START

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 600908

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.		4. Date
Supplemental []	R. E. VOGEL, PROCESSING AND ANALYTICAL LABS, T6-20, 373-3683		09/30/93
Direct Revision [X]	5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Impact Level
Change ECN []	100 K AREA BASINS	NA	3Q
Temporary []	8. Document Numbers Changed by this ECN (includes sheet no. and rev.)	9. Related ECN No(s).	10. Related PO No.
Standby []	WHC-SD-WM-DP-045, REV 0	NA	NA
Supersedure []			
Cancel/Void []			

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 11b)	NA	NA	NA
[X] No (NA Blks. 11b, 11c, 11d)		Cog. Engineer Signature & Date	Cog. Engineer Signature & Date

12. Description of Change

Complete revision, explanation below:

Employee payroll numbers have been eliminated from this data package to protect the privacy of WHC employees. The elimination of these numbers in no way compromises the integrity of the raw data or information contained herein.

13a. Justification (mark one)							
		Criteria Change	[]	Design Improvement	[]	Environmental	[X]
As-Found	[]	Facilitate Const.	[]	Const. Error/Omission	[]	Design Error/Omission	[]

13b. Justification Details

Complete revision to the document completes this project.

14. Distribution (include name, MSIN, and no. of copies)

C. L. Bennett (2)	X0-44	D. A. Dodd (ECN ONLY)	T6-50
Central Files (2)	L8-04	H. I. Martin (ECN ONLY)	T6-06
EDMC (1)	H6-08	R. E. Vogel (ECN ONLY)	T6-20

RELEASE STAMP

OFFICIAL RELEASE BY WHC

DATE SEP 30 1993

55 Sta. 6

A-7900-013-2 (06/92) GEF095

OCT 1993 RECEIVED EDMC

A-7900-013-1 (06/92)

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 600908

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer R. E. VOGEL RE Vogel	9/28/93	PE	
Cog. Mgr. R. E. VOGEL RE Vogel	9/28/93	QA	
QA J. C. LANGFORD J. C. Langford	9/29/93	Safety	
Safety		Design	
Security		Environ.	
Environ.		Other	
Projects/Programs			
Tank Waste Remediation System			
Facilities Operations		DEPARTMENT OF ENERGY	
Restoration & Remediation		Signature or Letter No.	
Operations & Support Services			
IRM		ADDITIONAL	
Other			

SEP 30 1993

Date Received: 9/28/93 TJD

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-045, REV 1 ECN 600908

List attachments.

Date Release Required: 09/30/93

Title: 222-S ANALYTICAL LABORATORY 100 K AREA BASINS - DATA PACKAGES

Unclassified Category: UC-

Impact Level: 3Q

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 - Signature Indicates Approval: Name (printed) / Signature / Date
Classification/Unclassified Controlled Nuclear Information	[]	[X]	
Patent - General Counsel	[X]	[]	Per OGC memo 2-4-93 Jennifer L Wilk 9-28-93
Legal - General Counsel	[X]	[]	Per OGC memo 2-4-93 Jennifer L Wilk 9-28-93
Applied Technology/Export Controlled Information or International Program	[]	[X]	
WHC Program/Project	[]	[X]	
Communications	[]	[X]	Jennifer L Wilk 9-28-93
RL Program/Project	[X]	[]	Per telecon w/ P Clark 9-28-93 does not want to see
Publication Services	[X]	[X]	Dale F. Washburn Jr. Per telecon w/ J Wilk 9-29-93
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): K. K. GIAMBERARDINI — Date: 9-28-93

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

Responsible Manager (Printed/Signature): K. K. GIAMBERARDINI — Date: 9-28-93

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

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

APPROVED FOR RELEASE — OFFICIAL DOCUMENT — Date 9/28/93

Date Cancelled | Date Disapproved

BD-7600-062 (08/91) WEF074

Part 1

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SUPPORTING DOCUMENT

1. Total Pages 639

2. Title

222-S ANALYTICAL LABORATORY 100 K AREA BASINS - DATA PACKAGE

3. Number

WHC-SD-WM-DP-045

4. Rev No.

1

5. Key Words

222-S LABS, 100 K BASINS, ANALYTICAL RESULTS

APPROVED FOR PUBLIC RELEASE

9/28/93

6. Author

Name: R. E. VOGEL

RE Vogel 9/28/93

Signature

Organization/Charge Code 12610/J120H

7. Abstract

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9. Impact Level 3Q

10. RELEASE STAMP

OFFICIAL RELEASE BY WHC
DATE SEP 30 1993
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RECORD OF REVISION	(1) Document Number WHC-SD-WM-DP-045	Page 1

(2) Title
222-S ANALYTICAL LABORATORY 100 K AREA BASINS - DATA PACKAGE

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) EDT: 140704	R. E. VOGEL RE Vogel 9/28/93	R. E. VOGEL RE Vogel 9/28/93
1 RS	ECN: 600908	R. E. Vogel RE Vogel 9/28/93	R. E. Vogel RE Vogel 9/28/93

9313091.1929

A-7320-005 (08/91) WEF168

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Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

WHC-SD-WM-DP-045
REV 1

222-S Analytical Laboratory

Project: 100 K AREA BASINS

Date Printed: AUGUST 25, 1993

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TABLE OF CONTENTS

Cover Page 1
Table of Contents 2

Narrative 4

PART I - ENVIRONMENTAL SAMPLES 6

Sampling and Custody Data 7
Sample Data Summary 14

K-Area Basins Customer ID. Number 065WQL 39
K-Area Basins Customer ID. Number 066WQL 91
K-Area Basins Customer ID. Number 069WQL 158
100 K-Area Basins Customer ID. Number 0343WQL 215
100 K-Area Basins Customer ID. Number 0344WQL 268
105 K-Area Basins Customer ID. Number 0491WQL 317

PART II - SB SAMPLES 360

Sampling and Custody Data 361
Sample Data Summary 366

UNDIGESTED SAMPLE ANALYSES (SAMPLE 3916) 404

Acid Digestion 405
Tritium 408

ACID DIGESTION ANALYSES (SAMPLE 3916) 411

Inductively Coupled Plasma Spectrographic 412
Total Alpha 427
Uranium 431
Plutonium 434
Americium 449
Total Beta 461
Strontium 468
Gamma Energy Analysis 472

UNDIGESTED SAMPLE ANALYSES (3943) 486

Acid Digestion (06-02-93) 487
Acid Digestion (06-10-93) 490

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ACID DIGESTION ANALYSES (3943) 493

Inductively Coupled Plasma Spectrographic (06-02-93) 494
Inductively Coupled Plasma Spectrographic (06-11-93) 508
Total Alpha 521
Uranium (06-04-93) 526
Uranium (06-16-93) 529
Plutonium (06-03-93) 531
Plutonium (06-16-93) 550
Gamma Energy Analysis 562

UNDIGESTED SAMPLE ANALYSES (3976) 574

Acid Digestion 575

ACID DIGESTION ANALYSES (3976) 579

Inductively Coupled Plasma Spectrographic 580
Total Alpha 595
Uranium 602
Plutonium (06-15-93) 606
Plutonium (06-16-93) 618
Americium (06-16-93) 635
Americium (06-17-93) 647
Total Beta 656
Strontium 661
Gamma Energy Analysis 665

UNDIGESTED SAMPLE ANALYSES (3853) 679

Acid Digestion 680

ACID DIGESTION ANALYSES (3853) 684

Uranium 685

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NARRATIVE

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RESULTS FOR THE FOLLOWING SAMPLES ARE PRESENTED

0344WQL- 1st quarter 93 sandfilter backwash pit sample.

0066WQL- 4th quarter 92 sandfilter backwash pit sample.

0343WQL- 1st quarter 93 sandfilter sand sample.

0065WQL- 4th quarter 92 sandfilter sand sample.

0069WQL- 4th quarter 92 sandfilter backwash composite sample.

0491WQL- Annual center of basin sample.

0345WQL- 1st quarter 93 sandfilter backwash composite sample.

53-032-04-Special sandfilter backwash pit sample.

5B-70E- Special sandfilter backwash pit sample.

5B-76A- Special sandfilter backwash pit sample.

5B-76A- Special sandfilter backwash pit sample.

All available supporting information is presented in these documents. The samples were run with LMCS standards and all standards were within limits.

The package is not a complete data package due to the fact all samples were run as process control samples and not to protocol.

R E Vl 8/15/93
R. E. Vogel
Project Manager
222-S Laboratory

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PART I - ENVIRONMENTAL SAMPLES

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SAMPLING AND CUSTODY DATA

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WHC-SD-WM-DP-045
REV 1

32619

REQUEST FOR SPECIAL ANALYSIS (RSA)

1. Sample Origin	2. Date Submitted	4. Requester Name	6. Charge Code/Work Package
K-AREA BASINS	1-12-93	M. A. GREEN	E11456
	3. Date Required: 2-15-92	5. Requester Phone/MSIN: 3-1463/ X0-35	

7. Customer ID	8. Laboratory ID
0062WAL KW SAND	E8604
0063WAL KW NLOP	E8605
0064WAL KW CNTR OF BASIN	E8609
0065WAL KE SAND	E8606
0066WAL KE NLOP	E8607
0067WAL KE CNTR OF BASIN	E8608
~~0068WAL KW BACKWASH~~	D1
~~0069WAL KE BACKWASH~~	SH 1/15/93
	E8608DV

11. Number of Samples: ~~6~~ ~~8~~ 7

12. Volume of Samples: (2) petri dishes (4) 500ml bottles

13. Protocols: XX None; ___ NQA-1; ___ CERCLA; ___ RCRA; ___ Other ___

14. Sample Type: ___ Solid; XX Soil; XX Slurry; ___ Gas; ___ Water; ___ Waste; ___ Solution; ___ Sludge; ___ Other (specify) ___

15. Storage Requirements: XX None; ___ Specify ___

9. Determination	10. Expected Range
DO FOR EACH:	
Total Alpha	App Amy
Pu 238 & 239/240	
Sr-90	
**PLEASE PROVIDE A NET WEIGHT FOR EACH SAMPLE **	see examples attached

16. Process Knowledge/Known Listed Wastes: XX Unknown; ___ Known (Please attach list); ___ Previously submitted for this Project

17. Survey: HPT; Reading (Contact/Uncorrected): 50 mRem/hr

18. Disposition of Waste: ___ Return to Client; XX Dispose per 222-S Procedures; ___ Other ___; Date Disposed:

19. Additional Information: 8

20. Chain of Custody: ___ No; XX Yes Number: 011293 KW-KE

21. Assigned Custodial Group (circle one): PCL PDSU (ENV) Process

22. Sample Received By: Sandie Cobb; Date: 01-13-93 Time: 1440

23. Laboratory Manager (if required); Date:

BC-6700-181 (03/92)

WHC SD-WM-DP-045
REV 1

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WHC-SD-WM-DP-045
REV 1

REQUEST FOR SPECIAL ANALYSIS (RSA)

1. Sample Origin	2. Date Submitted	4. Requester Name	6. Charge Code/Work Package
100K BASINS	5-12-93	M.A. GREEN	E11456
	3. Date Required: PRIORITY	5. Requester Phone/MSIN: 3-1463 / X0-35	

7. Customer ID	8. Laboratory ID
0343WQL - KE SAND	E9324
0344WQL - KE NLOP - PRIORITY TURNAROUND	E9325
0346WQL - KW SAND	E9331
0347WQL - KW NLOP	E9332

11. Number of Samples: 4

12. Volume of Samples: 2 - 50ml petri dish; 2 - 250ml bottles

13. Protocols: XX None; ___ NQA-1; ___ CERCLA; ___ RCRA; ___ Other

14. Sample Type: ___ Solid; ___ Soil; XX Slurry; ___ Gas; ___ Water; ___ Waste; ___ Solution; ___ Sludge; ___ Other (specify)

15. Storage Requirements: XX None; ___ Specify

9. Determination	10. Expected Range
TOTAL ALPHA	8725
Pu-238	
Pu-239/240 ① (See below).	~~8881~~ 8781
Sr-90	6786
Am-241	8782
Uranium	6740
Acid Digest	8700
IMPORTANT	
Please Provide the following information:	
*Total volume of ~~liquid in~~ MRR-E1243 sample (in ml)	100
*Total net weight of dry solids (in grams)	
① On sample #0344WQL - RUN TWO INDEPENDENT ANALYSIS FOR Pu-239/240	
*After radionuclides have been run do an ICP acid digest on sample #0343WQL & 0344WQL	
	8755
FAX RESULTS on #0344WQL TO M.A. GREEN @ 3-2655	

16. Process Knowledge/Known Listed Wastes: X Unknown; ___ Known (Please attach list); ___ Previously submitted for this Project

17. Survey: SPESE 5618 — Reading (Contact/Uncorrected): MAX. 100 mRem/hr — HPT

18. Disposition of Waste: ___ Return to Client; X Dispose per 222-S Procedures; ___ Other

Date Disposed:

19. Additional Information

SEE STAN CATLOW FOR ADDITIONAL INFORMATION
NEED PRIORITY TURNAROUND ON SAMPLE #0344WQL
Impact Level II, Safety Class III

20. Chain of Custody: ___ No; X Yes Number: 33

21. Assigned Custodial Group (circle one): PCL PDSU (ENV) Process

22. Sample Received By: Valerie L Masse
Date: 05-12-93 Time: 15:25

23. Laboratory Manager (if required)
Date:

10

BC-6700-181 (03/92)

9311309.1059

WHC-SD-WM-DP-045
REV 1

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9413300.0083

REQUEST FOR SPECIAL ANALYSIS (RSA)

WHC-SD-WM-DP-045 REV 1

1. Sample Origin: 105 K-AREA BASINS	2. Date Submitted: 5-7-93	4. Requester Name: M.A. GREEN	6. Charge Code/Work Package: E11456
	3. Date Required: 6-7-93	5. Requester Phone/MSIN: XXXXXXXXXXX 3-1463	

7. Customer ID	8. Laboratory ID
0490WQL _-KW BASIN SLUDGE	E9229
0491WQL - KE BASIN SLUDGE	E9230

11. Number of Samples: 2

12. Volume of Samples: 250 ml

13. Protocols: X None; ___ NQA-1; ___ CERCLA; ___ RCRA; ___ Other ___

14. Sample Type: ___ Solid; ___ Soil; XX Slurry; ___ Gas; ___ Water; ___ Waste; ___ Solution; ___ Sludge; ___ Other (specify) ___

15. Storage Requirements: XX None; ___ Specify ___

9. Determination	10. Expected Range
Pu-238	AVP
Pu-239/240	8700 ACID Digest
Total Alpha	
Sr-90	
Am-241	
U-238	
GEA	
IMPORTANT	
Please provide me with	the NET WEIGHT SOLIDS DRY
of the sample analyzed	
***See Stan Catlow for	additional Information

16. Process Knowledge/Known Listed Wastes: XX Unknown; ___ Known (Please attach list); ___ Previously submitted for this Project

17. Survey: Reeve 5618 (HPT); Reading (Contact/Uncorrected): 90 max mRem/hr

18. Disposition of Waste: ___ Return to Client; X Dispose per 222-S Procedures; ___ Other ___

Date Disposed:

19. Additional Information

SEE STAN CATLOW FOR INFORMATION

Impact Level II, Safety Class III

20. Chain of Custody: ___ No; XX Yes Number: 32

21. Assigned Custodial Group (circle one): PCL PDSU (ENV) Process

22. Sample Received By: Sandra Cobb

Date: 05-07-93 Time: 1115

23. Laboratory Manager (if required)

Date:

12

BC-6700-181 (03/92)

Westinghouse Hanford Company	CHAIN OF CUSTODY	33	COPY

Custody Form Initiator MARY ANN GREEN

Company Contact MARY ANN GREEN

Telephone 373-1463

Collection Date 3-31-93

Project Designation/Sampling Locations 105KE AND 105KW
QUARTERLY BASIN SLUDGE SAMPLES

WHC-SD-WM-DP-045
REV 1

Field Logbook No.

Ice Chest No.

Bill of Lading/Airbill No.

Offsite Property No.

Method of Shipment PLASTIC SAMPLE BOTTLE WRAPPED IN PLASTIC INSIDE A METAL SLIPLID CAN INSIDE A DOORSTOP CARRIER IN THE N-55 OVERPACK DRUM

Shipped to 222-S LABORATORIES, 200W AREA

Possible Sample Hazards/Remarks RADIOACTIVE

See Sample Analysis Request for individual containers and analysis.

Sample Identification

9324 0343WQL (1 PETRI DISH) KE SAND
9325 0344WQL (1 250ML BOTTLE) KE NLOP
9331 0346WQL (1 PETRI DISH) KW SAND
E9332 0347WQL (1 250ML BOTTLE) KW NLOP

[] Field Transfer of Custody

Chain of Possession (Sign and Print Names)

Relinquished by:	Received by:	Date/Time:
M. A. Green	John Thorne	5/12/93 1402
John Thorne	VL Massie / Valerie Massie	05-12-93 15:25

Final Sample Disposition

Disposal Method:	Disposed by:	Date/Time:

Comments:

EACH SAMPLE IS IN IT'S OWN SLIPLID CAN AND DOORSTOP CARRIER. FOLLOW INSTRUCTIONS ON ATTACHED RSA

A-6000-407 (12/90) (EF) WEF061
Chain of Custody

9413090.0043

SAMPLE DATA SUMMARY

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ANALYTICAL CARDS

K-area Basins
CUSTOMER ID: 0065UQL
TANK: N/a

E8604

		SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Gpr/OTR	LG-519-151/E-1	✓	N/a	N/a	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
U-Soil	LG-525-127	✓	N/a	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEG-Liq	LG-548-121	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GT-Solids	LG-508-101	✓	N/a	✓	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 238/40	LG-943-123	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Am 241	LG-503-156	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Sr 89/90	LG-233-101	✓	N/a	✓	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Acid Digestion

K-Area Basins

CUSTOMER ID: 0065WQL

SAMPLE RESULTS

E8606

	Standard		Sample	
Lab I.D.	N/a		E8606-1001	
Upper/OTR	N/a		Total Weight 4.772	G
Lab I.D.	S5340-42		E8606-4461	
U-Soil 04-14-93	104.28	%	5.72E-3	G/G
Lab I.D.	4-14-93 E8501-2142		E8606-2142	
GEG-Soil 04-14-93				
Cs 137	92.98	%	2.54E+7	pCi/g
Co 60	98.4	%	3.04E+5	pCi/g
Am 241	N/a		1.25E+6	pCi/g
Eu 154	N/a		3.08E+5	pCi/g
Eu 155	N/a		1.82E+4	pCi/g
Cs 134	N/a		<7.00E+3	pCi/g
Mn 54	N/a		<5.91E+3	pCi/g
Sb 125	N/a		<6.33E+4	pCi/g
Lab I.D.	N/a		E8606-1283	
GT-Solids 04-14-93	N/a		2.43E0	uCi/g
Lab I.D.	N/a		E8606-3336	
Pu 238 04-21-93	N/a		1.59E-1	uCi/g
Lab I.D.	S5336-3336		E8606-3336	
Pu 239/40 04-21-93	101.19	%	1.11E0	uCi/g

2 of 2

SAMPLE PREP.: Acid Digestion

K-Area Basins
CUSTOMER ID: 0045-UQL

SAMPLE RESULTS
E8606

	Standard		Sample	
Lab I.D.	55334-4822		E8608-4822	
Gr 241 04-21-93	72.32	%	1.19 E°	uci/g
Lab I.D.	N/a		E8606-3801	
Sr 89/90 04-23-93	N/a		3.44 E°	uci/g

ANALYTICAL CARDS

K-area Basins
CUSTOMER ID: 0066 UAL
TANK: N/a

		SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Cpp-OTR	LA-519-151	✓	N/a	N/a	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
U	LA-925-107	✓	N/a	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEA-Soil	LA-548-121	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GT	LA-508-101	✓	N/a	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 239/40	LA-503-156	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 238/40	LA-503-156	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Am 241	LA-503-156	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Sr 89/90	LA-223-101	✓	N/a	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Acid Digestion

K-Area Basins

CUSTOMER ID: 0046WQL

SAMPLE RESULTS

E8607

	Standard		Sample	
Lab I.D.	N/a		E8607-1001	
Gpp-/OTR	N/a		Total Weight 9.8164	G
Lab I.D.	S5340-4267		E8607-4461	
4.soil 04-17-93	104.28	%	1.34E-2	G/a
Lab I.D.	4-24-93 E8501-2142		E8607-2172	
GEA 05-23-93				
Cs 137	92.98	%	9.57E+7	PCi/G
Co 60	98.48	%	5.75E+6	PCi/G
Am 241	N/a		4.04E+7	PCi/G
Eu 154	N/a		7.95E+6	PCi/G
Eu 155	N/a		4.62E+6	PCi/G
Sb 125	N/a		9.88E+5	PCi/G
Mn 54	N/a		6.04E+4	PCi/G
Lab I.D.	4-22-93 E8501-1211		E8607-1183	
GT 04-14-93	101.94	%	8.25E+1	uCi/G
Lab I.D.	S5340-3334		E8607-3334	
Pu 239/40 04-20-93	102.68	%	4.62E+1	uCi/g
Pu 238 04-20-93	N/a		8.31E0	uCi/g
Lab I.D.	S4589-3336		E8607-3334	
Pu 239/40 05-10-93	183.03	%	2.73E+1	uCi/g
Pu 238	N/a		*	

* Unable to determine

WHC-SD-WM-DP-045
REV 1

2 of 2

SAMPLE PREP.: Acid Digestion

K. Area Basins

CUSTOMER ID: 0066WQL

SAMPLE RESULTS

E8607

	Standard		Sample	
lab I.D.	S5336-4842		E8607-4822	
Gm 241 04-21-93	74.32	%	3.45E-11	uci/g
lab I.D.	S5336-4974		E8607-3801	
Sr 89/90 04-24-93	99.30	%	7.08E-11	uci/g

WHC-SD-WM-DP-045
REV 1

ANALYTICAL CARDS

K-Area Basins
CUSTOMER ID: 0069WQL
TANK: N/a

		SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Gpp/OTR	La-519-151	✓	N/a	N/a	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
L	La-925-107	✓	N/a	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEG	La-548-121	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GT	La-508-101	✓	N/a	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 239/40	La-503-156	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Am 241	La-503-156	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Sr 90	La-223-101	✓	N/a	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Acid Digestion

K-Area Basins
CUSTOMER ID: 0049WQ

SAMPLE RESULTS

E8608

	Standard		Sample															
Lab I.D.	N/a		E8608-1001															
Appr/10^R	N/a		Total Weight 1.052	G														
Lab I.D.	55340-9 7		E8608-4441															
U 04-17-93	104.28	%	5.00 E^-2	G/G														
Lab I.D	4-24-93 E8501-2142		E8608-4712															
GEA 04-14-93																		
Cs 137	92.98	%	4.37 E^+5	pCi/G														
Co 60	98.48	%	4.44 E^+4	pCi/G														
Am 241	N/a		7.30 E^+7	pCi/G														
Cs 134	N/a		4.53 E^+5	pCi/G														
Eu 154	N/a		1.14 E^+7	pCi/G														
Eu 155	N/a		7.13 E^+6	pCi/G														
Sb 125	N/a		2.45 E^+6	pCi/G														
Mn 54	N/a		<4.32 E^+4	pCi/G														
Lab I.D.	4-22-93 E8501-1411		E8608-1283															
GT 04-14-93	101.94	%	1.61 E^+2	uCi/g														
Lab I.D.	55340-3336		E8608-3334															
Pu 239/40 04-20-93	102.68	%	9.09 E^+1	uCi/g														
Pu 238 04-20-93	N/a		1.87 E^+1	uCi/g														

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

E8608

K-Area Basins
CUSTOMER ID: 0049WQL

	Standard		Sample													
Lab I.D.	S5336-4832		E8608-4822													
Gn 241 04-21-93	72.32	%	4.39 E[11]	uci/g												
Lab I.D.	S5336-9514		E8608-3801													
Sr 89/90 04-24-93	99.30	%	1.44 E[12]	uci/g												

ANALYTICAL CARDS

100 K Basins
CUSTOMER ID: 0343 WQL
TANK: N/a

		SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Gpp-iOTR	LG-519-151	✓	N/a	N/a	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
Gcid Digestion	LG-505-159	✓	N/a	N/a	✓	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
U	LG-425-106	✓	N/a	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEG	LG-548-121	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GT	LG-508-101	✓	N/a	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 239/40	LG-503-156	✓	N/a	✓	✓	N/a	N/a	✓	✓	N/a	N/a	N/a	N/a
Am 241	LG-503-156	✓	N/a	✓	✓	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
Sr 90	LG-220-101	✓	N/a	✓	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Acid Digestion

100 K Basins
CUSTOMER ID: 0343 WQL

SAMPLE RESULTS
E9324

	Standard		Sample		Duplicate Sample											
Lab I.D.	N/a		E9324-1004		N/a											
Gpp-/DTR 05-13-93	N/a		KE Basin,	brown/	solids, clarity -	none,	phases - none,	<	15 ml/hr.							
Lab I.D.	N/a		E9324-8700		N/a											
Acid Digestion 05-13-93	N/a		5.019 E^{0}	g/L	N/a											
Lab I.D.	55343-9267		E9324-8740		N/a											
L 05-15-93	104.82	%	1.41 E^{-2}	g/g	N/a											
Lab I.D.	N/a		E9324-8755		N/a											
ICP 05-14-93	N/a				N/a											
Zr	N/a		3.98 E^{0}	mg/g	N/a											
Sr	N/a		4.70 E^{0}	mg/g	N/a											
Si	N/a		2.54 E^{+2}	mg/g	N/a											
Al	N/a		3.67 E^{+3}	mg/g	N/a											
Co	N/a		5.54 E^{0}	mg/g	N/a											
Cu	N/a		1.57 E^{+2}	mg/g	N/a											
Li	N/a		2.21 E^{0}	mg/g	N/a											
Zn	N/a		1.44 E^{+2}	mg/g	N/a											
Ni	N/a		3.43 E^{+1}	mg/g	N/a											
Fe	N/a		4.93 E^{+3}	mg/g	N/a											
Ca	N/a		4.15 E^{+2}	mg/g	N/a											
Cr	N/a		4.67 E^{+1}	mg/g	N/a											
Sm	N/a		8.53 E^{+1}	mg/g	N/a											

WHC-IDP-WM-DP-045
REV 1

SAMPLE PREP.: Acid Digestion

100 K Basins

CUSTOMER ID: 0343 WQL

SAMPLE RESULTS

E9324

	Standard		Sample		Duplicate Sample											
Lab I.D.			E9324-8755		N/a											
ICP Ag			3.61 E^{+1}	ug/g	N/a											
P			1.14 E^{+2}	ug/g	N/a											
S			3.43 E^{+1}	ug/g	N/a											
Mg			2.84 E^{+2}	ug/g	N/a											
Na			1.82 E^{+1}	ug/g	N/a											
Ca			2.63 E^{0}	ug/g	N/a											
Pb			2.13 E^{+2}	ug/g	N/a											
Ti			5.14 E^{+1}	ug/g	N/a											
Cd			9.30 E^{0}	ug/g	N/a											
K			1.59 E^{+2}	ug/g	N/a											
Mn			7.81 E^{+1}	ug/g	N/a											
V			5.94 E^{+1}	ug/g	N/a											
Zn			5.42 E^{+1}	ug/g	N/a											
Lab I.D.	4-23-93 E8501-1211		E9324-1211		N/a											
GT 05-14-93	101.94 %		1.05 E^{0}	uCi/g	N/a											
Lab I.D.	4-24-93 E8501-2142		E9324-8630		N/a											
GEG 05-18-93																
Cs 137	92.98	%	1.82 E^{+1}	uCi/g	N/a											
Co 60	98.48	%	2.41 E^{-1}	uCi/g	N/a											

WHC-SD-WM-DP-045
REV 1

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

E9324

100 K Basins
CUSTOMER ID: 0343WQL

	Standard		Sample		Duplicate Sample	
Lab I.D.	N/a		E9324-8181		E9324-8881	
Pu 239/40 05-18-93	N/a		3.42E-1	uci/g	3.44E-1	uci/g
Pu 238 05-18-93	N/a		5.22E-2	uci/g	5.42E-2	uci/g
Lab I.D.	N/a		E9324-8782		N/a	
Am 241 05-14-93	N/a		4.77E-1	uci/g	N/a	
Lab I.D.	N/a		E9324-8784		N/a	
Sr 90 05-14-93	N/a		1.03E0	uci/g	N/a	

WHC-SD-WM-DP-045
REV 1

ANALYTICAL CARDS

100 K Basins
CUSTOMER ID: 0344UQL
TANK: N/a

		SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Copper/OTR	LG-519-151	✓	N/a	N/a	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
Acid Digestion	LG-504-159	✓	N/a	N/a	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
U	LG-425-106	✓	N/a	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
ICP	LG-505-151	✓	N/a	N/a	✓	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
GT	LG-508-101	✓	N/a	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEA	LG-548-121	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 239/40	LG-503-156	✓	N/a	✓	✓	N/a	N/a	✓	✓	N/a	N/a	N/a	N/a
Am 241	LG-503-156	✓	N/a	✓	✓	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
Sr 90	LG-220-101	✓	N/a	✓	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS
E9325

100 K Basins
CUSTOMER ID; 0344UQL

	Standard		Sample															
Lab I.D.	N/a		E9325-1001															
Upper/OTR 05-13-93	N/a		KE basin, dark-brown, 250 mL, cloudy, solids, one phase, 300 mr/hr.															
Lab I.D.	N/a		E9325-8700															
Acid Digestion 05-12-93	N/a		4.988 E^0	g/l														
Lab I.D.	55573-9267		E9325-8740															
K 05-15-93	104.82	%	2.57 E^-1	g/g														
Lab I.D.	N/a		E9325-8755															
ICP 03-14-93	N/a																	
Zr	N/a		2.85 E^+2	mg/g														
Sr	N/a		4.75 E^+1	mg/g														
Al	N/a		8.60 E^+4	mg/g														
Co	N/a		3.87 E^+1	mg/g														
Cu	N/a		1.83 E^+3	mg/g														
Li	N/a		7.22 E^0	mg/g														
Zn	N/a		1.45 E^+3	mg/g														
Ni	N/a		1.07 E^+2	mg/g														
Fe	N/a		1.41 E^+5	mg/g														
Ca	N/a		3.41 E^+3	mg/g														
Cr	N/a		7.54 E^+2	mg/g														
Nd	N/a		3.98 E^+2	mg/g														
Sm	N/a		1.43 E^+3	mg/g														

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

E9325

100 K basins

CUSTOMER ID: 0344WQL

	Standard		Sample	
Lab I.D.	N/a		E9325-8735	
ICP Ba	N/a		$1.87E^{12}$	g/g
P	N/a		$1.07E^{13}$	g/g
S	N/a		$1.34E^{13}$	g/g
Mg	N/a		$1.03E^{13}$	g/g
Ca	N/a		$5.79E^{11}$	g/g
Na	N/a		$1.14E^{12}$	g/g
Mo	N/a		$2.21E^{11}$	g/g
Pb	N/a		$1.4E^{13}$	g/g
Ti	N/a		$1.34E^{12}$	g/g
Cd	N/a		$1.57E^{12}$	g/g
K	N/a		$1.71E^{12}$	g/g
Mn	N/a		$1.05E^{13}$	g/g
Sb	N/a		$5.14E^{12}$	g/g
V	N/a		$1.05E^{13}$	g/g
Be	N/a		$4.61E^{11}$	g/g
TR	N/a		$8.40E^{12}$	g/g
Lab I.D.	4-22-93 E8501-7211		E9325-1211	
GT 05-14-93	101.96	%	$1.44E^{12}$	uCi/g
Lab I.D.	4-24-93 E8501-7142		E9325-1072	
Geo Cs 137 05-14-93	92.98	%	$2.47E^{18}$	pCi/g

WHC-SD-WM-CP-045
REV 1

SAMPLE PREP.: Acid Digestion

100 K Basins
CUSTOMER ID: 0344WQL

SAMPLE RESULTS
E9325

	Standard		Sample		Duplicate Sample											
Lab I.D	N/a		E9325-8781		E9325-8881											
Pu 239/40 05-18-93	N/a		4.41 E^{11}	uci/g	4.26 E^{11}	uci/g										
Pu 238 05-18-93	N/a		6.43 E^{0}	uci/g	8.02 E^{0}	uci/g										
Lab I.D	N/a		E9325-8782		N/a											
Am 241 05-14-93	N/a		4.44 E^{11}	uci/g	N/a											
Lab I.D	N/a		E9325-8784		N/a											
Sr 90 05-17-93	N/a		8.12 E^{0}	uci/g	N/a											

WHC-SD-WM-DP-045
REV 1

ANALYTICAL CARDS

105 K-area Basins
CUSTOMER ID: 0491 UAL
TANK: N/a

		SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Cpp-107R	LG-519-157	✓	N/a	N/a	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
Acid Digestion	LG-505-159	✓	N/a	N/a	✓	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
U	LG-925-106	✓	N/a	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GT	LG-508-161	✓	N/a	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEA	LG-548-121	✓	N/a	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 239/40	LG-503-156	✓	N/a	✓	✓	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
Am 241	LG-503-156	✓	N/a	✓	✓	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
Sr 90	LG-220-101	✓	N/a	✓	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

E9230

105 K-area Basins

CUSTOMER ID; 0491WQL

	Standard		Sample	
Lab I.D.	N/A		E9230 1001	
Opp-/DTR 05-13-93	N/A		KE Basin, brown-250 ml, cloudy, solids, one phase, 700 gr/hr, dry solid wt.-9.19 51 S.	
Lab I.D.	N/A		E9230-8706	
Acid Digest 05-12-93	N/A		5.080 E^0	g/l
Lab I.D.	55340-9247		E9230-8740	
U 05-14-93	101.09	%	4.17 E^-2	g/g
Lab I.D.	4-26-93 E8501-1211		5-13-93 E9230-1211	
GT	101.46	%	4.81 E^+1	uci/g
Lab I.D	4-26-93 E8501-4142		5-13-93 E9230-4142	
GEA Cs 137	92.98	%	7.22 E^+7	pCi/g
Co60	98.48	%	N/A	
Lab I.D.	N/A		E9230-3461	
Pu 239/240 05-14-93	N/A		2.27 E^+7	pCi/g
Pu 238 05-14-93	N/A		3.59 E^+6	pCi/g
Lab I.D.	N/A		E9230-1181	
Am 241	N/A		1.70 E^+7	pCi/g
Lab I.D.	N/A		E9230-8784	
Sr 90 05-17-93	N/A		8.09 E^+1	uci/g

WHC-SD-WM-DP-045
REV 1

SAMPLE STATUS REPORT FOR E 9230. H&RWC 0491WQL TIME: 8/10/93 8: 7
DISPATCHED: 5/11/93 9:57 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/11/93 9:58

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
1001	APPR/OTR	KE SLUDGE, BROWN, 250 ML, CLOUDY, ONE PHASE,	700MR		PC41G
1181	Am-SOIL	1.70000E 04 pCi/gDRYwt	N	Y	PC41G
1211	AT MISC	4.81E+1 UCI/G			PC41G
2172	GEA-SOIL	7.2200E 01 uCi/G Cs-137			PC41G
3461	Pu-SOIL	Pu-239/240=2.27E01 uCi/G Pu-238=3.59 uCi/G			PC41G
5000	COMMENT	NET DRY WT WAS 9.195 GRAMS/250 ML			PC41G
8700	ACD DGST	5.08000E 00 G/L	N	Y	PC41G
8740	U	4.17000E-02 G/G Rec	N	Y	PC41G
8786	Sr90	OUT FOR RERUN			PC41G
8786	Sr90	8.09000E 01 uCi/G Rec	N	Y	PC41G

END OF REPORT

SAMPLE STATUS REPORT FOR E 8606. H&RWC 0065WQL TIME: 8/10/93 8: 7
DISPATCHED: 4/12/93 13: 0 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/14/93 11:51

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
1001	APPR/OTR	TOTAL WT 4.772 GRAMS			PC41G
1283	AT-SOLDS	2.43E+0 UCI/G			PC41G
2172	GEA-SOIL	1.25000E 06 pCi/gWETwt Am-241	N	Y	PC41G
2172	GEA-SOIL	2.54000E 07 pCi/gWETwt Cs-137	N	Y	PC41G
2172	GEA-SOIL	3.02000E 05 pCi/gWETwt Co-60	N	Y	PC41G
2172	GEA-SOIL	3.08000E 05 pCi/gWETwt Eu-154	N	Y	PC41G
2172	GEA-SOIL	1.82000E 04 pCi/gWETwt Eu-155	N	Y	PC41G
2172	GEA-SOIL	< 7.00000E 03 pCi/gWETwt Cs-134	N	Y	PC41G
2172	GEA-SOIL	< 5.91000E 03 pCi/gWETwt Mn-54	N	Y	PC41G
2172	GEA-SOIL	< 6.33000E 04 pCi/gWETwt Sb-125	N	Y	PC41G
3336	Pu239/40	PU238 1.59E-1 & PU239 1.11 UCI/G			VOGEL
3801	Sr89/90	OUT FOR RERUN			VOGEL
3801	Sr89/90	3.44 UCI/G			VOGEL
4461	U-SOIL	5.73000E-03 G/G	N	Y	PC41G
4822	Am241	1.19 UCI/G			VOGEL

END OF REPORT

9313080.0964

SAMPLE STATUS REPORT FOR E 9324. H&RWC 0343wql TIME: 8/10/93 8: 6
DISPATCHED: 5/12/93 15:41 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/14/93 11:46

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
1001	APPR/OTR	KE SAND, BROWN, ONE PHASE, <15 MR			E11457
1211	AT MISC	1.0500E 00 uCi/G			E11457
8630	GEA	2.61000E-01 uCi/G Co-60			E11457
8630	GEA	1.82000E 01 uCi/G Cs-137			E11457
8700	ACD DGST	5.01900E 00 G/L	N	Y	E11457
8740	U	1.21000E-02 G/G Rec	N	Y	E11457
8755	ICP-SOL	3.98000E 00 uG/G Rec Zr	N	Y	E11457
8755	ICP-SOL	4.70000E 00 uG/G Rec Sr	N	Y	E11457
8755	ICP-SOL	2.54000E 02 uG/G Rec Si	N	Y	E11457
8755	ICP-SOL	3.67000E 03 uG/G Rec Al	N	Y	E11457
8755	ICP-SOL	5.54000E 00 uG/G Rec Co	N	Y	E11457
8755	ICP-SOL	1.57000E 02 uG/G Rec Cu	N	Y	E11457
8755	ICP-SOL	2.21000E 00 uG/G Rec Li	N	Y	E11457
8755	ICP-SOL	1.44000E 02 uG/G Rec Zn	N	Y	E11457
8755	ICP-SOL	3.63000E 01 uG/G Rec Ni	N	Y	E11457
8755	ICP-SOL	4.93000E 03 uG/G Rec Fe	N	Y	E11457
8755	ICP-SOL	4.15000E 02 uG/G Rec Ca	N	Y	E11457
8755	ICP-SOL	6.67000E 01 uG/G Rec Cr	N	Y	E11457
8755	ICP-SOL	8.53000E 01 uG/G Rec Sm	N	Y	E11457
8755	ICP-SOL	3.61000E 01 uG/G Rec Ba	N	Y	E11457
8755	ICP-SOL	1.14000E 02 uG/G Rec P	N	Y	E11457
8755	ICP-SOL	3.63000E 01 uG/G Rec S	N	Y	E11457
8755	ICP-SOL	2.84000E 02 uG/G Rec Mg	N	Y	E11457
8755	ICP-SOL	1.82000E 01 uG/G Rec Na	N	Y	E11457
8755	ICP-SOL	2.63000E 00 uG/G Rec Ag	N	Y	E11457
8755	ICP-SOL	2.13000E 02 uG/G Rec Pb	N	Y	E11457
8755	ICP-SOL	5.16000E 01 uG/G Rec Ti	N	Y	E11457
8755	ICP-SOL	9.50000E 00 uG/G Rec Cd	N	Y	E11457
8755	ICP-SOL	1.59000E 02 uG/G Rec K	N	Y	E11457
8755	ICP-SOL	7.81000E 01 uG/G Rec Mn	N	Y	E11457
8755	ICP-SOL	5.96000E 01 uG/G Rec V	N	Y	E11457
8755	ICP-SOL	5.42000E 01 uG/G Rec Tl			E11457
8781	Pu239/40	OUT FOR RERUN			E11457
8781	Pu239/40	Pu-239/240= 3.62E-01 uCi/G Pu-238=5.22E-02 uCi/G			E11457
8782	Am241	6.77000E-01 uCi/G Rec	N	Y	E11457
8786	Sr90	1.03000E 00 uCi/G Rec	N	Y	E11457
8881	Pu239/40	OUT FOR RERUN			E11457
8881	Pu239/40	Pu-239/240 = 3.64E-01 uCi/G Pu-238=5.42E-2 uCi/G			E11457

END OF REPORT

SAMPLE STATUS REPORT FOR E 8608. H&RWC 0069WQL TIME: 8/16/93 18:33
DISPATCHED: 4/12/93 13: 3 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 4/14/93 11:52

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
1001	APPR/OTR	TOTAL WT 1.0521 GRAMS			PC41G
1283	AT-SOLDS	1.61E+2 UCI/G			PC41G
2172	GEA-SOIL	7.30000E 07 pCi/gWETwt Am-241	N	Y	PC41G
2172	GEA-SOIL	4.37000E 08 pCi/gWETwt Cs-137	N	Y	PC41G
2172	GEA-SOIL	4.55000E 05 pCi/gWETwt Cs-134	N	Y	PC41G
2172	GEA-SOIL	1.16000E 07 pCi/gWETwt Eu-154	N	Y	PC41G
2172	GEA-SOIL	7.13000E 06 pCi/gWETwt Eu-155	N	Y	PC41G
2172	GEA-SOIL	2.25000E 06 pCi/gWETwt Sb-125	N	Y	PC41G
2172	GEA-SOIL	< 6.32000E 04 pCi/gWETwt Mn-54	N	Y	PC41G
2172	GEA-SOIL	4.66000E 06 pCi/gWETwt Co-60	N	Y	PC41G
3336	Pu239/40	PU238 1.87E+1 & PU239 9.09E+1 UCI/G			VOGEL
3801	Sr89/90	OUT FOR RERUN			VOGEL
3801	Sr89/90	1.66E+2 UCI/G			VOGEL
4461	U-SOIL	5.00000E-02 G/G	N	Y	PC41G
4822	Am241	6.39E+1 UCI/G			VOGEL

END OF REPORT

9313090.0966

SAMPLE STATUS REPORT FOR E 9325. H&RWC 0344WQL TIME: 8/17/93 13:10
DISPATCHED: 5/12/93 15:42 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/14/93 11:46

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
1001	APPR/OTR	KE NLOP DARK BROWN, 250 ML, CLOUDY, SOLIDS,	ONE		E11457
1001	APPR/OTR	PHASES, 300 MR			E11457
1001	APPR/OTR	PHASES, 300 MR.			E11457
1211	AT MISC	1.44000E 02 uCi/G			E11457
2172	GEA-SOIL	2.97000E 05 pCi/gWETwt Cs-137	N	Y	E11457
5000	COMMENT	NET DRY WT WAS 6.846 GRAMS/250 ML			E11457
8700	ACD DGST	4.98800E 00 G/L	N	Y	E11457
8740	U	2.57000E-01 G/G Rec	N	Y	E11457
8755	ICP-SOL	2.85000E 02 uG/G Rec Zr	N	Y	E11457
8755	ICP-SOL	4.75000E 01 uG/G Rec Sr	N	Y	E11457
8755	ICP-SOL	8.59999E 04 uG/G Rec Al	N	Y	E11457
8755	ICP-SOL	3.87000E 01 uG/G Rec Co	N	Y	E11457
8755	ICP-SOL	1.83000E 03 uG/G Rec Cu	N	Y	E11457
8755	ICP-SOL	7.22000E 00 uG/G Rec Li	N	Y	E11457
8755	ICP-SOL	1.45000E 03 uG/G Rec Zn	N	Y	E11457
8755	ICP-SOL	1.07000E 02 uG/G Rec Ni	N	Y	E11457
8755	ICP-SOL	1.41000E 05 uG/G Rec Fe	N	Y	E11457
8755	ICP-SOL	3.61000E 03 uG/G Rec Ca	N	Y	E11457
8755	ICP-SOL	7.54000E 02 uG/G Rec Cr	N	Y	E11457
8755	ICP-SOL	3.98000E 02 uG/G Rec Nd	N	Y	E11457
8755	ICP-SOL	1.43000E 03 uG/G Rec Sm	N	Y	E11457
8755	ICP-SOL	1.87000E 02 uG/G Rec Ba	N	Y	E11457
8755	ICP-SOL	1.09000E 03 uG/G Rec P	N	Y	E11457
8755	ICP-SOL	1.34000E 03 uG/G Rec S	N	Y	E11457
8755	ICP-SOL	1.03000E 03 uG/G Rec Mg	N	Y	E11457
8755	ICP-SOL	5.79000E 01 uG/G Rec As	N	Y	E11457
8755	ICP-SOL	1.16000E 02 uG/G Rec Na	N	Y	E11457
8755	ICP-SOL	2.21000E 01 uG/G Rec Mo	N	Y	E11457
8755	ICP-SOL	1.21000E 03 uG/G Rec Pb	N	Y	E11457
8755	ICP-SOL	1.34000E 02 uG/G Rec Ti	N	Y	E11457
8755	ICP-SOL	1.57000E 02 uG/G Rec Cd	N	Y	E11457
8755	ICP-SOL	1.71000E 02 uG/G Rec K	N	Y	E11457
8755	ICP-SOL	1.05000E 03 uG/G Rec Mn	N	Y	E11457
8755	ICP-SOL	5.14000E 02 uG/G Rec Sb	N	Y	E11457
8755	ICP-SOL	1.05000E 03 uG/G Rec V	N	Y	E11457
8755	ICP-SOL	4.61000E 01 uG/G Rec Be	N	Y	E11457
8755	ICP-SOL	8.40000E 02 uG/G Rec Tl			E11457
8781	Pu239/40	OUT FOR RERUN			E11457
8781	Pu239/40	Pu-239/240 4.4100E 01 uCi/G Pu-238 = 6.43 uCi/G			E11457
8782	Am241	4.94000E 01 uCi/G Rec	N	Y	E11457
8786	Sr90	OUT FOR RERUN			E11457
8786	Sr90	8.12000E 00 uCi/G Rec	N	Y	E11457
8881	Pu239/40	OUT FOR RERUN			PC41G
8881	Pu239/40	Pu-239/240 = 4.260E 01 uCi/G Pu-238 = 8.02 uCi/G			PC41G

END OF REPORT

9313090.0969

K-AREA BASINS

CUSTOMER ID NUMBER 0065WQL

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Serial No	Sample Point	Date	Time Issued	Priority
E 8606.-4461	H&RWC	4-12-93	12:57	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U-SOIL	LA-925-107	G/G	PC41G	0

Sample Size	Customer ID
_____G OF SAMPLE 9ml + 1.434ml 7% OH	0065WQL

Remarks, Calculations, Results

Spike ID/Vol = 9083g/6.25E-4 (100 − 10 − 50 sample size)

.57

$\frac{.57(6.25\times10^{-4})(.1)(2020)(1.159)}{\frac{5.65}{5.55}(.86)-.57} = \frac{2.73\times10^{-4}\,g\,U/L}{47.72\,g/L} =$ $5.22\times10^{-3}\,g\,U/g\,sample$

.86

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-19-93	14:30	[signature]	4/27 SCHogan

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

Serial No.	Sample Point	Date	Time Issued	Priority
E 8606.-1001	H&RWC	4-12-93	12:57	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LA-519-151	NONE	PC41G	0

Sample Size	Customer ID
?	0065WQL

Remarks, Calculations, Results:

Sample or Tank ID?
Color and Est Vol?
Clarity?
Solids y/n
Phases?
OTR or CPM ?

4.772g Total wt

RUSH

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

Date	Time Completed	Lab Unit Mgr	
		[signature]	4/21 SEHogan

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

Original Analytical Card not received
[illegible] 8/24/93

Serial No.	Sample Point	Date	Time Issued	Priority
S 5340.-9267	SHIFT STD'S	4- 1-93	0:57	2S

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

Sample Size	Customer ID
100-10-100	

Remarks, Calculations, Results:

S267 UF1C
STD# RESULT 3.17×10^{-2} .16
STD VAL 3.04×10^{-2} %REC 104.3 .47
SPIKE ID/VAL 90B38 / $6.25E^{-4}$
SPIKE VOL. 126B38 104.28%

$$\frac{.16 - (6.25 \times 10^{-4})(.1)(1000)}{\frac{5.7}{56}(.47) - .16} = 3.17 \times 10^{-2}$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-19-93	11:40	[illegible]	[illegible]

54-6808-061 (R-10-83)

4951

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-2162	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-LIQ	LA-548-121	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

36851 ENVSTD
EDP E345 / CS137 1.59E-2 92.98% Li .500
EDP E346 / CO60 3.24E-2 98.48%
EDP E349 / AM241

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93		

54-5800-061 (R-10-83)

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UKaymond 4-24-93

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

24-APR-9322:10:46

WHC-SD-WM-DP-045
REV 1

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 4 / GEOMETRY NUMBER: S1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AND:
ANALYZED BY: UR

SAMPLE DESCRIPTION: E3501-2162 ENV/STD
GEOMETRY DESCRIPTION: 500 ML LIQ
SAMPLE SIZE: 5.0000E-01 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 24-APR-93 AT 21:20:16

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3021. SECONDS
DEAD TIME: 0.70 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

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24-APR-9322:10:46

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	96.68	48.31	1.00	1265.	965.	11.7	U-234
2	1322.77	661.40	1.49	1479.	22010.	1.4	CS-137
2B		661.44			159.	9.8	
3	2345.24	1172.78	1.84	1053.	31246.	1.2	CO-60
4	2663.52	1331.98	1.98	224.	29195.	1.2	CO-60
5	2920.13	1460.34	1.86	104.	806.	8.0	K-40
5B		1460.67			769.	1.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-92 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

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24-APR-9322:10:46

SAMPLE: E8301-2162 ENV/STD
DATA COLLECTED ON 24-APR-93 AT 23:20:16
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/L				ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<4.28E-04		LLD<4.28E-04		911.07	
AC-228A	LLD<4.28E-04		LLD<4.28E-04		911.10	
AC-228B	LLD<4.57E-04		LLD<4.57E-04		338.40	
AG-108M	LLD<7.31E-05		LLD<7.31E-05		433.94	
AG-110M	LLD<3.36E-04		LLD<3.36E-04		657.76	
AM-241	LLD<5.46E-04		LLD<5.46E-04		59.54	
AM-243	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243A	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243B	LLD<2.30E-03		LLD<2.30E-03		43.10	
AR-41	LLD<6.98E-05		LLD<6.98E-05		1293.64	
AU-198	LLD<6.06E-05		LLD<6.06E-05		411.80	
BA-133	LLD<9.66E-05		LLD<9.66E-05		356.02	
BA-139	LLD<2.36E-04		LLD<2.36E-04		165.85	
BA-140	LLD<2.94E-04		LLD<2.94E-04		537.27	
BA-141	LLD<2.12E-04		LLD<2.12E-04		190.23	
BE-7	LLD<6.62E-04		LLD<6.62E-04		477.59	
BI-207	LLD<7.42E-05		LLD<7.42E-05		569.70	
BI-212	LLD<7.31E-04		LLD<7.31E-04		727.27	
BI-214	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214A	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214B	LLD<8.37E-04		LLD<8.37E-04		1120.28	
BI-214C	LLD<2.69E-04		LLD<2.69E-04		1764.31	
CD-109	LLD<1.54E-03		LLD<1.54E-03		88.03	
CE-144	LLD<3.23E-04		LLD<3.23E-04		133.51	
CE-139	LLD<5.33E-05		LLD<5.33E-05		165.85	
CE-141	LLD<7.41E-05		LLD<7.41E-05		145.44	
CEPR144	LLD<6.46E-04		LLD<6.46E-04		133.51	
CO-56	LLD<1.09E-04		LLD<1.09E-04		846.76	
CO-57	LLD<4.24E-05		LLD<4.24E-05		122.06	
CO-58	LLD<1.02E-04		LLD<1.02E-04		810.75	
CO-60	3.24E-02	+-4.14E-04	3.24E-02	+-4.14E-04	1332.50	-0.32
					1173.24	-0.46
CR-51	LLD<5.73E-04		LLD<5.73E-04		320.04	
CS-134	LLD<1.08E-04		LLD<1.08E-04		795.84	
CS-136	LLD<1.05E-04		LLD<1.05E-04		818.51	
CS-137	1.59E-02	+-2.46E-04	1.59E-02	+-2.46E-04	661.65	-0.33
CS-138	LLD<7.71E-05		LLD<7.71E-05		1435.86	
EU-152	LLD<1.85E-04		LLD<1.85E-04		1408.01	
EU-154	LLD<1.84E-04		LLD<1.84E-04		1274.47	
EU-154A	LLD<8.90E-05		LLD<8.90E-05		123.10	
EU-155	LLD<2.06E-04		LLD<2.06E-04		105.31	
FE-59	LLD<2.36E-04		LLD<2.36E-04		1099.25	
HF-181	LLD<8.24E-05		LLD<8.24E-05		482.20	
HG-203	LLD<6.37E-05		LLD<6.37E-05		279.20	
I-131	LLD<7.46E-05		LLD<7.46E-05		364.48	
I-132	LLD<8.56E-05		LLD<8.56E-05		667.75	
I-133	LLD<7.36E-05		LLD<7.36E-05		529.87	
I-134	LLD<1.57E-04		LLD<1.57E-04		847.03	
I-135	LLD<2.20E-04		LLD<2.20E-04		1260.41	
K-40	LLD<8.03E-04		LLD<8.03E-04		1460.75	
KR-85	LLD<1.61E-02		LLD<1.61E-02		513.99	
KR-85M	LLD<7.68E-05		LLD<7.68E-05		151.17	
KR-87	LLD<[illegible]		LLD<[illegible]		[illegible]	

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KR-89	LLD<2.78E-03	LLD<2.78E-03	220.90
LA-140	LLD<4.05E-05	LLD<4.05E-05	1396.20
LA-142	LLD<1.86E-04	LLD<1.86E-04	641.83
MN-54	LLD<1.05E-04	LLD<1.05E-04	834.83
MN-56	LLD<1.23E-04	LLD<1.23E-04	846.76
NA-22	LLD<6.06E-05	LLD<6.06E-05	1274.35
NA-24	LLD<3.99E-05	LLD<3.99E-05	1366.60
NB-94	LLD<8.48E-05	LLD<8.48E-05	702.63
NB-95	LLD<9.24E-05	LLD<9.24E-05	765.78
NB-97	LLD<4.07E-04	LLD<4.07E-04	657.92
NP-237	LLD<4.61E-04	LLD<4.61E-04	86.50
NP-238	LLD<4.63E-04	LLD<4.63E-04	984.43
NP-239	LLD<3.60E-04	LLD<3.60E-04	277.60
PA-233	LLD<1.62E-04	LLD<1.62E-04	311.98
PA-234M	LLD<2.19E-02	LLD<2.19E-02	1001.03
PB-210	LLD<1.28E-02	LLD<1.28E-02	46.30
PB-212	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212A	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212B	LLD<1.72E-03	LLD<1.72E-03	300.10
PB-214	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214A	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214B	LLD<2.75E-04	LLD<2.75E-04	295.21
PO-210	LLD<8.39E+00	LLD<8.39E+00	804.00
PO-214	LLD<9.36E-01	LLD<9.36E-01	799.70
PO-216	LLD<4.95E+00	LLD<4.95E+00	804.90
PU-239	LLD<6.11E-01	LLD<6.11E-01	129.30
PU-241	LLD<1.94E+01	LLD<1.94E+01	148.37
RA-224	LLD<1.32E-03	LLD<1.32E-03	240.99
RA-226	LLD<1.24E-03	LLD<1.24E-03	186.10
RB-86	LLD<4.26E-04	LLD<4.26E-04	1836.00
RB-89	LLD<5.63E-04	LLD<5.63E-04	1031.88
RN-220	LLD<6.40E-02	LLD<6.40E-02	549.73
RU-103	LLD<7.34E-05	LLD<7.34E-05	497.08
RURH106	LLD<1.50E-03	LLD<1.50E-03	621.80
SB-124	LLD<7.46E-05	LLD<7.46E-05	602.72
SB-125	LLD<2.19E-04	LLD<2.19E-04	427.89
SB-125A	LLD<2.19E-04	LLD<2.19E-04	427.89
SC-46	LLD<1.25E-04	LLD<1.25E-04	1120.45
SE-75	LLD<3.54E-05	LLD<3.54E-05	764.66
SN-113	LLD<9.33E-05	LLD<9.33E-05	391.67
SR-89	LLD<7.07E-05	LLD<7.07E-05	513.99
SR-91	LLD<1.18E-04	LLD<1.18E-04	633.60
SR-92	LLD<3.19E-05	LLD<3.19E-05	1383.94
TA-182	LLD<3.78E-04	LLD<3.78E-04	1121.50
TC-99M	LLD<4.22E-05	LLD<4.22E-05	140.31
TE-123M	LLD<4.46E-05	LLD<4.46E-05	137.00
TE-125M	LLD<1.52E-02	LLD<1.52E-02	109.27
TE-132	LLD<5.90E-05	LLD<5.90E-05	928.16
TH-228	LLD<4.93E-03	LLD<4.93E-03	84.37
TH-229	LLD<1.94E-03	LLD<1.94E-03	86.44
TH-229B	LLD<2.24E-03	LLD<2.24E-03	137.02
TH-229C	LLD<9.73E-04	LLD<9.73E-04	193.39
TH-234	LLD<8.96E-04	LLD<8.96E-04	92.70
TH-234A	LLD<8.96E-04	LLD<8.96E-04	92.30
TH-234B	LLD<3.92E-03	LLD<3.92E-03	63.30
TL-208	LLD<8.08E-05	LLD<8.08E-05	583.14
U-232	LLD<1.33E-01	LLD<1.33E-01	270.26
U-233	LLD<8.01E-05	LLD<8.01E-05	183.71
U-233A	LLD<8.01E-05	LLD<8.01E-05	180.71
U-233B	LLD<3.76E-04	LLD<3.76E-04	143.76
U-237	LLD<2.03E-04	LLD<2.03E-04	708.00
W-187	LLD<2.92E-04	LLD<2.92E-04	681.74
XE-131M	LLD<2.02E-03	LLD<2.02E-03	153.33
XE-133	LLD<1.79E-04	LLD<1.79E-04	81.00
XE-135M	LLD<3.14E-04	LLD<3.14E-04	233.21

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XE-138	LLD<4.37E-04	LLD<4.37E-04	258.41
Y-88	LLD<4.19E-05	LLD<4.19E-05	1836.06
Y-91	LLD<2.75E-02	LLD<2.75E-02	1204.90
Y-91M	LLD<8.90E-05	LLD<8.90E-05	555.60
ZN-65	LLD<2.56E-04	LLD<2.56E-04	1115.55
ZR-95	LLD<1.70E-04	LLD<1.70E-04	756.73
ZR-97	LLD<8.91E-05	LLD<8.91E-05	743.33
TOTAL	4.83E-02 +-4.82E-04	4.83E-02 +-4.82E-04	

STANDARD DEVIATION = 0.14

WHC-SD-WM-DP-045
REV 1

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```
RUN CALIB

CALIB   --  Version 2.02

222-S COUNTING ROOM WESTINGHOUSE HANFORD

CAL. EFF
MCA UNIT NUMBER (2): 1
ADC UNIT NUMBER (1,0): 1
DETECTOR NUMBER (   12): 4
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 11-NOV-92
TIME COLLECT STARTED: 09:00
GEOMETRY NUMBER ( 12): 81
GEOMETRY DESCRIPTION: 500ML LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY;
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY;
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 481
38842-A 500ML LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :    1.00000
NUMBER OF POINTS:    12
ACTIVITY IN MICROCURIES (YES/NO): N

      PEAK     1
               ENERGY:      59.536
               ACTIVITY:    3.131000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   0158000
               DECAY TIME ( 0.000000E-01 MINS.):  1-FEB-92
               TIME OF SOURCE CALIBRATION:  12:00
               DECAY TIME:    4.087800E+05 MINS
      EFFICIENCY =  1.151452E-02 (+-  1.180572E-04)

      PEAK     2
               ENERGY:      88.034
               ACTIVITY:    1.753000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   0462.6
               DECAY TIME ( 4.087800E+05 MINS.)
      EFFICIENCY =  4.635223E-02 (+-  3.590011E-04)

      PEAK     3
               ENERGY:     122.061
               ACTIVITY:    1.597000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   0271.8
               DECAY TIME ( 4.087800E+05 MINS.)
      EFFICIENCY =  7.091829E-02 (+-  5.255487E-04)

      PEAK     4
               ENERGY:     165.853
               ACTIVITY:    1.940000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   0147.66
```

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93130001.0972

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EFFICIENCY COEFFICIENTS PART 1

LOG(EFF) = -6.582071E+01 + 2.261460E+01*LOG(E) - 2.592793E+00*LOG(E)^2

PEAK     5
         ENERGY:     279.197
         ACTIVITY:   3.435000E+01
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D46.413
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  5.099648E-02 (+-  3.270923E-03)

PEAR     6
         ENERGY:     391.868
         ACTIVITY:   6.201000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D115.09
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  4.175033E-02 (+-  3.169516E-04)

PEAK     7
         ENERGY:     513.990
         ACTIVITY:   1.063000E+03
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D64.84
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  3.316401E-02 (+-  5.326431E-04)

PEAK     8
         ENERGY:     661.650
         ACTIVITY:   6.921000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D11020
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.852897E-02 (+-  8.913840E-05)

PEAK     9
         ENERGY:     898.021
         ACTIVITY:   1.711000E+03
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D106.61
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.066866E-02 (+-  1.356644E-04)

PEAK    10
         ENERGY:    1173.240
         ACTIVITY:   9.279000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D1925.3
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.723549E-02 (+-  6.0[illegible]3E-05)

PEAK    11
         ENERGY:    1332.500
         ACTIVITY:   9.284000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D1925.3
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.574303E-02 (+-  5.737485E-05)

PEAK    12
         ENERGY:    1836.130
         ACTIVITY:   1.813000E+03
         ACTIVITY ONE SIGMA:   0.000000E-01
```

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EFFICIENCY = 1.247290E-02 (+- 8.695036E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

```
LOG(EFF) =  9.202042E+01 - 6.132777E+01*LOG(E) + 1.500303E+01*LOG(E)^2
          - 1.634262E+00*LOG(E)^3 + 6.608717E-02*LOG(E)^4
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9401160186

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

CANBERRA SPECTRAN-F V2.06  SOFTWARE

222-S COUNTING ROOM WESTINGHOUSE HANFORD            16-APR-93  13:39:20


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

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

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

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

SAMPLE DESCRIPTION: E8606-2172
GEOMETRY DESCRIPTION:  42B47-A 22CC LIQ
SAMPLE SIZE:   1.0000E+00 EA       / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-APR-93 AT 16:46:00

COLLECT LIVE TIME:     3000. SECONDS
        REAL TIME:     3048. SECONDS
        DEAD TIME:      1.57 %

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

ENERGY CALIBRATION PERFORMED 24-SEP-92
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92
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P E A K A N A L Y S I S

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1?	57.60	28.54	1.27	12791.	5006.	41.0	SB/TE-X
2?	60.72	30.10	1.27	12365.	7422.	32.1	
3?	64.32	31.90	1.27	11885.	51667.	6.5	
4?	73.10	36.29	1.27	10713.	12550.	18.6	TE-125M
5	85.68	42.58	1.33	7646.	3349.	7.6	U-233, EU/GD-X, AM-243B, PU-238
6	97.90	48.69	1.79	9231.	2051.	13.3	U-234
7	119.31	59.40	1.08	7665.	17650.	2.0	AM-241,U-237, EU-155
8C	170.08	84.78	1.15	7545.	743.	15.5	TH-234, TH-228, TL-208X
9C	173.39	86.44	1.15	7429.	2778.	10.4	CS-136, EU-155, EU-155A, PB-214X, TL-208X
10	210.77	105.13	1.27	7543.	1552.	15.8	PU-241, EU-155, EU-155B, NP-239
11	246.38	122.93	1.16	8049.	4743.	5.8	EU-152,CO-57, EU-154A
12$	373.04	186.26	1.66	17603.	656.	64.7	U-235,RA-226
13?	1316.82	658.20	1.61	2084.	1513.	61.5	AG-110M, NB-97
14?	1323.33	661.45	1.61	1488.	265979.	0.5	CS-137
14B		661.41			81.	28.8	
15	1446.70	723.15	1.64	381.	742.	10.7	SB-124,I-131, AG-108, EU-154D, ZR-95
16	1513.31	756.46	2.37	348.	138.	44.1	ZR-95,EU-154
17	1591.46	795.54	1.75	333.	242.	26.0	CS-134
18	1746.16	872.91	1.64	294.	412.	16.1	EU-154E, RH-106
19	1992.38	996.05	2.24	257.	265.	22.3	EU-154F
20	2009.13	1004.43	1.79	275.	486.	14.0	EU-154G, EU-152
21	2345.98	1172.89	2.07	180.	2459.	4.3	CO-60
22	2548.20	1274.04	2.25	56.	798.	7.6	EU-154, EU-154H, NA-22
23	2664.53	1332.22	2.17	94.	2119.	4.5	CO-60
24	2921.37	1460.69	2.09	26.	539.	9.0	K-40
24B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

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

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9313090.0981

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

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

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222-S COUNTING ROOM WESTINGHOUSE HANFORD 16-APR-93 13:39:20

SAMPLE: E8606-2172
DATA COLLECTED ON 14-APR-93 AT 16:46:00
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<1.07E-03		LLD<1.07E-03		911.07	
AC-228A	LLD<1.08E-03		LLD<1.08E-03		911.10	
AC-228B	LLD<5.28E-03		LLD<5.28E-03		338.40	
AG-108M	LLD<1.01E-03		LLD<1.01E-03		433.94	
AG-110M	LLD<6.68E-03		LLD<6.68E-03		657.76	
AM-241	5.98E-02	+-1.58E-03	5.98E-02	+-1.58E-03	59.54	-0.14
AM-243	LLD<4.80E-04		LLD<4.80E-04		74.67	
AM-243A	LLD<4.80E-04		LLD<4.80E-04		74.67	
~~AM-243B~~	~~7.70E-02~~	~~+-7.58E-03~~	~~7.70E-02~~	~~+-7.58E-03~~	~~43.10~~	~~-0.52~~
AR-41	LLD<2.64E-04		LLD<2.64E-04		1293.64	
AU-198	LLD<8.80E-04		LLD<8.80E-04		411.80	
BA-133	LLD<9.84E-04		LLD<9.84E-04		356.02	
BA-139	LLD<1.88E-03		LLD<1.88E-03		165.85	
BA-140	LLD<2.74E-03		LLD<2.74E-03		537.27	
BA-141	LLD<2.09E-03		LLD<2.09E-03		190.23	
BE-7	LLD<9.75E-03		LLD<9.75E-03		477.59	
BI-207	LLD<5.59E-04		LLD<5.59E-04		569.70	
BI-212	LLD<4.47E-03		LLD<4.47E-03		727.27	
BI-214	LLD<1.21E-03		LLD<1.21E-03		609.32	
BI-214A	LLD<1.21E-03		LLD<1.21E-03		609.32	
BI-214B	LLD<2.31E-03		LLD<2.31E-03		1120.28	
BI-214C	LLD<1.21E-03		LLD<1.21E-03		1764.51	
CD-109	LLD<8.30E-03		LLD<8.30E-03		88.03	
CE-144	LLD<2.89E-03		LLD<2.89E-03		133.51	
CE-139	LLD<4.25E-04		LLD<4.25E-04		165.85	
CE-141	LLD<6.74E-04		LLD<6.74E-04		145.44	
CEPR144	LLD<5.78E-03		LLD<5.78E-03		133.51	
CO-56	LLD<2.82E-04		LLD<2.82E-04		846.76	
~~CO-57~~	~~6.83E-03~~	~~+-4.39E-04~~	~~6.83E-03~~	~~+-4.39E-04~~	~~122.06~~	~~-0.87~~
CO-58	LLD<2.86E-04		LLD<2.86E-04		810.75	
CO-60	1.44E-02	+-7.01E-04	1.44E-02	+-7.01E-04	1332.50	-0.28
					1173.24	-0.34
CR-51	LLD<5.33E-03		LLD<5.33E-03		320.09	
CS-134	LLD<3.34E-04		LLD<3.34E-04		795.84	
CS-136	LLD<2.73E-04		LLD<2.73E-04		818.51	
CS-137	1.21E+00	+-2.35E-02	1.21E+00	+-2.35E-02	661.65	-0.20
CS-138	LLD<2.87E-04		LLD<2.87E-04		1435.86	
EU-152	LLD<8.18E-04		LLD<8.18E-04		1408.01	
EU-154	1.47E-02	+-1.14E-03	1.47E-02	+-1.14E-03	1274.45	-0.41
EU-154A	1.45E-02	+-9.34E-04	1.45E-02	+-9.34E-04	123.10	-0.17
EU-155	8.67E-03	+-1.39E-03	8.67E-03	+-1.39E-03	105.31	-0.18
					86.54	-0.11
FE-59	LLD<5.83E-04		LLD<5.83E-04		1099.25	
HF-181	LLD<1.14E-03		LLD<1.14E-03		482.20	
HG-203	LLD<5.24E-04		LLD<5.24E-04		279.20	
I-131	LLD<8.56E-04		LLD<8.56E-04		364.48	
I-132	LLD<1.04E-03		LLD<1.04E-03		667.69	
I-133	LLD<8.24E-04		LLD<8.24E-04		529.69	
I-134	LLD<4.06E-04		LLD<4.06E-04		847.03	
I-135	LLD<8.78E-04		LLD<8.78E-04		1260.41	

Jmf 4/16/93

Jmf 4/16/93

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K-40	LLD<4.69E-03	LLD<4.69E-03		1460.75	
KR-85	LLD<1.79E-01	LLD<1.79E-01		513.99	
KR-85M	LLD<4.68E-04	LLD<4.68E-04		151.17	
KR-87	LLD<1.85E-03	LLD<1.85E-03		402.58	
KR-89	LLD<2.20E-02	LLD<2.20E-02		220.90	
LA-140	LLD<1.41E-04	LLD<1.41E-04		1596.20	
LA-142	LLD<1.30E-03	LLD<1.30E-03		641.83	
MN-54	LLD<2.82E-04	LLD<2.82E-04		834.83	
MN-56	LLD<3.19E-04	LLD<3.19E-04		846.76	
~~NA-22~~	~~5.22E-03 +-4.06E-04~~	~~5.22E-03 +-4.06E-04~~		~~1274.55~~	~~0.51~~
NA-24	LLD<1.39E-04	LLD<1.39E-04		1368.60	
NB-94	LLD<2.63E-04	LLD<2.63E-04		702.63	
NB-95	LLD<2.83E-04	LLD<2.83E-04		765.78	
~~NB-97~~	~~7.51E-03 +-4.62E-03~~	~~7.51E-03 +-4.62E-03~~		~~657.92~~	~~0.2~~
~~NP-237~~	~~2.66E-02 +-2.83E-03~~	~~2.66E-02 +-2.83E-03~~		~~86.50~~	~~-0.0~~
NP-238	LLD<1.17E-03	LLD<1.17E-03		984.45	
NP-239	LLD<2.81E-03	LLD<2.81E-03		277.60	
PA-233	LLD<1.44E-03	LLD<1.44E-03		311.98	
PA-234M	LLD<1.00E-01	LLD<1.00E-01		1001.03	
PB-210	LLD<8.54E-03	LLD<8.54E-03		46.50	
PB-212	LLD<9.15E-04	LLD<9.15E-04		239.00	
PB-212A	LLD<9.11E-04	LLD<9.11E-04		239.00	
PB-212B	LLD<1.46E-02	LLD<1.46E-02		300.10	
PB-214	LLD<1.81E-03	LLD<1.81E-03		351.92	
PB-214A	LLD<1.81E-03	LLD<1.81E-03		351.92	
PB-214B	LLD<2.43E-03	LLD<2.43E-03		295.21	
PO-210	LLD<2.16E+01	LLD<2.16E+01		804.00	
PO-214	LLD<3.76E+00	LLD<3.76E+00		799.70	
PO-216	LLD<1.42E+01	LLD<1.42E+01		804.90	
PU-239	LLD<4.98E+00	LLD<4.98E+00		129.30	
PU-241	LLD<1.74E+02	LLD<1.74E+02		148.57	
RA-224	LLD<9.83E-03	LLD<9.83E-03		240.99	
~~RA-226~~	~~2.50E-02 +-1.63E-02~~	~~2.50E-02 +-1.63E-02~~		~~186.10~~	~~0.16~~
RB-88	LLD<6.43E-04	LLD<6.43E-04		1836.00	
RB-89	LLD<1.38E-03	LLD<1.38E-03		1031.88	
RN-220	LLD<5.57E-01	LLD<5.57E-01		549.73	
RU-103	LLD<9.01E-04	LLD<9.01E-04		497.08	
RURH106	LLD<1.04E-02	LLD<1.04E-02		621.80	
SB-124	LLD<5.28E-04	LLD<5.28E-04		602.72	
SB-125	LLD<3.02E-03	LLD<3.02E-03		427.89	
SB-125A	LLD<3.02E-03	LLD<3.02E-03		427.89	
SC-46	LLD<3.27E-04	LLD<3.27E-04		1120.45	
SE-75	LLD<6.66E-04	LLD<6.66E-04		264.66	
SN-113	LLD<1.20E-03	LLD<1.20E-03		391.67	
SR-85	LLD<7.85E-04	LLD<7.85E-04		513.99	
SR-91	LLD<1.07E-03	LLD<1.07E-03		555.60	
SR-92	LLD<2.18E-04	LLD<2.18E-04		1383.94	
TA-182	LLD<9.41E-04	LLD<9.41E-04		1121.30	
TC-99M	LLD<4.18E-04	LLD<4.18E-04		140.51	
TE-123M	LLD<4.40E-04	LLD<4.40E-04		159.00	
TE-125M	LLD<1.13E-01	LLD<1.13E-01		109.27	
TE-132	LLD<4.42E-04	LLD<4.42E-04		228.16	
~~TH-228~~	~~7.07E-02 +-1.11E-02~~	~~7.07E-02 +-1.11E-02~~		~~84.37~~	~~0.41~~
~~TH-229~~	~~1.12E-01 +-1.19E-02~~	~~1.12E-01 +-1.19E-02~~		~~86.44~~	~~-0.00~~
TH-229B	LLD<2.01E-02	LLD<2.01E-02		137.02	
TH-229C	LLD<1.03E-02	LLD<1.03E-02		193.59	
TH-234	LLD<4.87E-03	LLD<4.87E-03		92.50	
TH-234A	LLD<4.87E-03	LLD<4.87E-03		92.50	
TH-234B	LLD<1.06E-02	LLD<1.06E-02		63.30	
TL-208	LLD<6.36E-04	LLD<6.36E-04		583.14	
U-232	LLD<1.05E+00	LLD<1.05E+00		270.26	
U-235	LLD<7.62E-04	LLD<7.62E-04		185.71	
~~U-235A~~	~~1.62E-03 +-1.05E-03~~	~~1.62E-03 +-1.05E-03~~		~~185.71~~	~~0.55~~
U-235B	LLD<3.08E-03	LLD<3.08E-03		143.76	
U-237	LLD<1.98E-03	LLD<1.98E-03		208.00	
W-187	LLD<9.58E-04	LLD<9.58E-04		685.74	

Arf 4/16/9

Arf 4/16/

Arf 4/16/

Arf 4/16/93

Arf 4/16/9

WHC-SD-WM-DP-045
REV 1

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9313090.0994

XE-131M	LLD<1.96E-02	LLD<1.96E-02	163.98	
XE-133	LLD<7.30E-04	LLD<7.30E-04	81.00	
XE-133M	LLD<3.90E-03	LLD<3.90E-03	233.21	
XE-135	LLD<4.13E-04	LLD<4.13E-04	249.79	
XE-138	LLD<3.39E-03	LLD<3.39E-03	258.41	
Y-88	LLD<6.04E-05	LLD<6.04E-05	1836.06	
Y-91	LLD<8.58E-02	LLD<8.58E-02	1204.90	
Y-91M	LLD<8.15E-04	LLD<8.15E-04	555.60	
ZN-65	LLD<7.44E-04	LLD<7.44E-04	1115.55	
~~ZR-95~~	~~1.08E-03 +-4.75E-04~~	~~1.08E-03 +-4.75E-04~~	~~756.73~~	~~0.27~~
			724.20	-1.05
ZR-97	LLD<3.06E-04	LLD<3.06E-04	743.33	
TOTAL	1.66E+00 +-3.43E-02	1.66E+00 +-3.43E-02		

STANDARD DEVIATION = 0.43

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

WHC-SD-WM-DP-045
REV 1

222-S COUNTING ROOM WESTINGHOUSE HANFORD 23-OCT-92 12:20:37

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

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

ENVIRONMENTAL BACKGROUND SUBTRACTED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

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

SAMPLE DESCRIPTION: 42B47-A 22CC LIQ
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL230

COLLECT STARTED ON 16-OCT-92 AT 15:00:00

COLLECT LIVE TIME: 6000. SECONDS
REAL TIME: 6012. SECONDS
DEAD TIME: 0.20 %

DECAYED TO 258. DAYS, 3.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 24-SEP-92
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	98.80	49.14	2.18	3600.	927.	18.5	U-234
2	119.47	59.48	1.12	3181.	16379.	1.8	AM-241,U-237, EU-155
3	176.45	87.97	1.11	2399.	6237.	3.2	EU-155, EU-155A, PB-214X, TL-208X, CD-109, HF-175
4	244.55	122.02	1.15	2274.	4313.	4.2	SE-75,EU-152, CO-57, EU-154A
5	273.47	136.48	1.09	2449.	532.	27.1	SE-75,CO-57
6	332.20	165.84	1.11	1919.	2568.	6.0	U-237,BA-139, CE-139
7	559.14	279.32	1.43	1399.	456.	24.5	HG-203,SE-75
8	784.08	391.79	1.33	1223.	3191.	4.7	SN-113
9?	1022.10	510.82	1.42	911.	264.	43.5	RN-222,I-133, TL-208,NA-22, ZN-65,RH-106
10?	1028.55	514.04	1.42	873.	1438.	12.3	KR-85,SR-85
11	1219.33	609.45	1.38	879.	304.	31.5	BI-214A,
11B		609.19			244.	21.0	RU-103
12	1323.90	661.74	1.48	841.	11126.	2.0	CS-137
12B		661.41			162.	28.8	
13	1796.62	898.14	1.59	1004.	4078.	3.9	Y-88,RB-88
14	2347.01	1173.41	1.76	474.	8880.	2.2	CO-60
15	2665.59	1332.75	1.93	274.	7953.	2.3	CO-60
16	2922.30	1461.16	2.15	146.	1071.	7.1	K-40
16B		1460.58			1221.	5.5	
17	3530.48	1765.38	2.11	32.	82.	32.2	BI-214C
17B		1764.79			94.	25.0	
18	3673.07	1836.70	2.14	72.	2364.	4.2	RB-88,Y-88

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

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

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

LA1-2 DOWNTIME ROOM VER:1.1-1.256 HANFORD 23-OCT-92 12:20:37

SAMPLE: 42847-A 2200 LIU
DATA COLLECTED ON 16-OCT-92 AT 15:00:00
DECAYED TO 252. DAYS 3.0000 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 (MEV) EXPECT	DIFF
AM-241	2.77E-02	+-6.94E-04	2.78E-02	+-6.95E-04	100	59.54	-0.02
AG-109	9.92E-02	+-4.04E-03	1.46E-01	+-5.95E-03	94	88.03	-0.07
CO-57	3.10E-03	+-1.56E-04	5.99E-03	+-3.01E-04	101	122.06	-0.04
CE-139	2.09E-03	+-1.57E-04	7.67E-03	+-5.77E-04	99	165.85	-0.01
HG-203	4.50E-04	+-1.46E-04	2.09E-02	+-6.80E-03	99	279.20	0.12
SN-113	6.50E-03	+-4.16E-04	3.08E-02	+-1.97E-03	100	391.67	0.13
SR-85	2.40E-03	+-3.06E-04	3.79E-02	+-4.83E-03	110	513.99	0.05
CS-137	2.50E-02	+-7.00E-04	2.54E-02	+-7.11E-04	100	661.65	0.09
Y-88	1.05E-02	+-4.71E-04	3.62E-02	+-2.52E-03	97	898.04	0.20
CO-60	2.89E-02	+-7.34E-04	2.95E-02	+-8.06E-04	100	1173.24	0.18
CO-60	2.71E-02	+-7.88E-04	2.97E-02	+-8.65E-04	100	1332.50	0.25
Y-88	1.08E-02	+-6.42E-04	5.79E-02	+-3.43E-03	97	1836.06	0.34
TOTAL	2.42E-01	+-4.41E-03	4.76E-01	--1.14E-02			

STANDARD DEVIATION = 0.19

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.31E-10 UC/EA
TOTAL MEASURED ACTIVITY = 4.76E-01 (+-1.14E-02) UC/EA
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA

Calibration is ok
A.K. Smith
10/28/92

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
98.80	49.14	937.	18.5	2.13E+01
273.47	136.49	532.	27.1	1.24E+01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1022.10	510.92	264.	43.5	1.59E+01
1219.33	609.45	304.	31.5	2.07E+01
2922.30	1461.16	1071.	7.1	1.47E+02
3530.48	1765.38	82.	33.3	1.34E+01

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Serial No.	Sample Point	Date	Time Issued	Priority
E 8606.-1283	H&RWC	4-12-93	13: 0	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT-SOLDS	LA-508-101	uCi/g	PC41G	0

Sample Size	Customer ID
_____G OF SAMPLE	0065WQL

Remarks, Calculations, Results:

4.722g to 100mL mt .100ml

2.43 E+0 uci/g

RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4/14/93			4/14

54-6800-061 (R 10-83)

9/1 4-14-93 R8606-1283

Alpha Calculation by RW on 04-14-1993 at 14:27:44
Det #9 1 -inch mount Alpha eff. : .2941
Sample size : 4.722 g Dilution : 1

$\frac{37496}{5} = .9$
Mount # 1

$\frac{37496}{5} - 0.9 = 2.4321E-03$ uCi/g alpha
X1000

4-3-90
RA Jones

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS

WHC-SD-WM-DP-045
REV 1

RADIONUCLIDE_Am-241 HALF LIFE_432 Yr TIME ZERO (HD)_____

COUNT TIME 5 MINUTES HANFORD DATE (HD) WHEN COUNTED 16626

DETECTOR NO. __9_____ BKG. _0.5_ C/M

STANDARD ID	SIZE	DATE	~~TIME~~ SCT INITS	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	04/03/90	RAJ	90084	90065	90124	92435
36B40B7	1	04/03/90	RAJ	159636	159606	157844	158346
36B40C7	1	04/03/90	RAJ	230125	230909	233449	234954
36B40A3	2	04/03/90	RAJ	63232	64299	63975	64099
36B40B3	2	04/03/90	RAJ	115406	115701	115536	116365
36B40C3	2	04/03/90	RAJ	160402	164159	160356	163643

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CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 9

TIME ZERO DATE (HD): 15897

RADIONUCLIDE: Am-241
HALF LIFE: 157784
COUNT TIME: 5
CPM BKG: 1

DATE COUNTED (HD): 16626

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

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	04/03/90		90084	90065	90124	92435
36B40B7	1	04/03/90		159636	159606	157844	158346
36B40C7	1	04/03/90		230125	230909	233449	234954
36B40A3	2	04/03/90		63232	64299	63975	64099
36B40B3	2	04/03/90		115406	115701	115536	116365
36B40C3	2	04/03/90		160402	164159	160356	163643

R Jones
4-3-90

GRP
4/4/90

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A8	1"	60570	18134	1.00	18193	0.3004 ←
36B40B7	1"	109900	31771	1.00	31873	0.2900
36B40C7	1"	159700	46471	1.00	46620	0.2919
AVERAGE, 1" =		0.2941 +/- @95%		0.0108	3.67 %	ON 04/03/90

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	12779	1.00	12820	0.2074
36B40B3	2"	110700	23149	1.00	23224	0.2098
36B40C3	2"	161400	32427	1.00	32531	0.2016
AVERAGE, 2" =		0.2063 +/- @95%		0.0083	4.03 %	ON 04/03/90

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	-1	1.00	-1	-0.0000
36B40B6	5"	109800	-1	1.00	-1	-0.0000
36B40C5	5"	160100	-1	1.00	-1	-0.0000
AVERAGE, 5" =		-0.0000 +/- @95%		0.0000	-99.92 %	ON 04/03/90

0 5" det only 0 " det

NEW EFFS FOR DET 9 Am-241 1" = 0.2941 2" = 0.2063
5" = -0.0000

COMPARISON TO 1988 1" = 0.2792
1" = 1.05 HIGHER NOW 2" = 0.1833
2" = 1.13 HIGHER NOW

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1-4-90 RAJ

calculator Calc'n 36B40A8

$\frac{\bar{x}(n)}{5} = 18135.4 \pm 234.5$ c/m by HP 97

$18135 - 1\ c/m = 18134 \times e^{+\left[\ln 2 \times \frac{(1662.6 - 1589.7)}{1577.84}\right]} = 18192.57 = 18193^c$

$\frac{18193\ c/m}{60570\ d/m} = 0.3004$

9313090.0091

3936

Serial No.	Sample Point	Date	Time Issued	Priority
E 8606.-2172	H&RWC	4-12-93	12:57	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-SOIL	LA-548-121	~~pCi~~ µCi/gWETwt	PC41G	0

Sample Size	Customer ID
_____G OF SAMPLE	0065WQL

Remarks, Calculations, Results:

4.772 g to 100 mL mt 1m1 E+6

Am-241: $5.98 \times 10^{-2} \times \frac{100}{4.772}$ = 1.25 µCi/g wet wt E+7

Cs-137: 1.21 × " = 25.36 " 3.02 E+5

Co-60: 1.44×10^{-2} × " = 0.3 " 3.08 E+5

Eu-154: 1.47×10^{-2} × " = 0.3 "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	D. Hamilton			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4/14/93		A.K. Dirk 4/16/93	See back of the Cond

4/19/93 (R-10-93)

E8606 - 2172

Eu-155: $8.67 \times 10^{-3} \times \frac{100\ mL}{4.772\ g}$ = 0.18 µCi/g wet wt 1.82 E+4

CS-134 <3.34E-4 $\times \frac{100}{4.772}$ = <7.00E+3 pCi

MN-54 <2.82E-4 $\times \frac{100}{4.772}$ = <5.91E+3 pCi

SB-125 <3.02E-3 $\times \frac{100}{4.772}$ ~ <6.33E+4 pCi

Original Analytical Card was not received JH Weld 08/04/93

4.3 7782

Serial No	Sample Point	Date	Time Issued	Priority
S 5336.-3336	SHIFT STD'S	4- 1-93	0:55	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/L	STD	0

Sample Size	Customer ID
100-10-200 #63843	

Remarks, Calculations, Results

SPIKE #:64843
SPIKE VOL. 100 ul
(R211)
ACID ADJ
~~CON~~ HNO3 ML 1

8.5555 ***
0.4032 ***
397.5022 ***
1.3205+02 ***

Std value: 1.305E+2 %Rec: 101.19%

1.32E+2 uCi/L

Analyst - 1	Analyst - 2	[redacted]	Analyst - 4 [redacted]	Analyst - 5
[redacted]	[redacted]			
Hrs	Hrs	Hrs 4-21-93	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-21-93	4/21/93		

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

#2 VR 4.21.93

$\frac{13801}{30} - 2$

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 1.10

WHC-SD-WM-DP-045
REV 1

DATA REDUCTION REPORT

R Willis
4-22-93

SAMPLE
S-5336-5336
File ID: SD7782.SPC

Counted on: 4/22/93 @ 6:0
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	4125.7	4116.7	664.277	664.277	20.000	9.158	10.000	4.802
2	69.7	67.3	306.336	306.336	20.000	10.396	10.000	5.713
3	6737.9	6644.8	232.373	232.373	20.000	8.640	10.000	4.3[illegible]

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ml
1	Cm244	0.4030	5.796	5.786	0.010	0.04	67.68	843.31	0.156E-03
	Cm243		5.786	5.786	-0.000				0.213E-03
2	Pu238	0.0079	5.499	5.515	-0.016	0.05	1.33	9.41	0.424E-05
	Am241		5.480	5.515	-0.035				0.323E-05
3	Pu239	0.5888	5.143	5.166	-0.023	0.04	98.83	504.26	0.227E-03
	Pu240		5.144	5.166	-0.022				0.224E-03

Pu 239

DETECTOR CALIBRATION
Energy(MEV) = 4.074 + (0.0047)*Channel
Energy range (MeV): 4.074 TO 6.480
Efficiency = 0.1960 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	84938.0	100.000
Smoothed	84938.0	100.000
Composite fit	83922.3	98.804
Residuals	1015.7	1.196

Analyzed by: _____

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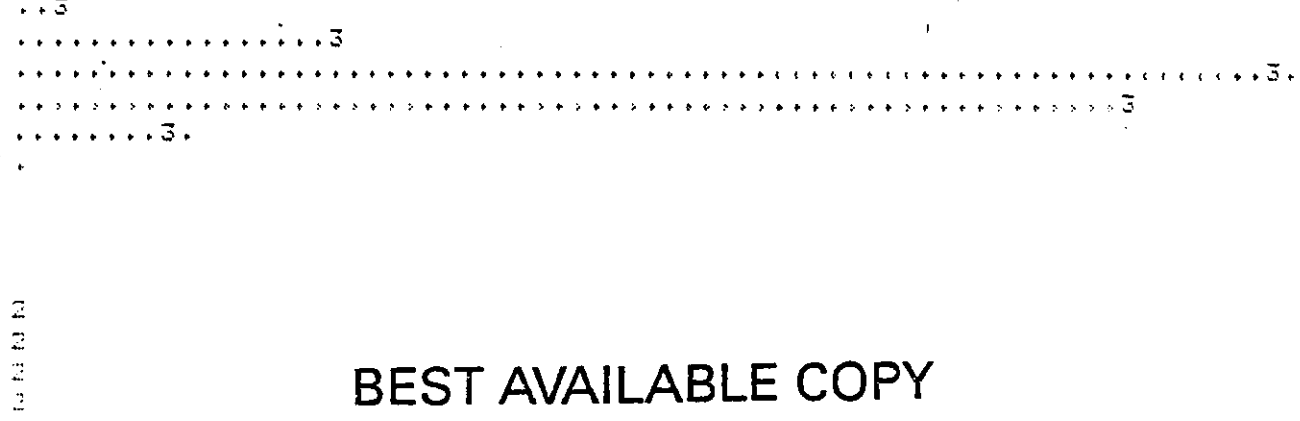
9313090.0095

SPECTRUM S077S2.SPC
1 LEGEND: RAW = ... MODELED PEAKS = 1,2,... ETC 21097.3



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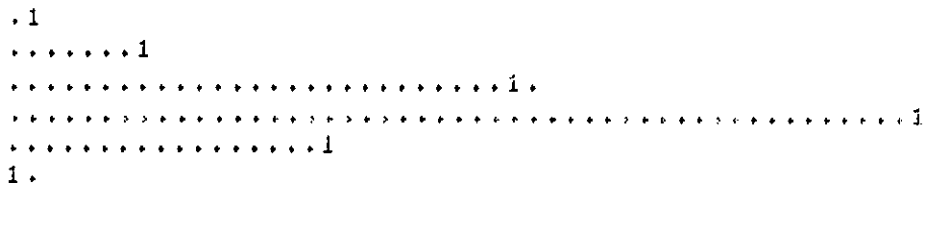

9310090166

Raw Data Dump for AFA Spectrum: SP:SD7762.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	2.	1.	1.	2.	0.	2.	0.	1.	2.	0.
31	0.	1.	0.	0.	1.	0.	0.	1.	1.	0.
41	0.	0.	1.	0.	0.	0.	1.	0.	2.	0.
51	0.	2.	0.	1.	0.	0.	0.	1.	1.	1.
61	0.	0.	0.	1.	0.	1.	2.	0.	1.	1.
71	2.	1.	0.	0.	1.	2.	0.	3.	1.	1.
81	1.	2.	1.	4.	1.	1.	0.	0.	1.	0.
91	1.	1.	2.	0.	1.	1.	1.	2.	0.	0.
101	1.	0.	0.	1.	2.	3.	1.	1.	1.	0.
111	0.	2.	0.	2.	1.	0.	1.	2.	0.	3.
121	1.	2.	3.	0.	3.	2.	2.	1.	1.	0.
131	0.	3.	5.	3.	3.	0.	3.	2.	1.	3.
141	2.	0.	3.	1.	1.	2.	2.	6.	2.	1.
151	4.	2.	7.	3.	1.	4.	2.	1.	3.	2.
161	1.	6.	1.	3.	6.	4.	2.	4.	5.	4.
171	4.	5.	4.	9.	8.	9.	8.	9.	10.	11.
181	12.	7.	10.	9.	10.	13.	19.	13.	22.	17.
191	13.	15.	26.	16.	21.	36.	25.	14.	26.	32.
201	30.	35.	33.	38.	36.	38.	54.	48.	76.	69.
211	100.	126.	144.	179.	239.	339.	412.	463.	584.	728.
221	839.	1020.	1284.	1566.	1964.	2320.	2741.	3324.	3908.	4132.
231	4341.	3999.	3831.	3223.	2509.	1909.	1348.	826.	491.	267.
241	159.	79.	29.	12.	8.	4.	3.	1.	1.	1.
251	3.	5.	4.	4.	10.	9.	5.	6.	7.	8.
261	11.	6.	11.	9.	8.	4.	8.	12.	7.	5.
271	3.	7.	1.	3.	0.	2.	2.	0.	3.	3.
281	4.	3.	8.	2.	7.	2.	7.	8.	11.	10.
291	5.	8.	13.	17.	6.	27.	13.	18.	19.	28.
301	29.	43.	39.	31.	41.	47.	44.	31.	34.	23.
311	16.	10.	12.	7.	14.	8.	7.	5.	4.	6.
321	7.	8.	9.	8.	14.	13.	12.	20.	13.	17.
331	17.	18.	29.	26.	29.	37.	32.	32.	43.	43.
341	34.	69.	81.	101.	148.	159.	226.	308.	405.	354.
351	649.	769.	940.	983.	1095.	1241.	1414.	1469.	1783.	1940.
361	2140.	2416.	2497.	2539.	2363.	1970.	1637.	1199.	838.	514.
371	288.	169.	83.	44.	17.	10.	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.	1.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	0.	0.	2.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.
481	1.	1.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
311	0.	0.								

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APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

4.2 6321

Serial No	Sample Point	Date	Time Issued	Priority
E 8606.-3336	H&RWC	4-12-93	13: 0	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/L g	VOGEL	0

Sample Size	Customer ID
100-10-500 4.772 g to 100ml	0065WQL

Remarks, Calculations, Results:

SPIKE #: 64643
SPIKE VOL. .100 ml

^{239}Pu = ~~765x10^-1 uCi/g~~ 1.59x10^-1 uCi/g

ACID ADJ ~~CON~~ HNO3 ML 1 ml 8M HNO_3

Pu^{239} = 1.11 uCi/g

.5437 (32554)(202)(1000) / .3707 (2.22x106) = 5.28x10^2 uCi/L / 47.72 g/L = 5.52 uCi/g

Analyst - 1	Analyst - 2	[redacted]	Analyst - 4	[redacted]
[redacted]	[redacted]	URaymond	[illegible]	URaymond
Hrs	Hrs	Hrs 4.21.93	Hrs	Hrs 4.24.93

Date	Time Completed	Lab Unit Mgr	
4-21-93	4/21/93	[illegible]	4/27 [illegible]

54-6800-009 (R-10-83)

II 3 VE 4-21-93

15576 / 30 -4

E 8606-3336

[(1630)(.0950) - (2.265)(5657)] (202)(1000) / .5657 (2.22x106) = 2.59 uCi/L / 47.72 g/L = 1.59x10^-1 uCi/g = ~~765x10^-1 uCi/g~~

Raymond 4-24-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
E8606-3336
File ID: 806321.SPC

Counted on: 4/24/93 @12: 0
Detector/Geometry number: 6/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	4342.0	4423.8	662.114	662.114	20.000	11.047	10.000	4.977
2	999.2	1016.5	303.740	303.740	20.000	11.518	10.000	4.987
3	6626.4	6687.7	230.406	230.406	20.000	11.956	10.000	5.947
4	13.6	13.6	22.672	22.672	28.000	11.973	14.000	16.194

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm244	0.3707	5.796	5.783	0.013	0.05	83.70	419.16	0.189E-07
	Cm243		5.786	5.783	0.003				0.259E-[illegible]
2	Pu238	0.0850	5.499	5.509	-0.010	0.05	19.20	133.45	0.601E-0[illegible]
	Am241		5.480	5.509	-0.029				0.460E-04
3	Pu239	0.5434	5.143	5.164	-0.021	0.06	122.78	614.51	0.277E-03
	Pu240		5.144	5.164	-0.020				0.277E-03
4	U 238	0.0010	4.200	4.188	0.012	0.06	0.22	1.45	0.644E-06

DETECTOR CALIBRATION
Energy(MeV) = 4.081 + (0.0047)*Channel
Energy range (MeV): 4.081 TO 6.466
Efficiency = 0.1993 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	112662.0	100.000
Smoothed	112662.0	100.000
Composite fit	112972.8	100.276
Residuals	-310.8	-0.276

Analyzed by: [redacted]

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          SPECTRUM SD6371.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,... ETC                    24687.0

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1
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Raw Data Dump for AEA Spectrum: SP:S06321.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	2.	2.	5.	3.	19.	7.	6.
21	8.	7.	7.	6.	3.	6.	6.	7.	3.	3.
31	4.	3.	0.	1.	2.	0.	1.	0.	0.	0.
41	1.	2.	0.	0.	1.	2.	1.	1.	1.	0.
51	1.	0.	2.	2.	0.	1.	1.	2.	1.	0.
61	1.	2.	0.	0.	0.	3.	5.	1.	2.	1.
71	2.	1.	1.	1.	4.	3.	0.	2.	3.	1.
81	3.	3.	1.	0.	0.	1.	3.	5.	2.	0.
91	2.	4.	0.	0.	2.	2.	1.	0.	1.	1.
101	2.	0.	3.	3.	0.	1.	6.	2.	1.	4.
111	4.	0.	3.	2.	3.	2.	4.	3.	4.	1.
121	4.	1.	6.	3.	4.	7.	3.	4.	6.	8.
131	7.	7.	11.	4.	5.	3.	6.	7.	4.	9.
141	8.	6.	6.	8.	6.	7.	7.	8.	7.	6.
151	8.	12.	8.	4.	8.	7.	7.	10.	9.	9.
161	7.	8.	10.	7.	15.	8.	8.	10.	11.	16.
171	14.	13.	25.	7.	15.	7.	25.	18.	12.	17.
181	17.	19.	20.	18.	23.	23.	20.	30.	23.	29.
191	21.	26.	25.	29.	28.	37.	36.	38.	50.	49.
201	62.	73.	90.	105.	128.	160.	157.	218.	280.	343.
211	406.	474.	545.	680.	792.	881.	1118.	1332.	1432.	1664.
221	1890.	2283.	2562.	2786.	3112.	3384.	3508.	3794.	3876.	3761.
231	3557.	3428.	3000.	2331.	1948.	1495.	1044.	722.	466.	266.
241	153.	112.	41.	24.	17.	8.	11.	8.	9.	16.
251	3.	7.	8.	10.	10.	13.	9.	11.	10.	17.
261	12.	13.	8.	22.	13.	12.	16.	14.	18.	10.
271	7.	9.	20.	18.	16.	10.	17.	21.	26.	37.
281	44.	45.	53.	71.	92.	85.	113.	130.	136.	166.
291	204.	254.	276.	322.	343.	380.	425.	479.	485.	504.
301	532.	551.	590.	539.	550.	471.	403.	320.	249.	182.
311	124.	102.	54.	33.	20.	17.	13.	21.	14.	12.
321	17.	23.	17.	20.	19.	21.	24.	27.	42.	36.
331	46.	39.	51.	57.	64.	62.	101.	113.	121.	168.
341	210.	238.	325.	363.	440.	563.	634.	780.	949.	1067.
351	1233.	1333.	1479.	1390.	1750.	1869.	2051.	2159.	2292.	2311.
361	2547.	2501.	2313.	2131.	1855.	1511.	1179.	831.	585.	358.
371	219.	98.	63.	27.	21.	3.	7.	2.	1.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
411	0.	0.	0.	0.	1.	0.	0.	0.	1.	2.
421	1.	0.	0.	1.	1.	1.	0.	0.	1.	0.
431	0.	0.	0.	2.	1.	0.	0.	0.	0.	0.
441	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
451	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
461	0.	1.	1.	0.	1.	1.	1.	2.	1.	3.
471	0.	1.	2.	2.	0.	1.	2.	2.	0.	1.
481	1.	1.	3.	1.	0.	0.	0.	1.	0.	0.
491	0.	1.	0.	0.	0.	1.	0.	0.	1.	0.
	0.	0.								

BEST AVAILABLE COPY

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 3
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 9
TODAY'S DATE: 08/19/92
DECAY CORR'N: 2.554 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME		C/M	COINC CORR	CORR C/M	GEOM
242920	5		48575	307	48882	0.4981
242932	5		48577	307	48884	0.4982
242052	5		48401	305	48706	0.4964
243038	5		48599	307	48906	0.4984
242907	5		48572	307	48879	0.4981
242795	5		48550	306	48856	0.4979
243214	5		48634	307	48941	0.4988
243707	5		48732	309	49041	0.4998
242647	5		48520	306	48826	0.4976
241653	5		48322	304	48625	0.4955
FOR	10	TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998					
MIN	0.4955		48548	306	48855	0.4979

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DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	151	147	154	149	151	153	Out of Service			
Day / BE	Pu	110	229	229	228	232	227	231	233				
DATE	Am	136	302	301	300	304	300	303	308				
4-18-93	Cm	160	370	367	369	371	366	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	150	148	149	152	146	150	152				
Day / BE	Pu	110	229	226	228	231	225	230	233				
DATE	Am	136	302	297	300	303	297	302	307				
4-19-93	Cm	160	370	364	369	370	365	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	152	148	152	149	151	153				
Day / BE	Pu	110	224	230	229	231	227	230	233				
DATE	Am	136	303	302	301	303	300	302	307				
4-20-93	Cm	161	371	368	369	370	368	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	149	148	154	148	151	153				
Day / BE	Pu	110	229	227	228	232	226	230	234				
DATE	Am	136	301	299	301	304	298	303	308				
4-21-93	Cm	161	370	366	369	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	151	150	152	154				
Day / BE	Pu	110	229	228	229	230	228	232	235				
DATE	Am	136	302	299	301	302	301	304	309				
4-22-93	Cm	160	370	366	370	369	368	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	146	150	146	152	146	151	154				
Day / BE	Pu	110	226	228	226	230	225	230	234				
DATE	Am	137	299	301	299	302	297	302	308				
4-23-93	Cm	161	366	367	367	370	364	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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Original card was not received
L.R. Webb 08/24/93

4.4 8996

Serial No	Sample Point	Date	Time Issued	Priority
S 5336.-4822	SHIFT STD'S	4- 1-93	0:55	26

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-508-156	uCi/L	STD	0

Sample Size	Customer ID
100-10-1ML #63B43	

Remarks, Calculations, Results
SPIKE #:58B43
SPIKE VOL. 100ul
(R201)
ACID ADJ
~~NON~~ HNO3 ML 1
8M

Stdvalue: 2.6821E+1
% Rec: 72.32%
WR# 9193
Result: 1.94E+1 uCi/L

Analyst - 1	Analyst - 2	[redacted]	Analyst - 4 [redacted]	Analyst - 5
[redacted]	[redacted]	[redacted]	D. H. [illegible]	
Hrs	Hrs	Hrs	Hrs	Hrs
		4.21.93		

Date	Time Completed	Lab Unit Mgr	
4-21-93	4/21/93		[illegible]

54-6800-061 (R-10 831)

#1 VR 4-21-93

$$\frac{9401}{30} - 4$$

$$\frac{(555)(2.547E^{-3})(.1)(1000)(101)}{734} =$$

$$1.9398E^{+1}$$

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

R Willis 4-22-93

SAMPLE
S-5336-4822
File ID: SD8996.SPC

Counted on: 4/22/93 @ 6: 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	1055.4	1113.6	297.078	297.078	40.000	39.448	20.000	2.178
2	780.5	880.0	254.717	254.717	32.000	16.151	16.000	1.342
3	19.8	20.3	27.325	27.325	16.000	2.965	8.000	9.693

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Th228	0.6550	5.430	5.456	-0.026	0.19	90.39	691.51	0.311E-03
	Am241		5.480	5.456	0.024				0.235E-03
2	Am243	0.3438	5.234	5.257	-0.023	0.08	47.44	2342.54	0.106E-02
3	U 238	0.0012	4.200	4.188	0.012	0.01	0.17	1.18	0.530E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.059 + (0.0047)*Channel
Energy range (MeV): 4.059 TO 6.466
Efficiency = 0.1841 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	65887.0	100.000
Smoothed	65887.0	100.000
Composite fit	68997.0	104.720
Residuals	-3110.0	-4.720

Analyzed by: [redacted] _____

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          SPECTRUM SD8996.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                5399.5

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.............................1............2...........................
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Raw Data Dump for AEA Spectrum: SP:SD8996.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	7.	8.	9.	10.	17.	10.
21	14.	21.	26.	19.	29.	32.	24.	22.	10.	24.
31	12.	16.	10.	7.	4.	1.	0.	3.	6.	3.
41	0.	1.	2.	1.	2.	2.	5.	8.	12.	13.
51	13.	13.	6.	7.	8.	7.	7.	6.	7.	12.
61	6.	13.	12.	10.	9.	7.	5.	8.	7.	5.
71	14.	14.	12.	9.	9.	11.	13.	8.	7.	5.
81	9.	4.	1.	12.	15.	14.	17.	25.	13.	17.
91	29.	18.	9.	7.	11.	27.	18.	20.	26.	26.
101	13.	19.	18.	30.	20.	24.	29.	23.	33.	17.
111	28.	34.	32.	37.	33.	43.	21.	41.	39.	40.
121	46.	41.	33.	42.	40.	46.	53.	39.	55.	46.
131	55.	46.	55.	50.	61.	48.	61.	60.	58.	60.
141	65.	67.	55.	72.	86.	65.	77.	87.	78.	68.
151	75.	95.	95.	93.	85.	104.	96.	97.	91.	116.
161	77.	92.	84.	111.	114.	101.	116.	135.	108.	119.
171	117.	132.	130.	141.	146.	145.	151.	165.	143.	192.
181	182.	166.	187.	168.	168.	182.	198.	197.	216.	204.
191	197.	239.	228.	237.	235.	262.	241.	234.	265.	275.
201	298.	283.	288.	304.	319.	291.	312.	334.	296.	367.
211	352.	380.	366.	347.	352.	392.	353.	404.	435.	436.
21	433.	437.	454.	474.	442.	504.	499.	497.	494.	519.
31	542.	523.	552.	528.	553.	582.	593.	602.	622.	571.
241	637.	632.	620.	640.	673.	649.	678.	626.	636.	704.
251	683.	736.	688.	676.	687.	704.	649.	713.	634.	627.
261	597.	585.	544.	480.	516.	417.	374.	397.	384.	357.
271	416.	397.	406.	419.	419.	441.	417.	433.	396.	425.
281	444.	511.	471.	438.	491.	499.	487.	517.	533.	555.
291	555.	482.	551.	521.	509.	542.	552.	566.	470.	515.
301	520.	528.	501.	482.	521.	448.	405.	345.	302.	254.
311	199.	149.	120.	94.	83.	60.	42.	33.	30.	26.
321	7.	7.	5.	1.	1.	1.	0.	0.	0.	0.
331	0.	0.	0.	1.	0.	0.	4.	0.	1.	0.
341	0.	1.	0.	1.	3.	1.	1.	1.	1.	2.
351	1.	1.	1.	4.	1.	2.	3.	0.	1.	2.
361	1.	0.	2.	0.	1.	1.	2.	2.	1.	1.
371	2.	0.	0.	0.	0.	0.	0.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	1.	0.	2.	0.	0.	0.	2.	1.	0.	2.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.								

#3 3314

Serial No.	Sample Point	Date	Time Issued	Priority
E 8606.-4822	H&RWC	4-12-93	13: 0	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/g	VOGEL	0

Sample Size	Customer ID
100-10-500	0065WQL

Remarks, Calculations, Results 4.772g to 100ml

SPIKE #: 58843
SPIKE VOL. 100ml

ACID ADJ
~~CON HNO3~~ ML 1ml 8M HNO_3
P.A.2.
4/20/93

$\frac{1124(565.5)(1000)(202)}{1064(2.22\times10^{6})} = \frac{5.68\times10^{1}\,uCi/L}{47.72\,g/L} = 1.19\,uCi/g$

Analyst - 1	Analyst - 2	[redacted]	Analyst - [redacted]	Analyst - 5
[redacted]	[redacted]	VRaymond	D.H.Milburn	
Hrs	Hrs	Hrs 4-21-93	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-21-93	4/21/93	RHCook	4/27 SEHogan

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

#1 4-21-93
7311/30 -4

E 8606-4822

D. H. Nilicia
4-22-93

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
E8606-4822 H&RWC/AM
File ID: SD3314.SPC

Counted on: 4/21/93 @22: 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	36.6	37.5	364.110	364.110	24.000	20.304	12.000	4.450
2	2104.0	2099.7	303.782	303.782	24.000	19.273	12.000	7.614
3	1894.6	1914.0	258.339	258.339	24.000	16.702	12.000	6.269
4	4.6	3.2	154.013	154.013	24.000	339.199	12.000	17.064

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.0119	5.756	5.768	-0.012	0.10	1.11	5.61	0.253E-05
	Cm243		5.786	5.768	0.018				0.339E-05
2	Pu238	0.5238	5.499	5.478	0.021	0.09	48.84	336.81	0.152E-03
	Am241		5.480	5.478	0.002				0.116E-03
3	Am243	0.4604	5.234	5.260	-0.026	0.08	42.93	1937.97	0.873E-03
4	Np237	0.0039	4.640	4.759	-0.119	1.63	0.36	30.02	0.135E-04
	Np237		4.781	4.759	0.022				0.933E-06

DETECTOR CALIBRATION

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

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	46548.0	100.000
Smoothed	46547.7	99.999
Composite fit	46621.9	100.159
Residuals	-74.2	-0.159

Analyzed by: _____
VR

```
          SPECTRUM SD3314.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                7708.9

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1
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Raw Data Dump for AEA Spectrum: SP:SD3314.SPC

1	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.
11	0.	0.	0.	0.	0.	1.	0.	1.	1.	2.
21	0.	0.	2.	0.	0.	1.	0.	0.	0.	0.
31	1.	0.	2.	0.	1.	1.	0.	1.	1.	1.
41	0.	1.	1.	1.	0.	0.	1.	1.	1.	0.
51	0.	1.	0.	0.	2.	2.	2.	1.	2.	0.
61	0.	0.	0.	0.	4.	2.	1.	0.	2.	1.
71	0.	0.	2.	2.	1.	0.	2.	1.	1.	2.
81	0.	0.	1.	0.	0.	0.	3.	1.	3.	0.
91	0.	1.	0.	1.	1.	0.	1.	1.	2.	2.
101	0.	1.	2.	0.	2.	2.	0.	0.	0.	1.
111	2.	0.	0.	1.	1.	0.	1.	1.	2.	0.
121	0.	0.	1.	1.	4.	2.	1.	1.	0.	2.
131	1.	0.	1.	1.	2.	1.	0.	2.	2.	1.
141	2.	0.	1.	4.	3.	0.	0.	1.	2.	1.
151	4.	4.	2.	2.	3.	3.	1.	0.	2.	1.
161	1.	2.	0.	0.	0.	2.	3.	1.	2.	1.
171	3.	4.	2.	2.	2.	1.	1.	3.	0.	1.
181	3.	1.	5.	2.	0.	2.	3.	3.	2.	2.
191	3.	2.	3.	6.	3.	4.	2.	2.	5.	5.
201	7.	6.	8.	3.	6.	5.	10.	10.	7.	8.
211	14.	13.	12.	20.	13.	14.	15.	17.	22.	30.
21	29.	36.	42.	48.	50.	57.	56.	78.	68.	85.
231	98.	86.	103.	128.	140.	158.	142.	201.	182.	240.
241	271.	281.	336.	371.	438.	476.	556.	646.	653.	755.
251	840.	845.	957.	991.	1013.	1062.	1064.	1019.	1034.	956.
261	839.	821.	668.	567.	492.	398.	319.	282.	231.	173.
271	152.	117.	113.	82.	108.	108.	100.	121.	123.	115.
281	141.	149.	167.	196.	226.	282.	290.	340.	418.	437.
291	511.	591.	673.	703.	810.	845.	962.	1003.	1081.	1070.
301	1149.	1163.	1174.	1110.	1045.	1045.	893.	774.	724.	596.
311	489.	460.	360.	277.	219.	158.	133.	94.	57.	59.
321	50.	38.	24.	16.	9.	6.	7.	2.	3.	6.
331	3.	2.	2.	1.	4.	2.	3.	3.	7.	5.
341	4.	4.	2.	9.	4.	4.	6.	8.	10.	8.
351	14.	9.	12.	15.	15.	16.	25.	18.	22.	18.
361	14.	18.	21.	18.	20.	16.	23.	17.	9.	15.
371	9.	11.	6.	8.	3.	3.	5.	2.	1.	0.
381	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
391	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.
411	0.	0.	0.	0.	0.	1.	0.	2.	0.	0.
421	0.	0.	2.	1.	2.	1.	0.	0.	0.	1.
431	0.	1.	3.	0.	2.	1.	0.	1.	1.	0.
441	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	0.	0.	0.	1.	1.	0.	1.	1.
471	1.	2.	0.	1.	1.	1.	1.	1.	1.	0.
481	0.	1.	1.	1.	0.	1.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

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DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	151	147	154	149	151	153	Out of Service			
Mar 18	Pu	110	229	229	228	232	227	231	233				
DATE	Am	136	302	301	300	304	300	303	308				
4-18-93	Cm	160	370	367	369	371	366	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	150	148	148	152	146	150	152				
Mar 18	Pu	110	229	226	228	231	225	230	233				
DATE	Am	136	302	297	300	303	297	302	307				
4-19-93	Cm	160	370	364	369	370	365	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	152	148	152	149	151	153				
Mar 18	Pu	110	229	230	229	231	228	230	233				
DATE	Am	136	303	302	301	303	300	302	307				
4-20-93	Cm	161	371	368	369	370	368	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	149	148	154	148	151	153				
Mar 18	Pu	110	229	227	228	232	226	230	234				
DATE	Am	136	301	299	301	304	298	303	308				
4-21-93	Cm	161	370	366	369	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	151	150	152	154				
Mar 18	Pu	110	229	228	224	230	228	232	235				
DATE	Am	136	302	299	301	302	301	304	309				
4-22-93	Cm	160	370	366	370	369	368	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	146	150	146	152	146	151	154				
Mar 18	Pu	110	226	228	226	230	225	230	234				
DATE	Am	137	299	301	299	302	297	302	305				
4-23-93	Cm	161	366	367	367	370	360	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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REDRUN

Serial No.	Sample Point	Date	Time Issued	Priority
E 8606.-3801	H&RWC	4-12-93	13: 0	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr89/90	LA-223-101	uCi/~~L~~g	VOGEL	1

Sample Size	Customer ID
100 MT 100	0065WQL

Remarks, Calculations, Results

SEP DATE= 4-24-93
SEP TIME- 0700

$$\frac{1.64\times10^{2}\ uCi/L}{47.72\ g/L} = 3.44\ uCi/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs 4-24-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-23-93	1440	SH Cook	4/27/93

54-6800-06 (R-10-83)

12 1" 4.24.93 R 1605

$\frac{5027}{10} - 9$ E8606-3801

$\frac{5202}{10} -$

DT 908
D.F. 10
MF. ~~4~~
MTF. 10

Sr Calculation by VR on 04-24-1993 at 18:38:59
Det #12 1 -inch mount Sr eff : .4993 Y eff : .5501

Sample size : .1 mL Dilution : 10 Method : 4

Mount # 1 Decay time = 9.08 hrs

$$\frac{5027}{10} - 9.0 = 1.6151E+02\ uCi/L\ \text{strontium}$$

Mount # 2 Decay time = 9.08 hrs

$$\frac{5202}{10} - 9.0 = 1.6723E+02\ uCi/L\ \text{strontium}$$

$\bar{x}$ 1.6437×10^{2} uCi/L

03/18/89 Det 12 Sr/Y-90 ratios

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5162	0.4912	0.5412

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.4476	0.4233	0.4719

Esr = .4912/.5162 = 0.9516 , 1"

Ey = .5412/.5162 = 1.0484 , 1"

Esr = .4233/.4476 = 0.9457 , 2"

' = .4719/.4476 = 1.0543 , 2"

RATIOS GENERATED USING PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK RHO-QA-NB-47, VOL 5: PAGES 32-36.

05/11/92 Det 12 CALCULATED Sr AND Y-90 EFFs

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5247	0.4993	0.5501

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.442	0.4180	0.4660

BEST AVAILABLE COPY

Original card was not received [illegible] 08/24/93

Serial No	Sample Point	Date	Time Issued	Priority
S 5336.-9374	SHIFT STD'S	4- 1-93	0:55	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-223-101	uCi/L	STD	0

Sample Size	Customer ID
50 MF#4 MT100	

Remarks, Calculations, Results

S374 BE25-2

STD# 57BS1-1 RESULT 2.4130+4

STD VAL 2.43+4 %REC 99.30

Sept. Time 0650 Date 4-1-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs 4-24-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93	1442	4-24-93 2350 D Donahue

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

11 1" 4-24.93R 1635

$\frac{353729}{10}$ - 20

$\frac{376095}{10}$

ΔT 9.75
DF 20
MF 4
MTF 10

Sr Calculation by VR on 04-24-1993 at 18:35:37
Det #11 1 -inch mount Sr eff : .4899 Y eff : .5469

Sample size : .1 mL Dilution : 20 Method : 4

Mount # 1 Decay time = 9.75 hrs

$\frac{353729}{10}$ - 20.0 = 2.3390E+04 uCi/L strontium

Mount # 2 Decay time = 9.75 hrs

$\frac{376095}{10}$ - 20.0 = 2.4870E+04 uCi/L strontium

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WHC-SD-WM-DP-045
REV 1

K AREA BASINS

CUSTOMER ID NUMBER 066WQL

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Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-1001	H&RWC	4-12-93	12:58	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LA-519-151	NONE	PC41G	0

Sample Size	Customer ID
?	0066WQL

Remarks, Calculations, Results

Sample or Tank ID?
Color and Est Vol?
Clarity?
Solids y/n
Phases?
OTR or CPM ?

9.8164g total wt

RUSH

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

Date	Time Completed	Lab Unit Mgr
		RL 4/21 SE Hogan

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

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-4461	H&RWC	4-12-93	12:58	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U-SOIL	LA-925-107	G/G	PC41G	0

Sample Size	Customer ID
G OF SAMPLE 9ml + 1.238ml NaOH	0066WQL

Remarks, Calculations, Results

spike ID/Val./90B38/6.25E-4 (100-10-50 sample size)

$$\frac{.30\,(6.25\times10^{-4})(.1)(2020)(1.138)}{\frac{565}{556}(.60) - .30} = \frac{1.39\times10^{-1}\ g/L}{10.322\ g/L} = 1.34\times10^{-2}\ g/g\ sample$$

.30
.60

Kathleen Ross

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-19-93	15:00	RL 4/27 SE Hogan

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

Receiving copy of card - not an original analytical card. [illegible] 8/24/93

Serial No.	Sample Point	Date	Time Issued	Priority
S 5340.-9267	SHIFT STD'S	4- 1-93	0:57	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
C	LA-325-106	G/L	STD	0

Sample Size	Customer ID
100-10-100	

Remarks, Calculations, Results:

S267 OF1C
STD VAL 3.04x10^-2 RESULT 3.17x10^-2 MRED 10.43 .16
SPIKE ID/VAL 90B38/ 6.25E-4 .47
SPIKE VOL 126B38 104.28%

$$\frac{.16\ (6.25\times10^{-4})(.1)(1000)}{\frac{5.7}{56}(.47) - .16} = 3.17\times10^{-2}$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-19-93	11:40	[signature]	[signature]

54-6806-061 (R-10-83)

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4951

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-2162	ENV STD	4- 6-93	13:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-LIQ	LA-548-121	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

36851 ENVSTD
EDP E345 / CS137 1.59E-2 92.98% Li .500
EDP E346 / CO60 3.24E-2 98.48%
EDP E349 / AM241

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] URaymond			
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93		SL Hogan

54-5800-061 (R-10-83)

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URaymond 4-24-93

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

CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-045
REV 1

24-APR-9322:10:46

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 4 / GEOMETRY NUMBER: S1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AND
ANALYZED BY: VR

SAMPLE DESCRIPTION: E8501-9162 ENV/STD
GEOMETRY DESCRIPTION: 500 ML LIQ
SAMPLE SIZE: 3.0000E-01 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 24-APR-93 AT 21:00:16

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3011. SECONDS
DEAD TIME: 0.70 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

BEST AVAILABLE COPY

24-APR-9322:10:46

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	96.68	48.31	1.00	1265.	965.	11.7	U-234
2	1322.77	661.40	1.49	1479.	22010.	1.4	CS-137
2B		661.44			159.	9.8	
3	2345.24	1172.78	1.84	1053.	31246.	1.2	CO-60
4	2663.52	1331.98	1.98	224.	29195.	1.2	CO-60
5	2920.13	1460.34	1.86	104.	806.	8.0	K-40
5B		1460.67			769.	1.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-93 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

9313090.1025

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24-APR-9322:10:46

SAMPLE: E8301-2162 ENV/STD
DATA COLLECTED ON 24-APR-93 AT 21:20:16
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/L				ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<4.28E-04		LLD<4.28E-04		911.07	
AC-228A	LLD<4.28E-04		LLD<4.28E-04		911.10	
AC-228B	LLD<4.57E-04		LLD<4.57E-04		338.40	
AG-108M	LLD<7.31E-05		LLD<7.31E-05		433.94	
AG-110M	LLD<3.36E-04		LLD<3.36E-04		657.76	
AM-241	LLD<5.46E-04		LLD<5.46E-04		59.54	
AM-243	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243A	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243B	LLD<2.30E-03		LLD<2.30E-03		43.10	
AR-41	LLD<6.98E-05		LLD<6.98E-05		1293.64	
AU-198	LLD<6.06E-05		LLD<6.06E-05		411.80	
BA-133	LLD<9.66E-05		LLD<9.66E-05		356.02	
BA-139	LLD<2.36E-04		LLD<2.36E-04		165.85	
BA-140	LLD<2.94E-04		LLD<2.94E-04		537.27	
BA-141	LLD<2.12E-04		LLD<2.12E-04		190.23	
BE-7	LLD<6.62E-04		LLD<6.62E-04		477.59	
BI-207	LLD<7.42E-05		LLD<7.42E-05		569.70	
BI-212	LLD<7.31E-04		LLD<7.31E-04		727.27	
BI-214	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214A	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214B	LLD<8.37E-04		LLD<8.37E-04		1120.28	
BI-214C	LLD<2.69E-04		LLD<2.69E-04		1764.51	
CD-109	LLD<1.54E-03		LLD<1.54E-03		88.03	
CE-144	LLD<3.23E-04		LLD<3.23E-04		133.51	
CE-139	LLD<3.33E-05		LLD<3.33E-05		165.87	
CE-141	LLD<7.41E-05		LLD<7.41E-05		145.44	
CEPR144	LLD<6.46E-04		LLD<6.46E-04		133.51	
CO-56	LLD<1.09E-04		LLD<1.09E-04		846.76	
CO-57	LLD<4.24E-05		LLD<4.24E-05		122.06	
CO-58	LLD<1.02E-04		LLD<1.02E-04		810.77	
CO-60	3.24E-02	+-1.14E-04	3.24E-02	+-1.14E-04	1332.50	-0.32
					1173.24	-0.46
CR-51	LLD<5.73E-04		LLD<5.73E-04		320.08	
CS-134	LLD<1.08E-04		LLD<1.08E-04		795.84	
CS-136	LLD<1.03E-04		LLD<1.03E-04		818.51	
CS-137	1.39E-01	+-2.66E-04	1.39E-01	+-2.66E-04	661.60	-0.20
CS-138	LLD<7.41E-05		LLD<7.41E-05		1435.85	
EU-152	LLD<1.83E-04		LLD<1.83E-04		1408.01	
EU-154	LLD<1.84E-04		LLD<1.84E-04		1274.47	
EU-155	LLD<8.90E-05		LLD<8.90E-05		105.10	
EU-156	LLD<2.06E-04		LLD<2.06E-04		145.51	
FE-59	LLD<2.36E-04		LLD<2.36E-04		1099.20	
HF-181	LLD<8.23E-05		LLD<8.23E-05		482.20	
HG-203	LLD<6.37E-05		LLD<6.37E-05		279.20	
I-131	LLD<7.46E-05		LLD<7.46E-05		364.48	
I-132	LLD<8.50E-05		LLD<8.50E-05		667.69	
I-133	LLD<7.36E-05		LLD<7.36E-05		529.69	
I-134	LLD<1.37E-04		LLD<1.37E-04		847.00	
I-135	LLD<2.20E-04		LLD<2.20E-04		1260.41	
K-40	LLD<8.03E-04		LLD<8.03E-04		1460.75	
KR-85	LLD<1.61E-02		LLD<1.61E-02		513.99	
KR-85M	LLD<7.68E-05		LLD<7.68E-05		151.17	
[illegible]	[illegible]		[illegible]		[illegible]	

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KR-89	LLD<2.78E-03	LLD<2.78E-03	220.90
LA-140	LLD<4.05E-05	LLD<4.05E-05	1596.20
LA-142	LLD<1.86E-04	LLD<1.86E-04	641.83
MN-54	LLD<1.05E-04	LLD<1.05E-04	834.83
MN-56	LLD<1.23E-04	LLD<1.23E-04	846.76
NA-22	LLD<6.06E-05	LLD<6.06E-05	1274.53
NA-24	LLD<3.99E-05	LLD<3.99E-05	1366.60
NB-94	LLD<8.48E-05	LLD<8.48E-05	702.63
NB-95	LLD<9.24E-05	LLD<9.24E-05	765.78
NB-97	LLD<4.07E-04	LLD<4.07E-04	657.92
NP-237	LLD<4.61E-04	LLD<4.61E-04	86.50
NP-238	LLD<4.63E-04	LLD<4.63E-04	984.45
NP-239	LLD<3.60E-04	LLD<3.60E-04	277.60
PA-233	LLD<1.62E-04	LLD<1.62E-04	311.98
PA-234M	LLD<2.19E-02	LLD<2.19E-02	1001.03
PB-210	LLD<1.28E-02	LLD<1.28E-02	46.50
PB-212	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212A	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212B	LLD<1.72E-03	LLD<1.72E-03	300.10
PB-214	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214A	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214B	LLD<2.73E-04	LLD<2.73E-04	295.21
PO-210	LLD<8.39E+00	LLD<8.39E+00	804.00
PO-214	LLD<9.36E-01	LLD<9.36E-01	799.70
PO-216	LLD<4.95E+00	LLD<4.95E+00	804.90
PU-239	LLD<6.11E-01	LLD<6.11E-01	129.30
PU-241	LLD<1.94E+01	LLD<1.94E+01	148.37
RA-224	LLD<1.32E-03	LLD<1.32E-03	240.99
RA-226	LLD<1.24E-03	LLD<1.24E-03	186.10
RB-88	LLD<4.26E-04	LLD<4.26E-04	1836.00
RB-89	LLD<3.63E-04	LLD<3.63E-04	1031.88
RN-220	LLD<6.40E-02	LLD<6.40E-02	549.73
RU-103	LLD<7.34E-05	LLD<7.34E-05	497.08
RURH106	LLD<1.50E-03	LLD<1.50E-03	621.80
SB-124	LLD<7.46E-05	LLD<7.46E-05	602.72
SB-125	LLD<2.19E-04	LLD<2.19E-04	427.89
SB-125A	LLD<2.19E-04	LLD<2.19E-04	427.89
SC-46	LLD<1.20E-04	LLD<1.20E-04	1120.45
SE-75	LLD<8.54E-05	LLD<8.54E-05	264.66
SN-113	LLD<9.33E-05	LLD<9.33E-05	391.67
SR-89	LLD<7.07E-05	LLD<7.07E-05	313.95
SR-91	LLD<1.18E-04	LLD<1.18E-04	533.60
SR-90	LLD<3.19E-05	LLD<3.19E-05	1383.94
TA-182	LLD<3.79E-04	LLD<3.79E-04	1121.50
TC-99M	LLD<4.22E-03	LLD<4.22E-03	140.31
TE-123M	LLD<4.46E-05	LLD<4.46E-05	109.00
TE-125M	LLD<1.52E-02	LLD<1.52E-02	109.27
TE-132	LLD<5.90E-05	LLD<5.90E-05	938.16
TH-228	LLD<4.93E-03	LLD<4.93E-03	84.37
TH-229	LLD<1.94E-03	LLD<1.94E-03	86.44
TH-229B	LLD<2.24E-03	LLD<2.24E-03	137.02
TH-229C	LLD<9.73E-04	LLD<9.73E-04	193.09
TH-230	LLD<8.96E-04	LLD<8.96E-04	92.50
TH-234A	LLD<8.96E-04	LLD<8.96E-04	92.50
TH-234B	LLD<3.93E-03	LLD<3.93E-03	63.30
TL-208	LLD<8.08E-05	LLD<8.08E-05	585.14
U-232	LLD<1.33E-01	LLD<1.33E-01	270.26
U-235	LLD<8.01E-05	LLD<8.01E-05	183.71
U-235A	LLD<8.01E-05	LLD<8.01E-05	180.71
U-238	LLD<3.76E-04	LLD<3.76E-04	143.76
U-237	LLD<2.05E-04	LLD<2.05E-04	306.00
W-187	LLD<2.92E-04	LLD<2.92E-04	881.74
XE-131M	LLD<2.02E-03	LLD<2.02E-03	163.98
XE-133	LLD<1.79E-04	LLD<1.79E-04	81.00
XE-133M	LLD<7.14E-04	LLD<7.14E-04	233.21

WHC-SD-WM-DP-045
REV 1

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XE-138	LLD<4.37E-04	LLD<4.37E-04	258.41
Y-88	LLD<4.19E-05	LLD<4.19E-05	1836.06
Y-91	LLD<2.75E-02	LLD<2.75E-02	1204.90
Y-91M	LLD<8.90E-05	LLD<8.90E-05	555.60
ZN-65	LLD<2.56E-04	LLD<2.56E-04	1115.55
ZR-95	LLD<1.70E-04	LLD<1.70E-04	756.73
ZR-97	LLD<8.91E-05	LLD<8.91E-05	743.33
TOTAL	4.83E-02 +-4.82E-04	4.83E-02 +-4.82E-04	

STANDARD DEVIATION = 0.14

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9312091.1028

RUN CALIB

CALIB -- Version 2.06

222-S COUNTING ROOM WESTINGHOUSE HANFORD

CAL: EFF
MCA UNIT NUMBER (2): 1
ADC UNIT NUMBER (1,0): 1
DETECTOR NUMBER (12): 4
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 11-NOV-92
TIME COLLECT STARTED: 09:00
GEOMETRY NUMBER (12): 81
GEOMETRY DESCRIPTION: 500ML LIQ
ACTIVITY UNITS (UCI) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
TYPE A CARRIAGE RETURN FOR MANUAL ENTRY;
TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY;
TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 481
38842-A 500ML LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA : 1.00000
NUMBER OF POINTS: 12
ACTIVITY IN MICROCURIES (YES/NO): N

PEAK 1
ENERGY: 59.536
ACTIVITY: 3.131000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: 0158000
DECAY TIME (0.000000E-01 MINS.): 1-FEB-92
TIME OF SOURCE CALIBRATION: 12:00
DECAY TIME: 4.087800E+05 MINS
EFFICIENCY = 1.151452E-02 (+- 1.180572E-04)

PEAK 2
ENERGY: 88.034
ACTIVITY: 1.753000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: 0462.6
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 4.525023E-02 (+- 3.590011E-04)

PEAK 3
ENERGY: 122.061
ACTIVITY: 1.597000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: 0271.8
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 7.091829E-02 (+- 5.255487E-04)

PEAK 4
ENERGY: 165.853
ACTIVITY: 1.940000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: 0137.66

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[illegible] EFFICIENCY COEFFICIENTS: FOR: [illegible]

LOG(EFF) = -6.592071E+01 + 2.221460E+01*LOG(E) - 2.592793E+00*LOG(E)^2

PEAK    5
        ENERGY:     279.197
        ACTIVITY:   5.435000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D[illegible]
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  5.099648E-02 (+-  3.270923E-03)

PEAK    6
        ENERGY:     391.688
        ACTIVITY:   6.201000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D115.09
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  4.175033E-02 (+-  3.169516E-04)

PEAK    7
        ENERGY:     513.990
        ACTIVITY:   1.063000E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D64.84
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  3.316401E-02 (+-  5.326431E-04)

PEAK    8
        ENERGY:     661.650
        ACTIVITY:   6.921000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D11020
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.852897E-02 (+-  8.913840E-05)

PEAK    9
        ENERGY:     898.021
        ACTIVITY:   1.711000E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D106.61
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.066866E-02 (+-  1.356644E-04)

PEAK   10
        ENERGY:    1173.240
        ACTIVITY:   9.279000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.723549E-02 (+-  6.099893E-05)

PEAK   11
        ENERGY:    1332.500
        ACTIVITY:   9.284000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.574303E-02 (+-  5.737485E-05)

PEAK   12
        ENERGY:    1836.130
        ACTIVITY:   1.813000E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
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```
EFFICIENCY =  1.247290E-02 (+-  8.695036E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) =  9.202042E+01 - 6.132777E+01*LOG(E) + 1.500303E+01*LOG(E)^2
          - 1.634262E+00*LOG(E)^3 + 6.608717E-02*LOG(E)^4
```


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3937

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-2172	H&RWC	4-12-93	12:58	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-SOIL	LA-548-121	~~PCi~~ PCi/gWETwt	PC41G	0

Sample Size	Customer ID
1 G OF SAMPLE	0086WQL

Remarks, Calculations, Results

.5161g to 50mL mt 1m1

Am-241: $4.17 \times 10^{-1} \times \frac{50}{.5161}$ = 40.39 E+7 mG/gwetwt

Cs-137: 9.90×10^{-1} " " = 95.9 E+7 "

Co-60: 5.93×10^{-2} " " = 5.75 E+6 "

Eu-154: 8.21×10^{-2} " " = 7.95 E+6 "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	D.H. Milian			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4/14/93		A.K. Deth 4/16/93	4/16/93 See back

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

E8607-2172

Eu-155: $4.77 \times 10^{-2} \times \frac{50}{0.5161}$ = 4.62 E+6 mG/gwetwt

Sb-125: 1.02×10^{-2} " " = 0.99 9.88 E+5 "

MN-54 $6.24E-4 \times \frac{50}{.5161}$ = 6.04 E+4

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD                 16-APR-93  11:50:35

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

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

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

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

SAMPLE DESCRIPTION: E9607-2172
GEOMETRY DESCRIPTION:  42B47-A 22CC LIQ
SAMPLE SIZE:    1.0000E+00 EA        / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-APR-93 AT 18:36:00

COLLECT LIVE TIME:     3000. SECONDS
        REAL TIME:     3055. SECONDS
        DEAD TIME:      1.80 %

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

ENERGY CALIBRATION PERFORMED 24-SEP-92
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92
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WHC-SD-WM-DP-045
REV 1

BEST AVAILABLE COPY

9312000.1033

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1?	53.57	26.53	1.33	16273.	8984.	21.6	SB/TE-X
2?	59.92	29.70	1.33	17551.	5722.	32.4	
3?	64.26	31.87	1.33	18425.	43668.	7.7	
4?	73.12	36.31	1.33	20209.	10133.	20.7	TE-125M
5?	82.34	40.91	1.33	22064.	1258.	152.3	I-129,BI-212, CE-144
6?	85.71	42.60	1.33	22744.	19653.	13.4	U-233, EU/GD-X, AM-243B, PU-239
7	97.92	48.70	2.00	22916.	11176.	4.1	U-234
8?	113.31	56.40	1.06	19885.	4682.	53.8	
9?	116.01	57.75	1.06	16652.	6662.	40.1	
10?	119.28	59.38	1.06	12738.	123215.	3.0	AM-241,U-237, EU-155
11C	145.74	72.61	1.09	9295.	577.	33.1	PU-241,W-187,
11B		73.08			57.	37.3	TL-208X
12C	150.08	74.78	1.09	9638.	1147.	26.6	AM-243A,
12B		75.25			140.	29.8	PB-214X, PB-212X, TL-208X
13	173.30	86.39	1.11	10566.	13383.	2.7	CS-136, EU-155, EU-155A, PB-214X, TL-208X
14	210.80	105.14	1.11	9515.	8542.	3.7	PU-241, EU-155, EU-155B, NP-239
15	246.38	122.93	1.15	8739.	27401.	1.5	EU-152,CO-57, EU-154A
16N	374.86	187.17	2.13	21241.	2017.	19.4	U-235,RA-226
17N	379.94	189.72	2.13	22512.	1483.	20.2	BA-141
18	496.16	247.82	1.22	7778.	3109.	8.6	EU-154B
19	856.27	427.90	1.30	9070.	1061.	26.3	SB-125, SB-125B
20	1183.63	591.59	1.51	2363.	869.	17.7	EU-154C
21	1323.33	661.45	1.59	3432.	217115.	0.4	CS-137
21B		661.41			81.	28.8	
22	1384.94	692.27	2.04	1023.	[illegible]	30.2	EU-154
23	1446.52	723.06	1.72	1107.	3757.	4.2	[illegible]-124,I-131, AG-108, EU-154D, ZR-95
24	1513.52	756.56	1.88	935.	898.	12.2	ZR-95,EU-154
25	1669.56	834.60	2.30	934.	136.	69.7	MN-54
26	1746.19	872.92	1.77	1007.	1950.	6.7	EU-154E, RH-106
27	1992.27	995.99	1.74	1008.	1617.	7.9	EU-154F
28	2009.15	1004.44	1.92	951.	2825.	5.1	EU-154G, EU-152
29	2345.98	1172.90	1.95	492.	9550.	2.1	CO-60
30	2548.37	1274.12	2.08	124.	4459.	3.0	EU-154, EU-154H,

BEST AVAILABLE COPY

							NA-22
31	2664.46	1332.19	2.08	214.	8703.	2.2	CO-60
32	2921.69	1460.85	2.13	62.	565.	9.5	K-40
32B		1460.58			611.	5.5	
33	2987.18	1493.61	1.63	26.	79.	31.1	EU-154
34	3191.87	1596.00	2.10	34.	199.	17.1	LA-140, EU-154I
35	3528.36	1764.32	1.03	13.	43.	41.3	BI-214C
35B		1764.79			47.	25.0	

WHC-SD-WM-DP-045
REV 1

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
N - MULTIPLET ANALYSIS DID NOT CONVERGE
? - MULTIPLET ANALYSIS CONVERGED BUT GFIT > 4
B - ENVIRONMENTAL BACKGROUND PEAK

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

9310090.1035

BEST AVAILABLE COPY

BEST AVAILABLE COPY

222-S COUNTING ROOM WESTINGHOUSE HANFORD 16-APR-93 11:50:35

SAMPLE: E8607-2172
DATA COLLECTED ON 14-APR-93 AT 18:36:00
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

WHC-SD-WM-DP-045
REV 1

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
AC-228	LLD<1.94E-03		LLD<1.94E-03		911.07	
AC-228A	LLD<1.94E-03		LLD<1.94E-03		911.10	
AC-228B	LLD<5.03E-03		LLD<5.03E-03		338.40	
AG-108M	LLD<9.57E-04		LLD<9.57E-04		433.94	
AG-110M	LLD<6.06E-03		LLD<6.06E-03		657.76	
AM-241	4.17E-01	+-1.44E-02	4.17E-01	+-1.44E-02	59.54	-0.15
~~AM-243~~	~~1.84E-03~~	~~+-5.63E-04~~	~~1.84E-03~~	~~+-5.63E-04~~	~~74.67~~	~~-0.11~~
~~AM-243A~~	~~1.84E-03~~	~~+-5.63E-04~~	~~1.84E-03~~	~~+-5.63E-04~~	~~74.67~~	~~-0.11~~
~~AM-243B~~	~~4.52E-01~~	~~+-6.70E-02~~	~~4.52E-01~~	~~+-6.70E-02~~	~~43.10~~	~~-0.50~~
AR-41	LLD<3.53E-04		LLD<3.53E-04		1293.64	
AU-198	LLD<8.29E-04		LLD<8.29E-04		411.80	
BA-133	LLD<9.57E-04		LLD<9.57E-04		356.02	
BA-139	LLD<1.83E-03		LLD<1.83E-03		165.85	
BA-140	LLD<2.81E-03		LLD<2.81E-03		537.27	
BA-141	LLD<2.01E-03		LLD<2.01E-03		190.23	
BE-7	LLD<9.29E-03		LLD<9.29E-03		477.59	
BI-207	LLD<5.85E-04		LLD<5.85E-04		569.70	
BI-212	LLD<9.34E-03		LLD<9.34E-03		727.27	
BI-214	LLD<1.32E-03		LLD<1.32E-03		609.32	
BI-214A	LLD<1.32E-03		LLD<1.32E-03		609.32	
BI-214B	LLD<3.75E-03		LLD<3.75E-03		1120.28	
BI-214C	LLD<1.39E-03		LLD<1.39E-03		1764.51	
CD-109	LLD<1.14E-02		LLD<1.14E-02		88.03	
CE 144	LLD<2.89E-03		LLD<2.89E-03		133.51	
CE-139	LLD<4.13E-04		LLD<4.13E-04		165.85	
CE-141	LLD<6.70E-04		LLD<6.70E-04		145.44	
CEPR144	LLD<5.79E-03		LLD<5.79E-03		133.51	
CO-56	LLD<5.11E-04		LLD<5.11E-04		846.76	
~~CO-57~~	~~3.94E-02~~	~~+-1.23E-03~~	~~3.94E-02~~	~~+-1.23E-03~~	~~122.06~~	~~-0.87~~
CO-58	LLD<4.89E-04		LLD<4.89E-04		810.75	
CO-60	5.93E-02	+-1.66E-03	5.93E-02	+-1.66E-03	1332.50	-0.31
					1173.24	-0.34
CR-51	LLD<5.09E-03		LLD<5.09E-03		320.09	
CS-134	LLD<5.63E-04		LLD<5.63E-04		795.84	
CS-136	LLD<4.86E-04		LLD<4.86E-04		818.51	
CS-137	9.90E-01	+-1.90E-02	9.90E-	+-1.90E-02	661.65	-0.20
CS-138	LLD<4.71E-04		LLD<4.71E-04		1435.86	
EU-152	LLD<9.15E-04		LLD<9.15E-04		1408.01	
EU-154	8.21E-02	+-2.85E-03	8.21E-02	+-2.85E-03	1274.45	-0.33
EU-154A	8.39E-02	+-2.62E-03	8.39E-02	+-2.62E-03	123.10	-0.17
EU-155	4.77E-02	+-2.20E-03	4.77E-02	+-2.20E-03	105.31	-0.17
					86.54	-0.15
FE-59	LLD<1.04E-03		LLD<1.04E-03		1099.25	
HF-181	LLD<1.11E-03		LLD<1.11E-03		482.20	
HG-203	LLD<4.99E-04		LLD<4.99E-04		279.20	
I-131	LLD<8.25E-04		LLD<8.25E-04		364.48	
I-132	LLD<1.04E-03		LLD<1.04E-03		667.69	
I-133	LLD<8.32E-04		LLD<8.32E-04		529.69	
I-134	LLD<7.35E-04		LLD<7.35E-04		847.03	
I-135	LLD<1.01E-03		LLD<1.01E-03		[illegible]	

Df 4/16/93

Df 4/16/93

107

K-40	LLD<4.93E-03		LLD<4.93E-03		1460.75	
KR-85	LLD<1.79E-01		LLD<1.79E-01		513.99	
KR-85M	LLD<4.58E-04		LLD<4.58E-04		151.17	
KR-87	LLD<1.75E-03		LLD<1.75E-03		402.58	
KR-89	LLD<2.19E-02		LLD<2.19E-02		220.90	
LA-140	LLD<1.90E-04		LLD<1.90E-04		1596.20	
LA-142	LLD<1.43E-03		LLD<1.43E-03		641.83	
MN-54	6.24E-04	+-4.35E-04	6.24E-04	+-4.35E-04	834.83	-0.23
MN-56	LLD<5.78E-04		LLD<5.78E-04		846.76	
~~NA-22~~	~~2.92E-02~~	~~+-1.01E-03~~	~~2.92E-02~~	~~+-1.01E-03~~	~~1274.55~~	~~-0.43~~
NA-24	LLD<2.27E-04		LLD<2.27E-04		1368.60	
NB-94	LLD<4.38E-04		LLD<4.38E-04		702.63	
NB-95	LLD<4.80E-04		LLD<4.80E-04		765.78	
NB-97	LLD<8.25E-03		LLD<8.25E-03		657.92	
~~NP-237~~	~~1.28E-01~~	~~+-4.65E-03~~	~~1.28E-01~~	~~+-4.65E-03~~	~~86.50~~	~~-0.11~~
NP-238	LLD<2.03E-03		LLD<2.03E-03		984.45	
NP-239	LLD<2.75E-03		LLD<2.75E-03		277.60	
PA-233	LLD<1.36E-03		LLD<1.36E-03		311.98	
PA-234M	LLD<2.29E-01		LLD<2.29E-01		1001.03	
PB-210	LLD<1.46E-02		LLD<1.46E-02		46.50	
PB-212	LLD<8.95E-04		LLD<8.95E-04		239.00	
PB-212A	LLD<8.91E-04		LLD<8.91E-04		239.00	
PB-212B	LLD<1.43E-02		LLD<1.43E-02		300.10	
PB-214	LLD<1.72E-03		LLD<1.72E-03		351.92	
PB-214A	LLD<1.72E-03		LLD<1.72E-03		351.92	
PB-214B	LLD<2.36E-03		LLD<2.36E-03		295.21	
PO-210	LLD<4.00E+01		LLD<4.00E+01		804.00	
PO-214	LLD<5.13E+00		LLD<5.13E+00		799.70	
PO-216	LLD<2.63E+01		LLD<2.63E+01		804.90	
PU-239	LLD<5.01E+00		LLD<5.01E+00		129.30	
PU-241	LLD<1.74E+02		LLD<1.74E+02		148.57	
RA-224	LLD<9.83E-03		LLD<9.83E-03		240.99	
~~RA-226~~	~~7.70E-02~~	~~+-1.57E-02~~	~~7.70E-02~~	~~+-1.57E-02~~	~~136.10~~	~~1.07~~
RB-88	LLD<1.88E-03		LLD<1.88E-03		1836.00	
RB-89	LLD<2.59E-03		LLD<2.59E-03		1031.88	
RN-220	LLD<5.71E-01		LLD<5.71E-01		549.73	
RU-103	LLD<8.70E-04		LLD<8.70E-04		497.08	
RURH106	LLD<1.15E-02		LLD<1.15E-02		621.80	
SB-124	LLD<5.95E-04		LLD<5.95E-04		602.72	
SB-125	LLD<2.85E-03		LLD<2.85E-03		427.89	
SB-125A	1.02E-02	+-2.72E-03	1.02E-02	+-2.72E-03	427.89	0.01
SC-46	LLD<5.26E-04	↓	LLD<5.26E-04		1120.45	
SE-75	LLD<6.51E-04	report on	LLD<6.51E-04		264.66	
SN-113	LLD<1.14E-03	S6-105	LLD<1.14E-03		391.67	
SR-85	LLD<7.85E-04		LLD<7.85E-04		513.99	
SR-91	LLD<1.11E-03		LLD<1.11E-03		555.60	
SR-92	LLD<2.70E-04		LLD<2.70E-04		1383.94	
TA-182	LLD<1.53E-03		LLD<1.53E-03		1121.30	
TC-99M	LLD<4.17E-04		LLD<4.17E-04		140.51	
TE-123M	LLD<4.32E-04		LLD<4.32E-04		159.00	
TE-125M	LLD<1.33E-01		LLD<1.33E-01		109.27	
TE-132	LLD<4.43E-04		LLD<4.43E-04		228.16	
TH-228	LLD<3.89E-02		LLD<3.89E-02		84.37	
~~TH-229~~	~~5.38E-01~~	~~+-1.95E-02~~	~~5.38E-01~~	~~+-1.95E-02~~	~~86.44~~	~~-0.05~~
TH-229B	LLD<2.00E-02		LLD<2.00E-02		137.02	
TH-229C	LLD<9.98E-03		LLD<9.98E-03		193.59	
TH-234	LLD<5.38E-03		LLD<5.38E-03		92.50	
TH-234A	LLD<5.38E-03		LLD<5.38E-03		92.50	
TH-234B	LLD<2.08E-02		LLD<2.08E-02		63.30	
TL-208	LLD<6.79E-04		LLD<6.79E-04		583.14	
U-232	LLD<1.02E+00		LLD<1.02E+00		270.26	
U-235	LLD<7.33E-04		LLD<7.33E-04		185.71	
~~U-235A~~	~~4.99E-03~~	~~+-1.02E-03~~	~~4.99E-03~~	~~+-1.02E-03~~	~~185.71~~	~~1.46~~
U-235B	LLD<3.08E-03		LLD<3.08E-03		143.76	
U-237	LLD<1.95E-03		LLD<1.95E-03		208.00	
W-187	LLD<1.51E-03		LLD<1.51E-03		685.74	

BEST AVAILABLE COPY

XE-131M	LLD<1.91E-02	LLD<1.91E-02	163.98	
XE-133	LLD<8.71E-04	LLD<8.71E-04	81.00	
XE-133M	LLD<3.88E-03	LLD<3.88E-03	233.21	
XE-135	LLD<4.47E-04	LLD<4.47E-04	249.79	
XE-138	LLD<3.30E-03	LLD<3.30E-03	258.41	
Y-88	LLD<1.76E-04	LLD<1.76E-04	1836.06	
Y-91	LLD<1.28E-01	LLD<1.28E-01	1204.90	
Y-91M	LLD<8.43E-04	LLD<8.43E-04	555.60	
ZN-65	LLD<1.14E-03	LLD<1.14E-03	1115.55	
~~ZR-95~~	~~7.00E-03 +-8.65E-04~~	~~7.00E-03 +-8.65E-04~~	~~756.73~~	~~-0.17~~
			724.20	-1.14
ZR-97	LLD<4.95E-04	LLD<4.95E-04	743.33	
TOTAL	2.97E+00 +-7.57E-02	2.97E+00 +-7.57E-02		

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
*            G A M M A   S P E C T R U M   A N A L Y S I S            *
*                                                                     *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE **WHC-SD-WM-DP-045**
REV 1

222-S COUNTING ROOM WESTINGHOUSE HANFORD 23-OCT-92 12:20:37

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

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

ENVIRONMENTAL BACKGROUND SUBTRACTED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

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

SAMPLE DESCRIPTION: 42B47-A 22CC LIQ
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL230

COLLECT STARTED ON 16-OCT-92 AT 15:00:00

COLLECT LIVE TIME: 6000. SECONDS
REAL TIME: 6012. SECONDS
DEAD TIME: 0.20 %

DECAYED TO 258. DAYS, 3.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 24-SEP-92
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

BEST AVAILABLE COPY

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	98.80	49.14	2.18	3600.	927.	18.5	U-234
2	119.47	59.48	1.12	3181.	16379.	1.8	AM-241,U-237, EU-155
3	176.45	87.97	1.11	2399.	6237.	3.2	EU-155, EU-155A, PB-214X, TL-208X, CD-109, HF-175
4	244.55	122.02	1.15	2274.	4313.	4.2	SE-75,EU-152, CO-57, EU-154A
5	273.47	136.48	1.09	2449.	532.	27.1	SE-75,CO-57
6	332.20	165.84	1.11	1919.	2568.	6.0	U-237,BA-139, CE-139
7	559.14	279.32	1.43	1399.	456.	24.5	HG-203,SE-75
8	784.08	391.79	1.33	1223.	3191.	4.7	SN-113
9?	1022.10	510.82	1.42	911.	264.	43.5	RN-222,I-133, TL-208,NA-22, ZN-65,RH-106
10?	1028.55	514.04	1.42	873.	1438.	12.3	KR-85,SR-85
11	1219.33	609.45	1.38	879.	304.	31.5	BI-214A,
11B		609.19			244.	21.0	RU-103
12	1323.90	661.74	1.48	841.	11126.	2.0	CS-137
12B		661.41			162.	28.8	
13	1796.62	898.14	1.59	1004.	4078.	3.9	Y-88,RB-88
14	2347.01	1173.41	1.76	474.	8880.	2.2	CO-60
15	2665.59	1332.75	1.93	274.	7953.	2.3	CO-60
16	2922.30	1461.16	2.15	146.	1071.	7.1	K-40
16B		1460.58			1221.	5.5	
17	3530.48	1765.38	2.11	32.	82.	32.2	BI-214C
17B		1764.79			94.	25.0	
18	3673.07	1836.70	2.14	72.	2364.	4.2	RB-88,Y-88

BEST AVAILABLE COPY

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

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

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

[illegible] HOOD [illegible] HANFORD 20-OCT-92 11:20:37

SAMPLE: 42847-A 2000 LIU
DATA COLLECTED ON 16-OCT-92 AT 15:00:00
DECAYED TO 259. DAYS. 3.0000 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 (MEV) EXPECT	DIFF
AM-241	2.77E-02	+-6.94E-04	2.78E-02	+-6.95E-04	100	59.54	-0.[illegible]
CD-109	9.92E-02	+-4.04E-03	1.46E-01	+-5.95E-03	94	88.03	-0.17
CO-57	3.10E-03	+-1.56E-04	5.99E-03	+-3.01E-04	101	122.06	-0.04
CE-139	2.09E-03	+-1.57E-04	7.67E-03	+-5.77E-04	99	165.85	-0.01
HG-203	4.50E-04	+-1.46E-04	2.09E-02	+-6.80E-03	99	279.20	0.12
SR-113	6.50E-03	+-4.16E-04	3.08E-02	+-1.97E-03	100	291.67	0.03
SR-85	2.40E-03	+-3.06E-04	3.79E-02	+-4.83E-03	110	513.99	0.07
CS-137	2.50E-02	+-7.00E-04	2.54E-02	+-7.11E-04	100	661.65	0.09
Y-88	1.03E-02	+-4.71E-04	3.62E-02	+-2.52E-03	97	898.04	0.10
CO-60	2.69E-02	+-7.34E-04	2.95E-02	+-8.06E-04	100	1173.24	0.18
CO-60	2.71E-02	+-7.98E-04	2.97E-02	+-8.65E-04	100	1332.50	0.25
Y-88	1.08E-02	+-6.42E-04	5.79E-02	+-3.43E-03	99	1836.06	0.[illegible]
TOTAL	2.40E-01	+-4.41E-03	4.76E-01	--1.14E-02			

STANDARD DEVIATION = 0.19

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.31E-10 UC/EA
TOTAL MEASURED ACTIVITY = 4.76E-01 (+-1.14E-02) UC/EA
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA

Calibration is OK.
A.K. Smith
10/28/92

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
98.80	49.14	927.	19.5	2.13E+01
273.47	136.49	532.	27.1	1.24E+01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1022.10	510.82	264.	43.5	1.59E+01
1219.33	609.45	304.	31.5	2.07E+01
1922.30	1461.16	1071.	7.1	1.47E+02
2330.49	1765.38	82.	33.3	1.34E+01

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Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-1211	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT-LIQ	LA-508-113	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

EDP E341 ENVAE

STD# 40B51 RESULT 6.464E-4

STD VAL %REC 101.96%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-22-93			6/10 SE Hogan

54-0600-061 (1-10-83)

BEST AVAILABLE COPY

SAMPLE POINT: ENV-STD.
LAB ID #: 8501
NUMBER OF ALIQUOTS: 3

	NET CPM	STANDARD DEV. CPM	CONCENTRATION RANGES (UCI/L) MEAN	UPPER	LOWER	DEVIATION* PER CENT	SCATTER ERROR
ALPHA:	175.927	4.233	6.464E -4	6.619E -4	6.308E -4	2.41	OK
BETA :	2430.820	86.003	7.523E -3	7.789E -3	7.257E -3	3.54	**

4-3-90
RAJones

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS

WHC-SD-WM-DP-045
REV 1

RADIONUCLIDE_Am-241 HALF LIFE_432 Yr TIME ZERO (HD)_____

COUNT TIME 5 MINUTES HANFORD DATE (HD) WHEN COUNTED 16626

DETECTOR NO. __9_____ BKG. _0.5_ C/M

STANDARD ID	SIZE	DATE	~~TIME~~ SCT INITS	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	04/03/90	RAJ	90084	90065	90124	92435
36B40B7	1	04/03/90	KK	159636	159606	157844	158346
36B40C7	1	04/03/90	KK	230125	230909	233449	234954
36B40A3	2	04/03/90	KK	63232	64299	63975	64099
36B40B3	2	04/03/90	KK	115406	115701	115536	116365
36B40C3	2	04/03/90	KK	160402	164159	160356	163648

BEST AVAILABLE COPY

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 9

TIME ZERO DATE (HD): 15897

RADIONUCLIDE: Am-241
HALF LIFE: 157784
COUNT TIME: 5
CPM BKG: 1

DATE COUNTED (HD): 16626

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

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	04/03/90		90084	90065	90124	92435
36B40B7	1	04/03/90		159636	159606	157844	158346
36B40C7	1	04/03/90		230125	230909	233449	234954
36B40A3	2	04/03/90		63232	64299	63975	64099
36B40B3	2	04/03/90		115406	115701	115536	116365
36B40C3	2	04/03/90		160402	164159	160356	163648

115

9130904.1004

RAJones
4-3-90

GRP
4/4/90

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A8	1"	60570	18134	1.00	18193	0.3004 ←
36B40B7	1"	109900	31771	1.00	31873	0.2900
36B40C7	1"	159700	46471	1.00	46620	0.2919
AVERAGE, 1" =		0.2941 +/- @95%		0.0108	3.67 %	ON 04/03/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	12779	1.00	12820	0.2074
36B40B3	2"	110700	23149	1.00	23224	0.2098
36B40C3	2"	161400	32427	1.00	32531	0.2016
AVERAGE, 2" =		0.2063 +/- @95%		0.0083	4.03 %	ON 04/03/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	-1	1.00	-1	-0.0000
36B40B6	5"	109800	-1	1.00	-1	-0.0000
36B40C5	5"	160100	-1	1.00	-1	-0.0000
AVERAGE, 5" =		-0.0000 +/- @95%		0.0000	-99.92 %	ON 04/03/90

5" det only
2" det only

NEW EFFS FOR DET 9 Am-241 1" = 0.2941 2" = 0.2063
5" = -0.0000

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COMPARISON TO 1988 1" = 0.2792
1" = 1.05 HIGHER NOW 2" = 0.1833
2" = 1.13 HIGHER NOW

4-4-90 RAJ
calculator Calc'n 36B40A8 $\frac{\bar{x}(4)}{5} = 18135.4 \pm 234.5$ c/m by HP 97

$18135 - 1\ c/m = 18134 \times e^{+\left[\ln 2 \times \frac{(16626 - 15897)}{157784}\right]} = 18192.57 = 18193$

$\frac{18193\ c/m}{60570\ d/m} = 0.3004$

9313090.1045

Original Card was not received
J P Webb
08/24/93

#5 5315

Serial No	Sample Point	Date	Time Issued	Priority
S 5340.-3336	SHIFT STD'S	4- 1-93	0:57	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/L	STD	0

Sample Size	Customer ID
100-10-200 +100λ SPIKE	

Remarks/Calculations, Results:
SPIKE #: 64843 Std 63843
SPIKE VOL. 100 mL Value 1.3050 +2
%Rec. 102.68%

ACID ADJ
~~CON~~ HNO3 ML 1 1.34E+2 uCi/L
SM.
~~2.67E+1 uCi/L~~
NW 4/23/93

5.6770-01 ***
3.9760-01 ***
3.9750+02 ***
1.3360+02 ***

Jeff Schlack

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	D H Milburn	L Raymond		
Hrs	Hrs	Hrs	Hrs	Hrs
		4.21.93		

Date	Time Completed	Lab Unit Mgr
4-20-93	4-24-93 0615	D Hanahe

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

BEST AVAILABLE COPY

#1 4-21-93 DM

$\frac{7270}{30} - 4$

$$\frac{(0.5877)(3.99360E^{+3})(0.1)(505)\frac{MW}{423}}{(0.3976)(2220)(1.00467)}$$

$2.67312E^{+1}$

D. H. Milicia
4-22-93

WHC-SD-WM-DP-045
REV 1

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
S-5340-3336
File ID: SD5315.SPC

Counted on: 4/21/93 @20: 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	2143.2	2179.1	364.890	364.890	16.000	9.705	8.000	4.411
2	62.7	64.0	306.526	306.526	24.000	12.515	12.000	4.721
3	419.9	0.0	267.809	267.809	12.000	12.123	6.000	6.102
4	3470.4	3447.1	233.597	233.597	20.000	9.555	10.000	5.330
5	7.0	7.2	25.375	25.375	20.000	9.599	10.000	14.290

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm244	0.3976	5.796	5.789	0.007	0.05	38.25	191.65	0.863E-04
	Cm243		5.786	5.789	-0.003				0.118E-03
2	Pu238	0.0135	5.499	5.515	-0.016	0.06	1.30	9.07	0.409E-05
	Am241		5.480	5.515	-0.035				0.313E-05
3		0.0000		5.333		0.06	0.00	0.00	0.000E+00
4	Pu239	0.5877	5.143	5.172	-0.029	0.04	56.54	283.27	0.128E-03
	Pu240		5.144	5.172	-0.028				0.128E-03
5	U 238	0.0011	4.200	4.194	0.006	0.05	0.11	0.70	0.314E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.074 + (0.0047)*Channel
Energy range (MeV): 4.074 TO 6.481
Efficiency = 0.1996 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	48615.0	100.000
Smoothed	48614.5	99.999
Composite fit	48102.8	98.946
Residuals	511.6	1.052

Analyzed by: [redacted]

SPECTRUM SD5315.SPC
1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 11056.3

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Raw Data Dump for AEA Spectrum: SP:SD5315.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	1.	2.	0.	2.	2.	6.
21	4.	6.	4.	3.	3.	3.	4.	5.	3.	1.
31	1.	1.	1.	0.	0.	0.	0.	1.	1.	1.
41	0.	2.	0.	0.	0.	0.	0.	0.	1.	0.
51	2.	1.	0.	1.	0.	1.	1.	1.	0.	1.
61	0.	2.	0.	0.	0.	1.	1.	1.	0.	0.
71	0.	1.	1.	3.	1.	0.	0.	1.	1.	0.
81	0.	0.	0.	1.	0.	0.	1.	0.	2.	2.
91	1.	1.	0.	0.	1.	0.	0.	0.	0.	0.
101	0.	2.	0.	0.	2.	1.	3.	2.	1.	0.
111	0.	3.	0.	1.	0.	0.	1.	1.	3.	1.
121	2.	1.	4.	0.	0.	2.	0.	3.	2.	4.
131	3.	2.	1.	1.	2.	2.	0.	4.	1.	2.
141	2.	3.	2.	2.	3.	1.	3.	2.	4.	2.
151	3.	2.	4.	2.	0.	2.	5.	1.	1.	9.
161	3.	7.	0.	8.	3.	7.	2.	8.	1.	3.
171	6.	7.	7.	5.	5.	8.	7.	6.	6.	9.
181	12.	13.	7.	12.	14.	17.	5.	15.	12.	16.
191	13.	14.	17.	19.	13.	16.	13.	17.	27.	21.
201	20.	20.	22.	27.	26.	39.	37.	48.	46.	52.
211	85.	72.	86.	144.	168.	194.	213.	296.	387.	435.
221	531.	628.	697.	852.	948.	1069.	1272.	1470.	1632.	1754.
231	2057.	2098.	2099.	2016.	1731.	1489.	1202.	832.	529.	374.
241	224.	106.	63.	28.	13.	5.	4.	3.	0.	5.
251	0.	4.	4.	10.	8.	9.	3.	9.	17.	7.
261	10.	9.	18.	21.	20.	21.	28.	19.	17.	17.
271	15.	6.	13.	4.	5.	2.	3.	4.	3.	2.
281	3.	2.	3.	2.	5.	4.	3.	10.	7.	7.
291	8.	13.	8.	16.	19.	23.	23.	20.	28.	25.
301	31.	35.	35.	34.	35.	35.	36.	37.	28.	27.
311	21.	15.	13.	11.	11.	10.	6.	6.	8.	4.
321	10.	7.	14.	7.	13.	20.	11.	14.	19.	20.
331	10.	16.	21.	15.	19.	18.	24.	25.	19.	41.
341	30.	48.	64.	95.	109.	126.	158.	205.	250.	278.
351	327.	410.	501.	576.	652.	672.	783.	813.	892.	958.
361	992.	1138.	1270.	1276.	1264.	1229.	1007.	804.	623.	414.
371	257.	149.	88.	36.	13.	4.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
421	0.	1.	0.	[illegible]	2.	0.	1.	0.	0.	2.
431	0.	1.	0.	0.	1.	0.	0.	0.	1.	1.
441	1.	0.	0.	0.	0.	1.	1.	0.	0.	0.
451	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.
471	0.	0.	0.	0.	2.	2.	2.	1.	5.	0.
481	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
511	0.	0.								

4.4 8993

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-3336	H&RWC	4-12-93	13: 2	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/g	VOGEL	0

Sample Size	Customer ID
100-10-50	0066WQL

Remarks, Calculations, Results: .5161g To 50ml

SPIKE #: 64843
SPIKE VOL. 100ml

$^{239}Pu = 8.31$ dpm/g

ACID ADJ
~~CON HNO3~~ ML 1M/8M HNO_3
pH 2.
4/20/93

$$\frac{.5096\,(225.54)(1000)(2020)}{.3943\,(2.22\times10^6)} = \frac{4.97\times10^1\ uCi/L}{10.322\ g/L} = 4.62\times10^1\ uCi/g$$

Analyst - 1	Analyst - 2	Analyst - 3		Analyst - 5
[redacted]	D. Hamilton		[redacted]	
Hrs	Hrs	Hrs	Hrs	Hrs
			4.21.93	

Date	Time Completed	Lab Unit Mgr	
4-20-93			4/27

54-6800-06 (R-10-83)

#1 4-21-93 DM

E8607-3336

$\frac{12875}{30} - 4$

$$\frac{\left[(85.33)(.0986) - (2.265)(.8262)\right](2020)(1000)}{.8262\ (2.22\times10^6)} = \frac{8.57\times10^1\ uCi/L}{10.322\ g/L} = 8.31\ uCi/g$$

Raymond 4-21-93

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
E8607-3336
File ID: SD8993.SPC

Counted on: 4/21/93 @ 9: 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	5120.5	4959.5	365.639	365.639	16.000	6.239	8.000	4.057
2	1230.3	1209.2	311.199	311.199	16.000	7.148	8.000	4.614
3	213.1	53.3	272.340	272.340	12.000	6.843	6.000	4.335
4	6327.0	6223.8	236.311	236.311	20.000	7.661	10.000	5.431
5	13.3	9.7	150.179	150.179	24.000	61.728	12.000	9.476
6	10.6	10.0	20.225	20.225	16.000	5.410	8.000	10.521

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm244	0.3843	5.796	5.781	0.015	0.03	66.84	327.66	0.148E-03
	Cm243		5.786	5.781	0.005				0.202E-03
2	Pu238	0.0986	5.499	5.525	-0.026	0.03	17.15	116.76	0.526E-04
3		0.0043		5.342		0.03	0.75	3.67	0.165E-05
4	Pu239	0.5096	5.143	5.173	-0.030	0.04	88.65	434.53	0.196E-03
	Pu240		5.144	5.173	-0.029				0.196E-03
5	Np237	0.0026	4.640	4.768	-0.128	0.29	0.46	37.24	0.168E-04
	Np237		4.781	4.768	0.013				0.116E-05
6		0.0006		4.157		0.03	0.11	0.54	0.245E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.062 + (0.0047)*Channel
Energy range (MeV): 4.062 TO 6.468
Efficiency = 0.2040 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	87658.0	100.000
Smoothed	87656.0	99.998
Composite fit	86975.8	99.222
Residuals	680.2	0.776

Analyzed by: [redacted]

```
          SPECTRUM SD8993.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC            22736.8

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Raw Data Dump for AEA Spectrum: SP:SD8993.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	6.	8.	11.	10.	7.
21	4.	1.	0.	4.	2.	0.	2.	1.	3.	1.
31	1.	0.	1.	0.	1.	0.	1.	0.	0.	0.
41	1.	0.	2.	0.	0.	2.	0.	1.	0.	0.
51	1.	1.	0.	0.	0.	1.	1.	0.	0.	0.
61	3.	0.	0.	0.	0.	0.	1.	0.	0.	0.
71	1.	0.	3.	1.	0.	0.	0.	0.	1.	0.
81	0.	0.	0.	0.	1.	2.	4.	0.	1.	1.
91	0.	0.	1.	3.	0.	2.	2.	2.	0.	1.
101	1.	1.	0.	0.	0.	2.	0.	1.	3.	1.
111	2.	2.	1.	2.	2.	1.	2.	2.	2.	3.
121	1.	3.	2.	1.	3.	1.	1.	1.	0.	2.
131	2.	2.	4.	0.	2.	1.	2.	0.	4.	5.
141	4.	6.	4.	10.	4.	9.	5.	8.	5.	7.
151	11.	5.	6.	7.	1.	2.	2.	1.	4.	1.
161	1.	1.	2.	2.	1.	4.	2.	2.	1.	5.
171	5.	1.	4.	3.	2.	2.	2.	2.	1.	3.
181	3.	7.	2.	3.	2.	1.	4.	2.	5.	2.
191	2.	9.	7.	5.	1.	5.	10.	6.	8.	9.
201	5.	9.	9.	13.	12.	23.	16.	20.	27.	23.
211	27.	31.	46.	48.	52.	76.	112.	162.	214.	287.
221	332.	443.	595.	669.	884.	968.	1185.	1417.	1685.	2043.
231	2469.	3005.	3534.	3898.	4137.	3942.	3722.	2917.	2260.	1499.
241	955.	472.	255.	100.	24.	9.	5.	3.	5.	4.
251	3.	5.	10.	5.	12.	10.	4.	14.	9.	15.
261	22.	14.	11.	13.	11.	12.	19.	28.	31.	44.
271	44.	52.	30.	24.	21.	16.	9.	6.	2.	6.
281	2.	6.	3.	5.	10.	6.	7.	4.	9.	10.
291	27.	28.	24.	32.	42.	75.	100.	90.	170.	190.
301	238.	274.	322.	340.	391.	466.	517.	609.	753.	827.
311	856.	731.	591.	381.	214.	116.	54.	31.	17.	12.
321	10.	5.	4.	4.	2.	6.	7.	3.	0.	6.
331	6.	8.	9.	10.	11.	9.	6.	21.	15.	19.
341	10.	19.	19.	33.	38.	44.	56.	89.	123.	162.
351	265.	400.	519.	729.	919.	1165.	1316.	1275.	1393.	1462.
361	1752.	2187.	2883.	3329.	3695.	3502.	2716.	1766.	879.	428.
371	131.	25.	5.	3.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	1.	0.	0.	1.	1.	3.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.
451	0.	0.	2.	1.	1.	3.	0.	2.	0.	0.
461	1.	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	2.	0.								

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	151	147	154	149	151	153	Out of Service			
DM / BG	Pu	110	229	229	228	232	227	231	233				
DATE	Am	136	302	301	300	304	300	303	308				
4-18-93	Cm	160	370	367	369	371	366	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	150	148	148	152	146	150	152				
DM / BG	Pu	110	229	226	228	231	225	230	233				
DATE	Am	136	302	297	300	303	297	302	307				
4-19-93	Cm	160	370	364	369	370	365	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	152	148	152	149	151	153				
DM / BG	Pu	110	229	230	229	231	228	230	233				
DATE	Am	136	303	302	301	303	300	302	307				
4-20-93	Cm	161	371	368	369	370	368	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	149	148	154	148	151	153				
DM / BG	Pu	110	229	227	228	232	226	230	234				
DATE	Am	136	301	299	301	304	298	303	308				
4-21-93	Cm	161	370	366	369	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	151	150	152	154				
DM / BG	Pu	110	229	228	229	230	228	232	235				
DATE	Am	136	302	299	301	302	301	304	309				
4-22-93	Cm	160	370	366	370	369	368	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	146	150	146	152	146	151	154				
DM / BG	Pu	110	226	228	226	230	225	230	234				
DATE	Am	137	299	301	299	302	297	302	308				
4-23-93	Cm	161	366	367	367	370	364	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

BEST AVAILABLE COPY

Original Card was not received L P Webb 08/24/93

3.3 3376 JSCR# 6239

Serial No	Sample Point	Date	Time Issued	Priority
S 4589.-3336	SHIFT STD'S	1- 1-93	23:49	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/L	STD	0

Sample Size	Customer ID
100-10-100 63B43	

Remarks, Calculations, Results:

SPIKE #: 64B43 Recovery 183.03%
SPIKE VOL. .1ml
R-211
Std Value 1.305+2
ACID ADJ
~~CON~~ HNO3 ML 1
8m

0.3394 ***
0.2553 ***
392.1252 ***
2.3885+02 ***

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]	Em Burela	[illegible]	D Williams
Hrs	Hrs	Hrs	Hrs	Hrs
		5-11-93		

Date	Time Completed	Lab Unit Mgr	
5-10-93	5-11-93 00 45	0125	

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

#1 5-11-93

$\frac{101}{5} - 6$

9313090.1058

O. H. Williams
5-11-93

WHC-SD-WM-DP-045
REV 1

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
S4589-3336
File ID: SD3376.SPC

Counted on: 5/11/93 @10: 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	46.8	49.2	364.994	364.994	24.000	17.137	12.000	2.694
2	80.6	82.3	304.787	304.787	20.000	16.327	10.000	2.701
3	66.2	70.0	231.851	231.851	28.000	20.820	14.000	3.881

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.2535	5.756	5.772	-0.016	0.08	1.69	8.56	0.385E-05
	Cm243		5.786	5.772	0.014				0.518E-05
2	Pu238 Cm	0.4072	5.499	5.483	0.016	0.08	2.71	18.71	0.843E-05
	Am241		5.480	5.483	-0.003				0.646E-05
3	Pu239	0.3394	5.143	5.133	0.010	0.10	2.26	11.23	0.506E-05
	Pu240		5.144	5.133	0.011				0.506E-05

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	3417.0	100.000
Smoothed	3416.9	99.998
Composite fit	3331.9	97.510
Residuals	85.0	2.487

Analyzed by: [redacted]

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          SPECTRUM SD3376.SPC
I LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                306.8

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Raw Data Dump for AEA Spectrum: SP:SD3376.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
11	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
21	0.	0.	0.	0.	1.	1.	0.	0.	0.	1.
31	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	1.	0.	0.	1.	0.	0.	1.	1.	1.	3.
51	2.	0.	0.	1.	0.	0.	1.	0.	2.	2.
61	2.	0.	1.	0.	0.	0.	3.	0.	0.	2.
71	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	1.	2.	0.	1.	1.	0.	1.	0.	0.
101	1.	1.	0.	2.	2.	2.	1.	1.	0.	0.
111	0.	0.	1.	1.	2.	0.	1.	1.	1.	2.
121	0.	1.	0.	1.	1.	1.	1.	0.	2.	0.
131	3.	0.	1.	0.	1.	3.	0.	0.	0.	0.
141	2.	0.	1.	1.	1.	2.	0.	1.	1.	1.
151	0.	0.	0.	0.	1.	2.	1.	0.	2.	3.
161	1.	1.	4.	0.	1.	4.	0.	3.	2.	2.
171	1.	1.	1.	2.	1.	3.	2.	2.	1.	0.
181	1.	1.	1.	3.	5.	7.	4.	5.	4.	5.
191	3.	6.	5.	9.	6.	6.	7.	7.	2.	7.
201	12.	7.	15.	14.	8.	8.	9.	11.	9.	21.
211	19.	22.	19.	20.	31.	23.	27.	15.	21.	31.
221	29.	26.	24.	30.	50.	26.	36.	28.	40.	41.
231	38.	28.	42.	31.	34.	31.	28.	25.	19.	17.
241	17.	24.	14.	9.	12.	4.	1.	2.	4.	3.
251	8.	3.	6.	4.	5.	6.	6.	6.	6.	10.
261	9.	7.	8.	10.	6.	7.	7.	9.	13.	10.
271	10.	12.	13.	11.	12.	11.	16.	17.	16.	14.
281	14.	14.	19.	12.	18.	19.	24.	24.	22.	30.
291	30.	33.	32.	34.	45.	39.	34.	35.	41.	36.
301	38.	44.	41.	45.	57.	45.	38.	30.	42.	24.
311	20.	18.	24.	16.	7.	10.	10.	5.	10.	4.
321	12.	3.	2.	4.	4.	3.	3.	3.	7.	7.
331	3.	2.	5.	8.	6.	6.	7.	11.	9.	9.
341	6.	8.	13.	13.	12.	13.	24.	14.	16.	16.
351	20.	21.	10.	15.	24.	24.	23.	23.	20.	27.
361	27.	20.	19.	20.	18.	33.	29.	21.	19.	20.
371	14.	8.	6.	9.	6.	6.	3.	2.	2.	2.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
401	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	0.	0.	0.	2.	0.
431	0.	1.	0.	0.	1.	0.	1.	0.	0.	0.
441	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
451	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	1.	1.	0.	1.	0.	0.	0.
471	0.	1.	1.	1.	2.	0.	2.	0.	0.	1.
481	0.	1.	2.	2.	1.	0.	2.	2.	4.	0.
491	2.	1.	1.	0.	0.	1.	0.	0.	0.	0.
511	0.	0.								

3.2 2953

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-3336	H&RWC	4-12-93	13: 2	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/L	VOGEL	1

Sample Size	Customer ID
100-10-50	00AAWQL

Remarks, Calculations, Results:
SPIKE #: 64B43 .5161g to 50mL
SPIKE VOL. .1 ml
2.73x10^1 uCi/g
ACID ADJ
CON HNO3 ML 1
.4409 (392.24)(1000)(2020) / .5561 (2.22x10^6) = 2.81x10^2 uCi/L / 10.322 g/L =

SUPER SUPER RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]	[redacted]	[redacted]	
Hrs	Hrs	Hrs	Hrs	Hrs
		5-11-93		

Date	Time Completed	Lab Unit Mgr
5-10-93	5-11-93 0045	0130

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

WHC-SD-WM-DP-045
REV 1

#1 5-11-93 E8607-3336

1294/5 -6

Pu^{238}

unable to determine

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
E-8607-3336
File ID: SD2953.SPC

Counted on: 5/11/93 @10: 0
Detector/Geometry number: 2/ 1
Count time: 20004. 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	1088.4	1143.7	361.249	361.249	28.000	25.806	14.000	4.782
2	855.7	890.4	227.694	227.694	28.000	23.778	14.000	4.147

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.5591	5.756	5.757	-0.001	0.12	58.50	339.75	0.153E-03
	Cm243		5.786	5.757	0.029				0.205E-03
2	Pu239	0.4409	5.143	5.143	0.000	0.11	46.13	262.54	0.118E-03
	Pu240		5.144	5.143	0.001				0.118E-03

DETECTOR CALIBRATION
Energy(MEV) = 4.095 + (0.0046)*Channel
Energy range (MeV): 4.095 TO 6.451
Efficiency = 0.1757 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	35353.0	100.000
Smoothed	35350.9	99.994
Composite fit	34383.0	98.671
Residuals	467.8	1.323

Analyzed by: [redacted]

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          SPECTRUM SD2953.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                4086.2

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Raw Data Dump for AEA Spectrum: SP:SD2953.SPC

1	0.	0.	0.	0.	0.	3.	0.	2.	0.	0.
11	1.	0.	3.	3.	2.	0.	0.	1.	2.	2.
21	2.	2.	2.	0.	0.	0.	3.	2.	2.	5.
31	3.	0.	1.	1.	1.	2.	2.	3.	1.	1.
41	3.	1.	4.	0.	4.	2.	4.	2.	0.	2.
51	1.	3.	3.	2.	4.	1.	3.	2.	2.	3.
61	3.	2.	0.	3.	1.	4.	2.	2.	2.	7.
71	3.	4.	3.	3.	2.	4.	6.	4.	5.	5.
81	3.	3.	5.	4.	5.	5.	2.	3.	3.	2.
91	8.	4.	3.	5.	2.	0.	4.	4.	3.	4.
101	3.	5.	9.	7.	5.	6.	3.	5.	3.	7.
111	8.	11.	6.	8.	8.	5.	4.	6.	8.	4.
121	10.	9.	5.	3.	6.	8.	13.	10.	7.	8.
131	10.	8.	12.	12.	5.	16.	13.	13.	10.	18.
141	12.	11.	22.	12.	10.	16.	9.	13.	18.	19.
151	22.	13.	13.	16.	21.	23.	30.	24.	18.	20.
161	23.	24.	25.	25.	22.	33.	38.	42.	32.	37.
171	41.	23.	42.	36.	32.	47.	39.	53.	62.	56.
181	53.	48.	64.	53.	60.	69.	71.	58.	70.	107.
191	90.	65.	113.	93.	102.	98.	108.	117.	119.	156.
201	164.	173.	184.	220.	177.	172.	205.	231.	240.	232.
211	262.	277.	291.	275.	298.	315.	348.	381.	365.	414.
221	406.	436.	437.	429.	447.	473.	426.	455.	400.	446.
231	408.	396.	336.	302.	271.	235.	195.	176.	131.	83.
241	76.	75.	48.	34.	18.	25.	14.	10.	20.	8.
251	10.	7.	10.	9.	9.	9.	5.	9.	8.	12.
261	11.	6.	13.	11.	15.	12.	7.	8.	7.	20.
271	13.	18.	11.	12.	21.	7.	18.	20.	17.	16.
281	11.	22.	11.	16.	18.	25.	26.	23.	27.	32.
291	20.	31.	31.	26.	29.	29.	37.	35.	39.	48.
301	36.	37.	45.	39.	47.	36.	45.	56.	53.	37.
311	60.	47.	61.	53.	59.	67.	70.	85.	65.	84.
321	78.	85.	105.	128.	100.	81.	111.	120.	110.	139.
331	129.	156.	140.	179.	182.	219.	213.	220.	221.	233.
341	272.	270.	286.	323.	329.	342.	398.	401.	411.	459.
351	478.	482.	475.	513.	575.	543.	553.	555.	566.	541.
361	578.	573.	517.	533.	521.	478.	430.	402.	387.	331.
371	282.	196.	177.	128.	94.	75.	42.	43.	30.	15.
381	14.	10.	2.	4.	4.	0.	1.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	2.	1.	0.	1.	2.	0.	1.	0.	0.	0.
481	1.	1.	0.	0.	1.	0.	1.	0.	1.	1.
491	0.	1.	0.	0.	0.	0.	1.	0.	0.	0.
511	0.	0.								

9313090.1065

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	151	149	150	154	151	152	154	out of Service			
AJ C/G	Pu	110	230	228	230	233	230	231	234				
DATE	Am	137	304	300	302	305	302	303	309				
5-5-93	Cm	161	372	367	371	372	370	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	153	148	153	150	152	153	out of Service			
AJ C/G	Pu	110	229	231	228	231	229	231	233				
DATE	Am	136	301	302	300	304	302	302	308				
5-6-93	Cm	160	369	369	368	371	369	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	148	148	148	152	148	147	151	out of Service			
AJ C/G	Pu	109	227	226	227	230	227	227	231				
DATE	Am	135	300	296	299	302	300	299	306				
5-7-93	Cm	159	367	362	366	370	367	366	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	152	150	153	150	153	154				
EMB A/G	Pu	110	229	230	231	231	228	233	235				
DATE	Am	136	302	302	303	302	300	304	309				
5-8-93	Cm	160	370	369	371	370	368	372	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	79	147	149	148	150	148	149	150				
EMB A/G	Pu	107	228	225	228	229	226	230	233				
DATE	Am	133	300	295	300	300	200	300	302				
5-9-93	Cm	158	368	365	369	370	367	370	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	151	153	150	155	148	153	154				
EMB A/G	Pu	111	231	231	230	233	226	232	235				
DATE	Am	137	304	303	303	305	299	303	309				
5-10-93	Cm	162	372	370	371	372	366	371	372				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

BEST AVAILABLE COPY

Original Card was not received.
JMWebb
8/24/93

4.4 8996

Serial No	Sample Point	Date	Time Issued	Priority
S 5336.-4822	SHIFT STD'S	4- 1-93	0:55	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/L	STD	0

Sample Size	Customer ID
100-10-1ML #63B43	

Remarks, Calculations, Results
SPIKE #:58B43
SPIKE VOL. 100ul
(R201)
ACID ADJ
~~CON~~ HNO3 ML 1
8M

Stdvalue: 2.6821E+1
% Rec: 72.32%
WR# 9193

Result: 1.94E+1 uCi/L

Analyst - 1	Analyst - 2	[redacted]	Analyst - [redacted]	Analyst - 5
[redacted]	[redacted]	Wagymond	D. H. Milne	
Hrs	Hrs	Hrs	Hrs	Hrs
		4.21.93		

Date	Time Completed	Lab Unit Mgr
4-21-93	0407 4/21/93	REWright

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

#1 VR 4-21-93

$$\frac{9401}{30} - 4$$

$$\frac{(555)(2.547E^{-3})(.1)(1000)(101)}{726} =$$

$$1.9398E^{+1}$$

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

Rwilkins 4-22-93

SAMPLE
S-5336-4822
File ID: SD8996.SPC

Counted on: 4/22/93 @ 6: 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	1055.4	1113.6	297.078	297.078	40.000	39.448	20.000	2.178
2	780.5	880.0	254.717	254.717	32.000	16.151	16.000	1.342
3	19.8	20.3	27.325	27.325	16.000	2.965	8.000	9.693

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Th228	0.6550	5.430	5.456	-0.026	0.19	90.39	691.51	0.311E-03
	Am241		5.480	5.456	0.024				0.235E-03
2	Am243	0.3438	5.234	5.257	-0.023	0.08	47.44	2342.54	0.106E-02
3	U 238	0.0012	4.200	4.188	0.012	0.01	0.17	1.18	0.530E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.059 + (0.0047)*Channel
Energy range (MeV): 4.059 TO 6.466
Efficiency = 0.1841 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	65887.0	100.000
Smoothed	65887.0	100.000
Composite fit	68997.0	104.720
Residuals	-3110.0	-4.720

Analyzed by: [redacted]

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          SPECTRUM SD8996.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                5399.5

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Raw Data Dump for AEA Spectrum: SP:SD8996.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	7.	8.	9.	10.	17.	10.
21	14.	21.	26.	19.	29.	32.	24.	22.	10.	24.
31	12.	16.	10.	7.	4.	1.	0.	3.	6.	3.
41	0.	1.	2.	1.	2.	2.	5.	8.	12.	13.
51	13.	13.	6.	7.	8.	7.	7.	6.	7.	12.
61	6.	13.	12.	10.	9.	7.	5.	8.	7.	5.
71	14.	14.	12.	9.	9.	11.	13.	8.	7.	5.
81	9.	4.	1.	12.	15.	14.	17.	25.	13.	17.
91	29.	18.	9.	7.	11.	27.	18.	20.	26.	26.
101	13.	19.	18.	30.	20.	24.	29.	23.	33.	17.
111	28.	34.	32.	37.	33.	43.	21.	41.	39.	40.
121	46.	41.	33.	42.	40.	46.	53.	39.	55.	46.
131	55.	46.	55.	50.	61.	48.	61.	60.	58.	60.
141	65.	67.	55.	72.	86.	65.	77.	87.	78.	68.
151	75.	95.	95.	93.	85.	104.	96.	97.	91.	116.
161	77.	92.	84.	111.	114.	101.	116.	135.	108.	119.
171	117.	132.	130.	141.	146.	145.	151.	165.	143.	192.
181	182.	166.	187.	168.	168.	182.	198.	197.	216.	204.
191	197.	239.	228.	237.	235.	262.	241.	234.	265.	275.
201	298.	283.	288.	304.	319.	291.	312.	334.	296.	367.
211	352.	380.	366.	347.	352.	392.	353.	404.	435.	436.
221	433.	437.	454.	474.	442.	504.	499.	497.	494.	519.
231	542.	523.	552.	528.	553.	582.	593.	602.	622.	571.
241	637.	632.	620.	640.	673.	649.	678.	626.	636.	704.
251	683.	736.	688.	676.	687.	704.	649.	713.	634.	627.
261	597.	585.	544.	480.	516.	417.	374.	397.	384.	357.
271	416.	397.	406.	419.	419.	441.	417.	433.	396.	425.
281	444.	511.	471.	438.	491.	499.	487.	517.	533.	555.
291	555.	482.	551.	521.	509.	542.	552.	566.	470.	515.
301	520.	528.	501.	482.	521.	448.	405.	345.	302.	254.
311	199.	149.	120.	94.	83.	60.	42.	33.	30.	26.
321	7.	7.	5.	1.	1.	1.	0.	0.	0.	0.
331	0.	0.	0.	1.	0.	0.	4.	0.	1.	0.
341	0.	1.	0.	1.	3.	1.	1.	1.	1.	2.
351	1.	1.	1.	4.	1.	2.	3.	0.	1.	2.
361	1.	0.	2.	0.	1.	1.	2.	2.	1.	1.
371	2.	0.	0.	0.	0.	0.	0.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	[illegible]
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	1.	0.	2.	0.	0.	0.	2.	1.	0.	2.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
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.								

2893

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-4822	H&RWC	4-12-93	13: 2	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/Kg	VOGEL	0

Sample Size	Customer ID
100-10-50	0066WQL

Remarks, Calculations, Results: .5161g to 50ml
SPIKE #:58B43
SPIKE VOL. 100 ul

ACID ADJ
~~CON HNO3~~ ML 1ml 8M HNO_3
J.G.2.
4/20/93

$$\frac{778(685.5)(2020)(1000)}{1064(2.22\times10^{6})} = \frac{326\times10^{2}\,uCi/L}{10.322\,g/L} = 365\pm10\ uCi/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]	Raymond	D Hamilton	
Hrs	Hrs	Hrs 4.21.93	Hrs	Hrs
Date 4-21-93	Time Completed 4/21/93	Lab Unit Mgr		

54-6600-061 (4-10-83)

#2 VR 4.21.93

E8607-4822

7175/30 - 2

D. H. Milbrin
4-22-93

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
E8607-4822 H&RWC/AM
File ID: SD2893.SPC

Counted on: 4/21/93 022: 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	5.5	4.9	481.921	481.921	20.000	11.953	10.000	3.404
2	17.6	13.5	355.408	355.408	28.000	45.593	14.000	3.404
3	1365.8	1374.2	300.730	300.730	28.000	21.487	14.000	5.168
4	1834.5	1875.4	254.544	254.544	28.000	18.651	14.000	4.492
5	9.2	7.8	155.934	155.934	20.000	42.072	10.000	4.080
6	3.0	2.0	98.067	98.067	16.000	41.173	8.000	4.109

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1		0.0012		6.309		0.05	0.11	0.51	0.228E-06
2	Ra224	0.0097	5.680	5.727	-0.047	0.21	0.90	4.31	0.194E-05
	Pu236		5.756	5.727	0.029				0.186E-05
3	Am241	0.4253	5.480	5.475	0.005	0.10	39.45	188.90	0.851E-04
	Pu238		5.499	5.475	0.024				0.111E-03
4	Am243	0.5582	5.234	5.263	-0.029	0.09	51.78	2118.65	0.954E-03
5	Np237	0.0045	4.781	4.809	-0.028	0.19	0.42	2.18	0.982E-06
6		0.0011		4.543		0.19	0.10	0.45	0.201E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.092 + (0.0046)*Channel
Energy range (MeV): 4.092 TO 6.447
Efficiency = 0.2222 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	46231.0	100.000
Smoothed	46231.0	100.000
Composite fit	46386.1	100.335
Residuals	-155.1	-0.336

Analyzed by: _____
VR

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          SPECTRUM SD2893.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                7333.4

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Raw Data Dump for AEA Spectrum: SP:SD2893.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
11	0.	1.	4.	0.	2.	2.	0.	0.	1.	0.
21	2.	0.	1.	1.	0.	2.	1.	2.	1.	2.
31	1.	1.	1.	0.	0.	2.	0.	1.	0.	1.
41	2.	1.	0.	1.	4.	0.	2.	0.	3.	5.
51	1.	2.	1.	1.	2.	0.	1.	1.	4.	2.
61	0.	3.	0.	1.	1.	3.	1.	1.	0.	1.
71	0.	2.	1.	2.	1.	1.	2.	2.	1.	1.
81	0.	0.	1.	0.	1.	5.	0.	3.	3.	3.
91	1.	3.	3.	1.	1.	0.	5.	4.	3.	1.
101	1.	3.	0.	1.	2.	1.	2.	1.	1.	2.
111	2.	2.	4.	2.	3.	3.	0.	1.	4.	3.
121	4.	1.	0.	1.	0.	1.	2.	2.	5.	3.
131	1.	8.	4.	6.	2.	4.	1.	1.	1.	2.
141	5.	4.	5.	1.	4.	6.	6.	8.	4.	2.
151	6.	8.	10.	4.	5.	8.	9.	5.	5.	5.
161	3.	5.	7.	5.	3.	5.	3.	6.	6.	11.
171	8.	8.	8.	10.	8.	9.	4.	8.	14.	5.
181	11.	16.	13.	17.	11.	13.	16.	15.	17.	24.
191	23.	24.	19.	21.	32.	23.	33.	30.	32.	26.
201	28.	37.	39.	51.	43.	46.	46.	60.	58.	66.
211	49.	88.	88.	75.	84.	87.	94.	95.	118.	114.
221	117.	121.	137.	181.	201.	181.	198.	202.	217.	247.
231	298.	257.	337.	302.	343.	367.	455.	436.	450.	564.
241	540.	587.	667.	702.	738.	791.	866.	863.	935.	970.
251	944.	1055.	997.	1064.	1017.	956.	892.	834.	750.	686.
261	617.	484.	400.	390.	341.	253.	248.	204.	214.	196.
271	168.	149.	136.	145.	173.	173.	168.	206.	224.	206.
281	209.	260.	271.	315.	316.	344.	373.	416.	415.	472.
291	526.	585.	601.	610.	665.	660.	682.	778.	758.	744.
301	721.	679.	681.	601.	531.	507.	394.	420.	312.	250.
311	229.	197.	141.	126.	92.	61.	34.	32.	29.	20.
321	11.	13.	8.	8.	7.	2.	3.	2.	3.	0.
331	1.	2.	3.	1.	3.	1.	5.	5.	1.	8.
341	3.	6.	7.	9.	4.	2.	9.	7.	6.	9.
351	8.	12.	7.	7.	10.	12.	10.	5.	11.	1.
361	5.	6.	2.	10.	4.	9.	2.	2.	2.	2.
371	2.	3.	2.	1.	1.	1.	1.	0.	0.	0.
381	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	1.	0.	1.	1.
401	1.	1.	0.	2.	0.	2.	1.	0.	0.	1.
411	2.	0.	1.	1.	0.	0.	0.	0	1.	1.
421	0.	0.	0.	0.	0.	3.	1.	3.	0.	1.
431	0.	3.	1.	2.	1.	1.	0.	0.	1.	0.
441	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
451	0.	0.	1.	0.	0.	0.	0.	1.	1.	0.
461	0.	0.	0.	0.	2.	0.	2.	1.	0.	0.
471	1.	2.	2.	2.	2.	1.	0.	5.	4.	3.
481	2.	4.	3.	3.	1.	1.	2.	1.	0.	2.
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
S-5336-4822
File ID: SD8996.SPC

Rwilli
4-22-93

Counted on: 4/22/93 @ 6: 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	1055.4	1113.6	297.078	297.078	40.000	39.448	20.000	2.178
2	780.5	880.0	254.717	254.717	32.000	16.151	16.000	1.342
3	19.8	20.3	27.325	27.325	16.000	2.965	8.000	9.693

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Th228	0.6550	5.430	5.456	-0.026	0.19	90.39	691.51	0.311E-03
	Am241		5.480	5.456	0.024				0.235E-03
2	Am243	0.3438	5.234	5.257	-0.023	0.08	47.44	2342.54	0.106E-02
3	U 238	0.0012	4.200	4.188	0.012	0.01	0.17	1.18	0.530E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.059 + (0.0047)*Channel
Energy range (MeV): 4.059 TO 6.466
Efficiency = 0.1841 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	65887.0	100.000
Smoothed	65887.0	100.000
Composite fit	68997.0	104.720
Residuals	-3110.0	-4.720

Analyzed by: [redacted]

```
          SPECTRUM SD8996.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC              5399.5

.
3.
1
1
1
1
1
 1
.1
21
21
2.1
2.1
.2.1
.2.1.
..2.1.
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..2..1..
...2.1...
.....21....
.....2.1.....
.....21.....
.....2.....
.....2.....
.....12.....
.....1..2.....
.....1....2.....
.....1.....2.....
.....1.....2.....
.....1.....2.....
.....21.....
.....2.....1.....
.....1
.....1
..... 1
.....1
.....1....
..... 1
.. 1
```

Raw Data Dump for AEA Spectrum: SP:SD8996.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	7.	8.	9.	10.	17.	10.
21	14.	21.	26.	19.	29.	32.	24.	22.	10.	24.
31	12.	16.	10.	7.	4.	1.	0.	3.	6.	3.
41	0.	1.	2.	1.	2.	2.	5.	8.	12.	13.
51	13.	13.	6.	7.	8.	7.	7.	6.	7.	12.
61	6.	13.	12.	10.	9.	7.	5.	8.	7.	5.
71	14.	14.	12.	9.	9.	11.	13.	8.	7.	5.
81	9.	4.	1.	12.	15.	14.	17.	25.	13.	17.
91	29.	18.	9.	7.	11.	27.	18.	20.	26.	26.
101	13.	19.	18.	30.	20.	24.	29.	23.	33.	17.
111	28.	34.	32.	37.	33.	43.	21.	41.	39.	40.
121	46.	41.	33.	42.	40.	46.	53.	39.	55.	46.
131	55.	46.	55.	50.	61.	48.	61.	60.	58.	60.
141	65.	67.	55.	72.	86.	65.	77.	87.	78.	68.
151	75.	95.	95.	93.	85.	104.	96.	97.	91.	116.
161	77.	92.	84.	111.	114.	101.	116.	135.	108.	119.
171	117.	132.	130.	141.	146.	145.	151.	165.	143.	192.
181	182.	166.	187.	168.	168.	182.	198.	197.	216.	204.
191	197.	239.	228.	237.	235.	262.	241.	234.	265.	275.
201	298.	283.	288.	304.	319.	291.	312.	334.	296.	367.
211	352.	380.	366.	347.	352.	392.	353.	404.	435.	436.
1	433.	437.	454.	474.	442.	504.	499.	497.	494.	519.
1	542.	523.	552.	528.	553.	582.	593.	602.	622.	571.
241	637.	632.	620.	640.	673.	649.	678.	626.	636.	704.
251	683.	736.	688.	676.	687.	704.	649.	713.	634.	627.
261	597.	585.	544.	480.	516.	417.	374.	397.	384.	357.
271	416.	397.	406.	419.	419.	441.	417.	433.	396.	425.
281	444.	511.	471.	438.	491.	499.	487.	517.	533.	555.
291	555.	482.	551.	521.	509.	542.	552.	566.	470.	515.
301	520.	528.	501.	482.	521.	448.	405.	345.	302.	254.
311	199.	149.	120.	94.	83.	60.	42.	33.	30.	26.
321	7.	7.	5.	1.	1.	1.	0.	0.	0.	0.
331	0.	0.	0.	1.	0.	0.	4.	0.	1.	0.
341	0.	1.	0.	1.	3.	1.	1.	1.	1.	2.
351	1.	1.	1.	4.	1.	2.	3.	0.	1.	2.
361	1.	0.	2.	0.	1.	1.	2.	2.	1.	1.
371	2.	0.	0.	0.	0.	0.	0.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	1.	0.	2.	0.	0.	0.	2.	1.	0.	2.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 2

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	10	
TODAY'S DATE:	08/20/92	
DECAY CORR'N:	2.557	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

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DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	151	147	154	149	151	153	Out of Service			
DM / BG	Pu	110	229	229	228	232	227	231	233				
DATE	Am	136	302	301	300	304	300	303	308				
4-18-93	Cm	160	370	367	369	371	366	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	150	148	148	152	146	150	152				
DM / BG	Pu	110	229	226	228	231	225	230	233				
DATE	Am	136	302	297	300	303	297	302	307				
4-19-93	Cm	160	370	364	369	370	365	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	152	148	152	149	151	153				
DM / BG	Pu	110	229	230	229	231	228	230	233				
DATE	Am	136	303	302	301	303	300	302	307				
4-20-93	Cm	161	371	368	369	370	368	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	149	148	154	148	151	153				
DM / BG	Pu	110	229	227	228	232	226	230	234				
DATE	Am	136	301	299	301	304	298	303	308				
4-21-93	Cm	161	370	366	369	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	151	150	152	154				
DM / BG	Pu	110	229	228	229	230	228	232	235				
DATE	Am	136	302	299	301	302	301	304	309				
4-22-93	Cm	160	370	366	370	369	368	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	146	150	146	152	146	151	154				
DM / BG	Pu	110	226	228	[illegible]	230	225	230	234				
DATE	Am	137	299	301	299	302	297	[illegible]02	308				
4-23-93	Cm	161	366	367	367	370	364	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-3801	H&RWC	4-12-93	13: 2	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr89/90	LA-223-101	uCi/Kg	VOGEL	1

Sample Size	Customer ID
100 MT 100	0066WQL

Remarks, Calculations, Results

SEP DATE= 4-23-93
SEP TIME- 0710

$\frac{2.03 \times 10^2 uC/L}{10.322 g/L} = 2.08 \times 10^1 uC/g$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-24-93			4/27/93

54-6800-061 (4-10-83)

WHC-SD-WM-DP-045
REV 1

11 1" 4-24-93 VR 0330 1530 ΔT 8.33

20379/10 - 20 DF 10

23558/10 R8607-3801 MF 4

MTF 10

Sr Calculation by VR on 04-24-1993 at 18:40:58
Det #11 1 -inch mount Sr eff : .4899 Y eff : .5469

Sample size : .1 mL Dilution : 10 Method : 4

Mount # 1 Decay time = 8.33 hrs

20379
---------- - 20.0 = 6.7702E+02 uCi/L strontium
10

Mount # 2 Decay time = 8.33 hrs

23558
---------- - 20.0 = 7.8368E+02 uCi/L strontium
10

$\bar{X} = 7.3035 \times 10^2$

Original Card was not received
L.N. Webb 8/24/93

Serial No	Sample Point	Date	Time Issued	Priority
S 5336.-9374	SHIFT STD'S	4- 1-93	0:55	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-223-101	uCi/L	STD	0

Sample Size	Customer ID
50 MF#4 MT100	

Remarks, Calculations, Results

S374 BE25-2

STD# 57851-1 RESULT 2.4130+4

STD VAL 2.43+4 %REC 99.30

Sept. Time 0650 Date 4-1-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	4-24-93			

Date	Time Completed	Lab Unit Mgr
4-24-93	1442	4-24-93 2350 D. Donahue

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

11 1" 4-24.93R 1635

$\frac{353729}{10}$ - 20

$\frac{376095}{10}$

ΔT 9.75
D.F. 20
M.F. 4
MTF. 10

Sr Calculation by VR on 04-24-1993 at 18:35:37
Det #11 1 -inch mount Sr eff : .4899 Y eff : .5469

Sample size : .1 mL Dilution : 20 Method : 4

Mount # 1 Decay time = 9.75 hrs

$\frac{353729}{10}$ - 20.0 = 2.3390E+04 uCi/L strontium

Mount # 2 Decay time = 9.75 hrs

$\frac{376095}{10}$ - 20.0 = 2.4870E+04 uCi/L strontium

06/14/89 Det 11 Sry-90 ratios

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5219	0.4899	0.5469

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.4181	0.3919	0.4443

Esr = .4899/.5219 = 0.9387 , 1"

Ey = .5469/.5219 = 1.0479 , 1"

Esr = .3919/.4181 = 0.9373 , 2"

Ey = .4443/.4181 = 1.0627 , 2"

RATIOS GENERATED USING PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK RHO-QA-NB-47, VOL 4: PAGES 31-36.

RJJones
11-18-92

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9315090.1082

K-AREA BASINS

CUSTOMER ID NUMBER 0069WQL

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Serial No	Sample Point	Date	Time Issued	Priority
E 8608.-4461	H&RWC	4-12-93	12:58	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
U-SOIL	LA-925-107	G/G	PC41G	0

Sample Size: G OF SAMPLE 9m/+2.186m/Pb/H

Customer ID: 0069WQL

Remarks, Calculations, Results:

spike ID/Val = 90133/6.25E-4 (50-10-50 sample size)

$\frac{.50(6.25\times10^{-4})(.1)(4020)(1.243)}{\frac{5.65}{3.65}(.80)-.50} = 4.97\times10^{-1}$ g4/L

.50
.80

9.92 g/L = 5.00×10^{-2} g4/g sample

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-19-93	15:15		4/27 SE Hogan

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

Serial No	Sample Point	Date	Time Issued	Priority
E 8608.-1001	H&RWC	4-12-93	12:58	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LA-519-151	NONE	PC41G	0

Sample Size: ?

Customer ID: 0069WQL

Remarks, Calculations, Results:

Sample or Tank ID?
Color and Est Vol?
Clarity?
Solids y/n
Phases?
OTR or CPM ?

1.0521g Total wt

RUSH

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

Date	Time Completed	Lab Unit Mgr	
			4/6/SE Hogan

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

Original card titles not received.
L Nelle 8/24/93

Serial No.	Sample Point	Date	Time Issued	Priority
S 5340.-9267	SHIFT STD'S	4- 1-93	0:57	26

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

Sample Size	Customer ID
100-10-100	

Remarks, Calculations, Results:

9267 UF1C
STD# RESULT 3.17×10^{-2} .16
STD VAL 3.04×10^{-2} %REC 104.3 .47
SPIKE ID/VAL 90B38 / 6.25E-4
SPIKE %CL. 126B38 104.28%

$$\frac{.16\,(6.25\times10^{-4})(.1)(1000)}{\frac{5.7}{5.6}(.47) - .16} = 3.17\times10^{-2}$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-19-93	11:40	[illegible]	[illegible]

54-6808-061 (R-10-83)

4951

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-2162	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-LIQ	LA-548-121	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

36651 ENVSTD
EDP E345 / CS137 1.59E-2 92.98% Li 500
EDP E346 / CO60 3.24E-2 98.48%
EDP E349 / AM241

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93		

54-5800-069 (R-10-83)

BEST AVAILABLE COPY

VKaymond 4-24-93

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

24-APR-9322:10:46

WHC-SD-WM-DP-045
REV 1

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 4 / GEOMETRY NUMBER: 61
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AND:
ANALYZED BY: VR

SAMPLE DESCRIPTION: E8501-2162 ENV/STD
GEOMETRY DESCRIPTION: 500 ML LIQ
SAMPLE SIZE: 5.0000E-01 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 24-APR-93 AT 21:20:16

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3021. SECONDS
DEAD TIME: 0.70 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

BEST AVAILABLE COPY

24-APR-9322:10:46

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	96.68	48.31	1.00	1263.	965.	11.7	U-234
2	1322.77	661.40	1.49	1479.	22010.	1.4	CS-137
2B		661.44			199.	5.8	
3	2345.24	1172.78	1.84	1053.	31246.	1.2	CO-60
4	2663.52	1331.98	1.98	224.	29195.	1.2	CO-60
5	2920.13	1460.34	1.86	104.	806.	8.0	K-40
5B		1460.67			769.	1.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-92 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

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24-APR-9322:10:46

SAMPLE: E8301-2162 ENV/STD

DATA COLLECTED ON 24-APR-93 AT 21:20:16

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

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/L				ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<4.28E-04		LLD<4.28E-04		911.07	
AC-228A	LLD<4.28E-04		LLD<4.28E-04		911.10	
AC-228B	LLD<4.57E-04		LLD<4.57E-04		338.40	
AG-108M	LLD<7.31E-05		LLD<7.31E-05		433.94	
AG-110M	LLD<3.36E-04		LLD<3.36E-04		657.76	
AM-241	LLD<5.46E-04		LLD<5.46E-04		59.54	
AM-243	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243A	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243B	LLD<2.30E-03		LLD<2.30E-03		43.10	
AR-41	LLD<6.98E-05		LLD<6.98E-05		1293.64	
AU-198	LLD<6.06E-05		LLD<6.06E-05		411.80	
BA-133	LLD<9.66E-05		LLD<9.66E-05		356.02	
BA-139	LLD<2.36E-04		LLD<2.36E-04		165.85	
BA-140	LLD<2.94E-04		LLD<2.94E-04		537.27	
BA-141	LLD<2.12E-04		LLD<2.12E-04		190.23	
BE-7	LLD<6.62E-04		LLD<6.62E-04		477.59	
BI-207	LLD<7.42E-05		LLD<7.42E-05		569.70	
BI-212	LLD<7.31E-04		LLD<7.31E-04		727.27	
BI-214	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214A	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214B	LLD<8.37E-04		LLD<8.37E-04		1120.28	
BI-214C	LLD<2.69E-04		LLD<2.69E-04		1764.31	
CD-109	LLD<1.54E-03		LLD<1.54E-03		88.03	
CE-144	LLD<3.23E-04		LLD<3.23E-04		133.51	
CE-137	LLD<5.33E-05		LLD<5.33E-05		165.85	
CE-141	LLD<7.41E-05		LLD<7.41E-05		145.44	
CEPR144	LLD<6.46E-04		LLD<6.46E-04		133.51	
CO-56	LLD<1.09E-04		LLD<1.09E-04		846.76	
CO-57	LLD<4.24E-05		LLD<4.24E-05		122.06	
CO-58	LLD<1.02E-04		LLD<1.02E-04		810.77	
CO-60	3.24E-02	+-1.24E-04	3.24E-02	+-1.24E-04	1332.50	-0.02
					1173.24	-0.42
CR-51	LLD<3.73E-04		LLD<3.73E-04		320.04	
CS-134	LLD<1.08E-04		LLD<1.08E-04		795.85	
CS-136	LLD<1.05E-04		LLD<1.05E-04		818.51	
CS-137	1.39E-02	+-1.06E-04	1.39E-02	+-2.46E-04	661.67	-0.02
CS-138	LLD<7.71E-05		LLD<7.71E-05		1435.85	
EU-152	LLD<1.83E-04		LLD<1.83E-04		1408.01	
EU-154	LLD<1.84E-04		LLD<1.84E-04		1274.42	
EU-154A	LLD<8.90E-05		LLD<8.90E-05		123.11	
EU-155	LLD<2.06E-04		LLD<2.06E-04		105.51	
FE-59	LLD<2.36E-04		LLD<2.36E-04		1099.17	
HF-181	LLD<8.23E-05		LLD<8.23E-05		482.10	
HG-203	LLD<8.37E-05		LLD<8.37E-05		279.20	
I-131	LLD<7.46E-05		LLD<7.46E-05		364.48	
I-132	LLD<8.56E-05		LLD<8.56E-05		667.69	
I-133	LLD<7.38E-05		LLD<7.38E-05		529.87	
I-134	LLD<1.57E-04		LLD<1.57E-04		847.00	
I-135	LLD<1.20E-04		LLD<1.20E-04		1260.41	
I-40	LLD<8.03E-04		LLD<8.03E-04		1460.75	
KR-85	LLD<1.61E-02		LLD<1.61E-02		513.99	
KR-85M	LLD<7.88E-05		LLD<7.88E-05		151.17	
[illegible]	[illegible]		[illegible]		[illegible]	

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KR-89	LLD<2.78E-03	LLD<2.78E-03	720.90
LA-140	LLD<4.05E-05	LLD<4.05E-05	1396.20
LA-142	LLD<1.86E-04	LLD<1.86E-04	641.83
MN-54	LLD<1.05E-04	LLD<1.05E-04	834.83
MN-56	LLD<1.23E-04	LLD<1.23E-04	846.76
NA-22	LLD<6.06E-05	LLD<6.06E-05	1274.55
NA-24	LLD<3.99E-05	LLD<3.99E-05	1368.60
NB-94	LLD<8.48E-05	LLD<8.48E-05	702.63
NB-95	LLD<9.24E-05	LLD<9.24E-05	765.78
NB-97	LLD<4.07E-04	LLD<4.07E-04	637.92
NP-237	LLD<4.61E-04	LLD<4.61E-04	86.50
NP-238	LLD<4.63E-04	LLD<4.63E-04	984.45
NP-239	LLD<3.60E-04	LLD<3.60E-04	277.60
PA-233	LLD<1.62E-04	LLD<1.62E-04	311.96
PA-234M	LLD<2.19E-02	LLD<2.19E-02	1001.03
PB-210	LLD<1.28E-02	LLD<1.28E-02	46.50
PB-212	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212A	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212B	LLD<1.72E-03	LLD<1.72E-03	300.10
PB-214	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214A	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214B	LLD<2.75E-04	LLD<2.75E-04	295.21
PO-210	LLD<8.39E+00	LLD<8.39E+00	804.00
PO-214	LLD<9.36E-01	LLD<9.36E-01	799.70
PO-216	LLD<4.95E+00	LLD<4.95E+00	804.90
PU-239	LLD<6.11E-01	LLD<6.11E-01	129.30
PU-241	LLD<1.94E+01	LLD<1.94E+01	148.37
RA-224	LLD<1.32E-03	LLD<1.32E-03	240.99
RA-226	LLD<1.24E-03	LLD<1.24E-03	186.10
RB-88	LLD<4.26E-04	LLD<4.26E-04	1836.00
RB-89	LLD<3.63E-04	LLD<3.63E-04	1031.88
RN-220	LLD<6.40E-02	LLD<6.40E-02	549.73
RU-103	LLD<7.34E-05	LLD<7.34E-05	497.08
RURH106	LLD<1.50E-03	LLD<1.50E-03	621.80
SB-124	LLD<7.46E-05	LLD<7.46E-05	602.72
SB-125	LLD<2.19E-04	LLD<2.19E-04	427.89
SB-125A	LLD<2.19E-04	LLD<2.19E-04	427.89
SC-46	LLD<1.25E-04	LLD<1.25E-04	1120.45
SE-75	LLD<6.34E-05	LLD<6.34E-05	764.66
SN-113	LLD<9.33E-05	LLD<9.33E-05	391.67
SR-89	LLD<7.07E-05	LLD<7.07E-05	913.98
SR-91	LLD<1.18E-04	LLD<1.18E-04	633.60
SR-92	LLD<3.19E-05	LLD<3.19E-05	1383.94
TA-182	LLD<3.78E-04	LLD<3.78E-04	1131.50
TC-99M	LLD<4.22E-05	LLD<4.22E-05	140.51
TE-123M	LLD<4.46E-05	LLD<4.46E-05	159.00
TE-125M	LLD<1.52E-02	LLD<1.52E-02	109.27
TE-132	LLD<3.90E-05	LLD<3.90E-05	208.10
TH-228	LLD<4.93E-03	LLD<4.93E-03	84.37
TH-229	LLD<1.94E-03	LLD<1.94E-03	86.44
TH-229B	LLD<2.24E-03	LLD<2.24E-03	137.02
TH-229C	LLD<7.73E-04	LLD<7.73E-04	193.78
TH-234	LLD<8.96E-04	LLD<8.96E-04	72.70
TH-234A	LLD<8.96E-04	LLD<8.96E-04	92.30
TH-234B	LLD<3.92E-03	LLD<3.92E-03	83.39
TL-208	LLD<8.08E-05	LLD<8.08E-05	588.14
U-232	LLD<1.33E-01	LLD<1.33E-01	270.18
U-233	LLD<3.01E-05	LLD<3.01E-05	183.71
U-233A	LLD<3.01E-05	LLD<3.01E-05	183.71
U-233B	LLD<3.76E-04	LLD<3.76E-04	143.76
U-237	LLD<2.05E-04	LLD<2.05E-04	708.00
W-187	LLD<2.90E-04	LLD<2.90E-04	681.74
XE-131M	LLD<2.02E-03	LLD<2.02E-03	163.98
XE-133	LLD<1.79E-04	LLD<1.79E-04	81.00
XE-133M	LLD<3.14E-04	LLD<3.14E-04	233.21

WHC-SD-WM-DP-045
REV 1

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XE-138	LLD<4.37E-04	LLD<4.37E-04	238.41
Y-88	LLD<4.19E-05	LLD<4.19E-05	1836.06
Y-91	LLD<2.75E-02	LLD<2.75E-02	1204.90
Y-91M	LLD<8.90E-05	LLD<8.90E-05	555.60
ZN-65	LLD<2.56E-04	LLD<2.56E-04	1115.55
ZR-95	LLD<1.70E-04	LLD<1.70E-04	756.73
ZR-97	LLD<8.91E-05	LLD<8.91E-05	743.33
TOTAL	4.83E-02 +-4.82E-04	4.83E-02 +-4.82E-04	

STANDARD DEVIATION = 0.14

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RUN CALIB

WHC-SD-WM-DP-045
REV 1

CALIB -- Version 2.06

222-S COUNTING ROOM WESTINGHOUSE HANFORD

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```
CALC EFF
MCA UNIT NUMBER (2): 1
ADC UNIT NUMBER (1,0): 1
DETECTOR NUMBER (   12): 4
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 11-NOV-92
TIME COLLECT STARTED: 09:00
GEOMETRY NUMBER ( 12): 81
GEOMETRY DESCRIPTION: 500ML LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY;
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY;
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 481
GEB42-A 500ML LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :    1.00000
NUMBER OF POINTS:     12
ACTIVITY IN MICROCURIES (YES/NO): N

      PEAK     1
               ENERGY:      59.536
               ACTIVITY:    3.121000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   D158000
               DECAY TIME ( 0.000000E-01 MINS.):  1-FEB-92
               TIME OF SOURCE CALIBRATION:  12:00
               DECAY TIME:    4.087800E+05 MINS
      EFFICIENCY =  1.151452E-02 (+-  1.120572E-04)

      PEAK     2
               ENERGY:      88.034
               ACTIVITY:    1.753000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   D462.6
               DECAY TIME ( 4.087800E+05 MINS.):
      EFFICIENCY =  4.635223E-02 (+-  3.590011E-04)

      PEAK     3
               ENERGY:     122.061
               ACTIVITY:    1.597000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   D271.8
               DECAY TIME ( 4.087800E+05 MINS.):
      EFFICIENCY =  7.091829E-02 (+-  5.255987E-04)

      PEAK     4
               ENERGY:     165.853
               ACTIVITY:    1.940000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   D137.66
```


9313090.1096

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[illegible] EFFICIENCY COEFFICIENTS FOR: 1

LOG(EFF) = -6.383071E+01 + 2.261460E+01*LOG(E) - 2.592793E+00*LOG(E)^2

PEAK     5
         ENERGY:     279.197
         ACTIVITY:   5.435000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D[illegible]
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  5.099648E-02 (+-  3.270935E-03)

PEAK     6
         ENERGY:     391.868
         ACTIVITY:   4.201000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D115.09
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  4.175033E-02 (+-  3.169516E-04)

PEAK     7
         ENERGY:     513.990
         ACTIVITY:   1.063000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D64.84
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  3.316401E-02 (+-  5.326431E-04)

PEAK     8
         ENERGY:     661.650
         ACTIVITY:   6.921000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D11020
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.852897E-02 (+-  9.913940E-05)

PEAK     9
         ENERGY:     898.021
         ACTIVITY:   1.711000E+03
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D106.61
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.066866E-02 (+-  1.336644E-04)

PEAK    10
         ENERGY:    1173.240
         ACTIVITY:   9.279000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D1925.3
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.723549E-02 (+-  6.099883E-05)

PEAK    11
         ENERGY:    1332.500
         ACTIVITY:   9.284000E+02
         ACTIVITY ONE SIGMA:   0.000000E-01
         HALF-LIFE:  D1925.3
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.574303E-02 (+-  5.737485E-05)

PEAK    12
         ENERGY:    1836.130
         ACTIVITY:   1.813000E+03
         ACTIVITY ONE SIGMA:   0.000000E-01
```

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```
EFFICIENCY =  1.247290E-02 (+-  8.695036E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) =  9.202042E+01 - 6.132777E+01*LOG(E) + 1.500303E+01*LOG(E)^2
          - 1.634262E+00*LOG(E)^3 + 6.608717E-02*LOG(E)^4
```


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3938

Serial No.	Sample Point	Date	Time Issued	Priority
E 8608.-2172	H&RWC	4-12-93	12:58	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-SOIL	LA-548-121	~~pCi~~ mCi/gWETwt	PC41G	0

Sample Size	Customer ID
_____G OF SAMPLE	0069WQL

Remarks, Calculations, Results:

.4962 to 50mL mt 1m1

Am-241: $7.24\times10^{-1}\times\frac{50\text{ mL}}{.4962\text{ g}}$ = 72.95 mCi/g wet wt

Cs-137 : 4.34 × " = 437 E+6

Co-60 : $4.62\times10^{-2}\times$ " = 4.65 E+6

Cs-134 : $4.52\times10^{-2}\times$ " = 4.55 E+5

Eu-154 : $1.15\times10^{-1}\times$ " = 11.59 " 1.16 E+7

Eu-155 : $7.08\times10^{-2}\times$ " = 7.15 E+6

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4/14/93		4/16/93	4/19 SEHogan

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

See Back of the Card

E-8608-2172

Sb-125 : $2.23\times10^{-2}\times\frac{50\text{ mL}}{.4962\text{ g}}$ = 2.25 E+6 mCi/g wet wt

MN-54 <6.27 E-4 $\times\frac{50}{.4962}$ <6.32 E+4

WHC-SD-WM-DP-045
REV 1

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

WHC-SD-WM-DP-045
REV 1

222-S COUNTING ROOM WESTINGHOUSE HANFORD 16-APR-93 11:30:34

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

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

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

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

SAMPLE DESCRIPTION: E8608-2172
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-APR-93 AT 19:42:00

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3188. SECONDS
DEAD TIME: 5.90 %

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

ENERGY CALIBRATION PERFORMED 24-SEP-92
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1?	54.28	26.88	1.39	48885.	22360.	40.9	SB/TE-X
2?	59.55	29.52	1.39	50336.	30680.	33.0	
3?	64.27	31.88	1.39	51633.	200924.	7.3	
4?	73.09	36.29	1.39	54061.	47922.	23.4	TE-123M
5	85.73	42.61	1.42	38759.	27975.	2.2	U-233, EU/GD-X, AM-243S, PU-238
6?	98.23	48.86	1.81	115712.	6685.	16.7	U-234
7?	112.93	56.21	1.07	48232.	8152.	61.0	
8?	115.79	57.64	1.07	42593.	12045.	43.1	
9?	119.29	59.39	1.07	35689.	213667.	3.3	AM-241,U-237, EU-155
10C	145.78	72.63	1.16	30104.	2049.	16.7	PU-241,W-187,
10B		73.09			57.	37.3	TL-208X
11C	150.10	74.79	1.16	30340.	3676.	14.5	AM-243A,
11B		75.25			140.	29.8	PB-214X, PB-212X, TL-208X
12?	169.60	84.54	1.15	29876.	3580.	28.2	TH-234, TH-228, TL-208X
13?	173.32	86.40	1.15	29406.	20945.	5.7	CS-136, EU-155, EU-155A, PB-214X, TL-208X
14	210.79	105.14	1.10	28998.	12661.	4.0	PU-241, EU-155, EU-155B, NP-239
15	246.39	122.94	1.18	29649.	38632.	1.6	EU-152,CO-57, EU-154A
16N	370.25	184.87	2.12	78747.	2390.	15.9	U-235,RA-226
17N	373.13	186.31	2.12	82228.	3754.	14.8	U-235,RA-226
18N	377.50	188.49	2.12	87520.	3983.	14.7	
19	496.10	247.30	1.19	25066.	4674.	9.2	EU-154B
20	856.20	427.86	1.23	37439.	2314.	24.2	SB-125, SB-125B
21	1183.63	591.24	1.35	7566.	1351.	19.7	EU-154C
22C	1201.32	600.04	1.46	7030.	746.	26.0	SB-125, SB-125D
23C	1209.47	604.32	1.46	6988.	1108.	24.6	CS-134
24?	1316.77	658.17	1.62	9079.	4818.	70.6	AG-110M, NB-97
25?	1323.41	661.49	1.62	8417.	951247.	0.4	CS-137
25B		661.81			81.	28.8	
26	1385.09	692.34	1.67	3186.	789.	22.7	EU-154
27	1446.62	723.11	1.56	2614.	5278.	4.0	SB-124,I-131, AG-108, EU-154D, ZR-95
28	1513.74	756.67	1.82	1992.	1195.	12.6	ZR-95,EU-154
29	1591.73	795.62	1.60	1844.	877.	16.2	CS-134
30	1746.28	872.97	1.59	1661.	2746.	5.9	EU-154E,

BEST AVAILABLE COPY

9313190.1101

17

							RH-106
31	1992.37	996.05	1.80	1347.	2193.	6.7	EU-154F
32	2009.27	1004.50	1.89	1389.	3816.	4.4	EU-154G, EU-152
33	2346.21	1173.01	1.86	646.	7660.	2.5	CO-60
34	2548.53	1274.20	2.07	348.	6236.	2.7	EU-154, EU-154H, NA-22
35	2664.61	1332.27	2.11	248.	6785.	2.5	CO-60
36	2921.05	1460.53	2.45	72.	535.	10.0	K-40
36B		1460.58			611.	5.5	
37	3193.08	1596.60	2.06	54.	278.	14.8	LA-140, EU-154[

WHC-SD-WM-DP-045
REV 1

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
N - MULTIPLET ANALYSIS DID NOT CONVERGE
? - MULTIPLET ANALYSIS CONVERGED BUT GFIT > 4
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK001Z
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 15-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

9313090.1102

BEST AVAILABLE COPY

222-S COUNTING ROOM WESTINGHOUSE HANFORD 16-APR-93 11:30:34

WHC-SD-WM-DP-045
REV 1

SAMPLE: E8608-2172
DATA COLLECTED ON 14-APR-93 AT 19:42:00
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/EA MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<2.28E-03		LLD<2.28E-03		911.07	
AC-228A	LLD<2.28E-03		LLD<2.28E-03		911.10	
AC-228B	LLD<9.96E-03		LLD<9.96E-03		338.40	
AG-108M	LLD<1.93E-03		LLD<1.93E-03		433.94	
AG-110M	LLD<1.25E-02		LLD<1.25E-02		657.76	
AM-241	7.24E-01	+-2.71E-02	7.24E-01	+-2.71E-02	59.54	-0.15
~~AM-243~~	~~6.45E-03~~	~~+-9.81E-04~~	~~6.45E-03~~	~~+-9.81E-04~~	~~74.67~~	~~0.12~~
~~AM-243A~~	~~6.45E-03~~	~~+-9.81E-04~~	~~6.45E-03~~	~~+-9.81E-04~~	~~74.67~~	~~0.12~~
~~AM-243B~~	~~6.43E-01~~	~~+-4.27E-02~~	~~6.43E-01~~	~~+-4.27E-02~~	~~43.10~~	~~-0.[illegible]~~
AR-41	LLD<4.82E-04		LLD<4.82E-04		1293.64	
AU-198	LLD<1.68E-03		LLD<1.68E-03		411.80	
BA-133	LLD<1.90E-03		LLD<1.90E-03		356.02	
BA-139	LLD<3.58E-03		LLD<3.58E-03		165.85	
BA-140	LLD<5.34E-03		LLD<5.34E-03		537.27	
BA-141	LLD<4.09E-03		LLD<4.09E-03		190.23	
BE-7	LLD<1.87E-02		LLD<1.87E-02		477.59	
BI-207	LLD<1.09E-03		LLD<1.09E-03		569.70	
BI-212	LLD<1.17E-02		LLD<1.17E-02		727.27	
BI-214	LLD<2.33E-03		LLD<2.33E-03		609.32	
BI-214A	LLD<2.33E-03		LLD<2.33E-03		609.32	
BI-214B	LLD<4.32E-03		LLD<4.32E-03		1120.28	
BI-214C	LLD<1.53E-03		LLD<1.53E-03		1764.51	
CD-109	LLD<1.76E-02		LLD<1.76E-02		88.03	
CE 144	LLD<5.48E-03		LLD<5.48E-03		133.51	
CE-139	LLD<8.01E-04		LLD<8.01E-04		165.85	
CE-141	LLD<1.27E-03		LLD<1.27E-03		145.44	
CEPR144	LLD<1.10E-02		LLD<1.10E-02		133.51	
CO-56	LLD<6.59E-04		LLD<6.59E-04		846.76	
~~CO-57~~	~~5.56E-02~~	~~+-1.76E-03~~	~~5.56E-02~~	~~+-1.76E-03~~	~~122.06~~	~~-0.88~~
CO-58	LLD<6.61E-04		LLD<6.61E-04		810.75	
CO-60	4.62E-02	+-1.42E-03	4.62E-02	+-1.42E-03	1332.50	-0.23
					1173.24	-0.22
CR-51	LLD<1.01E-02		LLD<1.01E-02		320.09	
CS-134	4.52E-03	+-7.39E-04	4.52E-03	+-7.39E-04	795.84	-0.17
					604.70	-0.18
CS-136	LLD<6.48E-04		LLD<6.48E-04		818.51	
CS-137	4.34E+00	+-8.30E-02	4.34E+00	+-8.30E-02	661.65	-0.16
CS-138	LLD<5.43E-04		LLD<5.43E-04		1435.86	
EU-152	LLD<1.32E-03		LLD<1.32E-03		1408.01	
EU-154	1.15E-01	+-3.60E-03	1.15E-01	+-3.60E-03	1274.45	-0.25
EU-154A	1.18E-01	+-3.73E-03	1.18E-01	+-3.73E-03	123.10	-0.16
EU-155	7.08E-02	+-3.42E-03	7.08E-02	+-3.42E-03	105.31	-0.17
					86.54	-0.14
FE-59	LLD<1.23E-03		LLD<1.23E-03		1099.25	
HF-181	LLD<2.22E-03		LLD<2.22E-03		482.20	
HG-203	LLD<9.92E-04		LLD<9.92E-04		279.20	
I-131	LLD<1.64E-03		LLD<1.64E-03		364.48	
I-132	LLD<2.29E-03		LLD<2.29E-03		667.69	
I-133	LLD<1.59E-03		LLD<1.59E-03		529.69	
I-134	LLD<9.61E-04		LLD<9.61E-04		847.03	

Jf 4/16/93

Jf 4/16/93

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I-135	LLD<1.38E-03		LLD<1.38E-03		1260.41	
K-40	LLD<4.99E-03		LLD<4.99E-03		1460.75	
KR-85	LLD<3.45E-01		LLD<3.45E-01		513.99	
KR-85M	LLD<8.85E-04		LLD<8.85E-04		151.17	
KR-87	LLD<3.53E-03		LLD<3.53E-03		402.58	
KR-89	LLD<4.38E-02		LLD<4.38E-02		220.90	
LA-140	LLD<2.38E-04		LLD<2.38E-04		1596.20	
LA-142	LLD<2.55E-03		LLD<2.55E-03		641.83	
MN-54	LLD<6.27E-04		LLD<6.27E-04		834.83	
MN-56	LLD<7.49E-04		LLD<7.49E-04		846.76	
~~NA-22~~	~~4.08E-02~~	~~+-1.28E-03~~	~~4.08E-02~~	~~+-1.28E-03~~	~~1274.55~~	~~0.35~~
NA-24	LLD<3.18E-04		LLD<3.18E-04		1368.60	
NB-94	LLD<7.00E-04		LLD<7.00E-04		702.63	
NB-95	LLD<6.88E-04		LLD<6.88E-04		765.78	
~~NB-97~~	~~2.42E-02~~	~~+ 1.71E-02~~	~~2.42E-02~~	~~+ 1.71E-02~~	~~657.92~~	~~0.25~~
~~NP-237~~	~~2.00E-01~~	~~+-1.25E-02~~	~~2.00E-01~~	~~+-1.25E-02~~	~~86.50~~	~~-0.~~
NP-238	LLD<2.41E-03		LLD<2.41E-03		984.45	
NP-239	LLD<5.30E-03		LLD<5.30E-03		277.60	
PA-233	LLD<2.70E-03		LLD<2.70E-03		311.98	
PA-234M	LLD<2.71E-01		LLD<2.71E-01		1001.03	
PB-210	LLD<2.10E-02		LLD<2.10E-02		46.50	
PB-212	LLD<1.73E-03		LLD<1.73E-03		239.00	
PB-212A	LLD<1.72E-03		LLD<1.72E-03		239.00	
PB-212B	LLD<2.81E-02		LLD<2.81E-02		300.10	
PB-214	LLD<3.40E-03		LLD<3.40E-03		351.92	
PB-214A	LLD<3.40E-03		LLD<3.40E-03		351.92	
PB-214B	LLD<4.62E-03		LLD<4.62E-03		295.21	
PO-210	LLD<5.31E+01		LLD<5.31E+01		804.00	
PO-214	LLD<7.99E+00		LLD<7.99E+00		799.70	
PO-216	LLD<3.48E+01		LLD<3.48E+01		804.90	
PU-239	LLD<9.48E+00		LLD<9.48E+00		129.30	
PU-241	LLD<3.29E+02		LLD<3.29E+02		148.57	
RA-224	LLD<1.86E-02		LLD<1.86E-02		240.99	
~~RA-226~~	~~7.12E-02~~	~~+-1.55E-02~~	~~9.12E-02~~	~~+-1.55E-02~~	~~186.10~~	~~-1.23~~
RB-88	LLD<1.94E-03		LLD<1.94E-03		1836.00	
RB-89	LLD<3.13E-03		LLD<3.13E-03		1031.88	
RN-220	LLD<1.08E+00		LLD<1.08E+00		549.73	
RU-103	LLD<1.75E-03		LLD<1.75E-03		497.08	
RURH106	LLD<2.02E-02		LLD<2.02E-02		621.80	
SB-124	LLD<1.06E-03		LLD<1.06E-03		602.72	
SB-125	2.23E-02	+-5.48E-03	2.23E-02	+-5.48E-03	427.89	-0.03
					600.56	-0.12
SB-125A	2.23E-02	+-5.48E-03	2.23E-02	+-5.48E-03	427.89	-0.03
SC-46	LLD<6.13E-04		LLD<6.13E-04		1120.45	
SE-75	LLD<1.27E-03		LLD<1.27E-03		264.66	
SN-113	LLD<2.31E-03		LLD<2.31E-03		391.67	
SR-85	LLD<1.51E-03		LLD<1.51E-03		513.99	
SR-91	LLD<2.09E-03		LLD<2.09E-03		555.60	
SR-92	LLD<4.02E-04		LLD<4.02E-04		1383.94	
TA-182	LLD<1.80E-03		LLD<1.80E-03		1121.30	
TC-99M	LLD<7.98E-04		LLD<7.98E-04		140.51	
TE-123M	LLD<8.32E-04		LLD<8.32E-04		159.00	
TE-125M	LLD<2.26E-01		LLD<2.26E-01		109.27	
TE-132	LLD<8.49E-04		LLD<8.49E-04		228.16	
~~TH-228~~	~~3.41E-01~~	~~+-9.64E-02~~	~~3.41E-01~~	~~+-9.64E-02~~	~~84.37~~	~~0.17~~
~~TH-229~~	~~8.41E-01~~	~~+-5.23E-02~~	~~8.41E-01~~	~~+-5.23E-02~~	~~86.44~~	~~-0.04~~
TH-229B	LLD<3.82E-02		LLD<3.82E-02		137.02	
TH-229C	LLD<1.96E-02		LLD<1.96E-02		193.59	
TH-234	LLD<9.57E-03		LLD<9.57E-03		92.50	
TH-234A	LLD<9.57E-03		LLD<9.57E-03		92.50	
TH-234B	LLD<2.96E-02		LLD<2.96E-02		63.30	
TL-208	LLD<1.22E-03		LLD<1.22E-03		583.14	
U-232	LLD<1.97E+00		LLD<1.97E+00		270.26	
U-235	LLD<1.45E-03		LLD<1.45E-03		185.71	
~~U-235A~~	~~5.91E-03~~	~~+-1.01E-03~~	~~5.91E-03~~	~~+-1.01E-03~~	~~185.71~~	~~0.85~~
U-235B	LLD<5.81E-03		LLD<5.81E-03		143.76	

WHC-SD-WM-DP-045
REV 1

BEST AVAILABLE COPY

U-237	LLD<3.79E-03	LLD<3.79E-03	208.00	
W-187	LLD<2.74E-03	LLD<2.74E-03	685.74	
XE-131M	LLD<3.70E-02	LLD<3.70E-02	163.98	
XE-133	LLD<1.48E-03	LLD<1.48E-03	81.00	
XE-133M	LLD<7.43E-03	LLD<7.43E-03	233.21	
XE-135	LLD<8.07E-04	LLD<8.07E-04	249.79	
XE-138	LLD<6.65E-03	LLD<6.65E-03	258.41	
Y-88	LLD<1.76E-04	LLD<1.76E-04	1836.06	
Y-91	LLD<1.55E-01	LLD<1.55E-01	1204.90	
Y-91M	LLD<1.61E-03	LLD<1.61E-03	555.60	
ZN-65	LLD<1.31E-03	LLD<1.31E-03	1115.55	
~~ZR-95~~	~~9.32E-03 +-1.19E-03~~	~~9.32E-03 +-1.19E-03~~	~~756.73~~	~~-0.05~~
			724.20	-1.09
ZR-97	[illegible]		743.33	

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

WHC-SD-WM-DP-045
REV 1

222-S COUNTING ROOM WESTINGHOUSE HANFORD 23-OCT-92 12:20:37

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

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

ENVIRONMENTAL BACKGROUND SUBTRACTED
MEASURED ENERGY DIFFERENCES LISTED
MULTIPLET ANALYSIS PERFORMED

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

SAMPLE DESCRIPTION: 42B47-A 22CC LIQ
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E+00 EA / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL230

COLLECT STARTED ON 16-OCT-92 AT 15:00:00

COLLECT LIVE TIME: 6000. SECONDS
REAL TIME: 6012. SECONDS
DEAD TIME: 0.20 %

DECAYED TO 258. DAYS, 3.0000 HOURS BEFORE THE START OF COLLECT

ENERGY CALIBRATION PERFORMED 24-SEP-92
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	98.80	49.14	2.18	3600.	927.	18.5	U-234
2	119.47	59.48	1.12	3181.	16379.	1.8	AM-241,U-237, EU-155
3	176.45	87.97	1.11	2399.	6237.	3.2	EU-155, EU-155A, PB-214X, TL-208X, CD-109, HF-175
4	244.55	122.02	1.15	2274.	4313.	4.2	SE-75,EU-152, CO-57, EU-154A
5	273.47	136.48	1.09	2449.	532.	27.1	SE-75,CO-57
6	332.20	165.84	1.11	1919.	2568.	6.0	U-237,BA-139, CE-139
7	559.14	279.32	1.43	1399.	456.	24.5	HG-203,SE-75
8	784.08	391.79	1.33	1223.	3191.	4.7	SN-113
9?	1022.10	510.82	1.42	911.	264.	43.5	RN-222,I-133, TL-208,NA-22, ZN-65,RH-106
10?	1028.55	514.04	1.42	873.	1438.	12.3	KR-85,SR-85
11	1219.33	609.45	1.38	879.	304.	31.5	BI-214A,
11B		609.19			244.	21.0	RU-103
12	1323.90	661.74	1.48	841.	11126.	2.0	CS-137
12B		661.41			162.	28.8	
13	1796.62	898.14	1.59	1004.	4078.	3.9	Y-88,RB-88
14	2347.01	1173.41	1.76	474.	8880.	2.2	CO-60
15	2665.59	1332.75	1.93	274.	7953.	2.3	CO-60
16	2922.30	1461.16	2.15	146.	1071.	7.1	K-40
16B		1460.58			1221.	5.5	
17	3530.48	1765.38	2.11	32.	82.	32.2	BI-214C
17B		1764.79			94.	25.0	
18	3673.07	1836.70	2.14	72.	2364.	4.2	RB-88,Y-88

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

BEST AVAILABLE COPY

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

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

GRC-E COUNTING ROOM ACCOUNT-1298 HANFORD 22-OCT-92 12:20:37

WHC-SD-WM-DP-045
REV 1

SAMPLE: 42847-A 2000 LIQ
DATA COLLECTED ON 16-OCT-92 AT 15:00:00
DECAYED TO 259. DAYS: 3.0000 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 (MEV) EXPECT	DIFF
AM-241	2.77E-02	+-6.94E-04	2.78E-02	+-6.95E-04	100	59.54	-0.08
CD-109	9.92E-02	+-4.04E-03	1.46E-01	+-5.95E-03	94	88.03	-0.17
CO-57	3.10E-03	+-1.56E-04	5.99E-03	+-3.01E-04	101	122.06	-0.04
CE-139	3.09E-03	+-1.57E-04	7.67E-03	+-3.77E-04	99	165.85	-0.01
HG-203	4.50E-04	+-1.46E-04	2.09E-02	+-6.80E-03	99	279.20	0.12
SN-113	6.50E-03	+-4.16E-04	3.08E-02	+-1.97E-03	100	391.67	0.03
SR-85	2.40E-02	+-3.06E-04	3.79E-02	+-4.83E-03	110	513.99	0.05
CE-137	2.50E-02	+-7.00E-04	2.54E-02	+-7.11E-04	100	661.65	0.09
Y-88	1.05E-02	+-4.71E-04	3.62E-02	+-2.52E-03	97	898.04	0.10
CO-60	2.69E-02	+-7.34E-04	2.95E-02	+-8.06E-04	100	1173.24	0.18
CO-60	2.71E-02	+-7.88E-04	2.97E-02	+-8.65E-04	100	1332.50	0.05
Y-88	1.08E-02	+-6.42E-04	5.79E-02	+-3.43E-03	99	1836.06	0.54
TOTAL	2.42E-01	+-4.41E-03	4.76E-01	+-1.14E-02			

STANDARD DEVIATION = 0.19

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.31E-10 UC/EA
TOTAL MEASURED ACTIVITY = 4.76E-01 (+-1.14E-02) UC/EA
TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA

Calibration is ok.
A.K. Dodd
10/28/92

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
98.80	49.14	927.	18.5	2.13E+01
273.47	136.48	532.	27.1	1.24E+01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1022.10	510.92	264.	43.5	1.59E+01
1219.33	609.45	304.	31.5	2.07E+01
2922.30	1461.16	1071.	7.1	1.47E+02
3530.48	1765.38	32.	33.3	1.34E+01

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Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-1211	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT-LIQ	LA-508-113	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

EDP E341 ENVAB

STD# 40B51 RESULT 6.464E-4

STD VAL %REC 101.96%

Mary Tracy

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-22-93			6/10 SE Hogg

54-0800-061 (4-10-83)

SAMPLE POINT: ENV-STD.
LAB ID #: 8501
NUMBER OF ALIQUOTS: 3

	NET CPM	STANDARD DEV. CPM	CONCENTRATION RANGES (UCI/L) MEAN	UPPER	LOWER	DEVIATION PER CENT	SCATTER ERROR
ALPHA:	175.927	4.233	6.464E -4	6.619E -4	6.308E -4	2.41	OK
BETA :	2430.820	86.003	7.523E -3	7.789E -3	7.257E -3	3.54	**

Serial No	Sample Point	Date	Time Issued	Priority
E 8608.-1283	H&RWC	4-12-93	13: 3	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT-SOLDS	LA-508-101	uCi/g	PC41C	0

Sample Size	Customer ID
_____C OF SAMPLE 100-10-1 ml	0060WOL

Remarks, Calculations, Results

.4962 g to 50 mL mt ~~100ml~~ ~~5000~~ 4/14/93

1.61 E+2 uci/g

RUSH

Analyst - 1	Analyst - 2	Analyst - [redacted]	Analyst - 4	Analyst - 5
[redacted]	[redacted]	DHMilvia		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4/14/93			4/15

54-5800-011

9/1 4-14-93 DM E8608-1283.

51642 / 5

Alpha Calculation by DM on 04-14-1993 at 19:22:56
Det #9 1 -inch mount Alpha eff. : .2941
Sample size : .4962 g Dilution : 1

Mount # 1

51642 / 5 - 0.6 = 3.1879E-02 uCi/g alpha

X5050

WHC-SD-WM-DP-045
REV 1

4-3-90
RAJones

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS

RADIONUCLIDE_Am-241 HALF LIFE_432 Yr TIME ZERO (HD)_____

COUNT TIME 5 MINUTES HANFORD DATE (HD) WHEN COUNTED_16626__

WHC-SD-WM-DP-045

DETECTOR NO. __9_____ **REV 1** BKG. _0.5_ C/M

STANDARD ID	SIZE	DATE	~~TIME~~ SCT UNITS	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	04/03/90	RAJ	90084	90065	90124	92435
36B40B7	1	04/03/90	KK	159636	159606	157844	158346
36B40C7	1	04/03/90	KK	230125	230909	233449	234954
36B40A3	2	04/03/90	KK	63232	64299	63975	64099
36B40B3	2	04/03/90	KK	115406	115701	115536	116365
36B40C3	2	04/03/90	KK	160402	164159	160356	163643

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CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 9

TIME ZERO DATE (HD): 15897

RADIONUCLIDE: Am-241
HALF LIFE: 157784
COUNT TIME: 5
CPM BKG: 1

DATE COUNTED (HD): 16626

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

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	04/03/90		90084	90065	90124	92435
36B40B7	1	04/03/90		159636	159606	157844	158346
36B40C7	1	04/03/90		230125	230909	233449	234954
36B40A3	2	04/03/90		63232	64299	63975	64099
36B40B3	2	04/03/90		115406	115701	115536	116365
36B40C3	2	04/03/90		160402	164159	160356	163643

9130090.1112

RAJones
4-3-90

GRP
4/4/90

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY.
36B40A8	1"	60570	18134	1.00	18193	0.3004 ←
36B40B7	1"	109900	31771	1.00	31873	0.2900
36B40C7	1"	159700	46471	1.00	46620	0.2919
AVERAGE, 1" =		0.2941	+/- @95%	0.0108	3.67 %	ON 04/03/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	12779	1.00	12820	0.2074
36B40B3	2"	110700	23149	1.00	23224	0.2098
36B40C3	2"	161400	32427	1.00	32531	0.2016
AVERAGE, 2" =		0.2063	+/- @95%	0.0083	4.03 %	ON 04/03/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	-1	1.00	-1	-0.0000
36B40B6	5"	109800	-1	1.00	-1	-0.0000
36B40C5	5"	160100	-1	1.00	-1	-0.0000
AVERAGE, 5" =		-0.0000	+/- @95%	0.0000	-99.92 %	ON 04/03/90

0 5" det only 5" det

NEW EFFS FOR DET 9 Am-241 1" = 0.2941 2" = 0.2063
5" = -0.0000

COMPARISON TO 1988 1" = 0.2792
1" = 1.05 HIGHER NOW 2" = 0.1833
2" = 1.13 HIGHER NOW

1-4-90 RAJ

alculator Calc'n 36B40A8 $\frac{\bar{x}(4)}{5} = 18135.4 \pm 234.5$ c/m by HP 97

$$18135 - 1\ c/m = 18134 \times e^{+\left[\frac{\ln 2 \times (16626 - 15897)}{157784}\right]} = 18192.57 = 18193$$

$$\frac{18193\ c/m}{60570\ d/m} = 0.3004$$

Original Card was not required
08/24/93

#5 5315

Serial No	Sample Point	Date	Time Issued	Priority
S 5340.-3336	SHIFT STD'S	4- 1-93	0:57	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/L	STD	0

Sample Size	Customer ID
100-10-200 +100λ SPIKE	

Remarks/Calculations, Results:

SPIKE #: 64843 STD 63843
SPIKE VOL. 100 ml. Value 1.3050 +2
%Rec. 102.68%

5.8770-01 ***
3.9760-01 ***
3.9750+02 ***
1.3366+02 ***

ACID ADJ
~~CON~~ HNO3 ML 1 ~~1.34E+2~~ uCi/L
8M.
~~2.67E+1 uCi/L~~
NW 4/28/93

Analyst - 1	Analyst - 2	[redacted]	Analyst - 4	Analyst - 5
[redacted]	D.H. Milburn	Raymond		
Hrs	Hrs	Hrs 4.21.93	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-20-93	4-21-93 0615	D Donahue

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

#1 4-21-93 DM

$\frac{7270}{30} - 4$

$$\frac{(0.5877)(3.99360E^{+3})(0.1)\cancel{(101)}\,(505)\,\frac{MW}{463}}{(0.3976)(\cancel{2220})(1.00467)}$$

$2.67312E^{+1}$

D.H. Milliken
4-22-93

WHC-SD-WM-DP-045
REV 1

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
S-5340-3336
File ID: SD5315.SPC

Counted on: 4/21/93 @20: 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	2143.2	2179.1	364.890	364.890	16.000	9.705	8.000	4.411
2	62.7	64.0	306.526	306.526	24.000	12.515	12.000	4.721
3	419.9	0.0	267.809	267.809	12.000	12.123	6.000	6.102
4	3470.4	3447.1	233.597	233.597	20.000	9.555	10.000	5.330
5	7.0	7.2	25.375	25.375	20.000	9.599	10.000	14.290

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm244	0.3976	5.796	5.789	0.007	0.05	38.25	191.65	0.863E-04
	Cm243		5.786	5.789	-0.003				0.118E-03
2	Pu238	0.0135	5.499	5.515	-0.016	0.06	1.30	9.07	0.409E-05
	Am241		5.480	5.515	-0.035				0.313E-05
3		0.0000		5.333		0.06	0.00	0.00	0.000E+00
4	Pu239	0.5877	5.143	5.172	-0.029	0.04	56.54	283.27	0.128E-03
	Pu240		5.144	5.172	-0.028				0.128E-03
5	U 238	0.0011	4.200	4.194	0.006	0.05	0.11	0.70	0.314E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.074 + (0.0047)*Channel
Energy range (MeV): 4.074 TO 6.481
Efficiency = 0.1996 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	48615.0	100.000
Smoothed	48614.5	99.999
Composite fit	48102.8	98.946
Residuals	511.6	1.052

Analyzed by: [redacted]

```
          SPECTRUM SD5315.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC              11056.3
```



```
5
5
4
....4
....................4
.............................................................4
.................................................................4
...............4.
.
2
2
2
2
1
. 1
..........1
...........................1..
.................................................1
.....................1
.1
```

Raw Data Dump for AEA Spectrum: SP:SD5315.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	1.	2.	0.	2.	2.	6.
21	4.	6.	4.	3.	3.	3.	4.	5.	3.	1.
31	1.	1.	1.	0.	0.	0.	0.	1.	1.	1.
41	0.	2.	0.	0.	0.	0.	0.	0.	1.	0.
51	2.	1.	0.	1.	0.	1.	1.	1.	0.	1.
61	0.	2.	0.	0.	0.	1.	1.	1.	0.	0.
71	0.	1.	1.	3.	1.	0.	0.	1.	1.	0.
81	0.	0.	0.	1.	0.	0.	1.	0.	2.	2.
91	1.	1.	0.	0.	1.	0.	0.	0.	0.	0.
101	0.	2.	0.	0.	2.	1.	3.	2.	1.	0.
111	0.	3.	0.	1.	0.	0.	1.	1.	3.	1.
121	2.	1.	4.	0.	0.	2.	0.	3.	2.	4.
131	3.	2.	1.	1.	2.	2.	0.	4.	1.	2.
141	2.	3.	2.	2.	3.	1.	3.	2.	4.	2.
151	3.	2.	4.	2.	0.	2.	5.	1.	1.	9.
161	3.	7.	0.	8.	3.	7.	2.	8.	1.	3.
171	6.	7.	7.	5.	5.	8.	7.	6.	6.	9.
181	12.	13.	7.	12.	14.	17.	5.	15.	12.	16.
191	13.	14.	17.	19.	13.	16.	13.	17.	27.	21.
201	20.	20.	22.	27.	26.	39.	37.	48.	46.	52.
211	85.	72.	86.	144.	168.	194.	213.	296.	387.	435.
21	531.	628.	697.	852.	948.	1069.	1272.	1470.	1632.	1754.
231	2057.	2098.	2099.	2016.	1731.	1489.	1202.	832.	529.	374.
241	224.	106.	63.	28.	13.	5.	4.	3.	0.	5.
251	0.	4.	4.	10.	8.	9.	3.	9.	17.	7.
261	10.	9.	18.	21.	20.	21.	28.	19.	17.	17.
271	15.	6.	13.	4.	5.	2.	3.	4.	3.	2.
281	3.	2.	3.	2.	5.	4.	3.	10.	7.	7.
291	8.	13.	8.	16.	19.	23.	23.	20.	28.	25.
301	31.	35.	35.	34.	35.	35.	36.	37.	28.	27.
311	21.	15.	13.	11.	11.	10.	6.	6.	8.	4.
321	10.	7.	14.	7.	13.	20.	11.	14.	19.	20.
331	10.	16.	21.	15.	19.	18.	24.	25.	19.	41.
341	30.	48.	64.	95.	109.	126.	158.	205.	250.	278.
351	327.	410.	501.	576.	652.	672.	783.	813.	892.	958.
361	992.	1138.	1270.	1276.	1264.	1229.	1007.	804.	623.	414.
371	257.	149.	88.	36.	13.	4.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
421	0.	1.	0.	1.	2.	0.	1.	0.	0.	2.
431	0.	1.	0.	0.	1.	0.	0.	0.	1.	1.
441	1.	0.	0.	0.	0.	1.	1.	0.	0.	0.
451	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	1.	2.	0.
471	0.	0.	0.	0.	2.	2.	2.	1.	5.	0.
481	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
511	0.	0.								

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APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

JUPITER II

DET #		1	2	3	4	5	6	7	8				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT DM/BG	Np	81	149	151	147	154	149	151	153	Out of Service			
	Pu	110	229	229	228	232	227	231	233				
DATE 4-18-93	Am	136	302	301	300	304	300	303	308				
	Cm	160	370	367	369	371	366	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT DM/BG	Np	81	150	148	148	152	146	150	152				
	Pu	110	229	226	228	231	225	230	233				
DATE 4-19-93	Am	136	302	297	300	303	297	302	307				
	Cm	160	370	364	369	370	365	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT DM/BG	Np	82	150	152	148	152	149	151	153				
	Pu	110	229	230	229	231	228	230	233				
DATE 4-20-93	Am	136	303	302	301	303	300	302	307				
	Cm	161	371	368	369	370	368	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT DM/BG	Np	82	149	149	148	154	148	151	153				
	Pu	110	229	227	228	232	226	230	234				
DATE 4-21-93	Am	136	301	299	301	304	298	303	308				
	Cm	161	370	366	369	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT DM/BG	Np	82	149	150	149	151	150	152	154				
	Pu	110	229	228	229	230	228	232	235				
DATE 4-22-93	Am	136	302	299	301	302	301	304	309				
	Cm	160	370	366	370	369	368	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT DM/BG	Np	82	146	150	146	152	146	151	154				
	Pu	110	226	228	226	230	225	230	234				
DATE 4-23-93	Am	137	299	301	299	302	297	302	308				
	Cm	161	366	367	367	370	364	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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4·3 7279

Serial No	Sample Point	Date	Time Issued	Priority
E 8608.-3336	H&RWC	4-12-93	13: 3	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/g	VOGEL	0

Sample Size	Customer ID
100-10-50	0069WQL

Remarks, Calculations, Results .4962g to 50ml ^{238}Pu 1.87x10¹ uC/g

SPIKE #: 64843
SPIKE VOL. .100 ml.

ACID ADJ
~~CON HNO3~~ ML 1 a 1 8M HNO_3

Q.a. 2
4/20/93

$$\frac{.6173\,(375.54)(2020)(1000)}{.2x2\,(2.22x10^6)} = \frac{9.02x10^3\,uC/L}{9.924\,g/L} = 90.9\,uC/g$$

Analyst - 1	Analyst - 2	Analyst - 3		Analyst - 5
[redacted]	DHMilburn	[signature]	[redacted]	
Hrs	Hrs	Hrs	Hrs	Hrs
			4.21.93	

Date	Time Completed	Lab Unit Mgr	
4-20-93		[signature]	4/27 [signature]

54-6800-064 (R-10-83)

#3 4-21-93 DM

E8608-3336

15031/30 -3

$$\frac{[(996.07)(.1318)-(7.265)(.6200)][(2020)(1000)]}{.6200\,(2.22x10^6)} = \frac{1.86x10^2\,uC/L}{9.924\,g/L}$$

$$= 1.87x10^1\,uC/g$$

Raymond 4-21-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
E8608-3336
File ID: SD7779.SPC

Counted on: 4/21/93 @ 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	2472.6	2479.2	364.002	364.002	20.000	10.012	10.000	4.666
2	1351.6	1352.8	305.511	305.511	20.000	10.642	10.000	5.692
3	380.6	0.0	268.382	268.382	12.000	12.123	6.000	6.102
4	6583.4	6610.3	232.756	232.756	20.000	9.979	10.000	5.739
5	13.2	8.8	150.138	150.138	32.000	269.411	16.000	35.973
6	8.4	8.7	22.569	22.569	20.000	6.978	10.000	11.557

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.2462	5.756	5.755	0.001	0.05	43.61	260.23	0.117E-03
2	Pu238	0.1318	5.499	5.486	0.013	0.05	23.35	189.64	0.854E-04
	Am241		5.480	5.486	-0.006				0.654E-04
3		0.0000		5.315		0.06	0.00	0.00	0.000E+00
4	Pu239	0.6173	5.143	5.151	-0.008	0.05	109.36	639.51	0.288E-03
	Pu240		5.144	5.151	-0.007				0.288E-03
5	Np237	0.0041	4.640	4.771	-0.131	1.24	0.73	70.69	0.318E-04
	Np237		4.781	4.771	0.010				0.220E-05
6	U 238	0.0006	4.200	4.184	0.016	0.03	0.11	0.83	0.376E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.080 + (0.0046)*Channel
Energy range (MeV): 4.080 TO 6.436
Efficiency = 0.1/10 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	88970.0	100.000
Smoothed	88970.0	100.000
Composite fit	88573.9	99.555
Residuals	396.1	0.445

Analyzed by: [redacted]

```
          SPECTRUM SD7779.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC            21046.8

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Raw Data Dump for AEA Spectrum: SP:SD7779.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	1.	0.	4.	6.	3.	5.	8.
21	6.	4.	3.	5.	4.	4.	1.	1.	0.	1.
31	1.	0.	0.	0.	0.	2.	1.	2.	0.	0.
41	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.
51	0.	0.	0.	1.	1.	0.	1.	0.	0.	0.
61	0.	2.	0.	2.	0.	2.	2.	1.	0.	0.
71	1.	0.	1.	0.	2.	1.	0.	1.	1.	0.
81	0.	2.	1.	0.	1.	2.	0.	4.	1.	3.
91	2.	1.	1.	2.	0.	1.	1.	1.	3.	0.
101	2.	0.	0.	0.	1.	2.	0.	2.	2.	0.
111	0.	2.	2.	0.	0.	0.	0.	0.	1.	1.
121	2.	0.	2.	2.	2.	0.	2.	3.	2.	1.
131	3.	2.	2.	3.	1.	3.	4.	7.	1.	4.
141	7.	1.	4.	5.	5.	6.	12.	6.	9.	9.
151	2.	8.	5.	5.	6.	2.	4.	3.	1.	4.
161	5.	4.	2.	2.	4.	3.	3.	4.	2.	4.
171	2.	7.	7.	7.	4.	8.	3.	9.	5.	10.
181	8.	13.	9.	10.	6.	10.	20.	14.	14.	21.
191	13.	19.	19.	28.	32.	25.	31.	40.	30.	30.
201	50.	67.	68.	65.	81.	83.	85.	108.	131.	148.
211	162.	217.	263.	287.	377.	477.	545.	660.	741.	918.
221	1070.	1254.	1506.	1771.	2137.	2457.	2828.	3185.	3458.	3793.
231	4020.	4015.	3743.	3482.	2875.	2457.	1803.	1265.	832.	487.
241	358.	146.	78.	44.	17.	9.	7.	5.	9.	5.
251	6.	6.	11.	4.	13.	9.	9.	13.	16.	11.
261	18.	14.	19.	26.	28.	30.	21.	24.	30.	26.
271	12.	21.	15.	14.	9.	17.	21.	31.	21.	25.
281	29.	26.	28.	30.	41.	56.	68.	85.	92.	140.
291	166.	203.	220.	264.	314.	361.	405.	493.	515.	568.
301	678.	706.	850.	765.	790.	719.	720.	595.	492.	349.
311	262.	180.	109.	64.	51.	20.	25.	20.	5.	18.
321	6.	6.	3.	4.	6.	6.	10.	11.	11.	12.
331	21.	16.	23.	28.	30.	34.	37.	32.	55.	63.
341	55.	79.	74.	106.	124.	171.	195.	264.	310.	409.
351	485.	566.	606.	696.	765.	806.	860.	1000.	1047.	1211.
361	1369.	1480.	1468.	1447.	1327.	1160.	935.	747.	517.	349.
371	232.	116.	73.	25.	14.	4.	3.	1.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
431	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
441	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 3

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	9	
TODAY'S DATE:	08/19/92	
DECAY CORR'N:	2.554	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242920	5	48575	307	48882	0.4981
242932	5	48577	307	48884	0.4982
242052	5	48401	305	48706	0.4964
243038	5	48599	307	48906	0.4984
242907	5	48572	307	48879	0.4981
242795	5	48550	306	48856	0.4979
243214	5	48634	307	48941	0.4988
243707	5	48732	309	49041	0.4998
242647	5	48520	306	48826	0.4976
241653	5	48322	304	48625	0.4955
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998				
MIN	0.4955	48548	306	48855	0.4979

BEST AVAILABLE COPY

JUPITER II

DET #		1	2	3	4	5	6	7	8				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	151	147	154	149	151	153	Out of Service			
DM / BG	Pu	110	229	229	228	232	227	231	233				
DATE	Am	136	302	301	300	304	300	303	308				
4-18-93	Cm	160	370	367	369	371	366	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	150	148	148	152	146	150	152				
DM / BG	Pu	110	229	226	228	231	225	230	233				
DATE	Am	136	302	297	300	303	297	302	307				
4-19-93	Cm	160	370	364	369	370	365	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	152	148	152	149	151	153				
DM / BG	Pu	110	229	230	229	231	228	230	233				
DATE	Am	136	303	302	301	303	300	302	307				
4-20-93	Cm	161	371	368	369	370	368	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	149	148	154	148	151	153				
DM / BG	Pu	110	229	227	228	232	226	230	234				
DATE	Am	136	301	299	301	304	298	303	308				
4-21-93	Cm	161	370	366	369	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	151	150	152	154				
DM / BG	Pu	110	229	228	229	230	228	232	235				
DATE	Am	136	302	299	301	302	301	304	309				
4-22-93	Cm	160	370	366	370	369	368	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	146	150	146	152	146	151	154				
DM / BG	Pu	110	226	228	226	230	225	230	234				
DATE	Am	137	299	301	299	302	297	302	308				
4-23-93	Cm	161	366	367	367	370	364	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

BEST AVAILABLE COPY

Original card was not received. [illegible] 08/24/93

4.4 8996

Serial No	Sample Point	Date	Time Issued	Priority
S 5336.-4822	SHIFT STD'S	4- 1-93	0:55	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/L	STD	0

Sample Size	Customer ID
100-10-1ML #63343	

Remarks, Calculations, Results
SPIKE #:58843
SPIKE VOL. 100ul
(R201)
ACID ADJ
~~CON~~ HNO3 ML 1
8M

Stdvalue: 2.6821E+1
% Rec: 72.32%
WK# 9193
Result: 1.94E+1 uCi/L

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]	[redacted]	D. H. Milne	
Hrs	Hrs	Hrs	Hrs	Hrs
		4-21-93		

Date	Time Completed	Lab Unit Mgr
4-21-93	0407 4/21/93	[illegible]

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

#1 VR 4-21-93

$$\frac{9401}{30} - 4$$

$$\frac{(555)(2.547E^{-3})(.1)(1000)(101)}{724} =$$

$$1.9398E^{+1}$$

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

Rwilli 4-22-93

SAMPLE
S-5336-4822
File ID: SD8996.SPC

Counted on: 4/22/93 @ 6: 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	1055.4	1113.6	297.078	297.078	40.000	39.448	20.000	2.178
2	780.5	880.0	254.717	254.717	32.000	16.151	16.000	1.342
3	19.8	20.3	27.325	27.325	16.000	2.965	8.000	9.693

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Th228	0.6550	5.430	5.456	-0.026	0.19	90.39	691.51	0.311E-03
	Am241		5.480	5.456	0.024				0.235E-03
2	Am243	0.3438	5.234	5.257	-0.023	0.08	47.44	2342.54	0.106E-02
3	U 238	0.0012	4.200	4.188	0.012	0.01	0.17	1.18	0.530E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.059 + (0.0047)*Channel
Energy range (MeV): 4.059 TO 6.466
Efficiency = 0.1841 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	65887.0	100.000
Smoothed	65887.0	100.000
Composite fit	68997.0	104.720
Residuals	-3110.0	-4.720

Analyzed by: [redacted]

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          SPECTRUM SD8996.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC              5399.5
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Raw Data Dump for AEA Spectrum: SP:SD8996.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	7.	8.	9.	10.	17.	10.
21	14.	21.	26.	19.	29.	32.	24.	22.	10.	24.
31	12.	16.	10.	7.	4.	1.	0.	3.	6.	3.
41	0.	1.	2.	1.	2.	2.	5.	8.	12.	13.
51	13.	13.	6.	7.	8.	7.	7.	6.	7.	12.
61	6.	13.	12.	10.	9.	7.	5.	8.	7.	5.
71	14.	14.	12.	9.	9.	11.	13.	8.	7.	5.
81	9.	4.	1.	12.	15.	14.	17.	25.	13.	17.
91	29.	18.	9.	7.	11.	27.	18.	20.	26.	26.
101	13.	19.	18.	30.	20.	24.	29.	23.	33.	17.
111	28.	34.	32.	37.	33.	43.	21.	41.	39.	40.
121	46.	41.	33.	42.	40.	46.	53.	39.	55.	46.
131	55.	46.	55.	50.	61.	48.	61.	60.	58.	60.
141	65.	67.	55.	72.	86.	65.	77.	87.	78.	68.
151	75.	95.	95.	93.	85.	104.	96.	97.	91.	116.
161	77.	92.	84.	111.	114.	101.	116.	135.	108.	119.
171	117.	132.	130.	141.	146.	145.	151.	165.	143.	192.
181	182.	166.	187.	168.	168.	182.	198.	197.	216.	204.
191	197.	239.	228.	237.	235.	262.	241.	234.	265.	275.
201	298.	283.	288.	304.	319.	291.	312.	334.	296.	367.
211	352.	380.	366.	347.	352.	392.	353.	404.	435.	436.
221	433.	437.	454.	474.	442.	504.	499.	497.	494.	519.
231	542.	523.	552.	528.	553.	582.	593.	602.	622.	571.
241	637.	632.	620.	640.	673.	649.	678.	626.	636.	704.
251	683.	736.	688.	676.	687.	704.	649.	713.	634.	627.
261	597.	585.	544.	480.	516.	417.	374.	397.	384.	357.
271	416.	397.	406.	419.	419.	441.	417.	433.	396.	425.
281	444.	511.	471.	438.	491.	499.	487.	517.	533.	555.
291	555.	482.	551.	521.	509.	542.	552.	566.	470.	515.
301	520.	528.	501.	482.	521.	448.	405.	345.	302.	254.
311	199.	149.	120.	94.	83.	60.	42.	33.	30.	26.
321	7.	7.	5.	1.	1.	1.	0.	0.	0.	0.
331	0.	0.	0.	1.	0.	0.	4.	0.	1.	0.
341	0.	1.	0.	1.	3.	1.	1.	1.	1.	2.
351	1.	1.	1.	4.	1.	2.	3.	0.	1.	2.
361	1.	0.	2.	0.	1.	1.	2.	2.	1.	1.
371	2.	0.	0.	0.	0.	0.	0.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	1.	0.	2.	0.	0.	0.	2.	1.	0.	2.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
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.								

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	151	147	154	149	151	153	Out of Service			
DM / BG	Pu	110	229	229	228	232	227	231	233				
DATE	Am	136	302	301	300	304	300	303	308				
4-18-93	Cm	160	370	367	369	371	366	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	150	148	148	152	146	150	152				
DM / BG	Pu	110	229	226	228	231	225	230	233				
DATE	Am	136	302	297	300	303	297	302	307				
4-19-93	Cm	160	370	364	369	370	365	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	152	148	152	149	151	153				
DM / BG	Pu	110	229	230	229	231	228	230	233				
DATE	Am	136	303	302	301	303	300	302	307				
4-20-93	Cm	161	371	368	369	370	368	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	149	148	154	148	151	153				
DM / BG	Pu	110	229	227	228	232	226	230	234				
DATE	Am	136	301	299	301	304	298	303	308				
4-21-93	Cm	161	370	366	369	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	151	150	152	154				
DM / BG	Pu	110	229	228	229	230	228	232	235				
DATE	Am	136	302	299	301	302	301	304	309				
4-22-93	Cm	160	370	366	370	369	368	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	146	150	146	152	146	151	154				
DM / BG	Pu	110	226	228	226	230	225	230	234				
DATE	Am	137	299	301	299	302	297	302	308				
4-23-93	Cm	161	366	367	367	370	364	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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H.3 7790

Serial No	Sample Point	Date	Time Issued	Priority
E 8608.-4822	H&RWC	4-12-93	13: 3	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/kg	VOGEL	0

Sample Size	Customer ID
100-10-50	0069WQL

Remarks, Calculations, Results: .4962g To 50ml
SPIKE #:58B43
SPIKE VOL. 100ul

ACID ADJ
CON HNO3 ML 1ml 8M HNO_3

pH 2.
4/20/93

$\frac{1183(565.5)(1000)(2020)}{964(2.22\times10^6)} = \frac{6.34\times10^2 uCi/L}{7.92 g/L} = 6.37\times10^1 uCi/g$

Analyst - 1	Analyst - 2	[redacted]	Analyst - [redacted]	[redacted]
[redacted]	[redacted]	VRaymond	[illegible]	VRaymond
Hrs	Hrs	Hrs	Hrs	Hrs
		4.21.93		4.24.93

Date	Time Completed	Lab Unit Mgr	
4-21-93	4/21/93	LACatt	4/27 SE Hoga

54-6800-061 (9/10-83)

WHC-SD-WM-DP-045
REV 1

#1 VR 4-21-93
7899/30 - 4

E 8608-4822

URaymond
4-24-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
E8606-4822
File ID: 907790.SPC

Counted on: 4/24/93 @12: 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	6.5	5.9	364.185	364.185	32.000	28.208	16.000	4.803
2	2166.2	2180.8	301.684	301.684	24.000	16.954	12.000	4.286
3	1620.1	1649.9	256.036	256.036	24.000	13.713	12.000	6.143

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/gm
1	Pu236	0.0021	5.756	5.749	0.007	0.13	0.22	1.11	0.500E-06
2	Th228	0.5686	5.430	5.462	-0.032	0.08	37.39	407.00	0.183E-03
	Am241		5.480	5.462	0.018				0.138E-07
3	Am243	0.4293	5.234	5.252	-0.018	0.06	44.33	1986.26	0.893E-0[illegible]

DETECTOR CALIBRATION

Energy(MEV) = 4.074 + (0.0046)*Channel
Energy range (MeV): 4.074 TO 6.429
Efficiency = 0.1986 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	30687.0	100.000
Smoothed	30687.0	100.000
Composite fit	30463.9	99.564
Residuals	221.1	0.436

Analyzed by: _____

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SPECTRUM SD7790.SPC

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,... ETC 6312.4

WHC-SD-WM-DP-045
REV 1

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Raw Data Dump for AEA Spectrum: SP:SU7790.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
21	1.	0.	1.	1.	0.	0.	0.	0.	0.	1.
31	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
41	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
51	1.	0.	0.	0.	1.	0.	1.	1.	0.	0.
61	1.	0.	0.	1.	0.	2.	0.	1.	2.	0.
71	0.	1.	0.	1.	0.	0.	0.	1.	1.	2.
81	0.	0.	1.	0.	2.	0.	1.	0.	0.	0.
91	1.	0.	0.	0.	1.	1.	1.	1.	2.	1.
101	0.	2.	1.	2.	0.	1.	3.	1.	1.	0.
111	3.	1.	2.	0.	1.	0.	0.	0.	0.	0.
121	0.	0.	2.	3.	2.	1.	4.	2.	0.	0.
131	1.	0.	4.	4.	4.	3.	3.	1.	4.	2.
141	2.	1.	1.	0.	3.	3.	4.	6.	5.	3.
151	4.	4.	2.	4.	7.	7.	2.	0.	5.	4.
161	7.	2.	5.	9.	9.	8.	10.	6.	7.	7.
171	8.	6.	6.	14.	11.	8.	11.	13.	9.	10.
181	13.	13.	13.	14.	17.	22.	12.	25.	14.	19.
191	28.	26.	20.	18.	21.	25.	27.	37.	29.	31.
201	29.	26.	41.	48.	49.	36.	38.	55.	47.	64.
211	56.	65.	82.	76.	75.	88.	93.	90.	108.	103.
221	115.	118.	98.	132.	146.	149.	163.	189.	209.	202.
231	238.	253.	243.	246.	294.	291.	338.	342.	399.	385.
241	440.	491.	486.	513.	545.	616.	629.	697.	767.	809.
251	816.	850.	928.	964.	927.	921.	973.	868.	758.	650.
261	586.	483.	427.	311.	268.	266.	224.	190.	192.	193.
271	176.	185.	187.	185.	230.	211.	230.	265.	296.	291.
281	339.	353.	399.	403.	447.	473.	533.	549.	627.	651.
291	731.	815.	834.	909.	960.	989.	1105.	1123.	1146.	1145.
301	1169.	1138.	1107.	1090.	934.	757.	673.	594.	481.	400.
311	288.	204.	171.	114.	102.	86.	56.	38.	22.	12.
321	12.	7.	7.	4.	2.	1.	1.	1.	0.	0.
331	0.	0.	1.	0.	0.	1.	0.	0.	0.	1.
341	2.	0.	0.	1.	3.	0.	0.	3.	1.	2.
351	2.	2.	1.	3.	1.	2.	3.	3.	3.	3.
361	2.	4.	7.	2.	2.	3.	0.	3.	3.	2.
371	2.	2.	4.	2.	2.	0.	1.	0.	0.	0.
381	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
391	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
411	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.
421	0.	0.	1.	1.	1.	0.	0.	1.	1.	0.
431	0.	1.	2.	0.	1.	0.	0.	0.	0.	0.
441	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0	0.
511	0.	0.								

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APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	10	
TODAY'S DATE:	08/18/92	
DECAY CORR'N:	2.552	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.
SCT/SHIFT	Np	81	149	151	147	154	149	151	153	Out of Service			
DM / BG	Pu	110	229	229	228	232	227	231	233				
DATE	Am	136	302	301	300	304	300	303	308				
4-18-93	Cm	160	370	367	369	371	366	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	150	148	148	152	146	150	152				
DM / BG	Pu	110	229	226	228	231	225	230	233				
DATE	Am	136	302	297	300	303	297	302	307				
4-19-93	Cm	160	370	364	369	370	365	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	152	148	152	149	151	153				
DM / BG	Pu	110	229	230	229	231	228	230	233				
DATE	Am	136	303	302	301	303	300	302	307				
4-20-93	Cm	161	371	368	369	370	368	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	149	148	154	148	151	153				
DM / BG	Pu	110	229	227	228	232	226	230	234				
DATE	Am	136	301	299	301	304	298	303	308				
4-21-93	Cm	161	370	366	369	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	151	150	152	154				
DM / BG	Pu	110	229	228	229	230	228	232	235				
DATE	Am	136	302	299	301	302	301	304	309				
4-22-93	Cm	160	370	366	370	369	368	371	372				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	146	150	146	152	146	151	154				
DM / BG	Pu	110	226	228	226	230	225	230	234				
DATE	Am	137	299	301	299	302	297	302	308				
4-23-93	Cm	161	366	367	367	370	364	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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Original Card was not received 08/24/93

Serial No.	Sample Point	Date	Time Issued	Priority
S 5336.-9374	SHIFT STD'S	4- 1-93	0:55	23

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-223-101	uCi/L	STD	0

Sample Size	Customer ID
50 MF#4 MT100	

Remarks, Calculations, Results:

S374 BE25-2

STD# 57851-1 RESULT 2.4130+4

STD VAL 2.43+4 %REC 99.30

Sept. Time 0650 Date 4-1-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	4-24-93			

Date	Time Completed	Lab Unit Mgr	
4-24-93	1442		~~4-24-93 2350~~ DOnahue

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

11 1" 4-24.93 R 1635

$\frac{353729}{10}$ - 20

$\frac{376095}{10}$

ΔT 9.75
D.F. 20
M.F. 4
MTF. 10

Sr Calculation by VR on 04-24-1993 at 18:35:37
Det #11 1 -inch mount Sr eff : .4899 Y eff : .5469

Sample size : .1 mL Dilution : 20 Method : 4

Mount # 1 Decay time = 9.75 hrs

$$\frac{353729}{10} - 20.0 = 2.3390E+04 \text{ uCi/L strontium}$$

Mount # 2 Decay time = 9.75 hrs

$$\frac{376095}{10} - 20.0 = 2.4870E+04 \text{ uCi/L strontium}$$

Serial No	Sample Point	Date	Time Issued	Priority
E 8608.-3801	H&RWC	4-12-93	13: 3	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr89/90	LA-223-101	uCi/Lg	VOGEL	1

Sample Size	Customer ID
50 mt 100	0069WQL

Remarks, Calculations, Results

SEP DATE= 4-24-93
SEP TIME- 0710

$$\frac{1.65 \times 10^3 \, uCi/L}{9.92 \, g/L} = 1.66 \times 10^2 \, uCi/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] URaymond			
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93	1430	

54-6800-061 (4/10-83)

12 1" 4.24-93R 0330 1530 ΔT 8.33
DF 20
MF 4
MTF 10

$\frac{24981}{10}$ - 9 E8608-3801

$\frac{25303}{10}$ -

Sr Calculation by VR on 04-24-1993 at 18:37:46
Det #12 1 -inch mount Sr eff : .4993 Y eff : .5501

Sample size : .1 mL Dilution : 20 Method : 4

Mount # 1 Decay time = 8.33 hrs

$\frac{24981}{10}$ - 9.0 = 1.6407E+03 uCi/L strontium

Mount # 2 Decay time = 8.33 hrs

$\frac{25303}{10}$ - 9.0 = 1.6619E+03 uCi/L strontium

$\bar{x} = 1.6513 \times 10^3$

06/14/89 Det 11 Sry-90 ratios

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5219	0.4899	0.5469

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.4181	0.3919	0.4443

Esr = .4899/.5219 = 0.9387 , 1"

Ey = .5469/.5219 = 1.0479 , 1"

Esr = .3919/.4181 = 0.9373 , 2"

Ey = .4443/.4181 = 1.0627 , 2"

RATIOS GENERATED USING PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK RHO-QA-NB-47, VOL 4: PAGES 31-36.

R Jones
11-18-92

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WHC-SD-WM-DP-045
REV 1

100-K AREA BASINS

CUSTOMER ID NUMBER 0343WQL

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Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-1001	H&RWC	5-12-93	15:36	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LA-519-151	NONE	E11457	0

Sample Size	Customer ID
?	0343wql

Remarks, Calculations, Results

Sample or Tank ID? KE BASIN
Color and Est Vol? BROWN /solids
Clarity? NONE
Solids Ø/n
Phases? NONE
OTR or CPM ? < 15 mR

SUPER SUPER RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/13/93	1500	5-13-93	5-17-93

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

WHC-SD-WM-DP-045
REV 1

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-8740	H&RWC	5-12-93	15:41	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E11457	0

Sample Size	Customer ID Std104.022
? .100ML-10ML-.100ML	0343wql

Remarks, Calculations, Results

SPIKE # 90838
SPIKE VAL. 6.25×10^{-4} g/l

.26
.52

$$\frac{.26(6.25\times10^{-4})(.1)(1010)}{\frac{5.7}{5.6}(.52)-.26} = 6.09\times10^{-2}\ g/L$$

$$\frac{6.09\times10^{-2}\ g/L}{50190\ g/L} = 1.21\times10^{-2}\ g/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/15/93	23:45		5-17-93

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

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-8700	H&RWC	5-12-93	15:36	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	G/L	E11457	0

Sample Size	Customer ID
?	0343wq1

Remarks, Calculations, Results:

JAR ID#
GRAMS SAMPLE .5019 g

VOLUME ON
COMPLETION .1001

.5019 g / .1001 L

SUPER SUPER RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/13/93	1500	Bertrand Griffin II 5-13-93	5-17-93

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

E9324-8700

SEQUENCE # : 18
WT 1: 0.0000
WT 2: 0.5019

NET WEIGHT:

---> 0.5019 GRAMS

05/12/93 @ 23:00:35

Original card was not received
LA Webb 08/24/93

Serial No.	Sample Point	Date	Time Issued	Priority
S 5543.-9267	SHIFT STD'S	5- 1-93	13:30	26

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

Sample Size	Customer ID
100-10-100	B SHIFT

Remarks, Calculations, Results:

S267 UF1C
STD#126838 RESULT 3.1867-2
STD VAL 3.04-2 %REC 104.82%

SPIKE ID/VAL 90B38/6.25x10^{-4}g/L
SPIKE VOL. .100 mL

~~Page 1 of 2~~
5/15/93 ~~-41~~
.14
.41

$\frac{.14(6.25\text{-}4)(.1)(1010)}{\frac{5.7}{5.6}(.41)-.14}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5/15/93	23:45	

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

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-8755	H&RWC	5-12-93	15:41	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP-SOL	LA-505-151	uG/G Rec	E11457	0

Sample Size 5.0190 g/l G OF SAMPLE

Customer ID 0343wq1

Remarks, Calculations, Results:

Zr 20/5.019 = 3.98 mg/kg rec.
Sr 23.6/5.019 = 4.70
Si 1.277E3/5.019 = 2.54E2
Al 1.8426E4/5.019 = 3.67E3
Co 27.8/5.019 = 5.54
Cu 7.86E2/5.019 = 1.57E2
Li 11.1/5.019 = 2.21
Zn 7.24E2/5.019 = 1.44E2
Ni 1.82E2/5.019 = 3.63E1
Fe 2.4764E4/5.019 = 4.93E3

→Dover SUPER SUPER RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs 5/14/93
Date 5-14-93	Time Completed	Lab Unit Mgr		

54-6800-064-7M-10-83)

E9324-8755

Ca 2.081E3/5.019 = 4.15E2
Cr 3.35E2/5.019 = 6.67E1
Sm 4.28E2/5.019 = 8.53E1
Ba 1.81E2/5.019 = 3.61E1
P 5.71E2/5.019 = 1.14E2
S 1.82E2/5.019 = 3.63E1
Mg 1.424E3/5.019 = 2.84E2
Na 91.4/5.019 = 1.82E1
Ag 13.2/5.019 = 2.63
Pb 1.071E3/5.019 = 2.13E2
Ti 259/5.019 = 5.16E1
Cd 47.7/5.019 = 9.50
K 797/5.019 = 1.59E2
Mn 392/5.019 = 7.81E1
V 299/5.019 = 5.96E1
Tl 272/5.019 = 5.42E1

WHC-SD-WM-DP-045
REV 1

Identity 1: E9324 H&RWC 0343wgl Identity 2: 5.0190 g/l 10:59 AM May 14, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	20.052	23.631	-94.557	12.004	-48.718	1277.207	18425.516	-6.962
S.D.	3.651	0.413	27.406	18.468	8.802	18.551	58.070	9.501
% R.S.D.	18.207	1.749	28.984	153.847	18.067	1.452	0.315	136.479

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	27.791	785.925	11.136	724.384	181.853	-162.784	-4.125	24764.281
S.D.	2.268	2.722	0.261	1.888	2.720	5.126	0.506	70.108
% R.S.D.	8.163	0.346	2.341	0.261	1.496	3.149	12.266	0.283

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	2080.835	334.696	90.952	60355.585	14.078	428.228	180.723	570.783
S.D.	2.808	0.466	35.861	221.843	30.325	33.079	0.765	50.707
% R.S.D.	0.135	0.139	39.428	0.368	215.404	7.725	0.423	8.884

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	181.684	1423.797	20.746	91.426	4.563	69.015	13.225	1070.823
S.D.	20.478	6.688	5.775	14.672	1.700	10.001	2.366	3.262
% R.S.D.	11.271	0.470	27.836	16.048	37.262	14.491	17.892	0.305

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	259.428	47.728	7.851	797.224	392.251	-100.569	299.206	0.357
S.D.	5.096	0.888	1.332	23.378	2.277	16.662	5.867	0.000
% R.S.D.	1.964	1.860	16.972	2.932	0.581	16.568	1.961	0.000

	Tl (ppb)
Mean	272.462
S.D.	79.467
% R.S.D.	29.166

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-1211	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT-LIQ	LA-508-113	uCi/L	R4E5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

EDP E341 ENVAE

STD# 40B51 RESULT 6.464E-4

STD VAL %REC 101.96%

Mary Tracy

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

Date	Time Completed	Lab Unit Mgr	
4-22-93			Gloise Hogan

S4-6600-061 (R-10-83)

SAMPLE POINT: ENV-STD.
LAB ID #: 8501
NUMBER OF ALIQUOTS: 3

	NET CPM	STANDARD DEV. CPM	CONCENTRATION RANGES (UCI/L) MEAN	UPPER	LOWER	DEVIATION PER CENT	SCATTER ERROR
ALPHA:	175.927	4.233	6.464E -4	6.619E -4	6.308E -4	2.41	OK
BETA :	2430.820	86.003	7.523E -3	7.789E -3	7.257E -3	3.54	**

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-1211	H&RWC	5-12-93	15:36	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT MISC	LA-508-101		E11457	0

Sample Size	Customer ID
_____G OF SAMPLE	0343wql

Remarks, Calculations, Results

.050 ml

SUPER SUPER RUSH

$$\frac{5.28\ nCi/L}{5.0190\ g/L} = 1.05\ nCi/g$$

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

Date	Time Completed	Lab Unit Mgr	
5-14-93	1040		5-17-93

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

WHC-SD-WM-DP-045
REV 1

#3 RW 5-14-93 E9324-1211

$$\frac{8969}{30} - 6$$

$$\frac{585.93\ (1000)(20)}{2.22 \times 10^6} = 5.27868\ nCi/L$$

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 3
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 9
TODAY'S DATE: 08/19/92
DECAY CORR'N: 2.554 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242920	5	48575	307	48882	0.4981
242932	5	48577	307	48884	0.4982
242052	5	48401	305	48706	0.4964
243038	5	48599	307	48906	0.4984
242907	5	48572	307	48879	0.4981
242795	5	48550	306	48856	0.4979
243214	5	48634	307	48941	0.4988
243707	5	48732	309	49041	0.4998
242647	5	48520	306	48826	0.4976
241653	5	48322	304	48625	0.4955
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998				
MIN	0.4955	48548	306	48855	0.4979

4951

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-2162	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-LIQ	LA-548-121	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

36851 ENVSTD
EDP E345 / CS137 1.59E-2 92.98% Li .500
EDP E346 / CO60 3.24E-2 98.48%
EDP E349 / AM241

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond			
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93		SJ Stoop

54-5800-061 (R-10-83)

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                           *
*              G A M M A   S P E C T R U M   A N A L Y S I S                *
*                                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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UKaymond 4-24-93

CANBERRA SPECTRAN-F V2.06 SOFTWARE

WHC-SD-WM-DP-045
REV 1

24-APR-9322:10:46

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 4 / GEOMETRY NUMBER: 61
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AND:
ANALYZED BY: VR

SAMPLE DESCRIPTION: E8501-2162 ENV/STD
GEOMETRY DESCRIPTION: 300 ML LIQ
SAMPLE SIZE: 3.0000E-01 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 23-APR-93 AT 21:20:16

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3021. SECONDS
DEAD TIME: 0.70 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

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24-APR-9322:10:46

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	96.68	48.31	1.00	1263.	965.	11.7	U-234
2	1322.77	661.40	1.49	1479.	22010.	1.4	CS-137
2B		661.44			139.	5.8	
3	2345.24	1172.78	1.84	1053.	31246.	1.2	CO-60
4	2663.52	1331.98	1.98	224.	29195.	1.2	CO-60
5	2920.13	1460.34	1.86	104.	806.	8.0	K-40
5B		1460.67			769.	1.7	

WHC-SD-WM-DP-045
REV 1

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-92 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

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24-APR-9322:10:46

SAMPLE: E8501-2162 ENV/STD
DATA COLLECTED ON 24-APR-93 AT 21:20:16
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

WHC-SD-WM-DP-045
REV 1

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/L				ENERGY COMPARISON (KEV)	
	MEASURED	ERROR	DECAY CORRECTED	ERROR	EXPECT	DIFF
AC-228	LLD<4.28E-04		LLD<4.28E-04		911.07	
AC-228A	LLD<4.28E-04		LLD<4.28E-04		911.10	
AC-228B	LLD<4.57E-04		LLD<4.57E-04		836.40	
AG-108M	LLD<7.31E-05		LLD<7.31E-05		433.94	
AG-110M	LLD<3.36E-04		LLD<3.36E-04		657.76	
AM-241	LLD<5.46E-04		LLD<5.46E-04		59.54	
AM-243	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243A	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243B	LLD<2.30E-03		LLD<2.30E-03		43.10	
AR-41	LLD<6.98E-05		LLD<6.98E-05		1293.64	
AU-198	LLD<6.06E-05		LLD<6.06E-05		411.80	
BA-133	LLD<9.66E-05		LLD<9.66E-05		356.02	
BA-139	LLD<2.36E-04		LLD<2.36E-04		165.85	
BA-140	LLD<2.94E-04		LLD<2.94E-04		537.27	
BA-141	LLD<2.12E-04		LLD<2.12E-04		190.23	
BE-7	LLD<6.62E-04		LLD<6.62E-04		477.59	
BI-207	LLD<7.42E-05		LLD<7.42E-05		569.70	
BI-212	LLD<7.31E-04		LLD<7.31E-04		727.27	
BI-214	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214A	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214B	LLD<8.37E-04		LLD<8.37E-04		1120.28	
BI-214C	LLD<2.69E-04		LLD<2.69E-04		1764.51	
CD-109	LLD<1.54E-03		LLD<1.54E-03		88.03	
CE 144	LLD<3.23E-04		LLD<3.23E-04		133.51	
CE-137	LLD<3.33E-05		LLD<3.33E-05		265.80	
CE-141	LLD<7.41E-05		LLD<7.41E-05		145.44	
CEPR144	LLD<6.46E-04		LLD<6.46E-04		133.51	
CO-56	LLD<1.09E-04		LLD<1.09E-04		846.76	
CO-57	LLD<4.24E-05		LLD<4.24E-05		122.06	
CO-58	LLD<1.02E-04		LLD<1.02E-04		810.75	
CO-60	3.24E-02	+-1.14E-04	3.24E-02	+-1.14E-04	1332.50	-0.32
					1173.24	-0.46
CR-51	LLD<3.73E-04		LLD<3.73E-04		320.94	
CS-134	LLD<1.08E-04		LLD<1.08E-04		795.84	
CS-136	LLD<1.05E-04		LLD<1.05E-04		818.51	
CS-137	1.39E-02	+-2.46E-04	1.39E-02	+-2.46E-04	661.60	-0.23
CS-138	LLD<7.71E-05		LLD<7.71E-05		1435.46	
EU-152	LLD<1.85E-04		LLD<1.85E-04		1408.01	
EU-154	LLD<1.84E-04		LLD<1.84E-04		1274.47	
EU-154A	LLD<8.90E-05		LLD<8.90E-05		123.10	
EU-155	LLD<2.06E-04		LLD<2.06E-04		105.31	
FE-59	LLD<2.36E-04		LLD<2.36E-04		1099.20	
HF-181	LLD<8.23E-05		LLD<8.23E-05		482.20	
HG-203	LLD<8.37E-05		LLD<8.37E-05		279.20	
I-131	LLD<7.46E-05		LLD<7.46E-05		364.48	
I-132	LLD<8.56E-05		LLD<8.56E-05		667.87	
I-133	LLD<7.38E-05		LLD<7.38E-05		529.86	
I-134	LLD<1.37E-04		LLD<1.37E-04		847.07	
I-135	LLD<2.20E-04		LLD<2.20E-04		1260.41	
K-40	LLD<8.03E-04		LLD<8.03E-04		1460.75	
KR-85	LLD<1.61E-02		LLD<1.61E-02		513.99	
KR-85M	LLD<7.88E-05		LLD<7.88E-05		151.17	
KR-87	LLD<3.25E-04		LLD<3.25E-04		402.58	

228

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KR-89	LLD<2.78E-03	LLD<2.78E-03	220.90
LA-140	LLD<4.05E-05	LLD<4.05E-05	1396.20
LA-142	LLD<1.86E-04	LLD<1.86E-04	641.83
MN-54	LLD<1.05E-04	LLD<1.05E-04	834.83
MN-56	LLD<1.23E-04	LLD<1.23E-04	846.76
NA-22	LLD<6.06E-05	LLD<6.06E-05	1274.53
NA-24	LLD<3.99E-05	LLD<3.99E-05	1368.60
NB-94	LLD<8.48E-05	LLD<8.48E-05	702.63
NB-95	LLD<9.24E-05	LLD<9.24E-05	765.78
NB-97	LLD<4.07E-04	LLD<4.07E-04	657.92
NP-237	LLD<4.61E-04	LLD<4.61E-04	86.50
NP-238	LLD<4.63E-04	LLD<4.63E-04	984.45
NP-239	LLD<3.60E-04	LLD<3.60E-04	277.60
PA-233	LLD<1.62E-04	LLD<1.62E-04	311.98
PA-234M	LLD<2.19E-02	LLD<2.19E-02	1001.03
PB-210	LLD<1.28E-02	LLD<1.28E-02	46.30
PB-212	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212A	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212B	LLD<1.72E-03	LLD<1.72E-03	300.10
PB-214	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214A	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214B	LLD<2.75E-04	LLD<2.75E-04	295.21
PO-210	LLD<8.39E+00	LLD<8.39E+00	804.00
PO-214	LLD<9.36E-01	LLD<9.36E-01	799.70
PO-216	LLD<4.95E+00	LLD<4.95E+00	804.90
PU-239	LLD<6.11E-01	LLD<6.11E-01	129.30
PU-241	LLD<1.94E+01	LLD<1.94E+01	148.37
RA-224	LLD<1.32E-03	LLD<1.32E-03	240.99
RA-226	LLD<1.24E-03	LLD<1.24E-03	186.10
RB-86	LLD<4.26E-04	LLD<4.26E-04	1836.00
RB-89	LLD<3.63E-04	LLD<3.63E-04	1031.88
RN-220	LLD<6.40E-02	LLD<6.40E-02	549.73
RU-103	LLD<7.34E-05	LLD<7.34E-05	497.08
RURH106	LLD<1.50E-03	LLD<1.50E-03	621.80
SB-124	LLD<7.46E-05	LLD<7.46E-05	602.72
SB-125	LLD<2.19E-04	LLD<2.19E-04	427.89
SB-125A	LLD<2.19E-04	LLD<2.19E-04	427.89
SC-46	LLD<1.25E-04	LLD<1.25E-04	1120.45
SE-75	LLD<6.54E-05	LLD<6.54E-05	264.66
SN-113	LLD<9.33E-05	LLD<9.33E-05	391.67
SR-85	LLD<7.07E-05	LLD<7.07E-05	513.99
SR-91	LLD<1.18E-04	LLD<1.18E-04	533.60
SR-92	LLD<3.19E-05	LLD<3.19E-05	1383.94
TA-182	LLD<3.78E-04	LLD<3.78E-04	1121.40
TC-99M	LLD<4.22E-03	LLD<4.22E-03	140.31
TE-123M	LLD<4.46E-05	LLD<4.46E-05	139.00
TE-125M	LLD<1.52E-02	LLD<1.52E-02	109.27
TE-132	LLD<5.70E-05	LLD<5.70E-05	928.16
TH-228	LLD<4.93E-03	LLD<4.93E-03	84.37
TH-229	LLD<1.94E-03	LLD<1.94E-03	86.44
TH-229B	LLD<2.24E-03	LLD<2.24E-03	137.02
TH-229C	LLD<9.73E-04	LLD<9.73E-04	193.09
TH-234	LLD<8.96E-04	LLD<8.96E-04	92.50
TH-234A	LLD<8.96E-04	LLD<8.96E-04	92.50
TH-234B	LLD<3.92E-03	LLD<3.92E-03	63.30
TL-208	LLD<8.08E-05	LLD<8.08E-05	583.14
U-232	LLD<1.33E-01	LLD<1.33E-01	320.26
U-233	LLD<8.01E-05	LLD<8.01E-05	183.71
U-233A	LLD<8.01E-05	LLD<8.01E-05	183.71
U-233B	LLD<3.76E-04	LLD<3.76E-04	143.76
U-237	LLD<2.05E-04	LLD<2.05E-04	206.00
U-187	LLD<2.92E-04	LLD<2.92E-04	881.74
XE-131M	LLD<2.02E-03	LLD<2.02E-03	163.98
XE-133	LLD<1.79E-04	LLD<1.79E-04	81.00
XE-133M	LLD<3.14E-04	LLD<3.14E-04	233.21

WHC-SD-WM-DP-045
REV 1

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XE-138	LLD<4.37E-04	LLD<4.37E-04	258.41
Y-88	LLD<4.19E-05	LLD<4.19E-05	1836.06
Y-91	LLD<2.75E-02	LLD<2.75E-02	1204.90
Y-91M	LLD<8.90E-05	LLD<8.90E-05	553.60
ZN-65	LLD<2.56E-04	LLD<2.56E-04	1113.55
ZR-95	LLD<1.70E-04	LLD<1.70E-04	756.73
ZR-97	LLD<8.91E-05	LLD<8.91E-05	743.33
TOTAL	4.83E-02 +-4.82E-04	4.83E-02 +-4.82E-04	

STANDARD DEVIATION = 0.14

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RUN CALIB

CALIB   --  Version 2.02

222-S COUNTING ROOM WESTINGHOUSE HANFORD

CAL: EFF
MCA UNIT NUMBER (2): 1
ABC UNIT NUMBER (1.0): 1
DETECTOR NUMBER (   12): 4
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 11-NOV-92
TIME COLLECT STARTED: 09:00
GEOMETRY NUMBER ( 12): 81
GEOMETRY DESCRIPTION: 500ML LID
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY;
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY;
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 461
38842-A 500ML LID
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :   1.00000
NUMBER OF POINTS:    12
ACTIVITY IN MICROCURIES (YES/NO): N

      PEAK     1
               ENERGY:      59.536
               ACTIVITY:    3.121000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   0158000
               DECAY TIME ( 0.000000E-01 MINS.):  1-FEB-92
               TIME OF SOURCE CALIBRATION:  12:00
               DECAY TIME:    4.087800E+05 MINS
      EFFICIENCY =  1.151452E-02 (+-  1.180572E-04)

      PEAK     2
               ENERGY:      88.034
               ACTIVITY:    1.753000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   0462.5
               DECAY TIME ( 4.087800E+05 MINS.):
      EFFICIENCY =  4.835223E-02 (+-  3.570011E-04)

      PEAK     3
               ENERGY:     122.061
               ACTIVITY:    1.597000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   0271.8
               DECAY TIME ( 4.087800E+05 MINS.):
      EFFICIENCY =  7.091829E-02 (+-  5.259487E-04)

      PEAK     4
               ENERGY:     165.853
               ACTIVITY:    1.940000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   0147.66
```

WHC-SD-WM-DP-045
REV 1

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```
--SIS: EFFICIENCY COEFFICIENTS FOR:

LOG(EFF) = -6.382071E+01 + 2.261460E+01*LOG(E) - 2.592793E+00*LOG(E)^2

PEAK     5
         ENERGY:     279.197
         ACTIVITY:    5.435000E+03
         ACTIVITY ONE SIGMA:    0.000000E-01
         HALF-LIFE:   D[illegible]
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  5.099649E-02 (+-  3.270925E-03)

PEAK     6
         ENERGY:     391.868
         ACTIVITY:    6.201000E+02
         ACTIVITY ONE SIGMA:    0.000000E-01
         HALF-LIFE:   D115.09
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  4.175033E-02 (+-  3.169516E-04)

PEAK     7
         ENERGY:     513.990
         ACTIVITY:    1.063000E+03
         ACTIVITY ONE SIGMA:    0.000000E-01
         HALF-LIFE:   D64.84
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  3.315401E-02 (+-  5.326431E-01)

PEAK     8
         ENERGY:     661.650
         ACTIVITY:    6.821000E+02
         ACTIVITY ONE SIGMA:    0.000000E-01
         HALF-LIFE:   D11020
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.852897E-02 (+-  8.913840E-05)

PEAK     9
         ENERGY:     898.021
         ACTIVITY:    1.711000E+03
         ACTIVITY ONE SIGMA:    0.000000E-01
         HALF-LIFE:   D106.61
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.066866E-02 (+-  1.336644E-04)

PEAK    10
         ENERGY:    1173.240
         ACTIVITY:    9.279000E+02
         ACTIVITY ONE SIGMA:    0.000000E-01
         HALF-LIFE:   D1925.2
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.722549E-02 (+-  6.099883E-05)

PEAK    11
         ENERGY:    1332.500
         ACTIVITY:    9.284000E+02
         ACTIVITY ONE SIGMA:    0.000000E-01
         HALF-LIFE:   D1925.3
         DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.574303E-02 (+-  5.737485E-05)

PEAK    12
         ENERGY:    1836.130
         ACTIVITY:    1.813000E+03
         ACTIVITY ONE SIGMA:    0.000000E-01
```

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```
EFFICIENCY =  1.247290E-02 (+-  8.695036E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) =  9.202042E+01 - 6.132777E+01*LOG(E) + 1.500303E+01*LOG(E)^2
          - 1.634262E+00*LOG(E)^3 + 6.608717E-02*LOG(E)^4
```


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4207

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-8630	H&RWC	5-12-93	15:41	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/~~ML~~ G	E11457	0

Sample Size	Customer ID
100	0343wq1

Remarks, Calculations, Results

RUSH

COUNT AS uCI/L
LASER PRINTOUT

^{60}Co = 1.31 nCi/L / 5.019 g/L = 2.61×10^{-1} nCi/g

^{137}Cs 9.14×10^{-1} nCi/L / 5.019 g/L = 1.82×10^{-1} nCi/g

Su Li

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

Date	Time Completed	Lab Unit Mgr
5-18-93	11:00	[illegible]

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

WHC-SD-WM-DP-045
REV 1

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

WHC-SD-WM-DP-045
REV 1

18-MAY-9313:01:10

R Wilkins 5-18-93

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

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

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANO:
ANALYZED BY: [redacted]

SAMPLE DESCRIPTION: E9324-8630
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 18-MAY-93 AT 12:10:56

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3011. SECONDS
DEAD TIME: 0.37 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

18-MAY-9313:01:10

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	118.79	59.37	0.85	1047.	381.	24.9	AM-241,U-237, EU-155
2	245.78	122.86	1.04	1195.	262.	38.5	EU-152,CO-57, EU-154A
3	1021.58	510.79	1.90	755.	334.	26.5	RN-222,I-133,
3B		510.83			317.	3.8	TL-208,NA-22, ZN-65,RH-106
4	1217.69	608.86	1.13	368.	165.	37.5	BI-214A,
4B		609.18			177.	5.7	RU-103
5	1322.54	661.29	1.55	269.	31493.	1.1	CS-137
5B		661.44			159.	5.8	
6	1821.11	910.63	2.25	103.	127.	29.8	AC-228A
6B		910.95			101.	7.7	
7	2344.81	1172.56	1.76	81.	330.	13.7	CO-60
8	2663.30	1331.87	2.20	55.	284.	14.3	CO-60
9	2919.39	1459.97	2.06	26.	828.	7.1	K-40
9B		1460.67			769.	1.7	
10$	3524.25	1762.56	1.25	9.	31.	46.8	
11$	3527.37	1764.12	1.25	10.	38.	42.0	BI-214C
11B		1764.58			64.	7.3	

RROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

$ - MULTIPLET ANALYSIS CONVERGED DUE TO LACK OF CHI-SQ IMPROVEMENT
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-92 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

18-MAY-9313:01:10

SAMPLE: E9324-8630
DATA COLLECTED ON 18-MAY-93 AT 12:10:56
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<4.68E-01		LLD<4.68E-01		911.07	
AC-228A	LLD<4.68E-01		LLD<4.68E-01		911.10	
AC-228B	LLD<1.18E+00		LLD<1.18E+00		338.40	
AG-108M	LLD<2.16E-01		LLD<2.16E-01		433.94	
AG-110M	LLD<1.57E+00		LLD<1.57E+00		657.76	
AM-241	3.73E+00	+-9.30E-01	3.73E+00	+-9.30E-01	59.54	-0.17
AM-243	LLD<2.52E-01		LLD<2.52E-01		74.67	
AM-243A	LLD<2.52E-01		LLD<2.52E-01		74.67	
AM-243B	LLD<1.05E+00		LLD<1.05E+00		43.10	
AR-41	LLD<1.42E-01		LLD<1.42E-01		1293.64	
AU-198	LLD<1.74E-01		LLD<1.74E-01		411.80	
BA-133	LLD<2.59E-01		LLD<2.59E-01		356.02	
BA-139	LLD<5.12E-01		LLD<5.12E-01		165.85	
BA-140	LLD<6.57E-01		LLD<6.57E-01		537.27	
BA-141	LLD<5.37E-01		LLD<5.37E-01		190.23	
BE-7	LLD<1.94E+00		LLD<1.94E+00		477.59	
BI-207	LLD<1.36E-01		LLD<1.36E-01		569.70	
BI-212	LLD<1.11E+00		LLD<1.11E+00		727.27	
BI-214	LLD<3.51E-01		LLD<3.51E-01		609.32	
BI-214A	LLD<3.51E-01		LLD<3.51E-01		609.32	
BI-214B	LLD<1.06E+00		LLD<1.06E+00		1120.28	
BI-214C	LLD<8.22E-01		LLD<8.22E-01		1764.51	
CD-109	LLD<3.18E+00		LLD<3.18E+00		88.03	
CE 144	LLD<6.79E-01		LLD<6.79E-01		133.51	
CE-139	LLD<1.16E-01		LLD<1.16E-01		165.85	
CE-141	LLD<1.60E-01		LLD<1.60E-01		145.44	
CEPR144	LLD<1.36E+00		LLD<1.36E+00		133.51	
CO-56	LLD<1.14E-01		LLD<1.14E-01		846.76	
CO-57	2.44E-01	+-9.40E-02	2.44E-01	+-9.40E-02	122.06	0.80
CO-58	LLD<1.13E-01		LLD<1.13E-01		810.75	
CO-60	1.31E+00	+-1.88E-01	1.31E+00	+-1.88E-01	1332.50	-0.63
					1173.24	-0.67
CR-51	LLD<1.51E+00		LLD<1.51E+00		320.09	
CS-134	LLD<1.30E-01		LLD<1.30E-01		795.84	
CS-136	LLD<1.18E-01		LLD<1.18E-01		818.51	
CS-137	9.14E+01	+-1.12E+00	9.14E+01	+-1.12E+00	661.65	-0.36
CS-138	LLD<2.33E-01		LLD<2.33E-01		1435.86	
EU-152	LL[illegible].59E-01		LLD<5.59E-01		1408.01	
EU-154	LLD<3.95E-01		LLD<3.95E-01		1274.45	
EU-154A	5.17E-01	+-1.99E-01	5.17E-01	+-1.99E-01	123.10	-0.24
EU-155	LLD<4.26E-01		LLD<4.26E-01		105.31	
FE-59	LLD<2.27E-01		LLD<2.27E-01		1099.25	
HF-181	LLD<2.28E-01		LLD<2.28E-01		482.20	
HG-203	LLD<1.57E-01		LLD<1.57E-01		279.20	
I-131	LLD<2.08E-01		LLD<2.08E-01		364.48	
I-132	LLD<1.25E-01		LLD<1.25E-01		667.69	
I-133	LLD<1.76E-01		LLD<1.76E-01		529.69	

I-134	LLD<1.72E-01	LLD<1.72E-01	847.03
I-135	LLD<4.20E-01	LLD<4.20E-01	1260.41
K-40	LLD<2.98E+00	LLD<2.98E+00	1460.75
KR-85	LLD<4.40E+01	LLD<4.40E+01	513.99
KR-85M	LLD<1.21E-01	LLD<1.21E-01	151.17
KR-87	LLD<4.34E-01	LLD<4.34E-01	402.58
KR-89	LLD<6.39E+00	LLD<6.39E+00	220.90
LA-140	LLD<1.27E-01	LLD<1.27E-01	1596.20
LA-142	LLD<3.35E-01	LLD<3.35E-01	641.83
MN-54	LLD<1.14E-01	LLD<1.14E-01	834.83
MN-56	LLD<1.28E-01	LLD<1.28E-01	846.76
NA-22	LLD<1.28E-01	LLD<1.28E-01	1274.55
NA-24	LLD<1.04E-01	LLD<1.04E-01	1368.60
NB-94	LLD<1.02E-01	LLD<1.02E-01	702.63
NB-95	LLD<9.53E-02	LLD<9.53E-02	765.78
NB-97	LLD<1.90E+00	LLD<1.90E+00	657.92
NP-237	LLD<9.13E-01	LLD<9.13E-01	86.50
NP-238	LLD<4.31E-01	LLD<4.31E-01	984.45
NP-239	LLD<8.99E-01	LLD<8.99E-01	277.60
PA-233	LLD<4.07E-01	LLD<4.07E-01	311.98
PA-234M	LLD<2.58E+01	LLD<2.58E+01	1001.03
PB-210	LLD<1.77E+01	LLD<1.77E+01	46.50
PB-212	LLD<2.93E-01	LLD<2.93E-01	239.00
PB-212A	LLD<2.92E-01	LLD<2.92E-01	239.00
PB-212B	LLD<4.37E+00	LLD<4.37E+00	300.10
PB-214	LLD<4.43E-01	LLD<4.43E-01	351.92
PB-214A	LLD<4.43E-01	LLD<4.43E-01	351.92
PB-214B	LLD<6.99E-01	LLD<6.99E-01	295.21
PO-210	LLD<8.78E+03	LLD<8.78E+03	804.00
PO-214	LLD<1.22E+03	LLD<1.22E+03	799.70
PO-216	LLD<5.49E+03	LLD<5.49E+03	804.90
PU-239	LLD<1.31E+03	LLD<1.31E+03	129.30
PU-241	LLD<4.08E+04	LLD<4.08E+04	148.57
RA-224	LLD<3.15E+00	LLD<3.15E+00	240.99
RA-226	LLD<3.08E+00	LLD<3.08E+00	186.10
RB-88	LLD<7.68E-01	LLD<7.68E-01	1836.00
RB-89	LLD<5.71E-01	LLD<5.71E-01	1031.88
RN-220	LLD<1.30E+02	LLD<1.30E+02	549.73
RU-103	LLD<1.84E-01	LLD<1.84E-01	497.08
RURH106	LLD<2.48E+00	LLD<2.48E+00	621.80
SB-124	LLD<1.41E-01	LLD<1.41E-01	602.72
SB-125	LLD<6.51E-01	LLD<6.51E-01	427.89
SB-125A	LLD<6.51E-01	LLD<6.51E-01	427.89
SC-46	LLD<1.49E-01	LLD<1.49E-01	1120.45
SE-75	LLD<2.13E-01	LLD<2.13E-01	264.66
SN-113	LLD<2.68E-01	LLD<2.68E-01	391.67
SR-85	LLD<1.93E-01	LLD<1.93E-01	513.99
SR-91	LLD<2.47E-01	LLD<2.47E-01	555.60
SR-92	LLD<1.22E-01	LLD<1.22E-01	1383.94
TA-182	LLD<4.35E-01	LLD<4.35E-01	1121.30
TC-99M	LLD<8.94E-02	LLD<8.94E-02	140.51
TE-123M	LLD<9.88E-02	LLD<9.88E-02	159.00
TE-125M	LLD<3.25E+01	LLD<3.25E+01	109.27
TE-132	LLD<1.38E-01	LLD<1.38E-01	228.16
TH-228	LLD<9.74E+00	LLD<9.74E+00	84.37
TH-229	LLD<3.84E+00	LLD<3.84E+00	86.44
TH-229B	LLD<4.71E+00	LLD<4.71E+00	137.02
TH-229C	LLD<2.42E+00	LLD<2.42E+00	193.59
TH-234	LLD<1.85E+00	LLD<1.85E+00	92.50
TH-234A	LLD<1.85E+00	LLD<1.85E+00	92.50

TH-234B	LLD<6.89E+00	LLD<6.89E+00	63.30
TL-208	LLD<1.67E-01	LLD<1.67E-01	583.14
U-232	LLD<3.36E+02	LLD<3.36E+02	270.26
U-235	LLD<2.00E-01	LLD<2.00E-01	185.71
U-235A	LLD<2.00E-01	LLD<2.00E-01	185.71
U-235B	LLD<8.03E-01	LLD<8.03E-01	143.76
U-237	LLD<5.00E-01	LLD<5.00E-01	208.00
W-187	LLD<3.88E-01	LLD<3.88E-01	685.74
XE-131M	LLD<4.43E+00	LLD<4.43E+00	163.98
XE-133	LLD<3.47E-01	LLD<3.47E-01	81.00
XE-133M	LLD<1.20E+00	LLD<1.20E+00	233.21
XE-135	LLD<1.41E-01	LLD<1.41E-01	249.79
XE-138	LLD<1.06E+00	LLD<1.06E+00	258.41
Y-88	LLD<8.22E-02	LLD<8.22E-02	1836.06
Y-91	LLD<4.42E+01	LLD<4.42E+01	1204.90
Y-91M	LLD<1.87E-01	LLD<1.87E-01	555.60
ZN-65	LLD<3.43E-01	LLD<3.43E-01	1115.55
ZR-95	LLD<2.05E-01	LLD<2.05E-01	756.73
ZR-97	LLD<1.08E-01	LLD<1.08E-01	743.33
TOTAL	9.72E+01 +-1.48E+00	9.72E+01 +-1.48E+00	

STANDARD DEVIATION = 0.54

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 8.48E-09 UC/LI
TOTAL MEASURED ACTIVITY = 9.72E+01 (+-1.48E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
3524.25	1762.56	31.	46.8	6.54E-01

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1021.58	510.79	334.	26.5	2.47E+00
12 ~ 69	608.86	165.	37.5	1.41E+00
1821.11	910.63	127.	29.8	1.55E+00
2919.39	1459.97	828.	7.1	1.52E+01
3527.37	1764.12	38.	42.0	7.88E-01

RUN CALIB

CALIB -- Version 2.06

WHC-SD-WM-DP-045
REV 1

Efficiency performed on 4/1/93
A.K. Dallas
4/1/93

222-S COUNTING ROOM WESTINGHOUSE HANFORD

```
CAL> EFF
MCA UNIT NUMBER (2): 1
ADC UNIT NUMBER (1.0): 1
DETECTOR NUMBER (   12): 4
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 1-APR-93
TIME COLLECT STARTED: 12:00
GEOMETRY NUMBER ( 12): 41
GEOMETRY DESCRIPTION: 22CC LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 441
42B47-A 22CC LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :   1.00000
NUMBER OF POINTS:    11
ACTIVITY IN MICROCURIES (YES/NO):

      PEAK    1
              ENERGY:      59.563
              ACTIVITY:    3.687000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D158000
              DECAY TIME ( 0.000000E-01 MINS.):  1-FEB-92
              TIME OF SOURCE CALIBRATION:  12:00
              DECAY TIME:   6.120000E+05 MINS
      EFFICIENCY =  2.550463E-02 (+-  1.311758E-04)

      PEAK    2
              ENERGY:      88.034
              ACTIVITY:    2.065000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D462.6
              DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  7.949910E-02 (+-  4.352131E-04)

      PEAK    3
              ENERGY:     122.061
              ACTIVITY:    1.881000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D271.8
              DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  1.082324E-01 (+-  6.692147E-04)

      PEAK    4
              ENERGY:     165.853
              ACTIVITY:    2.284000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D137.66
              DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  1.24[illegible]E-01 (+-  1.[illegible]E-03)
```

BEST AVAILABLE COPY

```
LOG(EFF) = -5.798443E+01 + 2.284603E+01*LOG(E) - 2.337798E+00*LOG(E)^2

      PEAK     5
               ENERGY:     391.668
               ACTIVITY:    7.301000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:  D115.09
               DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  5.422120E-02 (+-  5.866320E-04)

      PEAK     6
               ENERGY:     513.990
               ACTIVITY:    1.252100E+03
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:  D64.84
               DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  4.084660E-02 (+-  1.882325E-03)

      PEAK     7
               ENERGY:     661.650
               ACTIVITY:    8.032000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:  D11020
               DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  3.647674E-02 (+-  9.170283E-05)

      PEAK     8
               ENERGY:     898.021
               ACTIVITY:    2.014700E+03
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:  D106.61
               DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  2.626686E-02 (+-  2.552038E-04)

      PEAK     9
               ENERGY:    1173.240
               ACTIVITY:    1.092600E+03
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:  D1925.3
               DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  2.150980E-02 (+-  6.404292E-05)

      PEAK    10
               ENERGY:    1332.500
               ACTIVITY:    1.093200E+03
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:  D1925.3
               DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  1.974500E-02 (+-  6.005783E-05)

      PEAK    11
               ENERGY:    1836.130
               ACTIVITY:    2.135300E+03
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:  D106.61
               DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  1.537435E-02 (+-  1.418405E-04)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) =  1.227066E+02 - 7.976722E+01*LOG(E) + 1.920272E+01*LOG(E)^2
         - 2.059581E+00*LOG(E)^3 + 8.221420E-02*LOG(E)^4
```

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3219

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-2172	H&RWC	5-12-93	15:36	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-SOIL	LA-548-121	pCi/gWETwt	E11457	0

Sample Size	Customer ID
_____G OF SAMPLE	0343wq1

Remarks, Calculations, Results

100-10-100

SUPER SUPER RUSH

No weight

Sue Lai

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

Date	Time Completed	Lab Unit Mgr
5-14-93	13:40	[signature]

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

WHC-SD-WM-DP-045
REV 1

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD 14-MAY-93 14:53:43

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

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: [redacted]

SAMPLE DESCRIPTION: E9324-2172
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 9.9010E-04
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAY-93 AT 14:03:33

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 20-APR-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 14-MAY-93 14:53:43

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

WHC-SD-WM-DP-045
REV 1

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	703.65	351.72	1.58	248.	99.	50.9	PB-214A
1B		351.90			109.	28.2	
2	1020.92	510.38	2.25	134.	121.	33.2	RN-222,I-133,
2B		510.92			134.	19.6	TL-208,NA-22,
							ZN-65,RH-106
3	1166.19	583.03	0.89	117.	68.	53.5	EU-154,
3B		583.13			94.	24.1	TL-208
4	1218.52	609.20	1.55	81.	142.	25.3	BI-214A,
4B		609.19			122.	21.0	RU-103
5	1322.82	661.36	1.31	102.	107.	34.9	CS-137
5B		661.41			81.	28.8	
6	2921.37	1460.88	1.89	28.	561.	8.9	K-40
6B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD 14-MAY-93 14:53:43

WHC-SD-WM-DP-045
REV 1

SAMPLE: E9324-2172
DATA COLLECTED ON 14-MAY-93 AT 14:03:33
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<2.01E+02		LLD<2.01E+02		911.07	
AC-228A	LLD<2.01E+02		LLD<2.01E+02		911.10	
AC-228B	LLD<2.60E+02		LLD<2.60E+02		338.40	
AG-108M	LLD<3.75E+01		LLD<3.75E+01		433.94	
AG-110M	LLD<6.40E+01		LLD<6.40E+01		657.76	
AM-241	LLD<4.91E+01		LLD<4.91E+01		59.54	
AM-243	LLD<4.09E+01		LLD<4.09E+01		74.67	
AM-243A	LLD<4.09E+01		LLD<4.09E+01		74.67	
AM-243B	LLD<2.22E+02		LLD<2.22E+02		43.10	
AR-41	LLD<6.44E+01		LLD<6.44E+01		1293.64	
AU-198	LLD<4.01E+01		LLD<4.01E+01		411.80	
BA-133	LLD<5.64E+01		LLD<5.64E+01		356.02	
BA-139	LLD<1.45E+02		LLD<1.45E+02		165.85	
BA-140	LLD<1.52E+02		LLD<1.52E+02		537.27	
BA-141	LLD<1.23E+02		LLD<1.23E+02		190.23	
BE-7	LLD<3.65E+02		LLD<3.65E+02		477.59	
BI-207	LLD<3.49E+01		LLD<3.49E+01		569.70	
BI-212	LLD<3.38E+02		LLD<3.38E+02		727.27	
BI-214	LLD<1.17E+02		LLD<1.17E+02		609.32	
BI-214A	LLD<1.17E+02		LLD<1.17E+02		609.32	
BI-214B	LLD<4.47E+02		LLD<4.47E+02		1120.28	
BI-214C	LLD<4.15E+02		LLD<4.15E+02		1764.51	
CD-109	LLD<6.40E+02		LLD<6.40E+02		88.03	
CE 144	LLD<2.30E+02		LLD<2.30E+02		133.51	
CE-139	LLD<3.28E+01		LLD<3.28E+01		165.85	
CE-141	LLD<6.01E+01		LLD<6.01E+01		145.44	
CEPR144	LLD<4.59E+02		LLD<4.59E+02		133.51	
CO-56	LLD<4.32E+01		LLD<4.32E+01		846.76	
CO-57	LLD<2.91E+01		LLD<2.91E+01		122.06	
CO-58	LLD<4.49E+01		LLD<4.49E+01		810.75	
CO-60	LLD<5.73E+01		LLD<5.73E+01		1332.50	
CR-51	LLD<3.07E+02		LLD<3.07E+02		320.09	
CS-134	LLD<4.84E+01		LLD<4.84E+01		795.84	
CS-136	LLD<4.08E+01		LLD<4.08E+01		818.51	
CS-137	LLD<6.17E+01		LLD<6.17E+01		661.65	
CS-138	LLD<1.01E+02		LLD<1.01E+02		1435.86	
EU-152	LLD<2.51E+02		LLD<2.51E+02		1408.01	
EU-154	LLD<1.49E+02		LLD<1.49E+02		1274.45	
EU-154A	LLD<6.28E+01		LLD<6.28E+01		123.10	
EU-155	LLD<1.09E+02		LLD<1.09E+02		105.31	
FE-59	LLD<7.91E+01		LLD<7.91E+01		1099.25	
HF-181	LLD<3.80E+01		LLD<3.80E+01		482.20	
HG-203	LLD<3.51E+01		LLD<3.51E+01		279.20	
I-131	LLD<3.91E+01		LLD<3.91E+01		364.48	
I-132	LLD<3.99E+01		LLD<3.99E+01		667.69	
I-133	LLD<4.23E+01		LLD<4.23E+01		529.69	
I-134	LLD<5.93E+01		LLD<5.93E+01		847.03	

I-135	LLD<1.97E+02	LLD<1.97E+02	1260.41
K-40	LLD<1.48E+03	LLD<1.48E+03	1460.75
KR-85	LLD<1.17E+04	LLD<1.17E+04	513.99
R-85M	LLD<3.72E+01	LLD<3.72E+01	151.17
KR-87	LLD<8.40E+01	LLD<8.40E+01	402.58
KR-89	LLD<1.53E+03	LLD<1.53E+03	220.90
LA-140	LLD<5.49E+01	LLD<5.49E+01	1596.20
LA-142	LLD<1.01E+02	LLD<1.01E+02	641.83
MN-54	LLD<3.98E+01	LLD<3.98E+01	834.83
MN-56	LLD<4.87E+01	LLD<4.87E+01	846.76
NA-22	LLD<5.31E+01	LLD<5.31E+01	1274.55
NA-24	LLD<4.53E+01	LLD<4.53E+01	1368.60
NB-94	LLD<3.29E+01	LLD<3.29E+01	702.63
NB-95	LLD<4.13E+01	LLD<4.13E+01	765.78
NB-97	LLD<8.44E+01	LLD<8.44E+01	657.92
NP-237	LLD<1.62E+02	LLD<1.62E+02	86.50
NP-238	LLD<1.54E+02	LLD<1.54E+02	984.45
NP-239	LLD<2.02E+02	LLD<2.02E+02	277.60
PA-233	LLD<8.29E+01	LLD<8.29E+01	311.98
PA-234M	LLD<8.14E+03	LLD<8.14E+03	1001.03
PB-210	LLD<2.96E+02	LLD<2.96E+02	46.50
PB-212	LLD<6.42E+01	LLD<6.42E+01	239.00
PB-212A	LLD<6.39E+01	LLD<6.39E+01	239.00
PB-212B	LLD<8.87E+02	LLD<8.87E+02	300.10
PB-214	LLD<1.14E+02	LLD<1.14E+02	351.92
PB-214A	LLD<1.14E+02	LLD<1.14E+02	351.92
PB-214B	LLD<1.50E+02	LLD<1.50E+02	295.21
PO-210	LLD<3.15E+06	LLD<3.15E+06	804.00
PO-214	LLD<4.08E+05	LLD<4.08E+05	799.70
PO-216	LLD<2.02E+06	LLD<2.02E+06	804.90
U-239	LLD<4.04E+05	LLD<4.04E+05	129.30
PU-241	LLD<1.38E+07	LLD<1.38E+07	148.57
RA-224	LLD<7.88E+02	LLD<7.88E+02	240.99
RA-226	LLD<7.50E+02	LLD<7.50E+02	186.10
RB-88	LLD<4.15E+02	LLD<4.15E+02	1836.00
RB-89	LLD<2.35E+02	LLD<2.35E+02	1031.88
RN-220	LLD<3.30E+04	LLD<3.30E+04	549.73
RU-103	LLD<4.03E+01	LLD<4.03E+01	497.08
RURH106	LLD<7.97E+02	LLD<7.97E+02	621.80
SB-124	LLD<3.67E+01	LLD<3.67E+01	602.72
SB-125	LLD<1.16E+02	LLD<1.16E+02	427.89
SB-125A	LLD<1.16E+02	LLD<1.16E+02	427.89
SC-46	LLD<6.85E+01	LLD<6.85E+01	1120.45
SE-75	LLD<4.73E+01	LLD<4.73E+01	264.66
SN-113	LLD<5.27E+01	LLD<5.27E+01	391.67
SR-85	LLD<5.13E+01	LLD<5.13E+01	513.99
SR-91	LLD<7.08E+01	LLD<7.08E+01	555.60
SR-92	LLD<6.98E+01	LLD<6.98E+01	1383.94
TA-182	LLD<1.40E+02	LLD<1.40E+02	1121.30
TC-99M	LLD<3.02E+01	LLD<3.02E+01	140.51
TE-123M	LLD<3.18E+01	LLD<3.18E+01	159.00
TE-125M	LLD<8.41E+03	LLD<8.41E+03	109.27
TE-132	LLD<3.00E+01	LLD<3.00E+01	228.16
TH-228	LLD<1.59E+03	LLD<1.59E+03	84.37
TH-229	LLD<6.78E+02	LLD<6.78E+02	86.44
TH-229B	LLD<1.68E+03	LLD<1.68E+03	137.02
TH-229C	LLD<5.84E+02	LLD<5.84E+02	193.59
-234	LLD<4.06E+02	LLD<4.06E+02	92.50
TH-234A	LLD<4.06E+02	LLD<4.06E+02	92.50
TH-234B	LLD<4.49E+02	LLD<4.49E+02	63.30

TL-208	LLD<6.20E+01	LLD<6.20E+01	583.14
U-232	LLD<6.61E+04	LLD<6.61E+04	270.26
U-235	LLD<4.85E+01	LLD<4.85E+01	185.71
U-235A	LLD<4.85E+01	LLD<4.85E+01	185.71
U-235B	LLD<2.48E+02	LLD<2.48E+02	143.76
U-237	LLD<1.33E+02	LLD<1.33E+02	208.00
W-187	LLD<1.60E+02	LLD<1.60E+02	685.74
XE-131M	LLD<1.57E+03	LLD<1.57E+03	163.98
XE-133	LLD<5.20E+01	LLD<5.20E+01	81.00
XE-133M	LLD<2.51E+02	LLD<2.51E+02	233.21
XE-135	LLD<3.13E+01	LLD<3.13E+01	249.79
XE-138	LLD<2.40E+02	LLD<2.40E+02	258.41
Y-88	LLD<3.94E+01	LLD<3.94E+01	1836.06
Y-91	LLD<1.92E+04	LLD<1.92E+04	1204.90
Y-91M	LLD<5.35E+01	LLD<5.35E+01	555.60
ZN-65	LLD<1.31E+02	LLD<1.31E+02	1115.55
ZR-95	LLD<7.52E+01	LLD<7.52E+01	756.73
ZR-97	LLD<3.87E+01	LLD<3.87E+01	743.33
TOTAL	0.00E-01 +-0.00E-01	0.00E-01 +-0.00E-01	

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
703.65	351.72	99.	50.9	2.45E+00
1020.92	510.38	121.	33.2	4.24E+00
1166.19	583.03	68.	53.5	2.65E+00
1218.52	609.20	142.	25.3	5.70E+00
1322.82	661.36	107.	34.9	4.58E+00
2921.37	1460.88	561.	8.9	4.78E+01

8 8077

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-8781	H&RWC	5-12-93	15:41	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E11457	1

Sample Size	Customer ID
? 100 uL	0343wq1

Remarks, Calculations, Results

COUNT AS uCI/L

$Pu^{239} = 5.22 \times 10^{-2}$ uCi/G "AEA" - 480MIN

ATTACH PRINTOUT

100 uL 0343

RUSH

$\frac{.4687(370.42)(10)(1000)}{.4537(2.22\times10^6)} = \frac{1.82 \text{ uCi/L}}{5.019 \text{ g/L}} = 3.62\times10^{-1}$ uCi/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Watmond			
Hrs	Hrs 5-18-93 5-18-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-18-93		

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

#1 VR 5-18-93

E9324-8781

$\frac{7535}{30} - 6$

^{238}Pu

$490.33(0.076) - (7.265)(.5698) = 33.13$ d/m

$\frac{33.13(10)(1000)}{(.5698)(2.22\times10^6)} = \frac{2.62\times10^{-1} \text{ uCi/L}}{5.019 \text{ g/L}} = 5.22\times10^{-2}$ uCi/g

WHC-SD-WM-DP-045
REV 1

VRaymond 5-19-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

WHC-SD-WM-DP-045
REV 1

DATA REDUCTION REPORT

SAMPLE
E9324-8781 H&RWC/PU
File ID: 3D8077.SPC

Counted on: 3/18/93 0201 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	3499.6	3448.9	364.629	364.629	16.000	6.254	8.000	4.171
2	364.8	555.2	310.350	310.350	16.000	6.729	8.000	4.281
3	3370.3	3348.1	235.199	235.199	16.000	7.777	8.000	5.674
4	4.2	3.6	185.687	185.687	16.000	10.381	8.000	0.853

PEAK RESULTS

Peak ID	Isotope	AREA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ml
1	Cm244	0.4537	5.796	5.777	0.019	0.03	46.17	249.98	0.113E-03
	Cm243		5.786	5.777	0.009				0.134E-07
2	Pu238	0.0760	5.499	5.522	-0.023	0.03	7.73	38.55	0.862E-0
3	Pu239	0.4687	5.143	5.169	-0.026	0.04	47.70	238.84	0.116E-03
	Pu240		5.144	5.169	-0.025				0.116E-03
4		0.0017		4.966		0.05	0.17	0.93	0.417E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.064 + (0.0047)*(Channel
Energy range (MeV): 4.064 TO 6.470
Efficiency 0.1847 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	31104.0	100.000
Smoothed	31103.6	99.999
Composite fit	30886.6	99.302
Residuals	216.9	0.428

Analyzed by: _____
VR

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Raw Data Dump for AFA Spectrum: SF:SD6077.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	1.	0.	1.	2.
21	2.	0.	2.	2.	0.	3.	0.	1.	2.	0.
31	1.	0.	0.	3.	2.	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.	1.	0.
71	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
81	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
101	0.	0.	0.	0.	1.	1.	0.	0.	0.	1.
111	0.	0.	0.	0.	0.	0.	2.	0.	1.	0.
121	0.	0.	0.	1.	0.	2.	0.	0.	0.	0.
131	0.	1.	0.	1.	2.	1.	3.	0.	2.	1.
141	1.	0.	0.	2.	2.	0.	1.	0.	3.	0.
151	0.	0.	1.	0.	0.	0.	0.	0.	2.	1.
161	1.	2.	2.	1.	0.	0.	0.	0.	1.	0.
171	1.	1.	2.	1.	0.	3.	2.	2.	3.	0.
181	2.	1.	1.	5.	3.	3.	2.	0.	4.	0.
191	0.	1.	1.	0.	1.	3.	1.	2.	7.	2.
201	4.	2.	2.	7.	1.	6.	6.	11.	8.	13.
211	17.	22.	14.	27.	19.	61.	70.	106.	142.	194.
221	246.	322.	368.	452.	496.	692.	803.	908.	1142.	1370.
231	1396.	1910.	2130.	2232.	2171.	1857.	1061.	1202.	794.	467.
241	270.	131.	53.	16.	14.	1.	0.	2.	0.	0.
251	0.	0.	0.	1.	0.	0.	1.	1.	0.	0.
261	0.	0.	0.	0.	0.	0.	1.	0.	1.	1.
271	2.	0.	3.	1.	1.	2.	2.	2.	3.	0.
281	4.	2.	1.	1.	3.	1.	6.	4.	6.	6.
291	7.	11.	15.	16.	31.	34.	63.	67.	99.	122.
301	99.	150.	125.	180.	204.	236.	295.	333.	347.	388.
311	374.	272.	182.	107.	48.	20.	7.	3.	0.	2.
321	0.	0.	1.	2.	0.	2.	1.	3.	3.	3.
331	2.	2.	6.	6.	8.	3.	4.	6.	8.	4.
341	10.	14.	5.	24.	23.	31.	49.	70.	117.	172.
351	275.	343.	484.	631.	790.	903.	921.	930.	1000.	1236.
361	1640.	1960.	2420.	2459.	2375.	1896.	1215.	640.	248.	77.
371	23.	5.	4.	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.	1.	0.
421	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-045
REV 1

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#2 2876

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-8881	H&RWC	5-12-93	15:41	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E11457	1

Sample Size	Customer ID
? 100 mL	0343wq1

Remarks, Calculations, Results

DUPLICATE SAMPLE

COUNT AS uCI/L

100 mL 63843

RUSH

$Pu^{238} = 5.42 \times 10^{-2}$ uCi/g

"ALA" - 480MIN

ATTACH PRINTOUT

$$\frac{.4684(390.42)(10)(1000)}{.1508(2.22\times10^6)} = \frac{1.83\ uCi/L}{5.019\ g/L} = 3.64\times10^{-1}\ uCi/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	5-19-93 5-18-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-18-93		

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

#3 ve 5-18-93

$\frac{6752}{30} - 5$

E 9324-8881

$440.13(.0781) - (7.265)(.5082) = 30.68$ dpm

$$\frac{30.68(1000)(10)}{.5082(2.22\times10^6)} = \frac{2.72\times10^{-1}\ uCi/L}{5.019\ g/L} = 5.42\times10^{-2}\ uCi/g$$

WHC-SD-WM-DP-045
REV 1

9313090.1491

Raymond 5-19-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

WHC-SD-WM-DP-045
REV 1

DATA REDUCTION REPORT

SAMPLE
E9324-6881 H&RWC/PU
File ID: SD2876.SPC

Counted on: 3/18/93 @20: 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	2009.8	2036.1	363.511	363.511	24.000	19.915	12.000	7.920
2	337.1	338.3	306.780	306.780	26.000	17.313	14.000	8.573
3	2169.4	2178.1	232.726	232.726	24.000	13.721	12.000	6.922
4	8.2	6.5	142.280	142.280	76.000	2.000	38.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ml
1	Pu236	0.4506	5.756	5.771	-0.015	0.07	41.70	326.82	0.102E-03
	Cm243		5.786	5.771	0.015				0.137E-03
2	Pu238	0.0781	5.499	5.501	-0.002	0.06	7.22	56.58	0.340E-04
	Am241		5.480	5.501	-0.021				0.184E-04
3	Pu239	0.4684	5.143	5.160	-0.017	0.07	43.33	330.33	0.104E-03
	Pu240		5.144	5.160	-0.016				0.104E-03
4		0.0027		4.744		0.01	0.25	1.54	0.603E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.090 + (0.0046)*Channel
Energy range (MeV): 4.090 TO 6.443
Efficiency = 0.1381 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	46367.0	100.000
Smoothed	46366.4	99.999
Composite fit	46250.0	99.748
Residuals	116.4	0.251

Analyzed by: _____
VR

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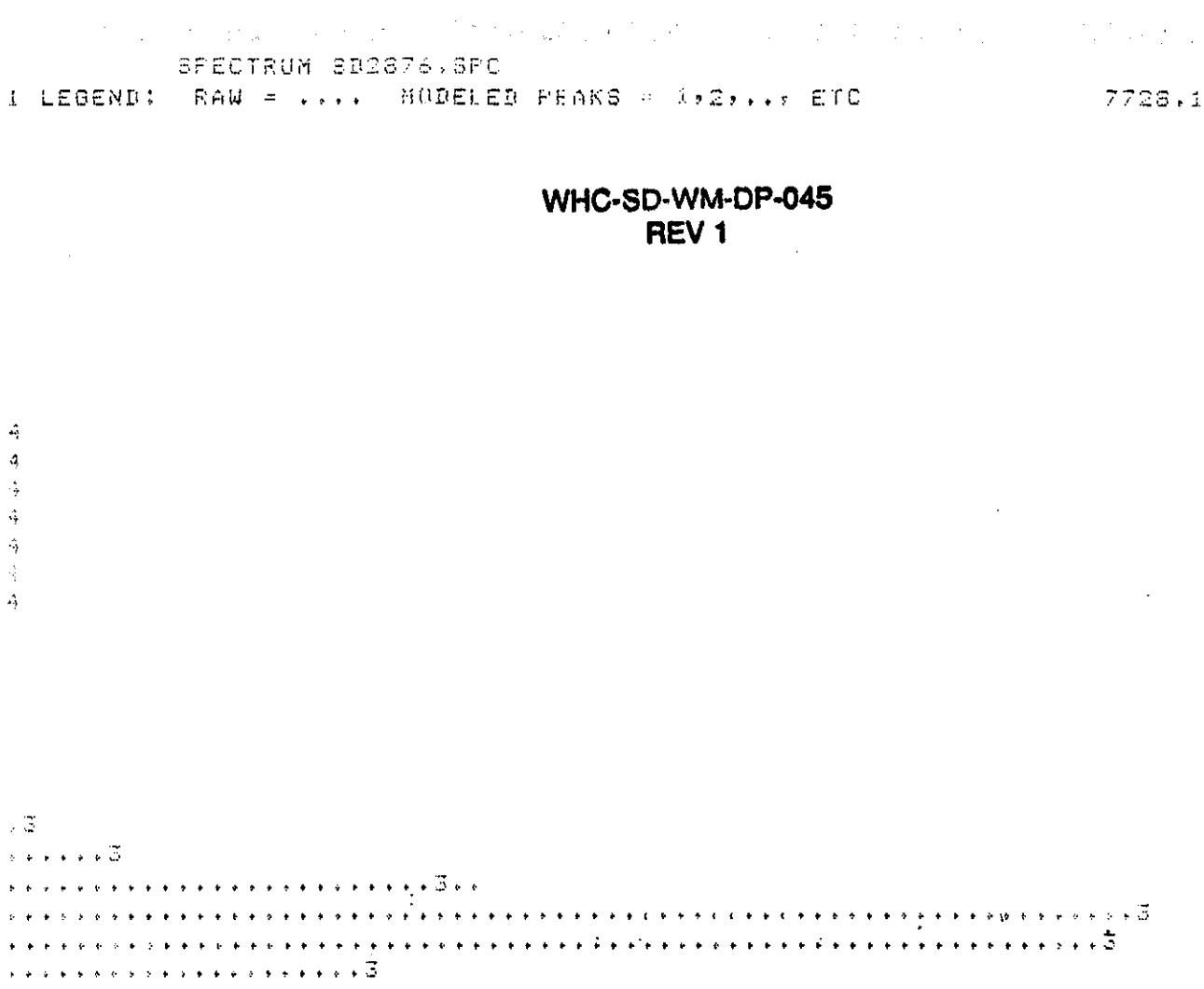

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Raw Data Dump for AEA Spectrum: SP:SD2876.SPC

1	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
11	0.	1.	1.	1.	1.	1.	0.	0.	1.	0.
21	1.	3.	0.	0.	0.	2.	2.	2.	0.	0.
31	0.	0.	0.	1.	2.	1.	1.	0.	1.	0.
41	0.	1.	1.	1.	2.	1.	1.	2.	4.	1.
51	1.	3.	1.	1.	0.	1.	0.	1.	0.	1.
61	2.	1.	1.	3.	1.	2.	2.	1.	1.	2.
71	2.	2.	0.	2.	0.	1.	2.	1.	2.	1.
81	1.	0.	3.	1.	1.	2.	3.	1.	3.	2.
91	2.	0.	2.	1.	0.	1.	2.	2.	1.	1.
101	0.	1.	0.	1.	0.	1.	2.	2.	0.	0.
111	1.	0.	0.	0.	3.	1.	3.	2.	1.	1.
121	3.	0.	0.	4.	0.	0.	1.	1.	2.	1.
131	2.	3.	2.	5.	2.	3.	3.	2.	4.	3.
141	6.	3.	3.	4.	0.	4.	3.	4.	3.	4.
151	0.	4.	3.	4.	3.	1.	3.	2.	6.	3.
161	3.	6.	3.	2.	2.	8.	1.	3.	3.	4.
171	8.	3.	8.	2.	1.	13.	6.	3.	12.	10.
181	11.	4.	14.	10.	2.	3.	4.	7.	10.	11.
191	11.	7.	8.	9.	6.	11.	18.	8.	13.	13.
201	20.	15.	15.	19.	34.	28.	29.	23.	40.	39.
211	62.	109.	141.	138.	183.	230.	252.	303.	368.	308.
221	511.	600.	683.	743.	863.	952.	980.	1137.	1253.	1147.
231	1233.	1188.	1182.	1156.	981.	922.	746.	677.	509.	393.
241	359.	273.	184.	106.	89.	63.	41.	19.	11.	10.
251	12.	5.	4.	2.	2.	5.	3.	4.	8.	2.
261	7.	4.	8.	4.	6.	8.	1.	3.	6.	4.
271	8.	6.	5.	6.	3.	8.	5.	6.	7.	8.
281	4.	8.	7.	17.	13.	19.	28.	37.	44.	37.
291	49.	52.	67.	73.	86.	88.	110.	119.	117.	161.
301	177.	181.	213.	161.	194.	181.	190.	166.	161.	140.
311	124.	112.	106.	97.	68.	49.	33.	28.	23.	16.
321	21.	8.	11.	15.	14.	13.	11.	10.	15.	13.
331	8.	17.	17.	10.	18.	23.	24.	20.	32.	34.
341	47.	59.	81.	97.	113.	113.	148.	190.	237.	274.
351	377.	403.	504.	531.	631.	638.	769.	810.	894.	938.
361	1052.	1065.	1099.	1161.	1113.	1057.	938.	983.	871.	693.
371	600.	482.	376.	295.	177.	148.	107.	69.	38.	20.
381	17.	11.	0.	1.	0.	1.	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	1.	0.	0.	1.	0.	0.	0.	0.	1.	2.
431	2.	0.	2.	0.	0.	2.	1.	1.	0.	0.
441	0.	1.	0.	0.	1.	0.	2.	0.	0.	0.
451	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	0.	2.	0.	0.	1.	1.	1.	0.
471	0.	0.	2.	0.	2.	0.	0.	1.	0.	1.
481	3.	2.	1.	1.	3.	0.	3.	0.	0.	0.
491	0.	0.	0.	1.	0.	0.		0.	0.	0.
511	0.	0.								

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 3
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 9
TODAY'S DATE: 08/19/92
DECAY CORR'N: 2.554 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242920	5	48575	307	48882	0.4981
242932	5	48577	307	48884	0.4982
242052	5	48401	305	48706	0.4964
243038	5	48599	307	48906	0.4984
242907	5	48572	307	48879	0.4981
242795	5	48550	306	48856	0.4979
243214	5	48634	307	48941	0.4988
243707	5	48732	309	49041	0.4998
242647	5	48520	306	48826	0.4976
241653	5	48322	304	48625	0.4955
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998				
MIN	0.4955	48548	306	48855	0.4979

BEST AVAILABLE COPY

DET # 1 2 3 4 5 6 7 8 JUPITER II

JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT Emp 1B	Np	84	152	155	149	154	150	153	153				
	Pu	113	232	233	230	232	229	232	233				
DATE 5-17-93	Am	139	305	306	302	304	301	303	307				
	Cm	163	373	373	370	371	369	371	370				

JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT Aje B	Np		147	151	145	150	145	149	149				
	Pu		227	229	226	229	225	227	229				
DATE 5-16-91	Am		300	303	295	301	296	300	304				
	Cm		369	370	366	367	364	368	367				

JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT VR B/G	Np	83	150	154	148	150	147	153	153				
	Pu	111	230	232	228	229	226	232	234				
DATE 5-18-93	Am	137	303	304	300	301	299	303	307				
	Cm	162	371	372	368	368	365	371	371				

JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT Emp B/G	Np	84	152	154	149	153	150	150	152				
	Pu	113	231	232	229	232	229	229	233				
DATE 5-20-93	Am	139	305	305	301	303	302	300	307				
	Cm	163	372	372	370	371	369	367	370				

JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT AJ B/G	Np	83	149	153	147	153	151	154	152				
	Pu	111	227	229	225	232	229	232	233				
DATE 5-21-93	Am	137	299	300	296	304	301	304	307				
	Cm	161	365	365	362	371	369	370	370				

JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT VR D/G	Np	83	149	153	147	152	149	152	152				
	Pu	111	228	230	226	230	227	231	232				
DATE 5-22	Am	137	300	301	297	302	300	303	307				
	Cm	161	367	367	364	369	368	370	370				

TE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

3-3 3400

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-8782	H&RWC	5-12-93	15:41	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/G Rec	E11457	0

Sample Size	Customer ID
~~1 ML~~ .050 ml	0343wq1

Remarks, Calculations, Results

"AEA" - 480MIN
ATTACH PRINTOUT

COUNT AS uCI/L
1 ml 8m HNO3
.100 ml Am243 spike 58B43

$\frac{603(565.5)(1000)(20)}{904(2.22\times10^6)} = \frac{3.348}{5.019 g/L} = 6.77\times10^{-1}$ uCi/g

Pa 5/24/93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond	[redacted]	[redacted] Raymond	
Hrs	Hrs 5-17-93	Hrs	Hrs 5-18-93	Hrs

Date	Time Completed	Lab Unit Mgr
5-14-93	1400	

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

AM-241: LA-503-156 (D-0) SOLIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		58B43
E9324-8782	Activity of Am243 Tracer in dpm/mL	(SPKA)	5655
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
	Volume of Sample in mL	(SS)	0.05
Rerun No.	Dilution Factor	(DF)	1
	Digest Grams of Solids / Liter	(D g/L)	5.019
Analyst	Am-241 Area Peak Height from AEA	(C241)	603
[redacted]	Am-243 Area Peak Height from AEA	(C243)	904
Date	Total At Count	ATOT	5630
05/14/93	AT Count Time in Minutes	(MIN CT'd)	30
	Background in CPM	(BKG)	5

Am-241 µCi/g = (C241) (SPKA) (SPKV) (DF) (1000mL/L) ÷ (C243) (SS) (D g/L) (2220000dpm/mL)
Tracer % Rec = (ATAT÷MIN CT'd - bkg) (2) [C243 ÷ (C241 + C243)] ÷ (SPKA) (SPKV)
Relative Counting Err = Square Root of [(1÷C241) + (1÷C243)] 100

Am-241 µCi/g	=	6.77E-1
Relative counting error	=	5.3%
Am-243 Tracer Recovery	=	38.8%

Data Entry by:	Date:	20-May-93
Approved by:	Date:	
Verified by:	Date:	

Form 4 Rev. 0

WHC-SD-WM-DP-045
REV 1

#1 R 5-17-93

5630 - 5
30

E9324-8782

WHC-SD-WM-DP-045
REV 1

UReymond 5-18-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
E9324-8782
File ID: SD3400.SPC

Counted on: 3/18/93 @12: 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	4.1	3.1	482.109	482.109	20.000	16.330	10.000	1.975
2	7.1	7.8	369.623	369.623	20.000	11.618	10.000	1.316
3	1080.0	1098.6	302.366	302.366	28.000	20.497	14.000	3.739
4	1624.3	1677.7	256.687	256.687	28.000	17.723	14.000	3.333

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1		0.0018		6.334		0.08	0.13	0.63	0.283E-04
2	Cm244	0.0045	5.796	5.794	0.002	0.06	0.32	1.59	0.710E-[illegible]
	Cm243		5.786	5.794	-0.008				0.380E-06
3	Th228	0.4102	5.430	5.471	-0.041	0.10	29.16	203.90	0.918E-04
	Am241		5.480	5.471	0.009				0.674E-04
4	Am243	0.5835	5.234	5.252	-0.018	0.09	41.47	1872.01	0.843E-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	33316.0	100.000
Smoothed	33313.7	99.999
Composite fit	33337.9	100.028
Residuals	-222.2	-0.629

Analyzed by: _____

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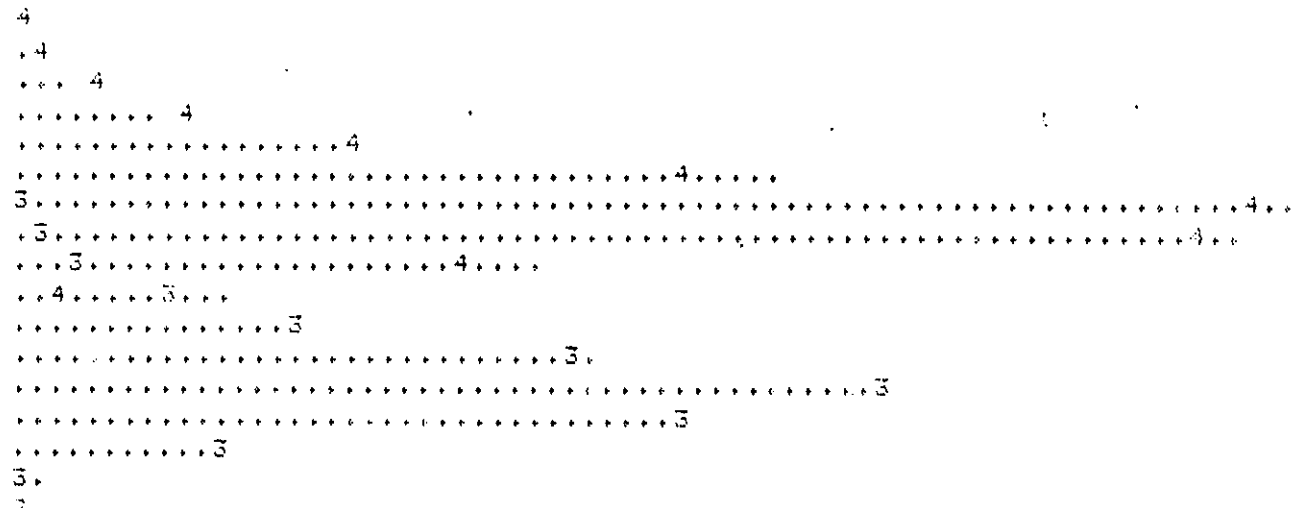
SPECTRUM SD3400.SPC

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,... ETC 6017.7



BEST AVAILABLE COPY

Raw Data Dump for AEA Spectrum: SP:SB3400.SPC

1	0.	0.	0.	0.	0.	0.	0.	2.	3.	1.
11	1.	1.	1.	0.	1.	0.	0.	1.	0.	2.
21	1.	0.	1.	3.	0.	0.	1.	0.	0.	0.
31	0.	1.	0.	0.	0.	0.	1.	1.	0.	1.
41	3.	1.	1.	0.	0.	0.	1.	4.	0.	0.
51	1.	1.	1.	1.	2.	1.	1.	0.	1.	1.
61	1.	0.	0.	0.	0.	1.	1.	1.	0.	3.
71	3.	2.	1.	2.	2.	1.	0.	0.	0.	2.
81	1.	1.	0.	2.	0.	1.	0.	0.	0.	4.
91	1.	1.	1.	2.	0.	0.	1.	3.	1.	0.
101	3.	0.	0.	0.	1.	1.	0.	1.	0.	2.
111	0.	0.	0.	1.	0.	1.	2.	3.	0.	1.
121	0.	2.	0.	2.	1.	0.	1.	1.	0.	0.
131	1.	3.	2.	1.	1.	4.	2.	1.	3.	0.
141	3.	2.	0.	5.	2.	2.	1.	2.	1.	3.
151	2.	2.	0.	2.	4.	1.	0.	3.	1.	0.
161	1.	3.	1.	0.	4.	2.	1.	1.	3.	2.
171	4.	0.	2.	0.	3.	1.	6.	1.	3.	1.
181	2.	4.	0.	1.	3.	3.	5.	3.	6.	7.
191	7.	7.	3.	5.	4.	3.	9.	11.	10.	7.
201	3.	13.	11.	7.	10.	17.	8.	10.	18.	17.
211	21.	21.	30.	25.	39.	29.	28.	26.	31.	32.
221	46.	50.	61.	39.	68.	84.	99.	92.	102.	142.
231	125.	133.	153.	169.	210.	218.	248.	260.	325.	343.
241	360.	400.	457.	531.	527.	605.	640.	650.	696.	745.
251	837.	824.	872.	947.	873.	890.	904.	826.	784.	746.
261	670.	618.	308.	421.	343.	301.	248.	180.	168.	126.
271	113.	84.	118.	97.	104.	101.	110.	99.	95.	183.
281	113.	152.	153.	181.	216.	215.	231.	274.	283.	301.
291	386.	398.	423.	440.	473.	516.	541.	337.	403.	357.
301	569.	574.	589.	509.	530.	464.	440.	377.	318.	276.
311	203.	186.	156.	124.	79.	69.	50.	30.	25.	20.
321	20.	13.	5.	5.	1.	5.	0.	2.	1.	2.
331	0.	0.	0.	0.	3.	1.	0.	0.	0.	0.
341	0.	2.	0.	3.	2.	3.	3.	2.	2.	3.
351	7.	3.	3.	3.	3.	4.	3.	3.	3.	4.
361	4.	3.	2.	2.	5.	3.	5.	1.	6.	3.
371	4.	4.	1.	3.	3.	2.	0.	1.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
411	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	2.	1.
431	0.	1.	1.	1.	3.	2.	0.	1.	1.	0.
441	0.	0.	2.	4.	0.	0.	0.	0.	0.	0.
451	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	0.	3.	1.	0.	1.	0.	1.	0.
471	2.	1.	2.	1.	0.	2.	0.	2.	4.	2.
481	3.	2.	3.	0.	3.	1.	0.	1.	0.	1.
491	0.	0.	1.	0.	0.	0.	0.	0.	1.	0.
511	0.	0.								

WHC-SD-WM-DP-045
REV 1

BEST AVAILABLE COPY

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	154	151	153	153	Out of Service			
EMB A/G	Pu	111	229	228	229	232	229	231	233				
DATE	Am	137	302	299	301	304	302	303	307				
5-11-93	Cm	161	370	365	369	372	370	371	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	152	155	148	151	147	150	150				
EMB A G	Pu	113	233	234	225	230	226	231	234				
DATE	Am	139	306	307	301	301	299	305	306				
5-12-93	Cm	164	371	373	370	369	366	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	85	152	156	150	154	151	152	153				
EMB A/G	Pu	113	232	235	230	233	230	231	233				
DATE	Am	140	305	307	302	304	302	303	308				
5-13-93	Cm	164	373	374	371	372	370	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	151	158	146	151	147	150	151				
A EMB	Pu	111	230	238	227	230	227	230	231				
DATE	Am	138	304	310	299	302	299	300	305				
5-14-93	Cm	162	372	376	367	369	366	368	369				
JUP AEA #	PK	3.1	3.2	3.3 OK	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	151	175 147	150	152	148	150	153				
DM/G	Pu	112	231	257 225	231	231	227	229	234				
DATE	Am	139	304	329 297	303	302	299	301	308				
5-15-93	Cm	163	372	397 363	371	370	367	368	371				
JUP AEA #	PK	3.1	3.2	3.3 OK	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	151	160 154	149	153	147	153	152				
DM/B G	Pu	112	231	239 232	229	232	225	231	233				
DATE	Am	138	305	312 304	301	304	297	303	307				
5-16-93	Cm	163	372	379 372	369	371	365	371	370				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

BEST AVAILABLE COPY

Serial No	Sample Point	Date	Time Issued	Priority
E 9324.-8786	H&RWC	5-12-93	15:41	20

Determination	Method/Standard	Result Units	Charge Code	Returns
Sr90	LA-220-101	uCi/G Rec	E11457	0

Sample Size	Customer ID
1 ML + 1ml Sr Carrier	0343wq1

Remarks, Calculations, Results

Sep time 18.5
Separate 5/14/93

$$\frac{5.17\ uCi/L}{5.0190\ g/L} = 1.03\ uCi/g$$

8.1900
8.1018
0.0882

C Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	D.H.Wilson			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/14/93		[signature]	5-17-93 [signature]

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

10/2 5-15-93 @ 0050 DM ΔT=6.58

E9324-8786

44239/10 - 11

Sr Calculation by DM on 05-15-1993 at 02:57:04
Det #10 2 -inch mount Sr eff : .4051 Y eff : .4503

Sample size : 1 mL Dilution : 1 Method : 1

Mount # 1 Decay time = 6.58 hrs

44239
---------- - 11.0 = 4.5587E+00 uCi/L strontium = 5.16855
10 .882

04/28/87 Det 10 Sry-90 ratios

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.4498	0.4210	0.4786

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.3837	0.3632	0.4038

Esr = .4370/.4694 = 0.9360 , 1"

Ey = .5018/.4694 = 1.0640 , 1"

Esr = .3728/.4005 = 0.9466 , 2"

Ey = .4282/.4005 = 1.0524 , 2"

RATIOS GENERATED USING PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK RHO-QA-NB-47, VOL 3: PAGES 44, 45, 57, & 58

02/18/92 Det 10 CALCULATED Sr AND Y-90 EFFs

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5053	0.4729	0.5377

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.4279	0.4050	0.4503

Approved
2-18-93

BEST AVAILABLE COPY

WHC-SD-WM-DP-045
REV 1

100-K AREA BASINS

CUSTOMER ID NUMBER 0344WQL

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WHC-SD-WM-DP-045
REV 1

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-8700	H&RWC	5-12-93	15:41	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	G/L	E11457	0

Sample Size	Customer ID
?	0344WQL

Remarks, Calculations, Results:

JAR ID#
GRAMS SAMPLE .4988 5/12/93
VOLUME ON COMPLETION ~~100ml~~ .100L BJ

SUPER SUPER RUSH

.4988 / .100L = 4.9

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/12/93	23.30	Bertrand Griffin II 5-13-93	5-17-93

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

E9325-8700

SEQUENCE # : 13
WT 1: 0.4988
WT 2: 0.0000

NET WEIGHT:

---> -0.4988 GRAMS

88 05/12/93 @ 07:08:24

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-1001	H&RWC	5-12-93	15:41	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LA-519-151	NONE	E11457	0

Sample Size	Customer ID
?	0344WQL

Remarks, Calculations, Results

Sample or Tank ID? KE BASIN
Color and Est Vol? DARK BROWN 250 ml
Clarity? CLOUDY
Solids Y/n
Phases? /
OTR or CPM ? 300 mR

SUPER SUPER RUSH

Dry solid wt.
6.8455g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/13/93	1500	Bertrand Griffin II 5-13-93	5-17-93

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

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-8740	H&RWC	5-12-93	15:42	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E11457	0

Sample Size	Customer ID STD 104 82%
? .025 mL - 10 mL - .025 mL	0344WQL

Remarks, Calculations, Results

SPIKE # 90838 .24
SPIKEVAL 6.25×10^{-4} g/L .42

$$\frac{.24(6.25\times10^{-4})(.6040)(1)}{\frac{5.625}{5.625}(.42)-.24)} = \frac{1.28\,g/L}{4.998\,g/L} = 2.50\times10^{-1}\,g/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/15/93	23:[illegible]	[illegible]	5-17-93

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

Analytical Original Card was not received. [illegible] 08/24/93

Serial No.	Sample Point	Date	Time Issued	Priority
S 5543.-9267	SHIFT STD'S	5- 1-93	13:30	26

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

Sample Size	Customer ID
100-10-100	B SHIFT

Remarks, Calculations, Results:

S267 UF1C
STD# 126838 RESULT 3.1867-2
STD VAL 3.04-2 %REC 104.82%

SPIKE ID/VAL 90838/6.25x10^-4 g/L
SPIKE VOL. .100 mL

[illegible] 5/15/93 .14 .41

$\frac{.14(6.25\text{-}4)(.1)(1010)}{\frac{5.7}{5.6}(.41)-.14}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5/15/93	23:45	[illegible] Judy Harris

54-8800-061 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-8755	H&RWC	5-12-93	15:42	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP-SOL	LA-505-151	uG/G Rec	E11457	0

Sample Size	Customer ID
4.9880 g/l G OF SAMPLE	0344WQL

Remarks, Calculations, Results

Zr 1424/4.988 = 2.85E2 ug/g rec
Sr 237/4.988 = 4.75E1
Al 4.28897E5/4.988 = 8.60E4
Co 193/4.988 = 3.87E1
Cu 9.130E3/4.988 = 1.83E3
Li 36.0/4.988 = 7.22
Zn 7216/4.988 = 1.45E3
Ni 534/4.988 = 1.07E2

SUPER SUPER RUSH

→ OVER

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs 5/14/93
Date	Time Completed	Lab Unit Mgr		

54-6800-061 (10-83)

E9325 - 8756

Fe 7.05612E5/4.988 = 1.41E5
Ca 1.8023E4/4.988 = 3.61E3
Cr 3.761E3/4.988 = 7.54E2
Nd 1.984E3/4.988 = 3.98E2
Sm 7.140E3/4.988 = 1.43E3
Ba 934/4.988 = 1.87E2
P 5.456E3/4.988 = 1.09E3
S 6.696E3/4.988 = 1.34E3
Mg 5.127E3/4.988 = 1.03E3
As 289/4.988 = 5.79E1
~~Na 289/4.988 = 1.0~~ 5/14/93
Na 577/4.988 = 1.16E2
Mo 110/4.988 = 2.21E1
Pb 6.018E3/4.988 = 1.21E3
Ti 667/4.988 = 1.34E2
Cd 783/4.988 = 1.57E2
K 855/4.988 = 1.71E2
Mn 5.214E3/4.988 = 1.05E3
Sb 2.562E3/4.988 = 5.14E2
V 5.252E3/4.988 = 1.05E3
Be 230/4.988 = 4.61E1
Tl 4.191E3/4.988 = 8.40E2

Identity 1: E9325 H&RWC 0344wql Identity 2: 4.9880 g/l 11:02 AM May 14, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	1423.747	237.063	-932.798	-40.291	-586.036	-1710.090	428897.277	-587.317
S.D.	15.311	1.922	68.335	24.389	20.394	48.127	2776.943	13.137
% R.S.D.	1.075	0.811	7.326	60.533	3.480	2.814	0.647	2.237

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	192.806	9130.171	35.965	7216.396	533.731	-3445.626	-77.469	705612.278
S.D.	5.975	60.751	0.904	34.048	6.746	4.413	1.113	3543.271
% R.S.D.	3.099	0.665	2.515	0.472	1.264	0.128	1.437	0.502

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	18023.102	3760.862	1984.563	1078236.426	-546.198	7139.531	934.413	5455.659
S.D.	112.372	29.867	67.722	8003.054	37.670	78.709	5.697	84.622
% R.S.D.	0.623	0.794	3.412	0.742	6.897	1.102	0.610	1.551

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	6696.379	5126.589	289.441	577.364	110.468	-331.040	-43.994	6018.170
S.D.	110.584	26.013	14.826	9.721	0.645	13.264	11.987	20.272
% R.S.D.	1.651	0.507	5.122	1.684	0.584	4.007	27.246	0.337

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	667.322	783.405	-621.452	855.070	5214.018	2561.742	5252.425	230.189
S.D.	6.704	6.241	8.187	12.042	23.678	107.014	47.420	1.521
% R.S.D.	1.005	0.797	1.317	1.408	0.454	4.177	0.903	0.661

	Tl (ppb)
Mean	4190.949
S.D.	81.504
% R.S.D.	1.945

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-1211	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT-LIQ	LA-508-113	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

EDP E341 ENVAB

STD# 40B51 RESULT 6.464E-4

STD VAL %REC 101.96%

Mary Tracy

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
4-22-93			6/10 SE Hoge

54-0600-061 (11-10-83)

BEST AVAILABLE COPY

SAMPLE POINT: ENV-STD.
LAB ID #: 8501
NUMBER OF ALIQUOTS: 3

	NET CPM	STANDARD DEV. CPM	CONCENTRATION RANGES (UCI/L) MEAN	UPPER	LOWER	DEVIATION PER CENT.	SCATTER ERROR
ALPHA:	175.927	4.233	6.464E -4	6.619E -4	6.308E -4	2.41	OK
BETA :	2430.820	86.003	7.523E -3	7.789E -3	7.257E -3	3.54	**

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-1211	H&RWC	5-12-93	15:41	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT MISC	LA-508		E11457	0

Sample Size	Customer ID
_____G OF SAMPLE	0344WQL

Remarks, Calculations, Results

100-10-50

SUPER SUPER RUSH

$\frac{7.19 \times 10^2 \text{ uCi/L}}{4.98 \text{ g/L}} = 1.44 \times 10^2 \text{ uCi/g}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-14-93	1040		5-17-93

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

#1 RW 5-14-93 E 9325-1211

$\frac{12008}{30} - 5$

$\frac{790.53 (1000)(2020)}{2.22 \times 10^6} = 7.1934 \times 10^2 \text{ uCi/L}$

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

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4951

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-2162	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Rerune
GEA-LIQ	LA-548-121	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

36851 ENVSTD
EDP E345 / CS137 1.59E-2 92.98% Li .500
EDP E346 / CO60 3.24E-2 98.48%
EDP E349 / AM241

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond			
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93		

54-8800-067 (R-10-83)

3220

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-2172	H&RWC	5-12-93	15:41	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-SOIL	LA-548-121	pCi/gWETwt	E11457	0

Sample Size	Customer ID
_____G OF SAMPLE	0344WQL

Remarks, Calculations, Results

100-12-100

SUPER SUPER R

^{137}Cs $\frac{1.478 \times 10^3 uG/L}{4.988 g/L} = 2.97 \times 10^2 uG/g$

2.97 x ~~10^-5~~ pCi/g
10^-1-1-0

Sue Li

Analyst - 1	Analyst - 2		Analyst - 4	Analyst - 5
[redacted]		[redacted]		
Hrs	Hrs	Hrs	Hrs	Hrs
		5-14-93		

Date	Time Completed	Lab Unit Mgr	
5-14-93	13:40		5-17-93

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

4951

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-2162	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-LIQ	LA-548-121	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

36651 ENVSTD
EDP E345 / CS137 1.59E-2 92.98% Li .500
EDP E346 / CO60 3.24E-2 98.48%
EDP E349 / AM241

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond			
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93		SE Hogan

54-8800-061 (R-10-83)

VRaymond 4-24-93

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

WHC-SD-WM-DP-045
REV 1

24-APR-9322:10:46

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 4 / GEOMETRY NUMBER: S1
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AND:
ANALYZED BY: VR

SAMPLE DESCRIPTION: E8501-9162 ENV/STD
GEOMETRY DESCRIPTION: 500 ML LIQ
SAMPLE SIZE: 3.0000E-01 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 24-APR-93 AT 21:20:16

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3021. SECONDS
DEAD TIME: 0.70 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

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24-APR-9322:10:46

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

WHC-SD-WM-DP-045
REV 1

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	96.68	48.31	1.00	1263.	965.	11.7	U-234
2	1322.77	661.40	1.49	1479.	22010.	1.4	CS-137
2B		661.44			159.	9.8	
3	2345.24	1172.78	1.84	1053.	31246.	1.2	CO-60
4	2663.52	1331.98	1.98	224.	29195.	1.2	CO-60
5	2920.13	1460.34	1.86	104.	806.	8.0	K-40
5B		1460.67			769.	1.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-92 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

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24-APR-9322:10:46

SAMPLE: E8301-2162 ENV/STD

DATA COLLECTED ON 24-APR-93 AT 21:20:16

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

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/L MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<4.28E-04		LLD<4.28E-04		911.07	
AC-228A	LLD<4.28E-04		LLD<4.28E-04		911.10	
AC-228B	LLD<4.57E-04		LLD<4.57E-04		338.40	
AG-108M	LLD<7.31E-05		LLD<7.31E-05		433.94	
AG-110M	LLD<3.36E-04		LLD<3.36E-04		657.76	
AM-241	LLD<5.46E-04		LLD<5.46E-04		59.54	
AM-243	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243A	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243B	LLD<2.30E-03		LLD<2.30E-03		43.10	
AR-41	LLD<6.98E-05		LLD<6.98E-05		1293.64	
AU-198	LLD<6.06E-05		LLD<6.06E-05		411.80	
BA-133	LLD<9.66E-05		LLD<9.66E-05		356.02	
BA-139	LLD<2.36E-04		LLD<2.36E-04		165.85	
BA-140	LLD<2.94E-04		LLD<2.94E-04		537.27	
BA-141	LLD<2.12E-04		LLD<2.12E-04		190.23	
BE-7	LLD<6.62E-04		LLD<6.62E-04		477.59	
BI-207	LLD<7.42E-05		LLD<7.42E-05		569.70	
BI-212	LLD<7.31E-04		LLD<7.31E-04		727.27	
BI-214	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214A	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214B	LLD<8.37E-04		LLD<8.37E-04		1120.28	
BI-214C	LLD<2.69E-04		LLD<2.69E-04		1764.51	
CD-109	LLD<1.54E-03		LLD<1.54E-03		88.03	
CE 144	LLD<3.23E-04		LLD<3.23E-04		133.51	
CE-139	LLD<5.33E-05		LLD<5.33E-05		165.85	
CE-141	LLD<7.41E-05		LLD<7.41E-05		145.44	
CEPR144	LLD<6.46E-04		LLD<6.46E-04		133.51	
CO-56	LLD<1.09E-04		LLD<1.09E-04		846.76	
CO-57	LLD<4.24E-05		LLD<4.24E-05		122.06	
CO-58	LLD<1.02E-04		LLD<1.02E-04		810.75	
CO-60	3.24E-02	+-1.14E-04	3.24E-02	+-1.14E-04	1332.50	-0.02
					1173.24	-0.46
CR-51	LLD<5.73E-04		LLD<5.73E-04		320.08	
CS-134	LLD<1.08E-04		LLD<1.08E-04		795.84	
CS-136	LLD<1.03E-04		LLD<1.03E-04		818.51	
CS-137	1.39E-02	+-2.46E-04	1.39E-02	+-2.46E-04	661.63	-0.23
CS-138	LLD<7.71E-05		LLD<7.71E-05		1435.86	
EU-152	LLD<1.83E-04		LLD<1.83E-04		1408.01	
EU-154	LLD<1.84E-04		LLD<1.84E-04		1274.42	
EU-154A	LLD<8.90E-05		LLD<8.90E-05		123.10	
EU-155	LLD<2.06E-04		LLD<2.06E-04		105.31	
FE-59	LLD<2.36E-04		LLD<2.36E-04		1099.22	
HF-181	LLD<6.21E-05		LLD<6.21E-05		482.20	
HG-203	LLD<6.37E-05		LLD<6.37E-05		279.20	
I-131	LLD<7.46E-05		LLD<7.46E-05		364.48	
I-132	LLD<8.50E-05		LLD<8.50E-05		667.65	
I-133	LLD<7.38E-05		LLD<7.38E-05		529.69	
I-134	LLD<1.57E-04		LLD<1.57E-04		847.03	
I-135	LLD<2.20E-04		LLD<2.20E-04		1260.41	
K-40	LLD<3.02E-04		LLD<3.02E-04		1460.75	
KR-85	LLD<1.61E-02		LLD<1.61E-02		513.99	
KR-85M	LLD<7.84E-05		LLD<7.84E-05		151.17	
KR-87	LLD<1.57E-04		LLD<1.57E-04		402.58	

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9310901.1212

KR-89	LLD<2.78E-03	LLD<2.78E-03	920.90
LA-140	LLD<4.05E-05	LLD<4.05E-05	1596.20
LA-142	LLD<1.86E-04	LLD<1.86E-04	641.63
MN-54	LLD<1.05E-04	LLD<1.05E-04	834.83
MN-56	LLD<1.23E-04	LLD<1.23E-04	846.76
NA-22	LLD<6.06E-05	LLD<6.06E-05	1274.55
NA-24	LLD<3.99E-05	LLD<3.99E-05	1368.60
NB-94	LLD<8.48E-05	LLD<8.48E-05	702.63
NB-95	LLD<9.24E-05	LLD<9.24E-05	765.78
NB-97	LLD<4.07E-04	LLD<4.07E-04	657.92
NP-237	LLD<4.61E-04	LLD<4.61E-04	86.50
NP-238	LLD<4.63E-04	LLD<4.63E-04	984.45
NP-239	LLD<3.60E-04	LLD<3.60E-04	277.60
PA-233	LLD<1.62E-04	LLD<1.62E-04	311.98
PA-234M	LLD<2.19E-02	LLD<2.19E-02	1001.03
PB-210	LLD<1.28E-02	LLD<1.28E-02	46.50
PB-212	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212A	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212B	LLD<1.72E-03	LLD<1.72E-03	300.10
PB-214	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214A	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214B	LLD<2.75E-04	LLD<2.75E-04	295.21
PO-210	LLD<8.39E+00	LLD<8.39E+00	804.00
PO-214	LLD<9.36E-01	LLD<9.36E-01	799.70
PO-216	LLD<4.95E+00	LLD<4.95E+00	804.90
PU-239	LLD<6.11E-01	LLD<6.11E-01	129.30
PU-241	LLD<1.94E+01	LLD<1.94E+01	148.37
RA-224	LLD<1.32E-03	LLD<1.32E-03	240.99
RA-226	LLD<1.24E-03	LLD<1.24E-03	186.10
RB-88	LLD<4.26E-04	LLD<4.26E-04	1836.00
RB-89	LLD<5.63E-04	LLD<5.63E-04	1031.88
RN-220	LLD<6.40E-02	LLD<6.40E-02	549.73
RU-103	LLD<7.34E-05	LLD<7.34E-05	497.08
RURH106	LLD<1.50E-03	LLD<1.50E-03	621.80
SB-124	LLD<7.46E-05	LLD<7.46E-05	602.72
SB-125	LLD<2.19E-04	LLD<2.19E-04	427.89
SB-125A	LLD<2.19E-04	LLD<2.19E-04	427.89
SC-46	LLD<1.25E-04	LLD<1.25E-04	1120.45
SE-75	LLD<8.54E-05	LLD<8.54E-05	264.66
SN-113	LLD<9.33E-05	LLD<9.33E-05	391.67
SR-85	LLD<7.07E-05	LLD<7.07E-05	513.99
SR-91	LLD<1.18E-04	LLD<1.18E-04	555.60
SR-92	LLD<3.19E-05	LLD<3.19E-05	1383.94
TA-182	LLD<3.78E-04	LLD<3.78E-04	1121.60
TC-99M	LLD<4.22E-05	LLD<4.22E-05	140.31
TE-123M	LLD<4.46E-05	LLD<4.46E-05	159.00
TE-125M	LLD<1.52E-02	LLD<1.52E-02	109.27
TE-132	LLD<5.90E-05	LLD<5.90E-05	938.14
TH-228	LLD<4.93E-03	LLD<4.93E-03	84.37
TH-229	LLD<1.94E-03	LLD<1.94E-03	86.44
TH-229B	LLD<2.24E-03	LLD<2.24E-03	137.02
TH-229C	LLD<9.73E-04	LLD<9.73E-04	193.09
TH-234	LLD<8.96E-04	LLD<8.96E-04	92.70
TH-234A	LLD<8.96E-04	LLD<8.96E-04	92.30
TH-234B	LLD<3.92E-03	LLD<3.92E-03	63.30
TL-208	LLD<8.08E-05	LLD<8.08E-05	583.14
U-232	LLD<1.33E-01	LLD<1.33E-01	270.24
U-233	LLD<8.01E-05	LLD<8.01E-05	185.71
U-233A	LLD<8.01E-05	LLD<8.01E-05	185.71
U-233B	LLD<3.76E-04	LLD<3.76E-04	143.76
U-237	LLD<2.05E-04	LLD<2.05E-04	708.00
W-187	LLD<2.92E-04	LLD<2.92E-04	881.74
XE-131M	LLD<2.02E-03	LLD<2.02E-03	153.98
XE-133	LLD<1.79E-04	LLD<1.79E-04	81.00
XE-133M	LLD<3.14E-04	LLD<3.14E-04	233.21

WHC-SD-WM-DP-045
REV 1

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XE-138	LLD<4.37E-04	LLD<4.37E-04	238.41
Y-88	LLD<4.19E-05	LLD<4.19E-05	1836.06
Y-91	LLD<2.75E-02	LLD<2.75E-02	1204.90
Y-91M	LLD<8.90E-05	LLD<8.90E-05	555.60
ZN-65	LLD<2.56E-04	LLD<2.56E-04	1113.55
ZR-95	LLD<1.70E-04	LLD<1.70E-04	736.73
ZR-97	LLD<8.91E-05	LLD<8.91E-05	743.33
TOTAL	4.83E-02 +-4.82E-04	4.83E-02 +-4.82E-04	

STANDARD DEVIATION = 0.14

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RUN CALIB

CALIB -- Version 2.06

222-S COUNTING ROOM WESTINGHOUSE HANFORD

CAL: EFF
MCA UNIT NUMBER (2): 1
ADC UNIT NUMBER (1,0): 1
DETECTOR NUMBER (12): 4
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 11-NOV-92
TIME COLLECT STARTED: 09:00
GEOMETRY NUMBER (12): 81
GEOMETRY DESCRIPTION: 500ML LIQ
ACTIVITY UNITS (uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
TYPE A CARRIAGE RETURN FOR MANUAL ENTRY;
TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY;
TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 481
GEB42-A 500ML LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA : 1.00000
NUMBER OF POINTS: 12
ACTIVITY IN MICROCURIES (YES/NO): N

PEAK 1
ENERGY: 59.536
ACTIVITY: 3.121000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D158000
DECAY TIME (0.000000E-01 MINS.): 1-FEB-92
TIME OF SOURCE CALIBRATION: 12:00
DECAY TIME: 4.087800E+05 MINS
EFFICIENCY = 1.151452E-02 (+- 1.120572E-04)

PEAK 2
ENERGY: 88.034
ACTIVITY: 1.753000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D462.6
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 4.835223E-02 (+- 3.570011E-04)

PEAK 3
ENERGY: 122.061
ACTIVITY: 1.597000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D271.8
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 7.091829E-02 (+- 5.259489E-04)

PEAK 4
ENERGY: 165.853
ACTIVITY: 1.940000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D147.66

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[illegible] EFFICIENCY COEFFICIENTS: PAGE 1

LOG(EFF) = -6.582071E+01 + 2.241460E+01*LOG(E) - 2.592793E+00*LOG(E)^2

PEAK    5
        ENERGY:     279.197
        ACTIVITY:    3.435000E+01
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  [illegible]
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  5.099649E-02 (+-  3.270925E-03)

PEAK    6
        ENERGY:     391.668
        ACTIVITY:    4.201000E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D115.09
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  4.175033E-02 (+-  3.169516E-04)

PEAK    7
        ENERGY:     513.990
        ACTIVITY:    1.063000E+01
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D64.84
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  3.314401E-02 (+-  5.326431E-04)

PEAK    8
        ENERGY:     661.650
        ACTIVITY:    6.921000E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D11020
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.852897E-02 (+-  8.913840E-05)

PEAK    9
        ENERGY:     898.021
        ACTIVITY:    1.711000E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D106.61
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  2.066866E-02 (+-  1.336644E-04)

PEAK   10
        ENERGY:    1173.240
        ACTIVITY:    9.279000E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.722549E-02 (+-  6.099883E-05)

PEAK   11
        ENERGY:    1332.500
        ACTIVITY:    9.284000E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 4.087800E+05 MINS.):
EFFICIENCY =  1.574303E-02 (+-  5.737485E-05)

PEAK   12
        ENERGY:    1836.130
        ACTIVITY:    1.813000E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
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EFFICIENCY = 1.247290E-02 (+- 8.695036E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) = 9.202042E+01 - 6.132777E+01*LOG(E) + 1.500303E+01*LOG(E)^2
- 1.634262E+00*LOG(E)^3 + 6.608717E-02*LOG(E)^4

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3220

Serial No.	Sample Point	Date	Time Issued	Priority
E 9325.-2172	H&RWC	5-12-93	15:41	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-SOIL	LA-548-121	pCi/gWETwt	E11457	0

Sample Size	Customer ID
_____G OF SAMPLE	0344WQL

Remarks, Calculations, Results

100-12-100

SUPER SUPER RUSH

^{137}Cs $\frac{1.48 \times 10^{3}\ uCi/L}{4.988\ g/L} = 2.97 \times 10^{2}\ uCi/g$

2.97×10^{5} pCi/g

10T 5-17-93

Sue Lin

Analyst - 1	Analyst - 2		Analyst - 4	Analyst - 5
[redacted]		[redacted]		
Hrs	Hrs	Hrs	Hrs	Hrs
		5-14-93		

Date	Time Completed	Lab Unit Mgr	
5-14-93	13:40		5-17-93

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

Raymond 5-14-93

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                     *
*          G A M M A   S P E C T R U M   A N A L Y S I S              *
*                                                                     *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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CANBERRA SPECTRAN-F V2.06 SOFTWARE **WHC-SD-WM-DP-045 REV 1**

222-S COUNTING ROOM WESTINGHOUSE HANFORD 14-MAY-93 15:52:29

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

MCA UNIT NUMBER: 2 / ADC UNIT NUMBER: 3.0
DETECTOR NUMBER: 3 / GEOMETRY NUMBER: 41
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: [redacted]

SAMPLE DESCRIPTION: E9325-2172
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 9.9010E-04
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 14-MAY-93 AT 15:02:18

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 20-APR-93
EFFICIENCY CALIBRATION PERFORMED 23-OCT-92

222-S COUNTING ROOM WESTINGHOUSE HANFORD 14-MAY-93 15:52:29

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

WHC-SD-WM-DP-045
REV 1

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	118.74	59.24	1.01	485.	359.	19.9	AM-241,U-237, EU-155
2	1218.14	609.01	1.48	116.	129.	30.6	BI-214A,
2B		609.19			122.	21.0	RU-103
3	1322.91	661.41	1.46	98.	1159.	6.3	CS-137
3B		661.41			81.	28.8	
4	2920.87	1460.63	1.89	21.	586.	8.5	K-40
4B		1460.58			611.	5.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

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

222-S COUNTING ROOM WESTINGHOUSE HANFORD 14-MAY-93 15:52:29

WHC-SD-WM-DP-045
REV 1

SAMPLE: E9325-2172
DATA COLLECTED ON 14-MAY-93 AT 15:02:18
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<2.22E+02		LLD<2.22E+02		911.07	
AC-228A	LLD<2.22E+02		LLD<2.22E+02		911.10	
AC-228B	LLD<2.71E+02		LLD<2.71E+02		338.40	
AG-108M	LLD<4.05E+01		LLD<4.05E+01		433.94	
AG-110M	LLD<1.51E+02		LLD<1.51E+02		657.76	
AM-241	3.18E+02	+-6.33E+01	3.18E+02	+-6.33E+01	59.54	-0.30
AM-243	LLD<4.14E+01		LLD<4.14E+01		74.67	
AM-243A	LLD<4.14E+01		LLD<4.14E+01		74.67	
AM-243B	LLD<2.42E+02		LLD<2.42E+02		43.10	
AR-41	LLD<6.90E+01		LLD<6.90E+01		1293.64	
AU-198	LLD<3.78E+01		LLD<3.78E+01		411.80	
BA-133	LLD<6.10E+01		LLD<6.10E+01		356.02	
BA-139	LLD<1.53E+02		LLD<1.53E+02		165.85	
BA-140	LLD<1.46E+02		LLD<1.46E+02		537.27	
BA-141	LLD<1.34E+02		LLD<1.34E+02		190.23	
BE-7	LLD<4.13E+02		LLD<4.13E+02		477.59	
BI-207	LLD<4.11E+01		LLD<4.11E+01		569.70	
BI-212	LLD<3.59E+02		LLD<3.59E+02		727.27	
BI-214	LLD<1.27E+02		LLD<1.27E+02		609.32	
BI-214A	LLD<1.27E+02		LLD<1.27E+02		609.32	
BI-214B	LLD<4.76E+02		LLD<4.76E+02		1120.28	
BI-214C	LLD<4.03E+02		LLD<4.03E+02		1764.51	
CD-109	LLD<6.95E+02		LLD<6.95E+02		88.03	
CE 144	LLD<2.40E+02		LLD<2.40E+02		133.51	
CE-139	LLD<3.45E+01		LLD<3.45E+01		165.85	
CE-141	LLD<6.05E+01		LLD<6.05E+01		145.44	
CEPR144	LLD<4.80E+02		LLD<4.80E+02		133.51	
CO-56	LLD<4.22E+01		LLD<4.22E+01		846.76	
CO-57	LLD<3.05E+01		LLD<3.05E+01		122.06	
CO-58	LLD<4.74E+01		LLD<4.74E+01		810.75	
CO-60	LLD<4.60E+01		LLD<4.60E+01		1332.50	
CR-51	LLD<3.25E+02		LLD<3.25E+02		320.09	
CS-134	LLD<4.41E+01		LLD<4.41E+01		795.84	
CS-136	LLD<4.74E+01		LLD<4.74E+01		818.51	
CS-137	1.48E+03	+-1.07E+02	1.48E+03	+-1.07E+02	661.65	-0.24
CS-138	LLD<1.11E+02		LLD<1.11E+02		1435.86	
EU-152	LLD<1.90E+02		LLD<1.90E+02		1408.01	
EU-154	LLD<1.71E+02		LLD<1.71E+02		1274.45	
EU-154A	LLD<6.38E+01		LLD<6.38E+01		123.10	
EU-155	LLD<1.15E+02		LLD<1.15E+02		105.31	
FE-59	LLD<8.87E+01		LLD<8.87E+01		1099.25	
HF-181	LLD<5.07E+01		LLD<5.07E+01		482.20	
HG-203	LLD<3.68E+01		LLD<3.68E+01		279.20	
I-131	LLD<4.07E+01		LLD<4.07E+01		364.48	
I-132	LLD<5.20E+01		LLD<5.20E+01		667.69	
I-133	LLD<4.12E+01		LLD<4.12E+01		529.69	
I-134	LLD<5.61E+01		LLD<5.61E+01		847.03	

I-135	LLD<1.86E+02	LLD<1.86E+02	1260.41
K-40	LLD<1.47E+03	LLD<1.47E+03	1460.75
KR-85	LLD<1.16E+04	LLD<1.16E+04	513.99
KR-85M	LLD<3.86E+01	LLD<3.86E+01	151.17
KR-87	LLD<9.00E+01	LLD<9.00E+01	402.58
KR-89	LLD<1.61E+03	LLD<1.61E+03	220.90
LA-140	LLD<5.88E+01	LLD<5.88E+01	1596.20
LA-142	LLD<1.08E+02	LLD<1.08E+02	641.83
MN-54	LLD<4.84E+01	LLD<4.84E+01	834.83
MN-56	LLD<4.76E+01	LLD<4.76E+01	846.76
NA-22	LLD<6.06E+01	LLD<6.06E+01	1274.55
NA-24	LLD<3.74E+01	LLD<3.74E+01	1368.60
NB-94	LLD<3.60E+01	LLD<3.60E+01	702.63
NB-95	LLD<4.55E+01	LLD<4.55E+01	765.78
NB-97	LLD<1.99E+02	LLD<1.99E+02	657.92
NP-237	LLD<1.77E+02	LLD<1.77E+02	86.50
NP-238	LLD<1.54E+02	LLD<1.54E+02	984.45
NP-239	LLD<2.03E+02	LLD<2.03E+02	277.60
PA-233	LLD<9.06E+01	LLD<9.06E+01	311.98
PA-234M	LLD<8.25E+03	LLD<8.25E+03	1001.03
PB-210	LLD<3.80E+02	LLD<3.80E+02	46.50
PB-212	LLD<7.11E+01	LLD<7.11E+01	239.00
PB-212A	LLD<7.08E+01	LLD<7.08E+01	239.00
PB-212B	LLD<9.27E+02	LLD<9.27E+02	300.10
PB-214	LLD<1.13E+02	LLD<1.13E+02	351.92
PB-214A	LLD<1.13E+02	LLD<1.13E+02	351.92
PB-214B	LLD<1.54E+02	LLD<1.54E+02	295.21
PO-210	LLD<3.48E+06	LLD<3.48E+06	804.00
PO-214	LLD<4.17E+05	LLD<4.17E+05	799.70
PO-216	LLD<2.07E+06	LLD<2.07E+06	804.90
PU-239	LLD<4.13E+05	LLD<4.13E+05	129.30
PU-241	LLD<1.40E+07	LLD<1.40E+07	148.57
RA-224	LLD<8.01E+02	LLD<8.01E+02	240.99
RA-226	LLD<7.66E+02	LLD<7.66E+02	186.10
RB-88	LLD<4.15E+02	LLD<4.15E+02	1836.00
RB-89	LLD<2.02E+02	LLD<2.02E+02	1031.88
RN-220	LLD<3.46E+04	LLD<3.46E+04	549.73
RU-103	LLD<4.09E+01	LLD<4.09E+01	497.08
RURH106	LLD<7.29E+02	LLD<7.29E+02	621.80
SB-124	LLD<3.77E+01	LLD<3.77E+01	602.72
SB-125	LLD<1.33E+02	LLD<1.33E+02	427.89
SB-125A	LLD<1.33E+02	LLD<1.33E+02	427.89
SC-46	LLD<7.32E+01	LLD<7.32E+01	1120.45
SE-75	LLD<4.96E+01	LLD<4.96E+01	264.66
SN-113	LLD<6.00E+01	LLD<6.00E+01	391.67
SR-85	LLD<5.08E+01	LLD<5.08E+01	513.99
SR-91	LLD<6.77E+01	LLD<6.77E+01	555.60
SR-92	LLD<6.00E+01	LLD<6.00E+01	1383.94
TA-182	LLD<1.64E+02	LLD<1.64E+02	1121.30
TC-99M	LLD<3.21E+01	LLD<3.21E+01	140.51
TE-123M	LLD<3.24E+01	LLD<3.24E+01	159.00
TE-125M	LLD<8.81E+03	LLD<8.81E+03	109.27
TE-132	LLD<3.09E+01	LLD<3.09E+01	228.16
TH-228	LLD<1.73E+03	LLD<1.73E+03	84.37
TH-229	LLD<7.45E+02	LLD<7.45E+02	86.44
TH-229B	LLD<1.69E+03	LLD<1.69E+03	137.02
TH-229C	LLD<5.83E+02	LLD<5.83E+02	193.59
TH-234	LLD<4.17E+02	LLD<4.17E+02	92.50
TH-234A	LLD<4.17E+02	LLD<4.17E+02	92.50
TH-234B	LLD<5.23E+02	LLD<5.23E+02	63.30

TL-208	LLD<6.37E+01	LLD<6.37E+01	583.14
U-232	LLD<6.81E+04	LLD<6.81E+04	270.26
U-235	LLD<5.01E+01	LLD<5.01E+01	185.71
U-235A	LLD<5.01E+01	LLD<5.01E+01	185.71
U-235B	LLD<2.60E+02	LLD<2.60E+02	143.76
U-237	LLD<1.39E+02	LLD<1.39E+02	208.00
W-187	LLD<1.39E+02	LLD<1.39E+02	685.74
XE-131M	LLD<1.55E+03	LLD<1.55E+03	163.98
XE-133	LLD<5.62E+01	LLD<5.62E+01	81.00
XE-133M	LLD<2.74E+02	LLD<2.74E+02	233.21
XE-135	LLD<3.40E+01	LLD<3.40E+01	249.79
XE-138	LLD<2.52E+02	LLD<2.52E+02	258.41
Y-88	LLD<3.94E+01	LLD<3.94E+01	1836.06
Y-91	LLD<2.03E+04	LLD<2.03E+04	1204.90
Y-91M	LLD<5.12E+01	LLD<5.12E+01	555.60
ZN-65	LLD<1.62E+02	LLD<1.62E+02	1115.55
ZR-95	LLD<7.75E+01	LLD<7.75E+01	756.73
ZR-97	LLD<3.95E+01	LLD<3.95E+01	743.33
TOTAL	1.80E+03 +-1.24E+02	1.80E+03 +-1.24E+02	

STANDARD DEVIATION = 0.04

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.39E-08 UC/LI
TOTAL MEASURED ACTIVITY = 1.80E+03 (+-1.24E+02) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

ALL DETECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.14	609.01	129.	30.6	5.16E+00
2920.87	1460.63	586.	8.5	4.99E+01

Det #3, Geom #41
Efficiency Calibration was performed
on 10/28/92 Arj 10/28/92

CALIB -- Version 2.06

222-S COUNTING ROOM WESTINGHOUSE HANFORD

WHC-SD-WM-DP-045
REV 1

```
CAL> EFF
MCA UNIT NUMBER (2): 2
ADC UNIT NUMBER (4,0): 3
DETECTOR NUMBER (   12): 3
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 16-OCT-92
TIME COLLECT STARTED: 13:00
GEOMETRY NUMBER ( 12): 41
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 279
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 341
42B47-A
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO):
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :   1.00000
NUMBER OF POINTS:    12
ACTIVITY IN MICROCURIES [YES/NO]:

      PEAK    1
              ENERGY:      59.536
              ACTIVITY:    3.686600E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D158000.
              DECAY TIME ( 0.000000E-01 MINS.):  1-FEB-92
              TIME OF SOURCE CALIBRATION:  12:00
              DECAY TIME:   3.715800E+05 MINS
      EFFICIENCY =  2.867638E-02 (+-  1.280716E-04)

      PEAK    2
              ENERGY:      88.035
              ACTIVITY:    2.064500E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D462.6
              DECAY TIME ( 3.715800E+05 MINS.):
      EFFICIENCY =  2.873442E-02 (+-  2.192801E-04)

      PEAK    3
              ENERGY:     122.061
              ACTIVITY:    1.881000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D271.8
              DECAY TIME ( 3.715800E+05 MINS.):
      EFFICIENCY =  2.798845E-02 (+-  2.757689E-04)

      PEAK    4
              ENERGY:     165.853
              ACTIVITY:    2.284100E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D137.66
              DECAY TIME ( 3.715800E+05 MINS.):
      EFFICIENCY =  2.432131E-02 (+-  3.476297E-04)
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        ENERGY:     279.197
        ACTIVITY:    6.399900E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D46.12
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  1.905749E-02 (+-  1.172329E-03)

SYSTEM EFFICIENCY COEFFICIENTS, PART 1

LOG(EFF) = -8.900926E+00 + 2.476058E+00*LOG(E) - 2.856299E-01*LOG(E)^2

PEAK     6
        ENERGY:     391.668
        ACTIVITY:    7.301200E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D115.09
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  1.197005E-02 (+-  1.465802E-04)

PEAK     7
        ENERGY:     513.990
        ACTIVITY:    1.252140E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D64.84
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  8.790109E-03 (+-  2.215078E-04)

PEAK     8
        ENERGY:     661.650
        ACTIVITY:    8.031900E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D11020
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  7.850802E-03 (+-  4.358826E-05)

PEAK     9
        ENERGY:     898.021
        ACTIVITY:    2.014700E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D106.61
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  5.892207E-03 (+-  6.369832E-05)

PEAK    10
        ENERGY:    1173.240
        ACTIVITY:    1.092550E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  4.768241E-03 (+-  3.001378E-05)

PEAK    11
        ENERGY:    1332.500
        ACTIVITY:    1.093210E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  4.271624E-03 (+-  2.805451E-05)

PEAK    12
        ENERGY:    1836.130
        ACTIVITY:    2.135290E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D106.61
```

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EFFICIENCY = 3.238070E-03 (+- 3.820561E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

```
LOG(EFF) =  4.136870E+02 - 2.479005E+02*LOG(E) + 5.525641E+01*LOG(E)^2
          - 5.477345E+00*LOG(E)^3 + 2.030400E-01*LOG(E)^4
```


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#3 5400

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-8781	H&RWC	5-12-93	15:42	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E11457	1

Sample Size	Customer ID
? 100-10-100	0344WQL

Remarks, Calculations, Results

COUNT AS uCI/L

Pu^{238} = 6.43 uC/L "AEA" - 480MIN

ATTACH PRINTOUT

100 mL 63 AK3

RUSH

$$\frac{.5673(330.42)(1000)(1010)}{.7098(2.22\times10^6)} = \frac{2.20\times10^2\ uC/L}{4.988\ g/L} = 4.41\times10^1\ uC/g$$

MCatt

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	5-18-93 5-18-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-18-93		MCatt	

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

#3 re 5-18-93

$\frac{7803}{30} - 5$

E9325-8781

$510.2(.0816) - (7.265)(.5355) = 37.74$

$$\frac{37.74(1000)(1010)}{(5355)(2.22\times10^6)} = \frac{32.1\ uC/L}{4.988\ g/L} = 6.43\ uC/g$$

WHC-SD-WM-DP-045
REV 1

iRaymond 5-19-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
E9325-8781 H&RWC/PU
File ID: SD5400.SPC

Counted on: 5/18/93 @20: 0
Detector/Geometry number: 3/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak	Peak height		Peak center		FWHM		Tau	
ID	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	2470.3	2486.0	363.646	363.646	20.000	10.129	10.000	4.785
2	484.9	488.2	305.944	305.944	20.000	10.676	10.000	5.117
3	3198.6	3223.6	232.978	232.978	20.000	10.334	10.000	5.908
4	7.1	6.7	27.188	27.188	28.000	21.476	14.000	13.654

PEAK RESULTS

Peak		AEA	Peak Centroid				Count		Activity
ID	Isotope	Fract.	Exp.	Obs.	Diff.	FWHM	Rate c/m	d/m	uCi/ea
1	Cm244	0.4098	5.796	5.788	0.008	0.05	43.70	192.02	0.866E-04
	Cm243		5.786	5.788	-0.002				0.115E-03
2	Pu238	0.0616	5.499	5.516	-0.017	0.03	8.70	53.09	0.239E-04
	Am241		5.480	5.516	-0.036				0.186E-04
3	Pu239	0.3073	5.143	5.173	-0.030	0.03	34.11	237.73	0.107E-03
	Pu240		5.144	5.173	-0.029				0.107E-03
4	U 238	0.0014	4.200	4.206	-0.006	0.10	0.15	0.84	0.380E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.078 + (0.0047)*(Channel)
Energy range (MeV): 4.078 TO 4.482
Efficiency = 0.2276 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	33525.0	100.000
Smoothed	33525.0	100.000
Composite fit	33328.1	99.632
Residuals	196.9	0.368

Analyzed by: _____
VR

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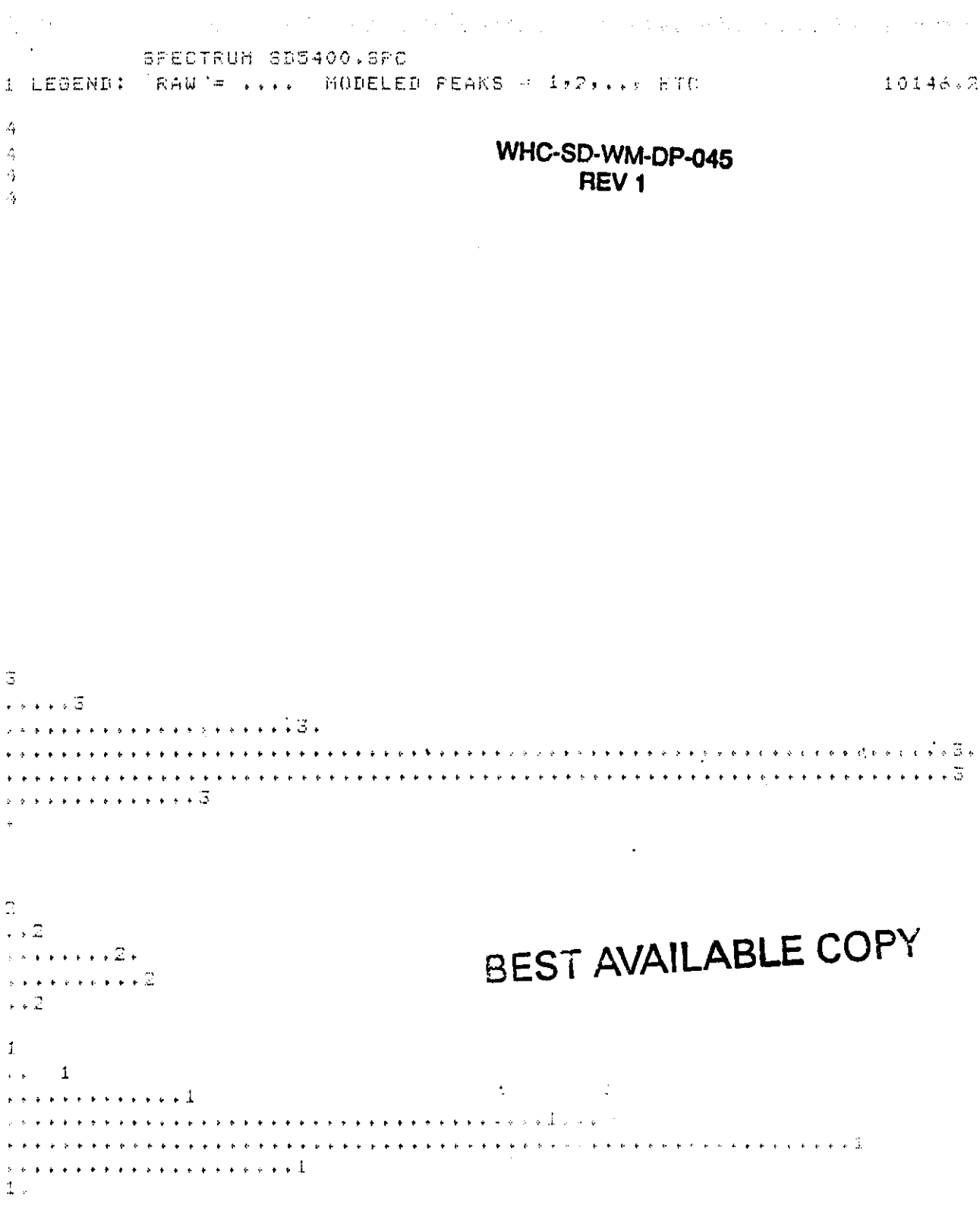
SPECTRUM SD5400.SPC

1 LEGEND: 'RAW'= .... MODELED PEAKS = 1,2,... ETC 10146.2

WHC-SD-WM-DP-045
REV 1



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Raw Data Dump for AEA Spectrum: SP:SD5400.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	2.	0.	4.	3.	3.	2.
21	3.	3.	1.	3.	4.	6.	3.	4.	3.	1.
31	4.	1.	3.	3.	2.	3.	2.	0.	0.	1.
41	1.	0.	1.	1.	0.	1.	1.	0.	0.	2.
51	1.	0.	0.	0.	0.	0.	0.	1.	0.	1.
61	0.	2.	0.	0.	2.	0.	0.	1.	3.	0.
71	1.	0.	3.	0.	0.	1.	0.	1.	0.	0.
81	0.	1.	1.	0.	0.	0.	1.	3.	0.	3.
91	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
101	1.	1.	1.	2.	3.	2.	3.	0.	1.	0.
111	1.	2.	0.	1.	0.	2.	0.	2.	4.	0.
121	1.	1.	0.	0.	0.	2.	0.	3.	3.	1.
131	3.	2.	0.	1.	1.	4.	1.	0.	3.	1.
141	2.	1.	1.	2.	7.	0.	2.	3.	6.	3.
151	2.	3.	2.	2.	2.	1.	4.	6.	4.	7.
161	3.	6.	3.	10.	4.	9.	3.	3.	8.	4.
171	11.	10.	5.	4.	4.	10.	6.	8.	70.	16.
181	10.	13.	12.	13.	15.	10.	15.	19.	13.	17.
191	16.	17.	9.	14.	14.	13.	13.	16.	20.	22.
201	28.	22.	26.	20.	36.	27.	33.	43.	42.	34.
211	64.	83.	109.	148.	166.	191.	281.	341.	369.	432.
221	562.	644.	699.	830.	1091.	1197.	1327.	1497.	1631.	1835.
231	1943.	1881.	1866.	1734.	1473.	1295.	943.	701.	466.	320.
241	175.	99.	39.	33.	13.	2.	4.	1.	4.	3.
251	1.	3.	2.	3.	2.	2.	4.	2.	4.	2.
261	2.	5.	7.	3.	7.	5.	3.	6.	2.	4.
271	3.	3.	2.	3.	3.	6.	6.	3.	6.	3.
281	9.	7.	7.	16.	19.	21.	20.	22.	31.	62.
291	73.	71.	71.	107.	124.	142.	143.	193.	179.	211.
301	221.	239.	245.	297.	299.	266.	267.	220.	191.	160.
311	102.	81.	52.	31.	19.	11.	13.	10.	7.	7.
321	6.	13.	11.	7.	13.	10.	12.	11.	13.	13.
331	14.	24.	19.	16.	17.	29.	32.	30.	32.	41.
341	33.	62.	80.	123.	136.	181.	240.	304.	318.	392.
351	493.	624.	673.	724.	821.	881.	926.	1090.	1102.	1197.
361	1360.	1440.	1473.	1467.	1336.	1133.	891.	663.	463.	295.
371	182.	89.	48.	16.	8.	3.	3.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
391	0.	0.	0.	0.	1.	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.	2.
421	0.	1.	0.	0.	1.	1.	2.	1.	0.	2.
431	0.	0.	0.	2.	1.	0.	0.	1.	1.	0.
441	1.	1.	0.	0.	0.	0.	0.	0.	0.	2.
451	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.
461	0.	1.	1.	0.	0.	0.	2.	0.	2.	0.
471	0.	0.	0.	1.	3.	0.	0.	2.	0.	2.
481	1.	2.	0.	2.	1.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-045
REV 1

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#4 4475

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-8881	H&RWC	5-12-93	15:42	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	PC41G	1

Sample Size	Customer ID
?100-10-100	0344WQL

Remarks, Calculations, Results

$Pu^{239} = 8.02$ uCi/G

RUSH

DUPLICATE SAMPLE

COUNT AS uCi/L

"REM" - 480MIN

ATTACH PRINTOUT

100uL 63843

$$\frac{.4818(370.42)(1000)(1010)}{.4032(2.22\times10^6)} = \frac{2.12\times10^2\ uCi/L}{4.988\ g/L} = 42.6\ uCi/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]			
Hrs	5-19-93 5-18-93	Hrs	Hrs	Hrs
Date 5-18-93	Time Completed	Lab Unit Mgr		

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

#2 ve 5-18-93

$\frac{7270}{30} - 1$

E9325-8881

48267(.0983)-(7.265)(.4983) = 4382

$$\frac{4382(1000)(1010)}{.4983(2.22\times10^6)} = \frac{39.99\ uCi/L}{4.988\ g/L} = 8.02\ uCi/g$$

WHC-SD-WM-DP-045
REV 1

302

VRaymond
5-19-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
E9325-6861 H&RWC/PU
File ID: SD4475.SPC

Counted on: 5/18/93 @20: 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	1483.6	1453.3	363.022	363.022	16.000	6.780	8.000	2.016
2	304.4	290.6	304.815	304.815	16.000	9.839	8.000	2.960
3	1851.3	1826.6	231.017	231.017	16.000	7.674	8.000	3.437
4	20.7	23.3	113.339	113.339	144.000	2.000	82.000	0.200
5	2.8	1.7	76.378	76.378	12.000	1.106	6.000	2.278
6	4.3	3.8	52.102	52.102	16.000	10.376	8.000	0.780

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ml
1	Pu236	0.4032	5.756	5.769	-0.013	0.03	23.07	162.14	0.732E-04
	Cm243		5.786	5.769	0.017				0.982E-04
2	Pu238	0.0983	5.499	5.502	-0.003	0.05	6.11	38.90	0.243E-04
	Am241		5.480	5.502	-0.022				0.186E-04
3	Pu239	0.4818	5.143	5.162	-0.019	0.04	29.96	190.28	0.837E-04
	Pu240		5.144	5.162	-0.018				0.857E-04
4	Np237	0.0142	4.640	4.621	0.019	0.01	0.88	93.56	0.421E-04
5		0.0001		4.451		0.01	0.01	0.06	0.257E-07
6		0.0024		4.339		0.05	0.15	0.93	0.419E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.099 + (0.0046)*Channel
Energy range (MeV): 4.099 TO 6.433
Efficiency = 0.1575 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	33447.0	100.000
Smoothed	33446.3	99.998
Composite fit	31093.1	92.962
Residuals	2353.2	7.036

Analyzed by: _____
VR

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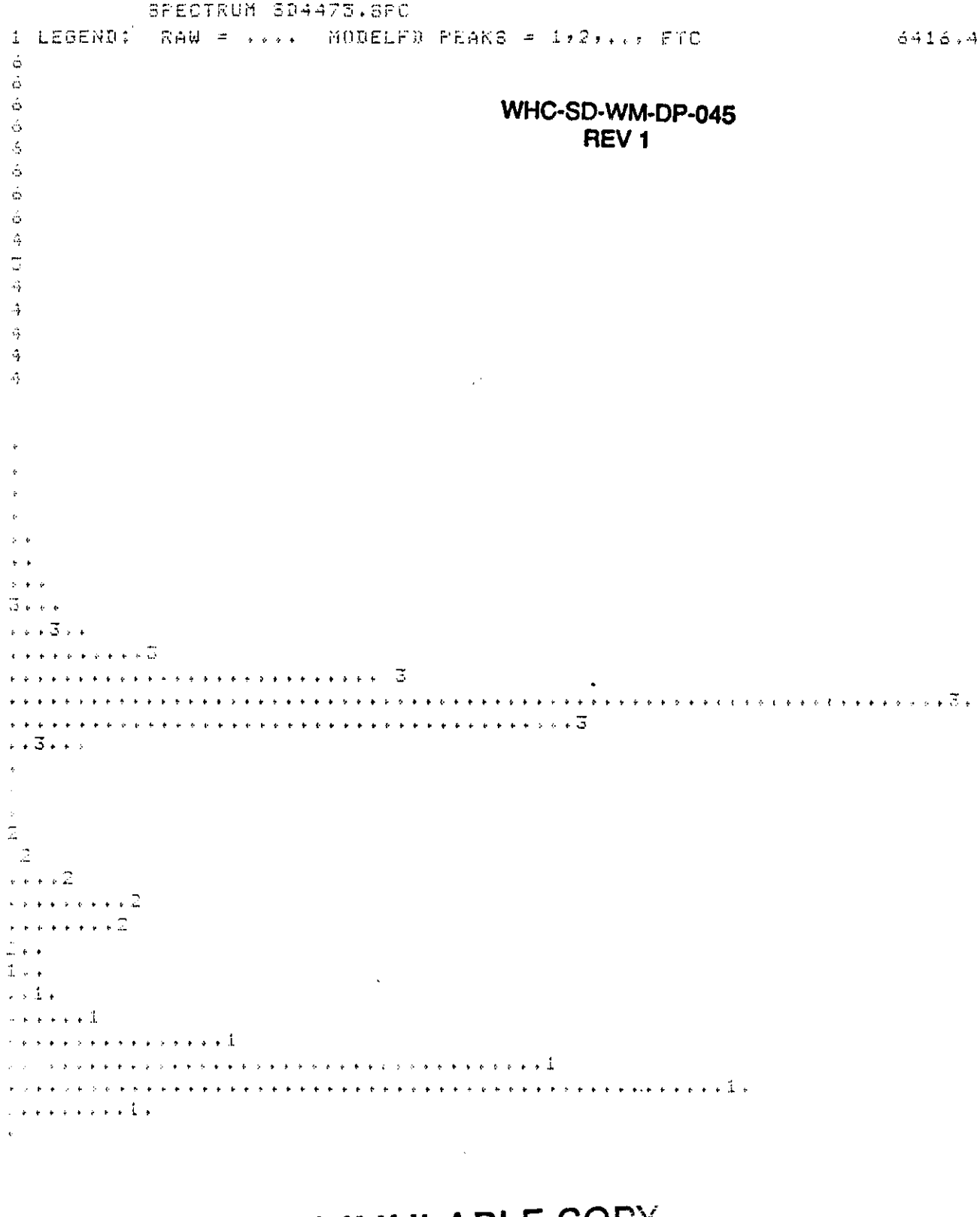

WHC-SD-WM-DP-045
REV 1

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Raw Data Dump for AEA Spectrum: SP:SD4475.SPC

1	0.	0.	0.	0.	0.	1.	0.	1.	1.	0.
11	1.	1.	1.	1.	1.	0.	2.	3.	2.	2.
21	6.	1.	0.	2.	3.	2.	5.	2.	1.	5.
31	1.	1.	4.	1.	4.	4.	2.	1.	2.	7.
41	2.	5.	3.	3.	4.	1.	6.	5.	3.	5.
51	4.	6.	3.	6.	4.	2.	2.	4.	5.	1.
61	3.	2.	4.	4.	2.	5.	6.	4.	4.	9.
71	2.	3.	5.	7.	6.	8.	2.	8.	4.	4.
81	2.	5.	4.	2.	10.	2.	6.	3.	4.	4.
91	4.	9.	6.	5.	6.	6.	2.	5.	7.	4.
101	7.	9.	5.	8.	8.	9.	4.	8.	12.	8.
111	9.	15.	16.	6.	14.	6.	3.	7.	10.	3.
121	4.	7.	10.	9.	3.	14.	8.	7.	10.	15.
131	13.	10.	11.	11.	12.	18.	10.	9.	11.	16.
141	14.	12.	16.	17.	12.	14.	14.	13.	16.	12.
151	12.	18.	16.	25.	17.	9.	15.	19.	14.	23.
161	21.	11.	17.	17.	23.	28.	12.	25.	26.	21.
171	27.	29.	23.	28.	22.	30.	32.	27.	40.	27.
181	39.	31.	31.	29.	33.	36.	41.	48.	31.	44.
191	39.	43.	51.	39.	44.	53.	69.	72.	63.	59.
201	75.	62.	74.	90.	85.	95.	83.	119.	103.	93.
211	120.	122.	126.	178.	195.	237.	216.	267.	293.	309.
221	361.	424.	445.	529.	591.	755.	927.	1056.	1203.	1191.
231	1195.	1016.	840.	633.	410.	234.	101.	48.	21.	12.
241	8.	4.	7.	10.	6.	8.	6.	7.	16.	5.
251	6.	14.	8.	11.	14.	12.	10.	14.	11.	14.
261	11.	8.	17.	16.	21.	13.	9.	13.	17.	13.
271	18.	18.	20.	22.	16.	22.	31.	31.	22.	21.
281	24.	20.	41.	29.	28.	33.	25.	42.	34.	39.
291	45.	67.	80.	79.	79.	92.	102.	119.	109.	115.
301	137.	161.	194.	206.	180.	171.	145.	83.	68.	40.
311	17.	19.	25.	21.	17.	23.	23.	14.	27.	34.
321	44.	29.	36.	33.	37.	42.	38.	32.	42.	43.
331	48.	50.	56.	62.	58.	73.	76.	77.	99.	85.
341	86.	84.	78.	131.	117.	139.	157.	191.	240.	313.
351	368.	427.	448.	475.	366.	433.	438.	406.	582.	752.
361	923.	950.	1054.	925.	673.	454.	203.	97.	18.	14.
371	2.	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.	1.	1.	0.	0.	0.
431	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	1.	0.	0.	1.	0.	0.	0.	0.	1.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	3.	1.
481	3.	2.	3.	2.	0.	0.	3.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WHC-SD-WM-DP-045
REV 1

9313090.1234

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APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 3

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	9	
TODAY'S DATE:	08/19/92	
DECAY CORR'N:	2.554	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242920	5	48575	307	48882	0.4981
242932	5	48577	307	48884	0.4982
242052	5	48401	305	48706	0.4964
243038	5	48599	307	48906	0.4984
242907	5	48572	307	48879	0.4981
242795	5	48550	306	48856	0.4979
243214	5	48634	307	48941	0.4988
243707	5	48732	309	49041	0.4998
242647	5	48520	306	48826	0.4976
241653	5	48322	304	48625	0.4955
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998				
MIN	0.4955	48548	306	48855	0.4979

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DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	152	155	149	154	150	153	153				
Emp 1/6	Pu	113	232	233	230	232	229	232	233				
DATE	Am	139	305	306	302	304	301	303	307				
5-17-93	Cm	163	373	373	370	371	369	371	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np		147	151	145	150	145	149	149				
Ajc B	Pu		227	229	226	229	225	227	229				
DATE	Am		300	303	298	301	296	300	304				
5-16-91	Cm		369	370	366	367	364	368	367				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	150	154	148	150	147	153	153				
15 D/G	Pu	111	230	232	228	229	226	232	234				
DATE	Am	137	303	304	300	301	299	303	307				
5-18-93	Cm	162	371	372	368	368	365	371	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	152	154	149	153	150	156	152				
Emp B/G	Pu	113	231	232	229	232	229	230	233				
DATE	Am	139	305	305	301	303	302	300	307				
5-20-93	Cm	163	372	372	370	371	369	367	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	149	153	147	153	151	154	152				
Aj B/G	Pu	111	227	229	225	232	229	232	233				
DATE	Am	137	299	300	296	304	301	304	307				
5-21-93	Cm	161	365	365	362	371	369	370	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	149	153	147	152	149	152	152				
VR D/G	Pu	111	228	230	226	230	227	231	232				
DATE	Am	137	300	301	297	302	300	303	307				
5-22	Cm	161	367	367	364	369	368	370	370				

TE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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4.1 5398

Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-8782	H&RWC	5-12-93	15:42	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/G Rec	E11457	0

Sample Size	Customer ID
~~1 ML~~ 100-10-100	0344WQT

"AEA" - 480MIN
ATTACH PRINTOUT

Remarks, Calculations, Results:

COUNT AS uCI/L
1ml Pm HNO_3
.100 ml 243 Am spike 5 & BY3

$$\frac{871(565.5)(100)(1010)}{210\ (2.22\times10^6)} = 2.46\times10^{2}\ uCi/L \quad \frac{}{4.988\ g/L} = 4.94\times10^{1}\ uCi/g$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	V Raymond	[illegible]	V Raymond	
Hrs	Hrs 5-17-93	Hrs	Hrs 5-18-93	Hrs

Date	Time Completed	Lab Unit Mgr	
5-17-93	1400	[illegible]	

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

WHC-SD-WM-DP-045
REV 1

3 VR 5-17-93
7194/30 - 6

E9325-8782

Raymond 5-18-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
E9323-0782
File ID: SD5398.SPC

Counted on: 3/18/93 @12: 0
Detector/Geometry number: 3/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak	Peak height		Peak center		FWHM		Tau	
ID	Initial	Final	Initial	Final	Initial	Final	Initial	Final
1	8.3	8.3	363.061	363.061	24.000	20.641	12.000	1.721
2	1583.1	1643.1	297.015	297.015	28.000	23.194	14.000	4.402
3	1463.8	1375.3	251.644	251.644	24.000	15.814	12.000	3.337
4	7.8	7.7	23.911	23.911	20.000	12.146	10.000	14.703

PEAK RESULTS

Peak		AEA	Peak Centroid				Count		Activity
ID	Isotope	Fract.	Exp.	Obs.	Diff.	FWHM	Rate c/m	d/m	uCi/ml
1	Pu236	0.0033	5.756	5.771	-0.015	0.10	0.52	2.28	0.102E-05
	Cm243		5.786	5.773	0.013				0.130E-07
2	Th228	0.5433	5.430	5.461	-0.031	0.11	33.94	326.88	0.146E-0.
	Am241		5.480	5.461	0.019				0.112E-03
3	Am243	0.4503	5.234	5.248	-0.014	0.07	44.70	1739.84	0.792E-03
4	U 238	0.0016	4.200	4.187	0.013	0.06	0.13	0.72	0.325E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.063 + (0.0047)*Channel
Energy range (MeV): 4.063 to 6.471
Efficiency = 0.2310 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	49092.0	100.000
Smoothed	49092.0	100.000
Composite fit	49644.0	101.124
Residuals	-552.1	-1.125

Analyzed by: _____

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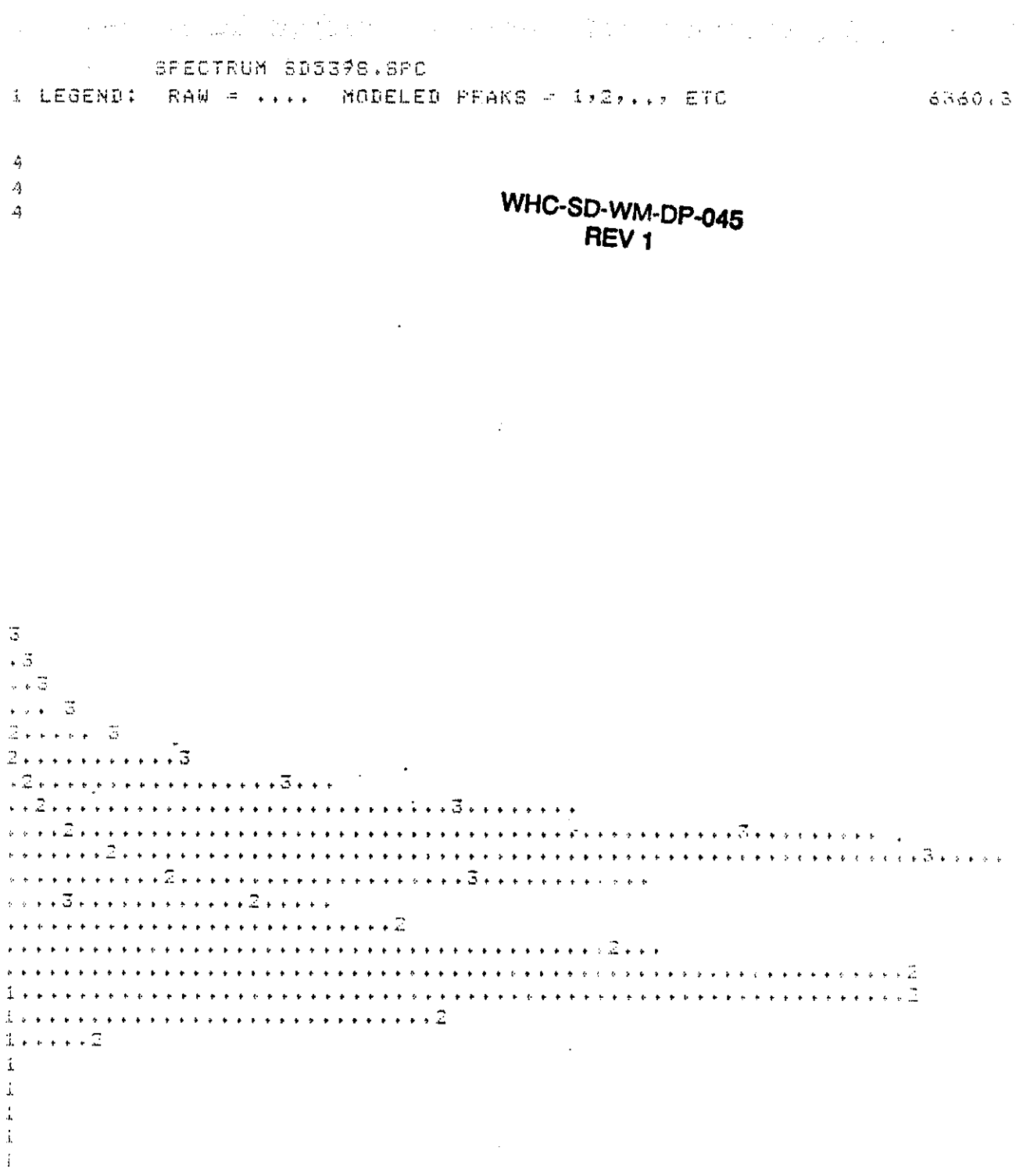
310



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Raw Data Dump for AEA Spectrum: SP:SD5398.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	1.	1.	1.	3.	3.	3.	3.
21	6.	3.	4.	5.	4.	5.	3.	3.	4.	0.
31	3.	1.	2.	0.	2.	0.	0.	1.	0.	0.
41	1.	0.	3.	0.	0.	0.	1.	0.	1.	0.
51	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
61	0.	0.	1.	3.	1.	0.	1.	3.	0.	1.
71	1.	0.	1.	1.	2.	1.	2.	2.	2.	0.
81	0.	1.	0.	0.	0.	2.	2.	3.	2.	0.
91	0.	0.	1.	1.	0.	0.	0.	0.	0.	2.
101	1.	3.	3.	2.	3.	1.	0.	2.	2.	1.
111	2.	1.	0.	1.	1.	1.	0.	2.	4.	1.
121	2.	2.	6.	1.	3.	1.	3.	3.	1.	2.
131	4.	5.	3.	2.	2.	3.	3.	3.	5.	3.
141	4.	3.	4.	3.	2.	3.	4.	4.	7.	3.
151	3.	7.	3.	3.	4.	7.	6.	3.	5.	3.
161	11.	6.	10.	9.	3.	9.	6.	11.	10.	8.
171	17.	10.	4.	7.	9.	13.	10.	7.	13.	13.
181	12.	14.	7.	16.	24.	21.	21.	18.	19.	21.
191	32.	17.	22.	21.	24.	30.	32.	41.	31.	46.
201	31.	41.	33.	33.	41.	48.	56.	69.	72.	58.
211	57.	76.	73.	99.	104.	110.	111.	139.	138.	134.
221	136.	178.	205.	188.	204.	256.	200.	289.	310.	338.
231	340.	406.	418.	456.	483.	503.	516.	540.	591.	613.
241	683.	717.	716.	745.	787.	847.	776.	809.	814.	817.
251	874.	875.	842.	786.	707.	736.	625.	617.	471.	435.
261	357.	311.	264.	257.	237.	201.	190.	204.	218.	225.
271	265.	238.	239.	259.	285.	342.	327.	354.	411.	426.
281	467.	521.	537.	570.	639.	636.	634.	692.	741.	767.
291	759.	780.	809.	821.	871.	793.	819.	822.	790.	701.
301	732.	659.	574.	530.	462.	364.	276.	234.	233.	150.
311	117.	69.	53.	39.	32.	27.	17.	9.	10.	2.
321	4.	1.	0.	2.	1.	2.	2.	1.	0.	0.
331	2.	1.	1.	0.	2.	1.	2.	1.	1.	4.
341	1.	5.	6.	5.	4.	4.	4.	2.	1.	4.
351	7.	6.	2.	3.	4.	3.	5.	2.	6.	6.
361	5.	2.	3.	5.	6.	3.	2.	3.	7.	3.
371	4.	2.	1.	1.	0.	1.	0.	0.	0.	0.
381	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.
391	0.	1.	0.	0.	0.	1.	0.	0.	0.	0.
401	0.	0.	0.	2.	0.	0.	0.	0.	0.	1.
411	0.	0.	0.	2.	0.	1.	0.	0.	0.	1.
421	1.	0.	0.	1.	2.	0.	1.	3.	2.	1.
431	2.	0.	2.	1.	2.	2.	1.	1.	1.	1.
441	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	1.	0.	1.	1.	2.	1.
471	2.	0.	1.	1.	1.	2.	1.	2.	2.	0.
481	0.	0.	3.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
511	0.	0.								

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APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 3
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 9
TODAY'S DATE: 08/19/92
DECAY CORR'N: 2.554 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME		C/M	COINC CORR	CORR C/M	GEOM
242920	5		48575	307	48882	0.4981
242932	5		48577	307	48884	0.4982
242052	5		48401	305	48706	0.4964
243038	5		48599	307	48906	0.4984
242907	5		48572	307	48879	0.4981
242795	5		48550	306	48856	0.4979
243214	5		48634	307	48941	0.4988
243707	5		48732	309	49041	0.4998
242647	5		48520	306	48826	0.4976
241653	5		48322	304	48625	0.4955
FOR	10	TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998					
MIN	0.4955		48548	306	48855	0.4979

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DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	149	150	149	154	151	153	153	Out of Service			
Emb A/G	Pu	111	229	228	229	232	229	231	233				
DATE	Am	137	302	299	301	304	302	303	309				
5-11-93	Cm	161	370	365	369	372	370	371	370	—		—	
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	152	155	148	151	147	150	150				
Emb A G	Pu	113	233	234	228	230	226	231	234				
DATE	Am	139	306	307	301	301	299	305	306				
5-12-93	Cm	164	371	373	370	369	366	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	85	152	156	150	154	151	152	153				
Emb A/G	Pu	113	232	235	230	233	230	231	233				
DATE	Am	140	305	307	302	304	302	303	308				
5-13-93	Cm	164	373	374	371	372	370	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	151	158	146	151	147	150	151				
A Emb	Pu	111	230	238	227	230	227	230	231				
DATE	Am	138	304	310	299	302	299	300	305				
5-14-93	Cm	162	372	376	367	369	366	368	369				
JUP AEA #	PK	3.1	3.2	3.3 Check	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	151	175 147	150	152	148	150	153				
DM / G	Pu	112	231	257 225	231	231	227	229	234				
DATE	Am	139	304	329 297	303	302	299	301	308				
5-15-93	Cm	163	372	397 365	371	370	367	368	371				
JUP AEA #	PK	3.1	3.2	3.3 OK	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	151	160 154	149	153	147	153	152				
Emb/B G	Pu	112	231	239 232	229	232	225	231	233				
DATE	Am	138	305	312 304	301	304	297	303	307				
5-16-93	Cm	163	372	379 372	369	371	365	371	370				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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Serial No	Sample Point	Date	Time Issued	Priority
E 9325.-8786	H&RWC	5-12-93	15:42	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	E11457	1

Sample Size	Customer ID
100-10-100 1 mL Sr CARRIER	0344WQL

Remarks, Calculations, Results
Sep time 1310 hrs
Sep date 5/17/93
gross 8.1842
carr 8.0984
net 0.0858

SUPER SUPER RUSH

$\frac{4.05 \times 10^{+1}\ uC/L}{4.98\ g/L} = 8.12\ uC/g$

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs 5-17-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5/17/93		

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

WHC-SD-WM-DP-045
REV 1

12

Sr Calculation by VR on 05-17-1993 at 18:24:54
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1010 Method : 1

Mount # 1 Decay time = 4.08 hrs

$\frac{423}{10} - 9.0 = 3.4579E+01$ uCi/L strontium

ΔT 4.08 or 3.58
D.F. 1010

E9325-8786

Sr Calculation by VR on 05-17-1993 at 18:25:28
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1010 Method : 1

Mount # 1 Decay time = 3.58 hrs

$\frac{423}{10} - 9.0 = \frac{3.4771E+01\ uCi/L}{.858}$ strontium

$4.05256 \times 10^{1}\ uC/L$

305

03/18/89 Det 12 Sr/Y-90 ratios

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5162	0.4912	0.5412

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.4476	0.4233	0.4719

Esr = .4912/.5162 = 0.9516 , 1"

Ey = .5412/.5162 = 1.0484 , 1"

Esr = .4233/.4476 = 0.9457 , 2"

Ey = .4719/.4476 = 1.0543 , 2"

RATIOS GENERATED USING PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK RHO-QA-NB-47, VOL 5: PAGES 32-36.

05/11/92 Det 12 CALCULATED Sr AND Y-90 EFFs

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5247	0.4993	0.5501

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.442	0.4180	0.4660

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WHC-SD-WM-DP-045
REV 1

105-K AREA BASINS

CUSTOMER ID NUMBER 0491WQL

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Serial No	Sample Point	Date	Time Issued	Priority
E 9230.-8700	H&RWC	5-11-93	9:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	G/L	PC41G	0

Sample Size	Customer ID
?	0491WQL

Remarks, Calculations, Results

JAR ID#
GRAMS SAMPLE 15080 g
VOLUME ON COMPLETION ~~15080 g~~ 100 ml
5.080 g/L

RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/12/97	2330		5/13

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

Serial No	Sample Point	Date	Time Issued	Priority
E 9230.-5000	H&RWC	5-11-93	9:57	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
COMMENT	XXXXXX		PC41G	0

Sample Size	Customer ID
? 250 mL	0491WQL

Remarks, Calculations, Results

GENERAL INFORMATION FOR THIS SAMPLE

GROSS	41.9986
TARE	32.8035
NET	9.1951

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/12/93			

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

E9230-8700

WHC-SD-WM-DP-045
REV 1

SEQUENCE # : 12
WT 1: 0.0000
WT 2: 0.5080

NET WEIGHT:

---> 0.5080 GRAMS

05/12/93 @ 05:24:20
****

Serial No	Sample Point	Date	Time Issued	Priority
E 9230.-1001	H&RWC	5-11-93	9:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
APPR/OTR	LA-519-151	NONE	PC41G	0

Sample Size	Customer ID
?	0491WQL

Remarks, Calculations, Results

Sample or Tank ID? RE BASIN
Color and Est Vol? BROWN /250 ml
Clarity? cloudy
Solids (Y)/n
Phases?
OTR or CPM ? 700 mR

Dry solid wt 9.1951 g

RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 5-13-93	5-17-93
5/13/93	1700	Bertrand Griffin II	

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

Serial No	Sample Point	Date	Time Issued	Priority
E 9230.-5000	H&RWC	5-11-93	9:57	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
COMMENT	XXXXXX		PC41G	0

Sample Size	Customer ID
? 250 mL	0491WQL

Remarks, Calculations, Results

GENERAL INFORMATION FOR THIS SAMPLE

GROSS 41.9986
TARE 32.8035
NET 9.1951

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/12/93			[signature]

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

Original card was not received
LA Webb 8/24/93

Serial No	Sample Point	Date	Time Issued	Priority
S 5340.-9267	SHIFT STD'S	4- 1-93	0:57	26

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-905-106	G/L	STD	0

Sample Size	Customer ID
100-10-100	

Remarks, Calculations, Results

9267 UT1C
STD#120838 RESULT 3.07×10^{-2} .14
STD VAL $3.04E^{-2}$ %REC 101.09
SPIKE ID/VAL 90838/$6.25E^{-4}$ .42
SPIKE VOL. .100 mL

$\frac{.14(.1)(6.25E^{-4})(1010)}{\left[\left(\frac{5.7}{5.6}\right)(.42) - .14\right]}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
5-14-93	08:30	

54-6800-061 (R 10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-1211	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT-LIQ	LA-508-113	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

EDP E341 ENVAE

STD# 40B51 RESULT 6.464E-4

STD VAL %REC 101.96%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Mary Tracy				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-22-93		G/OSE Hoge

54-8800-061 (R-10-83)

SAMPLE POINT: ENV-STD.
LAB ID #: 8501
NUMBER OF ALIQUOTS: 3

	NET CPM	STANDARD DEV. CPM	CONCENTRATION RANGES (UCI/L) MEAN	UPPER	LOWER	DEVIATION PER CENT	SCATTER ERROR
ALPHA:	175.927	4.233	6.464E -4	6.619E -4	6.308E -4	2.41	OK
BETA :	2430.820	86.003	7.523E -3	7.789E -3	7.257E -3	3.54	**

Serial No.	Sample Point	Date	Time Issued	Priority
E 9230.-1211	H&RWC	5-11-93	9:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT MISC	LA-508-101		PC41G	0

Sample Size	Customer ID
.5080 G OF SAMPLE to 100 mL	0491WQL

Remarks, Calculations, Results:
100 - 10.- 50

4.81 x 10 uC/g

RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-13-93	1030		5/13

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

#1 5-13-93 E9230-1211

$\frac{4.81}{30} - 5$

$\frac{268.73(2020)(1000)}{2.22 \times 10^6} = \frac{244.5\ nC/L}{5.080\ g/L} = 48.1\ uC/g$

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-1211	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT-LIQ	LA-508-113	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

EDP E341 ENVAB

STD# 40B51 RESULT 6.464E-4

STD VAL %REC 101.96%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-22-93		6/10 SE Hoge

54-8800-061 (4-10-83)

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SAMPLE POINT: ENV-STD.
LAB ID #: 8501
NUMBER OF ALIQUOTS: 3

	NET CPM	STANDARD DEV. CPM	CONCENTRATION RANGES (UCI/L) MEAN	UPPER	LOWER	DEVIATION PER CENT	SCATTER ERROR
ALPHA:	175.927	4.233	6.464E -4	6.619E -4	6.308E -4	2.41	OK
BETA :	2430.820	86.003	7.523E -3	7.789E -3	7.257E -3	3.54	**

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	10	
TODAY'S DATE:	08/18/92	
DECAY CORR'N:	2.552	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME		C/M	COINC CORR	CORR C/M	GEOM
243204	5		48631	307	48938	0.4987
243913	5		48773	309	49082	0.5002
244771	5		48944	311	49256	0.5020
243758	5		48742	309	49050	0.4999
243766	5		48743	309	49052	0.4999
243637	5		48717	309	49026	0.4996
243514	5		48693	308	49001	0.4994
243765	5		48743	309	49052	0.4999
243849	5		48760	309	49069	0.5001
244044	5		48799	310	49108	0.5005
FOR	10	TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020					
MIN	0.4987		48754	309	49063	0.5000

4951

Serial No.	Sample Point	Date	Time Issued	Priority
E 8501.-2162	ENV STD	4- 6-93	18:30	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-LIQ	LA-548-121	uCi/L	R4B5C	0

Sample Size	Customer ID
500 ML	MAR 1993

Remarks, Calculations, Results:

36851 ENVSTD
EDP E345 / CS137 1.59E-2 92.98% Li .500
EDP E346 / CO60 3.24E-2 98.48%
EDP E349 / AM241

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs 4.24.93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
4-24-93		SH Sethopa

54-6600-061 (R-10-63)

VRaymond 4-24-93

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

24-APR-9322:10:46

WHC-SD-WM-DP-045
REV 1

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

MCA UNIT NUMBER: 1 / ADC UNIT NUMBER: 1.0
DETECTOR NUMBER: 4 / GEOMETRY NUMBER: 81
SPECTRUM SIZE: 4096 CHANNELS
ORDER OF SMOOTHING FUNCTION: 5
NUMBER OF BACKGROUND CHANNELS: 4 ON EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 85.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AND:
ANALYZED BY: VR

SAMPLE DESCRIPTION: E8501-2162 ENV/STD
GEOMETRY DESCRIPTION: 500 ML LIQ
SAMPLE SIZE: 5.0000E-01 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 24-APR-93 AT 21:20:16

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3021. SECONDS
DEAD TIME: 0.70 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

BEST AVAILABLE COPY

24-APR-9322:10:46

SAMPLE: E8301-2162 ENV/STD
DATA COLLECTED ON 24-APR-93 AT 21:20:16
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AC-228	LLD<4.28E-04		LLD<4.28E-04		911.07	
AC-228A	LLD<4.28E-04		LLD<4.28E-04		911.10	
AC-228B	LLD<4.57E-04		LLD<4.57E-04		338.40	
AG-108M	LLD<7.31E-05		LLD<7.31E-05		433.94	
AG-110M	LLD<3.36E-04		LLD<3.36E-04		657.76	
AM-241	LLD<5.46E-04		LLD<3.46E-04		59.54	
AM-243	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243A	LLD<1.31E-04		LLD<1.31E-04		74.67	
AM-243B	LLD<2.30E-03		LLD<2.30E-03		43.10	
AR-41	LLD<6.98E-05		LLD<6.98E-05		1293.64	
AU-198	LLD<6.06E-05		LLD<6.06E-05		411.80	
BA-133	LLD<9.66E-05		LLD<9.66E-05		356.02	
BA-139	LLD<2.36E-04		LLD<2.36E-04		165.85	
BA-140	LLD<2.94E-04		LLD<2.94E-04		537.27	
BA-141	LLD<2.12E-04		LLD<2.12E-04		190.23	
BE-7	LLD<6.62E-04		LLD<6.62E-04		477.59	
BI-207	LLD<7.42E-05		LLD<7.42E-05		569.70	
BI-212	LLD<7.31E-04		LLD<7.31E-04		727.27	
BI-214	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214A	LLD<1.71E-04		LLD<1.71E-04		609.32	
BI-214B	LLD<8.37E-04		LLD<8.37E-04		1120.28	
BI-214C	LLD<2.69E-04		LLD<2.69E-04		1764.31	
CD-109	LLD<1.54E-03		LLD<1.54E-03		88.03	
CE 144	LLD<3.23E-04		LLD<3.23E-04		133.51	
CE-139	LLD<5.33E-05		LLD<5.33E-05		165.85	
CE-141	LLD<7.41E-05		LLD<7.41E-05		145.44	
CEPR144	LLD<6.46E-04		LLD<6.46E-04		133.51	
CO-56	LLD<1.09E-04		LLD<1.09E-04		846.76	
CO-57	LLD<4.24E-05		LLD<4.24E-05		122.06	
CO-58	LLD<1.02E-04		LLD<1.02E-04		810.75	
CO-60	3.24E-02	+-4.14E-04	3.24E-02	+-4.14E-04	1332.50	-0.52
					1173.24	-0.46
CR-51	LLD<5.73E-04		LLD<5.73E-04		320.09	
CS-134	LLD<1.08E-04		LLD<1.08E-04		795.84	
CS-136	LLD<1.05E-04		LLD<1.05E-04		818.51	
CS-137	1.59E-02	+-2.46E-04	1.59E-02	+-2.46E-04	661.65	-0.25
CS-138	LLD<7.71E-05		LLD<7.71E-05		1435.86	
EU-152	LLD<1.85E-04		LLD<1.85E-04		1408.01	
EU-154	LLD<1.84E-04		LLD<1.84E-04		1274.43	
EU-154A	LLD<8.95E-05		LLD<8.95E-05		123.10	
EU-155	LLD<2.06E-04		LLD<2.06E-04		105.51	
FE-59	LLD<2.36E-04		LLD<2.36E-04		1099.25	
HF-181	LLD<8.24E-05		LLD<8.24E-05		482.20	
HG-203	LLD<6.37E-05		LLD<6.37E-05		279.20	
I-131	LLD<7.46E-05		LLD<7.46E-05		364.48	
I-132	LLD<8.56E-05		LLD<8.56E-05		667.69	
I-133	LLD<7.38E-05		LLD<7.38E-05		529.69	
I-134	LLD<1.55E-04		LLD<1.55E-04		847.03	
I-135	LLD<2.20E-04		LLD<2.20E-04		1260.41	
K-40	LLD<8.03E-04		LLD<8.03E-04		1460.75	
KR-85	LLD<1.61E-02		LLD<1.61E-02		513.99	
KR-85M	LLD<5.68E-05		LLD<5.68E-05		151.17	
KR-87	LLD<1.56E-04		LLD<1.56E-04		402.58	

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24-APR-9322:10:46

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

WHC-SD-WM-DP-045
REV 1

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	96.68	48.31	1.00	1263.	965.	11.7	U-234
2	1322.77	661.40	1.49	1479.	22010.	1.4	CS-137
2B		661.44			139.	9.8	
3	2345.24	1172.78	1.84	1053.	31246.	1.2	CO-60
4	2663.52	1331.98	1.98	224.	29195.	1.2	CO-60
5	2920.13	1460.34	1.86	104.	806.	8.0	K-40
5B		1460.67			769.	1.7	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-92 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

93300.1260

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KR-89	LLD<2.78E-03	LLD<2.78E-03	920.90
LA-140	LLD<4.05E-05	LLD<4.05E-05	1596.20
LA-142	LLD<1.86E-04	LLD<1.86E-04	641.83
MN-54	LLD<1.05E-04	LLD<1.05E-04	834.83
MN-56	LLD<1.23E-04	LLD<1.23E-04	846.76
NA-22	LLD<6.06E-05	LLD<6.06E-05	1274.50
NA-24	LLD<3.99E-05	LLD<3.99E-05	1368.60
NB-94	LLD<8.48E-05	LLD<8.48E-05	702.63
NB-95	LLD<9.24E-05	LLD<9.24E-05	763.78
NB-97	LLD<4.07E-04	LLD<4.07E-04	657.92
NP-237	LLD<4.61E-04	LLD<4.61E-04	86.70
NP-238	LLD<4.63E-04	LLD<4.63E-04	984.40
NP-239	LLD<3.60E-04	LLD<3.60E-04	277.60
PA-233	LLD<1.62E-04	LLD<1.62E-04	311.98
PA-234M	LLD<2.19E-02	LLD<2.19E-02	1001.03
PB-210	LLD<1.28E-02	LLD<1.28E-02	46.50
PB-212	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212A	LLD<1.21E-04	LLD<1.21E-04	239.00
PB-212B	LLD<1.72E-03	LLD<1.72E-03	300.10
PB-214	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214A	LLD<1.61E-04	LLD<1.61E-04	351.92
PB-214B	LLD<2.75E-04	LLD<2.75E-04	295.21
PO-210	LLD<8.39E+00	LLD<8.39E+00	804.00
PO-214	LLD<9.36E-01	LLD<9.36E-01	799.70
PO-216	LLD<4.95E+00	LLD<4.95E+00	804.90
PU-239	LLD<6.11E-01	LLD<6.11E-01	129.30
PU-241	LLD<1.94E+01	LLD<1.94E+01	148.57
RA-224	LLD<1.32E-03	LLD<1.32E-03	240.99
RA-226	LLD<1.24E-03	LLD<1.24E-03	186.10
RB-88	LLD<4.26E-04	LLD<4.26E-04	1836.00
RB-89	LLD<5.63E-04	LLD<5.63E-04	1031.88
RN-220	LLD<6.40E-02	LLD<6.40E-02	549.73
RU-103	LLD<7.34E-05	LLD<7.34E-05	497.08
RURH106	LLD<1.50E-03	LLD<1.50E-03	621.80
SB-124	LLD<7.46E-05	LLD<7.46E-05	602.72
SB-125	LLD<2.19E-04	LLD<2.19E-04	427.89
SB-125A	LLD<2.19E-04	LLD<2.19E-04	427.89
SC-46	LLD<1.25E-04	LLD<1.25E-04	1120.45
SE-75	LLD<8.54E-05	LLD<8.54E-05	264.66
SN-113	LLD<9.53E-05	LLD<9.53E-05	391.67
SR-85	LLD<7.07E-05	LLD<7.07E-05	513.99
SR-91	LLD<1.18E-04	LLD<1.18E-04	533.60
SR-92	LLD<5.19E-05	LLD<5.19E-05	1383.94
TA-182	LLD<3.78E-04	LLD<3.78E-04	1121.50
TC-99M	LLD<4.22E-05	LLD<4.22E-05	140.51
TE-123M	LLD<4.46E-05	LLD<4.46E-05	159.00
TE-125M	LLD<1.52E-02	LLD<1.52E-02	109.27
TE-132	LLD<5.90E-05	LLD<5.90E-05	228.16
TH-228	LLD<4.93E-03	LLD<4.93E-03	84.37
TH-229	LLD<1.94E-03	LLD<1.94E-03	86.44
TH-229B	LLD<2.24E-03	LLD<2.24E-03	137.02
TH-229C	LLD<9.73E-04	LLD<9.73E-04	193.59
TH-234	LLD<8.96E-04	LLD<8.96E-04	92.50
TH-234A	LLD<8.96E-04	LLD<8.96E-04	92.50
TH-234B	LLD<3.92E-03	LLD<3.92E-03	63.30
TL-208	LLD<8.08E-05	LLD<8.08E-05	583.14
U-232	LLD<1.33E-01	LLD<1.33E-01	270.26
U-235	LLD<8.01E-05	LLD<8.01E-05	185.71
U-235A	LLD<8.01E-05	LLD<8.01E-05	185.71
U-235B	LLD<3.76E-04	LLD<3.76E-04	143.76
U-237	LLD<2.05E-04	LLD<2.05E-04	208.00
W-187	LLD<2.92E-04	LLD<2.92E-04	685.74
XE-131M	LLD<2.02E-03	LLD<2.02E-03	163.98
XE-133	LLD<1.79E-04	LLD<1.79E-04	81.00
XE-133M	LLD<5.14E-04	LLD<5.14E-04	233.21
XE-135	LLD<5.78E-05	LLD<5.78E-05	249.79

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XE-138	LLD<4.37E-04	LLD<4.37E-04	258.41
Y-88	LLD<4.19E-05	LLD<4.19E-05	1866.06
Y-91	LLD<2.75E-02	LLD<2.75E-02	1204.90
Y-91M	LLD<8.90E-05	LLD<8.90E-05	555.60
ZN-65	LLD<2.56E-04	LLD<2.56E-04	1115.55
ZR-95	LLD<1.70E-04	LLD<1.70E-04	756.73
ZR-97	LLD<8.91E-05	LLD<8.91E-05	743.33
TOTAL	4.83E-02 +-4.82E-04	4.83E-02 +-4.82E-04	

STANDARD DEVIATION = 0.14

9313090.1262

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RUN CALIB

CALIB   --  Version 2.06

222-S COUNTING ROOM WESTINGHOUSE HAMFORD

CAL: EFF
MCA UNIT NUMBER (2): 1
ABC UNIT NUMBER (1,0): 1
DETECTOR NUMBER (   12): 4
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 11-NOV-92
TIME COLLECT STARTED: 09:00
GEOMETRY NUMBER ( 12): 81
GEOMETRY DESCRIPTION: 500ML LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY;
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY;
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 481
SBB42-A 500ML LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  : .  1.00000
NUMBER OF POINTS:    12
ACTIVITY IN MICROCURIES (YES/NO): N

        PEAK     1
                 ENERGY:      59.536
                 ACTIVITY:    3.121000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D158000
                 DECAY TIME ( 0.000000E-01 MINS.):   1-FEB-92
                 TIME OF SOURCE CALIBRATION:   12:00
                 DECAY TIME:    4.087800E+05 MINS
        EFFICIENCY =  1.151452E-02 (+-  1.180572E-04)

        PEAK     2
                 ENERGY:      88.034
                 ACTIVITY:    1.753000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D462.6
                 DECAY TIME ( 4.087800E+05 MINS.):
        EFFICIENCY =  4.235223E-02 (+-  2.590011E-04)

        PEAK     3
                 ENERGY:     122.061
                 ACTIVITY:    1.597000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D271.8
                 DECAY TIME ( 4.087800E+05 MINS.):
        EFFICIENCY =  7.091829E-02 (+-  5.255489E-04)

        PEAK     4
                 ENERGY:     165.853
                 ACTIVITY:    1.940000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D147.66
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9318090.1263

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LOG(EFF) = -6.582071E+01 + 2.261460E+01*LOG(E) - 2.592793E+00*LOG(E)^2

PEAK 5
ENERGY: 279.197
ACTIVITY: 3.425000E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D42.412
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 5.099648E-02 (+- 3.270925E-03)

PEAK 6
ENERGY: 391.668
ACTIVITY: 6.201000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D115.09
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 4.175033E-02 (+- 3.169516E-04)

PEAK 7
ENERGY: 513.990
ACTIVITY: 1.063000E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D64.84
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 3.316401E-02 (+- 5.326431E-04)

PEAK 9
ENERGY: 661.650
ACTIVITY: 6.821000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D11020
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 2.852887E-02 (+- 8.913640E-05)

PEAK 9
ENERGY: 898.021
ACTIVITY: 1.711000E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D106.61
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 2.066866E-02 (+- 1.356644E-04)

PEAK 10
ENERGY: 1173.240
ACTIVITY: 9.279000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1925.3
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 1.722549E-02 (+- 6.099883E-05)

PEAK 11
ENERGY: 1332.500
ACTIVITY: 9.284000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1925.3
DECAY TIME (4.087800E+05 MINS.):
EFFICIENCY = 1.574303E-02 (+- 5.737485E-05)

PEAK 12
ENERGY: 1836.130
ACTIVITY: 1.813000E+03
ACTIVITY ONE SIGMA: 0.000000E-01

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9312090.1254

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

$$LOG(EFF) = 9.202042E+01 - 6.132777E+01*LOG(E) + 1.500303E+01*LOG(E)^2 - 1.634262E+00*LOG(E)^3 + 6.608717E-02*LOG(E)^4$$

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.3213

Serial No	Sample Point	Date	Time Issued	Priority
E 9230.-2172	H&RWC	5-11-93	9:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA-SOIL	LA-548-121	pCi/gWETwt	PC41G	0

Sample Size	Customer ID
_____G OF SAMPLE	0491WQL

Remarks, Calculations, Results

100-10-100 dilution

^{137}Cs $\frac{3.67\times10^{2}\ nCi/L}{5.080\ g/L}$ = 7.22×10^{1} ~~1.76~~ nCi/g

7.22×10^{4} pCi/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-13-93	15:15		5-17-93

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

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

CANBERRA SPECTRAN-F V2.06  SOFTWARE

222-E COUNTING ROOM WESTINGHOUSE HANFORD                  13-MAY-93  [illegible]

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

MCA UNIT NUMBER:    2        /      ADC UNIT NUMBER: [illegible]
DETECTOR NUMBER:    3        /      GEOMETRY NUMBER:  41
SPECTRUM SIZE:  4096 CHANNELS
ORDER OF SMOOTHING FUNCTION:      5
NUMBER OF BACKGROUND CHANNELS:  [illegible] EACH SIDE OF PEAK
PEAK CONFIDENCE FACTOR: 80.0%
IDENTIFICATION ENERGY WINDOW: +- 1.50 KEV
ERROR QUOTATION: 1.96 SIGMA UNCERTAINTY

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER UNIT
ANALYZED BY:  [redacted]

SAMPLE DESCRIPTION: 89230-2172
GEOMETRY DESCRIPTION:  42847-A 2200 LIC
SAMPLE SIZE:     .0000E-03 LI        / CONVERSION FACTOR: [illegible]
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 13-MAY-93 AT [illegible]

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

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

ENERGY CALIBRATION PERFORMED 30-APR-93
EFFICIENCY CALIBRATION PERFORMED [illegible]
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WHC-SD-WM-DP-045
REV 1

93130001257

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGRD COUNTS	NET AREA COUNTS	ERROR %	NUCLIDE
1	703.37	331.56	1.31	180.	107.	38.7	PB-214
1B		331.90			109.	28.2	
2	1021.58	510.71	1.75	149.	137.	40.4	TH-[illegible]
2B		510.97			134.	14.6	[illegible]
							ZN-65,AG-108
3	1216.27	607.06	1.46	94.	141.	26.6	[illegible]
3B		609.17			122.	21.0	RU-103
4	1323.04	661.47	1.47	110.	346.	14.1	CS-137
4B		661.41			81.	17.3	
5	2921.03	1460.71	2.68	35.	[illegible]	8.5	K-40
5B		1460.38			611.	3.5	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 95.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0015
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 10-JAN-90 AT 11:00:00
BACKGROUND LIVE TIME: 7000. SECONDS

9213090.1268

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222-S COUNTING ROOM WESTINGHOUSE HANFORD 13-MAY-93 19:48:17

WHC-SD-WM-DP-045
REV 1

SAMPLE: E9230-2A/2
DATA COLLECTED ON 13-MAY-93 AT 18:48:06
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCI/LI MEASURED	ERROR	D-DAY CORRECTED	ERROR	ENERGY CONFIGURATION (MEV) EXPECT	OBSERVED
AC-228	LLD<2.14E+02		LLD<2.14E+02		911.07	
AC-228A	LLD<2.14E+02		LLD<2.14E+02		911.10	
AG-108	LLD<2.73E+02		LLD<2.73E+02		434.40	
AG-108M	LLD<3.89E+01		LLD<3.89E+01		433.94	
AG-110M	LLD<9.37E+01		LLD<9.37E+01		657.76	
AM-241	LLD<3.13E+01		LLD<3.13E+01		59.54	
AM-243	LLD<4.10E+01		LLD<4.10E+01		74.67	
AM-243A	LLD<4.10E+01		LLD<4.10E+01		74.67	
AM-243B	LLD<2.18E+02		LLD<2.18E+02		48.10	
AR-41	LLD<5.26E+01		LLD<5.26E+01		1293.64	
AU-198	LLD<3.99E+01		LLD<3.99E+01		411.80	
BA-133	LLD<3.46E+01		LLD<3.46E+01		356.02	
BA-139	LLD<1.30E+02		LLD<1.30E+02		165.85	
BA-140	LLD<1.33E+02		LLD<1.33E+02		537.57	
BA-141	LLD<1.28E+02		LLD<1.28E+02		190.27	
BE-7	LLD<3.73E+02		LLD<3.73E+02		477.58	
BI-207	LLD<3.93E+01		LLD<3.93E+01		569.79	
BI-212	LLD<3.28E+02		LLD<3.28E+02		727.77	
BI-214	LLD<1.21E+02		LLD<1.21E+02		609.32	
BI-214A	LLD<1.21E+02		LLD<1.21E+02		609.32	
BI-214B	LLD<4.66E+02		LLD<4.66E+02		1120.18	
BI-214C	LLD<4.30E+02		LLD<4.30E+02		1764.21	
CD-109	LLD<6.89E+02		LLD<6.89E+02		88.03	
CE-144	LLD<2.38E+02		LLD<2.38E+02		133.51	
CE-139	LLD<3.39E+01		LLD<3.39E+01		165.85	
CE-141	LLD<3.93E+01		LLD<3.93E+01		145.44	
CEPR144	LLD<3.76E+02		LLD<3.76E+02		133.51	
CO-56	LLD<4.33E+01		LLD<4.33E+01		846.76	
CO-57	LLD<2.94E+01		LLD<2.94E+01		122.06	
CO-58	LLD<4.16E+01		LLD<4.16E+01		810.75	
CO-60	LLD<3.20E+01		LLD<3.20E+01		1332.50	
CR-51	LLD<3.05E+02		LLD<3.05E+02		320.08	
CS-134	LLD<4.66E+01		LLD<4.66E+01		795.84	
CS-136	LLD<4.37E+01		LLD<4.37E+01		818.51	
CS-137	2.57E+02 +-7.45E+01		3.46E+02	+-7.45E+01	661.62	661.6
CS-138	LLD<8.62E+01		LLD<8.62E+01		1435.82	
EU-152	LLD<1.07E+02		LLD<1.07E+02		1408.01	
EU-154	LLD<1.60E+02		LLD<1.60E+02		1274.43	
EU-155A	LLD<6.40E+01		LLD<6.40E+01		105.10	
EU-155	LLD<1.14E+02		LLD<1.14E+02		103.31	
FE-59	LLD<7.10E+01		LLD<7.10E+01		1099.20	
HF-181	LLD<4.24E+01		LLD<4.24E+01		482.20	
HG-203	LLD<3.41E+01		LLD<3.41E+01		279.20	
I-131	LLD<4.00E+01		LLD<4.00E+01		364.48	
I-132	LLD<4.02E+01		LLD<4.02E+01		667.67	
I-133	LLD<4.46E+01		LLD<4.46E+01		529.67	
I-134	LLD<6.18E+01		LLD<6.18E+01		847.03	
I-135	LLD<1.71E+02		LLD<1.71E+02		1260.41	
K-40	LLD<1.49E+03		LLD<1.49E+03		1460.73	
KR-85	LLD<1.78E+04		LLD<1.78E+04		513.99	
KR-85M	LLD<3.70E+01		LLD<3.70E+01		151.17	
KR-87	LLD<8.09E+01		LLD<8.09E+01		402.58	

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KR-89	LLD<1.53E+03	LLD<1.53E+03	320.90
LA-140	LLD<3.69E+01	LLD<3.69E+01	1744.20
LA-142	LLD<1.03E+02	LLD<1.03E+02	641.63
MN-54	LLD<4.13E+01	LLD<4.13E+01	834.83
MN-56	LLD<5.13E+01	LLD<5.13E+01	846.76
NA-22	LLD<3.70E+01	LLD<3.70E+01	1274.33
NA-24	LLD<3.56E+01	LLD<3.56E+01	1368.60
NB-94	LLD<3.80E+01	LLD<3.80E+01	702.63
NB-95	LLD<3.70E+01	LLD<3.70E+01	763.76
NB-97	LLD<1.21E+02	LLD<1.21E+02	437.92
NP-237	LLD<1.74E+02	LLD<1.74E+02	86.70
NP-238	LLD<1.71E+02	LLD<1.71E+02	884.45
NP-239	LLD<2.01E+02	LLD<2.01E+02	277.60
PA-233	LLD<8.03E+01	LLD<8.03E+01	511.98
PA-234M	LLD<1.01E+04	LLD<1.01E+04	1001.03
PB-210	LLD<3.30E+02	LLD<3.30E+02	46.00
PB-212	LLD<6.84E+01	LLD<6.84E+01	247.00
PB-212A	LLD<6.82E+01	LLD<6.82E+01	232.00
PB-212B	LLD<6.98E+02	LLD<6.98E+02	300.10
PB-214	LLD<1.06E+02	LLD<1.06E+02	301.42
PB-214A	LLD<1.06E+02	LLD<1.06E+02	307.42
PB-214B	LLD<1.43E+02	LLD<1.43E+02	247.21
PD-210	LLD<3.32E+06	LLD<3.32E+06	804.00
PD-214	LLD<4.21E+05	LLD<4.21E+05	249.70
PD-216	LLD<2.15E+06	LLD<2.15E+06	804.70
PU-239	LLD<4.07E+05	LLD<4.07E+05	109.30
PU-241	LLD<1.36E+07	LLD<1.36E+07	148.07
RA-224	LLD<7.79E+02	LLD<7.79E+02	240.55
RA-226	LLD<7.70E+02	LLD<7.70E+02	166.10
RB-88	LLD<3.79E+02	LLD<3.79E+02	1836.00
RB-89	LLD<1.81E+02	LLD<1.81E+02	1081.86
RN-220	LLD<3.00E+04	LLD<3.00E+04	349.73
RU-103	LLD<3.99E+01	LLD<3.99E+01	497.08
RURH106	LLD<7.66E+02	LLD<7.66E+02	821.80
SB-124	LLD<3.07E+01	LLD<3.07E+01	603.42
SB-125	LLD<1.17E+02	LLD<1.17E+02	427.89
SB-125A	LLD<1.17E+02	LLD<1.17E+02	427.89
SC-46	LLD<7.32E+01	LLD<7.32E+01	1130.45
SE-75	LLD<4.93E+01	LLD<4.93E+01	264.66
SN-113	LLD<3.36E+01	LLD<3.36E+01	491.67
SR-89	LLD<3.41E+01	LLD<3.41E+01	316.55
SR-91	LLD<7.12E+01	LLD<7.12E+01	507.60
SR-92	LLD<6.34E+01	LLD<6.34E+01	1563.54
TA-182	LLD<1.44E+02	LLD<1.44E+02	1121.30
TC-99M	LLD<3.04E+01	LLD<3.04E+01	140.31
TE-123M	LLD<3.18E+01	LLD<3.18E+01	159.00
TE-125M	LLD<8.38E+03	LLD<8.38E+03	104.17
TE-132	LLD<3.01E+01	LLD<3.01E+01	275.15
TH-228	LLD<1.66E+03	LLD<1.66E+03	94.37
TH-229	LLD<7.30E+02	LLD<7.30E+02	66.44
TH-229B	LLD<1.64E+03	LLD<1.64E+03	137.02
TH-230	LLD<6.03E+02	LLD<6.03E+02	143.09
TH-[illegible]	LLD<4.10E+02	LLD<4.10E+02	93.30
TH-234A	LLD<4.10E+02	LLD<4.10E+02	93.30
TH-234B	LLD<4.95E+02	LLD<4.95E+02	93.30
TL-208	LLD<5.98E+01	LLD<5.98E+01	745.14
U-232	LLD<6.38E+04	LLD<6.38E+04	270.15
U-233	LLD<4.95E+01	LLD<4.95E+01	183.71
U-233A	LLD<4.95E+01	LLD<4.95E+01	183.71
U-233B	LLD<2.39E+02	LLD<2.39E+02	183.76
U-237	LLD<1.38E+02	LLD<1.38E+02	104.00
W-187	LLD<1.30E+02	LLD<1.30E+02	880.74
XE-131M	LLD<1.52E+03	LLD<1.52E+03	143.46
XE-133	LLD<3.32E+01	LLD<3.32E+01	81.00
XE-133A	LLD<2.66E+02	LLD<2.66E+02	336.31
XE-135	LLD<3.10E+01	LLD<3.10E+01	249.79

WHC-SD-WM-DP-045
REV 1

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XE-133	LLD<2.31E+02	LLD<2.31E+02	206.41
Y-88	LLD<3.66E+01	LLD<3.66E+01	1846.06
Y-91	LLD<2.15E+04	LLD<2.15E+04	1204.90
Y-91M	LLD<3.38E+01	LLD<3.38E+01	800.60
ZN-65	LLD<1.46E+02	LLD<1.46E+02	1115.55
ZR-95	LLD<8.31E+01	LLD<8.31E+01	756.73
ZR-97	LLD<4.35E+01	LLD<4.35E+01	743.33
TOTAL	3.67E+02 +-7.45E+01	3.67E+02 +-7.40E+01	

ESAR - ***** MEV/DISINTEGRATION

MAXIMUM PERMISSABLE ACTIVITY - 1.16E-05 UC/LI
TOTAL MEASURED ACTIVITY - 3.67E+02 (+-7.40E+01) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

ALL REJECTED PEAKS WERE USED IN THE ANALYSIS

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
703.32	331.36	109.	58.7	2.70E+00
1021.08	510.71	137.	60.9	4.80E+00
1218.25	609.06	141.	26.6	3.44E+00
2921.03	1460.71	540.	8.9	4.31E+01

WHC-SD-WM-DP-045
REV 1

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Det # 3, Geom # 41
Efficiency Calibration was performed on 10/28/92 Arj 10/28/92

CALIB -- Version 2.06

222-S COUNTING ROOM WESTINGHOUSE HANFORD

WHC-SD-WM-DP-045
REV 1

```
CAL> EFF
MCA UNIT NUMBER (2): 2
ADC UNIT NUMBER (4.0): 3
DETECTOR NUMBER (   12): 3
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 16-OCT-92
TIME COLLECT STARTED: 13:00
GEOMETRY NUMBER ( 12): 41
GEOMETRY DESCRIPTION: 42B47-A 22CC LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 279
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 341
42B47-A
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO):
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :   1.00000
NUMBER OF POINTS:    12
ACTIVITY IN MICROCURIES [YES/NO]:

      PEAK     1
               ENERGY:      59.536
               ACTIVITY:    3.686600E+02
               ACTIVITY ONE SIGMA:   0.000000E-01
               HALF-LIFE:  D158000.
               DECAY TIME ( 0.000000E-01 MINS.):  1-FEB-92
               TIME OF SOURCE CALIBRATION:  12:00
               DECAY TIME:   3.715800E+05 MINS
     EFFICIENCY =  2.867638E-02 (+-  1.280716E-04)

      PEAK     2
               ENERGY:      88.035
               ACTIVITY:    2.064500E+02
               ACTIVITY ONE SIGMA:   0.000000E-01
               HALF-LIFE:  D462.6
               DECAY TIME ( 3.715800E+05 MINS.):
     EFFICIENCY =  2.873442E-02 (+-  2.192801E-04)

      PEAK     3
               ENERGY:     122.061
               ACTIVITY:    1.881000E+02
               ACTIVITY ONE SIGMA:   0.000000E-01
               HALF-LIFE:  D271.8
               DECAY TIME ( 3.715800E+05 MINS.):
     EFFICIENCY =  2.798845E-02 (+-  2.757689E-04)

      PEAK     4
               ENERGY:     165.853
               ACTIVITY:    2.284100E+02
               ACTIVITY ONE SIGMA:   0.000000E-01
               HALF-LIFE:  D137.66
               DECAY TIME ( 3.715800E+05 MINS.):
     EFFICIENCY =  2.732131E-02 (+-  2.476287E-04)
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```
        ENERGY:     279.197
        ACTIVITY:    6.399900E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D46.12
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  1.905749E-02 (+-  1.172329E-03)

SYSTEM EFFICIENCY COEFFICIENTS, PART 1

LOG(EFF) = -8.900926E+00 + 2.476058E+00*LOG(E) - 2.856299E-01*LOG(E)^2

PEAK     6
        ENERGY:     391.668
        ACTIVITY:    7.301200E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D115.09
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  1.197005E-02 (+-  1.465802E-04)

PEAK     7
        ENERGY:     513.990
        ACTIVITY:    1.252140E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D64.84
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  8.790109E-03 (+-  2.215078E-04)

PEAK     8
        ENERGY:     661.650
        ACTIVITY:    8.031900E+02
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D11020
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  7.850802E-03 (+-  4.358826E-05)

PEAK     9
        ENERGY:     898.021
        ACTIVITY:    2.014700E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D106.61
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  5.892207E-03 (+-  6.369832E-05)

PEAK    10
        ENERGY:    1173.240
        ACTIVITY:    1.092550E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  4.768241E-03 (+-  3.001378E-05)

PEAK    11
        ENERGY:    1332.500
        ACTIVITY:    1.093210E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 3.715800E+05 MINS.):
EFFICIENCY =  4.271624E-03 (+-  2.805451E-05)

PEAK    12
        ENERGY:    1836.130
        ACTIVITY:    2.135290E+03
        ACTIVITY ONE SIGMA:    0.000000E-01
        HALF-LIFE:  D106.61
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9312090.1223

EFFICIENCY = 3.238070E-03 (+- 3.820561E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

```
LOG(EFF) =  4.136870E+02 - 2.479005E+02*LOG(E) + 5.525641E+01*LOG(E)^2
          - 5.477345E+00*LOG(E)^3 + 2.030400E-01*LOG(E)^4
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9310001.1274

#8 . 50666 .

Serial No.	Sample Point	Date	Time Issued	Priority
E 9230.-3461	H&RWC	5-11-93	9:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu-SOIL	LA-~~943-125~~ 503-156	pCi/gDRYwt	PC41G	0

Sample Size	Customer ID
_____G OF SAMPLE 100-10-100	0491WQL

Remarks, Calculations, Results

1ml Pu HNO3

100 ml Pu 236 spike 64843

$\frac{.3482\ (391.46)(1000)(1010)}{.5368\ (2.22\times10^6)} = \frac{115.5\ uC/L}{5.0800\ g/L} = 22.7\ uC/g$

^{238}Pu 3.59 uC/g "AEA" - 480MIN ATTACH PRINTOUT

RUSH

2.27 pCi/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[illegible]	[illegible]	[illegible]	
Hrs	Hrs	Hrs 5-14-93	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr.	
5-14-93	1100	[illegible]	5-17-93 [illegible]

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

#1 pw 5-14-93

E9230-3461

$\frac{3002}{30} - 5$

$190.13\ (0.065)(7.265)(.2607) = 10.46$

$\frac{10.46\ (1000)(1010)}{(.2607)(2.22\times10^6)} = \frac{1.83\ uC/L}{5.0800\ g/L} = 3.59\ uC/g$

D.H. Milicia
5-15-93

WHC-SD-WM-DP-045
REV 1

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
E9230-3461 H&RWC/PU
File ID: SD8066.SPC

Counted on: 5/14/93 @22: 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	1595.1	1577.7	364.676	364.676	20.000	6.369	10.000	4.139
2	185.2	175.0	310.159	310.159	20.000	9.518	10.000	11.530
3	59.4	59.2	270.036	270.036	20.000	11.424	10.000	1.950
4	990.2	985.4	235.348	235.348	16.000	7.522	8.000	5.408
5	6.8	6.7	149.328	149.328	16.000	9.214	8.000	3.225
6	6.3	5.6	19.769	19.769	20.000	6.135	10.000	11.276

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm244	0.5368	5.796	5.777	0.019	0.03	21.42	115.15	0.519E-04
	Cm243		5.786	5.777	0.009				0.711E-04
2	Pu238	0.0650	5.499	5.520	-0.021	0.04	2.59	19.36	0.872E-05
3		0.0450		5.332		0.05	1.80	9.66	0.435E-05
4	Pu239	0.3482	5.143	5.169	-0.026	0.04	13.89	74.69	0.336E-04
	Pu240		5.144	5.169	-0.025				0.336E-04
5	Np237	0.0032	4.781	4.764	0.017	0.04	0.13	0.80	0.360E-06
6		0.0017		4.156		0.03	0.07	0.36	0.161E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.063 + (0.0047)*Channel
Energy range (MeV): 4.063 TO 6.469
Efficiency = 0.1860 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	20038.0	100.000
Smoothed	20035.0	99.985
Composite fit	19948.3	99.552
Residuals	86.7	0.433

Analyzed by: _____
VR

```
          SPECTRUM SD8066.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC              5669.4

6

5
5
5

4
 ...4
  .......................4
.........................................4.
3........4.
3
.3
.3
3


.2.
......2.
...2


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

Raw Data Dump for AEA Spectrum: SP:SD8066.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	1.	3.	6.	8.	6.	1.
21	1.	0.	1.	4.	0.	0.	1.	2.	0.	1.
31	0.	2.	1.	1.	1.	0.	0.	0.	0.	0.
41	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.
61	0.	3.	0.	0.	1.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
101	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
111	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
121	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
131	0.	1.	2.	2.	1.	1.	7.	1.	1.	2.
141	2.	1.	3.	4.	4.	2.	5.	1.	5.	6.
151	4.	0.	3.	3.	0.	1.	0.	0.	1.	0.
161	0.	1.	0.	0.	0.	0.	1.	1.	2.	0.
171	1.	0.	0.	2.	4.	1.	0.	2.	0.	0.
181	1.	0.	0.	2.	1.	0.	0.	1.	2.	0.
191	1.	0.	2.	2.	1.	1.	1.	2.	1.	1.
201	1.	4.	4.	3.	0.	4.	5.	8.	5.	7.
211	9.	3.	7.	13.	16.	12.	19.	26.	50.	50.
221	82.	98.	107.	142.	145.	169.	242.	286.	331.	408.
231	432.	570.	622.	662.	652.	557.	487.	366.	254.	163.
241	98.	47.	22.	8.	4.	2.	3.	0.	6.	4.
251	3.	5.	2.	8.	14.	14.	25.	14.	28.	18.
261	27.	26.	35.	32.	25.	18.	27.	31.	31.	35.
271	37.	34.	22.	19.	18.	7.	2.	1.	5.	1.
281	1.	4.	2.	2.	1.	3.	5.	3.	6.	8.
291	5.	12.	13.	5.	21.	16.	15.	25.	23.	39.
301	40.	58.	49.	62.	78.	69.	102.	129.	110.	128.
311	100.	76.	67.	45.	20.	13.	8.	0.	1.	0.
321	1.	3.	2.	0.	1.	1.	1.	3.	1.	1.
331	2.	5.	4.	7.	4.	4.	3.	5.	5.	8.
341	8.	9.	6.	12.	15.	16.	36.	43.	54.	90.
351	103.	166.	203.	311.	378.	407.	420.	440.	495.	596.
361	698.	869.	1068.	1192.	1041.	855.	632.	303.	143.	43.
371	11.	1.	0.	1.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
421	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.
451	0.	3.	1.	2.	0.	3.	1.	0.	1.	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.	1.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	1.	2.								

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

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9213090.1279

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	92	149	150	149	154	151	153	153	Out of Service			
GMB A/G	Pu	111	229	228	229	232	229	231	233				
DATE	Am	137	302	299	301	304	302	303	307				
5-11-93	Cm	161	370	365	369	372	370	371	370	—		—	—
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	94	152	153	148	151	147	150	150				
GMB A G	Pu	113	233	234	228	232	226	231	234				
DATE	Am	139	306	307	301	301	299	305	306				
5-12-93	Cm	164	371	373	370	369	366	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	95	152	156	150	154	151	152	153				
GMB A/G	Pu	113	232	235	230	233	230	231	233				
DATE	Am	140	305	307	302	304	302	303	308				
5-13-93	Cm	164	373	374	371	372	370	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	151	158	146	151	147	150	151				
A GMB	Pu	111	230	238	227	230	227	230	231				
DATE	Am	138	304	310	299	302	299	300	305				
5-14-93	Cm	162	372	376	367	369	366	368	369				
JUP AEA #	PK	3.1	3.2	3.3 OK	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	151	175 147	150	152	148	150	153				
DM / G	Pu	112	231	257 225	231	231	227	229	234				
DATE	Am	139	304	329 297	303	302	299	301	308				
5-15-93	Cm	163	372	377 365	371	370	367	368	371				
JUP AEA #	PK	3.1	3.2	3.3 OK	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	151	162 154	149	153	147	153	152				
GMB/B G	Pu	112	231	239 232	229	232	225	231	233				
DATE	Am	138	305	312 304	301	304	297	303	307				
5-16-93	Cm	163	372	374 372	369	371	365	371	370				

TE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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3.4 4466

Serial No	Sample Point	Date	Time Issued	Priority
E 9230.-1181	H&RWC RW 5-12-93	5-11-93	9:56	25

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am-SOIL	LA-~~943-128~~ 503-156	pCi/gDRYwt	PC41G	0

Sample Size	Customer ID
_____G OF SAMPLE 100-10-100	0491WQL

Remarks, Calculations, Results

1 ml 8m HNO_3
.150 ml Am 243 spike 58B43

"AEA" - 480MIN
ATTACH PRINTOUT

$\frac{446(565.5)(1000)(1010)}{1331(2.22)(.6)} = \frac{862\ uCi/L}{5080\ g/L} = 1.70 \times 10^{-1}\ uCi/g$

1.70×10^{1} pCi/g

RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[signature]	D H Miller		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5-14-93	1100	[signature]	5-17-93 [signature]

54-6600-061 (R-10-63)

#2 RW 5-14-93 E9230-1181

5736/30 -2

D. H. Villicia
5-16-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 1.10

WHC-SD-WM-DP-045
REV 1

DATA REDUCTION REPORT

SAMPLE
E-9230-1191
File ID: 204466.SPE

Counted on: 5/15/93 @13: 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	4.7	4.6	483.334	483.334	16.000	5.488	8.000	5.221
2	11.0	6.1	364.021	364.021	16.000	16.455	8.000	8.014
3	9.4	8.4	349.814	349.814	12.000	2.926	6.000	1.113
4	657.0	625.6	302.445	302.445	20.000	9.012	10.000	4.186
5	1940.5	1847.2	256.532	256.532	20.000	8.114	10.000	3.787

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1		0.0013		6.311		0.03	0.05	0.42	0.189E-0[illegible]
2	Pu236	0.0031	5.756	5.762	-0.006	0.08	0.13	0.99	0.447E-06
3	Ra224	0.0029	5.680	5.697	-0.017	0.01	0.12	0.98	0.440E-06
4	Am241	0.2578	5.480	5.479	0.001	0.04	10.64	87.26	0.393E-04
5	Am243	0.7349	5.234	5.268	-0.034	0.04	30.33	2125.64	0.957E-03

DETECTOR CALIBRATION
Energy(MEV) = 4.088 + (0.0046)*Channel
Energy range (MeV): 4.088 TO 6.443
Efficiency = 0.1297 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	22024.0	100.000
Smoothed	22024.0	100.000
Composite fit	20632.6	93.682
Residuals	1391.4	6.318

Analyzed by: _____

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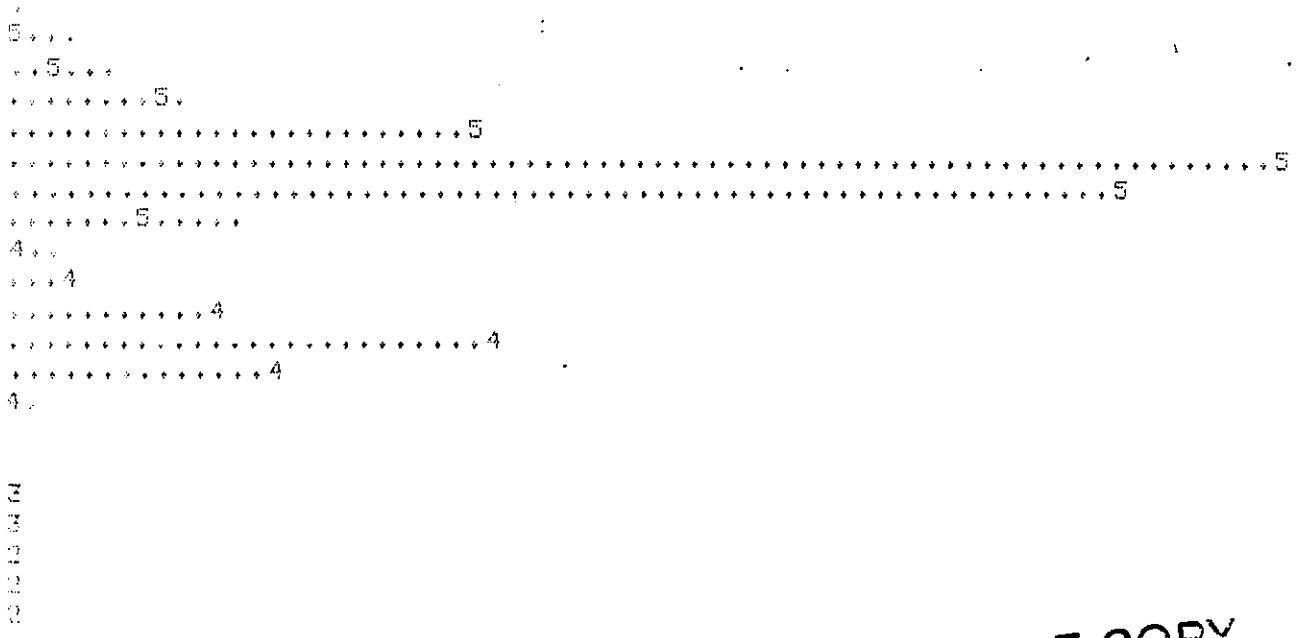
SPECTRUM SD4466.SPC

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 5806.4

WHC-SD-WM-DP-045
REV 1

9313090.1289



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Raw Data Dump for AEA Spectrum: SP:SD4466.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	1.	0.	1.	0.	1.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
31	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.
41	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	1.	0.	0.	1.	1.	1.	0.	0.	1.	0.
71	1.	0.	1.	0.	0.	0.	3.	1.	0.	2.
81	1.	1.	0.	2.	0.	2.	0.	2.	2.	0.
91	1.	0.	0.	0.	0.	1.	0.	1.	0.	0.
101	0.	2.	1.	1.	0.	0.	2.	0.	2.	0.
111	2.	2.	0.	2.	2.	0.	0.	0.	2.	1.
121	2.	1.	3.	2.	1.	1.	1.	2.	1.	2.
131	1.	0.	4.	0.	1.	1.	1.	1.	4.	1.
141	3.	3.	2.	2.	4.	2.	3.	3.	1.	4.
151	2.	3.	4.	2.	2.	2.	3.	2.	1.	4.
161	8.	6.	5.	1.	3.	4.	4.	2.	6.	3.
171	4.	7.	5.	2.	1.	6.	2.	6.	1.	6.
181	5.	9.	6.	8.	3.	3.	7.	5.	6.	6.
191	7.	6.	6.	6.	11.	15.	8.	5.	5.	10.
201	14.	11.	8.	10.	12.	13.	22.	14.	23.	23.
211	22.	22.	20.	29.	20.	18.	30.	30.	39.	28.
221	46.	33.	41.	46.	49.	60.	69.	70.	66.	91.
231	87.	94.	86.	92.	93.	110.	111.	130.	141.	163.
241	179.	212.	251.	284.	332.	366.	441.	478.	485.	562.
251	672.	778.	945.	1085.	1317.	1331.	1255.	967.	660.	404.
261	253.	164.	103.	92.	69.	70.	69.	68.	67.	39.
271	31.	42.	23.	26.	26.	24.	27.	23.	28.	24.
281	35.	60.	38.	40.	56.	54.	61.	67.	92.	118.
291	111.	122.	160.	182.	178.	198.	205.	274.	330.	416.
301	446.	423.	400.	305.	226.	155.	96.	69.	68.	41.
311	35.	33.	15.	19.	17.	5.	2.	2.	0.	0.
321	2.	2.	0.	0.	0.	2.	0.	1.	0.	1.
331	0.	0.	0.	2.	0.	0.	0.	2.	0.	0.
341	3.	1.	3.	3.	2.	7.	4.	8.	9.	9.
351	5.	2.	0.	2.	2.	0.	1.	2.	3.	4.
361	3.	3.	4.	3.	1.	4.	4.	1.	3.	1.
371	2.	1.	0.	1.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	1.	0.	0.	2.	1.	1.	2.	2.	1.	0.
431	0.	0.	2.	1.	0.	0.	2.	2.	3.	3.
441	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
471	0.	0.	1.	0.	0.	0.	1.	1.	6.	1.
481	1.	5.	2.	4.	2.	2.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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9313090.1285

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	92	149	150	149	154	151	153	153	Out of Service			
Emb A/G	Pu	111	229	228	229	232	229	231	233				
DATE	Am	137	302	299	301	304	302	303	307				
5-11-93	Cm	161	370	365	369	372	370	371	370	—		—	
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	94	152	155	148	151	147	150	150				
Emb A G	Pu	113	233	234	225	230	226	231	234				
DATE	Am	139	306	307	301	301	299	305	306				
5-12-93	Cm	164	371	373	370	369	366	369	370				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	95	152	156	150	154	151	152	153				
Emb A/G	Pu	113	232	235	230	233	230	231	233				
DATE	Am	140	305	307	302	304	302	303	308				
5-13-93	Cm	164	373	374	371	372	370	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	151	158	146	151	147	150	151				
A Emb	Pu	111	230	238	227	230	227	230	231				
DATE	Am	138	304	310	299	302	299	300	305				
5-14-93	Cm	162	372	376	367	369	366	368	369				
JUP AEA #	PK	3.1	3.2	3.3 OK	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	151	175 147	150	152	148	150	153				
DM / G	Pu	112	231	257 225	231	231	227	229	234				
DATE	Am	139	304	329 297	303	302	299	301	308				
5-15-93	Cm	163	372	397 365	371	370	367	368	371				
JUP AEA #	PK	3.1	3.2	3.3 OK	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	84	151	160 154	149	153	147	153	152				
Pu/B G	Pu	112	231	239 232	229	232	225	231	233				
DATE	Am	138	305	312 304	301	304	297	303	307				
5-16-93	Cm	163	372	379 372	369	371	365	371	370				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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Serial No	Sample Point	Date	Time Issued	Priority
E 9230.-8786	H&RWC	5-11-93	9:57	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	PC41G	1

Sample Size	Customer ID
100-10-100 1mL Sr CARRIER	0491WQL

Remarks, Calculations, Results
Sep date 1390 hrs
Sep time 5/17/93
gross 8.1892
Tare 8.1024
net 0.0868

SUPER SUPER RUSH

$\frac{4.11 \times 10^2 \text{ uCi/L}}{5.080 \text{ g/L}} = 8.09 \times 10^1 \text{ uCi/g}$

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted] Raymond			
Hrs	Hrs 5-17-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
5/17/93		[signature]	

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

WHC-SD-WM-DP-045
REV 1

9313090.1287

11 2" 5-17-93 R 1715 AT 358 E 9230-8786
DF 1010

$\frac{3325}{10} - 12$

Sr Calculation by VR on 05-17-1993 at 18:22:19
Det #11 2 -inch mount Sr eff : .3919 Y eff : .4443

Sample size : 1 mL Dilution : 1010 Method : 1

Mount # 1 Decay time = 3.58 hrs

$\frac{3325}{10} - 12.0 = \frac{3.5670E+02 \text{ uCi/L}}{.868}$ strontium

4.1094×10^2 uCi/L

358

06/14/89 Det 11 Sry-90 ratios

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5219	0.4899	0.5469

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.4181	0.3919	0.4443

Esr = .4899/.5219 = 0.9387 , 1"

Ey = .5469/.5219 = 1.0479 , 1"

Esr = .3919/.4181 = 0.9373 , 2"

Ey = .4443/.4181 = 1.0627 , 2"

RATIOS GENERATED USING PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK RHO-QA-NB-47, VOL 4: PAGES 31-36.

RPJones 11-18-92

9213080.1288

PART II - SB SAMPLES

9413090.1289

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SAMPLING AND CUSTODY DATA

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WHC-SD-WM-DP-045

REQUEST FOR SPECIAL ANALYSIS (RSA) REV 1

RSA No. #1557

1. Sample Origin: 34 (Bechtold 1)	2. Date Submitted: 5/25/93	4. Requester Name: D B Bechtold	6. Charge Code/Work Package: E13975
	3. Submitted By: D B Bechtold	5. Requester Phone/MSIN: 3-2462 / T6-09	7. Date Required: ASAP

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID
SB-76A	5/23/93		R3943

12. Number of Samples: 1

13. Volume of Samples: 10 mL

14. Protocols: [x] None [ ] RCRA [ ] NQA-1 [ ] Other [ ] CERCLA

15. Sample Type: [ ] Solid [ ] Soil [ ] Slurry [ ] Gas [ ] Water [ ] Waste [ ] Solution [x] Sludge [ ] Oil [ ] Other (specify)

16. Storage Requirements: [x] None [ ] Specify

17. Process Knowledge/Known Listed Wastes: [ ] Unknown [x] Known (Please attach list) KE Basin sludge [ ] Previously submitted for this Project

10. Determination	11. Expected Range
Acid Digest	
·) Pu 239, 240	
·) U	
·) ICP	

18. Survey: HPT Signature — Dose Rate: 150 mrem

19. Disposition of Waste: [ ] Return to Client/Location [ ] Dispose per 222-S Procedures [x] Other: Hold for possible rerun

20. Additional Information: replicates required for all analyses high alpha

21. Chain of Custody: [x] No [ ] Yes Number:

22. Assigned Custodial Group (select one): [ ] PCL [x] PDSU [ ] ENV [ ] Process

23. Sample Received By: [signature] Date: 05-26-93 Time: 1440

24. Laboratory Manager (if required): Date:

362

BC-6700-181 (11/92)

9313000.1291

Initial made

REQUEST FOR SPECIAL ANALYSIS (RSA)

WHC-SD-WM-DP-045
REV 1

RSA No. 1552

1. Sample Origin	2. Date Submitted	4. Requester Name	6. Charge Code/Work Package
34 (Beckstead-1)	5/24/93	D B Beckstead	E 13975
	3. Submitted By: S B Kimbler	5. Requester Phone/MSIN: 3-2162 / T6-09	7. Date Required: ASAP Rush

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID
SB-76A	5/24/93		R3916

12. Number of Samples	13. Volume of Samples
1	~10 cc

14. Protocols: [x] None [ ] RCRA [ ] NQA-1 [ ] Other [ ] CERCLA

15. Sample Type: [ ] Solid [ ] Soil [ ] Slurry [ ] Gas [ ] Water [ ] Waste [ ] Solution [x] Sludge [ ] Oil [ ] Other (specify)

16. Storage Requirements: [x] None [ ] Specify

17. Process Knowledge/Known Listed Wastes: [ ] Unknown [x] Known (Please attach list) KE Basin Sludge PuO_2 UO_2 [ ] Previously submitted for this Project

10. Determination	11. Expected Range
~~SO~~ filter (initial-93)	
Dry weight of solids	
acid digest	
AT	
TB	
GEA	
$Pu^{239,240}$	
Am^{241}	
Sr^{90}	
Ru^{106}	
ICP-all	
U	
H3 of saved water	

18. Survey: Gerald J Mackey (HPT Signature) Dose Rate 150 mrem

19. Disposition of Waste: [ ] Return to Client/Location [x] Dispose per 222-S Procedures [x] Other save and check with D Beckstead before disposal

20. Additional Information: Return Gamma copy to D Beckstead when "R" high alpha Rush $Pu^{239,240}$ ICP U

21. Chain of Custody: [x] No [ ] Yes Number:

22. Assigned Custodial Group (select one): [ ] PCL [x] PDSU [ ] ENV [ ] Process

23. Sample Received By: Valerie F Massie
Date: 5-24-93 Time: 15:00

24. Laboratory Manager (if required)
Date: 363

BC-6700-181 (11/92)

9413090.1292

#1525

REQUEST FOR SPECIAL ANALYSIS (RSA) WHC-SD-WM-DP-045 REV 1

RSA No.

1. Sample Origin: EC 34 Bechtold-1	2. Date Submitted: 5/13/93	4. Requester Name: D.B. Bechtold	6. Charge Code/Work Package: E 13975
	3. Submitted By:	5. Requester Phone/MSIN: 3-2162 / T6-09	7. Date Required: 6/4/93

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID
SB-70E	5/12/93	15:20	R3853

12. Number of Samples: 1

13. Volume of Samples: ~10 mL

14. Protocols: [x] None [ ] RCRA [ ] NQA-1 [ ] Other [ ] CERCLA

15. Sample Type: [ ] Solid [ ] Soil [ ] Slurry [ ] Gas [ ] Water [ ] Waste [ ] Solution [x] Sludge [ ] Oil [ ] Other (specify)

16. Storage Requirements: [x] None [ ] Specify

17. Process Knowledge/Known Listed Wastes: [ ] Unknown [x] Known (Please attach list) KE Basin sludge [x] Previously submitted for this Project

10. Determination	11. Expected Range
ACID DIGEST	
ICP All metals as received	
Total U as received	

18. Survey: S Hodges (HPT Signature) Dose Rate: 150 mrhr

19. Disposition of Waste: [ ] Return to Client/Location [x] Dispose per 222-S Procedures [ ] Other

20. Additional Information: high α, high β γ submit goldenrod copy to Dave Bechtold when "E" number added.

21. Chain of Custody: [x] No [ ] Yes Number:

22. Assigned Custodial Group (select one): [ ] PCL [ ] POSU [x] ENV [ ] Process

23. Sample Received By: Vilenit Manic Date: 05-13-93 Time: 14:55

24. Laboratory Manager (if required) Date: 364

BC-6700-181 (11/92)

93 3090.1293

WHC-SD-WM-DP-045
REV 1

REQUEST FOR SPECIAL ANALYSIS (RSA)

RSA No. 1567

1. Sample Origin: 34 (BECHTOLD)
2. Date Submitted: 6/4/93
3. Submitted By: S B Kunkler
4. Requester Name: D B Bechtold
5. Requester Phone/MSIN: 3-2162
6. Charge Code/Work Package: E13975
7. Date Required: Priority (Start 6/7)

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID
SB-77A	6/4/93	13:49	R 3976

12. Number of Samples: 1
13. Volume of Samples: 250 ml
14. Protocols: ☐ None ☐ RCRA ☐ NQA-1 ☐ Other ☐ CERCLA

15. Sample Type: ☐ Solid ☐ Soil ☐ Slurry ☐ Gas ☐ Water ☐ Waste ☐ Solution ☑ Sludge ☐ Oil ☐ Other (specify)

16. Storage Requirements: ☑ None ☐ Specify

17. Process Knowledge/Known Listed Wastes: ☐ Unknown ☑ Known (Please attach list) KE Basin sludge U, Pu, Sr^{90}, Cs^{137} ☐ Previously submitted for this Project

18. Survey: HPT Signature — Dose Rate

19. Disposition of Waste: ☐ Return to Client/Location ☐ Dispose per 222-S Procedures ☑ Other Hold for approval by Chris Lucas 3-1006

20. Additional Information
① filter all liquid + all solids
② save liquid

10. Determination	11. Expected Range
Total liquid volume	~250
weight dried solids	also total liquid weight
acid digest of dried solids	
$Pu^{239,240}$	
U	
ICP all	
AT	
TB	
Am^{241}	
GEA	
Sr^{90}	
Pu^{238}	
Cm^{244}	

21. Chain of Custody: ☒ No ☐ Yes Number:

22. Assigned Custodial Group (select one): ☐ PCL ☒ POSU ☐ ENV ☐ Process

23. Sample Received By: [signature] Date: 6/4/93 Time: 1445

24. Laboratory Manager (if required): 365 Date:

BC-6700-181 (11/92)

93 3090 1294

WHC-SD-WM-DP-045
REV 1

SAMPLE DATA SUMMARY

9313090.1295

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ANALYTICAL CARDS

105 K
CUSTOMER ID: SB-96 Q
TANK: N/a

Acid Digestion	SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Acid Digestion LG-505-154/B-0	✓	✓	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Acid Digestion LG-505-154/B-1	✓	✓	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
U LG-925-106/B-0	✓	✓	N/a	N/a	✓	N/a	✓	✓	N/a	N/a	N/a	N/a
U LG-925-106/B-0	✓	✓	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
ICP LG-505-151/B-0	✓	✓	✓	✓	✓	N/a	✓	✓	N/a	N/a	N/a	N/a
ICP LG-505-151/B-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GT LG-508-101/B-0	✓	✓	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEA LG-548-121/B-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 239/40 LG-503-156/B-0	✓	✓	✓	✓	✓	N/a	✓	✓	N/a	N/a	N/a	N/a
Pu 239/40 LG-503-156/B-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105 K
CUSTOMER ID: SB-76a

	Standard		Sample		Duplicate Sample	
Lab I.D.	R3942-8500		R3943-8700		N/a	
Acid Digestion 06-02-93	DF 100		10.351	g/l	N/a	
Lab I.D.	R4034-8500		R3943-8700		N/a	
Acid Digestion 06-10-93	DF 100		10.368	g/l	N/a	
Lab I.D.	R3942-8540		R3943-8740		R3943-8840	
U 06-04-93	100.99	%	$8.76 E^{-3}$	G/G	$7.81 E^{-3}$	G/G
Lab I.D.	R4034-85[illegible]		R3943-8740		N/a	
U 06-16-93	101.0	%	$7.97 E^{-3}$	G/G	N/a	
Lab I.D.	R3942-8550		R3943-8750		R3943-8850	
ICP. 06-02-93						
Zr	90.2	%	$1.69 E^{+1}$	mg/g	*	
Sr	99.8	%	$7.48 E^{0}$	mg/g	*	
Si	423.6	%	$2.77 E^{+2}$	mg/g	*	
Al	122.0	%	$3.40 E^{+3}$	mg/g	*	
Cu	98.6	%	$9.40 E^{+1}$	mg/g	*	
Zn	99.1	%	$1.60 E^{+2}$	mg/g	*	
Ni	102.0	%	$1.83 E^{+1}$	mg/g	*	
Fe	105.0	%	$1.17 E^{+4}$	mg/g	*	
Ca	154.2	%	$6.57 E^{+2}$	mg/g	*	
Cr	104.0	%	$3.68 E^{+1}$	mg/g	*	
Sn	92.3	%	$5.49 E^{+1}$	mg/g	*	

* No duplicate digested

SAMPLE PREP.: Acid Digestion

105K

CUSTOMER ID: SB-76a

SAMPLE RESULTS

	Standard		Sample		Duplicate Sample
Lab I.D.	R3942-8550		R3943-8750		R3943-8850
ICP Ba 6-2-93	98.3	%	2.71 E+1	mg/g	*
P	103.8	%	1.32 E+2	mg/g	*
S	104.6	%	1.98 E+2	mg/g	*
Mg	116.6	%	2.16 E+2	mg/g	*
Na	153.5	%	3.72 E+1	mg/g	*
Pb	94.2	%	4.38 E+1	mg/g	*
Ti	100.0	%	2.45 E+1	mg/g	*
Cd	101.4	%	5.06 E+1	mg/g	*
K	93.2	%	9.43 E+1	mg/g	*
Mn	98.2	%	2.61 E2	mg/g	*
Sb	100.5	%	3.26 E+1	mg/g	*
V	99.6	%	3.87 E+1	mg/g	*
Be	101.4	%	5.52 E0	mg/g	*
Tl	77.6	%	3.10 E+1	mg/g	*
Lab I.D.	R4034-8550		R3943-8755		
ICP Zr 6-11-93	98.50	%	1.83 E+1	mg/g	
Sr	100.05	%	7.98 E0	mg/g	
Si	419.25	%	4.13 E+2	mg/g	
Al	133.2	%	3.83 E+3	mg/g	
Li	98.65	%	2.06 E0	mg/g	

* No duplicate digested

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105 K
CUSTOMER ID: SB-76 G

	Standard		Sample	
Lab I.D.	R4034-8550		R3943-8755	
ICP Ni 6-11-93	103.3	%	2.28 E+1	mg/g
Fe	109.2	%	1.21 E+4	mg/g
Ca	117.65	%	8.19 E+2	mg/g
Cr	101.4	%	3.97 E+1	mg/g
Sn	87.10	%	1.32 E+1	mg/g
Ba	99.30	%	2.83 E+1	mg/g
P	101.50	%	1.77 E+2	mg/g
S	105.0	%	2.07 E+2	mg/g
Mg	103.[illegible]	%	2.16 E+2	mg/g
As	104.5	%	3.40 E0	mg/g
Na	129.5	%	4.06 E+1	mg/g
Mo	100.3	%	1.99 E0	mg/g
Pb	97.60	%	5.01 E+1	mg/g
Ti	98.40	%	2.05 E+1	mg/g
Cd	98.40	%	5.13 E+1	mg/g
K	96.3	%	1.11 E+2	mg/g
Mn	100.1	%	2.85 E+2	mg/g
Sb	106.6	%	3.22 E+1	mg/g
Be	100.75	%	5.41 E0	mg/g

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105 K

CUSTOMER ID: 58-76Q

	Standard		Sample		Duplicate Sample	
Lab I.D.	R4035-8525		R3943-8725		N/a	
QT 06-11-93	89.48	%	3.92 E^{0}	uci/g	N/a	
Lab I.D.	R4035-8530		R3943-8730		N/a	
GEQ 6-11-93					N/a	
Cs 137	101.0	%	1.053 E^{+1}	uci/g	N/a	
Co 60	103.0	%	4.33 E^{-1}	uci/g	N/a	
Am 241	N/a		1.66 E^{0}	uci/g	N/a	
Eu 154	N/a		3.75 E^{-1}	uci/g	N/a	
Eu 155	N/a		1.69 E^{-1}	uci/g	N/a	
Lab I.D.	R3942-8581		R3943-8781		R3943-8881	
Pu 239/40 06-3-93	102.7	%	1.92 E^{0}	uci/g	2.185 E^{0}	uci/g
Lab I.D.	R4034-8581		R3943-8781		N/a	
Pu 239/40 06-16-93	103.45	%	1.97	uci/g	N/a	

ANALYTICAL CARDS

105 K
CUSTOMER ID: SB-76 a
TANK: N/a

Undigested	SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
H3 La-218-114-/a-2	✓	✓		✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
ACID DIGESTION												
Acid Digestion La-505-159 /B-0	✓	✓	N/a	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
U La-925-106 /B-0	✓	✓	N/a	N/a	✓	N/a	✓	✓	N/a	N/a	N/a	N/a
ICP La-505-151 / B-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
TB L..508-101 /B-0	✓	✓	✓	N/a	✓	N/a	✓✓	N/a	N/a	N/a	N/a	N/a
GT La-508-101 / B-0	✓	✓	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEG La-548-121 / B-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 239/40 La-503-156 / B-0	✓	✓	✓	✓	✓	N/a	✓	✓	N/a	N/a	N/a	N/a
Am 241 La-503-156 / B-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Sr 90 La-220-101 / B-0	✓	✓	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Undigested

SAMPLE RESULTS

105 K

CUSTOMER ID: SB-76a

	Standard		Sample	
Lab I.D.	N/a		R3916-5000	
* Comment 06-03-93			8.6118	g
Lab I.D.	R3915-5587		R3916-5787	
#3 06-02-93	90.32	%	3.14 E-3	wt/wt

* Dry weight of solids

SAMPLE PREP.: Acid Digestion

105 K

CUSTOMER ID: 58-76Q

SAMPLE RESULTS

	Standard		Sample		Sample Duplicate
Lab I.D.	R3915-8500		R3916-8700		N/a
Acid Digestion 06-03-13	D.F. 100		5.01 E°	g/l	N/a
Lab I.D.	R3915-8540		R3916-8740		R3916-8840
U 06-04-13	100.99	%	1.22 E⁻²	G/G	1.31 E⁻²	G/G
Lab I.D.	R3915-8550		R3916-8755		N/a
ICP 06-03-13					
Zr	89.2	%	2.99 E⁺¹	mg/g	N/a
Sr	95.9	%	1.30 E⁺¹	mg/g	N/a
Si	419.9	%	2.93 E⁺²	mg/g	N/a
Al	131.0	%	5.97 E⁺³	mg/g	N/a
Co	93.7	%	3.65 E°	mg/g	N/a
Cu	95.0	%	1.52 E⁺²	mg/g	N/a
Li	95.1	%	2.75 E°	mg/g	N/a
Zn	93.0	%	2.52 E⁺²	mg/g	N/a
Ni	93.4	%	2.85 E⁺¹	mg/g	N/a
Fe	99.8	%	1.92 E⁺⁴	mg/g	N/a
Ca	169.8	%	9.53 E⁺²	mg/g	N/a
Cr	97.4	%	6.05 E⁺¹	mg/g	N/a
Sn	92.6	%	9.38 E⁺¹	mg/g	N/a
Ba	94.5	%	5.03 E⁺¹	mg/g	N/a
P	85.3	%	2.01 E⁺²	mg/g	N/a

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105K
CUSTOMER ID: SB-76 a

	Standard		Sample		Duplicate Sample
Lab I.D.	R3915-8550		R3916-8755		N/a
ICP S	118.4	%	3.31 E+2	ug/g	N/a
Mg	123.8	%	3.65 E+2	ug/g	N/a
Na	194.8	%	1.16 E+3	ug/g	N/a
Pb	93.4	%	7.76 E+1	ug/g	N/a
Ti	94.8	%	4.87 E+1	ug/g	N/a
Cd	94.7	%	8.00 E+1	ug/g	N/a
K	100.0	%	1.65 E+2	ug/g	N/a
Mn	91.4	%	4.30 E+2	ug/g	N/a
V	93.5	%	6.11 E+1	ug/g	N/a
Be	92.9	%	8.22 E0	ug/g	N/a
Lab I.D.	R3915-8520		R3916-8720		N/a
TB 06-03-93	112.3	%	*		N/a
TB 06-09-93	N/a		4.60 E+1	uci/g	N/a
Lab I.D.	R3915-8525		R3916-8725		N/a
GT 06-03-93	94.16	%	6.46 E0	uci/g	N/a
Lab I.D.	R3915-8530		R3916-8730		N/a
GEG 06-03-93					N/a
Cs 137	107.44	%	1.57 E+1	uci/g	N/a
Co-60	100.54	%	7.58 E-1	uci/g	N/a
Am 241	N/a		2.40 E0	uci/g	N/a

* Out for re-run

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105K

CUSTOMER ID: SB-76 a

	Standard		Sample		Duplicate Sample	
Lab I.D.	R3915-853		R3916-8730		N/a	
GEA Eu155	N/a		3.73 E-1	uci/g	N/a	
Lab I.D.	R3915-8581		R3916-8781		R3916-8881	
Pu 239/40 06-03-93	102.88	%	2.99 E0	uci/g	2.69 E0	uci/g
Lab I.D.	R3915-82		R3916-8782		N/a	
Am 241 06-03-93	95.42	%	5.07 E0	uci/g	N/a	
Lab I.D.	R3915-8586		R3916-8786		N/a	
Sr 90 06-04-93	95.64	%	7.01 E0	uci/g	N/a	

ANALYTICAL CARDS

105 K
CUSTOMER ID: SB-70 E
TANK: N/a

Acid Digestion	SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD ✓ ~~NOVE~~	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Acid Digestion LA-505-159 /B-0	✓	✓	N/a	✓		✓	✓	N/a	N/a	N/a	N/a	N/a
" LA-525-104 /A-2	✓	✓	N/a	N/a	✓	✓	✓	N/a	N/a	N/a	N/a	N/a
ICP LA-505-151 /C-0	✓	N/a	N/a	N/a	✓	✓	✓	N/a	N/a	N/a	N/a	N/a

WHC-SD-WM-DP-045
REV 1

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105 K

CUSTOMER ID: SB-70

	Standard		Blank		Sample	
Lab I.D.	R3851-8500		R3852-8600		R3853-8700	
Acid Digestion 05-12-93	D.F. = 100		Complete		10.064	g/l
Lab I.D.	R3851-8540		R3852-8640		R3853-8740	
U 06-01-93	101.00	%	<2.61 E+1	ug/ml	8.17 E-3	g/g
Lab I.D.	R3851-8550		R3852-8650		R3853-8750	
ICP 05-24-93						
Zr	91.6	%	<7.00 E-3	ug/ml	1.86 E+1	ug/g
Sr	99.6	%	<3.00 E-3	ug/ml	8.91 E0	ug/g
Si	400.0	%	9.48 E-2	ug/ml	8.97 E+2	ug/g
Al	128.0	%	<3.70 E-2	ug/ml	4.23 E+3	ug/g
Cu	98.4	%	<4.00 E-3	ug/ml	1.30 E+2	ug/g
Zn	110.4	%	2.38 E-2	ug/ml	1.92 E+2	ug/g
Ni	103.2	%	<1.30 E-2	ug/ml	2.10 E+1	ug/g
Fe	95.2	%	<1.50 E-2	ug/ml	1.43 E+4	ug/g
Ca	152.8	%	3.32 E-1	ug/ml	6.35 E+2	ug/g
Cr	104.0	%	<9.00 E-3	ug/ml	5.52 E+1	ug/g
Sn	102.4	%	<9.40 E-2	ug/ml	7.21 E+1	ug/g
Ba	97.6	%	<3.00 E-3	ug/ml	3.27 E+1	ug/g
P	116.8	%	<4.60 E-2	ug/ml	1.53 E+2	ug/g
S	155.2	%	8.45 E-2	ug/ml	2.04 E+2	ug/g
Mg	119.2	%	3.41 E-2	ug/ml	1.72 E+2	ug/g

378

20

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105 K

CUSTOMER ID: SB-70 E

	Standard		Blank		Sample	
Lab I.D.	R3851-8550		R3854-8650		R3853-8750	
ICP 05-26-93						
Na	266.0	%	2.23 E^{-1}	mg/mL	6.35 E^{+1}	mg/mL
Ti	100.0	%	<3.00 E^{-3}	mg/mL	1.89 E^{+1}	mg/mL
Cd	99.6	%	<6.00 E^{-3}	mg/mL	6.41 E^{+1}	mg/mL
K	69.9	%	<1.16 E^{-1}	mg/mL	4.46 E^{+1}	mg/mL
Mn	96.0	%	<3.00 E^{-3}	mg/mL	3.17 E^{+2}	mg/mL
V	100.0	%	<1.00 E^{-2}	mg/mL	4.55 E^{+1}	mg/mL
Be	100.0	%	<3.00 E^{-3}	mg/mL	6.87 E^{0}	mg/mL
Tl	80.8	%	<1.64 E^{-1}	mg/mL	3.95 E^{+1}	mg/mL
Pb	NONE		NONE		6.21 E^{+1}	mg/mL

WHC-SD-WM-DP-045
REV 1

ANALYTICAL CARDS

105 K
CUSTOMER ID: SB-77a
TANK: N/a

Undigested	SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP	DUP	STD
Appearance LQ-519-151 / E-1	✓	N/a	N/a	N/a	N/a	N/a	✓	N/a	N/a	N/a	N/a	N/a
H^+ LQ-211-102	✓	N/a	N/a	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu LQ-943-101 / J-2	✓	✓		✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Acid Digestion												
Acid Digestion LQ-505-159 / B-0	✓	✓	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
U LQ-925-104 / B-0	✓	✓	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
ICP LQ-505-151 / D-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
TB LQ-508-101 / D-0	✓	✓	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GT LQ-308-101 / D-0	✓	✓	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
GEG LQ-548-121 / D-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Pu 239/40 LQ-503-156 / D-0	✓	✓	✓	✓	✓	N/a	✓	✓	N/a	N/a	N/a	N/a
Am 241 LQ-503-156 / D-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Sr 90 LQ-220-101 / D-0	✓	✓	✓	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a

SAMPLE PREP.: Undigested

SAMPLE RESULTS

10.5 K

CUSTOMER ID: SB-77a

	Standard		Sample		Duplicate Sample
Lab I.D.	N/a		R3976-5002		N/a
Appear 06-07-93		Mix,	5% solids, brown, opaq, 1 phase, 265 grams		
Lab I.D.	R3975-2223		R3976-2223		N/a
H^+ 06-11-93	1.42	M	2.11	M	N/a
Lab I.D.	R3975-3411		R3976-3411		N/a
Pu 06-15-93	91.5	%	$1.32 E^{+4}$	dci/g	N/a

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105 K

CUSTOMER ID: SB-77A

	Standard		Sample		Duplicate Sample
Lab I.D.	R3975-8[illegible]0		R3976-8700		N/A
Acid Digestion 06-07-93	DF 100		1.4420	g/l	N/A
Lab I.D.	R3975-8540		R3976-8740		N/A
U 06-14-93	101.0	%	5.87 E-1	G/G	N/A
Lab I.D.	R3975-8550		R3976-8750		N/A
ICP 06-14-93					N/A
Zr	*		3.10 E+3	mg/g	N/A
Sr	*		1.07 E+2	mg/g	N/A
Si	*		3.34 E+4	mg/g	N/A
Ni	*		2.70 E+2	mg/g	N/A
Ca	*		5.21 E+3	mg/g	N/A
Cr	*		1.91 E+3	mg/g	N/A
Nd	*		1.32 E+3	mg/g	N/A
Sm	*		8.38 E+3	mg/g	N/A
Ba	*		3.24 E+2	mg/g	N/A
P	*		4.34 E+3	mg/g	N/A
S	*		5.34 E3	mg/g	N/A
Mg	*		2.74 E+3	mg/g	N/A
Cs	*		1.13 E+2	mg/g	N/A
Na	*		5.70 E+2	mg/g	N/A
Mo	*		4.35 E+1	mg/g	N/A

* Digested standard no good

SAMPLE PREP.: Acid Digestion

105 K

CUSTOMER ID: SB-77a

SAMPLE RESULTS

	Standard		Sample		Duplicate Sample
Lab I.D.	R3975-8530		R3976-8730		N/a
ICP Ag	*		1.89 E+2	mg/g	N/a
Al	*		3.17 E+3	mg/g	N/a
Ti	*		3.55 E+2	mg/g	N/a
Cd	*		2.67 E+2	mg/g	N/a
Mn	*		1.53 E+3	mg/g	N/a
Sb	*		2.04 E+3	mg/g	N/a
Be	*		7.93 E+1	mg/g	N/a
Tl	*		3.00 E+3	mg/g	N/a
Cr	*		2.48 E+3	mg/g	N/a
Fe	*		3.31 E+5	mg/g	N/a
Lab I.D.	R3975-8530		R3976-8730		N/a
TB 06-14-93	102.09	%	5.99 E+3	uci/g	N/a
Lab I.D.	R3975-8525		R3976-8725		N/a
GT 06-14-93	88.32	%	3.71 E+2	uci/g	N/a
Lab I.D.	R3975-8530		R3976-8730		N/a
GEA 06-14-93					N/a
Cs 137	104.0	%	1.46 E+3	uci/g	N/a
Co 60	102.0	%	1.37 E+1	uci/g	N/a
Am 241	N/a		1.94 E+2	uci/g	N/a
Cs 134	N/a		1.48 E0	uci/g	N/a

* Digested standard no good.

SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

105 K

CUSTOMER ID: SB-10

	Standard		Sample		Duplicate Sample
Lab I.D.	R3975-8330		R3976-8730		N/a
GEA E4154	N/a		3.415 E+1	uci/g	N/a
E4155	N/a		1.813 E+1	uci/g	N/a
Lab I.D.	R3975-8381		R3976-8781		R3976-8881
Pu 239/40 04-16-93	101.2	%	2.77 E+2	uci/g	2.74 E+2 uci/g
Lab I.D.	R3975-8382		R3976-8782		N/a
Cs 241 04-16-93	112.7	%	1.72 E+2	uci/g	N/a
Lab I D.	R3975-8386		R3976-8786		N/a
Sr 90 04-18-93	89.02	%	3.32 E+2	uci/g	N/a

SAMPLE STATUS REPORT FOR R 4034. BECHTOLD-1 STD TIME: 8/10/93 12:55
DISPATCHED: 6/ 9/93 10:13 SAMPLE HAS BEEN SLURPED
RECEIVED: 6/14/93 12:44

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8500	ACD DGST	DF 100			KP36A
8540	U	1.01000E 02 % RECOVERY	N	Y	KP36A
8550	ICP	DIGESTED STDS			KP36A
8550	ICP	9.85000E 01 % RECOVERY Zr	N	Y	KP36A
8550	ICP	1.00050E 02 % RECOVERY Sr	N	Y	KP36A
8550	ICP	4.19250E 02 % RECOVERY Si	N	Y	KP36A
8550	ICP	1.33200E 02 % RECOVERY Al	N	Y	KP36A
8550	ICP	9.86500E 01 % RECOVERY Li	N	Y	KP36A
8550	ICP	1.03300E 02 % RECOVERY Ni	N	Y	KP36A
8550	ICP	1.09200E 02 % RECOVERY Fe	N	Y	KP36A
8550	ICP	1.17650E 02 % RECOVERY Ca	N	Y	KP36A
8550	ICP	1.01400E 02 % RECOVERY Cr	N	Y	KP36A
8550	ICP	8.71000E 01 % RECOVERY Sm	N	Y	KP36A
8550	ICP	9.93000E 01 % RECOVERY Ba	N	Y	KP36A
8550	ICP	1.01500E 02 % RECOVERY P	N	Y	KP36A
8550	ICP	1.05000E 02 % RECOVERY S	N	Y	KP36A
8550	ICP	1.03000E 02 % RECOVERY Mg	N	Y	KP36A
8550	ICP	1.04300E 02 % RECOVERY As	N	Y	KP36A
8550	ICP	1.29500E 02 % RECOVERY Na	N	Y	KP36A
8550	ICP	1.00300E 02 % RECOVERY Mo	N	Y	KP36A
8550	ICP	9.76000E 01 % RECOVERY Pb	N	Y	KP36A
8550	ICP	9.84000E 01 % RECOVERY Ti	N	Y	KP36A
8550	ICP	9.84000E 01 % RECOVERY Cd	N	Y	KP36A
8550	ICP	9.63000E 01 % RECOVERY K	N	Y	KP36A
8550	ICP	1.00100E 02 % RECOVERY Mn	N	Y	KP36A
8550	ICP	1.06600E 02 % RECOVERY Sb	N	Y	KP36A
8550	ICP	1.00750E 02 % RECOVERY Be	N	Y	KP36A
8550	ICP	LMCS UNDIGESTED STDS			KP36A
8550	ICP	9.85600E 01 % RECOVERY Sr	N	Y	KP36A
8550	ICP	9.80700E 01 % RECOVERY Li	N	Y	KP36A
8550	ICP	1.04200E 02 % RECOVERY Ni	N	Y	KP36A
8550	ICP	9.67000E 01 % RECOVERY Fe	N	Y	KP36A
8550	ICP	9.65400E 01 % RECOVERY Ca	N	Y	KP36A
8550	ICP	9.94800E 01 % RECOVERY Cr	N	Y	KP36A
8550	ICP	9.82000E 01 % RECOVERY Ba	N	Y	KP36A
8550	ICP	9.82600E 01 % RECOVERY Mg	N	Y	KP36A
8550	ICP	9.81400E 01 % RECOVERY Na	N	Y	KP36A
8550	ICP	9.83200E 01 % RECOVERY Cd	N	Y	KP36A
8550	ICP	9.85800E 01 % RECOVERY K	N	Y	KP36A
8550	ICP	9.88400E 01 % RECOVERY Mn	N	Y	KP36A
8550	ICP	9.50200E 01 % RECOVERY Sb	N	Y	KP36A
8550	ICP	1.00000E 02 % RECOVERY Sm	N	Y	KP36A
8550	ICP	9.88000E 01 % RECOVERY Pb	N	Y	KP36A
8550	ICP	9.80800E 01 % RECOVERY Zr	N	Y	KP36A
8550	ICP	1.08190E 02 % RECOVERY Si	N	Y	KP36A
8550	ICP	9.55600E 01 % RECOVERY Al	N	Y	KP36A
8550	ICP	1.11500E 02 % RECOVERY P	N	Y	KP36A
8550	ICP	1.00960E 02 % RECOVERY S	N	Y	KP36A
8550	ICP	9.90400E 01 % RECOVERY As	N	Y	KP36A
8550	ICP	9.93400E 01 % RECOVERY Mo	N	Y	KP36A
8550	ICP	9.83200E 01 % RECOVERY Ti	N	Y	KP36A

8550	ICP	1.01500E 02 % RECOVERY Be	N	Y	KP36A

REPORT CONTINUED ON NEXT PAGE

SAMPLE STATUS REPORT FOR R 4034. BECHTOLD-1 STD TIME: 8/10/93 12:55
DISPATCHED: 6/ 9/93 10:13 SAMPLE HAS BEEN SLURPED

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8581	Pu239/40	1.03450E 02 % RECOVERY	N	Y	KP36A

END OF REPORT

WHC-SD-WM-DP-045
REV 1

9131000138

SAMPLE STATUS REPORT FOR R 4035. BECHTOLD-1 STD TIME: 8/10/93 12:5
DISPATCHED: 6/ 9/93 10:14 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/14/93 8:19

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8525	AT	8.94800E 01 % RECOVERY	N	Y	E13975
8530	GEA	1.01000E 02 % RECOVERY Cs-137	N	Y	KP36A
8530	GEA	1.03000E 02 % RECOVERY Co-60	N	Y	KP36A
9530	R S GEA	INCOMPLETE			KP36A

END OF REPORT

9413000.1312

SAMPLE STATUS REPORT FOR R 3942. BECHTOLD-1 STD TIME: 8/12/93 18:38
DISPATCHED: 5/26/93 13:32 SAMPLE HAS BEEN SLURPED
RECEIVED: 6/ 4/93 8:37

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8500	ACD DGST	D.F. 100			E13975
8540	U	1.00990E 02 % RECOVERY	N	Y	E13975
8550	ICP	UNDIGESTED LMCS STDS			E13975
8550	ICP	1.00280E 02 % RECOVERY Sr	N	Y	E13975
8550	ICP	9.89200E 01 % RECOVERY Cu	N	Y	E13975
8550	ICP	1.02720E 02 % RECOVERY Zn	N	Y	E13975
8550	ICP	1.03620E 02 % RECOVERY Ni	N	Y	E13975
8550	ICP	1.02720E 02 % RECOVERY Fe	N	Y	E13975
8550	ICP	1.01300E 02 % RECOVERY Ca	N	Y	E13975
8550	ICP	1.07040E 02 % RECOVERY Cr	N	Y	E13975
8550	ICP	9.94000E 01 % RECOVERY Ba	N	Y	E13975
8550	ICP	9.86900E 01 % RECOVERY Na	N	Y	E13975
8550	ICP	1.03360E 02 % RECOVERY Cd	N	Y	E13975
8550	ICP	1.09640E 02 % RECOVERY B	N	Y	E13975
8550	ICP	1.02100E 02 % RECOVERY Mg	N	Y	E13975
8550	ICP	1.02080E 02 % RECOVERY K	N	Y	E13975
8550	ICP	1.08000E 02 % RECOVERY Sb	N	Y	E13975
8550	ICP	9.60000E 01 % RECOVERY Sm	N	Y	E13975
8550	ICP	9.98000E 01 % RECOVERY Pb	N	Y	E13975
8550	ICP	9.42900E 01 % RECOVERY Zr	N	Y	E13975
8550	ICP	9.92100E 01 % RECOVERY Si	N	Y	E13975
8550	ICP	9.80200E 01 % RECOVERY Al	N	Y	E13975
8550	ICP	1.03030E 02 % RECOVERY P	N	Y	E13975
8550	ICP	1.02520E 02 % RECOVERY S	N	Y	E13975
8550	ICP	1.02900E 02 % RECOVERY Ti	N	Y	E13975
8550	ICP	1.01820E 02 % RECOVERY V	N	Y	E13975
8550	ICP	1.06810E 02 % RECOVERY Be	N	Y	E13975
8550	ICP	1.06020E 02 % RECOVERY Tl			E13975
8550	ICP	DIGESTED STDS			E13975
8550	ICP	9.02000E 01 % RECOVERY Zr	N	Y	E13975
8550	ICP	9.98000E 01 % RECOVERY Sr	N	Y	E13975
8550	ICP	4.23600E 02 % RECOVERY Si	N	Y	E13975
8550	ICP	1.22000E 02 % RECOVERY Al	N	Y	E13975
8550	ICP	9.86000E 01 % RECOVERY Cu	N	Y	E13975
8550	ICP	9.91000E 01 % RECOVERY Zn	N	Y	E13975
8550	ICP	1.02000E 02 % RECOVERY Ni	N	Y	E13975
8550	ICP	1.05000E 02 % RECOVERY Fe	N	Y	E13975
8550	ICP	1.54200E 02 % RECOVERY Ca	N	Y	E13975
8550	ICP	1.04000E 02 % RECOVERY Cr	N	Y	E13975
8550	ICP	9.23000E 01 % RECOVERY Sm	N	Y	E13975
8550	ICP	9.83000E 01 % RECOVERY Ba	N	Y	E13975
8550	ICP	1.03800E 02 % RECOVERY P	N	Y	E13975
8550	ICP	1.04600E 02 % RECOVERY S	N	Y	E13975
8550	ICP	1.16600E 02 % RECOVERY Mg	N	Y	E13975
8550	ICP	1.53500E 02 % RECOVERY Na	N	Y	E13975
8550	ICP	9.42000E 01 % RECOVERY Pb	N	Y	E13975
8550	ICP	1.00000E 02 % RECOVERY Ti	N	Y	E13975
8550	ICP	1.01400E 02 % RECOVERY Cd	N	Y	E13975
8550	ICP	9.32000E 01 % RECOVERY K	N	Y	E13975
8550	ICP	9.82000E 01 % RECOVERY Mn	N	Y	E13975
8550	ICP	1.00500E 02 % RECOVERY Sb	N	Y	E13975

8550	ICP	9.96000E 01 % RECOVERY V	N	Y	E13975

REPORT CONTINUED ON NEXT PAGE

9130050.1319

SAMPLE STATUS REPORT FOR R 3942. BECHTOLD-1 STD TIME: 8/12/93 18:38
DISPATCHED: 5/26/93 13:32 SAMPLE HAS BEEN SLURPED

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8550	ICP	1.01400E 02 % RECOVERY Be	N	Y	E13975
8550	ICP	7.76000E 01 % RECOVERY Tl	N	Y	E13975
8581	Pu239/40	1.02700E 02 % RECOVERY	N	Y	E13975

END OF REPORT

WHC-SD-WM-DP-045
REV 1

9413001.1320

SAMPLE STATUS REPORT FOR R 3943. BECHTOLD-1 SB-76A TIME: 8/12/93 18:39
DISPATCHED: 5/26/93 13:44 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/ 4/93 8:37

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS		OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********		***	***	******
8700	ACD DGST	1.03510E 01 G/L		N	Y	E13975
8700	ACD DGST	1.03680E 01 G/L		N	Y	E13975
8725	AT	3.92000E 00 uCi/G Rec		N	Y	E13975
8730	GEA	1.66000E 00 uCi/G Rec	Am-241	N	Y	E13975
8730	GEA	1.05300E 01 uCi/G Rec	Cs-137	N	Y	E13975
8730	GEA	3.75000E-01 uCi/G Rec	Eu-154	N	Y	E13975
8730	GEA	1.69000E-01 uCi/G Rec	Eu-155	N	Y	E13975
8730	GEA	4.33000E-01 uCi/G Rec	Co-60	N	Y	E13975
8740	U	8.75999E-03 G/G Rec		N	Y	E13975
8740	U	7.97000E-03 G/G Rec		N	Y	E13975
8755	ICP-SOL	1.69000E 01 uG/G Rec	Zr	N	Y	E13975
8755	ICP-SOL	7.48000E 00 uG/G Rec	Sr	N	Y	E13975
8755	ICP-SOL	2.77000E 02 uG/G Rec	Si	N	Y	E13975
8755	ICP-SOL	3.60000E 03 uG/G Rec	Al	N	Y	E13975
8755	ICP-SOL	9.40000E 01 uG/G Rec	Cu	N	Y	E13975
8755	ICP-SOL	1.60000E 02 uG/G Rec	Zn	N	Y	E13975
8755	ICP-SOL	1.83000E 01 uG/G Rec	Ni	N	Y	E13975
8755	ICP-SOL	1.17000E 04 uG/G Rec	Fe	N	Y	E13975
8755	ICP-SOL	6.57000E 02 uG/G Rec	Ca	N	Y	E13975
8755	ICP-SOL	3.68000E 01 uG/G Rec	Cr	N	Y	E13975
8755	ICP-SOL	5.49000E 01 uG/G Rec	Sm	N	Y	E13975
8755	ICP-SOL	2.71000E 01 uG/G Rec	Ba	N	Y	E13975
8755	ICP-SOL	1.32000E 02 uG/G Rec	P	N	Y	E13975
8755	ICP-SOL	1.98000E 02 uG/G Rec	S	N	Y	E13975
8755	ICP-SOL	2.16000E 02 uG/G Rec	Mg	N	Y	E13975
8755	ICP-SOL	3.72000E 01 uG/G Rec	Na	N	Y	E13975
8755	ICP-SOL	4.38000E 01 uG/G Rec	Pb	N	Y	E13975
8755	ICP-SOL	2.45000E 01 uG/G Rec	Ti	N	Y	E13975
8755	ICP-SOL	5.06000E 01 uG/G Rec	Cd	N	Y	E13975
8755	ICP-SOL	9.43000E 01 uG/G Rec	K	N	Y	E13975
8755	ICP-SOL	2.61000E 02 uG/G Rec	Mn	N	Y	E13975
8755	ICP-SOL	3.26000E 01 uG/G Rec	Sb	N	Y	E13975
8755	ICP-SOL	3.87000E 01 uG/G Rec	V	N	Y	E13975
8755	ICP-SOL	5.52000E 00 uG/G Rec	Be	N	Y	E13975
8755	ICP-SOL	3.1000E 01 uG/G	Tl			E13975
8755	ICP-SOL	1.83000E 01 uG/G Rec	Zr	N	Y	E13975
8755	ICP-SOL	7.98000E 00 uG/G Rec	Sr	N	Y	E13975
8755	ICP-SOL	4.13000E 02 uG/G Rec	Si	N	Y	E13975
8755	ICP-SOL	3.83000E 03 uG/G Rec	Al	N	Y	E13975
8755	ICP-SOL	2.06000E 00 uG/G Rec	Li	N	Y	E13975
8755	ICP-SOL	2.28000E 01 uG/G Rec	Ni	N	Y	E13975
8755	ICP-SOL	1.21000E 04 uG/G Rec	Fe	N	Y	E13975
8755	ICP-SOL	8.19000E 02 uG/G Rec	Ca	N	Y	E13975
8755	ICP-SOL	3.97000E 01 uG/G Rec	Cr	N	Y	E13975
8755	ICP-SOL	1.32000E 01 uG/G Rec	Sm	N	Y	E13975
8755	ICP-SOL	2.83000E 01 uG/G Rec	Ba	N	Y	E13975
8755	ICP-SOL	1.77000E 02 uG/G Rec	P	N	Y	E13975
8755	ICP-SOL	2.07000E 02 uG/G Rec	S	N	Y	E13975
8755	ICP-SOL	2.16000E 02 uG/G Rec	Mg	N	Y	E13975
8755	ICP-SOL	3.40000E 00 uG/G Rec	As	N	Y	E13975
8755	ICP-SOL	4.06000E 01 uG/G Rec	Na	N	Y	E13975

392

8755	ICP-SOL	1.99000E 00	uG/G	Rec	Mo	N	Y	E13975

REPORT CONTINUED ON NEXT PAGE

9413090.1327

SAMPLE STATUS REPORT FOR R 3943. BECHTOLD-1 SB-76A TIME: 8/12/93 18:39
DISPATCHED: 5/26/93 13:44 SAMPLE HAS NOT BEEN SLURPED

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8755	ICP-SOL	5.01000E 01 uG/G Rec Pb	N	Y	E13975
8755	ICP-SOL	2.05000E 01 uG/G Rec Ti	N	Y	E13975
8755	ICP-SOL	5.13000E 01 uG/G Rec Cd	N	Y	E13975
8755	ICP-SOL	1.11000E 02 uG/G Rec K	N	Y	E13975
8755	ICP-SOL	2.85000E 02 uG/G Rec Mn	N	Y	E13975
8755	ICP-SOL	3.22000E 01 uG/G Rec Sb	N	Y	E13975
8755	ICP-SOL	5.41000E 00 uG/G Rec Be	N	Y	E13975
8781	Pu239/40	1.92E 00 uCi/G Pu239/240 - <1.86E 00 uCi/G Pu238			E13975
8781	Pu239/40	1.97000E 00 uCi/G Rec	N	Y	E13975
8840	U	7.81000E-03 G/G Rec	N	Y	E13975
8850	ICP-LIQ	NO DUP DIGESTED DONE			E13975
8881	Pu239/40	2.185E 00 uCi/G Pu239/240 - <1.88E 00 uCi/G Pu238			E13975

END OF REPORT

SAMPLE STATUS REPORT FOR R 3915. BECHTOLD-1 STD TIME: 8/10/93 12:54
DISPATCHED: 5/25/93 8:45 SAMPLE HAS BEEN SLURPED
RECEIVED: 6/ 3/93 13:38

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
5587	H3	9.03200E 01 % RECOVERY	N	Y	E13975
8500	ACD DGST	D.F. 100			E13975
8520	TB	1.12300E 02 % RECOVERY	N	Y	E13975
8525	AT	OUT FOR RERUN			E13975
8525	AT	9.41600E 01 % RECOVERY	N	Y	E13975
8530	GEA	1.07440E 02 % RECOVERY Cs-137	N	Y	E13975
8530	GEA	1.00540E 02 % RECOVERY Co-60	N	Y	E13975
8540	U	1.00990E 02 % RECOVERY	N	Y	E13975
8550	ICP	8.92000E 01 % RECOVERY Zr	N	Y	E13975
8550	ICP	9.59000E 01 % RECOVERY Sr	N	Y	E13975
8550	ICP	4.19900E 02 % RECOVERY Si	N	Y	E13975
8550	ICP	1.31000E 02 % RECOVERY Al	N	Y	E13975
8550	ICP	9.37000E 01 % RECOVERY Co	N	Y	E13975
8550	ICP	9.50000E 01 % RECOVERY Cu	N	Y	E13975
8550	ICP	9.51000E 01 % RECOVERY Li	N	Y	E13975
8550	ICP	9.30000E 01 % RECOVERY Zn	N	Y	E13975
8550	ICP	9.34000E 01 % RECOVERY Ni	N	Y	E13975
8550	ICP	9.98000E 01 % RECOVERY Fe	N	Y	E13975
8550	ICP	1.69800E 02 % RECOVERY Ca	N	Y	E13975
8550	ICP	9.74000E 01 % RECOVERY Cr	N	Y	E13975
8550	ICP	9.26000E 01 % RECOVERY Sm	N	Y	E13975
8550	ICP	9.45000E 01 % RECOVERY Ba	N	Y	E13975
8550	ICP	8.53000E 01 % RECOVERY P	N	Y	E13975
8550	ICP	1.18400E 02 % RECOVERY S	N	Y	E13975
8550	ICP	1.22800E 02 % RECOVERY Mg	N	Y	E13975
8550	ICP	1.94800E 02 % RECOVERY Na	N	Y	E13975
8550	ICP	9.34000E 01 % RECOVERY Pb	N	Y	E13975
8550	ICP	9.48000E 01 % RECOVERY Ti	N	Y	E13975
8550	ICP	9.47000E 01 % RECOVERY Cd	N	Y	E13975
8550	ICP	1.00000E 02 % RECOVERY K	N	Y	E13975
8550	ICP	9.14000E 01 % RECOVERY Mn	N	Y	E13975
8550	ICP	9.35000E 01 % RECOVERY V	N	Y	E13975
8550	ICP	9.29000E 01 % RECOVERY Be	N	Y	E13975
8550	ICP	LMCS UNDIGESTED STDS			E13975
8550	ICP	9.99000E 01 % RECOVERY Sr	N	Y	E13975
8550	ICP	9.92000E 01 % RECOVERY Co	N	Y	E13975
8550	ICP	9.86000E 01 % RECOVERY Cu	N	Y	E13975
8550	ICP	9.94000E 01 % RECOVERY Li	N	Y	E13975
8550	ICP	1.00900E 02 % RECOVERY Zn	N	Y	E13975
8550	ICP	1.00200E 02 % RECOVERY Ni	N	Y	E13975
8550	ICP	9.92000E 01 % RECOVERY Fe	N	Y	E13975
8550	ICP	9.71000E 01 % RECOVERY Ca	N	Y	E13975
8550	ICP	1.03200E 02 % RECOVERY Cr	N	Y	E13975
8550	ICP	9.89000E 01 % RECOVERY Ba	N	Y	E13975
8550	ICP	1.00000E 02 % RECOVERY Mg	N	Y	E13975
8550	ICP	9.84000E 01 % RECOVERY Na	N	Y	E13975
8550	ICP	1.01300E 02 % RECOVERY Cd	N	Y	E13975
8550	ICP	9.80000E 01 % RECOVERY K	N	Y	E13975
8550	ICP	9.62000E 01 % RECOVERY Mn	N	Y	E13975
8550	ICP	9.98000E 01 % RECOVERY Sm	N	Y	E13975
8550	ICP	9.78000E 01 % RECOVERY Pb	N	Y	E13975

9313090.1324

8550	ICP	9.51000E 01 % RECOVERY Zr	N	Y	E13975

REPORT CONTINUED ON NEXT PAGE

9313006183

SAMPLE STATUS REPORT FOR R 3915. BECHTOLD-1 STD TIME: 8/10/93 12:54
DISPATCHED: 5/25/93 8:45 SAMPLE HAS BEEN SLURPED

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8550	ICP	8.95000E 01 % RECOVERY Si	N	Y	E13975
8550	ICP	9.02000E 01 % RECOVERY Al	N	Y	E13975
8550	ICP	9.80000E 01 % RECOVERY P	N	Y	E13975
8550	ICP	1.00400E 02 % RECOVERY S	N	Y	E13975
8550	ICP	1.00800E 02 % RECOVERY Ti	N	Y	E13975
8550	ICP	1.00900E 02 % RECOVERY Be	N	Y	E13975
8550	ICP	9.86000E 01 % RECOVERY V	N	Y	E13975
8581	Pu239/40	1.02880E 02 % RECOVERY	N	Y	E13975
8582	Am241	9.54200E 01 % RECOVERY	N	Y	E13975
8586	Sr90	9.56400E 01 % RECOVERY	N	Y	E13975

END OF REPORT

9314090.1326

SAMPLE STATUS REPORT FOR R 3916. BECHTOLD-1 SB-76A TIME: 8/10/93 8: 7
DISPATCHED: 5/25/93 8:47 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/ 3/93 13:38

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS		OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********		***	***	******
5000	COMMENT	DRY WEIGHT OF SOLIDS = 8.6118 GRAMS TOTAL				E13975
5787	H3	3.14000E-03 uCi/ML		N	Y	E13975
8700	ACD DGST	5.01000E 00 G/L		N	Y	E13975
8720	TB	OUT FOR RERUN				E13975
8720	TB	4.60000E 01 uCi/G		N	Y	E13975
8725	AT	OUT FOR RERUN				E13975
8725	AT	6.46000E 00 uCi/G Rec		N	Y	E13975
8730	GEA	2.40000E 00 uCi/G Rec	Am-241	N	Y	E13975
8730	GEA	7.58000E-01 uCi/G Rec	Co-60	N	Y	E13975
8730	GEA	1.57000E 01 uCi/G Rec	Cs-137	N	Y	E13975
8730	GEA	3.73000E-01 uCi/G Rec	Eu-155	N	Y	E13975
8740	U	1.22000E-02 G/G Rec		N	Y	E13975
8755	ICP-SOL	2.99000E 01 uG/G Rec	Zr	N	Y	E13975
8755	ICP-SOL	1.30000E 01 uG/G Rec	Sr	N	Y	E13975
8755	ICP-SOL	2.93000E 02 uG/G Rec	Si	N	Y	E13975
8755	ICP-SOL	5.97000E 03 uG/G Rec	Al	N	Y	E13975
8755	ICP-SOL	3.63000E 00 uG/G Rec	Co	N	Y	E13975
8755	ICP-SOL	1.52000E 02 uG/G Rec	Cu	N	Y	E13975
8755	ICP-SOL	2.75000E 00 uG/G Rec	Li	N	Y	E13975
8755	ICP-SOL	2.52000E 02 uG/G Rec	Zn	N	Y	E13975
8755	ICP-SOL	2.85000E 01 uG/G Rec	Ni	N	Y	E13975
8755	ICP-SOL	1.92000E 04 uG/G Rec	Fe	N	Y	E13975
8755	ICP-SOL	9.53000E 02 uG/G Rec	Ca	N	Y	E13975
8755	ICP-SOL	6.05000E 01 uG/G Rec	Cr	N	Y	E13975
8755	ICP-SOL	9.38000E 01 uG/G Rec	Sm	N	Y	E13975
8755	ICP-SOL	5.03000E 01 uG/G Rec	Ba	N	Y	E13975
8755	ICP-SOL	2.01000E 02 uG/G Rec	P	N	Y	E13975
8755	ICP-SOL	3.31000E 02 uG/G Rec	S	N	Y	E13975
8755	ICP-SOL	3.65000E 02 uG/G Rec	Mg	N	Y	E13975
8755	ICP-SOL	1.16000E 02 uG/G Rec	Na	N	Y	E13975
8755	ICP-SOL	7.76000E 01 uG/G Rec	Pb	N	Y	E13975
8755	ICP-SOL	4.87000E 01 uG/G Rec	Ti	N	Y	E13975
8755	ICP-SOL	8.00000E 01 uG/G Rec	Cd	N	Y	E13975
8755	ICP-SOL	1.65000E 02 uG/G Rec	K	N	Y	E13975
8755	ICP-SOL	4.30000E 02 uG/G Rec	Mn	N	Y	E13975
8755	ICP-SOL	6.11000E 01 uG/G Rec	V	N	Y	E13975
8755	ICP-SOL	8.22000E 00 uG/G Rec	Be	N	Y	E13975
8781	Pu239/40	2.99000E 00 uCi/G Rec		N	Y	E13975
8782	Am241	5.07000E 00 uCi/G Rec		N	Y	E13975
8786	Sr90	7.01000E 00 uCi/G Rec		N	Y	E13975
8840	U	1.31000E-02 G/G Rec		N	Y	E13975
8881	Pu239/40	2.69000E 00 uCi/G Rec		N	Y	E13975

END OF REPORT

SAMPLE STATUS REPORT FOR R 3851. BECHTOLD-1 STD TIME: 8/11/93 15:19
DISPATCHED: 5/14/93 8:37 SAMPLE HAS BEEN SLURPED
RECEIVED: 5/26/93 9:44

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8500	ACD DGST	D.F. 100			E13975
8540	U	1.01000E 02 % RECOVERY	N	Y	E13975
8550	ICP	DIGESTED STD			E13975
8550	ICP	9.16000E 01 % RECOVERY Zr	N	Y	E13975
8550	ICP	9.96000E 01 % RECOVERY Sr	N	Y	E13975
8550	ICP	4.00000E 02 % RECOVERY Si	N	Y	E13975
8550	ICP	1.28000E 02 % RECOVERY Al	N	Y	E13975
8550	ICP	9.84000E 01 % RECOVERY Cu	N	Y	E13975
8550	ICP	1.10400E 02 % RECOVERY Zn	N	Y	E13975
8550	ICP	1.03200E 02 % RECOVERY Ni	N	Y	E13975
8550	ICP	9.52000E 01 % RECOVERY Fe	N	Y	E13975
8550	ICP	1.52800E 02 % RECOVERY Ca	N	Y	E13975
8550	ICP	1.04000E 02 % RECOVERY Cr	N	Y	E13975
8550	ICP	1.02400E 02 % RECOVERY Sm	N	Y	E13975
8550	ICP	9.76000E 01 % RECOVERY Ba	N	Y	E13975
8550	ICP	1.16800E 02 % RECOVERY P	N	Y	E13975
8550	ICP	1.55200E 02 % RECOVERY S	N	Y	E13975
8550	ICP	1.19200E 02 % RECOVERY Mg	N	Y	E13975
8550	ICP	2.66000E 02 % RECOVERY Na	N	Y	E13975
8550	ICP	1.00000E 02 % RECOVERY Ti	N	Y	E13975
8550	ICP	9.96000E 01 % RECOVERY Cd	N	Y	E13975
8550	ICP	6.96000E 01 % RECOVERY K	N	Y	E13975
8550	ICP	9.60000E 01 % RECOVERY Mn	N	Y	E13975
8550	ICP	1.00000E 02 % RECOVERY V	N	Y	E13975
8550	ICP	1.00000E 02 % RECOVERY Be	N	Y	E13975
8550	ICP	8.08000E 01 % RECOVERY Tl			E13975
8550	ICP	LMCS UNDIGESTED STDS			E13975
8550	ICP	9.93400E 01 % RECOVERY Sr	N	Y	E13975
8550	ICP	9.86000E 01 % RECOVERY Cu	N	Y	E13975
8550	ICP	1.00600E 02 % RECOVERY Zn	N	Y	E13975
8550	ICP	1.02400E 02 % RECOVERY Ni	N	Y	E13975
8550	ICP	1.01200E 02 % RECOVERY Fe	N	Y	E13975
8550	ICP	1.00400E 02 % RECOVERY Ca	N	Y	E13975
8550	ICP	1.05200E 02 % RECOVERY Cr	N	Y	E13975
8550	ICP	9.81000E 01 % RECOVERY Ba	N	Y	E13975
8550	ICP	1.00200E 02 % RECOVERY Mg	N	Y	E13975
8550	ICP	9.61000E 01 % RECOVERY Na	N	Y	E13975
8550	ICP	1.03100E 02 % RECOVERY Cd	N	Y	E13975
8550	ICP	9.78000E 01 % RECOVERY K	N	Y	E13975
8550	ICP	9.80000E 01 % RECOVERY Mn	N	Y	E13975
8550	ICP	1.01600E 02 % RECOVERY Sm	N	Y	E13975
8550	ICP	1.07800E 02 % RECOVERY Pb	N	Y	E13975
8550	ICP	9.36000E 01 % RECOVERY Zr	N	Y	E13975
8550	ICP	9.39000E 01 % RECOVERY Si	N	Y	E13975
8550	ICP	9.26000E 01 % RECOVERY Al	N	Y	E13975
8550	ICP	1.01400E 02 % RECOVERY P	N	Y	E13975
8550	ICP	1.02600E 02 % RECOVERY S	N	Y	E13975
8550	ICP	1.01600E 02 % RECOVERY Ti	N	Y	E13975
8550	ICP	1.00800E 02 % RECOVERY V	N	Y	E13975
8550	ICP	1.02900E 02 % RECOVERY Be	N	Y	E13975
8550	ICP	1.06400E 02 % RECOVERY Tl			E13975

9313080.1328

SAMPLE STATUS REPORT FOR R 3852. BECHTOLD-1 BLK TIME: 8/10/93 12:5

DISPATCHED: 5/14/93 8:39 SAMPLE HAS BEEN SLURPED

RECEIVED: 5/26/93 9:52

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS		OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********		***	***	******
8600	ACD DGST	COMPLETED				E13975
8640	U	< 2.61000E 01 uG/ML		N	Y	E13975
8650	ICP	< 7.00000E-03 uG/ML	Zr	N	Y	E13975
8650	ICP	< 3.00000E-03 uG/ML	Sr	N	Y	E13975
8650	ICP	9.47999E-02 uG/ML	Si	N	Y	E13975
8650	ICP	< 3.70000E-02 uG/ML	Al	N	Y	E13975
8650	ICP	< 4.00000E-03 uG/ML	Cu	N	Y	E13975
8650	ICP	2.38000E-02 uG/ML	Zn	N	Y	E13975
8650	ICP	< 1.30000E-02 uG/ML	Ni	N	Y	E13975
8650	ICP	< 1.50000E-02 uG/ML	Fe	N	Y	E13975
8650	ICP	3.32000E-01 uG/ML	Ca	N	Y	E13975
8650	ICP	< 9.00000E-03 uG/ML	Cr	N	Y	E13975
8650	ICP	< 9.39999E-02 uG/ML	Sm	N	Y	E13975
8650	ICP	< 3.00000E-03 uG/ML	Ba	N	Y	E13975
8650	ICP	< 4.60000E-02 uG/ML	P	N	Y	E13975
8650	ICP	8.44999E-02 uG/ML	S	N	Y	E13975
8650	ICP	3.41000E-02 uG/ML	Mg	N	Y	E13975
8650	ICP	2.23000E-01 uG/ML	Na	N	Y	E13975
8650	ICP	< 3.00000E-03 uG/ML	Ti	N	Y	E13975
8650	ICP	< 6.00000E-03 uG/ML	Cd	N	Y	E13975
8650	ICP	< 1.16000E-01 uG/ML	K	N	Y	E13975
8650	ICP	< 3.00000E-03 uG/ML	Mn	N	Y	E13975
8650	ICP	< 1.00000E-02 uG/ML	V	N	Y	E13975
8650	ICP	< 3.00000E-03 uG/ML	V	N	Y	E13975
8650	ICP	< 1.64000E-01 uG/ML	Tl			E13975

END OF REPORT

SAMPLE STATUS REPORT FOR R 3853. BECHTOLD-1 SB70E TIME: 8/10/93 8: 7
DISPATCHED: 5/14/93 8:41 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 5/26/93 9:52

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS				OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********				***	***	******
8700	ACD DGST	1.00640E 01	G/L			N	Y	E13975
8740	U	8.17000E-03	G/G	Rec		N	Y	E13975
8755	ICP-SOL	1.86000E 01	uG/G	Rec	Zr	N	Y	E13975
8755	ICP-SOL	8.91000E 00	uG/G	Rec	Sr	N	Y	E13975
8755	ICP-SOL	8.97000E 02	uG/G	Rec	Si	N	Y	E13975
8755	ICP-SOL	4.23000E 03	uG/G	Rec	Al	N	Y	E13975
8755	ICP-SOL	1.30000E 02	uG/G	Rec	Cu	N	Y	E13975
8755	ICP-SOL	1.92000E 02	uG/G	Rec	Zn	N	Y	E13975
8755	ICP-SOL	2.10000E 01	uG/G	Rec	Ni	N	Y	E13975
8755	ICP-SOL	1.43000E 04	uG/G	Rec	Fe	N	Y	E13975
8755	ICP-SOL	6.35000E 02	uG/G	Rec	Ca	N	Y	E13975
8755	ICP-SOL	5.52000E 01	uG/G	Rec	Cr	N	Y	E13975
8755	ICP-SOL	7.21000E 01	uG/G	Rec	Sm	N	Y	E13975
8755	ICP-SOL	3.27000E 01	uG/G	Rec	Ba	N	Y	E13975
8755	ICP-SOL	1.53000E 02	uG/G	Rec	P	N	Y	E13975
8755	ICP-SOL	2.04000E 02	uG/G	Rec	S	N	Y	E13975
8755	ICP-SOL	1.72000E 02	uG/G	Rec	Mg	N	Y	E13975
8755	ICP-SOL	6.35000E 01	uG/G	Rec	Na	N	Y	E13975
8755	ICP-SOL	6.21000E 01	uG/G	Rec	Pb	N	Y	E13975
8755	ICP-SOL	1.89000E 01	uG/G	Rec	Ti	N	Y	E13975
8755	ICP-SOL	6.41000E 01	uG/G	Rec	Cd	N	Y	E13975
8755	ICP-SOL	4.42000E 01	uG/G	Rec	K	N	Y	E13975
8755	ICP-SOL	3.17000E 02	uG/G	Rec	Mn	N	Y	E13975
8755	ICP-SOL	4.55000E 01	uG/G	Rec	V	N	Y	E13975
8755	ICP-SOL	6.87000E 00	uG/G	Rec	Be	N	Y	E13975
8755	ICP-SOL	3.95000E 01	uG/G	Rec	Tl			E13975

END OF REPORT

SAMPLE STATUS REPORT FOR R 3975. BECHTOLD-1 STD TIME: 8/10/93 12:56
DISPATCHED: 6/ 7/93 9:47 SAMPLE HAS BEEN SLURPED
RECEIVED: 6/10/93 13:48

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
2223	H+	1.42000E 00 M	N	Y	E13975
3411	Pu	OUT FOR RERUN			E13975
3411	Pu	91.5%			E13975
8500	ACD DGST	D.F. 100			E13975
8520	TB	1.02090E 02 % RECOVERY	N	Y	E13975
8525	AT	8.83200E 01 % RECOVERY	N	Y	E13975
8530	GEA	1.04000E 02 % RECOVERY Cs-137	N	Y	E13975
8530	GEA	1.02000E 02 % RECOVERY Co-60	N	Y	E13975
8540	U	1.01000E 02 % RECOVERY	N	Y	E13975
8550	ICP	UNDIGESTED LMCS STDS			E13975
8550	ICP	9.71000E 01 % RECOVERY Sr	N	Y	E13975
8550	ICP	9.72000E 01 % RECOVERY Ni	N	Y	E13975
8550	ICP	9.58000E 01 % RECOVERY Fe	N	Y	E13975
8550	ICP	9.64000E 01 % RECOVERY Ca	N	Y	E13975
8550	ICP	9.68000E 01 % RECOVERY Cr	N	Y	E13975
8550	ICP	9.58000E 01 % RECOVERY Mg	N	Y	E13975
8550	ICP	9.57000E 01 % RECOVERY Na	N	Y	E13975
8550	ICP	9.51000E 01 % RECOVERY Cd	N	Y	E13975
8550	ICP	9.58000E 01 % RECOVERY Mn	N	Y	E13975
8550	ICP	9.44000E 01 % RECOVERY Sb	N	Y	E13975
8550	ICP	9.82000E 01 % RECOVERY Nd	N	Y	E13975
8550	ICP	9.94000E 01 % RECOVERY Sm	N	Y	E13975
8550	ICP	9.10000E 01 % RECOVERY Ag	N	Y	E13975
8550	ICP	9.58000E 01 % RECOVERY Pb	N	Y	E13975
8550	ICP	9.67000E 01 % RECOVERY Zr	N	Y	E13975
8550	ICP	1.00900E 02 % RECOVERY Si	N	Y	E13975
8550	ICP	9.32000E 01 % RECOVERY Al	N	Y	E13975
8550	ICP	1.04900E 02 % RECOVERY P	N	Y	E13975
8550	ICP	9.50000E 01 % RECOVERY S	N	Y	E13975
8550	ICP	9.58000E 01 % RECOVERY As	N	Y	E13975
8550	ICP	9.62000E 01 % RECOVERY Mo	N	Y	E13975
8550	ICP	9.60000E 01 % RECOVERY Ti	N	Y	E13975
8550	ICP	9.85000E 01 % RECOVERY Be	N	Y	E13975
8550	ICP	9.42000E 01 % RECOVERY Tl	N	Y	E13975
8581	Pu239/40	1.01200E 02 % RECOVERY	N	Y	E13975
8582	Am241	OUT FOR RERUN			E13975
8582	Am241	1.12700E 02 % RECOVERY	N	Y	E13975
8582	Am241	1.28850E 02 % RECOVERY	N	Y	E13975
8586	Sr90	8.90200E 01 % RECOVERY	N	Y	E13975

END OF REPORT

SAMPLE STATUS REPORT FOR R 3976. BECHTOLD-1 SB-77A TIME: 8/13/93 9:54
DISPATCHED: 6/ 7/93 9:51 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 6/10/93 13:48

WHC-SD-WM-DP-045
REV 1

EXT.	DETER.	RESULTS OR STATUS		OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********		***	***	******
2223	H+	2.11000E 00 M		N	Y	E13975
3411	Pu	OUT FOR RERUN				E13975
3411	Pu	2.32000E 02 uCi/g				E13975
5002	APPEAR	MIX, 5% SOLIDS, COLOR BROWN, OPAQ				E13975
5002	APPEAR	Phase 1, 260ml Total Volume. .265gms solids				E13975
5002	APPEAR	.0731 gms solids (dry) Digested into 100ml				E13975
8700	ACD DGST	1.46200E 00 G/L		N	Y	E13975
8720	TB	5.99000E 03 uCi/G		N	Y	E13975
8725	AT	3.63000E 02 uCi/G Rec		N	Y	E13975
8725	AT	3.71000E 02 uCi/G Rec		N	Y	E11457
8730	GEA	1.96000E 02 uCi/G Rec	Am-241	N	Y	E13975
8730	GEA	1.46000E 03 uCi/G Rec	Cs-137	N	Y	E13975
8730	GEA	1.48000E 00 uCi/G Rec	Cs-134	N	Y	E13975
8730	GEA	1.37000E 01 uCi/G Rec	Co-60	N	Y	E13975
8730	GEA	3.21500E 01 uCi/G Rec	Eu-154	N	Y	E13975
8730	GEA	1.81300E 01 uCi/G Rec	Eu-155	N	Y	E13975
8740	U	5.87000E-01 G/G Rec		N	Y	E13975
8750	ICP-LIQ	3.10000E 03 ug/g rec.	Zr			E13975
8750	ICP-LIQ	1.07000E 02 ug/g rec.	Sr			E13975
8750	ICP-LIQ	3.36000E 04 ug/g rec.	Si			E13975
8750	ICP-LIQ	2.70000E 02 ug/g rec.	Ni			E13975
8750	ICP-LIQ	5.21000E 03 ug/g rec.	Ca			E13975
8750	ICP-LIQ	1.91000E 03 ug/g rec.	Cr			E13975
8750	ICP-LIQ	1.32000E 03 ug/g rec.	Nd			E13975
8750	ICP-LIQ	8.38000E 03 ug/g rec.	Sm			E13975
8750	ICP-LIQ	3.24000E 02 ug/g rec.	Ba			E13975
8750	ICP-LIQ	4.36000E 03 ug/g rec.	P			E13975
8750	ICP-LIQ	5.34000E 03 ug/g rec.	S			E13975
8750	ICP-LIQ	2.76000E 03 ug/g rec.	Mg			E13975
8750	ICP-LIQ	1.13000E 02 ug/g rec.	As			E13975
8750	ICP-LIQ	5.70000E 02 ug/g rec.	Na			E13975
8750	ICP-LIQ	6.35000E 01 ug/g rec.	Mo			E13975
8750	ICP-LIQ	1.89000E 02 ug/g rec.	Ag			E13975
8750	ICP-LIQ	3.17000E 03 ug/g rec.	Pb			E13975
8750	ICP-LIQ	3.55000E 02 ug/g rec.	Ti			E13975
8750	ICP-LIQ	2.67000E 02 ug/g rec.	Cd			E13975
8750	ICP-LIQ	1.33000E 03 ug/g rec.	Mn			E13975
8750	ICP-LIQ	2.04000E 03 ug/g rec.	Sb			E13975
8750	ICP-LIQ	7.93000E 01 ug/g rec.	Be			E13975
8750	ICP-LIQ	3.00000E 03 ug/g rec.	Tl			E13975
8750	ICP-LIQ	2.48000E 05 ug/g rec.	Al			E13975
8750	ICP-LIQ	3.31000E 05 ug/g rec.	Fe			E13975
8781	Pu239/40	2.77000E 02 uCi/G Rec		N	Y	E13975
8782	Am241	OUT FOR RERUN				E13975
8782	Am241	1.72000E 02 uCi/G Rec		N	Y	E13975
8786	Sr90	3.32000E 02 uCi/G Rec		N	Y	E13975
8881	Pu239/40	2.74000E 02 uCi/G Rec		N	Y	E11457

END OF REPORT

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WHC-SD-WM-DP-045
REV 1

UNDIGESTED SAMPLE ANALYSES

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. R3916	Customer ID: SB-76a
Analysis: Acid Digestion	Sample Prep: Direct

Instrument: SN F04495	Procedure/ Rev: La-505-159 / ~~B-0~~ B-1 BD II 8-23-93
Technologist: Billsyth [redacted]	Date: 06-03-93
Starting Time: 0800	Temperature 95°
Ending Time: 1500	Chemist: Bert Griffin II

Comments:

	Description	Lab ID		Description	Lab ID
1	Initial LMCS Check Standard	R3915-8500	11		
2	Sample	R3916-8700	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
LMCS Check Std.	14N10-B / 1.0 mL	13N10-B / 1.0 mL	21B48-B / 1.0 mL	100 mL
				405

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-8500	BECHTOLD-1	5-25-93	8:42	18

Determination	Method/Standard	Result Units	Charge Code	Returns
ACD DGST	LA-505-159	% RECOVERY	E13975	0

Sample Size	Customer ID
? 1ml EACH INTO 100 ml 6-2-93	STD

Remarks, Calculations, Results

LMCS CHECK SAMPLE
LMCS ID_____

14N10-B
13N10-B
21B48-B
1ml EACH

DF = 100 ml / 1 ml = 100

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs
		Dated		
Date	Time Completed	Lab Unit Mgr 6-3-93		
6-3-93	1500	Bertrand Griffin III		

54-64030-00-01 (R-10-83)

ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-8700	BECHTOLD-1	5-25-93	8:45	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	G/L	E13975	0

Sample Size	Customer ID
? .5010 g into .100 l	SB-76A

Remarks, Calculations/Results

JAR ID#
GRAMS SAMPLE .5010 g

$\frac{.5010\,g}{.100\,l} = 5.010\,g/l$

VOLUME ON COMPLETION .100 l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	1500	6-3-93

54-6800-0(R-10-83)

R 3916 -8700

SEQUENCE # : 65
WT 1: 0.0000
WT 2: 0.5010

NET WEIGHT:
---> 0.5010 GRAMS

05/31/93 @ 23:08:53

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WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY Batch 802
222-S LABORATORY
ANALYTICAL BATCH

Lab Segment Serial No. R3916	Customer ID: SB-76A
Analysis: H3	Sample Prep: ~~Water~~ Direct

Instrument: WB27818	Procedure/ Rev: LA218-114 A-2
Technologist: Tam Gilbert	Date: 6-2-93
Starting Time: 0800	Temperature 24°C
Ending Time: 1000	Chemist: SA Carlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3915-5587	11		
2	REAGENT BLANK	N/A	12		
3	Sample	R3916-5787	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	38351 - 3 ml			1 ml

408

A-6000-881 (03/93)

TRITIUM ANALYSIS - UNDIGESTED SAMPLE

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-5587	BECHTOLD-1	5-25-93	8:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
H3	LA-218-114	% RECOVERY	E13975	0

Sample Size	Customer ID
? 1 ml	STD

Remarks, Calculations, Results

EDP R907 ENVSTD
STD#38351 RESULT .672
STD VAL. .744 %REC 90.32%

$\frac{1492.04}{2220} = .6721$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[signature]	D H Williams		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-2-93	1000	[signature]

54-6800-081 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-5787	BECHTOLD-1	5-25-93	8:45	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
H3	LA-218-114	uCi/ML	E13975	0

Sample Size	Customer ID
? 1 ml	SB-76A

Remarks, Calculations, Results

COUNT AS uCI/L

$\frac{6960.97}{2220} = 3.1356\ uCi/L$ $\frac{}{1000} = 3.14 \times 10^{3}\ uCi/ml$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[signature]	D H Williams		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-2-93	1000	[signature]

54-6800-081 (R-10-83)

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D. H. Milian
6-3-93

WHC-SD-WM-DP-045
REV 1

ID: H3 LOW LEVEL 3 JUN 1993 14:19

USER: 1 COMMENT:

PRESET TIME :	50.00						
DATA CALC :	SL DPM	H#	:YES	SAMPLE REPEATS:	1	PRINTER	:
COUNT 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 :	YES	HALF LIFE CORRECTION DATE:				none	

ISOTOPE 1: H3LL %ERROR: 0.00 FACTOR:1.0000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: Off

Quench Limits Low:56.611 High:246.80

SAM NO	POS	TIME MIN	H#	H3LL CPM	H3LL %ERROR	H3LL DPM	H3LL EFF-1	LUMEX %	ELAPSED TIME	2P
B1	**-1	50.00	84.7	13.76	7.65	27.59	49.88	0.27	51.57	
		Blank Average		DPM for	H3LL :	27.59	COEF. OF VAR:		0.000	
1	**-3	50.00	115.6	652.46	1.11	1492.04	42.94	0.04	103.54	2P
2	**-4	50.00	84.8	3483.86	0.48	6960.97	49.85	0.01	155.63	

ACID DIGESTION ANALYSES

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R3915-6	Customer ID: Bechtold SB-76a
Analysis: ICP	Sample Prep: Acid Digest

Instrument: WB39939	Procedure/ Rev: LA-505-151/D-0
Technologist: T.A. FRAZIER	Date: 6/3/93
Starting Time: 14:15	Temperature N/A
Ending Time: 15:30	Chemist: B. WELS

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS DIG STD	R3915-8550	11		
2	1M HNO3 Reag BLANK	----	12		
3	Bechtold SAM SB-76A	R3916-8755	13		
4	1M HNO3 Reag Blank	---	14		
5	Ending LMCS Undig STD	---	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
ICPSST1	12N10C DIRECT			
ICPSST2	22B48A DIRECT			
ICPSST3	16N10A DIRECT			

412

A-6000-881 (03/92)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Batch 803

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-8550	BECHTOLD-1	5-25-93	8:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	E13975	0

Sample Size	Customer ID
?/ml as 14N10B 13N10B 21B48B > in 100ml Digestate	STD

Remarks, Calculations, Results

1st STD Digested STD
Undigested
12N10C
22B48A
16N10A

Undigested
Sr 9.99
Co 9.92
Cu 4.93(2) = 98.6
Li 9.94
Zn 10.09
Ni 5.01(2) = 100.2

Fe 4.96(2) = 99.2%
Ca 9.71
Cr 5.16(2) 103.2%
Ba 9.89
Mg 5.02(2) 100%
Na 9.84

OVER

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	--			
Hrs	Hrs	Hrs	Hrs	Hrs
				C-9-93

Date	Time Completed	Lab Unit Mgr	
6/3/93	15:30	[signature]	[signature]

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

Cd 10.13
K 4.90(2) 98.1%
Mn 4.81(2) 96.2%
Sm 4.99(2) 99.8%
Pb 4.89(2) 97.8%
Zr 9.51
Si 8.95
Al 4.51(2) 90.2
P 9.80
S 5.02(2) 100.4%
Ti 5.04(2) 100.8%
V 9.86
Be 10.09

Digested
Zr 892/1000x100 = 89.2%
Sr 959/1000x100 = 95.9%
Si 4195/1000x100 = 419.5%
Al 655/500x100 = 131.0%
Co 937/1000x100 = 93.7%
Cu 475/500x100 = 95.0%
Li 951/1000x100 = 95.1%
Zn 930/1000x100 = 93.0%
Ni 467/500x100 = 93.4%
Fe 495/500x100 = 99.0%
Ca 1698/1000x100 = 169.8%
Cr 487/500x100 = 97.4%
Sm 926/1000x100 = 92.6%
Ba 945/1000x100 = 94.5%

Be 6/1/93
553
P 854/1000x100 = 85.3%
S 592/500x100 = 118.4%
Mg 614/500x100 = 122.8%
Na 1948/1000x100 = 194.8%
Pb 934/1000x100 = 93.4%
Ti 474/500x100 = 94.8%
Cd 947/1000x100 = 94.7%
K 500/500x100 = 100.0
Mn 457/500x100 = 91.4%
V 935/1000x100 = 93.5%
Be 925/1000x100 = 92.5%

R3915-8550

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INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-8755	BECHTOLD-1	5-25-93	8:45	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP-SOL	LA-505-151	uG/G Rec	E13975	0

Sample Size	Customer ID
? 0.5010g i 100 Ml 5.0100g/l	SB-76A

Remarks, Calculations, Results

Zr 1.50E2/5.010=2.99E1 ug/g rec.
Sr 6.53E1/5.010=1.30E1
Si 1.468E3/5.010=2.93E2
Al 2.9889E4/5.010=5.97E3
Co 1.82E1/5.010=3.63
Cu 7.61E2/5.010=1.52E2
Li 1.38E1/5.010=2.75
Zn 1.265E3/5.010=2.52E2
Ni 1.43E2/5.010=2.85E1
Fe 9.63 58E4/5.010=1.92E4
Ca 4.774E3/5.010=9.53E2
→OVER

Teresa L. Krogier

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs
		Rebuta		6/3/93
Date	Time Completed	Lab Unit Mgr		
6/3/93	15:30	Rebuta	Teresa L. Krogier	

54-6800-06 (R-10-83)

Cr 3.03E2/5.010=6.05E1
Sm 4.70E2/5.010=9.38E1
Ba 2.52E2/5.010=5.03E1
P 1.005E3/5.010=2.01E2
S 1.658E3/5.010=3.31E2
Mg 1.828E3/5.010=3.65E2
Na 5.79E2/5.010=1.16E2
Pb 3.89E2/5.010=7.76E1
Ti 2.44E2/5.010=4.87E1
Cd 4.01E2/5.010=8.00E1
K 8.29E2/5.010=1.65E2
Mn 2.153E3/5.010=4.30E2
V 3.06E2/5.010=6.11E1
Be 4.12E1/5.010=8.22

R 3916-8755

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Identity 1: SST1 Identity 2: Quality Control 2:27 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-6.823	9992.576	-65.679	-5.488	4882.685	-23.583	-115.931	-3.261
S.D.	2.050	15.135	33.819	12.345	34.709	6.063	12.871	4.166
% R.S.D.	30.048	0.151	51.491	224.936	0.711	25.708	11.102	127.737

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	9916.774	4930.034	9938.286	10093.887	5013.201	-4.921	1.108	4960.682
S.D.	51.304	2.253	8.905	28.013	23.438	5.916	0.499	16.547
% R.S.D.	0.517	0.046	0.090	0.278	0.468	120.213	45.062	0.334

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	9714.101	5159.354	-104.962	680.181	2.668	94.211	9890.213	22.032
S.D.	1.320	16.825	9.284	182.396	28.125	39.862	11.085	6.332
% R.S.D.	0.014	0.326	8.845	26.816	1054.008	42.312	0.112	28.739

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	102.374	5003.012	26.156	9844.660	-0.449	-454.404	3.375	32.271
S.D.	7.469	14.979	7.126	7.680	2.909	21.048	1.377	11.170
% R.S.D.	7.296	0.299	27.245	0.078	647.691	4.632	40.804	34.613

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-0.724	10130.647	5363.998	4898.200	4810.669	5154.924	4.109	0.847
S.D.	0.997	104.200	15.718	27.196	12.057	82.696	1.591	0.485
% R.S.D.	137.789	1.029	0.293	0.555	0.251	1.604	38.710	57.279

	Tl (ppb)
Mean	-32.280
S.D.	86.206
% R.S.D.	267.053

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 415 TO 426.

Teresa L. Frazier
6/3/93
R3915-6 (Acid Di

Identity 1: SST2 Identity 2: Quality Control 2:29 PM June 3, 1993

WHC-SD-WM-DP-045
REV 1

Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-66.552	1.586	5104.786	-2.662	9.684	-61.002	285.137	13.084
S.D.	2.779	0.331	49.347	8.589	12.379	3.478	3.008	6.402
% R.S.D.	4.176	20.862	0.967	322.661	127.823	5.701	1.055	48.932

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	2.965	14.361	2.938	76.347	5.611	4968.192	4868.817	14.089
S.D.	1.002	0.638	0.437	1.919	3.222	4.990	12.965	2.219
% R.S.D.	33.785	4.441	14.860	2.513	57.424	0.100	0.266	15.753

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	30.541	9.823	5065.481	3343.056	5269.794	4993.615	4.006	65.537
S.D.	0.627	2.873	20.985	46.104	17.182	8.468	0.297	21.932
% R.S.D.	2.055	29.249	0.414	1.379	0.326	0.170	7.402	33.465

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	38.670	3.915	-45.926	15.870	-5.018	59.356	4726.443	4890.109
S.D.	1.605	0.250	15.203	3.899	2.425	4.925	14.775	42.245
% R.S.D.	4.150	6.383	33.103	24.566	48.321	8.298	0.313	0.864

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-2.947	5.869	7.801	11.036	-0.948	-70.331	27.223	0.847
S.D.	0.559	2.113	2.418	47.870	0.177	24.154	0.621	0.485
% R.S.D.	18.977	35.992	30.997	433.744	18.682	34.344	2.280	57.279

	Tl (ppb)
Mean	-49.400
S.D.	24.695
% R.S.D.	49.990

Identity 1: SST3 Identity 2: Quality Control 2:31 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	9515.898	1.721	-1725.766	9754.552	10.292	8950.510	4509.751	10319.994
S.D.	25.137	0.113	13.074	45.906	9.621	45.707	9.871	63.161
% R.S.D.	0.264	6.565	0.758	0.471	93.480	0.511	0.219	0.612

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	-12.710	8.786	2.304	-8.146	-6.199	-8.235	-2.384	12.994
S.D.	0.809	0.528	0.704	0.442	5.306	2.944	0.204	1.955
% R.S.D.	6.365	6.005	30.537	5.430	85.602	35.752	8.543	15.048

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-10.893	11.104	-128.579	911.559	55.742	-144.703	2.119	9797.851
S.D.	0.104	1.357	14.126	18.602	12.469	17.268	0.096	68.493
% R.S.D.	0.959	12.219	10.986	2.041	22.369	11.933	4.538	0.699

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	5017.857	2.416	4879.063	10.053	10297.830	4841.899	100.538	-110.674
S.D.	6.990	0.000	32.474	5.706	33.103	37.339	28.208	13.748
% R.S.D.	0.139	0.000	0.666	56.761	0.321	0.771	28.057	12.422

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	5042.501	-8.111	7.055	29.130	0.857	-110.261	9858.899	10094.312
S.D.	8.641	2.117	1.416	26.289	0.000	14.214	25.925	23.700
% R.S.D.	0.171	26.096	20.069	90.247	0.009	12.892	0.263	0.235

	Tl (ppb)
Mean	5239.082
S.D.	12.084
% R.S.D.	0.231

Identity 1: 1M HNO3 Reag Blank Identity 2: Direct 2:33 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	5.658	0.614	-11.987	-2.167	-0.292	32.061	33.750	14.016
S.D.	2.926	0.156	13.509	15.939	8.405	11.572	21.104	3.370
% R.S.D.	51.714	25.347	112.700	735.437	2876.703	36.095	62.530	24.042

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	0.654	3.464	1.269	-4.017	-4.773	-5.065	1.287	3.914
S.D.	6.072	1.143	0.473	1.907	5.467	5.952	0.339	4.625
% R.S.D.	927.970	32.994	37.307	47.469	114.542	117.530	26.300	118.182

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-1.917	10.436	-43.380	347.321	86.336	62.804	1.322	51.278
S.D.	0.726	4.133	10.003	98.432	24.984	22.405	0.663	77.035
% R.S.D.	37.872	39.598	23.059	28.340	28.938	35.674	50.160	150.229

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	-18.913	-0.167	-14.248	9.671	1.830	75.955	5.044	74.256
S.D.	2.243	0.144	11.342	1.942	2.538	20.700	1.234	15.093
% R.S.D.	11.859	86.603	79.603	20.084	138.709	27.253	24.466	20.325

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	2.223	-0.680	2.075	21.088	0.465	-7.201	1.649	1.483
S.D.	0.390	1.070	2.232	27.196	0.594	156.868	2.773	0.485
% R.S.D.	17.557	157.285	107.555	128.961	127.817	2178.485	168.169	32.732

	Tl (ppb)
Mean	0.689
S.D.	65.757
% R.S.D.	9543.766

Identity 1: R3915 Dig STD 1-100 Identity 2: 14N10B,13N10B,21B48B 2:35 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	892.202	958.874	811.312	18.598	455.754	4199.023	655.431	821.703
S.D.	2.289	3.555	29.459	6.136	4.081	13.153	3.960	14.959
% R.S.D.	0.257	0.371	3.631	32.992	0.895	0.313	0.604	1.820

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	937.198	475.441	950.639	929.688	467.263	957.021	938.345	498.761
S.D.	1.849	0.507	2.558	0.553	11.544	5.200	4.245	5.947
% R.S.D.	0.197	0.107	0.269	0.059	2.471	0.543	0.452	1.192

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	1697.850	486.686	941.918	1013.040	1037.415	926.481	945.344	852.685
S.D.	6.739	5.071	15.794	42.185	12.713	8.903	3.784	25.317
% R.S.D.	0.397	1.042	1.677	4.164	1.225	0.961	0.400	2.969

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	592.352	613.610	464.168	1948.166	970.907	497.734	38.839	934.263
S.D.	0.804	2.081	8.177	5.444	8.751	25.504	0.702	15.980
% R.S.D.	0.136	0.339	1.762	0.279	0.901	5.124	1.808	1.710

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	474.436	946.551	797.574	499.552	456.908	557.546	934.682	929.314
S.D.	1.789	3.657	6.171	30.155	1.047	233.788	1.100	2.067
% R.S.D.	0.377	0.386	0.774	6.036	0.229	41.932	0.118	0.222

	Tl (ppb)
Mean	407.475
S.D.	23.896
% R.S.D.	5.864

Identity 1: R3916 Sam SB-76A Identity 2: 5.0100g/l Bechtold 2:43 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	150.355	65.308	-146.111	-14.196	-16.712	1468.175	29889.315	-12.458
S.D.	1.321	0.250	46.409	8.184	3.139	4.383	9.658	7.469
% R.S.D.	0.879	0.383	31.763	57.653	18.780	0.299	0.032	59.954

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	18.240	760.637	13.823	1265.340	142.891	-277.660	-4.438	96358.528
S.D.	3.487	0.959	0.810	3.356	7.572	2.986	0.215	194.397
% R.S.D.	19.117	0.126	5.857	0.265	5.299	1.076	4.849	0.202

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	4774.126	302.649	47.954	62652.929	-57.512	469.966	252.085	1005.479
S.D.	1.497	4.093	16.585	25.350	21.930	19.428	0.353	31.661
% R.S.D.	0.031	1.352	34.585	0.040	38.130	4.134	0.140	3.149

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	1658.210	1827.918	50.357	579.396	4.514	-13.045	-6.136	388.781
S.D.	41.975	0.721	12.268	8.189	2.162	23.723	0.204	21.836
% R.S.D.	2.531	0.039	24.362	1.413	47.889	181.854	3.321	5.617

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	244.223	400.531	-26.890	829.249	2152.632	138.724	305.638	41.197
S.D.	0.587	0.900	4.998	22.833	2.941	211.522	1.100	0.183
% R.S.D.	0.240	0.225	18.588	2.753	0.137	152.477	0.360	0.445

	Tl (ppb)
Mean	123.513
S.D.	15.018
% R.S.D.	12.159

Identity 1: R3916 Sam SB-76A Identity 2: 5.0100g/l-1ml-5ml 2:49 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	26.712	10.565	-30.999	10.771	7.238	243.049	4872.603	15.408
S.D.	3.884	0.392	30.850	11.986	3.190	11.540	23.838	9.209
% R.S.D.	14.542	3.713	99.520	111.277	44.065	4.748	0.489	59.769

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	2.212	130.349	2.504	217.023	16.075	-32.538	0.133	15579.467
S.D.	3.226	2.551	1.195	1.386	5.241	5.110	0.744	15.734
% R.S.D.	145.848	1.957	47.720	0.639	32.604	15.705	557.623	0.101

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	787.445	50.089	-11.508	10454.883	6.998	-58.335	41.472	164.614
S.D.	1.441	0.702	10.137	207.142	56.226	39.434	1.096	41.522
% R.S.D.	0.183	1.402	88.084	1.981	803.460	67.599	2.644	25.224

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	274.862	294.226	11.662	80.896	-2.342	51.555	-0.128	104.478
S.D.	18.797	1.127	12.603	18.395	2.095	34.387	2.483	20.216
% R.S.D.	6.839	0.383	108.069	22.739	89.480	66.700	1943.112	19.350

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	39.756	64.484	-1.826	119.595	346.516	-124.734	35.872	6.778
S.D.	1.952	2.301	0.518	55.276	3.279	31.684	4.143	0.318
% R.S.D.	4.909	3.568	28.386	46.219	0.946	25.401	11.550	4.687

	Tl (ppb)
Mean	-225.945
S.D.	71.669
% R.S.D.	31.720

Identity 1: R3916 Spk SB-76A Identity 2: 5.0100g/l-1ml-5ml 2:53 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	1588.855	1692.404	536.936	1558.034	813.428	1744.669	5686.037	1701.645
S.D.	2.842	1.445	14.806	16.792	2.150	10.205	16.950	19.334
% R.S.D.	0.179	0.085	2.757	1.078	0.264	0.585	0.298	1.136

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	1657.092	958.569	1674.395	1847.247	856.316	787.652	828.523	16583.876
S.D.	8.003	1.171	1.425	1.296	5.936	2.897	1.738	26.898
% R.S.D.	0.483	0.122	0.085	0.070	0.693	0.368	0.210	0.162

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	2443.491	913.050	881.230	11254.558	874.369	867.033	1709.386	1752.369
S.D.	3.226	13.552	30.364	91.940	3.609	15.902	2.206	45.657
% R.S.D.	0.132	1.484	3.446	0.817	0.413	1.834	0.129	2.605

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	1082.024	1136.253	802.405	1727.873	1684.385	792.306	781.303	862.452
S.D.	14.323	1.089	11.922	10.647	12.444	45.253	3.521	26.603
% R.S.D.	1.324	0.096	1.486	0.616	0.739	5.712	0.451	3.085

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	870.755	1736.490	890.777	925.746	1159.365	1091.532	1679.574	1639.512
S.D.	0.448	7.146	2.907	15.178	1.910	160.195	5.719	1.271
% R.S.D.	0.051	0.412	0.326	1.640	0.165	14.676	0.340	0.078

	Tl (ppb)
Mean	913.493
S.D.	11.928
% R.S.D.	1.306

Identity 1: HNO3 Reag Blank Identity 2: Direct 2:58 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	2.828	0.404	27.932	14.376	19.225	10.956	3.203	28.423
S.D.	0.865	0.104	14.980	9.080	3.525	4.929	3.794	5.939
% R.S.D.	30.578	25.660	53.630	63.165	18.337	44.988	118.449	20.895

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	1.484	2.872	1.235	-4.976	0.759	3.511	1.172	3.131
S.D.	3.547	0.528	0.000	0.169	0.691	0.030	0.329	5.443
% R.S.D.	238.961	18.367	0.000	3.395	91.053	0.845	28.067	173.845

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-2.506	6.884	-45.503	294.551	62.345	-0.009	1.192	65.902
S.D.	0.102	0.967	13.343	24.356	9.557	5.140	0.069	16.754
% R.S.D.	4.059	14.046	29.323	8.269	15.330	59810.522	5.788	25.423

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	14.058	-0.167	17.468	-4.554	-6.580	28.950	0.793	39.483
S.D.	10.606	0.144	16.597	9.867	2.556	13.900	0.721	16.421
% R.S.D.	75.441	86.603	95.011	216.670	38.854	48.015	90.892	41.589

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	0.879	1.664	1.577	2.995	-0.346	20.674	-4.274	-0.318
S.D.	0.545	1.693	0.800	39.240	0.177	72.992	0.364	0.183
% R.S.D.	61.966	101.760	50.756	1310.169	51.196	353.055	8.515	57.743

	Tl (ppb)
Mean	-42.221
S.D.	13.128
% R.S.D.	31.093

Identity 1: SST1 Identity 2: Quality Control 2:59 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	5.174	9995.524	-14.539	9.753	4865.644	-6.744	-75.545	20.317
S.D.	2.511	45.474	31.034	14.395	29.486	6.495	6.660	7.050
% R.S.D.	48.540	0.455	213.456	147.591	0.606	96.309	8.816	34.698

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	9898.492	4941.861	9911.540	10079.141	5009.433	0.148	3.049	4959.743
S.D.	50.374	21.310	39.169	40.166	10.879	2.942	0.419	35.008
% R.S.D.	0.509	0.431	0.395	0.399	0.217	1984.983	13.735	0.706

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	9749.690	5172.851	-87.843	1195.707	84.796	19.060	9902.716	3.747
S.D.	46.871	23.041	9.320	84.370	14.945	15.902	46.019	47.808
% R.S.D.	0.481	0.445	10.610	7.056	17.624	83.434	0.465	1276.012

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	139.308	4996.098	-0.071	9859.097	-3.097	-423.443	7.467	53.358
S.D.	10.799	21.470	1.920	50.003	2.083	34.668	0.334	23.917
% R.S.D.	7.752	0.430	2708.225	0.507	67.252	8.187	4.475	44.825

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	1.758	10087.209	5358.105	5083.152	4816.321	5126.553	-0.259	0.318
S.D.	0.882	51.164	19.249	33.579	22.867	150.077	1.099	0.485
% R.S.D.	50.169	0.507	0.359	0.661	0.475	2.927	423.607	152.731

	Tl (ppb)
Mean	-130.744
S.D.	15.735
% R.S.D.	12.035

Identity 1: SST2 Identity 2: Quality Control 3:02 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-61.894	1.586	4965.374	0.397	9.844	-48.698	283.101	0.621
S.D.	1.040	0.524	67.190	5.487	3.921	0.807	1.746	12.122
% R.S.D.	1.680	33.046	1.353	1380.379	39.832	1.658	0.617	1953.224

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	6.216	13.854	2.738	298.714	2.549	4961.903	4926.351	11.741
S.D.	0.580	0.638	0.609	1.400	0.635	23.343	7.098	8.727
% R.S.D.	9.327	4.604	22.253	0.469	24.913	0.470	0.144	74.332

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	37.135	12.451	5141.763	3468.894	5215.687	4902.761	4.428	61.704
S.D.	0.369	4.041	64.648	60.072	22.519	9.714	0.562	6.319
% R.S.D.	0.993	32.460	1.257	1.732	0.432	0.198	12.684	10.240

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	91.228	8.830	-51.614	47.919	-5.363	25.782	4973.290	4837.470
S.D.	4.821	0.144	16.896	11.234	2.258	48.321	6.819	30.911
% R.S.D.	5.284	1.634	32.736	23.445	42.094	187.421	0.137	0.639

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-3.153	1.830	-2.407	-13.088	-1.069	-66.660	27.603	0.635
S.D.	0.699	1.072	2.776	49.366	0.177	62.448	1.595	0.485
% R.S.D.	22.177	58.601	115.350	377.195	16.560	93.682	5.777	76.371

	Tl (ppb)
Mean	22.245
S.D.	27.969
% R.S.D.	125.734

Identity 1: SST3 Identity 2: Quality Control 3:03 PM June 3, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	9478.299	1.467	-1693.417	9488.439	12.177	8881.749	4437.575	10278.435
S.D.	9.694	0.196	28.375	12.195	7.657	35.587	8.057	39.218
% R.S.D.	0.102	13.344	1.676	0.129	62.880	0.401	0.182	0.382

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	-10.390	7.519	2.271	-8.146	-5.989	5.473	-3.412	10.489
S.D.	3.011	0.815	1.043	0.798	1.424	10.727	0.396	2.933
% R.S.D.	28.980	10.835	45.918	9.790	23.774	195.985	11.604	27.962

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-10.425	16.688	-120.353	1025.218	10.062	-100.958	1.421	9552.910
S.D.	0.001	0.416	30.494	74.075	17.288	16.599	0.231	165.000
% R.S.D.	0.005	2.490	25.337	7.225	171.805	16.442	16.234	1.727

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	4910.388	3.082	4795.387	-1.949	10132.142	4665.427	82.162	-92.294
S.D.	38.028	0.144	11.146	4.390	37.564	47.687	19.507	18.718
% R.S.D.	0.774	4.681	0.232	225.297	0.371	1.022	23.742	20.280

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	5002.538	-5.717	4.482	-3.036	1.320	14.813	9823.349	9999.951
S.D.	8.059	2.079	2.213	3.482	0.401	31.343	12.138	23.533
% R.S.D.	0.161	36.358	49.379	114.692	30.396	211.593	0.124	0.235

	Tl (ppb)
Mean	5246.089
S.D.	19.315
% R.S.D.	0.368

Teresa L Hagin
6/3/93

Br

WESTINGHOUSE HANFORD COMPANY

WHC-SD-WM-DP-045
REV 1

222-S LABORATORY
ANALYTICAL BATCH #908

Lab Segment Serial No. R3916	Customer ID: SB-74a
Analysis: AT	Sample Prep: acid digestion

Instrument: WB27810	Procedure/ Rev: LA-508-101 (0-0)
Technologist: [redacted], SUE LAI (Sue Lai)	Date: 6-3-93
Starting Time: 14:00	Temperature 25°C
Ending Time: 15:00	Chemist: S. Cabrera

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3915-8525	11		
2	REAGENT BLANK		12		
3	Sample	R3916-8925	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	65B51 (10ml)			
				427

A-6000-101 (03/93)

9313090.1356

TOTAL ALPHA ANALYSIS - ACID DIGESTION

1-2

908 8-12-93

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-8525	BECHTOLD-1	5-25-93	8:45	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E13975	1

Sample Size	Customer ID
? 10ml	STD

Remarks, Calculations, Results

S510 EV-CRB 65851

STD# RESULT 1.45E-2

STD VAL 1.53996-2 %REC 94.16%

Sue L

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	DM	[redacted]		
Hrs	Hrs	Hrs 6-4-93 0150	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	15:00	

6/4

64-6800-004 (R-10-83)

B/L 6-3-93 DM R3915-8525

2259/30 - .3

2230/30

Alpha Calculation by ALJ on 06-04-1993 at 01:47:45
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : 10 mL Dilution : 1

Mount # 1

2259
---------- - 0.3 = 1.4549E-02 uCi/L alpha
30

Mount # 2 1.4478E-2

2230
---------- - 0.3 = 1.4362E-02 uCi/L alpha
30

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

3-4

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-8725	BECHTOLD-1	5-25-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E13975	1

Sample Size	Customer ID
? 500 λ	SB-76A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

3.2341E1 uCi/L / 5.01 G/L = 6.46 uCi/G

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	D H Williams	[redacted]		
Hrs	Hrs	Hrs 6-4-93 01:50	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
1-3-93	15:00	

54-6800-081-1R-10-831

6-3-93 DM 13/2 R 3916-8725

240563 / 30 --- 3

259585 / 30

Alpha Calculation by ALJ on 06-04-1993 at 01:48:50
Det #13 2 -inch mount Alpha eff. : .2322
Sample size : .5 mL Dilution : 1

Mount # 1

240563 / 30 - 0.3 = 3.1110E+01 uCi/L alpha

Mount # 2 3.2341E1 uCi/L

259585 / 30 - 0.3 = 3.3571E+01 uCi/L alpha

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CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

Reference 1-27-93

WHC-SD-WM-DP-045
REV 1

DETECTOR NO. 13

TIME ZERO DATE (HD): 15697

RADIONUCLIDE: Am-241
HALF LIFE: 154497 DAYS
COUNT TIME: 5 MINUTES
BACKGROUND: 0.4 CTS/MIN

DATE COUNTED (HD): 17655

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

STANDARD ID	SIZE	DATE	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1"	01/26/93	91681	91625	91846	91975
36B40B7	1"	01/26/93	162879	162277	162160	163913
36B40C7	1"	01/26/93	235405	236017	235932	236684
36B40A3	2"	01/26/93	71378	70965	71118	71361
36B40B3	2"	01/26/93	130257	130024	129480	129640
36B40C3	2"	01/26/93	183090	181717	182673	182663
36B40A6	5"	01/26/93	71356	70882	71625	71307
36B40B6	5"	01/26/93	146902	145100	145724	146786
36B40C5	5"	01/26/93	199376	198941	198547	199737

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM			EFFICIENCY
36B40A8	1"	60570	18356	1.01	18501			0.3055
36B40B7	1"	109900	32561	1.01	32819			0.2986
36B40C7	1"	159700	47202	1.01	47575			0.2979
AVERAGE,	1" =	0.3007	+/- @95	0.0082	2.72	%	ON	01/26/93

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM			EFFICIENCY
36B40A3	2"	61800	14241	1.01	14353			0.2323
36B40B3	2"	110700	25970	1.01	26175			0.2365
36B40C3	2"	161400	36507	1.01	36796			0.2280
AVERAGE,	2" =	0.2322	+/- @95	0.0083	3.58	%	ON	01/26/93

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM			EFFICIENCY
36B40A6	5"	59470	14258	1.01	14371			0.2417
36B40B6	5"	109800	29225	1.01	29457			0.2683
36B40C5	5"	160100	39830	1.01	40145			0.2507
AVERAGE,	5" =	0.2536	+/- @95	0.0265	10.46	%	ON	01/26/93

NEW EFFS FOR DET 13 Am-241 1" = 0.3007 2" = 0.2322
ON 01/26/93 5" = 0.2536

430

9313080.1359

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 807

WHC-SD-WM-DP-045 REV 1

Lab Segment Serial No. R 3916	Customer ID: SR-76A
Analysis: U	Sample Prep: ACID DIGEST

Instrument: UB88807	Procedure/ Rev: 1A-925-106/R-0
Technologist: TANIA BATES [redacted]	Date: 6-4-93
Starting Time: 10:00	Temperature 23°C
Ending Time: 11:00	Chemist: S. CATLOW

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R 3915-8540	11		
2	REAGENT BLANK	N/A	12		
3	SAMPLE	R 3916-8740	13		
4	SAMPLE DUP.	R 3916-8840	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 .100ml			
SPIKE	90B38 .100ml			

431

A-6000-081 (03/93)

Tania Bates 6-4-93

URANIUM ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-8540	BECHTOLD-1	5-25-93	8:45	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	E13975	0

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

Remarks, Calculations, Results

S267 UF1C
STD# 124B38 RESULT 3.07E-2
STD VAL 3.04E-2 %REC 100.99%
SPIKE ID/VAL 90B38/6.25 -4 g/L
SPIKE VOL. .100 ml

$$\frac{.14(.1)(1010)(6.25E-4)}{\left(\frac{5.7}{5.6}\right).42 - .14} = 3.07E-2$$

.14
.42

Donna Bates

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-4-93	11:00	Rahde

6/4

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

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-8740	BECHTOLD-1	5-25-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E13975	0

Sample Size	Customer ID
? .100 - 10 → .100 ml	SB-76A

Remarks, Calculations, Results

90B38/6.25 -4 g/L
.100 ml

$$\frac{.26(.1)(1010)(6.25E-4)}{\left(\frac{5.7}{5.6}\right).52 - .26} = \frac{6.0948E-2\ G/L}{5.01\ G/L} = 1.22\times10^{-2}\ G/G$$

.26
.52

Donna Bates

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-4-93	11:00	Rahde

6/4

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

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URANIUM ANALYSIS - ACID DIGESTION

Serial No	Sample Point *	Date	Time Issued	Priority
R 3916.-8840	BECHTOLD-1	5-25-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E13975	0

Sample Size	Customer ID
? .100 -10 → .100 ml	SB-76A

Remarks, Calculations, Results

DUPLICATE SAMPLE
90B38/6.25 -4 g/l
.100 ml

$$\frac{.28(.1)(.010)(6.25e-4)}{(\frac{5.7}{5.6})54 - .28} = \frac{6.555e-2\ g/L}{5.016\ g/L} = 1.31 \times 10^{-2}\ g/L$$

.28
.54

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6-4-93	11:00	[illegible]	[illegible] 6/4

54-8800-061 (5-10-83)

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 806

WHC-SD-WM-DP-045 REV 1

Lab Segment Serial No. R3916	Customer ID: SB-764
Analysis: Pu 239/40	Sample Prep: Acid Digest

Instrument: W357237	Procedure/ Rev: LA 503-156 D-0
Technologist: TAm Gilbert [illegible]	Date: 6-3-93
Starting Time: 1410	Temperature 24°C
Ending Time: 2370	Chemist: SA Carlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3915-8581	11		
2	REAGENT BLANK	N/A	12		
3	Sample	R3916-8781	13		
4	Sample Dup	R3916-8881	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	63B43 - .100 ml			
Slice	64B43 - .100 ml			

434

A-6000-081 (03/93)

9314000156

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

3.2 2929

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-8581	BECHTOLD-1	5-25-93	8:45	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	E13975	0

Sample Size	Customer ID
? 100-10-100	STD

Remarks, Calculations, Results

EDP R211 AR001

STD#63B43 RESULT 1.3426+2

STD VAL 1.305+2 %REC 102.88%

1ml Km HNO3

.100 ml Pu 206 spike 64B43

"AEA" - 480MIN
ATTACH PRINTOUT

RUSH RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]		[redacted]	
Hrs	Hrs 6-4-93 0100	Hrs	Hrs	

Date	Time Completed	Lab Unit Mgr 6776	
6-7-93	2330		

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

3 6-4-93

R 3915-8581

7429 - 4
30

0.4270 ***
0.5586 ***
386.0569 ***
1.3426+02 ***

0.4270 ***
0.5586 ***
386.0569 ***
1.3426+02 ***

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PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

4.1 5453

Serial No.	Sample Point	Date	Time Issued	Priority
R 3916.-8781	BECHTOLD-1	5-25-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100 - 10 - 100 S.P. 6-4-93	SB-76A

Remarks, Calculations, Results:

COUNT AS uCI/L

1 ml Pm HNO_3

.100 ml Pu 236 Spike 64843 :

~~9.97E-5 uCi/L~~ S.P. 6-4-93

$\frac{1.50E^{+1}\ uCi/L}{5.01E^{0}\ g/L}$ = 2.99 uCi/G

"AEA" - 480MIN
ATTACH PRINTOUT
RUSH RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]	[redacted]	[redacted]	
Hrs	Hrs 6-4-93 0034	Hrs 6-4-93 09:30	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6-3-93	2330		

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

#3 6-4-93

0698 / 30 - 4

"R3916-8781"

~~3.0266-02 ***~~
~~8.6680-01 ***~~
~~3.8005+02 ***~~
~~6.1194+00 ***~~

S.P. 6-4-93

~~0.0362 ***~~
~~0.5666 ***~~
~~386.0569 ***~~
~~6.1194+00 ***~~

46
66
69
01

BEST AVAILABLE COPY

4.3 7900

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-8881	BECHTOLD-1	5-25-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100-10-100	SB-76A

Remarks, Calculations, Results

DUPLICATE SAMPLE 1.35E+1 uCi/l ~~(2.225E-6)~~ S.P 6-5-93

"AEA" - 480MIN

COUNT AS uCI/L 5.01E03/L ~~1.363+11~~ S.P 6-5-93 ATTACH PRINTOUT

1 ml Pu HNO3

.100 ml Pu 216 spike 64BY3 = 2.69 uCi/G RUSH RUSH

~~2.19E-4 uCi/g~~ S.P 6-5-93

Analyst - 1	Analyst - 2 [redacted]	Analyst - 3 [redacted]	Analyst - 4 [redacted]	Analyst - 5
[redacted]			D H Miller	
Hrs	Hrs 6-4-93 0100	Hrs 6-4-93 0730	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6-3-93	2330		

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

#1 6-4-93

5278

~~2390~~ - 4

30

R3916-8881

0.0643 ***
0.8382 ***
386.0569 ***
1.3474+01 ***

0.0643 ***
0.8382 ***
386.0569 ***
1.3474+01 ***

BEST AVAILABLE COPY

D H Milian
6-4-93

GENERAL ALPHA ENERGY ANALYSIS

Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
R3915-8581
File ID: SD2929.SPC

Counted on: 6/ 4/93 @ 8: 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	2462.8	2499.1	364.105	364.105	24.000	17.931	12.000	8.234
2	55.8	52.8	304.879	304.879	28.000	20.913	14.000	5.927
3	496.9	0.0	265.343	265.343	12.000	12.123	6.000	6.102
4	2027.0	2028.6	231.244	231.244	24.000	16.572	12.000	8.806

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm243 Pu236	0.5586	5.786	5.801	-0.015	0.08	54.56	0.01	0.570E-08
	Cm244		5.796	5.801	-0.005				0.416E-08
2	Pu238	0.0144	5.499	5.523	-0.024	0.10	1.41	0.00	0.149E-09
	Am241		5.480	5.523	-0.043				0.114E-09
3		0.0000		5.337		0.06	0.00	0.00	0.000E+00
4	Pu239	0.4270	5.143	5.177	-0.034	0.08	41.70	0.01	0.318E-08
	Pu240		5.144	5.177	-0.033				0.318E-08

DETECTOR CALIBRATION
Energy(MEV) = 4.090 + (0.0047)*Channel
Energy range (MeV): 4.090 TO 6.496
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	49360.0	100.000
Smoothed	49359.9	100.000
Composite fit	48836.1	98.939
Residuals	523.8	1.061

Analyzed by: _____
RW

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          SPECTRUM SD2929.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                9462.6
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Raw Data Dump for AEA Spectrum: SP:SD2929.SPC

1	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
11	1.	1.	0.	2.	0.	0.	0.	3.	0.	3.
21	1.	2.	1.	1.	3.	1.	1.	0.	0.	3.
31	0.	2.	0.	3.	0.	0.	1.	2.	5.	1.
41	0.	2.	0.	1.	1.	3.	2.	1.	2.	2.
51	1.	0.	2.	0.	1.	0.	2.	0.	2.	1.
61	1.	1.	0.	3.	3.	0.	2.	1.	1.	2.
71	0.	1.	0.	1.	3.	1.	2.	2.	1.	1.
81	2.	1.	1.	3.	2.	3.	0.	1.	1.	1.
91	2.	1.	3.	3.	1.	2.	0.	2.	1.	2.
101	5.	1.	1.	0.	2.	0.	0.	1.	2.	2.
111	4.	1.	2.	0.	4.	0.	1.	2.	0.	2.
121	2.	0.	0.	3.	1.	1.	0.	0.	2.	1.
131	4.	6.	2.	1.	4.	2.	3.	2.	3.	1.
141	2.	3.	4.	5.	2.	2.	7.	4.	6.	2.
151	7.	4.	3.	6.	3.	2.	0.	4.	2.	1.
161	7.	6.	3.	8.	6.	7.	5.	9.	8.	3.
171	5.	5.	5.	5.	5.	5.	11.	6.	13.	10.
181	9.	6.	7.	10.	10.	11.	5.	10.	11.	11.
191	16.	14.	10.	7.	19.	11.	15.	19.	21.	22.
201	21.	21.	31.	45.	49.	54.	55.	65.	73.	89.
211	125.	131.	166.	206.	226.	303.	302.	369.	443.	538.
221	615.	736.	768.	811.	956.	1022.	1062.	1054.	1151.	1104.
231	1136.	1089.	989.	871.	802.	695.	561.	499.	357.	299.
241	225.	153.	107.	75.	65.	36.	32.	12.	18.	8.
251	13.	15.	10.	20.	12.	9.	17.	13.	26.	16.
261	16.	26.	24.	8.	35.	11.	18.	25.	12.	22.
271	25.	12.	11.	17.	6.	4.	5.	8.	5.	9.
281	10.	12.	6.	8.	7.	7.	9.	8.	7.	13.
291	15.	14.	13.	20.	19.	21.	19.	22.	22.	32.
301	31.	26.	36.	36.	28.	39.	19.	18.	23.	18.
311	20.	14.	21.	15.	8.	16.	18.	20.	13.	7.
321	18.	17.	16.	12.	11.	14.	20.	23.	22.	25.
331	15.	29.	30.	34.	44.	33.	50.	66.	67.	93.
341	96.	128.	145.	228.	229.	246.	330.	403.	429.	498.
351	564.	700.	765.	809.	915.	1035.	1120.	1168.	1204.	1324.
361	1327.	1309.	1327.	1316.	1313.	1182.	1143.	1003.	847.	726.
371	637.	511.	389.	287.	173.	176.	99.	69.	32.	35.
381	17.	5.	3.	2.	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.	2.	1.	0.	0.	0.	0.	1.	0.	0.
431	0.	0.	1.	2.	1.	0.	0.	1.	0.	0.
441	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.
461	0.	0.	0.	1.	2.	2.	0.	0.	1.	1.
471	1.	0.	2.	2.	2.	0.	1.	2.	2.	1.
481	0.	1.	2.	2.	1.	0.	1.	0.	2.	1.
491	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
511	0.	0.								

D. H. Milligan
6-4-93

WHC-SD-WM-DP-045
REV 1

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
R3916-8781
File ID: SD5453.SPC

Counted on: 6/ 4/93 @ 9: 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	4.5	3.4	480.110	480.110	20.000	12.020	10.000	1.825
2	4059.2	4087.4	363.263	363.263	20.000	9.998	10.000	4.774
3	96.8	97.9	304.829	304.829	24.000	13.577	12.000	5.205
4	187.0	64.8	260.146	260.146	12.000	24.576	6.000	3.633
5	375.0	383.4	232.611	232.611	20.000	8.593	10.000	4.696
6	10.5	11.3	34.397	34.397	20.000	12.497	10.000	3.585

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Bi212	0.0014	6.040	6.047	-0.007	0.04	0.11	1.56	0.702E-06
2	Ra224 Pu236	0.8668	5.680	5.697	-0.017	0.03	71.29	378.05	0.170E-03
3	Pu238	0.0247	5.499	5.521	-0.022	0.04	2.03	14.09	0.635E-05
~~4~~	~~Pu239~~	0.0302		5.387		0.07	2.48	12.36	0.557E-05
~~5~~	~~Pu239~~	0.0740		5.305		0.03	6.09	30.35	0.137E-04
6		0.0029		4.710		0.04	0.24	1.21	0.543E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.607 + (0.0030)*Channel
Energy range (MeV): 4.607 TO 6.143
Efficiency = 0.2006 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	40545.0	100.000
Smoothed	40545.0	100.000
Composite fit	41121.8	101.423
Residuals	-576.8	-1.423

Analyzed by: [redacted]

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          SPECTRUM SD5453.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC            14601.7

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Raw Data Dump for AEA Spectrum: SP:SD5453.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	1.	2.	1.	2.	1.	2.	3.
21	2.	4.	7.	1.	7.	4.	5.	3.	6.	7.
31	5.	5.	6.	4.	7.	5.	4.	6.	6.	3.
41	1.	0.	0.	1.	0.	0.	1.	0.	0.	0.
51	1.	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.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
111	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
131	0.	0.	1.	2.	0.	1.	2.	2.	1.	0.
141	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
151	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.
161	4.	1.	1.	0.	0.	1.	1.	2.	1.	1.
171	1.	0.	4.	2.	0.	2.	1.	1.	3.	2.
181	1.	0.	1.	0.	1.	1.	1.	3.	2.	1.
191	1.	0.	2.	2.	3.	3.	5.	2.	4.	1.
201	0.	8.	1.	6.	7.	3.	5.	5.	7.	10.
211	13.	13.	19.	26.	22.	32.	39.	46.	54.	64.
221	83.	84.	123.	95.	154.	160.	161.	200.	189.	234.
231	245.	249.	202.	216.	175.	145.	101.	72.	55.	41.
241	17.	15.	8.	13.	5.	13.	14.	12.	16.	16.
251	14.	20.	25.	28.	38.	42.	44.	39.	36.	36.
261	32.	34.	29.	23.	31.	30.	21.	26.	15.	10.
271	18.	9.	9.	9.	11.	7.	4.	1.	2.	7.
281	8.	4.	4.	8.	5.	10.	11.	16.	18.	16.
291	20.	13.	25.	17.	40.	37.	38.	51.	45.	53.
301	47.	56.	41.	63.	63.	51.	44.	46.	33.	24.
311	25.	15.	21.	11.	13.	11.	17.	15.	14.	10.
321	13.	16.	20.	10.	17.	19.	17.	20.	19.	14.
331	17.	21.	30.	39.	33.	39.	48.	50.	62.	58.
341	108.	108.	152.	194.	235.	303.	410.	530.	583.	708.
351	836.	993.	1052.	1301.	1401.	1444.	1608.	1782.	1960.	2037.
361	2291.	2332.	2453.	2293.	2102.	1679.	1279.	924.	638.	380.
371	227.	103.	59.	15.	10.	0.	0.	0.	1.	0.
381	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.
421	0.	.	1.	1.	1.	1.	0.	0.	1.	1.
431	0.	1.	1.	1.	2.	1.	0.	2.	1.	1.
441	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
451	0.	1.	0.	0.	1.	1.	0.	0.	0.	0.
461	1.	0.	3.	0.	2.	0.	0.	2.	0.	0.
471	0.	1.	2.	1.	1.	3.	3.	2.	3.	3.
481	3.	2.	0.	1.	1.	2.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

D H Milian
6-4-93

WHC-SD-WM-DP-045
REV 1

GENERAL ALPHA ENERGY ANALYSIS

Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
R3916-8881
File ID: SD7900.SPC

Counted on: 6/ 4/93 @ 9: 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	2962.0	2916.8	363.717	363.717	20.000	11.912	10.000	5.371
2	105.0	100.5	305.311	305.311	24.000	17.193	12.000	6.390
3	80.2	38.5	265.563	265.563	16.000	14.767	8.000	0.503
4	265.2	267.1	233.013	233.013	16.000	10.167	8.000	7.783

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm244 Pu239	0.8382	5.796	5.783	0.013	0.06	55.01	0.01	0.425E-08
	Cm243		5.786	5.783	0.003				0.583E-08
2	Pu238	0.0348	5.499	5.508	-0.009	0.08	2.28	0.00	0.245E-09
	Am241		5.480	5.508	-0.028				0.188E-09
3		0.0626		5.321		0.07	4.11	0.00	0.318E-09
4	Pu239	0.0643	5.143	5.168	-0.025	0.05	4.22	0.00	0.326E-09
	Pu240		5.144	5.168	-0.024				0.326E-09

DETECTOR CALIBRATION
Energy(MEV) = 4.073 + (0.0047)*Channel
Energy range (MeV): 4.073 TO 6.480
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	32278.0	100.000
Smoothed	32278.0	100.000
Composite fit	32809.7	101.647
Residuals	-531.7	-1.647

Analyzed by: _____

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          SPECTRUM SD7900.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC            10870.2

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Raw Data Dump for AEA Spectrum: SP:SD7900.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	2.	3.	1.	1.	0.
21	3.	1.	2.	1.	2.	2.	1.	0.	0.	0.
31	0.	0.	1.	0.	1.	1.	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.	1.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
81	1.	0.	0.	0.	2.	0.	2.	0.	0.	1.
91	1.	0.	0.	0.	2.	1.	2.	0.	1.	0.
101	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
111	0.	0.	1.	0.	0.	1.	0.	0.	1.	0.
121	0.	1.	0.	0.	0.	0.	1.	1.	0.	0.
131	1.	0.	1.	0.	0.	1.	1.	1.	0.	0.
141	1.	2.	0.	0.	0.	0.	1.	1.	2.	2.
151	2.	0.	0.	0.	0.	0.	0.	0.	3.	0.
161	0.	1.	0.	1.	1.	0.	0.	1.	1.	2.
171	1.	0.	0.	1.	2.	2.	1.	0.	1.	3.
181	2.	1.	0.	1.	2.	0.	1.	1.	0.	4.
191	1.	4.	3.	2.	2.	2.	5.	1.	4.	5.
201	2.	4.	7.	10.	7.	6.	7.	4.	11.	6.
211	10.	11.	13.	11.	18.	20.	31.	30.	36.	44.
1	54.	66.	78.	87.	96.	97.	144.	139.	150.	170.
231	172.	153.	185.	159.	138.	116.	91.	85.	44.	35.
241	34.	28.	14.	14.	17.	17.	14.	10.	10.	14.
251	8.	18.	11.	12.	15.	19.	17.	22.	23.	27.
261	12.	17.	25.	23.	18.	23.	28.	17.	22.	14.
271	9.	17.	13.	7.	11.	8.	4.	5.	4.	3.
281	9.	8.	5.	5.	7.	19.	17.	12.	20.	15.
291	16.	22.	30.	33.	23.	33.	32.	36.	46.	55.
301	47.	57.	70.	70.	61.	46.	60.	45.	36.	31.
311	32.	25.	15.	24.	24.	8.	16.	12.	22.	26.
321	14.	20.	32.	21.	24.	31.	22.	31.	22.	24.
331	39.	43.	52.	63.	64.	69.	68.	88.	96.	125.
341	111.	122.	150.	175.	201.	243.	276.	345.	435.	545.
351	588.	705.	739.	868.	945.	991.	1096.	1191.	1347.	1556.
361	1713.	1681.	1784.	1659.	1552.	1351.	1068.	854.	603.	457.
371	288.	236.	151.	121.	113.	90.	91.	66.	54.	70.
381	40.	35.	25.	19.	13.	14.	17.	15.	6.	9.
391	4.	6.	4.	3.	2.	2.	2.	3.	0.	1.
401	1.	2.	0.	0.	0.	1.	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.	1.
431	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
441	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
451	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	1.	0.	1.
471	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.
481	0.	1.	1.	0.	0.	1.	0.	0.	0.	0.
1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 3

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	9	
TODAY'S DATE:	08/19/92	
DECAY CORR'N:	2.554	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242920	5	48575	307	48882	0.4981
242932	5	48577	307	48884	0.4982
242052	5	48401	305	48706	0.4964
243038	5	48599	307	48906	0.4984
242907	5	48572	307	48879	0.4981
242795	5	48550	306	48856	0.4979
243214	5	48634	307	48941	0.4988
243707	5	48732	309	49041	0.4998
242647	5	48520	306	48826	0.4976
241653	5	48322	304	48625	0.4955
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998				
MIN	0.4955	48548	306	48855	0.4979

BEST AVAILABLE COPY

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	149	148	150	147	out	150				
A/ C/G	Pu	109	228	227	227	231	227	of	233				
DATE	Am	135	300	297	297	303	300	Service	308				
5-29-93	Cm	159	367	362	365	370	367		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	150	148	151	149	out	150				
A/ C/G	Pu	110	228	227	227	232	230	of	233				
DATE	Am	136	300	298	297	304	303	Service	308				
5-30-93	Cm	160	367	362	364	371	370		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	73	149	158	146	150	148	out	149				
A/ C/G	Pu	110	227	235	225	231	229	of	233				
DATE	Am	136	298	305	296	303	301	Service	308				
5-31-93	Cm	160	305	371	363	370	369		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	147	148	150	150	152 out	150				
A/ C/G	Pu	110	229	224	227	231	229	231 of	233				
DATE	Am	136	301	296	298	304	301	303 Service	307				
6-1-93	Cm	160	368	361	367	371	368	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	156	148	152	151	152	150				
A/ C/G	Pu	110	229	231	227	231	228	230	233				
DATE	Am	136	300	302	299	303	300	302	307				
6-2-93	Cm	160	367	368	365	370	368	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	[illegible]	148	153	147	152	154				
A/ C/G	Pu	110	229		227	231	229	231	233				
DATE	Am	136	301	[illegible]	298	304	301	303	307				
6-3-93	Cm	160	368		365	371	369	370	371				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 805

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R3916	Customer ID: SB-76A
Analysis: Am241	Sample Prep: Acid Digest

Instrument: WB57237	Procedure/ Rev: L4 503-156 D-0
Technologist: [illegible]	Date: 6-3-93
Starting Time: 1400	Temperature 24°C
Ending Time: 2330	Chemist: SA Carlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3915-8582	11		
2	REAGENT BLANK	N/A	12		
3	Sample	R3916-8782	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	63B43- 1ml			
Spike	58B43- .100 ml			

449

A-6000-081 (07/97)

AMERICIUM 241 ANALYSIS - ACID DIGESTION

3.4 4530

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-8582	BECHTOLD-1	5-25-93	8:45	18

Determination	Method-Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	% RECOVERY	E13975	0

Sample Size	Customer ID
? 100-10-1 ml	STD

Remarks, Calculations, Results

EDP R201 AR001

STD# 63843 RESULT 2.5602+1

STD VAL 2.6830+1 %REC 95.42%

.100 ml Am 243 Spike 58843

"AEA" - 480MIN
ATTACH PRINTOUT

RUSH RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 6-4-93 0030	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	2330	

54-6800-061 (8-10-83)

#1 6-4-93 AJ R 3915-8582.

~~8495~~ 30 - 4

$$\frac{836\,(2547-3)(.1)(1000)(101)}{842} = 2.5602+1 \text{ uCi/l}$$

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AMERICIUM 241 ANALYSIS - ACID DIGESTION

4.2 " 6445

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-8782	BECHTOLD-1	5-25-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100 - 10 - 100	SB-76A

Remarks, Calculations, Results

COUNT AS uCI/L

"AEA" - 480MIN
ATTACH PRINTOUT

1 ml 8m HNO_3

.100 ml Am 243 spike 58343

2.54E+1 uci/L

RUSH RUSH

5.01E0 g/L = 5.07 uci/G

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]	[redacted]	[redacted]	
Hrs	Hrs 6-4-93 0030	Hrs 6-4-93 0930	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	2330	

54-6600-06 (R-10-83)

#2 6-4-93 AJ

R 3916-8782

1290/30 - 2

$$\frac{37\,(2.547\text{-}3)(.1)(1000)(1010)}{375}$$

$= 2.5382E^{+1}$ uCi/P

BEST AVAILABLE COPY

D. H. Mallica
6-4-93

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
R3915-8582
File ID: SD4530.SPC

Counted on: 6/ 4/93 @ 8: 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	5.6	4.9	346.244	346.244	24.000	30.321	12.000	0.000
2	1523.6	1604.6	298.594	298.594	20.000	13.311	10.000	2.875
3	1332.8	1465.5	253.519	253.519	20.000	8.314	10.000	1.951
4	4.8	4.7	146.070	146.070	20.000	7.757	10.000	11.103
5	1.9	2.1	127.180	127.180	12.000	2.180	6.000	6.935
6	0.1	0.1	103.105	103.105	12.000	0.200	6.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Ra224	0.0218	5.680	5.716	-0.036	0.14	1.73	12.45	0.561E-05
2	Pu238	0.5456	5.499	5.492	0.007	0.06	43.28	406.15	0.183E-03
	Am241		5.480	5.492	-0.012				0.140E-03
3		0.4315		5.280		0.04	34.23	231.27	0.104E-03
4	Np237	0.0008	4.781	4.775	0.006	0.04	0.06	0.48	0.217E-06
5		0.0002		4.686		0.01	0.01	0.10	0.445E-07
6		0.0000		4.573		0.00	0.00	0.00	0.144E-08

DETECTOR CALIBRATION
Energy(MEV) = 4.089 + (0.0047)*Channel
Energy range (MeV): 4.089 TO 6.495
Efficiency = 0.1480 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	38718.0	100.000
Smoothed	38718.0	100.000
Composite fit	39659.0	102.430
Residuals	-941.0	-2.430

Analyzed by: _____
RW

```
          SPECTRUM SD4530.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                5643.7
1
1
1
1
1
1
1
1
1
1
1
1
6
1
1
5
1
4
4
1
1
1
1
3
13
1.3
1.. 3
1.....  3
2............  3
12.......................3......
1.2.........................................3...........
1...2.............................................................3..
1.......2....................3..........
13............2
1..................    2
1.....................................2....
1.............................................................2...
1.......................................................................2
1.........................2
1.2.
1
1
1
1
1
```

Raw Data Dump for AEA Spectrum: SP:SD4530.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	1.	0.	0.	0.	0.	1.	1.	0.
21	0.	0.	1.	0.	1.	0.	0.	1.	1.	2.
31	1.	0.	1.	0.	2.	0.	3.	0.	0.	1.
41	2.	2.	2.	1.	0.	0.	0.	0.	0.	1.
51	1.	1.	2.	1.	3.	1.	2.	2.	1.	0.
61	0.	0.	2.	1.	1.	1.	1.	1.	0.	1.
71	0.	0.	1.	1.	0.	2.	1.	2.	1.	0.
81	1.	1.	0.	2.	1.	0.	2.	1.	2.	1.
91	0.	1.	3.	2.	0.	0.	3.	1.	2.	2.
101	2.	3.	5.	1.	2.	1.	0.	2.	1.	1.
111	1.	1.	1.	5.	1.	4.	5.	1.	3.	2.
121	0.	4.	6.	3.	5.	5.	1.	5.	4.	5.
131	2.	0.	3.	1.	6.	1.	2.	3.	5.	6.
141	3.	9.	9.	6.	6.	4.	4.	5.	10.	3.
151	4.	2.	7.	5.	4.	3.	5.	7.	5.	5.
161	6.	6.	5.	5.	7.	5.	12.	14.	4.	8.
171	8.	13.	8.	10.	6.	7.	13.	10.	14.	11.
181	7.	7.	12.	15.	14.	15.	11.	10.	13.	15.
191	18.	11.	15.	15.	10.	18.	14.	38.	26.	29.
201	15.	32.	25.	15.	27.	19.	38.	29.	31.	40.
211	28.	39.	32.	45.	50.	46.	65.	72.	67.	72.
221	52.	72.	90.	104.	111.	135.	108.	145.	178.	183.
231	199.	252.	267.	239.	303.	409.	397.	414.	516.	532.
241	532.	632.	641.	689.	624.	630.	674.	631.	659.	639.
251	731.	734.	798.	810.	842. Am 243	749.	643.	478.	329.	211.
261	133.	118.	120.	104.	99.	120.	96.	110.	115.	125.
271	111.	122.	139.	161.	174.	193.	211.	245.	278.	329.
281	318.	374.	449.	541.	541.	578.	619.	667.	642.	696.
291	681.	711.	748.	752.	696.	753.	714.	830.	832.	838. Am 241
301	778.	759.	587.	426.	266.	188.	131.	117.	91.	79.
311	51.	44.	30.	16.	10.	12.	8.	2.	1.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
331	0.	0.	0.	1.	0.	1.	1.	3.	0.	2.
341	5.	3.	1.	5.	3.	4.	3.	1.	1.	3.
351	3.	2.	0.	1.	3.	0.	1.	0.	0.	1.
361	2.	0.	0.	0.	0.	3.	0.	0.	0.	0.
371	0.	1.	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.	1.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
421	0.	0.	2.	0.	1.	1.	0.	1.	1.	0.
431	0.	0.	2.	1.	0.	0.	1.	0.	1.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
461	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
471	1.	1.	1.	1.	1.	2.	0.	0.	1.	4.
481	1.	2.	2.	1.	1.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

D.H. Nitlicia
6-4-93

WHC-SD-WM-DP-045
REV 1

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
R3916-8782
File ID: SD6445.SPC

Counted on: 6/ 4/93 @ 9: 0
Detector/Geometry number: 6/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	5.8	5.2	347.933	347.933	16.000	11.123	8.000	6.933
2	61.2	58.8	301.691	301.691	20.000	12.939	10.000	3.621
3	596.0	588.1	255.268	255.268	20.000	13.210	10.000	6.375

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1		0.0069		5.873		0.03	0.09	0.41	0.182E-06
2	Pu236	0.1077	5.756	5.762	-0.006	0.03	1.37	6.46	0.291E-05
3		0.8854		5.651		0.03	11.29	52.06	0.235E-04

DETECTOR CALIBRATION
Energy(MEV) = 5.038 + (0.0024)*Channel
Energy range (MeV): 5.038 TO 6.267
Efficiency = 0.2169 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	6591.0	100.000
Smoothed	6590.9	99.999
Composite fit	6376.7	96.748
Residuals	214.2	3.250

Analyzed by: [redacted]

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          SPECTRUM SD6445.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC              2151.0
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9313090.1385

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

Raw Data Dump for AEA Spectrum: SP:SD6445.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
21	1.	1.	6.	3.	0.	1.	2.	2.	3.	5.
31	4.	1.	3.	0.	3.	3.	3.	2.	3.	0.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
151	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
161	0.	1.	0.	2.	0.	1.	0.	0.	0.	1.
171	0.	1.	0.	1.	1.	1.	0.	1.	1.	0.
181	0.	2.	1.	1.	2.	1.	2.	1.	1.	0.
191	1.	1.	0.	2.	3.	1.	2.	3.	3.	1.
201	3.	4.	2.	5.	7.	2.	2.	1.	3.	1.
211	7.	6.	2.	4.	4.	9.	4.	6.	4.	2.
221	7.	9.	12.	10.	7.	8.	14.	10.	21.	24.
231	17.	23.	32.	33.	36.	38.	41.	54.	58.	85.
241	93.	100.	102.	146.	165.	140.	199.	219.	250.	284.
251	314.	308.	341.	375. am 243	357.	305.	289.	251.	215.	162.
261	130.	102.	59.	53.	38.	44.	42.	25.	21.	20.
271	15.	11.	7.	7.	11.	6.	4.	4.	2.	4.
281	3.	5.	2.	10.	7.	5.	13.	8.	14.	15.
291	22.	22.	12.	25.	29.	25.	30.	33.	24.	37. am 241
301	35.	36.	33.	30.	25.	14.	11.	11.	6.	4.
311	6.	7.	3.	2.	2.	3.	2.	0.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
331	1.	0.	0.	1.	0.	0.	1.	0.	0.	2.
341	2.	3.	3.	4.	1.	3.	3.	6.	3.	1.
351	3.	1.	0.	0.	0.	1.	0.	1.	0.	1.
361	1.	1.	1.	1.	0.	0.	0.	0.	1.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
411	0.	1.	0.	0.	0.	0.	0.	1.	1.	0.
421	0.	1.	0.	0.	0.	3.	0.	0.	1.	1.
431	1.	1.	0.	0.	0.	0.	0.	1.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
461	0.	1.	1.	0.	1.	0.	1.	5.	0.	0.
471	3.	2.	0.	3.	3.	2.	1.	1.	2.	5.
481	0.	0.	1.	0.	1.	1.	0.	0.	0.	0.
491	0.	0.	1.	0.	0.	0.	0.	1.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	149	148	150	147	out	150				
A/ C/G	Pu	109	228	227	227	231	227	4	233				
DATE	Am	135	300	297	297	303	300		308				
5-29-93	Cm	159	367	362	365	370	367		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	150	148	151	149	out	150				
A/ C/G	Pu	110	228	227	227	232	230	6	233				
DATE	Am	136	300	298	297	304	303	Service	308				
5-30-93	Cm	160	367	362	364	371	370		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	73	149	158	146	150	148	out	149				
A/ C/G	Pu	110	227	235	225	231	229	6	233				
DATE	Am	136	298	305	296	303	301	Service	308				
5-31-93	Cm	160	305 ~~367~~	371	363	370	369		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	147	148	150	150	152 out	150				
A/ C/G	Pu	110	229	224	227	231	229	231 6	233				
DATE	Am	136	301	296	298	304	301	303 Service	307				
6-1-93	Cm	160	368	361	367	371	368	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	156	148	152	151	152	150				
A/ C/G	Pu	110	229	231	227	231	228	230	233				
DATE	Am	136	300	302	299	303	300	302	307				
6-2-93	Cm	160	367	368	365	370	368	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	[illegible]	148	153	147	152	154				
A/ C/G	Pu	110	229		227	231	229	231	233				
DATE	Am	136	301	[illegible]	298	304	301	303	307				
6-3-93	Cm	160	368		365	371	369	370	371				

TE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

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9313090.1389

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

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APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

Batch 810

Lab Segment Serial No. R 3916	Customer ID: SB-76 a
Analysis: TB	Sample Prep: acid digestion

Instrument: WB27810, WB27806	Procedure/ Rev: LA-508-101 (0-0)
Technologist: [redacted], SUE LAI (Sue Lai)	Date: 6-3-93
Starting Time: 13:40	Temperature 25°C
Ending Time: 14:40	Chemist: S. Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3915-8520	11		
2	REAGENT BLANK		12		
3	Sample	R3916-8720	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	65B51 (10 mL)	52		

461

A-6000-081 (03/93)

TOTAL BETA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-8520	BECHTOLD-1	5-25-93	8:45	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	% RECOVERY	E13975	0

Sample Size	Customer ID
? 10 ml	STD

Remarks, Calculations, Results

S515 EV-CRB 65851

STD# RESULT 1.22E-1

STD VAL 1.1309E-1 %REC 112.5%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	14:40	

6/4

13/2 6-3-53 3-4 R-3915-8520

26107/30 -16

27429/30

Beta Calculation by DM on 06-03-1993 at 22:18:09
Det #13 2 -inch mount Beta eff. : .324
Sample size : 10 mL Dilution : 1

Mount # 1

26107/30 - 16.0 = 1.1876E-01 uCi/L beta

Mount # 2 1.2183E-1

27429/30 - 16.0 = 1.2489E-01 uCi/L beta

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TOTAL BETA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-8720	BECHTOLD-1	5-25-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/G	E13975	0

Sample Size	Customer ID
? 100λ	SB-76A

Remarks, Calculations, Results:

COUNT AS uCI/L
USE 13,14,15 OR 16

$\frac{<3.1048E-2}{5.01} = <6.20E-3$ uCi/G

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	R Wilkins	DH Miller	[redacted]	
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	14:40	Rakich

54-6800-051 (R-10-93)

13/2 6-3-93 1-2 R-3916-8720

$\frac{448}{30} - 16$

$\frac{511}{30}$

Beta Calculation by DM on 06-03-1993 at 22:18:52
Det #13 2 -inch mount Beta eff. : .324
Sample size : .1 mL Dilution : 1

Mount # 1

$\frac{448}{30} - 16.0 < 2.3657E-02$ uCi/L beta

Mount # 2 $<3.1048E-2$

$\frac{511}{30} - 16.0 < 3.8438E-02$ uCi/L beta

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TOTAL BETA ANALYSIS - ACID DIGESTION

3 54

Serial No.	Sample Point	Date	Time Issued	Priority
R' 3916.-8720	BECHTOLD-1	5-25-93	8:47	18

Determination	Method Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/G	E13975	1

Sample Size	Customer ID
100	SB-76A

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

RUSH

$\frac{2.30 \times 10^2 \text{ uCi/L}}{5.0 \text{ g/L}} = \frac{\cancel{2.3}}{\cancel{1.9}}$ 4.60×10^1 uCi/g

See Lab

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 6-9-93 1405	Hrs Rahd	Hrs	Hrs
Date 6-9-93	Time Completed 12:30	Lab Unit Mgr		

54-6809061 (R-10-83)

354 ~~[illegible]~~ 6-9-93 R-3916-8720
100 ml

16/2

A 166105 / 10 - 16

B 171540 / 10

Beta Calculation by AGJ on 06-09-1993 at 14:05:43
Det #16 2 -inch mount Beta eff. : .88
Sample size : .1 mL Dilution : 1

Mount # 1

166105
---------- - 16.0 = 2.2652E+02 uCi/L beta
10

230225×10^2

Mount # 2

171540
---------- - 16.0 = 2.3393E+02 uCi/L beta
10

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CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

RA Jones
1-27-93

WHC-SD-WM-DP-045
REV 1

DETECTOR NO:	13		2",5" STD	TIME ZERO DATE (HD)	15883
RADIONUCLIDE:	Co-60		1" STD	TIME ZERO DATE (HD)	16673
HALF LIFE:	1925	DAYS		DATE COUNTED (HD)	17655
COUNT TIME:	5	MINUTES		DATE 1" COUNTED (H	17665
BACKGROUND:	12	CTS/MIN			
BACKGROUND, 1":	12	CTS/MIN		HD 0 =	09/25/44
		CALIBRATED BY:		RA JONES	

STANDAR ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
100B40A2	1"	01/26/93		78776	78863	79180	79256
100B40B1	1"	01/26/93		161690	162494	162024	162588
100B40C1	1"	01/26/93		232056	231970	231737	230508
32B40A4	2"	01/26/93		61020	60587	61283	61422
32B40B3	2"	01/26/93		118314	119060	118335	118367
32B40C4	2"	01/26/93		166802	166975	166850	167756
32B40A5	5"	01/26/93		60827	60175	60130	60192
32B40B6	5"	01/26/93		118775	119091	119506	118776
32B40C5	5"	01/26/93		176357	177402	175892	175740

STANDAR ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM		EFFICIENC
100B40A2	1"	67290	15792	1.48	23315		0.3466
100B40B1	1"	137800	32428	1.48	47876		0.3474
100B40C1	1"	199700	46302	1.48	68359		0.3423
AVERAGE, 1" =		0.3454	+/- @95	0.0053	1.55 %	ON	01/26/93
STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY C RR CPM		EFFICIENCY
32B40A4	2"	70480	12204	1.89	23099		0.3277
32B40B3	2"	135100	23692	1.89	44844		0.3319
32B40C4	2"	202400	33407	1.89	63233		0.3124
AVERAGE, 2" =		0.3240	+/- @95	0.0201	6.21 %	ON	01/26/93
STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY C RR CPM		EFFICIENCY
32B40A5	5"	70160	12054	1.89	22816		0.32[illegible]
32B40B6	5"	135700	23795	1.89	45040		0.3319
32B40C5	5"	201900	35258	1.89	66735		0.3305
AVERAGE, 5" =		0.3292	+/- @95	0.0069	2.11 %	ON	01/26/93

NEW EFFS FOR DET	13	Co-60	1" =	0.3454	2" = 0.3240
ON	01/26/93			5" =	0.3292

RA Jones
10-1-92

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 16

		2",5" STD	TIME ZERO DATE (HD):	15883
RADIONUCLIDE:	Co-60	1" STD	TIME ZERO DATE (HD):	16573
HALF LIFE:	1925		DATE COUNTED (HD):	16816
COUNT TIME:	5		DATE COUNTED 1" (HD)	16816
CPM BKG:	20			
CPM 1" BKG:	20	CALIBRATED BY: RA JONES	HD 0 =	09/25/44

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
100B40A2	1	10/10/90		106500	106036	106765	105566
100B40B1	1	10/10/90		218090	216409	216901	216679
100B40C1	1	10/10/90		308671	309542	308481	307779
32B40A4	2	10/10/90		85189	84424	84670	84952
32B40B3	2	10/10/90		163311	161982	162122	162152
32B40C4	2	10/10/90		230945	229906	229613	228514
32B40A5	5	10/10/90		71725	71447	71713	71195
32B40B6	5	10/10/90		141426	143443	139342	143925
32B40C5	5	10/10/90		205714	206499	207564	206386

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
100B40A2	1"	67290	21223	1.09	23164	0.3442
100B40B1	1"	137800	43384	1.09	47351	0.3436
100B40C1	1"	199700	61704	1.09	67346	0.3372

AVERAGE, 1" = 0.3417 +/- @95% 0.0076 2.22 % ON 10/10/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A4	2"	70480	16942	1.40	23706	0.3364
32B40B3	2"	135100	32458	1.40	45418	0.3362
32B40C4	2"	202400	45929	1.40	64267	0.3175

AVERAGE, 2" = 0.3300 +/- @95% 0.0212 6.43 % ON 10/10/90

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A5	5"	70160	14284	1.40	19987	0.2849
32B40B6	5"	135700	28387	1.40	39721	0.2927
32B40C5	5"	201900	41288	1.40	57773	0.2861

AVERAGE, 5" = 0.2879 +/- @95% 0.0082 2.86 % ON 10/10/90

NEW EFFS FOR DET 16 Co-60 1" = 0.3417 2" = 0.3300

5" = 0.2879

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 804

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R3916	Customer ID: SB-116A
Analysis: Sr 90	Sample Prep: acid digestion

Instrument: WB27811	Procedure/ Rev: LA220-101 / Rev D-0
Technologist: Cynthia [illegible] [illegible] [redacted]	Date: 6 / 04 / 93
Starting Time: 0930 hrs	Temperature N/A
Ending Time: 1500 hrs	Chemist: Stan Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3915-8526	11		
2	REAGENT BLANK N/A		12		
3	Sample	R3916-8526	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	31B51/1ml			
Sr Carrier	39S1D/1ml			
				463

A-6000-401 (03/93)

STRONTIUM 90 ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3915.-8586	BECHTOLD-1	5-25-93	8:45	18

Determination	Method. Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	% RECOVERY	E13975	0

Sample Size	Customer ID
?/mL + mL Sr Carrier 3931D	STD

Remarks. Calculations. Results

LMCS CHECK SAMPLE
LMCS ID 3185I

Std value 1.199+0
Result: 1.1432

~~95.91%~~ S.P. 6-8-93
95.64%

Sep Time 1150 hrs
Sep date 6/04/93
G 8.1349
T 8.0537
N .0812

Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
D.H.Milsie			
Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6/04/93	3:05	

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

12/2 6-4-93 @ 1715 DM R3915-8586 ΔT=5.42

9251/10 -9

Sr Calculation by DM on 06-04-1993 at 19:17:56
Det #12 2 -inch mount Sr eff : .418 Y eff : .466
Sample size : 1 mL Dilution : 1 Method : 1

Mount # 1 Decay time = 5.42 hrs

$$\frac{9251}{10} - 9.0 = \frac{9.2827E\text{-}01 \text{ uCi/L strontium}}{.812}$$

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STRONTIUM 90 ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3916.-8786	BECHTOLD-1	5-25-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	E13975	0

Sample Size	Customer ID
?.500mo + 1 ml Sr Carrier 3951D	SB-76A

Remarks, Calculations, Results

Sep time 1150 hrs
Sep date 6/04/93

$$\frac{3.51E^{+1}\ uci/L}{5.01E0\ g/L} = \boxed{7.01\ uci/g}$$

Ce 8.2552
T 8.1697
N .0855

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	D.H. Milligan			
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6/04/93	3:05	[illegible]

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

12/2 6-4-93 @ 1750 DM R3916-8786 ΔT=5.67

148749 / 10 - 9

Sr Calculation by DM on 06-04-1993 at 19:18:46
Det #12 2-inch mount Sr eff : .418 Y eff : .466
Sample size : .5 mL Dilution : 1 Method : 1

Mount # 1 Decay time = 5.67 hrs

$$\frac{148749}{10} - 9.0 = \frac{3.0047E+01\ uCi/L\ \text{strontium}}{.855}$$

$= 3.5143^{+1}$ uCi/l

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03/18/89 Det 12 Sr/Y-90 ratios

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5162	0.4912	0.5412

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.4476	0.4233	0.4719

Esr = .4912/.5162 = 0.9516 , 1"

Ey = .5412/.5162 = 1.0484 , 1"

Esr = .4233/.4476 = 0.9457 , 2"

Ey = .4719/.4476 = 1.0543 , 2"

RATIOS GENERATED USING PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK RHO-QA-NB-47, VOL 5: PAGES 32-36.

05/11/92 Det 12 CALCULATED Sr AND Y-90 EFFs

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5247	0.4993	0.5501

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.442	0.4180	0.4660

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch # 906

WHC-SD-WM-DP-045

REV 1

Lab Segment Serial No. R3916	Customer ID: SB-76a
Analysis: GEA	Sample Prep: acid digestion

Instrument:	WB 28198	Procedure/ Rev:	LA-548-121 (D-0)
Technologist:	[redacted], SUE LAI (Sue Lai)	Date:	6-3-93
Starting Time:	13:00	Temperature	25°c
Ending Time:	13:40	Chemist:	A. K. Dasgupta

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3915-8530	11		
2	REAGENT BLANK		12		
3	Sample	R3916-8730	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	32851 (.100 ml)			

472

A-6000-081 (03/93)

GAMMA ENERGY ANALYSIS - ACID DIGESTION

1181

Serial No.	Sample Point	Date	Time Issued	Priority
R 3915.-8530	BECHTOLD-1	5-25-93	8:45	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	E13975	0

Sample Size	Customer ID
? 100 λ	STD

Remarks, Calculations, Results
COLX STD# 32B51
R901 STD VAL 1.527662
RESULT 1.56 % REC 102.44%
R905 STD VAL 1.2
RESULT 1.09 % REC 100.54%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	13:40	

54-5800-961 (R-10-83)

1182

Serial No.	Sample Point	Date	Time Issued	Priority
R 3916.-8730	BECHTOLD-1	5-25-93	8:47	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100 λ	SB-76A

Remarks, Calculations, Results
COUNT AS uCI/L Am^{241} 1.2061 uCi/L / 5.01 gL = 2.40 uCi/G
LASER PRINTOUT Co^{60} 3.80 " / 5.01 gL = 7.58×10^{-1} "
Cs^{137} 7.8761 " / 5.01 gL = 1.57×10^{0} "
Eu^{155} 1.87 " / 5.01 gL = 3.73×10^{-1} "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	13:40	

54-5800-961 (R-10-83)

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

03-JUN-9314:36:39

RWilliams
6-3-93

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

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

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

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

SAMPLE DESCRIPTION: R3915-8530
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E+00
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 3-JUN-93 AT 13:46:11

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3017. SECONDS
DEAD TIME: 0.56 %

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

ENERGY CALIBRATION PERFORMED 24-AUG-92
EFFICIENCY CALIBRATION PERFORMED 3-SEP-92

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 474 TO 481.

03-JUN-9314:36:39

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.18	563.80	1.43	853.	1139.	9.8	CS-134, EU-152
2C	1139.34	569.89	1.43	835.	2137.	7.5	CS-134, BI-207
3	1210.06	605.24	1.50	871.	13893.	1.8	CS-134, SB-125
4	1323.94	662.18	1.50	603.	19835.	1.4	CS-137
5C	1592.28	796.36	1.55	469.	10222.	2.2	CS-134
6C	1604.53	802.49	1.55	492.	984.	5.7	CS-134
7C	2336.26	1168.44	1.76	299.	189.	13.3	CS-134
8C	2346.94	1173.78	1.76	285.	12041.	1.9	CO-60
9	2665.45	1333.10	1.96	81.	11036.	1.9	CO-60
10	2731.07	1365.93	1.93	37.	299.	13.1	CS-134
11	2801.61	1401.22	1.88	44.	160.	20.1	BI-214
12	2922.06	1461.48	1.81	36.	313.	12.6	K-40
12B		1460.83			344.	10.8	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 24-AUG-92 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS

03-JUN-9314:36:39

SAMPLE: R3915-8530
DATA COLLECTED ON 3-JUN-93 AT 13:46:11
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<1.87E-01		LLD<1.87E-01		59.54	
AM-243	LLD<6.26E-02		LLD<6.26E-02		74.67	
BA-133	LLD<7.47E-02		LLD<7.47E-02		356.02	
BA-140	LLD<1.90E-01		LLD<1.90E-01		537.27	
BI-212	LLD<3.64E-01		LLD<3.64E-01		727.20	
CEPR144	LLD<4.82E-01		LLD<4.82E-01		133.51	
CO-60	1.09E+01	+-2.26E-01	1.09E+01	+-2.26E-01	1332.50	0.60
					1173.24	0.54
CR-51	LLD<3.91E-01		LLD<3.91E-01		320.09	
CS-134	8.00E+00	+-1.92E-01	8.00E+00	+-1.92E-01	795.84	0.51
					604.70	0.54
CS-137	1.36E+01	+-2.32E-01	1.36E+01	+-2.32E-01	661.65	0.53
EU-152	LLD<1.20E-01		LLD<1.20E-01		1408.01	
EU-154	LLD<9.23E-02		LLD<9.23E-02		1274.45	
EU-154H	LLD<8.15E-02		LLD<8.15E-02		1274.80	
EU-155	LLD<1.23E-01		LLD<1.23E-01		105.31	
FE-59	LLD<1.17E-01		LLD<1.17E-01		1099.25	
I-131	LLD<5.80E-02		LLD<5.80E-02		364.48	
K-40	LLD<6.08E-01		LLD<6.08E-01		1460.75	
LA-140	LLD<2.49E-02		LLD<2.49E-02		1596.20	
MN-54	LLD<5.35E-02		LLD<5.35E-02		834.83	
NA-22	LLD<2.89E-02		LLD<2.89E-02		1274.55	
NB-94	LLD<4.33E-02		LLD<4.33E-02		702.63	
NB-95	LLD<5.06E-02		LLD<5.06E-02		765.78	
NP-237	LLD<2.52E-01		LLD<2.52E-01		86.50	
PB-212	LLD<8.80E-02		LLD<8.80E-02		239.00	
PU-239	LLD<4.07E+02		LLD<4.07E+02		129.30	
PU-241	LLD<1.45E+04		LLD<1.45E+04		148.57	
RA-224	LLD<9.63E-01		LLD<9.63E-01		240.99	
RA-226	LLD<9.50E-01		LLD<9.50E-01		186.10	
RU-103	LLD<5.51E-02		LLD<5.51E-02		497.08	
RU103	LLD<5.79E-02		LLD<5.79E-02		497.08	
RURH106	LLD<8.31E-01		LLD<8.31E-01		621.80	
SB-125	LLD<1.71E-01		LLD<1.71E-01		427.89	
SB-125A	LLD<1.71E-01		LLD<1.71E-01		427.89	
SE-75	LLD<6.45E-02		LLD<6.45E-02		264.66	
SN-113	LLD<7.64E-02		LLD<7.64E-02		391.67	
SR-85	LLD<5.43E-02		LLD<5.43E-02		513.99	
TH-228	LLD<2.38E+00		LLD<2.38E+00		84.37	
TL-208	LLD<6.09E-02		LLD<6.09E-02		583.20	
U-235	LLD<5.75E-02		LLD<5.75E-02		185.71	
Y-88	LLD<1.94E-02		LLD<1.94E-02		1836.06	
ZN-65	LLD<1.29E-01		LLD<1.29E-01		1115.55	
ZR-95	LLD<8.79E-02		LLD<8.79E-02		756.73	
TOTAL	3.25E+01	+-3.76E-01	3.25E+01	+-3.76E-01		

STANDARD DEVIATION = 0.03

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.36E-09 UC/LI
TOTAL MEASURED ACTIVITY = 3.25E+01 (+-3.76E-01) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.18	563.80	1139.	9.8	2.19E+01
1139.34	569.89	2137.	7.5	4.13E+01
1604.53	802.49	984.	5.7	2.45E+01
2336.26	1168.44	189.	13.3	6.29E+00
2731.07	1365.93	299.	13.1	1.11E+01
2801.61	1401.22	160.	20.1	6.05E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.06	1461.48	313.	12.6	1.22E+01

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

WHC-SD-WM-DP-045
REV 1

03-JUN-9315:33:36

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

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

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER AN1:
ANALYZED BY: [redacted]

SAMPLE DESCRIPTION: R3916-8730
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 3-JUN-93 AT 14:43:19

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3008. SECONDS
DEAD TIME: 0.27 %

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

ENERGY CALIBRATION PERFORMED 24-AUG-92
EFFICIENCY CALIBRATION PERFORMED 3-SEP-92

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	119.24	59.97	1.02	354.	721.	10.1	AM-241,U-237, EU-155, NP-239
2	173.41	87.04	1.43	438.	230.	28.3	CS-136, EU-155, EU-155A, PB-214X, TL-208X, CD-109
3	211.14	105.90	1.19	365.	175.	32.8	EU-155, EU-155B, NP-239
4	246.42	123.53	1.31	429.	451.	15.7	CO-57, EU-154A
5	1323.98	662.20	1.52	120.	11492.	1.8	CS-137
6	1747.01	873.73	2.20	65.	41.	66.1	EU-154E, RH-106
7	2346.94	1173.78	1.52	26.	437.	10.0	CO-60
8	2549.29	1275.00	2.04	23.	88.	27.0	EU-154, EU-154H, NA-22
9	2665.45	1333.11	1.96	21.	384.	10.7	CO-60
10	2922.11	1461.50	2.00	11.	327.	11.3	K-40
108		1460.83			344.	10.8	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 24-AUG-92 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS

03-JUN-9315:33:36

WHC-SD-WM-DP-045
REV 1

SAMPLE: R3916-8730
DATA COLLECTED ON 3-JUN-93 AT 14:43:19
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	1.20E+01	+-1.23E+00	1.20E+01	+-1.23E+00	59.54	0.43
AM-243	LLD<3.55E-01		LLD<3.55E-01		74.67	
BA-133	LLD<3.94E-01		LLD<3.94E-01		356.02	
BA-140	LLD<7.90E-01		LLD<7.90E-01		537.27	
BI-212	LLD<1.97E+00		LLD<1.97E+00		727.20	
CEPR144	LLD<2.40E+00		LLD<2.40E+00		133.51	
CO-60	3.80E+00	+-4.07E-01	3.80E+00	+-4.07E-01	1332.50	0.61
					1173.24	0.54
CR-51	LLD<1.91E+00		LLD<1.91E+00		320.09	
CS-134	LLD<2.10E-01		LLD<2.10E-01		795.84	
CS-137	7.87E+01	+-1.63E+00	7.87E+01	+-1.63E+00	661.65	0.55
EU-152	LLD<7.39E-01		LLD<7.39E-01		1408.01	
EU-154	LLD<4.73E-01		LLD<4.73E-01		1274.45	
EU-154H	2.38E+00	+-6.43E-01	2.38E+00	+-6.43E-01	1274.80	0.20
EU-155	1.87E+00	+-6.14E-01	1.87E+00	+-6.14E-01	105.31	0.59
					86.54	0.50
E-59	LLD<3.70E-01		LLD<3.70E-01		1099.25	
-131	LLD<2.96E-01		LLD<2.96E-01		364.48	
K-40	LLD<5.76E+00		LLD<5.76E+00		1460.75	
LA-140	LLD<1.76E-01		LLD<1.76E-01		1596.20	
MN-54	LLD<1.83E-01		LLD<1.83E-01		834.83	
NA-22	8.45E-01	+-2.29E-01	8.45E-01	+-2.29E-01	1274.55	0.45
NB-94	LLD<1.43E-01		LLD<1.43E-01		702.63	
NB-95	LLD<1.86E-01		LLD<1.86E-01		765.78	
NP-237	5.21E+00	+-1.48E+00	5.21E+00	+-1.48E+00	86.50	0.54
PB-212	LLD<4.42E-01		LLD<4.42E-01		239.00	
PU-239	LLD<2.09E+03		LLD<2.09E+03		129.30	
PU-241	LLD<7.31E+04		LLD<7.31E+04		148.57	
RA-224	LLD<4.97E+00		LLD<4.97E+00		240.99	
RA-226	LLD<4.97E+00		LLD<4.97E+00		186.10	
RU-103	LLD<2.65E-01		LLD<2.65E-01		497.08	
RU103	LLD<2.78E-01		LLD<2.78E-01		497.08	
RURH106	LLD<3.78E+00		LLD<3.78E+00		621.80	
SB-125	LLD<9.22E-01		LLD<9.22E-01		427.89	
SB-125A	LLD<9.22E-01		LLD<9.22E-01		427.89	
SE-75	LLD<3.24E-01		LLD<3.24E-01		264.66	
SN-113	LLD<3.64E-01		LLD<3.64E-01		391.67	
SR-85	LLD<2.91E-01		LLD<2.91E-01		513.99	
TH-228	LLD<1.63E+01		LLD<1.63E+01		84.37	
TL-208	LLD<2.35E-01		LLD<2.35E-01		583.20	
U-235	LLD<2.98E-01		LLD<2.98E-01		185.71	
Y-88	LLD<1.28E-01		LLD<1.28E-01		1836.06	
ZN-65	LLD<4.75E-01		LLD<4.75E-01		1115.55	
R-95	LLD<3.04E-01		LLD<3.04E-01		756.73	
TOTAL	1.05E+02	+-2.71E+00	1.05E+02	+-2.71E+00		

STANDARD DEVIATION = 0.12

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 5.90E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.02E+02 (+-2.64E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
246.42	123.53	451.	15.7	3.62E+00
1747.01	873.73	41.	66.1	1.10E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.11	1461.50	327.	11.3	1.27E+01

J. Anderson 11-13-92

```
      EFF
MCA UNIT NUMBER (2):
ADC UNIT NUMBER (1.0):
DETECTOR NUMBER (1):  1
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 24-AUG-92
TIME COLLECT STARTED: 15:03
GEOMETRY NUMBER (12): 42  42  calibration source ID: 42B47-A
GEOMETRY DESCRIPTION: 22CC LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 142
22CC LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO):
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :    1.00000
NUMBER OF POINTS:    12
ACTIVITY IN MICROCURIES (YES/NO):
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BEST AVAILABLE COPY

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        PEAK     1
                 ENERGY:      59.536
                 ACTIVITY:    3.687000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D158000
                 DECAY TIME ( 0.000000E-01 MINS.):  1-FEB-92
                 TIME OF SOURCE CALIBRATION:  12:00
                 DECAY TIME:    2.953830E+05 MINS
        EFFICIENCY =  1.495966E-02 (+-  1.457409E-04)

        PEAK     2
                 ENERGY:      88.035
                 ACTIVITY:    2.065000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D462.6
                 DECAY TIME ( 2.953830E+05 MINS.):
        EFFICIENCY =  3.328336E-02 (+-  3.404008E-04)

        PEAK     3
                 ENERGY:     122.061
                 ACTIVITY:    1.881000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D271.8
                 DECAY TIME ( 2.953830E+05 MINS.):
        EFFICIENCY =  3.992001E-02 (+-  4.346472E-04)

        PEAK     4
                 ENERGY:     165.853
                 ACTIVITY:    2.284000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D137.66
                 DECAY TIME ( 2.953830E+05 MINS.):
        EFFICIENCY =  3.869252E-02 (+-  5.240505E-04)

SYSTEM EFFICIENCY COEFFICIENTS, PART 1

LOG(EFF) = -4.252798E+01 + 1.616063E+01*LOG(E) - 1.659189E+00*LOG(E)^2

        PEAK     5
                 ENERGY:     [illegible]
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482

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        HALF-LIFE:  D46.612
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  2.862727E-02 (+-  1.054006E-03)

PEAK    6
        ENERGY:    391.668
        ACTIVITY:   7.301000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D115.09
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  2.205499E-02 (+-  2.154050E-04)

PEAK    7
        ENERGY:    513.990
        ACTIVITY:   1.252100E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D64.84
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  1.812006E-02 (+-  2.663545E-04)

PEAK    8
        ENERGY:    661.650
        ACTIVITY:   8.032000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D11020
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  1.560478E-02 (+-  8.495761E-05)

PEAK    9
        ENERGY:    898.021
        ACTIVITY:   2.014000E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D106.61
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  1.210588E-02 (+-  9.562018E-05)

PEAK   10
        ENERGY:   1173.240
        ACTIVITY:   1.092600E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  1.001542E-02 (+-  5.929491E-05)

PEAK   11
        ENERGY:   1332.500
        ACTIVITY:   1.093200E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  9.134423E-03 (+-  5.595209E-05)

PEAK   12
        ENERGY:   1836.130
        ACTIVITY:   2.135300E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D106.61
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  7.415293E-03 (+-  6.714016E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) =  7.888321E+01 - 5.214094E+01*LOG(E) + 1.252259E+01*LOG(E)^2
            -1.343061E+00*LOG(E)^3 + 5.356648E-02*LOG(E)^4
```

WHC-SD-WM-DP-045
REV 1

BEST AVAILABLE COPY

J. Anderson 11-13-92

```
     EFF
MCA UNIT NUMBER (2):
ADC UNIT NUMBER (1.0):
DETECTOR NUMBER (0-12):
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 24-AUG-92
TIME COLLECT STARTED: 15:03
GEOMETRY NUMBER (0-12): 42
GEOMETRY DESCRIPTION: 22CC LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 142
22CC LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO):
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :   1.00000
NUMBER OF POINTS:    12
ACTIVITY IN MICROCURIES [YES/NO]:

        PEAK     1
                 ENERGY:      59.536
                 ACTIVITY:    3.687000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D158000
                 DECAY TIME ( 0.000000E-01 MINS.):   1-FEB-92
                 TIME OF SOURCE CALIBRATION:  12:00
                 DECAY TIME:    2.953830E+05 MINS
        EFFICIENCY =  1.495966E-02 (+-  1.457409E-04)

        PEAK     2
                 ENERGY:      88.035
                 ACTIVITY:    2.065000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D462.6
                 DECAY TIME ( 2.953830E+05 MINS.):
        EFFICIENCY =  3.328336E-02 (+-  3.404008E-04)

        PEAK     3
                 ENERGY:     122.061
                 ACTIVITY:    1.801000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D271.8
                 DECAY TIME ( 2.953830E+05 MINS.):
        EFFICIENCY =  3.992001E-02 (+-  4.346472E-04)

        PEAK     4
                 ENERGY:     165.853
                 ACTIVITY:    2.284000E+02
                 ACTIVITY ONE SIGMA:    0.000000E-01
                 HALF-LIFE:   D137.66
                 DECAY TIME ( 2.953830E+05 MINS.):
        EFFICIENCY =  3.869252E-02 (+-  5.240505E-04)

SYSTEM EFFICIENCY COEFFICIENTS, PART 1

LOG(EFF) = -4.252798E+01 + 1.616063E+01*LOG(E) - 1.659189E+00*LOG(E)^2

        PEAK     5
                 ENERGY:     276.402
```

Calibration Source ID: 42B47-A

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484

9313090.1413

```
        HALF-LIFE:  D46.612
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  2.862727E-02 (+-  1.054006E-03)

PEAK    6
        ENERGY:    391.668
        ACTIVITY:   7.301000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D115.09
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  2.205499E-02 (+-  2.154050E-04)

PEAK    7
        ENERGY:    513.990
        ACTIVITY:   1.252100E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D64.84
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  1.812006E-02 (+-  2.663545E-04)

PEAK    8
        ENERGY:    661.650
        ACTIVITY:   8.032000E+02
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D11020
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  1.560478E-02 (+-  8.495761E-05)

PEAK    9
        ENERGY:    898.021
        ACTIVITY:   2.014000E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D106.61
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  1.210588E-02 (+-  9.562018E-05)

PEAK   10
        ENERGY:   1173.240
        ACTIVITY:   1.092600E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  1.001542E-02 (+-  5.929491E-05)

PEAK   11
        ENERGY:   1332.500
        ACTIVITY:   1.093200E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D1925.3
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  9.134423E-03 (+-  5.595209E-05)

PEAK   12
        ENERGY:   1836.130
        ACTIVITY:   2.135300E+03
        ACTIVITY ONE SIGMA:   0.000000E-01
        HALF-LIFE:  D106.61
        DECAY TIME ( 2.953830E+05 MINS.):
EFFICIENCY =  7.415293E-03 (+-  6.714016E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) =  7.888321E+01 - 5.214094E+01*LOG(E) + 1.252259E+01*LOG(E)^2
            - 1.343061E+00*LOG(E)^3 + 5.356648E-02*LOG(E)^4
```

WHC-SD-WM-DP-045
REV 1

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UNDIGESTED SAMPLE ANALYSES

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222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. R-3943	Customer ID: SB-76A
Analysis: LA-505-159/Acid Digest	Sample Prep: DIRECT

Instrument: 3R1F044S	Procedure/ Rev: LA-505-159/B-0
Technologist: [redacted] L.H. Stanley	Date: 6-2-93
Starting Time: 0800	Temperature 95°C
Ending Time: 1400	Chemist: B. Griffin II

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R-3942-8500	11		
2	REAGENT BLANK	N/A	12		
3	~~STD~~ SAM	R-3943-8700	13		
4	6-2-93		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	13R110-B	14R110-B	21B48-B	~~[illegible]~~ 100ml 6-2-93

487

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-505-159

DATE START: 6-2-90

PREPARED BY: [signature]

DATE COMPLETE: 6-2-90

	UNITS:		D.F.	g/L					
SPL NAME	SPL ID	ANALYT	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD	R-3942	Acid Digest	100	—					
SAM	R-3943	↓	—	10.35	10.35 g/L				
				BJI					
				6-3-93					

NARRATIVE: [✓] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARATIONS FOR THIS BATCH:

Bertha J. Giffin II.
8-23-93

ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
R 3942.-8500	BECHTOLD-1	5-26-93	13:31	22

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	% RECOVERY	E13975	0

Sample Size	Customer ID
? 1ml in 100ml	STD

Remarks, Calculations, Results:
LMCS CHECK SAMPLE
LMCS ID 13B10-B, 14B10-B, 21B48-B

$\frac{100\,ml}{1\,ml} = DF\ 100$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-2-93	1500	6-3-93 Bertrand Griffin II

54-6800 (R-10-83)

Serial No	Sample Point	Date	Time Issued	Priority
R 3943.-8700	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	G/L	E13975	0

Sample Size	Customer ID
? 1.0351g in 100ml	SB-76A

Remarks, Calculations, Results:
JAR ID#
GRAMS SAMPLE 1.0351g
VOLUME ON COMPLETION 100 ml

$\frac{1.0351\,g}{0.1\,l} = DF\ 10.351\,g/l$ 6-2-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-2-93	1500	Bertrand Griffin II

54-6800 (R-10-83)

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 984

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R-3943	Customer ID: SB-76A
Analysis: Acid Digest	Sample Prep: DIRECT

Instrument: S/N F0C495	Procedure/ Rev: LA-505-159 ~~A-1~~ B-1 6-14-93
Technologist: [redacted]	Date: 6-10-93
Starting Time: 0900	Temperature 95°C
Ending Time: 1400	Chemist: B GRIFFIN

Comments:

	Description	Lab ID		Description	Lab ID
1	STD	R-4034-8500	11		
2	SAM	R-3943-8700	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
LCS ICP-SST	13N103 / .5ml 6/11/93	14N108 / .5ml 6/11/93	21BK83 / .5ml 6/11/93	50ml 6/11/93

490

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

WHC-SD-WM-DP-045
REV 1

METHOD:	DATE START:
IA-505-159	6-10-93
PREPARED BY: 6C922	DATE COMPLETE: 6-10-93

SPL NAME	SPL ID	ANALYT	RESULT #1 (G/U)	RESULT #2 (D/F)	AVERAGE	RPD%	%REC	DET LIM	% CT ER
UNITS:									
STD	L-4034	6-10-93		100					
Sam	P-7443	Acid Dig.	~~5,154~~ 10,3680	62I 6-14-93					

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Bertrand Griffin II
8-23-93

9413001.1162

ACID DIGESTION ANALYSIS

Serial No.	Sample Point	Date	Time Issued	Priority
R 4034.-8500	BECHTOLD-1	6- 9-93	10:12	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	% RECOVERY	KP36A	0

Sample Size	Customer ID
? 0.50mL ea. into 50mL	STD

Remarks, Calculations, Results

LMCS CHECK SAMPLE
LMCS ID 13N10B
14N10B
21B48B

$D.F. = \frac{50mL}{0.50mL} = 100$ D.F.

Bertrand Griffin II

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 6-14-93	
6-10-93	1400	Bertrand Griffin II	

54-8800-061 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
R 3943.-8700	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	G/L	E13975	0

Sample Size	Customer ID
?0.5184g into 50mL	SB-76A

Remarks, Calculations, Results

JAR ID#
GRAMS SAMPLE .5184g

VOLUME ON COMPLETION 50mL

$\frac{.5184g}{.05L} = 10.368$

Bertrand Griffin II

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr 6-14-93	
6-10-93	1400	Bertrand Griffin II	

54-8800-061 (R-10-83)

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WHC-SD-WM-DP-045
REV 1

ACID DIGESTION ANALYSES

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222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R3901-03, R3942-43, R3714-17	Customer ID: BECHTOLD-1 SB-75-1, BECHTOLD-1 SB-76A, 101-AN
Analysis: ICP	Sample Prep: ACID DIGEST

Instrument: WB39939	Procedure/ Rev: LA-505-151/D-0
Technologist: B. J. GOECKE	Date: 6-2-93
Starting Time: 3:15	Temperature N/A
Ending Time: 5:00	Chemist: B. WELS/M. ROBERTS

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS CHECK STD'S	- - - - - -	11		
2	REAGENT BLK	- - - - -	12		
3	BECHTOLD-1, SB-75-1	R3903-8750	13		
4	BECHTOLD-1, SB-76A	R3943-8750	14		
5	101-AN, 101-AN-1	R3715-5750	15		
6	101-AN, 101-AN-2	R3716-5750	16		
7	101-AN, 101-AN-3	R3717-5750	17		
8	REAGENT BLK	- - - - -	18		
9	LMCS CHECK STD'S	- - - - - -	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
ICPSST1	11N10C DIRECT			
ICPSST2	22B48A DIRECT			
ICPSST3	12N10B DIRECT			
				494

A-6000-881 (03/92)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Batch 841

Serial No	Sample Point	Date	Time Issued	Priority
R 3942.-8550	BECHTOLD-1	5-26-93	13:31	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	E13975	0

Sample Size 2100 ? Direct — SST1, SST2 } Undigested — 11 HNO3, 22 HCl, 12 HNO3 — Customer ID: STD

Remarks, Calculations, Results: SST3 / Digested STDs 13 R108, HR108, 21 HCl

1st STD Digested STD
Undigested

Sr 100.28%
Cu 98.92%
Zn 102.72%

Ni 102.62%
Fe 102.72%
Ca 101.30%
Cr 107.04%
Ba 99.40%
Na 98.69%

Cd 103.36%
Pb 109.64%
Mg 102.10%
K 102.08%
Sb 108.00%
Sm 96.0%
Pb 99.8%

→OVER

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

Date	Time Completed	Lab Unit Mgr
6-2-93	5:00	6/7/93

54-6800-06 (R 10-83)

Zr 94.29%
Si 99.21%
Al 98.02%
P 103.03%
S 102.52%
Ti 102.90%
V 101.82%
Be 106.81%
Tl 106.02%

Digested R3942-8550

Zr 902/1000x100 = 90.2%
Sr 998/1000x100 = 99.8%
Si 4236/1000x100 = 423.6%
Al 6101/500x100 = 122.0%
Cu 493/500x100 = 98.6%
Zn 991/1000x100 = 99.1%
Ni 510/500x100 = 102.0%
Fe 525/500x100 = 105.0%
Ca 1542/1000x100 = 154.2%
Cr 520/500x100 = 104.0%
Sm 923/1000x100 = 92.3%
Ba 983/1000x100 = 98.3%
P 1038/1000x100 = 103.8%
S 523/500x100 = 104.6%
Mg 583/500x100 = 116.6%

Na 1535/1000x100 = 153.5%
Pb 941/1000x100 = 94.2%
Ti 500/500x100 = 100.0%
Cd 1014/1000x100 = 101.4%
K 466/500x100 = 93.2%
Mn 491/500x100 = 98.2%
Sb 1005/1000x100 = 100.5%
V 996/1000x100 = 99.6%
Be 1014/1000x100 = 101.4%
Tl 388/500x100 = 77.6%

JK 6-11-93

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INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3943.-8750	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP-LIQ	LA-505-151	uG/~~ML~~G	E13975	0

Sample Size	Customer ID
? 10.35 g/l	SB-76A

Remarks, Calculations, Results

ZR 1.75E2/10.351=1.69E1 g/l
SR 7.74E1/10.351=7.48
Si 2.871E3/10.351=2.77E2
AL 3.7239E4/10.351=3.60E3
CU 9.73E2/10.351=9.40E1
ZN 1.653E3/10.351=1.60E2
Ni 1.90E2/10.351=1.83E1
Fe 1.20678E5/10.351=1.17E4
CA 6.803E3/10.351=6.57E2
CR 3.81E4/10.351=3.68E1

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
		Reload		6/4/93
Date	Time Completed	Lab Unit Mgr		
6-2-93	5:00			

54-6800-061 (R 10-83)

SM 5.68E2/10.351=5.49E1
BA 2.80E2/10.351=2.71E1
P 1.369E3/10.351=1.32E2
S 2.051E3/10.351=1.98E2
MG 2.240E3/10.351=2.16E2
NA 3.85E2/10.351=3.72E1
Pb 4.53E2/10.351=4.38E1
Ti 2.54E2/10.351=2.45E1
Cd 5.24E2/10.351=5.06E1
K ~~9.76E2~~ 9.77 6/4/93 /10.351=9.43E1
MN 2.699E3/10.351=2.61E2
SB 3.38E2/10.351=3.26E1
V 4.01E2/10.351=3.87E1
BE 5.71E1/10.351=5.52
TL 3.21E2/10.351=3.10E1
R3943-8750

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INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3943.-8850	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP-LIQ	LA-505-151	uG/ML	E13975	0

Sample Size	Customer ID
?	SB-76A

Remarks, Calculations, Results:

DUPLICATE SAMPLE
NO DUP DIGESTED

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs
				6/10/93

Date	Time Completed	Lab Unit Mgr
6-2-93	:	

54-6800-061 (R 10-83)

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Identity 1: SST1 Identity 2: Quality Control 3:28 PM June 2, 1993

WHC-SD-WM-DP-045
REV 1

Task name : ALL_SIM

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-3.913	10028.789	30.347	26.492	4877.724	-36.471	-126.974	-47.240
S.D.	1.958	76.197	19.818	12.591	22.719	6.337	12.137	10.729
% R.S.D.	50.033	0.760	65.304	47.530	0.466	17.375	9.559	22.713

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	10274.119	4946.889	9935.534	10272.790	5181.033	-5.554	0.319	5136.690
S.D.	79.199	43.807	98.950	88.288	19.096	3.269	0.318	52.722
% R.S.D.	0.771	0.886	0.996	0.859	0.369	58.862	99.571	1.026

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	10129.552	5352.838	-45.511	553.350	-28.626	46.334	9940.301	-12.095
S.D.	90.143	53.318	23.259	43.641	10.173	16.462	78.632	25.293
% R.S.D.	0.890	0.996	51.107	7.887	35.536	35.529	0.791	209.117

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	101.587	5105.368	-23.022	9868.651	-7.350	-461.981	2.106	-45.277
S.D.	16.700	40.742	10.451	92.668	1.025	33.459	1.181	29.513
% R.S.D.	16.439	0.798	45.396	0.939	13.945	7.242	56.060	65.183

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-0.842	10335.978	5481.917	5103.609	4945.103	5400.469	1.680	1.089
S.D.	0.515	79.592	61.671	49.534	42.740	91.237	1.770	0.210
% R.S.D.	61.109	0.770	1.125	0.971	0.864	1.689	105.374	19.243

	Tl (ppb)
Mean	92.809
S.D.	16.786
% R.S.D.	18.086

Identity 1: SST2 Identity 2: Quality Control 3:32 PM June 2, 1993

Task name : ALL_SIM

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-62.289	0.290	5033.446	12.974	-1.011	-69.356	220.445	-11.238
S.D.	4.414	0.465	42.379	8.004	6.977	7.477	19.939	16.952
% R.S.D.	7.086	160.148	0.842	61.695	689.953	10.780	9.045	150.851

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	-3.014	12.712	2.736	25.198	2.517	5049.681	5010.661	3.705
S.D.	1.179	2.218	1.404	2.238	3.139	33.255	37.882	1.332
% R.S.D.	39.103	17.451	51.316	8.882	124.679	0.659	0.756	35.948

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-45.312	4.141	5291.996	3395.257	5160.462	4800.824	2.891	73.729
S.D.	0.209	6.360	25.068	246.994	36.063	39.097	1.019	12.235
% R.S.D.	0.461	153.587	0.474	7.275	0.699	0.814	35.257	16.595

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	-38.159	2.109	-28.453	16.590	0.271	-22.537	4770.913	4992.943
S.D.	19.391	0.159	10.083	17.375	3.948	14.485	28.500	38.872
% R.S.D.	50.816	7.531	35.438	104.735	1457.868	64.271	0.597	0.779

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-3.312	2.829	2.581	24.032	-1.983	254.502	32.697	0.605
S.D.	1.878	2.720	6.102	20.162	0.074	38.785	4.635	0.000
% R.S.D.	56.699	96.122	236.444	83.900	3.738	15.240	14.174	0.000

	Tl (ppb)
Mean	117.144
S.D.	79.967
% R.S.D.	68.264

Identity 1: SST3 Identity 2: Quality Control 3:34 PM June 2, 1993

WHC-SD-WM-DP-045
REV 1

Task name : ALL_SIM

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	9429.500	0.549	-1692.045	9788.843	5.646	9921.048	4751.439	10537.606
S.D.	71.026	0.322	17.264	123.490	13.344	46.363	74.787	104.830
% R.S.D.	0.753	58.749	1.020	1.262	236.333	0.467	1.574	0.995

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	-17.538	2.453	21.348	218.342	-14.036	-1.636	-5.266	5.999
S.D.	2.188	1.398	0.651	23.607	7.511	8.647	0.399	4.234
% R.S.D.	12.477	56.992	3.049	10.812	53.514	528.592	7.586	70.584

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-77.255	-6.813	-69.193	268.254	-52.387	-91.478	-0.543	10303.451
S.D.	0.880	3.655	7.344	163.664	26.828	14.404	0.354	348.425
% R.S.D.	1.139	53.646	10.614	61.011	51.211	15.746	65.184	3.382

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	5126.134	18.061	4947.276	174.596	10555.400	4982.040	83.607	-198.518
S.D.	89.527	0.794	34.558	6.289	98.034	54.954	15.057	16.136
% R.S.D.	1.746	4.396	0.699	3.602	0.929	1.103	18.010	8.128

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	5144.924	-5.731	-5.530	-66.164	1.212	365.584	10182.053	10680.970
S.D.	44.666	1.342	3.754	23.796	0.561	73.118	81.890	109.840
% R.S.D.	0.868	23.416	67.885	35.964	46.282	20.000	0.804	1.028

	Tl (ppb)
Mean	5300.590
S.D.	48.889
% R.S.D.	0.922

Identity 1: HNO3 reag blk Identity 2: direct 3:37 PM June 2, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-5.091	-0.678	-10.100	-5.096	-1.673	1.527	-20.620	-43.018
S.D.	8.686	0.802	20.305	13.391	9.121	23.509	55.107	8.186
% R.S.D.	170.639	118.308	201.044	262.785	545.052	1539.762	267.249	19.030

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	-7.682	-4.085	-2.268	-12.897	-3.001	0.124	-2.803	0.706
S.D.	3.120	3.180	2.004	0.668	0.533	3.280	1.368	6.240
% R.S.D.	40.617	77.863	88.364	5.181	17.742	2654.270	48.806	883.817

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-72.529	-11.814	-32.749	-473.900	-76.734	-9.504	-2.414	52.715
S.D.	0.112	7.158	28.934	482.091	89.355	116.602	1.747	32.149
% R.S.D.	0.154	60.589	88.353	101.728	116.448	1226.917	72.372	60.987

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	-33.518	-1.100	2.355	-32.667	-2.366	20.050	0.638	7.730
S.D.	16.322	0.159	16.010	34.918	1.258	29.271	3.793	28.290
% R.S.D.	48.697	14.434	679.773	106.893	53.185	145.990	593.989	365.983

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-2.582	2.071	-4.055	-61.765	-0.849	157.206	-0.650	0.363
S.D.	2.674	1.626	0.277	157.474	0.257	107.785	8.017	0.419
% R.S.D.	103.534	78.480	6.818	254.958	30.274	68.563	1232.990	115.434

	Tl (ppb)
Mean	-27.070
S.D.	159.202
% R.S.D.	588.108

Identity 1: R3942 bechtold-1 Identity 2: dig std 3:54 PM June 2, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	902.106	997.982	844.418	888.378	497.149	4235.871	610.434	973.364
S.D.	5.996	10.148	14.099	3.557	2.469	33.427	4.850	6.589
% R.S.D.	0.665	1.017	1.670	0.400	0.497	0.789	0.795	0.677

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	1020.908	493.101	987.048	990.639	509.757	996.912	976.641	525.225
S.D.	8.723	5.365	11.030	13.589	3.366	11.593	12.337	5.725
% R.S.D.	0.854	1.088	1.118	1.372	0.660	1.163	1.263	1.090

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	1542.443	519.577	999.315	562.400	1015.936	923.099	982.605	1037.917
S.D.	18.095	4.163	6.740	135.986	36.780	19.629	10.502	78.146
% R.S.D.	1.173	0.801	0.674	24.180	3.620	2.126	1.069	7.529

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	523.479	582.808	497.218	1535.335	1037.581	462.682	73.166	941.500
S.D.	14.082	5.089	23.251	17.096	16.640	33.027	1.513	34.304
% R.S.D.	2.690	0.873	4.676	1.114	1.604	7.138	2.069	3.643

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	499.879	1014.311	806.490	466.212	490.714	1004.891	995.587	1014.428
S.D.	3.629	13.197	12.404	43.943	6.171	141.230	8.839	8.917
% R.S.D.	0.726	1.301	1.538	9.426	1.258	14.054	0.888	0.879

	Tl (ppb)
Mean	387.825
S.D.	64.173
% R.S.D.	16.547

Identity 1: R3943 bechtold-1 Identity 2: sample 3:57 PM June 2, 1993
Task name : ALL_SIM
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	174.816	77.431	-114.647	-22.392	-40.578	2870.524	37239.420	-57.206
S.D.	2.612	0.505	40.310	6.022	10.112	11.167	211.546	4.599
% R.S.D.	1.494	0.653	35.160	26.895	24.920	0.389	0.568	8.040

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	27.442	973.308	15.480	1653.381	189.747	-356.176	-7.837	120677.882
S.D.	3.778	7.144	0.286	10.463	2.382	3.271	0.491	652.538
% R.S.D.	13.767	0.734	1.846	0.633	1.256	0.918	6.269	0.541

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	6803.176	381.355	55.322	81004.673	-99.385	567.878	280.277	1369.004
S.D.	34.032	8.946	10.694	381.419	13.915	23.731	1.755	50.585
% R.S.D.	0.500	2.346	19.331	0.471	14.001	4.179	0.626	3.695

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	2050.890	2240.010	38.291	384.931	5.235	12.273	-13.360	452.771
S.D.	22.265	13.049	16.981	3.351	2.207	32.859	1.099	19.113
% R.S.D.	1.086	0.583	44.349	0.871	42.160	267.728	8.224	4.221

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	253.926	524.082	-106.641	976.590	2698.970	338.064	401.092	57.131
S.D.	1.179	5.389	1.994	28.767	19.550	107.909	4.776	0.210
% R.S.D.	0.464	1.028	1.870	2.946	0.724	31.920	1.191	0.367

	Tl (ppb)
Mean	321.076
S.D.	37.881
% R.S.D.	11.798

Identity 1: HNO3 reag blk Identity 2: direct 4:34 PM June 2, 1993

ask name : ALL_SIM

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-3.337	-0.339	19.149	-28.836	-1.256	-10.366	-28.879	-30.995
S.D.	0.803	0.112	6.442	15.128	6.787	2.674	10.175	10.370
% R.S.D.	24.065	32.992	33.640	52.461	540.455	25.794	35.232	33.458

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	5.194	-2.269	-1.404	-12.857	-0.934	3.800	-1.577	-8.997
S.D.	1.359	1.398	1.155	0.642	1.802	3.271	0.224	3.190
% R.S.D.	26.167	61.610	82.252	4.993	192.904	86.080	14.185	35.458

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-72.664	-11.313	-1.424	-238.583	-31.130	-39.204	-1.453	16.261
S.D.	0.113	3.146	18.375	64.158	22.719	13.493	0.491	48.601
% R.S.D.	0.155	27.807	1290.792	26.891	72.981	34.418	33.776	298.884

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	-22.433	-1.100	-17.059	1105.222	1.390	89.144	-7.105	-17.689
S.D.	4.819	0.159	21.011	22.211	4.802	18.254	1.533	13.971
% R.S.D.	21.480	14.434	123.164	2.010	345.541	20.477	21.581	78.982

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-3.088	-2.514	-5.807	365.017	-1.064	110.959	1.206	0.484
S.D.	0.583	2.003	2.148	33.867	0.324	115.622	2.655	0.210
% R.S.D.	18.896	79.688	36.988	9.278	30.435	104.202	220.108	43.291

	Tl (ppb)
Mean	-150.480
S.D.	5.529
% R.S.D.	3.674

Identity 1: SST1 Identity 2: Quality Control 4:36 PM June 2, 1993

WHC-SD-WM-DP-045
REV 1

Task name : ALL_SIM

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-11.681	9980.869	-61.008	-25.943	4926.512	-55.643	-150.189	-35.323
S.D.	3.588	73.033	15.216	14.403	30.706	6.272	1.490	18.484
% R.S.D.	30.718	0.732	24.941	55.517	0.623	11.271	0.992	52.330

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	10293.425	4939.898	9834.158	10247.879	5192.776	3.885	-0.038	5187.677
S.D.	76.183	33.103	108.611	60.125	13.668	3.256	0.691	21.558
% R.S.D.	0.740	0.670	1.104	0.587	0.263	83.816	1841.621	0.416

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	10134.129	5358.671	-49.940	295.406	-70.026	59.402	9895.389	56.757
S.D.	74.301	38.845	13.342	118.612	26.544	33.999	72.559	18.560
% R.S.D.	0.733	0.725	26.716	40.152	37.906	57.236	0.733	32.700

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	37.043	5117.653	-5.168	10165.245	-10.432	-425.697	-5.469	-15.645
S.D.	16.151	32.998	16.758	93.542	3.357	86.221	0.017	8.826
% R.S.D.	43.601	0.645	324.255	0.920	32.180	20.254	0.314	56.416

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-5.502	10440.606	5541.090	5138.807	4985.307	5175.394	4.098	0.726
S.D.	0.515	59.065	28.108	51.263	30.661	36.181	1.734	0.210
% R.S.D.	9.352	0.566	0.507	0.998	0.615	0.699	42.315	28.863

	Tl (ppb)
Mean	15.928
S.D.	68.315
% R.S.D.	428.895

Identity 1: SST2 Identity 2: Quality Control 4:39 PM June 2, 1993

Task name : ALL_SIM

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	-65.269	1.242	4970.976	2.023	-2.501	-72.658	258.331	-12.002
S.D.	0.526	0.422	66.630	12.931	13.821	1.306	11.380	10.601
% R.S.D.	0.805	33.965	1.340	639.242	552.695	1.797	4.405	88.321

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	-0.730	14.074	2.592	55.164	3.159	5056.639	4948.411	-1.764
S.D.	3.673	0.416	0.919	3.511	1.592	20.099	15.097	9.935
% R.S.D.	503.129	2.956	35.437	6.364	50.395	0.397	0.305	563.223

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-43.095	10.506	5181.714	3173.516	5209.434	4851.909	3.507	29.369
S.D.	0.529	5.409	17.779	69.667	44.813	20.577	0.524	39.022
% R.S.D.	1.226	51.485	0.343	2.195	0.860	0.424	14.949	132.865

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	-22.813	3.576	-32.738	623.973	-7.877	90.047	4832.566	5087.971
S.D.	8.966	0.420	2.472	5.093	3.301	55.971	23.462	36.729
% R.S.D.	39.302	11.750	7.550	0.816	41.900	62.158	0.486	0.722

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	-5.333	4.013	-0.277	178.025	-1.084	285.853	37.879	1.453
S.D.	0.351	1.058	0.845	43.277	0.999	62.295	3.917	0.210
% R.S.D.	6.574	26.372	305.502	24.310	92.093	21.793	10.340	14.433

	Tl (ppb)
Mean	112.583
S.D.	60.284
% R.S.D.	53.546

Identity 1: SST3 Identity 2: Quality Control 4:41 PM June 2, 1993

Task name : ALL_SIM

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Ta (ppb)	Sn (ppb)	Si (ppb)	Al (ppb)	W (ppb)
Mean	9255.104	-0.387	-1742.261	9592.626	-15.115	9602.769	4657.011	10409.255
S.D.	66.967	0.239	51.766	26.177	13.011	35.095	18.213	68.312
% R.S.D.	0.724	61.662	2.971	0.273	86.082	0.365	0.391	0.656

	Co (ppb)	Cu (ppb)	Li (ppb)	Zn (ppb)	Ni (ppb)	La (ppb)	Eu (ppb)	Fe (ppb)
Mean	-18.372	-1.996	17.784	151.939	-10.216	-22.263	-6.617	5.822
S.D.	5.047	1.344	0.944	1.942	2.286	6.584	0.423	4.501
% R.S.D.	27.472	67.305	5.306	1.278	22.378	29.575	6.394	77.313

	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)
Mean	-79.949	-8.549	-104.404	-102.823	-145.486	-35.640	-3.074	10396.607
S.D.	0.311	2.931	22.480	105.451	21.965	31.139	0.606	50.586
% R.S.D.	0.389	34.286	21.531	102.555	15.098	87.370	19.718	0.487

	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)
Mean	4987.817	15.311	4966.890	424.959	10374.156	4807.542	29.678	-206.588
S.D.	27.002	0.159	28.110	16.764	70.004	27.715	5.661	40.405
% R.S.D.	0.541	1.037	0.566	3.945	0.675	0.576	19.075	19.558

	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)
Mean	5041.344	-12.313	-6.083	-2.367	0.099	217.929	10027.325	10533.061
S.D.	33.724	1.248	0.319	49.972	0.856	107.416	70.945	77.367
% R.S.D.	0.669	10.137	5.249	2110.975	866.007	49.289	0.708	0.735

	Tl (ppb)
Mean	5293.863
S.D.	40.070
% R.S.D.	0.757

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R3943	Customer ID: Bechtold SB-76a
Analysis: ICP	Sample Prep: Acid Digest

Instrument: WB39939	Procedure/ Rev: LA-505-151/D-0
Technologist: TA FRAZIER	Date: 6/11/93
Starting Time: 10:15am	Temperature N/A
Ending Time: 11:25am	Chemist: B. Wels/M. Roberts

Comments:

	Description	Lab ID		Description	Lab ID
1	DIGESTED STDS	R4034-8550	11		
2	Reagent Blank	—	12		
3	Bechtold SAMP	R3943-8755	13		
4	Reag Blank	—	14		
5	Ending LMCS STDS	—	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
ICPSST1	15N10B DIRECT			
ICPSST2	22B48B DIRECT			
ICPSST3	16N10A DIRECT			
				505

A-6000-881 (03/92)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Batch 984

Serial No.	Sample Point	Date	Time Issued	Priority
R 4034.-8550	BECHTOLD-1	6- 9-93	10:12	26

Determination	Method-Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	KP36A	0

Sample Size	Customer ID
? Direct Undigested 15N08 ~~22B48B~~ 22B48B 6/14/93	STD

Remarks, Calculations, Results

1st STD Digested STD
DIGESTED ~~1ml 100ml 1ml-50ml~~
13N10B, 14N10B, 21B48B 6/14/93

Zr 1970/2000x100 = 98.50%
Sr 2001/2000x100 = 100.05%
Si 8385/2000x100 = 419.25%
Al 1332/1000x100 = 133.2%
Li 1973/2000x100 = 98.65%
Ni 1033/1000x100 = 103.3%
:Over

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs		
				6/14/93
Date	Time Completed	Lab Unit Mgr		
6/11/93	11:25 am			

54-6600-06 (TPA 10/83)

R4034-8550

Fe 1092/1000x100 = 109.2%
Ca 2353/2000x100 = 117.65%
Cr 1014/1000x100 = 101.4%
Sm 1742/2000x100 = 87.10%
Ba 1986/2000x100 = 99.30%
P 2030/2000x100 = 101.50%
S 1050/1000x100 = 105.0%
Mg 1030/1000x100 = 103.0%
As 1043/1000x100 = 104.3%
Na 2590/2000x100 = 129.50%
Mo 2006/2000x100 = 100.3%

Pb 1952/2000x100 = 97.60%
Ti 984/1000x100 = 98.40%
Cd 1968/2000x100 = 98.40%
K 963/1000x100 = 96.30%
Mn 1001/1000x100 = 100.1%
Sb 1066/1000x100 = 106.6%
Be 2015/2000x100 = 100.75%

Undigested			
Sr 9.856	98.56%	~~Sm~~ 5.00	100.0%
Li 9.807	98.07%	Pb 4.94	98.8%
Ni 5.021	104.2%	Zr 9.808	98.08%
Fe 4.835	96.70%	Si 10.819	108.19%
Ca 9.654	96.54%	Al 4.778	95.56%
Cr 4.974	99.48%	P 11.15	111.50%
Ba 9.820	98.20%	S 5.048	100.96
Mg 4.913	98.26%	As 4.952	99.04%
Na 9.814	98.14%	Mo 9.934	99.34%
Cd 9.832	98.32%	Ti 9.916	98.32%
K 4.929	98.58%	Be 10.15	101.5%
Mn 4.942	98.84%		
Sb 4.751	95.02%		

BEST AVAILABLE COPY

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No.	Sample Point	Date	Time Issued	Priority
R 3943.-8755	BECHTOLD-1	5-26-93	13:44	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP-SOL	LA-505-151	uG/G Rec	E13975	1

Sample Size	Customer ID
? 10.368g/l	SB-76A

Remarks, Calculations, Results

Zr 190/10.368= 1.83E 1 ug/g
Sr 82.7/10.368=7.98
Si 4280/10.368= 4.13E2
Al 39685/10.368=3.83E3
Li 21.4/10.368=2.06
Ni 236/10.368=2.28E1
Fe 125930E5/10.368=1.21E4
Ca 8490/10.368=8.19E2
Cr 412/10.368=3.97E1
Sm 137/10.368=1.32E1

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs 6/11/93

Date	Time Completed	Lab Unit Mgr
6/11/93	11:25am	

54-6800-061 (8-10-83)

R 3943-8755

Be 293/10.368=2.83E1
P 1832/10.368=1.77E2
S 2147/10.368=2.07E2
Mg 2244/10.368=2.16E2
As 35.3/10.368=3.40
Na 421/10.368=4.06E1
Mo 20.6/10.368=1.99
Pb 520/10.368=5.01E1
Ti 213/10.368=2.05E1
Cd 532/10.368=5.13E1
K 1154/10.368=1.11E2
Mn 2957/10.368=2.85E2
Sb 334/10.368=3.22E1
Be 56.1/10.368=5.41

BEST AVAILABLE COPY

Identity 1: SST1 Identity 2: Quality Control 10:13 AM June 11, 1993
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	-23.730	9856.543	-689.831	-20.026	-152.954	9806.733	5021.567	-4.564
S.D.	0.747	10.431	20.777	2.495	9.824	9.908	8.976	2.652
% R.S.D.	3.148	0.106	3.012	12.461	6.423	0.101	0.179	58.103

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	4834.782	9654.071	4974.401	77.467	455.326	115.562	-869.208	9820.364
S.D.	10.243	5.543	8.067	14.173	23.307	7.069	9.683	8.407
% R.S.D.	0.212	0.057	0.162	18.295	5.119	6.117	1.114	0.086

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	-14.859	131.200	4913.065	22.869	9813.664	3.760	1313.927	2.954
S.D.	10.092	4.502	4.444	5.616	10.812	0.946	8.571	0.852
% R.S.D.	67.920	3.431	0.090	24.557	0.110	25.156	0.652	28.849

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	-2.034	-1.058	9831.710	4909.640	4928.599	4941.880	4751.438	1.055
S.D.	9.559	0.264	11.333	4.452	36.965	7.085	61.781	0.152
% R.S.D.	470.068	24.941	0.115	0.091	0.750	0.143	1.300	14.434

	Tl (ppb)
Mean	-59.157
S.D.	23.008
% R.S.D.	38.893

Teresa L. Frazier
6/11/93
K3943

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 511 TO 520.

Identity 1: SST2 Identity 2: Quality Control 10:16 AM June 11, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	5.458	0.558	4239.074	20.315	334.940	4.232	8.974	5034.007
S.D.	1.743	0.170	60.917	4.011	4.385	0.116	2.352	23.118
% R.S.D.	31.938	30.463	1.437	19.744	1.309	2.749	26.204	0.459

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	8.794	71.647	-4.199	4876.959	3056.654	5070.112	4998.816	-1.748
S.D.	4.584	0.337	0.197	19.171	80.998	12.978	16.114	0.366
% R.S.D.	52.128	0.470	4.682	0.393	2.650	0.256	0.322	20.964

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	32.237	25.595	2.656	93.812	2.182	7.171	17.524	4735.193
S.D.	23.306	9.447	0.190	7.571	8.008	1.388	21.024	16.684
% R.S.D.	72.297	36.910	7.143	8.070	367.085	19.359	119.977	0.352

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	4939.531	-2.156	6.956	0.391	-15.823	0.059	-7.574	2.900
S.D.	32.667	0.457	0.716	3.402	50.341	0.370	35.094	0.304
% R.S.D.	0.661	21.193	10.286	870.541	318.153	624.087	463.347	10.497

	Tl (ppb)
Mean	70.490
S.D.	26.490
% R.S.D.	37.580

Identity 1: SST3 Identity 2: Quality Control 10:19 AM June 11, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	9808.480	0.831	34.201	10819.525	4778.211	1.814	77.627	-15.281
S.D.	19.755	0.163	8.937	41.427	39.409	1.049	1.991	0.000
% R.S.D.	0.201	19.672	26.132	0.383	0.825	57.809	2.564	0.000

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	14.974	-12.460	15.095	-82.799	1813.839	1.673	-169.163	0.228
S.D.	1.985	0.093	1.196	25.974	80.998	12.978	12.110	0.281
% R.S.D.	13.257	0.749	7.921	31.370	4.466	775.774	7.159	123.322

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	11153.519	5048.136	3.920	4952.569	25.321	9934.304	3632.116	206.778
S.D.	111.164	7.822	0.110	27.995	13.264	34.248	28.561	15.802
% R.S.D.	0.997	0.155	2.794	0.565	52.383	0.345	0.786	7.642

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	-112.066	4916.361	-4.243	2.178	25.611	4.502	264.838	10152.978
S.D.	28.548	11.934	0.391	2.509	40.290	0.224	70.724	29.152
% R.S.D.	25.475	0.243	9.205	115.220	157.319	4.967	26.704	0.287

	Tl (ppb)
Mean	4891.772
S.D.	15.294
% R.S.D.	0.313

Identity 1: hno3 blank Identity 2: direct 10:23 AM June 11, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	-3.744	0.191	26.054	-13.303	-18.402	2.351	2.297	-15.281
S.D.	1.245	0.357	7.913	5.778	7.721	0.648	4.661	4.593
% R.S.D.	33.260	187.219	30.372	43.434	41.958	27.548	202.966	30.057

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	-1.545	-0.329	3.178	365.396	-85.840	-1.469	25.990	-0.418
S.D.	5.171	0.247	5.861	608.852	51.309	15.689	10.854	0.302
% R.S.D.	334.677	75.130	184.412	166.628	59.773	1068.087	41.761	72.157

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	-51.862	10.457	0.126	-9.744	-7.225	7.346	7.037	3.250
S.D.	11.653	6.336	0.110	6.716	4.800	0.660	10.090	0.615
% R.S.D.	22.469	60.590	86.602	68.923	66.438	8.988	143.383	18.913

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	-3.598	-0.762	7.238	4.747	-11.877	-0.059	71.196	1.055
S.D.	2.390	0.581	1.566	2.855	3.417	0.235	63.501	0.304
% R.S.D.	66.419	76.212	21.630	60.140	28.773	397.126	89.192	28.867

	Tl (ppb)
Mean	-16.617
S.D.	7.017
% R.S.D.	42.231

Identity 1: R4034 bechtold-1 Identity 2: direct 10:26 AM June 11, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	1969.859	2001.043	1545.815	8385.362	1332.075	1972.731	1033.348	2017.907
S.D.	7.672	7.122	18.333	28.698	9.949	5.613	1.855	9.561
% R.S.D.	0.389	0.356	1.186	0.342	0.747	0.285	0.179	0.474

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	1092.526	2352.887	1014.425	1899.855	1813.839	2087.014	1742.085	1985.750
S.D.	8.265	8.101	4.257	10.759	57.456	15.149	6.759	7.318
% R.S.D.	0.756	0.344	0.420	0.566	3.168	0.726	0.388	0.369

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	2030.435	1049.926	1030.502	1042.633	2590.408	2006.205	1017.681	1950.944
S.D.	50.795	4.955	3.728	6.299	9.600	3.414	37.376	5.927
% R.S.D.	2.502	0.472	0.362	0.604	0.371	0.170	3.673	0.304

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	1951.960	984.386	1968.109	1298.065	962.802	1001.474	1065.665	2015.232
S.D.	5.494	4.414	8.230	2.418	42.683	3.915	56.499	8.525
% R.S.D.	0.281	0.448	0.418	0.186	4.433	0.391	5.302	0.423

	Tl (ppb)
Mean	994.232
S.D.	21.912
% R.S.D.	2.204

Identity 1: R3943 bechtold-1 Identity 2: .5184-100ml 10:30 AM June 11, 1993

WHC-SD-WM-DP-045
REV 1

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	189.792	82.704	-53.791	4280.159	39685.156	21.426	236.010	-27.529
S.D.	2.402	0.178	18.023	6.457	125.332	0.000	7.844	9.561
% R.S.D.	1.265	0.215	33.505	0.151	0.316	0.000	3.324	34.731

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	125929.552	8489.621	411.536	232.487	85817.720	-406.756	136.995	293.220
S.D.	375.126	31.908	6.947	8.264	278.191	4.905	4.102	0.889
% R.S.D.	0.298	0.376	1.688	3.555	0.324	1.206	2.995	0.303

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	1831.960	2146.704	2244.495	35.310	420.572	20.638	199.728	1.281
S.D.	36.387	34.976	7.785	6.080	2.281	3.280	13.092	0.902
% R.S.D.	1.986	1.629	0.347	17.219	0.542	15.894	6.555	70.399

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	520.492	213.401	532.159	-59.919	1154.186	2956.556	333.762	56.074
S.D.	18.795	1.097	3.157	1.956	18.083	11.579	15.159	0.457
% R.S.D.	3.611	0.514	0.593	3.265	1.567	0.392	4.542	0.814

	Tl (ppb)
Mean	206.216
S.D.	34.557
% R.S.D.	16.758

Identity 1: hno3 blank Identity 2: direct 10:34 AM June 11, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	-2.306	-0.259	18.178	-10.181	-3.410	1.277	4.801	-12.219
S.D.	2.376	0.094	17.518	0.416	10.538	0.201	1.819	2.652
% R.S.D.	103.021	36.464	96.372	4.085	309.068	15.784	37.894	21.702

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	0.713	0.534	7.037	-23.215	-52.251	-34.457	2.715	-0.399
S.D.	4.018	0.093	2.215	5.769	84.532	8.921	15.271	0.366
% R.S.D.	563.488	17.495	31.481	24.851	161.782	25.890	562.442	91.844

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	89.424	-27.388	0.126	-2.347	-32.998	2.623	70.612	-0.687
S.D.	29.133	12.057	0.290	8.793	6.360	0.151	13.950	1.181
% R.S.D.	32.578	44.022	229.128	374.604	19.275	5.774	19.755	171.891

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	30.820	-0.931	3.061	4.132	-61.203	-0.059	-19.608	0.000
S.D.	10.988	0.264	2.470	1.773	29.596	0.320	25.634	0.403
% R.S.D.	35.653	28.336	80.678	42.905	48.356	541.191	130.729	9502383.418

	Tl (ppb)
Mean	11.744
S.D.	40.464
% R.S.D.	344.561

Identity 1: SST1 Identity 2: Quality Control 10:35 AM June 11, 1993
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	-22.580	10014.869	-729.753	-9.221	-135.802	9886.895	5090.359	-15.281
S.D.	2.214	3.015	16.302	2.161	7.083	13.838	7.410	0.000
% R.S.D.	9.803	0.030	2.234	23.438	5.216	0.140	0.146	0.000

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	4910.486	9794.735	5044.655	97.578	511.309	95.926	-886.217	9977.549
S.D.	19.196	4.853	14.806	5.563	23.307	6.802	6.759	4.942
% R.S.D.	0.391	0.050	0.294	5.701	4.558	7.091	0.763	0.050

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	65.877	127.956	4980.340	25.895	9884.023	3.760	1306.717	3.742
S.D.	36.387	12.900	2.081	9.934	9.683	1.144	46.377	0.295
% R.S.D.	55.235	10.082	0.042	38.363	0.098	30.412	3.549	7.891

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	31.341	-1.945	9988.971	4948.953	4952.276	5005.709	5762.318	0.879
S.D.	15.355	0.480	10.538	1.956	17.757	4.932	1264.279	0.152
% R.S.D.	48.993	24.670	0.105	0.040	0.359	0.099	21.940	17.320

	Tl (ppb)
Mean	-85.492
S.D.	7.017
% R.S.D.	8.208

Identity 1: SST2 Identity 2: Quality Control 10:37 AM June 11, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	6.896	1.403	4294.748	32.081	322.616	2.989	3.270	5050.848
S.D.	3.019	0.522	85.176	2.201	3.676	0.895	3.878	16.560
% R.S.D.	43.785	37.186	1.983	6.860	1.139	29.956	118.571	0.328

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	14.499	73.588	1.022	4948.535	3187.281	5050.476	5030.148	-0.798
S.D.	0.206	0.187	1.228	39.112	84.036	20.587	10.167	0.685
% R.S.D.	1.420	0.254	120.129	0.790	2.637	0.408	0.202	85.813

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	72.605	21.270	2.909	111.296	-8.353	9.969	70.612	4920.612
S.D.	42.016	2.497	0.290	1.541	5.709	2.366	14.888	9.248
% R.S.D.	57.870	11.740	9.962	1.384	68.345	23.733	21.084	0.188

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	4926.494	-1.015	8.006	7.204	39.422	1.214	90.888	2.373
S.D.	18.533	0.552	2.036	1.942	23.676	0.224	91.212	0.152
% R.S.D.	0.376	54.398	25.426	26.954	60.059	18.414	100.356	6.415

	Tl (ppb)
Mean	121.134
S.D.	28.720
% R.S.D.	23.709

Identity 1: SST3 Identity 2: Quality Control 10:40 AM June 11, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	9842.126	0.858	46.694	10601.250	4722.433	2.989	77.280	-22.936
S.D.	30.211	0.094	19.320	19.742	18.940	0.462	0.790	2.652
% R.S.D.	0.307	10.997	41.377	0.186	0.401	15.445	1.022	11.562

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	21.035	-12.514	13.393	-76.429	2097.485	15.025	-145.888	0.627
S.D.	0.357	0.000	1.196	27.774	62.340	15.689	17.474	0.348
% R.S.D.	1.695	0.000	8.928	36.340	2.972	104.418	11.977	55.546

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	11059.328	5012.815	4.047	4897.093	10.459	9884.283	3584.271	204.219
S.D.	284.071	73.979	0.110	11.603	8.352	62.043	36.539	14.172
% R.S.D.	2.569	1.476	2.706	0.237	79.854	0.628	1.019	6.940

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	-116.760	4916.277	-2.211	0.447	49.287	4.087	175.128	10151.045
S.D.	15.408	18.294	1.124	1.431	18.083	0.051	48.385	39.467
% R.S.D.	13.196	0.372	50.827	320.492	36.689	1.255	27.628	0.389

	Tl (ppb)
Mean	4895.823
S.D.	6.077
% R.S.D.	0.124

WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

Batch 8984

Lab Segment Serial No. R3943	Customer ID: SB-16a
Analysis: AT	Sample Prep: acid digestion

Instrument:	WB 27809	Procedure/ Rev:	LA-508-101 (0-0)
Technologist:	SUE LAI (Sue Lai)	Date:	6-11-93
Starting Time:	08:50	Temperature	25°C
Ending Time:	10:10	Chemist:	S. Cathow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R4035-8525	11		
2	REAGENT BLANK		12		
3	Sample	R3943-8725	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	6EB51 (10ml)			

521

A-6000-081 (03/93)

TOTAL ALPHA ANALYSIS - ACID DIGESTION

182

Serial No	Sample Point	Date	Time Issued	Priority
R 4035.-8525	BECHTOLD-1	6- 9-93	10:14	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E13975	0

Sample Size	Customer ID
? 10ml	STD

Remarks, Calculations, Results

S510 EV-CRB 65851

STD# RESULT 1.378 x10^-2

STD VAL 1.5398E-2 %REC ~~89.626~~ 89.48%

JK 7-11-93

Su Li

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]			
Hrs	Hrs 6-11-93 14:15	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-11-93	10:18	

54-6800-061 (R-11-83)

14/2 R4035-8525 10ml

2180/30 - .5

2023/30 - .5

Alpha Calculation by ALJ on 06-11-1993 at 14:13:00
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Mount # 1

2180
---------- - 0.5 = 1.4295E-02 uCi/L alpha
30

> 1.378 x10^-2

Mount # 2

2023
---------- - 0.5 = 1.3259E-02 uCi/L alpha
30

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

384

Serial No	Sample Point	Date	Time Issued	Priority
R 3943.-8725	BECHTOLD-1	5-26-93	13:44	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100 λ	SB-76A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

$\frac{4.063 \times 10^{1}\ uCi/L}{10.351\ uCi/G} = 3.92\ uCi/G$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]			
Hrs	Hrs 6-11-93 14:15	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-11-93	10:10	

54-6800-061 (R-10-93)

14/2 R3943-8725 .100 ml

$\frac{57127}{30} - .5$

Alpha Calculation by ALJ on 06-11-1993 at 14:13:59
Det 814 2 -inch mount Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

$\frac{65969}{30} - .5$

Mount # 1

$\frac{57127}{30} - 0.5 = 3.7711E+01$ uCi/L alpha

Mount # 2 4.063×10^{1}

$\frac{65969}{30} - 0.5 = 4.3549E+01$ uCi/L alpha

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CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 14

TIME ZERO DATE (HD): 15897

RADIONUCLIDE: Am-241
HALF LIFE: 154497
COUNT TIME: 5
CPM BKG: 0.5

DATE COUNTED (HD): 16973
10-15-92

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

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	03/16/91		87483	87372	87925	88316
36B40B7	1	03/16/91		159352	158460	159108	159191
36B40C7	1	03/16/91		230843	230757	230921	232459
36B40A3	2	03/16/91		69454	69575	69518	69568
36B40B3	2	03/16/91		128127	127361	127118	127197
36B40C3	2	03/16/91		179974	179903	181057	180724
36B40A6	5	03/16/91		69515	69809	69580	69692
36B40B6	5	03/16/91		143043	143396	144729	141218
36B40C5	5	03/16/91		197772	197178	197963	197369

STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A8	1"	60570	17554	1.00	17639	0.2912
36B40B7	1"	109900	31805	1.00	31959	0.2908
36B40C7	1"	159700	46249	1.00	46472	0.2910

AVERAGE, 1" = 0.2910 +/- @95% 0.0004 0.14 % ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	13905	1.00	13973	0.2261
36B40B3	2"	110700	25490	1.00	25613	0.2314
36B40C3	2"	161400	36082	1.00	36257	0.2246

AVERAGE, 2" = 0.2274 +/- @95% 0.0069 3.05 % ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	13929	1.00	13997	0.2354
36B40B6	5"	109800	28619	1.00	28757	0.2619
36B40C5	5"	160100	39514	1.00	39705	0.2480

AVERAGE, 5" = 0.2484 +/- @95% 0.0260 10.48 % ON 03/16/91

NEW EFFS FOR DET 14 Am-241 1" = 0.2910 2" = 0.2274

5" = 0.2484

WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

Batch 842

Lab Segment Serial No. 2-3943	Customer ID: SB-76A
Analysis: U	Sample Prep: ACID DIGEST

Instrument: WB88807	Procedure/ Rev: LA-925-106/B-0
Technologist: TAMIA BATES	Date: 6-4-93
Starting Time: 10:00	Temperature 23°C
Ending Time: 11:00	Chemist: S. CARLOW

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R 3942-8540	11		
2	REAGENT BLANK	N/A	12		
3	SAMPLE	R 3943-8740	13		
4	SAMPLE Dup	R 3943-8840	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 (100 ml)			
spike	90B38 (100 ml)			

526

A-6000-081 (03/93)

Tamia Bates 6-4-93

URANIUM ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3942.-8540	BECHTOLD-1	5-26-93	13:31	22

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	E13975	0

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

Remarks, Calculations, Results

S267 UF1C
STD# 126338 RESULT
STD VAL %REC 100.99%
SPIKE ID/VAL 90B38/6.25^{-4} g/L
SPIKE VOL. .100 ml

$$\frac{.14(.1)(1010)(6.25E-4)}{\left(\frac{5.7}{3.6}\right).42 - .14} = 3.07E-2$$

.14
.42

Dania Bates

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Dakota 6/4/93

Date	Time Completed	Lab Unit Mgr	
6-4-93	11:00	Dakota	Teresa L. Fox

54-6800-061 (10-93)

Serial No	Sample Point	Date	Time Issued	Priority
R 3943.-8740	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E13975	0

Sample Size	Customer ID
? .100 - 10 → .100 ml	SB-76A

Remarks, Calculations, Results

90B38/6.25^{-4} g/L
.100 ml

$$\frac{.36(.1)(1010)(6.25E-4)}{\left(\frac{5.7}{3.6}\right).60 - .36} = \frac{9.064E-2 g/L}{10.351 g/L} \quad 8.76\times10^{-3} g/g$$

.36
.60

Dania Bates

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

6/4/93

Date	Time Completed	Lab Unit Mgr	
6-4-93	11:00	Dakota	Teresa L. Fox

54-6800-061 (10-93)

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URANIUM ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3943.-8840	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E13975	0

Sample Size	Customer ID
? .100 -10 → .100 ml	SB-76A

Remarks, Calculations, Results:

DUPLICATE SAMPLE
90838/6.25-4 gle
.100 ml

$\frac{.32(5.7)(1010)(6.25E-4)}{(\frac{5.7}{56}).56 - .32} = \frac{8.08E-2\ g/L}{10.351\ g/L} = 7.81 \times 10^{-3}\ g/L$

X 8-12-93
7.81×10^{-3}
.32
.56

Dania Batte

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs 6/4/93

Date	Time Completed	Lab Unit Mgr
6-4-93	11:00	[signature]

54-6800-067 (R-10-83)

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WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 985

Lab Segment Serial No. R 3943	Customer ID: SB-76A
Analysis: U	Sample Prep: ACID DIGEST

Instrument: UV88807	Procedure/ Rev: LA-925-106/B-0
Technologist: TANIA BATES	Date: 6-16-93
Starting Time: 1100	Temperature 23°C
Ending Time: 1200	Chemist: S. CATLOW

Comments:

	Description	Lab ID		Description	Lab ID
1	T.B. 6-16-93 ~~SAM~~ LMCS	R 4034-8740	11		
2	SAMPLE	R 3943-8740	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
LMCS CHECK STD	126B38 .100ml			
SPIKE	90B38 .100ml			
				529

A-6000-881 (03/92)

Tania Bates 6-16-93

URANIUM ANALYSIS - ACID DIGESTION

Serial No.	Sample Point	Date	Time Issued	Priority
R 4034.-8540	BECHTOLD-1	6- 9-93	10:12	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	KP36A	0

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

Remarks, Calculations, Results:

S267 UF1C
STD# 126B38 RESULT 3.07 E-2
STD VAL 3.04 E-2 %REC ~~100%~~ 101%

SPIKE ID/VAL 90B38/6.25 -4 g/l
SPIKE VOL. .100 ml

$$\frac{.14(.1)(1010)(6.25E-4)}{\left(\frac{5.7}{4.6}\right).42 - .14} = 3.07E-2$$

.14
.42

Dania Batio

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-16-93	1200	

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

Serial No.	Sample Point	Date	Time Issued	Priority
R 3943.-8740	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E13975	1

Sample Size	Customer ID
? .100 -10 → .100 ml	SB-76A

Remarks, Calculations, Results:

90B38/6.25 -4 g/l
.100 ml

$$\frac{.30(1010)(.1)(6.25^{-E-4})}{\frac{6.7}{5.6}.52 - .3} = \frac{4.26^{E-2}}{10.268 g/l} = 7.97^{E-3} g/l$$

.30
.52

Dania Batio

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-16-93	1200	

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

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WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

Batch 840

Lab Segment Serial No. R3943	Customer ID: SB-76A
Analysis: Pu 239/40	Sample Prep: ACID DIGEST

Instrument: WB57237	Procedure/ Rev: LA 503-156 D-0
Technologist: [illegible]	Date: 6-3-93
Starting Time: 1400	Temperature 24°C
Ending Time: 2330	Chemist: SA Cat Low

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3942-8581	11		
2	REAGENT BLANK	N/A	12		
3	Sample	R3943-8781	13		
4	Sample Dup	R3943-8881	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	63B43 - 100 ml			
Spike	64B43 - 100 ml			

531

A-6000-081 (03/93)

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

4.2 6444

Serial No	Sample Point	Date	Time Issued	Priority
R 3942.-8581	BECHTOLD-1	5-26-93	13:31	22

Determination	Method-Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	E13975	0

Sample Size	Customer ID
? 100-10-100	STD

Remarks, Calculations, Results

EDP R211 AR001

STD# 63343 RESULT 134

STD VAL. 130.5 %REC 102.7

1 ml 8m HNO_3

.100 ml Pu 236 std: kc 64343

.4A5 (3860.25)(.1)(101)(1000) 134

.5499 (2220000)(AEA" - 480MIN

ATTACH PRINTOUT

RUSH RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	6-4-93 0030	6-4-93 0830	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	7370	

SF-6600-061 (R 10-83)

WHC-SD-WM-DP-045
REV 1

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	06/04/93	Pu 236 AEA Frac. (C236)	STANDARD 0.5499
R3942-8581	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.0197
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac. (C239)	0.4195
840	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	1106
Rerun No.	Digest D.F. (DDF)	1	Time Counted (min)	5
0	Tracer Book No.	64B43	Background (cpm)	4
Analyst	Tracer Preperation Date	04/14/93	Pu 236 Counts	54.8
[redacted]	Pu-236 Preperation Value	3993.6	Pu 238 Counts	1.96
Date	Pu-236 Decay Corr'd value	3860.25	Pu 239 Counts	41.8
06/03/93	Pu-238 tracer Value	72.65	AEA Count Time	500

Decay Time = Counting Date No. - Preperation Date No.

Pu 236 decay correction = Tracer prep value x (e to the power of (- ln2 x Decay Time) ÷ 1040.95))

Pu 236 tracer recovery = (AL counts ÷ time ct'd - bkg) (2) (C236) (100) ÷ Tracer 236 decay corr'd value x mL added.

Pu 239/240 uCi/l = (C239) (tracer 236 decay corr'd val) (SPKV) (DF) (DDF) (1000mL/L) ÷ ((C236) (SS) (2220000dpm/µCi))

Pu 238 dpm = ((total AT ct's ÷ time ct'd) - bkg) ((2) (C238) - (Pu 236 dpm/ml in tracer) (SPKV) (Pu236 tracer recovery ÷ 100))

Pu 238 uCi/ml = ((Pu 238 dpm) (DF) (DDF)) ÷ ((Pu-236 Tracer recovery ÷ 100) (2220000dpm/µCi) (SS))

Relative counting error = Square root of ((1/Pu 236 total counts) + (1 / Pu 238 or 239/240 total counts)) * 100

Pu-239/240 µCi/l	=	1.34E+02

NOTE: Tracer values are in dpm/mL.

Pu 239/240 µCi/ml	=	1.34E-01
Relative counting error	=	0.9%
Pu 238 µCi/mL	=	< 1.47E-02
Relative counting error	=	3.3%
Pu 236 Tracer Recovery	=	61.9%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

532

Data Entry by:	Date:	04-Jun-93
Approved by:	Date:	
Verified by:	Date:	

Form 1 Rev. 0

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

#1 6-4-93 AO R3942-8581

1106/5 -4

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PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

4.1 5452

Serial No	Sample Point	Date	Time Issued	Priority
R 3943.-8781	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100-10-100	SB-76A

Remarks, Calculations, Results

COUNT AS uCI/L

"AEA" - 480MIN
ATTACH PRINTOUT

1 ml 8m HNO_3
.100 ml Pu 236 spike 64843

$\frac{.0947(3861.25)(.1)(1010)(1000)}{.8350(2.22\times10^6)(10.351)} = 1.92$ uCi/G $Pu^{239/240}$

RUSH RUSH

$\frac{<2.6(1010)(100.0)}{.4772(2.22\times10^6)(10.351)} = <1.86$ uCi/G Pu^{238}

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]	[redacted]		
Hrs	Hrs 6-4-93 0030	Hrs 6-4-93 0830	Hrs	Hrs
Date 6-3-93	Time Completed 2330	Lab Unit Mgr		

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

WHC-SD-WM-DP-045
REV 1

Pu 238 & 239/240: LA-503-156 (D-0) SOLIDS

Serial No.	Date Counted	06/04/93	Pu 236 AEA Frac. (C236)	SAMPLE
R3943-8781	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.0304
Batch ID	Sample D.F. DF	101	Pu 239 AEA Frac. (C239)	0.0947
840	Tracer Volume in mL(SPKV)	0.1	Total AT Counts	556
Rerun No.	Digest Grams/Liter (D g/L)	10.351	Time Counted (min)	5
0	Tracer Book No.	64843	Background (cpm)	2
Analyst	Tracer Preperation Date	04/14/93	Pu 236 Counts	36.69
[redacted]	Pu-236 Preperation Value	3993.6	Pu 238 Counts	1.33
Date	Pu-236 Decay Corr'd value	3860.25	Pu 239 Counts	4.16
06/03/93	Pu-238 tracer Value	72.65	AEA Count Time	500

Decay Time = Counting Date No. - Preperation Date No.

Pu 236 decay correction = Tracer prep value x (e to the power of (- ln2 x Decay Time) ÷ 1040.95))

Pu 236 tracer recovery = (At counts ÷ time ct'd - bkg) (2) (C236) (100) ÷ Tracer 236 decay corr'd value x mL added

Pu 239/240 uCi/g = (C239) (tracer 236 decay corr'd val) (tracer volume) (1000mL/L) (DF) ÷ ((C236) (SS) (D g/L) (2220000dpm/µCi))

Pu 238 dpm = ((total AT ct's ÷ time ct'd) - bkg) ((2) (C238) - (Pu 238 dpm / ml in tracer) (SPKV) (Pu236 tracer recovery ÷ 100))

Pu 238 uCi/g = ((Pu 238 dpm) (DF) (1000mL/L)) ÷ ((Pu-236 Tracer recovery ÷ 100) (2220000dpm/µCi) (D g/L) (SS))

Relative counting error = Square root of ((1/Pu 236 total counts) + (1 / Pu 238 or 239/240 total counts)) * 100

NOTE: Tracer values are in dpm/mL.

Pu 239/240 µCi/g	=	1.92E+00
Relative counting error	=	2.3%
Pu 238 µCi/g	=	< 1.86E+00
Relative counting error	=	3.9%
Pu 236 Tracer Recovery	=	47.2%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

534

Data Entry by:	Date:	04-Jun-93
Approved by:	Date:	
Verified by:	Date:	

Form 2 Rev. 0

9413060136

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

#2 6-4-93 AJ R 3943-8781

556/5 - 2

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

4.3 7899

Serial No	Sample Point	Date	Time Issued	Priority
R 3943.-8881	BECHTOLD-1	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100-10-100	SB-76A

Remarks, Calculations, Results

DUPLICATE SAMPLE

COUNT AS uCI/L

1 ml 8m HNO_3

.100 ml Pu 236 spike 64B43

$\frac{.1092(3860.25)(.1)(1010)(100)}{.8476(2.22\times10^6)(10.351)} = 2.185$ uCi/G $Pu^{239/240}$

"AEA" - 480MIN

ATTACH PRINTOUT

$\frac{<20(3860.25)(.1)(1010)(100)}{.467(2.22\times10^6)(10.351)}$ <1.88uCi/G Pu^{238}

RUSH RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]	[redacted]		
Hrs	Hrs 6-4-93 0030	Hrs 6-4-93 0830	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-3-93	8330	

54-6800-02 (R-10-83)

WHC-SD-WM-DP-045 REV 1

Pu 238 & 239/240: LA-503-156 (D-0) SOLIDS

Serial No.	Date Counted	06/04/93	Pu 236 AEA Frac. (C236)	DUPLICATE
R3943-8881	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.043
Batch ID	Sample D.F. DF	101	Pu 239 AEA Frac. (C239)	0.1092
840	Tracer Volume in mL(SPKV)	0.1	Total AT Counts	552
Rerun No.	Digest Grams/Liter (D g/L)	10.351	Time Counted (min)	5
0	Tracer Book No.	64B43	Background (cpm)	4
Analyst	Tracer Preperation Date	04/14/93	Pu 236 Counts	33.16
[redacted]	Pu-236 Preperation Value	3993.6	Pu 238 Counts	1.68
Date	Pu-236 Decay Corr'd value	3860.25	Pu 239 Counts	4.27
06/03/93	Pu-238 tracer Value	72.65	AEA Count Time	500

Decay Time = Counting Date No. − Preperation Date No.

Pu 236 decay correction = Tracer prep value x (e to the power of (− ln2 x Decay Time) ÷ 1040.95))

Pu 236 tracer recovery = (At counts ÷ time ct'd − bkg) (2) (C236) (100) ÷ Tracer 236 decay corr'd value x mL added

Pu 239/240 uCi/g = (C239) (tracer 236 decay corr'd val) (tracer volume) (1000mL/L) (DF) ÷ ((C236) (SS) (D g/L) (2220000dpm/µCi))

Pu 238 dpm = ((total AT ct's ÷ time ct'd) − bkg) ((2) (C238) − (Pu 236 dpm / ml in tracer) (SPKV) (Pu236 tracer recovery ÷ 100))

Pu 238 uCi/g = ((Pu 238 dpm) (DF) (1000mL/L)) ÷ ((Pu-236 Tracer recovery ÷ 100) (2220000dpm/µCi) (D g/L) (SS))

Relative counting error = Square root of ((1/Pu 236 total counts) + (1 / Pu 238 or 239/240 total counts)) * 100

NOTE: Tracer values are in dpm/mL.

Pu 239/240 µCi/g	=	2.19E+00
Relative counting error	=	2.3%
Pu 238 µCi/g	=	< 1.88E+00
Relative counting error	=	3.5%
Pu 236 Tracer Recovery	=	46.7%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

536

Data Entry by:	Date:	04-Jun-93
Approved by:	Date:	
Verified by:	Date:	

Form 2 Rev. 0

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

#3 6-4-93 AD. R3943-8881

$\frac{552}{5}$ -4

BEST AVAILABLE COPY

[redacted] 6-4-93

WHC-SD-WM-DP-045
REV 1

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

SAMPLE
R3942-8581
File ID: SD6444.SPC

Counted on: 6/ 4/93 @ 0: 0
Detector/Geometry number: 6/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	2914.6	2961.6	361.366	361.366	20.000	10.948	10.000	4.792
2	91.7	94.7	301.397	301.397	20.000	13.417	10.000	5.121
3	187.5	46.6	264.987	264.987	12.000	9.899	6.000	4.956
4	2400.5	2401.2	229.480	229.480	20.000	10.572	10.000	5.425
5	15.8	15.8	36.829	36.829	16.000	8.759	8.000	3.089

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1		0.5499		5.906		0.03	54.80	252.63	0.114E-03
2	Pu236	0.0197	5.756	5.762	-0.006	0.03	1.96	9.23	0.416E-05
3	Ra224	0.0080	5.680	5.674	0.006	0.02	0.80	3.92	0.176E-05
4		0.4195		5.589		0.03	41.80	192.73	0.868E-04
5	Pu239	0.0029	5.143	5.127	0.016	0.02	0.29	1.33	0.601E-06
	Pu240		5.144	5.127	0.017				0.601E-06

DETECTOR CALIBRATION
Energy(MEV) = 5.038 + (0.0024)*Channel
Energy range (MeV): 5.038 TO 6.267
Efficiency = 0.2169 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	49574.0	100.000
Smoothed	49574.0	100.000
Composite fit	49824.2	100.505
Residuals	-250.2	-0.505

Analyzed by: [redacted]

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          SPECTRUM SD6444.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                9500.3

5
5
5
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4
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2
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.....................................................................1
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1
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Raw Data Dump for AEA Spectrum: SP:SD6444.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	1.	0.	0.	1.	4.
21	1.	3.	5.	3.	5.	6.	7.	2.	6.	7.
31	4.	6.	5.	11.	13.	6.	6.	10.	13.	3.
41	3.	1.	2.	1.	1.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
101	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
111	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
131	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
141	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
151	2.	0.	3.	0.	1.	1.	1.	3.	1.	5.
161	5.	2.	4.	1.	3.	2.	3.	5.	2.	2.
171	5.	4.	6.	3.	7.	3.	8.	6.	6.	2.
181	6.	9.	1.	13.	9.	2.	6.	7.	12.	11.
191	14.	12.	13.	13.	9.	13.	14.	23.	21.	24.
201	13.	26.	35.	44.	51.	50.	58.	103.	102.	111.
211	135.	152.	218.	248.	303.	365.	422.	469.	608.	651.
21	720.	839.	920.	1097.	1126.	1298.	1383.	1413.	1376.	1359.
231	1231.	1049.	820.	632.	467.	309.	189.	95.	63.	37.
241	20.	10.	7.	7.	4.	5.	4.	3.	11.	12.
251	14.	19.	22.	21.	16.	8.	15.	14.	28.	22.
261	26.	18.	17.	35.	25.	22.	14.	29.	16.	16.
271	11.	12.	5.	8.	4.	2.	5.	9.	6.	9.
281	8.	9.	11.	9.	21.	13.	10.	25.	18.	21.
291	26.	29.	30.	40.	42.	48.	50.	61.	61.	45.
301	50.	47.	41.	55.	43.	36.	21.	22.	23.	9.
311	14.	12.	8.	11.	18.	9.	6.	15.	16.	14.
321	13.	17.	18.	12.	21.	32.	13.	21.	16.	19.
331	33.	29.	36.	43.	51.	63.	67.	92.	101.	107.
341	139.	200.	218.	291.	327.	407.	482.	564.	655.	763.
351	855.	969.	1069.	1080.	1186.	1256.	1414.	1535.	1571.	1723.
361	1699.	1608.	1460.	1309.	1042.	812.	589.	368.	239.	131.
371	65.	20.	15.	5.	2.	0.	2.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.
411	0.	0.	0.	0.	1.	0.	0.	0.	0.	2.
421	0.	0.	0.	0.	3.	2.	1.	1.	0.	0.
431	1.	0.	0.	1.	1.	0.	0.	0.	0.	0.
441	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.
451	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.
461	1.	1.	0.	2.	1.	3.	1.	0.	1.	0.
471	0.	0.	2.	1.	0.	2.	3.	3.	2.	1.
481	2.	0.	0.	1.	0.	1.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

[redacted] 6-4-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
R3943-8781
File ID: SD5452.SPC

Counted on: 6/ 4/93 @ 0: 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	5.6	5.1	479.719	479.719	16.000	6.299	8.000	2.776
2	1972.9	1993.5	363.520	363.520	20.000	10.894	10.000	4.819
3	56.7	57.9	305.526	305.526	20.000	11.834	10.000	3.252
4	35.6	23.3	267.464	267.464	12.000	8.779	6.000	0.549
5	239.8	245.7	233.032	233.032	16.000	9.583	8.000	4.793
6	8.6	8.2	31.889	31.889	24.000	17.039	12.000	19.304

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Bi212	0.0018	6.040	6.046	-0.006	0.02	0.08	1.11	0.499E-06
2	Ra224	0.8350	5.680	5.697	-0.017	0.03	36.69	194.59	0.877E-04
3	Pu238	0.0304	5.499	5.523	-0.024	0.04	1.33	9.24	0.416E-05
4		0.0344		5.409		0.03	1.51	7.54	0.340E-05
5		0.0947		5.306		0.03	4.16	20.75	0.935E-05
6		0.0037		4.702		0.05	0.16	0.81	0.365E-06

DETECTOR CALIBRATION

Energy(MEV) = 4.607 + (0.0030)*Channel
Energy range (MeV): 4.607 TO 6.143
Efficiency = 0.2006 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	21561.0	100.000
Smoothed	21560.9	100.000
Composite fit	21972.7	101.909
Residuals	-411.8	-1.910

Analyzed by: _____
[redacted]

```
          SPECTRUM SD5452.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                7224.8

6
6
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6


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Raw Data Dump for AEA Spectrum: SP:SD5452.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	2.	1.	2.	2.	1.	1.
21	2.	2.	8.	5.	2.	1.	2.	6.	4.	7.
31	6.	4.	6.	3.	3.	2.	2.	3.	4.	2.
41	3.	0.	2.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
61	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
101	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
111	0.	1.	1.	0.	1.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
131	2.	0.	1.	3.	0.	0.	0.	0.	0.	0.
141	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
151	0.	0.	0.	0.	1.	2.	2.	2.	0.	0.
161	3.	1.	0.	1.	0.	0.	1.	0.	1.	4.
171	1.	0.	0.	1.	1.	0.	1.	1.	1.	1.
181	1.	1.	1.	0.	2.	2.	2.	3.	3.	0.
191	3.	1.	0.	5.	6.	1.	4.	2.	3.	1.
201	3.	4.	4.	6.	4.	5.	7.	8.	5.	4.
211	13.	5.	13.	10.	24.	27.	34.	37.	44.	41.
221	40.	68.	73.	81.	98.	96.	118.	135.	100.	139.
231	141.	147.	130.	152.	134.	99.	87.	58.	33.	25.
241	22.	11.	9.	5.	3.	4.	7.	6.	6.	5.
251	5.	5.	6.	11.	11.	10.	11.	13.	14.	8.
261	12.	13.	20.	8.	15.	12.	15.	17.	11.	21.
271	7.	10.	9.	5.	5.	5.	2.	4.	4.	3.
281	4.	4.	5.	5.	9.	8.	8.	5.	7.	11.
291	12.	19.	16.	16.	26.	29.	24.	31.	25.	18.
301	23.	30.	31.	35.	35.	32.	32.	25.	23.	20.
311	16.	4.	14.	12.	13.	4.	9.	10.	8.	4.
321	10.	7.	9.	4.	20.	15.	14.	12.	16.	12.
331	18.	18.	22.	23.	35.	30.	37.	36.	52.	51.
341	61.	75.	94.	116.	139.	159.	216.	235.	321.	323.
351	432.	513.	584.	658.	717.	723.	793.	841.	952.	966.
361	1095.	1121.	1101.	1164.	1032.	884.	730.	539.	387.	267.
371	157.	100.	57.	37.	11.	7.	4.	1.	3.	2.
381	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
401	1.	0.	0.	0.	0.	0.	1.	0.	0.	0.
411	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
431	1.	0.	0.	0.	0.	2.	0.	0.	0.	0.
441	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	1.	0.	2.	2.	2.
461	0.	0.	0.	1.	0.	0.	1.	0.	0.	1.
471	1.	2.	0.	1.	4.	1.	4.	3.	5.	5.
481	1.	1.	2.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
511	0.	0.								

[redacted] 6-4-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
R3943-8881
File ID: SD7899.SPC

Counted on: 6/ 4/93 @ 0: 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	1308.6	1304.6	363.576	363.576	28.000	25.008	14.000	10.439
2	45.8	41.7	304.944	304.944	32.000	26.616	16.000	3.702
3	178.6	170.4	233.345	233.345	24.000	25.297	12.000	11.811

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm244	0.8478	5.796	5.782	0.014	0.12	33.16	0.01	0.256E-08
	Cm243		5.786	5.782	0.004				0.351E-08
2	Pu238	0.0430	5.499	5.506	-0.007	0.13	1.68	0.00	0.180E-09
	Am241		5.480	5.506	-0.026				0.138E-09
3	Pu239	0.1092	5.143	5.170	-0.027	0.12	4.27	0.00	0.330E-09
	Pu240		5.144	5.170	-0.026				0.330E-09

DETECTOR CALIBRATION

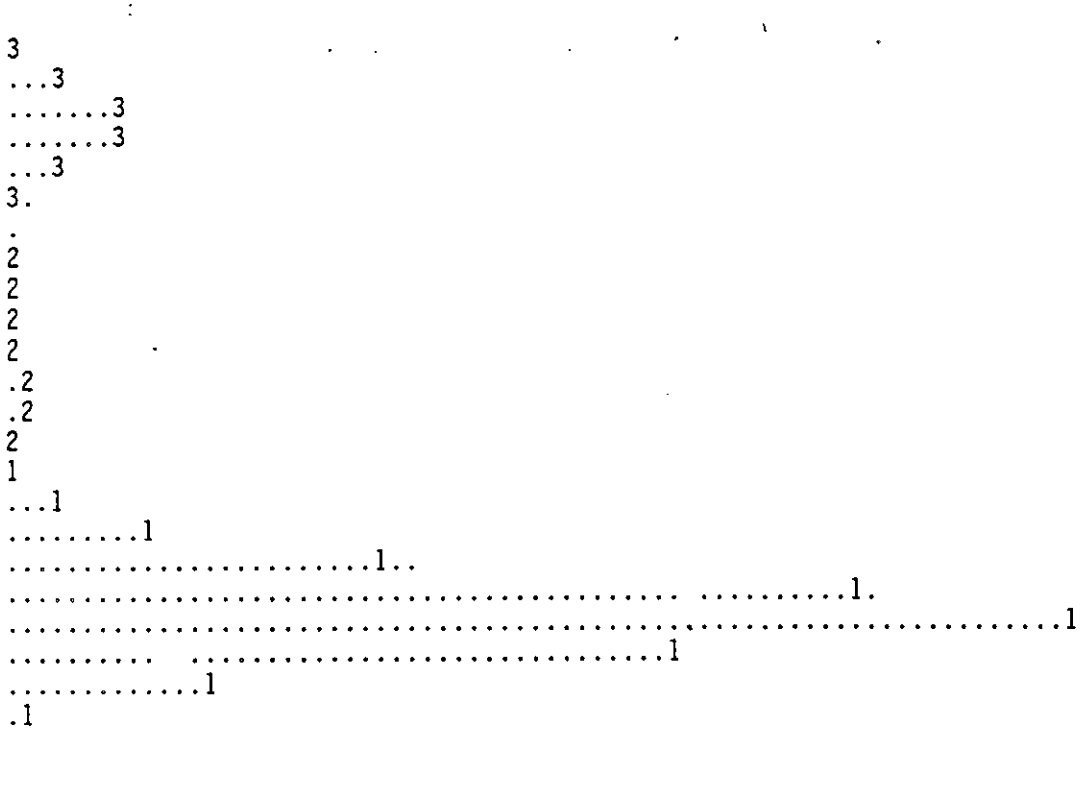
Energy(MEV) = 4.073 + (0.0047)*Channel
Energy range (MeV): 4.073 TO 6.480
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	19645.0	100.000
Smoothed	19644.9	100.000
Composite fit	19556.7	99.551
Residuals	88.2	0.449

Analyzed by: _____
[redacted]

SPECTRUM SD7899.SPC
1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 5021.4



Raw Data Dump for AEA Spectrum: SP:SD7899.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.
21	0.	1.	0.	0.	0.	0.	1.	1.	0.	0.
31	0.	0.	0.	0.	0.	1.	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.	1.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	2.	1.	1.	0.
81	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.
91	0.	1.	1.	1.	0.	0.	0.	0.	0.	1.
101	0.	1.	1.	0.	0.	0.	0.	0.	2.	0.
111	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
121	0.	0.	0.	0.	1.	0.	2.	0.	1.	1.
131	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
141	1.	1.	0.	1.	0.	0.	0.	1.	1.	1.
151	0.	0.	1.	2.	1.	0.	1.	0.	1.	2.
161	0.	0.	0.	0.	0.	3.	0.	0.	0.	0.
171	0.	1.	0.	2.	1.	0.	0.	1.	0.	1.
181	1.	2.	1.	3.	1.	0.	2.	2.	4.	1.
191	0.	1.	2.	1.	3.	5.	2.	4.	6.	2.
201	3.	0.	3.	3.	3.	7.	4.	4.	13.	17.
211	17.	16.	21.	20.	23.	26.	32.	28.	44.	42.
221	36.	60.	63.	71.	86.	64.	78.	82.	96.	109.
231	93.	87.	96.	99.	104.	86.	62.	53.	64.	55.
241	38.	42.	28.	32.	22.	26.	26.	16.	18.	19.
251	12.	9.	12.	15.	18.	11.	9.	12.	10.	11.
261	11.	14.	8.	10.	17.	12.	7.	15.	12.	6.
271	14.	9.	11.	4.	4.	11.	8.	7.	2.	6.
281	4.	10.	5.	10.	5.	5.	11.	8.	9.	17.
291	15.	15.	17.	20.	13.	19.	17.	19.	22.	19.
301	22.	32.	26.	28.	30.	21.	22.	21.	15.	17.
311	15.	15.	20.	16.	18.	20.	13.	25.	11.	13.
321	13.	13.	12.	15.	9.	15.	18.	17.	18.	17.
331	24.	31.	40.	45.	47.	44.	52.	75.	84.	79.
341	91.	130.	129.	161.	169.	211.	267.	283.	318.	337.
351	372.	421.	470.	481.	566.	594.	610.	645.	641.	676.
361	695.	730.	715.	655.	688.	604.	561.	521.	468.	400.
371	419.	296.	270.	219.	190.	170.	127.	110.	80.	68.
381	54.	34.	36.	21.	14.	14.	5.	7.	6.	7.
391	2.	4.	2.	1.	1.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
471	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.
481	0.	0.	1.	1.	0.	0.	1.	0.	0.	0.
491	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.
511	0.	0.								

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 1

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	10	
TODAY'S DATE:	08/18/92	
DECAY CORR'N:	2.552	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	149	148	150	147	out	150				
AJ C/G	Pu	109	228	227	227	231	227	of	233		out of service		
DATE	Am	135	300	297	297	303	300	Service	308				
5-29-93	Cm	159	367	362	365	370	367		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	150	148	151	149	out	150				
AJ C/G	Pu	110	228	227	227	232	230	of	233				
DATE	Am	136	300	298	297	304	303	Service	308				
5-30-93	Cm	160	367	362	364	371	370		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	149	156	146	150	148	out	149				
AJ C/G	Pu	110	227	235	225	231	229	of	233				
DATE	Am	136	298	305	296	303	301	Service	308				
5-31-93	Cm	160	305 ~~37~~	371	363	370	369		371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	147	148	150	150	152 out	150				
AJ C/G	Pu	110	229	224	227	231	229	231 of	233				
DATE	Am	136	301	296	298	301	301	303 Service	307				
6-1-93	Cm	160	366	361	367	371	366	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	156	148	152	151	152	150				
AJ C/G	Pu	110	229	231	227	231	228	230	233				
DATE	Am	136	300	302	299	303	300	302	307				
6-2-93	Cm	160	367	366	365	370	368	370	371				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	[illegible]	148	153	147	152	154				
AJ C/G	Pu	110	229		227	231	229	231	233				
DATE	Am	136	301	[illegible]	298	304	301	303	307				
6-3-93	Cm	160	368		365	371	369	370	371				

TE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

WESTINGHOUSE HANFORD COMPANY Batch 986

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R3943	Customer ID: SB-76A
Analysis: Pu 239/40	Sample Prep: Acid Digest

Instrument: WB57237	Procedure/ Rev: LA 503-156 D-0
Technologist: TA m Colloch P.M. Colloch [redacted]	Date: 6-16-93
Starting Time: 1400	Temperature 24°C
Ending Time: 1800	Chemist: SA Cayton

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	R4034-8581	11		
2	Blk	N/A	12		
3	Sample	R3943-8781	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	67B43-.100ml			
Spike	70B43-.100ml			
				550

A-6000-881 (03/92)

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

3.2 2970

Serial No.	Sample Point	Date	Time Issued	Priority
R 4034.-8581	BECHTOLD-1	6- 9-93	10:12	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	KP36A	0

Sample Size	Customer ID
? 100-10-100	STD

Remarks, Calculations, Results

EDP R211 AR001

"AEA" - 480MIN
ATTACH PRINTOUT

STD# 63B43 RESULT 1.35 E 2

STD VAL. 130.5 %REC 103.45%

.100 ml Pu236 → 70B43

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond	[illegible]	[illegible]	
Hrs	Hrs 6-16-93	Hrs 6-17-93	Hrs 6-17-93 19:40	Hrs

Date	Time Completed	Lab Unit Mgr
6-16-93	1800	[illegible]

54-5800-064 (R-10-83)

#1 ✓ 6-16-93

$\frac{8730}{30} - 5$

R 4034-8581

BEST AVAILABLE COPY

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

4.4 8159

Serial No.	Sample Point	Date	Time Issued	Priority
R 3943.-8781	BECHTOLD-1 --	5-26-93	13:42	18

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E13975	1

Sample Size	Customer ID
? 100-10-500	SB-76A

Remarks, Calculations, Results

COUNT AS uCI/L

"AEA" - 480MIN
ATTACH PRINTOUT

. 500 ml 8m HNO_3
. 10 ml Pu 236 → 70B43

$\frac{.4014(277.12)(1000)(202)}{.4947(2.222dm^3)} = \frac{20.46\ uCi/L}{10.56\ G/L} = 1.97\ uCi/G$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond	D H Miller		
Hrs	Hrs	Hrs	Hrs	Hrs
	6-16-93			

Date	Time Completed	Lab Unit Mgr
6-16-93	1800	[illegible]

3E-Seq/061 (R-10-83)

#2 ve 6-16-93
7371/30 - 2

R3943-8781

BEST AVAILABLE COPY

A H Johanson

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

WHC-SD-WM-DP-045
REV 1

DATA REDUCTION REPORT

SAMPLE
R4034-8581
File ID: SD2970.SPC

Counted on: 6/17/93 @10: 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	1414.2	1454.5	365.479	365.479	24.000	17.194	12.000	6.477
2	280.7	293.4	306.345	306.345	24.000	14.784	12.000	4.575
3	1611.1	1622.6	232.356	232.356	24.000	16.550	12.000	6.897
4	7.8	7.1	159.107	159.107	40.000	49.789	20.000	7.338
5	2.7	2.1	117.641	117.641	20.000	13.481	10.000	6.322

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.4374	5.756	5.771	-0.015	0.08	32.92	0.01	0.258E-08
	Cm243		5.786	5.771	0.015				0.347E-08
2	Pu238	0.0903	5.499	5.499	0.000	0.07	6.79	0.00	0.725E-09
	Am241		5.480	5.499	-0.019				0.556E-09
3	Pu239	0.4676	5.143	5.159	-0.016	0.08	35.19	0.01	0.270E-08
	Pu240		5.144	5.159	-0.015				0.270E-08
4	Np237	0.0043	4.781	4.822	-0.041	0.23	0.32	0.00	0.283E-10
5	Np237	0.0005	4.640	4.631	0.009	0.06	0.04	0.00	0.522E-10

DETECTOR CALIBRATION

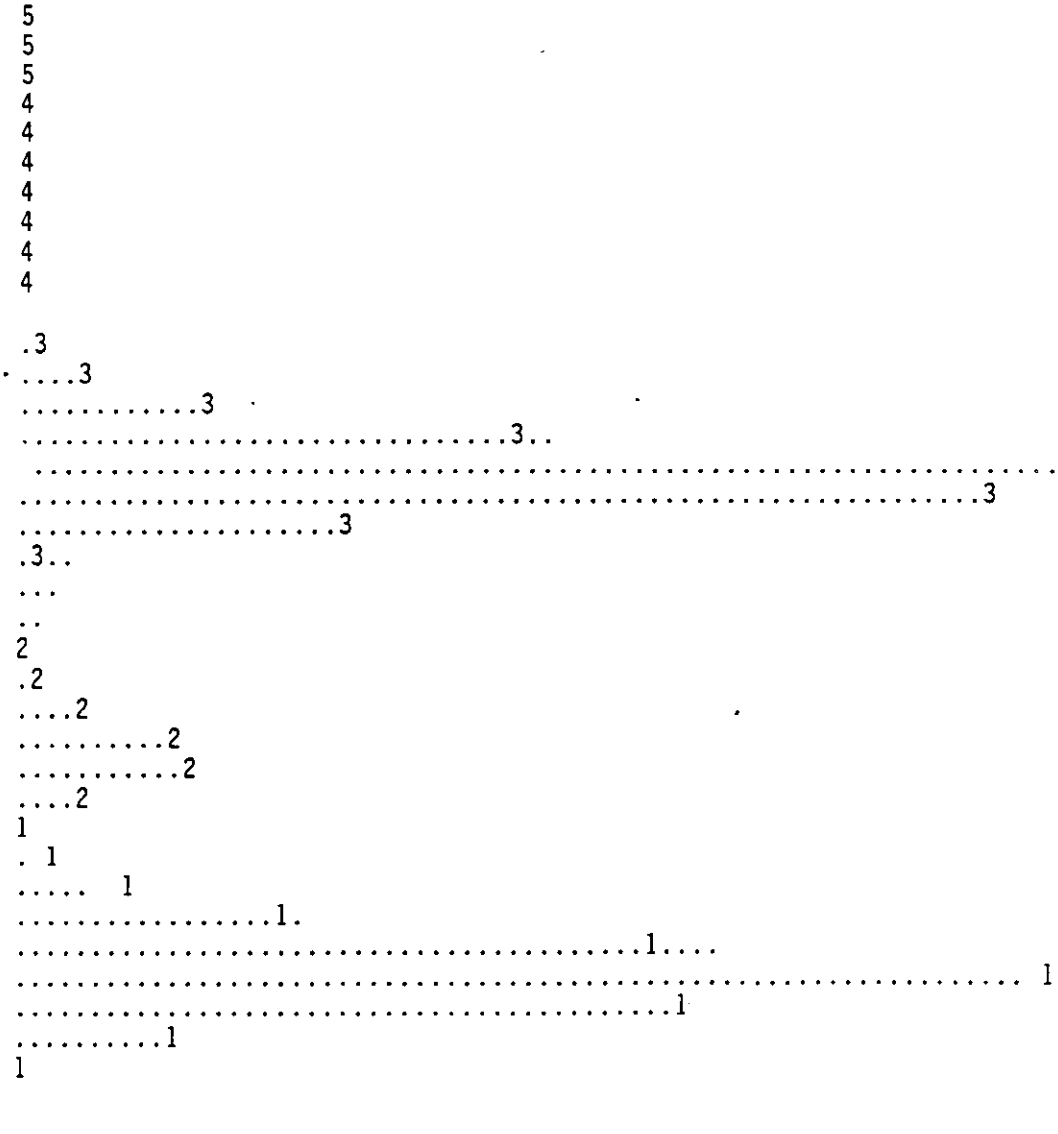
Energy(MEV) = 4.090 + (0.0046)*Channel
Energy range (MeV): 4.090 TO 6.445
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	37714.0	100.000
Smoothed	37714.0	100.000
Composite fit	37631.8	99.782
Residuals	82.2	0.218

Analyzed by: [redacted]

SPECTRUM SD2970.SPC
1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 5741.7



Raw Data Dump for AEA Spectrum: SP:SD2970.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
11	1.	1.	1.	0.	0.	0.	0.	0.	1.	1.
21	0.	2.	0.	2.	0.	0.	2.	0.	0.	1.
31	2.	1.	0.	0.	1.	1.	3.	0.	1.	0.
41	1.	0.	0.	1.	0.	2.	1.	2.	0.	0.
51	1.	2.	3.	3.	2.	1.	2.	0.	1.	0.
61	2.	1.	1.	1.	2.	0.	1.	3.	2.	0.
71	2.	2.	0.	0.	0.	0.	1.	1.	2.	1.
81	0.	4.	1.	3.	0.	0.	1.	2.	2.	2.
91	3.	0.	1.	4.	0.	1.	1.	1.	0.	3.
101	1.	2.	2.	0.	2.	2.	0.	1.	2.	1.
111	0.	3.	3.	0.	5.	3.	1.	1.	1.	4.
121	1.	3.	0.	2.	0.	2.	2.	2.	0.	2.
131	2.	1.	3.	0.	1.	2.	4.	2.	3.	2.
141	1.	2.	1.	3.	2.	3.	1.	3.	5.	3.
151	3.	4.	5.	2.	2.	6.	4.	6.	5.	3.
161	3.	5.	1.	5.	3.	1.	2.	5.	5.	4.
171	6.	3.	4.	1.	4.	4.	5.	5.	2.	5.
181	7.	3.	4.	8.	8.	4.	5.	6.	5.	6.
191	4.	7.	7.	11.	8.	10.	18.	22.	21.	16.
201	29.	36.	45.	44.	51.	60.	62.	86.	96.	94.
211	103.	144.	165.	163.	204.	233.	248.	338.	339.	426.
221	453.	526.	558.	575.	686.	749.	835.	811.	844.	870.
231	867.	949.	822.	790.	736.	653.	605.	433.	383.	296.
241	211.	156.	126.	103.	73.	53.	31.	27.	27.	26.
251	30.	30.	27.	22.	31.	27.	41.	42.	38.	37.
261	30.	25.	32.	18.	12.	25.	23.	18.	22.	13.
271	18.	12.	7.	12.	13.	14.	15.	11.	15.	14.
281	13.	23.	20.	19.	24.	23.	36.	39.	41.	53.
291	46.	62.	77.	100.	110.	96.	107.	126.	121.	148.
301	129.	148.	147.	157.	158.	145.	158.	133.	126.	134.
311	118.	90.	80.	53.	35.	31.	22.	34.	15.	12.
321	11.	10.	14.	8.	5.	5.	11.	10.	14.	11.
331	17.	12.	32.	28.	24.	26.	34.	61.	58.	57.
341	57.	85.	98.	142.	129.	141.	192.	201.	244.	301.
351	308.	374.	383.	432.	505.	549.	575.	597.	637.	722.
361	740.	743.	739.	777.	727.	740.	755.	675.	575.	572.
371	460.	386.	274.	233.	175.	138.	81.	56.	35.	20.
381	14.	15.	7.	6.	2.	2.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.
401	1.	0.	0.	0.	0.	0.	2.	0.	0.	1.
411	1.	0.	1.	1.	0.	0.	0.	1.	0.	1.
21	0.	0.	0.	0.	0.	1.	0.	1.	0.	0.
431	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
441	0.	1.	0.	0.	1.	0.	1.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.
471	0.	0.	1.	2.	1.	2.	3.	3.	0.	1.
481	0.	1.	2.	1.	3.	1.	0.	1.	1.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 1.10

WHC-SD-WM-DP-045
REV 1

DATA REDUCTION REPORT

Rullelia
6-17-93

SAMPLE
R-3943-8781
File ID: SD8159.SPC

Counted on: 6/17/93 @ 2: 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	2620.6	2643.4	363.019	363.019	16.000	10.162	8.000	5.115
2	558.4	554.5	305.433	305.433	20.000	11.071	10.000	6.280
3	503.4	0.0	264.765	264.765	12.000	12.123	6.000	6.102
4	2269.3	2255.5	233.447	233.447	20.000	10.166	10.000	6.253

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.4947	5.756	5.767	-0.011	0.05	45.62	267.09	0.120E-03
	Cm243		5.786	5.767	0.019				0.162E-03
2	Pu238	0.1039	5.499	5.496	0.003	0.05	9.58	76.31	0.344E-04
	Am241		5.480	5.496	-0.016				0.263E-04
3		0.0000		5.305		0.06	0.00	0.00	0.000E+00
4	Pu239	0.4014	5.143	5.158	-0.015	0.05	37.02	212.37	0.957E-04
	Pu240		5.144	5.158	-0.014				0.957E-04

DETECTOR CALIBRATION
Energy(MEV) = 4.061 + (0.0047)*Channel
Energy range (MeV): 4.061 TO 6.467
Efficiency = 0.1743 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	46819.0	100.000
Smoothed	46819.0	100.000
Composite fit	46107.3	98.480
Residuals	711.7	1.520

Analyzed by: [redacted]

```
          SPECTRUM SD8159.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                9393.3
.
..4
.............4.
.................................................4.
.....................................................4
...........4.
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2
...2
...........2
............2
..2
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1
... 1
...............1.
.................................................1.
.................................................................1
....................1
1.
```

Raw Data Dump for AEA Spectrum: SP:SD8159.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	1.	0.	0.	3.	1.	0.
21	0.	1.	0.	1.	0.	1.	0.	0.	0.	1.
31	2.	1.	0.	0.	1.	0.	0.	0.	0.	0.
41	1.	0.	0.	0.	0.	0.	1.	0.	0.	1.
51	0.	2.	0.	1.	0.	1.	0.	0.	1.	0.
61	0.	0.	1.	1.	0.	0.	0.	1.	0.	0.
71	1.	1.	1.	0.	0.	0.	2.	0.	0.	0.
81	0.	2.	0.	0.	0.	0.	0.	0.	1.	1.
91	2.	0.	1.	1.	0.	0.	1.	0.	2.	0.
101	1.	1.	1.	1.	0.	0.	0.	0.	0.	0.
111	1.	2.	2.	0.	2.	0.	1.	2.	2.	1.
121	0.	1.	3.	2.	1.	1.	1.	2.	3.	2.
131	2.	0.	1.	0.	1.	0.	7.	0.	1.	1.
141	2.	1.	1.	2.	1.	3.	5.	2.	6.	1.
151	1.	2.	5.	2.	0.	6.	0.	1.	2.	0.
161	3.	0.	4.	5.	5.	1.	2.	5.	6.	6.
171	3.	3.	2.	4.	5.	3.	4.	9.	3.	4.
181	8.	9.	6.	8.	7.	6.	10.	9.	7.	7.
191	9.	14.	5.	10.	13.	20.	12.	14.	14.	28.
201	13.	16.	17.	21.	30.	25.	38.	36.	36.	48.
211	47.	47.	62.	83.	84.	98.	139.	170.	219.	257.
221	351.	397.	421.	521.	623.	743.	851.	941.	1156.	1288.
231	1336.	1418.	1324.	1246.	1127.	948.	733.	606.	392.	264.
241	157.	119.	42.	32.	20.	9.	7.	6.	9.	7.
251	7.	9.	8.	18.	14.	15.	11.	20.	14.	19.
261	15.	18.	15.	21.	17.	21.	22.	10.	19.	13.
271	12.	4.	11.	9.	12.	6.	6.	11.	11.	14.
281	12.	19.	12.	12.	17.	15.	24.	26.	34.	50.
291	55.	69.	95.	112.	147.	147.	186.	187.	236.	250.
301	265.	297.	312.	337.	333.	305.	294.	231.	199.	136.
311	108.	60.	64.	37.	20.	10.	16.	7.	12.	12.
321	9.	19.	14.	13.	7.	14.	10.	17.	20.	18.
331	20.	29.	29.	37.	36.	28.	49.	41.	56.	48.
341	62.	63.	86.	97.	157.	169.	277.	316.	358.	471.
351	545.	620.	710.	786.	810.	980.	1083.	1129.	1311.	1504.
361	1481.	1593.	1523.	1498.	1210.	1020.	799.	583.	379.	228.
371	153.	70.	32.	19.	5.	7.	2.	0.	1.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
481	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 1

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	10	
TODAY'S DATE:	08/18/92	
DECAY CORR'N:	2.552	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	80	149	out	146	156	146	152	153				
DM / B.G.	Pu	108	227		224	235	224	231	231				
DATE	Am	134	299		295	308	298	303	302				
6-15-93	Cm	158	366	↓	362	376	366	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	out	147	154	150	151	152				
DM / B G	Pu	109	225		227	232	229	230	230				
DATE	Am	135	301		299	306	302	302	302				
6-16-93	Cm	159	369	↓	367	375	371	369	368				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	out	147	155	149	152	153				
DM / B.G.	Pu	111	230		228	234	227	231	231				
DATE	Am	137	304		300	308	301	303	302				
6-17-93	Cm	161	372	↓	368	376	370	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	152	out	149	155	150	151	154				
DM / B.G.	Pu	111	232		229	235	228	230	231				
DATE	Am	137	305		301	309	302	302	302				
6-18-93	Cm	161	373	↓	369	376	369	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	151	out	150	154	149	151	153				
VRD/G	Pu	111	232		231	233	227	231	231				
DATE	Am	137	305		302	306	300	303	302				
6-19-93	Cm	161	373		371	375	369	370	368				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	152		148	155	149	152	153				
VRD/G	Pu	110	232		229	235	227	231	230				
DATE	Am	136	305		301	308	301	303	302				
6-20-93	Cm	160	373		369	376	369	370	369				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 987

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R 3943	Customer ID: SB-76a
Analysis: Gea	Sample Prep: acid digestion

Instrument:	WG53225	Procedure/ Rev:	LA-548-121 (D-0)
Technologist:	[redacted], SUE LAI (Sue Lai)	Date:	6-11-93
Starting Time:	~~08:20~~ 0820 8-12-93	Temperature	25°C
Ending Time:	09:10	Chemist:	A. K. Dasgupta

Comments:

	Description	Lab ID		Description	Lab ID
1	STD	R 4035-8530	11		
2	Sample	R3943-8730	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
LYCS	3285 (.100ml)			

562

A-6000-881 (03/92)

GAMMA ENERGY ANALYSIS - ACID DIGESTION

4342

Serial No.	Sample Point	Date	Time Issued	Priority
R 4035.-8530	BECHTOLD-1	6- 9-93	10:14	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	KP36A	0

Sample Size	Customer ID
? 100 λ	STD

Remarks, Calculations, Results

COLX STD# 32851
R901 134 µCi/L STD VAL 133.3 µCi/L
RESULT % REC 101%
R905 STD VAL 108.2 "
RESULT 111 µCi/L % REC 103%

See Li

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]			
Hrs	Hrs 6-11-93	Hrs	Hrs	Hrs
Date 6-11-93	Time Completed 09:10	Lab Unit Mgr A.K. 6/11/93		

54-6800-061 (R-10-93)

4343 4344

Serial No.	Sample Point	Date	Time Issued	Priority
R 3943.-8730	BECHTOLD-1	5-26-93	13:44	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100 λ	SR-76A

Remarks, Calculations, Results

COUNT AS uCI/L
LASER PRINTOUT

Am-241 : 1.72×10^{1} µCi/L × $\frac{1}{1.0351 \times 10^{1}}$ g = 1.66 µCi/g
Cs-137 : 1.09×10^{2} " × " = 10.53 "
Eu-154 : 3.88 " × " = 0.3754
Eu-155 : 1.75 " × " = ~~0.169~~ 0.169 " 8/11/93
Co-60 : 4.48 " × " = 0.4334

See Li

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]			
Hrs	Hrs 6-11-93 1330	Hrs	Hrs	Hrs
Date 6-11-93	Time Completed 09:10	Lab Unit Mgr A.K. 6/11/93		

54-6800-061 (R-10-93)

BEST AVAILABLE COPY

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

WHC-SD-WM-DP-045
REV 1

11-JUN-9311:47:02

R Miller
6-11-93

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

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

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANO:
ANALYZED BY: [redacted]

SAMPLE DESCRIPTION: R4035-8530
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 11-JUN-93 AT 10:56:30

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3023. SECONDS
DEAD TIME: 0.76 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

11-JUN-9311:47:02

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	95.92	47.94	1.00	1736.	1202.	10.9	PB-210,U-234
2	950.52	475.25	1.50	3525.	779.	22.9	CS-134
3C	1126.42	563.21	1.39	2130.	2800.	5.4	CS-134, EU-152
4C	1138.61	569.31	1.39	2198.	4964.	4.6	CS-134, BI-207
5	1209.38	604.70	1.51	2386.	31662.	1.2	CS-134
6	1323.20	661.62	1.52	1746.	45999.	1.0	CS-137
6B		661.44			159.	5.8	
7C	1591.42	795.76	1.58	1433.	23077.	1.6	CS-134
8C	1603.57	801.83	1.58	1314.	2289.	4.9	CS-134
9C	2335.40	1167.86	1.89	755.	427.	15.1	CS-134
10C	2345.64	1172.98	1.89	672.	26082.	1.3	CO-60
11	2663.96	1332.20	2.00	250.	24074.	1.3	CO-60
12	2729.04	1364.76	1.99	68.	612.	9.0	CS-134
13	2799.79	1400.15	2.22	89.	288.	15.6	BI-214
14	2920.35	1460.45	1.96	62.	846.	7.4	K-40
14B		1460.67			769.	1.7	
15	3527.48	1764.18	1.71	43.	61.	43.8	BI-214C
15B		1764.58			64.	7.3	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

C - MULTIPLET ANALYSIS CONVERGED NORMALLY
B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-92 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

11-JUN-9311:47:02

AMPLE: R4035-8530
DATA COLLECTED ON 11-JUN-93 AT 10:56:30
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<1.66E+00		LLD<1.66E+00		59.54	
AM-243	LLD<4.28E-01		LLD<4.28E-01		74.67	
BA-133	LLD<5.02E-01		LLD<5.02E-01		356.02	
BA-140	LLD<1.39E+00		LLD<1.39E+00		537.27	
BI-212	LLD<2.79E+00		LLD<2.79E+00		727.20	
CEPR144	LLD<2.40E+00		LLD<2.40E+00		133.51	
CO-60	1.11E+02	+-1.51E+00	1.11E+02	+-1.51E+00	1332.50	-0.30
					1173.24	-0.26
CR-51	LLD<2.75E+00		LLD<2.75E+00		320.09	
CS-134	7.90E+01	+-1.30E+00	7.90E+01	+-1.30E+00	795.84	-0.09
					604.70	0.00
CS-137	1.34E+02	+-1.43E+00	1.34E+02	+-1.43E+00	661.65	-0.03
EU-152	LLD<7.55E-01		LLD<7.55E-01		1408.01	
EU-154	LLD<6.41E-01		LLD<6.41E-01		1274.45	
EU-154H	LLD<6.42E-01		LLD<6.42E-01		1274.80	
EU-155	LLD<7.46E-01		LLD<7.46E-01		105.31	
FE-59	LLD<8.90E-01		LLD<8.90E-01		1099.25	
131	LLD<3.81E-01		LLD<3.81E-01		364.48	
K-40	3.59E+00	+-2.95E+00	3.59E+00	+-2.95E+00	1460.75	-0.30
LA-140	LLD<1.63E-01		LLD<1.63E-01		1596.20	
MN-54	LLD<3.78E-01		LLD<3.78E-01		834.83	
NA-22	LLD<2.13E-01		LLD<2.13E-01		1274.55	
NB-94	LLD<3.33E-01		LLD<3.33E-01		702.63	
NB-95	LLD<3.66E-01		LLD<3.66E-01		765.78	
NP-237	LLD<1.58E+00		LLD<1.58E+00		86.50	
PB-212	LLD<5.24E-01		LLD<5.24E-01		239.00	
PU-239	LLD<2.29E+03		LLD<2.29E+03		129.30	
PU-241	LLD<7.31E+04		LLD<7.31E+04		148.57	
RA-224	LLD<5.73E+00		LLD<5.73E+00		240.99	
RA-226	LLD<5.48E+00		LLD<5.48E+00		186.10	
RU-103	LLD<3.55E-01		LLD<3.55E-01		497.08	
RU103	LLD<3.73E-01		LLD<3.73E-01		497.08	
RURH106	LLD<6.64E+00		LLD<6.64E+00		621.80	
SB-125	LLD<1.16E+00		LLD<1.16E+00		427.89	
SB-125A	LLD<1.16E+00		LLD<1.16E+00		427.89	
SE-75	LLD<4.02E-01		LLD<4.02E-01		264.66	
SN-113	LLD<5.21E-01		LLD<5.21E-01		391.67	
SR-85	LLD<3.41E-01		LLD<3.41E-01		513.99	
TH-228	LLD<1.68E+01		LLD<1.68E+01		84.37	
TL-208	LLD<4.29E-01		LLD<4.29E-01		583.20	
U-235	LLD<3.30E-01		LLD<3.30E-01		185.71	
Y-88	LLD<1.21E-01		LLD<1.21E-01		1836.06	
ZN-65	LLD<9.90E-01		LLD<9.90E-01		1115.55	
ZR-95	LLD<6.45E-01		LLD<6.45E-01		756.73	
TOTAL	3.28E+02	+-3.84E+00	3.28E+02	+-3.84E+00		

STANDARD DEVIATION = 0.14

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.37E-09 UC/LI
TOTAL MEASURED ACTIVITY = 3.28E+02 (+-3.84E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
95.92	47.94	1202.	10.9	3.92E+01
950.52	475.25	779.	22.9	5.44E+00
1126.42	563.21	2800.	5.4	2.24E+01
1138.61	569.31	4964.	4.6	4.01E+01
1603.57	801.83	2289.	4.9	2.49E+01
2335.40	1167.86	427.	15.1	6.53E+00
2729.04	1364.76	612.	9.0	1.07E+01
2799.79	1400.15	288.	15.6	5.11E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
3527.48	1764.18	61.	43.8	1.27E+00

[redacted] 6-11-93

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

WHC-SD-WM-DP-045
REV 1

11-JUN-9313:05:39

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

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

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

SPECTRAL DATA READ DIRECTLY FROM MULTICHANNEL ANALYZER ANO:
ANALYZED BY: [redacted]

SAMPLE DESCRIPTION: R3943-8730
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 11-JUN-93 AT 12:15:23

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3008. SECONDS
DEAD TIME: 0.27 %

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

ENERGY CALIBRATION PERFORMED 30-MAR-93
EFFICIENCY CALIBRATION PERFORMED 1-APR-93

11-JUN-9313:05:39

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

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	96.41	48.18	1.00	705.	484.	17.2	U-234
2	118.91	59.43	0.92	1312.	1758.	7.2	AM-241,U-237, EU-155
3	172.95	86.45	0.90	1290.	585.	18.4	CS-136, EU-155, EU-155A, PB-214X, TL-208X
4	210.39	105.17	0.94	1456.	427.	26.5	PU-241, EU-155, EU-155B, NP-239
5	246.07	123.01	1.09	1257.	1511.	8.1	EU-152,CO-57, EU-154A
6	1218.59	609.30	1.45	419.	165.	39.5	BI-214A,
6B		609.18			177.	5.7	RU-103
7	1322.95	661.49	1.50	331.	37549.	1.0	CS-137
7B		661.44			159.	5.8	
8	1445.90	722.98	1.39	186.	226.	22.0	SB-124,I-131, AG-108, EU-154D, ZR-95
9	1745.25	872.69	2.36	164.	101.	42.8	EU-154E, RH-106
10	1821.58	910.87	1.68	177.	123.	37.3	AC-228A
10B		910.95			101.	7.7	
11	1937.13	968.66	1.76	155.	71.	58.2	SB-124,
11B		968.67			59.	15.1	AC-228
12	2008.47	1004.34	1.92	138.	165.	26.4	EU-154G, EU-152
13	2345.43	1172.87	2.10	119.	1013.	7.0	CO-60
14	2547.32	1273.86	1.90	67.	309.	13.9	EU-154, EU-154H, NA-22
15	2663.69	1332.07	2.13	67.	969.	6.8	CO-60
16	2919.93	1460.25	2.21	35.	808.	7.3	K-40
16B		1460.67			769.	1.7	
17	3527.34	1764.11	2.49	28.	55.	41.6	BI-214C
17B		1764.58			64.	7.3	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0014
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 22-JUL-92 AT 14:00:00
BACKGROUND LIVE TIME: 60000. SECONDS

11-JUN-9313:05:39

WHC-SD-WM-DP-045
REV 1

AMPLE: R3943-8730
DATA COLLECTED ON 11-JUN-93 AT 12:15:23
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	1.72E+01	+-1.26E+00	1.72E+01	+-1.26E+00	59.54	-0.11
AM-243	LLD<2.73E-01		LLD<2.73E-01		74.67	
BA-133	LLD<2.81E-01		LLD<2.81E-01		356.02	
BA-140	LLD<7.30E-01		LLD<7.30E-01		537.27	
BI-212	LLD<1.66E+00		LLD<1.66E+00		727.20	
CEPR144	LLD<1.46E+00		LLD<1.46E+00		133.51	
CO-60	4.48E+00	+-3.07E-01	4.48E+00	+-3.07E-01	1332.50	-0.43
					1173.24	-0.36
CR-51	LLD<1.64E+00		LLD<1.64E+00		320.09	
CS-134	LLD<1.46E-01		LLD<1.46E-01		795.84	
CS-137	1.09E+02	+-1.24E+00	1.09E+02	+-1.24E+00	661.65	-0.16
EU-152	LLD<5.19E-01		LLD<5.19E-01		1408.01	
EU-154	3.88E+00	+-5.41E-01	3.88E+00	+-5.41E-01	1274.45	-0.59
					123.07	-0.06
					1004.76	-0.42
EU-154H	3.88E+00	+-5.41E-01	3.88E+00	+-5.41E-01	1274.80	-0.94
EU-155	1.75E+00	+-4.63E-01	1.75E+00	+-4.63E-01	105.31	-0.14
					86.54	-0.09
.E-59	LLD<2.87E-01		LLD<2.87E-01		1099.25	
I-131	LLD<2.14E-01		LLD<2.14E-01		364.48	
K-40	LLD<3.04E+00		LLD<3.04E+00		1460.75	
LA-140	LLD<1.35E-01		LLD<1.35E-01		1596.20	
MN-54	LLD<1.29E-01		LLD<1.29E-01		834.83	
~~NA-22~~	~~1.38E+00~~	~~+-1.92E-01~~	~~1.38E+00~~	~~+-1.92E-01~~	~~1274.55~~	~~-0.69~~
NB-94	LLD<1.21E-01		LLD<1.21E-01		702.63	
NB-95	LLD<1.30E-01		LLD<1.30E-01		765.78	
~~NP-237~~	~~5.60E+00~~	~~+-1.03E+00~~	~~5.60E+00~~	~~+-1.03E+00~~	~~86.50~~	~~-0.05~~
PB-212	LLD<3.10E-01		LLD<3.10E-01		239.00	
PU-239	LLD<1.41E+03		LLD<1.41E+03		129.30	
PU-241	LLD<4.51E+04		LLD<4.51E+04		148.57	
RA-224	LLD<3.37E+00		LLD<3.37E+00		240.99	
RA-226	LLD<3.32E+00		LLD<3.32E+00		186.10	
RU-103	LLD<2.07E-01		LLD<2.07E-01		497.08	
RU103	LLD<2.18E-01		LLD<2.18E-01		497.08	
RURH106	LLD<3.08E+00		LLD<3.08E+00		621.80	
SB-125	LLD<7.02E-01		LLD<7.02E-01		427.89	
SB-125A	LLD<7.02E-01		LLD<7.02E-01		427.89	
SE-75	LLD<2.29E-01		LLD<2.29E-01		264.66	
SN-113	LLD<2.94E-01		LLD<2.94E-01		391.67	
SR-85	LLD<2.07E-01		LLD<2.07E-01		513.99	
TH-228	LLD<1.20E+01		LLD<1.20E+01		84.37	
TL-208	LLD<1.85E-01		LLD<1.85E-01		583.20	
U-235	LLD<2.01E-01		LLD<2.01E-01		185.71	
Y-88	LLD<8.74E-02		LLD<8.74E-02		1836.06	
I-65	LLD<3.94E-01		LLD<3.94E-01		1115.55	
ZR-95	LLD<2.48E-01		LLD<2.48E-01		756.73	

570

TOTAL 1.47E+02 +-2.26E+00 1.47E+02 +-2.26E+00

STANDARD DEVIATION = 0.29

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 5.72E-09 UC/LI
TOTAL MEASURED ACTIVITY = 1.43E+02 (+-2.19E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
96.41	48.18	484.	17.2	1.54E+01
1445.90	722.98	226.	22.0	2.24E+00
1745.25	872.69	101.	42.8	1.19E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1218.59	609.30	165.	39.5	1.41E+00
1821.58	910.87	123.	37.3	1.50E+00
1937.13	968.66	71.	58.2	9.13E-01
2919.93	1460.25	808.	7.3	1.48E+01
3527.34	1764.11	55.	41.6	1.14E+00

RUN CALIB

Efficiency performed on 4/1/93
A.K. Dallt
4/1/93

CALIB -- Version 2.06

222-S COUNTING ROOM WESTINGHOUSE HANFORD

WHC-SD-WM-DP-045
REV 1

```
CAL> EFF
MCA UNIT NUMBER (2): 1
ADC UNIT NUMBER (1.0): 1
DETECTOR NUMBER (   12): 4
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 1-APR-93
TIME COLLECT STARTED: 12:00
GEOMETRY NUMBER ( 12): 41
GEOMETRY DESCRIPTION: 22CC LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 441
42B47-A 22CC LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO): N
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :   1.00000
NUMBER OF POINTS:    11
ACTIVITY IN MICROCURIES (YES/NO):

      PEAK    1
              ENERGY:      59.563
              ACTIVITY:    3.687000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D158000
              DECAY TIME ( 0.000000E-01 MINS.):  1-FEB-92
              TIME OF SOURCE CALIBRATION:  12:00
              DECAY TIME:   6.120000E+05 MINS
      EFFICIENCY =  2.550463E-02 (+-  1.311758E-04)

      PEAK    2
              ENERGY:      88.034
              ACTIVITY:    2.065000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D462.6
              DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  7.949910E-02 (+-  4.352131E-04)

      PEAK    3
              ENERGY:     122.061
              ACTIVITY:    1.881000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D271.8
              DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  1.082324E-01 (+-  6.692147E-04)

      PEAK    4
              ENERGY:     165.853
              ACTIVITY:    2.284000E+02
              ACTIVITY ONE SIGMA:   0.000000E-01
              HALF-LIFE:  D137.66
              DECAY TIME ( 6.120000E+05 MINS.):
      EFFICIENCY =  1.044237E-01 (+-  1.227744E-03)
```

SYSTEM EFFICIENCY COEFFICIENTS, PART 1

LOG(EFF) = -5.798443E+01 + 2.284603E+01*LOG(E) - 2.337798E+00*LOG(E)^2

PEAK 5
ENERGY: 391.668
ACTIVITY: 7.301000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D115.09
DECAY TIME (6.120000E+05 MINS.):
EFFICIENCY = 5.422120E-02 (+- 5.866320E-04)

PEAK 6
ENERGY: 513.990
ACTIVITY: 1.252100E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D64.84
DECAY TIME (6.120000E+05 MINS.):
EFFICIENCY = 4.084660E-02 (+- 1.882325E-03)

PEAK 7
ENERGY: 661.650
ACTIVITY: 8.032000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D11020
DECAY TIME (6.120000E+05 MINS.):
EFFICIENCY = 3.647674E-02 (+- 9.170283E-05)

PEAK 8
ENERGY: 898.021
ACTIVITY: 2.014700E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D106.61
DECAY TIME (6.120000E+05 MINS.):
EFFICIENCY = 2.626686E-02 (+- 2.552038E-04)

PEAK 9
ENERGY: 1173.240
ACTIVITY: 1.092600E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1925.3
DECAY TIME (6.120000E+05 MINS.):
EFFICIENCY = 2.150980E-02 (+- 6.404292E-05)

PEAK 10
ENERGY: 1332.500
ACTIVITY: 1.093200E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1925.3
DECAY TIME (6.120000E+05 MINS.):
EFFICIENCY = 1.974500E-02 (+- 6.005783E-05)

PEAK 11
ENERGY: 1836.130
ACTIVITY: 2.135300E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D106.61
DECAY TIME (6.120000E+05 MINS.):
EFFICIENCY = 1.537435E-02 (+- 1.418405E-04)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) = 1.227066E+02 - 7.976722E+01*LOG(E) + 1.920272E+01*LOG(E)^2
- 2.059581E+00*LOG(E)^3 + 8.221420E-02*LOG(E)^4

WHC-SD-WM-DP-045
REV 1

UNDIGESTED SAMPLE ANALYSES

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WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

Batch 924

Lab Segment Serial No. R3975, R3976	Customer ID: SB-77A
Analysis: Acid Digest	Sample Prep: Direct

Instrument: SN F04495	Procedure/ Rev: LA-505-154/B-0 LA-519-151/E-1
Technologist: Bertrand Griffin II Bertrand Griffin II	Date: 6-8-93 8-12-93
Starting Time: 0800	Temperature 950C
Ending Time: 1500	Chemist: Bertrand Griffin II

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3975-8500	11		
2	REAGENT BLANK	NA	12		
3	Sample	R3976-8700	13		
4	APPEAR	R-3976-5002	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	13R10 B/1mL	14R10 B/1mL	21B48 B/1mL	100mL

575

A-6000-881 (03/92)

WHC-SD-WM-DP-045
REV 1

ANALYTICAL BATCH SUMMARY SHEET

METHOD: Acid Digst + Appearance DATE START: 6-9-93

PREPARED BY: [illegible] #1098 DATE COMPLETE: 6-9-93

SPL NAME	SPL ID	ANALYT	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
UNITS:									
STD	R-3976	Acid Dig	100 DE						
SAM	R-3976	↓	1.4642 g/L						
APPEAR	R-3976	↓							

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARATIONS FOR THIS BATCH:

Bertrand Giffin II
8-23-93

ACID DIGESTION ANALYSIS

Serial No.	Sample Point	Date	Time Issued	Priority
R 3975.-8500	BECHTOLD-1	6- 7-93	9:47	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	% RECOVERY	E13975	0

Sample Size	Customer ID
? 1ml eq. in 100ml	STD

Remarks, Calculations, Results
LMCS CHECK SAMPLE
LMCS ID 13N10B
14N10B
21B48B

100ml / 1ml = DF 100

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-9-93	1500	6-10-93 Bertrand Griffin II

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

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-8700	BECHTOLD-1	6- 7-93	9:51	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	G/L	E13975	0

Sample Size	Customer ID
0.0731g in 50ml	SB-77A

Remarks, Calculations, Results
JAR ID# 3976
GRAMS SAMPLE 0.0731g
VOLUME ON COMPLETION 50ml

0.0731g / .05l = 1.4620g/l

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-9-93	1500	6-10-93 Bertrand Griffin II

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

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ACID DIGESTION ANALYSIS

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-5002	BECHTOLD-1	6- 7-93	9:47	24

Determination	Method-Standard	Result Units	Charge Code	Reruns
APPEAR	LA-519-151		E13975	0

Sample Size	Customer ID
? ~265 g in wt. / 260 mL in volume	SB-77A

Remarks, Calculations, Results

_SOLID _LIQUID X MIX.
EST. % SOLIDS 5%
COLOR Brown
_CLEAR _CLOUDY X OPAQ
PHASES 1
EST. SAMPLE WT. 265g.

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

Date	Time Completed	Lab Unit Mgr
6-9-93	1500	6-10-93 Bertrand Griffin II

54-8800-067 (R-10-831)

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WHC-SD-WM-DP-045
REV 1

ACID DIGESTION ANALYSES

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. ~~R3975-6~~ R3976	Customer ID: Bechtold SB-77a
Analysis: ICP	Sample Prep: ACID DIGEST

Instrument: WB39939	Procedure/ Rev: LA-505-151/D-0
Technologist: T.A. FRAZIER [redacted]	Date: 6/14/93
Starting Time: 1500	Temperature N/A
Ending Time: 1630	Chemist: B. WELS

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS STDS	—	11		
2	DIGESTED STDS	R3975-8550	12		
3	Sample Bechtold	R3976-8750	13		
4	HNO3 Reag Blank	—	14		
5	Ending LMCS STDS	—	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
ICPSST1	15N10B DIRECT			
ICPSST2	22B48B DIRECT			
ICPSST3	16N10A DIRECT			

580

A-6000-881 (03/92)

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Batch 955

Serial No.	Sample Point	Date	Time Issued	Priority
R 3975.-8550	BECHTOLD-1	6- 7-93	9:39	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	E13975	0

Sample Size		Customer ID
? 1gl in 100ml 13N10B 14N10B 21B48B	DIGESTED	STD

Remarks, Calculations, Results:

1st STD Digested STD

Undigested- DIRECT

15N10B, 22B48B, 16N10A

SUPER SUPER RUSH

Digested std No gold

Teresa G. Frazier

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs
			✓ Hrs	6/14/93

Date	Time Completed	Lab Unit Mgr
6/14/93	16:30	[signature] Teresa G. Frazier

54-6800-0(1)(R-10-83)

R3975- 8550

Sr 9.71	97.1%	Zr 9.67	96.7%
Ni 4.86	97.2%	Si 10.09	100.9%
Fe 4.79	95.8%	Al 4.66	93.2%
Ca 9.64	96.4%	P 10.49	104.9%
Cr 4.84	96.8%	S 4.75	95.0%
Mg 4.79	95.8%	As 4.79	95.8%
Na 9.57	95.7%	Mo 9.62	96.2%
Cd 9.51	95.1%	Ti 4.80	96.0%
Mn 4.79	95.8%	Be 9.85	98.5%
Sb 4.72	94.4%	Tl 4.71	94.2%

Nd 4.91 98.2%
Sm 4.97 99.4%
Ag 4.55 91.0%
Pb 4.79 95.8%

BEST AVAILABLE COPY

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3976..-8750	BECHTOLD-1	6- 7-93	9:47	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP-LIQ	LA-505-151	uG/ML	E13975	0

Sample Size	Customer ID
?0.0731g in .05l 1.4620g/l -1:1-5-2 (For Al,Fe)	SB-77A

Remarks, Calculations, Results

Zr 4.537E3/1.4620g/l=3.10E3ug/g nec. SUPER SUPER RUSH
Sr 156/1.4620= 107E2
Si 4.9168E4/1.4620=3.36E4
Ni 395E2/1.4620=2.70E2
Ca 7.616E3/1.4620=5.21E3
Cr 2.795E3/1.4620=1.91E3
Nd 1.929E3/1.4620=1.32E3
Sm 1.2255E4/1.4620=8.38E3
Ba 4.73E2/1.4620=3.24E2

Teresa L. Traiger

->OVER

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs 6/14/93

Date	Time Completed	Lab Unit No.	
6/14/93	16:30	[illegible]	Teresa L. Traiger

54-6800-001 (R-10-83)

P 6.381E3/1.4620= 4.36E3
S 7.803E3/1.4620=5.34E3
Mg 4.038E3/1.4620 = 2.76E3
As 1.66E2/1.4620= 1.13E2
Na 8.33E2/1.4620= ~~7.17E2~~ 5.70E2 nec 4/5
Mo 9.28E1/1.4620=6.35E1
Ag 2.77E2/1.4620= 1.89E2 nec 7-11-93
Pb 4.639E3/1.4620=3.17E3
Ti 5.19E2/1.4620=3.55E2
Cd 3.90E2/1.4620=2.67E2
Mn 1.945E3/1.4620=1.33E3
Sb 2.977E3/1.4620=2.04E3
Be 1.16E2/1.4620=7.93E1
Tl 4.380E3/1.4620=3.00E3

R 3976 - 8750

Al (6.0419E4)(6)/1.4620= 2.48E5
Fe (8.0670E4)(6)/1.4620=3.31E5

BEST AVAILABLE COPY

Identity 1: SST1 Identity 2: Quality Control 3:19 PM June 14, 1993

WHC-SD-WM-DP-045
REV 1

Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	-21.722	9707.952	-571.462	-7.599	-103.076	9670.752	4859.863	9.367
S.D.	1.986	16.628	17.039	0.857	8.305	12.005	11.233	7.145
% R.S.D.	9.141	0.171	2.982	11.281	8.057	0.124	0.231	76.272

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	4793.250	9636.878	4839.810	59.906	490.942	111.278	-887.724	9694.698
S.D.	8.120	13.545	6.124	11.262	36.701	8.429	6.407	13.718
% R.S.D.	0.169	0.141	0.127	18.799	7.476	7.575	0.722	0.141

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	15.311	104.309	4787.767	0.346	9573.482	-8.717	1328.230	-0.697
S.D.	35.986	11.574	8.584	5.115	17.551	2.179	20.056	1.052
% R.S.D.	235.030	11.096	0.179	1479.704	0.183	24.999	1.510	151.012

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	7.480	-0.172	9513.486	4761.254	4683.008	4792.644	4722.916	-0.180
S.D.	12.060	1.012	6.518	4.460	33.635	9.790	38.180	0.412
% R.S.D.	161.247	588.049	0.069	0.094	0.718	0.204	0.808	229.129

	Tl (ppb)
Mean	18.125
S.D.	19.465
% R.S.D.	107.390

SIGNATURE BELOW REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 583 TO 594.

Teresa L. Frazier
R3975-6
6/14/93

Identity 1: SST2 Identity 2: Quality Control 3:22 PM June 14, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	3.085	1.262	3349.224	17.641	336.783	-0.558	9.802	4990.565
S.D.	0.917	0.234	11.765	1.545	6.978	0.000	3.925	25.760
% R.S.D.	29.716	18.559	0.351	8.760	2.072	0.000	40.040	0.516

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	-1.597	113.113	3.118	4906.583	3257.726	4884.416	4971.279	-1.134
S.D.	4.043	0.698	4.356	45.261	63.569	6.929	21.548	0.117
% R.S.D.	253.191	0.617	139.717	0.922	1.951	0.142	0.433	10.345

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	-60.660	8.405	2.975	70.859	40.078	-2.516	89.458	4550.144
S.D.	27.702	10.356	0.112	6.336	6.456	1.122	20.089	23.845
% R.S.D.	45.668	123.222	3.765	8.942	16.108	44.612	22.456	0.524

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	4786.923	-0.691	2.568	-1.929	-123.285	0.060	45.297	2.248
S.D.	58.530	0.519	2.099	3.974	42.895	0.415	88.368	0.412
% R.S.D.	1:223	75.073	81.729	206.050	34.793	691.889	195.087	18.330

	Tl (ppb)
Mean	117.026
S.D.	9.249
%.R.S.D.	7.904

Identity 1: SST3 Identity 2: Quality Control 3:25 PM June 14, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	9670.302	1.360	97.371	10087.342	4660.797	0.908	83.475	0.013
S.D.	19.308	0.024	14.955	20.856	15.018	0.654	2.971	2.700
% R.S.D.	0.200	1.786	15.359	0.207	0.322	72.055	3.559	21095.030

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	3.809	-12.063	10.387	-68.184	2291.064	4.071	-174.768	0.254
S.D.	1.490	0.097	4.571	13.066	34.880	9.601	8.475	0.206
% R.S.D.	39.108	0.802	44.003	19.162	1.522	235.853	4.849	81.042

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	10487.349	4754.689	3.234	4788.340	66.131	9621.239	3440.761	267.182
S.D.	173.001	17.913	0.112	36.417	4.188	14.319	48.522	8.389
% R.S.D.	1.650	0.377	3.464	0.761	6.333	0.149	1.410	3.140

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	-96.583	4800.926	-7.437	-0.851	-29.643	2.458	152.582	9849.805
S.D.	7.182	10.517	0.449	4.345	10.578	0.260	85.508	22.049
% R.S.D.	7.436	0.219	6.034	510.686	35.684	10.561	56.041	0.224

	Tl (ppb)
Mean	4714.923
S.D.	24.221
% R.S.D.	0.514

Identity 1: 1 M HNO3 Reag Blank Identity 2: Direct 3:27 PM June 14, 1993
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	22.021	1.640	104.557	69.851	72.274	3.246	12.622	23.399
S.D.	25.306	2.306	53.983	42.953	85.743	6.960	9.058	18.903
% R.S.D.	114.920	140.605	51.630	61.492	118.636	214.394	71.767	80.785

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	-7.617	0.282	6.464	10.592	1111.280	176.883	112.819	4.889
S.D.	3.710	0.335	11.014	111.790	1180.624	219.205	243.130	5.253
% R.S.D.	48.710	118.981	170.394	1055.422	106.240	123.927	215.505	107.447

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	-32.670	-1.609	0.323	-7.950	67.868	-4.763	39.319	40.938
S.D.	23.991	25.023	0.224	14.567	78.390	6.708	34.583	13.642
% R.S.D.	73.433	1554.809	69.282	183.230	115.503	140.837	87.954	33.324

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	62.165	7.390	1.135	6.070	55.857	0.869	24.969	2.608
S.D.	45.694	7.934	3.632	5.460	234.707	1.350	5.175	1.176
% R.S.D.	73.504	107.371	319.930	89.953	420.196	155.273	20.726	45.092

	Tl (ppb)
Mean	312.810
S.D.	404.701
% R.S.D.	129.376

Identity 1: R3975 Dig STD 1-100 Identity 2: 13N10B,14N10B,21B48B 3:29 PM June 14, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	595.231	415.554	400.557	2512.116	471.360	416.793	213.265	495.794
S.D.	2.172	1.287	22.570	6.598	5.479	0.242	4.655	5.401
% R.S.D.	0.365	0.310	5.635	0.263	1.162	0.058	2.183	1.089

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	220.165	760.945	206.892	431.025	411.021	472.904	384.685	426.330
S.D.	7.908	1.653	1.708	12.170	82.595	12.081	12.713	1.390
% R.S.D.	3.592	0.217	0.825	2.824	20.095	2.555	3.305	0.326

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	663.066	317.300	243.835	292.077	831.714	586.646	258.594	145.274
S.D.	23.991	3.057	0.624	2.159	9.099	1.733	16.334	0.865
% R.S.D.	3.618	0.963	0.256	0.739	1.094	0.295	6.317	0.595

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	511.864	295.605	398.661	328.558	289.962	204.802	185.332	589.429
S.D.	32.694	1.272	2.122	2.052	31.339	1.551	59.875	0.947
% R.S.D.	6.387	0.430	0.532	0.624	10.808	0.757	32.307	0.161

	Tl (ppb)
Mean	266.387
S.D.	18.499
% R.S.D.	6.944

Identity 1: R3976 Sam SB-77A Identity 2: 0.0731g in .05 L 3:33 PM June 14, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	4536.657	156.486	-3839.344	49167.781	362529.944	26.702	395.226	-328.949
S.D.	24.253	0.868	46.685	362.628	1917.990	0.160	2.644	8.101
% R.S.D.	0.535	0.555	1.216	0.738	0.529	0.599	0.669	2.463

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	465768.217	7615.853	2795.146	1929.284	1125924.798	-3648.188	12255.270	472.657
S.D.	2136.921	34.487	13.032	84.953	4761.770	49.032	52.927	2.949
% R.S.D.	0.459	0.453	0.466	4.403	0.423	1.344	0.432	0.624

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	6380.903	7803.204	4037.958	165.914	833.451	92.832	1034.749	277.466
S.D.	142.101	31.012	19.696	18.228	10.243	5.571	44.138	8.572
% R.S.D.	2.227	0.397	0.488	10.986	1.229	6.001	4.266	3.089

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	4638.794	519.566	389.733	-279.376	633.996	1945.020	2976.996	115.728
S.D.	40.681	2.155	2.615	9.334	43.327	12.347	52.957	0.779
% R.S.D.	0.877	0.415	0.671	3.341	6.834	0.635	1.779	0.673

	Tl (ppb)
Mean	4379.870
S.D.	118.399
% R.S.D.	2.703

Identity 1: R3976 Sam SB-77A Identity 2: 0.0731g-.05L-1ml-5ml 3:57 PM June 14, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	760.075	26.357	-1608.705	8155.058	60418.662	3.490	67.965	-48.318
S.D.	5.104	0.212	16.297	36.896	276.088	0.527	5.182	0.000
% R.S.D.	0.672	0.803	1.013	0.452	0.457	15.099	7.625	0.000

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	80669.818	1317.841	474.129	306.981	188175.521	-586.371	2046.401	78.848
S.D.	299.092	5.420	2.226	6.419	818.096	4.800	22.019	0.588
% R.S.D.	0.371	0.411	0.469	2.091	0.435	0.819	1.076	0.745

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	982.945	1248.994	687.524	24.541	147.572	9.796	211.798	41.837
S.D.	36.647	2.908	2.532	18.904	5.799	2.035	14.509	1.537
% R.S.D.	3.728	0.233	0.368	77.028	3.930	20.779	6.850	3.674

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	817.150	85.687	68.864	-48.841	112.856	329.896	497.023	18.524
S.D.	5.743	0.585	2.498	0.614	30.126	1.142	56.725	0.467
% R.S.D.	0.703	0.682	3.628	1.256	26.694	0.346	11.413	2.522

	Tl (ppb)
Mean	789.151
S.D.	27.968
% R.S.D.	3.544

Identity 1: R3976 Spk SB-77A Identity 2: 1ml-5ml (std 1ml ea) 4:03 PM June 14, 1993
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	2387.669	1656.144	-8.758	10165.782	62481.703	1654.154	893.592	779.543
S.D.	14.156	4.817	29.945	47.569	198.432	6.186	3.404	0.000
% R.S.D.	0.593	0.291	341.919	0.468	0.318	0.374	0.381	0.000

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	83105.143	3670.603	1312.072	1153.664	192300.959	280.090	2635.445	1712.870
S.D.	324.996	17.059	10.425	25.999	747.053	13.364	23.594	6.484
% R.S.D.	0.391	0.465	0.795	2.254	0.388	4.771	0.895	0.379

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	2866.233	2102.501	1520.702	844.086	1793.758	1628.732	979.930	862.745
S.D.	66.066	27.074	4.754	14.701	11.081	3.280	6.447	7.343
% R.S.D.	2.305	1.288	0.313	1.742	0.618	0.201	0.658	0.851

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	1618.325	895.888	1651.655	753.720	802.959	1142.839	1443.388	1657.056
S.D.	19.573	3.846	4.143	6.540	45.016	2.149	48.032	4.441
% R.S.D.	1.209	0.429	0.251	0.868	5.606	0.188	3.328	0.268

	Tl (ppb)
Mean	1529.901
S.D.	0.000
% R.S.D.	0.000

Identity 1: HNO3 Reag Blank Identity 2: Direct 4:10 PM June 14, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	2.351	0.224	11.970	-3.145	15.114	0.384	5.924	6.249
S.D.	1.165	0.128	8.305	4.943	6.580	0.105	3.304	2.700
% R.S.D.	49.561	57.282	69.380	157.181	43.537	27.270	55.765	43.213

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	-10.074	-0.221	0.579	3.764	144.619	16.071	2.778	0.489
S.D.	6.849	0.000	1.708	18.785	36.701	6.350	8.918	0.135
% R.S.D.	67.989	0.000	294.893	499.093	25.378	39.513	321.066	27.712

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	-44.666	-19.712	0.194	0.346	18.077	-2.067	22.606	0.002
S.D.	11.995	7.338	0.194	7.644	4.855	0.467	7.231	0.692
% R.S.D.	26.856	37.228	99.999	2211.094	26.860	22.595	31.988	29729.747

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	5.356	0.130	-0.778	-2.836	-102.928	-0.240	-17.945	0.270
S.D.	13.547	0.075	1.655	1.747	10.578	0.052	50.289	0.156
% R.S.D.	252.933	57.438	212.536	61.579	10.277	21.658	280.247	57.735

	Tl (ppb)
Mean	-36.371
S.D.	9.249
% R.S.D.	25.431

Identity 1: SST1 Identity 2: Quality Control 4:12 PM June 14, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	0.002	9741.066	-508.171	27.291	-75.851	9602.339	4929.447	23.399
S.D.	24.654	63.856	50.270	44.628	85.905	185.008	69.299	15.035
% R.S.D.	1099060.313	0.656	9.892	163.528	113.256	1.927	1.406	64.256

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	4840.059	9695.360	4886.888	72.803	1564.165	278.490	-785.081	9733.594
S.D.	15.504	57.083	48.246	76.576	1119.843	216.951	248.210	75.122
% R.S.D.	0.320	0.589	0.987	105.182	71.594	77.903	31.616	0.772

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	-12.678	126.648	4820.429	18.320	9545.499	-3.864	1379.706	13.681
S.D.	36.647	17.788	29.320	3.168	67.821	5.567	78.097	12.751
% R.S.D.	289.057	14.045	0.608	17.293	0.711	144.065	5.660	93.206

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	41.990	5.661	9653.310	4792.396	4878.435	4843.156	4789.546	0.899
S.D.	52.763	7.214	150.816	12.551	188.465	30.184	109.747	1.021
% R.S.D.	125.656	127.429	1.562	0.262	3.863	0.623	2.291	113.578

	Tl (ppb)
Mean	367.307
S.D.	363.361
% R.S.D.	98.926

Identity 1: SST2 Identity 2: Quality Control 4:14 PM June 14, 1993

Task name : TWC93

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-045
REV 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	11.745	2.411	4146.295	32.735	370.976	2.199	1.060	5007.714
S.D.	2.260	0.665	14.606	2.227	7.755	0.735	2.750	12.375
% R.S.D.	19.240	27.596	0.352	6.803	2.090	33.446	259.425	0.247

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	2.703	115.906	5.771	4823.128	3307.200	4962.821	5010.117	0.254
S.D.	5.230	0.730	1.399	62.842	28.733	13.364	12.509	0.591
% R.S.D.	193.469	0.630	24.240	1.303	0.869	0.269	0.250	232.297

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	-8.680	20.345	3.622	106.461	21.165	-0.629	17.258	4411.662
S.D.	31.737	7.028	0.224	10.892	3.522	1.021	20.189	67.748
% R.S.D.	365.654	34.547	6.186	10.231	16.639	162.325	116.984	1.536

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	4816.125	0.908	1.960	2.269	-107.000	1.259	98.375	3.507
S.D.	50.427	0.714	0.807	0.937	19.632	0.270	46.577	0.156
% R.S.D.	1.047	78.621	41.140	41.307	18.347	21.427	47.346	4.441

	Tl (ppb)
Mean	179.597
S.D.	18.166
% R.S.D.	10.115

Identity 1: SST3 Identity 2: Quality Control 4:16 PM June 14, 1993

WHC-SD-WM-DP-045
REV 1

Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Li (ppb)	Ni (ppb)	La (ppb)
Mean	9658.118	1.598	39.885	10005.686	4683.119	0.908	82.558	1.572
S.D.	18.747	0.084	14.385	19.362	8.413	0.277	4.597	7.145
% R.S.D.	0.194	5.263	36.066	0.194	0.180	30.527	5.568	454.526

	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)	Ce (ppb)	Sm (ppb)	Ba (ppb)
Mean	14.006	-5.025	16.156	-74.380	2325.316	14.471	-184.015	1.017
S.D.	2.052	0.349	2.644	22.061	32.959	1.386	16.645	0.237
% R.S.D.	14.652	6.942	16.364	29.661	1.417	9.576	9.045	23.316

	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)	Mo (ppb)	Se (ppb)	Ag (ppb)
Mean	10619.299	4804.374	4.851	4806.660	46.639	9666.261	3432.739	98.847
S.D.	203.923	42.758	0.000	16.076	1.737	30.849	18.198	17.291
% R.S.D.	1.920	0.890	0.000	0.334	3.724	0.319	0.530	17.492

	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)	Mn (ppb)	Sb (ppb)	Be (ppb)
Mean	-123.130	4809.006	-7.952	-1.418	-117.178	3.957	267.772	9854.750
S.D.	36.228	7.767	1.066	2.195	27.538	0.450	62.102	23.761
% R.S.D.	29.423	0.162	13.404	154.764	23.501	11.363	23.192	0.241

	Tl (ppb)
Mean	4751.254
S.D.	12.110
% R.S.D.	0.255

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 959

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R 3976	Customer ID: SB-77a
Analysis: At	Sample Prep: acid digestion

Instrument:	WB27809	Procedure/ Rev:	LA-508-101 (D-0)
Technologist:	SUE LAI (Sue Lai)	Date:	6-14-93
Starting Time:	14: 00	Temperature	25°C
Ending Time:	15: 15	Chemist:	S. Carlson

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3975-8525	11		
2	REAGENT BLANK		12		
3		~~R3976~~ (R) 6-14-93	13		
4	Sample	R3976-8725	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	65B51 (10ml)			

595

A-6000-881 (03/93)

TOTAL ALPHA ANALYSIS - ACID DIGESTION

3-4

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-8725	BECHTOLD-1	RUSH	9:47	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
AT	LA-508-101	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100 λ	SB-77A

Remarks, Calculations, Results:

COUNT AS uCI/L
USE 13,14,15 OR 16

$\frac{5.33 \times 10^{2}\ uCi/L}{1.462} = 3.65 \times 10^{2}\ uCi/g$

$\frac{5.52 \times 10^{2}\ uCi/L}{1.462} = 3.78 \times 10^{2}\ uCi/g$

$\bar{x} = 3.71 \times 10^{2}\ uCi/g_{rec}$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	KRaymond			
Hrs	Hrs 6-14-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6-14-93	15:15		6/15

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

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

14 2" 6-14-93 VR F3-4 R3976-3725

836618 / 30 - .3

778126 / 30

Alpha Calculation by VR on 06-14-1993 at 22:54:38
Det 814 2 -inch count Alpha eff. : .2274
Sample size : .1 mL Dilution : 1

Count # 1

836618 / 30 - 0.3 = 5.5241E+02 uCi/L alpha

$\bar{x}$ 5.23075 x10²

Count # 2

778126 / 30 - 0.3 = 5.1378E+02 uCi/L alpha

9 2" 6-14-93 VR

264894 / 10 - .7

241017 / 10 -

Alpha Calculation by VR on 06-14-1993 at 23:02:23
Det 89 2 -inch count Alpha eff. : .2063
Sample size : .1 mL Dilution : 1

Count # 1

264894 / 10 - 0.7 = 5.7837E+02 uCi/L alpha

Count # 2

$\bar{x}$ 5.62305 x10²

241017 / 10 - 0.7 = 5.2624E+02 uCi/L alpha

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

1-2

Serial No.	Sample Point	Date	Time Issued	Priority
R 3975.-8525	BECHTOLD-1	6- 7-93	9:39	24

RUSH

Determination	Method/Standard	Result	Charge Code	Reruns
AT	LA-508-101	% RECOVERY	E13975	0

Sample Size	Customer ID
? 10 ml	STD

Remarks, Calculations, Results

S510 EV-CRB

STD# 65B51 RESULT 1.36 x10^-2

STD VAL 1.5398E-2 %REC 88.32%

Sue Lai

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond			
Hrs	Hrs	Hrs	Hrs	Hrs
	6-14-93			
Date	Time Completed	Lab Unit Mgr		
6-14-93	15:15			6/15

34-6800-061 (R-10-83)

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TOTAL ALPHA ANALYSIS - ACID DIGESTION

14 2" 6-14-93 VR

$\frac{1974}{30} - .3$

$\frac{2175}{30} -$

9 2" 6-14-93 VR

$\frac{1779}{30} - .7$

$\frac{1965}{30} -$

#1-2 R3975-8525

Alpha Calculation by VR on 06-14-1993 at 22:05:39
Det #14 2 -inch mount Alpha eff. : .2274
Sample size : 10 mL Dilution : 1

Mount # 1

$\frac{1974}{30} - 0.3 = 1.2975E-02$ uCi/L alpha

Mount # 2 1.3639×10^{-2}

$\frac{2175}{30} - 0.3 = 1.4302E-02$ uCi/L alpha

Alpha Calculation by VR on 06-14-1993 at 22:06:27
Det #9 2 -inch mount Alpha eff. : .2063
Sample size : 10 mL Dilution : 1

Mount # 1

$\frac{1779}{30} - 0.7 = 1.2795E-02$ uCi/L alpha

Mount # 2

$\frac{1965}{30} - 0.7 = 1.4149E-02$ uCi/L alpha

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CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 14

RADIONUCLIDE: Am-241
HALF LIFE: 154497
COUNT TIME: 5
CPM BKG: 0.5

TIME ZERO DATE (HD): 15897
DATE COUNTED (HD): 16973
10-15-92

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

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
36B40A8	1	03/16/91		87483	87372	87925	88316
36B40B7	1	03/16/91		159352	158460	159108	159191
36B40C7	1	03/16/91		230843	230757	230921	232459
36B40A3	2	03/16/91		69454	69575	69518	69568
36B40B3	2	03/16/91		128127	127361	127118	127197
36B40C3	2	03/16/91		179974	179903	181057	180724
36B40A6	5	03/16/91		69515	69809	69580	69692
36B40B6	5	03/16/91		143043	143396	144729	141218
36B40C5	5	03/16/91		197772	197178	197963	197369

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STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A8	1"	60570	17554	1.00	17639	0.2912
36B40B7	1"	109900	31805	1.00	31959	0.2908
36B40C7	1"	159700	46249	1.00	46472	0.2910

AVERAGE, 1" = 0.2910 +/- @95% 0.0004 0.14 % ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A3	2"	61800	13905	1.00	13973	0.2261
36B40B3	2"	110700	25490	1.00	25613	0.2314
36B40C3	2"	161400	36082	1.00	36257	0.2246

AVERAGE, 2" = 0.2274 +/- @95% 0.0069 3.05 % ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
36B40A6	5"	59470	13929	1.00	13997	0.2354
36B40B6	5"	109800	28619	1.00	28757	0.2619
36B40C5	5"	160100	39514	1.00	39705	0.2480

AVERAGE, 5" = 0.2484 +/- @95% 0.0260 10.48 % ON 03/16/91

NEW EFFS FOR DET 14 Am-241 1" = 0.2910 2" = 0.2274

5" = 0.2484

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WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

Batch 954

Lab Segment Serial No. R 3976	Customer ID: SB-77A
Analysis: U	Sample Prep: ACID DIGEST

Instrument: UB88807	Procedure/ Rev: LA-925-106/B-0
Technologist: TANIA BATES [redacted]	Date: 6-16-93
Starting Time: 1100	Temperature 230C
Ending Time: 1200	Chemist: S. CATLOW

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R 3975-8740	11		
2	REAGENT BLANK	N/A	12		
3	SAMPLE	R 3976-8740	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	126B38 .100 ml			
SPIKE	90B38 .100 ml			

602

A-6000-NH1 103/221

Tania Bates 6-16-93

09130001-1531

URANIUM ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3975.-8540	BECHTOLD-1	6- 7-93	9:39	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	E13975	0

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

Remarks, Calculations, Results:

S267 UF1C
STD# 126838 RESULT 3.07 → 26 F-11-93
STD VAL %REC ~~100%~~ 101 ~~%~~

SUPER SUPER RUSH

SPIKE ID/VAL 90838/6.25 -4 g/l
SPIKE VOL. .100 ml

.14
.42

Donna Battie

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs
Date	Time Completed	Lab Unit Mgr		
6-16-93	1200	Leslie Dix	Leslie Dix	

24-6800-061 (R-10-83)

R 3975 - 8540

$$\frac{.14(.1)(1010)(6.25^{\times 10^{-4}})}{\frac{5.7}{5.6}\,.42 - .14} = 3.07^{E-2}$$

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URANIUM ANALYSIS - ACID DIGESTION

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-8740	BECHTOLD-1	6- 7-93	9:47	24

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E13975	0

Sample Size	Customer ID
? ; .100 - 10 - .100 - 10 → .500 ml	SB-77A

Remarks, Calculations, Results

90B38/6.25 -4 g/l
.100 ml

SUPER SUPER RUSH

$$\frac{.18(.10201)(.1)(6.25^{-4})}{\left(\frac{6.15}{6}(.44)-.18(.5)\right)} = \frac{8.58^{-1}\ g/l}{1.462\ g/l} \quad 5.87\ g/l$$

.18
.44

Denise Bates LAD 6-16-93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-16-93	1200	

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

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BATCH 1045

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R3976	Customer ID: SB-77A
Analysis: Hg + A&A	Sample Prep: Acid digestion

Instrument: WB26875	Procedure/ Rev: LA 943-101 / Rev D-2
Technologist: Cynthia Johnson CJohnson [redacted]	Date: 6 / 15 / 93
Starting Time: 0830 hrs	Temperature N/a
Ending Time: 1055 hrs	Chemist: Stan Cotlow

Comments:

	Description	Lab ID		Description	Lab ID
1	Initial LMCS check std	R3975-3411	11		
2	Reagent blank	N/A	12		
3	Sample	R3976-3411	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	63B43 / 100ml			
Hg Spike N/A	/ 100ml			
				606

A-6000-881 (03/92)

9313090.1535

Serial No	Sample Point	Date	Time Issued	Priority
R 3975.-3411	BECHTOLD-1	6- 7-93	9:47	22

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu + AEA	LA-943-101	G/L	E13975	1

Sample Size	Customer ID
? 100-10-250 mt 500λ	STD

Remarks, Calculations, Results

ACID ADJ $\bar{x}$ 1.1965 +10² uG/L

VOL ACID .222 mL Con HNO3

VOL H2O .728 mL H2O 91.5%

std #63B43

Cynthia Johnson

SUPER SUPER RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[illegible]			
Hrs	Hrs	Hrs	Hrs	

Date	Time Completed	Lab Unit Mgr
6/15/93	1055	[illegible]

54-8800-[illegible] (R-10-83)

#2 6-15-93 R 3975-3411

A

$\frac{1587}{10} - 1$ 114.8 uG/L

B

$\frac{1720}{10} - 1$ 124.5 uG/L

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PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

4.3 A) 7934 Replicate analysis 4.4 B) 8154

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-3411	BECHTOLD-1	6- 7-93	9:51	22

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu IAEA	LA-943-101	G/L	E13975	1

Sample Size	Customer ID
? .100 ml Mt 500 λ	SB-77A

Remarks, Calculations, Results:

ACID ADJ.

VOL ACID .221 ml Con HNO3

VOL H2O .979 ml H2O

$\frac{3.40\times10^{2}\ uCi/L}{1.462\ g/L} = 2.32\times10^{2}\ uCi/gree$

SUPER SUPER RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]				
Hrs	Hrs	Hrs 6-15-93 13:50	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6/15/93	1055	

6/15

#1 6-15-93 R 3976-3411

A

$\frac{96569}{5} - 5 \quad \frac{17308.8}{.5} \frac{(10)(2)(1000)}{2.22\times10^{6}} = 3.479\times10^{2}$

B

$\frac{91978}{5} \quad \frac{8390.6(10)(2)(1000)}{.5\ (2.22\times10^{6})} = 3.396\times10^{2}$

$\frac{3.396\times10^{2}\ uCi/L}{1.462\ g/L} = 2323\ uCi/gree$

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[redacted] 6-15-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
R3976-3411 A
File ID: SD7934.SPC

Counted on: 6/15/93 @13: 0
Detector/Geometry number: 7/ 1
Count time: 900. 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	1549.6	1544.7	305.284	305.284	16.000	9.669	8.000	5.825
2	10839.4	10750.2	232.453	232.453	20.000	9.657	10.000	6.696
3	24.9	22.8	152.980	152.980	72.000	2.000	36.000	0.200
4	3.1	1.4	97.470	97.470	24.000	55.005	12.000	12.605
5	2.5	2.3	80.793	80.793	20.000	3.062	10.000	0.679
6	10.7	11.1	29.339	29.339	40.000	22.059	20.000	21.865

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu238	0.1280	5.499	5.507	-0.008	0.05	832.47	5926.26	0.267E-02
	Am241		5.480	5.507	-0.027				0.204E-02
2	Pu239	0.8656	5.143	5.164	-0.021	0.05	5627.72	28845.31	0.130E-01
	Pu240		5.144	5.164	-0.020				0.130E-01
3	Np237	0.0046	4.781	4.791	-0.010	0.01	29.85	173.89	0.792E-04
4		0.0003		4.530		0.26	1.90	9.76	0.439E-05
5		0.0002		4.451		0.01	1.57	8.04	0.362E-05
6	U 238	0.0013	4.200	4.210	-0.010	0.10	8.28	55.09	0.248E-04

DETECTOR CALIBRATION --
Energy(MEV) = 4.072 + (0.0047)*Channel
Energy range (MeV): 4.072 TO 6.478
Efficiency = 0.1951 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	98606.0	100.000
Smoothed	98606.0	100.000
Composite fit	97527.0	98.906
Residuals	1079.1	[illegible]94

Analyzed by: _____

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SPECTRUM SD7934.SPC

1 LEGEND: RAW - .... MODELED PEAKS = 1,2,..., ETC 34709.7

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WHC-SD-WM-DP-045
REV 1

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Raw Data Dump for AEA Spectrum: SP:SB7934.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	1.	0.	0.	3.	5.	9.	6.
21	6.	6.	9.	8.	3.	6.	3.	6.	5.	7.
31	5.	7.	8.	3.	3.	4.	2.	6.	3.	2.
41	1.	3.	2.	1.	3.	1.	0.	1.	3.	1.
51	1.	1.	2.	1.	3.	1.	2.	3.	1.	0.
61	1.	2.	1.	0.	0.	1.	1.	1.	4.	1.
71	3.	4.	3.	1.	0.	6.	3.	6.	1.	3.
81	2.	6.	1.	3.	4.	2.	0.	3.	4.	1.
91	4.	1.	6.	4.	4.	4.	3.	3.	3.	1.
101	5.	4.	3.	3.	1.	1.	5.	3.	3.	3.
111	4.	7.	5.	2.	7.	6.	4.	5.	5.	5.
121	7.	6.	3.	1.	6.	5.	3.	6.	7.	6.
131	6.	6.	6.	7.	4.	4.	8.	4.	6.	9.
141	3.	8.	8.	9.	6.	10.	5.	7.	11.	7.
151	10.	9.	11.	7.	8.	4.	12.	7.	5.	6.
161	7.	10.	9.	6.	9.	6.	11.	13.	13.	15.
171	12.	16.	14.	13.	15.	12.	13.	19.	14.	17.
181	17.	16.	22.	16.	16.	11.	25.	19.	18.	28.
191	21.	25.	33.	27.	25.	39.	41.	37.	43.	42.
201	48.	59.	46.	71.	73.	69.	89.	105.	106.	132.
211	176.	200.	236.	314.	391.	530.	707.	836.	1104.	1395.
221	1630.	1905.	2285.	2822.	3434.	3978.	4741.	5520.	6017.	6383.
231	6677.	6535.	6020.	5350.	4474.	3671.	2605.	1658.	1140.	672.
241	413.	199.	120.	55.	24.	11.	6.	1.	2.	6.
251	2.	3.	2.	3.	1.	3.	2.	0.	3.	3.
261	3.	4.	7.	0.	5.	4.	6.	11.	7.	2.
271	6.	4.	7.	8.	3.	5.	5.	20.	9.	9.
281	7.	9.	17.	21.	35.	30.	48.	63.	100.	117.
291	174.	203.	234.	298.	343.	402.	478.	522.	572.	644.
301	775.	842.	900.	955.	942.	882.	726.	629.	501.	307.
311	223.	135.	86.	47.	21.	8.	4.	2.	2.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
351	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
361	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
481	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

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[redacted] 6-15-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
R3976-3411 B
File ID: SD8154.SPC

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Counted on: 6/15/93 @13: 0
Detector/Geometry number: 6/ 1
Count time: 900. 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	1734.6	1746.1	304.940	304.940	20.000	10.433	10.000	7.304
2	12063.7	12071.5	232.902	232.902	20.000	10.147	10.000	7.581
3	17.5	15.1	158.404	158.404	52.000	2.000	26.000	0.200
4	2.3	0.0	135.148	135.148	16.000	16.164	8.000	6.136
5	2.6	2.3	121.297	121.297	36.000	2.174	18.000	0.055
6	1.4	1.4	67.982	67.982	12.000	1.706	6.000	0.982
7	4.8	4.4	29.228	29.228	16.000	6.973	8.000	16.005

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ee
1	Pu238	0.1285	5.499	5.493	0.006	0.05	944.62	7505.56	0.338E-02
	Am241		5.480	5.493	-0.013				0.259E-02
2	Pu239	0.8676	5.143	5.155	-0.012	0.05	6376.38	36478.13	0.164E-01
	Pu240		5.144	5.155	-0.011				0.164E-01
3	Np237	0.0027	4.781	4.805	-0.023	0.01	19.75	129.85	0.585E-04
4		0.0000		4.695		0.08	0.00	0.00	0.000E+00
5	Np237	0.0009	4.640	4.630	0.010	0.01	6.41	611.26	0.275E-03
6	U 235	0.0001	4.396	4.380	0.016	0.01	0.47	4.76	0.214E-05
7	U 238	0.0003	4.200	4.197	0.003	0.03	1.87	13.89	0.626E-05

DETECTOR CALIBRATION

Energy(MEV) = 4.060 + (0.0047)*Channel
Energy range (MeV): 4.060 TO 6.466
Efficiency = 0.1748 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	110990.0	100.000
Smoothed	110990.0	100.000
Composite fit	110242.5	99.326
Residuals	747.6	0.674

Analyzed by: _____ [redacted]

SPECTRUM SD8154.SPC

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,..., ETC 37743.5

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WHC-SD-WM-DP-045
REV 1

BEST AVAILABLE COPY

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Raw Data Dump for AEA Spectrum: SP:SD8154.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	1.	0.	0.	0.	1.	2.	3.
21	3.	3.	1.	6.	1.	3.	1.	5.	2.	6.
31	5.	1.	0.	1.	2.	1.	0.	0.	2.	1.
41	0.	0.	0.	0.	1.	1.	0.	0.	1.	1.
51	0.	1.	3.	1.	0.	4.	2.	1.	2.	1.
61	1.	2.	0.	2.	3.	4.	1.	4.	1.	2.
71	1.	1.	3.	0.	2.	1.	0.	3.	1.	1.
81	4.	2.	0.	3.	2.	3.	2.	1.	2.	6.
91	1.	1.	2.	3.	2.	3.	3.	1.	2.	4.
101	4.	2.	2.	2.	3.	3.	2.	3.	4.	4.
111	5.	3.	4.	2.	2.	4.	5.	4.	3.	3.
121	6.	4.	4.	2.	5.	4.	1.	0.	4.	2.
131	4.	5.	6.	5.	8.	2.	1.	5.	3.	2.
141	5.	1.	2.	5.	3.	3.	5.	6.	3.	7.
151	3.	7.	4.	5.	7.	7.	11.	8.	9.	2.
161	5.	5.	4.	6.	4.	7.	5.	4.	8.	7.
171	11.	4.	10.	5.	16.	7.	8.	10.	9.	10.
181	12.	14.	10.	13.	9.	14.	17.	16.	19.	19.
191	18.	17.	17.	20.	12.	23.	23.	25.	17.	21.
201	28.	21.	39.	27.	43.	53.	47.	60.	71.	114.
211	122.	135.	212.	298.	400.	509.	608.	816.	1069.	1347.
221	1625.	2014.	2489.	2981.	3561.	4326.	5143.	5806.	6369.	7193.
231	7463.	7337.	6977.	6350.	5420.	4476.	3405.	2534.	1804.	1113.
241	698.	382.	217.	107.	57.	23.	12.	4.	4.	2.
251	2.	1.	2.	0.	0.	2.	1.	0.	3.	0.
261	2.	2.	0.	6.	1.	1.	4.	1.	3.	6.
271	7.	2.	5.	3.	7.	8.	7.	8.	8.	14.
281	5.	11.	18.	11.	23.	27.	64.	91.	95.	129.
291	178.	229.	269.	354.	408.	435.	562.	634.	709.	784.
301	965.	1057.	1032.	1020.	996.	949.	787.	689.	495.	400.
311	265.	168.	101.	47.	29.	13.	4.	3.	0.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
341	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
351	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
361	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
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.								

9313000.1549

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BEST AVAILABLE COPY

APC GEOMETRY STD 5816 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

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DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	80	149	out	146	156	146	152	153				
DM/B-G	Pu	108	227		224	235	224	231	231				
DATE	Am	134	299		295	308	298	303	302				
6-15-93	Cm	158	366		362	376	366	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	out	147	154	150	151	152				
DM/BG	Pu	109	228		227	232	229	230	230				
DATE	Am	135	301		299	306	302	302	302				
6-16-93	Cm	159	369		367	375	371	369	368				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	out	147	155	149	152	153				
DM/B-G	Pu	111	230		228	234	227	231	231				
DATE	Am	137	304		300	308	301	303	302				
6-17-93	Cm	161	372		368	376	370	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	152	out	149	155	150	151	154				
DM/B-G	Pu	111	232		229	235	228	230	231				
DATE	Am	137	305		301	308	302	302	302				
6-18-93	Cm	161	373		369	376	369	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	151	out	150	154	149	151	153				
RD/G	Pu	111	232		231	233	227	231	231				
DATE	Am	137	305		302	306	300	303	302				
6-19-93	Cm	161	373		371	375	369	370	368				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	152		148	155	149	152	153				
RD/G	Pu	110	232		229	235	227	231	230				
DATE	Am	136	305		301	308	301	303	302				
6-20-93	Cm	160	373		369	376	369	370	369				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 956

WHC-SD-WM-DP-045

REV 1

Lab Segment Serial No. R3976	Customer ID: SB-77A
Analysis: Pu 239/40	Sample Prep: Acid Digest

Instrument: WB 57777	Procedure/ Rev: LA 563-1556 D-0
Technologist: TAM Colloch	Date: 6-16-93
Starting Time: 1400	Temperature 24°C
Ending Time: 1800	Chemist: SA Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3975-8581	11		
2	REAGENT BLANK	N/A	12		
3	Sample	R3976-8781	13		
4	Sample Dup	R3976-8841	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	63343-100ml			
Spike	70B43-100ml			
	8-12-93			
				618

A-6000-081 (03/93)

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

3.2 2969

Serial No.	Sample Point	Date	Time Issued	Priority
R 3975.-8581	BECHTOLD-1	6- 7-93	9:39	21

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	E13975	0

Sample Size	Customer ID
? 100-10-100	STD

Remarks, Calculations, Results

EDP R211 AR001

SUPER SUPER RUSH

STD# 63B43 RESULT 13202

STD VAL 130.5 %REC 101.2%

.100 ml Pu 236-70B43 $\frac{4378(27212)(1000)(1010)}{.4181(2.22\times10^6)} = 13202$

"AEA" - 480MIN

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond D Hamilton		Eric Bracken	
Hrs	Hrs	Hrs	Hrs	Hrs
	6-16-93		6-12-93	

Date	Time Completed	Lab Unit Mgr
6-16-93	1800	S M Catt

(4-5800-061) (R 10-83)

#2 R 6-16-93

$\frac{11132}{30} - 2$

R3975-8581

BEST AVAILABLE COPY

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

3.4 4568

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-8781	BECHTOLD-1	6- 7-93	9:47	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 50 uL - 10 mL - 100 uL	SB-77A

Remarks, Calculations, Results

SUPER SUPER RUSH

COUNT AS uCI/L
1 ml 8m HNO_3
.100 ml Pu 236 - 70343

$\frac{.5446(27212)(1000)(2020)}{.3395(2.22\times10^6)} = \frac{4.04\times10^{-2}\,dpm/L}{1.462\,g/L} = 2.77\times10^{-2}\,dpm/g$ "AEA" - 48UM18

ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond	[redacted]	Eric Barclay	
Hrs	Hrs 6-16-93	Hrs	Hrs 6-12-93	Hrs

Date	Time Completed	Lab Unit Mgr
6-16-93	1800	[illegible]

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

#1 VC 6-16-93

$\frac{11556}{30} - 5$

R3976-8781

^{235}Pu

$760.4(.1129) - (640)(.9316) = 24.37$

$\frac{24.37(1000)(2020)}{.9316(2.22\times10^6)} = \frac{23.8\,uCi/L}{1.462\,g/L} = 16.3\,uCi/gm$

BEST AVAILABLE COPY

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

4.1 5488

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-8881	BECHTOLD-1	6- 7-93	9:51	20

Determination	Method. Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E11457	0

Sample Size	Customer ID
? 50 mL - 10 mL - 100 ml	SB-77A

Remarks, Calculations, Results:
DUPLICATE SAMPLE
COUNT AS uCI/L
1 ml 8m HNO3
100 ml P-226 - 70843

"AEA" - 480M
ATTACH PRINTOUT

SUPER RUSH

$\frac{.4639\,(277.12)(1000)(2020)}{.2917\,(2.22\times10^6)} = \frac{401\times10^3\,uCi/L}{1.462\,g/L} = 2.74\times10^2\,uCi/g$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond	D.H. Wilson	Eva Barela	
Hrs	Hrs 6-16-93	Hrs	Hrs 6-17-93	Hrs

Date	Time Completed	Lab Unit Mgr.
6-16-93	1800	S.M. Watts

#3 ve 6-16-93
$\frac{13380}{30} - 5$

R 3976 - 8881

$882.0\,(.2427) - 660\,(.9284) = 152.79$

$\frac{152.79\,(1000)(2020)}{.9284\,(2.22\times10^6)} = \frac{149.7\,uCi/L}{1.462\,g/L} = 102.4\,uCi/g$

BEST AVAILABLE COPY

Em Berube
6-17-93

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-3975-8581
File ID: SD2969.SPC

Counted on: 6/17/93 @ 0: 0
Detector/Geometry number: 2/ 1
Count time: 30000. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	2360.0	2417.5	364.973	364.973	24.000	17.374	12.000	7.524
2	785.5	782.2	305.499	305.499	24.000	18.857	12.000	7.985
3	2589.3	2591.4	231.792	231.792	24.000	16.495	12.000	7.254
4	7.2	9.2	124.719	124.719	104.000	2.000	52.000	0.200
5	3.1	2.3	73.044	73.044	48.000	119.891	24.000	45.168

PEAK RESULTS

eak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.4181	5.756	5.769	-0.013	0.08	52.86	0.01	0.415E-08
	Cm243		5.786	5.769	0.017				0.557E-08
2	Pu238	0.1403	5.499	5.495	0.004	0.09	17.74	0.00	0.189E-08
	Am241		5.480	5.495	-0.015				0.145E-08
3	Pu239	0.4378	5.143	5.156	-0.013	0.08	55.35	0.01	0.425E-08
	Pu240		5.144	5.156	-0.012				0.425E-08
4	Np237	0.0028	4.640	4.664	-0.024	0.01	0.35	0.00	0.454E-09
5	U 235	0.0009	4.396	4.426	-0.030	0.55	0.12	0.00	0.161E-10

DETECTOR CALIBRATION

Energy(MEV) = 4.090 + (0.0046)*Channel
Energy range (MeV): 4.090 TO 6.445
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	63895.0	100.000
Smoothed	63894.0	99.999
Composite fit	63208.6	98.926
Residuals	685.5	1.073

Analyzed by: [redacted]

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          SPECTRUM SD2969.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                9378.6
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Raw Data Dump for AEA Spectrum: SP:SD2969.SPC

1	0.	0.	0.	0.	0.	1.	1.	0.	0.	2.
11	2.	2.	1.	0.	2.	2.	1.	2.	0.	1.
21	1.	1.	2.	2.	0.	2.	1.	1.	0.	1.
31	3.	0.	0.	0.	1.	0.	0.	1.	0.	1.
41	1.	0.	4.	2.	3.	2.	1.	3.	1.	3.
51	1.	1.	4.	1.	1.	1.	3.	1.	3.	5.
61	2.	1.	2.	1.	3.	1.	1.	2.	1.	4.
71	5.	2.	3.	1.	2.	3.	1.	2.	2.	4.
81	1.	1.	3.	1.	1.	2.	2.	6.	4.	1.
91	2.	1.	3.	5.	1.	2.	2.	2.	1.	3.
101	2.	1.	5.	3.	2.	1.	2.	0.	1.	6.
111	4.	7.	2.	2.	2.	1.	2.	2.	3.	2.
121	7.	3.	2.	4.	2.	5.	4.	3.	2.	1.
131	1.	4.	2.	2.	0.	2.	5.	4.	2.	4.
141	3.	4.	1.	5.	7.	2.	8.	8.	3.	6.
151	6.	1.	1.	7.	6.	6.	7.	8.	8.	6.
161	13.	5.	6.	4.	8.	7.	8.	3.	8.	7.
171	12.	13.	9.	9.	9.	17.	6.	10.	14.	14.
181	17.	11.	14.	22.	24.	18.	22.	17.	16.	23.
191	15.	23.	25.	27.	16.	25.	33.	22.	37.	43.
201	46.	59.	43.	69.	79.	98.	91.	94.	149.	147.
211	190.	199.	244.	259.	345.	362.	450.	513.	576.	685.
21	765.	890.	970.	1041.	1160.	1231.	1282.	1351.	1307.	1435.
31	1502.	1428.	1323.	1129.	1146.	948.	800.	651.	542.	408.
241	298.	217.	180.	113.	71.	51.	47.	43.	37.	38.
251	45.	45.	45.	56.	61.	42.	58.	64.	57.	62.
261	45.	49.	32.	34.	51.	34.	30.	21.	20.	41.
271	20.	22.	23.	35.	15.	18.	17.	13.	27.	25.
281	33.	43.	36.	50.	48.	64.	98.	87.	115.	107.
291	145.	148.	237.	213.	261.	279.	308.	369.	322.	342.
301	389.	450.	421.	478.	407.	422.	408.	331.	336.	277.
311	243.	247.	191.	145.	123.	83.	95.	67.	53.	40.
321	34.	29.	17.	22.	39.	22.	36.	28.	35.	27.
331	27.	35.	26.	35.	50.	41.	57.	58.	82.	79.
341	82.	103.	114.	158.	199.	239.	276.	289.	407.	463.
351	503.	591.	676.	740.	815.	893.	960.	1095.	1108.	1250.
361	1202.	1300.	1278.	1290.	1282.	1151.	1191.	1116.	976.	792.
371	649.	569.	463.	352.	270.	170.	110.	81.	52.	39.
381	20.	11.	3.	2.	4.	3.	1.	0.	0.	0.
391	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	1.	0.	0.	0.	0.	1.	1.	0.	0.
411	2.	0.	1.	1.	0.	0.	1.	0.	0.	1.
421	0.	0.	0.	0.	0.	0.	2.	0.	1.	0.
431	0.	1.	2.	2.	2.	0.	1.	1.	1.	0.
441	0.	0.	1.	0.	1.	0.	0.	1.	0.	0.
451	0.	0.	1.	1.	1.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.
471	0.	0.	0.	2.	0.	0.	1.	0.	3.	2.
481	1.	2.	2.	2.	0.	3.	1.	1.	0.	1.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

Em Bowler
6-17-93

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
R-3976-8781
File ID: SD4568.SPC

Counted on: 6/17/93 @ 0: 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	2266.4	2232.7	363.155	363.155	16.000	6.560	8.000	3.184
2	743.5	740.1	304.790	304.790	20.000	7.233	10.000	3.779
3	3869.0	3828.5	231.187	231.187	16.000	7.209	8.000	4.726
4	7.0	7.7	143.112	143.112	104.000	2.000	52.000	0.200

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.3395	5.756	5.771	-0.015	0.03	33.83	265.94	0.120E-03
	Cm243		5.786	5.771	0.015				0.161E-03
2	Pu238	0.1129	5.499	5.502	-0.003	0.03	11.25	120.35	0.542E-04
	Am241		5.480	5.502	-0.022				0.415E-04
3	Pu239	0.5446	5.143	5.164	-0.021	0.03	54.25	417.99	0.188E-03
	Pu240		5.144	5.164	-0.020				0.188E-03
4		0.0030		4.758		0.01	0.30	2.31	0.104E-05

DETECTOR CALIBRATION

Energy(MEV) = 4.100 + (0.0046)*Channel
Energy range (MeV): 4.100 TO 6.455
Efficiency = 0.1298 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	50793.0	100.000
Smoothed	50792.7	99.999
Composite fit	49815.8	98.076
Residual	976.9	1.923

Analyzed by: _____

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          SPECTRUM SD4568.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC            12996.0

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Raw Data Dump for AEA Spectrum: SP:SD4568.SPC

1	0.	0.	0.	0.	0.	0.	1.	0.	0.	2.
11	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
31	0.	0.	2.	1.	0.	0.	0.	0.	2.	1.
41	1.	0.	0.	1.	0.	0.	0.	2.	0.	0.
51	0.	1.	0.	1.	0.	1.	1.	0.	0.	0.
61	1.	1.	0.	1.	1.	0.	0.	0.	1.	0.
71	2.	1.	0.	0.	0.	0.	0.	1.	2.	2.
81	1.	4.	2.	0.	1.	2.	2.	0.	2.	1.
91	0.	0.	0.	0.	0.	3.	1.	1.	0.	0.
101	0.	2.	2.	2.	0.	2.	1.	0.	1.	2.
111	1.	1.	2.	3.	3.	0.	0.	3.	2.	0.
121	2.	2.	0.	3.	3.	2.	0.	2.	2.	0.
131	1.	4.	2.	1.	3.	1.	2.	4.	3.	4.
141	2.	5.	4.	3.	1.	2.	3.	4.	1.	1.
151	5.	1.	7.	2.	4.	4.	3.	6.	1.	4.
161	2.	3.	2.	4.	7.	2.	7.	2.	7.	5.
171	4.	7.	8.	8.	6.	7.	7.	9.	12.	8.
181	9.	6.	11.	7.	15.	17.	7.	14.	19.	10.
191	10.	18.	22.	18.	18.	19.	27.	28.	21.	23.
201	40.	36.	36.	34.	41.	54.	52.	51.	53.	66.
211	87.	96.	97.	131.	198.	262.	320.	391.	482.	559.
221	607.	738.	877.	1004.	1213.	1455.	1839.	2138.	2468.	2550.
231	2572.	2228.	1802.	1275.	788.	437.	219.	85.	31.	11.
241	5.	3.	2.	3.	6.	4.	4.	3.	5.	6.
251	8.	3.	10.	5.	10.	14.	9.	4.	6.	11.
261	6.	4.	8.	5.	7.	5.	12.	9.	9.	6.
271	10.	3.	7.	12.	6.	11.	8.	12.	14.	15.
281	11.	11.	17.	16.	16.	28.	36.	42.	52.	60.
291	89.	105.	140.	169.	193.	207.	231.	198.	268.	252.
301	335.	421.	460.	551.	462.	427.	326.	190.	108.	46.
311	26.	17.	3.	14.	19.	8.	6.	6.	10.	8.
321	4.	8.	5.	9.	6.	17.	12.	19.	16.	14.
331	11.	12.	26.	23.	20.	25.	20.	26.	38.	34.
341	40.	42.	73.	78.	85.	121.	141.	227.	284.	389.
351	486.	576.	678.	612.	603.	557.	582.	718.	860.	1088.
361	1426.	1589.	1601.	1373.	1067.	673.	317.	143.	55.	24.
371	4.	4.	0.	1.	0.	0.	0.	0.	0.	1.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
471	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
481	1.	0.	0.	3.	1.	2.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

Em Barelu
6-17-93

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-3976-8881
File ID: SD5488.SPC

Counted on: 6/17/93 @ 0: 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	2423.1	2469.2	368.677	368.677	24.000	16.309	12.000	7.217
2	2019.8	2035.2	309.156	309.156	24.000	17.837	12.000	8.890
3	4036.2	4039.0	235.751	235.751	24.000	16.041	12.000	7.800
4	4.5	5.8	108.845	108.845	152.000	2.000	76.000	0.200
5	1.3	1.4	81.782	81.782	12.000	1.329	6.000	0.637
6	3.7	3.9	31.650	31.650	20.000	9.803	10.000	2.413

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu236	0.2917	5.756	5.767	-0.011	0.08	52.44	0.01	0.361E-08
	Cm243		5.786	5.767	0.019				0.484E-08
2	Pu238	0.2427	5.499	5.493	0.006	0.08	43.62	0.01	0.409E-08
	Am241		5.480	5.493	-0.013				0.313E-08
3	Pu239	0.4639	5.143	5.155	-0.012	0.07	83.38	0.01	0.562E-08
	Pu240		5.144	5.155	-0.011				0.562E-08
4		0.0012		4.572		0.01	0.22	0.00	0.148E-10
5		0.0001		4.447		0.01	0.02	0.00	0.104E-11
6	U 238	0.0004	4.200	4.217	-0.017	0.05	0.08	0.00	0.702E-11

DETECTOR CALIBRATION
Energy(MEV) = 4.071 + (0.0046)*Channel
Energy range (MeV): 4.071 TO 6.426
Efficiency = ******* CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	90306.0	100.000
Smoothed	90305.9	100.000
Composite fit	89874.4	99.522
Residuals	431.5	0.478

Analyzed by: [redacted]

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          SPECTRUM SD5488.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC              15269.5
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Raw Data Dump for AEA Spectrum: SP:SD5488.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	1.	3.	0.	1.	1.	4.	2.
21	1.	0.	3.	1.	2.	2.	2.	3.	1.	3.
31	3.	2.	2.	3.	2.	1.	1.	0.	2.	1.
41	0.	0.	1.	0.	1.	1.	0.	1.	1.	1.
51	0.	0.	0.	1.	1.	1.	2.	0.	1.	1.
61	1.	0.	0.	0.	0.	3.	2.	0.	0.	1.
71	4.	3.	1.	0.	0.	3.	1.	2.	3.	2.
81	3.	2.	2.	2.	2.	0.	1.	2.	2.	1.
91	3.	0.	2.	1.	1.	3.	0.	0.	0.	2.
101	4.	3.	2.	1.	2.	2.	2.	2.	1.	3.
111	3.	3.	0.	0.	3.	0.	0.	2.	1.	1.
121	2.	2.	4.	3.	0.	5.	2.	2.	0.	4.
131	3.	1.	1.	3.	2.	3.	3.	1.	4.	2.
141	2.	2.	2.	3.	4.	6.	4.	3.	5.	2.
151	10.	6.	4.	3.	8.	4.	6.	5.	9.	5.
161	4.	6.	8.	13.	3.	13.	8.	9.	10.	9.
171	8.	16.	13.	14.	9.	13.	11.	14.	13.	15.
181	20.	14.	15.	19.	22.	21.	22.	18.	15.	19.
191	18.	10.	15.	17.	23.	31.	21.	30.	28.	39.
201	32.	43.	48.	39.	63.	58.	64.	83.	96.	83.
211	94.	122.	153.	202.	247.	290.	314.	389.	470.	579.
21	603.	757.	884.	973.	1181.	1309.	1390.	1586.	1648.	1980.
231	2057.	2120.	2262.	2240.	2268.	2163.	2051.	1848.	1695.	1464.
241	1273.	1036.	771.	610.	490.	321.	249.	173.	118.	69.
251	67.	52.	22.	34.	34.	25.	35.	34.	21.	32.
261	26.	42.	28.	30.	30.	30.	29.	38.	24.	27.
271	24.	27.	31.	28.	30.	27.	31.	33.	35.	27.
281	35.	45.	54.	64.	77.	70.	96.	115.	138.	162.
291	201.	233.	262.	320.	323.	433.	486.	550.	624.	741.
301	778.	864.	969.	1061.	1043.	1079.	1165.	1171.	1064.	1027.
311	978.	922.	810.	730.	632.	501.	380.	307.	257.	228.
321	162.	116.	103.	56.	48.	47.	34.	26.	21.	17.
331	12.	15.	25.	24.	25.	27.	30.	33.	46.	39.
341	55.	43.	50.	71.	96.	111.	144.	139.	188.	231.
351	248.	319.	386.	552.	489.	582.	641.	748.	896.	962.
361	1008.	1059.	1167.	1186.	1269.	1372.	1342.	1314.	1333.	1225.
371	1129.	1041.	910.	770.	636.	473.	400.	288.	204.	122.
381	97.	54.	40.	20.	11.	9.	6.	3.	1.	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.	1.	1.	0.
431	0.	1.	3.	2.	1.	1.	2.	0.	0.	0.
441	1.	0.	1.	0.	0.	2.	0.	0.	0.	1.
451	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.
461	1.	0.	0.	0.	0.	0.	0.	0.	1.	1.
471	1.	0.	1.	1.	0.	1.	0.	0.	1.	1.
481	0.	2.	1.	0.	0.	1.	2.	0.	1.	1.
91	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.
511	0.	0.								

BEST AVAILABLE COPY

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 1
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/18/92
DECAY CORR'N: 2.552 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
243204	5	48631	307	48938	0.4987
243913	5	48773	309	49082	0.5002
244771	5	48944	311	49256	0.5020
243758	5	48742	309	49050	0.4999
243766	5	48743	309	49052	0.4999
243637	5	48717	309	49026	0.4996
243514	5	48693	308	49001	0.4994
243765	5	48743	309	49052	0.4999
243849	5	48760	309	49069	0.5001
244044	5	48799	310	49108	0.5005
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5020				
MIN	0.4987	48754	309	49063	0.5000

BEST AVAILABLE COPY

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 10
TODAY'S DATE: 08/20/92
DECAY CORR'N: 2.557 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

BEST AVAILABLE COPY

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 3
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 9
TODAY'S DATE: 08/19/92
DECAY CORR'N: 2.554 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242920	5	48575	307	48882	0.4981
242932	5	48577	307	48884	0.4982
242052	5	48401	305	48706	0.4964
243038	5	48599	307	48906	0.4984
242907	5	48572	307	48879	0.4981
242795	5	48550	306	48856	0.4979
243214	5	48634	307	48941	0.4988
243707	5	48732	309	49041	0.4998
242647	5	48520	306	48826	0.4976
241653	5	48322	304	48625	0.4955
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998				
MIN	0.4955	48548	306	48855	0.4979

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	80	149	out	146	156	146	152	153				
Dm / B.G.	Pu	108	227		224	235	224	231	231				
DATE	Am	134	299		295	308	298	303	302				
6-15-93	Cm	158	366	↓	362	376	366	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	out	147	154	150	151	152				
Dm / B G	Pu	109	225		227	232	229	230	230				
DATE	Am	135	301		299	306	302	302	302				
6-16-93	Cm	159	369	↓	367	375	371	369	368				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	out	147	155	149	152	153				
Dm / B.G	Pu	111	230		228	234	227	231	231				
DATE	Am	137	304		300	308	301	303	302				
6-17-93	Cm	161	372	↓	368	376	370	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	152	out	149	155	150	151	154				
Dm / B.G	Pu	111	232		229	235	228	230	231				
DATE	Am	137	305		301	308	302	302	302				
6-18-93	Cm	161	373	↓	369	376	369	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	151	out	150	154	149	151	153				
VRD/G	Pu	111	232		231	233	227	231	231				
DATE	Am	137	305		302	306	300	303	302				
6-19-93	Cm	161	373		371	375	369	370	368				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	152		148	155	149	152	153				
VRD/G	Pu	110	232		229	235	227	231	230				
DATE	Am	136	305		301	308	301	303	302				
6-20-93	Cm	160	373		369	376	369	370	369				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH 1053

WHC-SD-WM-DP-045 REV 1

Lab Segment Serial No. R3976	Customer ID: 53-77A
Analysis: Am241	Sample Prep: Acid Digest

Instrument: WB57237	Procedure/ Rev: LA 503-156 D-0
Technologist: TA McGilch	Date: 6-16-93
Starting Time: 0800	Temperature 24°C
Ending Time: 1400	Chemist: SA Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	R3975-8582	11		
2	BLK	N/A	12		
3	Sample	R3976-8782	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	63B43-1ml			
Spike	58B43-.100ml			
				535

A-6000-881 (03/92)

AMERICIUM 241 ANALYSIS - ACID DIGESTION

3.2 2967

Serial No	Sample Point	Date	Time Issued	Priority
R 3975.-8582	BECHTOLD-1	6- 7-93	9:39	24

Determination	Method Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	% RECOVERY	E13975	1

Sample Size	Customer ID
? 100-10-1 ml	STD

Remarks, Calculations, Results:

"AEA" - 480MIN

EDP R201 AR001 ; ATTACH PRINTOUT

STD# 63343 RESULT 30.22

STD VAL 26.815 %REC 112.702 SUPER SUPER RUSH

.100 ml Am 243 - 58843 $\frac{121(.1)(2.5472-3)(101)(100)}{103}$ = 30.22

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	R Wells	D Hamilton		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-16-93	1400	Rahuta

54-6800-06 (15-10-83)

#3 6-16-93 R 3975-8582

$\frac{817}{30}$ -5

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AMERICIUM 241 ANALYSIS - ACID DIGESTION

4.1 5486

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-6782	BECHTOLD-1	6- 7-93	9:47	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/G Rec	E13975	1

Sample Size	Customer ID
? 100-10-1ml	SB-77A

Remarks, Calculations, Results

COUNT AS uCI/L

"AEA" - 480MIN
ATTACH PRINTOUT

.100 ml Am dY3 - 58B43

1489(2.547E-3)(.1)(10.1)(1000) / 152 = 2.526 uCi/L 1.72 x 10^2 uCi/g

SUPER SUPER RUSH

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[illegible]	D.H. Nelson		
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-16-93	1400	[illegible]

6/17

54-6800-061 (R 10-83)

#2 6-16-93 R3976-8782

5348/30 -2

BEST AVAILABLE COPY

D. H. Millsaw
6-17-93

WHC-SD-WM-DP-045
REV 1

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
R3975-8582
File ID: SD2967.SPC

Counted on: 6/16/93 @14: 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	4.3	3.8	355.003	355.003	16.000	9.124	8.000	0.000
2	197.4	196.2	306.243	306.243	24.000	17.965	12.000	9.647
3	158.8	157.4	259.298	259.298	28.000	18.343	14.000	11.838

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1		0.1535		5.728		0.04	1.35	7.12	0.321E-05
2	Pu238	0.4725	5.499	5.503	-0.004	0.08	4.16	30.42	0.137E-04
	Am241		5.480	5.503	-0.023				0.105E-04
3		0.3740		5.287		0.08	3.30	17.33	0.781E-05

DETECTOR CALIBRATION
Energy(MEV) = 4.095 + (0.0046)*Channel
Energy range (MeV): 4.095 TO 6.450
Efficiency = 0.1901 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	4110.0	100.000
Smoothed	4110.0	100.000
Composite fit	4405.6	107.193
Residuals	-295.6	-7.193

Analyzed by: [redacted]

```
          SPECTRUM SD2967.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC                729.5
1
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1.........................................................3..
1.............................3..
12...3.....
1.....2.
1....................2...
1...........................................................2..
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9313090.1568

Raw Data Dump for AEA Spectrum: SP:SD2967.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
21	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.
41	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	1.	1.	0.	1.	1.	0.	0.	0.	0.	1.
61	0.	1.	1.	0.	0.	0.	0.	0.	0.	1.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
81	0.	0.	1.	0.	0.	1.	0.	2.	0.	1.
91	0.	0.	1.	0.	2.	0.	0.	0.	0.	0.
101	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
111	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
121	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.
131	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
141	1.	1.	0.	1.	0.	0.	0.	2.	0.	0.
151	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
161	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.
171	1.	0.	0.	0.	0.	1.	0.	0.	0.	0.
181	0.	0.	3.	1.	1.	0.	1.	1.	0.	1.
191	1.	0.	0.	0.	0.	0.	1.	0.	2.	1.
201	1.	1.	0.	3.	1.	0.	1.	0.	1.	2.
211	2.	1.	3.	1.	1.	1.	3.	0.	1.	3.
221	2.	4.	4.	2.	3.	4.	3.	3.	1.	2.
231	3.	7.	4.	6.	4.	9.	5.	10.	6.	12.
241	11.	14.	16.	31.	26.	44.	30.	27.	58.	44.
251	54.	61.	78.	79.	94.	98.	85.	103.	85.	76.
261	88.	63.	57.	67.	66.	46.	32.	23.	30.	26.
271	16.	21.	12.	8.	13.	8.	6.	3.	7.	9.
281	7.	7.	6.	12.	14.	12.	17.	9.	17.	26.
291	31.	40.	41.	48.	51.	68.	77.	72.	82.	97.
301	91.	96.	119.	121.	112.	107.	94.	107.	95.	87.
311	50.	54.	57.	45.	36.	32.	16.	22.	16.	4.
321	8.	7.	5.	4.	6.	1.	2.	0.	3.	1.
331	1.	1.	0.	1.	3.	1.	2.	2.	2.	0.
341	2.	1.	0.	1.	3.	4.	3.	3.	2.	0.
351	1.	0.	1.	3.	3.	4.	3.	0.	1.	0.
361	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
441	0.	0.	2.	0.	1.	1.	0.	0.	1.	0.
451	0.	0.	0.	0.	1.	1.	1.	0.	1.	0.
461	0.	1.	0.	0.	0.	0.	1.	0.	0.	1.
471	0.	0.	1.	2.	1.	0.	0.	2.	1.	2.
481	3.	0.	3.	4.	2.	1.	2.	3.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

D. Hamilton
6-17-93

WHC-SD-WM-DP-045
REV 1

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
R3976-8782
File ID: SD5486.SPC

Counted on: 6/16/93 @15: 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	8.9	8.4	375.559	375.559	28.000	14.842	14.000	1.986
2	2622.7	2615.3	307.388	307.388	24.000	19.163	12.000	7.987
3	252.6	268.1	261.702	261.702	24.000	13.502	12.000	3.988
4	4.1	3.6	164.929	164.929	112.000	2.000	56.000	0.200
5	2.7	1.7	134.099	134.099	16.000	7.299	8.000	0.084

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm243	0.0047	5.786	5.804	-0.018	0.07	0.31	1.91	0.861E-06
	Cm244		5.796	5.804	-0.008				0.628E-06
2	Pu238	0.8977	5.499	5.491	0.008	0.09	59.90	370.89	0.167E-03
	Am241		5.480	5.491	-0.011				0.128E-03
3		0.0925		5.281		0.06	6.17	27.53	0.124E-04
4		0.0021		4.836		0.01	0.14	0.64	0.287E-06
5		0.0029		4.694		0.03	0.19	0.87	0.391E-06

DETECTOR CALIBRATION
Energy(MEV) = 4.077 + (0.0046)*Channel
Energy range (MeV): 4.077 TO 6.432
Efficiency = 0.2243 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	33465.0	100.000
Smoothed	33466.0	100.000
Composite fit	33361.2	99.687
Residuals	104.8	0.313

Analyzed by: [redacted]

SPECTRUM SD5486.SPC

1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 9946.2

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Raw Data Dump for AEA Spectrum: SP:SD5486.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	0.	1.	0.	0.	1.	0.	1.	0.
21	0.	0.	1.	1.	1.	0.	0.	1.	1.	0.
31	1.	0.	0.	1.	1.	1.	0.	0.	0.	1.
41	0.	0.	0.	0.	2.	6.	0.	0.	0.	0.
51	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.
61	1.	1.	2.	1.	1.	3.	1.	1.	2.	1.
71	1.	2.	0.	3.	1.	0.	0.	1.	0.	0.
81	1.	0.	0.	1.	0.	2.	2.	0.	0.	2.
91	1.	2.	1.	0.	1.	0.	2.	1.	1.	1.
101	1.	2.	4.	0.	3.	1.	1.	2.	1.	2.
111	1.	2.	0.	1.	1.	0.	1.	1.	2.	0.
121	1.	2.	0.	2.	1.	1.	0.	3.	2.	1.
131	2.	2.	3.	4.	1.	3.	0.	1.	1.	1.
141	1.	1.	2.	1.	0.	1.	1.	0.	0.	2.
151	1.	2.	2.	1.	0.	3.	1.	1.	1.	3.
161	2.	2.	3.	2.	3.	2.	1.	3.	0.	2.
171	1.	1.	3.	3.	3.	1.	0.	2.	2.	2.
181	0.	2.	4.	4.	1.	4.	1.	1.	7.	2.
191	0.	3.	1.	3.	0.	4.	1.	4.	4.	3.
201	3.	4.	5.	3.	7.	6.	5.	4.	4.	2.
211	3.	8.	7.	7.	5.	6.	4.	3.	6.	7.
221	2.	4.	9.	6.	13.	17.	5.	7.	10.	15.
231	12.	9.	12.	15.	18.	14.	26.	25.	30.	26.
241	29.	25.	41.	49.	63.	52.	62.	77.	71.	84.
251	84.	103.	106.	132.	123.	152.	150.	150.	151.	134.
261	138.	133.	158.	140.	127.	109.	110.	74.	78.	60.
271	73.	63.	61.	57.	57.	84.	85.	76.	90.	94.
281	125.	115.	135.	150.	186.	168.	230.	271.	296.	345.
291	424.	433.	527.	579.	650.	743.	848.	914.	1013.	1067.
301	1186.	1238.	1359.	1477.	1440.	1489.	1440.	1316.	1324.	1197.
311	1104.	908.	849.	671.	590.	496.	406.	313.	239.	188.
321	171.	105.	84.	65.	41.	23.	20.	17.	11.	7.
331	3.	4.	1.	0.	1.	1.	1.	0.	0.	0.
341	0.	1.	1.	1.	1.	2.	1.	2.	1.	2.
351	2.	5.	3.	0.	1.	3.	1.	3.	3.	1.
361	4.	3.	1.	2.	2.	4.	0.	5.	2.	6.
371	5.	3.	7.	4.	6.	5.	3.	3.	5.	5.
381	1.	2.	0.	4.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
411	1.	1.	0.	0.	0.	0.	0.	0.	0.	1.
421	0.	0.	0.	1.	0.	0.	0.	0.	0.	2.
431	1.	1.	1.	0.	0.	4.	2.	3.	1.	1.
441	1.	2.	2.	0.	2.	1.	1.	0.	2.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
481	0.	1.	1.	1.	0.	0.	0.	3.	1.	0.
491	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

DET #		1	2	3	4	5	6	7	8	JUPITER II			
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	80	149	out	146	156	146	152	153				
DM / B.G.	Pu	108	227		224	235	224	231	231				
DATE	Am	134	299		295	308	295	303	302				
6-15-93	Cm	158	366		362	376	366	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	81	149	out	147	154	150	151	152				
DM / B G	Pu	109	225		227	232	229	230	230				
DATE	Am	135	301		299	306	302	302	302				
6-16-93	Cm	159	369		367	375	371	369	368				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	150	out	147	155	149	152	153				
DM / B G	Pu	111	230		228	234	227	231	231				
DATE	Am	137	304		300	308	301	303	302				
6-17-93	Cm	161	372		368	376	370	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	83	152	out	149	155	150	151	154				
DM / B.G.	Pu	111	232		229	235	228	230	231				
DATE	Am	137	305		301	309	302	302	302				
6-18-93	Cm	161	373		369	376	369	370	369				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	151	out	150	154	149	151	153				
RD/G	Pu	111	232		231	233	227	231	231				
DATE	Am	137	305		302	306	300	303	302				
6-19-93	Cm	161	373		371	375	369	370	368				
JUP AEA #	PK	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4	1.1	1.2	1.3	1.4
SCT/SHIFT	Np	82	152		148	155	149	152	153				
RD/G	Pu	110	232		229	235	227	231	230				
DATE	Am	136	305		301	308	301	303	302				
6-20-93	Cm	160	373		369	376	369	370	369				

NOTE: Np (^{237}Np) peak must be at ch 150 +/- 10 (3.2 - 4.4) or ch 80 +/- 10 (3.1, 1.1 - 1.4)
Pu (^{239}Pu) peak must be at ch 229 +/- 10 (3.2 - 4.4) or ch 113 +/- 10 (3.1, 1.1 - 1.4)
Am (^{241}Am) peak must be at ch 300 +/- 10 (3.2 - 4.4) or ch 139 +/- 10 (3.1, 1.1 - 1.4)
Cm (^{244}Cm) peak must be at ch 368 +/- 10 (3.2 - 4.4) or ch 160 +/- 10 (3.1, 1.1 - 1.4)

BEST AVAILABLE COPY

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 2

STD VALUE:	98530	D/M
TIME ZERO:	01/29/90	
BKG:	10	
TODAY'S DATE:	08/20/92	
DECAY CORR'N:	2.557	YEARS
NEW STD VALUE:	98127	

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242703	5	48531	306	48837	0.4977
243638	5	48718	309	49026	0.4996
243386	5	48667	308	48975	0.4991
243764	5	48743	309	49052	0.4999
244275	5	48845	310	49155	0.5009
244108	5	48812	310	49121	0.5006
244275	5	48845	310	49155	0.5009
243645	5	48719	309	49028	0.4996
243015	5	48593	307	48900	0.4983
244057	5	48801	310	49111	0.5005
243516	5	48693	308	49001	0.4994
243510	5	48692	308	49000	0.4994
243627	5	48715	309	49024	0.4996
243690	5	48728	309	49037	0.4997
243901	5	48770	309	49079	0.5002
244466	5	48883	311	49194	0.5013
FOR	16 TRIALS	AVG	AVG	AVG	AVG
MAX	0.5013				
MIN	0.4977	48735	309	49043	0.4998

BEST AVAILABLE COPY

APC GEOMETRY STD 5B16 (83-17)
COUNTED ON APC # 3
STD VALUE: 98530 D/M
TIME ZERO: 01/29/90
BKG: 9
TODAY'S DATE: 08/19/92
DECAY CORR'N: 2.554 YEARS

NEW STD VALUE: 98127

COUNTS	CNT TIME	C/M	COINC CORR	CORR C/M	GEOM
242920	5	48575	307	48882	0.4981
242932	5	48577	307	48884	0.4982
242052	5	48401	305	48706	0.4964
243038	5	48599	307	48906	0.4984
242907	5	48572	307	48879	0.4981
242795	5	48550	306	48856	0.4979
243214	5	48634	307	48941	0.4988
243707	5	48732	309	49041	0.4998
242647	5	48520	306	48826	0.4976
241653	5	48322	304	48625	0.4955
FOR	10 TRIALS	AVG	AVG	AVG	AVG
MAX	0.4998				
MIN	0.4955	48548	306	48855	0.4979

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch # 1068

WHC-SD-WM-DP-045
REV 1

Lab Segment Serial No. R3976	Customer ID: SB-77A
Analysis: AM241	Sample Prep 6-17-93 Direct Acid Digest

Instrument: WB57237	Procedure/ Rev: LA 503-156 D-0
Technologist: TAM	Date: 6-17-93
Starting Time: 0930	Temperature 24°C
Ending Time: 1400	Chemist: SA Catlow

Comments:

	Description	Lab ID
1	LMCS	R3975-8582
2	BLK	N/A
3	SAMPLE	R3976-8582
4		
5		
6		
7		
8		
9		
10		

	Description	Lab ID
11		
12		
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19		
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	63B43- 1ml			
Spike	58B43- .100 ml			

647

A-6000-881 (03/92)

AMERICIUM 241 ANALYSIS - ACID DIGESTION

3-4 4572

Serial No.	Sample Point	Date	Time Issued	Priority
R 3975.-8582	BECHTOLD-1	6- 7-93	9:39	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-158	% RECOVERY	E13975	2

Sample Size	Customer ID
? 100-10-1 ml	STD

Remarks, Calculations, Results

EDP R201 AR001 **RERUN**

STD# 63343 RESULT 34.55 "AEA" - 480MIN

STD VAL %REC 128.85 % ATTACH PRINTOUT

.100 ml Am 243 - 58343

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[redacted]		[redacted]	
Hrs	Hrs 6-17-93 17:15	Hrs	Hrs 6-18-93 17:00	Hrs CAClark
Date 6-17.93	Time Completed 1400	Lab Unit Mgr		

54-8800-061 (R-10-83)

#1 6-17-93 AB R3975-8582

4145/30 - 6

$$\frac{(920)(.1)(2.347E^{-3})(101)(1000)}{(685)\ (1)}$$

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AMERICIUM 241 ANALYSIS - ACID DIGESTION

4·1 5492

Serial No	Sample Point	Date	Time Issued	Priority
R 3976.-8782	RECHTOLD-1	6- 7-93	9:47	24

Determination	Method-Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/G Rec	E13975	2

Sample Size	Customer ID
? .100 ml	SB-77A

Remarks, Calculations, Results

COUNT AS uCI/L
1 ml 8m HNO3
.100 ml CON HNO3
.100 ml Am 243- 58843

Deleted

RERUN

"AEA" - 480MIN
; ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	[illegible]	[illegible]		
Hrs	Hrs	6-18-93 1215	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr	
6-17-93	1400	CA Clark	CA Clark

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

#3 6-17-93 . R3976-8782

98229-6
10

BEST AVAILABLE COPY

9313000.1578

6-10-93

GENERAL ALPHA ENERGY ANALYSIS
Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
R3975-8582
File ID: SD4572.SPC

Counted on: 6/18/93 @ 8: 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	1343.6	1275.4	301.971	301.971	20.000	8.787	10.000	5.193
2	993.2	944.8	256.222	256.222	16.000	7.893	8.000	4.643

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Pu238	0.5837	5.499	5.482	0.017	0.04	19.98	214.94	0.968E-04
	Am241		5.480	5.482	-0.002				0.742E-04
?	Am243	0.4163	5.234	5.272	-0.038	0.04	14.25	1003.58	0.452E-03

DETECTOR CALIBRATION

Energy(MEV) = 4.093 + (0.0046)*Channel
Energy range (MeV): 4.093 TO 6.448
Efficiency = 0.1291 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	17917.0	100.000
Smoothed	17915.5	99.992
Composite fit	17115.6	95.527
Residuals	799.9	4.465

Analyzed by: [redacted]

93130901.1579

SPECTRUM SD4572.SPC
1 LEGEND: RAW = ... MODELED PEAKS = 1,2,.., ETC 4735.4

9312000.1590

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Raw Data Dump for AEA Spectrum: SP:SD4572.SPC

1	0.	0.	0.	0.	0.	1.	2.	3.	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	1.	0.	0.	0.	0.	0.	1.	0.	0.	0.
41	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.
61	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
71	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
81	2.	0.	0.	0.	0.	0.	1.	0.	1.	0.
91	0.	0.	1.	0.	1.	0.	0.	0.	1.	2.
101	2.	1.	0.	0.	0.	0.	1.	1.	0.	0.
111	1.	0.	1.	2.	0.	0.	0.	0.	0.	2.
121	0.	1.	1.	0.	0.	0.	0.	2.	0.	1.
131	0.	0.	0.	2.	1.	0.	2.	2.	2.	1.
141	1.	0.	0.	0.	1.	1.	2.	1.	0.	1.
151	0.	0.	2.	0.	0.	1.	0.	0.	0.	0.
161	0.	1.	0.	1.	0.	2.	1.	1.	0.	0.
171	0.	0.	2.	1.	1.	0.	0.	0.	1.	0.
181	0.	0.	1.	1.	2.	1.	3.	0.	4.	2.
191	0.	1.	1.	3.	2.	3.	1.	3.	3.	1.
201	3.	1.	4.	3.	2.	3.	3.	5.	6.	9.
211	2.	3.	3.	2.	9.	4.	6.	9.	10.	10.
21	14.	14.	18.	10.	12.	12.	9.	13.	26.	20.
231	37.	28.	26.	34.	23.	40.	41.	38.	54.	58.
241	75.	88.	109.	121.	163.	145.	175.	252.	256.	294.
251	352.	405.	567.	610.	662.	685.	560.	460.	295.	169.
261	100.	68.	50.	38.	46.	34.	40.	29.	28.	28.
271	27.	21.	27.	25.	28.	22.	35.	25.	34.	43.
281	56.	58.	42.	62.	94.	88.	93.	125.	138.	178.
291	240.	288.	267.	332.	385.	403.	505.	605.	775.	870.
301	920.	854.	708.	567.	386.	216.	162.	118.	111.	86.
311	72.	51.	37.	33.	17.	11.	6.	0.	2.	1.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.
341	0.	0.	0.	1.	1.	1.	4.	1.	0.	0.
351	1.	1.	1.	1.	0.	0.	1.	2.	3.	0.
361	0.	0.	3.	2.	1.	3.	1.	1.	1.	1.
371	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.
441	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
451	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
471	0.	0.	0.	0.	0.	0.	1.	0.	1.	0.
481	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

[redacted] 6-18-93
A Johansen

G E N E R A L A L P H A E N E R G Y A N A L Y S I S

Rev. 1.10

DATA REDUCTION REPORT

WHC-SD-WM-DP-045
REV 1

SAMPLE
R3976-8782
File ID: SD5492.SPC

Counted on: 6/18/93 @ 8: 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	106.9	112.4	441.394	441.394	28.000	19.881	14.000	6.718
2	398.8	389.9	374.240	374.240	24.000	19.109	12.000	4.188
3	159862.3	161213.8	306.265	306.265	28.000	21.203	14.000	7.219
4	118.1	104.2	84.053	84.053	336.000	2.000	168.000	0.200
5	105.3	109.7	29.033	29.033	28.000	20.924	14.000	16.790

9313090.1582

PEAK RESULTS

Peak ID	Isotope	AEA Fract.	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	d/m	Activity uCi/ea
1	Cm242	0.0007	6.115	6.098	0.017	0.09	2.77	16.21	0.730E-05
2	Cm244	0.0028	5.796	5.789	0.007	0.09	11.34	49.16	0.221E-04
	Cm243		5.786	5.789	-0.003				0.303E-04
3	Am241	0.9950	5.480	5.476	0.004	0.10	4047.33	18663.51	0.841E-02
	Pu238		5.499	5.476	0.023				0.110E-01
4		0.0009		4.454		0.01	3.72	16.12	0.726E-05
5	U 238	0.0006	4.200	4.201	-0.001	0.10	2.40	13.49	0.607E-05

DETECTOR CALIBRATION

Energy(MEV) = 4.067 + (0.0046)*Channel
Energy range (MeV): 4.067 TO 6.422
Efficiency = 0.2307 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	2075998.0	100.000
Smoothed	2075998.5	100.000
Composite fit	2033777.0	97.966
Residuals	42221.8	2.034

Analyzed by: _____
[redacted]

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          SPECTRUM SD5492.SPC
1 LEGEND:  RAW = ....  MODELED PEAKS = 1,2,.., ETC            592627.8

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9313090.1583

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Raw Data Dump for AEA Spectrum: SP:SD5492.SPC

1	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	2.	39.	39.	45.	53.	41.	53.	63.
21	53.	76.	51.	76.	78.	59.	62.	63.	73.	64.
31	66.	56.	62.	54.	55.	39.	44.	42.	35.	31.
41	25.	28.	16.	15.	21.	24.	25.	15.	26.	32.
51	19.	29.	33.	34.	31.	35.	48.	37.	40.	47.
61	43.	45.	39.	45.	47.	46.	41.	48.	52.	53.
71	53.	53.	52.	44.	52.	48.	60.	65.	46.	48.
81	61.	57.	56.	56.	48.	45.	65.	52.	53.	56.
91	42.	60.	46.	50.	58.	58.	54.	47.	64.	58.
101	76.	56.	56.	65.	52.	58.	63.	57.	44.	62.
111	64.	67.	67.	64.	71.	55.	74.	64.	59.	63.
121	63.	77.	61.	71.	72.	68.	63.	71.	68.	70.
131	72.	74.	68.	80.	67.	84.	89.	85.	98.	86.
141	82.	87.	89.	90.	101.	83.	104.	95.	84.	109.
151	85.	110.	93.	90.	111.	101.	100.	85.	113.	133.
161	111.	110.	111.	104.	104.	108.	103.	122.	117.	128.
171	132.	123.	131.	112.	144.	131.	146.	130.	140.	145.
181	138.	169.	142.	147.	147.	161.	153.	172.	154.	160.
191	177.	190.	199.	169.	227.	207.	201.	185.	217.	195.
201	225.	238.	240.	268.	270.	280.	259.	290.	279.	357.
211	331.	358.	379.	339.	408.	383.	406.	444.	452.	503.
221	543.	551.	614.	616.	640.	660.	653.	746.	788.	824.
231	795.	888.	927.	938.	906.	959.	1039.	978.	1091.	1059.
241	1088.	1159.	1193.	1230.	1275.	1328.	1476.	1539.	1618.	1704.
251	1825.	1918.	2053.	2099.	2120.	2305.	2392.	2456.	2647.	2600.
261	2712.	2741.	2845.	2945.	3000.	3187.	3190.	3375.	3608.	3807.
271	4107.	4403.	4835.	5234.	5907.	6435.	7124.	8050.	8899.	9780.
281	11106.	12347.	13951.	15565.	17693.	19732.	22020.	24651.	27302.	30763.
291	34255.	38269.	42243.	47183.	51858.	56095.	61500.	66215.	70751.	75197.
301	79185.	82721.	85207.	86946.	86721.	85269.	82684.	78932.	73605.	67762.
311	61037.	53272.	45998.	39237.	32821.	26731.	21805.	17169.	13620.	10554.
321	8223.	6279.	4495.	3391.	2432.	1676.	1200.	810.	509.	321.
331	235.	112.	96.	63.	40.	29.	13.	18.	11.	21.
341	23.	15.	20.	17.	13.	16.	17.	26.	31.	30.
351	41.	29.	52.	55.	54.	58.	84.	67.	88.	118.
361	108.	123.	124.	128.	140.	158.	164.	181.	201.	209.
371	205.	231.	218.	224.	199.	177.	194.	174.	133.	132.
381	114.	98.	65.	53.	51.	40.	22.	19.	15.	8.
391	9.	4.	2.	3.	6.	0.	2.	4.	3.	6.
401	2.	1.	2.	2.	6.	4.	3.	3.	7.	5.
411	5.	3.	7.	7.	3.	0	10.	14.	9.	11.
421	11.	11.	11.	17.	28.	17.	32.	34	31.	38.
431	31.	36.	50.	46.	50.	51.	62.	67.	65.	55.
441	41.	60.	50.	53.	53.	51.	35.	47.	27.	26.
451	18.	8.	8.	6.	2.	2.	5.	1.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.
471	1.	0.	0.	0.	1.	0.	0.	0.	0.	1.
481	0.	0.	1.	1.	1.	0.	2.	6.	1.	0.
491	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 953

WHC-SD-WM-DP-045

REV 1

Lab Segment Serial No. R3976	Customer ID: SB-77a
Analysis: TB	Sample Prep: acid digestion

Instrument:	WB47809	Procedure/ Rev:	LA-508-101 (0-2)
Technologist:	SUE LAI (Sue Lai)	Date:	6-14-93
Starting Time:	14:00	Temperature	23°c
Ending Time:	15:15	Chemist:	S. Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3976-8520	11		
2	REAGENT BLANK		12		
3	Sample	R3976-8720	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	6585 (10ml)			

656

A-6000-HH1 (03/93)

9413000.1995

TOTAL BETA ANALYSIS - ACID DIGESTION

Serial No.	Sample Point	Date	Time Issued	Priority
R 3975.-8520	BECHTOLD-1	RUSH	9:39	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	% RECOVERY	ETB975	0

Sample Size	Customer ID
PMCS CHECK SAMPLE 10ml	STD

Remarks, Calculations, Results

S515 EV-CRB

STD# 65B51 RESULT 1.15E-1

STD VAL 1.1265E-1 %REC 102.09%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs	Hrs	Hrs	Hrs
	6.14.93			
Date	Time Completed	Lab Unit Mgr		
6-14-93	15:15			

54-68[illegible]61, (R-10-83)

14 2" 6-14-93 VR #1-2

8163 - 16 R3975-8520
10

7841 -
10

Beta Calculation by VR on 06-14-1993 at 22:08:48
Det B14 2 -inch mount Beta eff. : .3076
Sample size : 10 uL Dilution : 1

Mount # 1

8163
---------- - 16.0 = 1.1720E-01 uCi/L beta
10

Mount # 2 1.1484E-1

7841
---------- - 16.0 = 1.1248E-01 uCi/L beta
10

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TOTAL BETA ANALYSIS - ACID DIGESTION

9-4

Serial No.	Sample Point		Time Issued	Priority
R 3976.-8720	BECHTOLD-1	RUSH 6- 7-93	9:47	24

Determination	Method-Standard	Result Units	Charge Code	Reruns
TB	LA-508-101	uCi/G	E13975	0

Sample Size	Customer ID
? 100-10-500	SB-77A

Remarks, Calculations, Results

COUNT AS uCI/L
USE 13,14,15 OR 16

$\frac{8.75\times10^{3}\ uCi/L}{1.462\ g/L} = 5.99\times10^{3}\ uCi/g$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 6-14-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-14-93	15:15	

54-6800061 (R-10-83)

14 2" 6-14-93 VR 43-4 DF. 202

147701 - 16 R3976-8720
10

148479
10

Beta Calculation by VR on 06-14-1993 at 22:11:28
Det 114 2 -inch mount Beta eff. : .3076
Sample size : .5 mL Dilution : 202

Mount # 1

147701
---------- - 16.0 = 8.7288E+03 uCi/L beta
10

8.7288×10³

Mount # 2

148479
---------- - 16.0 = 8.7748E+03 uCi/L beta
10

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RAJones
9-32

CALIBRATION SHEET FOR ALPHA/BETA SYSTEMS: USING PROCEDURE LQ-508-002

DETECTOR No. 14

		2",5" STD	TIME ZERO DATE (HD):	15883
RADIONUCLIDE:	Co-60	1" STD	TIME ZERO DATE (HD):	16573
HALF LIFE:	1925		DATE COUNTED (HD):	16973
COUNT TIME:	5		DATE COUNTED 1" (HD)	16973
CPM BKG:	8			
CPM 1" BKG:	8	CALIBRATED BY:	RA JONES HD 0 =	09/25/44

STANDARD ID	SIZE	DATE	TIME	COUNTS @ 0 DEG.	COUNTS @ 90 DEG.	COUNTS @ 180 DEG.	COUNTS @ 270 DEG.
100B40A2	1	03/16/91		92989	92994	93035	93405
100B40B1	1	03/16/91		192627	192410	191919	193055
100B40C1	1	03/16/91		275186	275194	276467	277850
32B40A4	2	03/16/91		74167	73525	74735	74674
32B40B3	2	03/16/91		142004	142342	143294	142285
32B40C4	2	03/16/91		203583	203979	204919	204002
32B40A5	5	03/16/91		70819	71365	70294	70476
32B40B6	5	03/16/91		141064	141079	139685	142440
32B40C5	5	03/16/91		205623	206968	206535	205895

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STANDARD ID	SIZE	STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
100B40A2	1"	67290	18613	1.15	21497	0.3195
100B40B1	1"	137800	38493	1.15	44456	0.3226
100B40C1	1"	199700	55227	1.15	63783	0.3194
AVERAGE, 1" =		0.3205 +/- @95%		0.0036	1.12 %	ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A4	2"	70480	14847	1.48	21983	0.3119
32B40B3	2"	135100	28488	1.48	42181	0.3122
32B40C4	2"	202400	40816	1.48	60435	0.2986
AVERAGE, 2" =		0.3076 +/- @95%		0.0153	4.96 %	ON 03/16/91

STANDARD ID		STD VALUE	AVE CPM	DECAY CORR	DECAY CORR CPM	EFFICIENCY
32B40A5	5"	70160	14140	1.48	20936	0.2984
32B40B6	5"	135700	28205	1.48	41762	0.3078
32B40C5	5"	201900	41243	1.48	61067	0.3025
AVERAGE, 5" =		0.3029 +/- @95%		0.0092	3.03 %	ON 03/16/91

NEW EFFS FOR DET 14 Co-60 1" = 0.3205 2" = 0.3076

5" = 0.3029

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WESTINGHOUSE HANFORD COMPANY

Batch 960

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. R3976	Customer ID: SB-77A
Analysis: SR 90	Sample Prep: acid digestion

Instrument: WB27818	Procedure/ Rev: LA 220-101 / Rev D-0
Technologist: Cynthia Johnson [redacted]	Date: 6 / 18 / 93
Starting Time: 0830 hrs	Temperature N/A
Ending Time: 1330 hrs	Chemist: Steve Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3975-8586	11		
2	REAGENT BLANK	N/A	12		
3	Sample	R3976-8786	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	31351 / 1ml			
SR Carrier	39510 / 1ml			

661

A-6000-801 (03/92)

9413091.1590

STRONTIUM 90 ANALYSIS - ACID DIGESTION

Serial No.	Sample Point	Date	Time Issued	Priority
R 3975.-8586	BECHTOLD-1	6- 7-93	9:39	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	% RECOVERY	E13975	0

Sample Size	Customer ID
? 1ml + 1ml Sr Carrier 3951D	STD

Remarks, Calculations, Results:
LMCS CHECK SAMPLE 5376
LMCS ID 3 1051

Sep time 1105 hrs
Sep date 6/18/93

STD vol 1.1508
RECULT 1.06
% REC: 88.62%

g 8.1850
t 8.0957
.0893

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Hrs	Hrs 6-18-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6/18/93	1330	

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

11/2 6-18-93 @ 1410 ΔT = 3.08
R3975-8586

8643
10

Sr Calculation by RMR on 06-18-1993 at 14:33:12
Det #11 2 inch mount Sr eff : .3919 Y eff : .4443

Sample size : 1 mL Dilution : 1 Method : 1

Mount # 1 Decay time = 3.08 hrs

$$\frac{8643}{10} - 7.0 = \frac{9.5008E-01}{.893 \times 1.0637} \text{ uCi/L strontium}$$

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STRONTIUM 90 ANALYSIS - ACID DIGESTION

Serial No.	Sample Point	Date	Time Issued	Priority
R 3976.-8786	BECHTOLD-1	6- 7-93	9:47	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
Sr90	LA-220-101	uCi/G Rec	E13975	0

Sample Size	Customer ID
?.100mL + Inl Sr Carrier 39510	SB-77A

Remarks, Calculations, Results:

Sep time 1105hrs
Sep date 6/18/93

$\frac{4.8471 \times 10^3 \text{ uCi/L}}{1.462 \text{ G/L}} = 3.32 \times 10^2 \text{ uCi/G}$

9.8.1680
t 8.0779
.0901

Cynthia Johnson

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Em Barclay			
Hrs	Hrs 6-18-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6/18/93	1330	

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

11/2 6-18-93 @1420 ΔT = 3.25
R 3976-8786

394910
10

Sr Calculation by KMB on 06-18-1993 at 14:32:38
Det #11 2 -inch mount Sr eff : .3919 Y eff : .4443

Sample size : .1 mL Dilution : 1 Method : 1

Mount # 1 Decay time = 3.25 hrs

$\frac{394910}{10} - 7.0 = \frac{4.3672E+02}{.901} \text{ uCi/L strontium} = 4.8471E2$

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06/14/89 Det 11 Sry-90 ratios

1" SrY-90 EFF	1" Sr-90 EFF	1" Y-90 EFF
0.5219	0.4899	0.5469

2" SrY-90 EFF	2" Sr-90 EFF	2" Y-90 EFF
0.4181	0.3919	0.4443

Esr = .4899/.5219 = 0.9387 , 1"

Ey = .5469/.5219 = 1.0479 , 1"

Esr = .3919/.4181 = 0.9373 , 2"

Ey = .4443/.4181 = 1.0627 , 2"

RATIOS GENERATED USING PROCEDURE LQ-508-005.

DATA IN LAB NOTEBOOK RHO-QA-NB-47, VOL 4: PAGES 31-36.

R Jones
11-18-92

BEST AVAILABLE COPY

9313061.1593

WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

Batch 958

Lab Segment Serial No. R 3976	Customer ID: SB-77a
Analysis: Gea	Sample Prep: acid digestion

Instrument:	WB28198	Procedure/ Rev:	LA-548-121 (0-0)
Technologist:	[redacted], SUE LAI (Sue Lai)	Date:	6-14-93
Starting Time:	13:00	Temperature	25°c
Ending Time:	14:10	Chemist:	A.K. Dasgupta

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R3975-8530	11		
2	REAGENT BLANK		12		
3	Sample	R3976-8730	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	32851 (.100 ml)			
				665

A-6000-081 (07/91)

GAMMA ENERGY ANALYSIS - ACID DIGESTION

1254

Serial No.	Sample Point	Date	Time Issued	Priority
R 3975.-8530	BECHTOLD-1	6- 7-93	9:39	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	E13975	0

Sample Size	Customer ID
? 100 λ	STD

Remarks, Calculations, Results

COLX STD# 32851 Li .001/10
R901 136 µCi/L STD VAL 133.3 µCi/L
RESULT % REC 104%
R905 STD VAL 108.2 µCi/L
RESULT 110 µCi/L % REC 102%

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond	D.H. Milsom		
Hrs	Hrs 6-14-93	Hrs	Hrs	Hrs
Date 6-14-93	Time Completed 14:10	Lab Unit Mgr A.K. Santschi 6/15/93		

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GAMMA ENERGY ANALYSIS - ACID DIGESTION

1255

Serial No	Sample Point	Date	Time Issued	Priority
R 3976.-8730	BECHTOLD-1	6- 7-93	9:47	24

Determination	Method/Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/G Rec	E13975	0

Sample Size	Customer ID
? 100 λ	SB-77A

Remarks, Calculations, Results

COUNT AS uCI/L
LASER PRINTOUT

Am-241 : 2.87×10^{2} nCi/μ × $\frac{1}{1.462\ g}$ = 1.96×10^{2} nCi/g

Cs-137 : 2.13×10^{3} " " " = 1.46×10^{3} nCi/g

Cs-134 : 2.16 " " " = 1.48 "

Co-60 : 2.0×10^{1} " " " = 1.37×10^{1} "

Eu-154 : 4.70×10^{1} " " " = 32.15 "

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
[redacted]	Raymond			See here
Hrs	Hrs	Hrs	Hrs	Hrs
	6-14-93			
Date	Time Completed	Lab Unit Mgr		
6-14-93	14:10	A.K. 6/15/93		

54-6800-061 (4-10-83)

R3976-8730

Eu-155 : 2.65×10^{1} nCi/μ × $\frac{1}{1.462\ g}$ = 18.13 nCi/g

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D.H. Miller
6-14-93

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

WHC-SD-WM-DP-045
REV 1

14-JUN-9323:14:11

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

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

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

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

SAMPLE DESCRIPTION: R3976-8730
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 14-JUN-93 AT 22:23:15

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3048. SECONDS
DEAD TIME: 1.57 %

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

ENERGY CALIBRATION PERFORMED 24-AUG-92
EFFICIENCY CALIBRATION PERFORMED 3-SEP-92

14-JUN-9323:14:11

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

WHC-SD-WM-DP-045
REV 1

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1	97.62	49.16	0.78	7846.	518.	48.2	U-234
2	119.32	60.01	1.16	7636.	17216.	2.1	AM-241,U-237, EU-155, NP-239
3	173.45	87.06	1.17	7335.	3208.	8.2	CS-136, EU-155, EU-155A, PB-214X, TL-208X, CD-109
4	211.01	105.83	1.15	7091.	2477.	10.2	EU-155, EU-155B, NP-239
5	246.52	123.58	1.22	7447.	8079.	3.7	EU-154A
6	496.59	248.57	1.61	7346.	1232.	20.1	EU-154B, XE-135
7	1184.24	592.33	1.15	1634.	342.	35.4	EU-154C
8	1210.13	605.28	1.53	1667.	244.	49.5	CS-134, SB-125
9	1324.09	662.26	1.51	1390.	310418.	0.4	CS-137
10	1447.45	723.94	1.56	260.	1560.	5.8	SB-124,I-131, AG-108, EU-154D, ZR-95
11	1514.45	757.44	1.54	241.	305.	18.7	ZR-95,EU-154
12	1592.62	796.53	1.51	231.	276.	20.1	CS-134
13	1747.16	873.81	1.74	223.	821.	8.8	EU-154E, RH-106
14	1993.19	996.85	1.58	190.	651.	10.0	EU-154F
15	2010.13	1005.32	1.80	228.	1050.	7.4	EU-154G, EU-152,
16	2347.12	1173.87	1.66	98.	2322.	4.3	CO-60
17	2549.57	1275.14	1.92	68.	1742.	4.9	EU-154, EU-154H, NA-22
18	2665.56	1333.16	2.02	36.	2026.	4.5	CO-60
19	2795.16	1397.99	1.90	31.	52.	43.4	I-132
20	2922.42	1461.66	2.26	18.	337.	11.4	K-40
20B		1460.83			344.	10.8	
21	3194.08	1597.58	2.19	13.	95.	23.4	LA-140, EU-154I

ERROR QUOTATION AT 1.00 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

B - ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 24-AUG-92 AT 13:00:00

BACKGROUND LIVE TIME: 3000. SECONDS

9313091.1598

SAMPLE: R3976-8730
DATA COLLECTED ON 14-JUN-93 AT 22:23:15
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	2.87E+02	+-7.90E+00	2.87E+02	+-7.90E+00	59.54	0.47
AM-243	LLD<1.36E+00		LLD<1.36E+00		74.67	
BA-133	LLD<1.57E+00		LLD<1.57E+00		356.02	
BA-140	LLD<3.47E+00		LLD<3.47E+00		537.27	
BI-212	LLD<7.15E+00		LLD<7.15E+00		727.20	
CEPR144	LLD<9.84E+00		LLD<9.84E+00		133.51	
CO-60	2.00E+01	+-9.08E-01	2.00E+01	+-9.08E-01	1332.50	0.66
					1173.24	0.63
CR-51	LLD<8.27E+00		LLD<8.27E+00		320.09	
CS-134	2.16E+00	+-4.33E-01	2.16E+00	+-4.33E-01	795.84	0.69
					604.70	0.58
CS-137	2.13E+03	+-2.10E+01	2.13E+03	+-2.10E+01	661.65	0.61
EU-152	LLD<1.16E+00		LLD<1.16E+00		1408.01	
EU-154	4.70E+01	+-2.34E+00	4.70E+01	+-2.34E+00	1274.45	0.69
					123.07	0.51
					1004.76	0.56
EU-154H	4.70E+01	+-2.34E+00	4.70E+01	+-2.34E+00	1274.80	0.34
EU-155	2.65E+01	+-2.73E+00	2.65E+01	+-2.73E+00	105.31	0.53
					86.54	0.52
FE-59	LLD<7.09E-01		LLD<7.09E-01		1099.25	
I-131	LLD<1.24E+00		LLD<1.24E+00		364.48	
K-40	LLD<5.87E+00		LLD<5.87E+00		1460.75	
LA-140	LLD<1.76E-01		LLD<1.76E-01		1596.20	
MN-54	LLD<3.52E-01		LLD<3.52E-01		834.83	
~~NA-22~~	~~1.67E+01~~	~~+-8.32E-01~~	~~1.67E+01~~	~~+-8.32E-01~~	~~1274.55~~	~~0.59~~
NB-94	LLD<3.61E-01		LLD<3.61E-01		702.63	
NB-95	LLD<3.84E-01		LLD<3.84E-01		765.78	
~~NP-237~~	~~7.26E+01~~	~~+-6.05E+00~~	~~7.26E+01~~	~~+-6.05E+00~~	~~86.50~~	~~0.56~~
PB-212	LLD<1.82E+00		LLD<1.82E+00		239.00	
PU-239	LLD<8.67E+03		LLD<8.67E+03		129.30	
PU-241	LLD<3.05E+05		LLD<3.05E+05		148.57	
RA-224	LLD<2.01E+01		LLD<2.01E+01		240.99	
RA-226	LLD<2.03E+01		LLD<2.03E+01		186.10	
RU-103	LLD<1.24E+00		LLD<1.24E+00		497.08	
RU103	LLD<1.31E+00		LLD<1.31E+00		497.08	
RURH106	LLD<1.35E+01		LLD<1.35E+01		621.80	
SB-125	LLD<4.03E+00		LLD<4.03E+00		427.89	
SB-125A	LLD<4.03E+00		LLD<4.03E+00		427.89	
SE-75	LLD<1.37E+00		LLD<1.37E+00		264.66	
SN-113	LLD<1.67E+00		LLD<1.67E+00		391.67	
SR-85	LLD<1.08E+00		LLD<1.08E+00		513.99	
TH-228	LLD<6.42E+01		LLD<6.42E+01		84.37	
TL-208	LLD<8.62E-01		LLD<8.62E-01		583.20	
U-235	LLD<1.24E+00		LLD<1.24E+00		185.71	
Y-88	LLD<9.44E-02		LLD<9.44E-02		1836.06	
ZN-65	LLD<8.30E-01		LLD<8.30E-01		1115.55	
~~ZR-95~~	~~3.60E+00~~	~~+-6.74E-01~~	~~3.60E+00~~	~~+-6.74E-01~~	~~756.73~~	~~0.71~~

671

724.20 -0.26

TOTAL	2.65E+03 +-2.37E+01	2.65E+03 +-2.37E+01

STANDARD DEVIATION = 0.23

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 6.23E-09 UC/LI
TOTAL MEASURED ACTIVITY = 2.60E+03 (+-2.36E+01) UC/LI
% TECH. SPEC. = ****** (+-****)

WHC-SD-WM-DP-045
REV 1

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
97.62	49.16	518.	48.2	2.00E+01
496.59	248.57	1232.	20.1	1.40E+01
1184.24	592.33	342.	35.4	6.79E+00
1747.16	873.81	821.	8.8	2.18E+01
1993.19	996.85	651.	10.0	1.92E+01
2795.16	1397.99	52.	43.4	1.97E+00
3194.08	1597.58	95.	23.4	3.93E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.42	1461.66	337.	11.4	1.32E+01

09/30/1991

672

Raymond 6-14-93

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                   *
*              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 **WHC-SD-WM-DP-045 REV 1**

14-JUN-9318:37:17

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

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

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

ANALYSIS OF SPECTRUM SAVED IN DISK FILE: SD1254
ANALYZED BY: VR

SAMPLE DESCRIPTION: R3975-8530 BECHTOLD
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL205

COLLECT STARTED ON 14-JUN-93 AT 16:48:51

COLLECT LIVE TIME: 3000. SECONDS
REAL TIME: 3017. SECONDS
DEAD TIME: 0.56 %

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

ENERGY CALIBRATION PERFORMED 24-AUG-92
EFFICIENCY CALIBRATION PERFORMED 3-SEP-92

9315090.1602

BLM 673

14-JUN-9318:37:17

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

WHC-SD-WM-DP-045
REV 1

PK	CENTROID CHANNEL	ENERGY KEV	FWHM KEV	BACKGND COUNTS	NET AREA COUNTS	ERROR %	NUCLIDES
1C	1127.24	563.84	1.41	816.	1227.	8.2	CS-134, EU-152
2C	1139.48	569.95	1.41	809.	2071.	7.0	CS-134, BI-207
3	1210.25	605.34	1.46	805.	13909.	1.8	CS-134, SB-125
4	1324.09	662.26	1.52	523.	20181.	1.4	CS-137
5C	1592.45	796.44	1.57	440.	9972.	2.3	CS-134
6C	1604.70	802.57	1.57	448.	1049.	6.2	CS-134, PO-210
7C	2336.75	1168.68	1.77	257.	229.	10.9	CS-134
8C	2347.17	1173.89	1.77	224.	12335.	1.9	CO-60
9C	2665.67	1333.21	1.92	74.	11151.	1.9	CO-60
10	2730.89	1365.84	1.93	36.	289.	13.2	CS-134
11	2801.51	1401.17	1.91	23.	217.	15.0	BI-214
12	2922.33	1461.61	1.66	29.	338.	11.8	K-40
12B		1460.83			344.	10.8	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

- MULTIPLET ANALYSIS CONVERGED NORMALLY
- ENVIRONMENTAL BACKGROUND PEAK

BACKGROUND SUBTRACTION PERFORMED USING FILE BK0011
BACKGROUND DESCRIPTION: BKG
BACKGROUND COLLECT STARTED ON 24-AUG-92 AT 13:00:00
BACKGROUND LIVE TIME: 3000. SECONDS

14-JUN-9318:37:17

SAMPLE: R3975-8530 BECHTOLD
DATA COLLECTED ON 14-JUN-93 AT 16:48:51
DECAYED TO 0. DAYS, 0.0000 HOURS BEFORE THE START OF COLLECT.

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

NUCLIDE	ACTIVITY CONCENTRATION IN uCi/LI MEASURED	ERROR	DECAY CORRECTED	ERROR	ENERGY COMPARISON (KEV) EXPECT	DIFF
AM-241	LLD<1.84E+00		LLD<1.84E+00		59.54	
AM-243	LLD<6.07E-01		LLD<6.07E-01		74.67	
BA-133	LLD<7.40E-01		LLD<7.40E-01		356.02	
BA-140	LLD<1.88E+00		LLD<1.88E+00		537.27	
BI-212	LLD<3.80E+00		LLD<3.80E+00		727.20	
CEPR144	LLD<4.76E+00		LLD<4.76E+00		133.51	
CO-60	1.10E+02	+-2.27E+00	1.10E+02	+-2.27E+00	1332.50	0.71
					1173.24	0.66
CR-51	LLD<3.88E+00		LLD<3.88E+00		320.09	
CS-134	7.80E+01	+-1.89E+00	7.80E+01	+-1.89E+00	795.84	0.60
					604.70	0.64
CS-137	1.38E+02	+-2.34E+00	1.38E+02	+-2.34E+00	661.65	0.61
EU-152	LLD<1.11E+00		LLD<1.11E+00		1408.01	
EU-154	LLD<9.31E-01		LLD<9.31E-01		1274.45	
EU-154H	LLD<8.75E-01		LLD<8.75E-01		1274.80	
EU-155	LLD<1.21E+00		LLD<1.21E+00		105.31	
FE-59	LLD<1.23E+00		LLD<1.23E+00		1099.25	
I-131	LLD<5.74E-01		LLD<5.74E-01		364.48	
K-40	LLD<5.91E+00		LLD<5.91E+00		1460.75	
LA-140	LLD<1.76E-01		LLD<1.76E-01		1596.20	
MN-54	LLD<5.50E-01		LLD<5.50E-01		834.83	
NA-22	LLD<3.11E-01		LLD<3.11E-01		1274.55	
NB-94	LLD<4.22E-01		LLD<4.22E-01		702.63	
NB-95	LLD<4.88E-01		LLD<4.88E-01		765.78	
NP-237	LLD<2.61E+00		LLD<2.61E+00		86.50	
PB-212	LLD<8.77E-01		LLD<8.77E-01		239.00	
PU-239	LLD<3.96E+03		LLD<3.96E+03		129.30	
PU-241	LLD<1.43E+05		LLD<1.43E+05		148.57	
RA-224	LLD<9.50E+00		LLD<9.50E+00		240.99	
RA-226	LLD<9.33E+00		LLD<9.33E+00		186.10	
RU-103	LLD<5.55E-01		LLD<5.55E-01		497.08	
RU103	LLD<5.84E-01		LLD<5.84E-01		497.08	
RURH106	LLD<8.83E+00		LLD<8.83E+00		621.80	
SB-125	LLD<1.76E+00		LLD<1.76E+00		427.89	
SB-125A	LLD<1.76E+00		LLD<1.76E+00		427.89	
SE-75	LLD<6.34E-01		LLD<6.34E-01		264.66	
SN-113	LLD<7.69E-01		LLD<7.69E-01		391.67	
SR [illegible]	LLD<5.32E-01		LLD<5.32E-01		513.99	
TH-228	LLD<2.31E+01		LLD<2.31E+01		84.37	
TL-208	LLD<6.09E-01		LLD<6.09E-01		583.20	
U-235	LLD<5.62E-01		LLD<5.62E-01		185.71	
Y-88	LLD<1.75E-01		LLD<1.75E-01		1836.06	
ZN-65	LLD<1.23E+00		LLD<1.23E+00		1115.55	
ZR-95	LLD<9.00E-01		LLD<9.00E-01		756.73	
TOTAL	3.26E+02	+-3.77E+00	3.26E+02	+-3.77E+00		

STANDARD DEVIATION = 0.05

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.37E-09 UC/LI
TOTAL MEASURED ACTIVITY = 3.26E+02 (+-3.77E+00) UC/LI
% TECH. SPEC. = ****** (+-****)

ERROR QUOTATION AT 1.96 SIGMA
LLD CONFIDENCE LEVEL AT 85.0%

PEAKS NOT USED IN ANALYSIS

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
1127.24	563.84	1227.	8.2	2.35E+01
1139.48	569.95	2071.	7.0	4.01E+01
1604.70	802.57	1049.	6.2	2.61E+01
2336.75	1168.68	229.	10.9	7.61E+00
2730.89	1365.84	289.	13.2	1.08E+01
2801.51	1401.17	217.	15.0	8.23E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.33	1461.61	338.	11.8	1.32E+01

J. Anderson
11-13-92

```
      EFF
MCA UNIT NUMBER (2):
ADC UNIT NUMBER (1,0):
DETECTOR NUMBER (I2): 1
MCA MEMORY REGION (FULL):
DATE SPECTRUM COLLECTED: 24-AUG-92
TIME COLLECT STARTED: 15:03
GEOMETRY NUMBER (I2): 42
GEOMETRY DESCRIPTION: 22CC LIQ
ACTIVITY UNITS ( uCi) :
CROSSOVER ENERGY: 165.853
CALIBRATION SOURCE ENTRY OPTIONS:
  TYPE A CARRIAGE RETURN FOR MANUAL ENTRY,
  TYPE AN INTEGER (0-999) TO USE A SOURCE LIBRARY,
  TYPE A PLUS SIGN BEFORE THE INTEGER (+0 - +999)
  TO CREATE A SOURCE LIBRARY DURING MANUAL ENTRY.
OPTION: 142
22CC LIQ
DO YOU WANT TO ENTER ANY EFFICIENCY POINTS MANUALLY (NO):
DIMENSIONAL UNITS OF STANDARD: EA
SIZE OF STANDARD IN EA  :    1.00000
NUMBER OF POINTS:    12
ACTIVITY IN MICROCURIES (YES/NO):
```

42 calibration source ID: 42B47-A

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```
      PEAK     1
               ENERGY:      59.536
               ACTIVITY:    3.687000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   D158000
               DECAY TIME ( 0.000000E-01 MINS.):   1-FEB-92
               TIME OF SOURCE CALIBRATION:   12:00
               DECAY TIME:    2.953830E+05 MINS
      EFFICIENCY =  1.495966E-02 (+-  1.457409E-04)

      PEAK     2
               ENERGY:      88.035
               ACTIVITY:    2.065000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   D462.6
               DECAY TIME ( 2.953830E+05 MINS.):
      EFFICIENCY =  3.328336E-02 (+-  3.404008E-04)

      PEAK     3
               ENERGY:     122.061
               ACTIVITY:    1.881000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   D271.8
               DECAY TIME ( 2.953830E+05 MINS.):
      EFFICIENCY =  3.992001E-02 (+-  4.346472E-04)

      PEAK     4
               ENERGY:     165.853
               ACTIVITY:    2.284000E+02
               ACTIVITY ONE SIGMA:    0.000000E-01
               HALF-LIFE:   D137.66
               DECAY TIME ( 2.953830E+05 MINS.):
      EFFICIENCY =  3.869252E-02 (+-  5.240505E-04)

SYSTEM EFFICIENCY COEFFICIENTS, PART 1

LOG(EFF) = -4.252798E+01 + 1.616063E+01*LOG(E) - 1.659189E+00*LOG(E)^2

      PEAK     5
               ENERGY:     276.402
```

677

9313090.1606

HALF-LIFE: D46.612
DECAY TIME (2.953830E+05 MINS.):
EFFICIENCY = 2.862727E-02 (+- 1.054006E-03)

WHC-SD-WM-DP-045
REV 1

PEAK 6
ENERGY: 391.668
ACTIVITY: 7.301000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D115.09
DECAY TIME (2.953830E+05 MINS.):
EFFICIENCY = 2.205499E-02 (+- 2.154050E-04)

PEAK 7
ENERGY: 513.990
ACTIVITY: 1.252100E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D64.84
DECAY TIME (2.953830E+05 MINS.):
EFFICIENCY = 1.812006E-02 (+- 2.663545E-04)

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PEAK 8
ENERGY: 661.650
ACTIVITY: 8.032000E+02
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D11020
DECAY TIME (2.953830E+05 MINS.):
EFFICIENCY = 1.560478E-02 (+- 8.495761E-05)

PEAK 9
ENERGY: 898.021
ACTIVITY: 2.014000E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D106.61
DECAY TIME (2.953830E+05 MINS.):
EFFICIENCY = 1.210588E-02 (+- 9.562018E-05)

PEAK 10
ENERGY: 1173.240
ACTIVITY: 1.092600E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1925.3
DECAY TIME (2.953830E+05 MINS.):
EFFICIENCY = 1.001542E-02 (+- 5.929491E-05)

PEAK 11
ENERGY: 1332.500
ACTIVITY: 1.093200E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D1925.3
DECAY TIME (2.953830E+05 MINS.):
EFFICIENCY = 9.134423E-03 (+- 5.595209E-05)

PEAK 12
ENERGY: 1836.130
ACTIVITY: 2.135300E+03
ACTIVITY ONE SIGMA: 0.000000E-01
HALF-LIFE: D106.61
DECAY TIME (2.953830E+05 MINS.):
EFFICIENCY = 7.415293E-03 (+- 6.714016E-05)

SYSTEM EFFICIENCY COEFFICIENTS, PART 2

LOG(EFF) = 7.888321E+01 - 5.214094E+01*LOG(E) + 1.252259E+01*LOG(E)^2
- 1.343061E+00*LOG(E)^3 + 5.356648E-02*LOG(E)^4

9313090.1807

UNDIGESTED SAMPLE ANALYSES

9313091.1609

WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH # 651

Lab Segment Serial No. R-3853	Customer ID: SB-70E
Analysis: Acid Digest	Sample Prep: Direct

Instrument: SN F04495	Procedure/ Rev: LA 505-159 / R-0
Technologist: BILL SYTH Will [illegible]	Date: 5/22/93
Starting Time: 1600	Temperature 95 C
Ending Time: 2300	Chemist: Bert Griffin II

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R-3851-8500	11		
2	REAGENT BLANK	R-3852-8600	12		
3	SAmple	R-3853-8700	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	14W10-A/1ml	13W10-A/1ml	21B48A/1ml	100ml
				580

0191 0060 1610

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WHC-SD-WM-DP-045
REV 1

ANALYTICAL BATCH SUMMARY SHEET

METHOD: Acid Dig
DATE START: 5/22/93
PREPARED BY: Bill Smith
DATE COMPLETE: 5/22/93

UNITS:

SPL NAME	SPL ID	ANALYT	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD	R-3851	Acid Dig	100						
B/K	R-3852		NA						
SAm	R-3853		10.0640 g/L						

NARRATIVE: [✓] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARATIONS FOR THIS BATCH:

Bertha D Griffin II.
8-23-93

ACID DIGESTION ANALYSIS

Serial No.	Sample Point	Date	Time Issued	Priority
R 3851.-8500	BECHTOLD-1	5-14-93	8:36	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	% RECOVERY	E13975	0

Sample Size	Customer ID
? 1gm/ into 100gm ?	STD

Remarks, Calculations, Results

LMCS CHECK SAMPLE
LMCS ID

14W10-A
13N10-A
27B18-A
1gm / Each

DF = 100gm / 1gm = 100

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

Date	Time Completed	Lab Unit Mgr 5-24-93	
5/22/93	2300	Bertrand Stiffin II	

54-6800-001 (R-10-83)

Serial No.	Sample Point	Date	Time Issued	Priority
R 3852.-8600	BECHTOLD-1	5-14-93	8:37	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	uG/ML	E13975	0

Sample Size	Customer ID
? 100ml Total Volume	BLK

Remarks, Calculations, Results

REAGENT BLANK

complete

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

Date	Time Completed	Lab Unit Mgr 5-24-93	
5/22/93	2300	Bertrand Stiffin II	5/26

5-26

54-6800-001 (R-10-83)

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ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
R 3853.-8700	BECHTOLD-1	5-14-93	8:40	20

Determination	Method/Standard	Result Units	Charge Code	Reruns
ACD DGST	GA-505-159	G/L	E13975	0

Sample Size	Customer ID
? ~~Lechtin~~ 25ml 1.0064g into .100l	SB70E

Remarks, Calculations, Results

JAR ID#
GRAMS SAMPLE 1.0064g
VOLUME ON COMPLETION .100l

DF = 1.0064g / .100l = 10.0640 g/l

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

Date	Time Completed	Lab Unit Mgr
5/22/93	2300	5-24-93

5-26

5-26

R3853-8700

SEQUENCE # : 43
WT 1: -0.0001
WT 2: 1.0063

NET WEIGHT:
---> 1.0064 GRAMS

05/21/93 @ 02:44:02

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WHC-SD-WM-DP-045
REV 1

ACID DIGESTION ANALYSES

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WHC-SD-WM-DP-045
REV 1

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

#649

Lab Segment Serial No. R 3852, R3853	Customer ID: SB70E
Analysis: U	Sample Prep: Acid Digestion

Instrument: WB88807	Procedure/ Rev: LA 925/106 Rev ~~A-2~~ B-0
Technologist: Sandra L Hood	Date: 6-1-93 BDII 8-23-93
Starting Time: 16:00	Temperature 25°C
Ending Time: 18:00	Chemist: S Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R 3851-8540	11		
2	REAGENT BLANK	R 3852-8640	12		
3	sample	R3853-8740	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 CHK STD	126B38 .100ml			

[redacted]

685

A-6000-081 (03/91)

9313000.1615

URANIUM ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3851.-8540	BECHTOLD-1	5-14-93	8:37	24

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	E13975	0

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

Remarks, Calculations, Results:
S267 UF1C
STD# 126838 RESULT 3.07E-2
STD VAL 3.04E-2 %REC 101.00%
SPIKE ID/VAL 90B38/6.25 -4 g/l
SPIKE VOL. .100 l

.14
.42

$\frac{.14(.1)(1010)(6.25-4)}{\left(\frac{5.7}{5.6}\right).42 - .14} =$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Sandra L Hood				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-1-93	18:00	Bechtold

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

Serial No	Sample Point	Date	Time Issued	Priority
R 3852.-8640	BECHTOLD-1	5-14-93	8:39	24

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	uG/ML	E13975	0

Sample Size	Customer ID
? .100 ml - 10 ml - .025 ml	BLK

Remarks, Calculations, Results:
REAGENT BLANK
Spike ID/Vol 90B38/6.25 -4 g/l
vol .100 ml

Ø
.21

$\frac{.02(.1)(6.25E-4)}{\left(\frac{5.625}{5.525}\right).21 - .02} = <2.66E-2\ G/L$

$<2.66E-2\left(\frac{1,000,000}{MCE}\right) = <2.61\times10^{1}\ ug/ml$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Sandra L Hood				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-01-93 ~~6-1-93~~	18:00	Bechtold

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

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URANIUM ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
R 3853.-8740	BECHTOLD-1	5-14-93	8:41	24

Determination	Method-Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E13975	0

Sample Size	Customer ID
? .100 ml - 10 ml - .025 ml	SB70E

Remarks, Calculations, Results

spike 10/ice 90838/6.25 -4 g/L

vol .100 ml

.10

.40

$$\frac{.10(.1)(\cancel{4.444})(6.25e^{-4})}{\left(\frac{5.625}{5.525}\right).40 - .10} = \frac{8.2186e^{-2}\ g/L}{10.064\ g/L} = 8.17\times10^{-3}\ g/L$$

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
Sandra L Ford				
Hrs	Hrs	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
6-1-93	18:00	

54-6800-06 (R-10-83)

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