	0.	4.	2.	0.
191	2.	3.	6.	3.	4.	4.	5.	7.	3.	6.
201	4.	3.	4.	7.	6.	7.	4.	6.	11.	5.
211	7.	7.	10.	5.	9.	4.	12.	12.	13.	7.
221	16.	13.	20.	10.	15.	15.	13.	20.	31.	24.
231	18.	26.	37.	43.	48.	50.	42.	46.	63.	61.
241	83.	94.	102.	106.	136.	141.	165.	176.	212.	273.
251	282.	308.	349.	330.	398.	389.	398.	368.	337.	373.
261	325.	276.	215.	185.	135.	125.	88.	77.	58.	36.
271	37.	34.	27.	23.	10.	12.	10.	6.	7.	5.
281	4.	3.	2.	1.	3.	1.	1.	3.	3.	1.
291	0.	1.	3.	1.	3.	2.	2.	2.	4.	1.
301	3.	1.	2.	4. 420	2.	2.	2.	2.	2.	0.
311	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
321	1.	1.	0.	0.	0.	0.	1.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.
341	1.	1.	1.	0.	0.	1.	0.	0.	2.	2.
351	1.	2.	0.	1.	1.	1.	3.	1.	0.	0.
361	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
431	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
451	2.	0.	0.	1.	0.	0.	0.	1.	0.	0.
461	0.	1.	1.	0.	0.	0.	0.	0.	1.	0.
471	4.	1.	0.	0.	2.	0.	0.	0.	0.	1.
481	2.	1.	1.	3.	2.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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
R949-5882
File ID: SD8025.SPC

Counted on: 12/31/91 @13: 0
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	35.1	22.1	304.287	304.287	12.000	0.555	6.000	0.000
2	2676.3	2631.2	258.862	258.862	20.000	12.937	10.000	2.851
3	0.0	0.1	70.953	70.953	0.000	0.200	0.000	0.200
4	0.0	0.1	45.741	45.741	0.000	0.200	0.000	0.200
5	0.0	0.1	28.627	28.627	0.000	0.200	0.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu238	0.0871	5.499	5.485	0.014	0.00	6.66	27.03	0.122E-04
	Am241		5.480	5.485	-0.005				0.933E-05
2	Am243	0.9129	5.234	5.271	-0.037	0.06	69.73	1853.64	0.835E-03
3	U 235	0.0000	4.396	4.388	0.008	0.00	0.00	0.00	0.108E-08
4		0.0000		4.269		0.00	0.00	0.00	0.656E-09
5	U 238	0.0000	4.200	4.189	0.011	0.00	0.00	0.00	0.792E-09

DETECTOR CALIBRATION

Energy(MEV) = 4.055 + (0.0047)*Channel
Energy range (MeV): 4.055 TO 6.461
Efficiency = 0.3420 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	38955.0	100.000
Smoothed	38955.0	100.000
Composite fit	38195.7	98.051
Residuals	759.3	1.949

Analyzed by: _____
63099

```
          SPECTRUM SD8025.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                    9741.7
1
1
1
-
4
1
1
3
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
2..
2.
1.2.
1..2.
1....2.
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1.....2.
1.....2
1.....2..
1.....2
1.2...
1
1
1
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Raw Data Dump for AEA Spectrum: SP:SD8025.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	1.	2.	2.	2.	3.
21	1.	1.	2.	2.	4.	4.	5.	6.	4.	1.
	1.	2.	2.	2.	2.	4.	3.	3.	4.	2.
	3.	4.	8.	5.	3.	6.	1.	5.	4.	2.
51	5.	2.	4.	3.	4.	2.	2.	3.	6.	4.
61	2.	6.	6.	4.	7.	2.	4.	11.	8.	7.
71	10.	10.	3.	4.	2.	3.	4.	9.	7.	7.
81	9.	7.	8.	5.	15.	6.	8.	6.	6.	10.
91	3.	8.	5.	7.	12.	14.	6.	9.	13.	8.
101	10.	8.	10.	9.	11.	10.	14.	10.	11.	9.
111	7.	11.	11.	13.	20.	11.	11.	10.	12.	9.
121	9.	12.	9.	17.	12.	12.	10.	13.	16.	17.
131	16.	10.	16.	17.	13.	16.	20.	15.	19.	28.
141	13.	16.	14.	24.	16.	20.	20.	18.	21.	25.
151	23.	16.	29.	29.	32.	24.	24.	38.	25.	37.
161	32.	34.	18.	25.	49.	31.	42.	30.	36.	35.
171	36.	45.	41.	38.	43.	45.	45.	38.	44.	40.
181	65.	42.	46.	46.	55.	51.	44.	52.	61.	54.
191	69.	78.	75.	45.	60.	59.	79.	73.	79.	78.
201	75.	79.	92.	89.	98.	72.	90.	114.	112.	91.
211	105.	124.	131.	123.	136.	163.	137.	156.	153.	159.
221	191.	181.	193.	201.	199.	230.	242.	236.	240.	319.
231	281.	317.	356.	381.	389.	398.	421.	463.	467.	518.
241	542.	632.	637.	683.	720.	784.	835.	839.	878.	923.
251	1043.	1192.	1115.	1247.	1268.	1337.	1528.	1478.	1567.	1485.
261	1422.	1079.	894.	603.	392.	313.	244.	199.	177.	184.
271	158.	152.	106.	74.	82.	65.	26.	17.	11.	6.
281	8.	2.	3.	1.	2.	5.	1.	1.	2.	0.
	1.	5.	5.	3.	0.	4.	6.	3.	1.	4.
301	5.	7.	6.	2.	4.	5.	4.	4.	2.	4.
311	1.	1.	1.	0.	2.	0.	2.	0.	0.	0.
321	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
331	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
341	0.	1.	0.	1.	0.	0.	2.	1.	0.	0.
351	3.	1.	0.	1.	1.	1.	0.	1.	0.	2.
361	0.	1.	0.	3.	1.	2.	2.	0.	1.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	1.	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.	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.	1.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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-950-3582 AM
File ID: SD4243.SPC

Counted on: 1/ 1/92 @ 0: 0
Detector/Geometry number: 4/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak	Peak height		Peak center		FWHM		Tau	
ID	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	614.2	597.5	304.216	304.216	20.000	11.256	10.000	6.389
2	388.1	375.8	259.220	259.220	20.000	11.103	10.000	6.291

PEAK RESULTS

Peak		AEA	Peak Centroid				Count		Activity
ID	Isotope	Fract.	Exp.	Obs.	Diff.	FWHM	Rate c/m	d/m	uCi/ea
1	Am241	0.6132	5.480	5.476	0.004	0.05	10.30	71.97	0.324E-04
2	Am243	0.3868	5.234	5.265	-0.031	0.05	6.50	387.96	0.175E-03

DETECTOR CALIBRATION

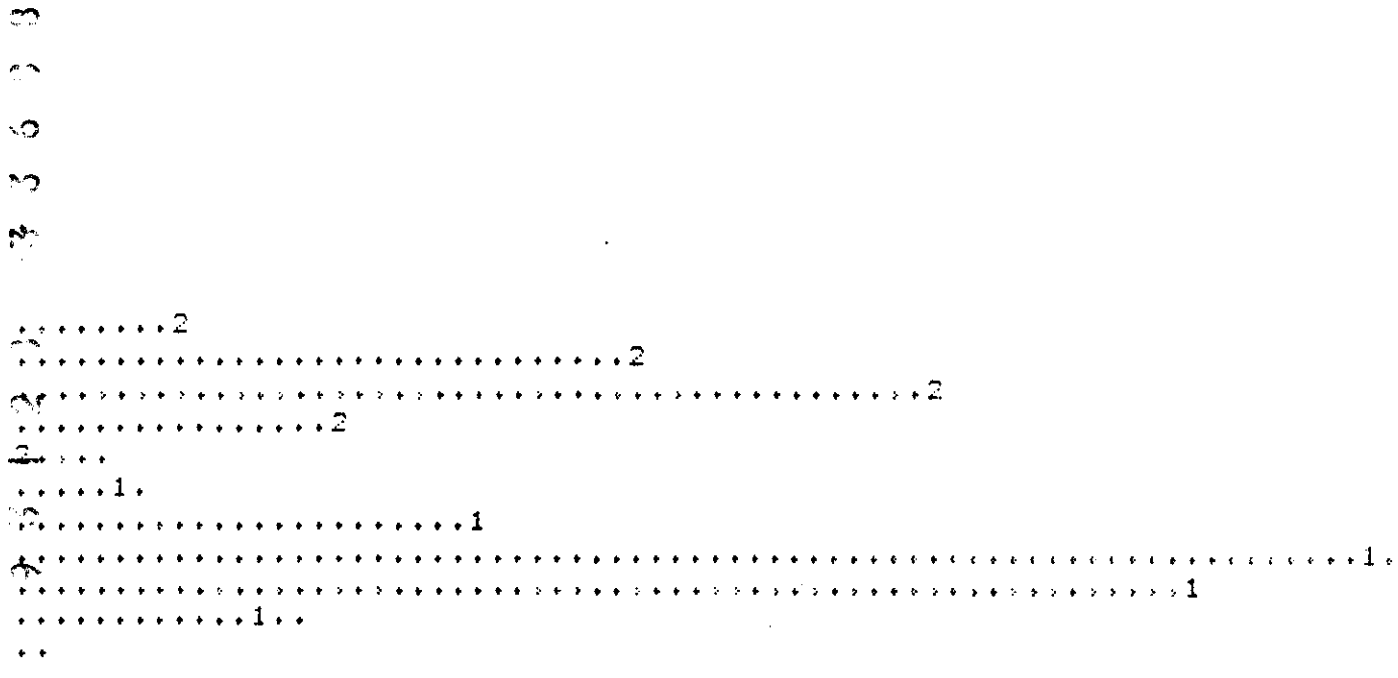
Energy(MEV) = 4.047 + (0.0047)*Channel
Energy range (MeV): 4.047 TO 6.453
Efficiency = 0.1523 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	8748.0	100.000
Smoothed	8747.5	99.994
Composite fit	8401.2	96.036
Residuals	346.2	3.958

Analyzed by: _____
61403

WHC-SD-WM-DP-025
Addendum 15 Rev 0



Raw Data Dump for AEA Spectrum: SF:SD4243.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
31	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
51	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
61	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	1.	0.	0.	0.	1.	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	2.	1.	1.	1.	2.	0.	0.	1.	0.	0.
121	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.
131	0.	1.	2.	0.	0.	2.	0.	1.	1.	2.
141	1.	1.	1.	0.	0.	1.	0.	0.	1.	0.
151	2.	0.	0.	0.	2.	2.	1.	0.	2.	0.
161	1.	1.	0.	0.	1.	0.	1.	0.	0.	2.
171	1.	1.	0.	1.	1.	0.	0.	2.	0.	2.
181	0.	1.	0.	3.	0.	0.	0.	1.	2.	0.
191	0.	1.	0.	1.	0.	0.	2.	1.	2.	2.
201	1.	0.	2.	3.	0.	1.	1.	1.	0.	3.
211	6.	8.	2.	3.	6.	0.	3.	1.	2.	6.
221	6.	6.	5.	6.	8.	6.	7.	7.	8.	11.
231	5.	8.	10.	9.	7.	8.	11.	12.	17.	30.
241	18.	19.	21.	32.	54.	40.	61.	74.	88.	102.
251	111.	126.	146.	174.	176.	222.	243.	222.	233.	220.
261	204.	141.	106.	85.	47.	40.	37.	26.	19.	21.
271	25.	19.	19.	19.	11.	18.	14.	14.	13.	7.
281	20.	20.	30.	22.	33.	27.	39.	39.	55.	57.
291	62.	100.	119.	133.	136.	184.	194.	260.	271.	300.
301	358.	345.	377.	378.	320.	300.	219.	201.	128.	103.
311	82.	55.	38.	33.	29.	18.	15.	13.	6.	5.
321	2.	0.	1.	0.	0.	1.	0.	1.	0.	1.
331	0.	0.	1.	1.	1.	1.	1.	0.	0.	0.
341	3.	1.	1.	0.	0.	1.	2.	1.	0.	0.
351	2.	1.	0.	1.	2.	0.	1.	0.	3.	0.
361	1.	0.	3.	0.	0.	1.	1.	0.	0.	1.
371	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
411	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
431	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	1.	0.	0.	1.	1.	1.	0.
481	0.	2.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: TECHNETIUM 99	Sample Prep: UNDIGESTED

Instrument: NA	Procedure/Rev: LA-438-101/D-1
Technologist: L. CONLIN	Date: 12-30-91
Starting Time: 17:00	Temperature: NA
Ending Time: 22:30	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5584	11		
2	REAGENT BLANK	R948-5684	12		
3	SAMPLE 3APR COMP	R949-5784	13		
4	SAM DUP OF 3APR COMP	R949-5884	14		
5	FINAL LMCS CHECK STD	R950-5584	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	28B49/0.250 mL			NA

A-6000-881 (03/92)

TECHNETIUM 99 ANALYSIS - UNDIGESTED SAMPLE

1-2

Serial No	Sample Point	Date	Time Issued	Priority
R 947.-5584	130AP R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Range
TC99	LA-438-101	% RECOVERY	NI24W	

Sample Size	Customer ID
? 250 λ + 100 λ SPIKE 49839	STD

Remarks, Calculations, Results
EMP 5363 TC99
STDW 28849 RESULT 1.828
STD VAL 2.0342 %REC 89.0

Analyst 1: 6C949 D Domitian
Analyst 2: Analyst 3: Analyst 4: Analyst 5:
Date: 12-30-91 Time Completed: Lab Unit Mgr: 12-31-91 SAC

R-947-5584

$$\frac{509.27(58794.7)(.1)(4)(1000)}{(3460.94-509.27)(2.22\times10^6)} = 1.828$$

3-4

Serial No	Sample Point	Date	Time Issued	Priority
R 948.-5684	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Range
TC99	LA-438-101	uCI/L	NI24W	0

Sample Size	Customer ID
? + 100 λ SPIKE 49839	BLK

Remarks, Calculations, Results
REAGENT BLANK
COUNT AS uCI/L
$< 4.09\times10^{-2}$ µCi/L

Analyst 1: 6C949 D Domitian
Analyst 2: Analyst 3: Analyst 4: Analyst 5:
Date: 12-30-91 Time Completed: Lab Unit Mgr: 12-31-91 SAC

R-948-5684

$$\frac{<10.5(58794.7)(.1)(1000)(4)}{(2731.13+10.5)(2.22\times10^6)} = <4.096^{-2}$$

5-6

Serial No	Sample Point	Date	Time Issued	Priority
R 949.-5784	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Range
TC99	LA-438-101	uCI/L	NI24W	

Sample Size	Customer ID
? 250 λ + 100 λ SPIKE 49839	SAPRCUMP

Remarks, Calculations, Results
COUNT AS uCI/L

$$\frac{296.01(58794.7)(.1)(4)(1000)}{(3057.74-296.01)(2.22\times10^6)} = 1.12E^{-2}\ \mu C/L$$

Analyst 1: 6C949 D Domitian
Analyst 2: Analyst 3: Analyst 4: Analyst 5:
Date: 12-30-91 Time Completed: Lab Unit Mgr: 12-31-91 SAC

7-8

Serial No	Sample Point	Date	Time Issued	Priority
R 949.-5884	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Range
TC99	LA-438-101	uCI/L	NI24W	0

Sample Size	Customer ID
? 250 λ + 100 λ SPIKE 49839	SAPRCUMP

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

$$\frac{270.62(58794.7)(.1)(4)(1000)}{(3036.18-270.62)(2.22\times10^6)} = 1.04\ \mu C/L$$

Analyst 1: 6C949 D Domitian
Analyst 2: Analyst 3: Analyst 4: Analyst 5:
Date: 12-30-91 Time Completed: Lab Unit Mgr: 12-31-91 SAC

TECHNETIUM 99 ANALYSIS - UNDIGESTED SAMPLE

9-10

Sample No	Sample Desc	Date	Time Issued	Priority
R 950.-5584	130RP R	12-16-91	15:45	25

Determination	Method/Standard	Result Units	Charge Code	Returns
1C99	LA-438-101	% RECOVERY	N124W	0

Sample Size	Customer ID
? 250 ml +100 ml SPIKE 49839	SID

Remarks, Calculations, Results
EDP 8363 1C99
STD# 28849 RESULT 1.792
STD VAL 2.0542 %REC 87.2

$$\frac{510.71\,(5879447)(.1)(4)/(\text{[illegible]})}{(8.588.8 - 510.71)(2.2\text{[illegible]})} \quad 1.792$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LOC949				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
12-30-91		12-31-91

USER: 5 ID:TC 99 PRESET TIME: 10.00 TUE 31 DEC 1991 03:15
SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
H#: 1 AQC:Y QCF:N RCM:Y 2 PHASE MONITOR:N
RCM-TIME: 0.10 INT:999.95
CHANNEL 1-LL:150 UL: 800 2SIGMA: 0.10 BKG SUB: 0.00 BKG 2SIG: 0.00 LSR: 0

SINGLE LABEL DPM SET UP ON 20 DEC 1991 13:14

UNKNOWN ID:TC 99 UNKNOWN REPLICATES: 1
UNKNOWN NORM FACTOR ISO1:Q 1.00000
UNKNOWN UNITS ISO1:DPM
UNKNOWN HALF LIFE CORRECTION:N
INDIVIDUAL UNKNOWN NORM FACTORS:N BACKGROUND QUENCH CURVES:Y
STANDARD ID:131828-A 1-10 QUENCH LIMITS LOW:73.67 HIGH:207.7
HALF LIFE(DAYS) ISO1:N
STANDARD DPM ISO1:0.00000000

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
B1	**- 1	1	47.80	9.15	10.00	10.63	153.0	9.32	

BACKGROUND QUENCH CURVES: CONSTANT

CHANNEL 1
QUENCH CURVE COEFFICIENTS
A: 47.80000 B:0.00000000 C:0.00000000 D:0.00000000000

BACKGROUND QUENCH CURVE CORRELATION TABLE

BKG	H#	MEASURED CPM.	CALCULATED CPM.	PERCENT DIFF.	FLAG
1	153.0	47.80	47.80	0.00	

BACKGROUND QUENCH LIMITS LOW:0.000 HIGH:1000.
TOTAL QUENCH LIMITS LOW:73.67 HIGH:207.7

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
1	**- 3	1	524.20	2.76	10.00	21.54	157.0	1.10	
	ISO1 %EFF CH1:93.55						ISO1 DPM :509.2704		
2	**- 4	1	3285.30	1.10	10.00	32.37	157.0	0.20	
	ISO1 %EFF CH1:93.55						ISO1 DPM :3460.879		
3	**- 5	1	53.70	8.63	10.00	43.16	152.0	15.04	
	ISO1 %EFF CH1:93.96						ISO1 DPM :6.279565		
4	**- 6	1	2611.70	1.24	10.00	53.97	153.0	0.35	
	ISO1 %EFF CH1:93.88						ISO1 DPM :2731.132		

BEST AVAILABLE COPY

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
5	**- 7	1	325.20	3.51	10.00	64.74	155.0	1.33	
	ISO1 %EFF CH1:93.71						ISO1 DPM :296.0124		
6	**- 8	1	2936.00	1.17	10.00	75.51	156.0	0.22	
	ISO1 %EFF CH1:93.63						ISO1 DPM :3084.739		
7	**- 9	1	301.40	3.64	10.00	86.31	155.0	1.39	
	ISO1 %EFF CH1:93.71						ISO1 DPM :270.6155		
8	**-10	1	2895.60	1.18	10.00	97.10	154.0	0.18	
	ISO1 %EFF CH1:93.80						ISO1 DPM :3036.184		
9	**-11	1	526.40	2.76	10.00	107.89	155.0	0.71	
	ISO1 %EFF CH1:93.71						ISO1 DPM :510.7121		
10	**-12	1	3346.80	1.09	10.00	118.69	158.0	0.14	
	ISO1 %EFF CH1:93.46						ISO1 DPM :3529.693		

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: IODINE 129	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-378-103/B-0
Technologist: T. McCOLLOCH	Date: 1-08-92
Starting Time: NA	Temperature: NA
Ending Time: NA	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5585	11		
2	REAGENT BLANK	R948-5685	12		
3	SAMPLE 3APR COMP	R949-5785	13		
4	SAM DUP OF 3APR COMP	R949-5885	14		
5	FINAL LMCS CHECK STD	R950-5585	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	38B46/1.0 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

IODINE I-129 ANALYSIS - UNDIGESTED ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
R 947.-5585	130AP R	12-16-91	16:43	25

Determination	Method/Standard	Result Units	Charge Code	Results
I129	LA-378-103	% RECOVERY	N124W	2

Sample Size: ? 1ml
Customer ID: STD

RERUN

Remarks, Calculations, Results:
EDP S928 ITANK
STDN 3786 RESULT 2.566-4
STD VAL 6.56-4 %REC 128.8
GROSS WT. 2.7334
TARE WT. 2.7127
NET WT. .0207

$\frac{5.156-4(1000)}{(.0207/.0305)} = 2.58E-4$

Analyst 1: [signature] Hrs: 81805 Date: 1/8/92
Analyst 2: [signature]
Time Completed:
Lab Unit Mgr: [signature] 1-14-92

6863

Serial No	Sample Point	Date	Time Issued	Priority
R 948.-5685	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Results
I129	LA-378-103	uCI/L	N124W	2

Sample Size: ? 1ml H_2O
Customer ID: BLK

RERUN

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L

Gross 2.7548
Tare 2.7344
Net .0104

$\frac{<1.85\times10^{-5}(1000)}{(.0104/.0305)} = <5.43E^{-2}$

Analyst 1: [signature] Hrs: 81805 Date: 1/8/92
Analyst 2: D Martin
Time Completed:
Lab Unit Mgr: [signature] 1-14-92

6864

Serial No	Sample Point	Date	Time Issued	Priority
R 949.-5785	130AP R	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Results
I129	LA-378-103	uCI/L	N124W	2

Sample Size: ? 1ml
Customer ID: 3APRCOMP

RERUN

Remarks, Calculations, Results:
COUNT AS uCI/L

Gross 2.7465
Tare 2.7277
Net .0188

$\frac{<1.57\times10^{-5}(1000)}{(.0188/.0305)} = <3.03E^{-2}$

Analyst 1: [signature] Hrs: 81805 Date: 1/8/92
Analyst 2: D Martin
Time Completed:
Lab Unit Mgr: [signature] 1-14-92

6865

Serial No	Sample Point	Date	Time Issued	Priority
R 949.-5885	130AP R	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Results
I129	LA-378-103	uCI/L	N124W	2

Sample Size: ? 1ml
Customer ID: 3APRCOMP

RERUN

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

Gross 2.7533
Tare 2.7315
Net .0218

$\frac{<2.39\times10^{-5}(1000)}{(.0218/.0305)} = <3.34\times10^{-2}$

Analyst 1: [signature] Hrs: 81805 Date: 1/8/92
Analyst 2: [signature]
Time Completed:
Lab Unit Mgr: [signature] 1-14-92

6866

Serial No	Sample Point	Date	Time Issued	Priority
R 950.-5585	130AP R	12-16-91	16:46	25

Determination	Method/Standard	Result Units	Charge Code	Results
I129	LA-378-103	% RECOVERY	N124W	2

Sample Size: ? 1ml
Customer ID: STD

RERUN

Remarks, Calculations, Results:
EDP S928 ITANK
STDN 3786 RESULT 6.56E-4
STD VAL 6.56E-4 %REC 106.6
GROSS WT. 2.7570
TARE WT. 2.7366
NET WT. .0204

$\frac{<1.39E-4(1000)}{(.0204/.0305)} = 6.56\times10^{-4}$

Analyst 1: [signature] Hrs: 81805 Date: 1/8/92
Analyst 2: [signature]
Time Completed:
Lab Unit Mgr: [signature] 1-14-92

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

CANBERRA SPECTRAN-F V2.06  SOFTWARE

10-JAN-9212:51:12


                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: 4.0
DETECTOR NUMBER:    6    /     GEOMETRY NUMBER:   1
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:     5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

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

   PLE DESCRIPTION: R 947-5585
GEOMETRY DESCRIPTION:  I-129/CULTURE TUBE
SAMPLE SIZE:   1.0000E+00 EA       / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 10-JAN-92 AT 12:00:58

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

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90
```

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

X	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	148.88	29.64	1.35	1209.	14887.	2.4	
2C	169.05	33.67	1.35	615.	3282.	7.1	CE-144
3	198.10	39.47	1.24	213.	2234.	4.9	I-129,BI-212, CE-144

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 4-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

10-JAN-9212:51:12

SAMPLE: R 947-5585
ATA COLLECTED ON 10-JAN-92 AT 12:00:58
AYED 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/EA				ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AM-241	LLD<2.17E-06		LLD<2.17E-06		59.54	
AM-243	LLD<9.31E-07		LLD<9.31E-07		74.67	
I-129	5.15E-04	+-2.52E-05	5.15E-04	+-2.52E-05	39.60	-0.13
SB-125	LLD<1.92E-05		LLD<1.92E-05		176.33	
SE-75	LLD<1.80E-06		LLD<1.80E-06		136.00	
SN-113	LLD<4.76E-06		LLD<4.76E-06		391.67	
TOTAL	5.15E-04	+-2.52E-05	5.15E-04	+-2.52E-05		

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 5.77E-03 UC/EA
TOTAL MEASURED ACTIVITY = 5.15E-04 (+-2.52E-05) UC/EA
% TECH. SPEC. = 8.93 (+-0.44)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
148.88	29.64	14887.	2.4	2.06E+01
169.05	33.67	3282.	7.1	3.11E+00

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

CANBERRA SPECTRAN-F V2.06  SOFTWARE

10-JAN-9214:25:35

                    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: 6.0
DETECTOR NUMBER:     6     /      GEOMETRY NUMBER:    1
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANA:
ANALYZED BY:          61433

SAMPLE DESCRIPTION: R-948-5685
GEOMETRY DESCRIPTION:  I-129/CULTURE TUBE
SAMPLE SIZE:    1.0000E+00 EA        / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 10-JAN-92 AT 13:35:25

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

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90
```

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

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 4-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

9 3 1 2 3 3 7 3 0

SAMPLE: R-948-5685
DATA COLLECTED ON 10-JAN-92 AT 13:35:25
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/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<2.15E-06		LLD<2.15E-06		59.54	
AM-243	LLD<1.02E-06		LLD<1.02E-06		74.67	
I-129	LLD<1.85E-05		LLD<1.85E-05		39.60	
SB-125	LLD<2.17E-05		LLD<2.17E-05		176.35	
SE-79	LLD<1.76E-06		LLD<1.76E-06		136.00	
SN-113	LLD<4.47E-06		LLD<4.47E-06		391.67	
TOTAL	0.00E-01	+-0.00E-01	0.00E-01	+-0.00E-01		

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 95.0%

ALL 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                *
*                                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

LANBERRA SPECTRAN-F V2.06  SOFTWARE

10-JAN-9215:21:14


                    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: 9.0
DETECTOR NUMBER:     6     /      GEOMETRY NUMBER:    1
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      3
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY:          61453

SAMPLE DESCRIPTION: R-949-5785
GEOMETRY DESCRIPTION:  I-129/CULTURE TUBE
SAMPLE SIZE:    1.0000E+00 EA        / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 10-JAN-92 AT 14:31:05

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

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90
```

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

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 4-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

9 3 1 2 3 5 3 3 7 0 3

SAMPLE: R-949-5785
DATA COLLECTED ON 10-JAN-92 AT 14:31:03
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/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<1.98E-06		LLD<1.98E-06		59.54	
AM-243	LLD<1.04E-06		LLD<1.04E-06		74.67	
I-129	LLD<1.87E-05		LLD<1.87E-05		39.60	
SB-125	LLD<1.72E-05		LLD<1.72E-05		176.33	
SE-75	LLD<1.99E-06		LLD<1.99E-06		136.00	
SN-113	LLD<4.90E-06		LLD<4.90E-06		391.67	
TOTAL	0.00E-01	+-0.00E-01	0.00E-01	+-0.00E-01		

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 95.0%

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

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

 ANBERRA SPECTRAN-F V2.06  SOFTWARE

10-JAN-9217:28:34


                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: 4.0
DETECTOR NUMBER:    6     /     GEOMETRY NUMBER:   1
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY:         62820

AMPLE DESCRIPTION: R949-5885
 OMETRY DESCRIPTION:  I-129/CULTURE TUBE
SAMPLE SIZE:   1.0000E+00 EA        / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 10-JAN-92 AT 16:38:25

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

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90
```

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$	3272.02	654.74	1.17	11.	232.	23.3	
2$	3276.76	655.69	1.17	11.	426.	14.4	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

$ - MULTIPLET ANALYSIS CONVERGED DUE TO LACK OF CHI-SQ IMPROVEMENT

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 4-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

9 3 1 2 3 3 7 0 6

SAMPLE: R949-5885
DATA COLLECTED ON 10-JAN-92 AT 16:38:23
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/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<2.01E-06		LLD<2.01E-06		59.54	
AM-243	LLD<1.11E-06		LLD<1.11E-06		74.67	
I-129	LLD<2.39E-05		LLD<2.39E-05		39.60	
SB-125	LLD<2.06E-05		LLD<2.06E-05		176.35	
SE-79	LLD<1.82E-06		LLD<1.82E-06		136.00	
SN-113	LLD<6.22E-06		LLD<6.22E-06		391.67	
TOTAL	0.00E-01	+-0.00E-01	0.00E-01	+-0.00E-01		

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2272.02	654.74	232.	23.3	9.83E-01
3276.76	800.69	426.	14.4	1.80E+00

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

 ANBERRA SPECTRAN-F V2.06  SOFTWARE

10-JAN-9218:23:53


                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: 4.0
DETECTOR NUMBER:    6     /     GEOMETRY NUMBER:   1
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 95.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY:         62820

SAMPLE DESCRIPTION: R950-3585
 OMETRY DESCRIPTION:  I-129/CULTURE TUBE
SAMPLE SIZE:   1.0000E+00 EA        / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL129

COLLECT STARTED ON 10-JAN-92 AT 17:33:43

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

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

ENERGY CALIBRATION PERFORMED 21-JUN-90
EFFICIENCY CALIBRATION PERFORMED 18-JUN-90
```

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	148.92	29.60	1.36	1253.	12982.	2.4	
2C	169.14	33.69	1.36	634.	2944.	6.2	CE-144
3	198.21	39.50	1.27	226.	1904.	5.5	[illegible] CID, CE-144

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 4-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

9 3 1 2 1 6 3 5 7 0 9

SAMPLE: R950-0085
DATA COLLECTED ON 10-JAN-92 AT 17:33:43
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/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<2.09E-06		LLD<2.09E-06		59.54	
AM-243	LLD<9.44E-07		LLD<9.44E-07		74.67	
I-129	4.39E-04	+-2.41E-05	4.39E-04	+-2.41E-05	39.60	-0.10
SB-125	LLD<2.06E-05		LLD<2.06E-05		176.33	
SE-75	LLD<1.76E-06		LLD<1.76E-06		136.00	
SN-113	LLD<4.76E-06		LLD<4.76E-06		391.67	
TOTAL	4.39E-04	+-2.41E-05	4.39E-04	+-2.41E-05		

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 5.77E-03 UC/EA
TOTAL MEASURED ACTIVITY = 4.37E-04 (+-2.41E-05) UC/EA
% TECH. SPEC. = 7.61 (+-0.42)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
143.92	29.65	12982.	2.4	1.80E+01
169.14	33.69	2944.	6.2	2.76E+00

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: STRONTIUM 90	Sample Prep: UNDIGESTED

Instrument: WB27812	Procedure/Rev: LA-220-101/D-0
Technologist: S. L. COBB	Date: 1-03-92
Starting Time: NA	Temperature: NA
Ending Time: NA	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5586	11		
2	REAGENT BLANK	R948-5686	12		
3	SAMPLE 3APR COMP	R949-5786	13		
4	SAM DUP OF 3APR COMP	R949-5886	14		
5	FINAL LMCS CHECK STD	R950-5586	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	150B46/1.0 mL			NA

A-6000-881 (03/92)

STRONTIUM 90 ANALYSIS - UNDIGESTED SAMPLE

Sample No	Sample Point	Date	Time Sampled	Priority
R 947.-5586	130AP R	12-16-91	17:15	25
Determination: SR90	Method/Standard: LA-220-101	Result Units: % RECOVERY	Charge Code: N124W	Rerun: 0
Sample Size: 7 1ml + 1ml	RUSH		Container ID: STD	

Remarks, Calculations, Results
COUNT ON DETECTOR#11
5376 ITS
STD#150846 RESULT 2.86E-7
STD VAL 2.86E-7 %REC 102.5%
SEP time 1938
date 01-03-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82588	169349			
SLCobb				
01-03-92			1-6-92	

a. 9.3633 / 7.2753 / .0880
b. 7.1427 / 7.0527 / .0900
R947-5586
11/2 1-3-92 AJ 2230 ΔT = 2.87
(a) 6498/10 - 14
(b) 6371/10 - 14
Sr Calculation by AJJ on 01-04-1992 at 02:31:19
Set #11 2-inch count Sr eff : .3919 Y eff : .4442
Sample size : 1 ml Dilution : 1 Method : 1
Count # 1 Decay time = 2.87 hrs
6498 / 10 - 14.0 = 7.0431E-01 uCi/L strontium .9686
Count # 2 Decay time = 2.87 hrs 7.86 x10^-1
6371 / 10 - 14.0 = 6.9755E-01 uCi/L strontium .7871

Sample No	Sample Point	Date	Time Sampled	Priority
R 948.-5686	130AP R	12-16-91	16:11	25
Determination: SR90	Method/Standard: LA-220-101	Result Units: uCI/L	Charge Code: N124W	Rerun: 0
Sample Size: 7 1ml + 1ml	RUSH		Container ID: BLK	

Remarks, Calculations, Results
REAGENT BLANK
COUNT AS uCI/L
SEP time 2000 <3.68E-3
date 01-03-91

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82583	169349			
SLCobb				
01-03-92			1-6-92	

a. 9.2745 / 7.1832 / .0923
b. 7.0830 / 6.9926 / .0904
R 948-5686
#11/2 1-3-92 AJ 2255 ΔT = 2.72
(a) 144/10 - 14
(b) 141/10 - 14
Sr Calculation by AJJ on 01-04-1992 at 02:31:19
Set #11 2-inch count Sr eff : .3919 Y eff : .4442
Sample size : 1 ml Dilution : 1 Method : 1
Count # 1 Decay time = 2.72 hrs
144 / 10 - 14.0 = 3.5336E-03 uCi/L strontium .923 <3.836-3
Count # 2 Decay time = 2.72 hrs <3.686-3
141 / 10 - 14.0 = 3.1815E-03 uCi/L strontium .907 <3.526-3

Sample No	Sample Point	Date	Time Sampled	Priority
R 949.-5786	130AP R	12-16-91	16:44	25
Determination: SR90	Method/Standard: LA-220-101	Result Units: uCI/L	Charge Code: N124W	Rerun: 0
Sample Size: 7 1ml + 1ml SR carrier	RUSH		Container ID: 30PRCOMP	

Remarks, Calculations, Results
COUNT AS uCI/L
2.62 µCi/L
SEP time 1948
date 01-03-92

Analyst-1	Analyst-2	Analyst-3	Analyst-4	Analyst-5
82583	169349			
SLCobb				
01-03-92			1-6-92	

a. 9.1036 / 7.0111 / .0925
b. 9.1023 / 7.0107 / .0916
R-949-5786
11/2 1-3-92 AJ ~~2250~~ 1-3-92 2320 ΔT = 3.53
(a) 22322/10 - 14
(b) 21677/10 - 14
Sr Calculation by AJJ on 01-04-1992 at 02:31:19
Set #11 2-inch count Sr eff : .3919 Y eff : .4442
Sample size : 1 ml Dilution : 1 Method : 1
Count # 1 Decay time = 3.53 hrs
22322 / 10 - 14.0 = 2.4472E-06 uCi/L strontium .925 2.644
Count # 2 Decay time = 3.53 hrs 2.62 µCi/L
21677 / 10 - 14.0 = 2.2742E-06 uCi/L strontium .916 2.592

STRONTIUM 90 ANALYSIS - UNDIGESTED SAMPLE

Sample No	Sample Point	Date	Time Sampled	Priority
R 949.-5886	130AP R	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	uCI/L	N124W	0

Sample Size: 2 1ml + 1ml SP CANNING

RUSH

Customer ID: 3APRCOMP

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

2.62 uCi/L

SEP time 1948
date 01-08-92

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583	67599			
SL Cobb				

Date	Time Completed	Lab Unit Mgr
01-03-92		1-6-92

a. 7.5874
7.2946
.0928

b. 7.5602
7.2674
.0928

R 949-5886

11/2 1-3-92 ag 2345 ΔT = 3.95

(a) 22359/10 -14

(b) 22306/10 -14

Sr Calculation by ALJ on 01-06-1992 at [illegible]
Det #11 2 -stack count Sr eff : .7919 Y eff : [illegible]
Sample size : 1 mL Dilution : 1 Method : 1
Count # 1 Decay time = 3.95 hrs
22359 / 10 - 14.0 = [illegible] / .928 strontium 2.627
Count # 2 Decay time = 3.95 hrs 2.62E
22306 / 10 - 14.0 = [illegible] / .928 strontium 2.621

Sample No	Sample Point	Date	Time Sampled	Priority
R 950.-5586	130AP R	12-16-91	15:45	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
SR90	LA-220-101	% RECOVERY	TYPE QAP	Range

Sample Size: 1ml + 1ml

RUSH

Customer ID:

Remarks, Calculations, Results:
COUNT ON DETECTOR#11
5376 IIS
STD# 150846 RESULT 2.6435-1
STD VAL 2.7466-1 %REC 99.0
SEP time 1938
date 01-03-92

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583	67599			
SL Cobb				

Date	Time Completed	Lab Unit Mgr
01-03-92		1-6-92

a. 7.5549
7.2481
.0918

b. 7.1033
7.0124
.0909

R 950-5586

11/2 1-3-92 ag 0015 ΔT = 4.87

(a) 6489/10 -14

(b) 6646/10 -14

Sr Calculation by ALJ on 01-06-1992 at [illegible]
Det #11 2 -stack count Sr eff : .7919 Y eff : [illegible]
Sample size : 1 mL Dilution : 1 Method : 1
Count # 1 Decay time = 4.87 hrs
6489 / 10 - 14.0 = [illegible] uCi/L / .909 strontium .7512
Count # 2 Decay time = 4.87 hrs 2.6436-1
6646 / 10 - 14.0 = [illegible] uCi/L / .909 strontium .7777

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: SELENIUM 79	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-365-132/B-0
Technologist: S. A. CATLOW	Date: 1-7-92
Starting Time: NA	Temperature: NA
Ending Time: NA	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	REAGENT BLANK	R948-5689	11		
2	SAMPLE 3APR COMP	R949-5789	12		
3	SAM DUP OF 3APR COMP	R949-5889	13		
4			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
NA				

A-6000-881 (03/92)

9 3 1 2 1 3 3 7 1 4

SELENIUM 79 ANALYSIS - UNDIGESTED SAMPLE

1

Spec No	Sample Point	Date	Time Issued	Priority
R 948.-5689	130AP R	12-16-91	16:43	26

Determination	Method Standard	Report Units	Charge Code	Results
SE79	LA-365-132	uCI/L	N124W	0

Sample Size	Container ID
5 mL	BLK

Remarks, Calculations, Results
REAGENT BLANK
COUNT AS uCI/L
2 mL 103C15-B

0.76417
0.74723
0.01694

$\frac{2.10(1000)}{\left(\frac{0.0694}{0.0200}\right)(2.22\times10^6)} = 2.5.32\times10^{3}$

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
SAPatten	69549			
61965				

Date	Time Completed	Lab Unit Mgr
1-7-92		1-9-92 SAPatten

2

Spec No	Sample Point	Date	Time Issued	Priority
R 949.-5689	130AP R	12-16-91	[illegible]	[illegible]

Determination	Method Standard	Report Units	Charge Code	Results
SE79	LA-365-132	[illegible]	[illegible]	

Sample Size	Container ID
5 mL	[illegible]

Remarks, Calculations, Results
COUNT AS uCI/L
2 mL 103C15-B

0.77920
0.76083
0.01837

$\frac{26.79(1000)}{\left(\frac{0.01837}{0.0200}\right)(2.22\times10^6)} = 1.32\times10^{-2}\ \mu C/L$

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
SAPatten	69549			
61966				

Date	Time Completed	Lab Unit Mgr
1-7-92		1-9-92 SAPatten

3

Spec No	Sample Point	Date	Time Issued	Priority
R 949.-5689	130AP R	12-16-91	16:45	26

Determination	Method Standard	Report Units	Charge Code	Results
SE79	LA-365-132	uCI/L	N124W	0

Sample Size	Container ID
5 mL	SAPRCUNW

Remarks, Calculations, Results
DUPLICATE SAMPLE
COUNT AS uCI/L
2 mL 103C15-B

0.77109
0.76220
0.01889

$\frac{19.08(1000)}{\left(\frac{0.0889}{0.0200}\right)(2.22\times10^6)} = 9.10\times10^{-3}\ \mu C/L$

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
SAPatten	69549			
61965				

Date	Time Completed	Lab Unit Mgr
1-7-92		1-9-92 SAPatten

MODEL: [illegible] SER-79 RESET TIME: [illegible]
[illegible] REPORT [illegible] REPORT [illegible] REPORT
[illegible] MODE MONITOR: [illegible]
TIME-TIME: [illegible]
[illegible] SIGMA: [illegible] BKG [illegible] BKG [illegible]

[illegible] LABEL DPM SET UP ON 20 DEC 991 [illegible]

[illegible] 1D[illegible]-14 UNKNOWN REPLICA [illegible]
[illegible] NORM FACTOR [illegible]
[illegible] UNITS [illegible]
[illegible] HALF LIFE CORRECTION
[illegible] UNKNOWN NORM FACTORS: BACKGROUND [illegible]
[illegible] 1: ACHARD [illegible] SIGMA LIMITS [illegible]
[illegible] UNITS [illegible]
[illegible] DPM [illegible]

SAM	[illegible]	CH	DPM	[illegible]	TIME	EL TIME	AVG MM	[illegible]
[illegible]	[illegible]	1	78.50	[illegible]	[illegible]	10.60	[illegible]	[illegible]

[illegible] SLENG CURVE CORRECT

[illegible]
SLENG CURVE COEFFICIENTS
[illegible] [illegible] [illegible] [illegible]

BACKGROUND SLENG- CURVE CORRELATION TABLE

[illegible]	[illegible]	MEASURED CPM	CALCULATED CPM	PERCENT DIFF	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	

[illegible] SIGMA LIMITS [illegible] HIGH [illegible]
[illegible] SIGMA LIMITS [illegible] HIGH [illegible]

[illegible]	[illegible]	CPM	[illegible]	EL TIME	AVG MM	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: TRITIUM	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-218-113/B-0
Technologist: J. SOLBRACK	Date: 1-04-92
Starting Time: NA	Temperature: NA
Ending Time: NA	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R947-5587	11		
2	REAGENT BLANK	R948-5687	12		
3	SAMPLE 3APR COMP	R949-5787	13		
4	SAM DUP OF 3APR COMP	R949-5887	14		
5	FINAL LMCS CHECK STD	R950-5587	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			NA

A-6000-881 (03/92)

TRITIUM ANALYSIS - UNDIGESTED SAMPLE

1

Sample No	Sample Point	Date	Time Issued	Priority
K 949.-5587	150AP K	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Range
H3	LA-218-113	% RECOVERY	N12AW	0

Sample Size: 1 ml
Customer ID: STD

Remarks, Calculations, Results
EDF KV07 ENVSTD
STD# 34849 RESULT 5.26-1 $\frac{1275.38(1000)}{2.22\times10^6(1)}$ = 5.26-1
STD VAL 6.45591-1 %REC 89.2

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82020	69549			

Date: 01-04-92 | Time Completed: | Lab Unit Mgr: | 1-6-92

2

Sample No	Sample Point	Date	Time Issued	Priority
K 948.-5587	150AP K	12-16-91	[illegible]	[illegible]

Determination	Method/Standard	Result Units	Charge Code	Range
H3	LA-218-113	uCI/L	[illegible]	

Sample Size: 1 ml
Customer ID: [illegible]

Remarks, Calculations, Results
REAGENT BLANK
COUNT AS uCI/L
$\frac{<7(1000)(1)}{2.22\times10^6}$ = <3.15E-3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82020	69549			

Date: 01-04-92 | Time Completed: | Lab Unit Mgr: | 1-6-92

3

Sample No	Sample Point	Date	Time Issued	Priority
K 949.-5587	150AP K	12-16-91	16:44	25

Determination	Method/Standard	Result Units	Charge Code	Range
H3	LA-218-113	uCI/L	N12AW	0

Sample Size: 1 ml
Customer ID: SMPRCUPP

Remarks, Calculations, Results
COUNT AS uCI/L
$\frac{11617.62(1000)(1)}{2.22\times10^6}$ = 5.23

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82020	69549			

Date: 01-04-92 | Time Completed: | Lab Unit Mgr: | 1-6-92

4

Sample No	Sample Point	Date	Time Issued	Priority
K 949.-5587	150AP K	12-16-91	[illegible]	[illegible]

Determination	Method/Standard	Result Units	Charge Code	Range
H3	LA-218-113	uCI/L	[illegible]	

Sample Size: 1 ml
Customer ID: [illegible]

Remarks, Calculations, Results
DUPLICATE SAMPLE
COUNT AS uCI/L
$\frac{11651.52(1000)(1)}{2.22\times10^6}$ = 5.25

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82020	69549			

Date: 1-4-92 | Time Completed: | Lab Unit Mgr: | 1-6-92

5

Sample No	Sample Point	Date	Time Issued	Priority
K 950.-5587	150AP K	12-16-91	16:45	25

Determination	Method/Standard	Result Units	Charge Code	Range
H3	LA-218-113	% RECOVERY	N12AW	

Sample Size: 1 ml
Customer ID: STD

Remarks, Calculations, Results
EDF KV07 ENVSTD
STD# 34849 RESULT 6.015-1
STD VAL 6.4591-1 %REC 93.1
$\frac{1335.41(1000)(1)}{2.22\times10^6}$ = 6.015-1

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82020	69549			

Date: 01-04-92 | Time Completed: | Lab Unit Mgr: | 1-6-92

USER: 1 ID:H-3 TRITIUM PRESET TIME: 10.00 SAT 04 JAN 1992 10:14
SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
H#: 1 AQC:Y QCF:N RCM:Y 2 PHASE MONITOR:N
RCM-TIME: 0.10 INT:999.95
CHANNEL 1-LL: 0 UL: 400 2SIGMA: 0.10 BKG SUB: 0.00 BKG 2SIG: 0.00 LSR: 0

SINGLE LABEL DPM SET UP ON 20 DEC 1991 13:23

UNKNOWN ID:H-3 TRITIUM UNKNOWN REPLICATES: 1
UNKNOWN NORM FACTOR ISO1:Q 1.00000
UNKNOWN UNITS ISO1:DPM
UNKNOWN HALF LIFE CORRECTION:N
INDIVIDUAL UNKNOWN NORM FACTORS:N BACKGROUND QUENCH CURVES:Y
STANDARD ID:PACKARD 6008501 #54 QUENCH LIMITS LOW:0.000 HIGH:252.0
HALF LIFE(DAYS) ISO1:N
STANDARD DPM ISO1:0.00000000

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
B1	**- 1	1	19.90	14.18	10.00	10.59	95.0	0.75	

BACKGROUND QUENCH CURVES: CONSTANT

CHANNEL 1
QUENCH CURVE COEFFICIENTS
A: 19.90000 B:0.00000000 C:0.00000000 D:0.00000000000

BACKGROUND QUENCH CURVE CORRELATION TABLE

BKG	H#	MEASURED CPM.	CALCULATED CPM.	PERCENT DIFF.	FLAG
1	95.0	19.90	19.90	0.00	

BACKGROUND QUENCH LIMITS LOW:0.000 HIGH:1000.
TOTAL QUENCH LIMITS LOW:0.000 HIGH:252.0

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
1	**- 3	1	584.50	2.62	10.00	21.44	95.0	0.08	
	ISO1 %EFF CH1:44.15						ISO1 DPM	:1278.782	
2	**- 4	1	21.40	13.67	10.00	32.18	94.0	0.56	
	ISO1 %EFF CH1:44.39						ISO1 DPM	:3.379094	
3	**- 5	1	5204.70	0.88	10.00	42.92	93.0	0.01	
	ISO1 %EFF CH1:44.63						ISO1 DPM	:11617.62	
4	**- 6	1	5223.40	0.88	10.00	53.67	93.0	0.02	
	ISO1 %EFF CH1:44.63						ISO1 DPM	:11659.52	

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
5	**- 7	1	609.50	2.56	10.00	64.42	95.0	0.08	
	ISO1 %EFF CH1:44.15						ISO1 DPM	:1335.405	

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R949	Customer ID: 3APR COMP
Analysis: TOTAL ALPHA/ALPHA ENERGY	Sample Prep: UNDIGESTED

Instrument: WB57237 WB57265	Procedure/Rev: LA-548-101/A-2
Technologist: NA	Date: 06-04-92
Starting Time: NA	Temperature: NA
Ending Time: NA	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	SAMPLE 3APR COMP	R949-1250	11		
2			12		
3			13		
4			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
NA				

A-6000-881 (03/92)

TOTAL ALPHA/ALPHA ENERGY ANALYSIS - UNDIGESTED SAMPLE

4.3 7198

Sample No	Sample Point	Date	Time Issued	Priority
S 949 -1250	103 6-4-92	12-16-91	16:04	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT/AEA	LA-504-101	uCi/Sample	W119U	0

Sample Size	Customer ID
	36PRCDNP

Remarks, Calculations, Results

^{234}U - 1.05×10^{-6} g/L

^{235}U - 1.57×10^{-7} g/L

^{238}U - 3.24×10^{-3} g/L

AEA-490 MIN
ATTACH PRINT OUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
64965	[illegible]			
[illegible] 6-4-92	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6-4-92		[illegible] 6/4/92	[illegible]

#1 6-4-92 [illegible]

$\frac{1260}{30}$ -9 660 D/m

^{234}U	.0787	51.39 g/L	3.21^{-9} g/L	0.027%	1.05^{-6} g/L
^{235}U	.0405	2.67	5.57^{-7}	4.03%	1.57^{-7} g/L
^{238}U	.1501	9.91	1.33^{-5}	95.95	3.24^{-3} g/L

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-949-1250
File ID: SD7198.SPC

Counted on: 6/ 4/92 @17: 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	13.0	12.1	263.260	263.260	24.000	23.202	12.000	14.087
2	241.2	243.6	152.982	152.982	36.000	38.139	18.000	24.786
3	10.7	9.8	85.464	85.464	24.000	37.519	12.000	6.566
4	62.9	66.0	29.986	29.986	32.000	19.424	16.000	17.118

PEAK RESULTS

	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1		0.0307		5.316		0.11	0.28	2.03	0.916E-06
2	Np237	0.7787	4.781	4.797	-0.016	0.18	7.21	59.34	0.267E-04
3	U 235	0.0405	4.396	4.480	-0.084	0.18	0.37	4.71	0.212E-05
4	U 238	0.1501	4.200	4.219	-0.019	0.09	1.39	12.93	0.582E-05

DETECTOR CALIBRATION

Energy(MEV) = 4.078 + (0.0047)*Channel
Energy range (MeV): 4.078 TO 6.485
Efficiency = 0.1397 CPM/DPM

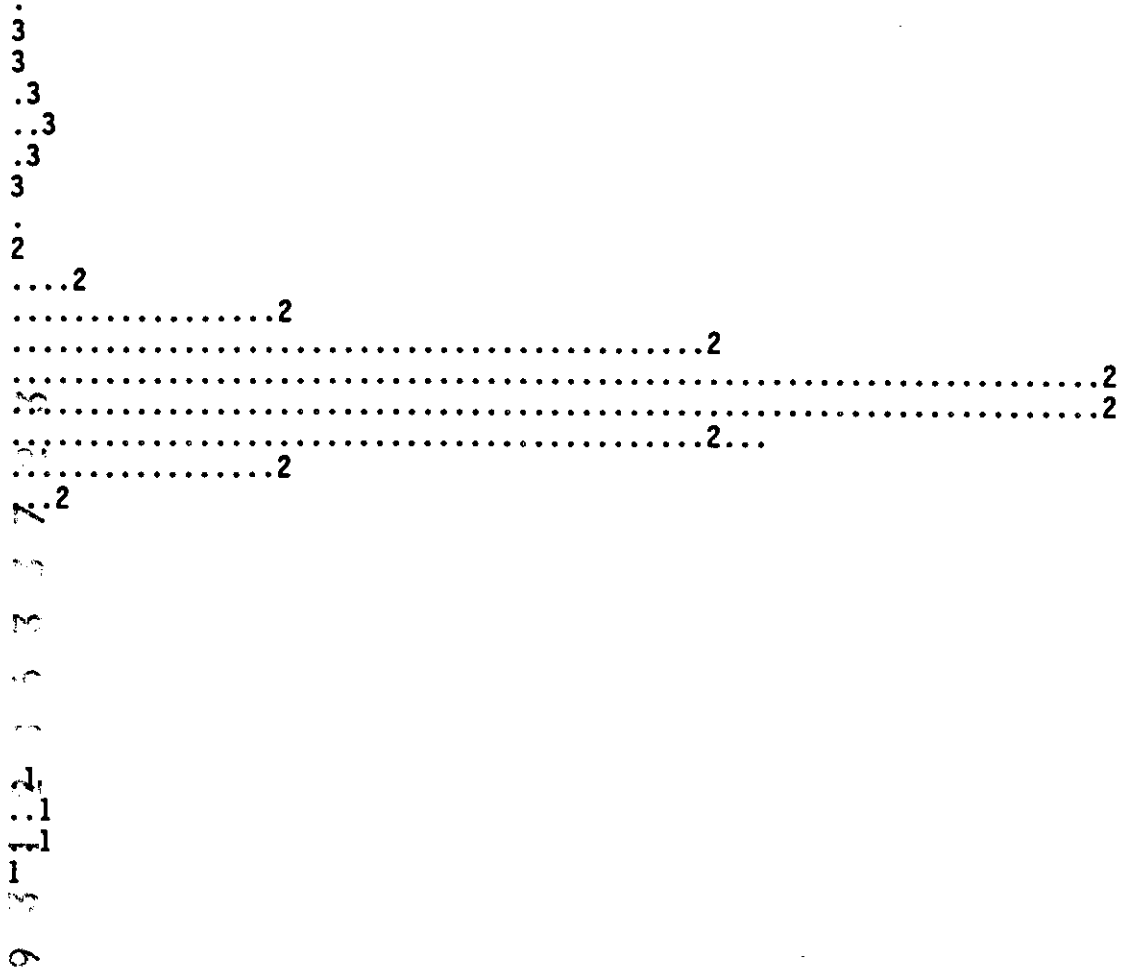
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	4624.0	100.000
Smoothed	4623.9	99.999
Composite fit	4631.1	100.154
Residuals	-7.2	-0.156

Analyzed by: _____
61453

SPECTRUM SD7198.SPC

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 900.1



Raw Data Dump for AEA Spectrum: SP:SD7198.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	11.	9.	15.	16.	20.	18.
21	25.	39.	29.	29.	35.	43.	28.	39.	38.	23.
31	25.	36.	24.	42.	22.	32.	23.	18.	16.	7.
41	10.	9.	2.	5.	3.	1.	4.	0.	1.	0.
51	1.	1.	3.	1.	1.	0.	2.	0.	2.	1.
61	2.	4.	0.	2.	3.	4.	5.	3.	1.	5.
71	5.	2.	0.	4.	5.	4.	2.	4.	7.	6.
81	7.	6.	5.	2.	5.	7.	3.	10.	5.	3.
91	2.	2.	3.	2.	2.	3.	1.	4.	1.	0.
101	2.	2.	2.	1.	1.	3.	2.	1.	3.	0.
111	0.	3.	1.	2.	1.	1.	3.	4.	5.	3.
121	3.	5.	5.	13.	6.	11.	14.	19.	15.	29.
131	27.	31.	43.	42.	45.	60.	67.	61.	72.	70.
141	98.	69.	111.	112.	112.	114.	125.	124.	125.	130.
151	108.	144.	120.	128.	109.	117.	105.	101.	104.	90.
161	86.	78.	90.	75.	64.	63.	43.	43.	26.	24.
171	16.	15.	11.	11.	8.	5.	2.	6.	2.	1.
181	1.	2.	0.	0.	0.	0.	0.	0.	0.	1.
191	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
201	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
211	1.	0.	0.	0.	0.	0.	0.	1.	1.	0.
	0.	0.	0.	0.	2.	0.	0.	0.	0.	1.
231	1.	1.	0.	0.	0.	0.	1.	0.	0.	1.
241	0.	1.	1.	1.	0.	0.	2.	1.	1.	5.
251	3.	3.	4.	2.	4.	4.	4.	8.	7.	8.
261	7.	9.	6.	6.	8.	4.	7.	1.	5.	1.
271	8.	4.	2.	1.	1.	0.	4.	0.	0.	2.
281	3.	2.	0.	0.	0.	1.	0.	1.	1.	0.
291	3.	1.	0.	0.	1.	1.	0.	0.	0.	0.
301	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
311	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
341	0.	1.	2.	0.	1.	0.	0.	0.	0.	0.
351	0.	2.	1.	0.	0.	1.	0.	0.	0.	0.
361	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	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.	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.
	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
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511	0.	0.								

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