START

STA 4

JAN 07 1993

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 140626

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Processing and Analytical Laboratories	NA
5. Proj./Prog./Dept./Div.:	**6. Cog. Engr.:**	**7. Purchase Order No.:**
242-A Evaporator/Waste Management/Processing and Analytical Laboratories/Laboratory Data Management	M. L. Bell	NA

8. Originator Remarks:
Total document includes SD-WM-DP-025, Rev 0, and Addendums 1-18

9. Equip./Component No.: NA

10. System/Bldg./Facility: NA

11. Receiver Remarks:

12. Major Assm. Dwg. No.: NA

13. Permit/Permit Application No.: NA

14. Required Response Date: December 22, 1992

JAN 1993 RECEIVED EDMC

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-DP-025	NA	0	242-A Evaporator Feed Characterization Data Package	4	2	1	

16. KEY

Impact Level (F)	Reason for Transmittal (G)	Disposition (H) & (I)
1, 2, 3, or 4 (see MRP 5.43)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
2	1	Cog.Eng. M. L. BELL			T6-16						
2	1	Cog. Mgr. M. L. BELL			T6-16						
		QA NA									
		Safety NA									
		Env. NA									

BEST AVAILABLE COPY

18.	19.	20.	21. DOE APPROVAL (if required)
M.L. BELL 12-28-92 Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	M.L. BELL 12/28/92 Cognizant/Project Engineer's Manager Date	Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments

BD-7400-172-2 (07/91) GEF097

BD-7400-172-1 (07/9

THIS PAGE INTENTIONALLY
LEFT BLANK

SUPPORTING DOCUMENT

1. Total Pages 510

2. Title
242-A Evaporator Feed Characterization Data

3. Number
WHC-SD-WM-DP-025

4. Rev No.
0

5. Key Words
242-A Evaporator, Evaporator, Characterization Data, Data Package, Analytical Data

6. Author
Name: M. L. Bell
Signature
Organization/Charge Code 12000/J120H

7. Abstract

APPROVED FOR PUBLIC RELEASE cw 12-14-92

8. PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.

PATENT STATUS - This document copy, since it is transmitted in advance of patent clearance, is made available in confidence solely for use in performance of work under contracts with the U.S. Department of Energy. This document is not to be published nor its contents otherwise disseminated or used for purposes other than specified above before patent approval for such release or use has been secured, upon request, from the Patent Counsel, U.S. Department of Energy Field Office, Richland, WA.

DISCLAIMER - This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

9. Impact Level 4

10. RELEASE STAMP

OFFICIAL RELEASE BY WHC 13
DATE JAN 07 1993
STA 4

9312830042

THIS PAGE INTENTIONALLY
LEFT BLANK

SIGNATURE PAGE

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

J. H. Tillman
242-A Evaporator Project Manager

7/29/92
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

7/30/92
Date

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

L. P. Markel
Laboratory Q.A. Officer

9/12/92
Date

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

M. A. Bell
Manager
Processing and Analytical Laboratories

9-14-92
Date

THIS PAGE INTENTIONALLY
LEFT BLANK

Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

222-S Analytical Laboratory

Project: 242 - A EVAPORATOR FEED CHARACTERIZATION

Tank: 102AW, RISER #22A

Customer Id. Number: 2AW-BD-1 (R332)
2AW-BD-2 (R333)

Report Revision: 0

Date Printed: June 23, 1992

9 3 1 2 8 3 0 0 4 4

Hanford Operations and Engineering Contractor for the US Department of Energy

THIS PAGE INTENTIONALLY
LEFT BLANK

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 20

Summary Data Report 21

Undigested Sample Analysis Results 23

Sample 2AW-BD-1, R332

Total Alpha/Alpha Energy Analysis 26

Americium 241 Analysis 31

Carbon 14 Analysis 49

Iodine 129 Analysis 52

Selenium 79 Analysis 72

Technetium 99 Analysis 76

Uranium Analysis 80

Sample 2AW-BD-2, R333

Total Alpha/Alpha Energy Analysis 83

Americium 241 Analysis 88

Carbon 14 Analysis 97

Iodine 129 Analysis 100

Selenium 79 Analysis 108

Technetium 99 Analysis 110

Uranium Analysis 112

This report consists of pages 1 through 113, plus pages 5.1-5.21 and 6.1-6.3.

THIS PAGE INTENTIONALLY
LEFT BLANK

NARRATIVE

9 3 1 2 3 3 0 0 4 6

THIS PAGE INTENTIONALLY
LEFT BLANK

P.O. Box 1970 Richland, WA 99352

242-EVAPORATOR FEED CHARACTERIZATION

INORGANIC CASE NARRATIVE

Introduction

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

Samples submitted to the laboratory were identified as:

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

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

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

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

Metals by ICP

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

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

9312835300448

Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

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 102AP, 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) <u>Instrument Detection Limits (IDL).</u> 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:

7

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

9 3 1 2 8 6 3 0 0 5 0

Detection Limits of Radionuclides

Listed below are the detection limits for indicated radionuclides for samples R332 and R333.

Radionuclide	DL uCi/L
Am-241	2.3×10^{-2}
C-14	2.3×10^{-3}
Tc-99	8.3×10^{-2}
I-129	3.3×10^{-2}
Se-79	3.0×10^{-2}
Total U	6.9×10^{-3} g/L

Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

242-EVAPORATOR FEED CHARACTERIZATION

INORGANICS CASE NARRATIVE

TANK: 102AW

Metals, anion, inorganic, and radionuclides data review for the 242-A Evaporator Feed Characterization Project Fiscal Year 1991.

Tank: 102AW (referred to as 102AW in the remainder of this report)

These samples appeared aqueous with no visible organic layer. All samples had a light yellow tint and 2291-4-3 (R9411) had solids present. Most check standards were within control limits except for some metals; i.e., aluminum, iron, and sodium. Also some of the radionuclides in the check standards were outside the control limits.

Ion Chromatography (IC) Anions and Conventional Parameters

Customer Sample #	Lab. I.D. #
2291-1-3	R9408
2291-2-3	R9409
2291-3-3	R9410
2291-4-3	R9411

Anions are determined on the undigested samples that are diluted if necessary. IC is used to determine fluoride, chloride, nitrate, nitrite, phosphate, and sulfate anions. All duplicates were within the control limits of 20% relative percent difference (RPD). The results were consistent over all samples analyzed for this batch of samples. The sulfate spike recovery data was biased high due to matrix interferences and the high ion content of the sample. The spike recovery data was bracketed by check standards that were within the limits. Some of the parameters for sample 2291-1-3 (R9408) were run in duplicate as a quality check of the method. The RPD for sulfate, phosphate, nitrate, and nitrite were within the defined control limits.

Duplicate cyanide analyses were run on sample 2291-1-3 (R9408). The RPD for this sample was within the control limit and the spike recovery value was about 95%. The results of the check standards run before and after the sample were 100.5 and 99.1% respectively. The check standards run before and after Total Inorganic Carbon (TIC) and Total Organic Carbon (TOC) indicate good accuracy for these analytes. No exotherm was detected for this batch of

Hanford Operations and Engineering Contractor for the US Department of Energy

9 3 1 2 8 6 3 0 0 5 2

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

Radiochemical Analysis

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

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

Metals Analysis

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

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

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

Riser #22A Radiochemical Analysis

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

These samples were used to determine americium 241 and several other radionuclides because of concern for criticality. Isotopic analysis for uranium was accomplished using Alpha Total/Alpha Energy Analysis.

The sample was run in duplicate except for the isotopic uranium. The precision and accuracy data were within the limits of control. An additive of the isotopic uranium data agrees well with the total uranium results.

For no apparent reason, the spikes were not run for Tritium with this batch of samples.

John H. Tillman 9/9/92

John H. Tillman, Manager
Inorganic Chemistry PAL

Westinghouse Hanford Company

Internal Memo

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

To: T. D. Blankenship R1-62

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

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

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

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

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

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

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.

9 3 1 2 8 6 3 0 0 5 6

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.

R. L. Weiss, Principal Scientist
Office of Sample Management

jmd

Attachments - 7

CONCURRENCE:

C. R. Stroup, Manager
Analytical Laboratories

Date 11/28/90

J. D. Briggs, Manager
222-S Analytical Laboratory Complex

Date 11/29/90

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

9 3 1 2 8 5 3 0 0 6 2

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 3 (cont)

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

		Quantitation Limits*			
Volatiles	CAS Number	Water ug/L	Low Soil ug/Kg	Med. Soil ug/Kg	On Column (ng)
1. Chloromethane	74-87-3	10	10	1200	(50)
2. Bromomethane	74-83-9	10	10	1200	(50)
3. Vinyl Chloride	75-01-4	10	10	1200	(50)
4. Chloroethane	75-00-3	10	10	1200	(50)
5. Methylene Chloride	75-09-2	10	10	1200	(50)
6. Acetone	67-64-1	10	10	1200	(50)
7. Carbon Disulfide	75-15-0	10	10	1200	(50)
8. 1,1-Dichloroethene	75-35-4	10	10	1200	(50)
9. 1,1-Dichloroethane	75-34-3	10	10	1200	(50)
10. 1,2-Dichloroethene (total)	540-59-0	10	10	1200	(50)
11. Chloroform	67-66-3	10	10	1200	(50)
12. 1,2-Dichloroethane	107-06-2	10	10	1200	(50)
13. 2-Butanone	78-93-3	10	10	1200	(50)
14. 1,1,1-Trichloroethane	71-55-6	10	10	1200	(50)
15. Carbon Tetrachloride	56-23-5	10	10	1200	(50)
16. Bromodichloromethane	75-27-4	10	10	1200	(50)
17. 1,2-Dichloropropane	78-87-5	10	10	1200	(50)
18. cis-1,3-Dichloropropene	10061-01-5	10	10	1200	(50)
19. Trichloroethene	79-01-6	10	10	1200	(50)
20. Dibromochloromethane	124-48-1	10	10	1200	(50)
21. 1,1,2-Trichloroethane	79-00-5	10	10	1200	(50)
22. Benzene	71-43-2	10	10	1200	(50)
23. trans-1,3-Dichloropropene	10061-02-6	10	10	1200	(50)
24. Bromoform	75-25-2	10	10	1200	(50)
25. 4-Methyl-2-pentanone	108-10-1	10	10	1200	(50)
26. 2-Hexanone	591-78-6	10	10	1200	(50)
27. Tetrachloroethene	127-18-4	10	10	1200	(50)
28. Toluene	108-88-3	10	10	1200	(50)
29. 1,1,2,2-Tetrachloroethane	79-34-5	10	10	1200	(50)
30. Chlorobenzene	108-90-7	10	10	1200	(50)
31. Ethyl Benzene	100-41-4	10	10	1200	(50)
32. Styrene	100-42-5	10	10	1200	(50)
33. Xylenes (Total)	1330-20-7	10	10	1200	(50)

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

9 3 1 2 8 3 0 0 6 4

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

9 3 1 2 8 6 3 0 0 6 6

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

THIS PAGE INTENTIONALLY LEFT BLANK

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 8 6 3 0 0 7 2

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 2 5 3 3 0 7 4

TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

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

SAMPLING INFORMATION

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

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

SAMPLE IDENTIFICATION

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

CHAIN OF POSSESSION

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

9312830075

TANK FARM PLANT OPERATING PROCEDURE

CHAIN OF CUSTODY

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

SAMPLING INFORMATION

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

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

SAMPLE IDENTIFICATION

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

CHAIN OF POSSESSION

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

9312863300076

#402

REQUEST FOR SPECIAL ANALYSIS (RSA)

Sample Point: 102 AW	(2) Date/Time Issued	(3) Date/Time Required	(4) Charge Code (5) Work Package
(6) Number of Samples: 2 Dose Rate mRad/Hr	(7) Customer I.D. 2AW-BD-1 (R332) 2AW-BD-2 (R333)	(8) Laboratory I.D. R1626 R1627	(9) Requester Name/Phone D.M. Thornton
(10) Release RPT			(11) Volume of Sample

(12) Determination	(13) Expected Range	(14) Minimum Detection Level	(15) Method
C^{14}			
Se^{79}			
Tc^{99}			
$Am^{241}/Cm^{243-244}$			
I^{129}			

Please mark "RUSH"

(16) Matrix (Other Metals or Anions Present)

Pull an aliquot from bottles currently labeled R332 + R333 attach new lab id to aliquot bottles and perform analyses requested per RCRA protocol.

waste code = DST waste

(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)

(19) Estimated Cost

(20) Samples Received

By	From	Date	Time

Laboratory Manager

(21) Distribution of Final Results/Sample Disposal Instructions

35

BC-6700-181 (1/87)

#402

REQUEST FOR SPECIAL ANALYSIS (RSA)

(1) Sample Point	(2) Date/Time Issued	(3) Date/Time Required	(4) Charge Code / (5) Work Package
102 AW			

(6) Number of Samples / Dose Rate mRad/Hr	(7) Customer I.D.	(8) Laboratory I.D.	(9) Requester Name/Phone
2	2AW-BD-1 (R332) 2AW-BD-2 (R333)	R1626 R1627	D.M. Thornton
(10) Release ____ RPT			(11) Volume of Sample

(12) Determination	(13) Expected Range	(14) Minimum Detection Level	(15) Method
C^{14}			
Se^{79}			
Tc^{99}			
$Am^{241}/Cm^{243-244}$			
I^{129}			

Please mark "RUSH"

(16) Matrix (Other Metals or Anions Present)

Pull an aliquot from bottles currently labeled R332 + R333 attach new lab id to aliquot bottles and perform analyses requested per RCRA protocol.

waste code = DST WASTE

(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)

(19) Estimated Cost

(20) Samples Received

By	From	Date	Time

Laboratory Manager

(21) Distribution of Final Results/Sample Disposal Instructions

36

BC-6700-181 (1/87)

SAMPLE STATUS REPORT FOR R 1624. 102 AW STD TIME: 6/10/92 14:22
DISPATCHED: 5/12/92 14:41 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/13/92 8:21

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5540	U	1.01100E 02 % RECOVERY	N	Y	N114U
5582	AM241	1.00600E 02 % RECOVERY	N	Y	N114U
5584	TC99	1.11500E 02 % RECOVERY	N	Y	N114U
5585	I129	1.15300E 02 % RECOVERY	N	Y	N114U
5588	C14	9.33000E 01 % RECOVERY	N	Y	N114U

END OF REPORT

SAMPLE STATUS REPORT FOR R 1625. 102 AW BLK TIME: 6/23/92 8:31
DISPATCHED: 5/12/92 14:44 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/13/92 8:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5640	U	< 6.88000E-03 G/L	N	Y	N114U
5682	AM241	< 2.27000E-02 uCI/L	N	Y	N114U
5684	TC99	< 8.34999E-02 uCI/L	N	Y	N114U
5685	I129	< 3.30000E-02 uCI/L	N	Y	N114U
5688	C14	< 2.25000E-03 uCI/L	N	Y	N114U
5689	SE79	OUT FOR RERUN			N114U
5689	SE79	OUT FOR RERUN			N114U
5689	SE79	OUT FOR RERUN			N114U
5689	SE79	3.22000E-03 uCI/L	N	Y	N114U

END OF REPORT

SAMPLE STATUS REPORT FOR R 1626. 102 AW 2AWBD1 TIME: 6/23/92 8:29
DISPATCHED: 5/12/92 14:56 SAMPLE HAS NOT BEEN SLURPED
IVED: 5/13/92 8:21

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
1250	AT/AEA	234U5.29E-06G/L235U1.82E-03G/L238U4.20E-02G/L			E12341
5740	U	4.16000E-02 G/L			N114U
5782	AM241	<6.730E-06 UG/ML; Cm 243/244 NOT DETECTABLE			N114U
5784	TC99	4.42000E 00 uCI/L	N	Y	N114U
5785	I129	< 3.19000E-05 uCI/ML	N	Y	N114U
5788	C14	5.08000E-06 UG/ML	N	Y	N114U
5789	SE79	OUT FOR RERUN			N114U
5789	SE79	OUT FOR RERUN			N114U
5789	SE79	OUT FOR RERUN			N114U
5789	SE79	1.58000E-02 uCI/L	N	Y	N114U
5840	U	4.38000E-02 G/L			N114U
5882	AM241	<6.660E-06 UG/ML; Cm 243/244 NOT DETECTABLE			N114U
5884	TC99	4.63000E 00 uCI/L	N	Y	N114U
5885	I129	< 3.74000E-05 uCI/ML	N	Y	N114U
5888	C14	5.24000E-06 UG/ML	N	Y	N114U
5889	SE79	OUT FOR RERUN			N114U
5889	SE79	OUT FOR RERUN			N114U
5889	SE79	OUT FOR RERUN			N114U
5889	SE79	1.61000E-02 uCI/L	N	Y	N114U
5940	U	9.02000E 01 % RECOVERY	N	Y	N114U
	I129	115.8% RECOVERY			N114U
	C14	9.46000E 01 % RECOVERY	N	Y	N114U

END OF REPORT

SAMPLE STATUS REPORT FOR R 1628. 102 AW STD TIME: 6/11/92 8:30
DISPATCHED: 5/12/92 15: 4 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/13/92 8:22

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5582	AM241	9.57000E 01 % RECOVERY	N	Y	N114U
5584	TC99	NOT REQUIRED PER STAN CATLOW			N114U
5585	I129	1.14100E 02 % RECOVERY	N	Y	N114U
5588	C14	9.29000E 01 % RECOVERY	N	Y	N114U

END OF REPORT

SAMPLE STATUS REPORT FOR R 1624. 102 AW STD TIME: 6/12/92 7:58
DISPATCHED: 5/12/92 14:41 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/13/92 8:21

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5540	U	1.01100E 02 % RECOVERY	N	Y	N114U
5582	AM241	1.00600E 02 % RECOVERY	N	Y	N114U
5584	TC99	1.11500E 02 % RECOVERY	N	Y	N114U
5585	I129	1.15300E 02 % RECOVERY	N	Y	N114U
5588	C14	9.33000E 01 % RECOVERY	N	Y	N114U

END OF REPORT

SAMPLE STATUS REPORT FOR R 1625. 102 AW BLK TIME: 6/23/92 8:31
DISPATCHED: 5/12/92 14:44 SAMPLE HAS NOT BEEN SLURPED
EIVED: 5/13/92 8:20

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5640	U	< 6.88000E-03 G/L	N	Y	N114U
5682	AM241	< 2.27000E-02 uCI/L	N	Y	N114U
5684	TC99	< 8.34999E-02 uCI/L	N	Y	N114U
5685	I129	< 3.30000E-02 uCI/L	N	Y	N114U
5688	C14	< 2.25000E-03 uCI/L	N	Y	N114U
5689	SE79	OUT FOR RERUN			N114U
5689	SE79	OUT FOR RERUN			N114U
5689	SE79	OUT FOR RERUN			N114U
5689	SE79	3.22000E-03 uCI/L	N	Y	N114U

END OF REPORT

SAMPLE STATUS REPORT FOR R 1627. 102 AW 2AWBD2 TIME: 6/23/92 8:49
DISPATCHED: 5/12/92 14:59 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/13/92 8:21

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
1250	AT/AEA	234U8.44E-06G/L235U2.26E-03G/L238U4.53E-02G/L			E12341
5740	U	4.76000E-02 G/L			N114U
5782	AM241	<6.660E-06 UG/ML; Cm 243/244 NOT DETECTABLE			N114U
5784	TC99	4.20000E 00 uCI/L	N	Y	N114U
5785	I129	< 3.63000E-05 uCI/ML	N	Y	N114U
5788	C14	5.90000E-06 UG/ML	N	Y	N114U
5789	SE79	OUT FOR RERUN			N114U
5789	SE79	OUT FOR RERUN			N114U
5789	SE79	OUT FOR RERUN			N114U
5789	SE79	1.46000E-02 uCI/L	N	Y	N114U
5840	U	4.71000E-02 G/L			N114U
5882	AM241	<6.660E-06 UG/ML; Cm 243/244 NOT DETECTABLE			N114U
5884	TC99	4.26000E 00 uCI/L	N	Y	N114U
5885	I129	< 3.25000E-05 uCI/ML	N	Y	N114U
5888	C14	4.13000E-06 UG/ML	N	Y	N114U
5889	SE79	OUT FOR RERUN			N114U
5889	SE79	OUT FOR RERUN			N114U
5889	SE79	OUT FOR RERUN			N114U
5889	SE79	1.39000E-02 uCI/L	N	Y	N114U

END OF REPORT

SAMPLE STATUS REPORT FOR R 1628. 102 AW STD TIME: 6/12/92 7:58
DISPATCHED: 5/12/92 15: 4 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/13/92 8:22

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5582	AM241	9.57000E 01 % RECOVERY	N	Y	N114U
5584	TC99	NOT REQUIRED PER STAN CATLOW			N114U
5585	I129	1.14100E 02 % RECOVERY	N	Y	N114U
5588	C14	9.29000E 01 % RECOVERY	N	Y	N114U

END OF REPORT

SAMPLE DATA SUMMARY

9 3 1 2 3 3 0 0 3 7

SUMMARY DATA REPORT

Project: 242-A EVAPORATOR FEED CHARACTERIZATION
Tank: 102AW, RISER #22A
Customer ID: 2AW-BD-1 (R332)

Undigested Sample Results

		Sample R1626		Sample Duplicate R1626	
Am 241	(5-15-92)	<6.73E-6	uCi/L	<6.66E-6	uCi/L
C 14	(5-15-92)	5.08E-6	uCi/L	5.24E-6	uCi/L
I 129	(5-13-92)	<3.19E-5	uCi/L	<3.74E-5	uCi/L
Se 79	(6-11-92)	1.58E-2	uCi/L	1.61E-2	uCi/L
Tc 99	(5-14-92)	4.42E+0	uCi/L	4.63E+0	uCi/L
U	(6-04-92)	4.16E-2	g/L	4.38E-2	g/L
AT/AEA	(6-04-92)*				
U-234		5.29E-6	g/L	NA	
U-235		1.82E-3	g/L	NA	
U-238		4.20E-2	g/L	NA	

* Additional uranium analysis requested by 242-A Evaporator Restart Program Office due to criticality concerns. Analysis was done by chemist using results from AT/AEA method.

SUMMARY DATA REPORT

Project: 242-A EVAPORATOR FEED CHARACTERIZATION
Tank: 102AW, RISER #22A
Customer ID: 2AW-BD-2 (R333)

Undigested Sample Results

		Sample R1627		Sample Duplicate R1627	
Am 241	(5-15-92)	<6.66E-6	uCi/L	<6.66E-6	uCi/L
C 14	(5-15-92)	5.90E-6	uCi/L	4.13E-6	uCi/L
I 129	(5-13-92)	<3.63E-5	uCi/L	<3.25E-5	uCi/L
Se 79	(6-11-92)	1.46E-2	uCi/L	1.39E-2	uCi/L
Tc 99	(5-14-92)	4.20E+0	uCi/L	4.26E+0	uCi/L
U	(6-04-92)	4.76E-2	g/L	4.71E-2	g/L
AT/AEA	(6-04-92)*				
U-234		8.44E-6	g/L	NA	
U-235		2.26E-3	g/L	NA	
U-238		4.53E-2	g/L	NA	

* Additional uranium analysis requested by 242-A Evaporator Restart Program Office due to criticality concerns. Analysis was done by chemist using results from AT/AEA method.

UNDIGESTED SAMPLE ANALYSIS RESULTS

UNDIGESTED SAMPLE RESULTS

Tank: 102AW, RISER #22A
Sample No.: R1626
Customer ID: 2AW-BD-1 (R332)

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:	R1624		R1625		R1626		R1626		R1626		R1628	
Lab ID: Americium 241 (5-15-92)	100.6	%	<2.27E-2	uCi/L	R1626-5782 <6.73E-6	uCi/L	R1626-5882 <6.66E-6	uCi/L	NA		95.7	%
Lab ID: Carbon 14 (5-15-92)	93.3	%	<2.25E-3	uCi/L	R1626-5788 5.08E-6	uCi/L	R1626-5888 5.24E-6	uCi/L	R1626-5988 94.6	%	92.9	%
Lab ID: Iodine 129 (5-13-92)	115.3	%	<3.30E-2	uCi/L	R1626-5785 <3.19E-5	uCi/L	R1626-5885 <3.74E-5	uCi/L	R1626-5985 115.8	%	114.1	%
Lab ID: Selenium 79 (6-11-92)	NA		3.22E-3	uCi/L	R1626-5789 1.58E-2	uCi/L	R1626-5889 1.61E-2	uCi/L	NA		NA	
Lab ID: Technetium 99 (5-14-92)	111.5	%	<8.35E-2	uCi/L	R1626-5784 4.42E+0	uCi/L	R1626-5884 4.63E+0	uCi/L	NA		NA	
Lab ID: Uranium (6-04-92)	101.1	%	<6.88E-3	ug	R1626-5740 4.16E-2	g/L	R1626-5840 4.38E-2	g/L	R1626-5940 90.2	%	NA	
Lab ID: AT/AEA (6-04-92)*					R1626-1250							
U-234	NA		NA		5.29E-6	g/L	NA		NA		NA	
U-235	NA		NA		1.82E-3	g/L	NA		NA		NA	
U-238	NA		NA		4.20E-2	g/L	NA		NA		NA	

* Additional uranium analysis requested by 242-A Evaporator Restart Program Office due to criticality concerns. Analysis was done by chemist using results from AT/AEA method.

UNDIGESTED SAMPLE RESULTS

Tank: 102AW, RISER #22A
Sample No.: R1627
Customer ID: 2AW-BD-2 (R333)

	Check Standard		Blank		Sample		Duplicate Sample		Spike of Sample		Check Standard	
Lab ID:	R1624		R1625		R1627		R1627		NA		R1628	
Lab ID: Americium 241 (5-15-92)	100.6	%	<2.27E-2	uCi/L	R1627-5782 <6.66E-6	uCi/L	R1627-5882 <6.66E-6	uCi/L	NA		95.7	%
Lab ID: Carbon 14 (5-15-92)	93.3	%	<2.25E-3	uCi/L	R1627-5788 5.90E-6	uCi/L	R1627-5888 4.13E-6	uCi/L	NA		92.9	%
Lab ID: Iodine 129 (5-13-92)	115.3	%	<3.30E-2	uCi/L	R1627-5785 <3.63E-5	uCi/L	R1627-5885 <3.25E-5	uCi/L	NA		114.1	%
Lab ID: Selenium 79 (6-11-92)	NA		3.22E-3	uCi/L	R1627-5789 1.46E-2	uCi/L	R1627-5889 1.39E-2	uCi/L	NA		NA	
Lab ID: Technetium 99 (5-14-92)	111.5	%	<8.35E-2	uCi/L	R1627-5784 4.20E+0	uCi/L	R1627-5884 4.26E+0	uCi/L	NA		NA	
Lab ID: Uranium (6-04-92)	101.1	%	<6.88E-3	ug	R1627-5740 4.76E-2	g/L	R1627-5840 4.71E-2	g/L	NA		NA	
Lab ID: AT/AEA (6-04-92)*					R1627-1250							
U-234	NA		NA		8.44E-6	g/L	NA		NA		NA	
U-235	NA		NA		2.26E-3	g/L	NA		NA		NA	
U-238	NA		NA		4.53E-2	g/L	NA		NA		NA	

* Additional uranium analysis requested by 242-A Evaporator Restart Program Office due to criticality concerns. Analysis was done by chemist using results from AT/AEA method.

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1626	Customer ID: 2AW-BD-1 (R332)
Analysis: TOTAL ALPHA/ALPHA ENERGY	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-548-101/A-2
Technologist: N/A	Date: 6-04-92
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	SAMPLE 2AW-BD-1	R1626-1250	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
N/A				N/A

A-6000-881 (03/92)

TOTAL ALPHA/ALPHA ENERGY ANALYSIS - UNDIGESTED SAMPLE

#2 2912, 43 7204

Sample No.	Sample Point	Date	Time Issued	Priority
R 1626.-1250	102 AW	5-12-92	14:56	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT/AEA	LA-548-101	uCi/Sample	F12341	0

Sample Size	Customer ID
2	2AWBD1

Remarks, Calculations, Results:

^{234}U = 5.29×10^{-6} g/L

^{235}U = 1.82×10^{-3} g/L

^{238}U = 7.20×10^{-2} g/L

AEA-400 MIN
ATTACH PRINT OUT

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

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

4.38-2

#1 IR 6-4-92
1138/30 - 9 5287 g/m R1626-1250

^{234}U	.6445	37.3 g/m	2.69^{-9} g/m	0.012%	5.29^{-6} g/L
^{235}U	.0797	4.61	9.26^{-7}	4.15%	1.82^{-3} g/L
^{238}U	.2757	15.97	2.15^{-5}	95.87%	7.20^{-2} g/L

9312865300094

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 1626-1250 102 AW
File ID: SD7204.SPC

Counted on: 6/ 8/92 @ 8: 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	159.0	157.9	147.779	147.779	36.000	39.047	18.000	20.578
2	13.9	13.3	88.176	88.176	36.000	22.146	18.000	2.287
3	100.4	102.9	26.737	26.737	32.000	17.246	16.000	16.195

PEAK RESULTS

Peak	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	p237	0.6445	4.781	4.775	0.006	0.18	4.76	40.34	0.182E-04
2		0.0797		4.495		0.10	0.59	4.34	0.195E-05
3	U 238	0.2759	4.200	4.206	-0.006	0.08	2.04	19.51	0.879E-05

DETECTOR CALIBRATION

Energy(MEV) = 4.080 + (0.0047)*Channel
Energy range (MeV): 4.080 TO 6.487
Efficiency = 0.1357 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	3741.0	100.000
Smoothed	3741.0	100.000
Composite fit	3695.2	98.775
Residuals	45.8	1.225

Analyzed by: _____
CJS

SPECTRUM SD7204.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 619.8

```
...      3
   ............................3
.......................................3
..................3.......
.3....
2
2
.2
..2
...2
...2
2

.1
..........1
.............................1.
.......................................................1
.....................................................................1.
.....................................1
.......................1
..... 1
```

aw Data Dump for AEA Spectrum: SP:SD7204.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	18.	39.	32.	38.	40.	47.
21	63.	58.	61.	57.	50.	60.	51.	47.	48.	49.
31	39.	44.	28.	38.	31.	31.	24.	16.	13.	11.
41	7.	2.	5.	3.	4.	2.	2.	1.	0.	4.
51	1.	2.	0.	3.	3.	2.	2.	3.	7.	1.
61	0.	6.	5.	6.	1.	3.	3.	1.	1.	11.
71	6.	6.	5.	5.	5.	3.	6.	7.	4.	10.
81	11.	7.	9.	2.	4.	7.	7.	4.	3.	6.
91	14.	5.	6.	2.	4.	4.	1.	2.	5.	0.
01	3.	1.	3.	0.	2.	0.	2.	3.	3.	5.
11	1.	4.	0.	1.	3.	4.	2.	7.	3.	7.
21	15.	12.	14.	10.	20.	22.	18.	34.	25.	40.
31	34.	61.	49.	43.	51.	53.	63.	70.	74.	86.
41	60.	79.	73.	70.	100.	102.	76.	70.	84.	65.
51	83.	72.	67.	58.	55.	58.	52.	35.	40.	36.
61	32.	34.	29.	14.	19.	15.	12.	7.	7.	4.
71	5.	4.	4.	1.	0.	0.	0.	0.	0.	1.
81	0.	0.	0.	1.	0.	1.	0.	2.	0.	0.
91	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
01	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
11	1.	0.	2.	0.	0.	2.	1.	1.	0.	0.
	1.	1.	1.	1.	0.	0.	0.	0.	0.	0.
31	0.	0.	2.	0.	1.	0.	0.	2.	0.	0.
41	0.	0.	1.	0.	0.	1.	0.	1.	3.	1.
51	1.	0.	2.	0.	1.	1.	3.	0.	2.	3.
61	1.	1.	1.	0.	0.	0.	1.	1.	2.	0.
71	0.	1.	0.	2.	0.	1.	0.	1.	0.	0.
81	0.	1.	1.	0.	0.	0.	1.	0.	2.	0.
91	2.	1.	0.	1.	0.	1.	1.	1.	0.	1.
01	0.	0.	1.	0.	0.	2.	0.	1.	1.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.
51	1.	1.	0.	0.	0.	0.	1.	0.	0.	2.
61	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	1.	1.	0.	1.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.								

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1626	Customer ID: 2AW-BD-1 (R332)
Analysis: AMERICIUM 241	Sample Prep: UNDIGESTED

Instrument: WB57237	Procedure/Rev: LA-503-156/D-0
Technologist: M. BIERMAN	Date: 5-15-92
Starting Time: 08:00	Temperature: 25degC
Ending Time: 14:00	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5582	11		
2	REAGENT BLANK	R1625-5682	12		
3	SAMPLE 2AW-BD-1	R1626-5782	13		
4	SAM DUP OF 2AW-BD-1	R1626-5882	14		
5	FINAL LMCS CHECK STD	R1628-5582	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	50B43/0.1 mL			N/A

A-6000-881 (03/92)

9312863.0098

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#1 5-19-92 R1624-5582

5101/30 -8

#N 2581

Serial No	Sample Point	Date	Time Issued	Priority
R 1624-5582	102 AW	5-12-92	14:36	05

Determination	Method/Standard	Result Units	Charge Code	Reruns
AM241	LA-503-156	% RECOVERY	N1140	0

Sample Size	Customer ID
? .100-10-1.0-1	STD

Remarks, Calculations, Results

EDP R201 AR001

RUSH

"AEA" - 480MIN ATTACH PRINTOUT

STDN 50843 RESULT 26577

STD VAL. %REC 100.6

Am243 (18043) .100-1

$\frac{146(2.274\times10^{-3})(1)(1000)(101)}{878}$ 26577

Dilution in 8M HNO3

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6559	[illegible]	[illegible]		
Hrs	Hrs	Hrs 5-19-92	Hrs	Hrs

Date 5/15/92 Time Completed Lab Unit Mgr [illegible]

#2 5-19-92 R1625-5682

2225/30 -7

#N 5552

Serial No.	Sample Point	Date	Time Issued	Priority
R 1625-5682	102 AW	5-12-92	14:41	05

Determination	Method/Standard	Result Units	Charge Code	Reruns
AM241	LA-503-156	uCI/L	N1140	0

Sample Size	Customer ID
? 0.5mL	BLK

Remarks, Calculations, Results

REAGENT BLANK

RUSH

"AEA" - 480MIN ATTACH PRINTOUT

COUNT AS uCI/L

Am243 (18043) .100-1

8M HNO3 1-1

$\frac{146(2.274\times10^{-3})(1)(1000)(1)}{920} = 2.27\times10^{-2}$ pCi/L

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6559	[illegible]			
Hrs	Hrs 5-19-92	Hrs	Hrs	Hrs

Date 5/15/92 Time Completed Lab Unit Mgr [illegible]

#3 5-19-92 R1626-5782

2608/30 -10

#N 8323

Serial No.	Sample Point	Date	Time Issued	Priority
R 1626-5782	102 AW	5-12-92	14:47	05

Determination	Method/Standard	Result Units	Charge Code	Reruns
AM241	LA-503-156	UG/ML	N1140	0

Sample Size	Customer ID
? .500-1	PAWDD1

Remarks, Calculations, Results

RUSH

"AEA" - 480MIN ATTACH PRINTOUT

COUNT AS uCI/L

Am243 (18043) .100-1

Con HNO3 .500-1

$\frac{460(5.68\times10^{-3})(1)(2)(100)}{1192(2.61\times10^{-3})} = 2.63\times10^{-6}$ mg

CA 243/244 - not deducted

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
6559	[illegible]			
Hrs	Hrs 5-19-92	Hrs	Hrs	Hrs

Date 5/15/92 Time Completed Lab Unit Mgr MAY 26 1992 [illegible]

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#7 7169

Serial No	Sample Point	Date	Time Issued	Priority
R 1626-5882	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AM241	LA-503-156	UG/ML	H1141	0

Sample Size	Customer ID
2 .500 ml	2AWHD1

Remarks, Calculations, Results

DUPLICATE SAMPLE

COUNT AS UCIA

Am243(18B43) .100 ml

Cm HWL .500 ml

$\frac{\text{cpm}(2.27\times10^{-2})(.1)(1000)(6)}{350}$ = 2.23 mc = 24/L = 5666 pCi/ml

Cm 243/244 = not detectable

RUSH

"AEA" - 480M

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC559				
Note	Note	Note	Note	Note
		5/19/92		
Date	Time Completed	Lab Unit Mgr		
5/15/92				

#1 5-19-92 R1626-5882

1934/30 -8

2883

Serial No	Sample Point	Date	Time Issued	Priority
R 1628-5582	102 AW	5-12-92	15:0	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AM241	LA-503-156	% RECOVERY	N1141	0

Sample Size	Customer ID
.100 ml - 10 - 1.0 ml	STD

Remarks, Calculations, Results

EDP R201 AR001 5-21-92

STDH 50B43 RESULT 25.3

STD VAL. 26481 %REC: 95.7%

Am243(18B43) .100 ml $\frac{\text{cpm}(2.27\times10^{-2})(.1)(1000)(100)}{269}$ = 25.3

Oil Dilution in 8M HWL

RUSH

"AEA" - 430M

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LC559				
Note	Note	Note	Note	Note
Date	Time Completed	Lab Unit Mgr		
5/15/92				

#3 5-19-92 R1628-5582

4658/30 -16

9312865301000

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
R1624-5582 102AW
File ID: SD2881.SPC

Counted on: 5/19/92 @16: 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	8.3	6.6	359.640	359.640	20.000	26.936	10.000	0.000
2	1702.7	1673.3	301.772	301.772	24.000	17.380	12.000	8.567
3	1522.7	1515.0	255.294	255.294	24.000	16.844	12.000	8.682

PEAK RESULTS

Peak	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
	u236	0.0349	5.756	5.754	0.002	0.12	2.42	0.00	0.188E-09
2	ru238	0.5116	5.499	5.488	0.011	0.08	35.56	0.01	0.374E-08
	Am241		5.480	5.488	-0.008				0.287E-08
3		0.4535		5.274		0.08	31.52	0.01	0.239E-08

DETECTOR CALIBRATION

Energy(MEV) = 4.100 + (0.0046)*Channel
Energy range (MeV): 4.100 TO 6.455
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	34536.0	100.000
Smoothed	34535.1	99.997
Composite fit	34756.8	100.639
Residuals	-221.8	-0.642

Analyzed by: _____
VR

SPECTRUM SD2881.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 6488.8

.....3
.....3.
.....3.
.....3
.....3..
.2...
.....2
.....2
.....2.
.....2
.....2.

Raw Data Dump for AEA Spectrum: SP:SD2881.SPC

1	0.	0.	0.	0.	0.	0.	2.	1.	0.	1.
11	0.	0.	0.	1.	0.	0.	1.	1.	2.	0.
21	1.	0.	0.	1.	2.	2.	0.	0.	1.	1.
31	0.	0.	0.	1.	0.	2.	0.	0.	4.	0.
41	2.	1.	0.	0.	0.	3.	1.	0.	2.	1.
51	0.	0.	1.	0.	0.	0.	0.	0.	0.	1.
61	0.	2.	0.	0.	1.	1.	1.	0.	2.	0.
71	1.	1.	0.	0.	0.	2.	0.	1.	0.	2.
81	0.	1.	0.	0.	1.	1.	0.	0.	1.	2.
91	1.	0.	1.	0.	0.	2.	0.	0.	2.	0.
101	0.	0.	1.	0.	1.	0.	0.	1.	0.	0.
111	0.	0.	1.	1.	2.	0.	1.	2.	0.	0.
121	3.	1.	0.	4.	2.	0.	2.	0.	1.	3.
131	2.	0.	0.	2.	2.	2.	1.	1.	3.	1.
141	1.	2.	1.	2.	2.	1.	1.	0.	1.	3.
151	0.	3.	4.	0.	2.	3.	1.	2.	1.	0.
161	2.	4.	3.	1.	2.	3.	2.	3.	2.	1.
171	1.	2.	2.	4.	3.	4.	2.	6.	4.	5.
181	2.	2.	5.	5.	5.	4.	3.	1.	6.	3.
191	5.	6.	4.	8.	3.	2.	4.	11.	6.	3.
201	6.	16.	6.	4.	16.	8.	11.	8.	8.	14.
211	14.	16.	12.	12.	13.	11.	13.	20.	13.	25.
	24.	31.	26.	24.	27.	42.	32.	40.	50.	51.
	54.	56.	60.	87.	79.	103.	124.	157.	172.	214.
241	254.	291.	353.	412.	392.	522.	573.	625.	738.	726.
251	779.	878.	872.	827.	870.	792.	762.	679.	609.	526.
261	451.	322.	281.	251.	201.	185.	116.	111.	90.	71.
271	66.	66.	63.	53.	59.	54.	77.	63.	85.	80.
281	98.	99.	148.	165.	196.	230.	250.	271.	343.	374.
291	449.	538.	606.	664.	686.	842.	865.	900.	900.	1016.
301	952.	926.	867.	797.	673.	585.	546.	457.	370.	315.
311	254.	191.	160.	139.	93.	55.	55.	43.	21.	13.
321	22.	11.	10.	3.	1.	1.	1.	1.	1.	0.
331	1.	0.	0.	1.	0.	0.	2.	1.	0.	1.
341	5.	2.	2.	3.	1.	4.	5.	1.	3.	4.
351	3.	2.	3.	4.	6.	4.	7.	2.	4.	4.
361	3.	6.	4.	5.	1.	2.	3.	1.	1.	2.
371	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.
381	0.	0.	1.	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.	1.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.
431	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
441	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
451	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.
	2.	0.	1.	0.	0.	4.	1.	1.	1.	0.
	1.	0.	0.	0.	1.	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
R1625-5682 102AW
File ID: SD5552.SPC

Counted on: 5/19/92 @16: 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	7.2	7.3	359.510	359.510	28.000	19.658	14.000	10.567
2	22.3	11.7	303.286	303.286	12.000	13.686	6.000	10.567
3	1510.2	1471.8	258.460	258.460	20.000	11.338	10.000	6.649

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
	Pu236	0.0062	5.756	5.759	-0.003	0.09	0.16	0.00	0.109E-10
	Pu238	0.0081	5.499	5.494	0.005	0.06	0.21	0.00	0.193E-10
	Am241		5.480	5.494	-0.014				0.148E-10
3		0.9856		5.284		0.05	25.47	0.00	0.169E-08

DETECTOR CALIBRATION

Energy(MEV) = 4.069 + (0.0047)*Channel
Energy range (MeV): 4.069 TO 6.475
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	13468.0	100.000
Smoothed	13468.0	100.000
Composite fit	12920.8	95.937
Residuals	547.2	4.063

Analyzed by: _____
VR

SPECTRUM SD5552.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 5188.3

9 3 1 2 8 3 0 1 0 5

```
..
.............3
..2.........................................3
.......................................................3.
...1................3.
..
```

Raw Data Dump for AEA Spectrum: SP:SD5552.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.	1.	0.	0.	0.	0.	2.	0.
31	1.	0.	1.	1.	0.	0.	1.	1.	0.	1.
41	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	1.	1.	0.	1.	0.	0.	0.	1.
61	0.	1.	1.	0.	0.	1.	0.	0.	0.	1.
71	2.	0.	0.	0.	1.	0.	0.	0.	1.	0.
81	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
91	1.	0.	1.	0.	1.	0.	1.	0.	0.	0.
01	1.	1.	1.	1.	0.	0.	0.	1.	1.	0.
11	0.	0.	1.	0.	0.	0.	2.	0.	0.	3.
21	0.	2.	0.	1.	0.	2.	1.	0.	2.	1.
31	0.	0.	0.	0.	2.	0.	0.	0.	1.	0.
41	0.	0.	3.	0.	0.	1.	1.	1.	0.	0.
51	2.	0.	0.	1.	0.	0.	1.	0.	3.	0.
61	1.	1.	1.	0.	2.	0.	2.	0.	1.	1.
71	1.	1.	1.	1.	2.	0.	0.	2.	0.	2.
81	1.	0.	0.	0.	1.	1.	1.	2.	4.	2.
91	3.	0.	0.	0.	5.	3.	6.	3.	5.	4.
01	5.	4.	5.	2.	1.	4.	5.	2.	4.	10.
11	6.	4.	5.	6.	4.	8.	10.	11.	6.	2[illegible]
[illegible]	13.	15.	9.	13.	8.	15.	12.	20.	17.	38.
31	27.	33.	34.	34.	49.	30.	41.	44.	60.	68.
41	101.	94.	129.	157.	200.	219.	254.	310.	359.	456.
51	483.	555.	661.	717.	835.	898.	920.	907.	847.	730.
61	650.	483.	337.	266.	198.	133.	108.	89.	63.	55.
71	42.	55.	39.	39.	25.	14.	13.	5.	7.	3.
81	1.	0.	1.	1.	0.	3.	0.	2.	0.	0.
91	6.	0.	3.	5.	5.	6.	4.	5.	6.	8.
01	3.	8.	6.	7.	2.	7.	5.	4.	4.	2.
11	1.	0.	1.	0.	1.	1.	0.	2.	1.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	1.	0.	0.	0.	1.	1.	0.	1.	1.
41	1.	0.	0.	0.	2.	2.	0.	3.	2.	0.
51	2.	3.	3.	4.	3.	7.	4.	4.	2.	5.
61	2.	5.	3.	3.	1.	3.	5.	1.	4.	1.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
01	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.
[illegible]	1.	0.	0.	0.	0.	0.	2.	2.	0.	0.
[illegible]	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	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
R1626-5782 102AW
File ID: SD8323.SPC

Counted on: 5/19/92 @16: 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	11.7	11.4	361.183	361.183	16.000	8.217	8.000	3.050
2	20.5	16.0	303.016	303.016	20.000	12.752	10.000	1.435
3	1707.1	1635.6	255.524	255.524	16.000	7.890	8.000	6.071

PEAK RESULTS

Peak	otope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
	m244	0.0086	5.796	5.779	0.017	0.04	0.21	1.01	0.456E-06
	Cm243		5.786	5.779	0.007				0.624E-06
2	Pu238	0.0276	5.499	5.505	-0.006	0.06	0.66	4.52	0.204E-05
	Am241		5.480	5.505	-0.025				0.156E-05
3		0.9638		5.282		0.04	23.21	113.76	0.512E-04

DETECTOR CALIBRATION

Energy(MEV) = 4.081 + (0.0047)*Channel
Energy range (MeV): 4.081 TO 6.487
Efficiency = 0.2040 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	12821.0	100.000
Smoothed	12821.0	100.000
Composite fit	12038.7	93.898
Residuals	782.3	6.102

Analyzed by: _____
VR

SPECTRUM SD8323.SPC
LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 5498.5

.....3
.....3.
.....3
...3.....

aw Data Dump for AEA Spectrum: SP:SD8323.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.
21	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
51	0.	1.	0.	0.	1.	0.	0.	0.	2.	0.
61	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
71	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
91	0.	0.	0.	0.	0.	1.	0.	0.	1.	1.
101	0.	0.	0.	1.	1.	0.	0.	0.	1.	1.
111	0.	0.	1.	1.	1.	0.	1.	1.	2.	0.
121	0.	0.	0.	1.	1.	0.	0.	1.	0.	0.
131	1.	0.	1.	0.	3.	0.	0.	2.	1.	0.
141	5.	3.	0.	1.	3.	3.	1.	2.	2.	1.
151	0.	1.	0.	0.	0.	0.	0.	0.	2.	1.
161	2.	1.	0.	0.	1.	0.	0.	2.	1.	1.
171	1.	0.	1.	1.	0.	1.	0.	2.	1.	1.
181	0.	0.	1.	1.	1.	0.	0.	3.	2.	1.
191	2.	1.	0.	2.	1.	2.	2.	1.	1.	0.
201	0.	0.	4.	2.	0.	2.	3.	6.	1.	2.
211	3.	9.	5.	2.	5.	7.	7.	13.	13.	14.
	13.	9.	20.	23.	15.	27.	30.	31.	17.	44.
[illegible]	38.	33.	31.	37.	40.	31.	43.	51.	65.	78.
241	97.	107.	140.	193.	213.	260.	313.	397.	477.	590.
251	731.	899.	1076.	1154.	1182.	1019.	833.	580.	402.	203.
261	135.	112.	76.	80.	58.	66.	64.	58.	47.	40.
271	24.	13.	15.	7.	5.	0.	1.	0.	5.	1.
281	0.	1.	0.	4.	1.	4.	1.	5.	2.	4.
291	3.	2.	3.	3.	1.	8.	3.	11.	12.	12.
301	15.	12.	15.	8.	7.	7.	8.	4.	0.	1.
311	3.	0.	1.	1.	1.	0.	0.	0.	0.	0.
321	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	1.	0.	0.	0.	2.	0.
341	1.	2.	0.	2.	3.	1.	1.	5.	1.	6.
351	3.	2.	3.	4.	2.	5.	5.	6.	7.	8.
361	5.	9.	6.	4.	1.	3.	0.	1.	0.	1.
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.	1.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.
421	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.
461	1.	1.	0.	0.	0.	0.	0.	1.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
[illegible]	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
R1626-5882 102AW
File ID: SD7169.SPC

Counted on: 5/19/92 @16: 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	4.4	4.1	363.261	363.261	24.000	17.725	12.000	8.522
2	30.9	12.5	302.712	302.712	12.000	8.467	6.000	8.522
3	642.7	643.2	258.117	258.117	28.000	23.730	14.000	12.216

PEAK RESULTS

eak In	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
	Cm244	0.0056	5.796	5.783	0.013	0.08	0.09	0.64	0.290E-06
	Cm243		5.786	5.783	0.003				0.398E-06
2	Pu238	0.0113	5.499	5.499	0.000	0.04	0.18	1.80	0.812E-06
	Am241		5.480	5.499	-0.019				0.622E-06
3	Am243	0.9831	5.234	5.289	-0.055	0.11	15.48	1030.11	0.464E-03

DETECTOR CALIBRATION

Energy(MEV) = 4.076 + (0.0047)*Channel
Energy range (MeV): 4.076 TO 6.483
Efficiency = 0.1366 CPM/DPM

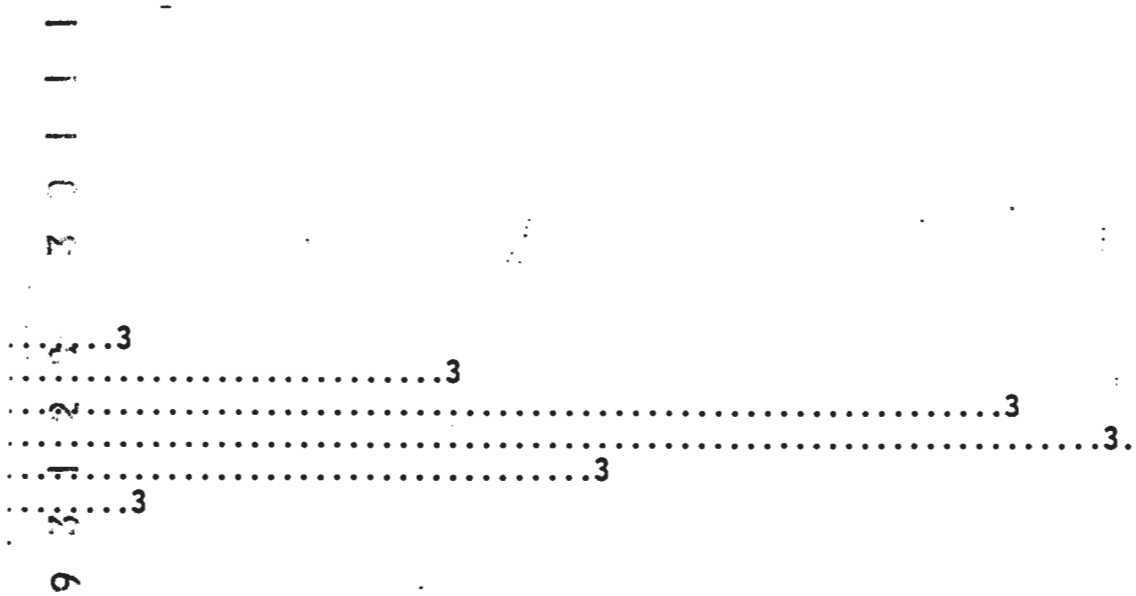
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	7991.0	100.000
Smoothed	7991.0	100.000
Composite fit	7872.0	98.510
Residuals	119.0	1.490

Analyzed by: _____
VR

SPECTRUM SD7169.SPC

LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 2392.3



w Data Dump for AEA Spectrum: SP:SD7169.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
1	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	2.	0.	1.	0.	0.	0.	0.	0.
1	0.	0.	1.	0.	0.	0.	0.	1.	2.	0.
1	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	1.	0.	1.	1.	0.	0.	0.	0.
1	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.
1	0.	2.	1.	1.	1.	1.	0.	1.	0.	0.
1	0.	1.	0.	0.	0.	1.	1.	0.	1.	2.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1	0.	1.	0.	0.	0.	1.	0.	0.	0.	0.
1	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
1	0.	0.	0.	1.	1.	0.	1.	0.	0.	0.
1	1.	1.	0.	1.	2.	0.	0.	2.	0.	2.
1	0.	2.	2.	0.	0.	1.	0.	0.	0.	0.
1	1.	0.	0.	1.	1.	1.	2.	2.	2.	0.
1	0.	5.	0.	0.	4.	4.	2.	0.	0.	3.
1	2.	3.	3.	2.	7.	6.	6.	5.	7.	8.
	6.	6.	3.	7.	10.	8.	17.	18.	10.	16.
1	23.	19.	23.	35.	32.	47.	38.	55.	62.	70.
1	87.	109.	121.	128.	180.	207.	204.	227.	221.	261.
1	287.	324.	356.	358.	332.	341.	343.	330.	315.	348.
1	312.	250.	257.	213.	183.	153.	150.	126.	112.	80.
1	53.	47.	39.	43.	28.	29.	15.	21.	9.	6.
1	5.	6.	2.	1.	5.	1.	2.	2.	2.	1.
1	1.	3.	1.	1.	4.	0.	0.	3.	7.	8.
1	6.	2.	1.	3.	5.	3.	4.	3.	0.	1.
1	2.	2.	1.	3.	1.	2.	0.	0.	0.	1.
1	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.
1	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
1	0.	0.	2.	0.	0.	0.	0.	1.	2.	0.
1	0.	0.	1.	1.	1.	2.	1.	2.	3.	4.
1	2.	1.	3.	2.	4.	1.	0.	2.	2.	0.
1	2.	1.	0.	0.	1.	0.	0.	1.	1.	0.
1	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.
	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	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-1626-5582
File ID: SD2883.SPC

Counted on: 5/20/92 @ 3: 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	13.3	13.0	362.079	362.079	24.000	19.296	12.000	4.360
2	1491.7	1470.0	302.001	302.001	24.000	18.337	12.000	9.515
3	1314.8	1299.8	255.510	255.510	24.000	17.534	12.000	8.389
4	5.0	5.8	155.282	155.282	124.000	2.000	62.000	0.200

PEAK RESULTS

Peak	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.0061	5.756	5.766	-0.010	0.09	0.36	0.00	0.283E-10
	Cm243		5.786	5.766	0.020				0.380E-10
2	Pu238	0.5263	5.499	5.490	0.009	0.08	31.64	0.01	0.334E-08
	Am241		5.480	5.490	-0.010				0.256E-08
3		0.4638		5.276		0.08	27.89	0.00	0.212E-08
4	Np237	0.0038	4.781	4.815	-0.034	0.01	0.23	0.00	0.199E-10

DETECTOR CALIBRATION

Energy(MEV) = 4.101 + (0.0046)*Channel
Energy range (MeV): 4.101 TO 6.456
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

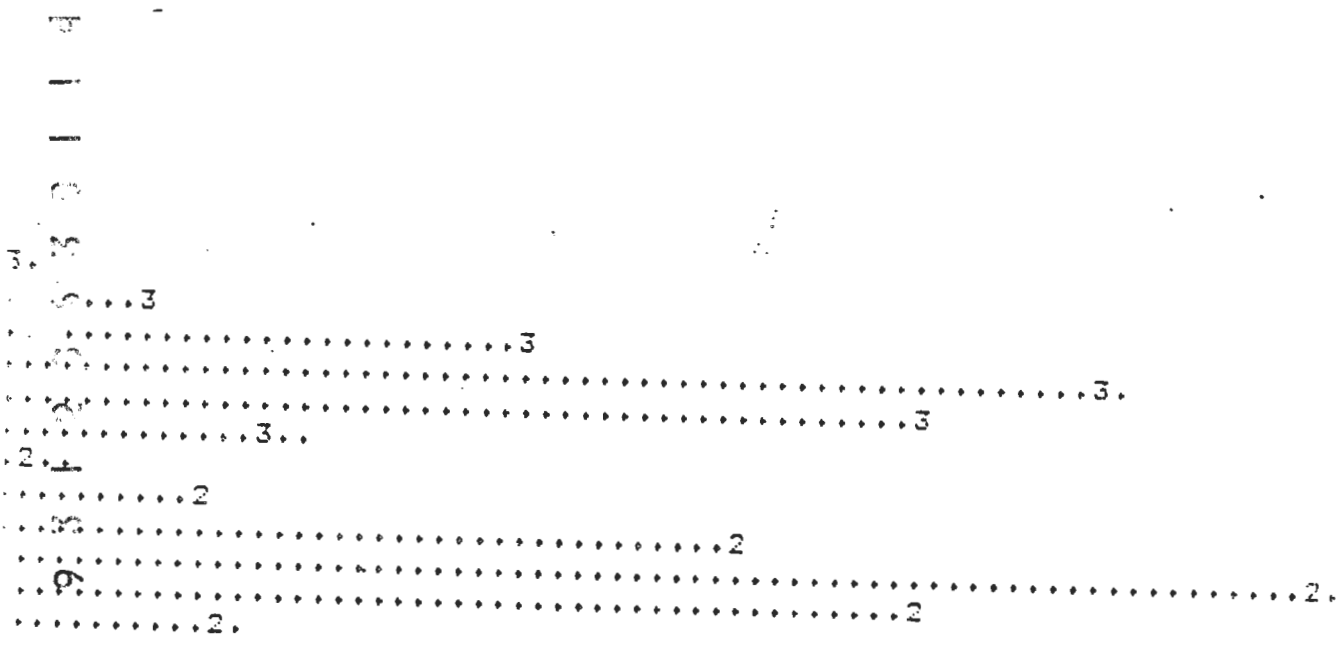
Item	Total	% Recovery
Raw spectrum	30529.0	100.000
Smoothed	30528.9	100.000
Composite fit	30062.2	98.471
Residuals	466.6	1.529

Analyzed by: _____
61453

SPECTRUM SD2883.SPC

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

5670.9



WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1626	Customer ID: 2AW-BD-1 (R332)
Analysis: CARBON 14	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-348-104/B-0
Technologist: J. SOLBRACK	Date: 5-15-92
Starting Time: 16:30	Temperature: N/A
Ending Time: 22:00	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5588	11		
2	REAGENT BLANK	R1625-5688	12		
3	SAMPLE 2AW-BD-1	R1626-5788	13		
4	SAM DUP OF 2AW-BD-1	R1626-5888	14		
5	SPIKE OF SAMPLE 2AW-BD-1	R1626-5988	15		
6	FINAL LMCS CHECK STD	R1628-5582	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	81B49/1 mL			N/A
SPIKE	81B49/1 mL			N/A

A-6000-881 (03/92)

CARBON 14 ANALYSIS - UNDIGESTED SAMPLE

1

Serial No	Sample Point	Date	Time Issued	Priority
R 1624.-5588	102 AW	5-12-92	14:36	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	% RECOVERY	N114U	0

Sample Size: ? /ml
Customer ID: STD

Remarks, Calculations, Results: RUSH

EDP R909 C14EDTA
STDH 81849 RESULT 2202
STD VAL 2301 %REC 95.3

$\frac{4866.06(1000)(1)}{3.62\times10^6} = .2202$

Analyst 1: JHSelbach Hrs: 82020 Date: 5-15-92
Analyst 2: WRaymond Hrs: 5-15-92
Analyst 3 / Analyst 4 / Analyst 5: Hrs
Time Completed:
Lab Unit Mgr: SA Cook MAY 18 1992

2

Serial No	Sample Point	Date	Time Issued	Priority
R 1625.-5688	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	uCI/L	N114U	0

Sample Size: ? /ml
Customer ID: 14 K

Remarks, Calculations, Results: RUSH

REAGENT BLANK
COUNT AS uCI/L

$\frac{<5(1000)(1)}{3.62\times10^6} = <2.25\times10^{-3}$ uCi/L

Analyst 1: JHSelbach Hrs: 82020 Date: 5-15-92
Analyst 2: WRaymond Hrs: 5-15-92
Analyst 3 / Analyst 4 / Analyst 5: Hrs
Time Completed:
Lab Unit Mgr: SA Cook MAY 18 1992

3

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5788	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	UG/ML	N114U	0

Sample Size: ? /ml
Customer ID: 2AWDD1

Remarks, Calculations, Results: RUSH

COUNT AS uCI/L

$\frac{50.30(1000)(1)}{2.22\times10^6} = 2.27\times10^{-2}$ uCi/L

$\frac{50.3 \text{ dpm/mL}}{9.902\times10^6 \text{ dpm/mg}} = 5.08\times10^{-6}$ mg/mL

Analyst 1: JHSelbach Hrs: 82020 Date: 5-15-92
Analyst 2: WRaymond Hrs: 5-15-92
Analyst 3 / Analyst 4 / Analyst 5: Hrs
Time Completed:
Lab Unit Mgr: SA Cook MAY 18 1992

4

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5888	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	UG/ML	N114U	0

Sample Size: ? /ml
Customer ID: 2AWDD1

Remarks, Calculations, Results: RUSH

DUPLICATE SAMPLE
COUNT AS uCI/L

$\frac{51.87 \text{ dpm/mL}}{9.902\times10^6 \text{ dpm/mg}} = 5.24\times10^{-6}$ mg/mL 6-23-92

Analyst 1: JHSelbach Hrs: 82020 Date: 5-15-92
Analyst 2: WRaymond Hrs: 5-15-92
Analyst 3 / Analyst 4 / Analyst 5: Hrs
Time Completed:
Lab Unit Mgr: SA Cook MAY 18 1992

5

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5988	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	% RECOVERY	N114U	0

Sample Size: ? /ml - /ml spike
Customer ID: 2AWDD1

Remarks, Calculations, Results: RUSH

SAMPLE SPIKED ID R-1626
SPIKE ID 81849
SPIKE VOLUME 1ml
COUNT AS uCI/L (2.26 - 2.27×10⁻²)(1) = .223

$\frac{500.77(1000)(1)}{2.22\times10^6} = 2.26$ 6-23-92 94.6%

Analyst 1: JHSelbach Hrs: 82020 Date: 5-15-92
Analyst 2: WRaymond Hrs: 5-15-92
Analyst 3 / Analyst 4 / Analyst 5: Hrs
Time Completed:
Lab Unit Mgr: SA Cook MAY 18 1992

8

Serial No	Sample Point	Date	Time Issued	Priority
R 1628.-5988	102 AW	5-12-92	15: 0	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	% RECOVERY	N114U	0

Sample Size: ? /ml
Customer ID: STD

Remarks, Calculations, Results: RUSH

EDP R909 C14EDTA
STDH 81849 RESULT 2192
STD VAL 2301 %REC 92.96

$\frac{4866.34(1000)(1)}{3.62\times10^6} = 2.192$

Analyst 1: JHSelbach Hrs: 82020 Date: 5-15-92
Analyst 2: WRaymond Hrs: 5-15-92
Analyst 3 / Analyst 4 / Analyst 5: Hrs
Time Completed:
Lab Unit Mgr: SA Cook MAY 18 1992

ID:C-14 16 MAY 1992 02:04

USER: 2 COMMENT:108600 DPM ON 7 MAY 1986

PRESET TIME :	50.00						
TA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: STD
UNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	:EDIT
TWO PHASE :	YES	AQC	: NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX	:YES	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:				none	

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR:1.0000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 2.670 High:313.57

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	2P
B1	**-1	50.00	148.4	41.20	4.41	44.68	92.22	0.26	52.32	
		Blank Average		DPM for		14C :	44.68	COEF. OF VAR:	0.000	
1	**-3	50.00	143.4	4565.98	0.42	4889.06	92.55	0.01	104.97	
2	**-4	50.00	144.9	41.02	4.42	-0.31	92.45	0.27	157.54	
3	**-5	50.00	143.1	87.92	3.02	50.30	92.57	0.17	210.09	
4	**-6	50.00	144.3	89.30	2.99	51.87	92.49	0.13	262.60	
5	**-7	50.00	147.5	4661.42	0.41	5006.77	92.28	0.00	315.20	
6	**-8	50.00	146.4	95.22	2.90	58.43	92.35	0.14	367.79	
7	**-9	50.00	145.2	79.12	3.18	40.92	92.43	0.14	420.31	
8	**-10	50.00	146.1	4536.30	0.42	4866.34	92.37	0.00	472.92	

9 3 1 2 3 1 1 7

BEST AVAILABLE COPY

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1626	Customer ID: 2AW-BD-1 (R332)
Analysis: IODINE 129	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-378-103/B-1
Technologist: T. McCOLLOCH	Date: 5-13-92
Starting Time: 08:45 (5-13-92)	Temperature: 25degC
Ending Time: 13:40 (5-18-92)	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5585	11		
2	REAGENT BLANK	R1625-5685	12		
3	SAMPLE 2AW-BD-1	R1626-5785	13		
4	SAM DUP OF 2AW-BD-1	R1626-5885	14		
5	SPIKE OF SAMPLE 2AW-BD-1	R1626-5985	15		
6	FINAL LMCS CHECK STD	R1628-5585	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	40B49/1 mL			N/A

A-6000-881 (03/92)

IODINE I-129 ANALYSIS - UNDIGESTED ANALYSIS

6080

Serial No	Sample Point	Date	Time Issued	Priority
R 1624.-5885	102 AW	5-12-92	14:36	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	% RECOVERY	N114U	0

Sample Size: ? 1ml
Customer ID: STD

Remarks, Calculations, Results: RUSH

EDP SPIN ITANK
SIDH 40849 RESULT 1.527
SID VOL 1.527 %REC 115.3%
GROSS WT. 2.7059
TARE WT. 2.6907
NET WT. .0152

$\frac{7.61\times10^{-4}(1000)(1)}{0.0152/0.0305} = 1.527$

Analyst-1: [signature] Analyst-2: [signature] Analyst-3 Analyst-4 Analyst-5
Hrs: 81805 Hrs: 5-18-92
Date: 5/12/92 Time Completed: Lab Unit Mgr: [signature] MAY 18 1992

6081

Serial No	Sample Point	Date	Time Issued	Priority
R 1625.-5885	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	uCI/L	N114U	0

Sample Size: ? 1ml
Customer ID: DI K

Remarks, Calculations, Results:
REAGENT 10 ANK
COUNT AS uCI/L

$\frac{4.20\times10^{-5}(1000)(1)}{0.0192/0.0305} = 4.20\times10^{-5}$ µCi/L

GROSS 2.7339
TARE 2.7147
NET. .0192

Analyst-1: [signature] Analyst-2: [signature] Analyst-3 Analyst-4 Analyst-5
Hrs: 81805 Hrs: 5-18-92
Date: 5/12/92 Time Completed: Lab Unit Mgr: [signature] MAY 18 1992

6082

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5885	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	uCI/ML	N114U	0

Sample Size: ? 1ml
Customer ID: 2GWND1

Remarks, Calculations, Results: RUSH
COUNT AS uCI/L

$\frac{4.85\times10^{-5}(1000)(1)}{0.0177/0.0305} = 4.19\times10^{-5}$ µCi/mL

GROSS 2.7219
TARE 2.7102
NET. .0177

Analyst-1: [signature] Analyst-2: [signature] Analyst-3 Analyst-4 Analyst-5
Hrs: 81805 Hrs: 5-18-92
Date: 5/12/92 Time Completed: Lab Unit Mgr: [signature] MAY 18 1992

6083

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5885	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	uCI/ML	N114U	0

Sample Size: ? 1ml
Customer ID: 2GWND1

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

$\frac{4.79\times10^{-5}(1)}{0.0154/0.0305} = 4.74\times10^{-5}$ µCi/mL

GROSS 2.7355
TARE 2.7201
NET. .0154

Analyst-1: [signature] Analyst-2: [signature] Analyst-3 Analyst-4 Analyst-5
Hrs: 81805 Hrs: 5-18-92
Date: 5/12/92 Time Completed: Lab Unit Mgr: [signature] MAY 18 1992

6084

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5885	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	uCI/G	N114U	0

Sample Size: ? 1ml + 1ml spike
Customer ID: 2GWND1

Remarks, Calculations, Results: RUSH
SAMPLE SPIKED ID ITANK
SPIKE ID 40849
SPIKE VOLUME 1ml
COUNT AS uCI/L.

$\frac{7.19\times10^{-4}(1000)(1)}{0.0143/0.0305} = 1.557$ 115.8 %

GROSS 2.7265
TARE 2.7120
NET. .0143

Analyst-1: [signature] Analyst-2: [signature] Analyst-3 Analyst-4 Analyst-5
Hrs: 81805
Date: 5/12/92 Time Completed: Lab Unit Mgr: [signature] MAY 18 1992

6087

Serial No	Sample Point	Date	Time Issued	Priority
R 1628.-5885	102 AW	5-12-92	15:0	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	% RECOVERY	N114U	0

Sample Size: ? 1ml
Customer ID: STD

Remarks, Calculations, Results: RUSH
EDP SPIN ITANK
SIDH 40849 RESULT 1.511
SID VOL 1.527 %REC 114.1
GROSS WT. 2.7245
TARE WT. 2.7073
NET WT. .0172

$\frac{8.52\times10^{-4}(1000)(1)}{0.0172/0.0305} = 1.511$

Analyst-1: [signature] Analyst-2: [signature] Analyst-3 Analyst-4 Analyst-5
Hrs: 81805
Date: 5/12/92 Time Completed: Lab Unit Mgr: [signature] MAY 18 1992

9 3 1 2 8 3 0 1 1 9

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                                                                   *
          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

3-MAY-9217:34:30


                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: 4.0
ETECTOR NUMBER:    6    /     GEOMETRY NUMBER:   1
PECTRUM SIZE:  4096 CHANNELS
RDER OF SMOOTHING FUNCTION:     5
JMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
EAK CONFIDENCE FACTOR: 95.0%
DENTIFICATION ENERGY WINDOW: +- 1.50 KEV
RROR QUOTATION: 1.96 SIGMA UNCERTAINTY

IVIRONMENTAL BACKGROUND SUBTRACTED
.D CALCULATION PERFORMED
ASURED ENERGY DIFFERENCES LISTED
ILTIPLET ANALYSIS PERFORMED

PECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
IALYZED BY:        VR

MPLE DESCRIPTION: R1624-5585 102AW
OMETRY DESCRIPTION:  I-129/CULTURE TUBE
MPLE SIZE:   1.0000E+00 EA       / CONVERSION FACTOR: 1.0000E+00
ANDARD SIZE: 1.0000E+00 EA
ALYSIS LIBRARY FILE: ANL129

LLECT STARTED ON 18-MAY-92 AT 16:44:20

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

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

ERGY CALIBRATION PERFORMED 21-JUN-90
FICIENCY CALIBRATION PERFORMED 18-JUN-90
```

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

	ENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	100.46	19.96	2.40	400.	1239.	8.6	
EAK AT CHANNEL	134.5 DROPPED FROM MULTIPLET ANALYSIS						
2?	149.19	29.70	1.29	2048.	22017.	2.3	
3?	169.42	33.74	1.29	1008.	5058.	7.3	CE-144
4	198.47	39.55	1.17	348.	3300.	4.1	I-129,BI-212, CE-144

RROR QUOTATION AT 1.96 SIGMA
EAK CONFIDENCE LEVEL AT 95.0%

- MULTIPLET ANALYSIS CONVERGED BUT GFIT > 4

ACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
ACKGROUND DESCRIPTION: BKG
ACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
ACKGROUND LIVE TIME: 3000. SECONDS
ACKGROUND WAS INSIGNIFICANT

MPLE: R1624-5585 102AW
COLLECTED ON 18-MAY-92 AT 16:44:20
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

CLIDE	ACTIVITY CONCENTRATION IN uCi/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
-241	LLD<1.98E-06		LLD<1.98E-06		59.54	
-243	LLD<1.06E-06		LLD<1.06E-06		74.67	
129	7.61E-04	+-3.12E-05	7.61E-04	+-3.12E-05	39.60	-0.05
-125	LLD<2.02E-05		LLD<2.02E-05		176.33	
-75	LLD<1.90E-06		LLD<1.90E-06		136.00	
-113	LLD<3.82E-06		LLD<3.82E-06		391.67	
TAL	7.61E-04	+-3.12E-05	7.61E-04	+-3.12E-05		

AR = ***** MEV/DISINTEGRATION
XIMUM PERMISSABLE ACTIVITY = 5.77E-03 UC/EA
TAL MEASURED ACTIVITY = 7.61E-04 (+-3.12E-05) UC/EA
TECH. SPEC. = 13.20 (+-0.54)

ROR QUOTATION AT 1.96 SIGMA
CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

NTROID ANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
100.46	19.96	1239.	8.6	8.80E+00
149.19	29.70	22017.	2.3	3.03E+01
169.42	33.74	5058.	7.3	4.76E+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

8-MAY-9219:51:47

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: 4.0
ETECTOR NUMBER: 6 / GEOMETRY NUMBER: 1
PECTRUM SIZE: 4096 CHANNELS
RDER OF SMOOTHING FUNCTION: 5
UMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
EAK CONFIDENCE FACTOR: 95.0%
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:
N ED BY: VR

A E DESCRIPTION: R1625-5685 102AW
EOMETRY DESCRIPTION: I-129/CULTURE TUBE
AMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
TANDARD SIZE: 1.0000E+00 EA
NALYSIS LIBRARY FILE: ANL129

OLLECT STARTED ON 18-MAY-92 AT 19:01:38

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

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

NERGY CALIBRATION PERFORMED 21-JUN-90
FFICIENCY CALIBRATION PERFORMED 18-JUN-90

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

RROR QUOTATION AT 1.96 SIGMA
EAK CONFIDENCE LEVEL AT 95.0%

ACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
ACKGROUND DESCRIPTION: BKG
ACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
ACKGROUND LIVE TIME: 3000. SECONDS
ACKGROUND WAS INSIGNIFICANT

8-MAY-9219:51:47

AMPLE: R1625-5685 102AW
OLLECTED ON 18-MAY-92 AT 19:01:38
) 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/EA				ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
M-241	LLD<1.83E-06		LLD<1.83E-06		59.54	
M-243	LLD<8.42E-07		LLD<8.42E-07		74.67	
-129	LLD<2.08E-05		LLD<2.08E-05		39.60	
B-125	LLD<1.97E-05		LLD<1.97E-05		176.33	
E-75	LLD<1.80E-06		LLD<1.80E-06		136.00	
N-113	LLD<3.99E-06		LLD<3.99E-06		391.67	
	---		---			
OTAL	0.00E-01	+-0.00E-01	0.00E-01	+-0.00E-01		

RROR QUOTATION AT 1.96 SIGMA
LD CONFIDENCE LEVEL AT 95.0%

LL 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

3-MAY-9222:40:54

              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: 4.0
ETECTOR NUMBER:    6    /     GEOMETRY NUMBER:   1
PECTRUM SIZE:  4096 CHANNELS
RDER OF SMOOTHING FUNCTION:      5
JMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
EAK CONFIDENCE FACTOR: 95.0%
DENTIFICATION ENERGY WINDOW: +- 1.50 KEV
RROR QUOTATION: 1.96 SIGMA UNCERTAINTY

NVIRONMENTAL BACKGROUND SUBTRACTED
.D CALCULATION PERFORMED
EASURED ENERGY DIFFERENCES LISTED
JLTIPLET ANALYSIS PERFORMED

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

MPLE DESCRIPTION: R1626-5785 102AW
EOMETRY DESCRIPTION:  I-129/CULTURE TUBE
MPLE SIZE:   1.0000E+00 EA       / CONVERSION FACTOR: 1.0000E+00
TANDARD SIZE: 1.0000E+00 EA
NALYSIS LIBRARY FILE: ANL129

OLLECT STARTED ON 18-MAY-92 AT 21:50:43

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

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

NERGY CALIBRATION PERFORMED 21-JUN-90
FFICIENCY CALIBRATION PERFORMED 18-JUN-90
```

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

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 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

3-MAY-9222:40:54

AMPLE: R1626-5785 102AW
COLLECTED ON 18-MAY-92 AT 21:50:43
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

JCLIDE	ACTIVITY CONCENTRATION IN uCi/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
1-241	LLD<2.12E-06		LLD<2.12E-06		59.54	
1-243	LLD<9.72E-07		LLD<9.72E-07		74.67	
-129	LLD<1.85E-05		LLD<1.85E-05		39.60	
3-125	LLD<2.10E-05		LLD<2.10E-05		176.33	
E-75	LLD<2.05E-06		LLD<2.05E-06		136.00	
1-113	LLD<3.82E-06		LLD<3.82E-06		391.67	
	---		---			
TAL	0.00E-01	+-0.00E-01	0.00E-01	+-0.00E-01		

ROR QUOTATION AT 1.96 SIGMA
D CONFIDENCE LEVEL AT 95.0%

L 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

3-MAY-9223:41:44


                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: 4.0
ETECTOR NUMBER:    6    /     GEOMETRY NUMBER:   1
PECTRUM SIZE:  4096 CHANNELS
RDER OF SMOOTHING FUNCTION:     5
UMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
EAK CONFIDENCE FACTOR: 95.0%
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:
A    D BY:        VR

AMPLE DESCRIPTION: R1626-5885 102AW
EOMETRY DESCRIPTION:  I-129/CULTURE TUBE
AMPLE SIZE:   1.0000E+00 EA       / CONVERSION FACTOR: 1.0000E+00
TANDARD SIZE: 1.0000E+00 EA
NALYSIS LIBRARY FILE: ANL129

OLLECT STARTED ON 18-MAY-92 AT 22:51:35

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

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

NERGY CALIBRATION PERFORMED 21-JUN-90
FFICIENCY CALIBRATION PERFORMED 18-JUN-90
```

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

RROR QUOTATION AT 1.96 SIGMA
EAK CONFIDENCE LEVEL AT 95.0%

ACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
ACKGROUND DESCRIPTION: BKG
ACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
ACKGROUND LIVE TIME: 3000. SECONDS
ACKGROUND WAS INSIGNIFICANT

8-MAY-9223:41:44

AMPLE: R1626-5885 102AW
OLLECTED ON 18-MAY-92 AT 22:51:35
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/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
M-241	LLD<1.89E-06		LLD<1.89E-06		59.54	
M-243	LLD<1.07E-06		LLD<1.07E-06		74.67	
-129	LLD<1.89E-05		LLD<1.89E-05		39.60	
B-125	LLD<2.04E-05		LLD<2.04E-05		176.33	
E-75	LLD<1.71E-06		LLD<1.71E-06		136.00	
N-113	LLD<5.04E-06		LLD<5.04E-06		391.67	
OTAL	0.00E-01	+-0.00E-01	0.00E-01	+-0.00E-01		

RROR QUOTATION AT 1.96 SIGMA
LD CONFIDENCE LEVEL AT 95.0%

LL 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          *
                                                               *
  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

NBERRA SPECTRAN-F V2.06  SOFTWARE

)-MAY-9200:51:17

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

:A UNIT NUMBER:   2     /     ADC UNIT NUMBER: 4.0
:TECTOR NUMBER:    6    /     GEOMETRY NUMBER:   1
'ECTRUM SIZE:  4096 CHANNELS
RDER OF SMOOTHING FUNCTION:     5
JMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
:AK CONFIDENCE FACTOR: 95.0%
)ENTIFICATION ENERGY WINDOW: +- 1.50 KEV
RROR QUOTATION: 1.96 SIGMA UNCERTAINTY

IVIRONMENTAL BACKGROUND SUBTRACTED
.D CALCULATION PERFORMED
ASURED ENERGY DIFFERENCES LISTED
ILTIPLET ANALYSIS PERFORMED

'ECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
'YZED BY:        61453

MPLE DESCRIPTION: R-1626-5985
OMETRY DESCRIPTION:  I-129/CULTURE TUBE
MPLE SIZE:   1.0000E+00 EA       / CONVERSION FACTOR: 1.0000E+00
ANDARD SIZE: 1.0000E+00 EA
ALYSIS LIBRARY FILE: ANL129

LLECT STARTED ON 19-MAY-92 AT 00:01:07

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

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

ERGY CALIBRATION PERFORMED 21-JUN-90
FICIENCY CALIBRATION PERFORMED 18-JUN-90
```

9-MAY-9200:51:17

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

	ENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1?	149.26	29.71	1.31	1889.	21373.	2.1	
2?	169.50	33.76	1.31	996.	4811.	6.3	CE-144
3	198.46	39.55	1.26	354.	3118.	4.3	I-129,BI-212, CE-144

RROR QUOTATION AT 1.96 SIGMA
EAK CONFIDENCE LEVEL AT 95.0%

- MULTIPLET ANALYSIS CONVERGED BUT GFIT > 4

ACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
ACKGROUND DESCRIPTION: BKG
ACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
ACKGROUND LIVE TIME: 3000. SECONDS
ACKGROUND WAS INSIGNIFICANT

)-MAY-9200:51:17

MPLE: R-1626-5985
COLLECTED ON 19-MAY-92 AT 00:01:07
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

CLIDE	ACTIVITY CONCENTRATION IN uCi/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
-241	LLD<2.04E-06		LLD<2.04E-06		59.54	
-243	LLD<1.10E-06		LLD<1.10E-06		74.67	
129	7.19E-04	+-3.07E-05	7.19E-04	+-3.07E-05	39.60	-0.05
-125	LLD<1.83E-05		LLD<1.83E-05		176.33	
-75	LLD<1.76E-06		LLD<1.76E-06		136.00	
-113	LLD<5.04E-06		LLD<5.04E-06		391.67	
TAL	7.19E-04	+-3.07E-05	7.19E-04	+-3.07E-05		

AR = ***** MEV/DISINTEGRATION
XIMUM PERMISSABLE ACTIVITY = 5.77E-03 UC/EA
TAL MEASURED ACTIVITY = 7.19E-04 (+-3.07E-05) UC/EA
TECH. SPEC. = 12.47 (+-0.53)

ROR QUOTATION AT 1.96 SIGMA
CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

NTROID ANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
149.26	29.71	21373.	2.1	2.94E+01
169.50	33.76	4811.	6.3	4.52E+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

9-MAY-9204:39:27


              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: 4.0
ETECTOR NUMBER:    6    /     GEOMETRY NUMBER:   1
PECTRUM SIZE:  4096 CHANNELS
RDER OF SMOOTHING FUNCTION:     5
UMBER OF BACKGROUND CHANNELS:  4 ON EACH SIDE OF PEAK
EAK CONFIDENCE FACTOR: 95.0%
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:        61453

AMPLE DESCRIPTION: R-1628-5585
EOMETRY DESCRIPTION:  I-129/CULTURE TUBE
AMPLE SIZE:   1.0000E+00 EA       / CONVERSION FACTOR: 1.0000E+00
TANDARD SIZE: 1.0000E+00 EA
NALYSIS LIBRARY FILE: ANL129

OLLECT STARTED ON 19-MAY-92 AT 03:49:16

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

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

NERGY CALIBRATION PERFORMED 21-JUN-90
FFICIENCY CALIBRATION PERFORMED 18-JUN-90
```

9-MAY-9204:39:27

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
EAK AT CHANNEL	160.5	DROPPED FROM MULTIPLET ANALYSIS					
EAK AT CHANNEL	136.9	DROPPED FROM MULTIPLET ANALYSIS					
1?	149.24	29.71	1.32	2131.	25031.	2.1	
2?	169.52	33.76	1.32	1012.	5631.	6.8	CE-144
3	198.26	39.50	1.13	312.	3693.	3.7	I-129,BI-212, CE-144

RROR QUOTATION AT 1.96 SIGMA
EAK CONFIDENCE LEVEL AT 95.0%

- MULTIPLET ANALYSIS CONVERGED BUT GFIT > 4

ACKGROUND SUBTRACTION PERFORMED USING FILE BK0024
ACKGROUND DESCRIPTION: BKG
ACKGROUND COLLECT STARTED ON 5-JUN-90 AT 13:00:00
ACKGROUND LIVE TIME: 3000. SECONDS
ACKGROUND WAS INSIGNIFICANT

9-MAY-9204:39:27

AMPLE: R-1628-5585
COLLECTED ON 19-MAY-92 AT 03:49:16
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

JCLIDE	ACTIVITY CONCENTRATION IN uCi/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
I-241	LLD<1.83E-06		LLD<1.83E-06		59.54	
I-243	LLD<1.04E-06		LLD<1.04E-06		74.67	
-129	8.52E-04	+-3.19E-05	8.52E-04	+-3.19E-05	39.60	-0.10
B-125	LLD<2.29E-05		LLD<2.29E-05		176.33	
E-75	LLD<1.71E-06		LLD<1.71E-06		136.00	
I-113	LLD<4.16E-06		LLD<4.16E-06		391.67	
	---		---			
TAL	8.52E-04	+-3.19E-05	8.52E-04	+-3.19E-05		

AR = ***** MEV/DISINTEGRATION
XIMUM PERMISSABLE ACTIVITY = 5.77E-03 UC/EA
TAL MEASURED ACTIVITY = 8.52E-04 (+-3.19E-05) UC/EA
TECH. SPEC. = 14.77 (+-0.55)

ROR QUOTATION AT 1.96 SIGMA
D CONFIDENCE LEVEL AT 95.0%

PEAKS NOT USED IN ANALYSIS

NTROID ANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
149.24	29.71	25031.	2.1	3.44E+01
169.52	33.76	5631.	6.8	5.29E+00

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1626	Customer ID: 2AW-BD-1 (R332)
Analysis: SELENIUM 79	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-365-132/B-0
Technologist: V. MASSIE	Date: 6-19-92
Starting Time: 07:45 (6-18-92)	Temperature: N/A
Ending Time: 14:00 (6-19-92)	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	REAGENT BLANK	R1625-5689	11		
2	SAMPLE 2AW-BD-1	R1626-5789	12		
3	SAM DUP OF 2AW-BD-1	R1626-5889	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
LMCS CHECK STD	1851-B/2 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

SELENIUM 79 ANALYSIS - UNDIGESTED SAMPLE

1

Serial No	Sample Point	Date	Time Issued	Priority
R 1625.-5689	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
SE79	LA-365-132	uCI/l	N114U	3

Sample Size: 1ml H_2O + 2ml Selenium Carrier RSI-B — RUSH

Customer ID: BLK

Remarks, Calculations, Results: RERUN

REAGENT BLANK

COUNT AS uCI/L

9 .79100
6 .77383
.01717

$\frac{6.13(1000)(1)}{0.01717\ (2.22\times10^6)} = 322\times10^{-3}$ uCi/L

Analyst 1: 82016 — Analyst 2: Eva Barnes — Analyst 3 — Analyst 4 — Analyst 5

Hrs | Hrs | Hrs | Hrs | Hrs

Date: 6-19-92 — Time Completed — Lab Unit Mgr: JUN 23 1992

2

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5889	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
SE79	LA-365-132	uCI/L	N114U	3

Sample Size: 1ml + 2ml Selenium Carrier-RSI-B — RUSH

Customer ID: 2AWDD1

Remarks, Calculations, Results: RERUN

DUPLICATE SAMPLE

COUNT AS uCI/L

9 .79136
6 .77291
.01844

$\frac{32.75(1000)(1)}{0.01844\ (2.22\times10^6)} = 1.6\times10^{-2}$ uCi/L

Analyst 1: 82016 — Analyst 2: Eva Barnes — Analyst 3 — Analyst 4 — Analyst 5

Hrs | Hrs | Hrs | Hrs | Hrs

Date: 6-19-92 — Time Completed — Lab Unit Mgr: JUN 23 1992

3

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5789	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
SE79	LA-365-132	uCI/L	N114U	3

Sample Size: 1ml + 2ml Selenium Carrier-RSI-B — RUSH

Customer ID: 2AWDD1

Remarks, Calculations, Results: RERUN

COUNT AS uCI/L

9 .78905
6 .77049
.01856

$\frac{32.55(1000)(1)}{0.01856\ (2.22\times10^6)} = 1.58\times10^{-2}$ uCi/L

Analyst 1: 82016 — Analyst 2: Eva Barnes — Analyst 3 — Analyst 4 — Analyst 5

Hrs | Hrs | Hrs | Hrs | Hrs

Date: 6-19-92 — Time Completed — Lab Unit Mgr: JUN 23 1992

USER: 2 ID:C-14 : SE-79 PRESET TIME: 50.00 TUE 23 JUN 1992 01:
SAMPLE REPEAT: 1 CYCLE REPEAT: 1 SCR:N RS232:N
H#: 1 AQC:Y QCF:N RCM:Y 2 PHASE MONITOR:Y POST CHK:N VIAL:G VOLUME:1
RCM-TIME: 0.10 INT:999.95
CHANNEL 1-LL: 0 UL: 700 2SIGMA: 0.10 BKG SUB: 0.00 BKG 2SIG: 0.00 LSR:

SINGLE LABEL DPM SET UP ON 20 DEC 1991 13:34

UNKNOWN ID:C-14 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 6008502 #2 QUENCH LIMITS LOW:0.000 HIGH:253.7
HALF LIFE(DAYS) ISO1:N
STANDARD DPM ISO1:0.00000000

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	2P	ERF
B1	**- 1	1	43.84	4.27	50.00	51.74	119.0	0.75	**	

BACKGROUND QUENCH CURVES: CONSTANT

BEST AVAILABLE COPY

CHANNEL 1
QUENCH CURVE COEFFICIENTS
A: 43.84000 B:0.00000000 C:0.00000000 D:0.00000000000

BACKGROUND QUENCH CURVE CORRELATION TABLE

BKG	H#	MEASURED CPM.	CALCULATED CPM.	PERCENT DIFF.	FLAG
1	119.0	43.84	43.84	0.00	

BACKGROUND QUENCH LIMITS LOW:0.000 HIGH:1000.
TOTAL QUENCH LIMITS LOW:0.000 HIGH:253.7

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	2P	ERF
1	**- 3	1	49.24	4.03	50.00	103.78	174.0	0.26	**	
	ISO1 %EFF CH1:88.09						ISO1 DPM :6.130351			
2	**- 4	1	72.90	3.31	50.00	155.67	172.0	0.57	**	
	ISO1 %EFF CH1:88.18						ISO1 DPM :32.95413			
3	**- 5	1	72.74	3.32	50.00	207.56	161.0	0.39	**	
	ISO1 %EFF CH1:88.83						ISO1 DPM :32.53246			
4	**- 6	1	69.74	3.39	50.00	259.44	188.0	0.31	**	
	ISO1 %EFF CH1:87.35						ISO1 DPM :29.65201			

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	2P	ERR
5	**- 7	1	67.76	3.44	50.00	311.34	206.0	0.38	**	

ISO1 %EFF CH1:85.49 ISO1 DPM :27.97946

BEST AVAILABLE COPY

9 3 1 2 8 3 0 1 4 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1626	Customer ID: 2AW-BD-1 (R332)
Analysis: TECHNETIUM 99	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-438-101/D-1
Technologist: S. LAI	Date: 5-14-92
Starting Time: 08:00	Temperature: 24degC
Ending Time: 15:20	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5584	11		
2	REAGENT BLANK	R1625-5684	12		
3	SAMPLE 2AW-BD-1	R1626-5784	13		
4	SAM DUP OF 2AW-BD-1	R1626-5884	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	86B49/0.25 mL			N/A

A-6000-881 (03/92)

TECHNETIUM 99 ANALYSIS - UNDIGESTED SAMPLE

1 2 3 1 2 8 3 0 1 4 3

1&2

Serial No	Sample Point	Date	Time Issued	Priority
R 1624.-5684	102 AW	5-12-92	14:36	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
TC99	LA-438-101	% RECOVERY	N114U	0

Sample Size: ? 250 λ 100 λ Spike 49839
Customer ID: STD

Remarks, Calculations, Results:
EDP 8363 TC99 86849
STDN 86849 RESULT 2.39
STD VAL 2.47 %REC 106.5%
537.00 (5.8795x10^-7)(1)(1000)(1)/(300.31 - 35.00 (1.12x10^-4)) = 2.39

RUSH

Analyst-1: [signature] Analyst-2: Analyst-3: Analyst-4: Analyst-5:
Hrs: 6.916
Date: 5-14-92 Time Completed: Lab Unit Mgr: MAY 18 1992

3&4

Serial No	Sample Point	Date	Time Issued	Priority
R 1625.-5684	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
TC99	LA-438-101	uCI/L	N114U	0

Sample Size: ? 100 λ 100 λ Spike 49839
Customer ID: BLK

Remarks, Calculations, Results:
REANALYZED IN ANK
COUNT AS uCI/L
47 (5.8795x10^-7)(1)(1000)(10) / 2545.6 - 8 (1.12x10^-4) = 2.35x10^-2 uCi/L

RUSH

Analyst-1: [signature] Analyst-2: Analyst-3: Analyst-4: Analyst-5:
Hrs: 6.916
Date: 5-14-92 Time Completed: Lab Unit Mgr: MAY 18 1992

5&6

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5884	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
TC99	LA-438-101	uCI/L	H114U	0

Sample Size: ? 100 λ 100 λ Spike 49839
Customer ID: 2AWD01

Remarks, Calculations, Results:
COUNT AS uCI/L
412.31 (5.8795x10^-7)(1000)(10)(1) / 2217.87 - 41.231 (1.12x10^-4) = 4.42x10^0 pCi/L
5-20-92 5-20-92 4.42 pCi/L

RUSH

Analyst-1: [signature] Analyst-2: Analyst-3: Analyst-4: Analyst-5:
Hrs: 6.916
Date: 5-14-92 Time Completed: Lab Unit Mgr: MAY 18 1992

7&8

Serial No	Sample Point	Date	Time Issued	Priority
R 1626.-5884	102 AW	5-12-92	14:47	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
TC99	LA-438-101	uCI/L	H114U	0

Sample Size: ? 100 λ 100 λ Spike 49839
Customer ID: 2AWD01

Remarks, Calculations, Results:
DUPLICATE SAMPLE
COUNT AS uCI/L
Duplicate Sample
435.53 (5.8795x10^-7)(1)(1000)(10) / 2557.31 - 43.553 (1.12x10^-4) = 4.63x10^0 pCi/L

RUSH

Analyst-1: [signature] Analyst-2: Analyst-3: Analyst-4: Analyst-5:
Hrs: 6.916
Date: 5-14-92 Time Completed: Lab Unit Mgr: MAY 18 1992

Serial No	Sample Point	Date	Time Issued	Priority
R 1628.-5884	102 AW	5-12-92	15:0	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
TC99	LA-438-101	% RECOVERY	H114U	0

Sample Size: ?
Customer ID: STD

Remarks, Calculations, Results:
EDP 8363 TC99
STDN RESULT
STD VAL %REC

Not Required Per Steve Cotton

RUSH

Analyst-1: [signature] Analyst-2: Analyst-3: Analyst-4: Analyst-5:
Hrs: 6.916
Date: 5-14-92 Time Completed: Lab Unit Mgr: MAY 18 1992 David L. Cato

USER: 5 ID:TC 99 PRESET TIME: 20.00 THU 14 MAY 1992 18:11
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:

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:131B28-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	51.15	6.25	20.00	20.96	156.0	2.76	

BACKGROUND QUENCH CURVES: CONSTANT

BEST AVAILABLE COPY

CHANNEL 1
QUENCH CURVE COEFFICIENTS
A: 51.15000 B:0.00000000 C:0.00000000 D:0.00000000000

BACKGROUND QUENCH CURVE CORRELATION TABLE

BKG	H#	MEASURED CPM.	CALCULATED CPM.	PERCENT DIFF.	FLAG
1	156.0	51.15	51.15	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	568.45	1.88	20.00	42.26	161.0	0.96	
	ISO1 %EFF CH1:93.24						ISO1 DPM :554.8024		
2	**- 4	1	2853.40	0.84	20.00	63.42	163.0	0.22	
	ISO1 %EFF CH1:93.12						ISO1 DPM :3009.314		
3	**- 5	1	55.15	6.02	20.00	84.55	163.0	11.56	
	ISO1 %EFF CH1:93.12						ISO1 DPM :4.295568		
4	**- 6	1	2420.25	0.91	20.00	105.72	164.0	0.20	
	ISO1 %EFF CH1:93.07						ISO1 DPM :2545.495		

SAM	POS	CH	CPM	2SIG%	TIME	EL TIME	AVG H#	RCM%	ERR
5	**- 7	1	439.75	2.13	20.00	126.84	163.0	1.02	
	ISO1	%EFF	CH1:93.12				ISO1	DPM :417.3144	
6	**- 8	1	2768.65	0.85	20.00	147.96	164.0	0.19	
	ISO1	%EFF	CH1:93.07				ISO1	DPM :2919.835	
7	**- 9	1	456.50	2.09	20.00	169.10	164.0	0.82	
	ISO1	%EFF	CH1:93.07				ISO1	DPM :435.5309	
8	**-10	1	2778.90	0.85	20.00	190.21	163.0	0.15	
	ISO1	%EFF	CH1:93.12				ISO1	DPM :2929.309	
9	**-11	1	430.80	2.15	20.00	211.33	163.0	0.66	
	ISO1	%EFF	CH1:93.12				ISO1	DPM :407.7031	
10	**-12	1	2820.60	0.84	20.00	232.47	164.0	0.15	
	ISO1	%EFF	CH1:93.07				ISO1	DPM :2975.654	
11	**- 1	1	436.50	2.14	20.00	253.66	164.0	1.05	
	ISO1	%EFF	CH1:93.07				ISO1	DPM :414.0418	
12	**- 2	1	2830.45	0.84	20.00	274.81	164.0	0.14	
	ISO1	%EFF	CH1:93.07				ISO1	DPM :2986.237	

BEST AVAILABLE COPY

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1626	Customer ID: 2AW-BD-1 (R332)
Analysis: URANIUM	Sample Prep: UNDIGESTED

Instrument: WB88807	Procedure/Rev: LA-925-106/B-0
Technologist: S. L. COBB	Date: 6-04-92
Starting Time: N/A	Temperature: 21.5degC
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5540	11		
2	REAGENT BLANK	R1625-5640	12		
3	SAMPLE 2AW-BD-1	R1626-5740	13		
4	SAM DUP OF 2AW-BD-1	R1626-5840	14		
5	SPIKE OF SAMPLE 2AW-BD-1	R1626-5940	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	126B38/0.1 mL			N/A
SPIKE	90B38/0.1 mL			N/A

A-6000-881 (03/92)

URANIUM ANALYSIS - UNDIGESTED SAMPLE

Serial No.	Sample Point	Date	Time Issued	Priority
R 1629.-5540	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N114U	0

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

Remarks, Calculations, Results:
SPIKE ID/VOL 6.25-4 Hi 90838
SPIKE VOL. 100ul
.15 (6.25x10-4)(.1)(1000) / (5.7/86)(.45) - .15 = 3.07x10-2
SL Cobb

.15
.45

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SACatts 6/4/92

Serial No.	Sample Point	Date	Time Issued	Priority
R 1625.-5640	102 AW	5-12-92	14:44	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/L	N114U	0

Sample Size: 100-10-100 ul
Customer ID: BLK

Remarks, Calculations, Results:
REAGENT BLANK
<0.02 (6.25x10-4)(.1)(1000) / (5.7/86)(.20) - .02 = <6.88x10-3 g/L
SL Cobb

.02
.20

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SACatts 6/4/92

Serial No.	Sample Point	Date	Time Issued	Priority
R 1626.-5740	102 AW	5-12-92	14:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	UG/ML	N114U	0

Sample Size: 100-10-100ul
Customer ID: 2GAWD1

Remarks, Calculations, Results:
.19 (6.25x10-4)(.1)(1000) / (5.7/86)(.77) - .19 = 4.16x10-2 g/L
SL Cobb = 4.16x10 mg/L

.19
.47

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SACatts 6/4/92

Serial No.	Sample Point	Date	Time Issued	Priority
R 1626.-5840	102 AW	5-12-92	14:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/L	N114U	0

Sample Size: 100-10-100ul
Customer ID: 2GAWD1

Remarks, Calculations, Results:
DUPLICATE SAMPLE
.20 (6.25x10-4)(.1)(1000) / (5.7/86)(.98) - .20 = 4.38x10-2 g/L
SL Cobb = 4.38x10 mg/L

.20
.48

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SACatts 6/4/92

Serial No.	Sample Point	Date	Time Issued	Priority
R 1626.-5940	102 AW	5-12-92	14:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N114U	0

Sample Size: 100-10 + 100-10-1ml = about 100ml
Customer ID: 2GAWD1

Remarks, Calculations, Results:
SAMPLE SPIKED TO
SPIKE ID 90838 6.25-4 Hi
SPIKE VOLUME 100ml
.14 (6.25x10-4)(.1)(1000) / (5.7/86)(.44) - .14 = 3.19x10-2 g/L
(3.19x10-1 / 11.8 - 1.15x10-2 / 11.8)(118) = 2.77x10-2
90.2%
SL Cobb

.14
.44

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SACatts 6/4/92

UNDIGESTED SAMPLE ANALYSIS RESULTS

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1627	Customer ID: 2AW-BD-2 (R333)
Analysis: TOTAL ALPHA/ALPHA ENERGY	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-548-101/A-2
Technologist: N/A	Date: 6-04-92
Starting Time: N/A	Temperature: N/A
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	SAMPLE 2AW-BD-2	R1627-1250	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
N/A				N/A

A-6000-881 (03/92)

TOTAL ALPHA/ALPHA ENERGY ANALYSIS - UNDIGESTED SAMPLE

#3 3557 , 4.4 5357

Sample No.	Sample Point	Date	Time Issued	Priority
R 1627.-1250	102 AW	5-12-92	14:59	25

Determination	Method/Standard	Result Units	Charge Code	Rerun
AT/AEA	LA-548-101	uCi/Sample	E12341	0

Sample Size	Customer ID
?	2AWB02

Remarks, Calculations, Results:

U^{234} . 8.44×10^{-6} g/L

U^{235} - 2.26×10^{-3} g/L

U^{238} - 4.53×10^{-2} g/L

AEA-400 MIN
ATTACH PRINT OUT

Analyst #1	Analyst #2	Analyst #3	Analyst #4	Analyst #5
64966	[illegible]			
[illegible]	Hrs 6-4-92	Hrs	Hrs	Hrs

Date	Time Completed	Lab Mgr	
6-4-92		JUN 8 1992	

11.76-2

#2 K 6-4-92
1365 - 9 230 g/L
50

R1627-1250

^{234}U	.6911	50.4346	3.64^{-7}	0.0152%	8.44^{-6} g/L
^{235}U	.0665	4.58	9.75^{-7}	4.25%	2.26^{-3}
^{238}U	.2000	19.60	1.86^{-5}	87.24	4.53^{-2}

9312863015 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 1627-1250 102 AW
File ID: SD8357.SPC

Counted on: 6/ 8/92 @ 8: 0
Detector/Geometry number: 8/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak	Peak height		Peak center		FWHM		Tau	
ID	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	4.4	4.4	299.072	299.072	20.000	11.375	10.000	2.258
2	3.8	3.4	258.602	258.602	16.000	6.408	8.000	1.211
3	6.6	6.8	224.860	224.860	24.000	9.385	12.000	2.112
4	292.8	275.3	146.660	146.660	28.000	20.942	14.000	13.939
5	21.4	21.1	85.428	85.428	20.000	10.787	10.000	2.031
6	130.9	136.5	23.065	23.065	16.000	7.339	8.000	13.518

PEAK RESULTS

		AEA	Peak Centroid				Count		Activity
ID	Isotope	Fract.	Exp.	Obs.	Diff.	FWHM	Rate c/m	d/m	uCi/ea
1	Pu238	0.0137	5.499	5.485	0.014	0.05	0.12	0.82	0.368E-06
	Am241		5.480	5.485	-0.005				0.282E-06
2		0.0098		5.295		0.03	0.09	0.42	0.190E-06
3	Pu239	0.0190	5.143	5.137	0.006	0.04	0.17	0.81	0.367E-06
	Pu240		5.144	5.137	0.007				0.367E-06
4	Np237	0.6911	4.781	4.769	0.012	0.10	6.11	34.11	0.154E-04
5		0.0665		4.481		0.05	0.59	2.85	0.129E-05
6	U 238	0.2000	4.200	4.188	0.012	0.03	1.77	11.15	0.502E-05

DETECTOR CALIBRATION

Energy(MEV) = 4.080 + (0.0047)*Channel
Energy range (MeV): 4.080 TO 6.486
Efficiency = 0.2059 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	4454.0	100.000
Smoothed	4454.0	100.000
Composite fit	4420.6	99.250
Residuals	33.4	0.750

Analyzed by: _____
CJS

SPECTRUM SD8357.SPC

```
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                1050.0

.... 6
    ............................6
    ...............6.
5..

5
5
.5
..5
....5
.5


4
....4
.......................4.
.......................................................... 4
.......................................................................4..
.....................................4.
.....4.
```

w Data Dump for AEA Spectrum: SP:SD8357.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	69.	79.	90.	73.	75.
1	82.	62.	79.	75.	59.	57.	44.	27.	12.	11.
1	1.	1.	0.	1.	0.	0.	0.	0.	0.	0.
1	0.	1.	1.	1.	1.	0.	0.	0.	0.	0.
1	0.	2.	1.	0.	3.	1.	5.	5.	3.	5.
1	5.	3.	5.	6.	3.	4.	12.	2.	7.	4.
1	10.	4.	5.	7.	6.	8.	4.	7.	8.	13.
1	11.	8.	11.	14.	11.	12.	14.	7.	5.	11.
1	4.	0.	3.	1.	0.	0.	0.	0.	0.	1.
1	1.	0.	1.	1.	0.	2.	1.	3.	0.	3.
1	1.	1.	2.	1.	1.	1.	1.	1.	1.	2.
1	4.	9.	9.	9.	10.	15.	25.	24.	32.	36.
1	25.	44.	60.	65.	84.	103.	79.	85.	115.	105.
1	116.	143.	158.	164.	171.	182.	167.	133.	125.	106.
1	90.	80.	68.	76.	55.	51.	65.	47.	37.	32.
1	20.	11.	6.	1.	1.	1.	1.	1.	0.	1.
1	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
1	0.	0.	1.	0.	0.	1.	0.	2.	0.	1.
1	2.	0.	0.	1.	0.	0.	3.	1.	0.	1.
1	1.	0.	2.	1.	1.	2.	0.	1.	2.	0.
1	5.	1.	1.	4.	1.	6.	3.	2.	5.	3.
	3.	3.	2.	7.	5.	1.	3.	5.	3.	1.
1	3.	1.	0.	0.	2.	0.	0.	0.	2.	0.
1	0.	2.	0.	2.	0.	0.	3.	3.	0.	3.
1	2.	0.	0.	2.	0.	3.	3.	5.	2.	1.
1	0.	1.	3.	0.	0.	0.	0.	1.	0.	2.
1	0.	2.	0.	0.	1.	0.	0.	1.	2.	2.
1	0.	2.	1.	0.	3.	0.	1.	3.	0.	1.
1	2.	1.	2.	2.	3.	2.	4.	1.	2.	2.
1	3.	3.	1.	1.	1.	0.	1.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
1	1.	1.	1.	1.	2.	0.	1.	1.	1.	1.
1	3.	3.	2.	0.	0.	0.	1.	1.	1.	0.
1	1.	2.	1.	0.	2.	2.	2.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	1.	0.	1.	0.	1.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.								

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1627	Customer ID: 2AW-BD-2 (R333)
Analysis: AMERICIUM 241	Sample Prep: UNDIGESTED

Instrument: WB57237	Procedure/Rev: LA-503-156/D-0
Technologist: M. BIERMAN	Date: 5-15-92
Starting Time: 08:00	Temperature: 25degC
Ending Time: 14:00	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5582	11		
2	REAGENT BLANK	R1625-5682	12		
3	SAMPLE 2AW-BD-2	R1627-5782	13		
4	SAM DUP OF 2AW-BD-2	R1627-5882	14		
5	FINAL LMCS CHECK STD	R1628-5582	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	50B43/0.1 mL			N/A

A-6000-881 (03/92)

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#1 5-19-92 R1624-5582

5101/30 -8

#1 2881

Sample No	Sample Point	Date	Time Issued	Priority
R 1624.-5582	102 AW	5-12-92	14:36	28

Determination	Method/Standard	Result Units	Charge Code	Rerun
AM241	LA-503-156	% RECOVERY	N114U	0

Sample Size: ? .100-10-1.0 ml

Customer ID: STD

Remarks, Calculations, Results

EDP R201 AR001

STD# 50843 RESULT 26.577

STD VAL. %REC 100.6

Am243 (18043) .100 ml

$\frac{(4)(62.274)(.1)(6)(100)}{878}$ 26577

Aliquot is 80 HWs

RUSH

"AEA" - 480MIN

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS9	[illegible]	[illegible]		
Hrs	Hrs	Hrs 5-19-92	Hrs	Hrs

Date 5/15/92 Time Completed ? Lab Unit Mgr [illegible]

#2 5-19-92 R1625-5682

2225/30 -7

#6 5552

Sample No	Sample Point	Date	Time Issued	Priority
R 1625.-5682	102 AW	5-12-92	10:01	28

Determination	Method/Standard	Result Units	Charge Code	Rerun
AM241	LA-503-156	uCI/L	N114U	0

Sample Size: ? 0.5 mL

Customer ID: BLK

Remarks, Calculations, Results

REAGENT BLANK

COUNT AS uCI/L

Am243 (18043) .100 ml

80 HWs 1 ml

$\frac{(46)(2.274\times10^{-2})(.1)(1000)(6)}{920} = 12.27\times10^{-2}$ pCi/L

RUSH

"AEA" - 480MIN

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS9	[illegible]			
Hrs	Hrs 5-19-92	Hrs	Hrs	Hrs

Date 5/15/92 Time Completed Lab Unit Mgr [illegible]

#1 5-19-92 R1627-5782

2572/30 -8

#7 3529

Sample No	Sample Point	Date	Time Issued	Priority
R 1627.-5782	102 AW	5-12-92	14:55	28

Determination	Method/Standard	Result Units	Charge Code	Rerun
AM241	LA-503-156	UG/ML	N114U	0

Sample Size: .500 ml

Customer ID: 2AWBD2

Remarks, Calculations, Results

COUNT AS uCI/L

Am243 (18043) .100 ml

Cm HWs .500 ml

$\frac{(4)(1.0222)(.1)(1000)}{856\ (7.6192\times10^{-4})} = 26.66\times10^{-6}$ ug/mL

Cm243/244 - not detectable

RUSH

"AEA" - 480MIN

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS9	[illegible]			
Hrs	Hrs 5-19-92	Hrs	Hrs	Hrs

Date 5/15/92 Time Completed Lab Unit Mgr [illegible]

9 3 1 2 8 3 0 1 5 5

AMERICIUM 241 ANALYSIS - UNDIGESTED SAMPLE

#4 4607

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5882	102 AW	5-12-92	14:55	25

Determination	Method/Standard	Result Units	Charge Code	Results
AM241	LA-503-156	UG/ML	H114U	0

Sample Size	Customer ID
7 .500 ml	2AWBD2

Remarks, Calculations, Results

DUPLICATE SAMPLE

COUNT AS UC12.

Am243 (18B43) .100 ml

Cm Hotly .500 ml

435(30225)(.1)(.5)(10⁶) / 627 (261824×10⁻¹²) = 6.66×10⁻⁶ ug/ml

Cs 134/137 - not detectable

RUSH

"AEA" - 430MIN

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS59	UReynolds			
MB	5-19-92			
Date 5/15/92	Time Completed	Lab Unit Mgr MAY 28 1992		

#2 ✓ 5-19-92

1607/30 - 7

R1627-5882

2883

Serial No	Sample Point	Date	Time Issued	Priority
R 1628 -5582	102 AW	5-12-92	15:0	25

Determination	Method/Standard	Result Units	Charge Code	Results
AM241	LA-503-156	% RECOVERY	N114U	0

Sample Size	Customer ID
.100 ml - 10 - 1.0 ml	STD

Remarks, Calculations, Results

EDP R201 AR001

STDH 50B43 RESULT 2.4525.3 (5.2142 LCS)

STD VAL 2.6721 %REC 95.7%

Am243 (18B43) .100 ml 847 (1.237×10⁻¹²)(.1)(1000)(100) / 769 = 253

Oil Dilution in 8M HNO3

RUSH

"AEA" - 430MIN

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
LCS59	UReynolds	DHaystine		
MB				
Date 5/15/92	Time Completed	Lab Unit Mgr MAY 28 1992		

#3 ✓ 5-19-92

4688/30 - 16

R 1628-5582

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
R1627-5782 102AW
File ID: SD3529.SPC

Counted on: 5/19/92 @18: 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	13.5	13.3	358.637	358.637	28.000	23.288	14.000	7.874
2	31.0	23.2	301.217	301.217	20.000	20.719	10.000	7.874
3	1512.0	1494.0	253.510	253.510	24.000	15.696	12.000	9.222

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
	Pu236	0.0114	5.756	5.741	0.015	0.11	0.35	1.75	0.789E-06
	Th228	0.0184	5.430	5.466	-0.036	0.10	0.56	3.91	0.176E-05
	Am241		5.480	5.466	0.014				0.133E-05
3	Am243	0.9703	5.234	5.237	-0.003	0.08	29.54	1333.34	0.601E-03

DETECTOR CALIBRATION

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

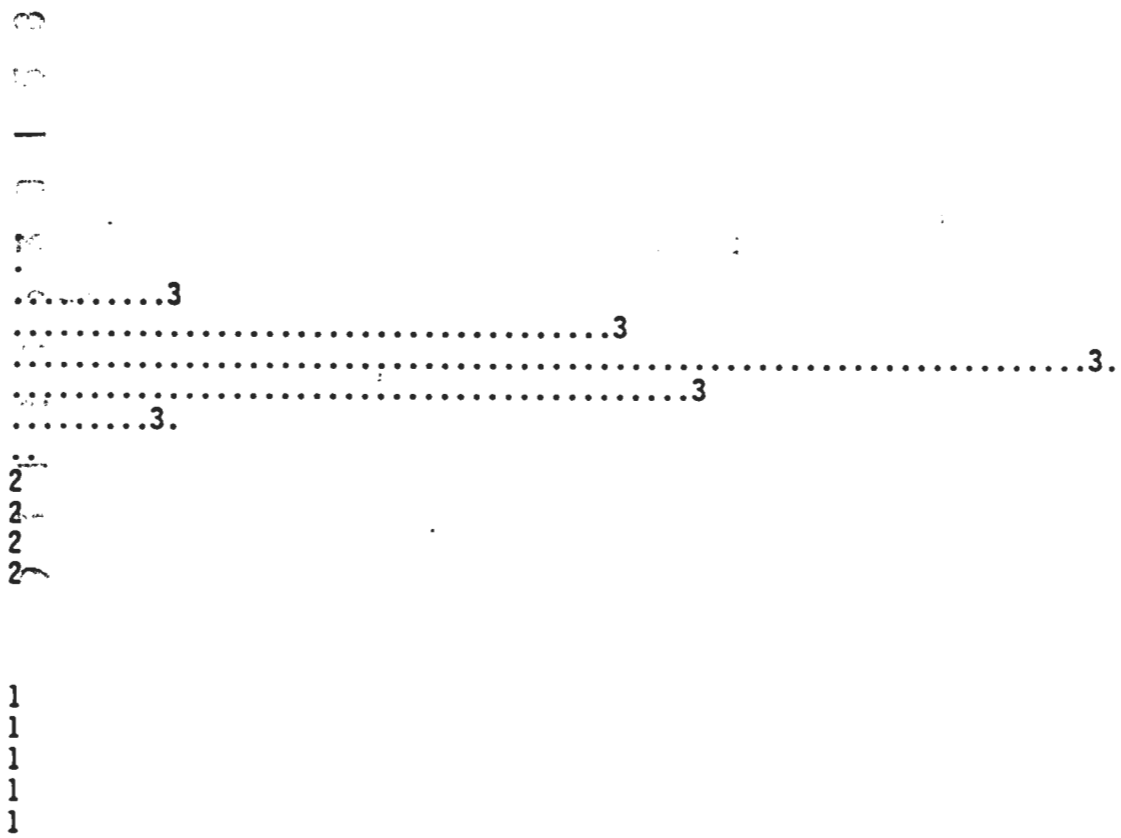
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	15768.0	100.000
Smoothed	15767.1	99.994
Composite fit	15221.9	96.537
Residuals	545.2	3.458

Analyzed by: _____
VR

SPECTRUM SD3529.SPC

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 5768.0



Raw Data Dump for AEA Spectrum: SP:SD3529.SPC

1	0.	0.	0.	0.	0.	1.	0.	2.	2.	0.
11	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
21	0.	0.	1.	0.	1.	1.	0.	0.	1.	1.
31	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.
41	0.	2.	1.	1.	0.	1.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
61	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
71	1.	0.	1.	1.	0.	0.	0.	0.	1.	0.
81	1.	0.	0.	2.	1.	1.	1.	1.	0.	2.
91	1.	0.	1.	0.	0.	0.	0.	0.	1.	0.
101	1.	0.	1.	1.	0.	0.	0.	1.	1.	0.
111	0.	1.	0.	1.	1.	0.	0.	0.	0.	2.
121	0.	1.	1.	1.	1.	1.	1.	0.	0.	1.
131	0.	1.	0.	0.	2.	1.	0.	0.	0.	0.
141	0.	1.	0.	0.	0.	0.	2.	1.	2.	2.
151	0.	0.	2.	0.	1.	0.	1.	2.	0.	2.
161	0.	0.	1.	1.	1.	1.	2.	1.	1.	1.
171	1.	1.	1.	2.	0.	0.	0.	2.	1.	1.
181	1.	2.	1.	0.	2.	0.	1.	1.	1.	1.
191	1.	0.	0.	3.	0.	2.	6.	0.	1.	1.
201	3.	1.	0.	4.	5.	4.	3.	5.	5.	8.
211	6.	9.	9.	7.	14.	13.	17.	14.	15.	22.
	28.	29.	33.	31.	34.	42.	40.	42.	49.	51.
	58.	41.	72.	73.	89.	99.	143.	154.	195.	226.
241	235.	327.	362.	439.	502.	578.	713.	734.	804.	828.
251	851.	856.	831.	797.	783.	665.	581.	535.	438.	321.
261	261.	225.	147.	132.	98.	81.	82.	67.	54.	30.
271	31.	15.	21.	5.	5.	11.	8.	4.	1.	5.
281	2.	5.	2.	3.	4.	4.	9.	7.	9.	10.
291	9.	11.	11.	11.	14.	12.	14.	14.	16.	18.
301	19.	26.	43 6.	14.	10.	6.	8.	5.	4.	4.
311	5.	4.	3.	0.	1.	0.	2.	0.	0.	2.
321	0.	1.	1.	0.	0.	0.	1.	1.	1.	0.
331	0.	0.	1.	0.	1.	1.	0.	0.	2.	4.
341	2.	4.	4.	6.	2.	6.	3.	5.	8.	2.
351	3.	6.	7.	9.	7.	3.	6.	13.	7.	3.
361	7.	5.	4.	5.	7.	6.	3.	3.	2.	1.
371	0.	2.	0.	0.	0.	0.	1.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
421	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
431	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	0.	0.	0.	0.	0.	0.	2.	0.
471	0.	1.	1.	2.	2.	1.	2.	3.	0.	2.
	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.
	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
R1627-5882 102AW/AM
File ID: SD4607.SPC

Counted on: 5/19/92 @18: 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	6.4	6.1	361.858	361.858	16.000	7.035	8.000	3.749
2	17.4	15.3	301.284	301.284	20.000	8.255	10.000	2.559
3	886.6	839.8	256.577	256.577	16.000	6.089	8.000	5.584

PEAK RESULTS

Peak	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
	Cm244	0.0085	5.796	5.777	0.019	0.03	0.09	0.62	0.279E-06
	Cm243		5.786	5.777	0.009				0.382E-06
2	Pu238	0.0281	5.499	5.492	0.007	0.04	0.30	2.84	0.128E-05
	Am241		5.480	5.492	-0.012				0.980E-06
3		0.9633		5.282		0.03	10.39	70.04	0.315E-04

DETECTOR CALIBRATION

Energy(MEV) = 4.076 + (0.0047)*Channel
Energy range (MeV): 4.076 TO 6.482
Efficiency = 0.1483 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	5896.0	100.000
Smoothed	5896.0	100.000
Composite fit	5390.8	91.432
Residuals	505.1	8.567

Analyzed by: _____
VR

SPECTRUM SD4607.SPC

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 2360.2

.....3

.....3

.....3

....3.....

2

2

2

2

1

1

Raw Data Dump for AEA Spectrum: SP:SD4607.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
91	0.	1.	2.	0.	0.	0.	0.	1.	0.	0.
101	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
121	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
131	1.	0.	0.	0.	0.	3.	0.	1.	0.	0.
141	0.	0.	0.	0.	0.	1.	1.	0.	0.	1.
151	0.	0.	1.	2.	1.	1.	0.	1.	0.	0.
161	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
171	0.	1.	1.	0.	0.	0.	0.	0.	0.	1.
181	1.	0.	1.	1.	0.	0.	0.	1.	0.	0.
191	0.	1.	0.	0.	0.	0.	1.	0.	0.	3.
201	1.	1.	0.	1.	1.	2.	1.	0.	1.	0.
211	2.	5.	2.	2.	3.	2.	6.	2.	2.	5.
221	6.	11.	8.	7.	11.	9.	9.	12.	11.	18.
231	22.	25.	19.	21.	13.	16.	10.	9.	13.	21.
241	20.	32.	50.	57.	78.	86.	101.	109.	119.	166.
251	210.	345.	445.	572.	697.	675.	546.	357.	238.	126.
261	78.	26.	35.	21.	31.	27.	24.	33.	19.	18.
271	12.	10.	5.	3.	1.	2.	1.	1.	0.	1.
281	1.	1.	1.	2.	2.	0.	0.	2.	1.	2.
291	3.	5.	1.	7.	6.	4.	3.	7.	16.	15.
301	11.	11.	5.	3.	5.	1.	3.	0.	0.	1.
311	1.	0.	0.	1.	0.	0.	0.	1.	0.	0.
321	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
341	0.	0.	0.	0.	0.	1.	0.	3.	2.	0.
351	2.	0.	1.	1.	2.	2.	1.	4.	4.	4.
361	4.	5.	3.	2.	2.	1.	0.	1.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1627	Customer ID: 2AW-BD-2 (R333)
Analysis: CARBON 14	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-348-104/B-0
Technologist: J. SOLBRACK	Date: 5-15-92
Starting Time: 16:30	Temperature: N/A
Ending Time: 22:00	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5588	11		
2	REAGENT BLANK	R1625-5688	12		
3	SAMPLE 2AW-BD-2	R1627-5788	13		
4	SAM DUP OF 2AW-BD-2	R1627-5888	14		
5	FINAL LMCS CHECK STD	R1628-5588	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	81B49/1 mL			N/A

A-6000-881 (03/92)

9312830163

CARBON 14 ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
R 1624.-5588	102 AW	5-12-92	14:36	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	% RECOVERY	H114U	0

Sample Size: ? /ml
Customer ID: STD

Remarks, Calculations, Results: RUSH

EDP R909 C14EDTA
STDN 81849 RESULT 2202
STD VAL 23601 %REC 93.3

$\frac{4889.6 (100)(1)}{2.22 \times 10^6} = 2.2202$

Analyst-1: [signature] Analyst-2: [signature] Analyst-3: Analyst-4: Analyst-5:
Hrs: 82020 Hrs: 5-15-92
Date: 5-15-92 Time Completed: Lab Unit Mgr: MAY 18 1992 [signature]

Serial No	Sample Point	Date	Time Issued	Priority
R 1625.-5688	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	uCI/L	H114U	0

Sample Size: ? /ml
Customer ID: BLK

Remarks, Calculations, Results: RUSH

REAGENT BLANK
COUNT AS uCI/L

$\frac{45 (100)(1)}{2.22 \times 10^6} = 2.25 \times 10^{-3}$ uCi/L

Analyst-1: [signature] Analyst-2: [signature] Analyst-3: Analyst-4: Analyst-5:
Hrs: 82020 Hrs: 5-15-92
Date: 5-15-92 Time Completed: Lab Unit Mgr: MAY 18 1992 [signature]

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5788	102 AW	5-12-92	14:55	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	UG/ML	H114U	0

Sample Size: ? /ml
Customer ID: 2AWIDX

Remarks, Calculations, Results: RUSH

COUNT AS uCI/L

$\frac{50.43 \text{ dpm/L}}{9.5012 \times 10^4 \text{ dpm/pCi} \times 2.2 \times 10^{12} \text{ pCi/pCi}} = 5.50 \times 10^{-6}$ ug/mL

Analyst-1: [signature] Analyst-2: [signature] Analyst-3: Analyst-4: Analyst-5:
Hrs: 82020 Hrs: 5-15-92
Date: 5-15-92 Time Completed: Lab Unit Mgr: MAY 18 1992 [signature]

Serial No	Sample Point	Date	Time Issued	Priority
R 1628.-5588	102 AW	5-12-92	15:0	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	% RECOVERY	H114U	0

Sample Size: ? /ml
Customer ID: STD

Remarks, Calculations, Results: RUSH

EDP R909 C14EDTA
STDN 81849 RESULT 2.192
STD VAL 23601 %REC 92.96

$\frac{4866.34 (100)(1)}{2.22 \times 10^6} = 2.192$

Analyst-1: [signature] Analyst-2: [signature] Analyst-3: Analyst-4: Analyst-5:
Hrs: 82020 Hrs: 5-15-92
Date: 5-15-92 Time Completed: Lab Unit Mgr: MAY 18 1992 [signature]

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5888	102 AW	5-12-92	14:55	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
C14	LA-348-104	UG/ML	H114U	0

Sample Size: ? /ml
Customer ID: 2AWIDX

Remarks, Calculations, Results: RUSH

DUPLICATE SAMPLE
COUNT AS uCI/L

$\frac{40.92 \text{ dpm/L}}{9.5012 \times 10^4 \text{ dpm/pCi} \times 2.2 \times 10^{12} \text{ pCi/pCi}} = 4.13 \times 10^{-6}$ mg/mL

Analyst-1: [signature] Analyst-2: [signature] Analyst-3: Analyst-4: Analyst-5:
Hrs: 82020 Hrs: 5-15-92
Date: 5-15-92 Time Completed: Lab Unit Mgr: MAY 18 1992 [signature]

ID:C-14 16 MAY 1992 02:0

USER: 2 COMMENT:108600 DPM ON 7 MAY 1986

PRESET TIME :	50.00						
DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	: ST
COUNT BLANK :	YES	IC#	: NO	REPLICATES :	1	RS232	:EDI
TWO PHASE :	YES	AQC	: NO	CYCLE REPEATS :	1		
SCINTILLATOR:	LIQUID	LUMEX	:YES	LOW SAMPLE REJ:	0		
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE:				none	

ISOTOPE 1: 14C %ERROR: 0.00 FACTOR:1.0000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: On

Quench Limits Low: 2.670 High:313.57

SAM NO	POS	TIME MIN	H#	14C CPM	14C %ERROR	14C DPM	14C EFF-1	LUMEX %	ELAPSED TIME	2P
B1	**-1	50.00	148.4	41.20	4.41	44.68	92.22	0.26	52.32	
		Blank Average		DPM for		14C :	44.68	COEF. OF VAR:	0.000	
1	**-3	50.00	143.4	4565.98	0.42	4889.06	92.55	0.01	104.97	
2	**-4	50.00	144.9	41.02	4.42	-0.31	92.45	0.27	157.54	
3	**-5	50.00	143.1	87.92	3.02	50.30	92.57	0.17	210.09	
4	**-6	50.00	144.3	89.30	2.99	51.87	92.49	0.13	262.60	
5	**-7	50.00	147.5	4661.42	0.41	5006.77	92.28	0.00	315.20	
6	**-8	50.00	146.4	95.22	2.90	58.43	92.35	0.14	367.79	
7	**-9	50.00	145.2	79.12	3.18	40.92	92.43	0.14	420.31	
8	**-10	50.00	146.1	4536.30	0.42	4866.34	92.37	0.00	472.92	

BEST AVAILABLE COPY

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1627	Customer ID: 2AW-BD-2 (R333)
Analysis: IODINE 129	Sample Prep: UNDIGESTED

Instrument: WB57237, WB57265	Procedure/Rev: LA-378-103/B-1
Technologist: T. McCOLLOCH	Date: 5-13-92
Starting Time: 08:45 (5-13-92)	Temperature: 25degC
Ending Time: 13:40 (5-18-92)	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5585	11		
2	REAGENT BLANK	R1625-5685	12		
3	SAMPLE 2AW-BD-2	R1627-5785	13		
4	SAM DUP OF 2AW-BD-2	R1627-5885	14		
5	FINAL LMCS CHECK STD	R1628-5585	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	40B49/1 mL			N/A

A-6000-881 (03/92)

9312865301166

IODINE I-129 ANALYSIS - UNDIGESTED ANALYSIS

6080

Serial No	Sample Point	Date	Time Issued	Priority
R 1628.-5585	102 AW	5-12-92	14:36	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	% RECOVERY	N114U	0

Sample Size: ? 1ml
Customer ID: SID

RUSH

Remarks, Calculations, Results:
EDP S92H TANK
SIDH 40849 RESULT 1.527
SID VAL 1.527 %REC 1.527%
GROSS WT. 2.7059
TARE WT. 2.6907
NET WT. .0152
$\frac{3.61\times10^{-7}(1000)(1)}{0.0152/0.0305} = 1.527$

Analyst 1: [illegible] Analyst 2: [illegible] Analyst 3: Analyst 4: Analyst 5:
Pos: 81805 Pos: 5-13-92
Date: 5/13/92 Time Completed: Lab Unit Mgr: MAY 13 1992

6081

Serial No	Sample Point	Date	Time Issued	Priority
R 1628.-5585	102 AW	5-12-92	[illegible]	[illegible]

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	uCI/ml	[illegible]	[illegible]

Sample Size: ? 1ml
Customer ID: [illegible]

RUSH

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L.
GROSS 2.7339
TARE 2.7147
NET. .0192
$\frac{2.0985\times10^{-5}(1000)(1)}{0.0192/0.0305} = 2.330\times10^{-2}$ uCi/L

Analyst 1: [illegible] Analyst 2: [illegible] Analyst 3: Analyst 4: Analyst 5:
Pos: 81805 Pos: 5-13-92
Date: 5/13/92 Time Completed: Lab Unit Mgr: MAY 13 1992

6085

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5785	102 AW	5-12-92	14:55	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	uCI/ML	N114U	0

Sample Size: ? 1ml
Customer ID: 2AW002

RUSH

Remarks, Calculations, Results:
COUNT AS uCI/L
GROSS 2.7260
TARE 2.7098
NET: .0162
$\frac{4.93\times10^{-3}(1)}{0.0162/0.0305} = 2.63\times10^{-5}$ uCi/ml

Analyst 1: [illegible] Analyst 2: D. Hamilton Analyst 3: Analyst 4: Analyst 5:
Pos: 81805
Date: 5/13/92 Time Completed: Lab Unit Mgr: MAY 13 1992

6086

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5885	102 AW	5-12-92	14:55	[illegible]

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	uCI/ML	N114U	[illegible]

Sample Size: ? 1ml
Customer ID: 2AW002

RUSH

Remarks, Calculations, Results:
DUPLICATE SAMPLE
COUNT AS uCI/L.
GROSS 2.7119
TARE 2.6933
NET. .0186
$\frac{4.97\times10^{-3}(1)}{0.0186/0.0305} = 3.25\times10^{-5}$ uCi/ml

Analyst 1: [illegible] Analyst 2: D. Hamilton Analyst 3: Analyst 4: Analyst 5:
Pos: 81805
Date: 5/13/92 Time Completed: Lab Unit Mgr: MAY 13 1992

6087

Serial No	Sample Point	Date	Time Issued	Priority
R 1628.-5585	102 AW	5-12-92	15: 0	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
I129	LA-378-103	% RECOVERY	N114U	0

Sample Size: ? 1ml
Customer ID: SID

RUSH

Remarks, Calculations, Results:
EDP S92H TANK
SIDH 40849 RESULT 1.511
SID VAL 1.511 %REC 1.511
GROSS WT. 2.7245
TARE WT. 2.7073
NET WT. .0172
$\frac{8.52\times10^{-7}(1000)(1)}{0.0172/0.0305} = 1.511$

Analyst 1: [illegible] Analyst 2: D. Hamilton Analyst 3: Analyst 4: Analyst 5:
Pos: 81805
Date: 5/13/92 Time Completed: Lab Unit Mgr: MAY 13 1992

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                   *
*          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

19-MAY-9202:09:23

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: 61453

SAMPLE DESCRIPTION: R-1627-5785
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 19-MAY-92 AT 01:19:13

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

19-MAY-9202:09:23

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

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 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

9 3 1 2 8 3 0 1 6 9

19-MAY-9202:09:23

SAMPLE: R-1627-5785
D COLLECTED ON 19-MAY-92 AT 01:19:13
D ED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<2.20E-06		LLD<2.20E-06		59.54	
AM-243	LLD<1.01E-06		LLD<1.01E-06		74.67	
I-129	LLD<1.93E-05		LLD<1.93E-05		39.60	
SB-125	LLD<2.31E-05		LLD<2.31E-05		176.33	
SE-75	LLD<1.92E-06		LLD<1.92E-06		136.00	
SN-113	LLD<5.66E-06		LLD<5.66E-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              *
*                                                                     *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

CANBERRA SPECTRAN-F V2.06 SOFTWARE

19-MAY-9203:42:45

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: 61453

SAMPLE DESCRIPTION: R-1627-5885
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 19-MAY-92 AT 02:52:36

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

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

P.	ENTROID 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 5-JUN-90 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS
BACKGROUND WAS INSIGNIFICANT

19-MAY-9203:42:45

SAMPLE: R-1627-5885
COLLECTED ON 19-MAY-92 AT 02:52:36
'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/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<2.12E-06		LLD<2.12E-06		59.54	
AM-243	LLD<8.58E-07		LLD<8.58E-07		74.67	
I-129	LLD<1.98E-05		LLD<1.98E-05		39.60	
SB-125	LLD<1.90E-05		LLD<1.90E-05		176.33	
SE-75	LLD<1.75E-06		LLD<1.75E-06		136.00	
SN-113	LLD<3.44E-06		LLD<3.44E-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

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1627	Customer ID: 2AW-BD-2 (R333)
Analysis: SELENIUM 79	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-365-132/B-0
Technologist: V. MASSIE	Date: 6-19-92
Starting Time: 07:45 (6-18-92)	Temperature: N/A
Ending Time: 14:00 (6-19-92)	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	REAGENT BLANK	R1625-5689	11		
2	SAMPLE 2AW-BD-2	R1627-5789	12		
3	SAM DUP OF 2AW-BD-2	R1627-5889	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
LMCS CHECK STD	1851-B/2 mL			N/A
SAMPLES RERUN.				

A-6000-881 (03/92)

9 3 1 2 8 6 3 0 1 7 4

SELENIUM 79 ANALYSIS - UNDIGESTED SAMPLE

1

Serial No	Sample Point	Date	Time Issued	Priority
R 1625.-5689	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
SE79	LA-365-132	uCI/L	N114U	3

Sample Size: 1ml SiH_2O + 2ml Selenium Carrier 1851-B **RUSH** | Customer ID: BLK

Remarks, Calculations, Results: **RERUN**

REAGENT BLANK

COUNT AS uCI/L

.79100
+ .77383
.01717

$\frac{6.13(1000)(1)}{0.01717\ (2.22\times10^6)} = 322\times10^{-3}$ uCi/L

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
820116	Em Barela			

Date	Time Completed	Lab Unit Mgr	
6-19-92		JUN 23 1992	

4

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5789	102 AW	5-12-92	14:55	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
SE79	LA-365-132	uCI/L	N114U	4

RUSH

Sample Size: 1ml + 2ml Selenium Carrier 1851-B | Customer ID: 2GWBD2

Remarks, Calculations, Results: **RERUN**

COUNT AS uCI/L

.78730
+ .76904
.01826

$\frac{27.65(1000)(1)}{.01826\ (2.22\times10^6)} = 1.16\times10^{-2}$ uCi/L

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
820116	Em Barela			

Date	Time Completed	Lab Unit Mgr	
6-19-92		JUN 23 1992	

5

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5889	102 AW	5-12-92	14:55	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
SE79	LA-365-132	uCI/L	N114U	3

Sample Size: 1ml + 2ml Selenium Carrier 1851-B **RUSH** | Customer ID: 2GWBD2

Remarks, Calculations, Results: **RERUN**

DUPLICATE SAMPLE

COUNT AS uCI/L

.79263
+ .77448
.01815

$\frac{27.98(1000)(1)}{.01815\ (2.22\times10^6)} = 1.39\times10^{-2}$ uCi/L

Analyst 1	Analyst 2	Analyst 3	Analyst 4	Analyst 5
820116	Em Barela			

Date	Time Completed	Lab Unit Mgr	
6-19-92		JUN 23 1992	

9312830175

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1627	Customer ID: 2AW-BD-2 (R333)
Analysis: TECHNETIUM 99	Sample Prep: UNDIGESTED

Instrument: WB27818, WC16085	Procedure/Rev: LA-438-101/D-1
Technologist: S. LAI	Date: 5-14-92
Starting Time: 08:00	Temperature: 24degC
Ending Time: 15:20	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5584	11		
2	REAGENT BLANK	R1625-5684	12		
3	SAMPLE 2AW-BD-2	R1627-5784	13		
4	SAM DUP OF 2AW-BD-2	R1627-5884	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	86B49/0.25 mL			N/A

A-6000-881 (03/92)

9312835301176

TECHNETIUM 99 ANALYSIS - UNDIGESTED SAMPLE

1&2

Serial No	Sample Point	Date	Time Issued	Priority
R 1624.-5684	102 AW	5-12-92	14:36	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
TC99	LA-438-101	% RECOVERY	H1140	0

Sample Size: ? 250 λ 100 λ Spike 49839
Customer ID: STD

Remarks, Calculations, Results:
EDP S363 TC99 86649
STDN 86849 RESULT 2.39
STD VAL 2.047 %REC 116.5%
$\frac{557.00\,(5.9795\times10^{-4})(1)(1000)(2)}{2008.31 - 557.00\,(2.22\times10^{-6})} = 239$

RUSH

Analyst-1: Sue L. | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Pos: 1c916 | Pos | Pos | Pos | Pos
Date: 5-14-92 | Time Completed | Lab Unit Mgr: HAY 18 1992

3&4

Serial No	Sample Point	Date	Time Issued	Priority
R 1625.-5684	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
TC99	LA-438-101	uCI/L	H1140	0

Sample Size: ? 100 λ 100 λ Spike 49839
Customer ID: BLK

Remarks, Calculations, Results:
REAGENT BLANK
COUNT AS uCI/L
$\frac{49\,(5.9795\times10^{-4})(1)(1000)(2)}{2595.6 - 8\,(2.22\times10^{-6})} = 47.35\times10^{-2}$ uCi/L

RUSH

Analyst-1: Sue L. | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Pos: 1c916 | Pos | Pos | Pos | Pos
Date: 5-14-92 | Time Completed | Lab Unit Mgr: HAY 18 1992

9&10

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5684	102 AW	5-12-92	14:55	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
TC99	LA-438-101	uCI/L	H1140	0

Sample Size: ? 100 λ 100 λ Spike 49839
Customer ID: 2AWDD2

Remarks, Calculations, Results:
COUNT AS uCI/L
$\frac{407.76\,(5.9795\times10^{-4})(1)(1000)(2)}{(4975.65 - 407.76)(2.22\times10^{-6})} = 4.20\times10^{+0}$ uCi/L

RUSH

Analyst-1: Sue L. | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Pos: 1c916 | Pos | Pos | Pos | Pos
Date: 5-14-92 | Time Completed | Lab Unit Mgr: HAY 18 1992

11&12

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5684	102 AW	5-12-92	14:55	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
TC99	LA-438 101	uCI/L	H1140	0

Sample Size: ? 100 λ 100 λ Spike 49839
Customer ID: 2AWDD2

Remarks, Calculations, Results:
DUPLICATE SAMPLE
COUNT AS uCI/L
$\frac{414.04\,(5.9795\times10^{-4})(1)(1000)(2)}{2986.24 - 414.04\,(2.22\times10^{-6})} = 4.26\times10^{+0}$ uCi/L

RUSH

Analyst-1: Sue L. | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Pos: 1c916 | Pos | Pos | Pos | Pos
Date: 5-14-92 | Time Completed | Lab Unit Mgr: HAY 18 1992

Serial No	Sample Point	Date	Time Issued	Priority
R 1628.-5684	102 AW	5-12-92	15:0	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
TC99	LA-438-101	% RECOVERY	H1140	0

Sample Size: ?
Customer ID: STD

Remarks, Calculations, Results:
EDP S363 TC99
STDN RESULT
STD VAL %REC

Not Required Per Steve Cotton

RUSH

Analyst-1: Sue L. | Analyst-2 | Analyst-3 | Analyst-4 | Analyst-5
Pos: 1c916 | Pos | Pos | Pos | Pos
Date: 5-14-92 | Time Completed | Lab Unit Mgr: HAY 18 1992

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No.: R1627	Customer ID: 2AW-BD-2 (R333)
Analysis: URANIUM	Sample Prep: UNDIGESTED

Instrument: WB88807	Procedure/Rev: LA-925-106/B-0
Technologist: S. L. COBB	Date: 6-04-92
Starting Time: N/A	Temperature: 21.5degC
Ending Time: N/A	Chemist: S. CATLOW

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R1624-5540	11		
2	REAGENT BLANK	R1625-5640	12		
3	SAMPLE 2AW-BD-2	R1627-5740	13		
4	SAM DUP OF 2AW-BD-2	R1627-5840	14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Standard Type	Primary Book No. and Aliquot Vol.	Second Book No. and Aliquot Vol.	Third Book No. and Aliquot Vol.	Final Vol. of Standard
LMCS CHECK STD	126B38/0.1 mL			N/A

A-6000-881 (03/92)

9 3 1 2 8 6 3 0 1 7 8

URANIUM ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
R 1624.-5540	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	N114U	0

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

Remarks, Calculations, Results:
SVC 1626A38
STDR 90838 RESULT 2.075-2
STD VOL 5.075-2 %REC 101.1
SPIKE 10/VOL 6.25-4 Hi 90838
SPIKE VOL 100ul
.15 (6.25x10⁻⁴)(1)(1000) / (2.7/5.2)(.45) - .15 = 3.07x10⁻²
.15
.45

SL Cobb

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SHCobb 6/4/92

Serial No	Sample Point	Date	Time Issued	Priority
R 1625.-5640	102 AW	5-12-92	14:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/L	111401	0

Sample Size: 100-10-100 ul
Customer ID: BLK

Remarks, Calculations, Results:
REAGENT BLANK
.02
.20
<0.02 (6.25x10⁻⁴)(1)(1000) / (2.7/5.2)(.20) - .02 = <6.88x10⁻³ g/L
.02
.20

SL Cobb

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SHCobb 6/4/92

Serial No	Sample Point	Date	Time Issued	Priority
R 1627.-5740	102 AW	5-12-92	14:59	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	UG/ML	N114U	0

Sample Size: 100-10-100ul
Customer ID: 2AWDD2

Remarks, Calculations, Results:
.21
.48
.21 (6.25x10⁻⁴)(1)(1000) / (2.7/5.2)(.48) - .21 = 4.26x10⁻² g/L
= 4.26x10¹ mg/mL

SL Cobb

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SHCobb 6/4/92

Serial No.	Sample Point	Date	Time Issued	Priority
R 1627.-5840	102 AW	5-12-92	14:59	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/L	111401	0

Sample Size: 100-10-100ul
Customer ID: [illegible]

Remarks, Calculations, Results:
DUPLICATE SAMPLE
.20
.46
.20 (6.25x10⁻⁴)(1)(1000) / (2.7/5.2)(.46) - .20 = 4.71x10⁻² g/L
= 4.71x10¹ mg/mL

SL Cobb

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
82583				
Hrs	Hrs	Hrs	Hrs	Hrs

Date: 06-04-92 | Time Completed: | Lab Unit Mgr: SHCobb 6/4/92

THIS PAGE INTENTIONALLY
LEFT BLANK

Date Received: 12-14-92 CW

INFORMATION RELEASE REQUEST

Reference: WHC-CM-3-4

Complete for all Types of Release

Purpose

- [ ] Speech or Presentation
  - [ ] Full Paper
  - [ ] Summary
  - [ ] Abstract
  - [ ] Visual Aid
  - (Check only one suffix)
- [ ] Speakers Bureau
- [ ] Poster Session
- [ ] Videotape
- [ ] Reference
- [X] Technical Report
- [ ] Thesis or Dissertation
- [ ] Manual
- [ ] Brochure/Flier
- [ ] Software/Database
- [ ] Controlled Document
- [ ] Other

ID Number (include revision, volume, etc.): WHC-SD-WM-DP-025, REV 0

List attachments.

Date Release Required: 12/14/92

Title: 242-A Evaporator Feed Characterization Data Package

Unclassified Category: UC-

Impact Level:

New or novel (patentable) subject matter? [X] No [ ] Yes
If "Yes", has disclosure been submitted by WHC or other company?
[ ] No [ ] Yes Disclosure No(s).

Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions?
[X] No [ ] Yes (Identify)

Copyrights? [X] No [ ] Yes
If "Yes", has written permission been granted?
[ ] No [ ] Yes (Attach Permission)

Trademarks?
[X] No [ ] Yes (Identify)

Complete for Speech or Presentation

Title of Conference or Meeting: NA

Group or Society Sponsoring: NA

Date(s) of Conference or Meeting: NA

City/State: NA

Will proceedings be published? [ ] Yes [X] No
Will material be handed out? [ ] Yes [X] No

Title of Journal: NA

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	[ ]	[X]			
Patent - General Counsel	[X]	[ ]	Barb Williamson	Barb Williamson 3 on telecon	12/14/92
Legal - General Counsel	[X]	[ ]	Barb Williamson	Barb Williamson 3 Jennifer W. Ikeda	50?1
Applied Technology/Export Controlled Information or International Program	[ ]	[X]			
WHC Program/Project	[ ]	[X]			
Communications	[ ]	[X]			
RL Program/Project	[ ]	[X]			
Publication Services	[ ]	[X]			
Other Program/Project	[ ]	[X]			

Information conforms to all applicable requirements. The above information is certified to be correct.

	Yes	No
References Available to Intended Audience	[ ]	[X]
Transmit to DOE-HQ/Office of Scientific and Technical Information	[ ]	[X]

Author/Requestor (Printed/Signature): Brian S. Sprouse — Date: 12/14/92

Intended Audience: [ ] Internal [ ] Sponsor [X] External

Responsible Manager (Printed/Signature): P. Karen Vacca — Date: 12/14/92

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.

APPROVED FOR RELEASE — OFFICIAL DOCUMENT — CW — Date 12-14-92

Date Cancelled

Date Disapproved

9312830180

BD-7600-062 (08/91) WEF074

Part 1

THIS PAGE INTENTIONALLY
LEFT BLANK