OCT 1 9 1993
55 Sta. 6

ENGINEERING DATA TRANSMITTAL

1. EDT 140706

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Program Support	4. Related EDT No.: NA
5. Proj./Prog./Dept./Div.: 105 KE Basin/Waste Management/Program Support/Processing and Analytical Labs	6. Cog. Engr.: A. D. Rice	7. Purchase Order No.: NA
8. Originator Remarks:		9. Equip./Component No.: NA
		10. System/Bldg./Facility: NA
11. Receiver Remarks:		12. Major Assm. Dwg. No.: NA
		13. Permit/Permit Application No.: NA
		14. Required Response Date: 10/04/93

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-DP-050	NA	0	105 KE BASIN	3Q	2	1	1

16. KEY

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

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

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
2	1	Cog.Eng. A. D. Rice	[signature]								
2	1	Cog. Mgr. J. G. Kristofzski	[signature]	10-14-93							
2	1	QA J. C. Langford	[signature]	10/14/93							
		Safety									
		Env.									

18.	19.	20.	21. DOE APPROVAL (if required)
[signature] Signature of EDT Originator Date 10-4-93	Authorized Representative for Receiving Organization Date	J. G. Kristofzski [signature] Cognizant/Project Engineer's Manager Date 10-14-93	Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments

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

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BD-7400-172-1 (07/91)

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OCT 19 1993

Date Received: 10/14/93 KMB

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-050, REV 0

List attachments.

Date Release Required: 10/04/93

Title: 222-S ANALYTICAL LABS 105 KE BASIN - DATA PACKAGE

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 [signature] 10-14-93
Legal - General Counsel	[X]	[]	Per OGC memo 2-4-93 [signature]
Applied Technology/Export Controlled Information or International Program	[]	[X]	
WHC Program/Project	[]	[X]	
Communications	[]	[X]	
RL Program/Project	[X]	[]	P. Clark does not want to see per telecon 10/28/93
Publication Services	[X]	[]	C.A. COLLINS C.A. Collins 10/14/93 [signature]
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) Date
K. K. Gramberardini [signature] 10-4-93

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

Responsible Manager (Printed/Signature) Date
K. K. Gramberardini [signature] 10-4-93

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

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

APPROVED FOR RELEASE OFFICIAL DOCUMENT [signature] Date 10/14/93

Date Cancelled | Date Disapproved

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BD-7600-062 (08/91) WEF074

Part 1

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SUPPORTING DOCUMENT

1. Total Pages 114

2. Title
222-S ANALYTICAL LABS 105 KE BASIN DATA PACKAGE

3. Number
WHC-SD-WM-DP-050

4. Rev No.
0

5. Key Words
222-S LABS, 105 KE BASIN, DATA PACKAGE

APPROVED FOR PUBLIC RELEASE
KMB 10/14/93

6. Author
Name: A. D. Rice
Signature
Organization/Charge Code 12610/J120H

7. Abstract

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9. Impact Level 3Q

10. RELEASE STAMP

OFFICIAL RELEASE BY WHC
DATE OCT 19 1993
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Westinghouse
Hanford Company

P.O. Box 1970 Richland, WA 99352

WHC-SD-WM-DP-050
REV 0

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105 KE BASIN

Date Printed: September 23, 1993

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NARRATIVE

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105KE (0066WQL) NARRATIVE

Sample 0066WQL, a solid from the 105KE basin (laboratory ID E8607), was submitted for analysis on 8/25/93. The entire sample was to be acid digested and analyzed for gamma emitters, Pu-238/39/40, Am-241, Uranium, and metals by ICP. The Pu-238/39/40, Am-241, and Uranium determinations were to be performed in triplicate, the ICP was to be performed in duplicate, and the GEA was to be performed once. The RSA requested that any undissolved material be dried and weighed.

The sample results are summarized on pages 7-9 of the package. All required analyses were performed. All standards analyzed with the sample demonstrated acceptable recoveries. The spike recovery for the Uranium analysis was high for both the initial determination and the rerun. RPD values were not calculated. The residue remaining following the digestion was not weighed, but was set aside for possible fusion and reanalysis, as requested by the SAIC representative.

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Andrew Rice
Project Coordinator
222-S Laboratory

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SAMPLING AND CUSTODY DATA

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WHC-SD-WM-DP-050
REV 0

REQUEST FOR SPECIAL ANALYSIS (RSA)

RSA No. 1647

Sample Origin	2. Date Submitted	4. Requester Name	6. Charge Code/Work Package
105KE BASIN	8/25/93	M. A. GREEN	E11456
	3. Submitted By	5. Requester Phone/MSIN	7. Date Required
		373-1462 / X0-35	9/8/93

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID
OOLLWQL			E8607

12. Number of Samples: 1

13. Volume of Samples:

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) ☐ Previously submitted for this Project

10. Determination	11. Expected Range
ACID DIGEST	(ENTIRE SAMPLE)
GEA	
PU 238 / PU 239/240	(TRIPLICATE)
AM 241	(TRIPLICATE)
ICP	DUPLICATE
U	(TRIPLICATE)

18. Survey — Dose Rate

HPT Signature

19. Disposition of Waste: ☐ Return to Client/Location ☐ Dispose per 222-S Procedures ☐ Other DO NOT SLURP

20. Additional Information
- RECORD ALL WTS OF DRY SOLIDS
- FILTER UNDISSOLVED RESIDUE DRY AND WEIGH.

21. Chain of Custody: ☒ No ☐ Yes Number: Sample has been Rec'd awhile ago

22. Assigned Custodial Group (select one): ☐ PCL ☒ PDSU ☐ ENV ☐ Process

23. Sample Received By: LAP 8-27-93

Date: Time:

24. Laboratory Manager (if required)

Date:

4

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SAMPLE DATA SUMMARY

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ANALYTICAL CARDS

E8607

105 KE Basin
CUSTOMER ID: 0044WQL
TANK: N/a

Acid Digestion	SUMM SHEET	BATCH SHEET	CALIB SHEET	INSTR PRTOUT	STD	BLK	SAM	DUP	SPK	SAMP Triplicate	DUP	STD
Acid Digestion LG-505-159/D-1	✓	✓	N/a	N/a	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Uranium LG-925-106/B-0	✓	✓	N/a	N/a	✓	N/a	✓	✓	✓	✓	N/a	N/a
ICP LG-505-151/D-0	✓	✓	✓	✓	✓	N/a	✓	✓	N/a	N/a	N/a	N/a
GEA LG-548-121/D-0	✓	✓	✓	✓	✓	N/a	✓	N/a	N/a	N/a	N/a	N/a
Am 241 LG-503-156/D-0	✓	✓	✓	✓	✓	N/a	✓	✓	N/a	✓	N/a	N/a
Pu 239/40 LG-503-156/D-0	✓	✓	✓	✓	✓	N/a	✓	✓	N/a	✓	N/a	N/a

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1 of 3

SAMPLE PREP.: Acid Digestion

105 KE Basin
CUSTOMER ID: 0066WQL

SAMPLE RESULTS
E8607

	Standard		Sample		Duplicate Sample		Triplicate Sample		Spike	
Lab. I.D.	R4295		E8607		N/a		N/a		N/a	
Acid Digestion 08-30-93	Dilution Factor 10		34.1372	g/l	N/a		N/a		N/a	
Lab I.D.	R4295		E8607-8740		E8607-8740		E8607-8740		N/a	
U 09-09-93	100.4	%	6.42E^{-2}	3/g	6.78E^{-2}	3/g	7.56E^{-2}	3/g	232.7	%
Lab I.D.	R4295		E8607-8750		E8607-8750		N/a		N/a	
ICP 09-01-93							N/a		N/a	
Zr	101.76	%	1.35E^{+2}	43/g	1.37E^{+2}	43/g	N/a		N/a	
Sr	101.86	%	3.44E^{+1}	43/g	3.70E^{+1}	43/g	N/a		N/a	
Si	96.42	%	6.51E^{+2}	43/g	6.66E^{+2}	43/g	N/a		N/a	
Al	99.16	%	2.29E^{+4}	43/g	2.33E^{+4}	43/g	N/a		N/a	
Co	100.88	%	8.83E^{0}	43/g	9.22E^{0}	43/g	N/a		N/a	
Cu	99.28	%	6.07E^{+2}	43/g	6.20E^{+2}	43/g	N/a		N/a	
Li	101.54	%	3.06E^{0}	43/g	3.45E^{0}	43/g	N/a		N/a	
Zn	100.8	%	7.75E^{+2}	43/g	7.91E^{+2}	43/g	N/a		N/a	
Ni	102.66	%	4.51E^{+1}	43/g	4.54E^{+1}	43/g	N/a		N/a	
Fe	102.56	%	5.05E^{+4}	43/g	5.15E^{+4}	43/g	N/a		N/a	
Ca	103.76	%	2.77E^{+3}	43/g	2.83E^{+3}	43/g	N/a		N/a	
Cr	103.38	%	1.95E^{+2}	43/g	1.99E^{+2}	43/g	N/a		N/a	
Nd	104.98	%	6.96E^{+1}	43/g	7.06E^{+1}	43/g	N/a		N/a	
Sm	100.88	%	4.26E^{+2}	43/g	4.40E^{+2}	43/g	N/a		N/a	
Ba	103.54	%	1.25E^{+2}	43/g	1.28E^{+2}	43/g	N/a		N/a	

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SAMPLE PREP.: Acid Digestion

SAMPLE RESULTS

E8607

105 KE Basin
CUSTOMER ID: 0066WQL

	Standard		Sample		Duplicate Sample		Triplicate Sample		Spike
Lab I.D.	R4295		E8607-8750		E8607-8750		N/a		N/a
ICP P	100.16	%	4.04 E+2	mg/g	5.13 E+2	mg/g	N/a		N/a
S	96.48	%	3.50 E+2	mg/g	3.47 E+2	mg/g	N/a		N/a
Ag	100.22	%	4.09 E+2	mg/g	4.17 E+2	mg/g	N/a		N/a
Cs	99.50	%	1.05 E+1	mg/g	1.05 E+1	mg/g	N/a		N/a
Na	102.06	%	1.23 E+2	mg/g	1.23 E+2	mg/g	N/a		N/a
Mo	101.76	%	5.44 E0	mg/g	5.70 E0	mg/g	N/a		N/a
Cd	99.70	%	4.96 E0	mg/g	4.38 E0	mg/g	N/a		N/a
Pb	104.14	%	3.27 E+2	mg/g	3.42 E+2	mg/g	N/a		N/a
Ti	99.10	%	5.77 E+1	mg/g	5.90 E+1	mg/g	N/a		N/a
Cd	103.04	%	1.59 E+2	mg/g	1.63 E+2	mg/g	N/a		N/a
K	114.96	%	2.41 E+2	mg/g	2.15 E+2	mg/g	N/a		N/a
Mn	101.54	%	7.53 E+2	mg/g	7.69 E+2	mg/g	N/a		N/a
Sb	96.50	%	1.66 E+2	mg/g	1.87 E+2	mg/g	N/a		N/a
V	99.66	%	1.77 E+2	mg/g	1.81 E+2	mg/g	N/a		N/a
Be	105.50	%	2.37 E+1	mg/g	2.40 E+1	mg/g	N/a		N/a
Tl	95.44	%	2.26 E+2	mg/g	2.11 E+2	mg/g	N/a		N/a
Lab I.D.	R4295		E8607-8730		N/a		N/a		N/a
GEG 09-02-93					N/a		N/a		N/a
Co 60	100.3	%	1.61 E0	uCi/g	N/a		N/a		N/a
Cs 137	99.3	%	2.87 E+1	uCi/g	N/a		N/a		N/a

WHC-SD-WM-DP-050 REV 0

00

SAMPLE PREP.: Acid Digestion

105 KE Basin
CUSTOMER ID: 0066WQL

SAMPLE RESULTS
E8607

	Std		Sample		Duplicate Sample		Triplicate Sample		Spike						
Lab I.D.	R4295		E8607-8730		N/a		N/a		N/a						
GEA E4154	N/a		2.40 E^{0}	uCi/g	N/a		N/a		N/a						
E4155	N/a		1.23 E^{+1}	uCi/g	N/a		N/a		N/a						
Lab I.D.	R4295		E8607-8782		E8607-8782		E8607-8782		N/a						
Gh 241 09-03-93	95.9	%	3.24 E^{+1}	uCi/g	3.11 E^{+1}	uCi/g	3.43 E^{+1}	uCi/g	N/a						
Lab I.D.	R4295		E8607-8781		E8607-8781		E8607-8781		N/a						
Pu 239/40 09-03-93	99.6	%	4.30 E^{+1}	uCi/g	4.76 E^{+1}	uCi/g	4.20 E^{+1}	uCi/g	N/a						

WHC-SP-WM-DP-050
REV 0

SAMPLE STATUS REPORT FOR R 4295. 105 KE BASIN STD TIME: 9/10/93 10:32
DISPATCHED: 8/26/93 14:48 SAMPLE HAS NOT BEEN SLURPED
RECEIVED: 9/ 1/93 10:54

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8500	ACD DGST	D.F. 10			E11456
8530	GEA	9.93000E 01 % RECOVERY Cs-137	N	Y	E11456
8530	GEA	1.00300E 02 % RECOVERY Co-60	N	Y	E11456
8540	U	OUT FOR RERUN			E11456
8540	U	1.00400E 02 % RECOVERY	N	Y	E11456
8550	ICP	UNDIGESTED LMCS STD			E11456
8550	ICP	1.01760E 02 % RECOVERY Zr	N	Y	E11456
8550	ICP	1.01860E 02 % RECOVERY Sr	N	Y	E11456
8550	ICP	9.64200E 01 % RECOVERY Si	N	Y	E11456
8550	ICP	9.91600E 01 % RECOVERY Al	N	Y	E11456
8550	ICP	1.00880E 02 % RECOVERY Co	N	Y	E11456
8550	ICP	9.92800E 01 % RECOVERY Cu	N	Y	E11456
8550	ICP	1.01540E 02 % RECOVERY Li	N	Y	E11456
8550	ICP	1.00800E 02 % RECOVERY Zn	N	Y	E11456
8550	ICP	1.02660E 02 % RECOVERY Ni	N	Y	E11456
8550	ICP	1.02560E 02 % RECOVERY Fe	N	Y	E11456
8550	ICP	1.03700E 02 % RECOVERY Ca	N	Y	E11456
8550	ICP	1.03380E 02 % RECOVERY Cr	N	Y	E11456
8550	ICP	1.04980E 02 % RECOVERY Nd	N	Y	E11456
8550	ICP	1.00880E 02 % RECOVERY Sm	N	Y	E11456
8550	ICP	1.03540E 02 % RECOVERY Ba	N	Y	E11456
8550	ICP	1.00160E 02 % RECOVERY P	N	Y	E11456
8550	ICP	9.64800E 01 % RECOVERY S	N	Y	E11456
8550	ICP	1.00220E 02 % RECOVERY Mg	N	Y	E11456
8550	ICP	9.95000E 01 % RECOVERY As	N	Y	E11456
8550	ICP	1.02060E 02 % RECOVERY Na	N	Y	E11456
8550	ICP	1.01760E 02 % RECOVERY Mo	N	Y	E11456
8550	ICP	9.97000E 01 % RECOVERY Ag	N	Y	E11456
8550	ICP	1.04140E 02 % RECOVERY Pb	N	Y	E11456
8550	ICP	9.91000E 01 % RECOVERY Ti	N	Y	E11456
8550	ICP	1.03040E 02 % RECOVERY Cd	N	Y	E11456
8550	ICP	1.16960E 02 % RECOVERY K	N	Y	E11456
8550	ICP	1.01540E 02 % RECOVERY Mn	N	Y	E11456
8550	ICP	9.65000E 01 % RECOVERY Sb	N	Y	E11456
8550	ICP	9.96600E 01 % RECOVERY V	N	Y	E11456
8550	ICP	1.05500E 02 % RECOVERY Be	N	Y	E11456
8550	ICP	9.54400E 01 % RECOVERY Tl	N	Y	E11456
8581	Pu239/40	9.96000E 01 % RECOVERY	N	Y	E11456
8582	Am241	9.59000E 01 % RECOVERY	N	Y	E11456

END OF REPORT

SAMPLE STATUS REPORT FOR E 8607. H&RWC 0066WQL TIME: 9/14/93 10:24
DISPATCHED: 4/12/93 13: 2 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 9.8164 GRAMS			PC41G
1283	AT-SOLDS	8.25E+1 UCI/G			PC41G
2172	GEA-SOIL	4.04000E 07 pCi/gWETwt Am-241	N	Y	PC41G
2172	GEA-SOIL	9.59000E 07 pCi/gWETwt Cs-137	N	Y	PC41G
2172	GEA-SOIL	5.75000E 06 pCi/gWETwt Co-60	N	Y	PC41G
2172	GEA-SOIL	7.95000E 06 pCi/gWETwt Eu-154	N	Y	PC41G
2172	GEA-SOIL	4.62000E 06 pCi/gWETwt Eu-155	N	Y	PC41G
2172	GEA-SOIL	9.88000E 05 pCi/gWETwt Sb-125	N	Y	PC41G
2172	GEA-SOIL	6.04000E 04 pCi/gWETwt Mn-54	N	Y	PC41G
3336	Pu239/40	PU238 8.31 & PU239 4.61E+1 UCI/G			VOGEL
3336	Pu239/40	PU238 UNABLE TO DETERMINE & PU239 2.73E+1 UCI/G			VOGEL
3801	Sr89/90	OUT FOR RERUN			VOGEL
3801	Sr89/90	7.08E+1 UCI/G			VOGEL
4461	U-SOIL	1.34000E-02 G/G	N	Y	PC41G
4822	Am241	3.65E+1 UCI/G			VOGEL
8700	ACD DGST	3.41372E 01 G/L	N	Y	E11456
8730	GEA	1.61000E 00 uCi/G Rec Co-60	N	Y	E11456
8730	GEA	2.87000E 01 uCi/G Rec Cs-137	N	Y	E11456
8730	GEA	2.40000E 00 uCi/G Rec Eu-154	N	Y	E11456
8730	GEA	1.23000E 01 uCi/G Rec Eu-155	N	Y	E11456
8740	U	OUT FOR RERUN			E11456
8740	U	OUT FOR RERUN			E11456
8740	U	OUT FOR RERUN			E11456
8740	U	6.41999E-02 G/G Rec	N	Y	E11456
8740	U	6.77999E-02 G/G Rec	N	Y	E11456
8740	U	7.56000E-02 G/G Rec	N	Y	E11456
8750	ICP-LIQ	SOLID SAMPLE GENERATED EXTENTION FOR UG/G REC			E11456
8750	ICP-LIQ	SOLID SAMPLE GENERATED EXTEN. FOR UG/G REC RESULT			E11456
8755	ICP-SOL	1.35000E 02 uG/G Rec Zr	N	Y	E11456
8755	ICP-SOL	3.64000E 01 uG/G Rec Sr	N	Y	E11456
8755	ICP-SOL	6.51000E 02 uG/G Rec Si	N	Y	E11456
8755	ICP-SOL	2.29000E 04 uG/G Rec Al	N	Y	E11456
8755	ICP-SOL	8.83000E 00 uG/G Rec Co	N	Y	E11456
8755	ICP-SOL	6.07000E 02 uG/G Rec Cu	N	Y	E11456
8755	ICP-SOL	3.06000E 00 uG/G Rec Li	N	Y	E11456
8755	ICP-SOL	7.75000E 02 uG/G Rec Zn	N	Y	E11456
8755	ICP-SOL	4.51000E 01 uG/G Rec Ni	N	Y	E11456
8755	ICP-SOL	5.05000E 04 uG/G Rec Fe	N	Y	E11456
8755	ICP-SOL	2.77000E 03 uG/G Rec Ca	N	Y	E11456
8755	ICP-SOL	1.95000E 02 uG/G Rec Cr	N	Y	E11456
8755	ICP-SOL	6.96000E 01 uG/G Rec Nd	N	Y	E11456
8755	ICP-SOL	4.26000E 02 uG/G Rec Sm	N	Y	E11456
8755	ICP-SOL	1.25000E 02 uG/G Rec Ba	N	Y	E11456
8755	ICP-SOL	6.04000E 02 uG/G Rec P	N	Y	E11456
8755	ICP-SOL	3.50000E 02 uG/G Rec S	N	Y	E11456
8755	ICP-SOL	4.09000E 02 uG/G Rec Mg	N	Y	E11456
8755	ICP-SOL	1.05000E 01 uG/G Rec As	N	Y	E11456
8755	ICP-SOL	1.23000E 02 uG/G Rec Na	N	Y	E11456
8755	ICP-SOL	5.44000E 00 uG/G Rec Mo	N	Y	E11456
8755	ICP-SOL	4.96000E 00 uG/G Rec Ag	N	Y	E11456
8755	ICP-SOL	3.27000E 02 uG/G Rec Pb	N	Y	E11456

755 ICP-SOL 5.77000E 01 uG/G Rec Ti N Y E11456

REPORT CONTINUED ON NEXT PAGE

9313090.1639

SAMPLE STATUS REPORT FOR E 8607. H&RWC 0066WQL TIME: 9/14/93 10:24
DISPATCHED: 4/12/93 13: 2 SAMPLE HAS NOT BEEN SLURPED

EXT.	DETER.	RESULTS OR STATUS	OUT OF RANGE?	GOOD ANS?	CHARGE CODE
****	********	**********	***	***	******
8755	ICP-SOL	1.59000E 02 uG/G Rec Cd	N	Y	E11456
8755	ICP-SOL	2.41000E 02 uG/G Rec K	N	Y	E11456
8755	ICP-SOL	7.53000E 02 uG/G Rec Mn	N	Y	E11456
8755	ICP-SOL	1.66000E 02 uG/G Rec Sb	N	Y	E11456
8755	ICP-SOL	1.77000E 02 uG/G Rec V	N	Y	E11456
8755	ICP-SOL	2.37000E 01 uG/G Rec Be	N	Y	E11456
8755	ICP-SOL	2.26000E 02 uG/G Rec Tl	N	Y	E11456
8755	ICP-SOL	1.37000E 02 uG/G Rec Zr	N	Y	E11456
8755	ICP-SOL	3.70000E 01 uG/G Rec Sr	N	Y	E11456
8755	ICP-SOL	6.66000E 02 uG/G Rec Si	N	Y	E11456
8755	ICP-SOL	2.33000E 04 uG/G Rec Al	N	Y	E11456
8755	ICP-SOL	9.22000E 00 uG/G Rec Co	N	Y	E11456
8755	ICP-SOL	6.20000E 02 uG/G Rec Cu	N	Y	E11456
8755	ICP-SOL	3.45000E 00 uG/G Rec Li	N	Y	E11456
8755	ICP-SOL	7.91000E 02 uG/G Rec Zn	N	Y	E11456
8755	ICP-SOL	4.54000E 01 uG/G Rec Ni	N	Y	E11456
8755	ICP-SOL	5.15000E 04 uG/G Rec Fe	N	Y	E11456
8755	ICP-SOL	2.83000E 03 uG/G Rec Ca	N	Y	E11456
8755	ICP-SOL	1.99000E 02 uG/G Rec Cr	N	Y	E11456
8755	ICP-SOL	7.06000E 01 uG/G Rec Nd	N	Y	E11456
8755	ICP-SOL	4.40000E 02 uG/G Rec Sm	N	Y	E11456
8755	ICP-SOL	1.28000E 02 uG/G Rec Ba	N	Y	E11456
8755	ICP-SOL	5.13000E 02 uG/G Rec P	N	Y	E11456
8755	ICP-SOL	3.47000E 02 uG/G Rec S	N	Y	E11456
8755	ICP-SOL	4.17000E 02 uG/G Rec Mg	N	Y	E11456
8755	ICP-SOL	1.05000E 01 uG/G Rec As	N	Y	E11456
8755	ICP-SOL	1.23000E 02 uG/G Rec Na	N	Y	E11456
8755	ICP-SOL	5.70000E 00 uG/G Rec Mo	N	Y	E11456
8755	ICP-SOL	6.38000E 00 uG/G Rec Ag	N	Y	E11456
8755	ICP-SOL	3.42000E 02 uG/G Rec Pb	N	Y	E11456
8755	ICP-SOL	5.90000E 01 uG/G Rec Ti	N	Y	E11456
8755	ICP-SOL	1.63000E 02 uG/G Rec Cd	N	Y	E11456
8755	ICP-SOL	2.15000E 02 uG/G Rec K	N	Y	E11456
8755	ICP-SOL	7.69000E 02 uG/G Rec Mn	N	Y	E11456
8755	ICP-SOL	1.87000E 02 uG/G Rec Sb	N	Y	E11456
8755	ICP-SOL	1.81000E 02 uG/G Rec V	N	Y	E11456
8755	ICP-SOL	2.40000E 01 uG/G Rec Be	N	Y	E11456
8755	ICP-SOL	2.11000E 02 uG/G Rec Tl	N	Y	E11456
8781	Pu239/40	4.30000E 01 uCi/G Rec	N	Y	E11456
8781	Pu239/40	4.76000E 01 uCi/G Rec	N	Y	E11456
8781	Pu239/40	4.20000E 01 uCi/G Rec	N	Y	E11456
8782	Am241	3.24000E 01 uCi/G Rec	N	Y	E11456
8782	Am241	3.11000E 01 uCi/G Rec	N	Y	E11456
8782	Am241	3.43000E 01 uCi/G Rec	N	Y	E11456
8940	U	OUT FOR RERUN			E11456
8940	U	1.04200E 02 % RECOVERY	N	Y	E11456
8940	U	2.32900E 02 % RECOVERY	N	Y	E11456

END OF REPORT

93130PD 16540

CALIBRATIONS

9313090.1691

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9313090.1642

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

93130900.1643

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 6B16 (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

9313090.1649

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	152		149	151	145	152	149	149	150	151	149
Emb/A-Cz	Pu	110	230		229	229	220	229	228	229	230	231	229
DATE	Am	136	302		300	301	293	301	300	301	303	303	300
8-29-93	Cm	160	369		369	368	363	369	368	371	372	372	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	151		148	152	142	147	148	150	149	150	150
Emb/A-Cz	Pu	109	230		229	230	218	226	227	230	230	230	229
DATE	Am	135	302		300	302	300	299	299	303	302	302	301
8-30-93	Cm	159	369		368	371	362	367	367	372	372	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	81	152	148	149	152		147	148	148	149	151	148
Emb A-Cz	Pu	109	231	228	229	230		227	226	228	229	231	228
DATE	Am	135	303	301	301	302		299	298	301	302	302	299
8-31-93	Cm	159	370	368	368	369		367	366	370	371	371	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	76	151	144	149	152	149	148	148	149	149	150	149
Emb A-Cz	Pu	104	229	223	229	231	225	226	227	229	229	230	228
DATE	Am	129	301	294	301	302	296	299	299	302	302	302	299
9-1-93	Cm	153	369	362	369	370	367	366	366	371	371	371	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	76	152	148	148	153	150	149	148	149	149	150	148
Emb A/Cz	Pu	104	229	227	229	231	227	227	227	229	229	230	227
DATE	Am	130	301	299	300	304	298	300	299	301	301	302	299
9-2-93	Cm	153	369	367	368	371	372	368	367	371	371	371	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	78	151	149	148	153	151	148	149	149	149	150	148
Emb A-Cz	Pu	105	230	228	229	231	227	226	227	229	229	230	227
DATE	Am	131	302	301	300	304	300	299	299	301	301	302	299
9-3-93	Cm	155	368	369	365	371	371	366	367	371	371	371	367

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)

9313090.1545

9313090.1646

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

9313090.1647

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

9213090.1648

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	152		149	151	145	152	149	149	150	151	149
Emb B/A Cz	Pu	110	230		229	229	220	229	228	229	230	231	229
DATE	Am	136	302		300	301	293	301	300	301	303	303	300
8-29-93	Cm	160	369		369	368	363	369	368	371	372	372	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	151		148	152	142	147	148	150	149	150	150
Emb /A Cz	Pu	109	230		229	230	218	226	227	230	230	230	229
DATE	Am	135	302		300	302	300	299	299	303	302	302	301
8-30-93	Cm	159	369		368	371	362	367	367	372	372	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	81	152	148	149	152		147	148	148	149	151	148
Emb A-Cz	Pu	109	231	228	229	230		227	226	228	229	231	228
DATE	Am	135	303	301	301	302		299	298	301	302	302	299
8-31-93	Cm	159	370	368	368	369		367	366	370	371	371	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	76	151	144	149	152	149	148	148	149	149	150	149
Emb A-Cz	Pu	104	229	223	229	231	225	226	227	229	229	230	228
DATE	Am	129	301	294	301	302	296	299	299	302	302	302	299
9-1-93	Cm	153	369	362	369	370	367	366	366	371	371	371	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	76	152	148	148	153	150	149	148	149	149	150	148
Emb A/Cz	Pu	104	229	227	229	231	227	227	227	229	229	230	227
DATE	Am	130	301	299	300	304	298	300	299	301	301	302	299
9-2-93	Cm	153	369	367	368	371	372	368	367	371	371	371	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	78	151	149	148	153	151	148	149	149	149	150	148
Emb A-C	Pu	105	230	228	229	231	227	226	227	229	229	230	227
DATE	Am	131	302	301	300	304	300	299	299	301	301	302	299
9-3-93	Cm	155	369	369	365	371	371	366	367	371	371	371	367

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)

9313090.1649

SAMPLE E8607.-8730		DENSITY 34.1372 G/L
RADIONUCLIDE	uCi/L	uCi/G
Co-60	5.50E+01	1.61E+00
Cs-137	9.80E+02	2.87E+01
Eu-154	8.20E+01	2.40E+00
Eu-155	4.19E+02	1.23E+01

9313090.1650

Efficiency performed on 4/1/93
A.K. Dell 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 =  1.344237E-01 (+-  1.227744E-03)
```

24

93130090.1651

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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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ACID DIGESTION ANALYSES

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 1772

WHC-SD-WM-DP-050
REV 0

Lab Segment Serial No. E-8607	Customer ID: 0066WQL
Analysis: Acid Digest	Sample Prep: Direct

Instrument: SNFO 2/4/95	Procedure/ Rev: LA-505-159/B-1
Technologist: Bill Smith Will-Kf	Date: 8/30/93
Starting Time: 0800	Temperature 95 C
Ending Time: 1500	Chemist: Burt Griffin II

Comments:

	Description	Lab ID		Description	Lab ID
1	SAM	E-8607-8700	11		
2	STD	R-4295-8500	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
1mcc	13N10-C/5ml	21B49-C/5ml	14N10-D/5ml	STD conc/ 250 SAM

A-6000-881 (03/92)

9313090.1654

ANALYTICAL BATCH SUMMARY SHEET

METHOD: Acid Digest

DATE START: 8/30/93

PREPARED BY: R.K. FULLER

DATE COMPLETE: 8/31/93

SPL NAME	SPL ID	DIGESTION	g/L RESULT #1	g/L RESULT #2	REMARKS
STD	R-4295	Acid dig	10 D.F.		
Sample	E-8607	1	34.1372 g/L		

NARRATIVE: [✓] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARATIONS FOR THIS BATCH:

Bernard Griffin II
8-31-93

9313090.1655

ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8700	H&RWC	4-12-93	13: 2	26

Determination	Method/Standard	Result Units	Charge Code	Returns
ACD DGST	LA-505-159	G/L	E11456	0

Sample Size	Customer ID
? 8.5343 g. into .250 l	0066WQL

Remarks, Calculations, Results

JAR ID#
GRAMS SAMPLE 8.5343 g.

$\frac{8.5343}{.250 l}$ g = 34.1372 g/l

VOLUME ON COMPLETION .250 ~~[illegible]~~ l
8/30/93

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs
Date 8/30/93	Time Completed 1500	Lab Unit Mgr 8-31-93 Bertrand Miller		

54-8600-061 (R-10-83)

E 8607-8700

SEQUENCE # : 173
WT 1: 0.0000
WT 2: 8.5343

NET WEIGHT:

---> 8.5343 GRAMS

08/29/93 @ 20:56:36

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ACID DIGESTION ANALYSIS

Serial No	Sample Point	Date	Time Issued	Priority
R 4295.-8500	105 KE BASIN	8-26-93	14:47	26

Determination	Method Standard	Result Units	Charge Code	Reruns
ACD DGST	LA-505-159	% RECOVERY	E11456	0

Sample Size	Customer ID
? 5ml EACH into 50ml	STD

Remarks Calculations, Results

LMCS CHECK SAMPLE
LMCS ID

13N10-C
14N10-D
21B48-C
} 5ml/EACH

DF = 50ml / 5ml = 10

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

Date	Time Completed	Lab Unit Mgr
8/30/93	1500	8-31-93

64-6800-061 (R-10-83)

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WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-050
REV 0

ANALYTICAL BATCH

Lab Segment Serial No. R4295, E8607	Customer ID: H&RWC 0066WQL
Analysis: ICP	Sample Prep: NONE

Instrument: WB39939	Procedure/ Rev: LA-505-151/D-0
Technologist: TA FRAZIER	Date: 09/01/93
Starting Time: 15:13	Temperature N/A
Ending Time: 15:40	Chemist: B. WELS

Comments:

	Description	Lab ID		Description	Lab ID
1	INITIAL LMCS CHECK STD	R4295-8550	11		
2	HNO3 REAGENT BLANK	----	12		
3	Sample 0066WQL	E8607-8750	13		
4	Duplicate 0066WQL	E8607-8750	14		
5	HNO3 REAGENT BLANK	----	15		
6	ENDING LMCS CHECK STD	----	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
ICPSST4	25N10B DIRECT			

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A-6000-881 (03/92)

9313090.1659

INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Batch 1767

Serial No	Sample Point	Date	Time Issued	Priority
R 4295.-8550	105 KE BASIN	8-26-93	14:47	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
ICP	LA-505-151	% RECOVERY	E11456	0

Sample Size			Customer ID
? Direct	ICP5574 25N10B	Undigested	STD

Remarks, Calculations, Results

1st STD Digested STD
Zr 5.088 101.76%
Sr 5.093 101.86%
Si 4.821 96.42%
Al 4.958 99.16%
Co 5.044 100.88%
Cu 4.964 99.28%
Li 5.077 101.54%
Zn 5.040 100.80%
Ni 5.133 102.66%

Teresa A. Frazier

over

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs 9/2/93

Date	Time Completed	Lab Unit Mgr
9/1/93	15:40	Brian Wels Teresa Frazier

54-8600-06 (10-83)

Fe 5.128 102.56%
Ca 5.185 103.70%
Cr 5.169 103.38%
Nd 5.249 104.98%
Sm 5.044 100.88%
Ba 5.177 103.54%
P 5.008 100.16%
S 4.824 96.48
Mg 5.011 100.22%
As 4.975 99.50%
Na 5.103 102.06%
Mo 5.088 101.76%
Ag 4.985 99.70%
Pb 5.207 104.14%
Ti 4.955 99.10%
Cd 5.152 103.04%
K 5.848 116.96%
Mn 5.077 101.54%
Sb 4.825 96.50%
V 4.983 99.66%
Be 5.275 105.50%
Tl 4.772 95.44%

R4295-8550

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INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8750	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP-LIQ	LA-505-151	uG/~~ML~~g JK 9-10-93	E11456	0

Sample Size	Customer ID
? 34.1372g Id, -1ml in 10ml	0066WQL

Remarks, Calculations, Results

Sample

Zr(42)(11)/34.1372=1.35E2
Sr(113)(11)/34.1372=3.64E1
Si(202)(11)/34.1372=6.51E2
Al(7.1249E4)(11)/34.1372=2.29E4
Co(27.4)(11)/34.1372=8.83
Cu(1.885E3)(11)/34.1372=6.07E2
Li(9.51)(11)/34.1372=3.06
Zn(2.406E3)(11)/34.1372=7.75E2
Ni(140)(11)/34.1372=4.51E1

→ over

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs 9/2/93

Date	Time Completed	Lab Unit Mgr
9/1/93	15:40	Brian Wels

54-6800-06 (R 10-83)

Fe(1.56661E5)(11)/34.1372=5.05E4
Ca(8.586E3)(11)/34.1372=2.77E3
Cr(604)(11)/34.1372=1.95E2
Nd(216)(11)/34.1372=6.96E1
Sm(1.321E3)(11)/34.1372=4.26E2
Ba(389)(11)/34.1372=1.25E2
P(1.873E3)(11)/34.1372=6.04E2
S(1.086E3)(11)/34.1372=3.50E2
Mg(1.270E3)(11)/34.1372=4.09E2
As(32.5)(11)/34.1372=1.05E1
Na(382)(11)/34.1372=1.23E2
Mo(16.9)(11)/34.1372=5.44
Ag(15.4)(11)/34.1372=4.96
Pb(1.016E3)(11)/34.1372=3.27E2
Ti(179)(11)/34.1372=5.77E1
Cd(495)(11)/34.1372=1.59E2
K(747)(11)/34.1372=2.41E2
Mn(2336)(11)/34.1372=7.53E2
Sb(515)(11)/34.1372=1.66E2
V(551)(11)/34.1372=1.77E2
Be(73.4)(11)/34.1372=2.37E1
Tl(70)(11)/34.1372=2.26E2

E8607-8750

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INDUCTIVELY COUPLED PLASMA ANALYSIS - ACID DIGESTION

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8750	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
ICP-LIQ	LA-505-151	uG/~~ml~~ J 9-13-93	E11456	0

Sample Size	Customer ID
34.1372g/l-1ml in 10ml	0066WQL

Remarks, Calculations, Results

Duplicate

Zr (426)(11)/34.1372=1.37E2
Sr (115)(11)/34.1372=3.70E1
Si (2.067E3)(11)/34.1372=6.66E2
Al (7.2408E4)(11)/34.1372=2.33E4
Co (28.6)(11)/34.1372=9.22
Cu (1.923E3)(11)/34.1372=6.20E2
Li (10.7)(11)/34.1372=3.45
Zn (2.454E3)(11)/34.1372=7.91E2
Ni (141)(11)/34.1372=4.54E1

Teresa L. Fizier

→over..

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs 9/2/93

Date	Time Completed	Lab Unit Mgr	
9/1/93	15:40	Brian Wells	Teresa L. Fizier

S4-6800-06 (R-10-83)

E8607-8750

Fe (1.59969E5)(11)/34.1372=5.15E4
Ca (8.795E3)(11)/34.1372=2.83E3
Cr (617)(11)/34.1372=1.99E2
Nd (219)(11)/34.1372=7.06E1
Sm (1.365E3)(11)/34.1372=4.40E2
Ba (398)(11)/34.1372=1.28E2
P (1.591E3)(11)/34.1372=5.13E2
S (1.078E3)(11)/34.1372=3.47E2
Mg (1.293E3)(11)/34.1372=4.17E2
As (32.7)(11)/34.1372=1.05E1
Na (381)(11)/34.1372=1.23E2
Mo (17.7)(11)/34.1372=5.70
Ag (19.8)(11)/34.1372=6.38
Pb (1.061E3)(11)/34.1372=3.42E2
Ti (183)(11)/34.1372=5.90E1
Cd (507)(11)/34.1372=1.63E2
K (668)(11)/34.1372=2.15E2
Mn (2.386E3)(11)/34.1372=7.69E2
Sb (581)(11)/34.1372=1.87E2
V (562)(11)/34.1372=1.8E2
Be (74.5)(11)/34.1372=2.40E1
Tl (654)(11)/34.1372=2.11E2

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Identity 1: SST4 Identity 2: Quality Control 3:13 PM September 1, 1993

WHC-SD-WM-DP-050
REV 0

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)	Co (ppb)	Cu (ppb)	Li (ppb)
Mean	5087.581	5093.343	4912.847	4821.142	4958.041	5043.859	4964.302	5076.557
S.D.	4.760	14.814	22.527	9.763	8.986	14.047	10.656	30.485
% R.S.D.	0.094	0.291	0.459	0.203	0.181	0.278	0.215	0.601

	Zn (ppb)	Ni (ppb)	La (ppb)	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)
Mean	5039.913	5133.299	5087.823	5127.649	5184.658	5168.938	5249.406	447.967
S.D.	8.147	8.185	7.993	15.238	11.355	7.190	25.410	1275.914
% R.S.D.	0.162	0.159	0.157	0.297	0.219	0.139	0.484	284.823

	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)
Mean	5032.395	5043.945	5177.172	5008.377	4823.882	5011.435	4975.080	5103.279
S.D.	3.960	6.031	15.111	154.708	71.514	10.544	27.555	30.868
% R.S.D.	0.079	0.120	0.292	3.089	1.482	0.210	0.554	0.605

	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)
Mean	5088.157	2875.805	4984.880	5207.222	4954.674	5152.409	5039.642	5848.441
S.D.	14.098	20.440	8.842	24.685	11.038	10.760	13.036	8.791
% R.S.D.	0.277	0.711	0.177	0.474	0.223	0.209	0.259	0.150

	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)	Tl (ppb)
Mean	5076.903	4825.013	4983.153	5274.797	4771.975
S.D.	4.495	51.056	5.165	8.981	46.586
% R.S.D.	0.089	1.058	0.104	0.170	0.976

Teresa L. Stazin
E8607 H+RWC
Acid Digest
9/1/93

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 35 TO 41.

9313090.1692

Identity 1: HNO3 Reag Blank Identity 2: Direct 3:15 PM September 1, 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)	Co (ppb)	Cu (ppb)	Li (ppb)
Mean	6.881	2.725	39.882	20.928	2.343	-2.726	2.899	3.336
S.D.	1.144	0.451	17.066	1.025	3.106	1.129	0.594	0.418
% R.S.D.	16.631	16.564	42.791	4.898	132.582	41.419	20.508	12.526

	Zn (ppb)	Ni (ppb)	La (ppb)	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)
Mean	8.651	6.788	3.977	-3.596	5.341	-3.422	39.375	482.426
S.D.	0.899	3.779	0.031	4.415	0.708	1.384	13.695	745.462
% R.S.D.	10.389	55.672	0.787	122.766	13.252	40.438	34.782	154.524

	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)
Mean	29.335	24.397	3.017	67.143	6.686	3.133	5.593	13.497
S.D.	14.076	11.398	0.492	38.151	10.399	0.600	8.742	4.423
% R.S.D.	47.983	46.717	16.321	56.820	155.522	19.155	156.288	32.772

	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)
Mean	-0.905	0.099	14.730	-24.405	1.939	2.210	11.655	804.841
S.D.	2.345	18.056	2.242	16.142	0.496	1.364	3.461	31.013
% R.S.D.	259.222	18288.675	15.218	66.140	25.574	61.715	29.695	3.853

	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)	Tl (ppb)
Mean	2.477	-34.811	4.549	3.116	54.927
S.D.	1.231	37.508	1.041	0.246	8.638
% R.S.D.	49.695	107.749	22.874	7.895	15.727

93130190.1663

Identity 1: E8607 Sam 0066WQL Identity 2: 34.1372g/l Acid Dig 3:21 PM September 1, 1993
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-050
REV 0

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Co (ppb)	Cu (ppb)	Li (ppb)
Mean	4177.265	1079.996	430.427	20616.954	210998.714	305.902	18075.372	110.868
S.D.	16.671	3.802	14.221	78.130	411078.733	1.851	65.300	0.490
% R.S.D.	0.399	0.352	3.304	0.379	194.825	0.605	0.361	0.442

	Zn (ppb)	Ni (ppb)	La (ppb)	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)
Mean	21738.992	1347.997	-116.453	-7751.743	74015.923	5640.809	2248.074	15932942.798
S.D.	85.225	9.003	12.937	0.000	266.467	41.536	16.075	55635.259
% R.S.D.	0.392	0.668	11.109	0.000	0.360	0.736	0.715	0.349

	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)
Mean	-1932.667	12950.910	3807.200	17813.001	10697.887	11471.277	386.683	3862.154
S.D.	36.226	27.196	13.342	303.279	199.363	42.775	4.385	36.300
% R.S.D.	1.874	0.210	0.350	1.703	1.864	0.373	1.134	0.940

	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)
Mean	179.644	-148.074	504.321	9412.934	1816.157	4366.573	-1179.616	3972.107
S.D.	1.567	33.633	6.461	65.994	9.677	4.879	6.310	10.566
% R.S.D.	0.872	22.714	1.281	0.701	0.533	0.112	0.535	0.266

	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)	Tl (ppb)
Mean	21313.538	4556.643	5785.513	672.387	8296.807
S.D.	59.936	62.722	39.625	3.006	80.237
% R.S.D.	0.281	1.377	0.685	0.447	0.967

9313090.1664

Identity 1: E8607 Sam 0066WQL Identity 2: 34.1372g/l-1ml in 10 3:26 PM September 1, 1993
Task name : TWC93
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 1

WHC-SD-WM-DP-050
REV 0

	Zr (ppb)	Sr (ppb)	Bi (ppb)	Si (ppb)	Al (ppb)	Co (ppb)	Cu (ppb)	Li (ppb)
Mean	420.876	112.893	-0.601	2020.574	71249.398	27.384	1885.393	9.515
S.D.	2.623	0.247	10.774	6.004	190.182	2.332	0.806	0.881
% R.S.D.	0.623	0.219	1792.377	0.297	0.267	8.516	0.043	9.257

	Zn (ppb)	Ni (ppb)	La (ppb)	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)
Mean	2406.490	140.455	-43.385	156660.746	8586.236	604.333	215.689	1635871.813
S.D.	6.888	2.501	2.318	412.147	8.866	7.032	11.612	926.556
% R.S.D.	0.286	1.781	5.342	0.263	0.103	1.164	5.384	0.057

	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)
Mean	-414.761	1321.456	389.350	1873.299	1085.558	1269.592	32.489	381.618
S.D.	11.348	8.219	0.585	22.026	14.629	2.741	8.111	7.053
% R.S.D.	2.736	0.622	0.150	1.176	1.348	0.216	24.964	1.848

	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)
Mean	16.890	-23.679	15.443	1015.646	178.685	494.530	-125.009	747.316
S.D.	1.217	9.589	1.423	4.898	1.314	1.333	2.319	13.429
% R.S.D.	7.205	40.494	9.214	0.482	0.735	0.269	1.855	1.797

	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)	Tl (ppb)
Mean	2335.902	515.541	551.081	73.389	700.555
S.D.	2.546	52.615	4.135	0.619	18.812
% R.S.D.	0.109	10.206	0.750	0.844	2.685

93130901.1865

Identity 1: E8607 Dup 0066WQL Identity 2: 34.1372g/l-1ml in 10 3:30 PM September 1, 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)	Co (ppb)	Cu (ppb)	Li (ppb)
Mean	426.150	115.521	-5.407	2067.367	72408.239	28.628	1923.056	10.688
S.D.	3.081	0.891	3.376	17.206	547.948	2.862	16.598	1.139
% R.S.D.	0.723	0.771	62.439	0.832	0.757	9.996	0.863	10.654

	Zn (ppb)	Ni (ppb)	La (ppb)	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)
Mean	2454.430	140.969	-32.658	159968.629	8795.196	617.217	218.656	1673845.624
S.D.	16.343	0.743	4.046	1220.855	72.039	5.611	20.622	15130.167
% R.S.D.	0.666	0.527	12.390	0.763	0.819	0.909	9.431	0.904

	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)
Mean	-381.919	1364.767	397.928	1590.629	1078.316	1293.233	32.743	380.750
S.D.	17.876	15.793	3.448	60.656	24.007	10.855	3.490	6.084
% R.S.D.	4.681	1.157	0.867	3.813	2.226	0.839	10.658	1.598

	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)
Mean	17.678	21.554	19.846	1060.723	182.629	506.800	-125.894	667.796
S.D.	2.861	25.278	0.384	4.959	1.593	4.533	5.187	38.096
% R.S.D.	16.185	117.276	1.935	0.467	0.872	0.894	4.120	5.705

	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)	Tl (ppb)
Mean	2386.230	580.689	561.832	74.537	654.158
S.D.	17.722	9.377	5.563	0.619	22.000
% R.S.D.	0.743	1.615	0.990	0.831	3.363

93130090.1666

Identity 1: HNO3 Reag Blank Identity 2: Direct 3:36 PM September 1, 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)	Co (ppb)	Cu (ppb)	Li (ppb)
Mean	1.007	-0.194	39.701	4.207	21.141	-5.097	-0.368	-0.834
S.D.	1.688	0.000	18.208	3.807	6.293	1.129	0.385	0.631
% R.S.D.	167.615	0.000	45.862	90.494	29.767	22.154	104.487	75.635

	Zn (ppb)	Ni (ppb)	La (ppb)	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)
Mean	5.252	3.307	-8.013	1.526	2.366	-3.623	1.952	-551.344
S.D.	0.566	3.860	4.013	3.714	0.143	1.663	13.815	206.754
% R.S.D.	10.781	116.716	50.088	243.333	6.063	45.900	707.817	37.500

	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)
Mean	2.219	23.638	-0.361	30.432	20.083	0.285	-9.064	-25.460
S.D.	1.239	1.316	0.193	6.358	5.811	0.000	9.489	3.901
% R.S.D.	55.810	5.568	53.360	20.894	28.933	0.000	104.689	15.323

	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)
Mean	-3.560	10.385	1.821	0.487	-1.398	-1.222	-1.574	419.084
S.D.	1.098	9.533	0.300	4.907	0.174	0.167	1.402	21.132
% R.S.D.	30.833	91.794	16.498	1007.933	12.430	13.652	89.104	5.042

	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)	Tl (ppb)
Mean	-0.570	-4.668	1.241	0.082	-4.277
S.D.	0.118	36.434	1.041	0.376	22.962
% R.S.D.	20.769	780.549	83.834	458.251	536.814

9313090.1667

Identity 1: SST4 Identity 2: Quality Control 3:37 PM September 1, 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)	Co (ppb)	Cu (ppb)	Li (ppb)
Mean	4956.161	4952.620	4828.665	4723.421	4863.335	4886.314	4869.065	5007.917
S.D.	22.581	27.669	41.114	23.926	45.826	15.831	21.940	31.793
% R.S.D.	0.456	0.559	0.851	0.507	0.942	0.324	0.451	0.635

	Zn (ppb)	Ni (ppb)	La (ppb)	Fe (ppb)	Ca (ppb)	Cr (ppb)	Nd (ppb)	U (ppb)
Mean	4989.815	4979.940	4949.968	5026.291	5169.038	5015.238	5100.831	-551.344
S.D.	25.750	16.884	31.202	30.667	25.124	14.173	33.603	473.733
% R.S.D.	0.516	0.339	0.630	0.610	0.486	0.283	0.659	85.923

	Ce (ppb)	Sm (ppb)	Ba (ppb)	P (ppb)	S (ppb)	Mg (ppb)	As (ppb)	Na (ppb)
Mean	4814.213	4958.842	5037.719	5658.153	4989.766	4875.572	4847.856	5000.603
S.D.	45.117	24.374	27.861	106.966	105.173	27.231	25.096	21.861
% R.S.D.	0.937	0.492	0.553	1.890	2.108	0.559	0.518	0.437

	Mo (ppb)	Se (ppb)	Ag (ppb)	Pb (ppb)	Ti (ppb)	Cd (ppb)	B (ppb)	K (ppb)
Mean	4925.851	2810.333	4944.524	5106.254	4811.533	4977.110	4942.468	5178.442
S.D.	27.279	53.018	24.568	20.245	27.806	25.140	28.299	18.301
% R.S.D.	0.554	1.887	0.497	0.396	0.578	0.505	0.573	0.353

	Mn (ppb)	Sb (ppb)	V (ppb)	Be (ppb)	Tl (ppb)
Mean	4948.494	4796.814	4855.376	5096.942	4566.038
S.D.	21.277	15.436	22.513	34.323	24.853
% R.S.D.	0.430	0.322	0.464	0.673	0.544

9313090.1669

Teresa L. Frazier
9/1/93

7 ✓

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

WHC-SD-WM-DP-050
REV 0

ANALYTICAL BATCH 1854

Lab Segment Serial No. E-8607	Customer ID: 0066WQL
Analysis: 4	Sample Prep: Acid Digest

Instrument: AL-1062O WS55837	Procedure/ Rev: LA-925-106 / B-0
Technologist: RG Acker	Date: 9/9/93
Starting Time: 08:00	Temperature N/A
Ending Time: 09:00	Chemist: Chuck Gaser

Comments: % RPD on Analytical Batch sheet is the difference of the high and low result divided by the average of the three results

	Description	Lab ID		Description	Lab ID
1	STD	R-4285-8540	11		
2	Sample	E-8607-8740	12		
3	Sample Dup	E-8607-8740	13		
4	Sample Triple	E-8607-8740	14		
5	Sample Spike	E-8607-8740	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
LnCS	144338 / .100ml			
Spike	146338 / .100ml			
				42

A-6000-881 (03/92)

9313090.1669

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-925-106

DATE START: SEPT. 9, 1993

PREPARED BY: C. G. GRASER

DATE COMPLETE: SEPT. 9, 1993

C Graser 9 SEPT 93

	UNITS:	G/G							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD.144B38	R4295	U	3.88E-2				100.4	3.50E-3	
BLANK									
0066WQL	E8607	U	6.42E-2	6.78E-2	6.93E-2	16.5	232.9	3.38E-3	
			RESULT #3					3.48E-3	
			7.56E-2					4.09E-3	

NARRATIVE: [ ] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

Standard result is in G/L.

High %RPD may be caused by matrix interference, most probably Fe+++.

High %REC on matrix-spike probably due to sample interference

9313090.1670

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN Batch 1854

Serial No.	Sample Point	Date	Time Issued	Priority
R 4295.-8540	105 KE BASIN	8-26-93	14:47	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	E11456	1

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

Remarks, Calculations, Results

S267 UF1C
STD# 14B38 RESULT .22
STD VAL 386-2 %REC→100.4 .50
SPIKE ID/VAL 14B35/5.04-4 g/l
SPIKE VOL. .100 ml

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

Date	Time Completed	Lab Unit Mgr
9/9/93	08:15	C Brown

54-6900061 (R-10-83)

9/10

9313090.1621

URANIUM : LA-925-106 (B-0) LIQUIDS

			STANDARD
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
R4295-8540	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1854	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
1			
Instrument	Deflection (sample + fluran)	DSAM	0.22
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.5
09/09/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration (gU/L)		3.8760E-02

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

U in gU/L=	3.88E-02
U in µg/mL=	3.88E+01

DETECTION LEVEL G/L= 3.5E-03

Data Entry by:	C Brown	Date:	09-Sep-93
Approved by:	CA Clark	Date:	9-Sep-93

Form 1 Rev. 1

A.2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No.	Sample Point		Time Issued	Priority
E 8607.-8740	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E11456	1

Sample Size	Customer ID
? .100-10-.025 P.F=10	0066WQL

Remarks, Calculations, Results

Spike ID - 141338 / 5.04^{-4} g/l
Spike vol - .100ml

Readings
.38
.72

$$\frac{(.38)(5.04^{-4})(.1)(.010)}{\left[\left(\frac{5.7}{5.6}\times .72\right)-.38\right].025(34.1372)} = 6.748E-2$$

5.625
5.525

6.42E-2 G/G

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

Date	Time Completed	Lab Unit Mgr
9/9/93	08:25	C Brown

9/10

54-680X (R 10-83)

URANIUM : LA-925-106 (B-0) SOLIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
E8607-8740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1854	Volume of sample (mL)	VSAM	0.0250
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.53
2			
Instrument	Deflection (sample + fluran)	DSAM	0.38
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.63
Date:	Deflection (sample + fluran + spike)	DS+S	0.72
09/09/93	Dilution factor of sample	DF	101
	Digest Grams of Solids/Liter	D G/L	34.1372
	Preparation factor of sample	PF	10
	Concentration (gU/L) in Digest Solution		2.1917E+00
	Concentration (gU/g)		6.4203E-02

gU/L = (DSAM*VSP*CSP*DF*PF)/((VTOT/VSUB*DS+S-DSAM)*VSAM)
gU/g = (DSAM*VSP*CSP*DF*PF)/((VTOT/VSUB*DS+S-DSAM)*VSAM*D G/L)
Detection Level = (0.02*VSP*CSP*DF*PF*1000000)/((VTOT/VSUB*DS+S-DSAM)*VSAM*D G/L))

U in gU/g	=	6.42E-02
U in µg/g	=	6.42E+04

DETECTION LEVEL in µg/g = 3.38E+03

Data Entry by:	C A Clark	Date:	13-Sep-93
Approved by:	C Brown	Date:	13 SEPT. 93

Form 3 Rev. 2

9313090.1672

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No	Sample Point		Time Issued	Priority
E 8607.-8740	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E11456	2

Sample Size	Customer ID
? P.F. = 10 .100-10.025	0066WQL

Remarks Calculations Results

Spike ID - 146B38 / 5.04-4 g/l

Spike vol - .100 ml

Readings .39 .72

(.39)(5.04-4)(.1)(1010) / 5425/6.48 (5.7/54 x .72) - .39 (.025)(34.1372) = 6.785-2 / 6.78E-2 g/g

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

Date	Time Completed	Lab Unit Mgr
9/9/93	08:35	C Brown 9/10

54-08-0-061 (R-10-83)

93130090.1673

URANIUM : LA-925-106 (B-0) SOLIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
E8607-8740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1854	Volume of sample (mL)	VSAM	0.0250
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.53
2			
Instrument	Deflection (sample + fluran)	DSAM	0.39
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.63
82579			
Date:	Deflection (sample + fluran + spike)	DS+S	0.72
09/09/93	Dilution factor of sample	DF	101
	Digest Grams of Solids/Liter	D G/L	34.1372
	Preparation factor of sample	PF	10
	Concentration (gU/L) in Digest Solution		2.3150E+00
	Concentration (gU/g)		6.7813E-02

gU/L = (DSAM*VSP*CSP*DF*PF)/((VTOT/VSUB*DS+S-DSAM)*VSAM)
gU/g = (DSAM*VSP*CSP*DF*PF)/((VTOT/VSUB*DS+S-DSAM)*VSAM*D G/L)
Detection Level = (0.02*VSP*CSP*DF*PF*1000000)/((VTOT/VSUB*DS+S-DSAM)*VSAM*D G/L))

U in gU/g	=	6.78E-02
U in µg/g	=	6.78E+04

DETECTION LEVEL in µg/g = 3.48E+03

Data Entry by:	G Q Clark	Date:	13-Sep-93
Approved by:	C Brown	Date:	13 SEPT. 93

Form 3 Rev. 2

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

RERUN

Serial No.	Sample Point		Time Issued	Priority
E 8607.-8740	H&RWC	4-12-93	13: 2	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E11456	3

Sample Size	Customer ID
? P.F. = 10 - .100 - 10 - .025	0066WQL

Remarks, Calculations, Results

Spike ID - 146B78 5.04-4 g/l .37 .65

Spike Vol - .100 ml (.37)(5.04-4)(.1)(1010) / (.65) - .37 (.025)(34.1372) = 2.568E-2 G/G 7.56E-2

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs	Hrs	Hrs	Hrs
Date 9/9/93	Time Completed 08:45	Lab Unit Mgr		

54-680 (06) (A-10-83)

URANIUM : LA-925-106 (B-0) SOLIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
E8607-8740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1854	Volume of sample (mL)	VSAM	0.0250
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.53
2			
Instrument	Deflection (sample + fluran)	DSAM	0.37
AL-10620	Volume of spike (mL)	VSP	0.1000
Analyst	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.63
82579			
Date:	Deflection (sample + fluran + spike)	DS+S	0.65
09/09/93	Dilution factor of sample	DF	101
	Digest Grams of Solids/Liter	D G/L	34.1372
	Preparation factor of sample	PF	10
	Concentration (gU/L) in Digest Solution		2.5821E+00
	Concentration (gU/g)		7.5640E-02

gU/L = (DSAM*VSP*CSP*DF*PF)/((VTOT/VSUB*DS+S-DSAM)*VSAM)
gU/g = (DSAM*VSP*CSP*DF*PF)/((VTOT/VSUB*DS+S-DSAM)*VSAM*D G/L)
Detection Level = (0.02*VSP*CSP*DF*PF*1000000)/((VTOT/VSUB*DS+S-DSAM)*VSAM*D G/L))

U in gU/g	=	7.56E-02
U in µg/g	=	7.56E+04

DETECTION LEVEL in µg/g = 4.09E+03

Data Entry by:		Date:	13-Sep-93
Approved by:		Date:	13 SEPT. 93

Form 3 Rev. 2

9313090.1674

47

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-8940	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	E11456	2

Sample Size: Sample .025 mL > 10 mL (IN Cell) .05 mL; ? STD .100 mL

Customer ID: 0066WQL

Remarks, Calculations, Results

SAMPLE SPIKED ID
SPIKE ID 146B38
SPIKE VOLUME .100 mL

PF = 10

.40
.67

Spike ID - 146B38 (5.04E-4 g/l)
Spike Vol - .100 mL

232.9 % Rec.

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

Date	Time Completed	Lab Unit Mgr
9/9/93	0910	Cbrun

S4-0800-061 (R-10-83)

URANIUM : LA-925-106 (B-0) SPIKE

			SPIKE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
R4295-8940	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1854	Volume of sample (mL)	VSAM	0.0500
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.55
1			
Instrument	Volume of spike (mL)	VSP	0.1000
AL-10620	Volume of liquid in cell (sample + fluran + water + spike)	VTOT	5.65
Analyst:			
82579	Deflection (sample + fluran)	DSAM	0.4
Date:	Deflection (sample + fluran + spike)	DS+S	0.67
09/09/93	Dilution factor of sample	DF	405
	Dilution factor of spike	DFS	101.25
	Spike value (matrix) (gU/L)	SV	3.8600E-02
	Preparation factor of sample	PF	10
	Concentration (gU/L) Form 1 (SAMPLE)	gU/L1	2.1926E+00
	Concentration (gU/L)	gU/LS	5.789E+00
	% Recovery		232.9

gU/L = (DSAM*VSP*CSP*DF*PF) / (((VTOT/VSUB) * DS+S - DSAM) * VSAM)
%Recovery = ((gU/LS - gU/L1) * (DFS / (DF * PF) / SV) * 100

% RECOVERY =	232.94

HIGH

Data Entry by:		Date:	09-Sep-93
Approved by:	PA Clark	Date:	9-Sep-93

Form 2 Rev. 2

9313090.1675

WHC-SD-WM-DP-050
REV 0

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY
ANALYTICAL BATCH

Batch 1770

Lab Segment Serial No. E-8607	Customer ID: 0066WQL
Analysis: U	Sample Prep: ~~Direct~~ Acid Digestion 9-10-93

Instrument: AL-10620	Procedure/ Rev: LA-925-106 / B-0
Technologist: RG Hohen	Date: 9/7/93
Starting Time: 10:00	Temperature NA
Ending Time: 15:00	Chemist: Stan Catlow

Comments: OUT FOR RERUN

	Description	Lab ID		Description	Lab ID
1	STD	R-4295-8540	11		
2	Sample	E-8607-8740	12		
3	Sample Dup	E-8607-8740	13		
4	Sample Trip.	E-8607-8740	14		
5	Sample Spike	E-8607-8740	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	144338/ .100ml			
Sample Spike	144338/ .025ml			

49

A-6000-881 (03/92)

9313090.1676

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
R 4295.-8540	105 KE BASIN	8-26-93	14:47	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	E11456	0

Sample Size	Customer ID
? .001-10ml-.100ml	STD

Remarks, Calculations, Results

S267 UF1C
STD# 14838 RESULT 3.9-2 .22
STD VAL 3.86-2 %REC 101.03 % .50
SPIKE ID/VAL 14838/5.04-4 g/l
SPIKE VOL. 100ml

OUT FOR RERUN

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

Date	Time Completed	Lab Unit Mgr
9/7/93	10:00	

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

URANIUM : LA-925-106 (B-0) LIQUIDS

			STANDARD
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
R4295-8540	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1770	Volume of sample (mL)	VSAM	0.1000
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.60
0			
Instrument	Deflection (sample + fluran)	DSAM	0.22
AL10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.70
Date:	Deflection (sample + fluran + spike)	DS+S	0.5
09/07/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	1
	Concentration (gU/L)		3.8760E-02

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((((VTOT/VSUB)*(DS+S))-DSAM)*VSAM))

U in gU/L=	3.88E-02
U in µg/mL=	3.88E+01

DETECTION LEVEL G/L= 3.5E-03

50

Data Entry by:		Date:	08-Sep-93
Approved by:		Date:	

Form 1 Rev. 1

9313090.1677

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8740	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E11456	0

Sample Size: ?P.F. = 10 & .100 - 10ml - .025ml

Customer ID: 0066WQL

Remarks, Calculations, Results:
Sample
Spike ID - 1%B38/5.04-4g/l
Spike vol - .100 ml

37 OKA 9/7/93
.50
.80

OUT FOR RERUN

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

Date	Time Completed	Lab Unit Mgr
9/7/93	10:55	

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

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
E8607-8740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1770	Volume of sample (mL)	VSAM	0.0250
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.53
0			
Instrument	Deflection (sample + fluran)	DSAM	0.5
AL10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.63
Date:	Deflection (sample + fluran + spike)	DS+S	0.8
09/07/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration (gU/L)		3.2373E+00

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))-DSAM*VSAM))

U in gU/L=	3.24E+00
U in µg/mL=	3.24E+03

DETECTION LEVEL G/L= 1.3E-01

51

Data Entry by:		Date:	08-Sep-93
Approved by:		Date:	

Form 1 Rev. 1

9313090.0178

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-8740	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E11456	0

Sample Size	Customer ID
? P.F. = 10 + 100ml − 10ml − .025ml	0066WQL

Remarks, Calculations, Results

Duplicate .44
.68
SpKLID-146B38/5.04-4 g/l
Spike Vol. -.100ml

OUT FOR RERUN

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

Date	Time Completed	Lab Unit Mgr
9/7/93	13:00	

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

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
E8607-8740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1770	Volume of sample (mL)	VSAM	0.0250
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.53
0			
Instrument	Deflection (sample + fluran)	DSAM	0.44
AL10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.63
Date:	Deflection (sample + fluran + spike)	DS+S	0.68
09/07/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration (gU/L)		3.5509E+00

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))−DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/(((VTOT/VSUB)*(DS+S))−DSAM*VSAM))

U in gU/L=	3.55E+00
U in µg/mL=	3.55E+03

DETECTION LEVEL G/L= 1.6E-01

Data Entry by:		Date:	08-Sep-93
Approved by:		Date:	

Form 1 Rev. 1

52

9313090.1979

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-8740	H&RWC	4-12-93	13: 2	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
U	LA-925-106	G/G Rec	E11456	0

Sample Size	Customer ID
? P.F. = 10 + 10 ml - 10 ml - .025 ml	0066WQL

Remarks, Calculations, Results

Triplicate .48

Spike ID - 14B38/5.04-4/l .76

Spike Vol - .100 ml

OUT FOR RERUN

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

Date	Time Completed	Lab Unit Mgr
9/7/93	13:50	

54-5600-061 (R-10-83)

URANIUM : LA-925-106 (B-0) LIQUIDS

			SAMPLE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
E8607-8740	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1770	Volume of sample (mL)	VSAM	0.0250
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.53
0			
Instrument	Deflection (sample + fluran)	DSAM	0.48
AL10620	Volume of spike (mL)	VSP	0.1000
Analyst:	Volume of liquid in cell (mL) (sample + fluran + water + spike)	VTOT	5.63
Date:	Deflection (sample + fluran + spike)	DS+S	0.76
09/07/93	Dilution factor of sample	DF	101
	Digestion Dilution Factor of Sample	DDF	1
	Preparation Factor	PF	10
	Concentration (gU/L)		3.3271E+00

gU/L = ((DSAM*VSP*CSP*DF*DDF*PF)/((|VTOT/VSUB|*(DS+S))-DSAM*VSAM))

0.02 is used as the Sample Deflection Reading for Calculating Less Than Values & Detection Level

Detection Level=((0.02*VSP*CSP*DF*DDF*PF)/((|VTOT/VSUB|*(DS+S))-DSAM*VSAM))

U in gU/L=	3.33E+00
U in µg/mL=	3.33E+03

DETECTION LEVEL G/L= 1.4E-01

53

Data Entry by:		Date:	08-Sep-93
Approved by:		Date:	

Form 1 Rev. 1

9313090.1680

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8940	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
U	LA-925-106	% RECOVERY	E11456	0

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

Customer ID: 0066WQL

Remarks, Calculations, Results

SAMPLE SPIKED ID .34
SPIKE ID 144838 .52
SPIKE VOLUME - .100ml

Spike ID - 144838 5.04-4 g/l
Spike vol - .100ml

OUT FOR RERUN

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

Date	Time Completed	Lab Unit Mgr
9/7/93	15:00	

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

URANIUM : LA-925-106 (B-0) SPIKE

			SPIKE
Serial No.	Spike concentration (gU/L)	CSP	5.04E-04
E8607-8940	Volume of water (mL)		4.5
Batch ID	Volume of fluran (mL)		1
1770	Volume of sample (mL)	VSAM	0.0250
Rerun No.	Volume of liquid in cell (sample + fluran + water)	VSUB	5.53
0			
Instrument	Volume of spike (mL)	VSP	0.1000
AL10620	Volume of liquid in cell (sample + fluran + water + spike)	VTOT	5.63
Analyst:			
	Deflection (sample + fluran)	DSAM	0.34
Date:	Deflection (sample + fluran + spike)	DS+S	0.52
09/07/93	Dilution factor of sample	DF	10302
	Dilution factor of spike	DFS	102
	Spike value (matrix) (gU/L)	SV	3.8600E-02
	Preparation factor of sample	PF	10
	Concentration (gU/L) Form 1 (SAMPLE)	gU/L1	3.3300E+00
	Concentration (gU/L)	gU/LS	3.728E+02
	% Recovery		947.7

gU/L = (DSAM*VSP*CSP*DF*PF) / (((VTOT/VSUB) * DS+S - DSAM) * VSAM)
%Recovery = ((gU/LS - gU/L1) * (DFS / (DF * PF) / SV) * 100

% RECOVERY =	947.72

54

Data Entry by:		Date:	08-Sep-93
Approved by:		Date:	

Form 2 Rev. 2

9313090.1881

WHC-SD-WM-DP-050
REV 0

WESTINGHOUSE HANFORD COMPANY
222-S LABORATORY

Batch 1768

ANALYTICAL BATCH

Lab Segment Serial No. E8607	Customer ID: 0066WQL
Analysis: Pu239/40	Sample Prep: Acid digest

Instrument: WB57237	Procedure/ Rev: LA 503-156 D-0
Technologist: TAM	Date: 9-3-93
Starting Time: 0800	Temperature 24°C
Ending Time: 1400	Chemist: SA Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	R4295-8581	11		
2	SAM	E8607-8781	12		
3	SAM Dup	E8607-8781	13		
4	SAM Trip.	E8607-8781	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-.150ml			
~~Spike~~	~~58B43-1ml 9-3-93~~			
Spike	74B43--100ml			
				55

A-6000-881 (03/92)

9313090.1982

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-503-156

DATE START: September 3, 1993

PREPARED BY: L. L. Fritts LLFritts 9-7-93

DATE COMPLETE: September 7, 1993

		UNITS:	uCi/g						
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 63B43	R4295	Pu-239/40	1.30E+2				99.6		1.0
BLANK									
0066WQL	E8607	Pu-239/40	4.30E+1				65.6	3.48E-3	0.8
0066WQL	E8607	Pu-239/40	4.76E+1				80.4	3.48E-3	0.7
0066WQL	E8607	Pu-239/40	4.20E+1				81.0	3.48E-3	0.7
0066WQL	E8607	Pu-238	7.10E+0				65.6	1.62E-3	1.3
0066WQL	E8607	Pu-238	8.07E+0				80.4	1.62E-3	1.0
0066WQL	E8607	Pu-238	7.03E+0				81.0	1.62E-3	1.1

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

9313090.1683

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-050
REV 0

8 8390

Serial No	Sample Point	Date	Time Issued	Priority
R 4295.-8581	105 KE BASIN	8-26-93	14:47	26

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	% RECOVERY	E11456	0

Sample Size	Customer ID
? 100-10-100	STD

Remarks, Calculations, Results

EDP R211 AR001

STD# 63B43 RESULT 1.30 E+2

STD VAL. 1.305E+2 %REC 99.6%

1 ml 8m HNO_3
.10 ml Pu236-74B43

"AEA" - 480MIN
ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs 9-3-93	Hrs	Hrs 9-4-93 1:00	Hrs 8-93

Date	Time Completed	Lab Unit Mgr
9-3-93	1400	

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

Pu 238 & 239/240: LA-503-156 (D-0) LIQUIDS

Serial No.	Date Counted	09/04/93	Pu 236 AEA Frac. (C236)	STANDARD 0.524
R4295-8581	Sample Volume in mL (SS)	0.1	Pu 238 AEA Frac. (C238)	0.015
Batch ID	Sample D.F. (DF)	101	Pu 239 AEA Frac. (C239)	0.412
1768	Tracer Volume in mL (SPKV)	0.1	Total AT Counts	8683
Rerun No.	Digest D.F. (DDF)	1	Time Counted (min)	30
0	Tracer Book No.	74B43	Background (cpm)	6
Analyst	Tracer Preparation Date	07/30/93	Pu 236 Counts	44.49
	Pu-236 Preparation Value	3712	Pu 238 Counts	1.29
Date	Pu-236 Decay Corr'd value	3624.08	Pu 239 Counts	34.97
09/03/93	Pu-238 Tracer Value	0	AEA Count Time (min)	480

Decay Time = Counting Date No. - Preparation Date No.

Pu 236 Decay Correction = Tracer Prep Value * (e to the power of [- ln2 * Decay Time) / 1040.95])

Pu 236 Tracer Recovery = (AT Counts / Time Ct'd - Bkg) (2) (C236) (100) / Tracer 236 Decay Corr'd Value * mL added

Pu 239/240 µCi/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 238 dpm/mL in Tracer) (SPKV) (Pu236 Tracer Recovery / 100))

Pu 238 µCi/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	=	1.30E+02

NOTE: Tracer values are in dpm/mL.

Pu 239/240 µCi/mL	=	1.30E-01
Relative Counting Error	=	1.0%
Pu 238 µCi/mL	=	< 1.11E-02
Relative Counting Error	=	4.1%
Pu 236 Tracer Recovery	=	82.0%

NOTE: Pu 238 Reported result is a LESS THAN value using 20 dpm for the Pu-238 sample activity.

Data Entry by:		Date:	07-Sep-93
Approved by:		Date:	Sept 7, 1993

Form 1 Rev. 1.2

Page 1 of 1

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93130090.1694

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

#3 VR 9.3.93
8683/30 - 6

R4295-8581

BEST AVAILABLE COPY

9313090.1685

12 4106

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8781	H&RWC	4-12-93	13: 2	26

Determination	Method-Standard	Result Units	Charge Code	Returns
Pu239/40	LA-503-156	uCi/G Rec	E11456	0

Sample Size	Customer ID
? .050ml - 10ml - .050 ml	0066WQL

Remarks, Calculations, Results

COUNT AS uCI/L 4.30x10¹ µCi/g "AEA" - 480MIN
ATTACH PRINTOUT

Sample
1ml 8m HNO3
.050 ml CON HNO3
100 ml Pu 236 - 74343

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs 9-3-93	Hrs	Hrs 9-4-93	Hrs

Date	Time Completed	Lab Unit No.
9-3-93	1400	

54-6600-05 (R10-83)

93130900.1686

Pu 238 & 239/240: LA-503-156 (D-0) SOLIDS

Serial No.	Date Counted	09/04/93	Pu 236 AEA Frac. (C236)	SAMPLE 0.276
E8607-8781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.102
Batch ID	Sample D.F. DF	201	Pu 239 AEA Frac. (C239)	0.618
1768	Tracer Volume in mL(SPKV)	0.1	Total AT Counts	13107
Rerun No.	Digest Grams/Liter (D g/L)	34.1372	Time Counted (min)	30
0	Tracer Book No.	74843	Background (cpm)	6
Analyst	Tracer Preparation Date	07/30/93	Pu 236 Counts	46.47
	Pu-236 Preparation Value	3712	Pu 238 Counts	17.12
Date	Pu-236 Decay Corr'd value	3624.08	Pu 239 Counts	103.87
09/03/93	Pu-238 Tracer Value	0	AEA Count Time (min)	480

Decay Time = Counting Date No. - Preparation Date No.

Pu 236 Decay Correction = Tracer Prep Value * [e to the Power of { - ln2 * Decay Time) / 1040.95 }]

Pu 236 Tracer Recovery = (AT Counts / Time Ct'd - Bkg) (2) (C236) (100) / Tracer 236 Decay Corr'd Value * mL added

Pu 239/240 µCi/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 µCi/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	=	4.30E+01
Relative Counting Error	=	0.8%
Pu 238 µCi/g	=	7.10E+00
Relative Counting Error	=	1.3%
Pu 236 Tracer Recovery	=	65.6%

Data Entry by:	Date: 07-Sep-93
Approved by:	Date: Sept 7, 1993

Form 2 Rev. 1.2

#3 P 9.3.93
13/07 - 6
30

E8607-8781

9313090.1582

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-050
REV 0

10 2108

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-8781	H&RWC	4-12-93	13: 2	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E11456	0

Sample Size: ? .050 ml - 10 ml - .050 ml

Customer ID: 0066WQL

Remarks, Calculations, Results

COUNT AS uCI/L

"AEA" - 480MIN
ATTACH PRINTOUT

Duplicate 1 ml Fm HNO_3
.050 ml Con HNO_3
.100 ml Pu 236 - 74B43

4.76 X 10' uCi/g

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs 9-3-93	Hrs	Hrs 9-4-93	Hrs

Date	Time Completed	Lab Unit Mgr
9-3-93	1400	

54-5800-06 (R-10-83)

Pu 238 & 239/240: LA-503-156 (D-0) SOLIDS

Serial No.	Date Counted	09/04/93	Pu 236 AEA Frac. (C236)	SAMPLE 0.255
E8607-8781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.107
Batch ID	Sample D.F. DF	201	Pu 239 AEA Frac. (C239)	0.632
1768	Tracer Volume in mL(SPKV)	0.1	Total AT Counts	17315
Rerun No.	Digest Grams/Liter (D g/L)	34.1372	Time Counted (min)	30
0	Tracer Book No.	74B43	Background (cpm)	6
Analyst	Tracer Preparation Date	07/30/93	Pu 236 Counts	64.82
	Pu-236 Preparation Value	3712	Pu 238 Counts	27.13
Date	Pu-236 Decay Corr'd value	3624.08	Pu 239 Counts	160.6
09/03/93	Pu-238 Tracer Value	0	AEA Count Time (min)	480

Decay Time = Counting Date No. - Preparation Date No.

Pu 236 Decay Correction = Tracer Prep Value * (e to the Power of [- ln2 * Decay Time) / 1040.95])

Pu 236 Tracer Recovery = (AT Counts / Time Ct'd - Bkg) (2) (C236) (100) / Tracer 236 Decay Corr'd Value * mL added

Pu 239/240 µCi/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 µCi/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	=	4.76E+01
Relative Counting Error	=	0.7%
Pu 238 µCi/g	=	8.07E+00
Relative Counting Error	=	1.0%
Pu 236 Tracer Recovery	=	80.4%

Data Entry by:		Date:	07-Sep-93
Approved by:		Date:	Sept 7, 1993

Form 2 Rev. 1.2

61

9313090.0891

PLUTONIUM 239\240 ANALYSIS - ACID DIGESTION

#1 VR 9-3-93
17315/30 - 6

E8607-8781

BEST AVAILABLE COPY

9313090.1689

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-050
REV 0

11 3107

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8781	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
Pu239/40	LA-503-156	uCi/G Rec	E11456	0

Sample Size: ? .650 ml - 10 ml - .050 ml

Customer ID: 0066WQL

Remarks Calculations, Results

COUNT AS uCI/L
Triplicate

1 ml 8m HNO_3
.050 ml Con HNO_3
.100 ml Pu 236 - 74B43

4.20X10¹ µCi/g

"AEA" - 480MIN
ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D H Miller	Raymond	
	Hrs 9-3-93	Hrs	Hrs 9-4-93	Hrs

Date	Time Completed	Lab Unit Mgr
9-3-93	1400	

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

93130090.1690

Pu 238 & 239/240: LA-503-156 (D-0) SOLIDS

Serial No.	Date Counted	09/04/93	Pu 236 AEA Frac. (C236)	SAMPLE 0.276
E8607-8781	Sample Volume in mL (SS)	0.05	Pu 238 AEA Frac. (C238)	0.101
Batch ID	Sample D.F. DF	201	Pu 239 AEA Frac. (C239)	0.603
1768	Tracer Volume in mL(SPKV)	0.1	Total AT Counts	16022
Rerun No.	Digest Grams/Liter (D g/L)	34.1372	Time Counted (min)	30
0	Tracer Book No.	74B43	Background (cpm)	2
Analyst	Tracer Preparation Date	07/30/93	Pu 236 Counts	61.29
	Pu-236 Preparation Value	3712	Pu 238 Counts	22.35
Date	Pu-236 Decay Corr'd value	3624.08	Pu 239 Counts	134.03
09/03/93	Pu-238 Tracer Value	0	AEA Count Time (min)	480

Decay Time = Counting Date No. - Preparation Date No.

Pu 236 Decay Correction = Tracer Prep Value * (e to the Power of [- ln2 * Decay Time) / 1040.95])

Pu 236 Tracer Recovery = (AT Counts / Time Ct'd - Bkg) (2) (C236) (100) / Tracer 236 Decay Corr'd Value * mL added.

Pu 239/240 µCi/g = (C239) (Tracer 236 Decay Corr'd Val) (Tracer Volume) (1000mL/L) (DF) / ((C236) (SS) (D g/L) (2220000dpm/µCi))

Pu 236 dpm = ((Total AT Ct's / Time Ct'd) - Bkg * (2) (C236)) - ((Pu 236 dpm / mL in Tracer) (SPKV) (Pu236 Tracer Recovery / 100))

Pu 238 µCi/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	=	4.20E+01
Relative Counting Error	=	0.7%
Pu 238 µCi/g	=	7.03E+00
Relative Counting Error	=	1.1%
Pu 236 Tracer Recovery	=	81.0%

63

Data Entry by:		Date:	07-Sep-93
Approved by:		Date:	Sept 7, 1993

Form 2 Rev. 1.2

#2 K 9.3.93
16022/30 - 2 E8607-8781

9312090.1691

BEST AVAILABLE COPY

Raymond 9-4-93

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
R4295-8581
File ID: 8a8390.CNF

Counted on: 9/ 4/93 @10:57
Detector: AEA8
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1366.4	1366.4	360.219	360.219	14.000	6.727	7.000	3.063
2	33.7	33.7	300.756	300.670	16.000	9.508	8.000	3.756
3	49.0	49.0	252.419	252.390	8.000	0.914	4.000	0.062
4	1261.2	1261.2	228.193	228.180	14.000	6.368	7.000	4.418

PEAK RESULTS
Peak Error Limit: 15%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm244	0.524	5.796	5.777	0.019	0.03	44.49	1.3	394.8	0.178E-03
	Cm243		5.786	5.777	0.009				540.8	0.244E-03
2	Am241	0.015	5.480	5.497	-.017	0.04	1.29	8.4	12.2	0.548E-05
	Pu238		5.499	5.497	0.002				15.9	0.716E-05
3	Am243	0.066	5.276	5.271	0.005	0.00	5.62	3.8	50.4	0.227E-04
4	Pu239	0.412	5.143	5.157	-.014	0.03	34.97	1.6	310.3	0.140E-03
	Pu240		5.144	5.157	-.013				310.3	0.140E-03
Totals:		1.017	<--valid peaks only-->				86.37			

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1127 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	40772.0	100.000
Smoothed	41407.5	101.559
Composite fit	41459.9	101.687
Residuals	-687.9	-1.687

Analyzed by: ALJ

9313090.1592

I Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 9313.6

9313090.1993

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Raw Data Dump for AEA Spectrum: 8a8390.CNF

1	28800.	0.	0.	210.	417.	1.	1.	0.	0.	0.
11	2.	0.	0.	2.	0.	1.	2.	2.	1.	0.
21	5.	1.	2.	2.	2.	0.	4.	1.	1.	2.
31	3.	1.	1.	3.	3.	2.	0.	1.	2.	1.
41	2.	3.	3.	0.	2.	1.	4.	1.	2.	1.
51	0.	0.	1.	1.	2.	2.	6.	4.	1.	4.
61	1.	2.	0.	1.	1.	5.	0.	0.	2.	3.
71	2.	0.	5.	1.	1.	2.	1.	0.	2.	1.
81	0.	1.	2.	3.	0.	2.	0.	1.	1.	4.
91	1.	0.	1.	2.	1.	0.	0.	0.	0.	0.
101	1.	0.	1.	1.	3.	0.	1.	0.	0.	4.
111	0.	2.	1.	0.	1.	2.	1.	0.	1.	1.
121	1.	0.	2.	6.	1.	2.	2.	2.	3.	3.
131	0.	1.	1.	1.	1.	2.	0.	1.	2.	1.
141	2.	0.	3.	1.	3.	3.	1.	5.	1.	2.
151	2.	2.	1.	1.	2.	0.	1.	3.	0.	3.
161	1.	2.	3.	1.	3.	2.	4.	2.	5.	4.
171	1.	2.	2.	4.	4.	4.	4.	3.	3.	4.
181	4.	4.	9.	5.	5.	5.	2.	7.	3.	6.
191	4.	3.	5.	7.	12.	13.	5.	8.	7.	10.
201	10.	16.	24.	30.	22.	26.	36.	49.	68.	64.
211	79.	105.	110.	148.	207.	236.	263.	379.	372.	503.
221	595.	702.	843.	1035.	1133.	1400.	1424.	1454.	1408.	1263.
231	1149.	894.	646.	452.	312.	174.	99.	46.	26.	19.
241	4.	7.	8.	10.	4.	7.	9.	17.	12.	24.
251	16.	22.	29.	21.	13.	19.	11.	15.	14.	6.
261	6.	6.	7.	8.	2.	5.	3.	2.	9.	5.
271	4.	2.	2.	3.	1.	2.	7.	0.	9.	5.
281	3.	5.	7.	10.	11.	11.	7.	13.	11.	18.
291	11.	13.	19.	28.	19.	23.	26.	26.	42.	38.
301	42.	33.	28.	35.	32.	25.	20.	12.	9.	10.
311	14.	6.	3.	3.	4.	1.	3.	5.	1.	6.
321	3.	4.	2.	7.	4.	7.	13.	18.	10.	14.
331	11.	20.	22.	24.	24.	24.	39.	41.	49.	55.
341	92.	96.	143.	171.	205.	296.	369.	453.	490.	578.
351	726.	744.	821.	877.	1014.	1097.	1253.	1394.	1404.	1547.
361	1460.	1362.	1177.	982.	660.	475.	270.	205.	75.	47.
371	21.	5.	2.	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.	1.
411	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.
431	0.	0.	1.	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.	1.	0.	0.	0.	2.
471	2.	1.	1.	2.	0.	4.	1.	0.	2.	1.
481	0.	1.	0.	1.	0.	1.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

9313090.1694

VRaymond 9-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-050
REV 0

SAMPLE
E-8607-8781
File ID: 12a4106.CNF

Counted on: 9/ 4/93 @ 7:14
Detector: AEA12
Geometry number: 1
Count time: 28804. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	1939.3	1939.3	361.888	361.888	10.000	2.731	5.000	1.444
2	715.1	715.1	303.512	303.511	10.000	2.940	5.000	1.612
3	4441.4	4441.4	230.074	230.074	12.000	3.776	6.000	2.551

9313090.1695

PEAK RESULTS
Peak Error Limit: 15%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm244	0.276	5.796	5.785	0.011	0.01	46.47	1.3	412.4	0.186E-03
	Cm243		5.786	5.785	0.001				564.9	0.254E-03
2	Pu238	0.102	5.499	5.511	-.012	0.01	17.12	2.2	210.9	0.950E-04
	Am241		5.480	5.511	-.031				161.6	0.728E-04
3	Pu239	0.618	5.143	5.166	-.023	0.02	103.87	0.9	921.7	0.415E-03
	Pu240		5.144	5.166	-.022				921.7	0.415E-03
Totals:		0.996	<--valid peaks only-->				167.46			

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1127 CPM/DPM

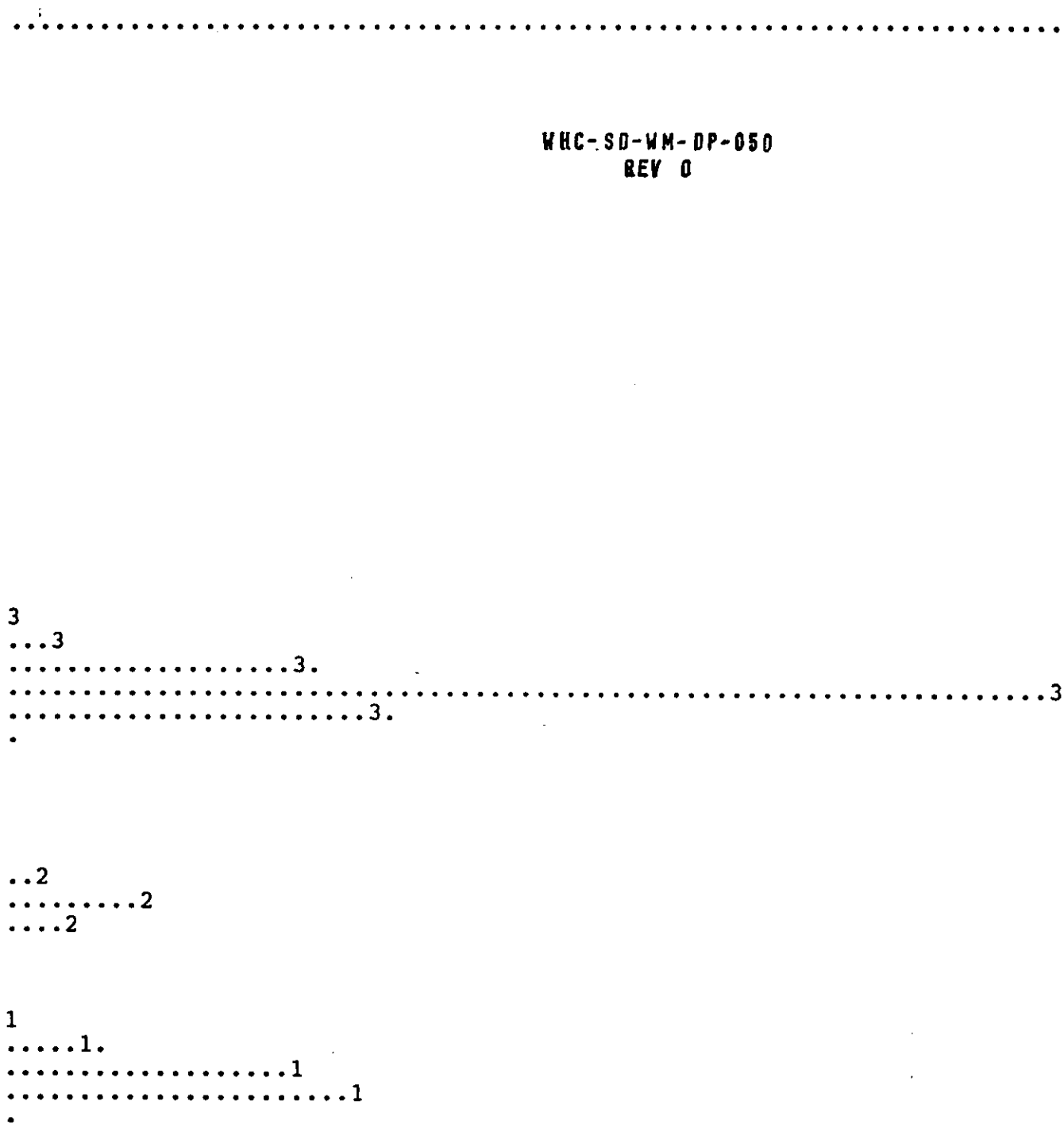
TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	80731.0	100.000
Smoothed	80843.5	100.139
Composite fit	80394.0	99.583
Residuals	337.0	0.417

Analyzed by: _____
DM

Spectrum 12a4106.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 28354.6



9313090.1696

Raw Data Dump for AEA Spectrum: 12a4106.CNF

1	28804.	0.	0.	0.	0.	0.	0.	0.	0.	2.
11	0.	0.	2.	0.	2.	0.	0.	0.	0.	0.
21	1.	0.	1.	1.	1.	1.	1.	0.	0.	0.
31	2.	1.	2.	0.	1.	0.	1.	0.	0.	0.
41	0.	0.	2.	0.	0.	0.	1.	1.	0.	0.
51	1.	1.	0.	0.	0.	1.	0.	0.	0.	0.
61	0.	1.	0.	1.	2.	0.	0.	0.	1.	1.
71	0.	0.	1.	0.	3.	0.	0.	1.	1.	0.
81	0.	0.	0.	1.	0.	1.	0.	1.	0.	2.
91	1.	0.	0.	1.	1.	2.	0.	1.	0.	1.
101	1.	0.	0.	0.	0.	1.	1.	2.	0.	0.
111	2.	1.	2.	1.	3.	2.	0.	2.	3.	2.
121	3.	0.	0.	3.	1.	0.	0.	2.	2.	0.
131	2.	1.	1.	2.	1.	1.	1.	3.	0.	4.
141	2.	2.	2.	0.	4.	3.	0.	1.	1.	1.
151	3.	1.	3.	2.	2.	2.	0.	0.	3.	2.
161	7.	3.	6.	1.	2.	1.	3.	2.	5.	2.
171	3.	8.	6.	5.	3.	6.	7.	6.	5.	3.
181	4.	2.	17.	7.	14.	7.	13.	8.	10.	3.
191	14.	8.	7.	11.	14.	16.	12.	18.	23.	32.
201	28.	33.	22.	43.	32.	45.	47.	63.	72.	93.
211	123.	145.	172.	206.	315.	399.	550.	693.	915.	1078.
221	1295.	1491.	1697.	1815.	2241.	2700.	3457.	4274.	5045.	5439.
231	5045.	4190.	3009.	1817.	931.	340.	118.	26.	4.	2.
241	1.	2.	1.	1.	1.	1.	2.	4.	3.	2.
251	3.	10.	7.	10.	9.	9.	6.	8.	5.	6.
261	1.	3.	5.	2.	4.	6.	5.	5.	6.	3.
271	5.	4.	4.	2.	7.	7.	1.	8.	5.	15.
281	13.	19.	11.	22.	22.	34.	46.	56.	50.	104.
291	135.	159.	240.	281.	326.	361.	325.	332.	375.	449.
301	550.	725.	844.	913.	767.	539.	251.	83.	30.	6.
311	3.	1.	3.	3.	3.	2.	2.	1.	6.	3.
321	5.	5.	8.	5.	5.	12.	4.	9.	8.	11.
331	12.	14.	4.	13.	15.	10.	17.	23.	22.	32.
341	49.	52.	71.	91.	101.	152.	202.	267.	407.	529.
351	763.	874.	867.	871.	783.	798.	892.	992.	1323.	1751.
361	2175.	2508.	2238.	1693.	852.	304.	111.	21.	2.	0.
371	3.	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.	1.	1.	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.								

9313090.1697

Kaymark 9-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-050
REV 0

SAMPLE
E-8607-8781
File ID: 10a2108.CNF

Counted on: 9/ 4/93 @ 7:13
Detector: AEA10
Geometry number: 1
Count time: 28803. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	2662.4	2662.4	363.060	363.060	10.000	2.988	5.000	1.597
2	1106.3	1106.3	303.923	303.922	10.000	3.238	5.000	1.774
3?	63.1	63.1	255.666	255.576	8.000	0.019	4.000	1.686
4	6736.0	6736.0	229.464	229.464	10.000	4.093	5.000	2.813

PEAK RESULTS
Peak Error Limit: 15%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm244	0.255	5.796	5.791	0.005	0.01	64.82	1.1	575.1	0.259E-03
	Cm243		5.786	5.791	-.005				787.9	0.355E-03
2	Pu238	0.107	5.499	5.513	-.014	0.02	27.13	1.7	334.3	0.151E-03
	Am241		5.480	5.513	-.033				256.1	0.115E-03
3		????		5.286			0.05	48.0		
4	Pu239	0.632	5.143	5.163	-.020	0.02	160.60	0.7	1425.0	0.642E-03
	Pu240		5.144	5.163	-.019				1425.0	0.642E-03
		---					---			
Totals:		0.994	<--valid peaks only-->				252.54			

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1127 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	121921.0	100.000
Smoothed	122033.5	100.092
Composite fit	121255.7	99.454
Residuals	665.3	0.546

Analyzed by: _____
DM

9313090.1598

.1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 45022.9

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9313090.1599

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Raw Data Dump for AEA Spectrum: 10a2108.CNF

1	28803.	0.	0.	0.	0.	0.	0.	0.	1.	1.
11	0.	0.	0.	1.	0.	0.	2.	0.	0.	1.
21	1.	0.	0.	0.	0.	0.	2.	0.	0.	0.
31	2.	1.	0.	0.	2.	0.	0.	2.	0.	1.
41	1.	0.	1.	2.	0.	2.	1.	2.	0.	1.
51	0.	2.	2.	0.	0.	2.	1.	0.	1.	1.
61	0.	1.	0.	1.	1.	1.	1.	1.	1.	1.
71	2.	2.	1.	1.	1.	0.	1.	0.	0.	1.
81	2.	1.	1.	0.	2.	1.	2.	1.	2.	0.
91	0.	0.	4.	3.	1.	0.	0.	0.	3.	2.
101	0.	2.	1.	3.	1.	0.	0.	1.	2.	2.
111	2.	2.	2.	0.	1.	1.	0.	0.	2.	0.
121	2.	0.	1.	4.	0.	6.	3.	0.	2.	2.
131	2.	3.	2.	0.	6.	2.	3.	1.	1.	4.
141	0.	3.	2.	1.	2.	3.	4.	1.	4.	2.
151	3.	3.	4.	1.	3.	2.	3.	2.	4.	6.
161	6.	3.	6.	3.	7.	3.	5.	13.	7.	4.
171	6.	11.	7.	8.	6.	11.	5.	7.	8.	9.
181	11.	10.	7.	8.	13.	13.	14.	8.	15.	13.
191	18.	17.	23.	15.	19.	19.	31.	23.	22.	35.
201	45.	40.	48.	43.	51.	59.	76.	98.	136.	156.
211	181.	252.	313.	424.	518.	711.	991.	1210.	1532.	1724.
221	1966.	2319.	2787.	3340.	4012.	4943.	6193.	7367.	8026.	8084.
231	6968.	5493.	3608.	2143.	1085.	343.	91.	22.	4.	3.
241	1.	4.	5.	6.	6.	5.	5.	7.	10.	9.
251	9.	7.	6.	15.	20.	21.	22.	11.	10.	6.
261	3.	5.	6.	2.	6.	3.	6.	3.	6.	6.
271	4.	5.	6.	11.	7.	7.	12.	10.	12.	14.
281	21.	20.	30.	28.	33.	46.	59.	53.	102.	128.
291	189.	231.	304.	434.	476.	500.	551.	481.	566.	698.
301	903.	1009.	1207.	1387.	1231.	1025.	603.	279.	117.	34.
311	15.	10.	8.	7.	8.	2.	5.	8.	2.	5.
321	5.	10.	3.	8.	4.	7.	5.	10.	7.	12.
331	13.	13.	10.	14.	12.	28.	28.	34.	29.	36.
341	41.	57.	63.	86.	113.	143.	198.	277.	354.	521.
351	686.	903.	1066.	1218.	1120.	1053.	1146.	1212.	1471.	1864.
361	2446.	2937.	3330.	3096.	2580.	1477.	685.	212.	52.	11.
371	3.	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.	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.	1.	1.	1.	0.	1.	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.								

9313090.1700

9-4-93

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-050
REV 0

SAMPLE
E-8607-8781
File ID: 11a3107.CNF

Counted on: 9/ 4/93 @ 7:13
Detector: AEA11
Geometry number: 1
Count time: 28800. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	2760.1	2760.1	364.340	364.340	10.000	2.760	5.000	1.706
2	1012.8	1012.8	305.998	305.997	10.000	2.889	5.000	1.857
3?	142.0	142.0	255.844	255.599	8.000	0.000	4.000	0.074
4	6170.6	6170.6	232.222	232.222	12.000	3.672	6.000	3.001

9313090.1701

PEAK RESULTS
Peak Error Limit: 15%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Peak Centroid Obs.	Peak Centroid Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Cm243	0.276	5.786	5.797	-.0110	.01	61.29	1.1	745.0	0.336E-03
	Cm244		5.796	5.797	-.001				543.8	0.245E-03
2	Pu238	0.101	5.499	5.522	-.0230	.01	22.35	1.9	275.5	0.124E-03
3		????		5.286			0.00	1000.		
4	Pu239	0.603	5.143	5.176	-.0330	.02	134.03	0.8	1189.2	0.536E-03
	Pu240		5.144	5.176	-.032				1189.2	0.536E-03
Totals:		0.980	<--valid peaks only-->				217.67			

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1127 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	106638.0	100.000
Smoothed	106750.5	100.106
Composite fit	104481.4	97.978
Residuals	2156.6	2.022

Analyzed by: _____
DM

74

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 30482.5

.....

9313090.1702

```
.4
...........4..
.............................................................4
.......................................................4
4...
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.2
.......2
...........2
.
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```
1
...1
...............1.
.....................................1
...1..
```

Raw Data Dump for AEA Spectrum: 11a3107.CNF

1	28800.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	0.	0.	1.	0.	0.	1.	0.	1.	2.	3.
21	2.	2.	0.	1.	1.	4.	1.	1.	0.	3.
31	1.	0.	0.	0.	4.	0.	2.	0.	1.	1.
41	0.	0.	1.	1.	0.	0.	0.	1.	2.	0.
51	0.	0.	1.	0.	0.	0.	0.	1.	2.	0.
61	0.	0.	0.	0.	0.	0.	2.	0.	1.	3.
71	0.	0.	2.	0.	1.	0.	0.	0.	1.	1.
81	0.	0.	1.	1.	1.	0.	1.	2.	2.	0.
91	0.	0.	1.	0.	0.	2.	0.	1.	0.	0.
101	0.	1.	0.	0.	1.	1.	0.	2.	1.	1.
111	1.	1.	0.	0.	3.	0.	2.	0.	2.	1.
121	3.	1.	2.	0.	0.	1.	0.	0.	1.	0.
131	2.	2.	2.	3.	1.	1.	0.	2.	2.	4.
141	2.	5.	1.	2.	0.	1.	1.	1.	2.	5.
151	3.	2.	1.	2.	1.	3.	1.	3.	2.	4.
161	6.	2.	4.	3.	2.	3.	4.	7.	8.	2.
171	7.	6.	6.	12.	11.	5.	8.	9.	6.	5.
181	9.	9.	9.	9.	14.	11.	12.	11.	13.	12.
191	11.	23.	14.	19.	17.	14.	27.	33.	22.	26.
201	24.	34.	42.	30.	39.	46.	65.	47.	56.	56.
211	72.	89.	97.	114.	173.	219.	252.	403.	558.	752.
221	925.	1161.	1256.	1507.	1745.	2087.	2565.	3488.	4591.	5830.
231	6987.	7641.	7288.	5892.	4396.	2711.	1343.	581.	197.	50.
241	10.	4.	3.	3.	8.	8.	10.	1.	5.	4.
251	5.	7.	7.	7.	9.	11.	19.	12.	8.	8.
261	5.	8.	6.	3.	8.	4.	13.	9.	5.	5.
271	4.	10.	3.	4.	9.	9.	4.	5.	10.	4.
281	6.	7.	11.	15.	21.	28.	20.	22.	45.	43.
291	58.	89.	103.	155.	245.	290.	411.	419.	373.	393.
301	456.	475.	695.	925.	1134.	1318.	1155.	935.	507.	219.
311	93.	24.	13.	2.	5.	4.	4.	7.	6.	5.
321	9.	3.	6.	1.	6.	6.	5.	13.	12.	13.
331	15.	26.	24.	15.	16.	19.	19.	23.	20.	24.
341	35.	30.	53.	44.	58.	48.	86.	92.	166.	215.
351	396.	555.	856.	1065.	1100.	1061.	974.	909.	921.	1194.
361	1567.	2193.	3016.	3519.	3552.	2781.	1704.	787.	286.	71.
371	15.	1.	1.	1.	0.	1.	1.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
431	1.	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.	1.	0.	0.	1.	0.
481	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

9313090.1209

✓

WESTINGHOUSE HANFORD COMPANY

222-S LABORATORY

ANALYTICAL BATCH

Batch 1769

WHC-SD-WM-DP-050 REV 0

Lab Segment Serial No. E8607	Customer ID: 0066WQL
Analysis: Am 241	Sample Prep: Acid digest

Instrument: WB57237	Procedure/ Rev: LA 503-156 D-0
Technologist: SAM Pollock	Date: 9-3-93
Starting Time: 0800	Temperature 24°C
Ending Time: 1400	Chemist: SA Catlow

Comments:

	Description	Lab ID		Description	Lab ID
1	LMCS	R4295-8582	11		
2	SAM	E8607-8782	12		
3	SAM Dup	E8607-8782	13		
4	SAM Tail	E8607-8782	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			

9313090.1704

A-6000-881 (03/92)

ANALYTICAL BATCH SUMMARY SHEET

METHOD: LA-503-156

DATE START: September 3, 1993

PREPARED BY: L. L. Fritts LLFritts 9.7.93

DATE COMPLETE: September 7, 1993

	UNITS:	uCi/g							
SPL NAME	SPL ID	ANALYTE	RESULT #1	RESULT #2	AVERAGE	RPD%	%REC	DET LIM	% CT ER
STD 63B43	R4295	Am-241	2.57E+1				95.9		8.1
BLANK									
0066WQL	E8067	Am-241	3.24E+1				11.5	7.50E-4	7.2
0066WQL	E8067	Am-241	3.11E+1				10.8	7.50E-4	7.2
0066WQL	E8067	Am-241	3.43E+1				6.0	7.50E-4	11.6

NARRATIVE: [X] NO SPECIAL PROBLEMS/METHOD VARIATIONS IN THIS BATCH
LIST SPECIFIC PROBLEMS/VARIATIONS FOR THIS BATCH:

The results for the standard are in uCi/L.

9313090.1705

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-050
REV 0

4 4808

Serial No	Sample Point	Date	Time Issued	Priority
R 4295.-8582	105 KE BASIN	8-26-93	14:47	26

Determination	Method-Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	% RECOVERY	E11456	0

Sample Size	Customer ID
? 100-10-1ml	STD

Remarks, Calculations, Results

EDP R201 AR001 "AEA" - 480MIN

STD#63843 RESULT 25.7uCi/L ATTACH PRINTOUT

STD VAL 26.805 %REC 95.9%

.100 ml Am 243-58843

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs 9-3-93 1430	Hrs	Hrs 9-4-93 10:00	Hrs

Date	Time Completed	Lab Unit Mgr
9-3-93	1400	

SA-0800-25 (1-10-83)

AM-241: LA-503-156 (D-0) LIQUIDS

Serial No.			STANDARD
R4295-8582	Spike (Tracer) Book Number		58843
Batch ID	Activity of Am243 Tracer in dpm/mL	(SPKA)	5655
1769	Spike (Tracer) Volume in mL	(SPKV)	0.1
Rerun No.	Volume of Sample in mL	(SS)	1
0	Dilution Factor	(DF)	101
Analyst	Digest Dilution Factor	(DDF)	1
	Am-241 Area Peak Height from AEA	(C241)	305
	Am-243 Area Peak Height from AEA	(C243)	305
Date	Total AT Count	(ATOT)	2882
09/03/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	6

Am-241 µCi/L = ((C241 * SPKA * SPKV * DF * DDF * (1000mL/L)) / ((C243 * SS * (2220000dpm/mL))

µCi/mL = µCi/L / (1000mL/L)

Tracer % Rec = ((ATOT / MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100

Relative Counting Error = Square Root of ((1 / C241) + (1/C243)) * 100

Am-241 µCi/L	=	2.57E+01
Am-241 µCi/mL	=	2.57E-02
Relative counting error	=	8.1%
Am-243 Tracer Recovery	=	15.9%

Data Entry by:	Date: 07-Sep-93
Approved by:	Date: Sept 7, 1993

Form 3 Rev. 1.1

Page 1 of 1

93130090.1706

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AMERICIUM 241 ANALYSIS - ACID DIGESTION

#3. 9-3-93 AJ

2882-6
3d

R 4295-8582

BEST AVAILABLE COPY

9313090.1207

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-050
REV 0

5 5725

Serial No.	Sample Point	Date	Time Issued	Priority
E 8607.-8782	H&RWC	4-12-93	13: 2	26

Determination	Method-Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/G Rec	E11456	0

Sample Size	Customer ID
? .050 ml - 10 ml - .10 ml	0066WQL

Remarks, Calculations, Results

COUNT AS uCI/L 32.4 uCi/g

"AEA" - 480MIN
ATTACH PRINTOUT

Sample
1 ml 8m HNO3
.100 ml CON HNO3
.100 ml Am 243 - 58B43

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs 9-3-93 1430	Hrs	Hrs 9-4-93 11:00	Hrs
Date 9-3-93	Time Completed 1400	Lab Unit Mgr		

S4-6800 (R-10-831)

AM-241: LA-503-156 (D-0) SOLIDS

Serial No.			SAMPLE
	Spike (Tracer) Book Number		58B43
E8607-8782	Activity of Am243 Tracer in dpm/mL	(SPKA)	5655
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
1769	Volume of Sample in mL	(SS)	0.1
Rerun No.	Dilution Factor	(DF)	201
0	Digest Grams of Solids / Liter	(D g/L)	34.1372
Analyst	Am-241 Area Peak Height from AEA	(C241)	612
	Am-243 Area Peak Height from AEA	(C243)	283
Date	Total AT Count	(ATOT)	3273
09/03/93	AT Count Time in Minutes	(MIN CT'd)	30
	Background in CPM	(BKG)	6

Am-241 µCi/g = (C241 * SPKA * SPKV * DF * (1000mL/L)) / (C243 * SS * (D g/L) * (2220000dpm/uCi))
Tracer % Rec = ((ATOT/MIN CT'd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100
Relative Counting Error = Square Root of ((1/C241) + (1/C243)) * 100

Am-241 µCi/g	=	3.24E+01
Relative Counting Error	=	7.2%
Am-243 Tracer Recovery	=	11.5%

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Data Entry by:	Date: 07-Sep-93
Approved by:	Date: Sept 7, 1993

Form 4 Rev. 1.1

9313090.1709

AMERICIUM 241 ANALYSIS - ACID DIGESTION

#1 9-3-93 AJ

3273/30 -6

E8607-8782

BEST AVAILABLE COPY

9313090.1709

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-050
REV 0

6 6643

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8782	H&RWC	4-12-93	13: 2	26

Determination	Method/Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/G Rec	E11456	0

Sample Size	Customer ID
? .050 ml - .10 ml - .100 ml	0066WQL

Remarks, Calculations, Results:
COUNT AS uCI/L
Duplicate
1 ml 8m HNO_3
.100 ml Con HNO_3
.100 ml Am 243 - 513 43

31.1 uCi/g

"AEA" - 480MIN
ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs 9-3-93 14 30	Hrs	Hrs 9/4-93 1:00	Hrs
Date 9-3-93	Time Completed 1400	Lab Unit Mgr.		

54-6800-05 (R-10-91)

AM-241: LA-503-156 (D-0) SOLIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		58843
E8607-8782	Activity of Am243 Tracer in dpm/mL	(SPKA)	5655
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
1769	Volume of Sample in mL	(SS)	0.1
Rerun No.	Dilution Factor	(DF)	201
0	Digest Grams of Solids / Liter	(D g/L)	34.1372
Analyst	Am-241 Area Peak Height from AEA	(C241)	593
	Am-243 Area Peak Height from AEA	(C243)	286
Date	Total AT Count	(ATOT)	2885
09/03/93	AT Count Time in Minutes	(MIN CT'd)	30
	Background in CPM	(BKG)	2

Am-241 µCi/g = (C241 * SPKA * SPKV * DF * (1000mL/L)) / (C243 * SS * (D g/L) * (2220000dpm/uCi))
Tracer % Rec = ((ATOT/MIN CT'd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100
Relative Counting Error = Square Root of ((1/C241) + (1/C243)) * 100

Am-241 µCi/g	=	3.11E+01
Relative Counting Error	=	7.2%
Am-243 Tracer Recovery	=	10.8%

Data Entry by: Date: 07-Sep-93
Approved by: Date: Sept 7, 1993

Form 4 Rev. 1.1

93130901.1710

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AMERICIUM 241 ANALYSIS - ACID DIGESTION

#2 9-3-93 AJ

2885/30 -2

E8607-8782

BEST AVAILABLE COPY

PLACE ANALYTICAL CARD IN BOX BELOW-DO NOT WRITE IN SPACE

WHC-SD-WM-DP-050
REV 0

7 7172

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8782	H&RWC	4-12-93	13: 2	26

Determination	Method-Standard	Result Units	Charge Code	Reruns
Am241	LA-503-156	uCi/G Rec	E11456	0

Sample Size	Customer ID
? .050 ml - 10ml - .100 ml	0066WQL

Remarks, Calculations Results

COUNT AS uCI/L
Triplicate

1ml Gm HNO3
-100 ml Gm HNO3
-100 ml Am 243 - 5YBY3
34.3 uCi/g
"AEA" - 480MIN
ATTACH PRINTOUT

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Raymond	D. Hudson		
	Hrs 9-3-93	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit No.
9-3-93	1400	

54-6800-001 (R-10-83)

AM-241: LA-503-156 (D-0) SOLIDS

			SAMPLE
Serial No.	Spike (Tracer) Book Number		58843
E8607-8782	Activity of Am243 Tracer in dpm/mL	(SPKA)	5655
Batch ID	Spike (Tracer) Volume in mL	(SPKV)	0.1
1769	Volume of Sample in mL	(SS)	0.1
Rerun No.	Dilution Factor	(DF)	201
0	Digest Grams of Solids / Liter	(D g/L)	34.1372
Analyst	Am-241 Area Peak Height from AEA	(C241)	245
	Am-243 Area Peak Height from AEA	(C243)	107
Date	Total AT Count	(ATOT)	1863
09/03/93	AT Count Time in Minutes	(MIN CTd)	30
	Background in CPM	(BKG)	6

Am-241 µCi/g = (C241 * SPKA * SPKV * DF * (1000mL/L)) / (C243 * SS * (D g/L) * (2220000dpm/uCi))
Tracer % Rec = ((ATOT/MIN CTd - BKG) * 2 * (C243 / (C241 + C243)) / (SPKA * SPKV)) * 100
Relative Counting Error = Square Root of ((1/C241) + (1/C243)) * 100

Am-241 µCi/g	=	3.43E+01
Relative Counting Error	=	11.6%
Am-243 Tracer Recovery	=	6.0%

Data Entry by:	Date: 07-Sep-93
Approved by:	Date: Sept 7, 1993

Form 4 Rev. 1.1

85

AMERICIUM 241 ANALYSIS - ACID DIGESTION

#1 K 9.3.93
1863/30 -6

E 8607-8782

BEST AVAILABLE COPY

9313090.1713

9-4-93

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
R-4295-8582
File ID: 4a4808.CNF

Counted on: 9/ 4/93 @ 1: 9
Detector: AEA4
Geometry number: 1
Count time: 28805. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	262.3	262.3	301.717	301.717	12.000	5.527	6.000	3.504
2	243.7	243.7	256.187	256.185	12.000	5.076	6.000	3.207
3	338.1	338.1	230.462	230.426	14.000	4.850	7.000	2.974

9313090.1214

PEAK RESULTS
Peak Error Limit: 15%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Pu238	0.302	5.499	5.502	-.003	0.03	7.10	3.4	87.5	0.394E-04
	Am241		5.480	5.502	-.022				67.0	0.302E-04
2	Am243	0.273	5.276	5.288	-.012	0.02	6.42	3.5	57.5	0.259E-04
3	Pu239	0.378	5.143	5.167	-.024	0.02	8.87	3.1	78.7	0.354E-04
	Pu240		5.144	5.167	-.023				78.7	0.354E-04
Totals:		0.953	<--valid peaks only-->				22.39			

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1127 CPM/DPM

TOTAL COUNT DATA:

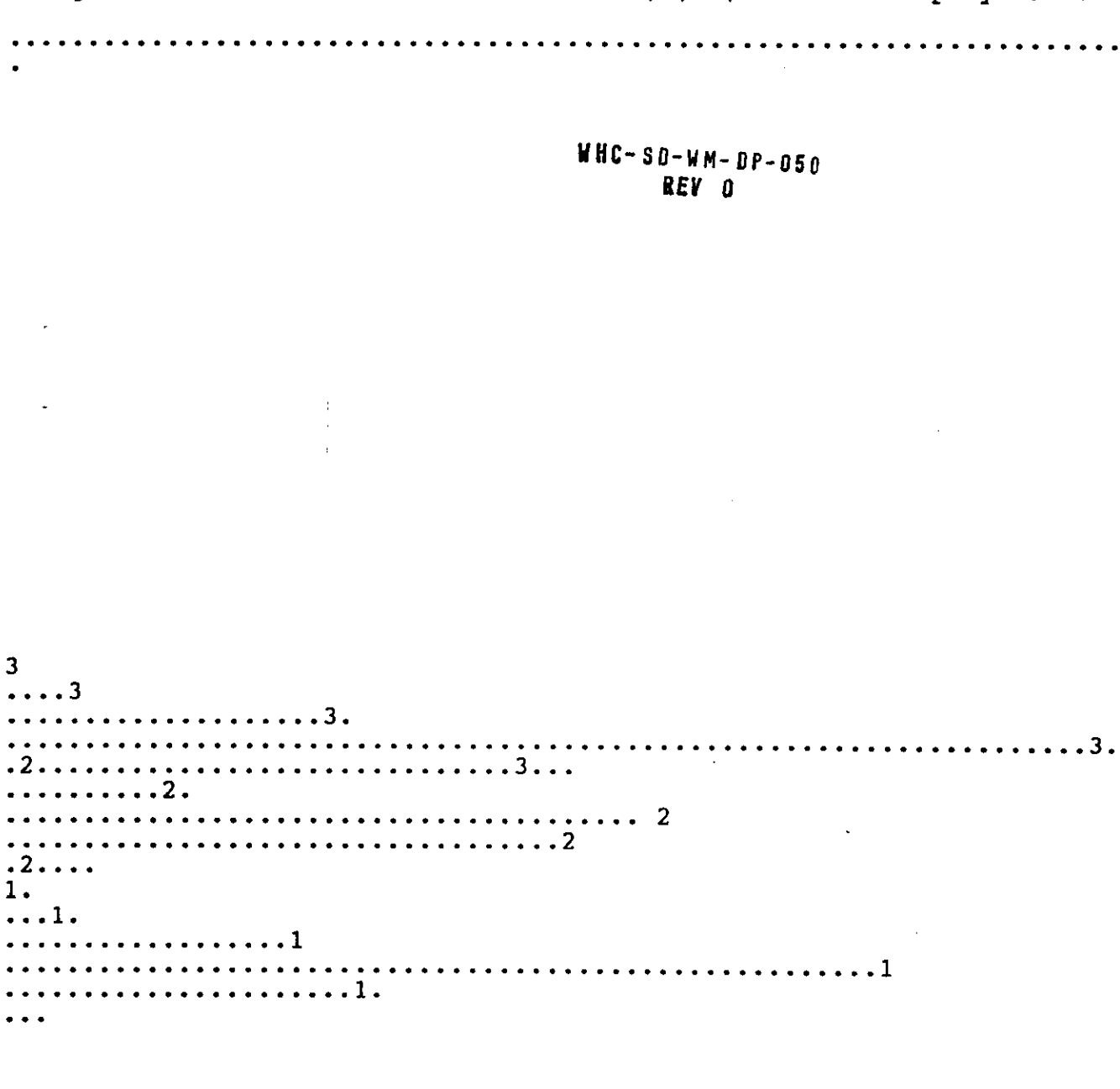
Item	Total	% Recovery
Raw spectrum	11271.0	100.000
Smoothed	11495.8	101.994
Composite fit	10746.8	95.349
Residuals	524.2	4.651

Analyzed by: _____
DM

87

Spectrum 4a4808.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 2244.2



9313090.1215

Raw Data Dump for AEA Spectrum: 4a4808.CNF

1	26805.	0.	0.	164.	29.	0.	0.	0.	0.	0.
11	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
21	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
51	0.	0.	0.	0.	2.	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.	1.	0.	0.	0.
91	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
101	0.	0.	0.	1.	0.	0.	1.	1.	1.	0.
111	0.	1.	0.	0.	0.	3.	0.	1.	0.	0.
121	0.	0.	2.	0.	1.	0.	0.	1.	0.	0.
131	0.	1.	0.	2.	0.	0.	0.	0.	1.	0.
141	2.	0.	1.	0.	1.	0.	0.	1.	0.	1.
151	2.	1.	1.	0.	2.	1.	0.	1.	0.	0.
161	0.	4.	2.	0.	1.	2.	0.	1.	0.	1.
171	1.	2.	0.	2.	1.	2.	1.	0.	0.	0.
181	1.	3.	2.	1.	2.	2.	2.	3.	4.	1.
191	1.	1.	0.	1.	4.	4.	3.	2.	7.	2.
201	7.	8.	4.	6.	12.	10.	9.	8.	12.	13.
211	20.	14.	29.	29.	30.	44.	41.	67.	79.	78.
221	97.	124.	124.	158.	200.	204.	270.	334.	385.	415.
231	354.	383.	285.	219.	147.	82.	49.	30.	25.	24.
241	29.	20.	43.	35.	52.	59.	59.	66.	105.	103.
251	145.	150.	190.	222.	272.	305.	274.	215.	192.	144.
261	82.	58.	31.	25.	22.	15.	20.	14.	9.	11.
271	15.	14.	13.	7.	4.	11.	7.	12.	10.	16.
281	17.	17.	13.	13.	21.	29.	34.	31.	35.	58.
291	61.	78.	75.	86.	124.	139.	172.	183.	224.	285.
301	305.	305.	283.	241.	161.	113.	81.	49.	49.	30.
311	30.	21.	21.	14.	20.	10.	3.	0.	1.	0.
321	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
331	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
341	0.	2.	0.	0.	0.	1.	2.	2.	0.	0.
351	3.	3.	0.	1.	1.	0.	0.	1.	2.	0.
361	1.	1.	0.	3.	0.	1.	1.	0.	0.	1.
371	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	0.	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.	1.	0.
471	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.
481	3.	1.	1.	0.	1.	0.	0.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

9313090.1216

9-4-93

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
E-8607-8782
File ID: 5a5725.CNF

Counted on: 9/ 4/93 @ 1:10
Detector: AEA5
Geometry number: 1
Count time: 28802. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	565.9	565.9	303.335	303.335	18.000	15.107	9.000	6.346
2	254.0	254.0	257.723	257.650	20.000	12.142	10.000	3.120

PEAK RESULTS
Peak Error Limit: 15%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.644	5.480	5.510	-.030	0.07	24.63	1.8	232.4	0.105E-03
	Pu238		5.499	5.510	-.011				303.5	0.137E-03
2	Am243	0.332	5.276	5.295	-.019	0.06	12.67	2.6	113.6	0.512E-04
Totals:		0.976	<--valid peaks only-->				37.30			

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1127 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	18344.0	100.000
Smoothed	18456.9	100.616
Composite fit	17903.7	97.600
Residuals	440.3	2.400

Analyzed by: _____
DM

Spectrum 5a5725.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 4109.1

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9313090.1218

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Raw Data Dump for AEA Spectrum: 5a5725.CNF

1	28802.	0.	0.	1.	0.	0.	0.	2.	0.	0.
11	1.	1.	2.	0.	1.	0.	0.	0.	0.	0.
21	0.	1.	1.	1.	1.	1.	0.	0.	2.	1.
31	0.	0.	1.	1.	1.	1.	0.	0.	1.	0.
41	0.	1.	1.	0.	0.	0.	0.	1.	1.	2.
51	0.	0.	0.	0.	2.	0.	0.	0.	1.	1.
61	1.	0.	1.	2.	1.	1.	0.	1.	1.	0.
71	1.	0.	2.	2.	0.	0.	2.	0.	0.	0.
81	1.	0.	1.	0.	0.	0.	1.	0.	1.	1.
91	0.	0.	1.	2.	1.	2.	2.	0.	3.	2.
101	3.	1.	1.	1.	3.	0.	0.	0.	0.	2.
111	2.	1.	2.	2.	2.	2.	0.	0.	3.	3.
121	1.	4.	1.	1.	0.	3.	2.	0.	2.	2.
131	0.	2.	3.	0.	0.	1.	4.	1.	1.	1.
141	4.	1.	0.	2.	0.	2.	2.	5.	2.	1.
151	1.	3.	1.	1.	3.	2.	3.	1.	4.	3.
161	2.	1.	2.	0.	2.	0.	0.	2.	1.	3.
171	2.	4.	5.	4.	3.	1.	0.	1.	1.	5.
181	2.	4.	1.	1.	5.	0.	4.	2.	3.	3.
191	6.	6.	4.	6.	1.	8.	8.	5.	4.	12.
201	3.	4.	7.	2.	6.	5.	9.	7.	8.	4.
211	7.	16.	13.	21.	17.	19.	19.	21.	24.	34.
221	38.	35.	44.	46.	57.	46.	59.	57.	52.	78.
231	70.	57.	65.	56.	55.	57.	73.	61.	60.	59.
241	61.	72.	79.	103.	90.	102.	136.	144.	167.	192.
251	195.	217.	225.	264.	243.	252.	283.	270.	274.	245.
261	210.	207.	167.	147.	99.	101.	98.	65.	63.	55.
271	51.	47.	33.	23.	49.	26.	38.	41.	39.	35.
281	53.	70.	67.	63.	95.	110.	128.	155.	189.	197.
291	218.	274.	273.	324.	354.	391.	433.	491.	531.	598.
301	612.	581.	571.	595.	567.	545.	522.	406.	367.	322.
311	278.	219.	174.	147.	94.	88.	72.	55.	53.	26.
321	14.	10.	14.	5.	4.	1.	3.	1.	1.	0.
331	0.	2.	0.	2.	0.	1.	1.	2.	1.	3.
341	1.	0.	1.	4.	0.	4.	1.	1.	2.	1.
351	3.	1.	1.	2.	2.	1.	0.	2.	1.	2.
361	2.	2.	1.	2.	4.	0.	3.	3.	1.	4.
371	3.	4.	1.	0.	2.	0.	0.	2.	0.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
401	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	4.	0.	0.	0.	0.	0.	0.	0.
431	0.	0.	0.	2.	1.	1.	0.	0.	0.	0.
441	1.	0.	0.	0.	2.	0.	1.	0.	0.	0.
451	0.	0.	0.	2.	1.	0.	0.	0.	0.	0.
461	0.	0.	1.	0.	0.	1.	0.	1.	0.	1.
471	2.	1.	0.	0.	1.	1.	2.	1.	1.	0.
481	2.	0.	2.	0.	1.	1.	2.	2.	0.	1.
491	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	0.	0.								

9313090.1219

9-4-93

Westinghouse Hanford Co.

GENERAL ALPHA ENERGY ANALYSIS
Rev. 2.01

DATA REDUCTION REPORT

SAMPLE
E-8607-8782
File ID: 6a6643.CNF

Counted on: 9/ 4/93 @ 1:11
Detector: AEA6
Geometry number: 1
Count time: 28806. Sec

PEAK ANALYSIS

Peak ID	Peak height Initial	Peak height Final	Peak center Initial	Peak center Final	FWHM Initial	FWHM Final	Tau Initial	Tau Final
1	557.7	557.7	299.254	299.254	24.000	22.194	12.000	7.589
2	249.9	249.9	251.534	251.215	24.000	20.480	12.000	5.507

PEAK RESULTS
Peak Error Limit: 15%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.669	5.480	5.491	-.011	0.10	29.53	1.6	278.7	0.126E-03
	Pu238		5.499	5.491	0.008				363.9	0.164E-03
2	Am243	0.318	5.276	5.265	0.011	0.10	14.02	2.6	125.7	0.566E-04
	Pu240		5.144	5.265	-.121				124.4	0.560E-04
Totals:		0.986	<--valid peaks only-->				43.55			

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1127 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	21200.0	100.000
Smoothed	21315.2	100.544
Composite fit	20906.9	98.617
Residuals	293.1	1.383

Analyzed by: _____
DM

93

9313090.1720

Spectrum 6a6643.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 4302.6

9313090.1721

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1............................2.
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1
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Raw Data Dump for AEA Spectrum: 6a6643.CNF

1	28806.	0.	0.	1.	0.	1.	1.	1.	0.	0.
11	0.	1.	0.	0.	0.	0.	0.	2.	0.	0.
21	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
31	0.	2.	1.	0.	0.	0.	0.	0.	0.	2.
41	1.	1.	0.	1.	0.	0.	0.	0.	0.	1.
51	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.
61	0.	0.	1.	0.	1.	0.	0.	0.	0.	1.
71	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
81	0.	2.	0.	0.	1.	1.	0.	1.	1.	0.
91	1.	1.	0.	1.	1.	0.	1.	0.	1.	1.
101	0.	0.	2.	0.	1.	1.	0.	0.	0.	0.
111	0.	1.	1.	0.	1.	0.	1.	1.	2.	0.
121	0.	2.	0.	0.	1.	0.	1.	1.	0.	0.
131	0.	1.	1.	3.	2.	2.	0.	0.	1.	2.
141	0.	1.	3.	0.	0.	3.	0.	0.	1.	1.
151	1.	3.	1.	3.	2.	0.	1.	0.	1.	0.
161	2.	0.	1.	3.	2.	0.	1.	0.	0.	0.
171	1.	2.	3.	2.	1.	1.	3.	2.	4.	2.
181	1.	1.	2.	2.	1.	2.	2.	1.	9.	6.
191	3.	8.	2.	1.	5.	8.	4.	9.	7.	7.
201	7.	3.	5.	7.	6.	13.	5.	13.	25.	11.
211	22.	16.	26.	18.	34.	36.	34.	37.	38.	33.
221	61.	50.	50.	64.	66.	65.	60.	70.	57.	76.
231	70.	58.	67.	84.	112.	81.	90.	82.	139.	128.
241	141.	148.	156.	216.	236.	212.	237.	255.	271.	254.
251	270.	286.	242.	235.	262.	250.	209.	220.	152.	171.
261	137.	118.	100.	112.	84.	89.	76.	66.	59.	60.
271	65.	61.	64.	61.	76.	86.	91.	95.	112.	151.
281	147.	175.	163.	197.	210.	273.	259.	356.	331.	412.
291	432.	463.	512.	486.	528.	564.	573.	570.	593.	549.
301	569.	528.	511.	510.	452.	379.	336.	308.	248.	231.
311	196.	152.	134.	84.	78.	56.	40.	35.	13.	22.
321	13.	10.	8.	9.	4.	3.	5.	0.	0.	0.
331	2.	1.	2.	1.	0.	0.	3.	0.	0.	1.
341	1.	0.	2.	3.	3.	1.	0.	0.	0.	4.
351	3.	2.	4.	2.	1.	4.	1.	2.	3.	1.
361	1.	3.	0.	3.	1.	2.	2.	2.	1.	3.
371	1.	4.	4.	0.	1.	2.	0.	1.	1.	0.
381	1.	0.	1.	1.	0.	0.	1.	0.	0.	0.
391	1.	0.	0.	0.	0.	0.	1.	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.	2.	1.	0.	0.	1.	0.
431	1.	0.	0.	3.	2.	0.	0.	1.	2.	0.
441	1.	1.	0.	0.	2.	2.	2.	0.	0.	0.
451	1.	0.	2.	1.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	1.	0.	0.	1.	1.	1.	1.
471	2.	2.	4.	1.	3.	4.	1.	0.	0.	0.
481	0.	0.	0.	0.	1.	0.	0.	1.	1.	0.
491	0.	0.	2.	1.	9.	6.	5.	0.	0.	0.
511	0.	0.								

9313090.1722

Westinghouse Hanford Co.

G E N E R A L A L P H A E N E R G Y A N A L Y S I S
Rev. 2.01

DATA REDUCTION REPORT

WHC-SD-WM-DP-050
REV 0

SAMPLE
E-8607-8782
File ID: 7a7172.CNF

Counted on: 9/ 4/93 @ 1:12
Detector: AEA7
Geometry number: 1
Count time: 28803. Sec

9313090.1723

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	227.1	227.1	299.298	299.298	28.000	26.333	14.000	10.091
2	95.1	95.1	253.542	253.236	26.000	21.608	13.000	3.703

PEAK RESULTS
Peak Error Limit: 15%

Peak ID	Isotope	AEA Frac	Peak Centroid Exp.	Obs.	Diff.	FWHM	Count Rate c/m	%err @95	d/m	Activity uCi/ea
1	Am241	0.651	5.480	5.491	-.011	0.12	12.46	2.5	117.6	0.530E-04
	Pu238		5.499	5.491	0.008				153.5	0.692E-04
2	Am243	0.353	5.276	5.275	0.001	0.10	6.75	3.7	60.5	0.272E-04
	Pu240		5.144	5.275	-.131				59.9	0.270E-04
Totals:		1.004	<--valid peaks only-->				19.20			

DETECTOR CALIBRATION
Energy(MEV) = 4.084 + (0.0047)*Channel
Energy range (MeV): 4.084 TO 6.491
Efficiency = 0.1127 CPM/DPM

TOTAL COUNT DATA:

Item	Total	% Recovery
Raw spectrum	9184.0	100.000
Smoothed	9295.8	101.218
Composite fit	9218.8	100.379
Residuals	-34.8	-0.379

Analyzed by: _____
DM

Spectrum 7a7172.CNF

1 Legend: Raw = ... Modeled Peaks = 1,2,.., etc Display Max.: 1764.2

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

9313090.1224

Raw Data Dump for AEA Spectrum: 7a7172.CNF

1	28803.	0.	0.	0.	0.	1.	1.	0.	0.	0.
11	0.	0.	1.	0.	2.	0.	2.	0.	0.	1.
21	1.	0.	2.	0.	0.	0.	0.	0.	0.	0.
31	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
41	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.
51	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.
61	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.
71	2.	1.	1.	0.	1.	1.	1.	0.	0.	2.
81	0.	1.	0.	0.	1.	0.	1.	0.	1.	1.
91	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
101	0.	2.	2.	4.	1.	0.	0.	0.	0.	1.
111	0.	1.	0.	3.	2.	0.	1.	1.	0.	0.
121	0.	1.	2.	1.	1.	3.	0.	0.	1.	1.
131	1.	2.	0.	2.	0.	1.	5.	0.	1.	2.
141	2.	1.	2.	0.	1.	1.	0.	1.	2.	1.
151	0.	1.	0.	1.	0.	0.	0.	1.	1.	1.
161	0.	0.	1.	0.	0.	0.	0.	1.	0.	2.
171	1.	1.	0.	1.	1.	0.	1.	1.	4.	1.
181	2.	1.	3.	1.	2.	1.	0.	1.	2.	5.
191	2.	4.	2.	1.	4.	4.	4.	5.	1.	2.
201	5.	1.	2.	6.	4.	11.	5.	4.	10.	5.
211	15.	14.	18.	16.	28.	21.	21.	23.	27.	25.
221	31.	21.	29.	37.	40.	30.	47.	47.	43.	48.
231	34.	43.	42.	44.	37.	44.	50.	37.	51.	54.
241	56.	52.	67.	61.	61.	81.	91.	98.	78.	87.
251	102.	94.	107.	105.	91.	92.	92.	100.	74.	61.
261	82.	62.	68.	51.	40.	47.	30.	26.	28.	20.
271	31.	30.	37.	26.	28.	34.	48.	38.	49.	44.
281	59.	61.	70.	79.	98.	103.	132.	114.	132.	165.
291	168.	182.	181.	188.	215.	209.	233.	245.	241.	235.
301	218.	221.	210.	219.	193.	184.	169.	136.	120.	95.
311	113.	81.	62.	51.	61.	36.	43.	28.	21.	11.
321	11.	12.	6.	6.	1.	5.	4.	2.	1.	1.
331	1.	1.	0.	0.	1.	1.	0.	1.	0.	0.
341	0.	0.	0.	0.	0.	1.	1.	1.	1.	2.
351	0.	0.	3.	1.	3.	2.	2.	0.	1.	6.
361	2.	2.	2.	1.	0.	2.	0.	4.	2.	1.
371	0.	2.	1.	0.	0.	1.	2.	0.	1.	0.
381	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
391	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.
401	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
411	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
421	0.	0.	0.	0.	0.	1.	1.	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.	0.	0.	0.	0.	0.	0.	0.	0.	0.
461	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
471	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
481	0.	1.	0.	0.	0.	0.	1.	0.	0.	0.
491	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
511	1.	0.								

9313090.1725

WESTINGHOUSE HANFORD COMPANY Batch 1846

222-S LABORATORY

ANALYTICAL BATCH

Lab Segment Serial No. E 8607	Customer ID: 0066WQL
Analysis: Gea	Sample Prep: acid digestion

Instrument:	WC38461	Procedure/ Rev:	LA-548-121 (0-0)
Technologist:	SUE LAI (Sue Lai)	Date:	9-2-93
Starting Time:	11:30	Temperature	25c
Ending Time:	11:30	Chemist:	A. K. Dasgupta

Comments:

	Description	Lab ID		Description	Lab ID
1	STD	R4295-8530	11		
2	Sample	E8607-8730	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
LMCS	32851 (0.1 ml)			

9313090.1726

GAMMA ENERGY ANALYSIS - ACID DIGESTION

4266

Serial No	Sample Point	Date	Time Issued	Priority
R 4295.-8530	105 KE BASIN	8-26-93	14:47	26

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	% RECOVERY	E11456	0

Sample Size	Customer ID
? 0.1 ml	STD

Remarks Calculations, Results

COLX STD# 32851
R901 STD VAL
RESULT % REC 99.5%
R905 STD VAL
RESULT % REC 100.3

CO-60 1.05 E+02
CS-134 7.28 E+01
CS-137 1.31 E+02

Sue Li

Analyst - 1	Analyst - 2	Analyst - 3	Analyst - 4	Analyst - 5
	Hrs 9-2-93 14:30	Hrs	Hrs	Hrs

Date	Time Completed	Lab Unit Mgr
9-2-93	11:30	

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

4267

Serial No	Sample Point	Date	Time Issued	Priority
E 8607.-8730	H&RWC	4-12-93	13: 2	26

Determination	Method Standard	Result Units	Charge Code	Reruns
GEA	LA-548-121	uCi/L Rec	E11456	0

Sample Size	Customer ID
? 0.1 ml	0066WQL

Remarks, Calculations, Results

COUNT AS uCI/L
LASER PRINTOUT

^{60}Co 1.61 E+00 uCi/g
^{137}Cs 2.87 E+01 uCi/g
^{154}Eu 2.40 E+00 uCi/g
^{155}Eu 1.23 E+01 uCi/g

CO-60 5.50 E+01 uCi/L
CS-137 9.80 E+02 uCi/L
EU-154 8.20 E+01 uCi/L
EU-155 4.19 E+01 uCi/L

Sue Li

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

Date	Time Completed	Lab Unit Mgr
9-2-93	11:30	

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

BEST AVAILABLE COPY

Em Barker
9-2-93

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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

02-SEP-9317:42:04

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:

SAMPLE DESCRIPTION: E8607-8730
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 2-SEP-93 AT 16:51:05

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

9313090.1728

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	99.03	49.49	1.00	1663.	1147.	11.2	U-234
2	951.56	475.77	1.26	3726.	602.	30.9	CS-134
3C	1127.42	563.71	1.40	2164.	2463.	7.9	CS-134, EU-152
4C	1139.69	569.85	1.40	2167.	4310.	6.0	CS-134, BI-207
5C	1210.46	605.24	1.42	2068.	28606.	1.5	CS-134, SB-125
6	1324.34	662.19	1.52	1503.	45182.	1.0	CS-137
6B		661.44			159.	5.8	
7C	1592.69	796.39	1.58	1311.	21272.	1.7	CS-134
8C	1604.87	802.48	1.58	1256.	2107.	5.0	CS-134
9C	2336.95	1168.64	1.86	739.	348.	12.4	CS-134
10C	2347.32	1173.82	1.86	637.	25101.	1.4	CO-60
11	2665.69	1333.07	2.00	198.	22774.	1.3	CO-60
12	2731.01	1365.74	2.07	88.	535.	10.1	CS-134
13	2801.77	1401.14	1.70	73.	234.	17.3	BI-214
14	2922.50	1461.53	2.35	55.	859.	7.2	K-40
14B		1460.67			769.	1.7	

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

9313090.1729

02-SEP-9315:15:31

SAMPLE: R4295-8530
DATA COLLECTED ON 2-SEP-93 AT 14:25:01
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<1.56E+00		LLD<1.56E+00		59.54	
AM-243	LLD<4.22E-01		LLD<4.22E-01		74.67	
BA-133	LLD<4.80E-01		LLD<4.80E-01		356.02	
BA-140	LLD<1.36E+00		LLD<1.36E+00		537.27	
BI-212	LLD<2.73E+00		LLD<2.73E+00		727.20	
CEPR144	LLD<2.31E+00		LLD<2.31E+00		133.51	
CO-60	1.05E+02	+-1.46E+00	1.05E+02	+-1.46E+00	1332.50	0.57
					1173.24	0.58
CR-51	LLD<2.68E+00		LLD<2.68E+00		320.09	
CS-134	7.28E+01	+-1.26E+00	7.28E+01	+-1.26E+00	795.84	0.55
					604.70	0.54
CS-137	1.31E+02	+-1.41E+00	1.31E+02	+-1.41E+00	661.65	0.54
EU-152	LLD<7.76E-01		LLD<7.76E-01		1408.01	
EU-154	LLD<6.44E-01		LLD<6.44E-01		1274.45	
EU-154H	LLD<6.37E-01		LLD<6.37E-01		1274.80	
EU-155	LLD<7.16E-01		LLD<7.16E-01		105.31	
FE-59	LLD<8.64E-01		LLD<8.64E-01		1099.25	
I-131	LLD<3.79E-01		LLD<3.79E-01		364.48	
~~K-40~~	~~4.17E+00~~	~~+-2.94E+00~~	~~4.17E+00~~	~~+-2.94E+00~~	~~1460.75~~	~~0.78~~ ~~ATB~~ 9/7/93 BKG
LA-140	LLD<1.45E-01		LLD<1.45E-01		1596.20	
MN-54	LLD<3.76E-01		LLD<3.76E-01		834.83	
NA-22	LLD<2.20E-01		LLD<2.20E-01		1274.55	
NB-94	LLD<3.29E-01		LLD<3.29E-01		702.63	
NB-95	LLD<3.50E-01		LLD<3.50E-01		765.78	
NP-237	LLD<1.53E+00		LLD<1.53E+00		86.50	
PB-212	LLD<5.06E-01		LLD<5.06E-01		239.00	
PU-239	LLD<2.22E+03		LLD<2.22E+03		129.30	
PU-241	LLD<7.21E+04		LLD<7.21E+04		148.57	
RA-224	LLD<5.63E+00		LLD<5.63E+00		240.99	
RA-226	LLD<5.27E+00		LLD<5.27E+00		186.10	
RU-103	LLD<3.39E-01		LLD<3.39E-01		497.08	
RU103	LLD<3.57E-01		LLD<3.57E-01		497.08	
RURH106	LLD<6.43E+00		LLD<6.43E+00		621.80	
SB-125	LLD<1.14E+00		LLD<1.14E+00		427.89	
SB-125A	LLD<1.14E+00		LLD<1.14E+00		427.89	
SE-75	LLD<3.79E-01		LLD<3.79E-01		264.66	
SN-113	LLD<5.08E-01		LLD<5.08E-01		391.67	
SR-85	LLD<3.33E-01		LLD<3.33E-01		513.99	
TH-228	LLD<1.61E+01		LLD<1.61E+01		84.37	
TL-208	LLD<4.09E-01		LLD<4.09E-01		583.20	
U-235	LLD<3.18E-01		LLD<3.18E-01		185.71	
Y-88	LLD<1.31E-01		LLD<1.31E-01		1836.06	
ZN-65	LLD<9.68E-01		LLD<9.68E-01		1115.55	
ZR-95	LLD<6.44E-01		LLD<6.44E-01		756.73	
TOTAL	3.14E+02	+-3.79E+00	3.14E+02	+-3.79E+00		

93130901230

100

STANDARD DEVIATION = 0.09

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 1.40E-09 UC/LI
TOTAL MEASURED ACTIVITY = 3.14E+02 (+-3.79E+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
99.03	49.49	1147.	11.2	3.22E+01
951.56	475.77	602.	30.9	4.21E+00
1127.42	563.71	2463.	7.9	1.97E+01
1139.69	569.85	4310.	6.0	3.48E+01
1604.87	802.48	2107.	5.0	2.30E+01
2336.95	1168.64	348.	12.4	5.33E+00
2731.01	1365.74	535.	10.1	9.33E+00
2801.77	1401.14	234.	17.3	4.16E+00

9313090.1231

Em Barker
9-2-93

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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

02-SEP-9317:42:04

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:

SAMPLE DESCRIPTION: E8607-8730
GEOMETRY DESCRIPTION: 22CC LIQ
SAMPLE SIZE: 1.0000E-03 LI / CONVERSION FACTOR: 1.0000E-01
STANDARD SIZE: 1.0000E+00 EA
ANALYSIS LIBRARY FILE: ANL000

COLLECT STARTED ON 2-SEP-93 AT 16:51:05

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

9313090.1232

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	98.98	49.47	1.00	6938.	4838.	5.4	U-234
2	119.78	59.87	1.02	12408.	40812.	1.2	AM-241,U-237, EU-155
3	173.73	86.84	1.07	10735.	12843.	2.8	CS-136, EU-155, EU-155A, PB-214X, TL-208X, CD-109
4E	211.35	105.65	1.08	23088.	10238.	5.4	EU-155, EU-155B, NP-239
5	246.90	123.42	1.07	9780.	33343.	1.3	CO-57, EU-154A
6	496.81	248.38	1.15	10343.	4231.	7.3	EU-154B, XE-135
7	1165.67	582.84	2.09	3226.	488.	35.4	EU-154,
7B		583.05			117.	7.9	TL-208
8	1184.60	592.31	1.50	3038.	1525.	11.8	EU-154C
9	1324.38	662.21	1.51	2553.	336073.	0.3	CS-137
9B		661.44			159.	5.8	
10	1386.02	693.04	1.60	1105.	473.	22.5	EU-154
11	1447.67	723.86	1.47	1086.	5569.	3.2	SB-124,I-131, AG-108, EU-154D, ZR-95 20%
12	1514.63	757.35	1.66	1094.	1200.	9.9	ZR-95,EU-154 4%
13	1592.57	796.33	1.80	1189.	290.	37.8	CS-134
14	1747.36	873.75	1.68	1145.	2918.	5.0	EU-154E, RH-106
15	1993.40	996.80	1.78	1033.	2361.	5.8	EU-154F
16	2010.43	1005.32	1.80	1051.	4124.	3.9	EU-154G, EU-152
17	2347.32	1173.82	1.87	483.	12929.	1.8	CO-60
18	2493.18	1246.78	1.57	250.	144.	38.6	EU-154,RB-89
19	2549.70	1275.05	1.95	197.	6538.	2.5	EU-154, EU-154H, NA-22
20	2665.74	1333.09	1.84	161.	11910.	1.8	CO-60
21	2795.96	1398.23	1.90	75.	134.	26.5	I-132
22	2922.49	1461.53	2.04	63.	788.	7.7	K-40
22B		1460.67			769.	1.7	
23	2989.30	1494.94	2.30	54.	93.	32.1	EU-154
24	3193.27	1596.98	2.03	49.	306.	13.3	LA-140, EU-154I
25	3528.97	1764.92	2.44	21.	91.	26.3	BI-214C
25B		1764.58			64.	7.3	

ERROR QUOTATION AT 1.96 SIGMA
PEAK CONFIDENCE LEVEL AT 85.0%

9313090.1238

E - MULTIPLET ANALYSIS ERROR
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

9313000.1234

02-SEP-9317:42:04

SAMPLE: E8607-8730
DATA COLLECTED ON 2-SEP-93 AT 16:51:05
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<1.28E+00		LLD<1.28E+00		911.07		
AC-228A	LLD<1.28E+00		LLD<1.28E+00		911.10		
AC-228B	LLD<3.48E+00		LLD<3.48E+00		338.40		
AG-108M	LLD<6.68E-01		LLD<6.68E-01		433.94		
AG-110M	LLD<4.00E+00		LLD<4.00E+00		657.76		
~~AM-241~~	~~4.00E+02~~	~~+-6.24E+00~~	~~4.00E+02~~	~~+-6.24E+00~~	~~59.54~~	~~0.33~~	Eu-155 @ 1.21 % approx 9-7-93 1.33+1 for Eu-155
AM-243	LLD<7.60E-01		LLD<7.60E-01		74.67		
AM-243A	LLD<7.60E-01		LLD<7.60E-01		74.67		
AM-243B	LLD<3.79E+00		LLD<3.79E+00		43.10		
AR-41	LLD<2.39E-01		LLD<2.39E-01		1293.64		
AU-198	LLD<5.39E-01		LLD<5.39E-01		411.80		
BA-133	LLD<7.73E-01		LLD<7.73E-01		356.02		
BA-139	LLD<1.48E+00		LLD<1.48E+00		165.85		
BA-140	LLD<1.95E+00		LLD<1.95E+00		537.27		
BA-141	LLD<1.58E+00		LLD<1.58E+00		190.23		
BE-7	LLD<6.12E+00		LLD<6.12E+00		477.59		
BI-207	LLD<4.14E-01		LLD<4.14E-01		569.70		
BI-212	LLD<6.40E+00		LLD<6.40E+00		727.27		
BI-214	LLD<9.77E-01		LLD<9.77E-01		609.32		
BI-214A	LLD<9.77E-01		LLD<9.77E-01		609.32		
BI-214B	LLD<2.56E+00		LLD<2.56E+00		1120.28		no A or B approx 9-7-93
~~BI-214C~~	~~9.49E-01~~	~~+-8.62E-01~~	~~9.49E-01~~	~~+-8.62E-01~~	~~1764.51~~	~~0.41~~	
~~CD-109~~	~~4.14E+02~~	~~+-1.21E+01~~	~~4.14E+02~~	~~+-1.21E+01~~	~~88.03~~	~~-1.19~~	Eu-155 approx 9-7-93
CE 144	LLD<1.96E+00		LLD<1.96E+00		133.51		
CE-139	LLD<3.33E-01		LLD<3.33E-01		165.85		
CE-141	LLD<4.56E-01		LLD<4.56E-01		145.44		
CEPR144	LLD<3.93E+00		LLD<3.93E+00		133.51		
CO-56	LLD<3.49E-01		LLD<3.49E-01		846.76		
~~CO-57~~	~~3.11E+01~~	~~+-4.98E-01~~	~~3.11E+01~~	~~+-4.98E-01~~	~~122.06~~	~~1.36~~	no 136 ok approx 9-7-93
CO-58	LLD<3.38E-01		LLD<3.38E-01		810.75		
CO-60 ok	5.50E+01	+-1.04E+00	5.50E+01	+-1.04E+00	1332.50	0.59	
					1173.24	0.59	
CR-51	LLD<4.40E+00		LLD<4.40E+00		320.09		
CS-134	LLD<3.65E-01		LLD<3.65E-01		795.84		
CS-136	LLD<3.47E-01		LLD<3.47E-01		818.51		
CS-137 ok	9.80E+02	+-5.78E+00	9.80E+02	+-5.78E+00	661.65	0.56	
CS-138	LLD<2.70E-01		LLD<2.70E-01		1435.86		
EU-152	LLD<7.26E-01		LLD<7.26E-01		1408.01		
EU-154 ok	8.20E+01	+-2.09E+00	8.20E+01	+-2.09E+00	1274.45	0.60	
EU-154A	6.58E+01	+-1.06E+00	6.58E+01	+-1.06E+00	123.10	0.32	
EU-155 ok	4.19E+01	+-2.29E+00	4.19E+01	+-2.29E+00	105.31	0.34	
					86.54	0.30	
FE-59	LLD<7.40E-01		LLD<7.40E-01		1099.25		
HF-181	LLD<7.44E-01		LLD<7.44E-01		482.20		
HG-203	LLD<4.60E-01		LLD<4.60E-01		279.20		
I-131	LLD<6.02E-01		LLD<6.02E-01		364.48		
I-132	LLD<1.24E+00		LLD<1.24E+00		667.69		

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I-133	LLD<5.40E-01	LLD<5.40E-01	529.69	
I-134	LLD<5.05E-01	LLD<5.05E-01	847.03	
I-135	LLD<7.81E-01	LLD<7.81E-01	1260.41	
K-40	LLD<3.23E+00	LLD<3.23E+00	1460.75	
KR-85	LLD<1.17E+02	LLD<1.17E+02	513.99	
KR-85M	LLD<3.52E-01	LLD<3.52E-01	151.17	
KR-87	LLD<1.35E+00	LLD<1.35E+00	402.58	
KR-89	LLD<1.92E+01	LLD<1.92E+01	220.90	
LA-140	LLD<1.48E-01	LLD<1.48E-01	1596.20	
LA-142	LLD<1.07E+00	LLD<1.07E+00	641.83	
MN-54	LLD<3.30E-01	LLD<3.30E-01	834.83	
MN-56	LLD<3.95E-01	LLD<3.95E-01	846.76	
~~NA-22~~	~~2.91E+01 +-7.43E-01~~	~~2.91E+01 +-7.43E-01~~	~~1274.55~~	~~0.50~~ Eu-155 [illegible] 9-7-93
NA-24	LLD<1.68E-01	LLD<1.68E-01	1368.60	
NB-94	LLD<3.11E-01	LLD<3.11E-01	702.63	
NB-95	LLD<3.26E-01	LLD<3.26E-01	765.78	
NB-97	LLD<4.87E+00	LLD<4.87E+00	657.92	
~~NP-237~~	~~1.23E+02 +-3.58E+00~~	~~1.23E+02 +-3.58E+00~~	~~86.50~~	~~0.34~~ Eu-155 [illegible] 9-7-9
NP-237A	LLD<1.45E+02	LLD<1.45E+02	195.00	
NP-237B	LLD<1.45E+02	LLD<1.45E+02	213.00	
NP-238	LLD<1.46E+00	LLD<1.46E+00	984.45	
NP-239	LLD<2.63E+00	LLD<2.63E+00	277.60	
PA-233	LLD<1.19E+00	LLD<1.19E+00	311.98	
PA-234M	LLD<1.93E+02	LLD<1.93E+02	1001.03	
PB-210	LLD<5.93E+01	LLD<5.93E+01	46.50	
PB-212	LLD<8.45E-01	LLD<8.45E-01	239.00	
PB-212A	LLD<8.41E-01	LLD<8.41E-01	239.00	
PB-212B	LLD<1.32E+01	LLD<1.32E+01	300.10	
PB-214	LLD<1.29E+00	LLD<1.29E+00	351.92	
PB-214A	LLD<1.29E+00	LLD<1.29E+00	351.92	
PB-214B	LLD<2.01E+00	LLD<2.01E+00	295.21	
PO-210	LLD<2.73E+04	LLD<2.73E+04	804.00	
PO-214	LLD<3.60E+03	LLD<3.60E+03	799.70	
PO-216	LLD<1.63E+04	LLD<1.63E+04	804.90	
PU-239	LLD<3.78E+03	LLD<3.78E+03	129.30	
PU-241	LLD<1.20E+05	LLD<1.20E+05	148.57	
RA-224	LLD<9.05E+00	LLD<9.05E+00	240.99	
RA-226	LLD<8.96E+00	LLD<8.96E+00	186.10	
RB-88	LLD<1.45E+00	LLD<1.45E+00	1836.00	
RB-89	LLD<1.86E+00	LLD<1.86E+00	1031.88	
RN-220	LLD<3.99E+02	LLD<3.99E+02	549.73	
RU-103	LLD<5.72E-01	LLD<5.72E-01	497.08	
RURH106	LLD<8.21E+00	LLD<8.21E+00	621.80	
SB-124	LLD<4.33E-01	LLD<4.33E-01	602.72	
SB-125	LLD<2.01E+00	LLD<2.01E+00	427.89	
SB-125A	LLD<2.01E+00	LLD<2.01E+00	427.89	
SC-46	LLD<3.85E-01	LLD<3.85E-01	1120.45	
SE-75	LLD<6.25E-01	LLD<6.25E-01	264.66	
SN-113	LLD<8.17E-01	LLD<8.17E-01	391.67	
SR-85	LLD<5.14E-01	LLD<5.14E-01	513.99	
SR-91	LLD<7.31E-01	LLD<7.31E-01	555.60	
SR-92	LLD<2.16E-01	LLD<2.16E-01	1383.94	
TA-182	LLD<1.15E+00	LLD<1.15E+00	1121.30	
TC-99M	LLD<2.59E-01	LLD<2.59E-01	140.51	
TE-123M	LLD<2.77E-01	LLD<2.77E-01	159.00	
TE-125M	LLD<1.31E+02	LLD<1.31E+02	109.27	
TE-132	LLD<4.03E-01	LLD<4.03E-01	228.16	
TH-228	LLD<4.25E+01	LLD<4.25E+01	84.37	
~~TH-229~~	~~5.17E+02 +-1.50E+01~~	~~5.17E+02 +-1.50E+01~~	~~86.44~~	~~0.40~~ Eu-155 [illegible] 9-7-93
TH-229B	LLD<1.38E+01	LLD<1.38E+01	137.02	

TH-229C	LLD<7.21E+00	LLD<7.21E+00	193.59	
TH-234	LLD<5.67E+00	LLD<5.67E+00	92.50	
TH-234A	LLD<5.67E+00	LLD<5.67E+00	92.50	
TH-234B	LLD<3.87E+01	LLD<3.87E+01	63.30	
~~TL-208~~	~~9.88E-01 +-4.60E-01~~	~~9.88E-01 +-4.60E-01~~	~~583.14~~	~~0.30~~ RAfarr 9-7-93
U-232	LLD<9.77E+02	LLD<9.77E+02	270.26	
U-235	LLD<5.78E-01	LLD<5.78E-01	185.71	
U-235A	LLD<5.78E-01	LLD<5.78E-01	185.71	
U-235B	LLD<2.32E+00	LLD<2.32E+00	143.76	
U-237	LLD<1.47E+00	LLD<1.47E+00	208.00	
W-187	LLD<1.03E+00	LLD<1.03E+00	685.74	
XE-131M	LLD<1.27E+01	LLD<1.27E+01	163.98	
XE-133	LLD<1.09E+00	LLD<1.09E+00	81.00	
XE-133M	LLD<3.56E+00	LLD<3.56E+00	233.21	
~~XE-135~~	~~5.74E+00 +-4.63E-01~~	~~5.74E+00 +-4.63E-01~~	~~249.79~~	~~1.41~~ Eu-154 RAfarr 9-7-93
XE-138	LLD<3.19E+00	LLD<3.19E+00	258.41	
Y-88	LLD<1.47E-01	LLD<1.47E-01	1836.06	
Y-91	LLD<9.00E+01	LLD<9.00E+01	1204.90	
Y-91M	LLD<5.55E-01	LLD<5.55E-01	555.60	
ZN-65	LLD<7.88E-01	LLD<7.88E-01	1115.55	
~~ZR-95~~	~~6.15E+00 +-6.09E-01~~	~~6.15E+00 +-6.09E-01~~	~~756.73~~	~~0.62~~ Eu-154 RAfarr 9-7-93
			724.20	-0.33 of in wrong ratio
ZR-97	LLD<3.05E-01	LLD<3.05E-01	743.33	
TOTAL	2.75E+03 +-2.17E+01	2.75E+03 +-2.17E+01		

STANDARD DEVIATION = 0.66

EBAR = ***** MEV/DISINTEGRATION
MAXIMUM PERMISSABLE ACTIVITY = 7.23E-12 UC/LI
TOTAL MEASURED ACTIVITY = 2.23E+03 (+-1.56E+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
98.98	49.47	4838.	5.4	1.36E+02
1184.60	592.31	1525.	11.8	1.27E+01
1386.02	693.04	473.	22.5	4.52E+00
1592.57	796.33	290.	37.8	3.13E+00
1747.36	873.75	2918.	5.0	3.44E+01
1993.40	996.80	2361.	5.8	3.13E+01
2010.43	1005.32	4124.	3.9	5.52E+01
2493.18	1246.78	144.	38.6	2.32E+00
2795.96	1398.23	134.	26.5	2.38E+00
2989.30	1494.94	93.	32.1	1.74E+00
3193.27	1596.98	306.	13.3	5.99E+00

PEAKS ELIMINATED BY BACKGROUND SUBTRACTION

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CENTROID CHANNEL	ENERGY KEV	NET AREA COUNTS	ERROR %	GAMMAS/SEC
2922.49	1461.53	788.	7.7	1.45E+01

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DISTRIBUTION SHEET

To	From	Page 1 of 1
DISTRIBUTION	PROGRAM SUPPORT	Date 10/04/93

Project Title/Work Order	EDT No. 140706
222-S ANALYTICAL LABORATORIES 105 KE AREA BASINS DATA PACKAGE	ECN NO. ~~140706~~

Name	MSIN	Text With all Attach	NA	EDT/ECN Only
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D. A. Dodd	T6-50			X
H. I. Martin	T6-06			X
A. D. Rice	T6-06			X
Central Files	L8-04	2		
EDMC	H6-08	X		

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