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SEVERN TRENT STL®

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Tel: 314 298 8566 Fax: 314 298 8757
www.stl-inc.com

ANALYTICAL REPORT

PROJECT NO. 5601

Li-Tungsten

Lot #: F7A090121

Ted Johnson

Environmental Chemical Corpora
1746 Cole Blvd
Bldg 21, Suite 350
Golden, CO 80401

SEVERN TRENT LABORATORIES, INC.

Terry Romanko
Project Manager

January 29, 2007

Case Narrative
LOT NUMBER: F7A090121

This report contains the analytical results for the 11 samples received under chain of custody by STL St. Louis on January 9, 2007. These samples are associated with your Li-Tungsten project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by STL St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Radium-226 by GFPC
The barium carrier is outside upper control limits which may cause a potential low bias result. The yield was truncated at 100% to eliminate a biased result.
Affected Samples:
F7A090121 (8): 5601-FSS-SU7-1003
F7A090121 (9): 5601-FSS-SU7-1005
F7A090121 (10): 5601-FSS-SU7-1017

Radium-228 by GFPC
The barium carrier is outside upper control limits which may cause a potential low bias result. The yield was truncated at 100% to eliminate a biased result.
Affected Samples:
F7A090121 (8): 5601-FSS-SU7-1003
F7A090121 (9): 5601-FSS-SU7-1005
F7A090121 (10): 5601-FSS-SU7-1017

There were no nonconformances or observations noted with any other analysis on this lot.

CUR 5 #5

Environmental Chemical Corporation
1746 Cole Blvd.
Bldg. 21, Suite 350
Lakewood, CO 80401
Phone: (303) 298-7607
Fax: (303) 298-7837

COC Number:

Customer Name: ECC – Li Tungsten
Address: 63 Herb Hill Road, Glen Cove, NY 11542

Contact: Theodore Johnson
Phone: (303) 472 - 8834
Fax: (516) 665- 8531

ECC Project Manager:_Phil O'Dwyer
Address: 63 Herb Hill Road, Glen Cove, NY 11542

Phone: (614) 402 - 2020
Customer Project Name: Li Tungsten

1.9.07
Bag

SAMPLE NUMBER	DATE	TIME	TYPE	CLIENT SAMPLE IDENTIFIER	TESTS	CONTAINER(S)	MATRIX
5601 -FSS-SU5-1007	1/5/2007	1045	FSS	Parcel B	Ra-226/Ra-228, Iso-Th, Iso-U	1 glass jar	Soil
5601 -FSS-SU5-1012	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601 -FSS-SU5-1018	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601 -FSS-SU5-1019	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU6-1009	1/5/2007	1100	FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU6-1017	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU6-1018	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU7-1003	1/5/2007	1120	FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU7-1005	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU7-1017	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU7-1018	1/5/2007		FSS	Parcel B		1 glass jar	Soil

Notes:
Ship to: Severn Trent Laboratory, St Louis
13715 Rider Trail N., Earth City, Mo 63045
Phone: 314-298-8566
Request Turnaround Time: 7 Day

Samples cooled below 4 C

Laboratory Receipt Information
Cooler/Container Intact? Yes____ No____
Samples Received At Below 4 C? Yes____ No____
Samples Containers Intact? Yes____ No____
Cooler/Container Custody Seal? Yes____ No____

CUSTODY TRANSFER RECORD

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Print:Ted Johnson Sign:	ECC	1/8/2006	1400	Print: J. Clarke	STL	1.9.07	0915
Print:				Print:			
Print:				Print:			

STL St. Louis

Lot #(s): F7A090121

- 5745 -

Condition Upon Receipt Form

Client: ECC
Quote No:
COC/RFA No: N/A
Initiated By: [illegible]
Date 1.9.07
Time: 0915

Shipping Information

Shipper Name: Fed Ex
Shipping # (s):*
TRK# 7922 6875 9139

1.		6.	
2.		7.	
3.		8.	
4.		9.	
5.		10.	

*Numbered shipping lines correspond to Numbered Sample Temp lines

Multiple Packages Y (N) N/A

Sample Temperature (s):**

1.	2	6.	
2.		7.	
3.		8.	
4.		9.	
5.		10.	

**Sample must be received at 4°C ± 2°C- If not, note contents below. Temperature variance does NOT affect the following: Metals-Liquid or Rad tests- Liquid or Solids

Condition (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1.	Y (N)	Was sample received broken?	8.	(Y) N	Sample received with Chain of Custody?
2.	Y N (N/A)	Was sample received with proper pH[1] ? (If not, make note below)	9.	(Y) N	Chain of Custody matches sample ID's on container(s)?
3.	Y N	If N/A-Was pH taken by original STL Lab?	10.	Y (N)	Are there custody seals present on cooler?
4.	(Y) N	Sample received in proper containers?	11.	Y N (N/A)	Do custody seals on cooler appear to be tampered with?
5.	(Y) N	Sample volume sufficient for analysis?	12.	Y (N)	Are there custody seals present on bottles?
6.	Y N (N/A)	Headspace in VOA or TOX liquid samples? (If Yes, note sample ID's below)	13.	Y N (N/A)	Do custody seals on bottles appear to be tampered with?
7.	(Y) N	Were contents of the cooler frisked after opening	14.	Y N (NA)	Was Internal COC/Workshare received?

[1] For DOE-AL (Pantex, LANL, Sandia) sites, pH of ALL containers received must be verified, EXCEPT VOA, TOX and soils.

Notes:

Corrective Action:

- ☐ Client Contact Name: Informed by:
- ☐ Sample(s) processed "as is"
- ☐ Sample(s) on hold until: If released, notify:

Project Management Review: [illegible] Date: 01-09-07

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED IN. IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY THEIR INITIAL AND THE DATE NEXT TO THAT ITEM.

ADMIN-0004, REVISED 03/01/06\\Slsvr01\QA\FORMS\ST-LOUIS\ADMIN\Admin004030106.doc

F7A090121 CLIENT ANALYSIS SUMMARY

Storage Loc: RAD

Date Received: 2007-01-09
Analytical Due Date: 2007-01-15
Report Due Date: 2007-01-16

Project Manager: TJR
Quote #: 72311
SDG: F7A090121
Project: 5601
Li-Tungsten
PO#: 139211.US
Report to: Ted Johnson
Client: 103641 Environmental Chemical Corporation

RUSH

#SMPS in LOT: 11

Report Type: X
EDD Code: 99

SAMPLE RECEIVING: *STRICT ICOC DOCUMENTATION REQUIRED. *SUBOUTs - Log RADs in own Lot - sub to STL St. Louis
*Log WET CHEM RAW DATA code as appropriate *Log METALS FORMS code on 1st sample in lot as appropriate *Enter the Lot# into the SDG field
*Enter the COC# into the Chain of Custody field *SAMPLE STORAGE AND DISPOSAL: 30 days w/ permission PROJECT MANAGEMENT:
*SCR/COC to Ted Johnson (tjohnson@ecc.net) *Charge for client requested MS/MSDs *See Client Requirements and Report Input Sheet for

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
1	5601-FSS-SU5-1007	2007-01-05 / 1045	JMJ4V	SOLID

SAMPLE COMMENTS:

	XX 2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX 2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
X	XX Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
X	XX ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
2	5601-FSS-SU5-1012	2007-01-05 / 1045	JMJ4W	SOLID

SAMPLE COMMENTS:

	XX 2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX 2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
3	5601-FSS-SU5-1018	2007-01-05 / 1045	JMJ4X	SOLID

SAMPLE COMMENTS:

	XX 2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX 2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
4	5601-FSS-SU5-1019	2007-01-05 / 1045	JMJ40	SOLID

SAMPLE COMMENTS:

	XX 2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX 2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
5	5601-FSS-SU6-1009	2007-01-05 / 1100	JMJ41	SOLID

SAMPLE COMMENTS:

	XX 2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX 2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
	XX Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

F7A090121 CLIENT ANALYSIS SUMMARY

Storage Loc: RAD

Date Received: 2007-01-09
Analytical Due Date: 2007-01-15
Report Due Date: 2007-01-16

Project Manager: TJR
Quote #: 72311
SDG: F7A090121
Project: 5601
Li-Tungsten
PO#: 139211.US
Report to: Ted Johnson
Client: 103641 Environmental Chemical Corporation

RUSH

#SMPS in LOT: 11

Report Type: X
EDD Code: 99

SAMPLE RECEIVING: *STRICT ICOC DOCUMENTATION REQUIRED. *SUBOUTs - Log RADs in own Lot - sub to STL St. Louis
*Log WET CHEM RAW DATA code as appropriate *Log METALS FORMS code on 1st sample in lot as appropriate *Enter the Lot# into the SDG field
*Enter the COC# into the Chain of Custody field *SAMPLE STORAGE AND DISPOSAL: 30 days w/ permission PROJECT MANAGEMENT:
*SCR/COC to Ted Johnson (tjohnson@ecc.net) *Charge for client requested MS/MSDs *See Client Requirements and Report Input Sheet for

XX	ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
6	5601-FSS-SU6-1017	2007-01-05 / 1100	JMJ42	SOLID

SAMPLE COMMENTS:

XX	2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
7	5601-FSS-SU6-1018	2007-01-05 / 1100	JMJ46	SOLID

SAMPLE COMMENTS:

XX	2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
8	5601-FSS-SU7-1003	2007-01-05 / 1120	JMJ47	SOLID

SAMPLE COMMENTS:

XX	2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
9	5601-FSS-SU7-1005	2007-01-05 / 1120	JMJ49	SOLID

SAMPLE COMMENTS:

XX	2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
10	5601-FSS-SU7-1017	2007-01-05 / 1120	JMJ5A	SOLID

SAMPLE COMMENTS:

XX	2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

F7A090121

CLIENT ANALYSIS SUMMARY

Storage Loc: RAD

Date Received: 2007-01-09

Analytical Due Date: 2007-01-15

Report Due Date: 2007-01-16

Report Type: X

EDD Code: 99

Project Manager: TJR

Quote #: 72311

SDG: F7A090121

Project: 5601

Li-Tungsten

PO#: 139211.US

Report to: Ted Johnson

Client: 103641 Environmental Chemical Corporation

RUSH

#SMPS in LOT: 11

SAMPLE RECEIVING: *STRICT ICOC DOCUMENTATION REQUIRED. *SUBOUTs - Log RADs in own Lot - sub to STL St. Louis

***Log WET CHEM RAW DATA code as appropriate *Log METALS FORMS code on 1st sample in lot as appropriate *Enter the Lot# into the SDG field**

***Enter the COC# into the Chain of Custody field *SAMPLE STORAGE AND DISPOSAL: 30 days w/ permission PROJECT MANAGEMENT:**

***SCR/COC to Ted Johnson (tjohnson@ecc.net) *Charge for client requested MS/MSDs *See Client Requirements and Report Input Sheet for**

SAMPLE #	CLIENT SAMPLE ID	DATE/TIME SAMPLED	WORKORDER	A
11	5601-FSS-SU7-1018	2007-01-05 / 1120	JMJ5C	SOLID

SAMPLE COMMENTS:

XX	2M	EML	A-01-R MOD	Iso URANIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	2O	EML	A-01-R MOD	Iso THORIUM (LONG CT) DOE A-01-R MOD	J2	Extraction Chromatography - Sequential Actinides	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	Z4	EPA	904 MOD	RA-228 BY GFPC EPA 904 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06
XX	ZY	EPA	903.0 MOD	RA-226 BY EPA-903.0 MOD	G1	Dry, Grind, Digest, Precipitate, Separation - 14day ingrowth	01	STANDARD TEST SET	PROT: B	WRK LOC	06

F7A090121

CLIENT COMMENTS SUMMARY

Storage Loc: RAD

Date Received: 2007-01-09

Analytical Due Date: 2007-01-15

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Project: 5601

Li-Tungsten

PO#: 139211.US

Report to: Ted Johnson

Client: 103641 Environmental Chemical Corporation

RUSH

#SMPS in LOT: 11

SAMPLE RECEIVING:
*STRICT ICOC DOCUMENTATION REQUIRED.
*SUBOUTs - Log RADs in own Lot - sub to STL St. Louis
*Log WET CHEM RAW DATA code as appropriate
*Log METALS FORMS code on 1st sample in lot as appropriat
*Enter the Lot# into the SDG field
*Enter the COC# into the Chain of Custody field
*SAMPLE STORAGE AND DISPOSAL: 30 days w/ permissio
PROJECT MANAGEMENT:
*SCR/COC to Ted Johnson (tjohnson@ecc.net)
*Charge for client requested MS/MSDs
*See Client Requirements and Report Input Sheet for
additional requirements
*Metals TAT = 5 Business Days
*RAD TAT = Uranium & Thorium: 1 Business Day
Radium 226 & 226: 18 analytical/21 report
(Rad 226&228 requires 14 day minimum ingrowth)
*RAD BOTTLES: Rad 226/228 = 1L HN03 Poly (minimum)
Isotopic Thorium = 1L HN03 Poly (minimum)
Isotopic Uranium = 1L HN03 Poly (minimum)
RAD QDS Report: RADRPT (code)
RAD QDS EDD: ENVDATA 16ECC (code)
EDD LOG-IN REQUIREMENTS: (as applicable)
*Enter the Lot# into the SDG field
*Enter the COC# into the Chain of Custody field
*Enter the Station# into the Sample Location field
*Enter the Depths into the Beginning and End Depth fields
RUSH TAT SURCHARGES (standard = 21 days)
24 HR TAT - 100%
2-3 Business Days - 75%
7 Calendar Days - 30%
14 Calendar Days - 10%

METHODS SUMMARY

F7A090121

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Isotopic Thorium by Alpha Spectroscopy	EML A-01-R MOD	
Isotopic Uranium by Alpha Spectroscopy	EML A-01-R MOD	
Radium-226 by GFPC	EPA 903.0 MOD	
Radium-228 by GFPC	EPA 904 MOD	

References:

EML "ENVIRONMENTAL MEASUREMENTS LABORATORY PROCEDURES MANUAL" HASL-300 28TH EDITION, VOLUME I and II DEPARTMENT OF ENERGY

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

SAMPLE SUMMARY

F7A090121

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
JMJ4V	001	5601-FSS-SU5-1007	01/05/07	10:45
JMJ4W	002	5601-FSS-SU5-1012	01/05/07	10:45
JMJ4X	003	5601-FSS-SU5-1018	01/05/07	10:45
JMJ40	004	5601-FSS-SU5-1019	01/05/07	10:45
JMJ41	005	5601-FSS-SU6-1009	01/05/07	11:00
JMJ42	006	5601-FSS-SU6-1017	01/05/07	11:00
JMJ46	007	5601-FSS-SU6-1018	01/05/07	11:00
JMJ47	008	5601-FSS-SU7-1003	01/05/07	11:20
JMJ49	009	5601-FSS-SU7-1005	01/05/07	11:20
JMJ5A	010	5601-FSS-SU7-1017	01/05/07	11:20
JMJ5C	011	5601-FSS-SU7-1018	01/05/07	11:20

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU5-1007

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-001
Work Order: JMJ4V
Matrix: SOLID

Date Collected: 01/05/07 1045
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				pCi/g		Batch # 7009195	Yld % 89
Radium (226)	0.78	J	0.24	1.00	0.25	01/09/07	01/26/07
RA-228 BY GFPC EPA 904 MOD				pCi/g		Batch # 7009196	Yld % 74
Radium 228	1.0	J	0.55	1.00	0.85	01/09/07	01/26/07
Iso URANIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011121	Yld % 82
Uranium 234	0.79		0.18	0.10	0.03	01/11/07	01/17/07
Uranium 235/236	0.035	J	0.035	0.100	0.019	01/11/07	01/17/07
Uranium 238	0.71		0.17	0.10	0.03	01/11/07	01/17/07
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011119	Yld % 94
Thorium 228	0.73		0.16	0.10	0.05	01/11/07	01/17/07
Thorium 230	0.61		0.14	0.10	0.03	01/11/07	01/17/07
Thorium 232	0.72		0.16	0.10	0.02	01/11/07	01/17/07

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU5-1007 DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-001X
Work Order: JMJ4V
Matrix: SOLID

Date Collected: 01/05/07 1045
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				pCi/g		Batch # 7009195	Yld % 109
Radium (226)	0.97	J	0.24	1.00	0.20	01/09/07	01/26/07
RA-228 BY GFPC EPA 904 MOD				pCi/g		Batch # 7009196	Yld % 96
Radium 228	0.75	J	0.40	1.00	0.61	01/09/07	01/26/07
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011119	Yld % 80
Thorium 228	0.76		0.18	0.10	0.05	01/11/07	01/17/07
Thorium 230	0.72		0.17	0.10	0.03	01/11/07	01/17/07
Thorium 232	0.94		0.21	0.10	0.03	01/11/07	01/17/07
Iso URANIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011121	Yld % 92
Uranium 234	0.61		0.14	0.10	0.03	01/11/07	01/17/07
Uranium 235/236	0.057	J	0.041	0.100	0.036	01/11/07	01/17/07
Uranium 238	0.56		0.13	0.10	0.02	01/11/07	01/17/07

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU5-1012

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-002
Work Order: JMJ4W
Matrix: SOLID

Date Collected: 01/05/07 1045
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				pCi/g		Batch # 7009195	Yld % 104
Radium (226)	1.40		0.28	1.00	0.15	01/09/07	01/26/07
RA-228 BY GFPC EPA 904 MOD				pCi/g		Batch # 7009196	Yld % 87
Radium 228	0.92	J	0.46	1.00	0.70	01/09/07	01/26/07
Iso URANIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011121	Yld % 82
Uranium 234	0.51		0.13	0.10	0.03	01/11/07	01/17/07
Uranium 235/236	0.035	J	0.035	0.100	0.019	01/11/07	01/17/07
Uranium 238	0.58		0.15	0.10	0.03	01/11/07	01/17/07
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011119	Yld % 86
Thorium 228	0.66		0.16	0.10	0.05	01/11/07	01/17/07
Thorium 230	0.60		0.14	0.10	0.04	01/11/07	01/17/07
Thorium 232	0.63		0.15	0.10	0.03	01/11/07	01/17/07

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU5-1018

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-003
Work Order: JMJ4X
Matrix: SOLID

Date Collected: 01/05/07 1045
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				**pCi/g**		**Batch # 7009195**	**Yld % 100**
Radium (226)	**1.0**	**J**	**0.24**	1.00	**0.17**	**01/09/07**	**01/26/07**
RA-228 BY GFPC EPA 904 MOD				**pCi/g**		**Batch # 7009196**	**Yld % 99**
Radium 228	**0.73**	**J**	**0.40**	1.00	**0.61**	**01/09/07**	**01/26/07**
Iso URANIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011121**	**Yld % 83**
Uranium 234	**0.66**		**0.16**	0.10	**0.04**	**01/11/07**	**01/17/07**
Uranium 235/236	**0.073**	**J**	**0.049**	0.100	**0.038**	**01/11/07**	**01/17/07**
Uranium 238	**0.72**		**0.17**	0.10	**0.03**	**01/11/07**	**01/17/07**
Iso THORIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011119**	**Yld % 92**
Thorium 228	**0.94**		**0.20**	0.10	**0.05**	**01/11/07**	**01/17/07**
Thorium 230	**0.66**		**0.15**	0.10	**0.03**	**01/11/07**	**01/17/07**
Thorium 232	**0.85**		**0.18**	0.10	**0.02**	**01/11/07**	**01/17/07**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU5-1019

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-004
Work Order: JMJ40
Matrix: SOLID

Date Collected: 01/05/07 1045
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				pCi/g		Batch # 7009195	Yld % 105
Radium (226)	1.08		0.24	1.00	0.15	01/09/07	01/26/07
RA-228 BY GFPC EPA 904 MOD				pCi/g		Batch # 7009196	Yld % 110
Radium 228	0.84	J	0.36	1.00	0.53	01/09/07	01/26/07
Iso URANIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011121	Yld % 88
Uranium 234	0.71		0.16	0.10	0.03	01/11/07	01/17/07
Uranium 235/236	0.028	U	0.029	0.100	0.030	01/11/07	01/17/07
Uranium 238	0.81		0.18	0.10	0.03	01/11/07	01/17/07
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011119	Yld % 90
Thorium 228	0.91		0.20	0.10	0.03	01/11/07	01/17/07
Thorium 230	0.67		0.16	0.10	0.03	01/11/07	01/17/07
Thorium 232	0.91		0.20	0.10	0.02	01/11/07	01/17/07

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU6-1009

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-005
Work Order: JMJ41
Matrix: SOLID

Date Collected: 01/05/07 1100
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				pCi/g		Batch # 7009195	Yld % 105
Radium (226)	**0.95**	J	**0.22**	1.00	**0.12**	01/09/07	01/26/07
RA-228 BY GFPC EPA 904 MOD				pCi/g		Batch # 7009196	Yld % 98
Radium 228	**1.0**	J	**0.46**	1.00	**0.70**	01/09/07	01/26/07
Iso URANIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011121	Yld % 84
Uranium 234	**0.46**		**0.12**	0.10	**0.03**	01/11/07	01/17/07
Uranium 235/236	0.026	U	0.028	0.100	0.029	01/11/07	01/17/07
Uranium 238	**0.45**		**0.12**	0.10	**0.01**	01/11/07	01/17/07
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011119	Yld % 84
Thorium 228	**0.69**		**0.16**	0.10	**0.04**	01/11/07	01/17/07
Thorium 230	**0.63**		**0.15**	0.10	**0.03**	01/11/07	01/17/07
Thorium 232	**0.72**		**0.17**	0.10	**0.01**	01/11/07	01/17/07

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU6-1017

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-006
Work Order: JMJ42
Matrix: SOLID

Date Collected: 01/05/07 1100
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				**pCi/g**		**Batch # 7009195**	**Yld % 105**
Radium (226)	**1.04**		**0.24**	1.00	**0.16**	**01/09/07**	**01/26/07**
RA-228 BY GFPC EPA 904 MOD				**pCi/g**		**Batch # 7009196**	**Yld % 101**
Radium 228	**0.71**	**J**	**0.37**	1.00	**0.56**	**01/09/07**	**01/26/07**
Iso URANIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011121**	**Yld % 86**
Uranium 234	**0.41**		**0.11**	0.10	**0.04**	**01/11/07**	**01/17/07**
Uranium 235/236	0.029	U	0.029	0.100	0.031	01/11/07	01/17/07
Uranium 238	**0.47**		**0.12**	0.10	**0.04**	**01/11/07**	**01/17/07**
Iso THORIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011119**	**Yld % 101**
Thorium 228	**0.67**		**0.15**	0.10	**0.03**	**01/11/07**	**01/17/07**
Thorium 230	**0.47**		**0.12**	0.10	**0.02**	**01/11/07**	**01/17/07**
Thorium 232	**0.72**		**0.16**	0.10	**0.03**	**01/11/07**	**01/17/07**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU6-1018

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-007
Work Order: JMJ46
Matrix: SOLID

Date Collected: 01/05/07 1100
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				**pCi/g**		**Batch # 7009195**	**Yld % 104**
Radium (226)	**0.97**	**J**	**0.22**	1.00	**0.15**	**01/09/07**	**01/26/07**
RA-228 BY GFPC EPA 904 MOD				**pCi/g**		**Batch # 7009196**	**Yld % 89**
Radium 228	**0.85**	**J**	**0.49**	1.00	**0.75**	**01/09/07**	**01/26/07**
Iso URANIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011121**	**Yld % 90**
Uranium 234	**0.36**		**0.10**	0.10	**0.03**	**01/11/07**	**01/17/07**
Uranium 235/236	0.017	U	0.024	0.100	0.032	01/11/07	01/17/07
Uranium 238	**0.37**		**0.10**	0.10	**0.03**	**01/11/07**	**01/17/07**
Iso THORIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011119**	**Yld % 98**
Thorium 228	**0.54**		**0.13**	0.10	**0.04**	**01/11/07**	**01/17/07**
Thorium 230	**0.50**		**0.12**	0.10	**0.02**	**01/11/07**	**01/17/07**
Thorium 232	**0.51**		**0.12**	0.10	**0.02**	**01/11/07**	**01/17/07**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU7-1003

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-008
Work Order: JMJ47
Matrix: SOLID

Date Collected: 01/05/07 1120
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				pCi/g		Batch # 7009195	Yld % 100
Radium (226)	1.21		0.27	1.00	0.18	01/09/07	01/26/07
RA-228 BY GFPC EPA 904 MOD				pCi/g		Batch # 7009196	Yld % 96
Radium 228	0.76	J	0.34	1.00	0.50	01/09/07	01/26/07
Iso URANIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011121	Yld % 93
Uranium 234	0.65		0.15	0.10	0.03	01/11/07	01/17/07
Uranium 235/236	0.004	U	0.015	0.100	0.032	01/11/07	01/17/07
Uranium 238	0.70		0.16	0.10	0.03	01/11/07	01/17/07
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011119	Yld % 80
Thorium 228	1.12		0.24	0.10	0.06	01/11/07	01/17/07
Thorium 230	0.92		0.21	0.10	0.04	01/11/07	01/17/07
Thorium 232	1.08		0.23	0.10	0.03	01/11/07	01/17/07

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU7-1005

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-009
Work Order: JMJ49
Matrix: SOLID

Date Collected: 01/05/07 1120
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				pCi/g		Batch # 7009195	Yld % 100
Radium (226)	1.31		0.28	1.00	0.14	01/09/07	01/26/07
RA-228 BY GFPC EPA 904 MOD				pCi/g		Batch # 7009196	Yld % 91
Radium 228	0.51	J	0.31	1.00	0.47	01/09/07	01/26/07
Iso URANIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011121	Yld % 93
Uranium 234	0.76		0.17	0.10	0.03	01/11/07	01/17/07
Uranium 235/236	0.024	U	0.026	0.100	0.027	01/11/07	01/17/07
Uranium 238	0.77		0.17	0.10	0.03	01/11/07	01/17/07
Iso THORIUM (LONG CT) DOE A-01-R MOD				pCi/g		Batch # 7011119	Yld % 90
Thorium 228	0.73		0.16	0.10	0.04	01/11/07	01/17/07
Thorium 230	0.67		0.15	0.10	0.03	01/11/07	01/17/07
Thorium 232	0.67		0.15	0.10	0.03	01/11/07	01/17/07

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU7-1017

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-010
Work Order: JMJ5A
Matrix: SOLID

Date Collected: 01/05/07 1120
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				**pCi/g**		**Batch # 7009195**	**Yld % 100**
Radium (226)	**0.96**	**J**	**0.23**	1.00	**0.16**	**01/09/07**	**01/26/07**
RA-228 BY GFPC EPA 904 MOD				**pCi/g**		**Batch # 7009196**	**Yld % 100**
Radium 228	**0.64**	**J**	**0.34**	1.00	**0.52**	**01/09/07**	**01/26/07**
Iso URANIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011121**	**Yld % 92**
Uranium 234	**0.54**		**0.13**	0.10	**0.03**	**01/11/07**	**01/17/07**
Uranium 235/236	0.012	U	0.019	0.100	0.027	01/11/07	01/17/07
Uranium 238	**0.62**		**0.15**	0.10	**0.03**	**01/11/07**	**01/17/07**
Iso THORIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011119**	**Yld % 91**
Thorium 228	**0.81**		**0.18**	0.10	**0.05**	**01/11/07**	**01/17/07**
Thorium 230	**0.68**		**0.16**	0.10	**0.04**	**01/11/07**	**01/17/07**
Thorium 232	**0.88**		**0.19**	0.10	**0.02**	**01/11/07**	**01/17/07**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

Environmental Chemical Corporation

Client Sample ID: 5601-FSS-SU7-1018

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F7A090121-011
Work Order: JMJ5C
Matrix: SOLID

Date Collected: 01/05/07 1120
Date Received: 01/09/07 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
RA-226 BY EPA-903.0 MOD				**pCi/g**		**Batch # 7009195**	**Yld % 101**
Radium (226)	**1.20**		**0.26**	1.00	**0.17**	**01/09/07**	**01/26/07**
RA-228 BY GFPC EPA 904 MOD				**pCi/g**		**Batch # 7009196**	**Yld % 91**
Radium 228	0.18	U	0.30	1.00	0.49	01/09/07	01/26/07
Iso URANIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011121**	**Yld % 94**
Uranium 234	**0.60**		**0.14**	0.10	**0.02**	**01/11/07**	**01/17/07**
Uranium 235/236	0.022	U	0.025	0.100	0.030	01/11/07	01/17/07
Uranium 238	**0.76**		**0.16**	0.10	**0.02**	**01/11/07**	**01/17/07**
Iso THORIUM (LONG CT) DOE A-01-R MOD				**pCi/g**		**Batch # 7011119**	**Yld % 97**
Thorium 228	**0.82**		**0.17**	0.10	**0.03**	**01/11/07**	**01/17/07**
Thorium 230	**0.66**		**0.15**	0.10	**0.02**	**01/11/07**	**01/17/07**
Thorium 232	**0.89**		**0.19**	0.10	**0.02**	**01/11/07**	**01/17/07**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F7A090121
Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date	Lab Sample ID
RA-226 BY EPA-903.0 MOD			**pCi/g**	**Batch # 7009195**		**Yld % 105**		**F7A090000-195B**
Radium (226)	0.034	U	0.091	1.00	0.17	01/09/07	01/26/07	
RA-228 BY GFPC EPA 904 MOD			**pCi/g**	**Batch # 7009196**		**Yld % 95**		**F7A090000-196B**
Radium 228	0.31	U	0.40	1.00	0.65	01/09/07	01/26/07	
Iso URANIUM (LONG CT) DOE A-01-R MOD			**pCi/g**	**Batch # 7011121**		**Yld % 91**		**F7A110000-121B**
Uranium 234	0.002	U	0.019	0.100	0.035	01/11/07	01/17/07	
Uranium 235/236	-0.001	U	0.013	0.100	0.026	01/11/07	01/17/07	
Uranium 238	0.014	U	0.018	0.100	0.021	01/11/07	01/17/07	
Iso THORIUM (LONG CT) DOE A-01-R MOD			**pCi/g**	**Batch # 7011119**		**Yld % 101**		**F7A110000-119B**
Thorium 228	0.011	U	0.018	0.100	0.027	01/11/07	01/17/07	
Thorium 230	**0.041**	**J**	**0.030**	0.100	**0.023**	**01/11/07**	**01/17/07**	
Thorium 232	0.0	U	0.0	0.1	0.01	01/11/07	01/17/07	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

Laboratory Control Sample Report

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F7A090121
Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert. (2 σ+/-)	MDC	% Yld	% Rec	Lab Sample ID / QC Control Limits
RA-226 BY EPA-903.0 MOD			**pCi/g**	**903.0 MOD**			**F7A090000-195C**
Radium (226)	11.2	10.4	1.2	0.2	109	93	(53 - 113)
	Batch #:	7009195		**Analysis Date:**	01/26/07		
RA-228 BY GFPC EPA 904 MOD			**pCi/g**	**904 MOD**			**F7A090000-196C**
Radium 228	9.31	8.3	1.1	0.6	93	89	(54 - 130)
	Batch #:	7009196		**Analysis Date:**	01/26/07		
Iso THORIUM (LONG CT) DOE A-01-R MOD			**pCi/g**	**A-01-R MOD**			**F7A110000-119C**
Thorium 230	58.5	59.6	9.8	0.4	96	102	(81 - 124)
	Batch #:	7011119		**Analysis Date:**	01/17/07		
Iso URANIUM (LONG CT) DOE A-01-R MOD			**pCi/g**	**A-01-R MOD**			**F7A110000-121C**
Uranium 234	19.6	20.1	4.0	0.4	98	103	(78 - 125)
Uranium 238	19.6	18.7	3.7	0.3	98	96	(76 - 122)
	Batch #:	7011121		**Analysis Date:**	01/17/07		

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

DUPLICATE EVALUATION REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F7A090121
Matrix: SOLID

Date Sampled: 01/05/07
Date Received: 01/09/07

Parameter	SAMPLE Result		Total Uncert. (2σ+/-)	% Yld	DUPLICATE Result		Total Uncert. (2 σ+/-)	% Yld	QC Sample ID Precision	
RA-226 BY EPA-903.0 MOD				**pCi/g**	**903.0 MOD**				**F7A090121-001**	
Radium (226)	**0.78**	J	**0.24**	89	**0.97**	J	**0.24**	109	22	%RPD
	Batch #:		7009195	(Sample)	7009195		(Duplicate)			
RA-228 BY GFPC EPA 904 MOD				**pCi/g**	**904 MOD**				**F7A090121-001**	
Radium 228	**1.0**	J	**0.55**	74	**0.75**	J	**0.40**	96	28	%RPD
	Batch #:		7009196	(Sample)	7009196		(Duplicate)			
Iso THORIUM (LONG CT) DOE A-01-R MOD				**pCi/g**	**A-01-R MOD**				**F7A090121-001**	
Thorium 228	**0.73**		**0.16**	94	**0.76**		**0.18**	80	5	%RPD
Thorium 230	**0.61**		**0.14**	94	**0.72**		**0.17**	80	16	%RPD
Thorium 232	**0.72**		**0.16**	94	**0.94**		**0.21**	80	26	%RPD
	Batch #:		7011119	(Sample)	7011119		(Duplicate)			
Iso URANIUM (LONG CT) DOE A-01-R MOD				**pCi/g**	**A-01-R MOD**				**F7A090121-001**	
Uranium 234	**0.79**		**0.18**	82	**0.61**		**0.14**	92	26	%RPD
Uranium 235/236	**0.035**	J	**0.035**	82	**0.057**	J	**0.041**	92	47	%RPD
Uranium 238	**0.71**		**0.17**	82	**0.56**		**0.13**	92	23	%RPD
	Batch #:		7011121	(Sample)	7011121		(Duplicate)			

NOTE(S)

Data are incomplete without the case narrative.
Calculations are performed before rounding to avoid round-off error in calculated results

J Result is greater than sample detection limit but less than stated reporting limit.

CUR 5 #5

Environmental Chemical Corporation
1746 Cole Blvd.
Bldg. 21, Suite 350
Lakewood, CO 80401
Phone: (303) 298-7607
Fax: (303) 298-7837

COC Number:

Customer Name: ECC – Li Tungsten
Address: 63 Herb Hill Road, Glen Cove, NY 11542

Contact: Theodore Johnson
Phone: (303) 472 - 8834
Fax: (516) 665- 8531

ECC Project Manager:_Phil O'Dwyer
Address: 63 Herb Hill Road, Glen Cove, NY 11542

Phone: (614) 402 - 2020
Customer Project Name: Li Tungsten

1.9.07
Bag

SAMPLE NUMBER	DATE	TIME	TYPE	CLIENT SAMPLE IDENTIFIER	TESTS	CONTAINER(S)	MATRIX
5601 -FSS-SU5-1007	1/5/2007	1045	FSS	Parcel B	Ra-226/Ra-228, Iso-Th, Iso-U	1 glass jar	Soil
5601 -FSS-SU5-1012	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601 -FSS-SU5-1018	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601 -FSS-SU5-1019	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU6-1009	1/5/2007	1100	FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU6-1017	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU6-1018	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU7-1003	1/5/2007	1120	FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU7-1005	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU7-1017	1/5/2007		FSS	Parcel B		1 glass jar	Soil
5601-FSS-SU7-1018	1/5/2007		FSS	Parcel B		1 glass jar	Soil

Notes:
Ship to: Severn Trent Laboratory, St Louis
13715 Rider Trail N., Earth City, Mo 63045
Phone: 314-298-8566
Request Turnaround Time: 7 Day

Samples cooled below 4 C

Laboratory Receipt Information
Cooler/Container Intact? Yes____ No____
Samples Received At Below 4 C? Yes____ No____
Samples Containers Intact? Yes____ No____
Cooler/Container Custody Seal? Yes____ No____

CUSTODY TRANSFER RECORD

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
Print:Ted Johnson Sign:	ECC	1/8/2006	1400	Print: J. Clark	STL	1.9.07	0915
Print:				Print:			
Print:				Print:			

STL St. Louis

Lot #(s): F7A090121

- 5745 -

Condition Upon Receipt Form

Client: ECC
Quote No:
COC/RFA No: N/A
Initiated By:
Date 1.9.07
Time: 0915

Shipping Information

Shipper Name: Fed Ex
Shipping # (s)*
1. TRK# 7922 6875 9139
2.
3.
4.
5.
6.
7.
8.
9.
10.

Multiple Packages Y (N) N/A
Sample Temperature (s):**
1. 2
2.
3.
4.
5.
6.
7.
8.
9.
10.

*Numbered shipping lines correspond to Numbered Sample Temp lines

**Sample must be received at 4°C ± 2°C- If not, note contents below. Temperature variance does NOT affect the following: Metals-Liquid or Rad tests- Liquid or Solids

Condition (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1.	Y (N)	Was sample received broken?	8.	(Y) N	Sample received with Chain of Custody?
2.	Y N (N/A)	Was sample received with proper pH[1] ? (If not, make note below)	9.	(Y) N	Chain of Custody matches sample ID's on container(s)?
3.	Y N	If N/A-Was pH taken by original STL Lab?	10.	Y (N)	Are there custody seals present on cooler?
4.	(Y) N	Sample received in proper containers?	11.	Y N (N/A)	Do custody seals on cooler appear to be tampered with?
5.	(Y) N	Sample volume sufficient for analysis?	12.	Y (N)	Are there custody seals present on bottles?
6.	Y N (N/A)	Headspace in VOA or TOX liquid samples? (If Yes, note sample ID's below)	13.	Y N (N/A)	Do custody seals on bottles appear to be tampered with?
7.	(Y) N	Were contents of the cooler frisked after opening	14.	Y N (NA)	Was Internal COC/Workshare received?

[1] For DOE-AL (Pantex, LANL, Sandia) sites, pH of ALL containers received must be verified, EXCEPT VOA, TOX and soils.

Notes:

Corrective Action:
- ☐ Client Contact Name: Informed by:
- ☐ Sample(s) processed "as is"
- ☐ Sample(s) on hold until: If released, notify:

Project Management Review: Date: 01-09-07

THIS FORM MUST BE COMPLETED AT THE TIME THE ITEMS ARE BEING CHECKED IN. IF ANY ITEM IS COMPLETED BY SOMEONE OTHER THAN THE INITIATOR, THEN THAT PERSON IS REQUIRED TO APPLY THEIR INITIAL AND THE DATE NEXT TO THAT ITEM.

ADMIN-0004, REVISED 03/01/06\\Slsvr01\QA\FORMS\ST-LOUIS\ADMIN\Admin004030106.doc

ALPHA SPECTROSCOPY

SEVERN TRENT STL

Alpha Spectroscopy Thorium

SEVERN TRENT STL

Analysis Report for Alpha Spectroscopy

Batch: 7011119 **Operator:** 403293

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
F7A090121-001	JMJ4V1AE	2.0033	1.00	2.00	AV16	1/17/07 14:39	180.00	rad05-0048	Th-229	3.654E+000	93.83%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
Th-228	7.303E-001	pCi/g	1.196E-001	1.608E-001	4.510E-002	1.622E-002
Th-229	1.544E+000	pCi/g	1.762E-001	2.268E-001	3.189E-002	9.612E-003
Th-230	6.138E-001	pCi/g	1.078E-001	1.406E-001	2.718E-002	7.260E-003
Th-232	7.242E-001	pCi/g	1.164E-001	1.578E-001	2.281E-002	5.108E-003

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
F7A090121-001X	JMJ4V1AH	2.0034	1.00	2.00	AV18	1/17/07 14:39	180.00	rad05-0048	Th-229	3.654E+000	80.25%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
Th-228	7.649E-001	pCi/g	1.350E-001	1.802E-001	4.658E-002	1.549E-002
Th-229	1.321E+000	pCi/g	1.954E-001	2.055E-001	3.353E-002	8.958E-003
Th-230	7.175E-001	pCi/g	1.292E-001	1.709E-001	3.111E-002	7.752E-003
Th-232	9.387E-001	pCi/g	1.471E-001	2.075E-001	2.812E-002	6.298E-003

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
F7A090121-002	JMJ4W1AE	2.0040	1.00	2.00	AV19	1/17/07 14:39	180.00	rad05-0048	Th-229	3.653E+000	86.08%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
Th-228	6.644E-001	pCi/g	1.193E-001	1.556E-001	5.032E-002	1.834E-002
Th-229	1.416E+000	pCi/g	1.832E-001	2.125E-001	3.842E-002	1.238E-002
Th-230	5.965E-001	pCi/g	1.112E-001	1.429E-001	3.712E-002	1.174E-002
Th-232	6.343E-001	pCi/g	1.133E-001	1.481E-001	2.706E-002	6.744E-003

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
F7A090121-003	JMJ4X1AE	2.0035	1.00	2.00	AV20	1/17/07 14:39	180.00	rad05-0048	Th-229	3.654E+000	92.21%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
Th-228	9.374E-001	pCi/g	1.405E-001	1.993E-001	4.883E-002	1.757E-002
Th-229	1.518E+000	pCi/g	1.841E-001	2.282E-001	3.328E-002	9.722E-003
Th-230	6.617E-001	pCi/g	1.169E-001	1.537E-001	3.450E-002	1.040E-002
Th-232	8.455E-001	pCi/g	1.307E-001	1.825E-001	2.145E-002	3.911E-003

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
F7A090121-004	JMJ401AE	2.0178	1.00	2.00	AV22	1/17/07 14:39	180.00	rad05-0048	Th-229	3.628E+000	90.38%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
Th-228	9.140E-001	pCi/g	1.407E-001	1.986E-001	2.641E-002	5.915E-003
Th-229	1.477E+000	pCi/g	1.885E-001	2.260E-001	3.512E-002	1.026E-002
Th-230	6.699E-001	pCi/g	1.209E-001	1.587E-001	3.133E-002	8.370E-003
Th-232	9.110E-001	pCi/g	1.400E-001	1.978E-001	2.284E-002	4.164E-003

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
F7A090121-005	JMJ411AE	2.0040	1.00	2.00	AV53	1/17/07 14:39	180.00	rad05-0048	Th-229	3.653E+000	83.66%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
Th-228	6.888E-001	pCi/g	1.229E-001	1.619E-001	3.506E-002	1.024E-002
Th-229	1.377E+000	pCi/g	1.889E-001	2.101E-001	3.332E-002	9.362E-003
Th-230	6.275E-001	pCi/g	1.169E-001	1.513E-001	2.908E-002	7.246E-003
Th-232	7.240E-001	pCi/g	1.246E-001	1.671E-001	1.451E-002	0.000E+000

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
F7A090121-006	JMJ421AE	2.0090	1.00	2.00	AV56	1/17/07 14:39	180.00	rad05-0048	Th-229	3.644E+000	101.49%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte		TracerAdded	TracerYield
						Th-228	6.690E-001	pCi/g	1.125E-001	1.496E-001	2.534E-002	6.314E-003
						Th-229	1.666E+000	pCi/g	1.757E-001	2.448E-001	1.273E-002	0.000E+000
						Th-230	4.738E-001	pCi/g	9.454E-002	1.175E-001	2.001E-002	3.648E-003
						Th-232	7.213E-001	pCi/g	1.167E-001	1.579E-001	2.717E-002	7.259E-003
F7A090121-007	JMJ461AE	2.0153	1.00	2.00	AV9	1 / 17 / 07 17:13	180.00	rad05-0048	Th-229		3.632E+000	97.62%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						Th-228	5.446E-001	pCi/g	1.041E-001	1.318E-001	3.666E-002	1.182E-002
						Th-229	1.597E+000	pCi/g	1.779E-001	2.365E-001	2.600E-002	6.481E-003
						Th-230	5.000E-001	pCi/g	9.833E-002	1.232E-001	2.051E-002	3.739E-003
						Th-232	5.119E-001	pCi/g	9.924E-002	1.250E-001	2.041E-002	3.720E-003
F7A090121-008	JMJ471AE	2.0012	1.00	2.00	AV11	1 / 17 / 07 17:13	180.00	rad05-0048	Th-229		3.658E+000	80.22%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						Th-228	1.125E+000	pCi/g	1.651E-001	2.418E-001	5.536E-002	1.977E-002
						Th-229	1.322E+000	pCi/g	1.979E-001	2.071E-001	3.647E-002	1.025E-002
						Th-230	9.242E-001	pCi/g	1.479E-001	2.072E-001	3.612E-002	1.015E-002
						Th-232	1.079E+000	pCi/g	1.589E-001	2.323E-001	3.139E-002	7.822E-003
F7A090121-009	JMJ491AE	2.0018	1.00	2.00	AV12	1 / 17 / 07 17:13	180.00	rad05-0048	Th-229		3.657E+000	90.39%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						Th-228	7.292E-001	pCi/g	1.225E-001	1.639E-001	4.319E-002	1.489E-002
						Th-229	1.489E+000	pCi/g	1.813E-001	2.219E-001	3.064E-002	8.610E-003
						Th-230	6.726E-001	pCi/g	1.166E-001	1.539E-001	3.377E-002	1.018E-002
						Th-232	6.729E-001	pCi/g	1.157E-001	1.533E-001	2.661E-002	6.631E-003
F7A090121-010	JMJ5A1AE	2.0130	1.00	2.00	AV13	1 / 17 / 07 17:13	180.00	rad05-0048	Th-229		3.636E+000	91.15%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						Th-228	8.088E-001	pCi/g	1.314E-001	1.794E-001	4.993E-002	1.809E-002
						Th-229	1.493E+000	pCi/g	1.839E-001	2.250E-001	4.116E-002	1.369E-002
						Th-230	6.842E-001	pCi/g	1.193E-001	1.578E-001	3.610E-002	1.117E-002
						Th-232	8.839E-001	pCi/g	1.341E-001	1.892E-001	2.481E-002	5.557E-003
F7A090121-011	JMJ5C1AE	2.0102	1.00	2.00	AV14	1 / 17 / 07 17:13	180.00	rad05-0048	Th-229		3.642E+000	96.85%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						Th-228	8.160E-001	pCi/g	1.262E-001	1.749E-001	2.981E-002	8.377E-003
						Th-229	1.589E+000	pCi/g	1.783E-001	2.353E-001	2.607E-002	6.497E-003
						Th-230	6.597E-001	pCi/g	1.132E-001	1.497E-001	2.367E-002	5.301E-003
						Th-232	8.928E-001	pCi/g	1.311E-001	1.864E-001	2.046E-002	3.730E-003
F7A110000-119B	JMNTF1AA	2.0000	1.00	2.00	AV52	1 / 17 / 07 14:39	180.00	rad05-0048	Th-229		3.660E+000	100.74%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						Th-228	1.062E-002	pCi/g	1.829E-002	1.835E-002	2.744E-002	7.330E-003
						Th-229	1.661E+000	pCi/g	1.772E-001	2.445E-001	3.222E-002	9.710E-003
						Th-230	4.075E-002	pCi/g	2.893E-002	2.955E-002	2.316E-002	5.186E-003
						Th-232	0.000E+000	pCi/g	0.000E+000	0.000E+000	1.272E-002	0.000E+000
F7A110000-119C	JMNTF1AC	0.1315	1.00	2.00	AV54	1 / 17 / 07 14:39	180.00	rad05-0048	Th-229		5.567E+001	95.72%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
						Th-228	1.282E+000	pCi/g	6.738E-001	7.003E-001	5.454E-001	1.725E-001
						Th-229	2.400E+001	pCi/g	2.735E+000	3.560E+000	4.582E-001	1.287E-001
						Th-230	5.962E+001	pCi/g	4.207E+000	9.812E+000	3.999E-001	9.965E-002
						Th-232	1.240E+000	pCi/g	6.115E-001	6.387E-001	3.140E-001	5.724E-002

Laboratory Control Sample Information

Sample ID	WRKNO	RegionName	Activity	StdAdded	Recovery	LCL	UCL
F7A110000-119C	JMNTF1AC	Th-230	5.962E+001	5.850E+001	101.92%	81.00	124.00

Sample Duplicate Information

Sample ID	Analyte	Sample Activity	Dup Sample ID	Dup Activity	RPD	RER	DER	Qualifier
F7A090121-001	Th-228	7.303E-001	F7A090121-001X	7.649E-001	4.63%	1.016E-001	1.434E-001	
	Th-230	6.138E-001	F7A090121-001X	7.175E-001	15.57%	3.327E-001	4.683E-001	
	Th-232	7.242E-001	F7A090121-001X	9.387E-001	25.80%	5.872E-001	8.229E-001	

Matrix Spike Information

SampID	SampMSID	RegionName	Sample Activity	MS Activity	StdAdded	MSRecovery

ST SEVERN TRENT STL

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

5:39:43PM 1/17/2007

Sample

Sample Name: F7A090121-001
SampleType: Sample
: JMJ4V1AE
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0033g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

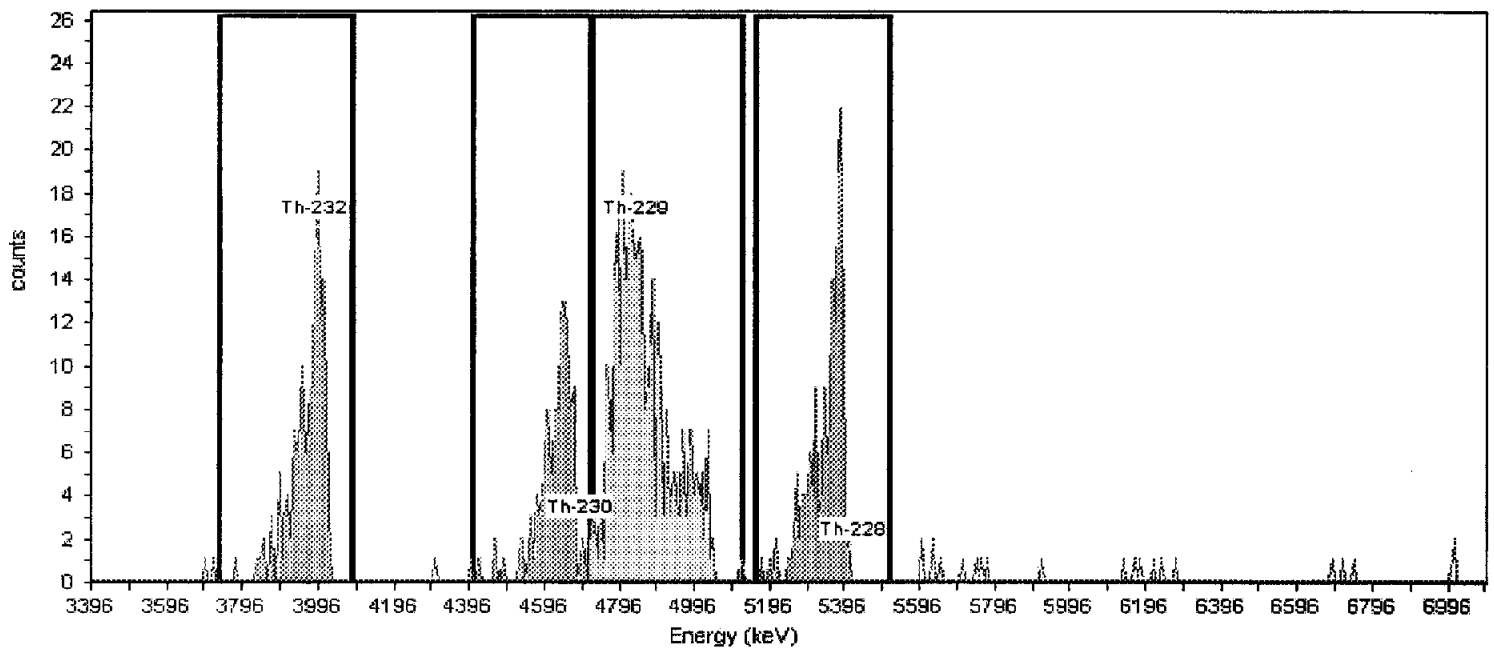
Tracer Nuclide: Th-229
Tracer Recovery: 93.83%

Acquisition

Detector: AV16
Serial Number: 41-172Q7
Acquisition Start Date: 1/17/2007 2:39:17PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:11PM

Calibration Name: Dec2006_AV16
Calibration Date: 12/27/2006 7:37:25PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 28.55% +/- 0.28% TPU(2 sigma)

Background Info: Sample: AV16; Det: AV16; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:00PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	64.350	100.2	156.00	0.3750	156	7.242E-001	1.578E-001	5.108E-003	2.281E-002
Th-230	4688.465	4405.333	4717.504	64.112	99.7	132.00	0.7500	131	6.138E-001	1.406E-001	7.260E-003	2.718E-002
Th-229	4840.921	4724.764	5124.053	130.440	99.6	353.00	1.3125	352	1.544E+000	2.268E-001	9.612E-003	3.189E-002
Th-228	5421.705	5160.352	5516.082	49.770	99.8	160.00	3.7500	156	7.303E-001	1.608E-001	1.622E-002	4.510E-002

ST SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:40:03PM 1/17/2007

Sample

Sample Name: F7A090121-001X
SampleType: Sample
: JMJ4V1AH
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0034g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

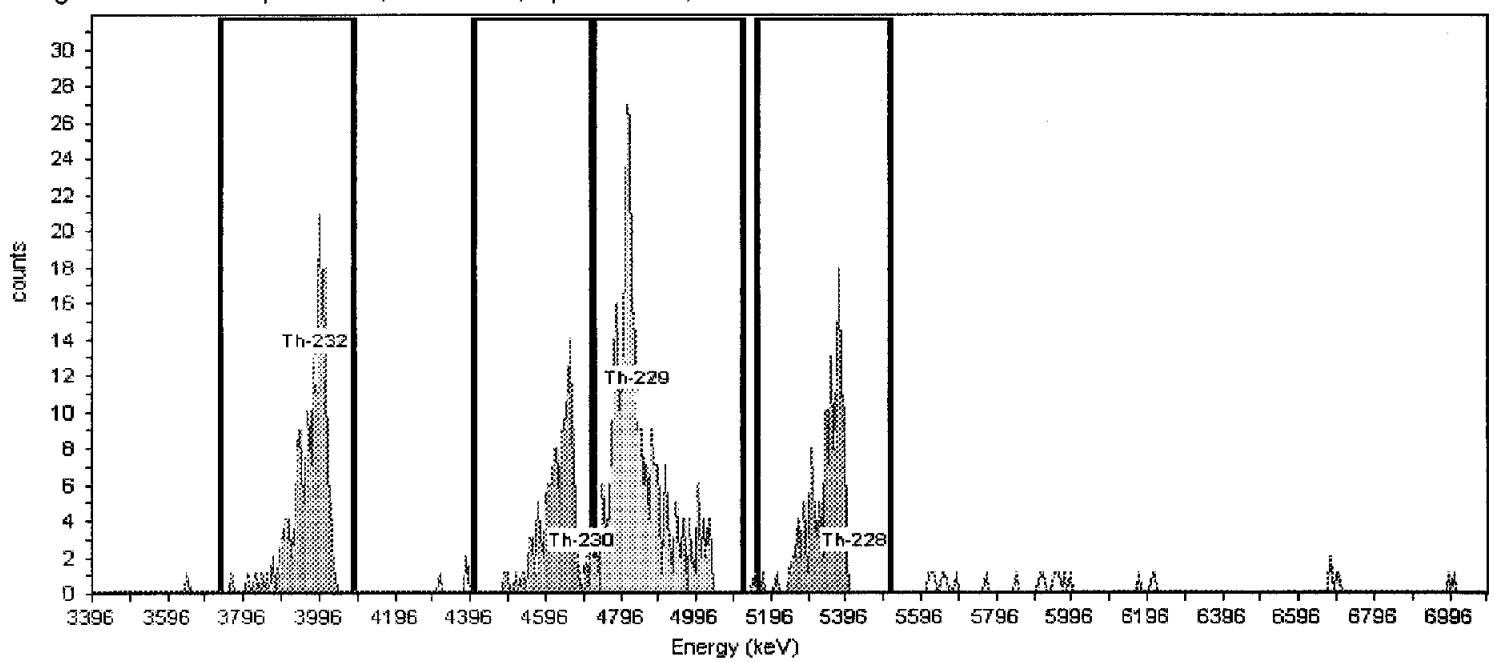
Tracer Nuclide: Th-229
Tracer Recovery: 80.25%

Acquisition

Detector: AV18
Serial Number: 41-172C6
Acquisition Start Date: 1/17/2007 2:39:19PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 12/24/2006 6:01:13PM

Calibration Name: Dec2006_AV18
Calibration Date: 12/26/2006 12:55:33PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.08% +/- 0.28% TPU(2 sigma)

Background Info: Sample: AV18; Det: AV18; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:00PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	58.531	100.2	164.00	0.3750	164	9.387E-001	2.075E-001	6.298E-003	2.812E-002
Th-230	4688.465	4405.333	4717.504	82.361	99.7	125.00	0.5625	124	7.175E-001	1.709E-001	7.752E-003	3.111E-002
Th-229	4840.921	4724.764	5124.053	64.903	99.6	286.00	0.7500	285	1.321E+000	2.055E-001	8.958E-003	3.353E-002
Th-228	5421.705	5160.352	5516.082	52.437	99.8	135.00	2.2500	133	7.649E-001	1.802E-001	1.549E-002	4.658E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 9:38:23AM 1/18/2007

Sample

Sample Name: F7A090121-002
SampleType: Sample
: JMJ4W1AE
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0040g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

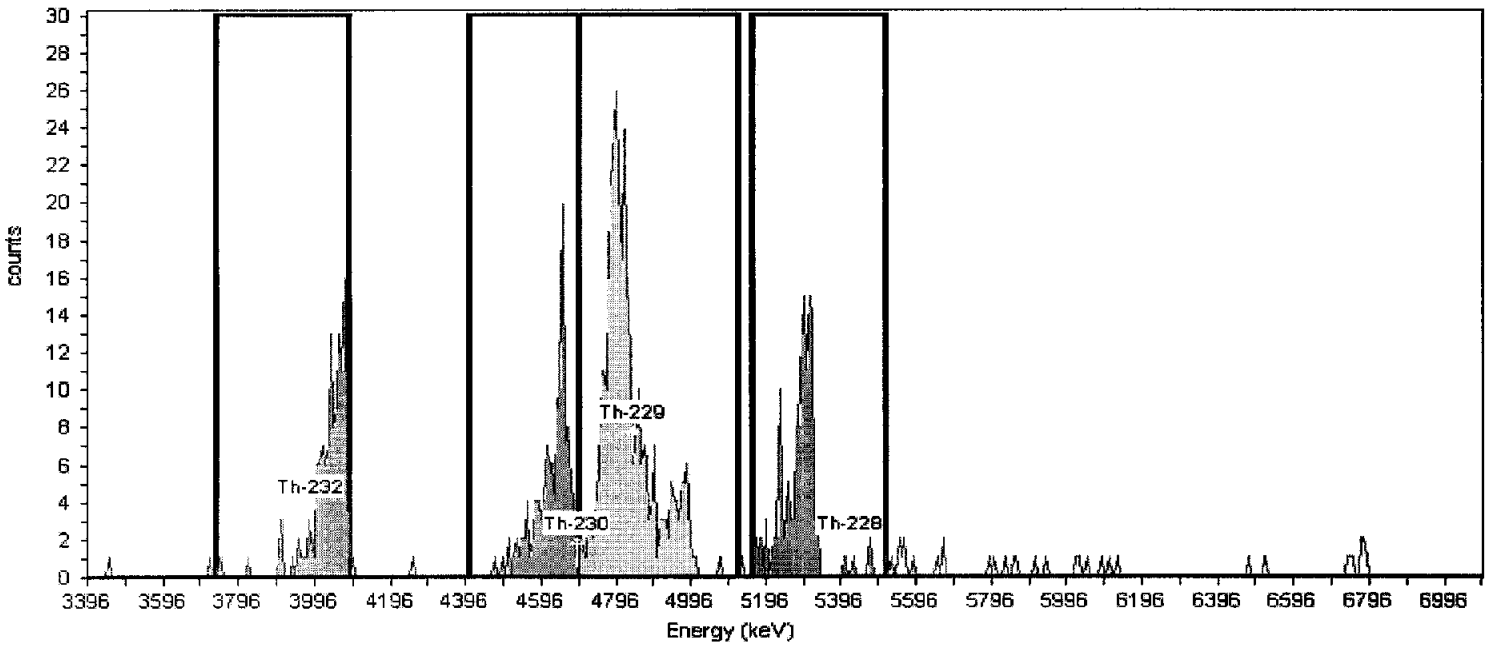
Tracer Nuclide: Th-229
Tracer Recovery: 86.08%

Acquisition

Detector: AV19
Serial Number: 41-172Q6
Acquisition Start Date: 1/17/2007 2:39:20PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 12/24/2006 6:01:15PM

Calibration Name: Dec2006_AV19
Calibration Date: 12/26/2006 12:55:41PM
Energy Cal: Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 28.86% +/- 0.30% TPU(2 sigma)

Background Info: Sample: AV19; Det: AV19; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	33.243	100.2	127.00	0.5625	126	6.343E-001	1.481E-001	6.744E-003	2.706E-002
Th-230	4688.465	4405.333	4695.725	41.744	99.7	120.00	1.6875	118	5.965E-001	1.429E-001	1.174E-002	3.712E-002
Th-229	4840.921	4695.725	5124.053	70.740	99.6	328.00	1.8750	326	1.416E+000	2.125E-001	1.238E-002	3.842E-002
Th-228	5421.705	5160.352	5516.082	51.334	99.8	136.00	4.1250	132	6.644E-001	1.556E-001	1.834E-002	5.032E-002

Manual
KW
1/18/07

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:39:22AM 1/18/2007

Analyst: 60040

Sample

Sample Name: F7A090121-003
SampleType: Sample
: JMJ4X1AE
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0035g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

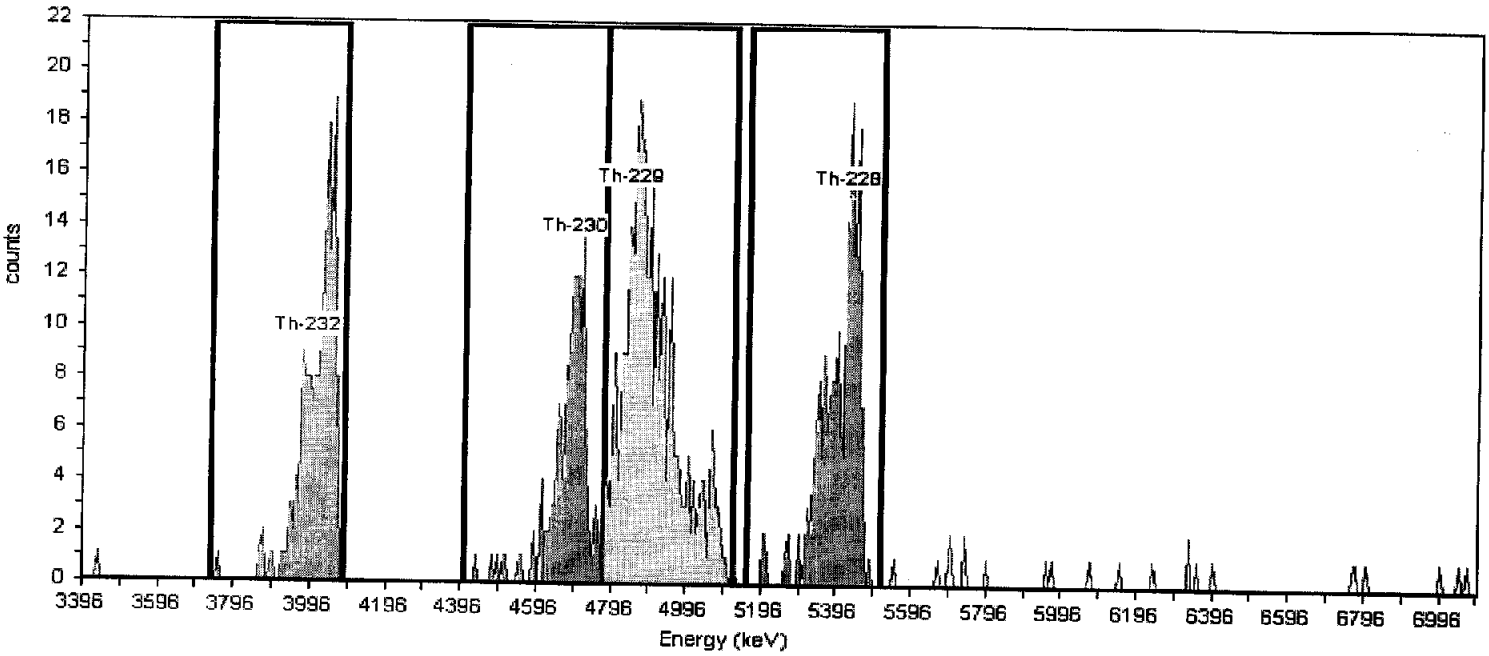
Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

Tracer Nuclide: Th-229
Tracer Recovery: 92.21%

Acquisition

Detector: AV20
Serial Number: 41-172R2
Acquisition Start Date: 1/17/2007 2:39:22PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 12/24/2006 6:01:17PM
Background Info: Sample: AV20; Det: AV20; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV20
Calibration Date: 12/26/2006 12:55:51PM
Energy Cal: Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.83% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	15.729	100.2	168.00	0.1875	168	8.455E-001	1.825E-001	3.911E-003	2.145E-002
Th-230	4688.465	4405.333	4775.583	63.590	99.7	132.00	1.3125	131	6.617E-001	1.537E-001	1.040E-002	3.450E-002
Th-229	4840.921	4775.583	5124.053	118.109	98.8	323.00	1.1250	322	1.518E+000	2.282E-001	9.722E-003	3.328E-002
Th-228	5421.705	5160.352	5516.082	92.820	99.8	189.00	3.7500	185	9.374E-001	1.993E-001	1.757E-002	4.883E-002

manual
1/18/07

SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:40:15PM 1/17/2007

Sample

Sample Name: F7A090121-004
SampleType: Sample
: JMJ401AE
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0178g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

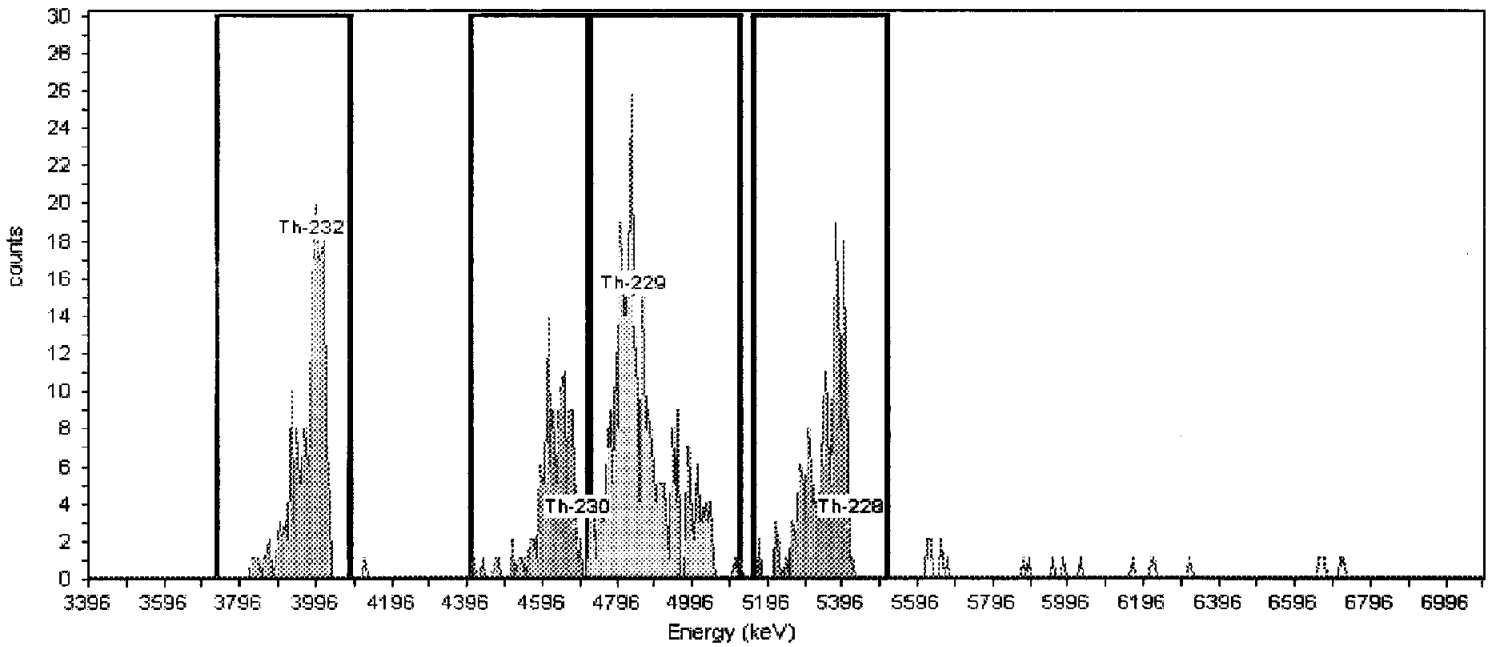
Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

Tracer Nuclide: Th-229
Tracer Recovery: 90.38%

Acquisition

Detector: AV22
Serial Number: 41-172Q5
Acquisition Start Date: 1/17/2007 2:39:25PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 12/24/2006 6:01:20PM
Background Info: Sample: AV22; Det: AV22; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV22
Calibration Date: 12/27/2006 8:51:16AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 25.53% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	53.135	100.2	170.00	0.1875	170	9.110E-001	1.978E-001	4.164E-003	2.284E-002
Th-230	4688.465	4405.333	4717.504	99.789	99.7	125.00	0.7500	124	6.699E-001	1.587E-001	8.370E-003	3.133E-002
Th-229	4840.921	4724.764	5124.053	81.071	99.6	304.00	1.1250	303	1.477E+000	2.260E-001	1.026E-002	3.512E-002
Th-228	5421.705	5160.352	5516.082	60.394	99.8	170.00	0.3750	170	9.140E-001	1.986E-001	5.915E-003	2.641E-002

SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:40:30PM 1/17/2007

Sample

Sample Name: F7A090121-005
SampleType: Sample
: JMJ411AE
Sample Collection Date: 1/5/2007 11:00:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0040g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

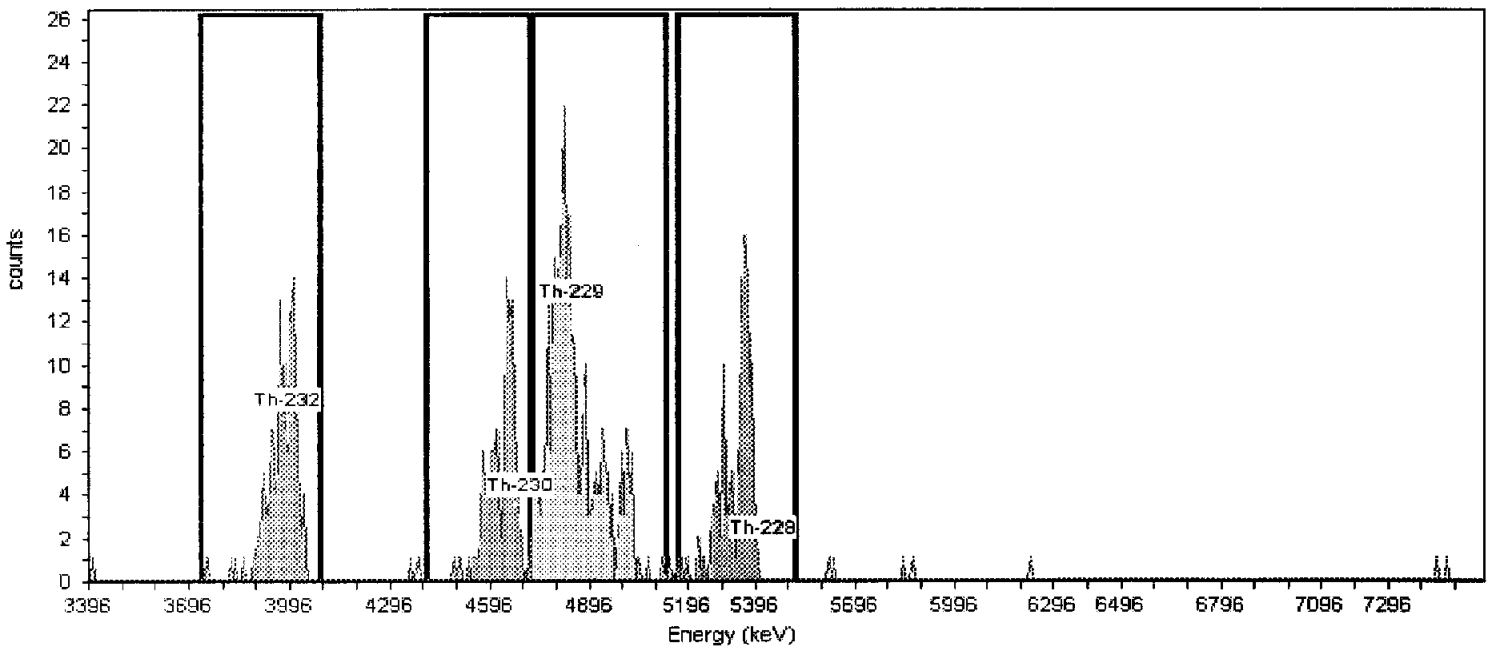
Tracer Nuclide: Th-229
Tracer Recovery: 83.66%

Acquisition

Detector: AV53
Serial Number:
Acquisition Start Date: 1/17/2007 2:39:40PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:37PM

Calibration Name: DEC2006_AV53
Calibration Date: 12/29/2006 6:57:21AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.78% +/- 0.30% TPU(2 sigma)

Background Info: Sample: AV53; Det: AV53; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	78.614	100.2	135.00	0.0000	135	7.240E-001	1.671E-001	0.000E+000	1.451E-002
Th-230	4688.465	4405.333	4717.504	101.217	99.7	117.00	0.5625	116	6.275E-001	1.513E-001	7.246E-003	2.908E-002
Th-229	4840.921	4724.764	5124.053	78.030	99.6	306.00	0.9375	305	1.377E+000	2.101E-001	9.362E-003	3.332E-002
Th-228	5421.705	5160.352	5516.082	50.139	99.8	129.00	1.1250	128	6.888E-001	1.619E-001	1.024E-002	3.506E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:40:36PM 1/17/2007

Sample

Sample Name: F7A090121-006
SampleType: Sample
: JMJ421AE
Sample Collection Date: 1/5/2007 11:00:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0090g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

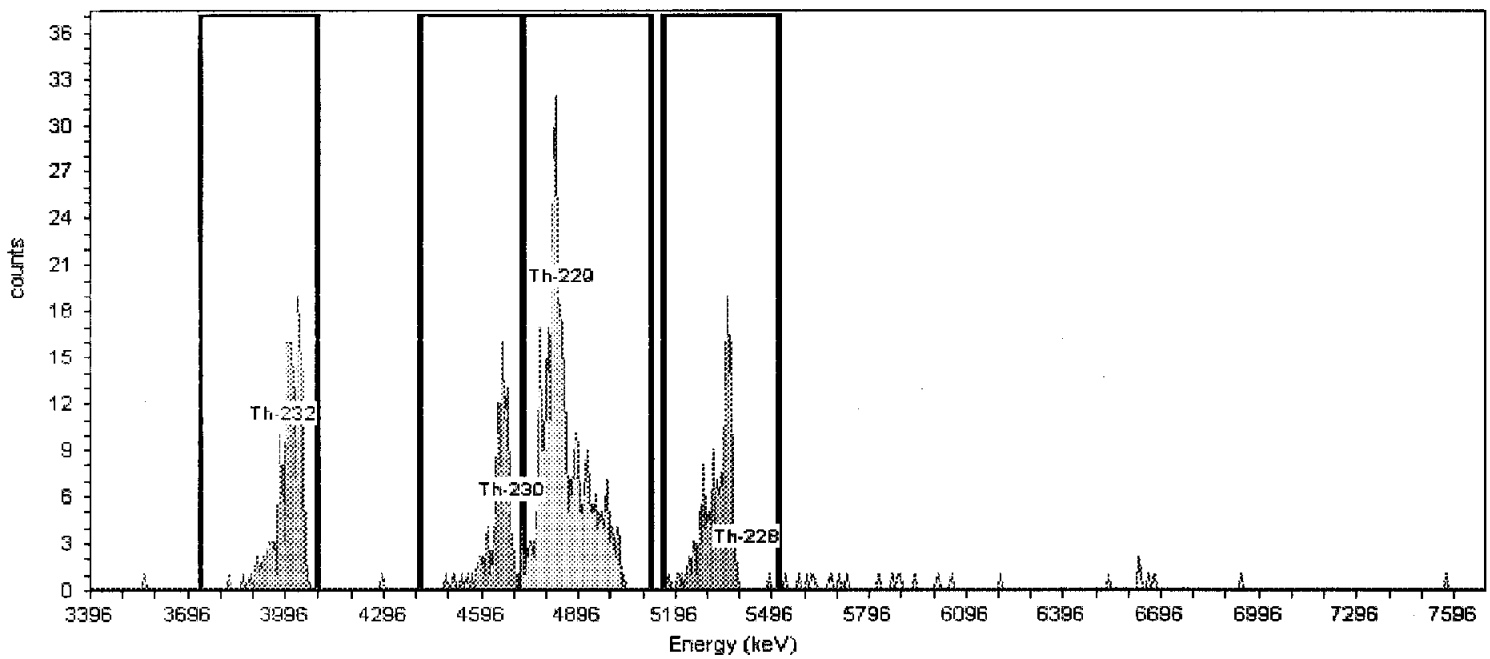
Tracer Nuclide: Th-229
Tracer Recovery: 101.49%

Acquisition

Detector: AV56
Serial Number:
Acquisition Start Date: 1/17/2007 2:39:43PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:42PM

Calibration Name: DEC2006_AV56
Calibration Date: 12/28/2006 7:27:19AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.20% +/- 0.28% TPU(2 sigma)

Background Info: Sample: AV56; Det: AV56; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	71.667	100.2	155.00	0.7500	154	7.213E-001	1.579E-001	7.259E-003	2.717E-002
Th-230	4688.465	4405.333	4717.504	54.219	99.7	101.00	0.1875	101	4.738E-001	1.175E-001	3.648E-003	2.001E-002
Th-229	4840.921	4724.764	5124.053	61.018	99.6	349.00	0.0000	349	1.666E+000	2.448E-001	0.000E+000	1.273E-002
Th-228	5421.705	5160.352	5516.082	52.381	99.8	143.00	0.5625	142	6.690E-001	1.496E-001	6.314E-003	2.534E-002

STL SEVERN TRENT STL

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 9:41:53AM 1/18/2007

Sample

Sample Name: F7A090121-007
SampleType: Sample
: JMJ461AE
Sample Collection Date: 1/5/2007 11:00:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0153g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

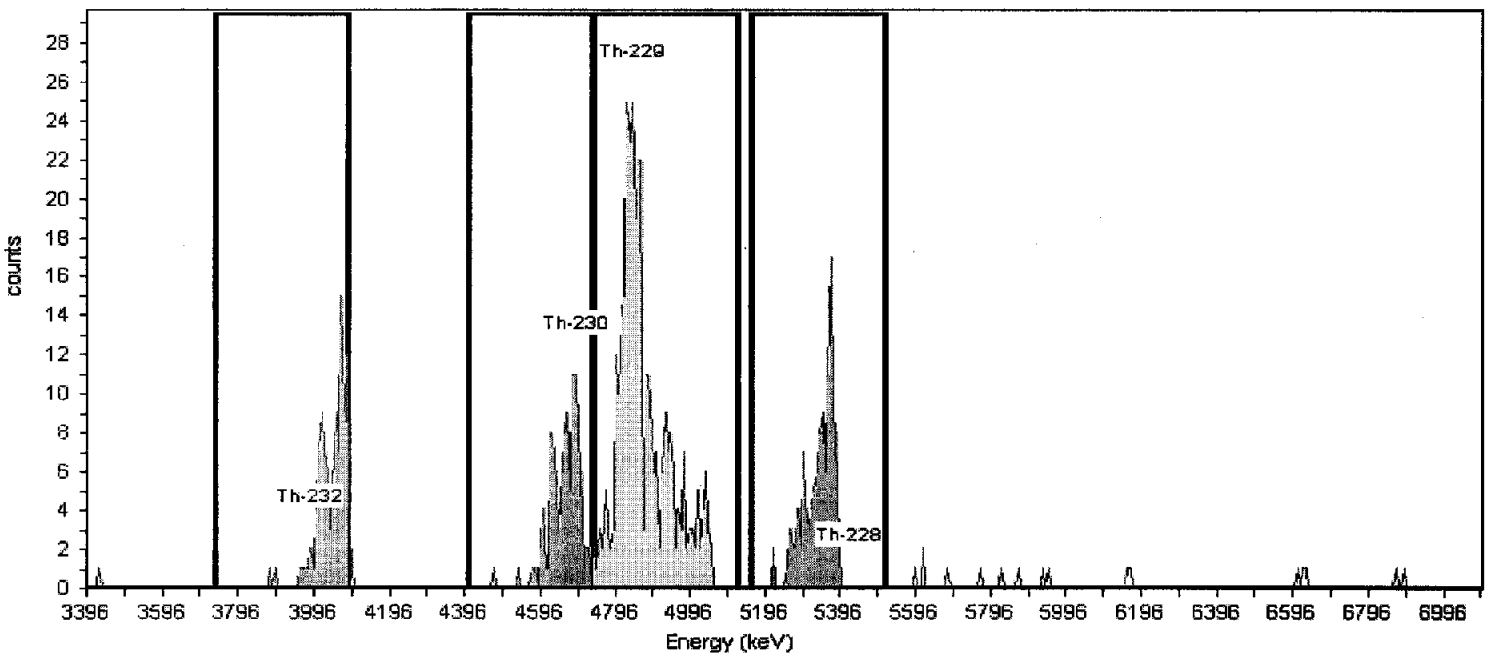
Tracer Nuclide: Th-229
Tracer Recovery: 97.62%

Acquisition

Detector: AV9
Serial Number: 41-172R1
Acquisition Start Date: 1/17/2007 5:13:46PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:00:59PM

Calibration Name: Dec2006_AV9
Calibration Date: 12/27/2006 2:23:33PM
Energy Cal: Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.49% +/- 0.26% TPU(2 sigma)

Background Info: Sample: AV9; Det: AV9; Spectrum #1; Dec-24-2006 18:00



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	37.695	100.2	107.00	0.1875	107	5.119E-001	1.250E-001	3.720E-003	2.041E-002
Th-230	4688.465	4405.333	4732.024	39.745	99.7	104.00	0.1875	104	5.000E-001	1.232E-001	3.739E-003	2.051E-002
Th-229	4840.921	4739.284	5124.053	68.246	99.6	340.00	0.5625	339	1.597E+000	2.365E-001	6.481E-003	2.600E-002
Th-228	5421.705	5160.352	5516.082	54.120	99.8	115.00	1.8750	113	5.446E-001	1.318E-001	1.182E-002	3.666E-002

manual
MW
1/18/07

STL SEVERN TRENT STL

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 9:43:45AM 1/18/2007

Sample

Sample Name: F7A090121-008
SampleType: Sample
: JMJ471AE
Sample Collection Date: 1/5/2007 11:20:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0012g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

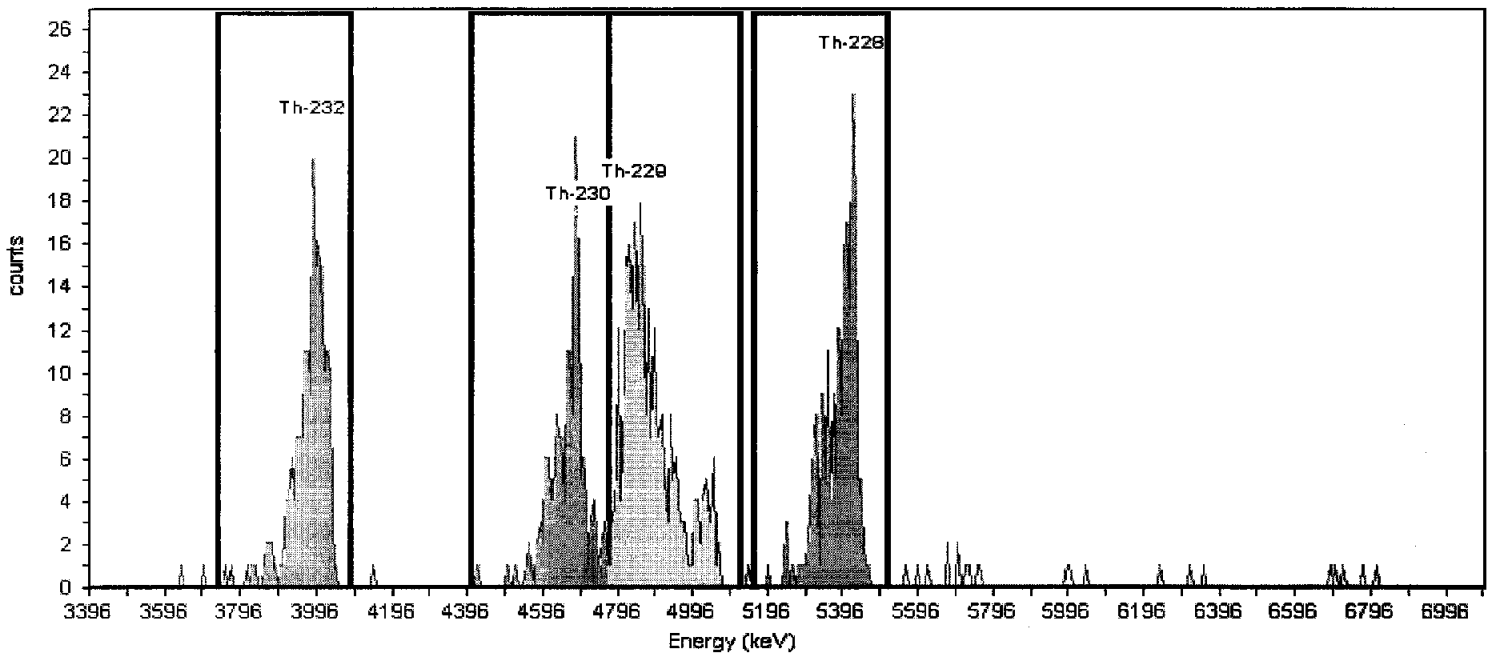
Tracer Nuclide: Th-229
Tracer Recovery: 80.22%

Acquisition

Detector: AV11
Serial Number: 41-172Q3
Acquisition Start Date: 1/17/2007 5:13:48PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:01PM

Calibration Name: Dec2006_AV11
Calibration Date: 12/27/2006 4:55:05PM
Energy Cal: Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.74% +/- 0.29% TPU(2 sigma)

Background Info: Sample: AV11; Det: AV11; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	72.870	100.2	186.00	0.5625	185	1.079E+000	2.323E-001	7.822E-003	3.139E-002
Th-230	4688.465	4405.333	4768.323	59.398	99.7	159.00	0.9375	158	9.242E-001	2.072E-001	1.015E-002	3.612E-002
Th-229	4840.921	4768.323	5124.053	97.198	98.8	280.00	0.9375	279	1.322E+000	2.071E-001	1.025E-002	3.647E-002
Th-228	5421.705	5160.352	5516.082	60.403	99.8	196.00	3.5625	192	1.125E+000	2.418E-001	1.977E-002	5.536E-002

manual
KW
1/18/07

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 9:44:33AM 1/18/2007

Sample

Sample Name: F7A090121-009
SampleType: Sample
: JMJ491AE
Sample Collection Date: 1/5/2007 11:20:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0018g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

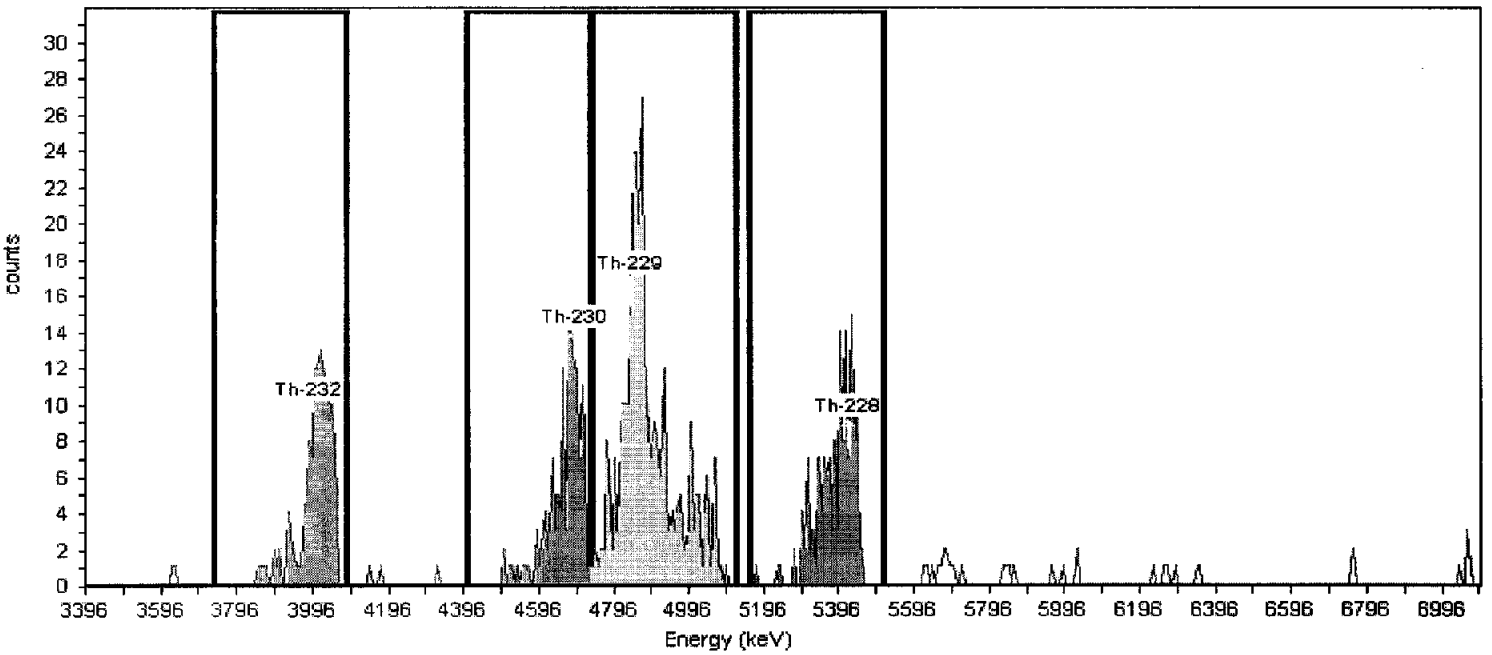
Tracer Nuclide: Th-229
Tracer Recovery: 90.39%

Acquisition

Detector: AV12
Serial Number: 41-172Q2
Acquisition Start Date: 1/17/2007 5:13:50PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:03PM

Calibration Name: Dec2006_AV12
Calibration Date: 12/27/2006 4:55:46PM
Energy Cal: Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.99% +/- 0.28% TPU(2 sigma)

Background Info: Sample: AV12; Det: AV12; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	73.241	100.2	137.00	0.5625	136	6.729E-001	1.533E-001	6.631E-003	2.661E-002
Th-230	4688.465	4405.333	4732.024	31.928	99.7	137.00	1.3125	136	6.726E-001	1.539E-001	1.018E-002	3.377E-002
Th-229	4840.921	4739.284	5124.053	62.712	99.6	333.00	0.9375	332	1.489E+000	2.219E-001	8.610E-003	3.064E-002
Th-228	5421.705	5160.352	5516.082	78.257	99.8	150.00	2.8125	147	7.292E-001	1.639E-001	1.489E-002	4.319E-002

manual
KW
1/18/07

SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 8:14:17PM 1/17/2007

Sample

Sample Name: F7A090121-010
SampleType: Sample
: JMJ5A1AE
Sample Collection Date: 1/5/2007 11:20:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0130g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

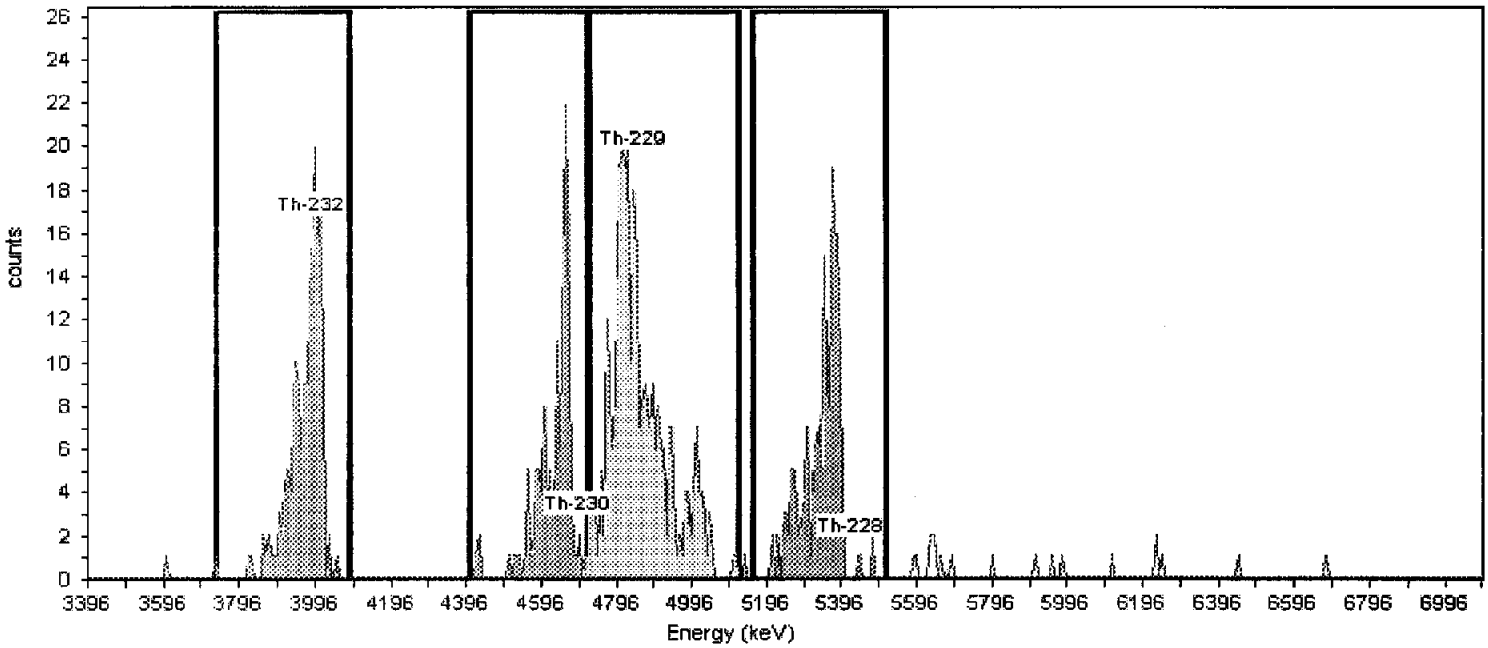
Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

Tracer Nuclide: Th-229
Tracer Recovery: 91.15%

Acquisition

Detector: AV13
Serial Number: 41-172Q1
Acquisition Start Date: 1/17/2007 5:13:51PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:05PM
Background Info: Sample: AV13; Det: AV13; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV13
Calibration Date: 12/27/2006 7:37:13PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.89% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	60.632	100.2	175.00	0.3750	175	8.839E-001	1.892E-001	5.557E-003	2.481E-002
Th-230	4688.465	4405.333	4717.504	50.037	99.7	136.00	1.5000	135	6.842E-001	1.578E-001	1.117E-002	3.610E-002
Th-229	4840.921	4724.764	5124.053	77.504	99.6	324.00	2.2500	322	1.493E+000	2.250E-001	1.369E-002	4.116E-002
Th-228	5421.705	5160.352	5516.082	56.871	99.8	163.00	3.9375	159	8.088E-001	1.794E-001	1.809E-002	4.993E-002

SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 8:14:20PM 1/17/2007

Sample

Sample Name: F7A090121-011
SampleType: Sample
: JMJ5C1AE
Sample Collection Date: 1/5/2007 11:20:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0102g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

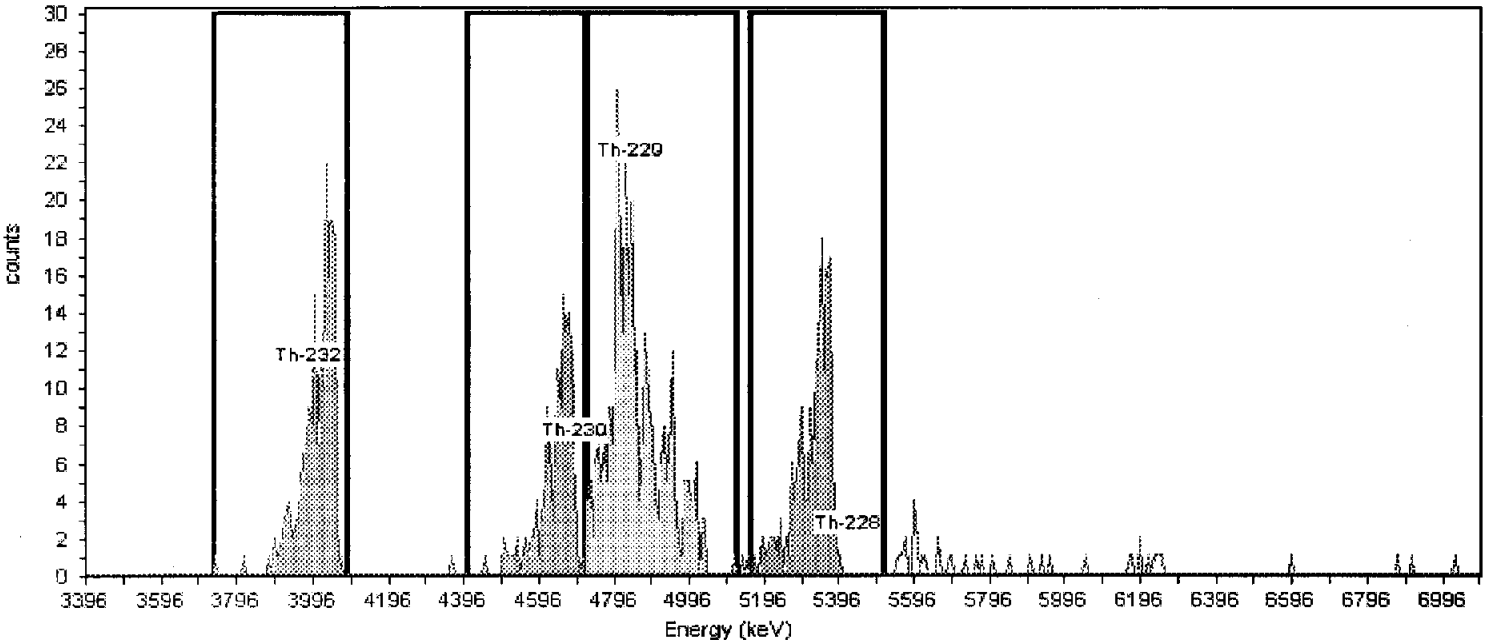
Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

Tracer Nuclide: Th-229
Tracer Recovery: 96.85%

Acquisition

Detector: AV14
Serial Number: 41-172C4
Acquisition Start Date: 1/17/2007 5:13:53PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:07PM
Background Info: Sample: AV14; Det: AV14; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV14
Calibration Date: 12/27/2006 4:54:47PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.70% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	35.870	100.2	186.00	0.1875	186	8.928E-001	1.864E-001	3.730E-003	2.046E-002
Th-230	4688.465	4405.333	4717.504	37.967	99.7	137.00	0.3750	137	6.597E-001	1.497E-001	5.301E-003	2.367E-002
Th-229	4840.921	4724.764	5124.053	76.718	99.6	340.00	0.5625	339	1.589E+000	2.353E-001	6.497E-003	2.607E-002
Th-228	5421.705	5160.352	5516.082	61.665	99.8	170.00	0.9375	169	8.160E-001	1.749E-001	8.377E-003	2.981E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:40:20PM 1/17/2007

Analyst: 60040

Sample

Sample Name: F7A110000-119B
SampleType: Blank
: JMNTF1AA
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0000g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

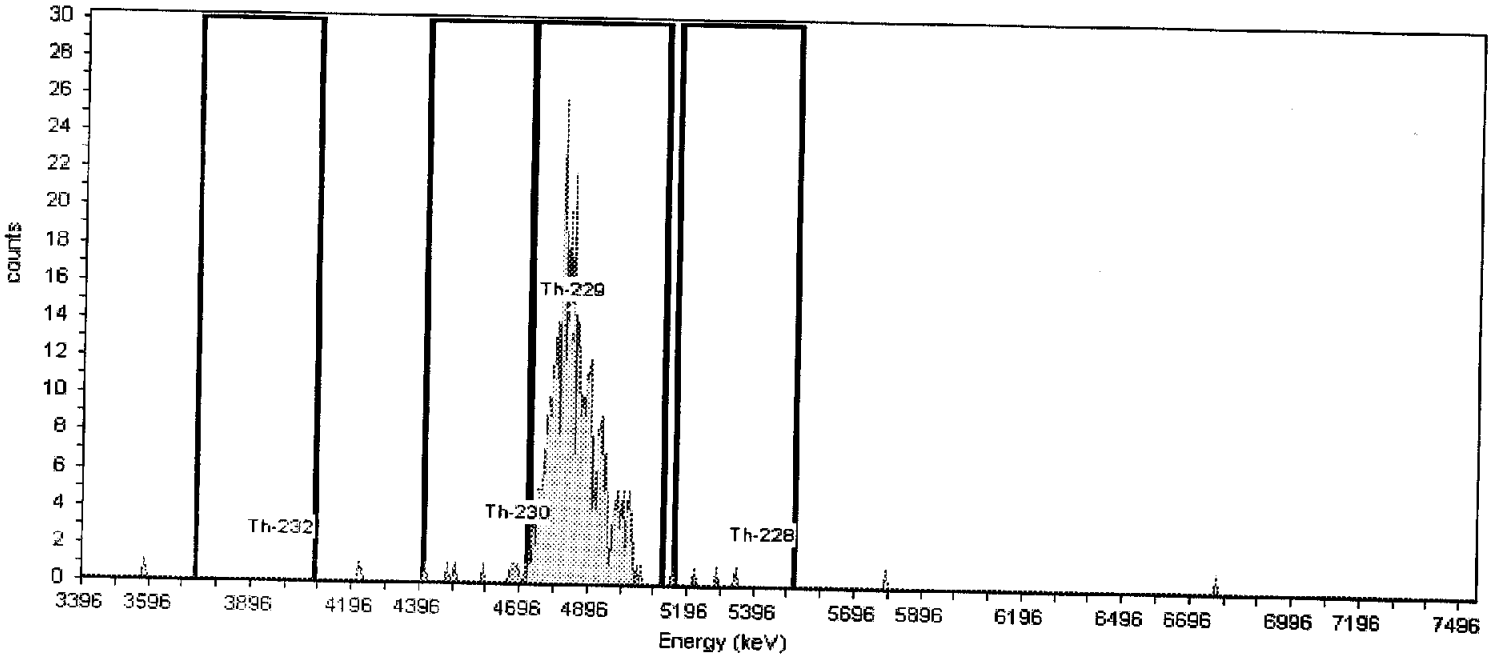
Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

Tracer Nuclide: Th-229
Tracer Recovery: 100.74%

Acquisition

Detector: AV52
Serial Number:
Acquisition Start Date: 1/17/2007 2:39:39PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:36PM
Background Info: Sample: AV52; Det: AV52; Spectrum #1; Dec-24-2006 18:01

Calibration Name: DEC2006_AV52
Calibration Date: 12/29/2006 10:46:54AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.37% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	.000	100.2	0.00	0.0000	0	0.000E+000	0.000E+000	0.000E+000	1.272E-002
Th-230	4688.465	4405.333	4717.504	16.532	99.7	9.00	0.3750	9	4.075E-002	2.955E-002	5.186E-003	2.316E-002
Th-229	4840.921	4724.764	5124.053	101.186	99.6	350.00	1.3125	349	1.661E+000	2.445E-001	9.710E-003	3.222E-002
Th-228	5421.705	5160.352	5516.082	104.237	99.8	3.00	0.7500	2	1.062E-002	1.835E-002	7.330E-003	2.744E-002

SEVERN TRENT STL

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:40:33PM 1/17/2007

Sample

Sample Name: F7A110000-119C
SampleType: Control
: JMNTF1AC
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 0.1315g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011119
:
Description:

Client Name: Undefined
Client Contact:

Tracer

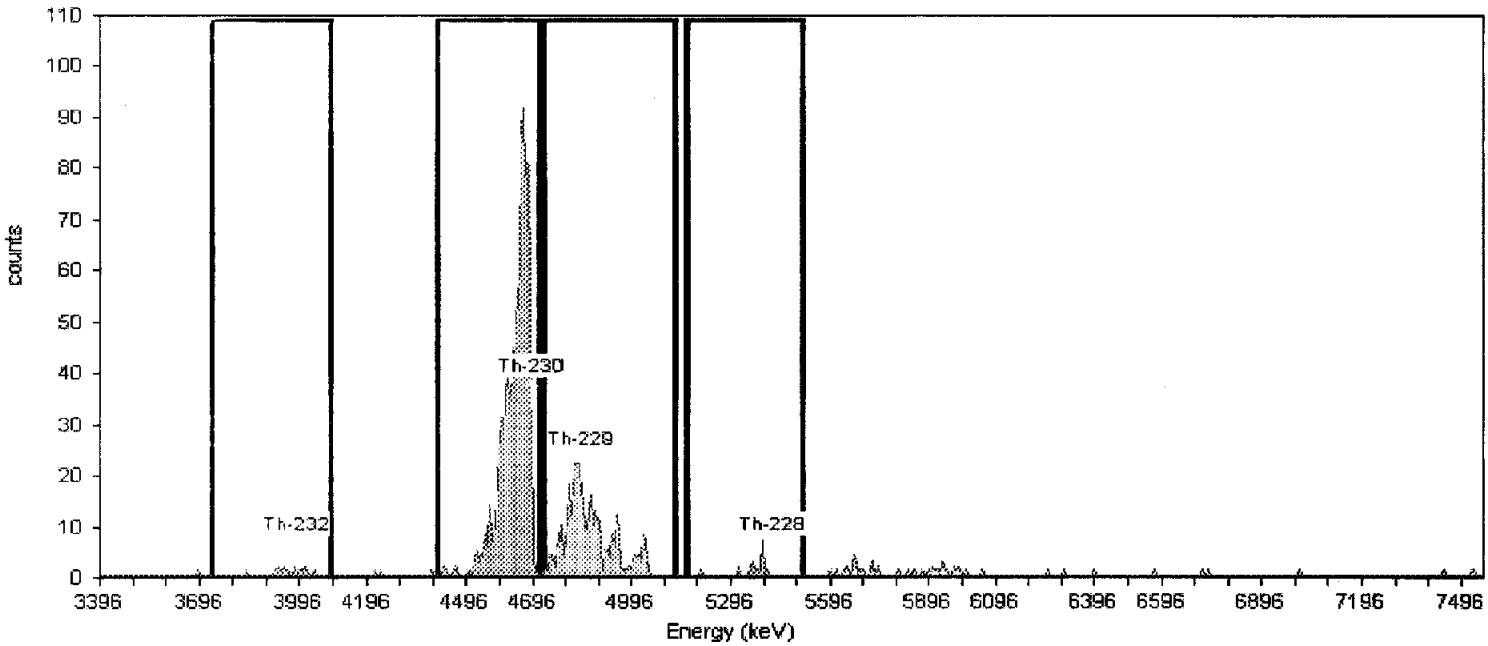
Tracer Name: Rad05-0048_Th229
Tracer Activity: 73.20 DPM/mL x (Vol.)0.10 mL = 7.32 DPM
Tracer Ref. Date: 8/19/2004 12:00:30PM

Tracer Nuclide: Th-229
Tracer Recovery: 95.72%

Acquisition

Detector: AV54
Serial Number:
Acquisition Start Date: 1/17/2007 2:39:41PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:40PM
Background Info: Sample: AV54; Det: AV54; Spectrum #1; Dec-24-2006 18:01

Calibration Name: DEC2006_AV54
Calibration Date: 12/29/2006 10:46:58AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.91% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = ThROI
Decay Correction: 1/17/2007 2:37:01PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Thorium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
Th-232	3984.265	3730.172	4085.902	48.580	100.2	17.00	0.1875	17	1.240E+000	6.387E-001	5.724E-002	3.140E-001
Th-230	4688.465	4405.333	4717.504	34.996	99.7	805.00	0.5625	804	5.962E+001	9.812E+000	9.965E-002	3.999E-001
Th-229	4840.921	4724.764	5124.053	100.178	99.6	339.00	0.9375	338	2.400E+001	3.560E+000	1.287E-001	4.582E-001
Th-228	5421.705	5160.352	5516.082	48.084	99.8	19.00	1.6875	17	1.282E+000	7.003E-001	1.725E-001	5.454E-001

SEVERN TRENT STL

Daily Pulsers

1/17/07

Daily Pulser Check - Severn Trent Lab

Pulser Date: 1/17/2007

Detector	Date/Time	Gross Counts Result	Gross Counts Criteria	P/F	FWHM (keV) Result	FWHM (keV) Criteria	P/F	Pulser Center Result	Pulser Center Criteria	P/F	Energy (keV) Result	Energy (keV) Criteria	P/F
AV1	01/17/2007 7:21	7415	7218.7 +/- 5%	Pass	14.0	5 - 50	Pass	222.1	229.0 +/- 5%	Pass	5001	5051.1 +/- 25%	Pass
AV2	01/17/2007 7:21	7418	7468.7 +/- 5%	Pass	14.4	5 - 50	Pass	227.1	222.9 +/- 5%	Pass	5037	5007.5 +/- 25%	Pass
AV3	01/17/2007 7:21	7413	7484.9 +/- 5%	Pass	13.5	5 - 50	Pass	222.0	225.9 +/- 5%	Pass	5001	5028.8 +/- 25%	Pass
AV4	01/17/2007 7:21	7395	7413.7 +/- 5%	Pass	14.9	5 - 50	Pass	226.0	224.9 +/- 5%	Pass	5030	5021.6 +/- 25%	Pass
AV6	01/17/2007 7:21	7311	7476.7 +/- 5%	Pass	11.2	5 - 50	Pass	224.0	224.0 +/- 5%	Pass	5015	5015.3 +/- 25%	Pass
AV7	01/17/2007 7:21	7404	7477.0 +/- 5%	Pass	13.4	5 - 50	Pass	225.9	224.9 +/- 5%	Pass	5029	5021.9 +/- 25%	Pass
AV8	01/17/2007 7:21	7397	7327.4 +/- 5%	Pass	23.3	5 - 50	Pass	223.9	228.0 +/- 5%	Pass	5014	5044.6 +/- 25%	Pass
AV9	01/17/2007 7:21	7717	7519.3 +/- 5%	Pass	13.2	5 - 50	Pass	225.0	227.9 +/- 5%	Pass	5023	5043.3 +/- 25%	Pass
AV11	01/17/2007 7:21	7712	7666.2 +/- 5%	Pass	17.8	5 - 50	Pass	224.9	225.0 +/- 5%	Pass	5021	5022.1 +/- 25%	Pass
AV12	01/17/2007 7:21	7679	7588.7 +/- 5%	Pass	15.7	5 - 50	Pass	223.9	230.0 +/- 5%	Pass	5014	5058.4 +/- 25%	Pass
AV13	01/17/2007 7:21	7592	7584.6 +/- 5%	Pass	11.9	5 - 50	Pass	226.0	228.0 +/- 5%	Pass	5030	5044.1 +/- 25%	Pass
AV14	01/17/2007 7:21	7705	7638.3 +/- 5%	Pass	13.3	5 - 50	Pass	222.1	227.0 +/- 5%	Pass	5001	5037.2 +/- 25%	Pass
AV15	01/17/2007 7:21	7702	7770.5 +/- 5%	Pass	26.9	5 - 50	Pass	221.9	226.9 +/- 5%	Pass	5000	5036.6 +/- 25%	Pass
AV16	01/17/2007 7:21	7694	7456.0 +/- 5%	Pass	14.6	5 - 50	Pass	225.0	226.9 +/- 5%	Pass	5023	5036.2 +/- 25%	Pass
AV17	01/17/2007 7:21	7708	7619.1 +/- 5%	Pass	14.2	5 - 50	Pass	227.0	229.9 +/- 5%	Pass	5037	5058.3 +/- 25%	Pass
AV18	01/17/2007 7:21	7700	7714.5 +/- 5%	Pass	14.5	5 - 50	Pass	221.9	226.9 +/- 5%	Pass	5000	5036.4 +/- 25%	Pass
AV19	01/17/2007 7:21	7704	7269.8 +/- 5%	FAIL	23.0	5 - 50	Pass	224.9	227.7 +/- 5%	Pass	5022	5041.9 +/- 25%	Pass
AV19	01/17/2007 7:55	7580	7269.8 +/- 5%	Pass	22.8	5 - 50	Pass	224.9	227.7 +/- 5%	Pass	5022	5041.9 +/- 25%	Pass
AV20	01/17/2007 7:21	7704	7503.6 +/- 5%	Pass	13.3	5 - 50	Pass	227.0	226.0 +/- 5%	Pass	5037	5029.9 +/- 25%	Pass
AV21	01/17/2007 7:21	7701	7550.9 +/- 5%	Pass	13.2	5 - 50	Pass	223.0	226.0 +/- 5%	Pass	5008	5029.6 +/- 25%	Pass
AV22	01/17/2007 7:21	7697	7691.4 +/- 5%	Pass	13.7	5 - 50	Pass	223.0	225.0 +/- 5%	Pass	5008	5022.4 +/- 25%	Pass
AV23	01/17/2007 7:21	7689	7665.3 +/- 5%	Pass	19.4	5 - 50	Pass	229.9	229.8 +/- 5%	Pass	5058	5057.0 +/- 25%	Pass
AV24	01/17/2007 7:21	7668	7354.0 +/- 5%	Pass	15.7	5 - 50	Pass	224.0	226.9 +/- 5%	Pass	5015	5036.4 +/- 25%	Pass
AV45	01/17/2007 7:21	7591	7593.5 +/- 5%	Pass	19.8	5 - 50	Pass	227.1	225.6 +/- 5%	Pass	5037	5026.9 +/- 25%	Pass
AV46	01/17/2007 7:21	7406	7722.7 +/- 5%	Pass	12.5	5 - 50	Pass	223.0	225.8 +/- 5%	Pass	5008	5028.0 +/- 25%	Pass
AV48	01/17/2007 7:21	7594	7717.5 +/- 5%	Pass	14.1	5 - 50	Pass	224.0	224.0 +/- 5%	Pass	5015	5015.2 +/- 25%	Pass
AV49	01/17/2007 7:21	7583	7703.4 +/- 5%	Pass	14.7	5 - 50	Pass	232.0	226.0 +/- 5%	Pass	5073	5029.5 +/- 25%	Pass
AV50	01/17/2007 7:21	7534	7660.9 +/- 5%	Pass	21.5	5 - 50	Pass	223.8	227.0 +/- 5%	Pass	5013	5037.2 +/- 25%	Pass
AV51	01/17/2007 7:21	6780	7070.5 +/- 5%	Pass	12.9	5 - 50	Pass	226.8	223.0 +/- 5%	Pass	5036	5007.6 +/- 25%	Pass
AV52	01/17/2007 7:21	7297	7156.4 +/- 5%	Pass	20.9	5 - 50	Pass	223.1	225.0 +/- 5%	Pass	5009	5022.4 +/- 25%	Pass
AV53	01/17/2007 7:21	7315	7144.1 +/- 5%	Pass	14.7	5 - 50	Pass	223.0	223.0 +/- 5%	Pass	5008	5007.8 +/- 25%	Pass
AV54	01/17/2007 7:21	7319	7313.1 +/- 5%	Pass	13.3	5 - 50	Pass	227.0	226.0 +/- 5%	Pass	5037	5029.5 +/- 25%	Pass

Detector	Date/Time	Gross Counts Result	Gross Counts Criteria		Gross Counts P/F	FWHM (keV) Result	FWHM (keV) Criteria	FWHM (keV) P/F	Pulser Center Result	Pulser Center Criteria		Pulser Center P/F	Energy (keV) Result	Energy (keV) Criteria		Energy (keV) P/F
AV56	01/17/2007 7:21	7317	7163.7	+/- 5%	Pass	13.5	5 - 50	Pass	222.1	222.0	+/- 5%	Pass	5001	5000.7	+/- 25%	Pass
AV57	01/17/2007 7:21	7299	7309.5	+/- 5%	Pass	20.3	5 - 50	Pass	219.0	222.0	+/- 5%	Pass	4979	5000.6	+/- 25%	Pass
AV58	01/17/2007 7:21	7311	7249.2	+/- 5%	Pass	13.9	5 - 50	Pass	220.9	223.0	+/- 5%	Pass	4993	5008.0	+/- 25%	Pass
AV59	01/17/2007 7:21	7320	7141.4	+/- 5%	Pass	14.2	5 - 50	Pass	287.0	284.0	+/- 5%	Pass	5473	5450.6	+/- 25%	Pass
AV60	01/17/2007 7:21	7322	7019.7	+/- 5%	Pass	22.7	5 - 50	Pass	221.1	223.0	+/- 5%	Pass	4994	5007.5	+/- 25%	Pass
AV63	01/17/2007 7:21	7325	7120.8	+/- 5%	Pass	38.9	5 - 50	Pass	218.6	223.0	+/- 5%	Pass	4976	5007.9	+/- 25%	Pass
AV64	01/17/2007 7:21	7320	7153.7	+/- 5%	Pass	13.5	5 - 50	Pass	224.0	224.0	+/- 5%	Pass	5015	5015.3	+/- 25%	Pass
AV65	01/17/2007 7:21	7156	7233.4	+/- 5%	Pass	24.9	5 - 50	Pass	216.0	224.0	+/- 5%	Pass	4957	5015.3	+/- 25%	Pass
AV66	01/17/2007 7:22	7317	7165.5	+/- 5%	Pass	13.8	5 - 50	Pass	218.9	222.0	+/- 5%	Pass	4978	5000.5	+/- 25%	Pass
AV67	01/17/2007 7:22	7404	7128.1	+/- 5%	Pass	18.5	5 - 50	Pass	225.0	224.1	+/- 5%	Pass	5022	5015.6	+/- 25%	Pass
AV68	01/17/2007 7:56	7384	7259.5	+/- 5%	Pass	13.9	5 - 50	Pass	220.9	222.0	+/- 5%	Pass	4993	5000.8	+/- 25%	Pass
AV69	01/17/2007 7:56	7357	7305.4	+/- 5%	Pass	16.2	5 - 50	Pass	220.0	222.0	+/- 5%	Pass	4986	5000.6	+/- 25%	Pass
AV70	01/17/2007 7:55	7381	7406.5	+/- 5%	Pass	13.5	5 - 50	Pass	219.9	222.6	+/- 5%	Pass	4985	5004.7	+/- 25%	Pass
AV71	01/17/2007 7:55	7092	7187.3	+/- 5%	Pass	12.6	5 - 50	Pass	220.0	225.0	+/- 5%	Pass	4986	5022.7	+/- 25%	Pass
AV71	01/17/2007 7:55	7092	7187.3	+/- 5%	Pass	12.6	5 - 50	Pass	220.0	225.0	+/- 5%	Pass	4986	5022.7	+/- 25%	Pass
AV72	01/17/2007 7:55	7163	7090.0	+/- 5%	Pass	12.9	5 - 50	Pass	218.0	223.9	+/- 5%	Pass	4971	5014.6	+/- 25%	Pass
AV72	01/17/2007 7:55	7163	7090.0	+/- 5%	Pass	12.9	5 - 50	Pass	218.0	223.9	+/- 5%	Pass	4971	5014.6	+/- 25%	Pass
AV73	01/17/2007 7:55	7370	7251.3	+/- 5%	Pass	23.9	5 - 50	Pass	218.8	225.0	+/- 5%	Pass	4978	5022.4	+/- 25%	Pass
AV75	01/17/2007 7:55	7389	7267.9	+/- 5%	Pass	12.3	5 - 50	Pass	223.0	224.1	+/- 5%	Pass	5008	5015.5	+/- 25%	Pass
AV76	01/17/2007 7:55	7353	7374.3	+/- 5%	Pass	12.5	5 - 50	Pass	223.0	224.0	+/- 5%	Pass	5008	5015.2	+/- 25%	Pass
AV77	01/17/2007 7:55	7540	7497.1	+/- 5%	Pass	13.1	5 - 50	Pass	224.0	224.0	+/- 5%	Pass	5015	5015.4	+/- 25%	Pass
AV78	01/17/2007 7:55	7360	7183.8	+/- 5%	Pass	12.3	5 - 50	Pass	222.0	223.3	+/- 5%	Pass	5001	5009.8	+/- 25%	Pass
AV78	01/17/2007 7:55	7360	7183.8	+/- 5%	Pass	12.3	5 - 50	Pass	222.0	223.3	+/- 5%	Pass	5001	5009.8	+/- 25%	Pass
AV79	01/17/2007 7:55	7116	7349.7	+/- 5%	Pass	12.8	5 - 50	Pass	220.9	222.0	+/- 5%	Pass	4993	5000.4	+/- 25%	Pass
AV80	01/17/2007 7:55	7286	7226.4	+/- 5%	Pass	12.8	5 - 50	Pass	223.0	224.1	+/- 5%	Pass	5008	5015.5	+/- 25%	Pass
AV80	01/17/2007 7:55	7286	7226.4	+/- 5%	Pass	12.8	5 - 50	Pass	223.0	224.1	+/- 5%	Pass	5008	5015.5	+/- 25%	Pass
AV81	01/17/2007 7:55	6963	7453.4	+/- 5%	FAIL	13.3	5 - 50	Pass	221.9	223.0	+/- 5%	Pass	5000	5008.1	+/- 25%	Pass
AV82	01/17/2007 7:55	7456	7529.2	+/- 5%	Pass	13.2	5 - 50	Pass	224.0	224.0	+/- 5%	Pass	5015	5015.2	+/- 25%	Pass
AV82	01/17/2007 7:55	7456	7529.2	+/- 5%	Pass	13.2	5 - 50	Pass	224.0	224.0	+/- 5%	Pass	5015	5015.2	+/- 25%	Pass
AV83	01/17/2007 7:55	7520	7523.7	+/- 5%	Pass	12.3	5 - 50	Pass	222.0	222.0	+/- 5%	Pass	5001	5000.4	+/- 25%	Pass
AV83	01/17/2007 7:55	7520	7523.7	+/- 5%	Pass	12.3	5 - 50	Pass	222.0	222.0	+/- 5%	Pass	5001	5000.4	+/- 25%	Pass
AV84	01/17/2007 7:55	7529	7637.7	+/- 5%	Pass	12.7	5 - 50	Pass	223.0	223.0	+/- 5%	Pass	5008	5007.7	+/- 25%	Pass
AV85	01/17/2007 7:55	7487	7549.7	+/- 5%	Pass	12.1	5 - 50	Pass	222.0	223.0	+/- 5%	Pass	5000	5008.0	+/- 25%	Pass
AV85	01/17/2007 7:55	7487	7549.7	+/- 5%	Pass	12.1	5 - 50	Pass	222.0	223.0	+/- 5%	Pass	5000	5008.0	+/- 25%	Pass
AV86	01/17/2007 7:55	7628	7679.0	+/- 5%	Pass	16.8	5 - 50	Pass	224.1	223.9	+/- 5%	Pass	5016	5014.3	+/- 25%	Pass
AV87	01/17/2007 7:55	7661	7512.4	+/- 5%	Pass	13.6	5 - 50	Pass	223.1	223.0	+/- 5%	Pass	5008	5007.7	+/- 25%	Pass

Detector	Date/Time	Gross Counts Result	Gross Counts Criteria	P/F	FWHM (keV) Result	FWHM (keV) Criteria	P/F	Pulser Center Result	Pulser Center Criteria	P/F	Energy (keV) Result	Energy (keV) Criteria	P/F
AV87	01/17/2007 7:55	7661	7512.4 +/- 5%	Pass	13.6	5 - 50	Pass	223.1	223.0 +/- 5%	Pass	5008	5007.7 +/- 25%	Pass
AV88	01/17/2007 7:55	7661	7716.1 +/- 5%	Pass	13.8	5 - 50	Pass	223.1	224.0 +/- 5%	Pass	5008	5015.4 +/- 25%	Pass
AV89	01/17/2007 7:21	7424	7553.8 +/- 5%	Pass	12.6	5 - 50	Pass	221.0	222.6 +/- 5%	Pass	4994	5004.7 +/- 25%	Pass
AV90	01/17/2007 7:21	7701	7474.4 +/- 5%	Pass	13.5	5 - 50	Pass	222.9	224.1 +/- 5%	Pass	5007	5015.6 +/- 25%	Pass
AV92	01/17/2007 7:21	7459	7358.9 +/- 5%	Pass	11.9	5 - 50	Pass	224.0	223.9 +/- 5%	Pass	5015	5014.6 +/- 25%	Pass
AV93	01/17/2007 7:21	7185	7393.5 +/- 5%	Pass	13.0	5 - 50	Pass	221.9	223.0 +/- 5%	Pass	5000	5008.3 +/- 25%	Pass
AV94	01/17/2007 7:21	7339	7477.9 +/- 5%	Pass	12.6	5 - 50	Pass	222.1	222.0 +/- 5%	Pass	5001	5000.5 +/- 25%	Pass
AV95	01/17/2007 7:21	7627	7432.4 +/- 5%	Pass	13.2	5 - 50	Pass	222.0	222.2 +/- 5%	Pass	5001	5001.9 +/- 25%	Pass
AV96	01/17/2007 7:21	7623	7654.3 +/- 5%	Pass	13.3	5 - 50	Pass	221.0	222.6 +/- 5%	Pass	4993	5005.3 +/- 25%	Pass
AV97	01/17/2007 7:21	7621	7649.9 +/- 5%	Pass	13.1	5 - 50	Pass	223.0	223.8 +/- 5%	Pass	5008	5014.0 +/- 25%	Pass
AV98	01/17/2007 7:21	7447	7582.0 +/- 5%	Pass	12.8	5 - 50	Pass	223.0	223.0 +/- 5%	Pass	5008	5007.6 +/- 25%	Pass

SEVERN TRENT STL

Run Log

Logbook No.: 2908

STL
St. Louis

Alpha Spectrometry Runlog

	Date	Batch #	Sample #	Detector	Count Time	Analyte	Setup Initials	Process Initials
1	1/16/07	7010319	F6L160119-010X-1	11	180m	Th	MW	GW
2	1/17/07	Daily	Pulsers	1-98	1min	QA	GW	L
3		7010319	F6L160119-010	56	180min	Th	MW	MW
4			-010X	53				
5		7015231	F7A130154-001	1		U		
6			-001S	2				
7			-002	3				
8			-002X	4				
9			-003	6				
10			-004	7				
11			-005	8				
12			-006	MW 1/17 9/14				
13			-007	16				
14			-008	17				
15			-009	18				
16			-010	19				
17			-011	20				
18			-012	22				
19			F7A150000-231B	54				
20			-231C	58				
21		M0704165	ISOPULCS	52		Pu		
22		7009357	D6L220111-001	9				
23			-001X	11				
24			-002	12				
25			-003	13				
26			F7A090000-357B	21				
27			-357C	45		Pu241		
28		7011355	F7A040213-001	23	360min	Th		
29			-002	24				

Reviewed By: MW Date: 1/17/07

SOP References: STL-RD-0210 Rev 5 01/16/06. Form: SL-RAD-0030, Revised 7/07/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

Logbook No.: 2908

STL
St. Louis

Alpha Spectrometry Runlog

	Date	Batch #	Sample #	Detector	Count Time	Analyte	Setup Initials	Process Initials
1	1/17/07	7011355	F7A040213-003	46	360min	Th	MW	MW
2			-004	48				
3			-005	49				
4			-006	50				
5			-007	51				
6			F7A110000-355B	63				
7			-355C	59				
8			-355L	60				
9			F7A040213-008	1				
10			-009	2				
11			-010	3				
12			-011	4				
13		7015090	F6L160132-008	9	180min	U		MW
14			-012	11				
15			-016	12				
16			F6L200244-016	13				
17			-016X	14				
18			F7A150000-090B	21				
19			-090C	45				
20		7011119	F7A090121-001	16		Th		
21			-001X	18				
22			-002	19				
23			-003	20				
24			-004	22				
25			-005	53				
26			-006	56				
27			F7A110000-119B	52				
28			-119C	54				
29		7011121		6		U		

Reviewed By: MW Date: 1/17/07

SOP References: STL-RD-0210 Rev 5 01/16/06. Form: SL-RAD-0030, Revised 7/07/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

Logbook No.: 2908

STL
St. Louis

Alpha Spectrometry Runlog

	Date	Batch #	Sample #	Detector	Count Time	Analyte	Setup Initials	Process Initials
1	1/17/07	7011121	F7A 090121 -001x	7	180min	U	MW	MW
2			-002	8				
3			-003	17				
4			F7A110000 -121B	58				
5			-121C	64				
6			~~FAO~~ MW 4/17/07 F7A090121-004	16				
7			-005	18				
8			-006	19				
9			-007	20				
10			-008	22				
11			-009	23				
12			-010	24				
13			-011	44				
14	1/18/07	Daily	Pulsers	1-98	1min	QA	JW	—
15	1/17/07	7011119	F7A090121-007	9	180min	Th	MW	MW
16			-008	11				
17			-009	12				
18			-010	13				
19			-011	14				
20	1/18/07	7017268	F7A110122-004	1		U		
21			F7A170000-268B	2				
22			-268C	3				
23			-268L	4				
24		7011338	F7A110000-338B	9		Pu		
25			-338L	11				
26								
27								
28								
29								

* forgot to write in Book

Reviewed By:_____ Date:_____

SOP References: STL-RD-0210 Rev 5 01/16/06. Form: SL-RAD-0030, Revised 7/07/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

180min LL 1/30

SEVERN TRENT **STL**

Prep Report for:

Thorium, Isotopic by Alpha Spectroscopy

Batch: 7011119 **Prep Analyst:** 403301

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

SampID	WRKNO	Aliquot	Dilution	Adj Aliquot	TracerID	TracerAnalyte	TracerAliquot	Low Level
F7A090121-001	JMJ4V1AE	2.0033E+000 g	1.00	2.0033E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-001X	JMJ4V1AH	2.0034E+000 g	1.00	2.0034E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-002	JMJ4W1AE	2.0040E+000 g	1.00	2.0040E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-003	JMJ4X1AE	2.0035E+000 g	1.00	2.0035E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-004	JMJ401AE	2.0178E+000 g	1.00	2.0178E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-005	JMJ411AE	2.0040E+000 g	1.00	2.0040E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-006	JMJ421AE	2.0090E+000 g	1.00	2.0090E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-007	JMJ461AE	2.0153E+000 g	1.00	2.0153E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-008	JMJ471AE	2.0012E+000 g	1.00	2.0012E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-009	JMJ491AE	2.0018E+000 g	1.00	2.0018E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-010	JMJ5A1AE	2.0130E+000 g	1.00	2.0130E+000 g	rad05-0048	Th-229	0.10	N
F7A090121-011	JMJ5C1AE	2.0102E+000 g	1.00	2.0102E+000 g	rad05-0048	Th-229	0.10	N
F7A110000-119B	JMNTF1AA	2.0000E+000 g	1.00	2.0000E+000 g	rad05-0048	Th-229	0.10	N
F7A110000-119C	JMNTF1AC	1.3150E-001 g	1.00	1.3150E-001 g	rad05-0048	Th-229	0.10	N

16
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Spike Information

Sample ID	Standard ID	Analyte	Std Conc	Aliquot	Ref Date	StdAdded
F7A110000-119C	TRM-3_IsoTh	TH-230	1.299E+002 dpm/g	0.13 g	5/29/2003 12:00:00AM	5.850E+001 pCi/g

SAL — Spiked By
Fleep — Spike Verified By
01/11/07 — Spike Date

SampID	WRKNO	Aliquot	Dilution	Adj Aliquot	TracerID	TracerAnalyte	TracerAliquot	Low Level

Standard Operating Procedures

	SOPNumber	Title	Revision
☐	STL-RC-0002	Planchet Preparation For Radiochemistry And Radiological Screening Analysis	4.00
☐	STL-RC-0003	Drying And Grinding Of Soil And Solid Samples	6.00
☐	STL-RC-0004	Preparation Of Soil, Sludge, And Filter Paper Samples For Radiochemical Analysis	10.00
☐	STL-RC-0090	Preparation Of Samples For Sequential Determination Of Isotopic Americium, Currium, Neptunium, Plutonium, Tho	4.00
☑	STL-RC-0100	Actinide Coprecipitation	9.00
☐	STL-RC-0232	Isotopic Thorium And/oR Neptunium in Water, Soil, Sludge, and Filters by Eichrom TEVA Separation Resins	7.00
☐	STL-RC-0238	Isotopic Uranium By Eichrom UTEVA Resin for Water, Soil, Sludge and Filters	7.00
☐	STL-RC-0240	Isotopic Americium, Curium, Plutonium, Thorium, and Uranium in Water, Soil, Sludge and Filters by Eichrome Sepa	5.00
☐	STL-RC-0241	Isotopic Americium, Plutonium, Curium, and Uranium in Water, Soil, Sludge and Filters by Eichrome Uteva and Tr	3.00
☑	STL-RC-0242	Isotopic Thorium, Plutonium and Uranium in Water, Soil, Sludge and Filters by Eichrome Separation Resin	6.00
☐	STL-RD-0201	Daily Operations Of An Alpha Spectroscopy System	2.00
☐	STL-RD-0203	Calibration And Maintenance Of A Alpha Spectroscopy System	1.00

[signature]	1-17-7	Brandy Swift	1/17/07
Column Analyst	Date	Coprecipitated By	Precip Date
[signature]	1/18/07		
Reviewed By	Review Date		
Brandy Swift	1/17/07	[signature]	1/17/07
Analyst/Relenquished By	Release Date	Received By	Receipt Date

SEVERN TRENT STL

Alpha Spectroscopy Uranium

SEVERN TRENT STL

Analysis Report for Alpha Spectroscopy

Batch: 7011121 **Operator:** 403293

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
F7A090121-001	JMJ4V1AD	2.0033	1.00	2.00	AV6	1/17/07 14:52	180.00	rad06-0048	U-232	3.867E+000	81.98%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
U-232	1.428E+000	pCi/g	1.969E-001	2.205E-001	5.005E-002	1.707E-002
U-234	7.868E-001	pCi/g	1.343E-001	1.813E-001	3.066E-002	7.641E-003
U-235	3.536E-002	pCi/g	3.163E-002	3.508E-002	1.914E-002	0.000E+000
U-238	7.115E-001	pCi/g	1.276E-001	1.686E-001	3.060E-002	7.626E-003

F7A090121-001X	JMJ4V1AJ	2.0034	1.00	2.00	AV7	1/17/07 14:52	180.00	rad06-0048	U-232	3.867E+000	92.35%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
U-232	1.609E+000	pCi/g	1.825E-001	2.382E-001	2.514E-002	5.630E-003
U-234	6.054E-001	pCi/g	1.104E-001	1.424E-001	3.064E-002	8.608E-003
U-235	5.709E-002	pCi/g	4.047E-002	4.135E-002	3.586E-002	9.581E-003
U-238	5.624E-001	pCi/g	1.059E-001	1.348E-001	2.426E-002	5.434E-003

F7A090121-002	JMJ4W1AD	2.0040	1.00	2.00	AV8	1/17/07 14:52	180.00	rad06-0048	U-232	3.866E+000	81.79%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
U-232	1.424E+000	pCi/g	1.951E-001	2.188E-001	4.681E-002	1.557E-002
U-234	5.120E-001	pCi/g	1.077E-001	1.335E-001	3.021E-002	7.528E-003
U-235	3.484E-002	pCi/g	3.116E-002	3.455E-002	1.885E-002	0.000E+000
U-238	5.815E-001	pCi/g	1.150E-001	1.458E-001	3.452E-002	9.699E-003

F7A090121-003	JMJ4X1AD	2.0035	1.00	2.00	AV17	1/17/07 14:52	180.00	rad06-0048	U-232	3.867E+000	83.44%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
U-232	1.453E+000	pCi/g	1.998E-001	2.263E-001	7.655E-002	3.038E-002
U-234	6.639E-001	pCi/g	1.238E-001	1.614E-001	3.844E-002	1.159E-002
U-235	7.327E-002	pCi/g	4.774E-002	4.909E-002	3.787E-002	9.438E-003
U-238	7.164E-001	pCi/g	1.278E-001	1.698E-001	3.272E-002	8.741E-003

F7A090121-004	JMJ401AD	2.0178	1.00	2.00	AV16	1/17/07 17:57	180.00	rad06-0048	U-232	3.840E+000	88.11%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
U-232	1.524E+000	pCi/g	1.826E-001	2.265E-001	4.242E-002	1.430E-002
U-234	7.147E-001	pCi/g	1.199E-001	1.603E-001	3.366E-002	1.014E-002
U-235	2.843E-002	pCi/g	2.850E-002	2.881E-002	3.013E-002	6.748E-003
U-238	8.107E-001	pCi/g	1.269E-001	1.751E-001	2.660E-002	6.628E-003

F7A090121-005	JMJ411AD	2.0040	1.00	2.00	AV18	1/17/07 17:57	180.00	rad06-0048	U-232	3.866E+000	83.67%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
U-232	1.457E+000	pCi/g	1.931E-001	2.225E-001	3.718E-002	1.086E-002
U-234	4.553E-001	pCi/g	1.010E-001	1.227E-001	2.980E-002	7.426E-003
U-235	2.620E-002	pCi/g	2.813E-002	2.841E-002	2.927E-002	5.335E-003
U-238	4.520E-001	pCi/g	9.983E-002	1.220E-001	1.492E-002	0.000E+000

F7A090121-006	JMJ421AD	2.0090	1.00	2.00	AV19	1/17/07 17:57	180.00	rad06-0048	U-232	3.856E+000	86.31%
		g									

Analyte	Activity		CountUnc	TotalUnc	MDA	DLC

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte		TracerAdded	TracerYield
						U-232	1.499E+000	pCi/g	1.850E-001	2.240E-001	5.000E-002	1.799E-002
						U-234	4.055E-001	pCi/g	9.242E-002	1.106E-001	3.936E-002	1.290E-002
						U-235	2.884E-002	pCi/g	2.891E-002	2.923E-002	3.056E-002	6.844E-003
						U-238	4.725E-001	pCi/g	9.875E-002	1.215E-001	3.549E-002	1.098E-002
F7A090121-007	JMJ461AD	2.0153	1.00	2.00	AV20	1/17/07 17:57	180.00	rad06-0048	U-232		3.844E+000	89.74%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						U-232	1.554E+000	pCi/g	1.861E-001	2.332E-001	3.301E-002	9.275E-003
						U-234	3.559E-001	pCi/g	8.716E-002	1.023E-001	3.363E-002	9.824E-003
						U-235	1.688E-002	pCi/g	2.363E-002	2.376E-002	3.152E-002	7.058E-003
						U-238	3.726E-001	pCi/g	8.857E-002	1.048E-001	2.997E-002	8.006E-003
F7A090121-008	JMJ471AD	2.0012	1.00	2.00	AV22	1/17/07 17:57	180.00	rad06-0048	U-232		3.871E+000	92.69%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						U-232	1.616E+000	pCi/g	1.888E-001	2.436E-001	2.955E-002	7.363E-003
						U-234	6.517E-001	pCi/g	1.184E-001	1.540E-001	3.271E-002	9.191E-003
						U-235	4.119E-003	pCi/g	1.545E-002	1.547E-002	3.230E-002	7.234E-003
						U-238	7.009E-001	pCi/g	1.221E-001	1.616E-001	2.590E-002	5.801E-003
F7A090121-009	JMJ491AD	2.0018	1.00	2.00	AV23	1/17/07 17:57	180.00	rad06-0048	U-232		3.870E+000	93.09%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						U-232	1.623E+000	pCi/g	1.838E-001	2.411E-001	3.368E-002	9.840E-003
						U-234	7.591E-001	pCi/g	1.243E-001	1.681E-001	3.410E-002	1.028E-002
						U-235	2.374E-002	pCi/g	2.549E-002	2.573E-002	2.652E-002	4.834E-003
						U-238	7.694E-001	pCi/g	1.247E-001	1.694E-001	3.085E-002	8.668E-003
F7A090121-010	JMJ5A1AD	2.0130	1.00	2.00	AV24	1/17/07 17:57	180.00	rad06-0048	U-232		3.849E+000	92.10%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						U-232	1.597E+000	pCi/g	1.856E-001	2.392E-001	4.024E-002	1.297E-002
						U-234	5.400E-001	pCi/g	1.063E-001	1.337E-001	3.481E-002	1.049E-002
						U-235	1.152E-002	pCi/g	1.881E-002	1.889E-002	2.707E-002	4.935E-003
						U-238	6.173E-001	pCi/g	1.131E-001	1.462E-001	3.150E-002	8.850E-003
F7A090121-011	JMJ5C1AD	2.0102	1.00	2.00	AV46	1/17/07 17:57	180.00	rad06-0048	U-232		3.854E+000	94.29%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						U-232	1.637E+000	pCi/g	1.802E-001	2.411E-001	3.090E-002	8.682E-003
						U-234	6.028E-001	pCi/g	1.083E-001	1.402E-001	2.371E-002	5.310E-003
						U-235	2.182E-002	pCi/g	2.518E-002	2.538E-002	2.950E-002	6.607E-003
						U-238	7.570E-001	pCi/g	1.210E-001	1.647E-001	2.056E-002	3.747E-003
F7A110000-121B	JMNT11AA	2.0000	1.00	2.00	AV58	1/17/07 14:53	180.00	rad06-0048	U-232		3.874E+000	91.48%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC
						U-232	1.596E+000	pCi/g	1.830E-001	2.364E-001	2.773E-002	6.911E-003
						U-234	2.485E-003	pCi/g	1.860E-002	1.860E-002	3.528E-002	1.091E-002
						U-235	-1.160E-003	pCi/g	5.357E-003	1.348E-002	2.634E-002	4.801E-003
						U-238	1.395E-002	pCi/g	1.771E-002	1.783E-002	2.113E-002	3.851E-003
F7A110000-121C	JMNT11AC	0.1315	1.00	2.00	AV64	1/17/07 14:53	180.00	rad06-0048	U-232		5.892E+001	97.94%
		g				Analyte	Activity		CountUnc	TotalUnc	MDA	DLC

Sample ID	Work Order #	Aliquot	Dilution	Sigma	Instrument	RunDateTime	RunDuration	TracerID	TracerAnalyte	TracerAdded	TracerYield
						U-232	2.599E+001	pCi/g	2.851E+000	3.902E+000	5.059E-001	1.421E-001
						U-234	2.015E+001	pCi/g	2.532E+000	3.951E+000	4.272E-001	1.065E-001
						U-235	1.084E+000	pCi/g	6.537E-001	7.019E-001	2.667E-001	0.000E+000
						U-238	1.872E+001	pCi/g	2.434E+000	3.723E+000	3.366E-001	6.135E-002

Laboratory Control Sample Information

Sample ID	WRKNO	RegionName	Activity	StdAdded	Recovery	LCL	UCL
F7A110000-121C	JMNT11AC	U-234	2.015E+001	1.960E+001	102.80%	78.00	125.00
	JMNT11AC	U-238	1.872E+001	1.960E+001	95.49%	76.00	122.00

Sample Duplicate Information

Sample ID	Analyte	Sample Activity	Dup Sample ID	Dup Activity	RPD	RER	DER	Qualifier
F7A090121-001	U-234	7.868E-001	F7A090121-001X	6.054E-001	26.07%	5.606E-001	7.872E-001	
	U-235	3.536E-002	F7A090121-001X	5.709E-002	47.00%	2.843E-001	4.007E-001	
	U-238	7.115E-001	F7A090121-001X	5.624E-001	23.41%	4.915E-001	6.908E-001	

Matrix Spike Information

SampID	SampMSID	RegionName	Sample Activity	MS Activity	StdAdded	MSRecovery

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:53:14PM 1/17/2007

Analyst: 60040

Sample

Sample Name: F7A090121-001
SampleType: Sample
: JMJ4V1AD
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0033g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

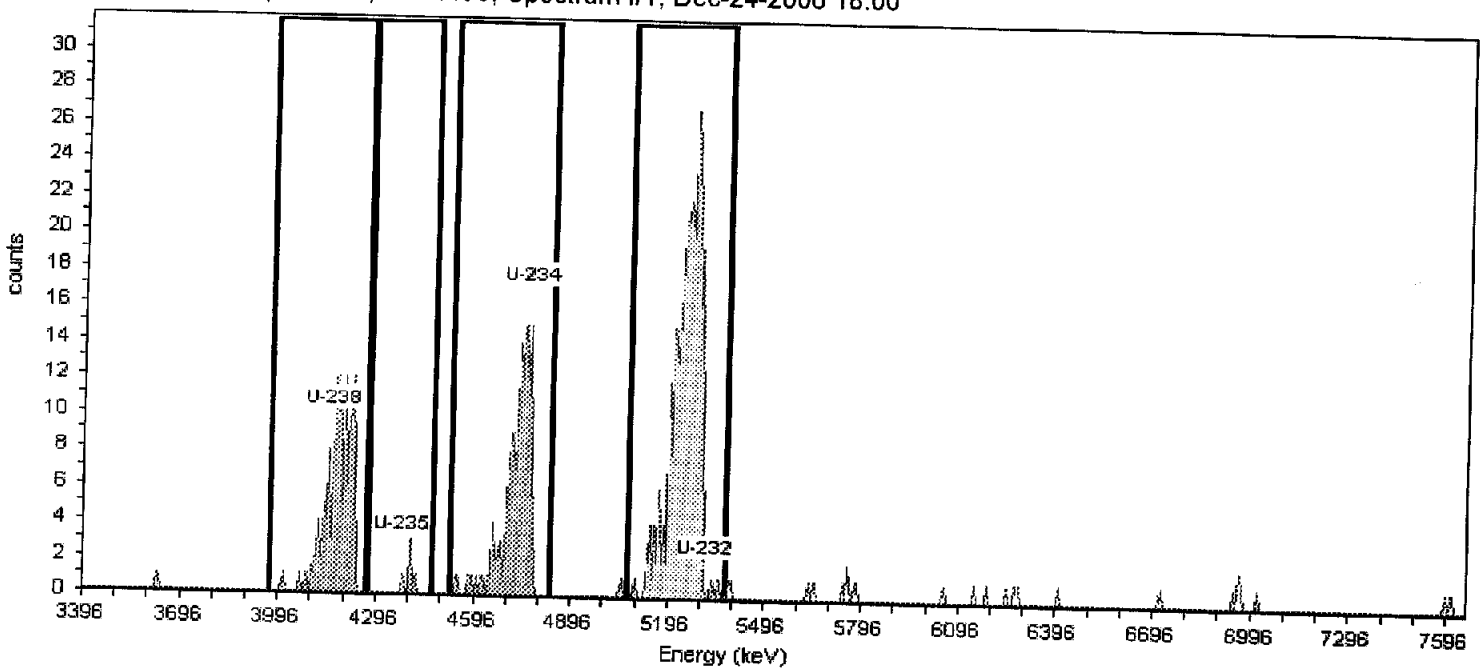
Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

Tracer Nuclide: U-232
Tracer Recovery: 81.98%

Acquisition

Detector: AV6
Serial Number:
Acquisition Start Date: 1/17/2007 2:52:46PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 12/24/2006 6:00:54PM
Background Info: Sample: AV6; Det: AV6; Spectrum #1; Dec-24-2006 18:00

Calibration Name: Dec2006_AV6
Calibration Date: 12/27/2006 2:23:42PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.86% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	82.811	100.0	126.00	0.5625	125	7.115E-001	1.686E-001	7.626E-003	3.060E-002
U-235	4376.294	4267.397	4463.412	19.668	80.2	5.00	0.0000	5	3.536E-002	3.508E-002	0.000E+000	1.914E-002
U-234	4761.063	4521.490	4833.661	63.581	99.8	139.00	0.5625	138	7.868E-001	1.813E-001	7.641E-003	3.066E-002
U-232	5312.808	5073.234	5378.146	84.900	100.1	299.00	2.6250	296	1.428E+000	2.205E-001	1.707E-002	5.005E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:53:17PM 1/17/2007

Sample

Sample Name: F7A090121-001X
SampleType: Sample
: JMJ4V1AJ
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0034g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

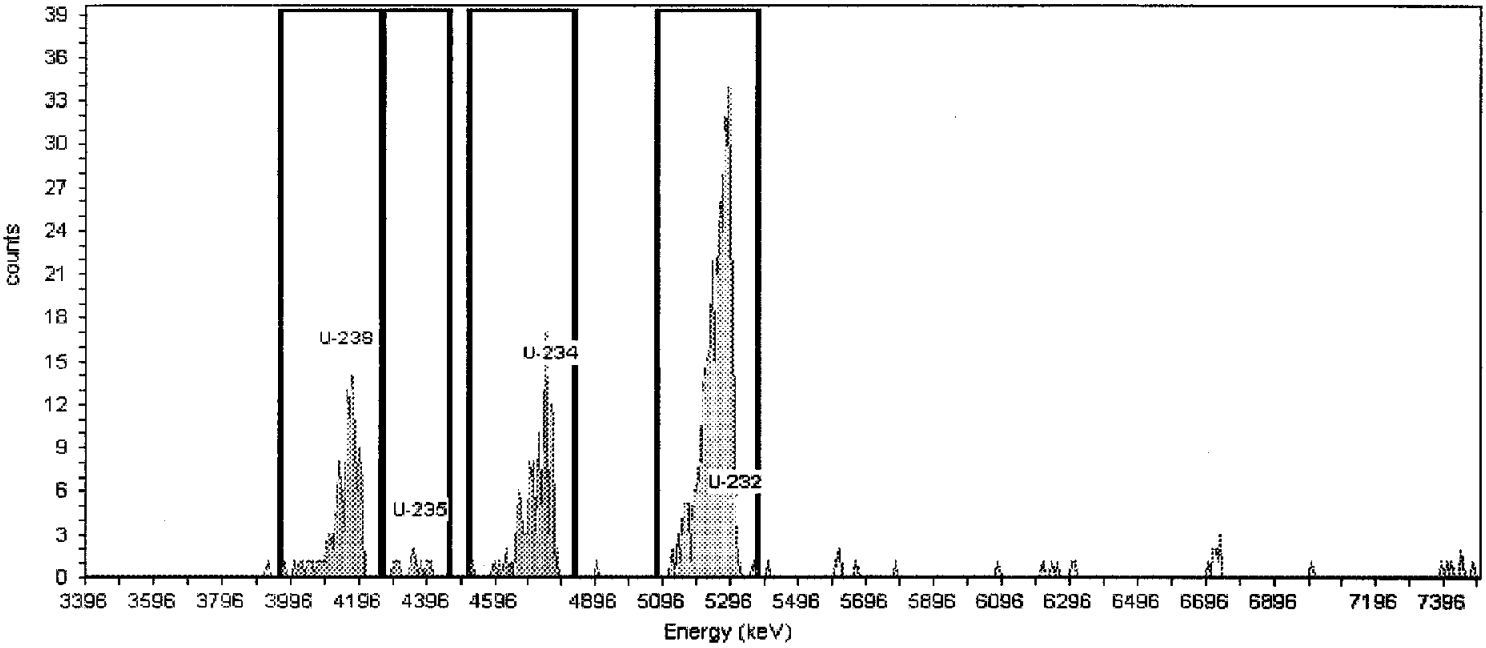
Tracer Nuclide: U-232
Tracer Recovery: 92.35%

Acquisition

Detector: AV7
Serial Number: 41-158X6
Acquisition Start Date: 1/17/2007 2:52:47PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 12/24/2006 6:00:56PM

Calibration Name: Dec2006_AV7
Calibration Date: 12/27/2006 2:23:50PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.33% +/- 0.29% TPU(2 sigma)

Background Info: Sample: AV7; Det: AV7; Spectrum #1; Dec-24-2006 18:00



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	61.459	100.0	114.00	0.3750	114	5.624E-001	1.348E-001	5.434E-003	2.426E-002
U-235	4376.294	4267.397	4463.412	66.087	80.2	10.00	0.7500	9	5.709E-002	4.135E-002	9.581E-003	3.586E-002
U-234	4761.063	4521.490	4833.661	94.292	99.8	123.00	0.9375	122	6.054E-001	1.424E-001	8.608E-003	3.064E-002
U-232	5312.808	5073.234	5378.146	79.210	100.1	340.00	0.3750	340	1.609E+000	2.382E-001	5.630E-003	2.514E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:53:20PM 1/17/2007

Sample

Sample Name: F7A090121-002
SampleType: Sample
: JMJ4W1AD
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0040g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

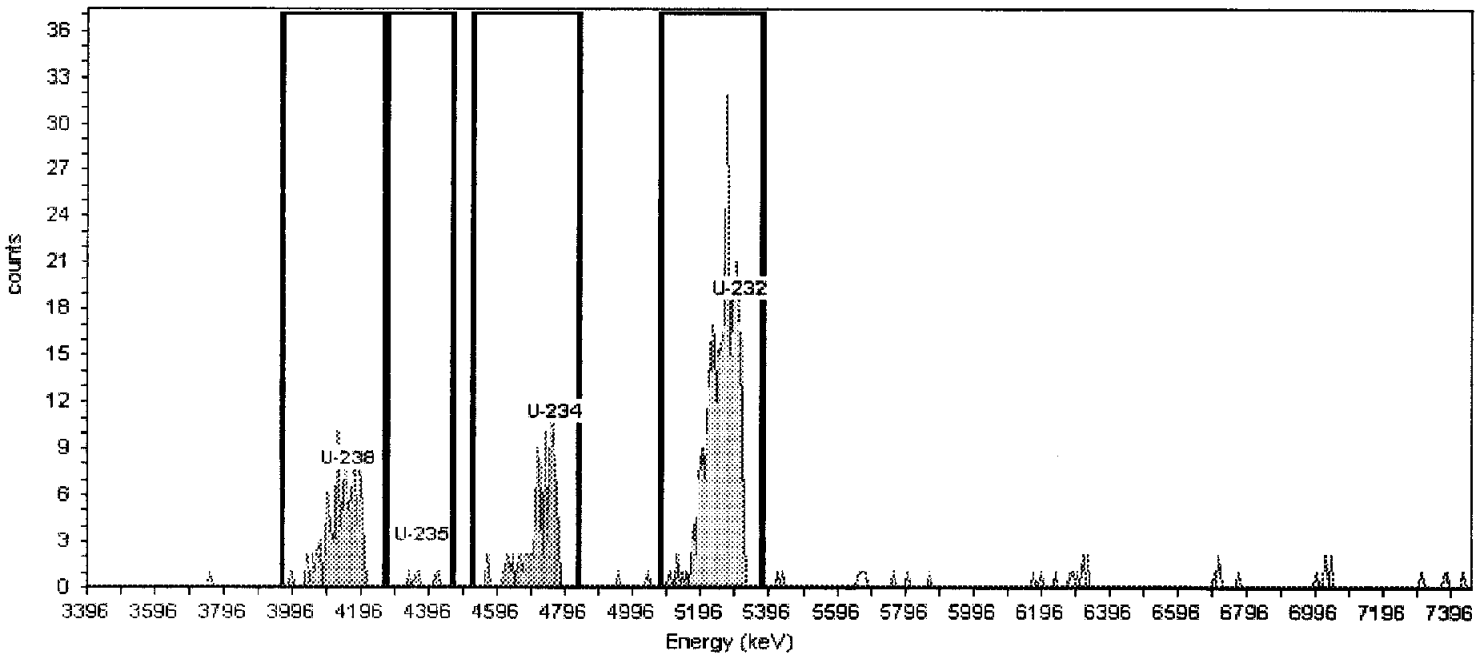
Tracer Nuclide: U-232
Tracer Recovery: 81.79%

Acquisition

Detector: AV8
Serial Number: 41-158X1
Acquisition Start Date: 1/17/2007 2:52:48PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 12/24/2006 6:00:58PM

Calibration Name: Dec2006_AV8
Calibration Date: 12/27/2006 2:24:03PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.32% +/- 0.28% TPU(2 sigma)

Background Info: Sample: AV8; Det: AV8; Spectrum #1; Dec-24-2006 18:00



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	100.991	100.0	105.00	0.9375	104	5.815E-001	1.458E-001	9.699E-003	3.452E-002
U-235	4376.294	4267.397	4463.412	37.512	80.2	5.00	0.0000	5	3.484E-002	3.455E-002	0.000E+000	1.885E-002
U-234	4761.063	4521.490	4833.661	80.346	99.8	92.00	0.5625	91	5.120E-001	1.335E-001	7.528E-003	3.021E-002
U-232	5312.808	5073.234	5378.146	100.848	100.1	303.00	2.2500	301	1.424E+000	2.188E-001	1.557E-002	4.681E-002

STL SEVERN TRENT STL

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:53:24PM 1/17/2007

Analyst: 60040

Sample

Sample Name: F7A090121-003
SampleType: Sample
: JMJ4X1AD
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0035g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

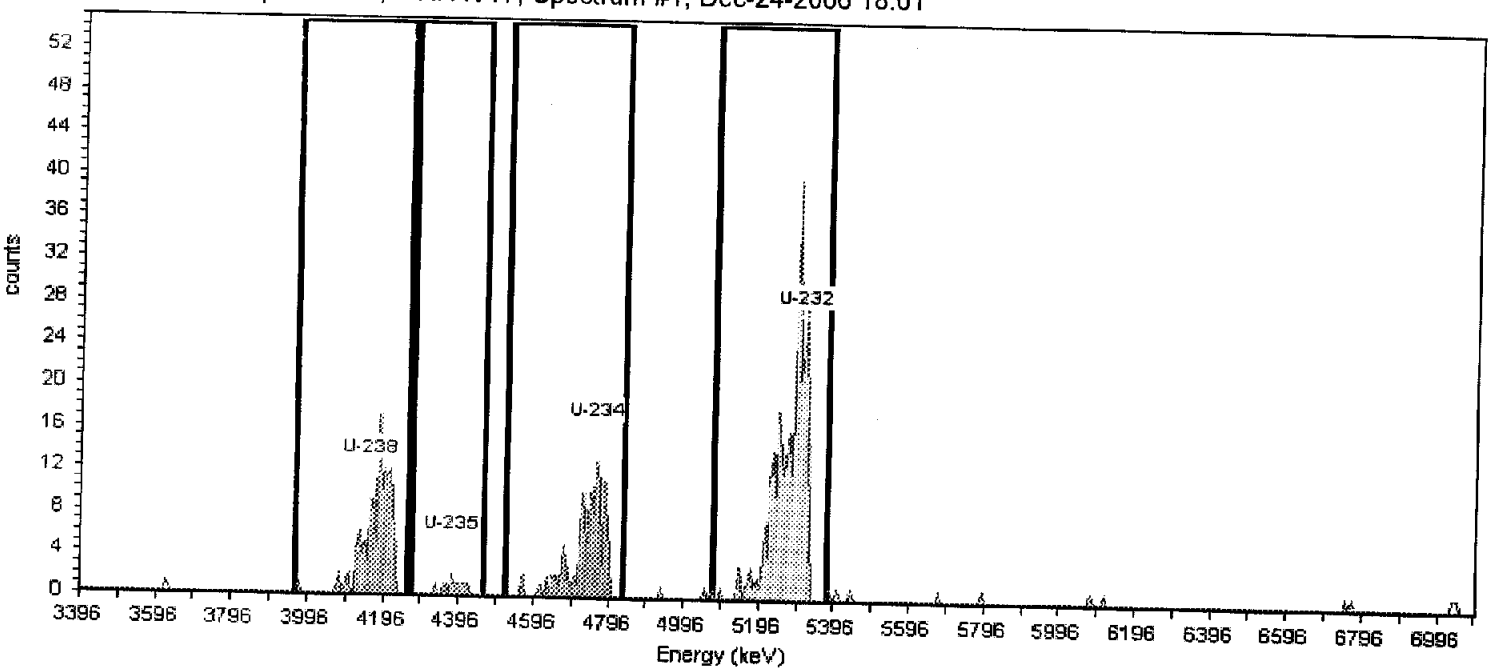
Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

Tracer Nuclide: U-232
Tracer Recovery: 83.44%

Acquisition

Detector: AV17
Serial Number: 41-172Q4
Acquisition Start Date: 1/17/2007 2:52:59PM
Live Time: 180.00 min.
Real Time: 180.01 min.
Background Date: 12/24/2006 6:01:12PM
Background Info: Sample: AV17; Det: AV17; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV17
Calibration Date: 12/26/2006 12:55:23PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.59% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	76.855	100.0	128.00	0.7500	127	7.164E-001	1.698E-001	8.741E-003	3.272E-002
U-235	4376.294	4267.397	4463.412	67.434	80.2	11.00	0.5625	10	7.327E-002	4.909E-002	9.438E-003	3.787E-002
U-234	4761.063	4521.490	4833.661	80.228	99.8	119.00	1.3125	118	6.639E-001	1.614E-001	1.159E-002	3.844E-002
U-232	5312.808	5073.234	5378.146	78.982	100.1	307.00	8.4375	299	1.453E+000	2.263E-001	3.038E-002	7.655E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:57:25PM 1/17/2007

Analyst: 60040

Sample

Sample Name: F7A090121-004
SampleType: Sample
: JMJ401AD
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0178g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

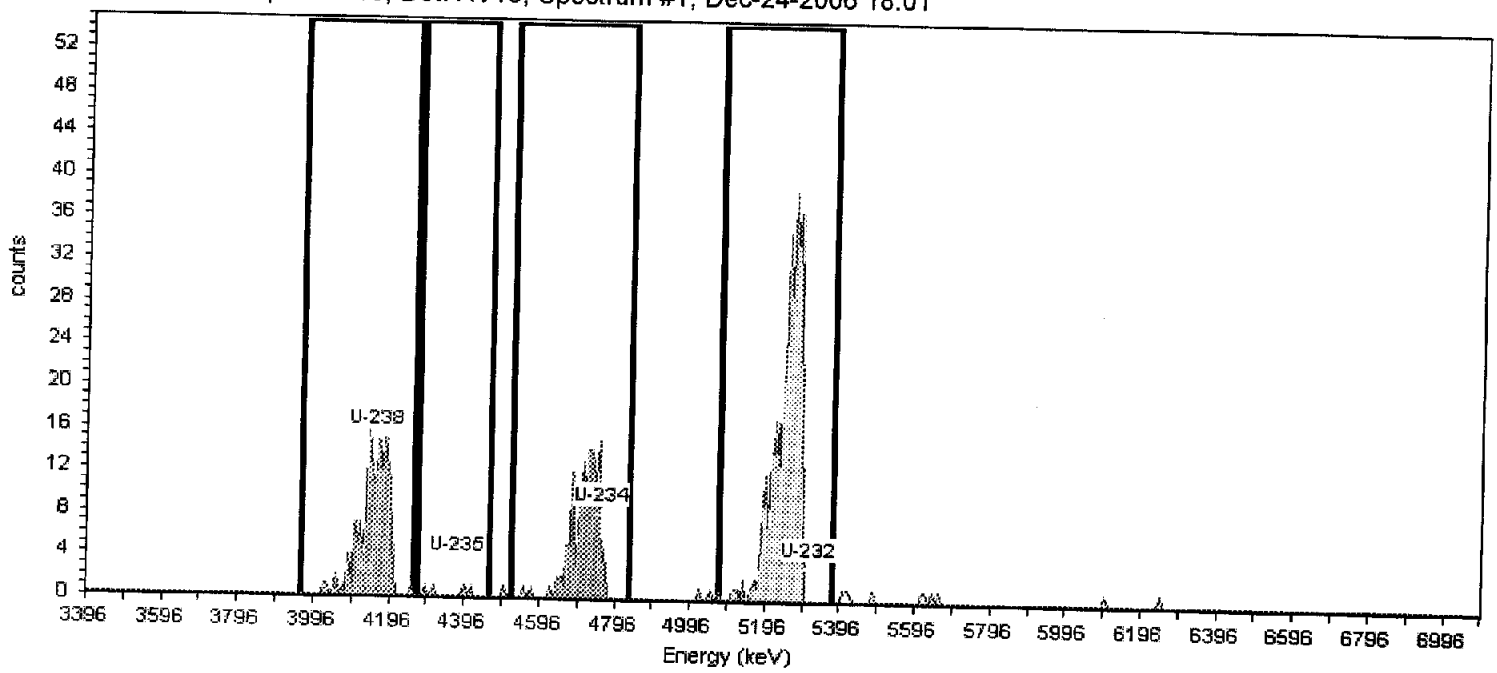
Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

Tracer Nuclide: U-232
Tracer Recovery: 88.11%

Acquisition

Detector: AV16
Serial Number: 41-172Q7
Acquisition Start Date: 1/17/2007 5:57:00PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:11PM
Background Info: Sample: AV16; Det: AV16; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV16
Calibration Date: 12/27/2006 7:37:25PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 28.55% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	81.597	100.0	165.00	0.5625	164	8.107E-001	1.751E-001	6.628E-003	2.660E-002
U-235	4376.294	4267.397	4463.412	127.252	80.2	5.00	0.3750	5	2.843E-002	2.881E-002	6.748E-003	3.013E-002
U-234	4761.063	4521.490	4833.661	73.658	99.8	146.00	1.3125	145	7.147E-001	1.603E-001	1.014E-002	3.366E-002
U-232	5312.808	5073.234	5378.146	59.167	100.1	341.00	2.4375	339	1.524E+000	2.265E-001	1.430E-002	4.242E-002

SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 8:57:32PM 1/17/2007

Sample

Sample Name: F7A090121-005
SampleType: Sample
: JMJ411AD
Sample Collection Date: 1/5/2007 11:00:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0040g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

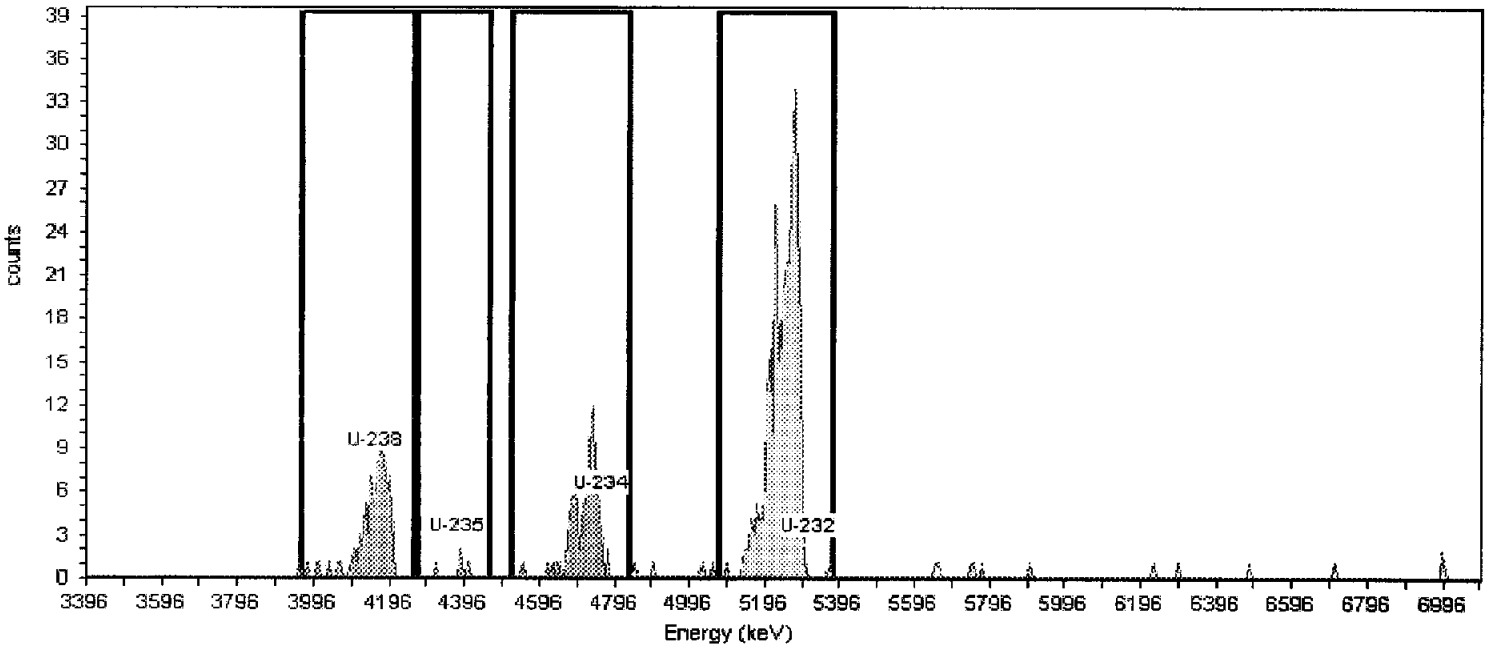
Tracer Nuclide: U-232
Tracer Recovery: 83.67%

Acquisition

Detector: AV18
Serial Number: 41-172C6
Acquisition Start Date: 1/17/2007 5:57:03PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:13PM

Calibration Name: Dec2006_AV18
Calibration Date: 12/26/2006 12:55:33PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.08% +/- 0.28% TPU(2 sigma)

Background Info: Sample: AV18; Det: AV18; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	65.026	100.0	82.00	0.0000	82	4.520E-001	1.220E-001	0.000E+000	1.492E-002
U-235	4376.294	4267.397	4463.412	17.430	80.2	4.00	0.1875	4	2.620E-002	2.841E-002	5.335E-003	2.927E-002
U-234	4761.063	4521.490	4833.661	73.081	99.8	83.00	0.5625	82	4.553E-001	1.227E-001	7.426E-003	2.980E-002
U-232	5312.808	5073.234	5378.146	81.124	100.1	306.00	1.1250	305	1.457E+000	2.225E-001	1.086E-002	3.718E-002

SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:57:35PM 1/17/2007

Analyst: 60040

Sample

Sample Name: F7A090121-006
SampleType: Sample
: JMJ421AD
Sample Collection Date: 1/5/2007 11:00:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0090g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

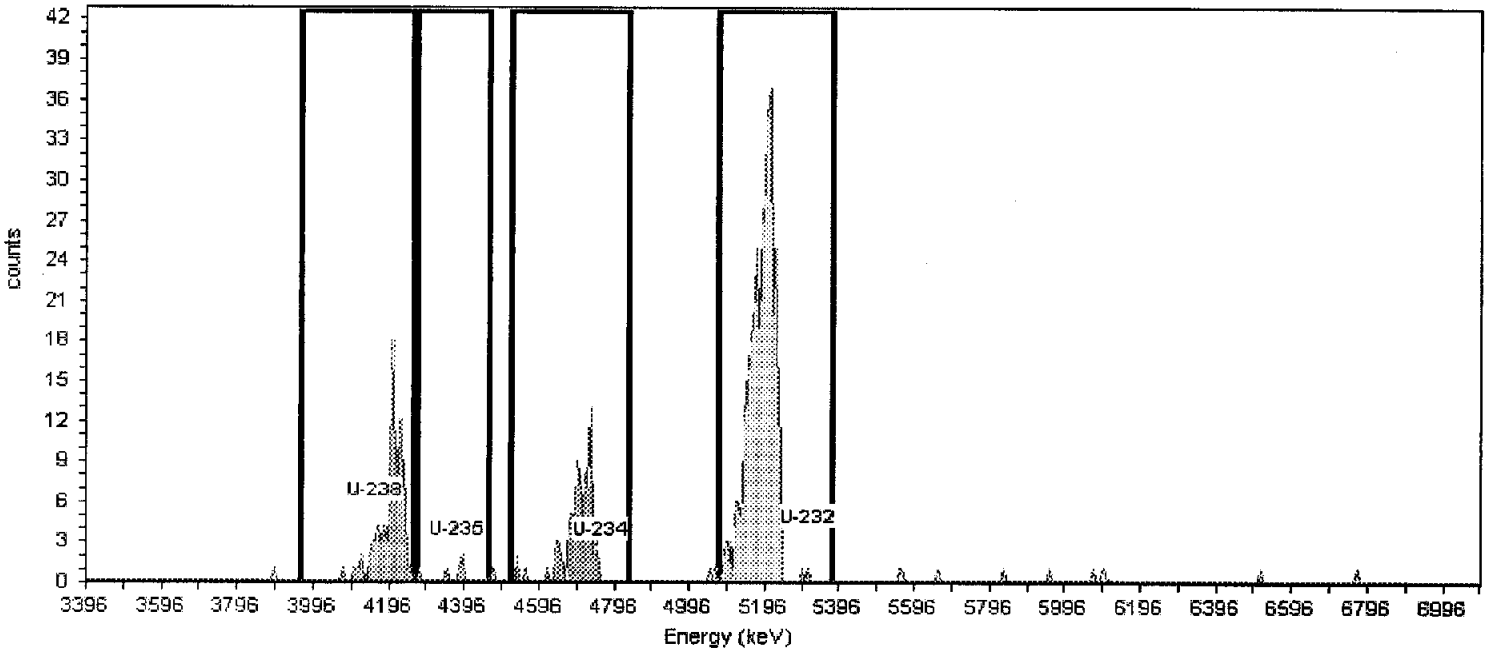
Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

Tracer Nuclide: U-232
Tracer Recovery: 86.31%

Acquisition

Detector: AV19
Serial Number: 41-172Q6
Acquisition Start Date: 1/17/2007 5:57:05PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:15PM
Background Info: Sample: AV19; Det: AV19; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV19
Calibration Date: 12/26/2006 12:55:41PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 28.86% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	22.058	100.0	96.00	1.5000	95	4.725E-001	1.215E-001	1.098E-002	3.549E-002
U-235	4376.294	4267.397	4463.412	17.228	80.2	5.00	0.3750	5	2.884E-002	2.923E-002	6.844E-003	3.056E-002
U-234	4761.063	4521.490	4833.661	66.918	99.8	83.00	2.0625	81	4.055E-001	1.106E-001	1.290E-002	3.936E-002
U-232	5312.808	5073.234	5378.146	77.283	100.1	339.00	3.7500	335	1.499E+000	2.240E-001	1.799E-002	5.000E-002

SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 8:57:38PM 1/17/2007

Sample

Sample Name: F7A090121-007
SampleType: Sample
: JMJ461AD
Sample Collection Date: 1/5/2007 11:00:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0153g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

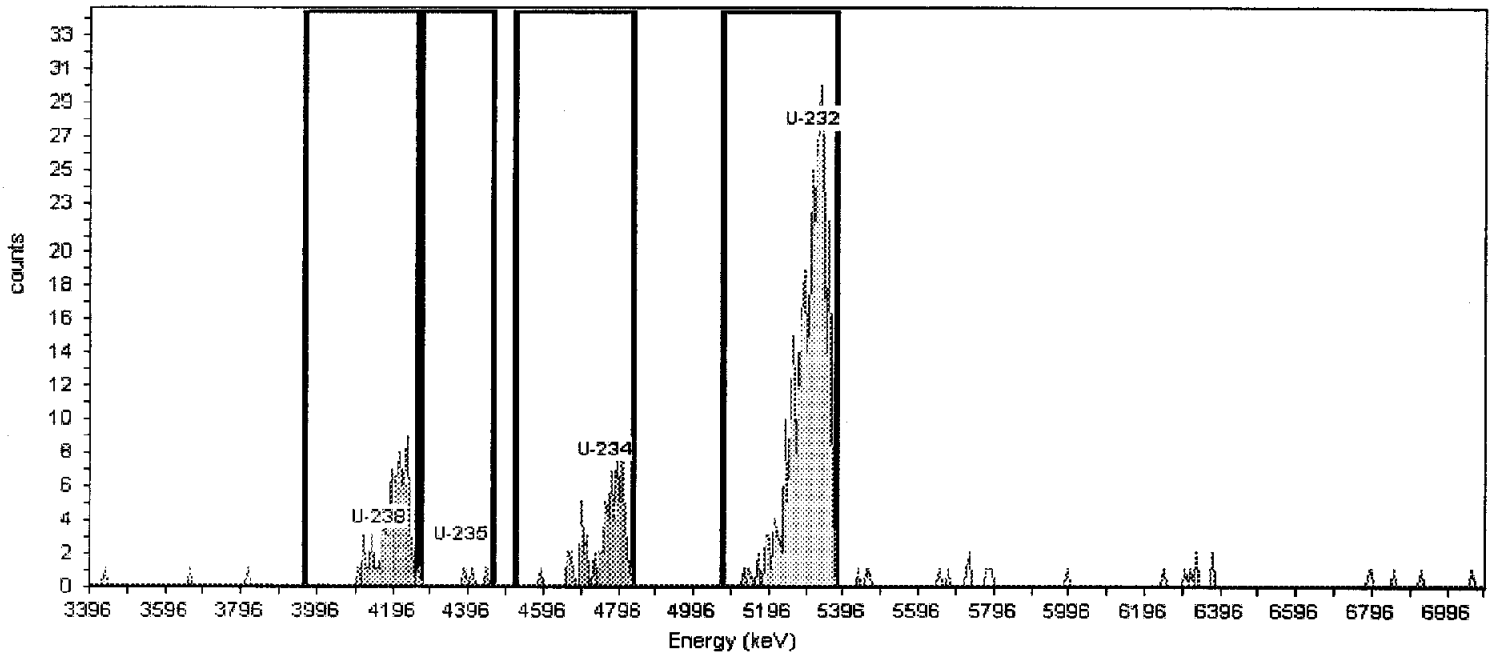
Tracer Nuclide: U-232
Tracer Recovery: 89.74%

Acquisition

Detector: AV20
Serial Number: 41-172R2
Acquisition Start Date: 1/17/2007 5:57:06PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:17PM

Calibration Name: Dec2006_AV20
Calibration Date: 12/26/2006 12:55:51PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.83% +/- 0.27% TPU(2 sigma)

Background Info: Sample: AV20; Det: AV20; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	21.108	100.0	73.00	0.7500	72	3.726E-001	1.048E-001	8.006E-003	2.997E-002
U-235	4376.294	4267.397	4463.412	16.344	80.2	3.00	0.3750	3	1.688E-002	2.376E-002	7.058E-003	3.152E-002
U-234	4761.063	4521.490	4833.661	23.443	99.8	70.00	1.1250	69	3.559E-001	1.023E-001	9.824E-003	3.363E-002
U-232	5312.808	5073.234	5378.146	27.829	100.1	325.00	0.9375	324	1.554E+000	2.332E-001	9.275E-003	3.301E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:57:42PM 1/17/2007

Analyst: 60040

Sample

Sample Name: F7A090121-008
SampleType: Sample
: JMJ471AD
Sample Collection Date: 1/5/2007 11:20:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0012g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

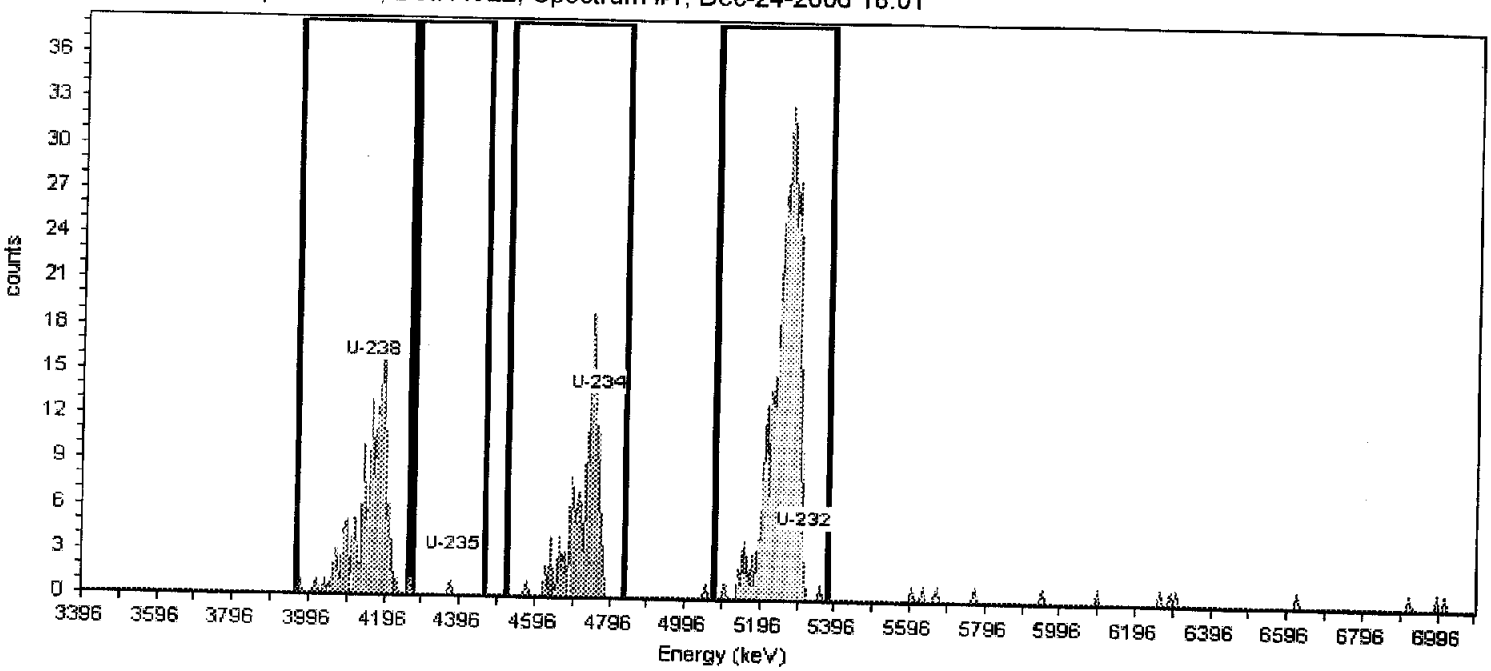
Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

Tracer Nuclide: U-232
Tracer Recovery: 92.69%

Acquisition

Detector: AV22
Serial Number: 41-172Q5
Acquisition Start Date: 1/17/2007 5:57:10PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:20PM
Background Info: Sample: AV22; Det: AV22; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV22
Calibration Date: 12/27/2006 8:51:16AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 25.53% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	64.180	100.0	133.00	0.3750	133	7.009E-001	1.616E-001	5.801E-003	2.590E-002
U-235	4376.294	4267.397	4463.412	17.776	80.2	1.00	0.3750	1	4.119E-003	1.547E-002	7.234E-003	3.230E-002
U-234	4761.063	4521.490	4833.661	56.322	99.8	124.00	0.9375	123	6.517E-001	1.540E-001	9.191E-003	3.271E-002
U-232	5312.808	5073.234	5378.146	66.731	100.1	319.00	0.5625	318	1.616E+000	2.436E-001	7.363E-003	2.955E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 8:57:45PM 1/17/2007

Sample

Sample Name: F7A090121-009
SampleType: Sample
: JMJ491AD
Sample Collection Date: 1/5/2007 11:20:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0018g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

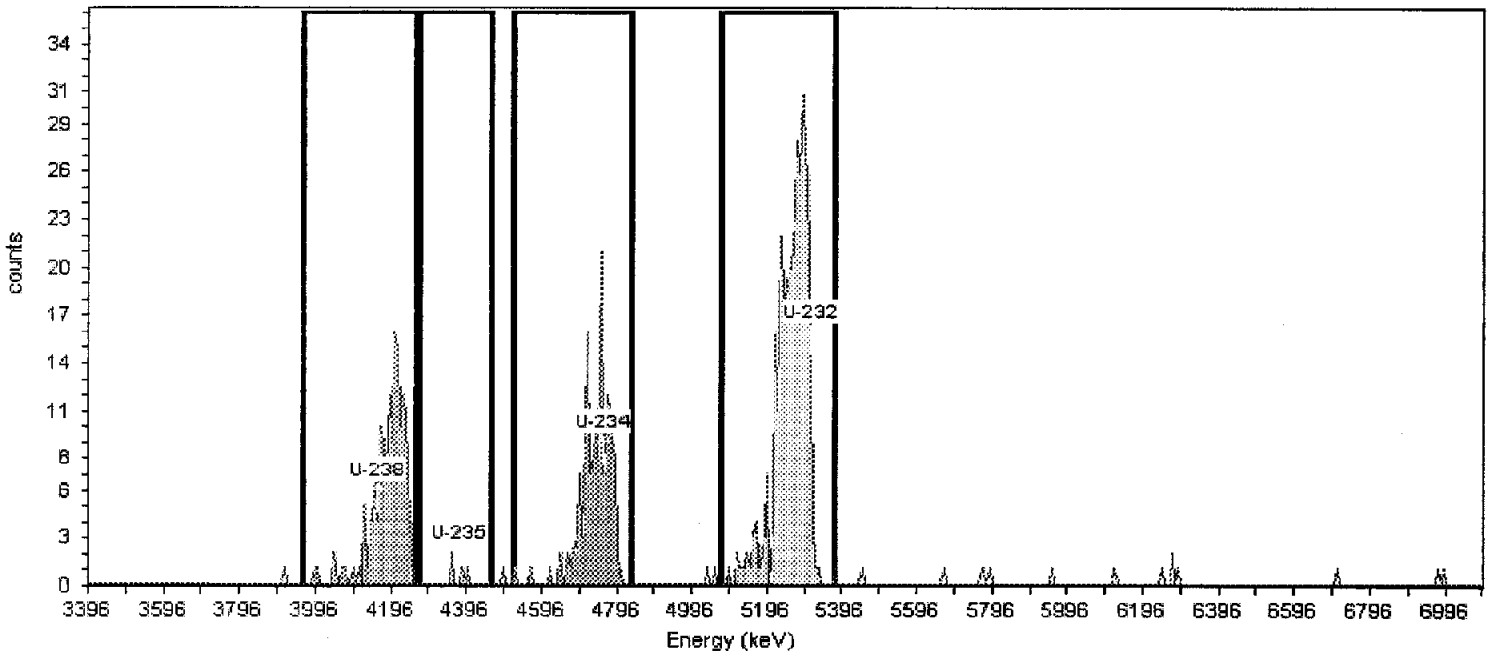
Tracer Nuclide: U-232
Tracer Recovery: 93.09%

Acquisition

Detector: AV23
Serial Number: 41-172R4
Acquisition Start Date: 1/17/2007 5:57:11PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:23PM

Calibration Name: Dec2006_AV23
Calibration Date: 12/27/2006 8:51:24AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 26.89% +/- 0.29% TPU(2 sigma)

Background Info: Sample: AV23; Det: AV23; Spectrum #1; Dec-24-2006 18:01



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	46.189	100.0	155.00	0.9375	154	7.694E-001	1.694E-001	8.668E-003	3.085E-002
U-235	4376.294	4267.397	4463.412	17.513	80.2	4.00	0.1875	4	2.374E-002	2.573E-002	4.834E-003	2.652E-002
U-234	4761.063	4521.490	4833.661	87.061	99.8	153.00	1.3125	152	7.591E-001	1.681E-001	1.028E-002	3.410E-002
U-232	5312.808	5073.234	5378.146	85.457	100.1	338.00	1.1250	337	1.623E+000	2.411E-001	9.840E-003	3.368E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:57:22PM 1/17/2007

Analyst: 60040

Sample

Sample Name: F7A090121-010
SampleType: Sample
: JMJ5A1AD
Sample Collection Date: 1/5/2007 11:20:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0130g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

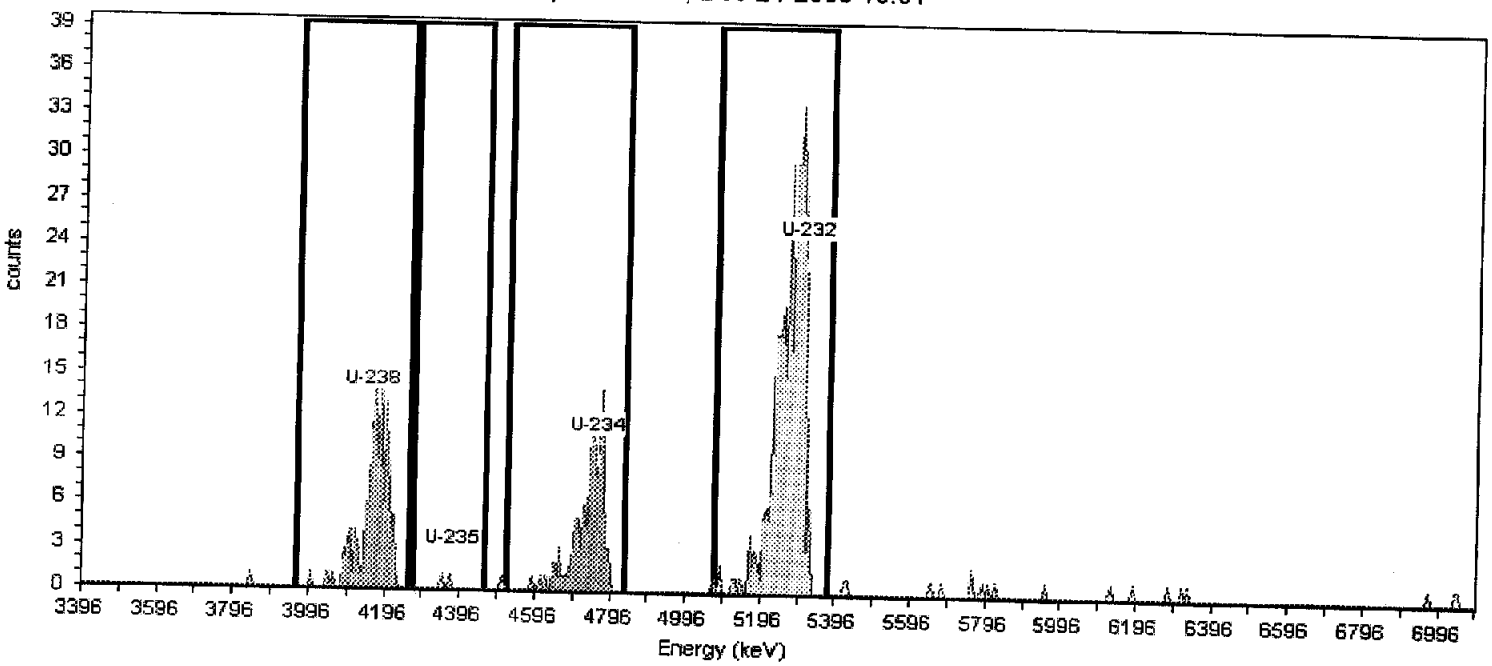
Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

Tracer Nuclide: U-232
Tracer Recovery: 92.10%

Acquisition

Detector: AV24
Serial Number: 41-172R5
Acquisition Start Date: 1/17/2007 5:57:13PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:25PM
Background Info: Sample: AV24; Det: AV24; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV24
Calibration Date: 12/27/2006 8:51:32AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 26.47% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	63.196	100.0	122.00	0.9375	121	6.173E-001	1.462E-001	8.850E-003	3.150E-002
U-235	4376.294	4267.397	4463.412	39.199	80.2	2.00	0.1875	2	1.152E-002	1.889E-002	4.935E-003	2.707E-002
U-234	4761.063	4521.490	4833.661	63.240	99.8	107.00	1.3125	106	5.400E-001	1.337E-001	1.049E-002	3.481E-002
U-232	5312.808	5073.234	5378.146	80.031	100.1	330.00	1.8750	328	1.597E+000	2.392E-001	1.297E-002	4.024E-002

SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 8:57:28PM 1/17/2007

Sample

Sample Name: F7A090121-011
SampleType: Sample
: JMJ5C1AD
Sample Collection Date: 1/5/2007 11:20:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0102g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

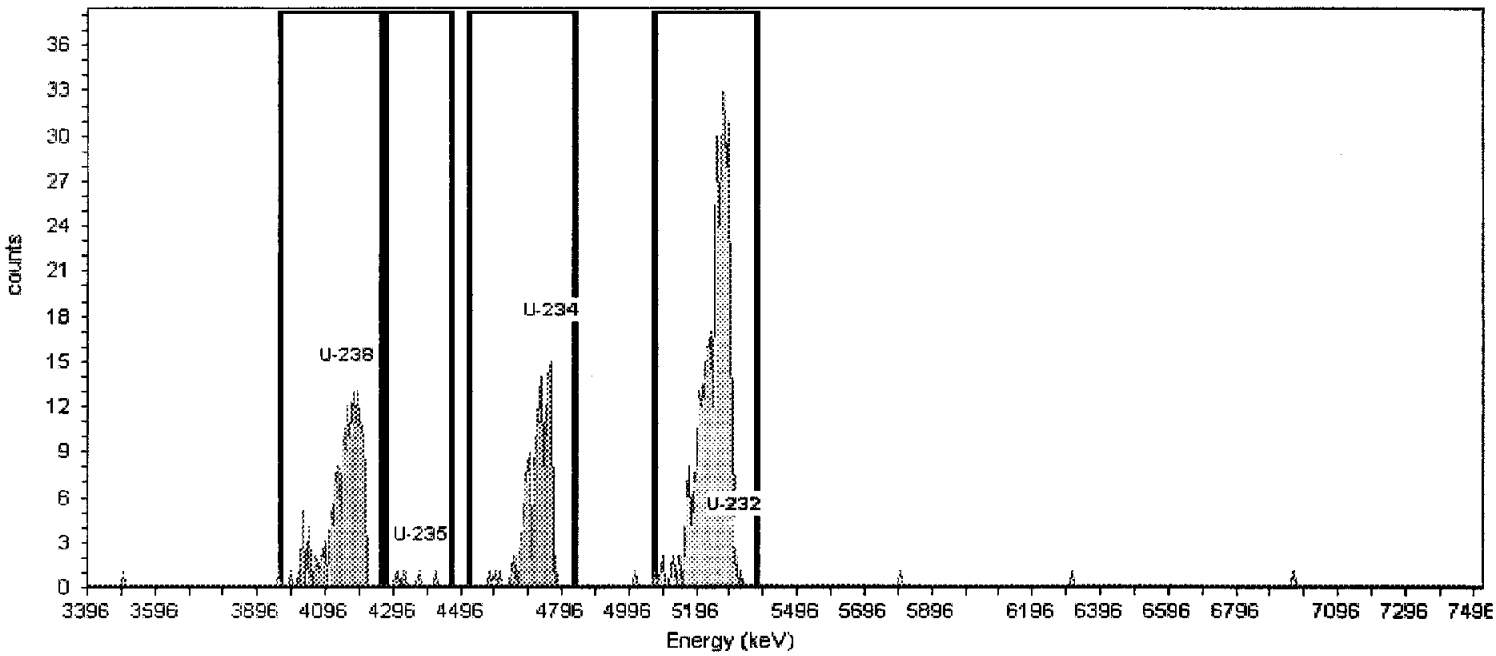
Tracer Nuclide: U-232
Tracer Recovery: 94.29%

Acquisition

Detector: AV46
Serial Number: AV46
Acquisition Start Date: 1/17/2007 5:57:18PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:02:59PM

Calibration Name: DEC2006_AV46
Calibration Date: 12/29/2006 6:57:16AM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 27.35% +/- 0.28% TPU(2 sigma)

Background Info: Sample: AV46; Det: AV46; Spectrum #1; Dec-24-2006 18:02



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	81.249	100.0	157.00	0.1875	157	7.570E-001	1.647E-001	3.747E-003	2.056E-002
U-235	4376.294	4267.397	4463.412	39.155	80.2	4.00	0.3750	4	2.182E-002	2.538E-002	6.607E-003	2.950E-002
U-234	4761.063	4521.490	4833.661	68.436	99.8	125.00	0.3750	125	6.028E-001	1.402E-001	5.310E-003	2.371E-002
U-232	5312.808	5073.234	5378.146	75.315	100.1	348.00	0.9375	347	1.637E+000	2.411E-001	8.682E-003	3.090E-002

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:53:27PM 1/17/2007

Analyst: 60040

Sample

Sample Name: F7A110000-121B
SampleType: Blank
: JMNT11AA
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 2.0000g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

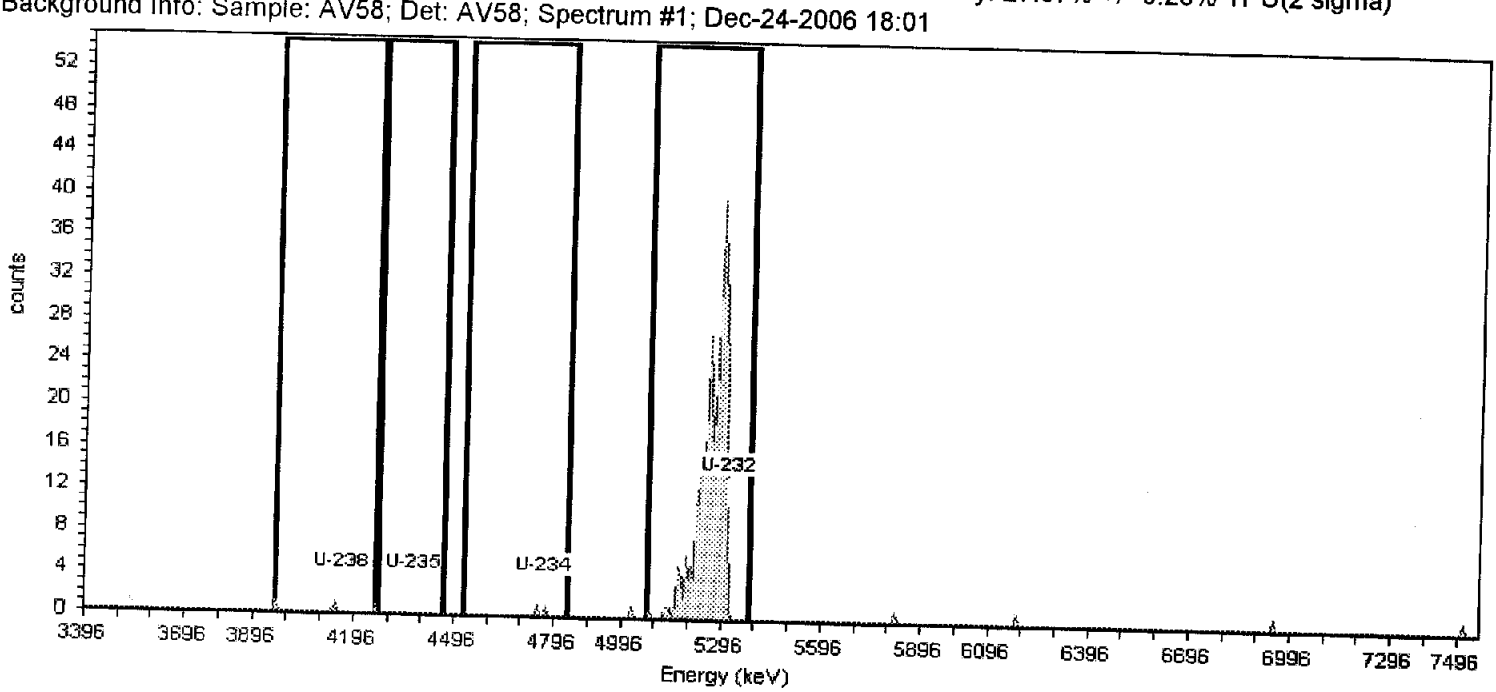
Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

Tracer Nuclide: U-232
Tracer Recovery: 91.48%

Acquisition

Detector: AV58
Serial Number:
Acquisition Start Date: 1/17/2007 2:53:12PM
Live Time: 180.00 min.
Real Time: 180.00 min.
Background Date: 12/24/2006 6:01:44PM
Background Info: Sample: AV58; Det: AV58; Spectrum #1; Dec-24-2006 18:01

Calibration Name: Dec2006_AV58
Calibration Date: 12/28/2006 3:40:46PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²
Efficiency: 27.57% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	.316	100.0	3.00	0.1875	3	1.395E-002	1.783E-002	3.851E-003	2.113E-002
U-235	4376.294	4267.397	4463.412	.000	80.2	0.00	0.1875	0	-1.160E-003	1.348E-002	4.801E-003	2.634E-002
U-234	4761.063	4521.490	4833.661	39.477	99.8	2.00	1.5000	1	2.485E-003	1.860E-002	1.091E-002	3.528E-002
U-232	5312.808	5073.234	5378.146	78.550	100.1	340.00	0.5625	339	1.596E+000	2.364E-001	6.911E-003	2.773E-002

STL SEVERN TRENT STL

Alpha-Spectroscopy Analysis Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:53:30PM 1/17/2007

Sample

Sample Name: F7A110000-121C
SampleType: Control
: JMNT11AC
Sample Collection Date: 1/5/2007 10:45:00AM
Comment:

Spectrum #1 Analysis #1
Sample Weight : 0.1315g
Aliquot: N/A Aliquot Fraction: N/A
Lab Preparation:

Batch

Batch Name: 7011121
:
Description:

Client Name: Undefined
Client Contact:

Tracer

Tracer Name: Rad06-0048_U232
Tracer Activity: 77.48 DPM/mL x (Vol.)0.10 mL = 7.75 DPM
Tracer Ref. Date: 4/7/2003 12:00:09PM

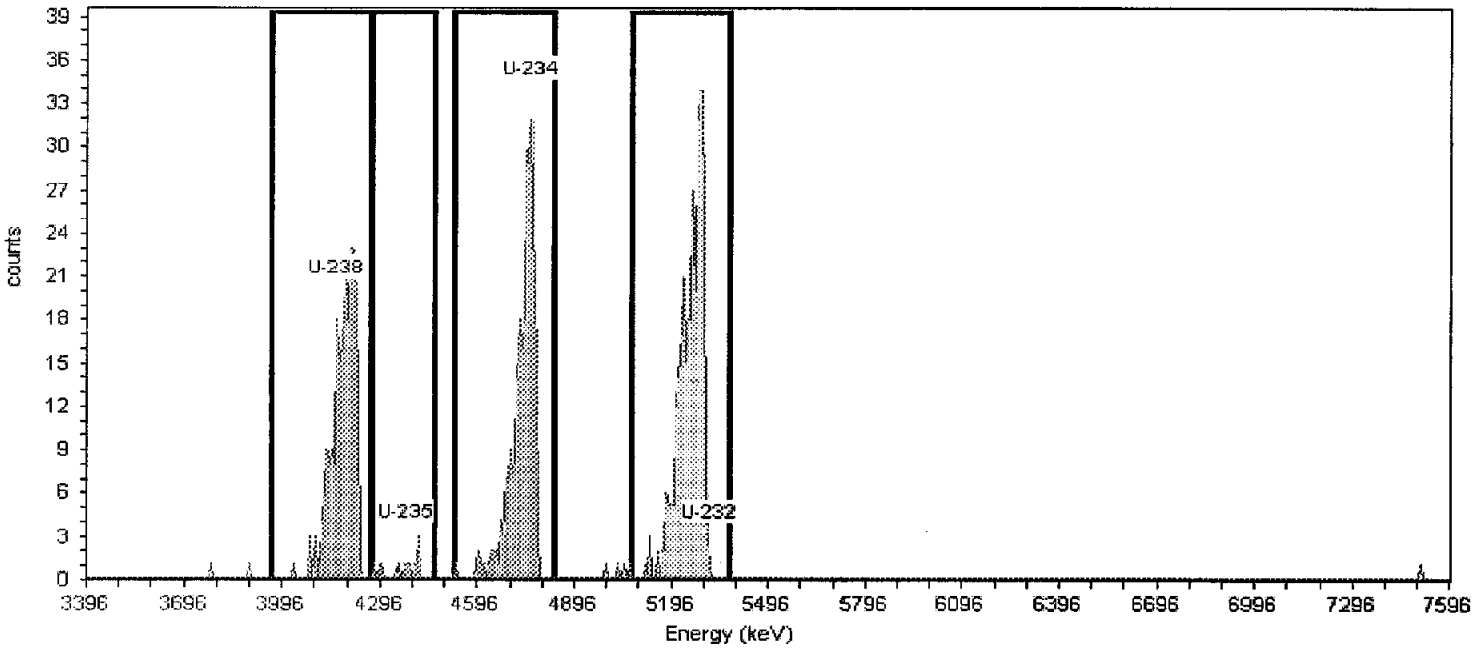
Tracer Nuclide: U-232
Tracer Recovery: 97.94%

Acquisition

Detector: AV64
Serial Number:
Acquisition Start Date: 1/17/2007 2:53:21PM
Live Time: 180.00 min.
Real Time: 180.25 min.
Background Date: 12/24/2006 6:00:53PM

Calibration Name: Dec2006_AV64
Calibration Date: 12/28/2006 12:39:39PM
Energy Cal Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2
Efficiency: 24.59% +/- 0.27% TPU(2 sigma)

Background Info: Sample: AV64; Det: AV64; Spectrum #1; Dec-24-2006 18:00



General Analysis

Analysis Method: ROI Analysis, Set Name = UROI
Decay Correction: 1/17/2007 2:51:17PM
MDA Constants: Kα = 1.65 , Kβ = 1.65

Nuclide Library: Uranium
MDA Source: Background

Nuclide Summary (ROI)

Nuclide	Peak Energy keV	ROI Start keV	ROI End keV	FWHM keV	B.R. %	Gross Counts	Bkgd Counts	Net Counts	Activity pCi/g	2.00Sigma TPU pCi/g	Critical Level pCi/g	MDA pCi/g
U-238	4158.500	3962.485	4260.137	78.172	100.0	237.00	0.1875	237	1.872E+001	3.723E+000	6.135E-002	3.366E-001
U-235	4376.294	4267.397	4463.412	47.763	80.2	11.00	0.0000	11	1.084E+000	7.019E-001	0.000E+000	2.667E-001
U-234	4761.063	4521.490	4833.661	55.187	99.8	255.00	0.5625	254	2.015E+001	3.951E+000	1.065E-001	4.272E-001
U-232	5312.808	5073.234	5378.146	77.386	100.1	325.00	0.9375	324	2.599E+001	3.902E+000	1.421E-001	5.059E-001

SEVERN TRENT STL

Daily Pulsers

1/17/07

Daily Pulser Check - Severn Trent Lab

Pulser Date: 1/17/2007

		Gross Counts				FWHM (keV)			Pulser Center				Energy (keV)			
Detector	Date/Time	Result	Criteria		P/F	Result	Criteria	P/F	Result	Criteria		P/F	Result	Criteria		P/F
AV1	01/17/2007 7:21	7415	7218.7	+/- 5%	Pass	14.0	5 - 50	Pass	222.1	229.0	+/- 5%	Pass	5001	5051.1	+/- 25%	Pass
AV2	01/17/2007 7:21	7418	7468.7	+/- 5%	Pass	14.4	5 - 50	Pass	227.1	222.9	+/- 5%	Pass	5037	5007.5	+/- 25%	Pass
AV3	01/17/2007 7:21	7413	7484.9	+/- 5%	Pass	13.5	5 - 50	Pass	222.0	225.9	+/- 5%	Pass	5001	5028.8	+/- 25%	Pass
AV4	01/17/2007 7:21	7395	7413.7	+/- 5%	Pass	14.9	5 - 50	Pass	226.0	224.9	+/- 5%	Pass	5030	5021.6	+/- 25%	Pass
AV6	01/17/2007 7:21	7311	7476.7	+/- 5%	Pass	11.2	5 - 50	Pass	224.0	224.0	+/- 5%	Pass	5015	5015.3	+/- 25%	Pass
AV7	01/17/2007 7:21	7404	7477.0	+/- 5%	Pass	13.4	5 - 50	Pass	225.9	224.9	+/- 5%	Pass	5029	5021.9	+/- 25%	Pass
AV8	01/17/2007 7:21	7397	7327.4	+/- 5%	Pass	23.3	5 - 50	Pass	223.9	228.0	+/- 5%	Pass	5014	5044.6	+/- 25%	Pass
AV9	01/17/2007 7:21	7717	7519.3	+/- 5%	Pass	13.2	5 - 50	Pass	225.0	227.9	+/- 5%	Pass	5023	5043.3	+/- 25%	Pass
AV11	01/17/2007 7:21	7712	7666.2	+/- 5%	Pass	17.8	5 - 50	Pass	224.9	225.0	+/- 5%	Pass	5021	5022.1	+/- 25%	Pass
AV12	01/17/2007 7:21	7679	7588.7	+/- 5%	Pass	15.7	5 - 50	Pass	223.9	230.0	+/- 5%	Pass	5014	5058.4	+/- 25%	Pass
AV13	01/17/2007 7:21	7592	7584.6	+/- 5%	Pass	11.9	5 - 50	Pass	226.0	228.0	+/- 5%	Pass	5030	5044.1	+/- 25%	Pass
AV14	01/17/2007 7:21	7705	7638.3	+/- 5%	Pass	13.3	5 - 50	Pass	222.1	227.0	+/- 5%	Pass	5001	5037.2	+/- 25%	Pass
AV15	01/17/2007 7:21	7702	7770.5	+/- 5%	Pass	26.9	5 - 50	Pass	221.9	226.9	+/- 5%	Pass	5000	5036.6	+/- 25%	Pass
AV16	01/17/2007 7:21	7694	7456.0	+/- 5%	Pass	14.6	5 - 50	Pass	225.0	226.9	+/- 5%	Pass	5023	5036.2	+/- 25%	Pass
AV17	01/17/2007 7:21	7708	7619.1	+/- 5%	Pass	14.2	5 - 50	Pass	227.0	229.9	+/- 5%	Pass	5037	5058.3	+/- 25%	Pass
AV18	01/17/2007 7:21	7700	7714.5	+/- 5%	Pass	14.5	5 - 50	Pass	221.9	226.9	+/- 5%	Pass	5000	5036.4	+/- 25%	Pass
AV19	01/17/2007 7:21	7704	7269.8	+/- 5%	FAIL	23.0	5 - 50	Pass	224.9	227.7	+/- 5%	Pass	5022	5041.9	+/- 25%	Pass
AV19	01/17/2007 7:55	7580	7269.8	+/- 5%	Pass	22.8	5 - 50	Pass	224.9	227.7	+/- 5%	Pass	5022	5041.9	+/- 25%	Pass
AV20	01/17/2007 7:21	7704	7503.6	+/- 5%	Pass	13.3	5 - 50	Pass	227.0	226.0	+/- 5%	Pass	5037	5029.9	+/- 25%	Pass
AV21	01/17/2007 7:21	7701	7550.9	+/- 5%	Pass	13.2	5 - 50	Pass	223.0	226.0	+/- 5%	Pass	5008	5029.6	+/- 25%	Pass
AV22	01/17/2007 7:21	7697	7691.4	+/- 5%	Pass	13.7	5 - 50	Pass	223.0	225.0	+/- 5%	Pass	5008	5022.4	+/- 25%	Pass
AV23	01/17/2007 7:21	7689	7665.3	+/- 5%	Pass	19.4	5 - 50	Pass	229.9	229.8	+/- 5%	Pass	5058	5057.0	+/- 25%	Pass
AV24	01/17/2007 7:21	7668	7354.0	+/- 5%	Pass	15.7	5 - 50	Pass	224.0	226.9	+/- 5%	Pass	5015	5036.4	+/- 25%	Pass
AV45	01/17/2007 7:21	7591	7593.5	+/- 5%	Pass	19.8	5 - 50	Pass	227.1	225.6	+/- 5%	Pass	5037	5026.9	+/- 25%	Pass
AV46	01/17/2007 7:21	7406	7722.7	+/- 5%	Pass	12.5	5 - 50	Pass	223.0	225.8	+/- 5%	Pass	5008	5028.0	+/- 25%	Pass
AV48	01/17/2007 7:21	7594	7717.5	+/- 5%	Pass	14.1	5 - 50	Pass	224.0	224.0	+/- 5%	Pass	5015	5015.2	+/- 25%	Pass
AV49	01/17/2007 7:21	7583	7703.4	+/- 5%	Pass	14.7	5 - 50	Pass	232.0	226.0	+/- 5%	Pass	5073	5029.5	+/- 25%	Pass
AV50	01/17/2007 7:21	7534	7660.9	+/- 5%	Pass	21.5	5 - 50	Pass	223.8	227.0	+/- 5%	Pass	5013	5037.2	+/- 25%	Pass
AV51	01/17/2007 7:21	6780	7070.5	+/- 5%	Pass	12.9	5 - 50	Pass	226.8	223.0	+/- 5%	Pass	5036	5007.6	+/- 25%	Pass
AV52	01/17/2007 7:21	7297	7156.4	+/- 5%	Pass	20.9	5 - 50	Pass	223.1	225.0	+/- 5%	Pass	5009	5022.4	+/- 25%	Pass
AV53	01/17/2007 7:21	7315	7144.1	+/- 5%	Pass	14.7	5 - 50	Pass	223.0	223.0	+/- 5%	Pass	5008	5007.8	+/- 25%	Pass
AV54	01/17/2007 7:21	7319	7313.1	+/- 5%	Pass	13.3	5 - 50	Pass	227.0	226.0	+/- 5%	Pass	5037	5029.5	+/- 25%	Pass

Detector	Date/Time	Gross Counts Result	Gross Counts Criteria	P/F	FWHM (keV) Result	FWHM (keV) Criteria	P/F	Pulser Center Result	Pulser Center Criteria	P/F	Energy (keV) Result	Energy (keV) Criteria	P/F
AV56	01/17/2007 7:21	7317	7163.7 +/- 5%	Pass	13.5	5 - 50	Pass	222.1	222.0 +/- 5%	Pass	5001	5000.7 +/- 25%	Pass
AV57	01/17/2007 7:21	7299	7309.5 +/- 5%	Pass	20.3	5 - 50	Pass	219.0	222.0 +/- 5%	Pass	4979	5000.6 +/- 25%	Pass
AV58	01/17/2007 7:21	7311	7249.2 +/- 5%	Pass	13.9	5 - 50	Pass	220.9	223.0 +/- 5%	Pass	4993	5008.0 +/- 25%	Pass
AV59	01/17/2007 7:21	7320	7141.4 +/- 5%	Pass	14.2	5 - 50	Pass	287.0	284.0 +/- 5%	Pass	5473	5450.6 +/- 25%	Pass
AV60	01/17/2007 7:21	7322	7019.7 +/- 5%	Pass	22.7	5 - 50	Pass	221.1	223.0 +/- 5%	Pass	4994	5007.5 +/- 25%	Pass
AV63	01/17/2007 7:21	7325	7120.8 +/- 5%	Pass	38.9	5 - 50	Pass	218.6	223.0 +/- 5%	Pass	4976	5007.9 +/- 25%	Pass
AV64	01/17/2007 7:21	7320	7153.7 +/- 5%	Pass	13.5	5 - 50	Pass	224.0	224.0 +/- 5%	Pass	5015	5015.3 +/- 25%	Pass
AV65	01/17/2007 7:21	7156	7233.4 +/- 5%	Pass	24.9	5 - 50	Pass	216.0	224.0 +/- 5%	Pass	4957	5015.3 +/- 25%	Pass
AV66	01/17/2007 7:22	7317	7165.5 +/- 5%	Pass	13.8	5 - 50	Pass	218.9	222.0 +/- 5%	Pass	4978	5000.5 +/- 25%	Pass
AV67	01/17/2007 7:22	7404	7128.1 +/- 5%	Pass	18.5	5 - 50	Pass	225.0	224.1 +/- 5%	Pass	5022	5015.6 +/- 25%	Pass
AV68	01/17/2007 7:56	7384	7259.5 +/- 5%	Pass	13.9	5 - 50	Pass	220.9	222.0 +/- 5%	Pass	4993	5000.8 +/- 25%	Pass
AV69	01/17/2007 7:56	7357	7305.4 +/- 5%	Pass	16.2	5 - 50	Pass	220.0	222.0 +/- 5%	Pass	4986	5000.6 +/- 25%	Pass
AV70	01/17/2007 7:55	7381	7406.5 +/- 5%	Pass	13.5	5 - 50	Pass	219.9	222.6 +/- 5%	Pass	4985	5004.7 +/- 25%	Pass
AV71	01/17/2007 7:55	7092	7187.3 +/- 5%	Pass	12.6	5 - 50	Pass	220.0	225.0 +/- 5%	Pass	4986	5022.7 +/- 25%	Pass
AV71	01/17/2007 7:55	7092	7187.3 +/- 5%	Pass	12.6	5 - 50	Pass	220.0	225.0 +/- 5%	Pass	4986	5022.7 +/- 25%	Pass
AV72	01/17/2007 7:55	7163	7090.0 +/- 5%	Pass	12.9	5 - 50	Pass	218.0	223.9 +/- 5%	Pass	4971	5014.6 +/- 25%	Pass
AV72	01/17/2007 7:55	7163	7090.0 +/- 5%	Pass	12.9	5 - 50	Pass	218.0	223.9 +/- 5%	Pass	4971	5014.6 +/- 25%	Pass
AV73	01/17/2007 7:55	7370	7251.3 +/- 5%	Pass	23.9	5 - 50	Pass	218.8	225.0 +/- 5%	Pass	4978	5022.4 +/- 25%	Pass
AV75	01/17/2007 7:55	7389	7267.9 +/- 5%	Pass	12.3	5 - 50	Pass	223.0	224.1 +/- 5%	Pass	5008	5015.5 +/- 25%	Pass
AV76	01/17/2007 7:55	7353	7374.3 +/- 5%	Pass	12.5	5 - 50	Pass	223.0	224.0 +/- 5%	Pass	5008	5015.2 +/- 25%	Pass
AV77	01/17/2007 7:55	7540	7497.1 +/- 5%	Pass	13.1	5 - 50	Pass	224.0	224.0 +/- 5%	Pass	5015	5015.4 +/- 25%	Pass
AV78	01/17/2007 7:55	7360	7183.8 +/- 5%	Pass	12.3	5 - 50	Pass	222.0	223.3 +/- 5%	Pass	5001	5009.8 +/- 25%	Pass
AV78	01/17/2007 7:55	7360	7183.8 +/- 5%	Pass	12.3	5 - 50	Pass	222.0	223.3 +/- 5%	Pass	5001	5009.8 +/- 25%	Pass
AV79	01/17/2007 7:55	7116	7349.7 +/- 5%	Pass	12.8	5 - 50	Pass	220.9	222.0 +/- 5%	Pass	4993	5000.4 +/- 25%	Pass
AV80	01/17/2007 7:55	7286	7226.4 +/- 5%	Pass	12.8	5 - 50	Pass	223.0	224.1 +/- 5%	Pass	5008	5015.5 +/- 25%	Pass
AV80	01/17/2007 7:55	7286	7226.4 +/- 5%	Pass	12.8	5 - 50	Pass	223.0	224.1 +/- 5%	Pass	5008	5015.5 +/- 25%	Pass
AV81	01/17/2007 7:55	6963	7453.4 +/- 5%	FAIL	13.3	5 - 50	Pass	221.9	223.0 +/- 5%	Pass	5000	5008.1 +/- 25%	Pass
AV82	01/17/2007 7:55	7456	7529.2 +/- 5%	Pass	13.2	5 - 50	Pass	224.0	224.0 +/- 5%	Pass	5015	5015.2 +/- 25%	Pass
AV82	01/17/2007 7:55	7456	7529.2 +/- 5%	Pass	13.2	5 - 50	Pass	224.0	224.0 +/- 5%	Pass	5015	5015.2 +/- 25%	Pass
AV83	01/17/2007 7:55	7520	7523.7 +/- 5%	Pass	12.3	5 - 50	Pass	222.0	222.0 +/- 5%	Pass	5001	5000.4 +/- 25%	Pass
AV83	01/17/2007 7:55	7520	7523.7 +/- 5%	Pass	12.3	5 - 50	Pass	222.0	222.0 +/- 5%	Pass	5001	5000.4 +/- 25%	Pass
AV84	01/17/2007 7:55	7529	7637.7 +/- 5%	Pass	12.7	5 - 50	Pass	223.0	223.0 +/- 5%	Pass	5008	5007.7 +/- 25%	Pass
AV85	01/17/2007 7:55	7487	7549.7 +/- 5%	Pass	12.1	5 - 50	Pass	222.0	223.0 +/- 5%	Pass	5000	5008.0 +/- 25%	Pass
AV85	01/17/2007 7:55	7487	7549.7 +/- 5%	Pass	12.1	5 - 50	Pass	222.0	223.0 +/- 5%	Pass	5000	5008.0 +/- 25%	Pass
AV86	01/17/2007 7:55	7628	7679.0 +/- 5%	Pass	16.8	5 - 50	Pass	224.1	223.9 +/- 5%	Pass	5016	5014.3 +/- 25%	Pass
AV87	01/17/2007 7:55	7661	7512.4 +/- 5%	Pass	13.6	5 - 50	Pass	223.1	223.0 +/- 5%	Pass	5008	5007.7 +/- 25%	Pass

Detector	Date/Time	Gross Counts Result	Gross Counts Criteria	P/F	FWHM (keV) Result	FWHM (keV) Criteria	P/F	Pulser Center Result	Pulser Center Criteria	P/F	Energy (keV) Result	Energy (keV) Criteria	P/F
AV87	01/17/2007 7:55	7661	7512.4 +/- 5%	Pass	13.6	5 - 50	Pass	223.1	223.0 +/- 5%	Pass	5008	5007.7 +/- 25%	Pass
AV88	01/17/2007 7:55	7661	7716.1 +/- 5%	Pass	13.8	5 - 50	Pass	223.1	224.0 +/- 5%	Pass	5008	5015.4 +/- 25%	Pass
AV89	01/17/2007 7:21	7424	7553.8 +/- 5%	Pass	12.6	5 - 50	Pass	221.0	222.6 +/- 5%	Pass	4994	5004.7 +/- 25%	Pass
AV90	01/17/2007 7:21	7701	7474.4 +/- 5%	Pass	13.5	5 - 50	Pass	222.9	224.1 +/- 5%	Pass	5007	5015.6 +/- 25%	Pass
AV92	01/17/2007 7:21	7459	7358.9 +/- 5%	Pass	11.9	5 - 50	Pass	224.0	223.9 +/- 5%	Pass	5015	5014.6 +/- 25%	Pass
AV93	01/17/2007 7:21	7185	7393.5 +/- 5%	Pass	13.0	5 - 50	Pass	221.9	223.0 +/- 5%	Pass	5000	5008.3 +/- 25%	Pass
AV94	01/17/2007 7:21	7339	7477.9 +/- 5%	Pass	12.6	5 - 50	Pass	222.1	222.0 +/- 5%	Pass	5001	5000.5 +/- 25%	Pass
AV95	01/17/2007 7:21	7627	7432.4 +/- 5%	Pass	13.2	5 - 50	Pass	222.0	222.2 +/- 5%	Pass	5001	5001.9 +/- 25%	Pass
AV96	01/17/2007 7:21	7623	7654.3 +/- 5%	Pass	13.3	5 - 50	Pass	221.0	222.6 +/- 5%	Pass	4993	5005.3 +/- 25%	Pass
AV97	01/17/2007 7:21	7621	7649.9 +/- 5%	Pass	13.1	5 - 50	Pass	223.0	223.8 +/- 5%	Pass	5008	5014.0 +/- 25%	Pass
AV98	01/17/2007 7:21	7447	7582.0 +/- 5%	Pass	12.8	5 - 50	Pass	223.0	223.0 +/- 5%	Pass	5008	5007.6 +/- 25%	Pass

SEVERN TRENT STL

Run Log

Logbook No.: 2908

STL
St. Louis

Alpha Spectrometry Runlog

	Date	Batch #	Sample #	Detector	Count Time	Analyte	Setup Initials	Process Initials
1	1/16/07	7010319	F6L160119-010X-1	11	180m	Th	MW	JW
2	1/17/07	Daily	Pulcers	1-98	1min	QA	JW	L
3		7010319	F6L160119-010	56	180min	Th	MW	MW
4			-010X	53				
5		7015231	F7A130154-001	1		U		
6			-001S	2				
7			-002	3				
8			-002X	4				
9			-003	6				
10			-004	7				
11			-005	8				
12			-006	MW 1/17 9/14				
13			-007	16				
14			-008	17				
15			-009	18				
16			-010	19				
17			-011	20				
18			-012	22				
19			F7A150000-231B	54				
20			-231C	58				
21		M0704165	ISOPULCS	52		Pu		
22		7009307	D6L220111-001	9				
23			-001X	11				
24			-002	12				
25			-003	13				
26			F7A090000-357B	21				
27			-357C	45		Pu241		
28		7011355	F7A040213-001	23	360min	Th		
29			-002	24				

Reviewed By: KW Date: 1/17/07

SOP References: STL-RD-0210 Rev 5 01/16/06. Form: SL-RAD-0030, Revised 7/07/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

Logbook No.: 2908

STL
St. Louis

Alpha Spectrometry Runlog

	Date	Batch #	Sample #	Detector	Count Time	Analyte	Setup Initials	Process Initials
1	1/17/07	7011355	F7A040213-003	46	360min	Th	MW	MW
2			-004	48				
3			-005	49				
4			-006	50				
5			-007	51				
6			F7A110000-355B	63				
7			-355C	59				
8			-355L	60				
9			F7A040213-008	1				
10			-009	2				
11			-010	3				
12			-011	4				
13		7015090	F6L160132-008	9	180min	U		MW
14			-012	11				
15			-016	12				
16			F6L200244-016	13				
17			-016X	14				
18			F7A150000-090B	21				
19			-090C	45				
20		7011119	F7A090121-001	16		Th		
21			-001X	18				
22			-002	19				
23			-003	20				
24			-004	22				
25			-005	53				
26			-006	56				
27			F7A110000-119B	52				
28			-119C	54				
29		7011121		6		U		

Reviewed By: MW Date: 1/17/07

SOP References: STL-RD-0210 Rev 5 01/16/06. Form: SL-RAD-0030, Revised 7/07/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

Logbook No.: 2908

STL
St. Louis

Alpha Spectrometry Runlog

	Date	Batch #	Sample #	Detector	Count Time	Analyte	Setup Initials	Process Initials
1	1/17/07	7011121	F7A 090121-001x	7	180min	U	MW	MW
2			-002	8				
3			-003	17				
4			F7A110000-121B	58				
5			-121C	64				
6			~~FAO~~ F7A090121-004	16				
7			-005	18				
8			-006	19				
9			-007	20				
10			-008	22				
11			-009	23				
12			-010	24				
13			-011	44				
14	1/18/07	Daily	Pulsers	1-98	1min	QA	JW	—
15	1/17/07	7011119	F7A090121-007	9	180min	Th	MW	MW
16			-008	11				
17			-009	12				
18			-010	13				
19			-011	14				
20	1/18/07	7017268	F7A110122-004	1		U		
21			F7A110000-268B	2				
22			-268C	3				
23			-268L	4				
24		7011338	F7A110000-338B	9		Pu		
25			-338L	11				
26								
27								
28								
29								

* forgot to write in Book

Reviewed By:_____ Date:_____

SOP References: STL-RD-0210 Rev 5 01/16/06. Form: SL-RAD-0030, Revised 7/07/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

180min LL or R

1/30

SEVERN TRENT **STL**

Prep Report for:

Uranium, Isotopic by Alpha Spectroscopy

Batch: 7011121 **Prep Analyst:** 403301

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

SampID	WRKNO	Aliquot	Dilution	Adj Aliquot	TracerID	TracerAnalyte	TracerAliquot	Low Level
F7A090121-001	JMJ4V1AD	2.0033E+000 g	1.00	2.0033E+000 g	rad06-0048	U-232	0.10	N
F7A090121-001X	JMJ4V1AJ	2.0034E+000 g	1.00	2.0034E+000 g	rad06-0048	U-232	0.10	N
F7A090121-002	JMJ4W1AD	2.0040E+000 g	1.00	2.0040E+000 g	rad06-0048	U-232	0.10	N
F7A090121-003	JMJ4X1AD	2.0035E+000 g	1.00	2.0035E+000 g	rad06-0048	U-232	0.10	N
F7A090121-004	JMJ401AD	2.0178E+000 g	1.00	2.0178E+000 g	rad06-0048	U-232	0.10	N
F7A090121-005	JMJ411AD	2.0040E+000 g	1.00	2.0040E+000 g	rad06-0048	U-232	0.10	N
F7A090121-006	JMJ421AD	2.0090E+000 g	1.00	2.0090E+000 g	rad06-0048	U-232	0.10	N
F7A090121-007	JMJ461AD	2.0153E+000 g	1.00	2.0153E+000 g	rad06-0048	U-232	0.10	N
F7A090121-008	JMJ471AD	2.0012E+000 g	1.00	2.0012E+000 g	rad06-0048	U-232	0.10	N
F7A090121-009	JMJ491AD	2.0018E+000 g	1.00	2.0018E+000 g	rad06-0048	U-232	0.10	N
F7A090121-010	JMJ5A1AD	2.0130E+000 g	1.00	2.0130E+000 g	rad06-0048	U-232	0.10	N
F7A090121-011	JMJ5C1AD	2.0102E+000 g	1.00	2.0102E+000 g	rad06-0048	U-232	0.10	N
F7A110000-121B	JMNT11AA	2.0000E+000 g	1.00	2.0000E+000 g	rad06-0048	U-232	0.10	N
F7A110000-121C	JMNT11AC	1.3150E-001 g	1.00	1.3150E-001 g	rad06-0048	U-232	0.10	N

6 7 8 17 16 18 19 20 22 23 24 46 58 64

Spike Information

Sample ID	Standard ID	Analyte	Std Conc	Aliquot	Ref Date	StdAdded
F7A110000-121C	TRM-3_IsoU	U-234	4.351E+001 dpm/g	0.13 g	5/29/2003 12:00:00AM	1.960E+001 pCi/g
F7A110000-121C	TRM-3_IsoU	U-238	4.351E+001 dpm/g	0.13 g	5/29/2003 12:00:00AM	1.960E+001 pCi/g

SAL — Spiked By

FLP — Spike Verified By

1-11-07 — Spike Date

SampID	WRKNO	Aliquot	Dilution	Adj Aliquot	TracerID	TracerAnalyte	TracerAliquot	Low Level

Standard Operating Procedures

	SOPNumber	Title	Revision
☐	STL-RC-0002	Planchet Preparation For Radiochemistry And Radiological Screening Analysis	4.00
☐	STL-RC-0003	Drying And Grinding Of Soil And Solid Samples	6.00
☐	STL-RC-0004	Preparation Of Soil, Sludge, And Filter Paper Samples For Radiochemical Analysis	10.00
☐	STL-RC-0090	Preparation Of Samples For Sequential Determination Of Isotopic Americium, Currium, Neptunium, Plutonium, Tho	4.00
☑	STL-RC-0100	Actinide Coprecipitation	9.00
☐	STL-RC-0232	Isotopic Thorium And/oR Neptunium in Water, Soil, Sludge, and Filters by Eichrom TEVA Separation Resins	7.00
☐	STL-RC-0238	Isotopic Uranium By Eichrom UTEVA Resin for Water, Soil, Sludge and Filters	7.00
☐	STL-RC-0240	Isotopic Americium, Curium, Plutonium, Thorium, and Uranium in Water, Soil, Sludge and Filters by Eichrome Sepa	5.00
☐	STL-RC-0241	Isotopic Americium, Plutonium, Curium, and Uranium in Water, Soil, Sludge and Filters by Eichrome Uteva and Tr	3.00
☑	STL-RC-0242	Isotopic Thorium, Plutonium and Uranium in Water, Soil, Sludge and Filters by Eichrome Separation Resin	6.00
☐	STL-RD-0201	Daily Operations Of An Alpha Spectroscopy System	2.00
☐	STL-RD-0203	Calibration And Maintenance Of A Alpha Spectroscopy System	1.00

[signature]	1-17-7	Brandy Swift	1/17/07
Column Analyst	Date	Coprecipitated By	Precip Date
[signature]	1/18/07		
Reviewed By	Review Date		
Brandy Swift	1/17/07	[signature]	1/17/07
Analyst/Relenquished By	Release Date	Received By	Receipt Date

SEVERN TRENT STL

Monthly Backgrounds
Alphavision
December 2006

ST

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:25AM 12/26/2006

Sample

Sample Name: AV1 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

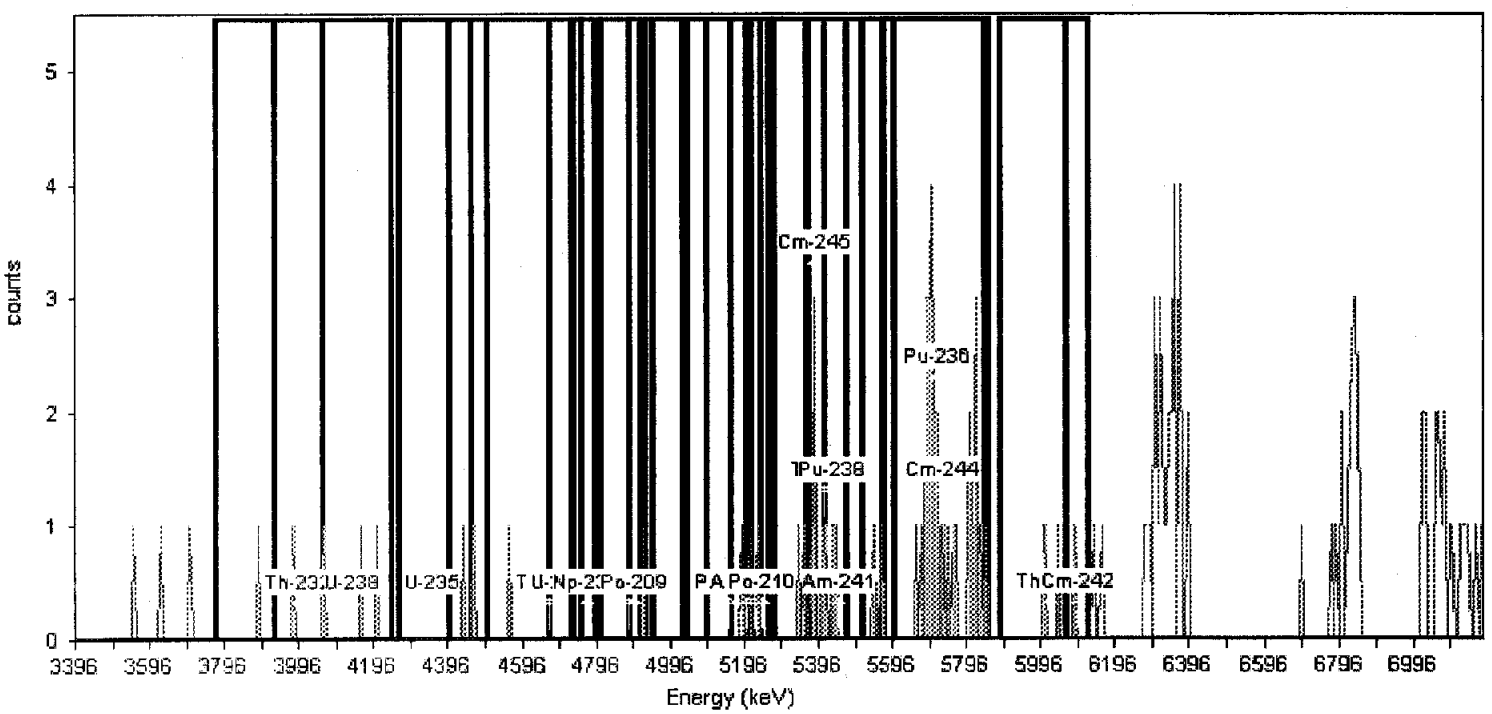
Acquisition

Detector: AV1 , SN: 41-158W6
Acquisition Start Date: 12/24/2006 6:01:57PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV1
Calibration Date: 11/27/2006 8:45:31AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.43% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_Background Nuclide Library: Background ROI Library

Total Background Counts: 121.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	3.00	3.125E-003	2.083E-003
U-238	4.14	3.93	4.24	4.00	4.167E-003	2.329E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	5.00	5.208E-003	2.552E-003
Th-228	5.41	5.16	5.47	13.00	1.354E-002	3.898E-003
Po-210	5.25	5.20	5.26	2.00	2.083E-003	1.804E-003
Pu-238	5.44	5.24	5.52	10.00	1.042E-002	3.455E-003
Am-241	5.45	5.27	5.57	12.00	1.250E-002	3.756E-003
Cm-245	5.39	5.36	5.41	6.00	6.250E-003	2.756E-003
Pu-236	5.72	5.57	5.84	27.00	2.813E-002	5.512E-003
Cm-244	5.73	5.60	5.86	28.00	2.917E-002	5.610E-003
Th-227	6.02	5.89	6.13	3.00	3.125E-003	2.083E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:02:22AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV2
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

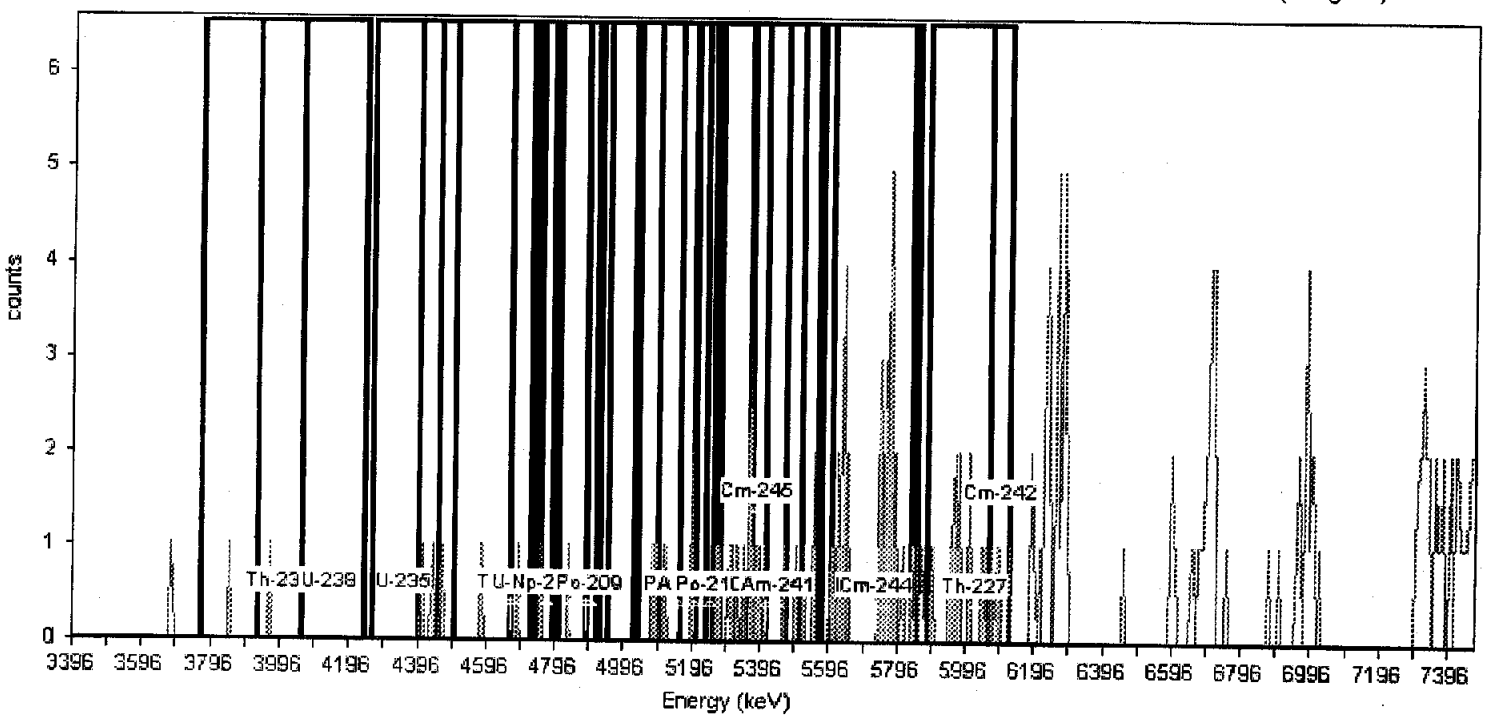
Acquisition

Detector: AV2 , SN: 41-158W7
Acquisition Start Date: 12/24/2006 6:01:58PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV2
Calibration Date: 11/27/2006 8:46:40AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.96% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundRoi
Nuclide Library: Background ROI Library
Total Background Counts: 183.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003
Pu-236	5.72	5.57	5.84	31.00	3.229E-002	5.893E-003
Cm-244	5.73	5.60	5.86	32.00	3.333E-002	5.984E-003
Th-227	6.02	5.89	6.13	16.00	1.667E-002	4.295E-003
Cm-242	6.10	6.07	6.13	4.00	4.167E-003	2.329E-003
Th-230	4.67	4.40	4.73	5.00	5.208E-003	2.552E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	4.00	4.167E-003	2.329E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	5.00	5.208E-003	2.552E-003
Am-243	5.20	5.03	5.28	7.00	7.292E-003	2.946E-003
U-232	5.23	5.04	5.37	16.00	1.667E-002	4.295E-003
Th-228	5.41	5.16	5.47	17.00	1.771E-002	4.419E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	16.00	1.667E-002	4.295E-003
Am-241	5.45	5.27	5.57	19.00	1.979E-002	4.658E-003
Cm-245	5.39	5.36	5.41	8.00	8.333E-003	3.125E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:32AM 12/26/2006

Sample

Sample Name: AV3 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

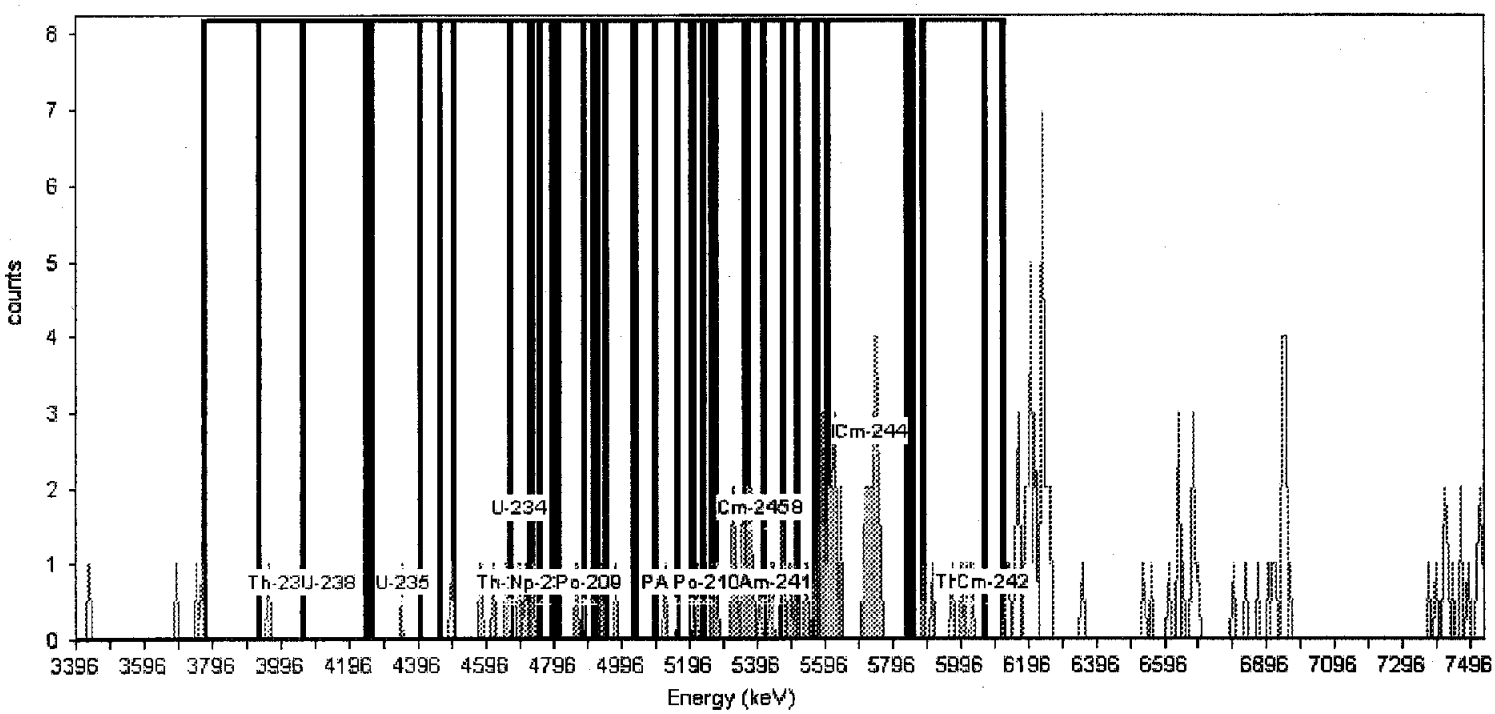
Acquisition

Detector: AV3 , SN: 41-158X5
Acquisition Start Date: 12/24/2006 6:02:00PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV3
Calibration Date: 11/27/2006 8:47:01AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.59% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_Background Nuclide Library: Background ROI Library

Total Background Counts: 161.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	9.00	9.375E-003	3.294E-003
U-234	4.70	4.50	4.80	8.00	8.333E-003	3.125E-003
Pu-242	4.88	4.67	4.93	5.00	5.208E-003	2.552E-003
Th-229	4.84	4.72	5.10	4.00	4.167E-003	2.329E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	4.00	4.167E-003	2.329E-003
U-232	5.23	5.04	5.37	14.00	1.458E-002	4.034E-003
Th-228	5.41	5.16	5.47	21.00	2.187E-002	4.886E-003
Po-210	5.25	5.20	5.26	2.00	2.083E-003	1.804E-003
Pu-238	5.44	5.24	5.52	22.00	2.292E-002	4.996E-003
Am-241	5.45	5.27	5.57	24.00	2.500E-002	5.208E-003
Cm-245	5.39	5.36	5.41	7.00	7.292E-003	2.946E-003
Pu-236	5.72	5.57	5.84	31.00	3.229E-002	5.893E-003
Cm-244	5.73	5.60	5.86	27.00	2.813E-002	5.512E-003
Th-227	6.02	5.89	6.13	6.00	6.250E-003	2.756E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:29AM 12/26/2006

Sample

Sample Name: AV4 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

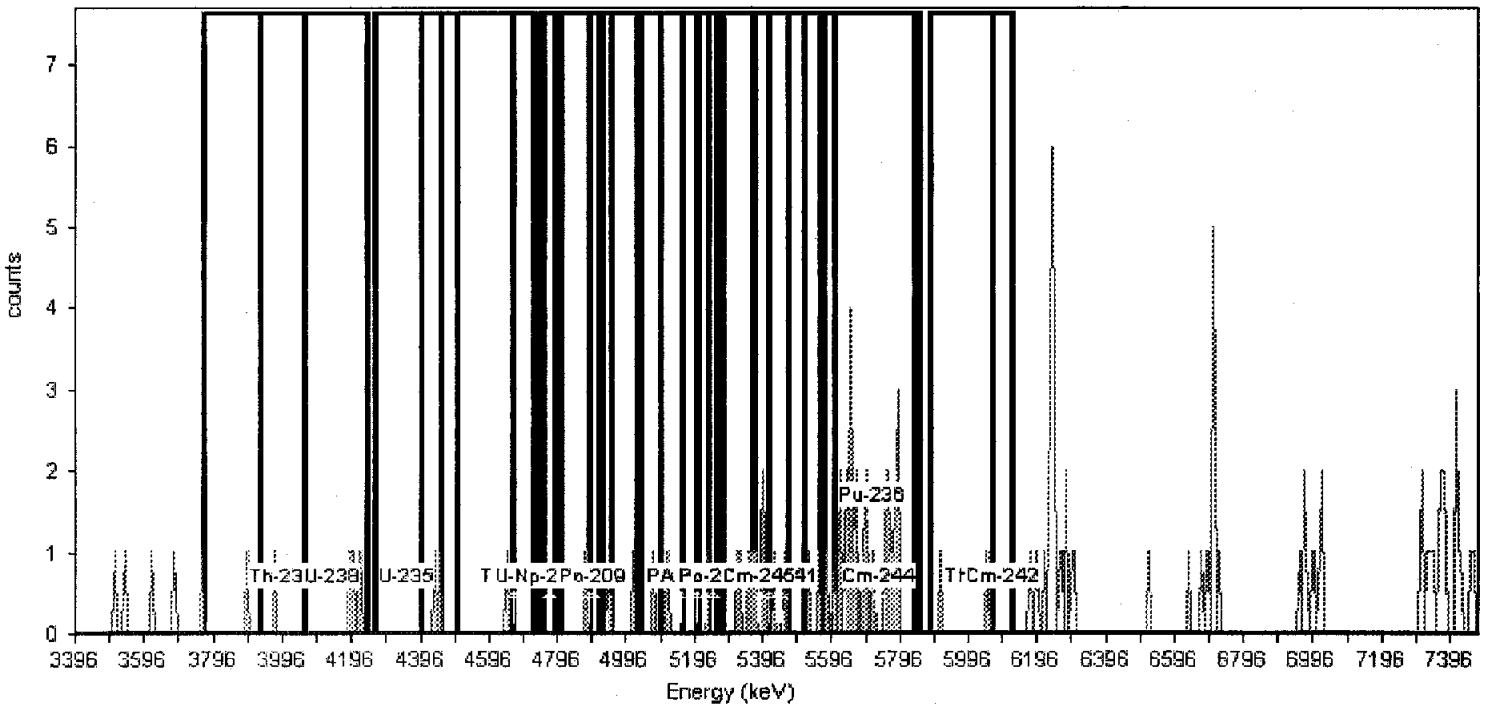
Acquisition

Detector: AV4 , SN: 41-172B5
Acquisition Start Date: 12/24/2006 6:00:52PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV4
Calibration Date: 11/27/2006 8:47:19AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.75% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 124.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	4.00	4.167E-003	2.329E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	4.00	4.167E-003	2.329E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	3.00	3.125E-003	2.083E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	8.00	8.333E-003	3.125E-003
Th-228	5.41	5.16	5.47	12.00	1.250E-002	3.756E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	11.00	1.146E-002	3.608E-003
Am-241	5.45	5.27	5.57	13.00	1.354E-002	3.898E-003
Cm-245	5.39	5.36	5.41	6.00	6.250E-003	2.756E-003
Pu-236	5.72	5.57	5.84	30.00	3.125E-002	5.800E-003
Cm-244	5.73	5.60	5.86	29.00	3.021E-002	5.705E-003
Th-227	6.02	5.89	6.13	2.00	2.083E-003	1.804E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:35AM 12/26/2006

Sample

Sample Name: AV6 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

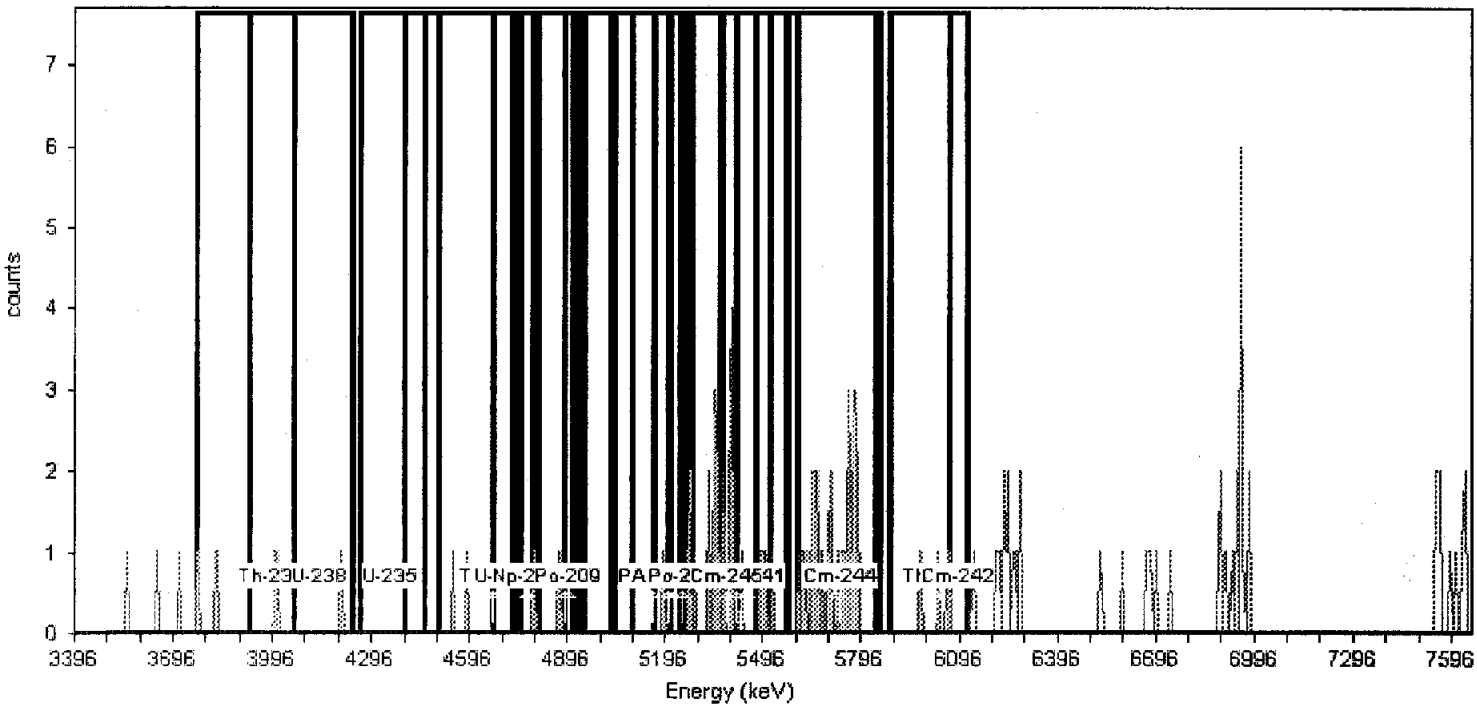
Acquisition

Detector: AV6 , SN:
Acquisition Start Date: 12/24/2006 6:00:54PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV6
Calibration Date: 11/27/2006 8:47:36AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 114.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	5.00	5.208E-003	2.552E-003
U-238	4.14	3.93	4.24	3.00	3.125E-003	2.083E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	13.00	1.354E-002	3.898E-003
Th-228	5.41	5.16	5.47	22.00	2.292E-002	4.996E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	24.00	2.500E-002	5.208E-003
Am-241	5.45	5.27	5.57	25.00	2.604E-002	5.311E-003
Cm-245	5.39	5.36	5.41	10.00	1.042E-002	3.455E-003
Pu-236	5.72	5.57	5.84	27.00	2.813E-002	5.512E-003
Cm-244	5.73	5.60	5.86	27.00	2.813E-002	5.512E-003
Th-227	6.02	5.89	6.13	4.00	4.167E-003	2.329E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:38AM 12/26/2006

Sample

Sample Name: AV7 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

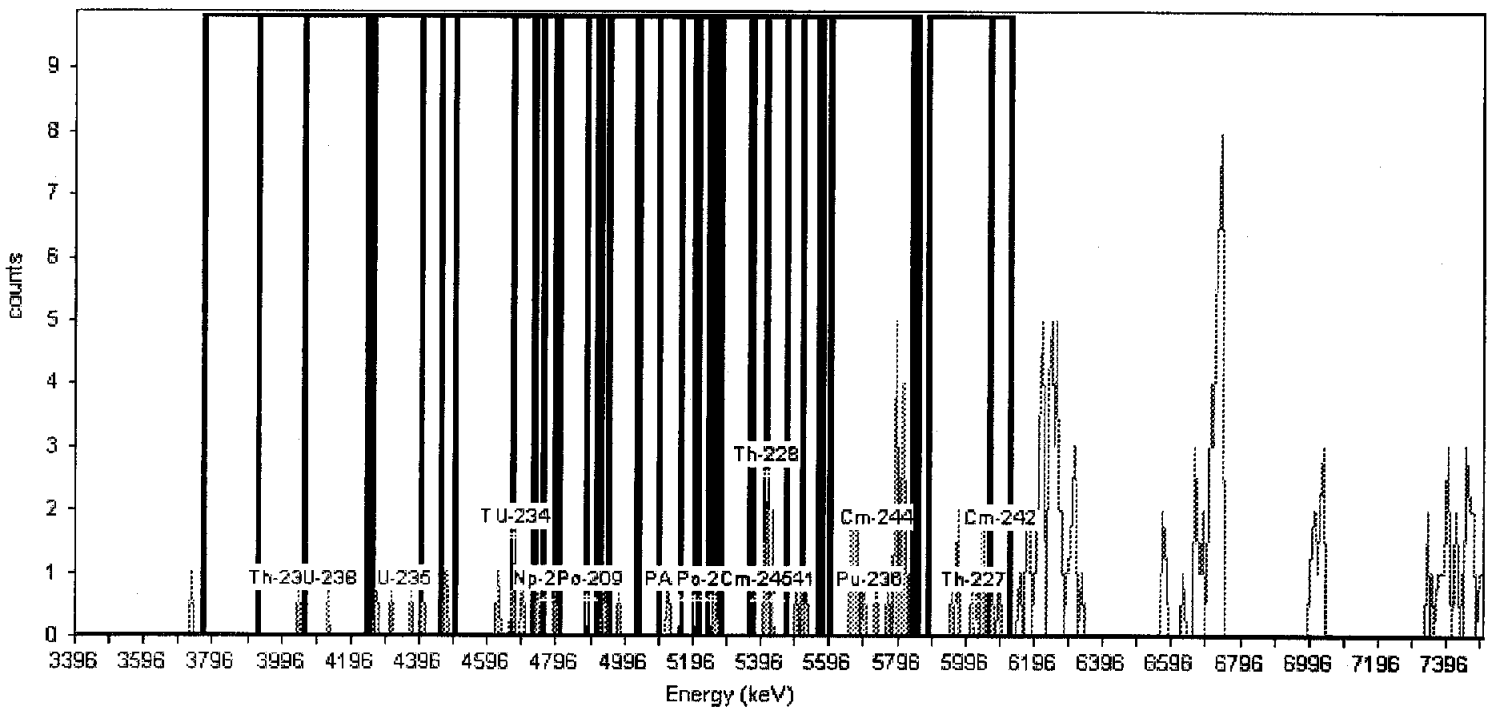
Acquisition

Detector: AV7 , SN: 41-158X6
Acquisition Start Date: 12/24/2006 6:00:56PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV7
Calibration Date: 11/27/2006 8:47:55AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.19% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 191.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	5.00	5.208E-003	2.552E-003
U-234	4.70	4.50	4.80	5.00	5.208E-003	2.552E-003
Pu-242	4.88	4.67	4.93	4.00	4.167E-003	2.329E-003
Th-229	4.84	4.72	5.10	4.00	4.167E-003	2.329E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	2.00	2.083E-003	1.804E-003
Th-228	5.41	5.16	5.47	6.00	6.250E-003	2.756E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	8.00	8.333E-003	3.125E-003
Am-241	5.45	5.27	5.57	8.00	8.333E-003	3.125E-003
Cm-245	5.39	5.36	5.41	3.00	3.125E-003	2.083E-003
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	4.00	4.167E-003	2.329E-003
Pu-236	5.72	5.57	5.84	24.00	2.500E-002	5.208E-003
Cm-244	5.73	5.60	5.86	24.00	2.500E-002	5.208E-003
Th-227	6.02	5.89	6.13	11.00	1.146E-002	3.608E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:02:42AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV8
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

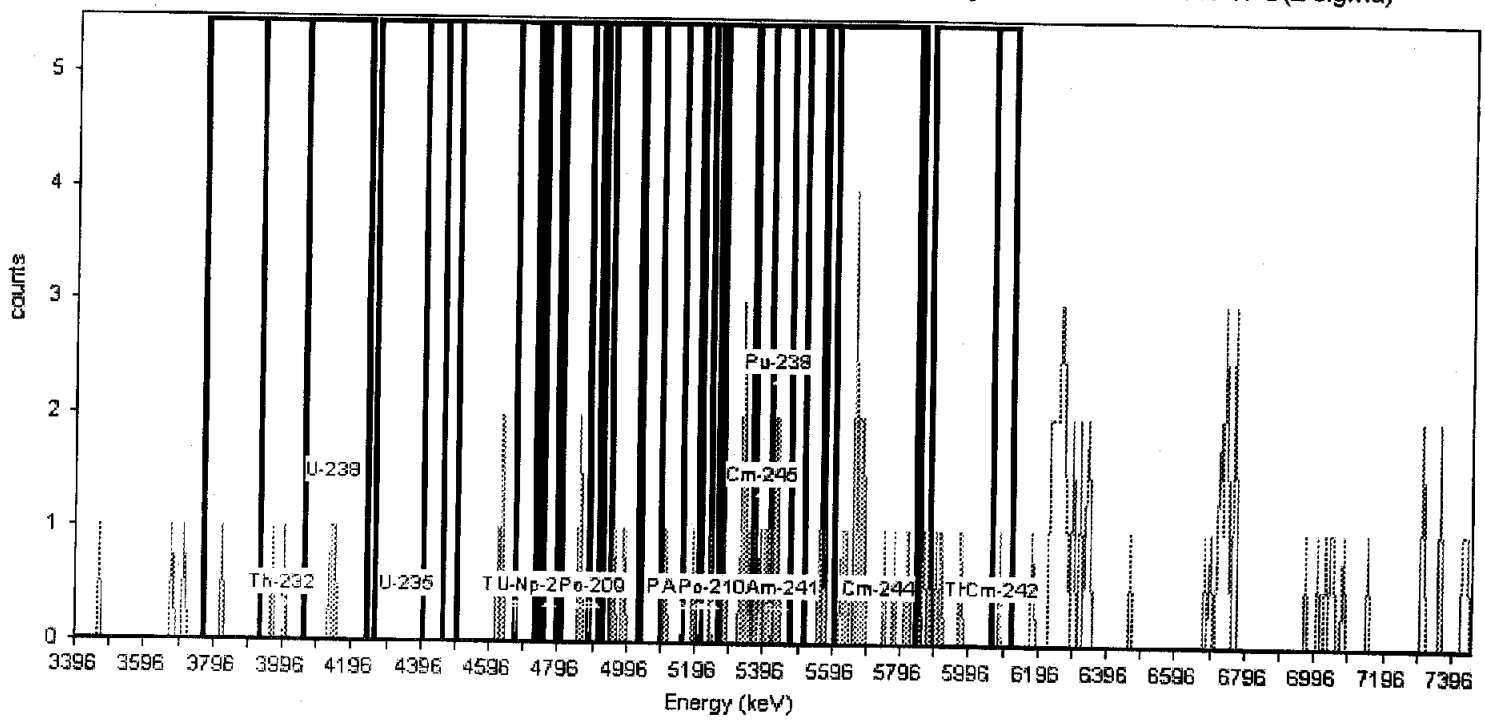
Acquisition

Detector: AV8 , SN: 41-158X1
Acquisition Start Date: 12/24/2006 6:00:58PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV8
Calibration Date: 11/27/2006 8:48:12AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 27.10% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 117.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	3.00	3.125E-003	2.083E-003
U-238	4.14	3.93	4.24	5.00	5.208E-003	2.552E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	5.00	5.208E-003	2.552E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	4.00	4.167E-003	2.329E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	12.00	1.250E-002	3.756E-003
Th-228	5.41	5.16	5.47	18.00	1.875E-002	4.541E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	17.00	1.771E-002	4.419E-003
Am-241	5.45	5.27	5.57	17.00	1.771E-002	4.419E-003
Cm-245	5.39	5.36	5.41	4.00	4.167E-003	2.329E-003
Pu-236	5.72	5.57	5.84	18.00	1.875E-002	4.541E-003
Cm-244	5.73	5.60	5.86	17.00	1.771E-002	4.419E-003
Th-227	6.02	5.89	6.13	4.00	4.167E-003	2.329E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

STL

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:02:45AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV9
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

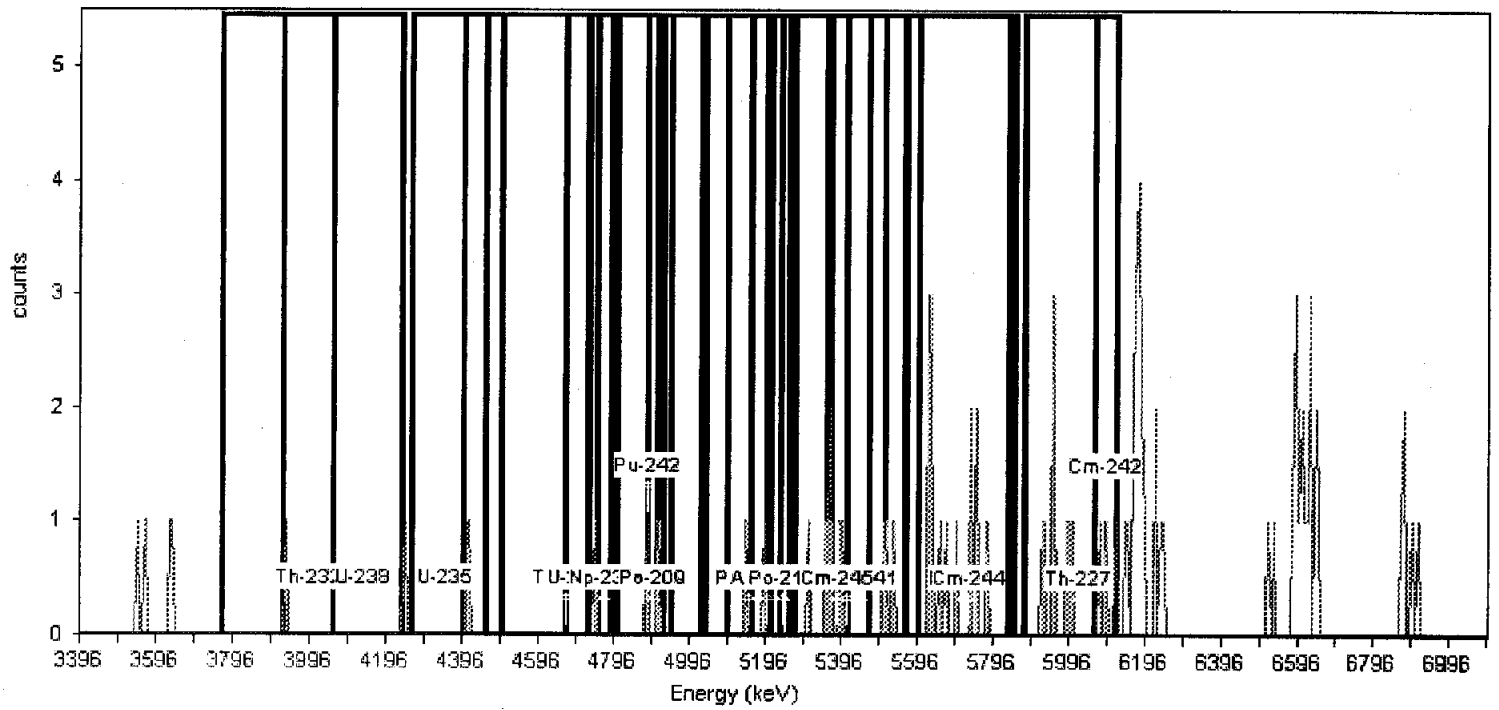
Acquisition

Detector: AV9 , SN: 41-172R1
Acquisition Start Date: 12/24/2006 6:00:59PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV9
Calibration Date: 11/27/2006 8:53:17AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.46% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 86.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	3.00	3.125E-003	2.083E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	2.00	2.083E-003	1.804E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	7.00	7.292E-003	2.946E-003
Th-228	5.41	5.16	5.47	8.00	8.333E-003	3.125E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	9.00	9.375E-003	3.294E-003
Am-241	5.45	5.27	5.57	10.00	1.042E-002	3.455E-003
Cm-245	5.39	5.36	5.41	5.00	5.208E-003	2.552E-003
Pu-236	5.72	5.57	5.84	12.00	1.250E-002	3.756E-003
Cm-244	5.73	5.60	5.86	12.00	1.250E-002	3.756E-003
Th-227	6.02	5.89	6.13	11.00	1.146E-002	3.608E-003
Cm-242	6.10	6.07	6.13	3.00	3.125E-003	2.083E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:48AM 12/26/2006

Sample

Sample Name: AV11 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

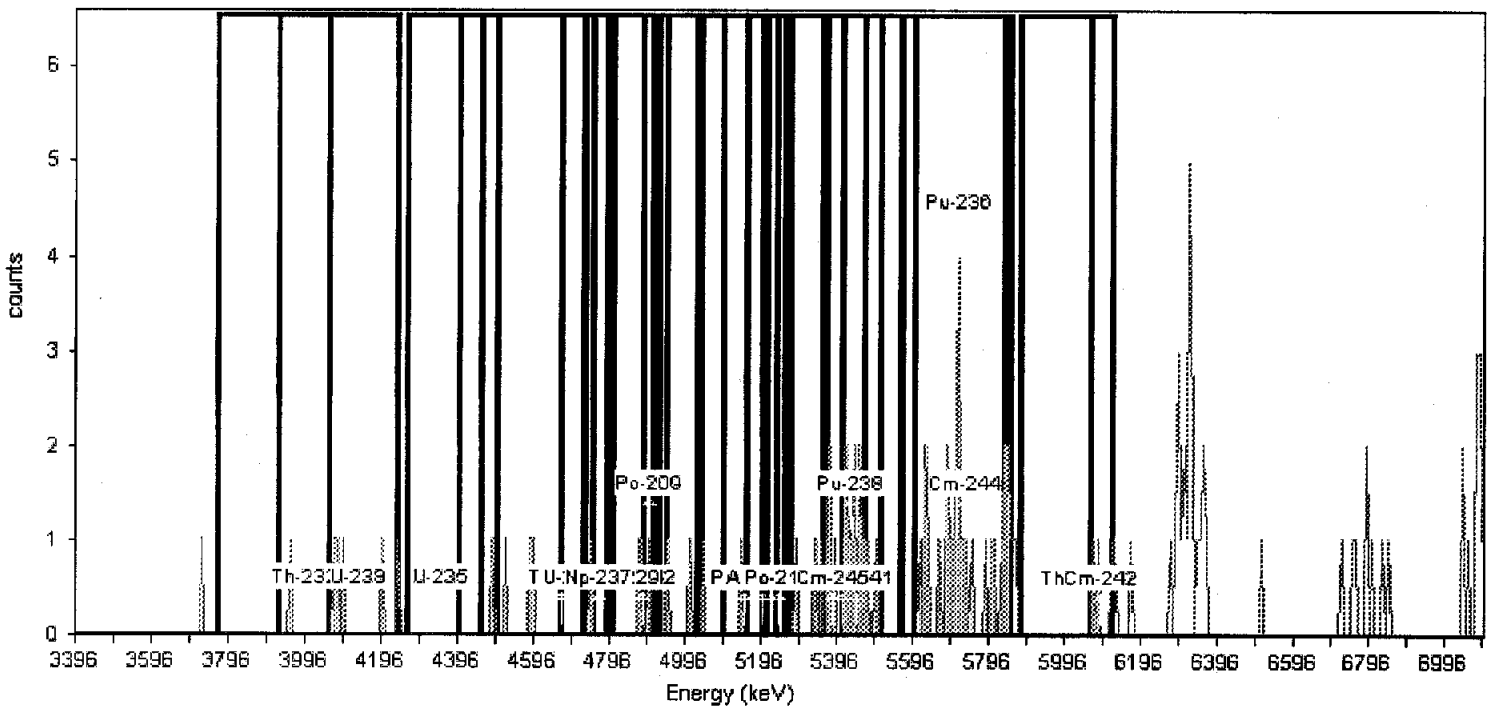
Acquisition

Detector: AV11 , SN: 41-172Q3
Acquisition Start Date: 12/24/2006 6:01:01PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV11
Calibration Date: 11/28/2006 1:34:48PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.93% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 111.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	6.00	6.250E-003	2.756E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	4.00	4.167E-003	2.329E-003
U-234	4.70	4.50	4.80	4.00	4.167E-003	2.329E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	6.00	6.250E-003	2.756E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	4.00	4.167E-003	2.329E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	6.00	6.250E-003	2.756E-003
Th-228	5.41	5.16	5.47	17.00	1.771E-002	4.419E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	19.00	1.979E-002	4.658E-003
Am-241	5.45	5.27	5.57	19.00	1.979E-002	4.658E-003
Cm-245	5.39	5.36	5.41	4.00	4.167E-003	2.329E-003
Pu-236	5.72	5.57	5.84	24.00	2.500E-002	5.208E-003
Cm-244	5.73	5.60	5.86	27.00	2.813E-002	5.512E-003
Th-227	6.02	5.89	6.13	3.00	3.125E-003	2.083E-003
Cm-242	6.10	6.07	6.13	3.00	3.125E-003	2.083E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

6:02:51AM 12/26/2006

Sample

Sample Name: AV12

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

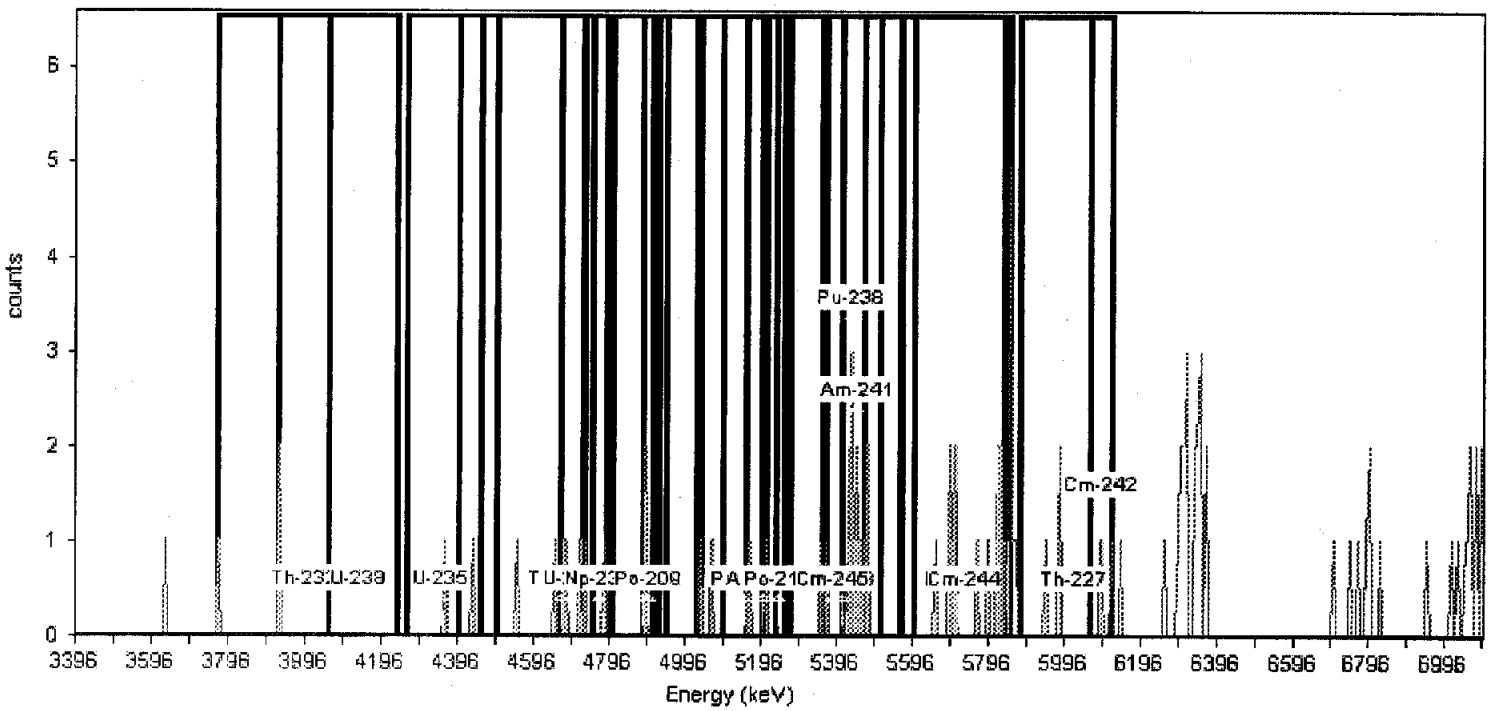
Acquisition

Detector: AV12 , SN: 41-172Q2
Acquisition Start Date: 12/24/2006 6:01:03PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV12
Calibration Date: 11/28/2006 1:34:54PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.58% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI

Nuclide Library: Background ROI Library

Total Background Counts: 95.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	7.00	7.292E-003	2.946E-003
U-234	4.70	4.50	4.80	7.00	7.292E-003	2.946E-003
Pu-242	4.88	4.67	4.93	7.00	7.292E-003	2.946E-003
Th-229	4.84	4.72	5.10	6.00	6.250E-003	2.756E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	2.00	2.083E-003	1.804E-003
Pu-239	5.15	4.95	5.21	4.00	4.167E-003	2.329E-003
Am-243	5.20	5.03	5.28	4.00	4.167E-003	2.329E-003
U-232	5.23	5.04	5.37	6.00	6.250E-003	2.756E-003
Th-228	5.41	5.16	5.47	13.00	1.354E-002	3.898E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	13.00	1.354E-002	3.898E-003
Am-241	5.45	5.27	5.57	13.00	1.354E-002	3.898E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	13.00	1.354E-002	3.898E-003
Cm-244	5.73	5.60	5.86	19.00	1.979E-002	4.658E-003
Th-227	6.02	5.89	6.13	5.00	5.208E-003	2.552E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003
Th-232	3.99	3.77	4.06	3.00	3.125E-003	2.083E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:02:55AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV13
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

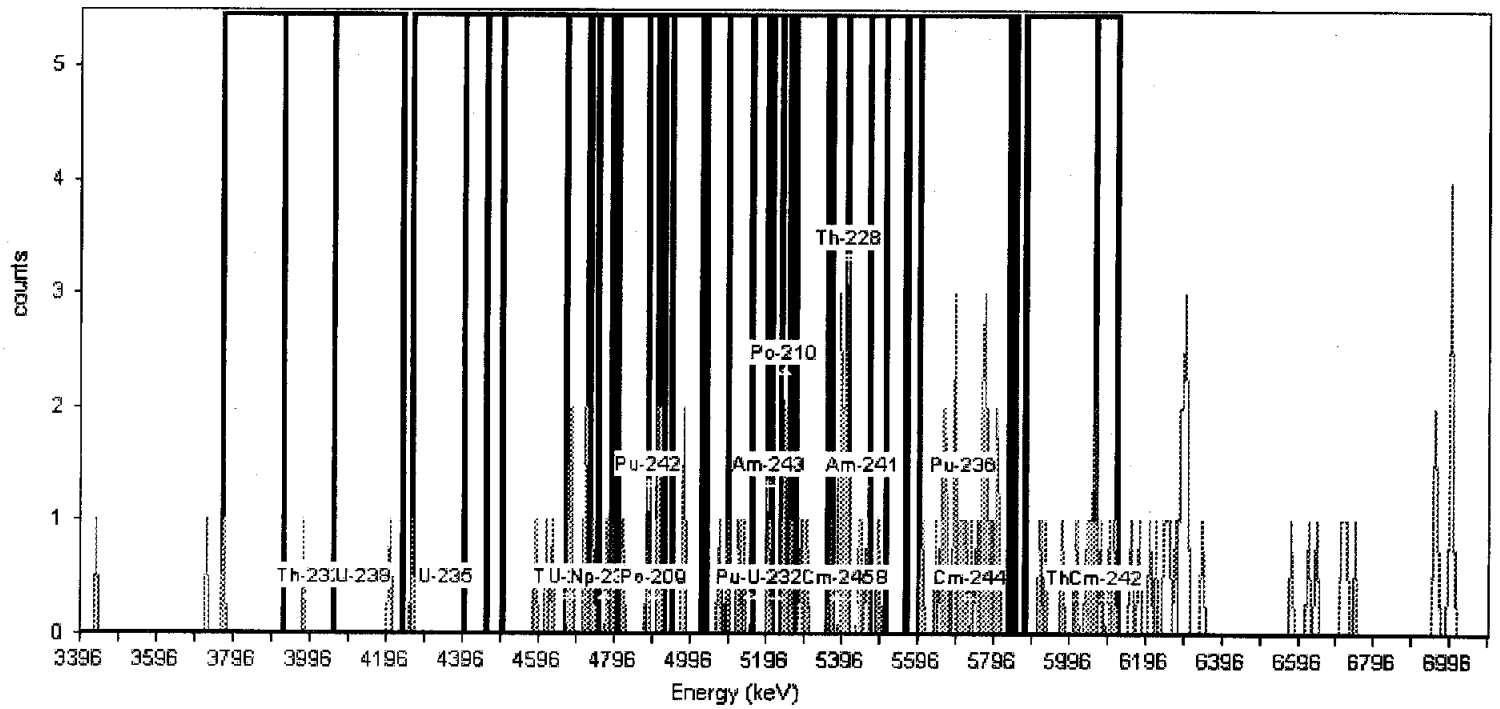
Acquisition

Detector: AV13 , SN: 41-172Q1
Acquisition Start Date: 12/24/2006 6:01:05PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV13
Calibration Date: 11/27/2006 11:34:47AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.92% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 116.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	8.00	8.333E-003	3.125E-003
U-234	4.70	4.50	4.80	11.00	1.146E-002	3.608E-003
Pu-242	4.88	4.67	4.93	12.00	1.250E-002	3.756E-003
Th-229	4.84	4.72	5.10	11.00	1.146E-002	3.608E-003
Np-237	4.77	4.75	4.79	2.00	2.083E-003	1.804E-003
Po-209	4.90	4.88	4.91	3.00	3.125E-003	2.083E-003
Pu-239	5.15	4.95	5.21	7.00	7.292E-003	2.946E-003
Am-243	5.20	5.03	5.28	8.00	8.333E-003	3.125E-003
U-232	5.23	5.04	5.37	11.00	1.146E-002	3.608E-003
Th-228	5.41	5.16	5.47	20.00	2.083E-002	4.774E-003
Po-210	5.25	5.20	5.26	4.00	4.167E-003	2.329E-003
Pu-238	5.44	5.24	5.52	20.00	2.083E-002	4.774E-003
Am-241	5.45	5.27	5.57	17.00	1.771E-002	4.419E-003
Cm-245	5.39	5.36	5.41	11.00	1.146E-002	3.608E-003
Pu-236	5.72	5.57	5.84	24.00	2.500E-002	5.208E-003
Cm-244	5.73	5.60	5.86	24.00	2.500E-002	5.208E-003
Th-227	6.02	5.89	6.13	12.00	1.250E-002	3.756E-003
Cm-242	6.10	6.07	6.13	5.00	5.208E-003	2.552E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

6:02:58AM 12/26/2006

Sample

Sample Name: AV14

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

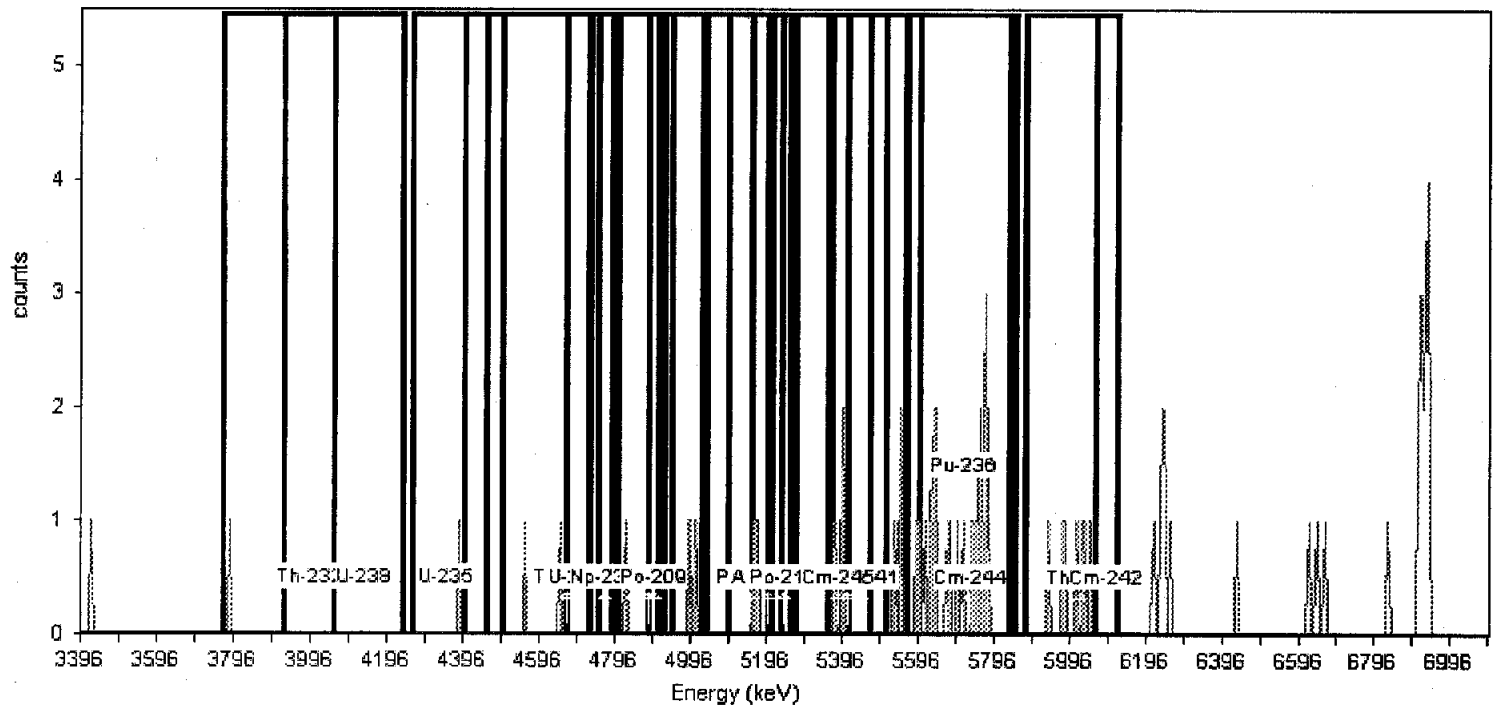
Acquisition

Detector: AV14 , SN: 41-172C4
Acquisition Start Date: 12/24/2006 6:01:07PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV14
Calibration Date: 11/27/2006 11:34:53AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.55% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI

Nuclide Library: Background ROI Library

Total Background Counts: 69.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	3.00	3.125E-003	2.083E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	4.00	4.167E-003	2.329E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	2.00	2.083E-003	1.804E-003
Th-228	5.41	5.16	5.47	5.00	5.208E-003	2.552E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	3.00	3.125E-003	2.083E-003
Am-241	5.45	5.27	5.57	6.00	6.250E-003	2.756E-003
Cm-245	5.39	5.36	5.41	3.00	3.125E-003	2.083E-003
Pu-236	5.72	5.57	5.84	22.00	2.292E-002	4.996E-003
Cm-244	5.73	5.60	5.86	21.00	2.187E-002	4.886E-003
Th-227	6.02	5.89	6.13	7.00	7.292E-003	2.946E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:01:42AM 12/25/2006

Analyst: 60040

Sample

Sample Name: AV15
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

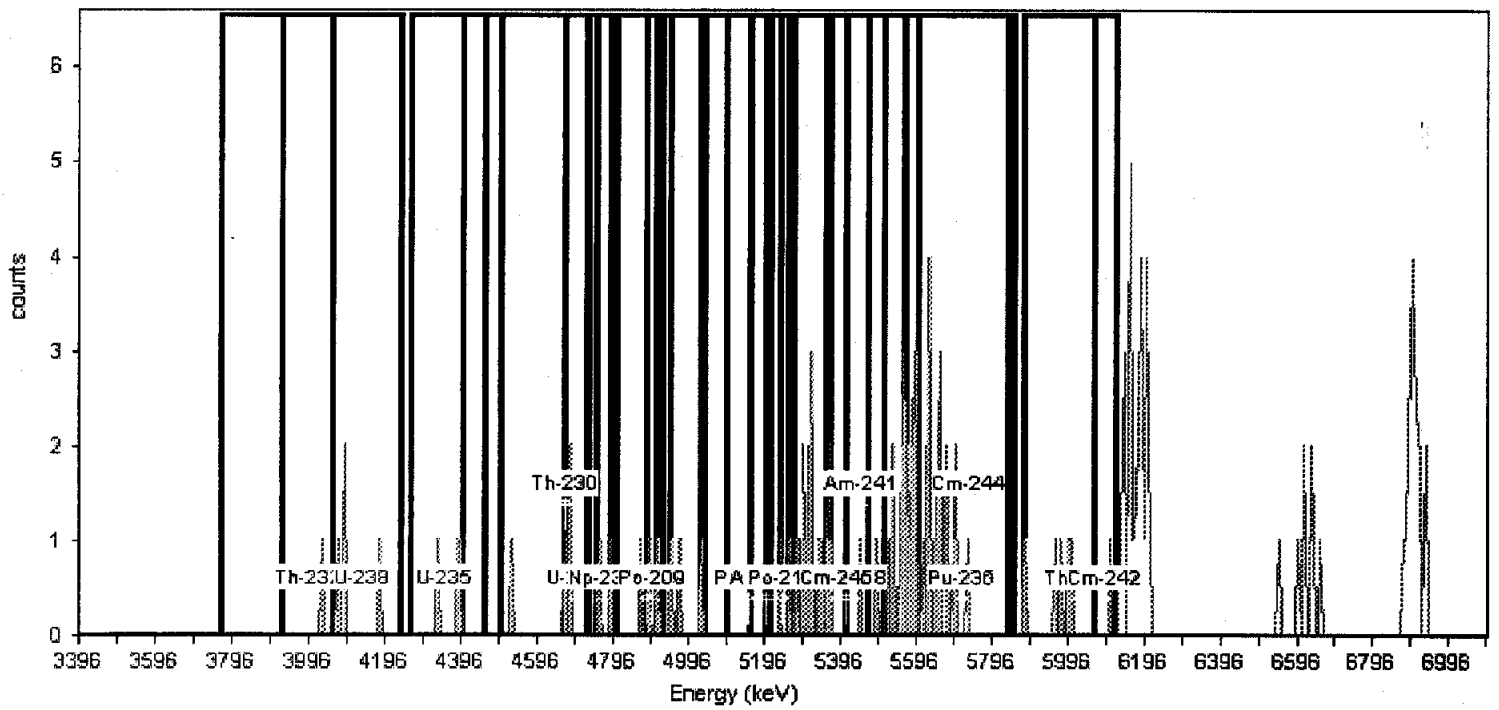
Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 12/24/2006 6:01:09PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV15
Calibration Date: 11/27/2006 11:34:59AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.49% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 125.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	5.00	5.208E-003	2.552E-003
U-235	4.35	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.67	4.40	4.73	4.00	4.167E-003	2.329E-003
U-234	4.70	4.50	4.80	6.00	6.250E-003	2.756E-003
Pu-242	4.88	4.67	4.93	8.00	8.333E-003	3.125E-003
Th-229	4.84	4.72	5.10	8.00	8.333E-003	3.125E-003
Np-237	4.77	4.75	4.79	2.00	2.083E-003	1.804E-003
Po-209	4.90	4.88	4.91	2.00	2.083E-003	1.804E-003
Pu-239	5.15	4.95	5.21	3.00	3.125E-003	2.083E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	15.00	1.563E-002	4.167E-003
Th-228	5.41	5.16	5.47	16.00	1.667E-002	4.295E-003
Po-210	5.25	5.20	5.26	2.00	2.083E-003	1.804E-003
Pu-238	5.44	5.24	5.52	17.00	1.771E-002	4.419E-003
Am-241	5.45	5.27	5.57	23.00	2.396E-002	5.103E-003
Cm-245	5.39	5.36	5.41	3.00	3.125E-003	2.083E-003
Pu-236	5.72	5.57	5.84	25.00	2.604E-002	5.311E-003
Cm-244	5.73	5.60	5.86	17.00	1.771E-002	4.419E-003
Th-227	6.02	5.89	6.13	6.00	6.250E-003	2.756E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:59:21AM 12/26/2006

Sample

Sample Name: AV16 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

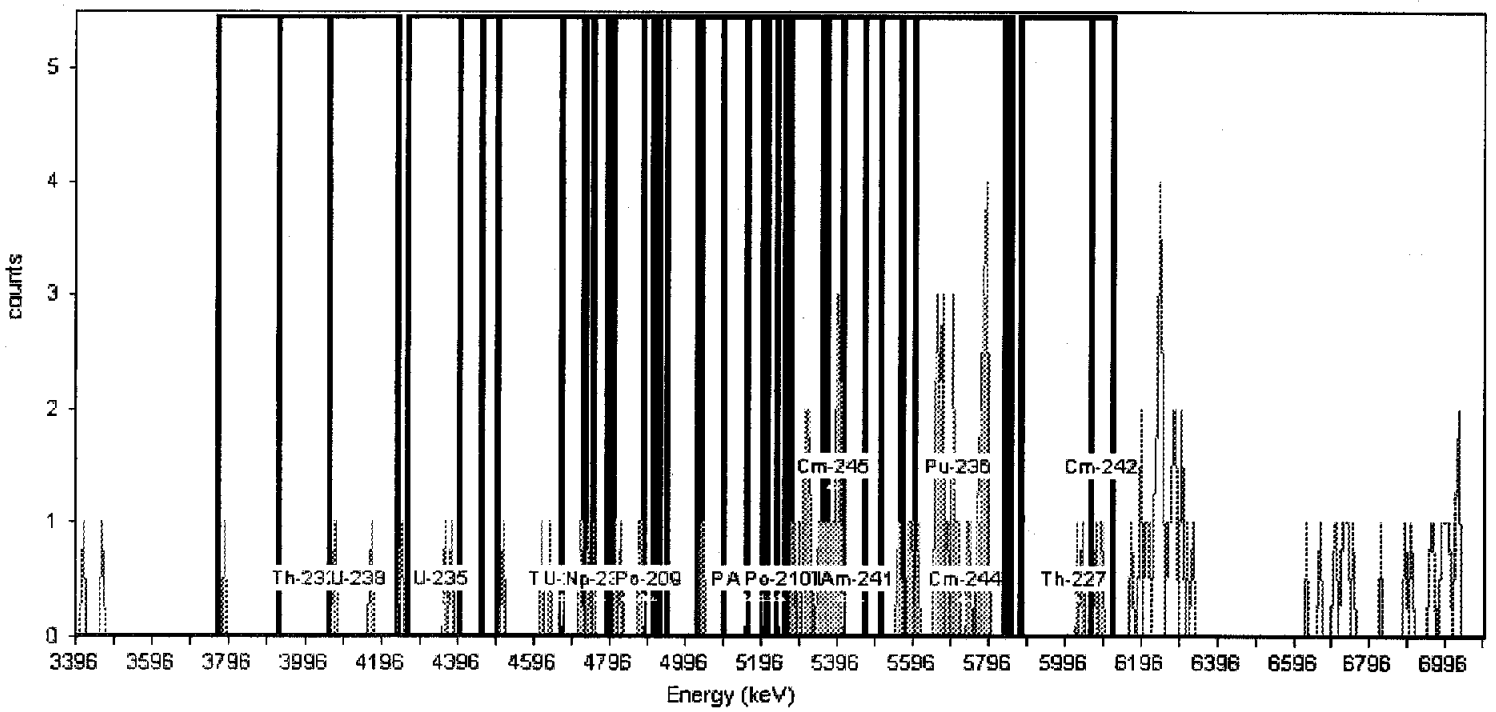
Acquisition

Detector: AV16 , SN: 41-172Q7
Acquisition Start Date: 12/24/2006 6:01:11PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV16
Calibration Date: 11/27/2006 11:35:04AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 28.16% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 119.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.67	4.40	4.73	4.00	4.167E-003	2.329E-003
U-234	4.70	4.50	4.80	6.00	6.250E-003	2.756E-003
Pu-242	4.88	4.67	4.93	6.00	6.250E-003	2.756E-003
Th-229	4.84	4.72	5.10	7.00	7.292E-003	2.946E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	14.00	1.458E-002	4.034E-003
Th-228	5.41	5.16	5.47	20.00	2.083E-002	4.774E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	20.00	2.083E-002	4.774E-003
Am-241	5.45	5.27	5.57	22.00	2.292E-002	4.996E-003
Cm-245	5.39	5.36	5.41	10.00	1.042E-002	3.455E-003
Pu-236	5.72	5.57	5.84	30.00	3.125E-002	5.800E-003
Cm-244	5.73	5.60	5.86	28.00	2.917E-002	5.610E-003
Th-227	6.02	5.89	6.13	4.00	4.167E-003	2.329E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:59:31AM 12/26/2006

Sample

Sample Name: AV17 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

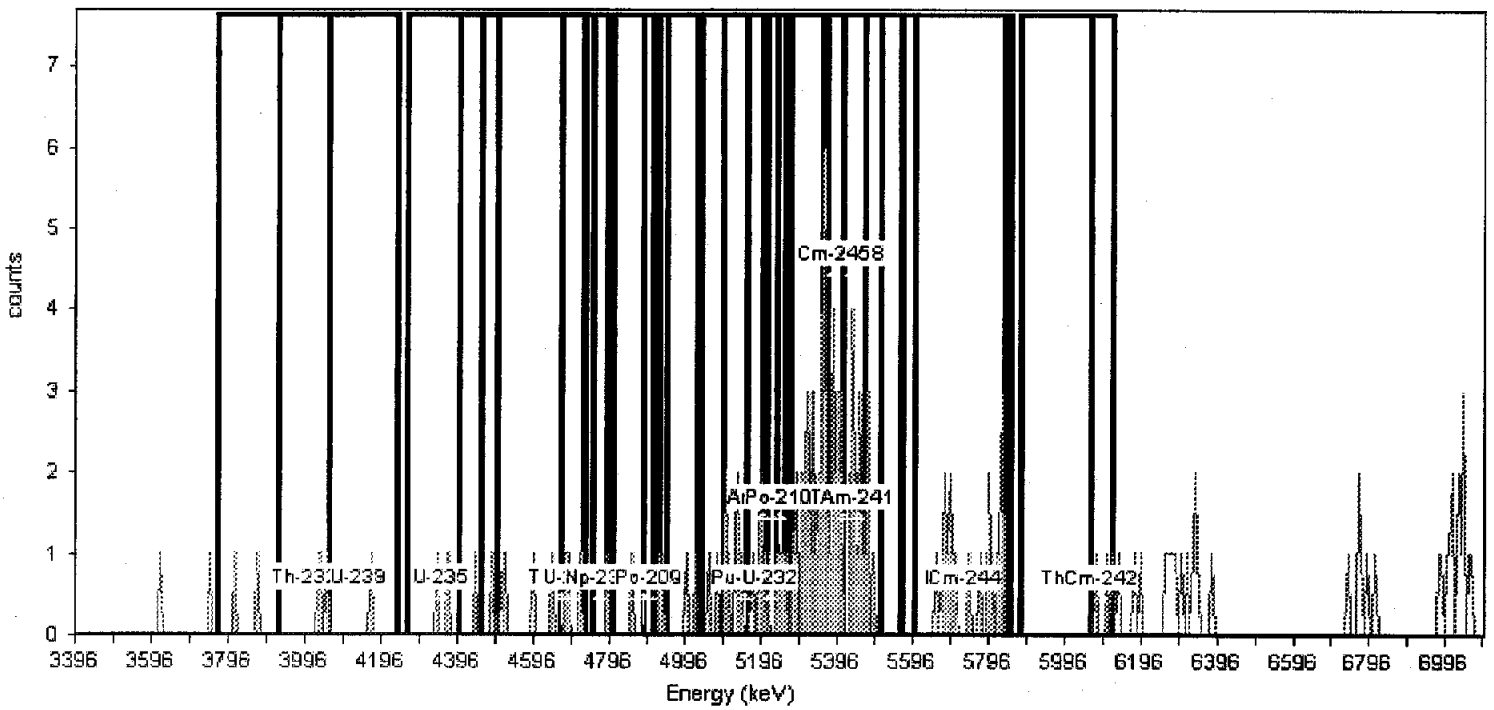
Acquisition

Detector: AV17 , SN: 41-172Q4
Acquisition Start Date: 12/24/2006 6:01:12PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV17
Calibration Date: 11/27/2006 5:58:53PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.45% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 157.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	9.00	9.375E-003	3.294E-003
U-234	4.70	4.50	4.80	8.00	8.333E-003	3.125E-003
Pu-242	4.88	4.67	4.93	6.00	6.250E-003	2.756E-003
Th-229	4.84	4.72	5.10	8.00	8.333E-003	3.125E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	15.00	1.563E-002	4.167E-003
Am-243	5.20	5.03	5.28	18.00	1.875E-002	4.541E-003
U-232	5.23	5.04	5.37	45.00	4.688E-002	7.065E-003
Th-228	5.41	5.16	5.47	62.00	6.458E-002	8.268E-003
Po-210	5.25	5.20	5.26	6.00	6.250E-003	2.756E-003
Pu-238	5.44	5.24	5.52	61.00	6.354E-002	8.202E-003
Am-241	5.45	5.27	5.57	57.00	5.937E-002	7.933E-003
Cm-245	5.39	5.36	5.41	22.00	2.292E-002	4.996E-003
Pu-236	5.72	5.57	5.84	19.00	1.979E-002	4.658E-003
Cm-244	5.73	5.60	5.86	19.00	1.979E-002	4.658E-003
Th-227	6.02	5.89	6.13	3.00	3.125E-003	2.083E-003
Cm-242	6.10	6.07	6.13	3.00	3.125E-003	2.083E-003
Th-232	3.99	3.77	4.06	5.00	5.208E-003	2.552E-003
U-238	4.14	3.93	4.24	4.00	4.167E-003	2.329E-003
U-235	4.35	4.26	4.46	3.00	3.125E-003	2.083E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:59:34AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV18
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

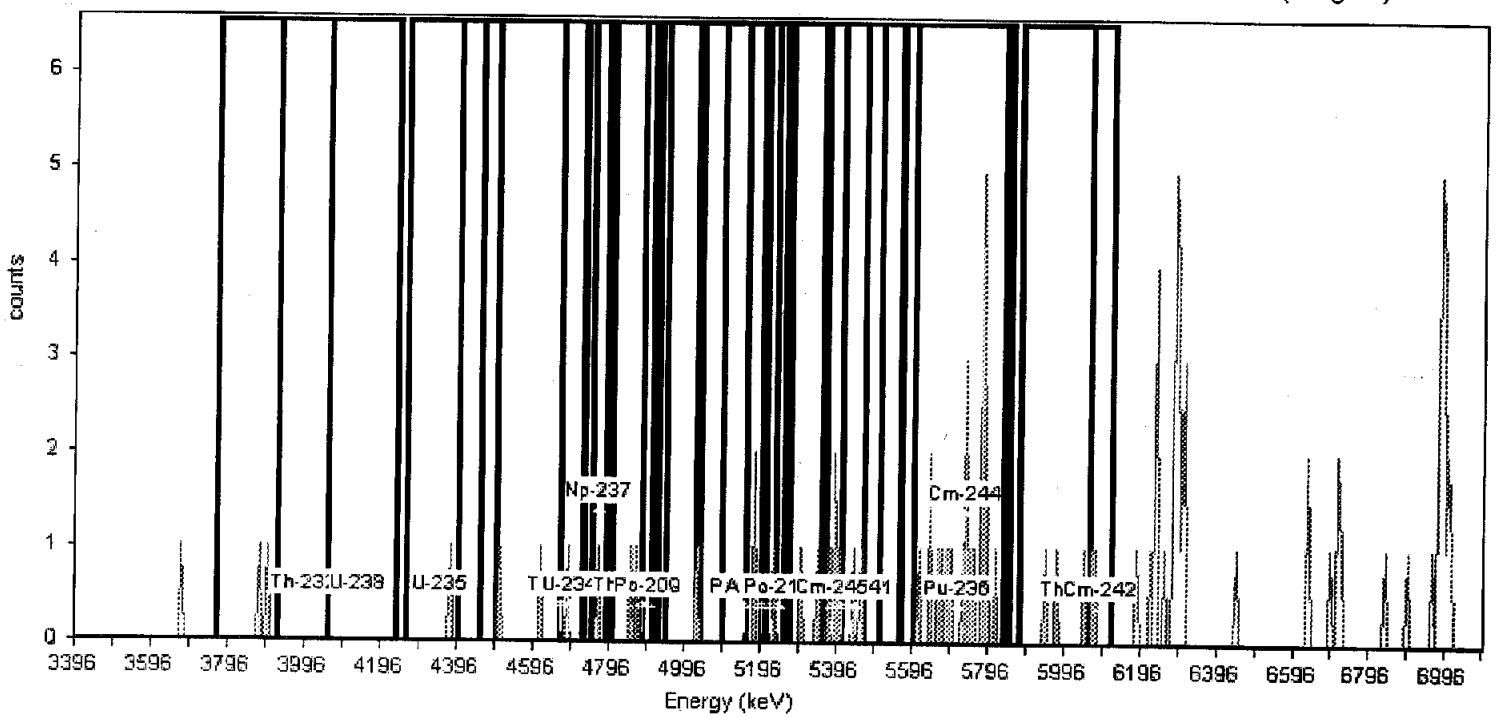
Acquisition

Detector: AV18 , SN: 41-172C6
Acquisition Start Date: 12/24/2006 6:01:13PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV18
Calibration Date: 11/27/2006 5:59:14PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.29% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundRoi
Nuclide Library: Background ROI Library
Total Background Counts: 98.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	4.00	4.167E-003	2.329E-003
Pu-242	4.88	4.67	4.93	4.00	4.167E-003	2.329E-003
Th-229	4.84	4.72	5.10	4.00	4.167E-003	2.329E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	3.00	3.125E-003	2.083E-003
Am-243	5.20	5.03	5.28	4.00	4.167E-003	2.329E-003
U-232	5.23	5.04	5.37	5.00	5.208E-003	2.552E-003
Th-228	5.41	5.16	5.47	12.00	1.250E-002	3.756E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	9.00	9.375E-003	3.294E-003
Am-241	5.45	5.27	5.57	9.00	9.375E-003	3.294E-003
Cm-245	5.39	5.36	5.41	5.00	5.208E-003	2.552E-003
Pu-236	5.72	5.57	5.84	24.00	2.500E-002	5.208E-003
Cm-244	5.73	5.60	5.86	24.00	2.500E-002	5.208E-003
Th-227	6.02	5.89	6.13	5.00	5.208E-003	2.552E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:59:38AM 12/26/2006

Sample

Sample Name: AV19 Spectrum #1 Analysis #1
Comment:

Batch

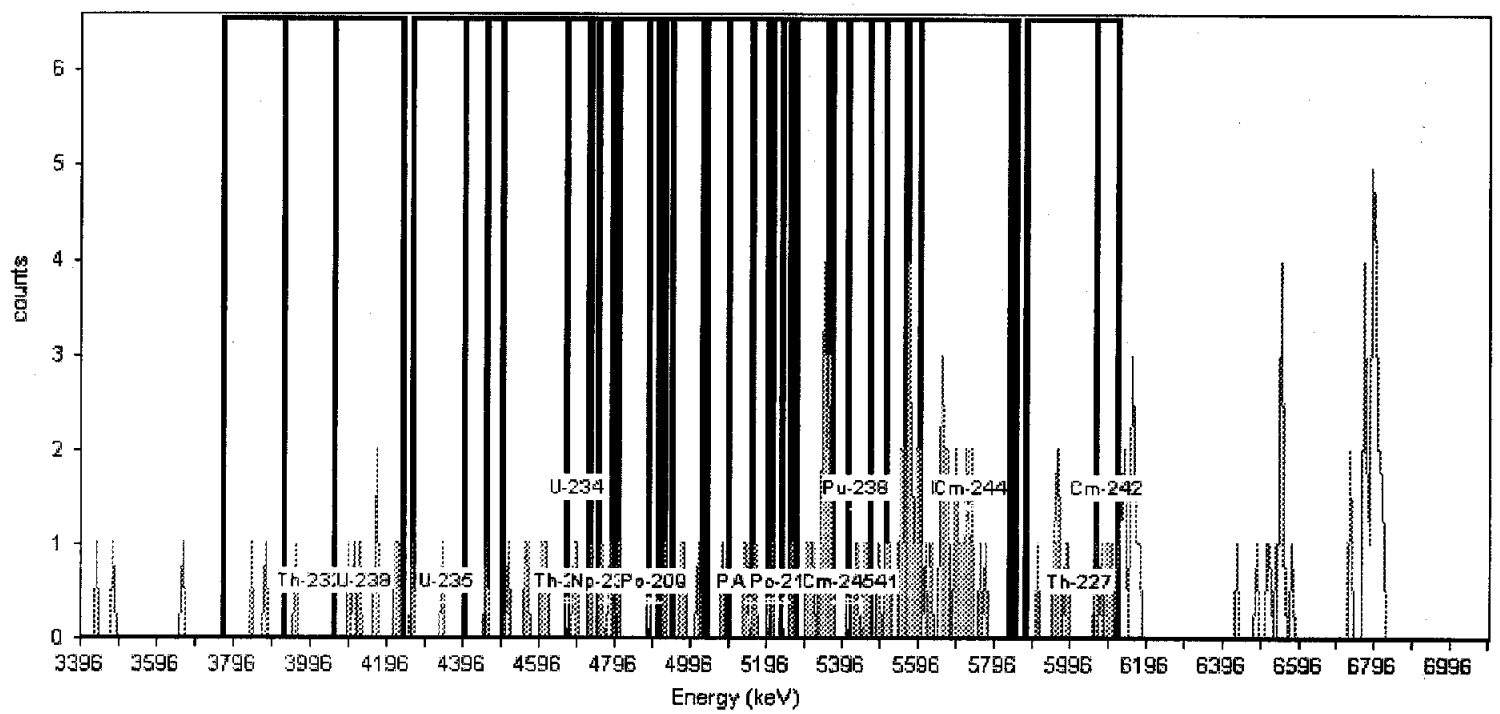
Batch Name: Dec2006
Description:

Acquisition

Detector: AV19 , SN: 41-172Q6
Acquisition Start Date: 12/24/2006 6:01:15PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV19a
Calibration Date: 11/27/2006 5:59:25PM

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.38% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library
Total Background Counts: 152.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	3.00	3.125E-003	2.083E-003
U-238	4.14	3.93	4.24	8.00	8.333E-003	3.125E-003
U-235	4.35	4.26	4.46	3.00	3.125E-003	2.083E-003
Th-230	4.67	4.40	4.73	10.00	1.042E-002	3.455E-003
U-234	4.70	4.50	4.80	12.00	1.250E-002	3.756E-003
Pu-242	4.88	4.67	4.93	7.00	7.292E-003	2.946E-003
Th-229	4.84	4.72	5.10	9.00	9.375E-003	3.294E-003
Np-237	4.77	4.75	4.79	2.00	2.083E-003	1.804E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	8.00	8.333E-003	3.125E-003
Am-243	5.20	5.03	5.28	6.00	6.250E-003	2.756E-003
U-232	5.23	5.04	5.37	20.00	2.083E-002	4.774E-003
Th-228	5.41	5.16	5.47	20.00	2.083E-002	4.774E-003
Po-210	5.25	5.20	5.26	2.00	2.083E-003	1.804E-003
Pu-238	5.44	5.24	5.52	20.00	2.083E-002	4.774E-003
Am-241	5.45	5.27	5.57	24.00	2.500E-002	5.208E-003
Cm-245	5.39	5.36	5.41	4.00	4.167E-003	2.329E-003
Pu-236	5.72	5.57	5.84	32.00	3.333E-002	5.984E-003
Cm-244	5.73	5.60	5.86	23.00	2.396E-002	5.103E-003
Th-227	6.02	5.89	6.13	13.00	1.354E-002	3.898E-003
Cm-242	6.10	6.07	6.13	6.00	6.250E-003	2.756E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:59:41AM 12/26/2006

Sample

Sample Name: AV20 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

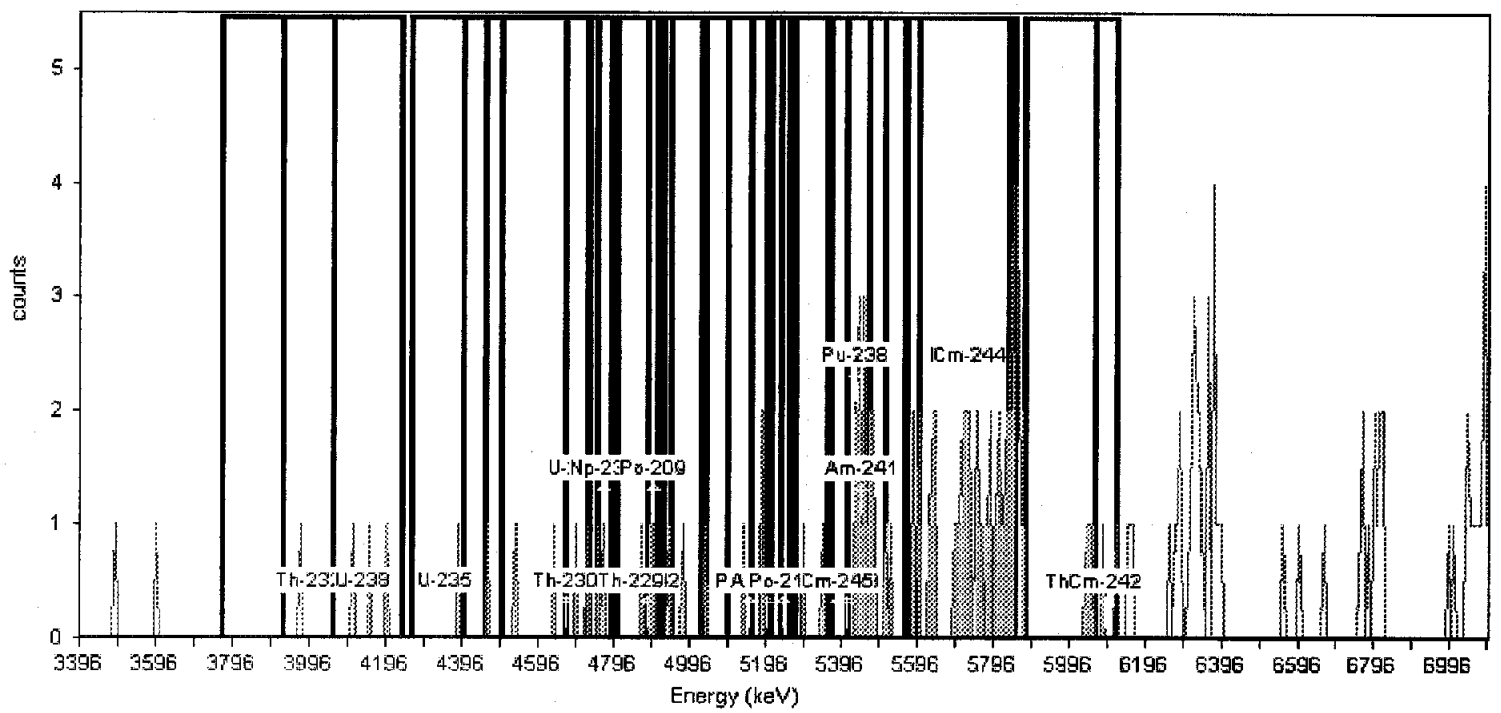
Acquisition

Detector: AV20 , SN: 41-172R2
Acquisition Start Date: 12/24/2006 6:01:17PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV20
Calibration Date: 11/27/2006 5:59:19PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.95% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 152.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	4.00	4.167E-003	2.329E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	5.00	5.208E-003	2.552E-003
U-234	4.70	4.50	4.80	6.00	6.250E-003	2.756E-003
Pu-242	4.88	4.67	4.93	7.00	7.292E-003	2.946E-003
Th-229	4.84	4.72	5.10	9.00	9.375E-003	3.294E-003
Np-237	4.77	4.75	4.79	2.00	2.083E-003	1.804E-003
Po-209	4.90	4.88	4.91	2.00	2.083E-003	1.804E-003
Pu-239	5.15	4.95	5.21	5.00	5.208E-003	2.552E-003
Am-243	5.20	5.03	5.28	4.00	4.167E-003	2.329E-003
U-232	5.23	5.04	5.37	6.00	6.250E-003	2.756E-003
Th-228	5.41	5.16	5.47	16.00	1.667E-002	4.295E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	18.00	1.875E-002	4.541E-003
Am-241	5.45	5.27	5.57	19.00	1.979E-002	4.658E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	35.00	3.646E-002	6.250E-003
Cm-244	5.73	5.60	5.86	38.00	3.958E-002	6.505E-003
Th-227	6.02	5.89	6.13	5.00	5.208E-003	2.552E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:59:51AM 12/26/2006

Sample

Sample Name: AV21 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

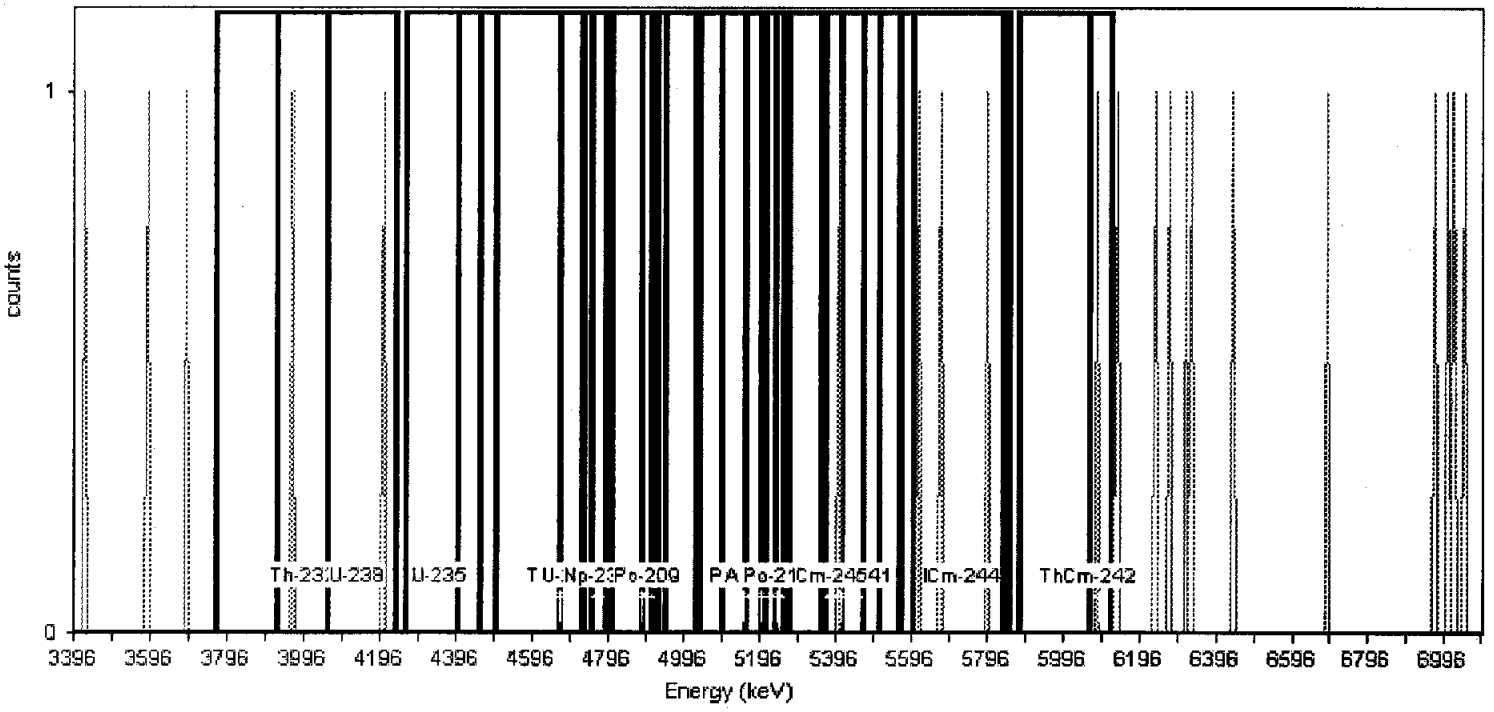
Acquisition

Detector: AV21 , SN: 41-172C7
Acquisition Start Date: 12/24/2006 6:01:19PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV21
Calibration Date: 11/27/2006 2:05:41PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.26% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 21.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	3.00	3.125E-003	2.083E-003
Cm-244	5.73	5.60	5.86	3.00	3.125E-003	2.083E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:59:57AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV22
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

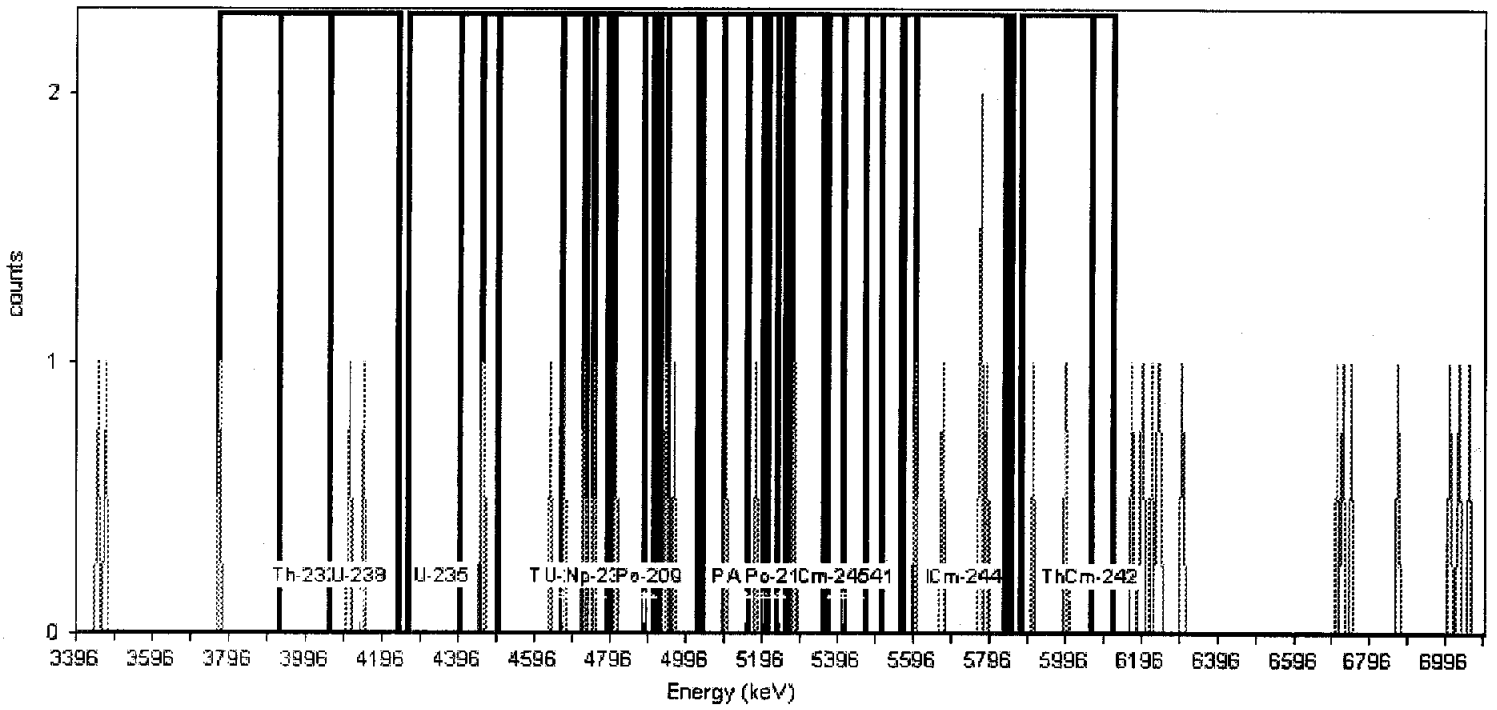
Acquisition

Detector: AV22 , SN: 41-172Q5
Acquisition Start Date: 12/24/2006 6:01:20PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV22
Calibration Date: 11/27/2006 2:05:52PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.76% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 38.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	5.00	5.208E-003	2.552E-003
U-234	4.70	4.50	4.80	4.00	4.167E-003	2.329E-003
Pu-242	4.88	4.67	4.93	4.00	4.167E-003	2.329E-003
Th-229	4.84	4.72	5.10	5.00	5.208E-003	2.552E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	3.00	3.125E-003	2.083E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	3.00	3.125E-003	2.083E-003
Th-228	5.41	5.16	5.47	2.00	2.083E-003	1.804E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	5.00	5.208E-003	2.552E-003
Cm-244	5.73	5.60	5.86	5.00	5.208E-003	2.552E-003
Th-227	6.02	5.89	6.13	2.00	2.083E-003	1.804E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:00:04AM 12/26/2006

Sample

Sample Name: AV23 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

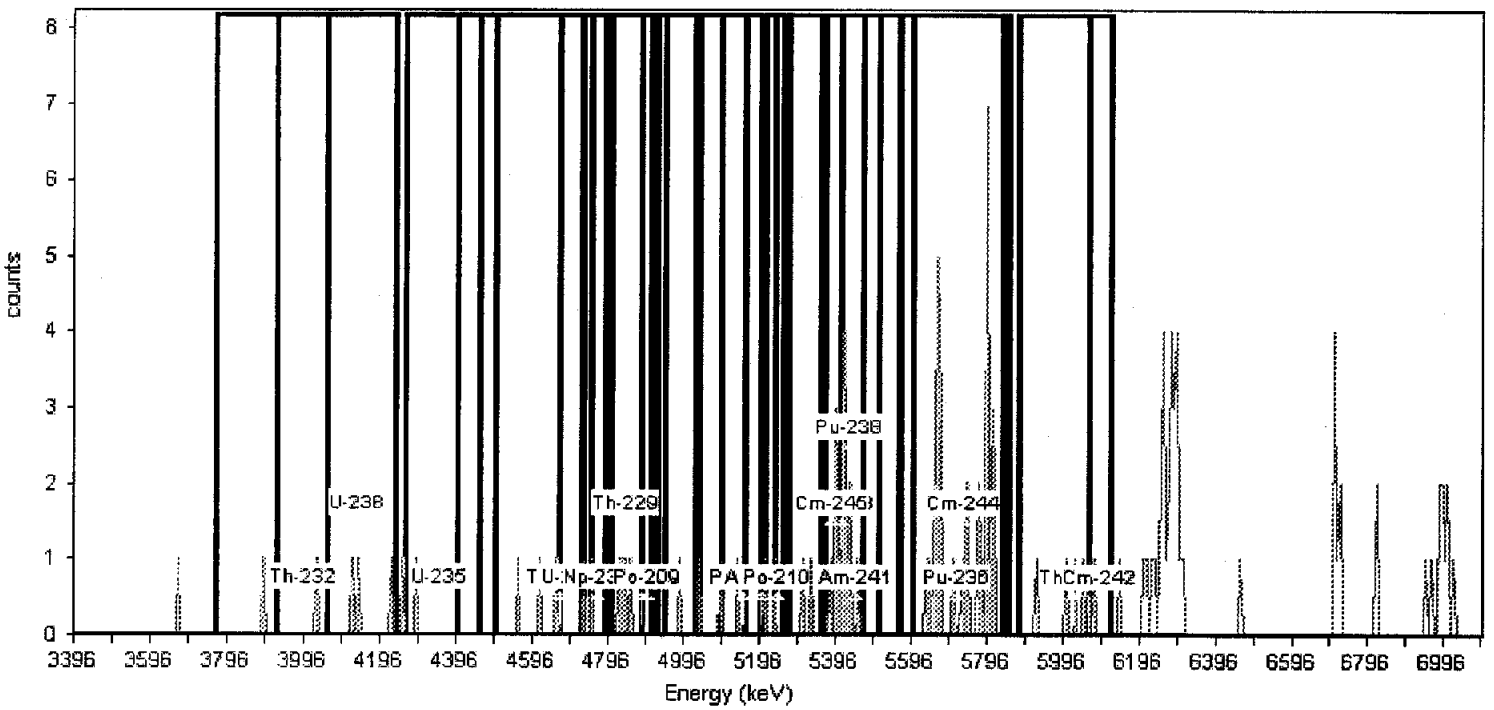
Acquisition

Detector: AV23 , SN: 41-172R4
Acquisition Start Date: 12/24/2006 6:01:23PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV23
Calibration Date: 11/27/2006 2:06:01PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.01% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 125.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	4.00	4.167E-003	2.329E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	4.00	4.167E-003	2.329E-003
U-234	4.70	4.50	4.80	5.00	5.208E-003	2.552E-003
Pu-242	4.88	4.67	4.93	6.00	6.250E-003	2.756E-003
Th-229	4.84	4.72	5.10	9.00	9.375E-003	3.294E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	5.00	5.208E-003	2.552E-003
Am-243	5.20	5.03	5.28	5.00	5.208E-003	2.552E-003
U-232	5.23	5.04	5.37	7.00	7.292E-003	2.946E-003
Th-228	5.41	5.16	5.47	18.00	1.875E-002	4.541E-003
Po-210	5.25	5.20	5.26	2.00	2.083E-003	1.804E-003
Pu-238	5.44	5.24	5.52	17.00	1.771E-002	4.419E-003
Am-241	5.45	5.27	5.57	16.00	1.667E-002	4.295E-003
Cm-245	5.39	5.36	5.41	6.00	6.250E-003	2.756E-003
Pu-236	5.72	5.57	5.84	33.00	3.437E-002	6.074E-003
Cm-244	5.73	5.60	5.86	33.00	3.437E-002	6.074E-003
Th-227	6.02	5.89	6.13	6.00	6.250E-003	2.756E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

6:00:11AM 12/26/2006

Sample

Sample Name: AV24

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

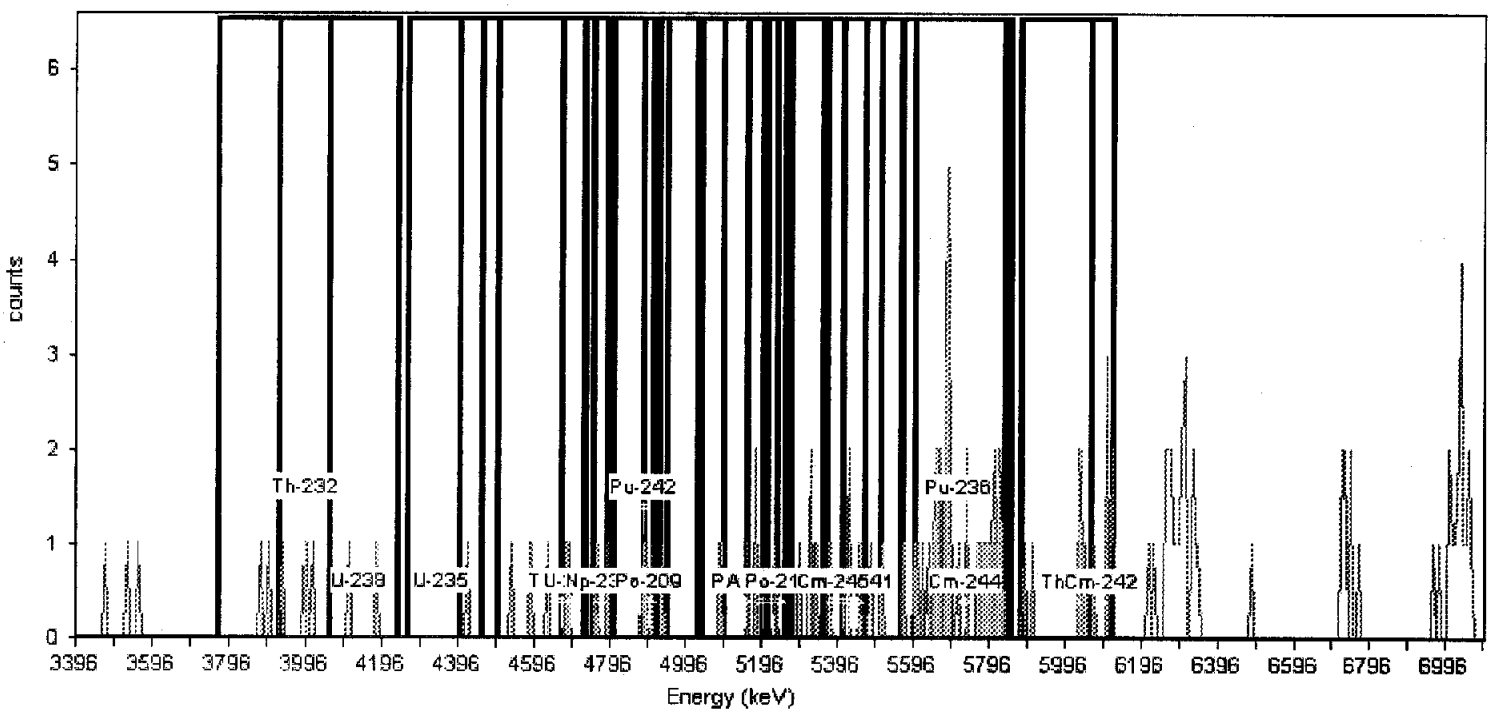
Acquisition

Detector: AV24 , SN: 41-172R5
Acquisition Start Date: 12/24/2006 6:01:25PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV24
Calibration Date: 11/27/2006 2:06:14PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.97% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI

Nuclide Library: Background ROI Library

Total Background Counts: 130.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	6.00	6.250E-003	2.756E-003
U-238	4.14	3.93	4.24	6.00	6.250E-003	2.756E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	6.00	6.250E-003	2.756E-003
U-234	4.70	4.50	4.80	7.00	7.292E-003	2.946E-003
Pu-242	4.88	4.67	4.93	7.00	7.292E-003	2.946E-003
Th-229	4.84	4.72	5.10	7.00	7.292E-003	2.946E-003
Np-237	4.77	4.75	4.79	2.00	2.083E-003	1.804E-003
Po-209	4.90	4.88	4.91	3.00	3.125E-003	2.083E-003
Pu-239	5.15	4.95	5.21	4.00	4.167E-003	2.329E-003
Am-243	5.20	5.03	5.28	5.00	5.208E-003	2.552E-003
U-232	5.23	5.04	5.37	9.00	9.375E-003	3.294E-003
Th-228	5.41	5.16	5.47	12.00	1.250E-002	3.756E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	10.00	1.042E-002	3.455E-003
Am-241	5.45	5.27	5.57	10.00	1.042E-002	3.455E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	35.00	3.646E-002	6.250E-003
Cm-244	5.73	5.60	5.86	34.00	3.542E-002	6.163E-003
Th-227	6.02	5.89	6.13	12.00	1.250E-002	3.756E-003
Cm-242	6.10	6.07	6.13	6.00	6.250E-003	2.756E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:14AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV45
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

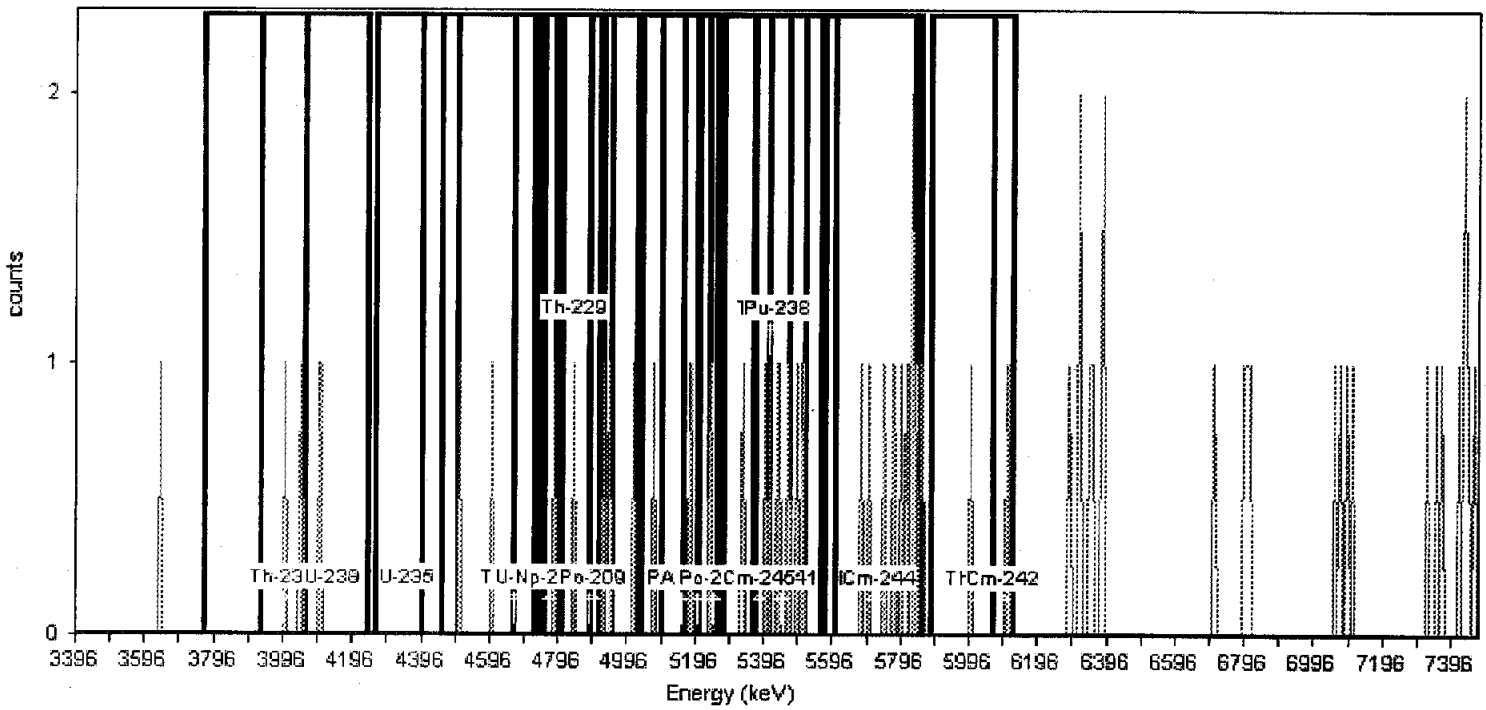
Acquisition

Detector: AV45 , SN: AV45
Acquisition Start Date: 12/24/2006 6:01:27PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV45
Calibration Date: 11/29/2006 4:08:32PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.59% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 61.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	3.00	3.125E-003	2.083E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	6.00	6.250E-003	2.756E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	3.00	3.125E-003	2.083E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	4.00	4.167E-003	2.329E-003
Th-228	5.41	5.16	5.47	9.00	9.375E-003	3.294E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	10.00	1.042E-002	3.455E-003
Am-241	5.45	5.27	5.57	9.00	9.375E-003	3.294E-003
Cm-245	5.39	5.36	5.41	2.00	2.083E-003	1.804E-003
Pu-236	5.72	5.57	5.84	10.00	1.042E-002	3.455E-003
Cm-244	5.73	5.60	5.86	11.00	1.146E-002	3.608E-003
Th-227	6.02	5.89	6.13	2.00	2.083E-003	1.804E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:34:29AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV46
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec_2006a
Description:

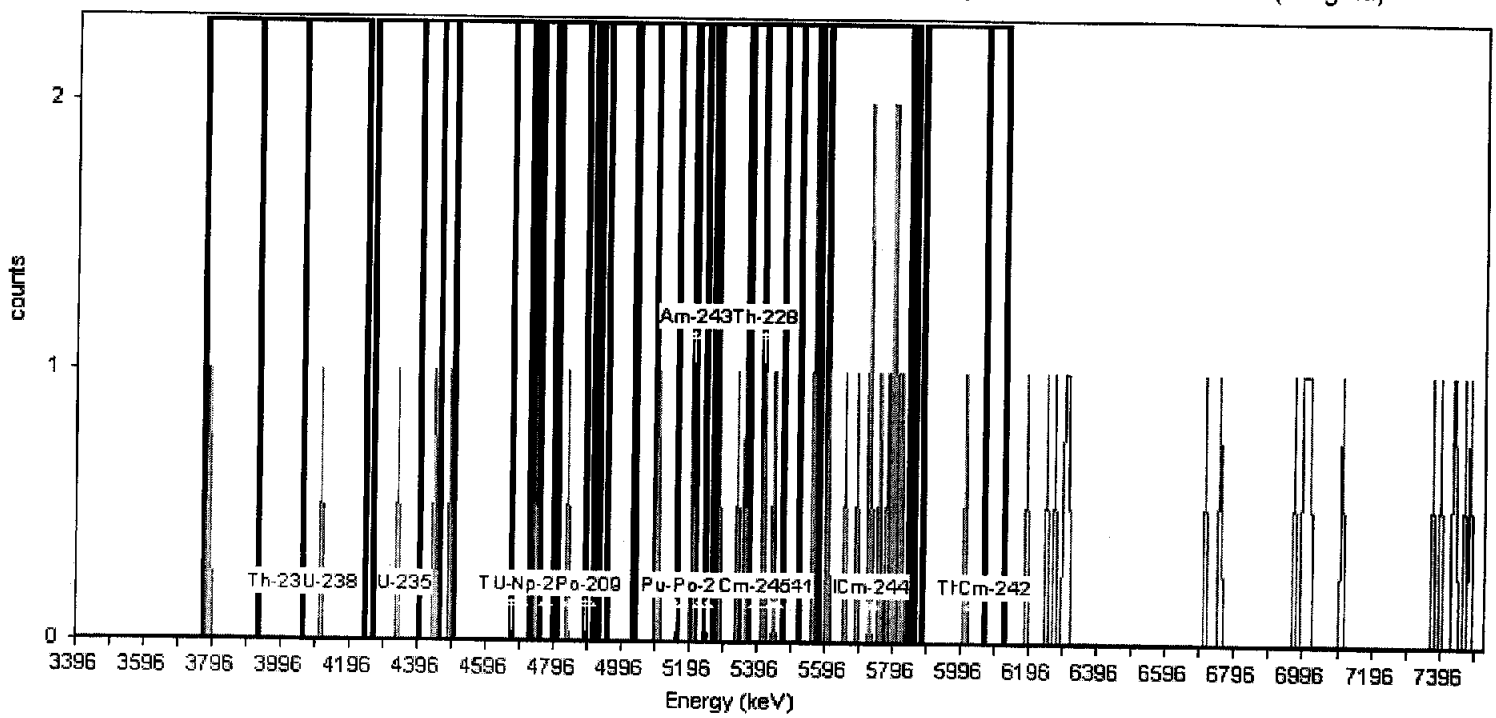
Acquisition

Detector: AV46 , SN: AV46
Acquisition Start Date: 12/24/2006 6:02:59PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV46
Calibration Date: 11/28/2006 6:55:38AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 27.78% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 50.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	5.00	5.208E-003	2.552E-003
Th-228	5.41	5.16	5.47	6.00	6.250E-003	2.756E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	5.00	5.208E-003	2.552E-003
Am-241	5.45	5.27	5.57	7.00	7.292E-003	2.946E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	13.00	1.354E-002	3.898E-003
Cm-244	5.73	5.60	5.86	13.00	1.354E-002	3.898E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:20AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV48
Comment:

Spectrum #1 Analysis #1

Batch

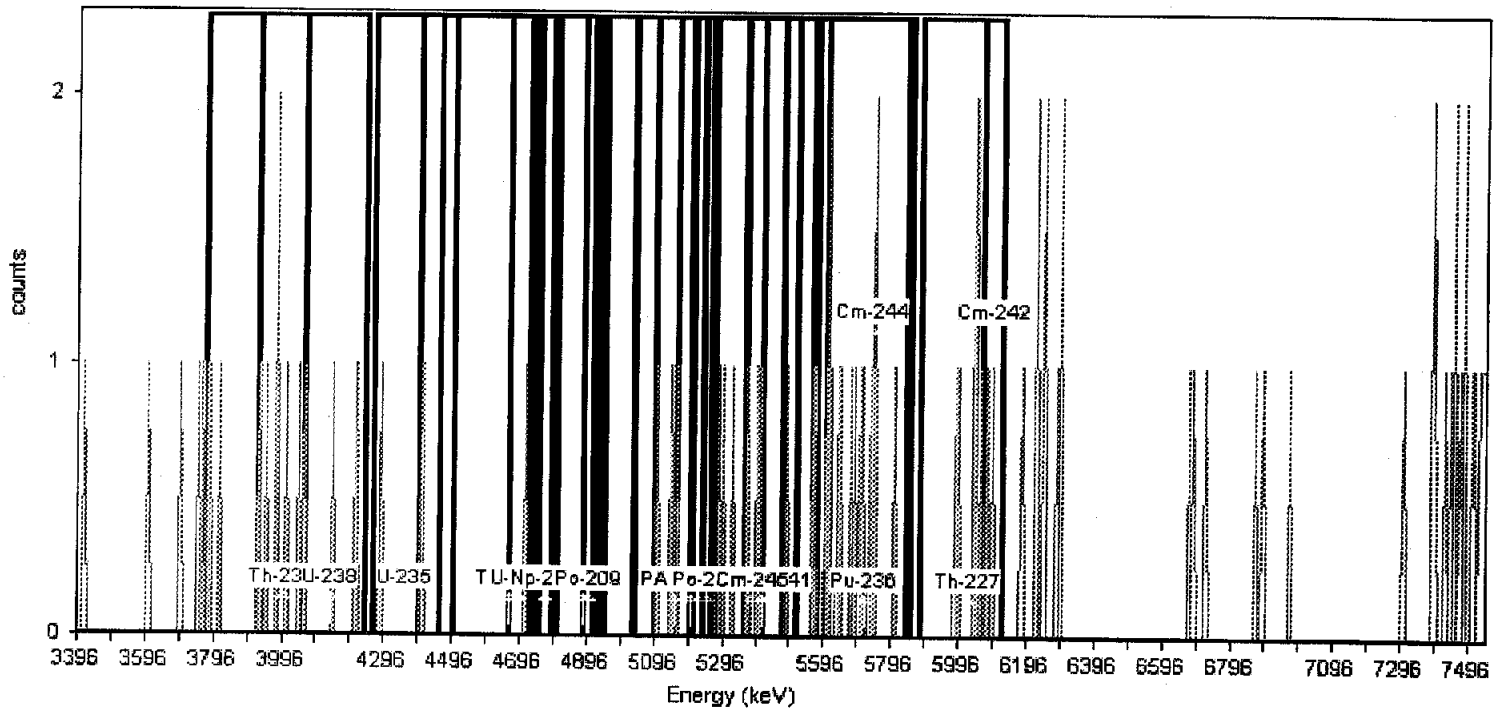
Batch Name: Dec2006
Description:

Acquisition

Detector: AV48 , SN: AV48
Acquisition Start Date: 12/24/2006 6:01:28PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV48
Calibration Date: 11/27/2006 8:52:08PM

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.39% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_Background Nuclide Library: Background ROI Library
Total Background Counts: 82.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	10.00	1.042E-002	3.455E-003
U-238	4.14	3.93	4.24	9.00	9.375E-003	3.294E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	3.00	3.125E-003	2.083E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	7.00	7.292E-003	2.946E-003
Th-228	5.41	5.16	5.47	7.00	7.292E-003	2.946E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	7.00	7.292E-003	2.946E-003
Am-241	5.45	5.27	5.57	8.00	8.333E-003	3.125E-003
Cm-245	5.39	5.36	5.41	3.00	3.125E-003	2.083E-003
Pu-236	5.72	5.57	5.84	14.00	1.458E-002	4.034E-003
Cm-244	5.73	5.60	5.86	14.00	1.458E-002	4.034E-003
Th-227	6.02	5.89	6.13	7.00	7.292E-003	2.946E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:00:27AM 12/26/2006

Sample

Sample Name: AV49 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

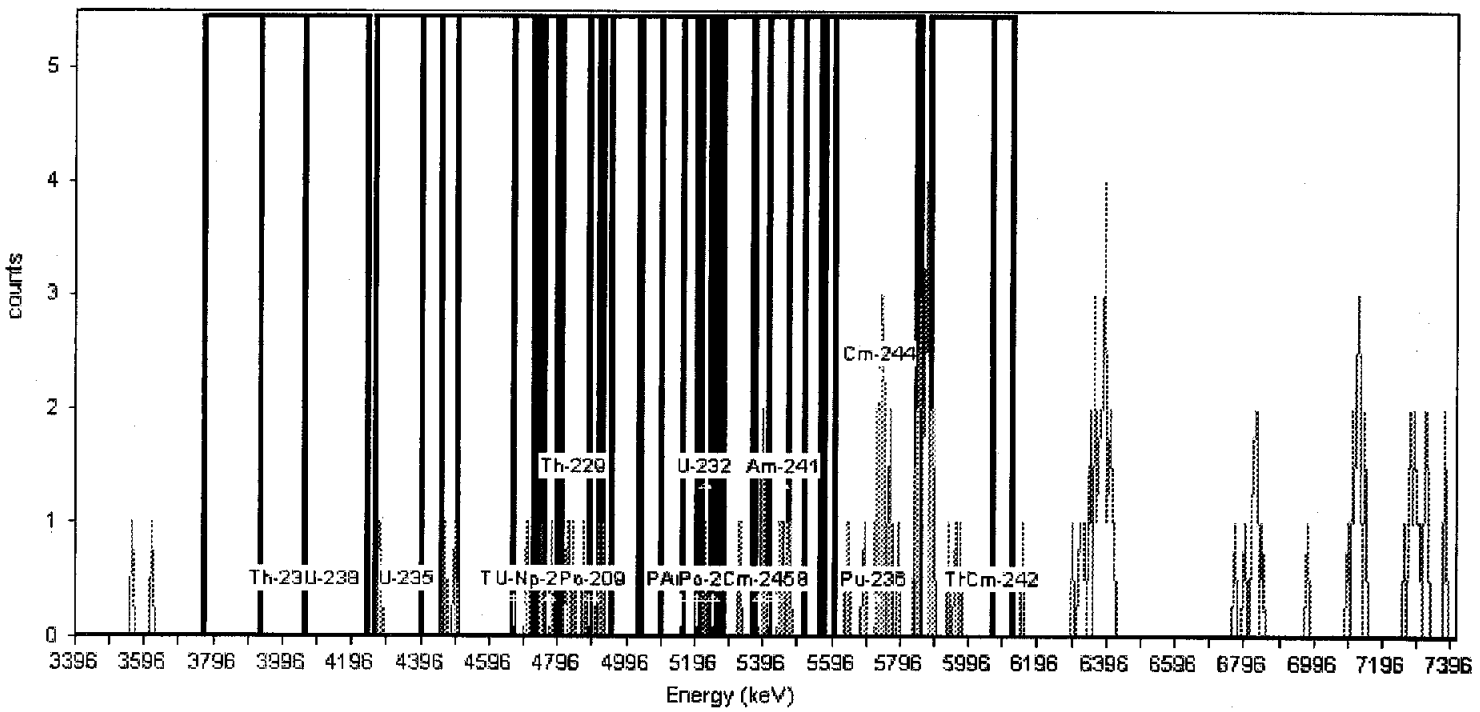
Acquisition

Detector: AV49 , SN: AV49
Acquisition Start Date: 12/24/2006 6:01:30PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV49
Calibration Date: 11/27/2006 8:52:13PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.79% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 118.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	9.00	9.375E-003	3.294E-003
Th-229	4.84	4.72	5.10	8.00	8.333E-003	3.125E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	2.00	2.083E-003	1.804E-003
Th-228	5.41	5.16	5.47	9.00	9.375E-003	3.294E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	8.00	8.333E-003	3.125E-003
Am-241	5.45	5.27	5.57	8.00	8.333E-003	3.125E-003
Cm-245	5.39	5.36	5.41	3.00	3.125E-003	2.083E-003
Pu-236	5.72	5.57	5.84	18.00	1.875E-002	4.541E-003
Cm-244	5.73	5.60	5.86	23.00	2.396E-002	5.103E-003
Th-227	6.02	5.89	6.13	7.00	7.292E-003	2.946E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:34AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV50
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

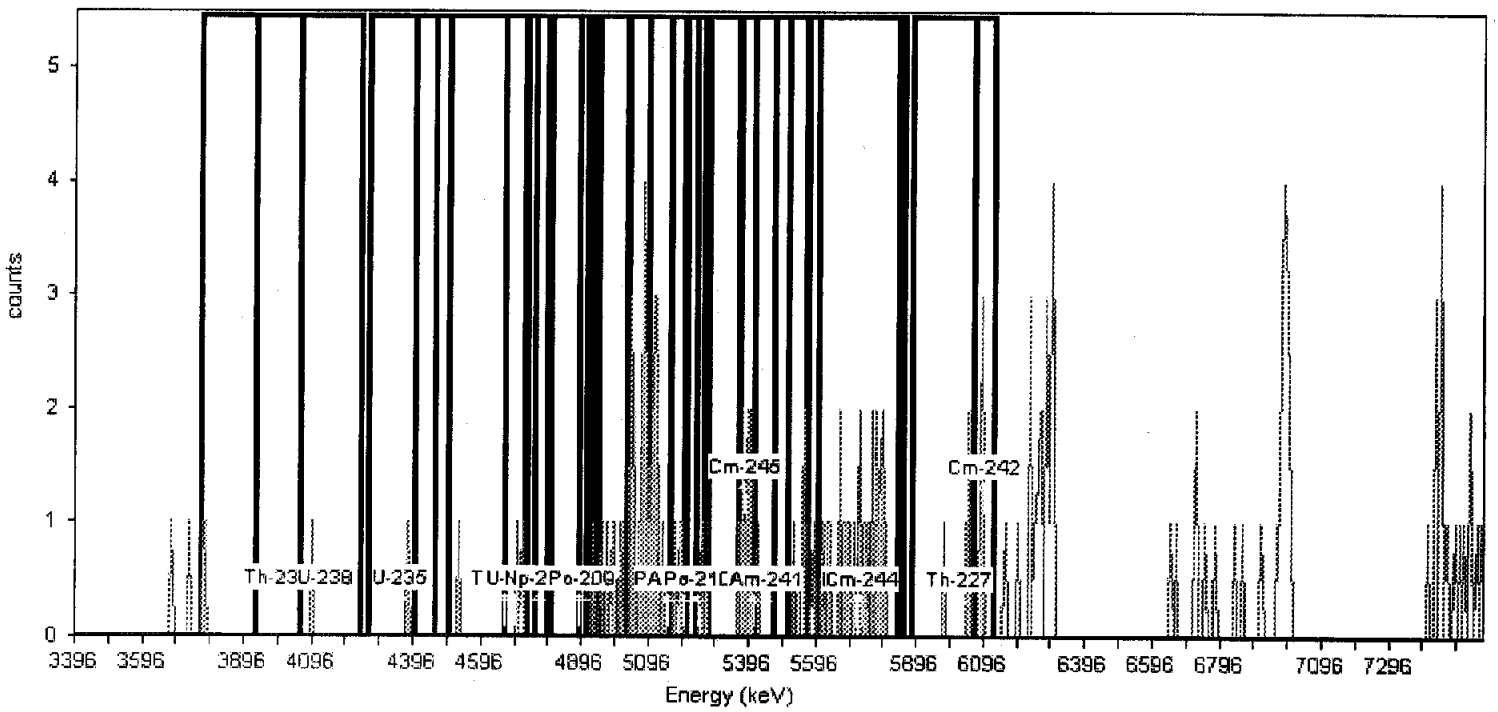
Acquisition

Detector: AV50 , SN: AV50
Acquisition Start Date: 12/24/2006 6:01:32PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV50
Calibration Date: 11/27/2006 8:52:17PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.06% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 147.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	20.00	2.083E-002	4.774E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	30.00	3.125E-002	5.800E-003
Am-243	5.20	5.03	5.28	27.00	2.813E-002	5.512E-003
U-232	5.23	5.04	5.37	28.00	2.917E-002	5.610E-003
Th-228	5.41	5.16	5.47	15.00	1.563E-002	4.167E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	12.00	1.250E-002	3.756E-003
Am-241	5.45	5.27	5.57	14.00	1.458E-002	4.034E-003
Cm-245	5.39	5.36	5.41	9.00	9.375E-003	3.294E-003
Pu-236	5.72	5.57	5.84	23.00	2.396E-002	5.103E-003
Cm-244	5.73	5.60	5.86	22.00	2.292E-002	4.996E-003
Th-227	6.02	5.89	6.13	7.00	7.292E-003	2.946E-003
Cm-242	6.10	6.07	6.13	4.00	4.167E-003	2.329E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:40AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV51
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

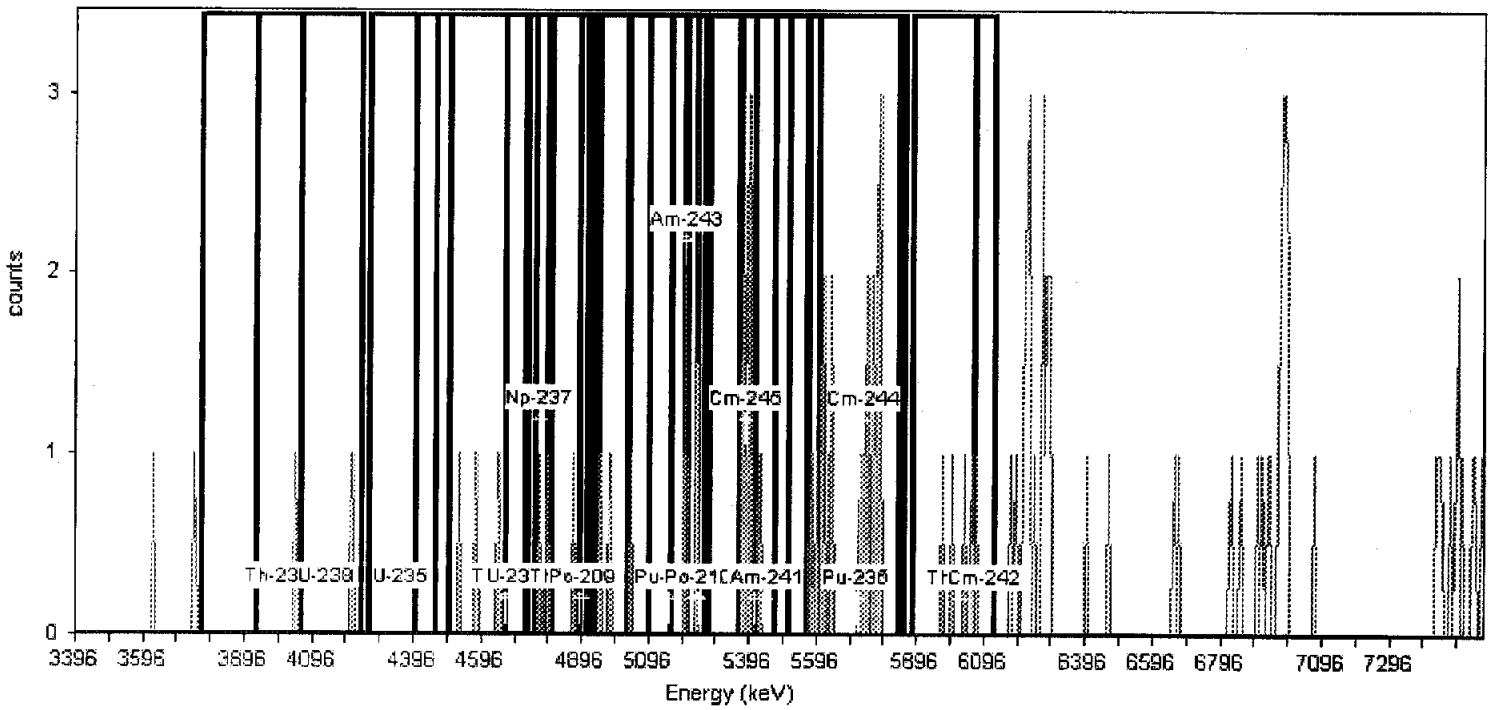
Acquisition

Detector: AV51 , SN:
Acquisition Start Date: 12/24/2006 6:01:34PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV51
Calibration Date: 11/27/2006 8:52:22PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.73% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 106.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	5.00	5.208E-003	2.552E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	6.00	6.250E-003	2.756E-003
Np-237	4.77	4.75	4.79	2.00	2.083E-003	1.804E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	5.00	5.208E-003	2.552E-003
Am-243	5.20	5.03	5.28	6.00	6.250E-003	2.756E-003
U-232	5.23	5.04	5.37	6.00	6.250E-003	2.756E-003
Th-228	5.41	5.16	5.47	16.00	1.667E-002	4.295E-003
Po-210	5.25	5.20	5.26	5.00	5.208E-003	2.552E-003
Pu-238	5.44	5.24	5.52	14.00	1.458E-002	4.034E-003
Am-241	5.45	5.27	5.57	11.00	1.146E-002	3.608E-003
Cm-245	5.39	5.36	5.41	9.00	9.375E-003	3.294E-003
Pu-236	5.72	5.57	5.84	21.00	2.187E-002	4.886E-003
Cm-244	5.73	5.60	5.86	19.00	1.979E-002	4.658E-003
Th-227	6.02	5.89	6.13	5.00	5.208E-003	2.552E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:59:18AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV52
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

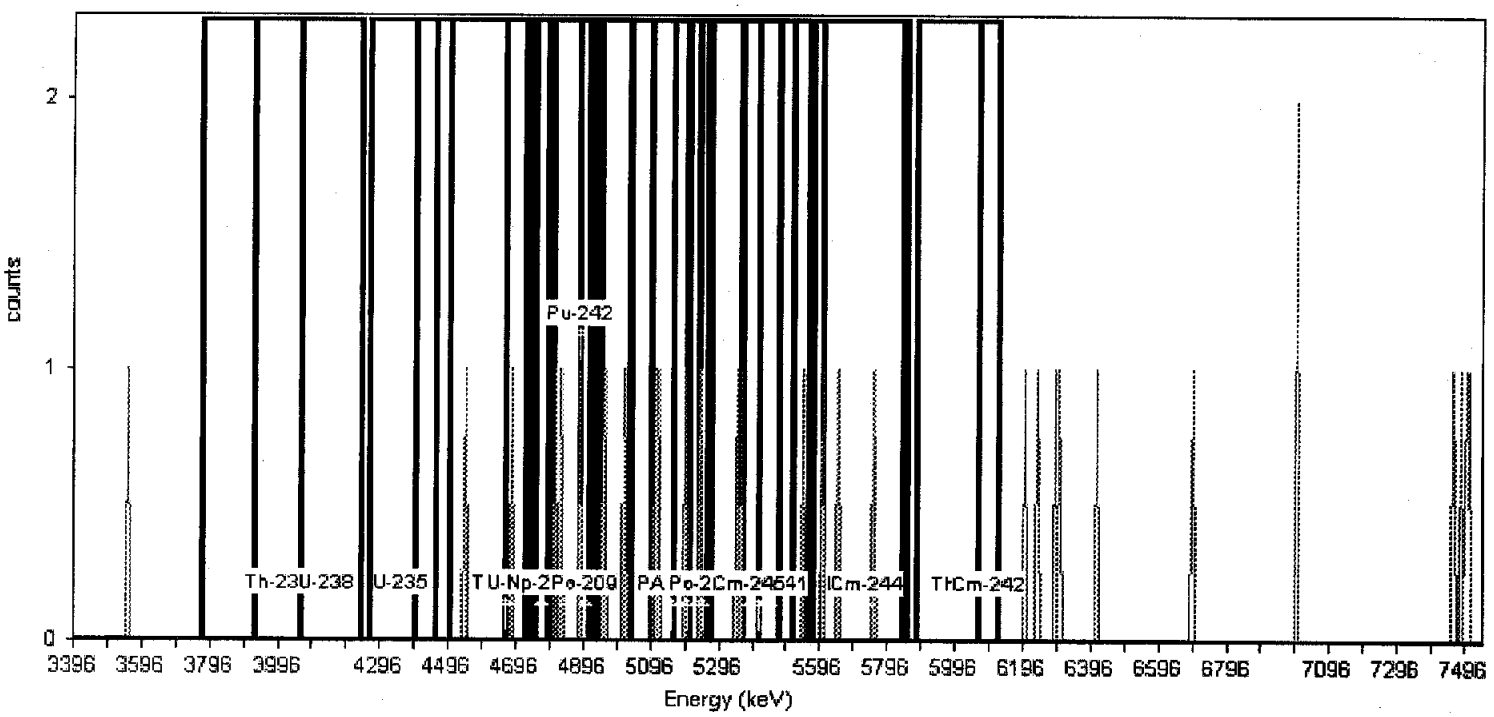
Acquisition

Detector: AV52 , SN:
Acquisition Start Date: 12/24/2006 6:01:36PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV52
Calibration Date: 11/30/2006 4:06:47PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.77% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 31.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	4.00	4.167E-003	2.329E-003
Th-229	4.84	4.72	5.10	5.00	5.208E-003	2.552E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	5.00	5.208E-003	2.552E-003
Am-243	5.20	5.03	5.28	4.00	4.167E-003	2.329E-003
U-232	5.23	5.04	5.37	6.00	6.250E-003	2.756E-003
Th-228	5.41	5.16	5.47	4.00	4.167E-003	2.329E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	3.00	3.125E-003	2.083E-003
Am-241	5.45	5.27	5.57	3.00	3.125E-003	2.083E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	4.00	4.167E-003	2.329E-003
Cm-244	5.73	5.60	5.86	4.00	4.167E-003	2.329E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:59:25AM 12/26/2006

Sample

Sample Name: AV53 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

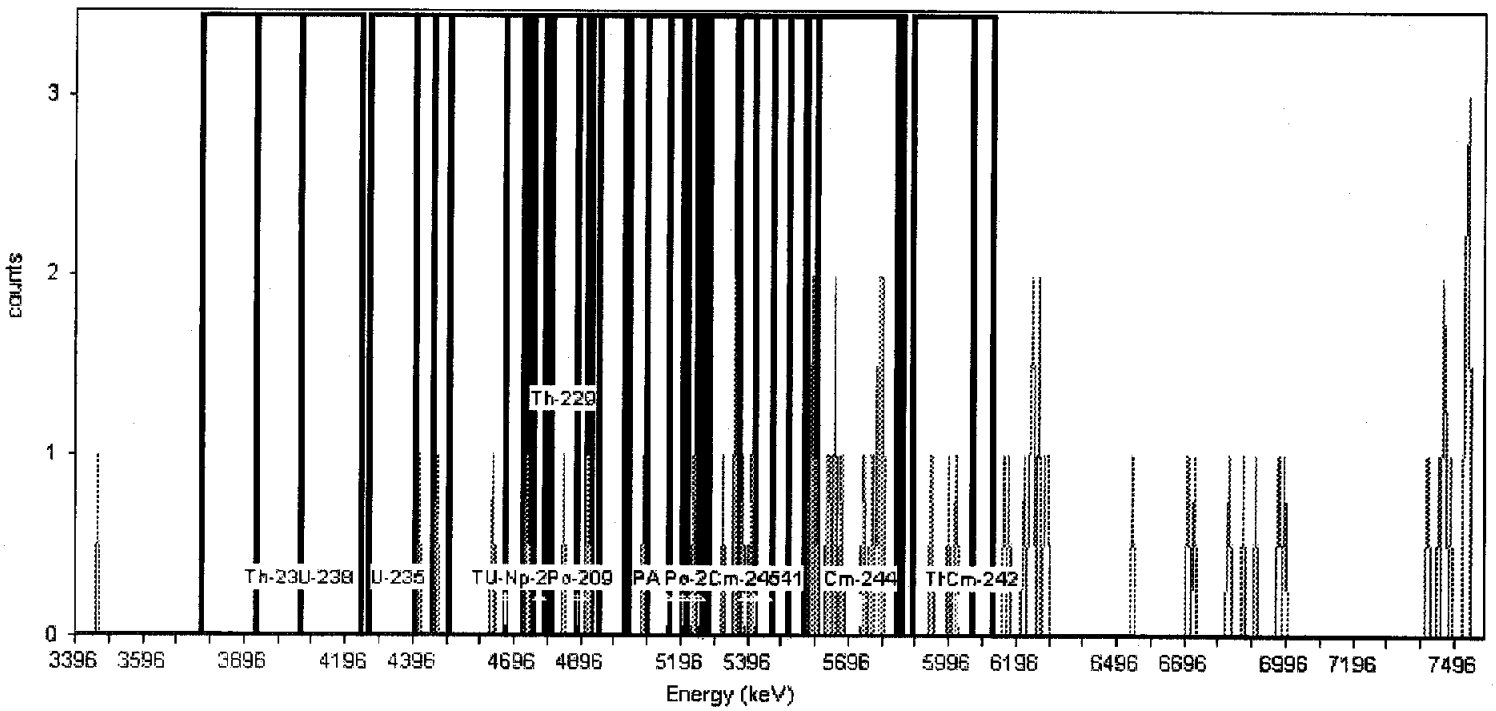
Acquisition

Detector: AV53 , SN:
Acquisition Start Date: 12/24/2006 6:01:37PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV53
Calibration Date: 11/28/2006 6:55:24AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.64% +/- 0.30% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundRoi Nuclide Library: Background ROI Library

Total Background Counts: 69.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	4.00	4.167E-003	2.329E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	4.00	4.167E-003	2.329E-003
Th-229	4.84	4.72	5.10	5.00	5.208E-003	2.552E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	5.00	5.208E-003	2.552E-003
Th-228	5.41	5.16	5.47	6.00	6.250E-003	2.756E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	5.00	5.208E-003	2.552E-003
Am-241	5.45	5.27	5.57	5.00	5.208E-003	2.552E-003
Cm-245	5.39	5.36	5.41	2.00	2.083E-003	1.804E-003
Pu-236	5.72	5.57	5.84	18.00	1.875E-002	4.541E-003
Cm-244	5.73	5.60	5.86	15.00	1.563E-002	4.167E-003
Th-227	6.02	5.89	6.13	3.00	3.125E-003	2.083E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:59:28AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV54
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

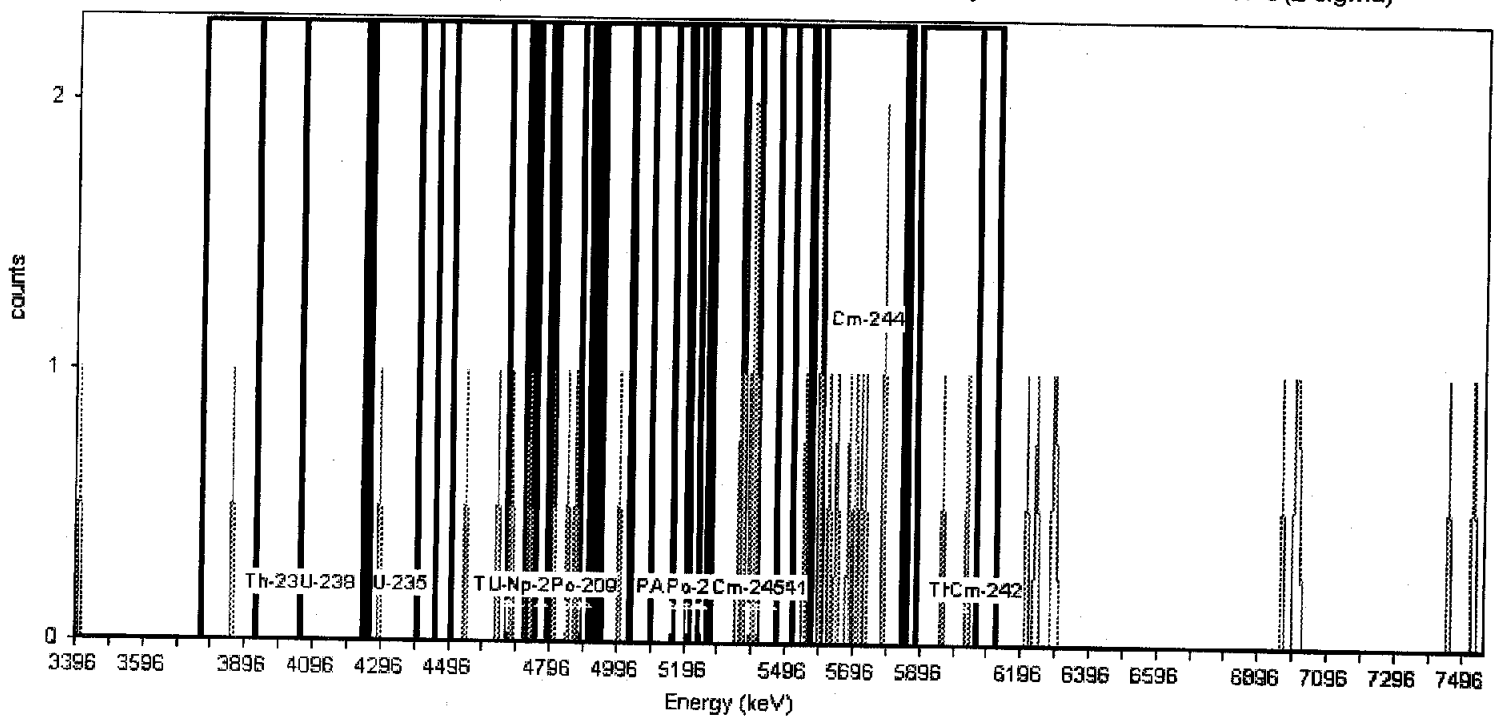
Acquisition

Detector: AV54 , SN:
Acquisition Start Date: 12/24/2006 6:01:40PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV54
Calibration Date: 11/29/2006 4:08:38PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.34% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_Background Roi
Nuclide Library: Background ROI Library
Total Background Counts: 44.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	4.00	4.167E-003	2.329E-003
U-234	4.70	4.50	4.80	5.00	5.208E-003	2.552E-003
Pu-242	4.88	4.67	4.93	5.00	5.208E-003	2.552E-003
Th-229	4.84	4.72	5.10	5.00	5.208E-003	2.552E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	3.00	3.125E-003	2.083E-003
Th-228	5.41	5.16	5.47	9.00	9.375E-003	3.294E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	9.00	9.375E-003	3.294E-003
Am-241	5.45	5.27	5.57	10.00	1.042E-002	3.455E-003
Cm-245	5.39	5.36	5.41	8.00	8.333E-003	3.125E-003
Pu-236	5.72	5.57	5.84	10.00	1.042E-002	3.455E-003
Cm-244	5.73	5.60	5.86	8.00	8.333E-003	3.125E-003
Th-227	6.02	5.89	6.13	2.00	2.083E-003	1.804E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:59:48AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV56
Comment:

Spectrum #1 Analysis #1

Batch

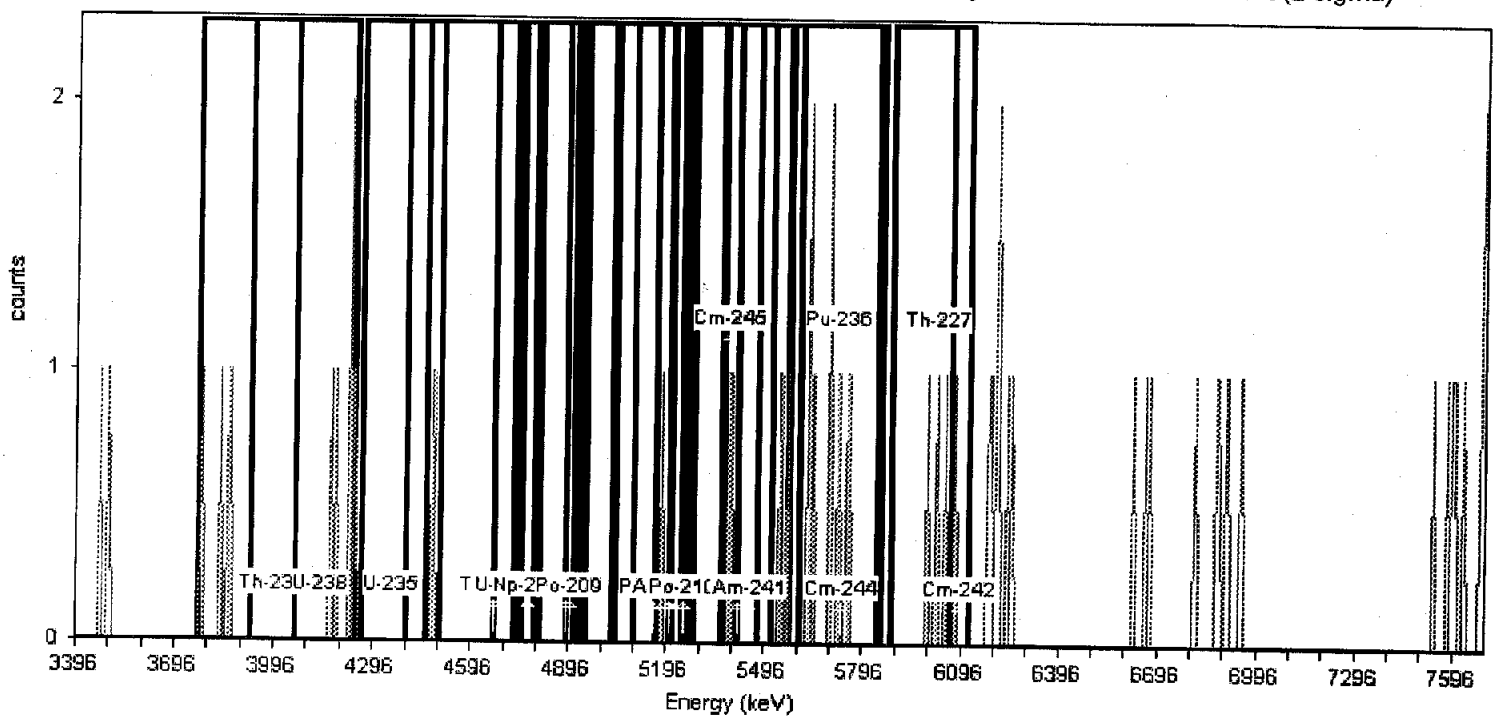
Batch Name: Dec2006
Description:

Acquisition

Detector: AV56 , SN:
Acquisition Start Date: 12/24/2006 6:01:42PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV56
Calibration Date: 11/28/2006 6:55:32AM

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.01% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_Background Nuclide Library: Background ROI Library
Total Background Counts: 55.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	4.00	4.167E-003	2.329E-003
U-238	4.14	3.93	4.24	5.00	5.208E-003	2.552E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	3.00	3.125E-003	2.083E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	2.00	2.083E-003	1.804E-003
Am-241	5.45	5.27	5.57	4.00	4.167E-003	2.329E-003
Cm-245	5.39	5.36	5.41	2.00	2.083E-003	1.804E-003
Pu-236	5.72	5.57	5.84	9.00	9.375E-003	3.294E-003
Cm-244	5.73	5.60	5.86	9.00	9.375E-003	3.294E-003
Th-227	6.02	5.89	6.13	4.00	4.167E-003	2.329E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

5:59:44AM 12/26/2006

Sample

Sample Name: AV57

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

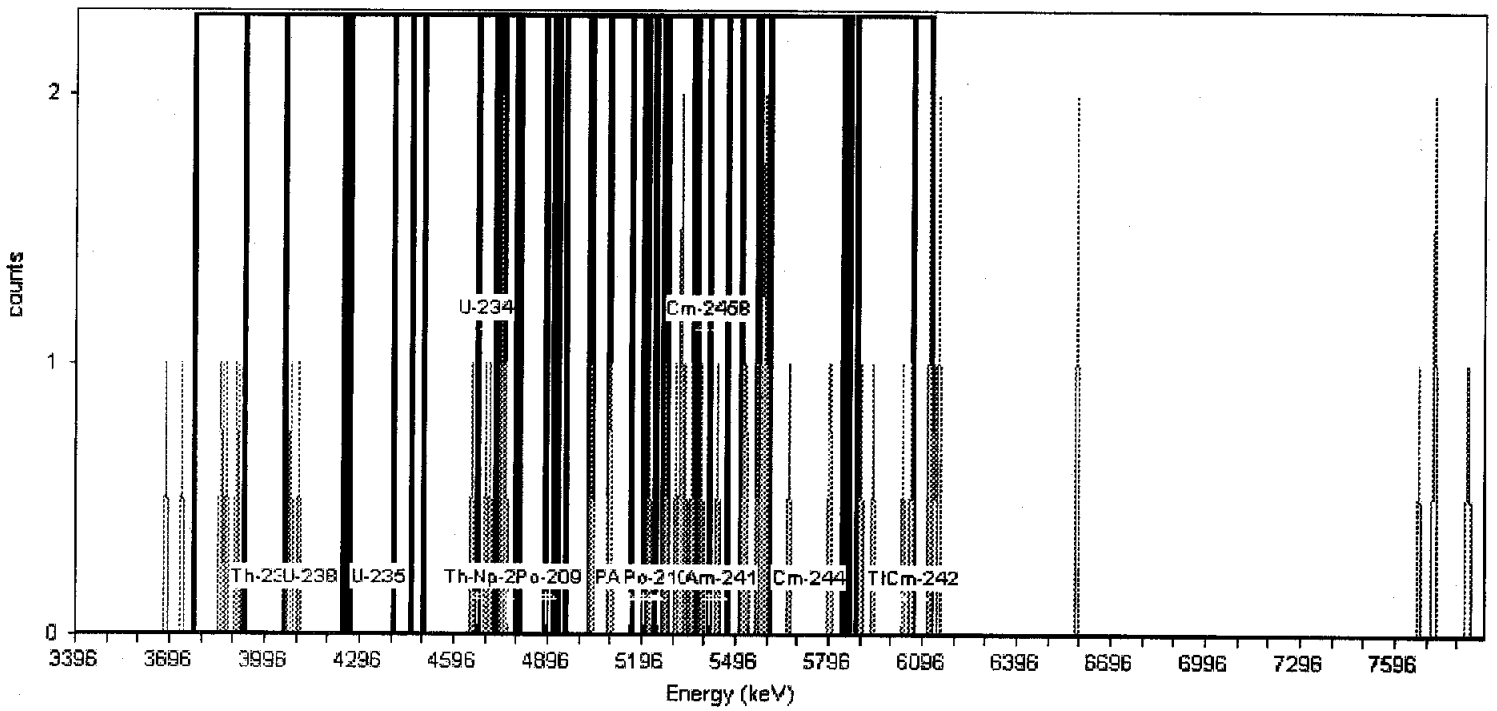
Acquisition

Detector: AV57 , SN:
Acquisition Start Date: 12/24/2006 6:01:43PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV57
Calibration Date: 11/30/2006 4:06:55PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.37% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI

Nuclide Library: Background ROI Library

Total Background Counts: 49.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	6.00	6.250E-003	2.756E-003
Pu-242	4.88	4.67	4.93	5.00	5.208E-003	2.552E-003
Th-229	4.84	4.72	5.10	5.00	5.208E-003	2.552E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	4.00	4.167E-003	2.329E-003
U-232	5.23	5.04	5.37	9.00	9.375E-003	3.294E-003
Th-228	5.41	5.16	5.47	9.00	9.375E-003	3.294E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	8.00	8.333E-003	3.125E-003
Am-241	5.45	5.27	5.57	11.00	1.146E-002	3.608E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	5.00	5.208E-003	2.552E-003
Cm-244	5.73	5.60	5.86	2.00	2.083E-003	1.804E-003
Th-227	6.02	5.89	6.13	6.00	6.250E-003	2.756E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003
Th-232	3.99	3.77	4.06	3.00	3.125E-003	2.083E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 5:59:54AM 12/26/2006

Sample

Sample Name: AV58 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

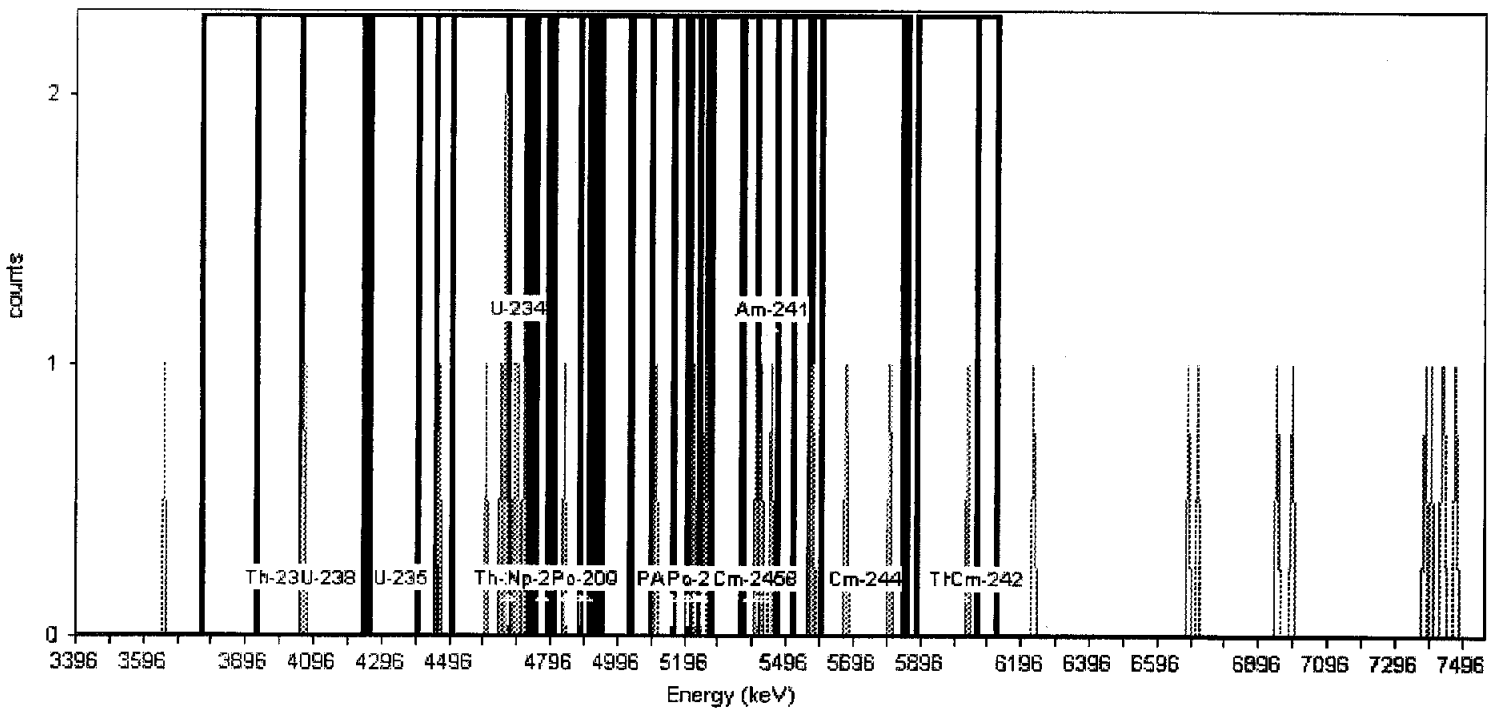
Acquisition

Detector: AV58 , SN:
Acquisition Start Date: 12/24/2006 6:01:44PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV58
Calibration Date: 12/1/2006 3:25:30PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.71% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 31.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	8.00	8.333E-003	3.125E-003
U-234	4.70	4.50	4.80	7.00	7.292E-003	2.946E-003
Pu-242	4.88	4.67	4.93	4.00	4.167E-003	2.329E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	3.00	3.125E-003	2.083E-003
Th-228	5.41	5.16	5.47	5.00	5.208E-003	2.552E-003
Po-210	5.25	5.20	5.26	2.00	2.083E-003	1.804E-003
Pu-238	5.44	5.24	5.52	4.00	4.167E-003	2.329E-003
Am-241	5.45	5.27	5.57	3.00	3.125E-003	2.083E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	3.00	3.125E-003	2.083E-003
Cm-244	5.73	5.60	5.86	2.00	2.083E-003	1.804E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:01AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV59
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

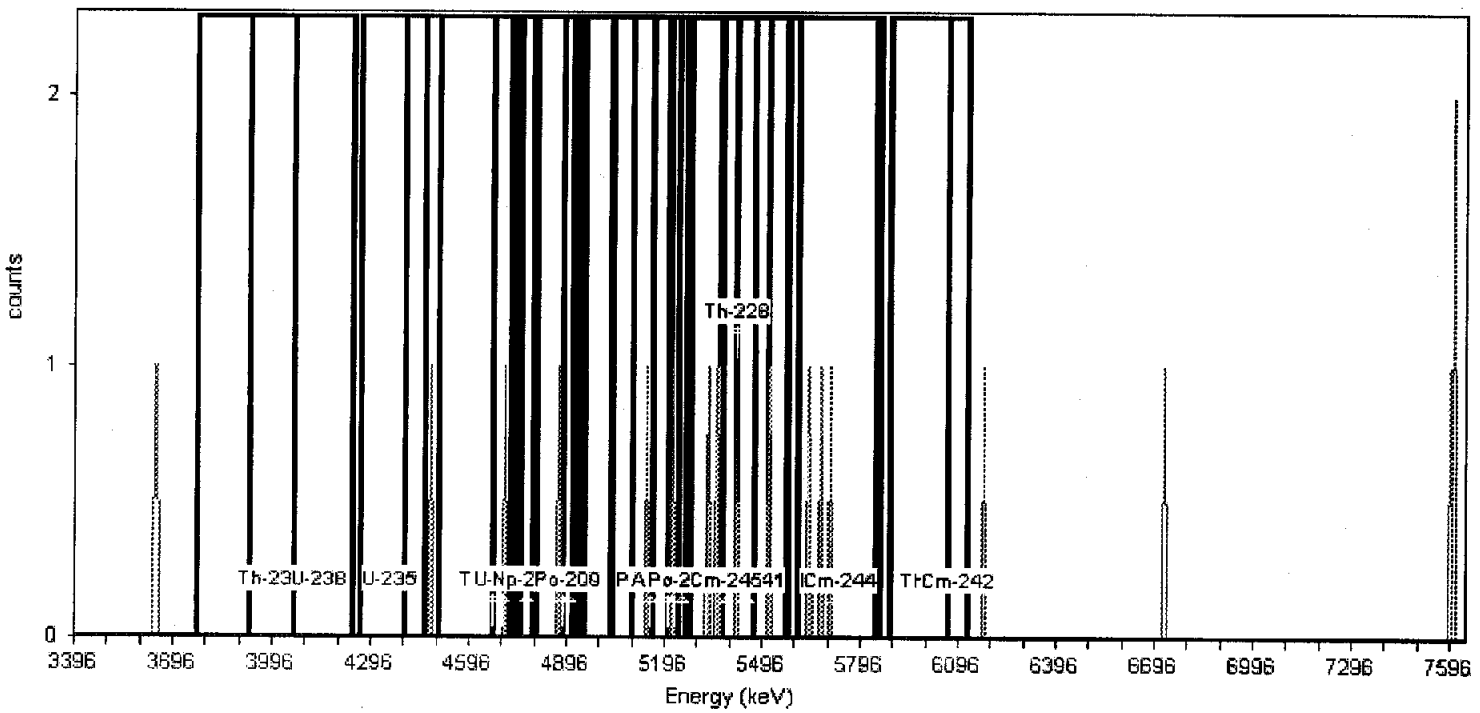
Acquisition

Detector: AV59 , SN:
Acquisition Start Date: 12/24/2006 6:01:46PM
Live Time: 960.00 min.
Real Time: 960.18 min.
Calibration Name: Nov2006_AV59
Calibration Date: 12/1/2006 3:50:52PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.36% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 19.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	4.00	4.167E-003	2.329E-003
Th-228	5.41	5.16	5.47	4.00	4.167E-003	2.329E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	4.00	4.167E-003	2.329E-003
Am-241	5.45	5.27	5.57	4.00	4.167E-003	2.329E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	3.00	3.125E-003	2.083E-003
Cm-244	5.73	5.60	5.86	3.00	3.125E-003	2.083E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:07AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV60
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

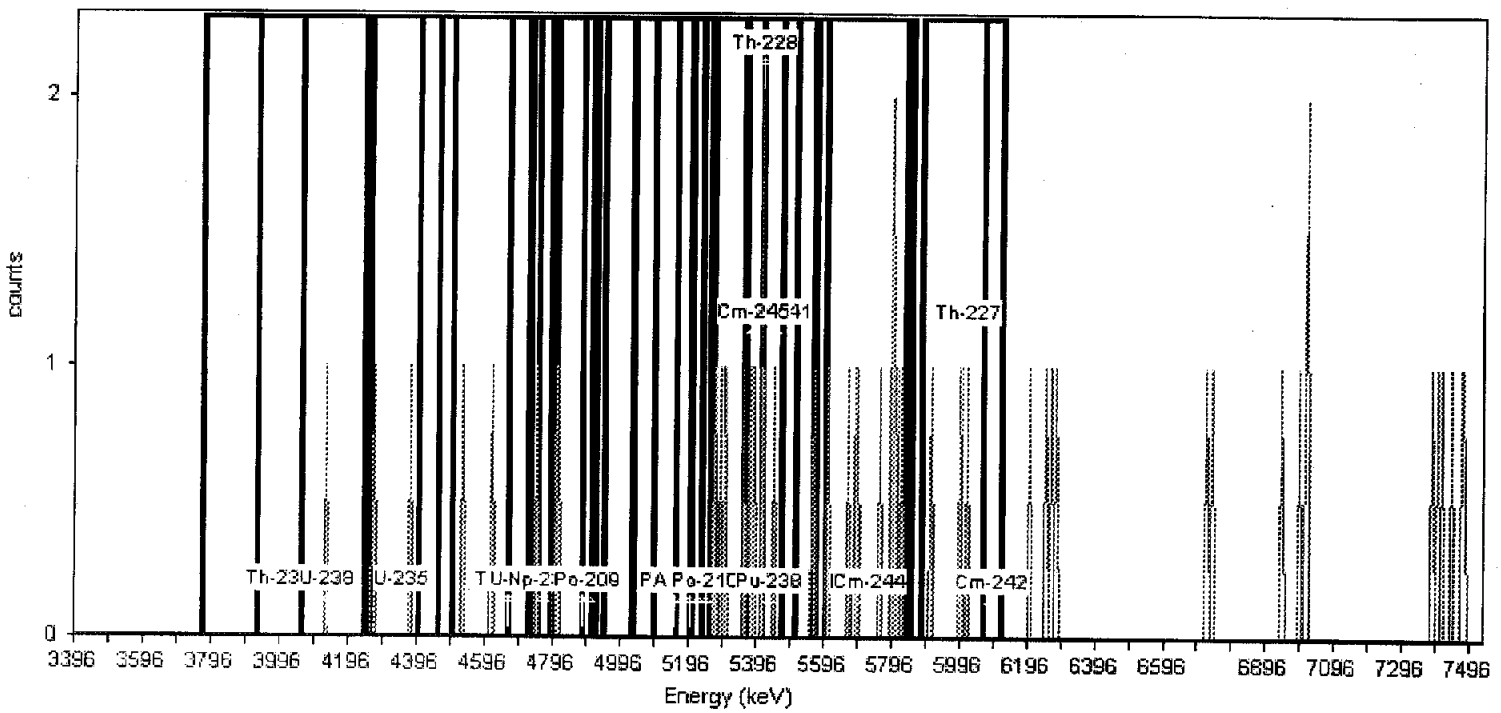
Acquisition

Detector: AV60 , SN:
Acquisition Start Date: 12/24/2006 6:01:48PM
Live Time: 960.00 min.
Real Time: 960.18 min.
Calibration Name: Nov2006_AV60
Calibration Date: 12/1/2006 4:04:58PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.67% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 48.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	4.00	4.167E-003	2.329E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	3.00	3.125E-003	2.083E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	4.00	4.167E-003	2.329E-003
Th-228	5.41	5.16	5.47	10.00	1.042E-002	3.455E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	10.00	1.042E-002	3.455E-003
Am-241	5.45	5.27	5.57	11.00	1.146E-002	3.608E-003
Cm-245	5.39	5.36	5.41	6.00	6.250E-003	2.756E-003
Pu-236	5.72	5.57	5.84	10.00	1.042E-002	3.455E-003
Cm-244	5.73	5.60	5.86	10.00	1.042E-002	3.455E-003
Th-227	6.02	5.89	6.13	3.00	3.125E-003	2.083E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:17AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV63
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

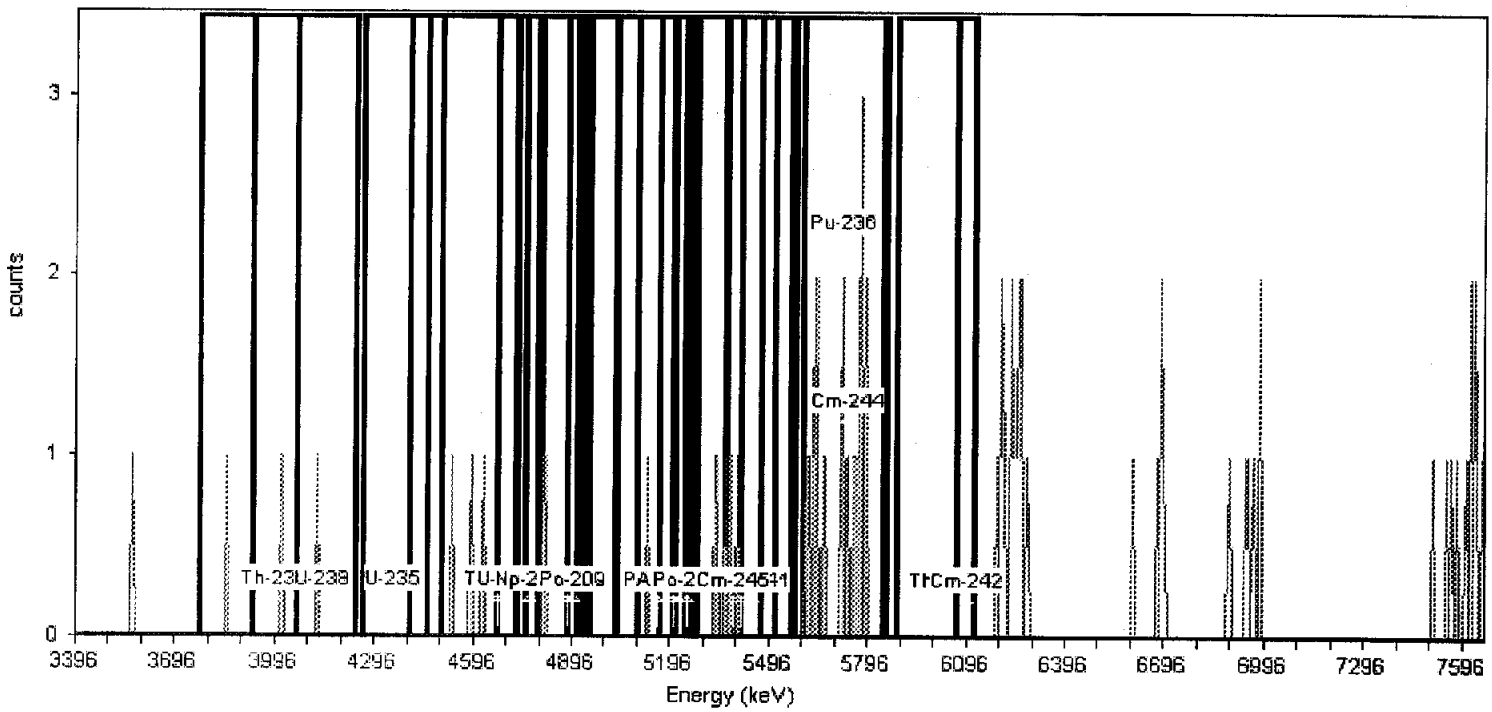
Acquisition

Detector: AV63 , SN:
Acquisition Start Date: 12/24/2006 6:01:49PM
Live Time: 960.00 min.
Real Time: 960.18 min.
Calibration Name: Nov2006_AV63
Calibration Date: 11/28/2006 5:03:03PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.89% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 65.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	3.00	3.125E-003	2.083E-003
Th-228	5.41	5.16	5.47	4.00	4.167E-003	2.329E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	4.00	4.167E-003	2.329E-003
Am-241	5.45	5.27	5.57	4.00	4.167E-003	2.329E-003
Cm-245	5.39	5.36	5.41	3.00	3.125E-003	2.083E-003
Pu-236	5.72	5.57	5.84	18.00	1.875E-002	4.541E-003
Cm-244	5.73	5.60	5.86	18.00	1.875E-002	4.541E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

ST

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:00:24AM 12/26/2006

Sample

Sample Name: AV64 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

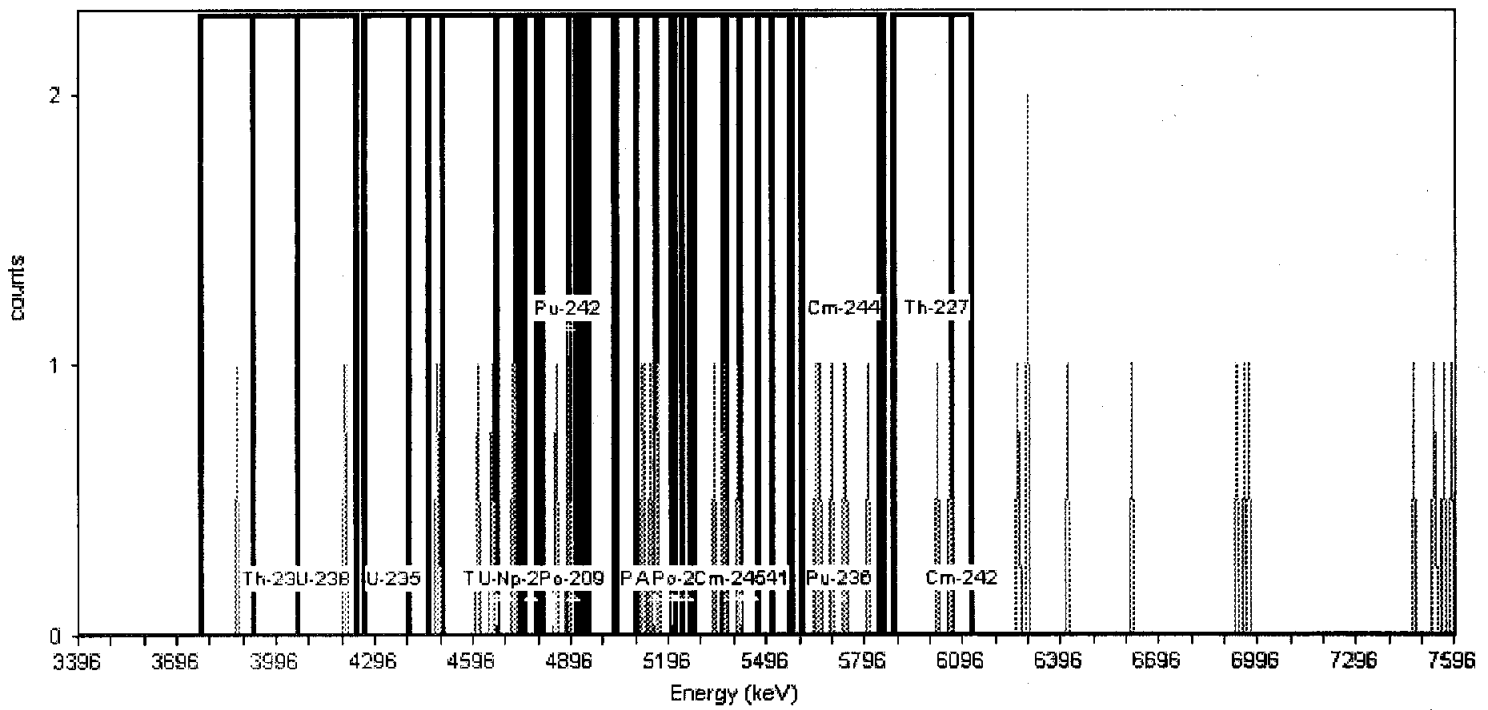
Acquisition

Detector: AV64 . SN:
Acquisition Start Date: 12/24/2006 6:00:53PM
Live Time: 960.00 min.
Real Time: 960.18 min.
Calibration Name: Nov2006_AV64
Calibration Date: 11/28/2006 5:03:08PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.34% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 35.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	4.00	4.167E-003	2.329E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	3.00	3.125E-003	2.083E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	5.00	5.208E-003	2.552E-003
Th-228	5.41	5.16	5.47	4.00	4.167E-003	2.329E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	3.00	3.125E-003	2.083E-003
Am-241	5.45	5.27	5.57	3.00	3.125E-003	2.083E-003
Cm-245	5.39	5.36	5.41	2.00	2.083E-003	1.804E-003
Pu-236	5.72	5.57	5.84	7.00	7.292E-003	2.946E-003
Cm-244	5.73	5.60	5.86	7.00	7.292E-003	2.946E-003
Th-227	6.02	5.89	6.13	2.00	2.083E-003	1.804E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

6:00:30AM 12/26/2006

Sample

Sample Name: AV65

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

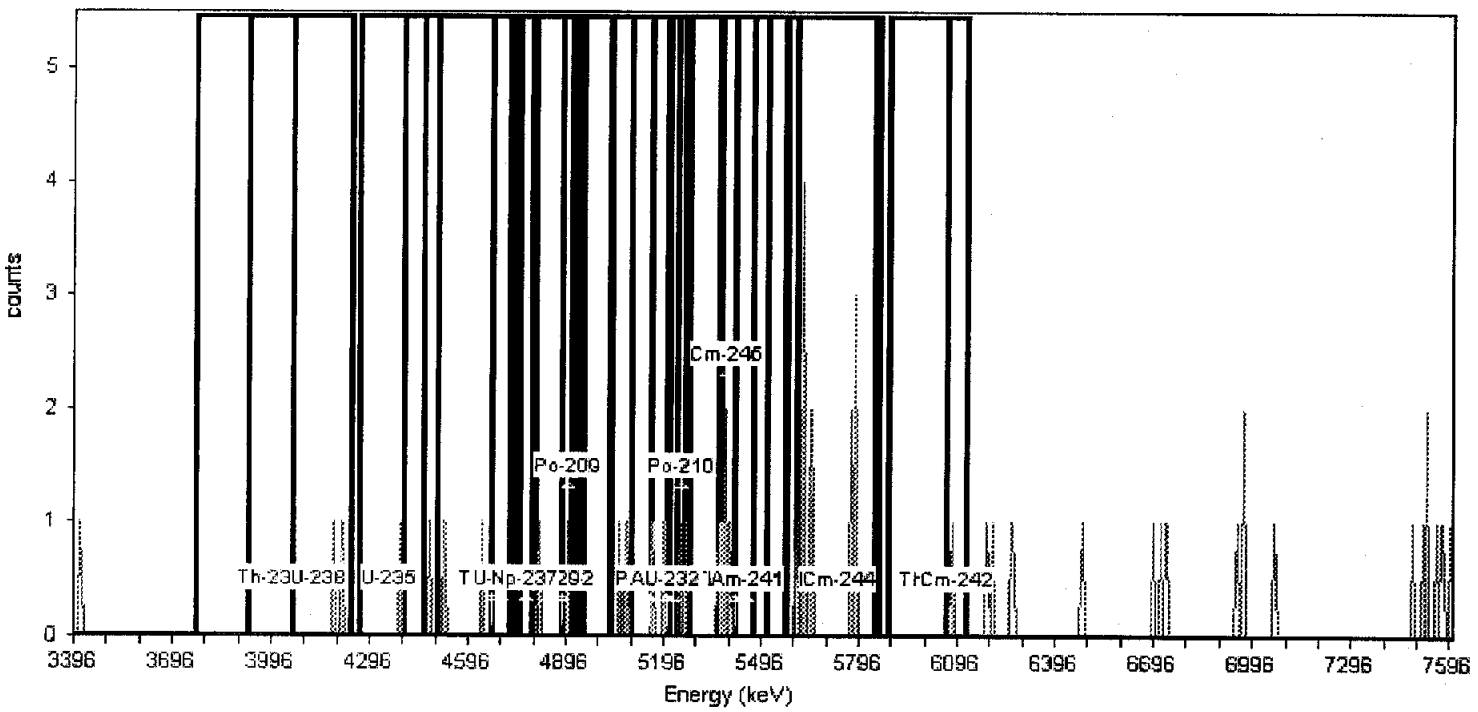
Acquisition

Detector: AV65 , SN:
Acquisition Start Date: 12/24/2006 6:00:55PM
Live Time: 960.00 min.
Real Time: 960.18 min.
Calibration Name: Nov2006_AV65
Calibration Date: 11/28/2006 5:03:13PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.52% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 58.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	4.00	4.167E-003	2.329E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	4.00	4.167E-003	2.329E-003
Am-243	5.20	5.03	5.28	6.00	6.250E-003	2.756E-003
U-232	5.23	5.04	5.37	8.00	8.333E-003	3.125E-003
Th-228	5.41	5.16	5.47	10.00	1.042E-002	3.455E-003
Po-210	5.25	5.20	5.26	2.00	2.083E-003	1.804E-003
Pu-238	5.44	5.24	5.52	8.00	8.333E-003	3.125E-003
Am-241	5.45	5.27	5.57	6.00	6.250E-003	2.756E-003
Cm-245	5.39	5.36	5.41	6.00	6.250E-003	2.756E-003
Pu-236	5.72	5.57	5.84	15.00	1.563E-002	4.167E-003
Cm-244	5.73	5.60	5.86	15.00	1.563E-002	4.167E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

6:00:37AM 12/26/2006

Sample

Sample Name: AV66

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

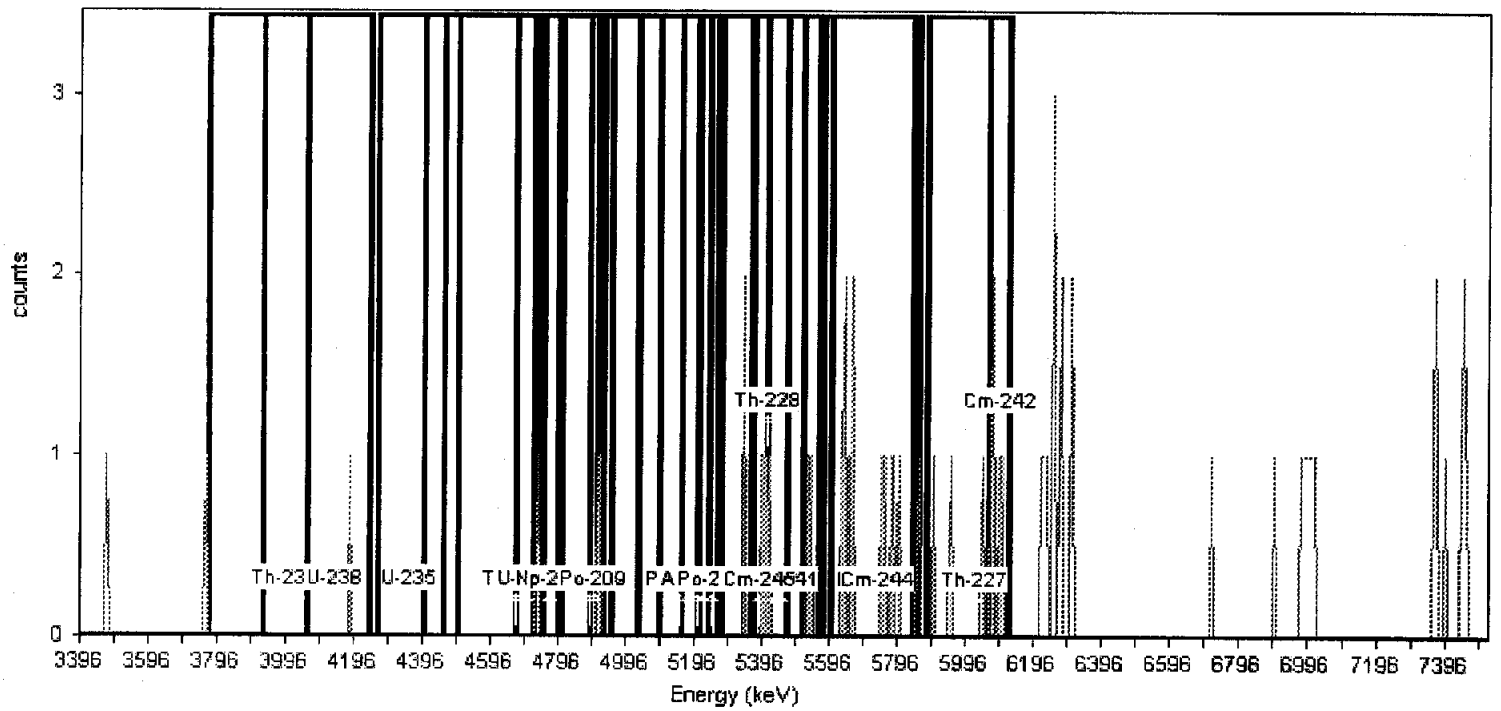
Acquisition

Detector: AV66 , SN:
Acquisition Start Date: 12/24/2006 6:00:57PM
Live Time: 960.00 min.
Real Time: 960.18 min.
Calibration Name: Nov2006_AV66
Calibration Date: 11/28/2006 5:03:17PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.60% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI

Nuclide Library: Background ROI Library

Total Background Counts: 60.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	2.00	2.083E-003	1.804E-003
Th-228	5.41	5.16	5.47	6.00	6.250E-003	2.756E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	6.00	6.250E-003	2.756E-003
Am-241	5.45	5.27	5.57	8.00	8.333E-003	3.125E-003
Cm-245	5.39	5.36	5.41	4.00	4.167E-003	2.329E-003
Pu-236	5.72	5.57	5.84	10.00	1.042E-002	3.455E-003
Cm-244	5.73	5.60	5.86	11.00	1.146E-002	3.608E-003
Th-227	6.02	5.89	6.13	7.00	7.292E-003	2.946E-003
Cm-242	6.10	6.07	6.13	4.00	4.167E-003	2.329E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

6:00:43AM 12/26/2006

Sample

Sample Name: AV67

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

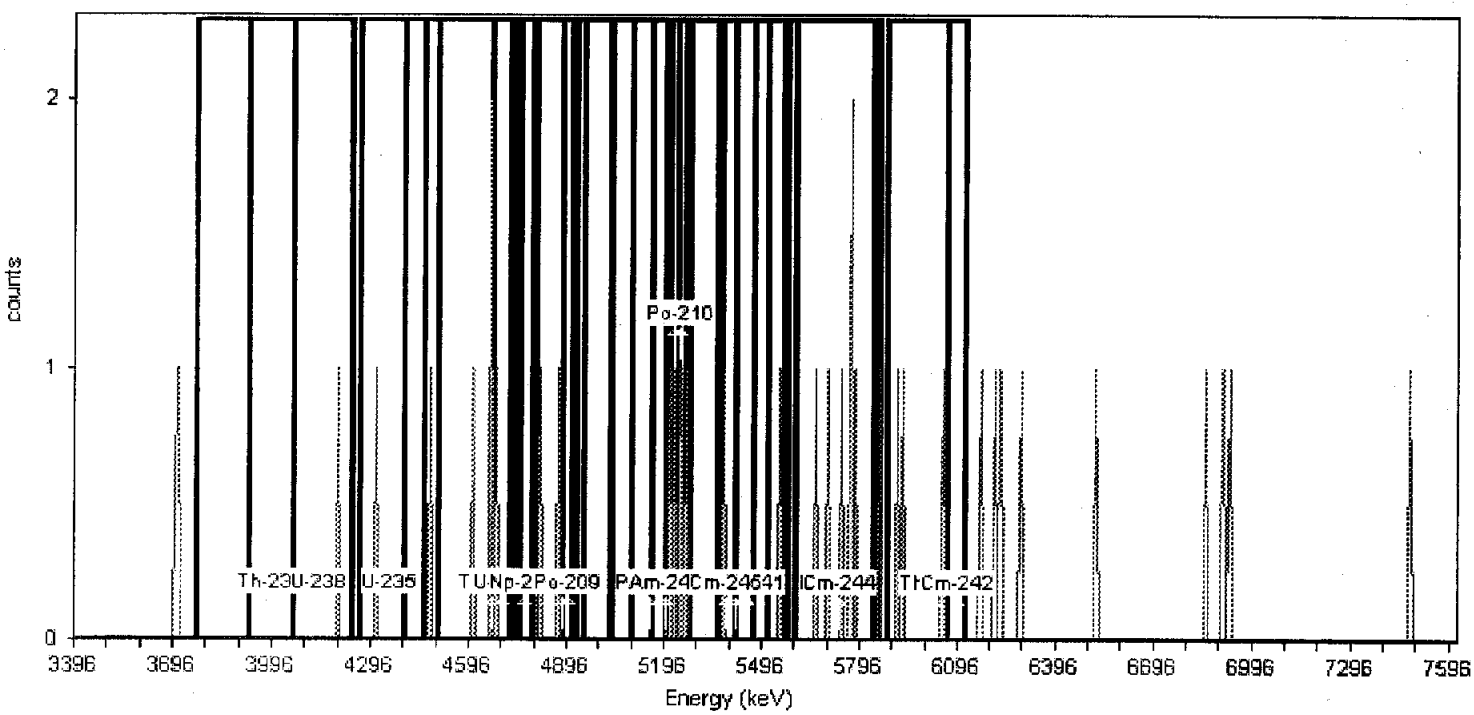
Acquisition

Detector: AV67 , SN:
Acquisition Start Date: 12/24/2006 6:00:58PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV67
Calibration Date: 12/1/2006 3:31:44PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.07% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI

Nuclide Library: Background ROI Library

Total Background Counts: 38.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	5.00	5.208E-003	2.552E-003
U-234	4.70	4.50	4.80	4.00	4.167E-003	2.329E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	4.00	4.167E-003	2.329E-003
U-232	5.23	5.04	5.37	4.00	4.167E-003	2.329E-003
Th-228	5.41	5.16	5.47	5.00	5.208E-003	2.552E-003
Po-210	5.25	5.20	5.26	4.00	4.167E-003	2.329E-003
Pu-238	5.44	5.24	5.52	3.00	3.125E-003	2.083E-003
Am-241	5.45	5.27	5.57	2.00	2.083E-003	1.804E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	6.00	6.250E-003	2.756E-003
Cm-244	5.73	5.60	5.86	7.00	7.292E-003	2.946E-003
Th-227	6.02	5.89	6.13	3.00	3.125E-003	2.083E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:47AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV68
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

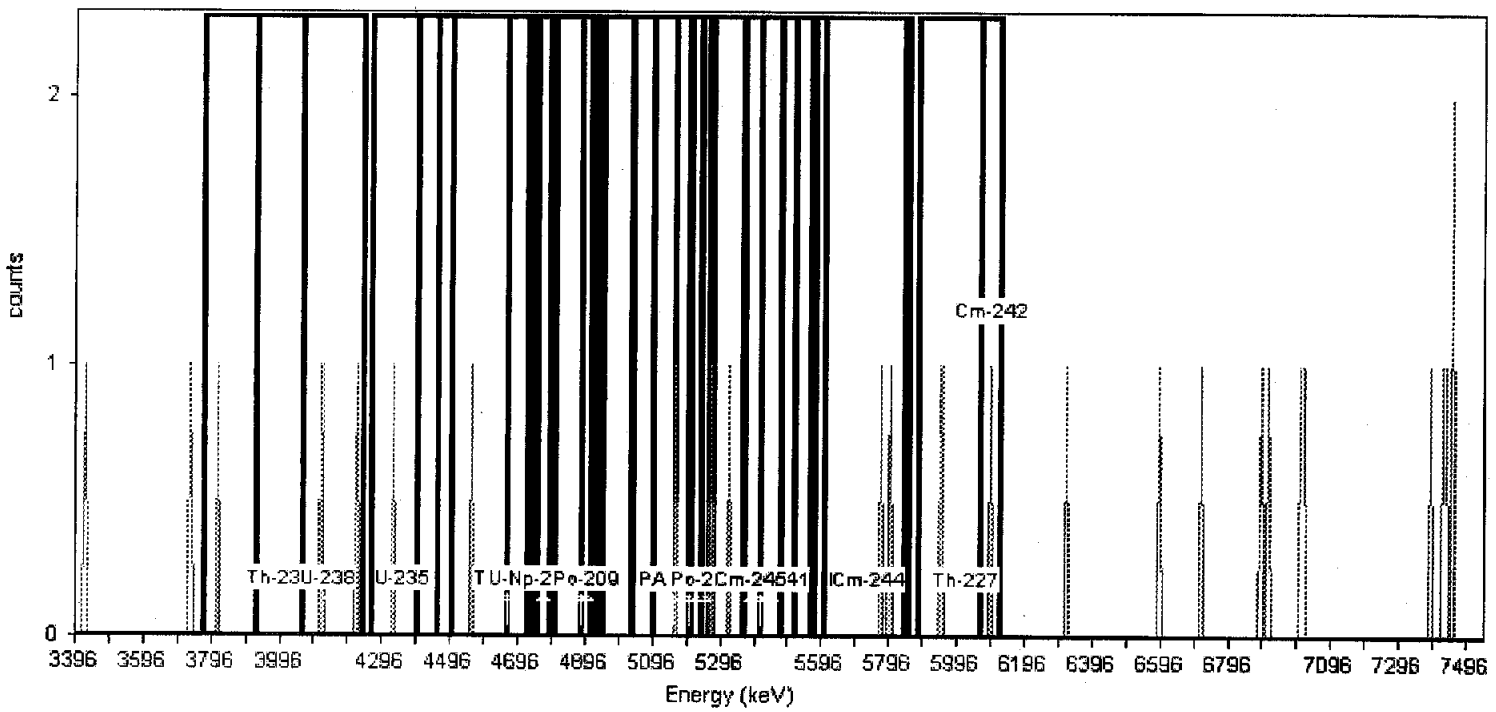
Acquisition

Detector: AV68 , SN:
Acquisition Start Date: 12/24/2006 6:01:00PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV68
Calibration Date: 12/1/2006 3:32:00PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.14% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 26.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	3.00	3.125E-003	2.083E-003
Th-228	5.41	5.16	5.47	3.00	3.125E-003	2.083E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	2.00	2.083E-003	1.804E-003
Am-241	5.45	5.27	5.57	2.00	2.083E-003	1.804E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	2.00	2.083E-003	1.804E-003
Cm-244	5.73	5.60	5.86	2.00	2.083E-003	1.804E-003
Th-227	6.02	5.89	6.13	2.00	2.083E-003	1.804E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:50AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV69
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

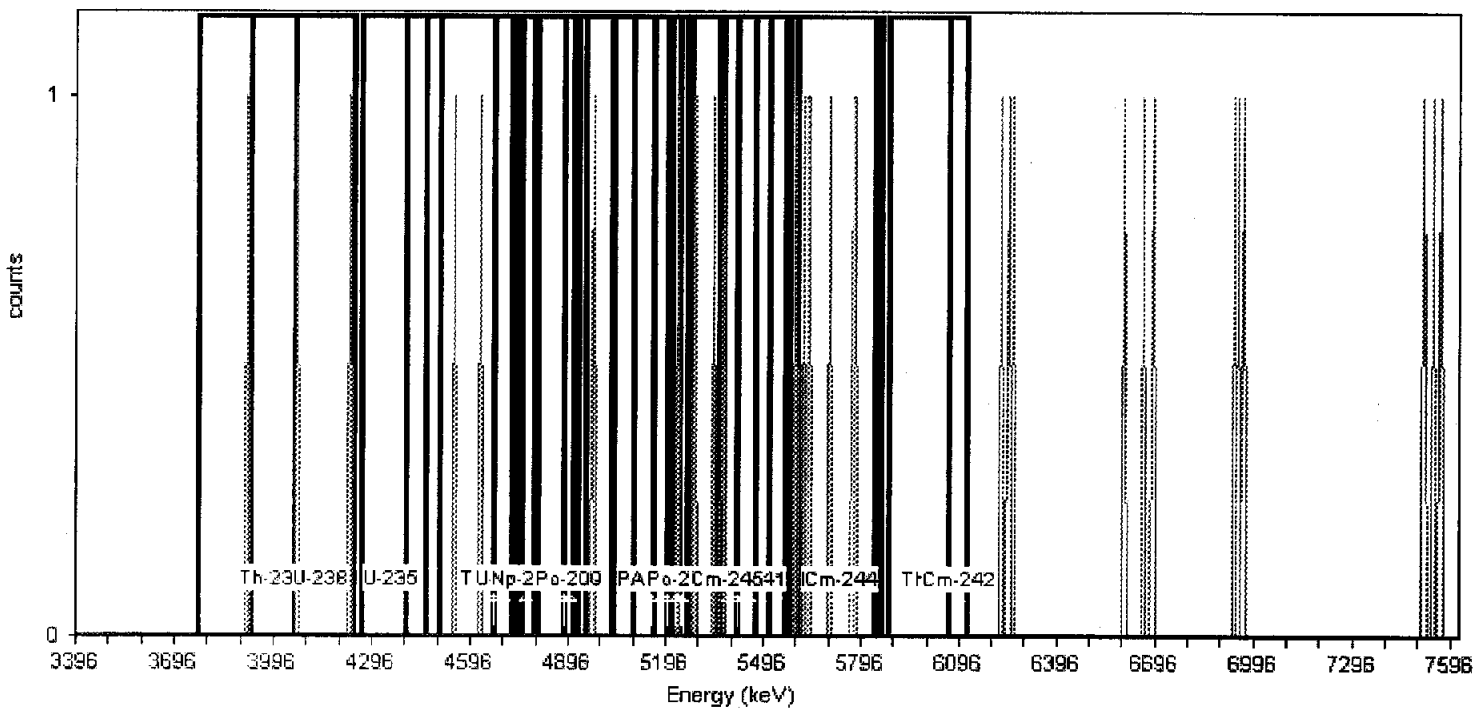
Acquisition

Detector: AV69 , SN:
Acquisition Start Date: 12/24/2006 6:01:02PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV69
Calibration Date: 12/1/2006 3:32:12PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.72% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 29.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	4.00	4.167E-003	2.329E-003
Th-228	5.41	5.16	5.47	4.00	4.167E-003	2.329E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	3.00	3.125E-003	2.083E-003
Am-241	5.45	5.27	5.57	3.00	3.125E-003	2.083E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	7.00	7.292E-003	2.946E-003
Cm-244	5.73	5.60	5.86	6.00	6.250E-003	2.756E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:53AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV70
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

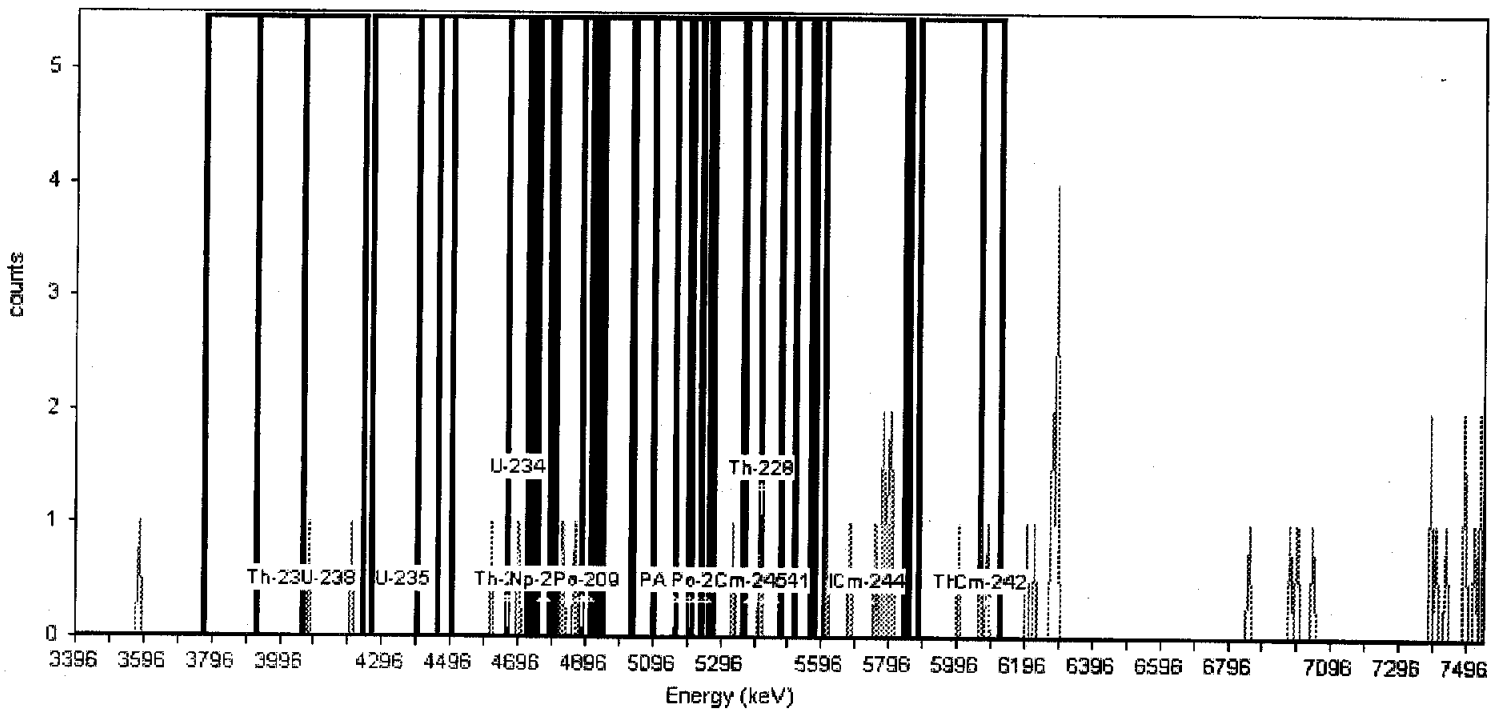
Acquisition

Detector: AV70 , SN:
Acquisition Start Date: 12/24/2006 6:01:04PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV70
Calibration Date: 11/30/2006 4:06:40PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.20% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 48.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	2.00	2.083E-003	1.804E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	2.00	2.083E-003	1.804E-003
Am-241	5.45	5.27	5.57	2.00	2.083E-003	1.804E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	12.00	1.250E-002	3.756E-003
Cm-244	5.73	5.60	5.86	12.00	1.250E-002	3.756E-003
Th-227	6.02	5.89	6.13	3.00	3.125E-003	2.083E-003
Cm-242	6.10	6.07	6.13	2.00	2.083E-003	1.804E-003

STL SEVERN TRENT STL

Alpha Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:00:57AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV71
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

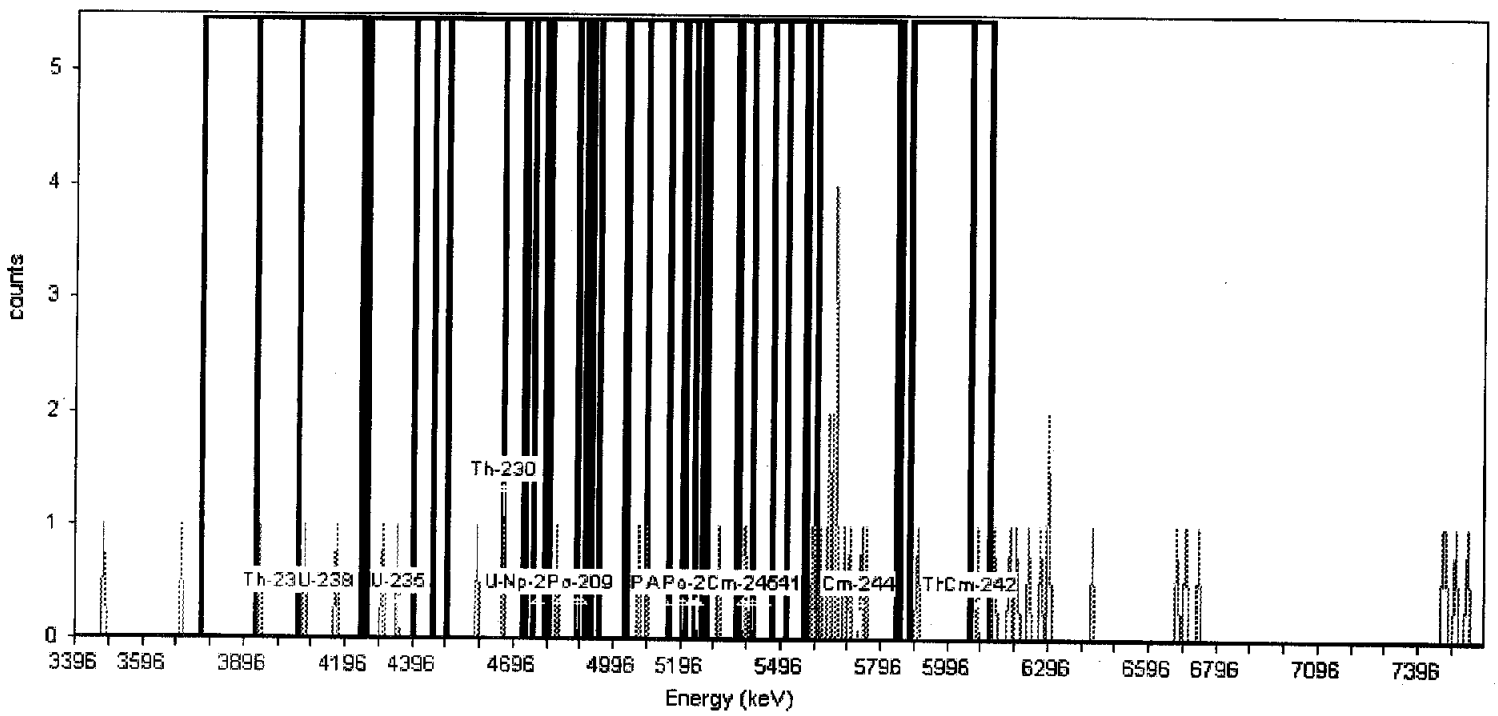
Acquisition

Detector: AV71 , SN:
Acquisition Start Date: 12/24/2006 6:01:06PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV71
Calibration Date: 11/29/2006 4:08:42PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.15% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 46.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	3.00	3.125E-003	2.083E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	3.00	3.125E-003	2.083E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	3.00	3.125E-003	2.083E-003
Th-228	5.41	5.16	5.47	2.00	2.083E-003	1.804E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	2.00	2.083E-003	1.804E-003
Am-241	5.45	5.27	5.57	2.00	2.083E-003	1.804E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	13.00	1.354E-002	3.898E-003
Cm-244	5.73	5.60	5.86	12.00	1.250E-002	3.756E-003
Th-227	6.02	5.89	6.13	2.00	2.083E-003	1.804E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

SEVERN TRENT STL

Alpha Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:01:00AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV72
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

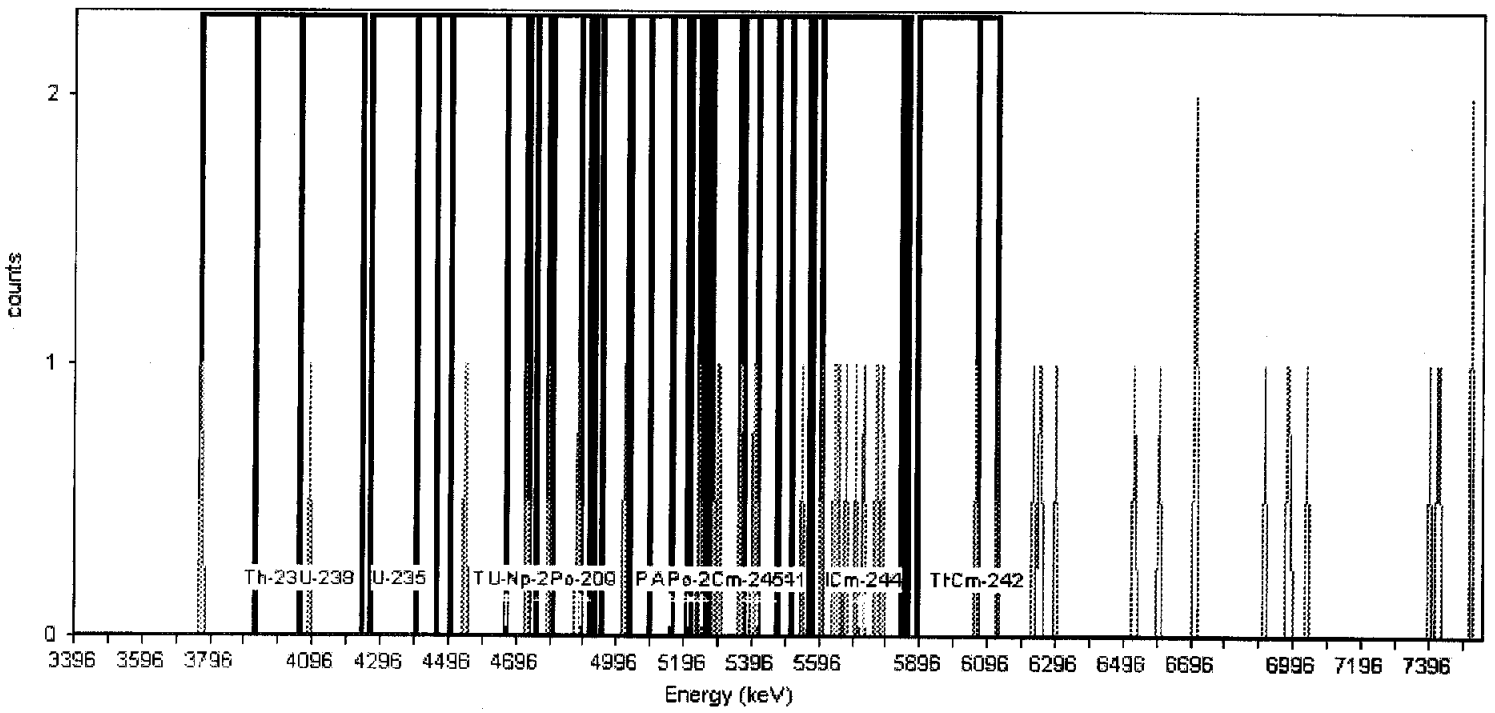
Acquisition

Detector: AV72 , SN:
Acquisition Start Date: 12/24/2006 6:01:07PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV72
Calibration Date: 11/28/2006 1:35:07PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.79% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 44.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	4.00	4.167E-003	2.329E-003
Np-237	4.77	4.75	4.79	1.00	1.042E-003	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	4.00	4.167E-003	2.329E-003
Th-228	5.41	5.16	5.47	6.00	6.250E-003	2.756E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	6.00	6.250E-003	2.756E-003
Am-241	5.45	5.27	5.57	6.00	6.250E-003	2.756E-003
Cm-245	5.39	5.36	5.41	3.00	3.125E-003	2.083E-003
Pu-236	5.72	5.57	5.84	10.00	1.042E-002	3.455E-003
Cm-244	5.73	5.60	5.86	10.00	1.042E-002	3.455E-003
Th-227	6.02	5.89	6.13	2.00	2.083E-003	1.804E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:01:03AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV73
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

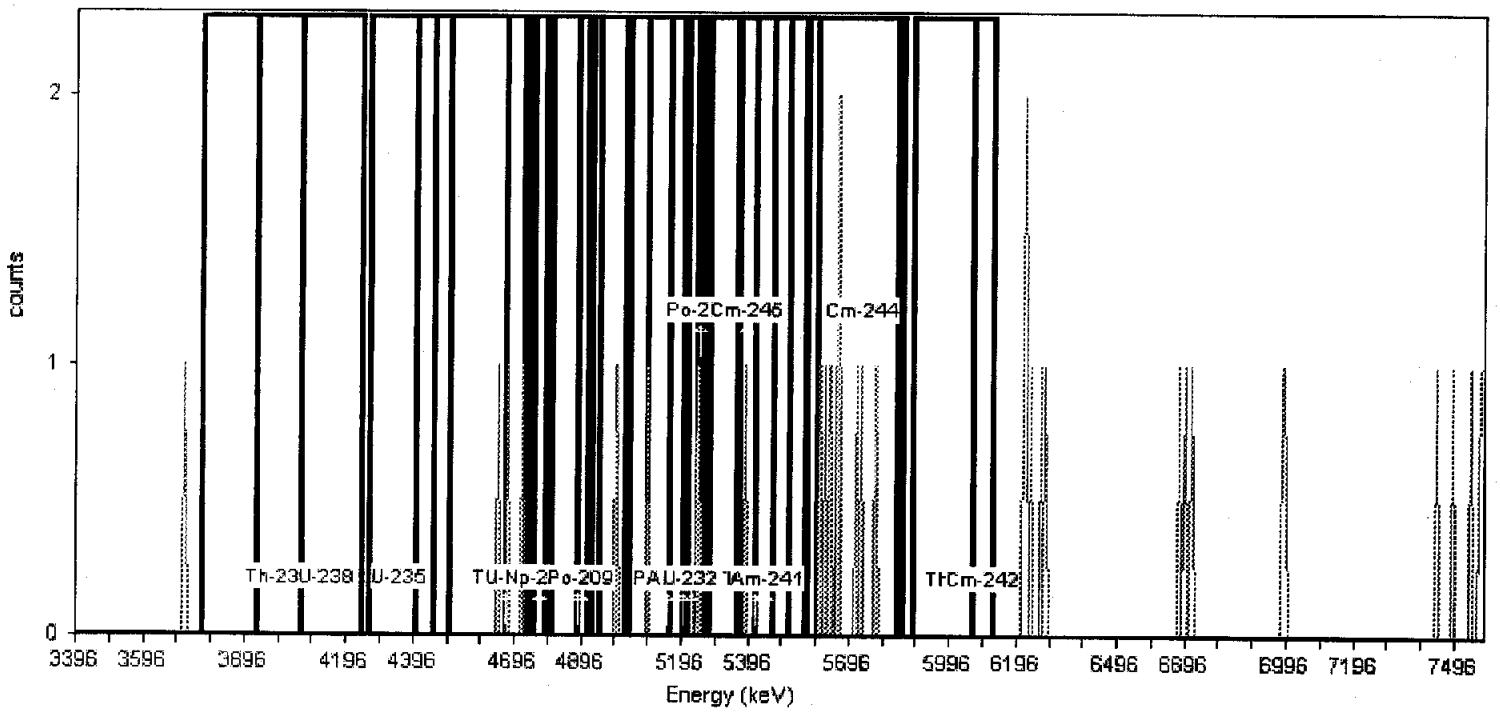
Acquisition

Detector: AV73 , SN:
Acquisition Start Date: 12/24/2006 6:01:09PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV73
Calibration Date: 11/29/2006 6:45:10PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.42% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 35.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	3.00	3.125E-003	2.083E-003
U-234	4.70	4.50	4.80	3.00	3.125E-003	2.083E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	3.00	3.125E-003	2.083E-003
U-232	5.23	5.04	5.37	3.00	3.125E-003	2.083E-003
Th-228	5.41	5.16	5.47	3.00	3.125E-003	2.083E-003
Po-210	5.25	5.20	5.26	2.00	2.083E-003	1.804E-003
Pu-238	5.44	5.24	5.52	3.00	3.125E-003	2.083E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	10.00	1.042E-002	3.455E-003
Cm-244	5.73	5.60	5.86	10.00	1.042E-002	3.455E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:01:06AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV75
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

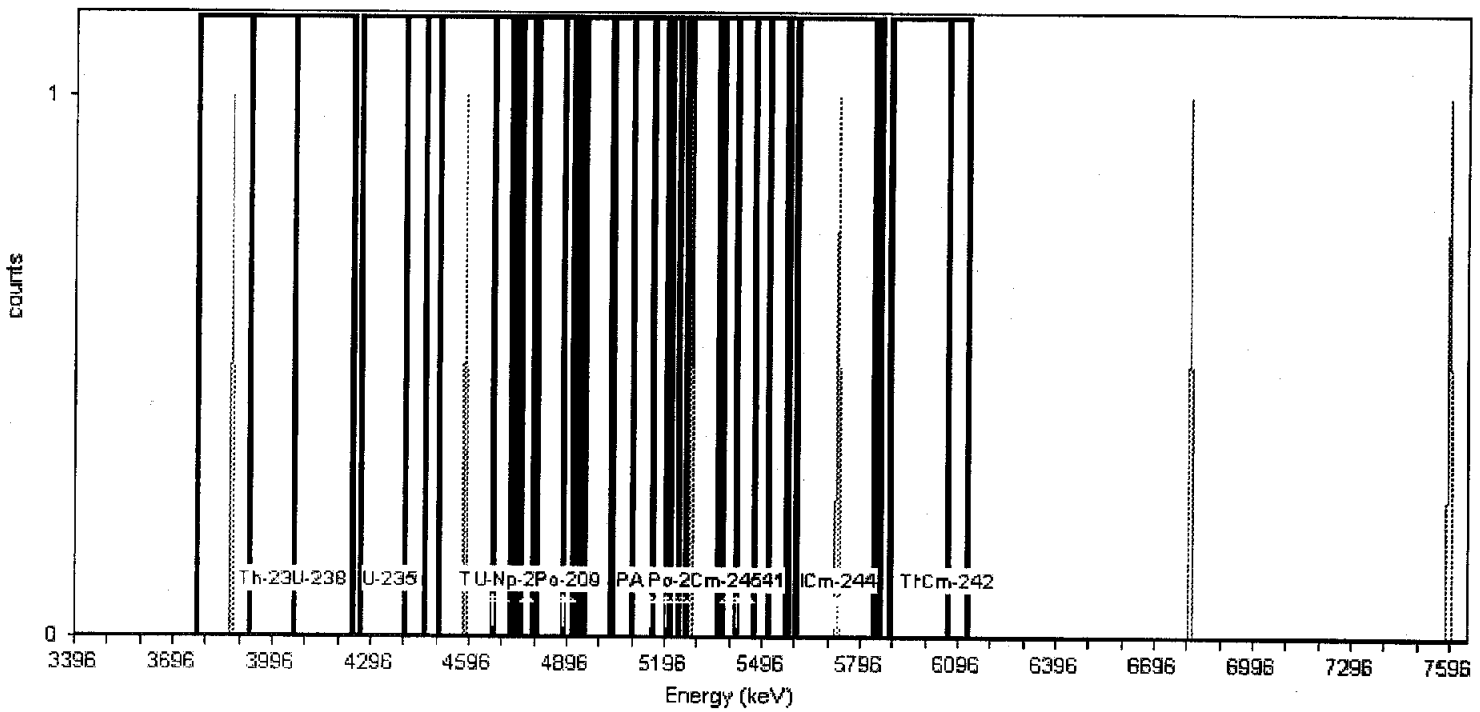
Acquisition

Detector: AV75 , SN: 46-033P6
Acquisition Start Date: 12/24/2006 6:01:12PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV75
Calibration Date: 11/28/2006 7:30:58PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.70% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 6.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	1.00	1.042E-003	1.473E-003
Cm-244	5.73	5.60	5.86	1.00	1.042E-003	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:01:10AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV76
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

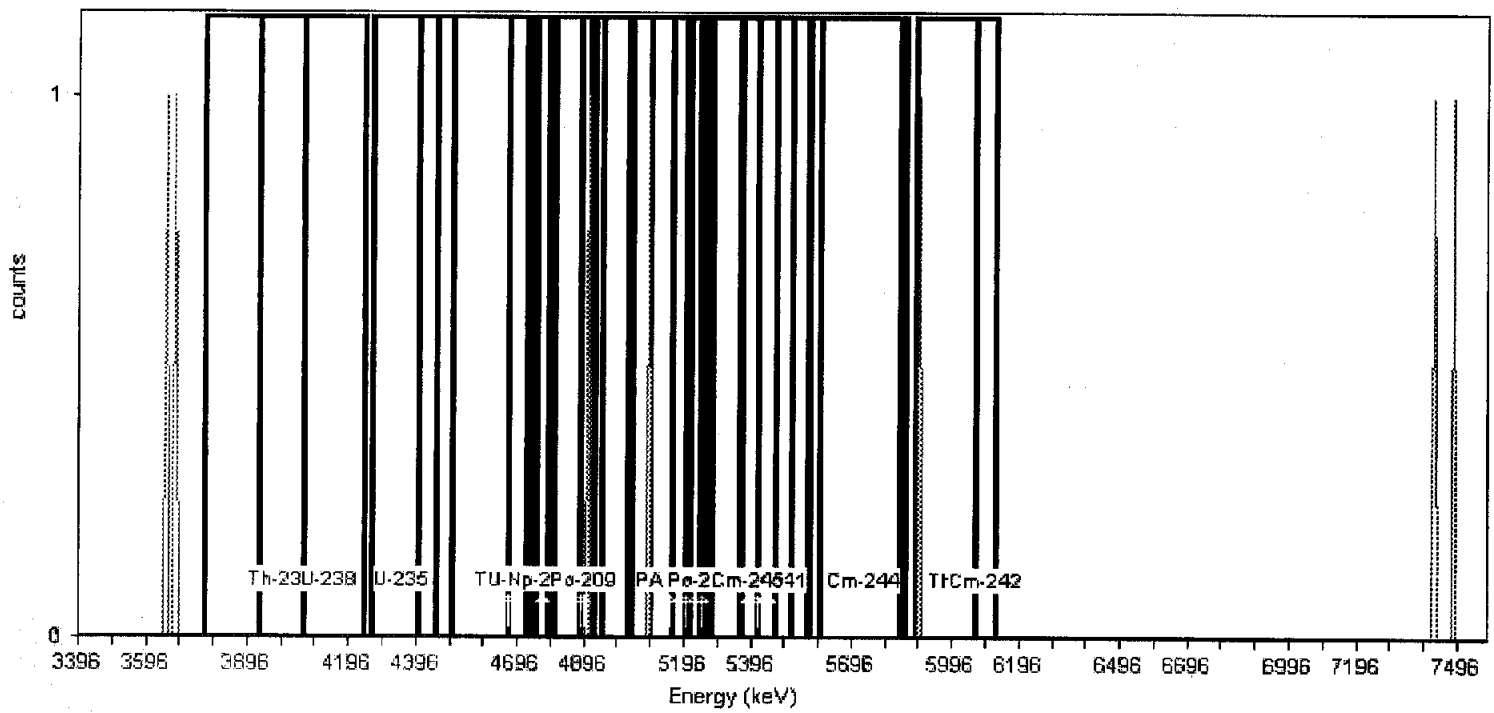
Acquisition

Detector: AV76 , SN: 46-033Q4
Acquisition Start Date: 12/24/2006 6:01:14PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV76
Calibration Date: 11/28/2006 9:54:09PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.64% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 7.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:01:13AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV77
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

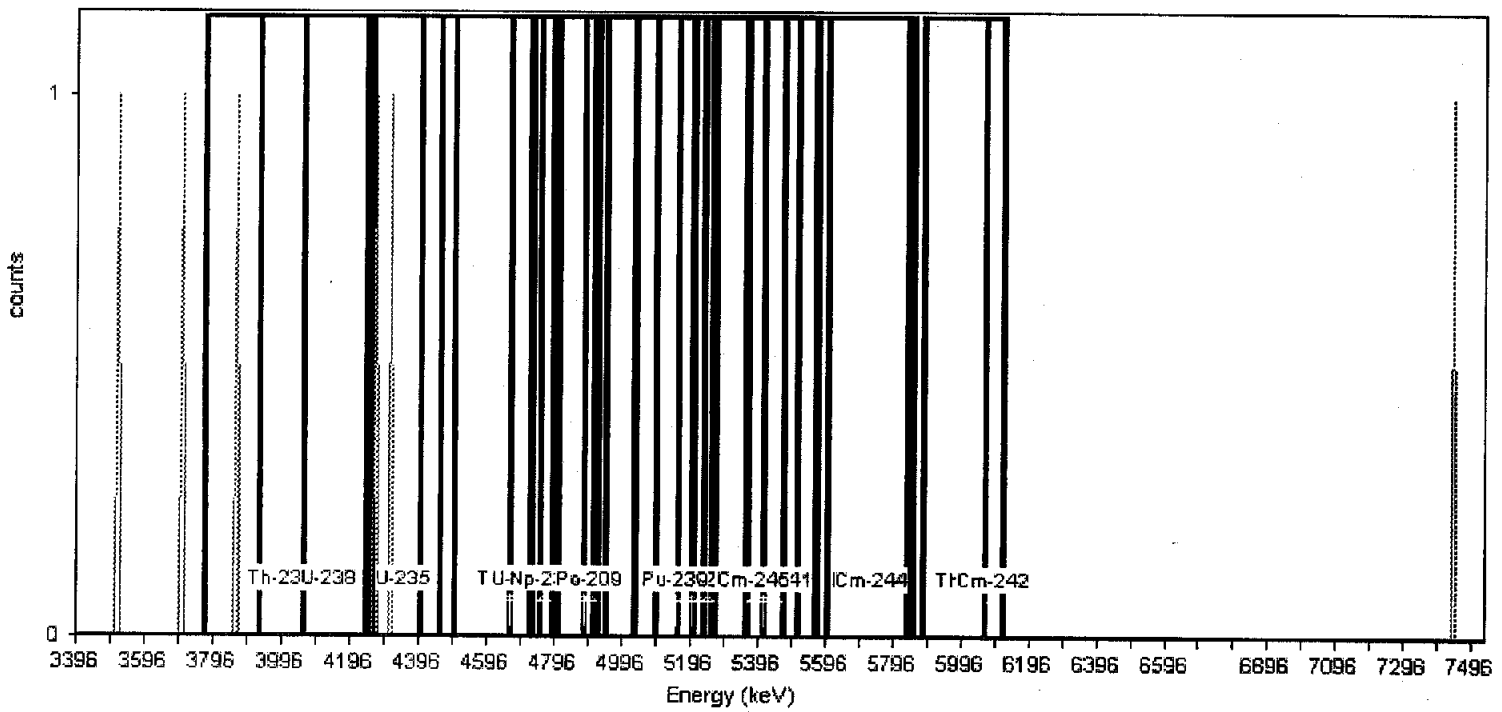
Acquisition

Detector: AV77 , SN: 46-033Q7
Acquisition Start Date: 12/24/2006 6:01:16PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV77
Calibration Date: 11/28/2006 9:54:13PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.75% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 6.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	2.00	2.083E-003	1.804E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:16AM 12/26/2006

Sample

Sample Name: AV78 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

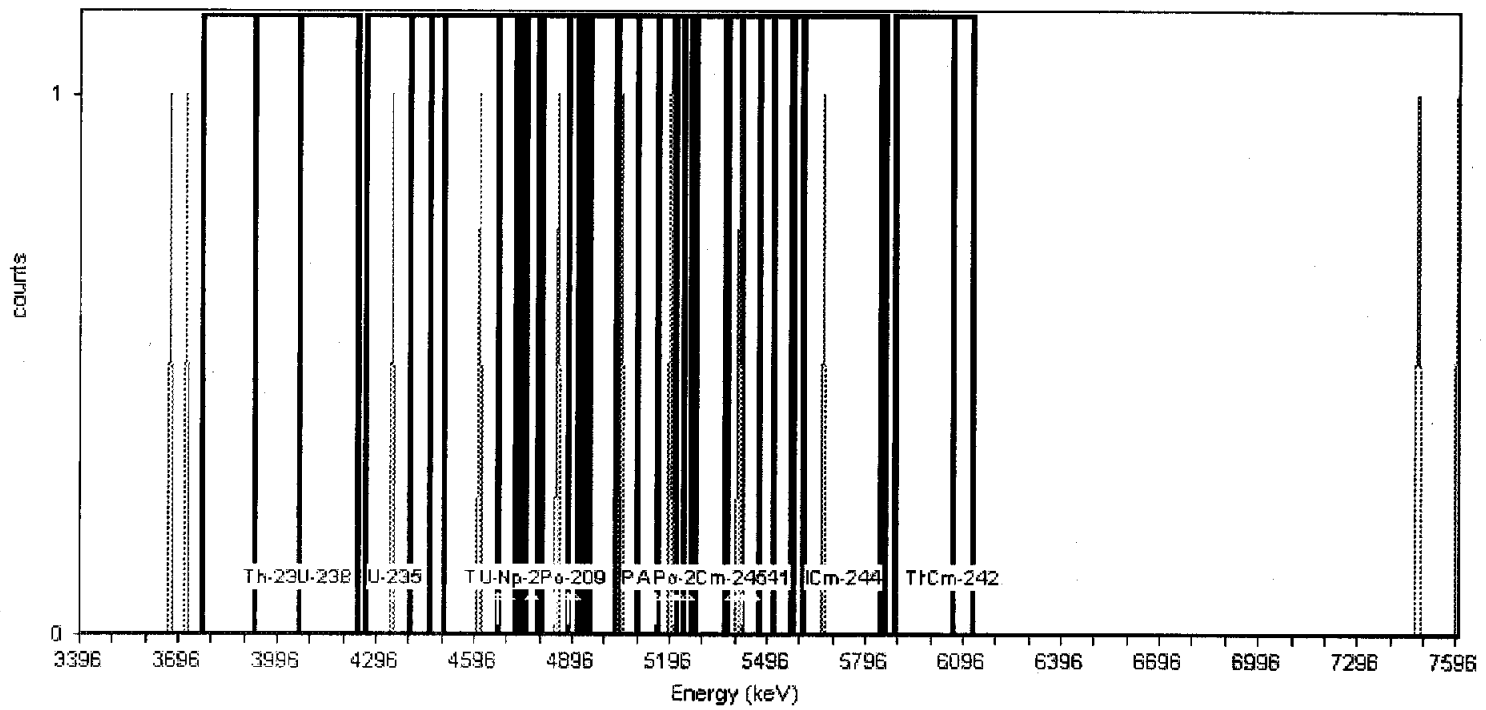
Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 12/24/2006 6:01:18PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV78
Calibration Date: 11/28/2006 9:54:22PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.94% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 12.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	2.00	2.083E-003	1.804E-003
U-232	5.23	5.04	5.37	2.00	2.083E-003	1.804E-003
Th-228	5.41	5.16	5.47	2.00	2.083E-003	1.804E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	1.00	1.042E-003	1.473E-003
Cm-244	5.73	5.60	5.86	1.00	1.042E-003	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

6:01:20AM 12/26/2006

Sample

Sample Name: AV79

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

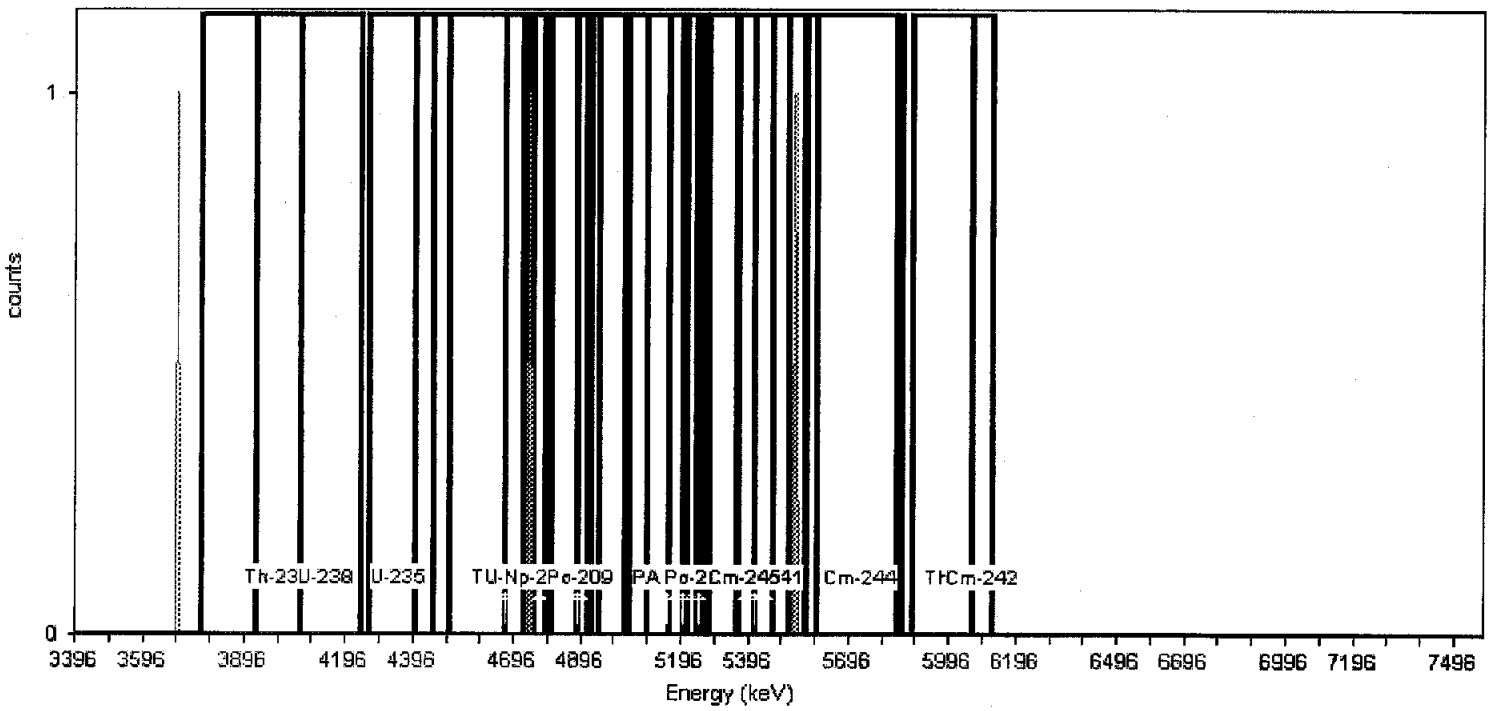
Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 12/24/2006 6:01:19PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV79
Calibration Date: 11/28/2006 9:53:56PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.15% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI

Nuclide Library: Background ROI Library

Total Background Counts: 3.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:01:23AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV80
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

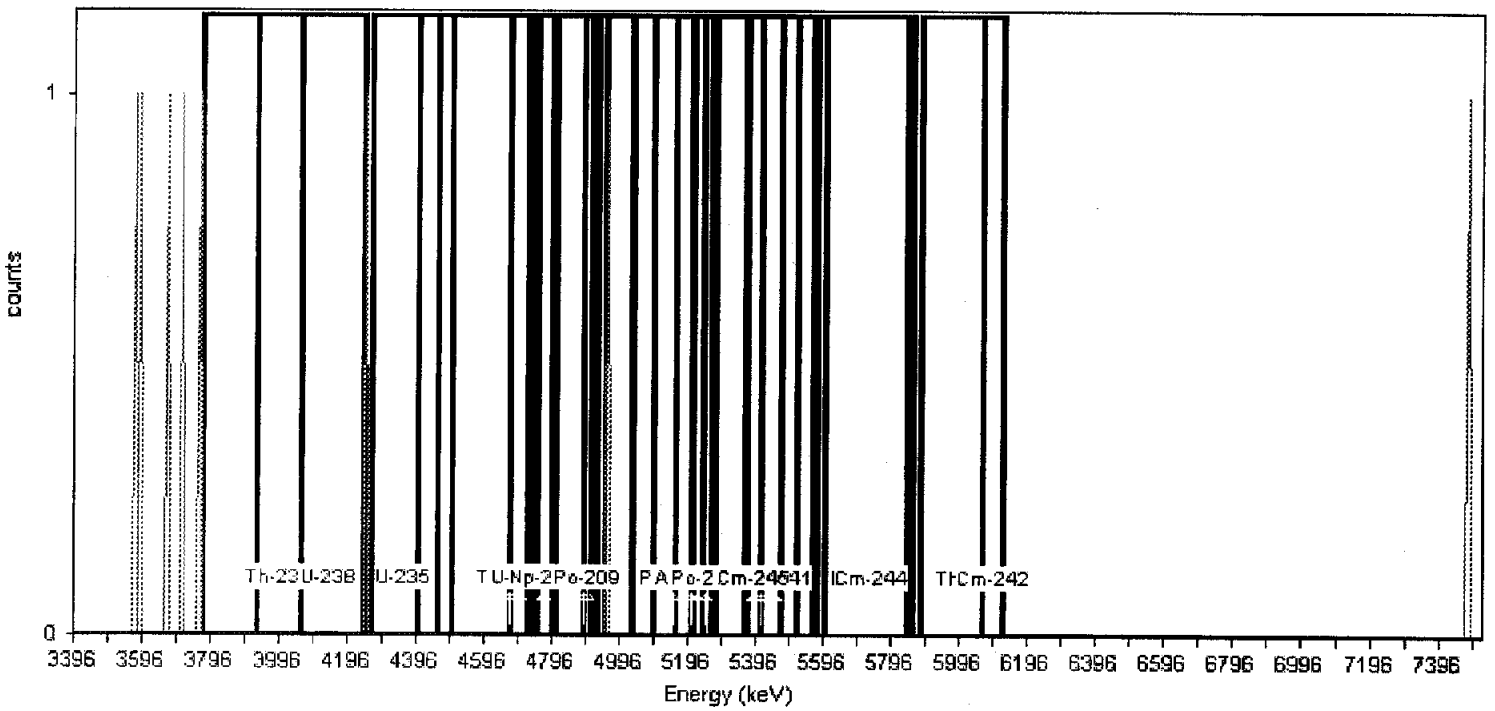
Acquisition

Detector: AV80 , SN: 46-03305
Acquisition Start Date: 12/24/2006 6:01:21PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV80
Calibration Date: 11/29/2006 12:25:16AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.01% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundRoi
Nuclide Library: Background ROI Library
Total Background Counts: 8.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:26AM 12/26/2006

Sample

Sample Name: AV81 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

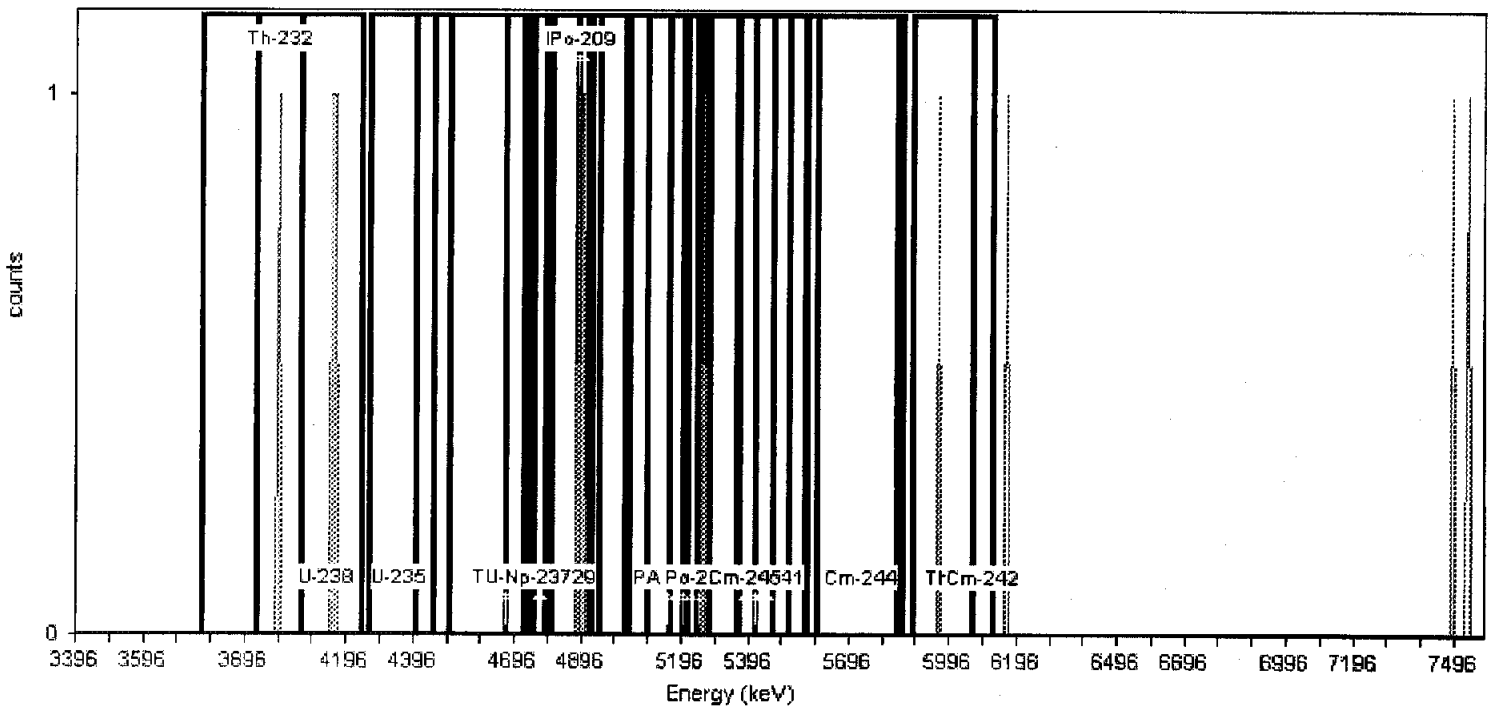
Acquisition

Detector: AV81 , SN: 46-03307
Acquisition Start Date: 12/24/2006 6:01:23PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV81
Calibration Date: 11/29/2006 12:25:20AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.94% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 10.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	3.00	3.125E-003	2.083E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	2.00	2.083E-003	1.804E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:29AM 12/26/2006

Sample

Sample Name: AV82 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

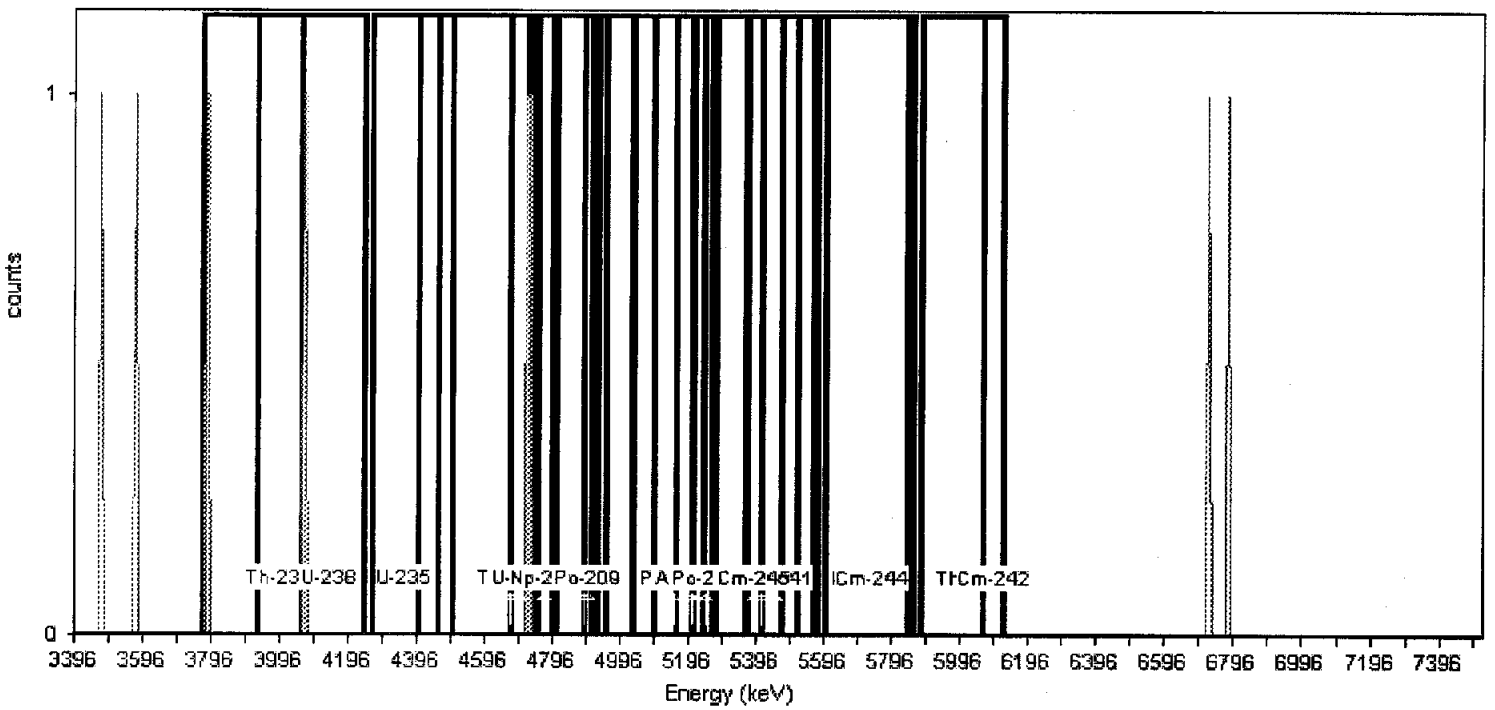
Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 12/24/2006 6:01:25PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV82
Calibration Date: 11/29/2006 12:25:24AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.35% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 8.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:01:33AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV83
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

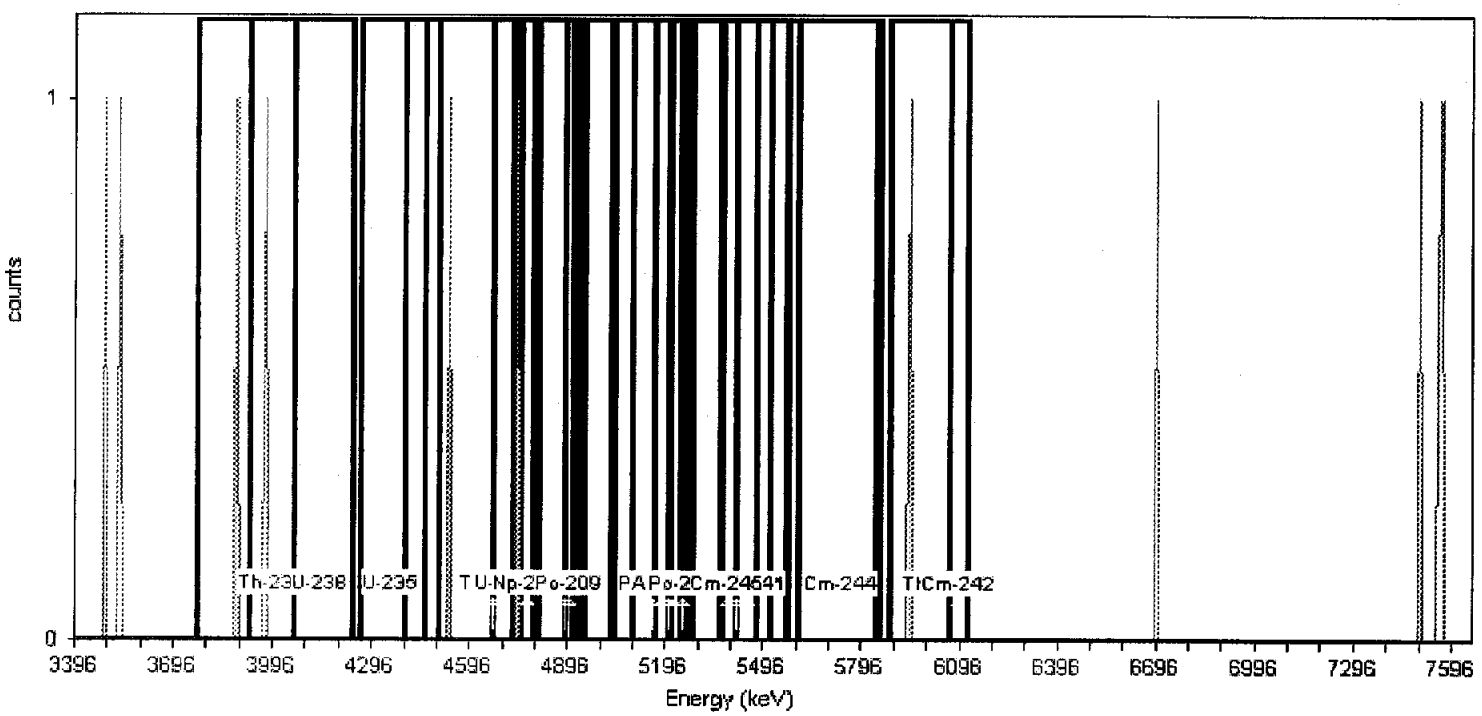
Acquisition

Detector: AV83 , SN: 46-03306
Acquisition Start Date: 12/24/2006 6:01:27PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV83
Calibration Date: 11/29/2006 12:25:11AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.74% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 11.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:36AM 12/26/2006

Sample

Sample Name: AV84 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

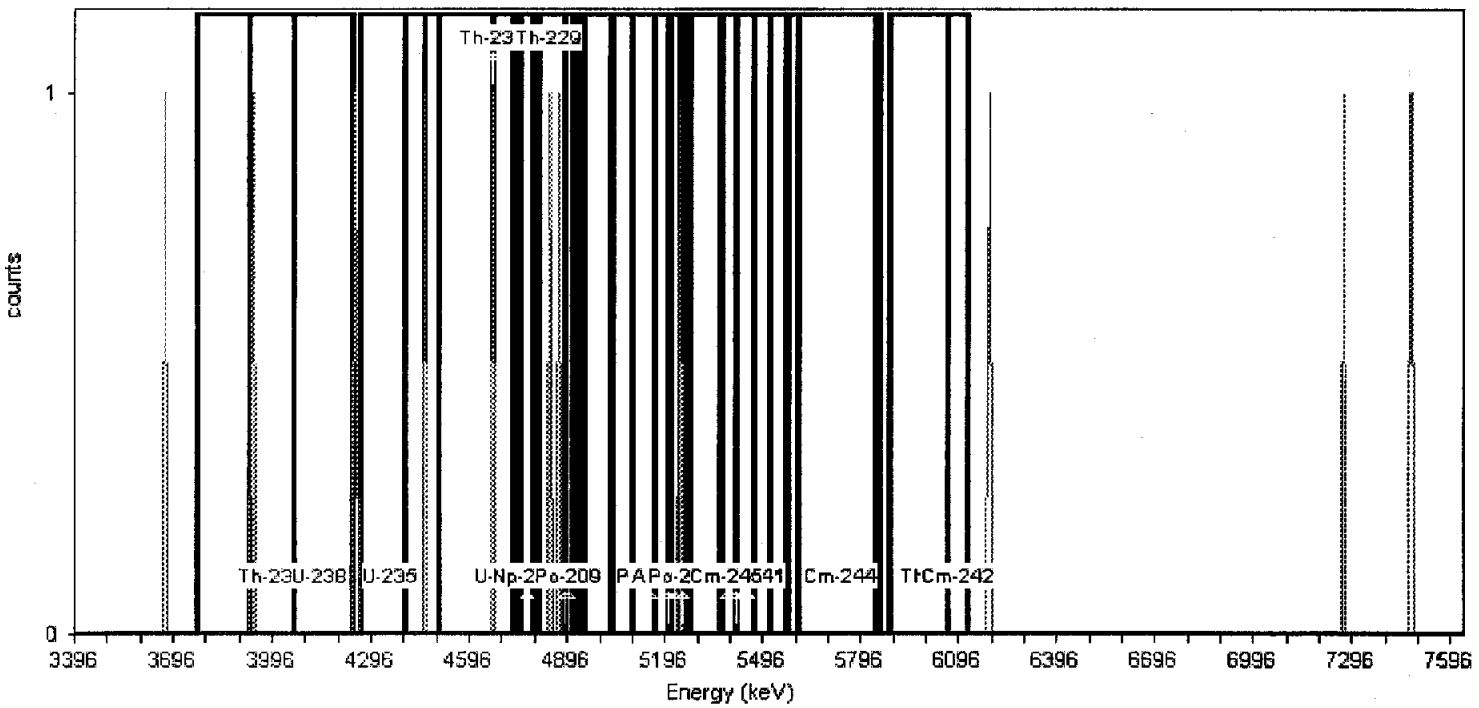
Acquisition

Detector: AV84 , SN: 46-033FF3
Acquisition Start Date: 12/24/2006 6:01:28PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV84
Calibration Date: 11/29/2006 1:40:09PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.75% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 12.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:39AM 12/26/2006

Sample

Sample Name: AV85 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

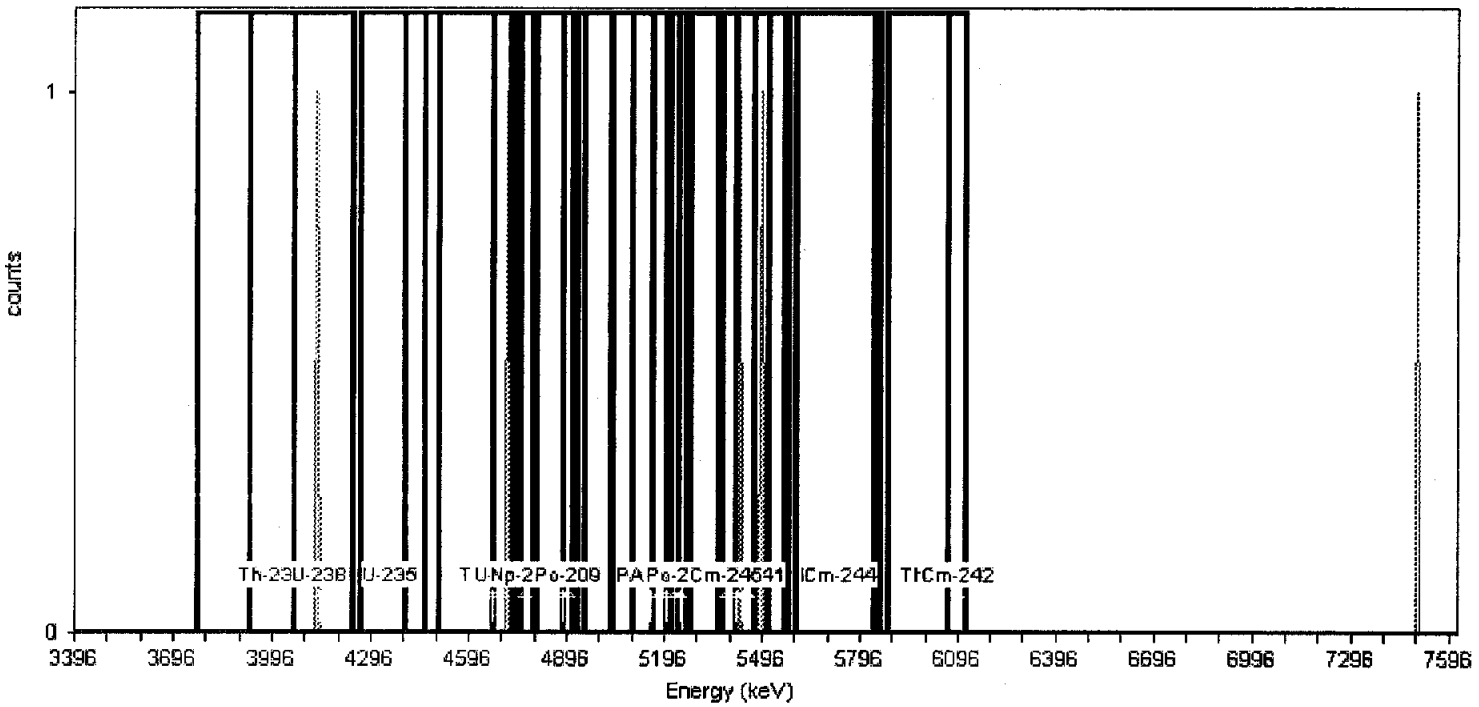
Acquisition

Detector: AV85 , SN: 46-032EE7
Acquisition Start Date: 12/24/2006 6:01:31PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV85
Calibration Date: 11/29/2006 1:40:15PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.34% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 5.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	2.00	2.083E-003	1.804E-003
Am-241	5.45	5.27	5.57	2.00	2.083E-003	1.804E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:42AM 12/26/2006

Sample

Sample Name: AV86 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

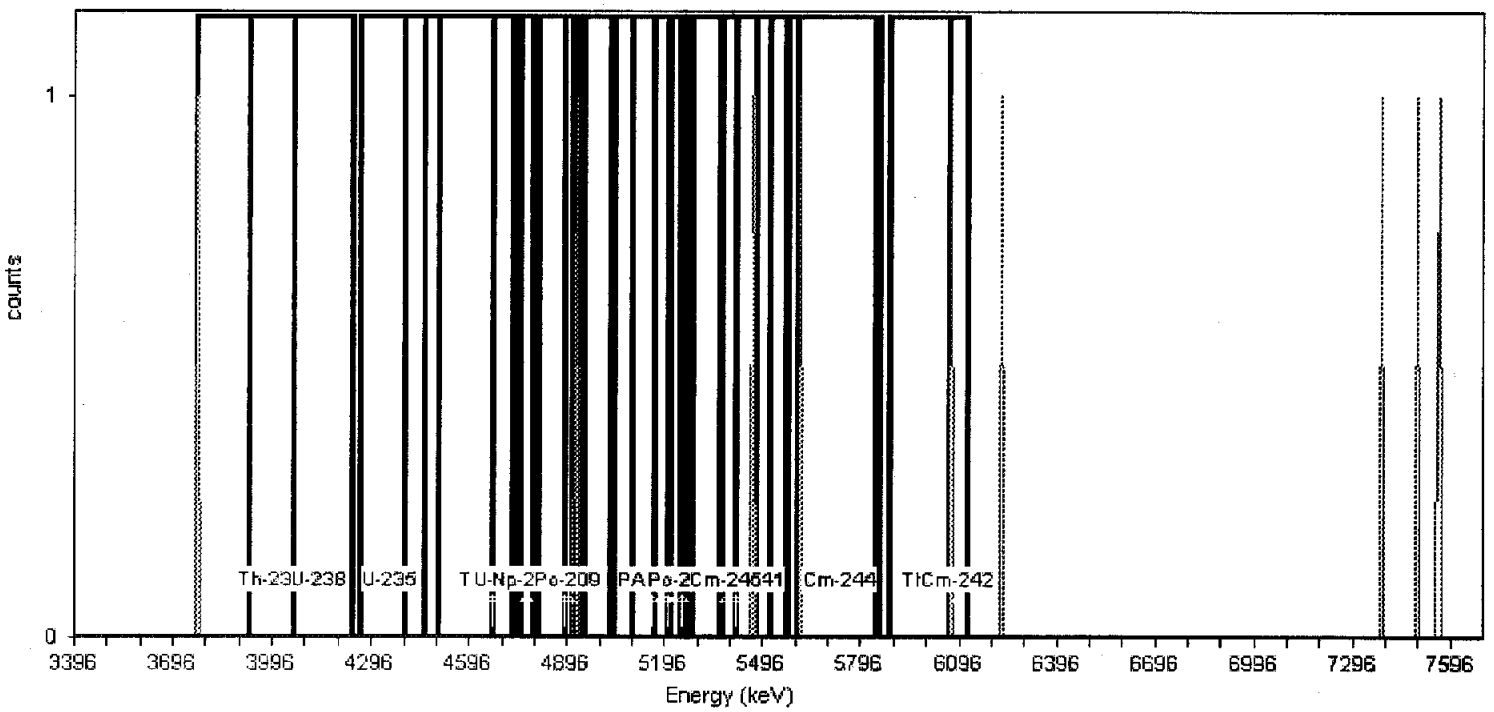
Acquisition

Detector: AV86 , SN: 46-033Q6
Acquisition Start Date: 12/24/2006 6:01:33PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV86
Calibration Date: 11/29/2006 1:40:21PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.90% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 9.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	1.00	1.042E-003	1.473E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	1.00	1.042E-003	1.473E-003
Cm-244	5.73	5.60	5.86	1.00	1.042E-003	1.473E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	1.00	1.042E-003	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:46AM 12/26/2006

Sample

Sample Name: AV87 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

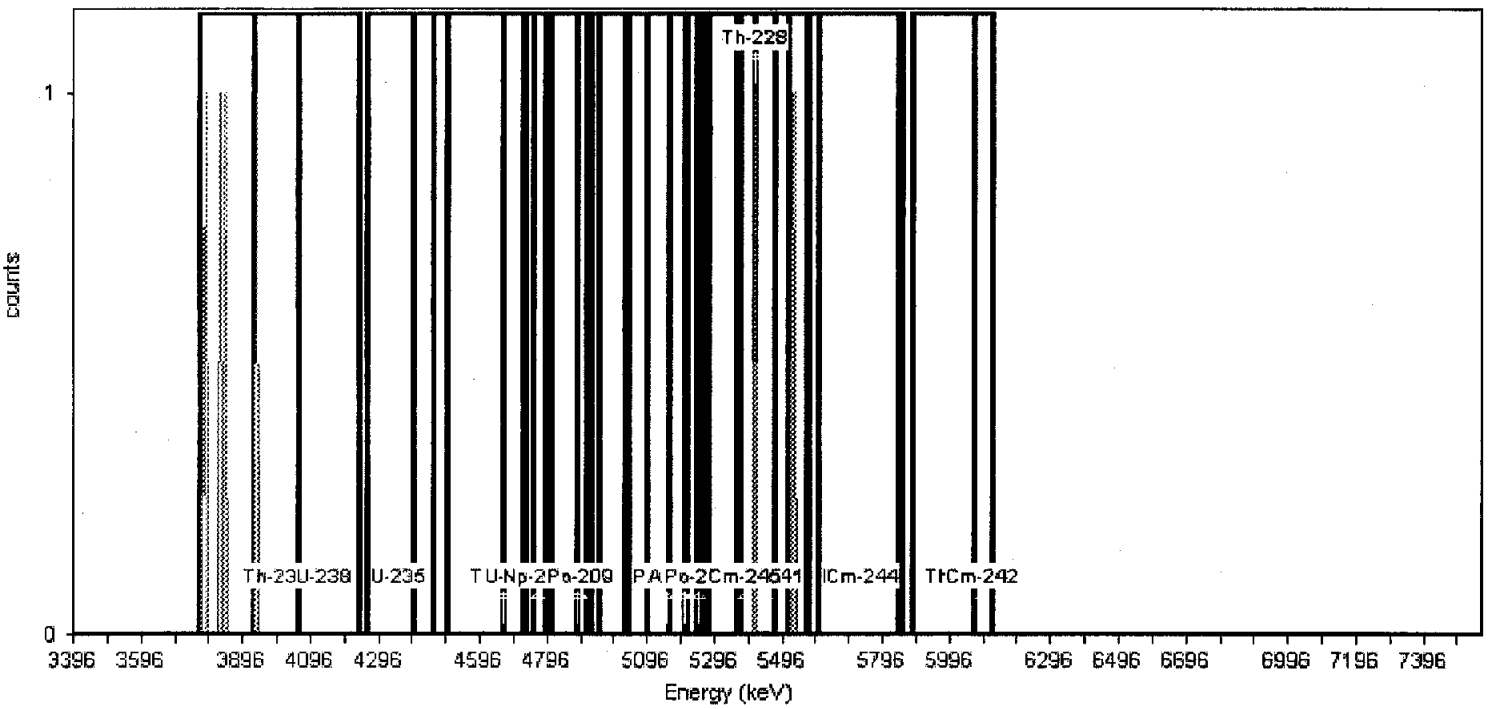
Acquisition

Detector: AV87 , SN: 46-033FF5
Acquisition Start Date: 12/24/2006 6:01:35PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV87
Calibration Date: 11/29/2006 1:40:02PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.75% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 6.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	4.00	4.167E-003	2.329E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	2.00	2.083E-003	1.804E-003
Cm-245	5.39	5.36	5.41	1.00	1.042E-003	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:49AM 12/26/2006

Sample

Sample Name: AV88 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

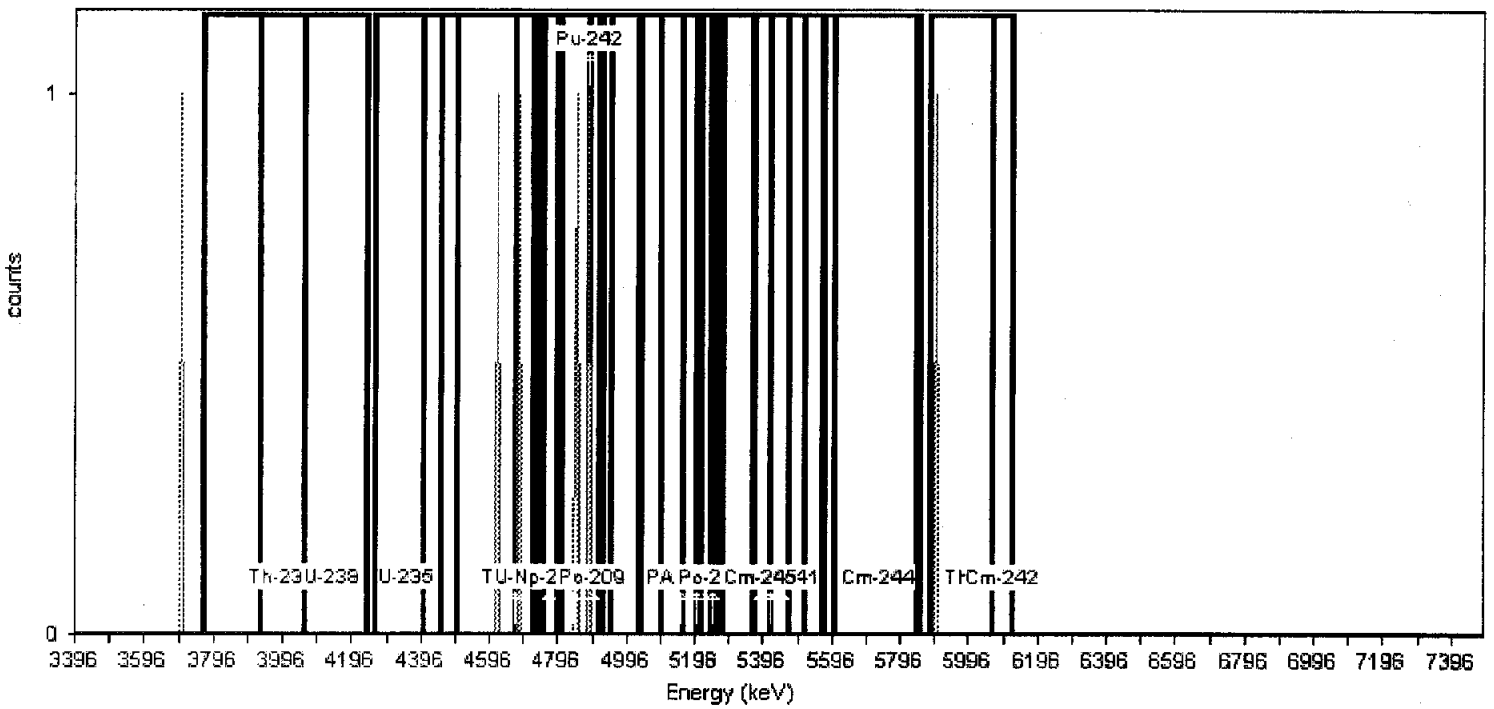
Acquisition

Detector: AV88 , SN: 76-033FF1
Acquisition Start Date: 12/24/2006 6:01:36PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: Nov2006_AV88a
Calibration Date: 11/29/2006 4:08:46PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.31% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 6.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	3.00	3.125E-003	2.083E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	1.00	1.042E-003	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:52AM 12/26/2006

Sample

Sample Name: AV89 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

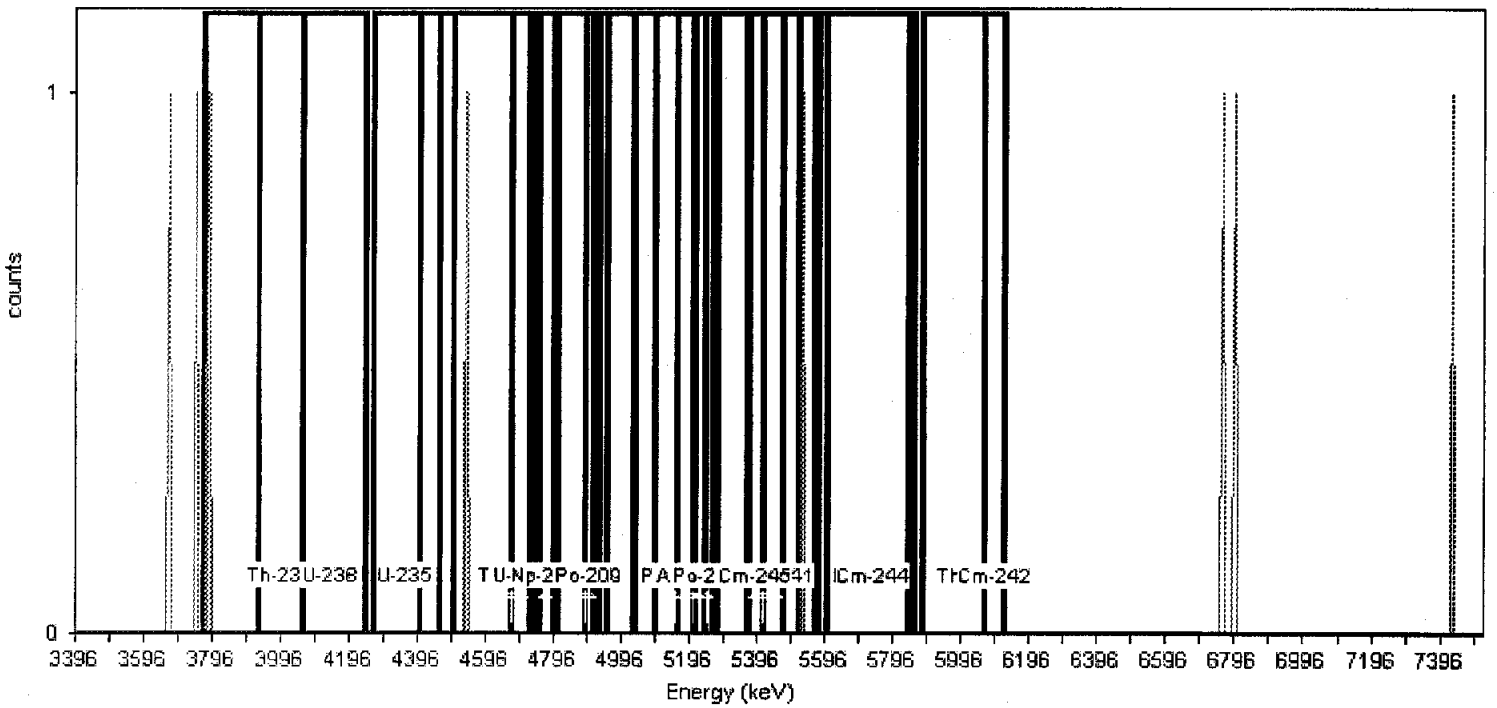
Acquisition

Detector: AV89 , SN: 46-033P5
Acquisition Start Date: 12/24/2006 6:01:38PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV89
Calibration Date: 11/30/2006 6:59:52AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.78% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 8.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:01:56AM 12/26/2006

Sample

Sample Name: AV90 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

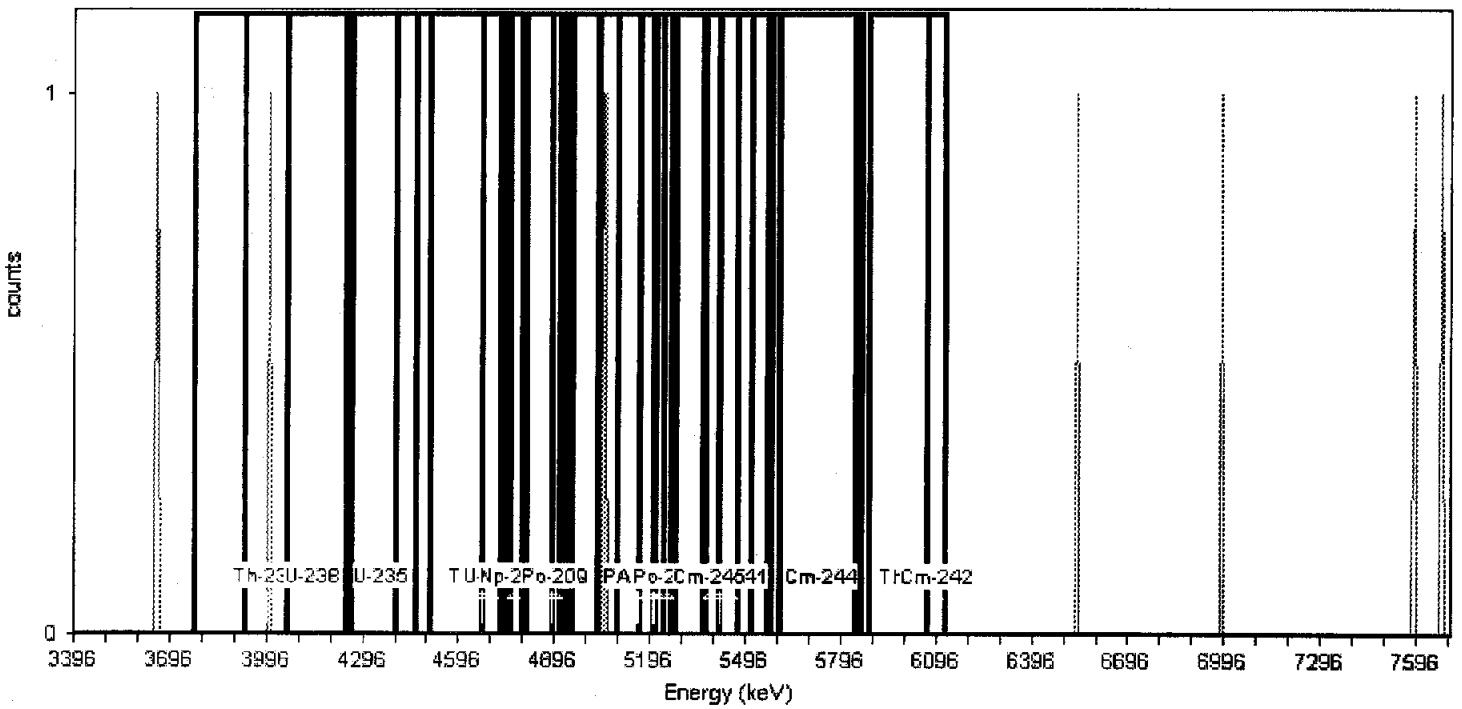
Acquisition

Detector: AV90 , SN: 46-033Q1
Acquisition Start Date: 12/24/2006 6:01:40PM
Live Time: 960.00 min.
Real Time: 960.02 min.
Calibration Name: NOV2006_AV90
Calibration Date: 11/30/2006 6:59:56AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.42% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 7.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	1.00	1.042E-003	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	1.00	1.042E-003	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040

6:01:59AM 12/26/2006

Sample

Sample Name: AV92

Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

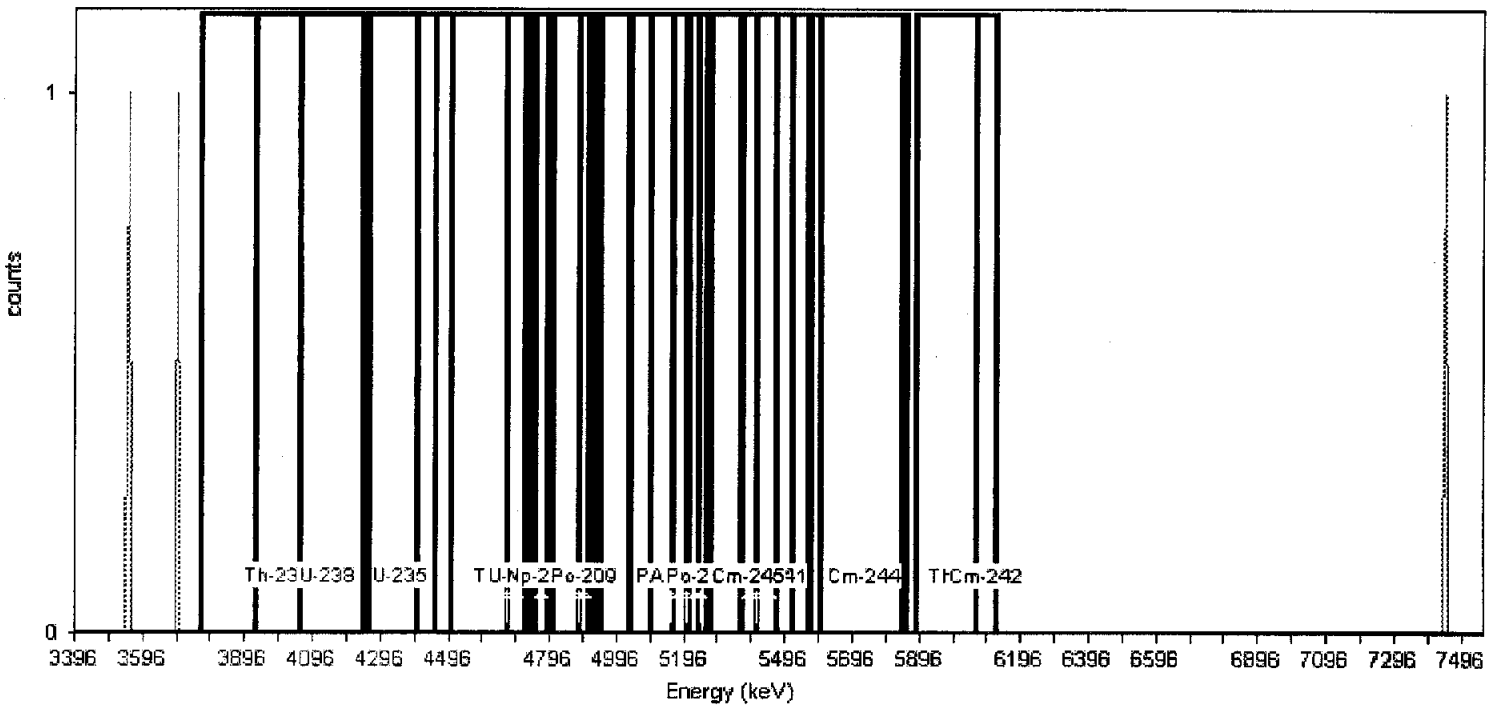
Acquisition

Detector: AV92 , SN: 46-033FF2
Acquisition Start Date: 12/24/2006 6:01:43PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV92
Calibration Date: 11/29/2006 6:45:38PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.56% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI

Nuclide Library: Background ROI Library

Total Background Counts: 3.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:02AM 12/26/2006

Sample

Sample Name: AV93 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

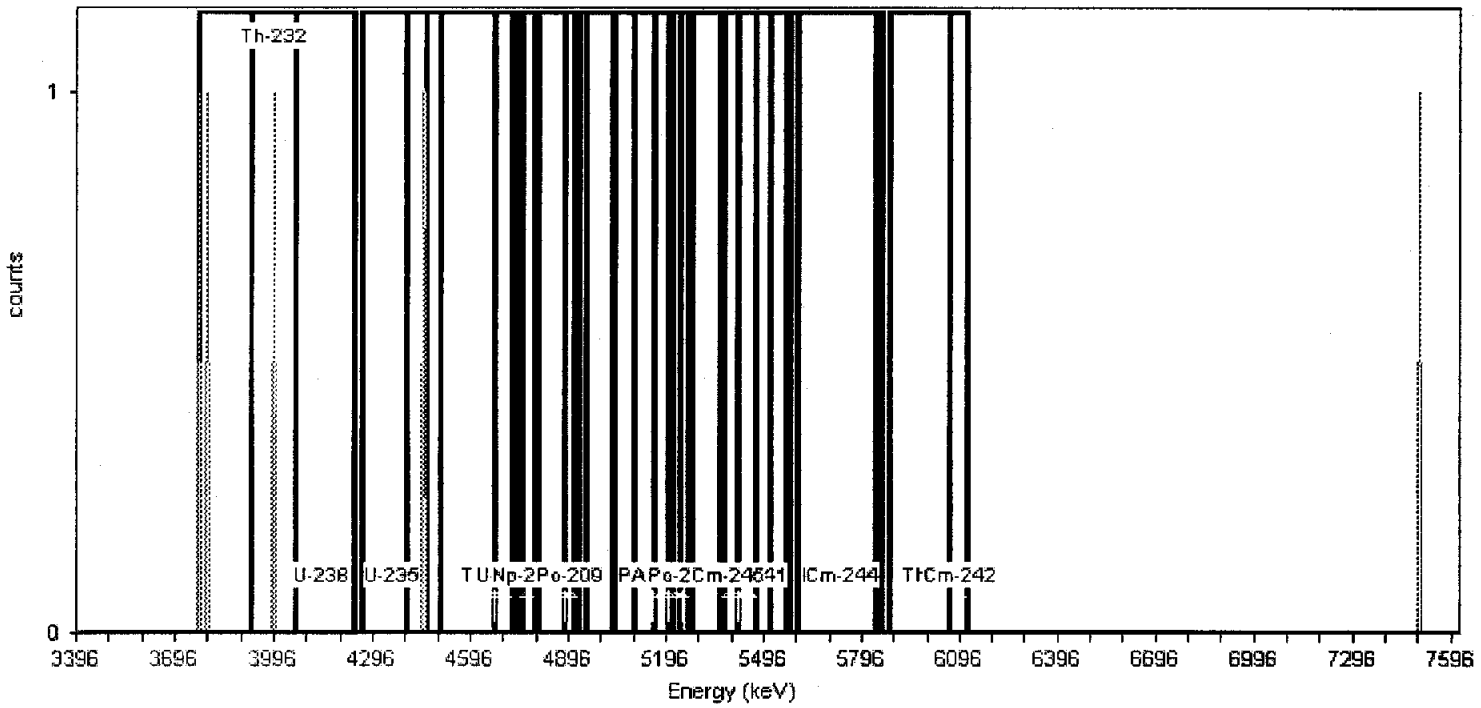
Acquisition

Detector: AV93 , SN: 46-033Q2
Acquisition Start Date: 12/24/2006 6:01:45PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV93
Calibration Date: 11/30/2006 11:43:34AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.47% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 5.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	3.00	3.125E-003	2.083E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:05AM 12/26/2006

Sample

Sample Name: AV94 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

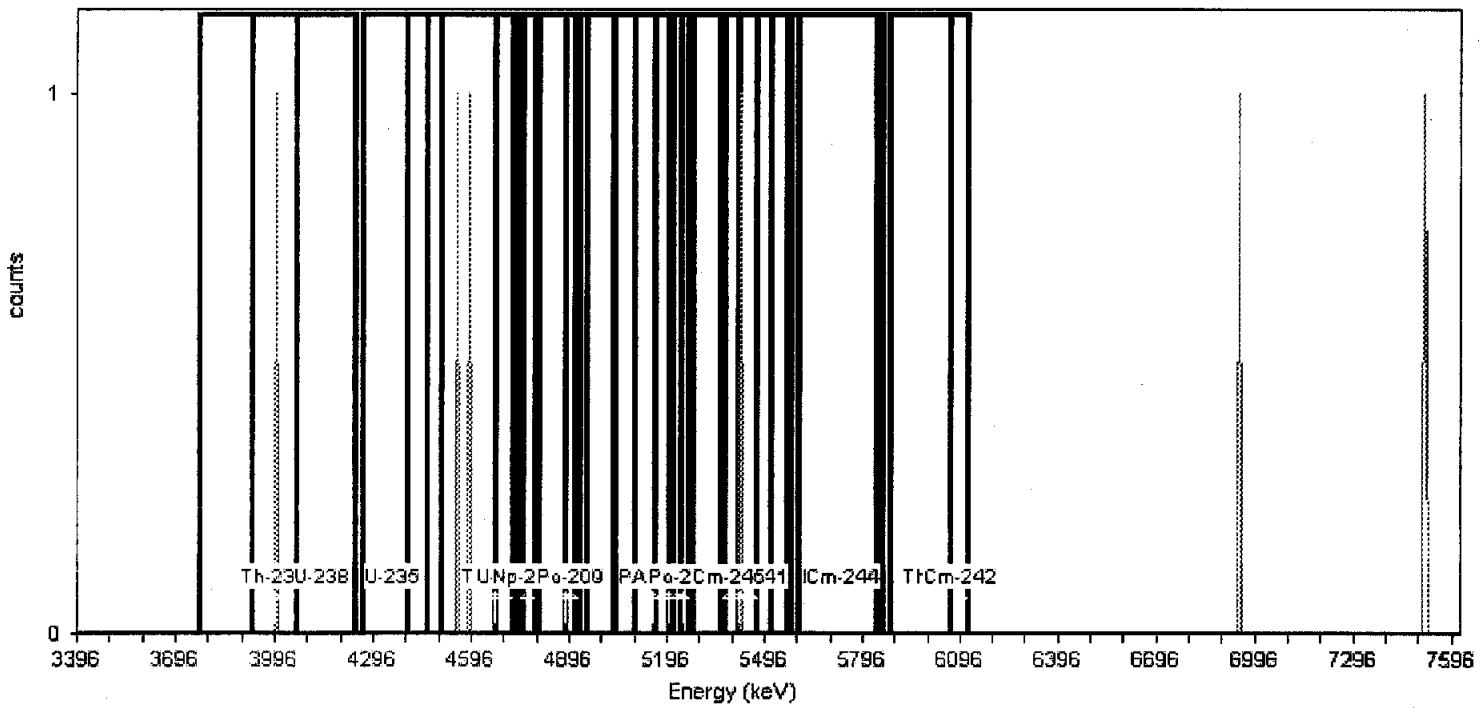
Acquisition

Detector: AV94 , SN: 46-032EE6
Acquisition Start Date: 12/24/2006 6:01:46PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: Nov2006_AV94
Calibration Date: 11/30/2006 11:43:45AM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.67% +/- 0.27% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 6.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003
Th-230	4.67	4.40	4.73	2.00	2.083E-003	1.804E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:09AM 12/26/2006

Sample

Sample Name: AV95 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

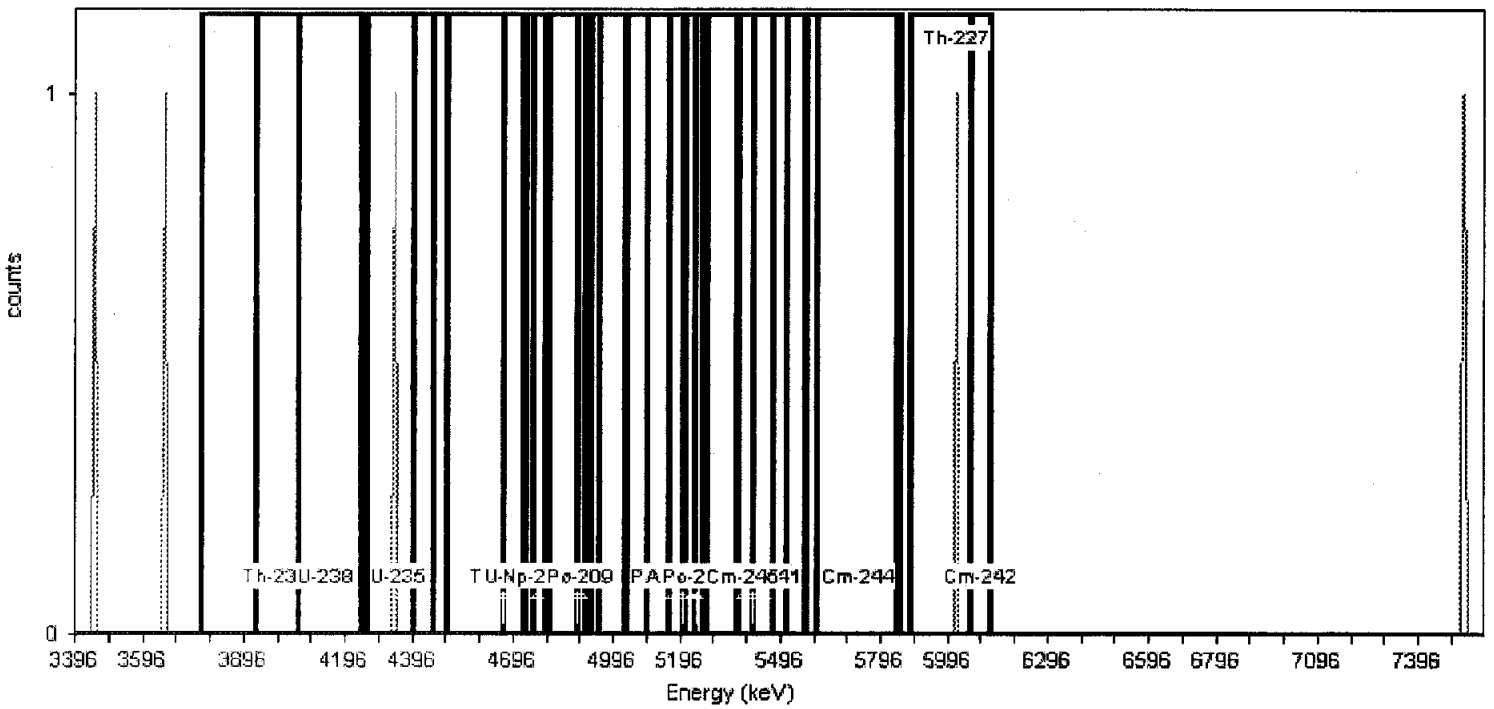
Acquisition

Detector: AV95 , SN: 46-033P4
Acquisition Start Date: 12/24/2006 6:01:48PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV95
Calibration Date: 11/29/2006 6:45:24PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.54% +/- 0.26% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundRoi Nuclide Library: Background ROI Library

Total Background Counts: 6.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	0.00	0.000E+000	1.473E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	0.00	0.000E+000	1.473E-003
U-232	5.23	5.04	5.37	0.00	0.000E+000	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

SEVERN TRENT **STL**

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:12AM 12/26/2006

Sample

Sample Name: AV96 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

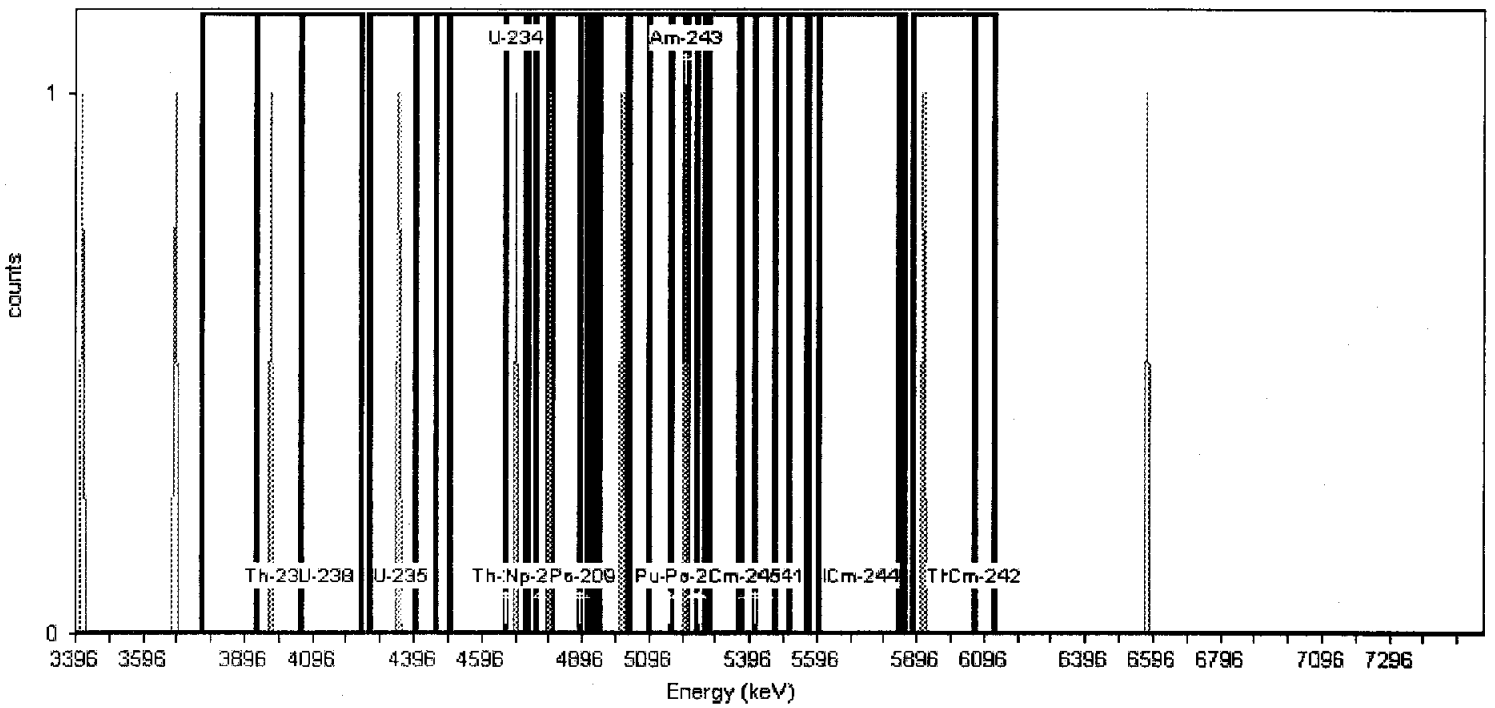
Acquisition

Detector: AV96 , SN: 46-033P1
Acquisition Start Date: 12/24/2006 6:01:50PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV96
Calibration Date: 11/29/2006 9:49:25PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.55% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_Background Nuclide Library: Background ROI Library

Total Background Counts: 10.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	2.00	2.083E-003	1.804E-003
Pu-242	4.88	4.67	4.93	2.00	2.083E-003	1.804E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	1.00	1.042E-003	1.473E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	0.00	0.000E+000	1.473E-003
Am-241	5.45	5.27	5.57	0.00	0.000E+000	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	1.00	1.042E-003	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003
Th-232	3.99	3.77	4.06	1.00	1.042E-003	1.473E-003
U-238	4.14	3.93	4.24	1.00	1.042E-003	1.473E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003

SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040 6:02:15AM 12/26/2006

Sample

Sample Name: AV97 Spectrum #1 Analysis #1

Comment:

Batch

Batch Name: Dec2006

Description:

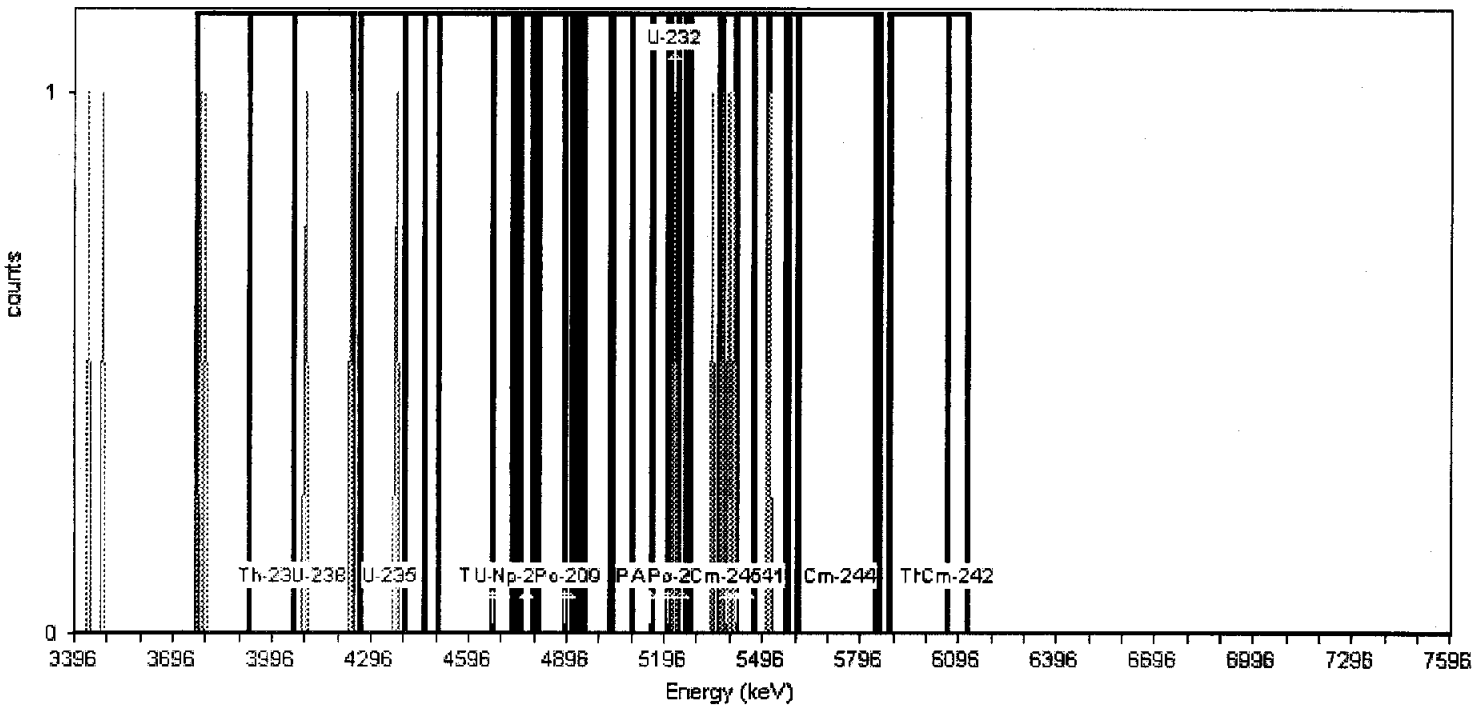
Acquisition

Detector: AV97 , SN: 76-03393
Acquisition Start Date: 12/24/2006 6:01:53PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV97
Calibration Date: 11/29/2006 9:49:32PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.13% +/- 0.29% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI Nuclide Library: Background ROI Library

Total Background Counts: 13.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	2.00	2.083E-003	1.804E-003
U-235	4.35	4.26	4.46	1.00	1.042E-003	1.473E-003
Th-230	4.67	4.40	4.73	0.00	0.000E+000	1.473E-003
U-234	4.70	4.50	4.80	0.00	0.000E+000	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	0.00	0.000E+000	1.473E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	0.00	0.000E+000	1.473E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	3.00	3.125E-003	2.083E-003
Th-228	5.41	5.16	5.47	5.00	5.208E-003	2.552E-003
Po-210	5.25	5.20	5.26	1.00	1.042E-003	1.473E-003
Pu-238	5.44	5.24	5.52	5.00	5.208E-003	2.552E-003
Am-241	5.45	5.27	5.57	5.00	5.208E-003	2.552E-003
Cm-245	5.39	5.36	5.41	3.00	3.125E-003	2.083E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003

STL SEVERN TRENT STL

Alpha-Spectroscopy Background Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:02:19AM 12/26/2006

Analyst: 60040

Sample

Sample Name: AV98
Comment:

Spectrum #1 Analysis #1

Batch

Batch Name: Dec2006
Description:

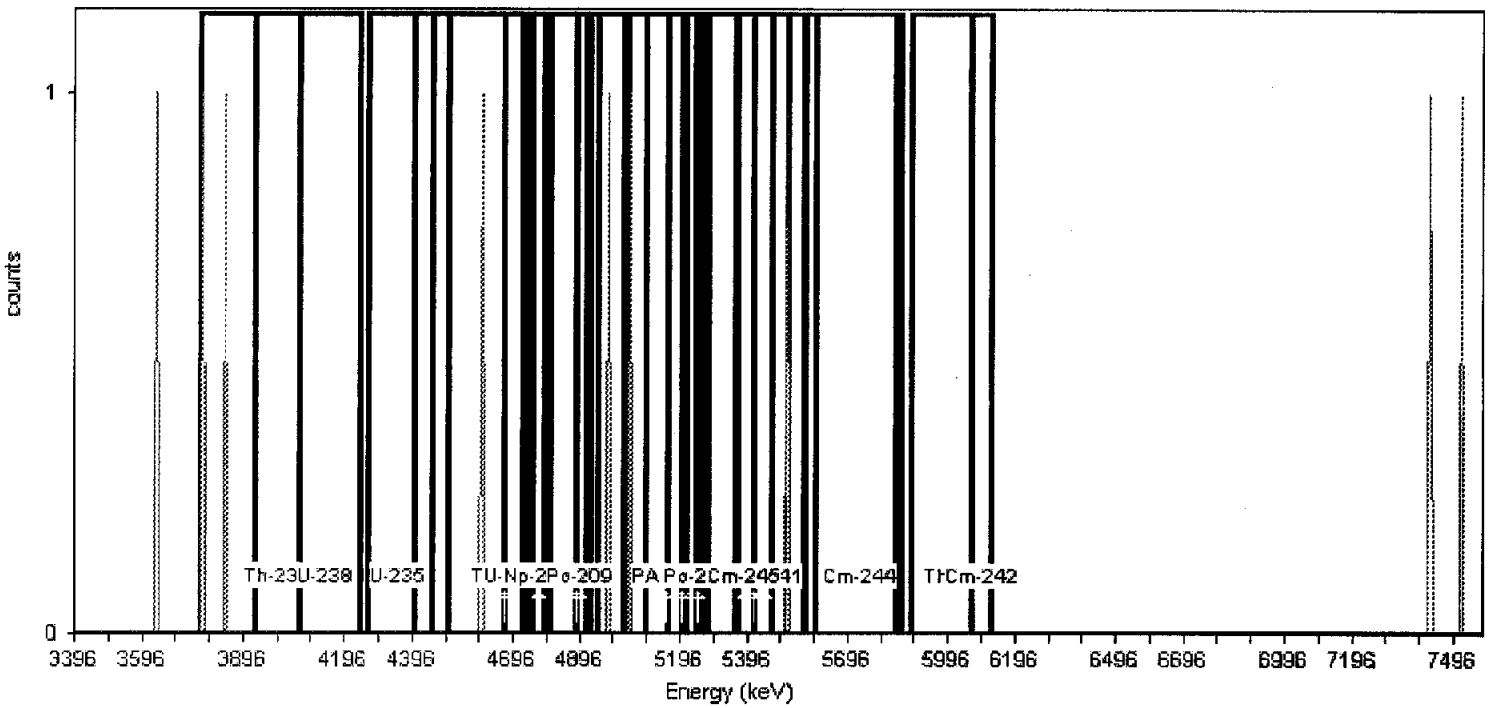
Acquisition

Detector: AV98 , SN: 46-033Q3
Acquisition Start Date: 12/24/2006 6:01:54PM
Live Time: 960.00 min.
Real Time: 960.01 min.
Calibration Name: NOV2006_AV98
Calibration Date: 11/29/2006 9:49:36PM

Energy Calibration Equation:

Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 27.82% +/- 0.28% TPU(2 sigma)



General Analysis

Analysis Method: Absolute ROI Analysis, Set Name = 11/05_BackgroundROI
Nuclide Library: Background ROI Library
Total Background Counts: 9.00

Nuclide Summary (ROI)

RegionName	Peak Energy (MeV)	Start Energy (MeV)	End Energy (MeV)	GrossCounts	Count Rate (CPM)	CR Uncertainty (CPM)
Th-230	4.67	4.40	4.73	1.00	1.042E-003	1.473E-003
U-234	4.70	4.50	4.80	1.00	1.042E-003	1.473E-003
Pu-242	4.88	4.67	4.93	0.00	0.000E+000	1.473E-003
Th-229	4.84	4.72	5.10	2.00	2.083E-003	1.804E-003
Np-237	4.77	4.75	4.79	0.00	0.000E+000	1.473E-003
Po-209	4.90	4.88	4.91	0.00	0.000E+000	1.473E-003
Pu-239	5.15	4.95	5.21	2.00	2.083E-003	1.804E-003
Am-243	5.20	5.03	5.28	1.00	1.042E-003	1.473E-003
U-232	5.23	5.04	5.37	1.00	1.042E-003	1.473E-003
Th-228	5.41	5.16	5.47	0.00	0.000E+000	1.473E-003
Po-210	5.25	5.20	5.26	0.00	0.000E+000	1.473E-003
Pu-238	5.44	5.24	5.52	1.00	1.042E-003	1.473E-003
Am-241	5.45	5.27	5.57	1.00	1.042E-003	1.473E-003
Cm-245	5.39	5.36	5.41	0.00	0.000E+000	1.473E-003
Pu-236	5.72	5.57	5.84	0.00	0.000E+000	1.473E-003
Cm-244	5.73	5.60	5.86	0.00	0.000E+000	1.473E-003
Th-227	6.02	5.89	6.13	0.00	0.000E+000	1.473E-003
Cm-242	6.10	6.07	6.13	0.00	0.000E+000	1.473E-003
Th-232	3.99	3.77	4.06	2.00	2.083E-003	1.804E-003
U-238	4.14	3.93	4.24	0.00	0.000E+000	1.473E-003
U-235	4.35	4.26	4.46	0.00	0.000E+000	1.473E-003

SEVERN TRENT STL

Monthly Calibrations
Alphavision
December 2006

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:21:19PM 12/26/2006

Analyst: 60040
Detector: AV1

Calibration

Name: Dec2006_AV1
Description:

Calibration Date: 12/26/2006 3:21:08PM

Source Info

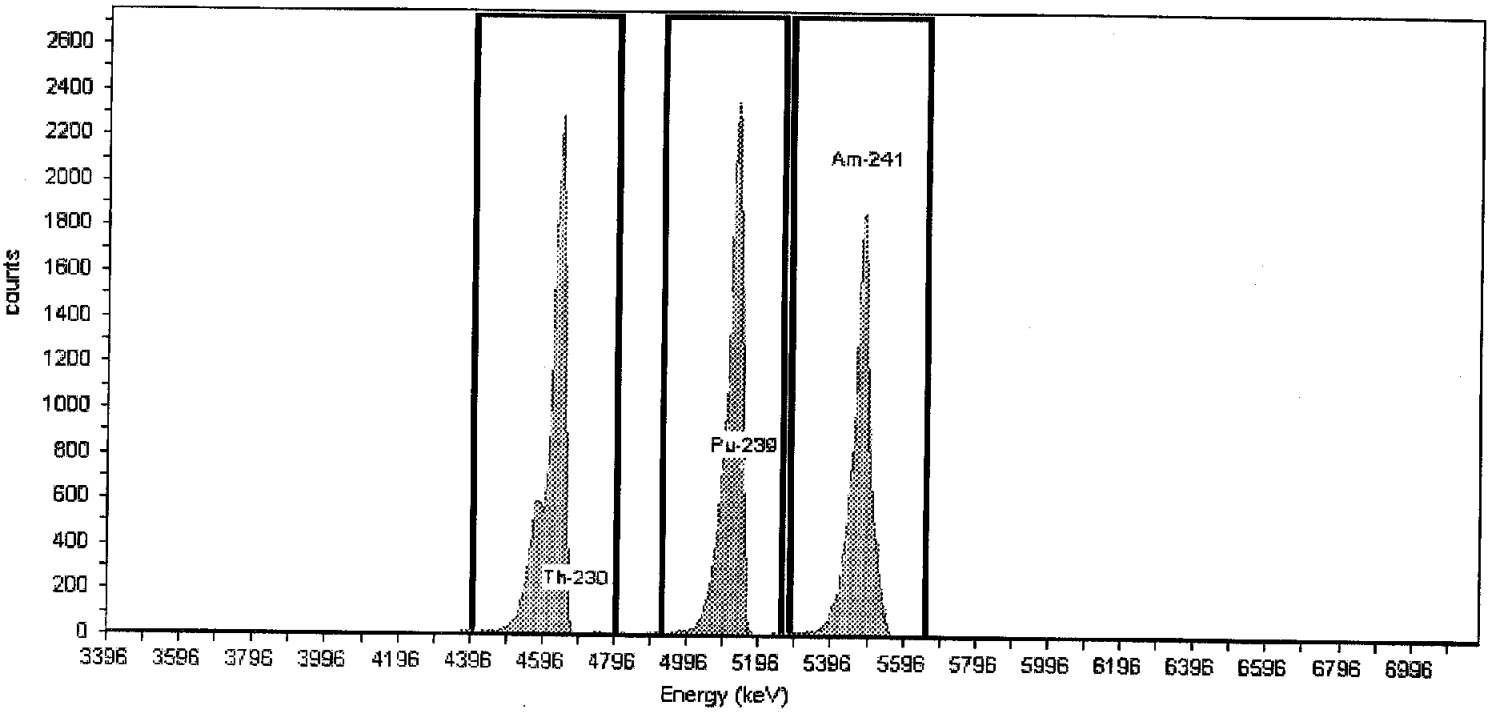
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV1 , SN: 41-158W6
Acquisition Start Date: 12/26/2006 12:58:41PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.85% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,339.00	116.71
Pu-239	243	5.16	212	258	15,756.00	112.54
Am-241	289	5.49	261	313	14,581.00	104.15

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:21:31PM 12/26/2006

Analyst: 60040
Detector: AV2

Calibration

Name: Dec2006_AV2
Description:

Calibration Date: 12/26/2006 3:21:27PM

Source Info

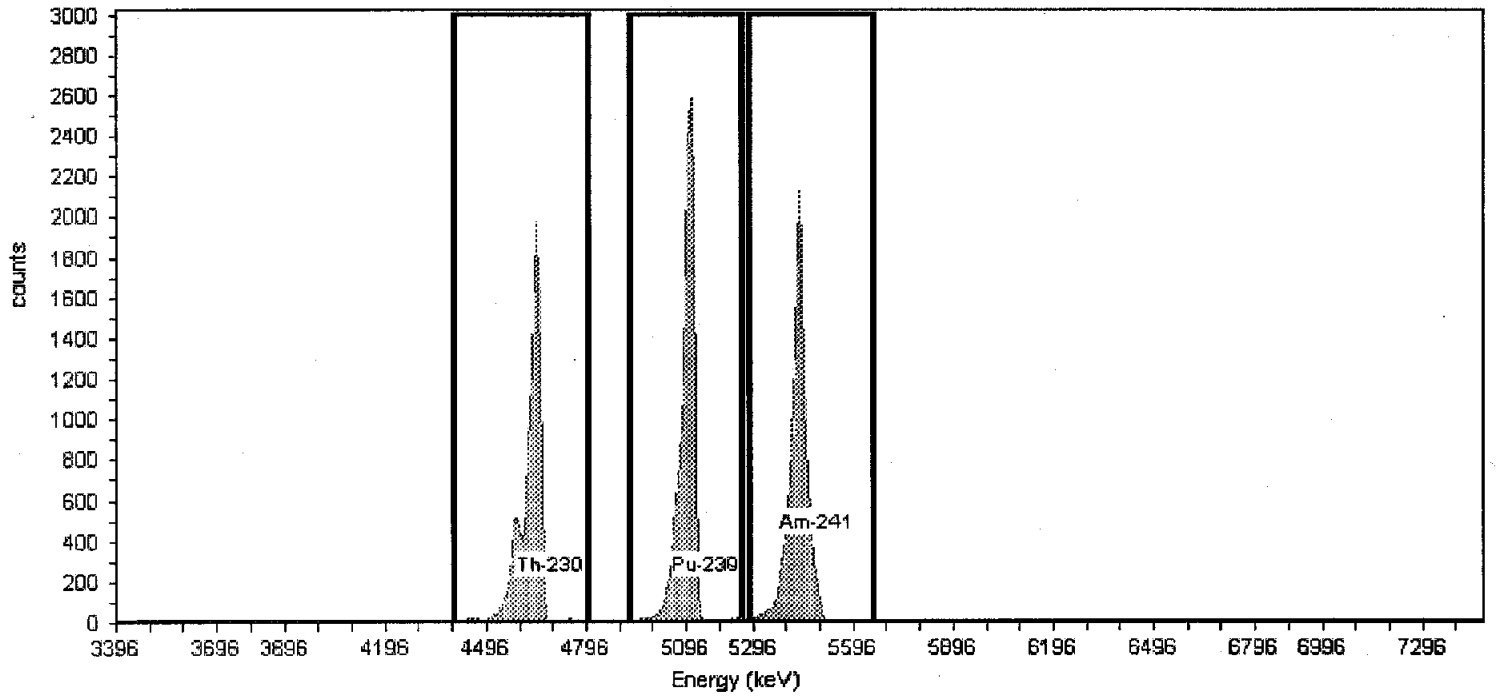
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV2 , SN: 41-158W7
Acquisition Start Date: 12/26/2006 12:59:21PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.26% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,223.00	87.31
Pu-239	243	5.16	212	258	14,597.00	104.26
Am-241	289	5.49	261	313	13,970.00	99.79

SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV3

3:21:40PM 12/26/2006

Calibration

Name: Dec2006_AV3
Description:

Calibration Date: 12/26/2006 3:21:37PM

Source Info

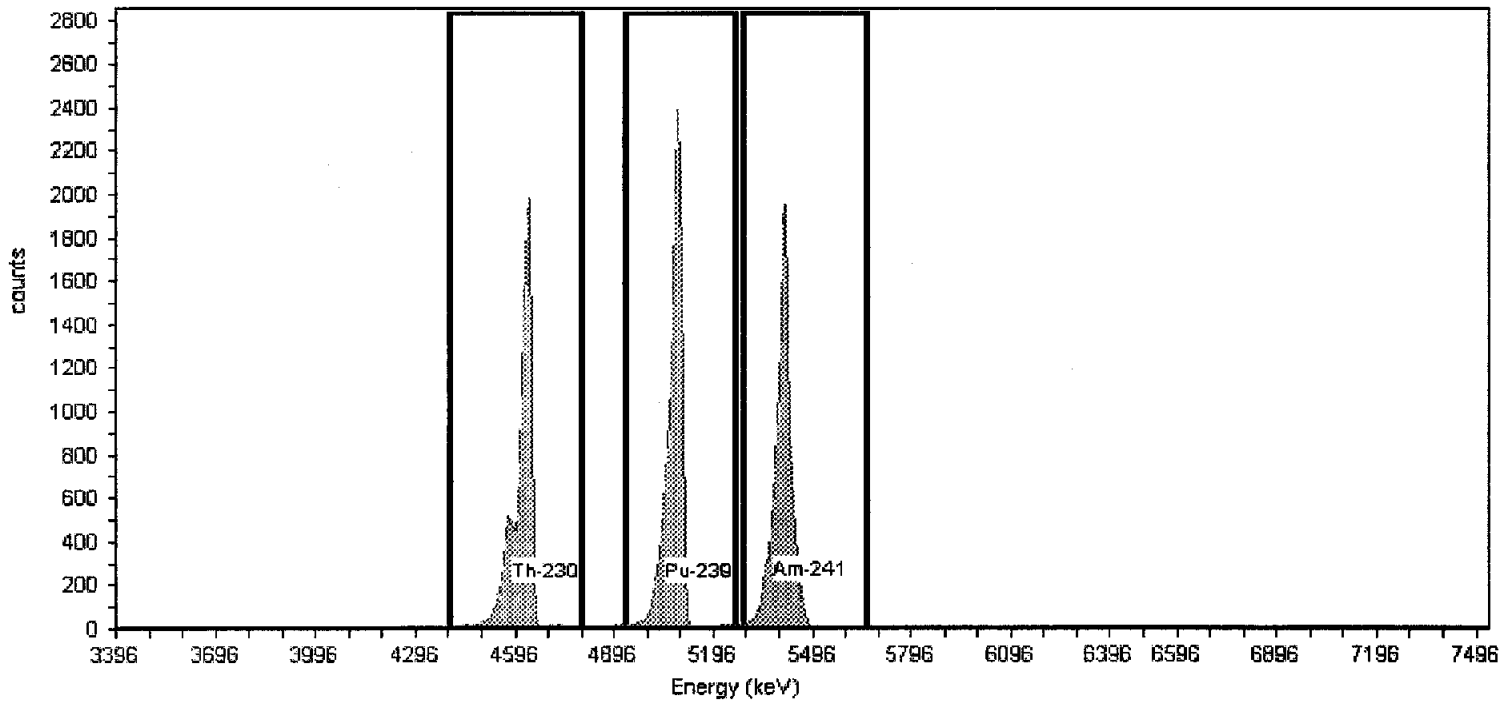
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV3 , SN: 41-158X5
Acquisition Start Date: 12/26/2006 12:59:22PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.98% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,462.00	89.01
Pu-239	243	5.16	212	258	14,191.00	101.36
Am-241	289	5.49	261	313	13,190.00	94.21

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV4

3:21:56PM 12/26/2006

Calibration

Name: Dec2006_AV4
Description:

Calibration Date: 12/26/2006 3:21:52PM

Source Info

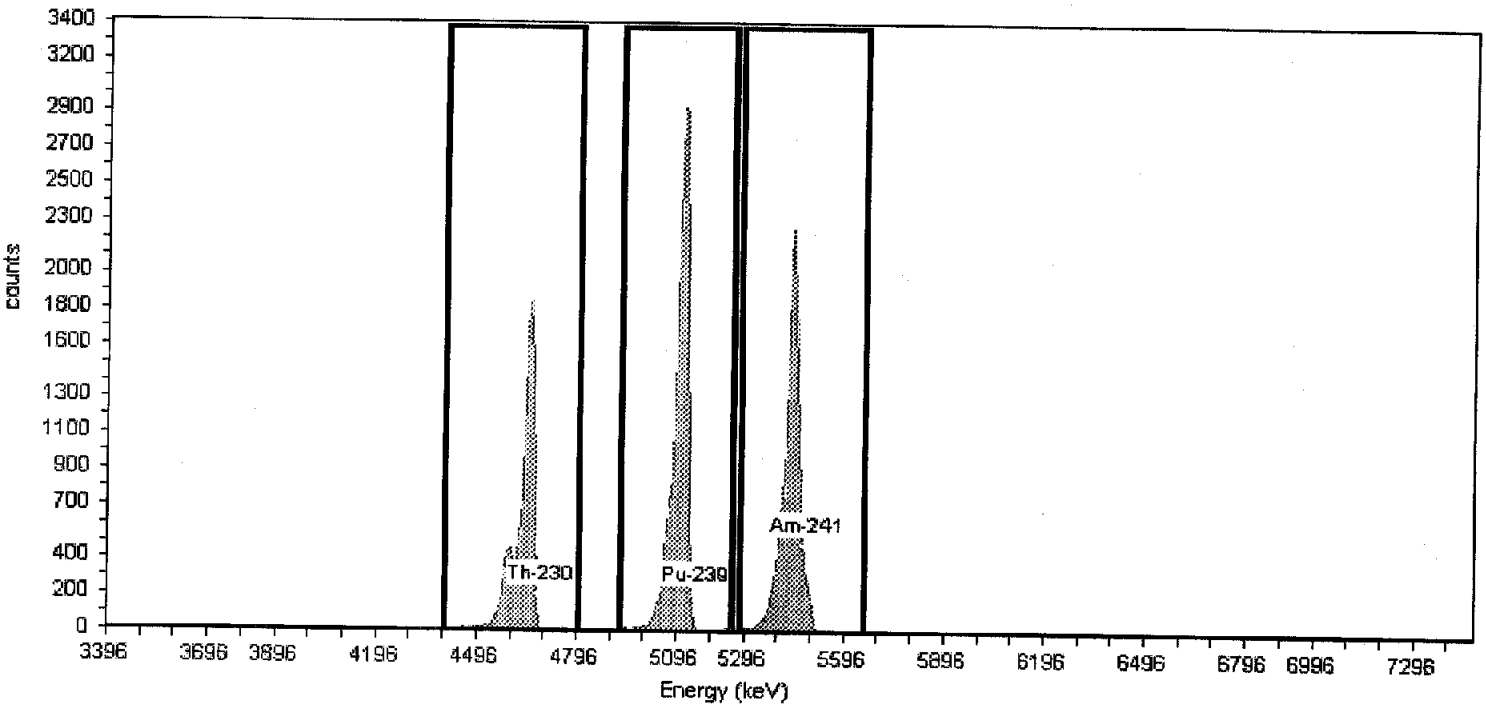
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV4 , SN: 41-172B5
Acquisition Start Date: 12/26/2006 12:59:24PM
Live Time: 140.00 min.
Real Time: 140.07 min.
Efficiency: 26.56% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,357.00	81.12
Pu-239	243	5.16	212	258	17,306.00	123.61
Am-241	289	5.49	261	313	14,993.00	107.09

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:23:45PM 12/27/2006

Analyst: 60040
Detector: AV6

Calibration

Name: Dec2006_AV6
Description:

Calibration Date: 12/27/2006 2:23:42PM

Source Info

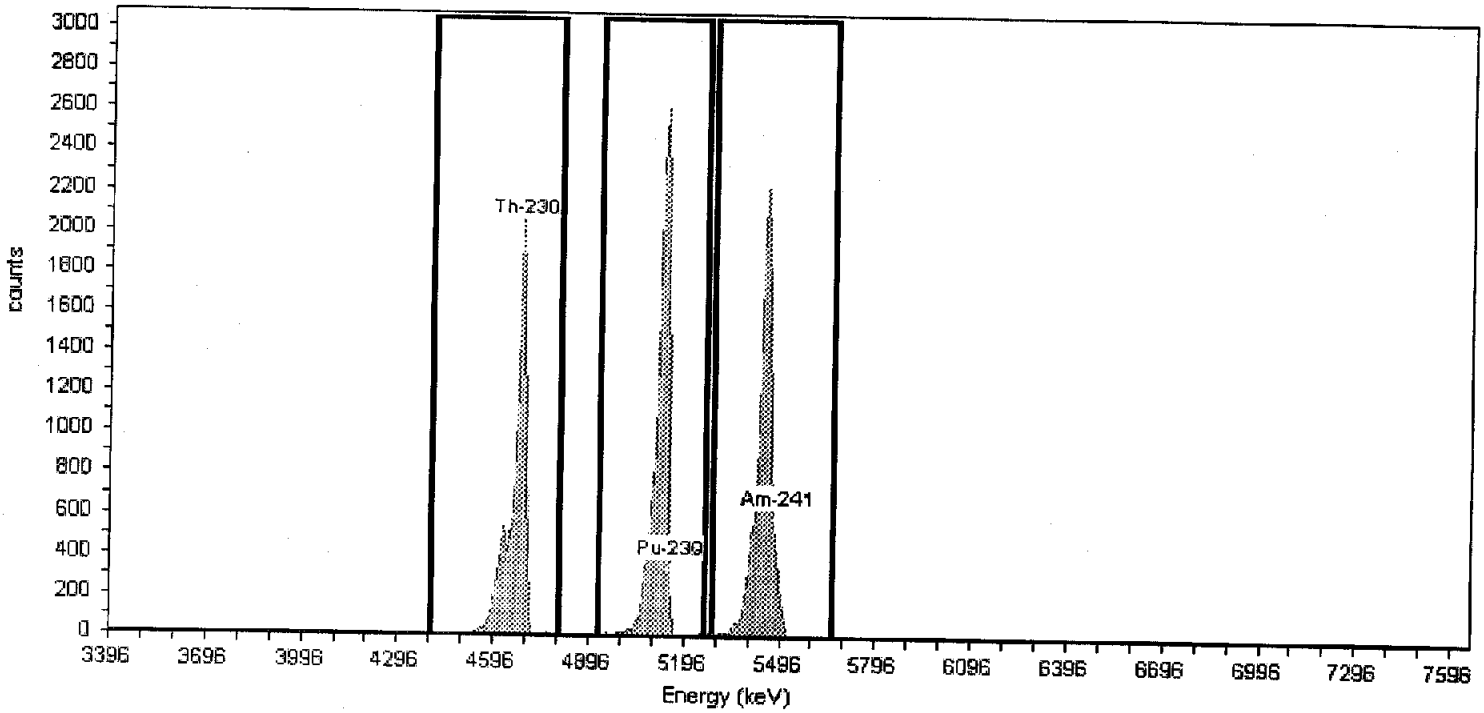
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV6 , SN:
Acquisition Start Date: 12/27/2006 11:46:04AM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 26.86% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,585.00	89.89
Pu-239	243	5.16	212	258	14,821.00	105.86
Am-241	289	5.49	261	313	14,266.00	101.90

STL

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:23:53PM 12/27/2006

Analyst: 60040
Detector: AV7

Calibration

Name: Dec2006_AV7
Description:

Calibration Date: 12/27/2006 2:23:50PM

Source Info

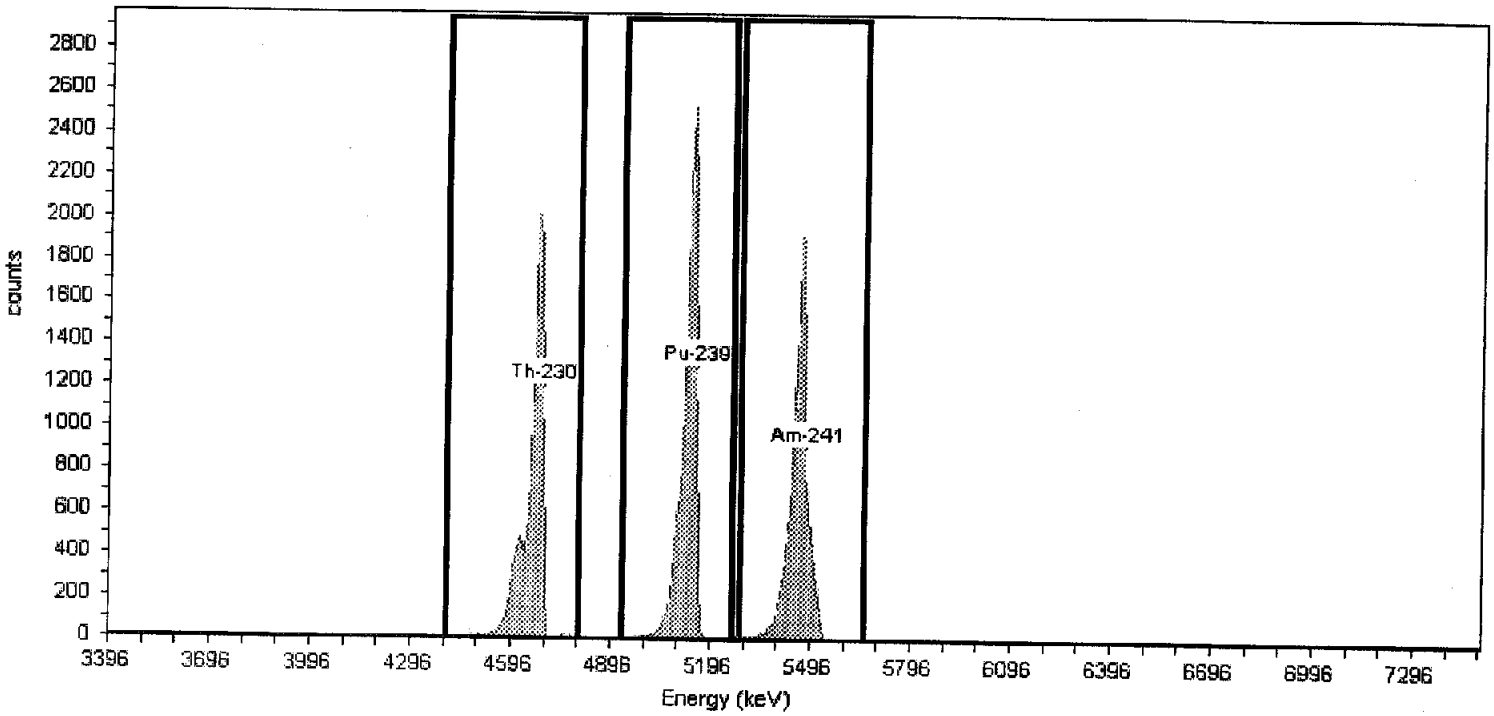
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV7 , SN: 41-158X6
Acquisition Start Date: 12/27/2006 11:46:06AM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.33% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,546.00	89.61
Pu-239	243	5.16	212	258	14,487.00	103.48
Am-241	289	5.49	261	313	13,334.00	95.24

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:24:06PM 12/27/2006

Analyst: 60040
Detector: AV8

Calibration

Name: Dec2006_AV8
Description:

Calibration Date: 12/27/2006 2:24:03PM

Source Info

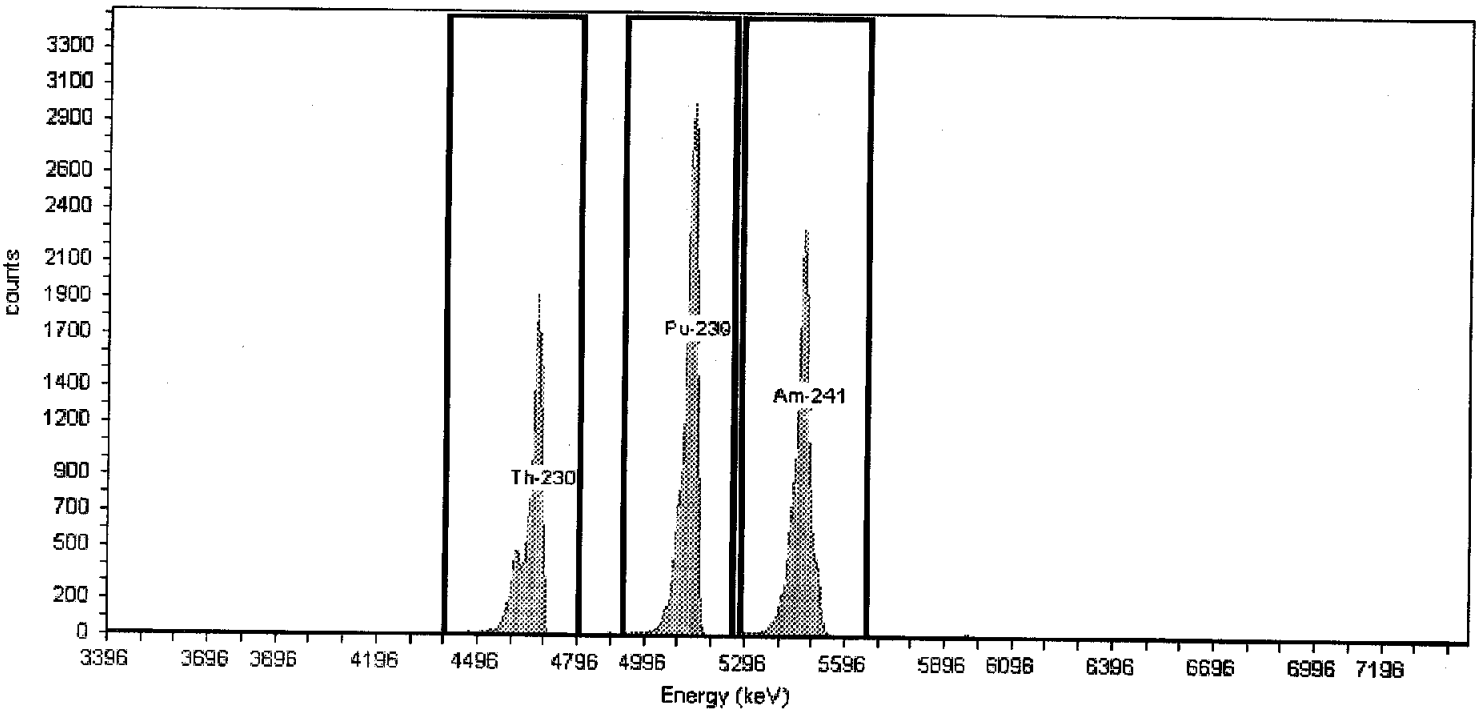
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV8 , SN: 41-158X1
Acquisition Start Date: 12/27/2006 11:46:36AM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.32% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,635.00	83.11
Pu-239	243	5.16	212	258	17,880.00	127.71
Am-241	289	5.49	261	313	15,397.00	109.98

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV9

2:23:37PM 12/27/2006

Calibration

Name: Dec2006_AV9
Description:

Calibration Date: 12/27/2006 2:23:33PM

Source Info

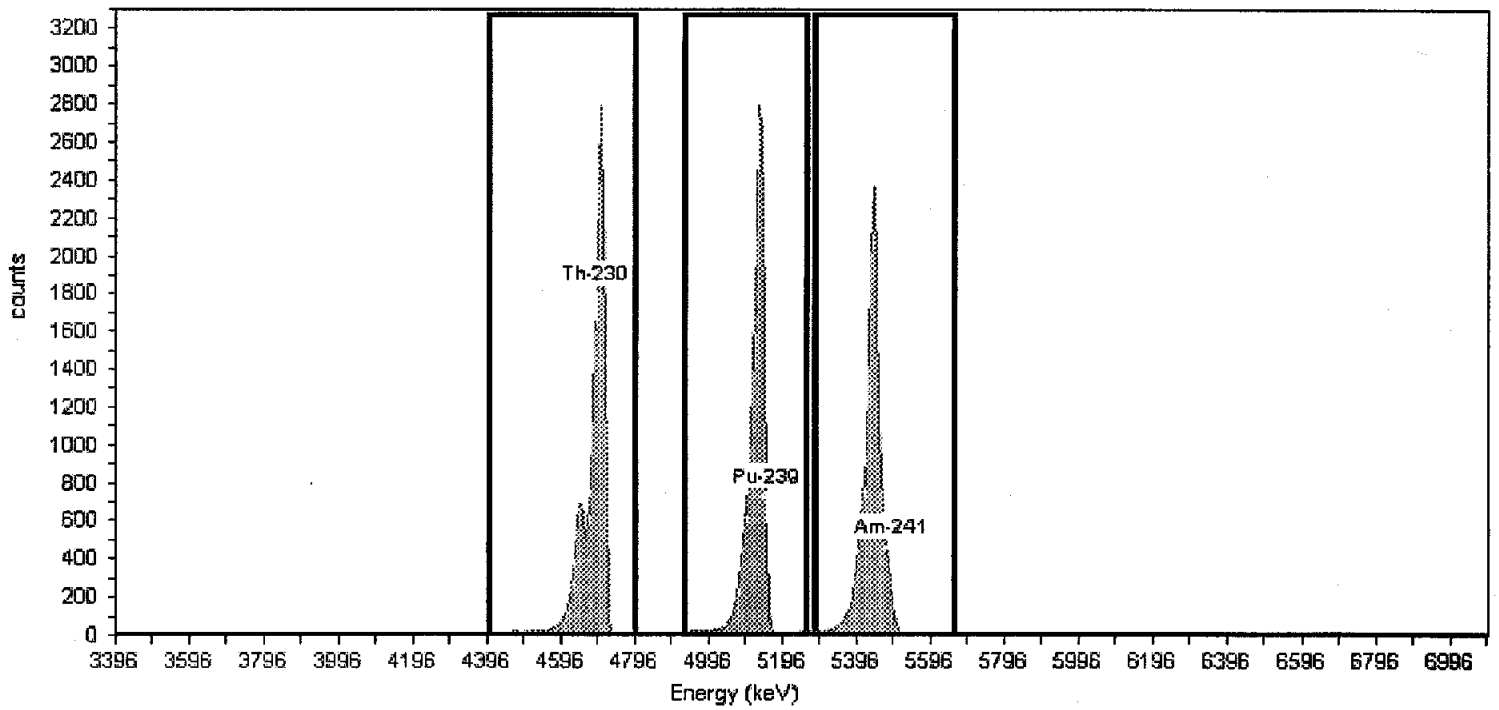
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV9 , SN: 41-172R1
Acquisition Start Date: 12/27/2006 11:45:39AM
Live Time: 140.00 min.
Real Time: 140.01 min.
Efficiency: 26.49% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,029.00	114.49
Pu-239	243	5.16	212	258	15,297.00	109.26
Am-241	289	5.49	261	313	14,670.00	104.79

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:55:17PM 12/27/2006

Analyst: 60040
Detector: AV11

Calibration

Name: Dec2006_AV11
Description:

Calibration Date: 12/27/2006 4:55:05PM

Source Info

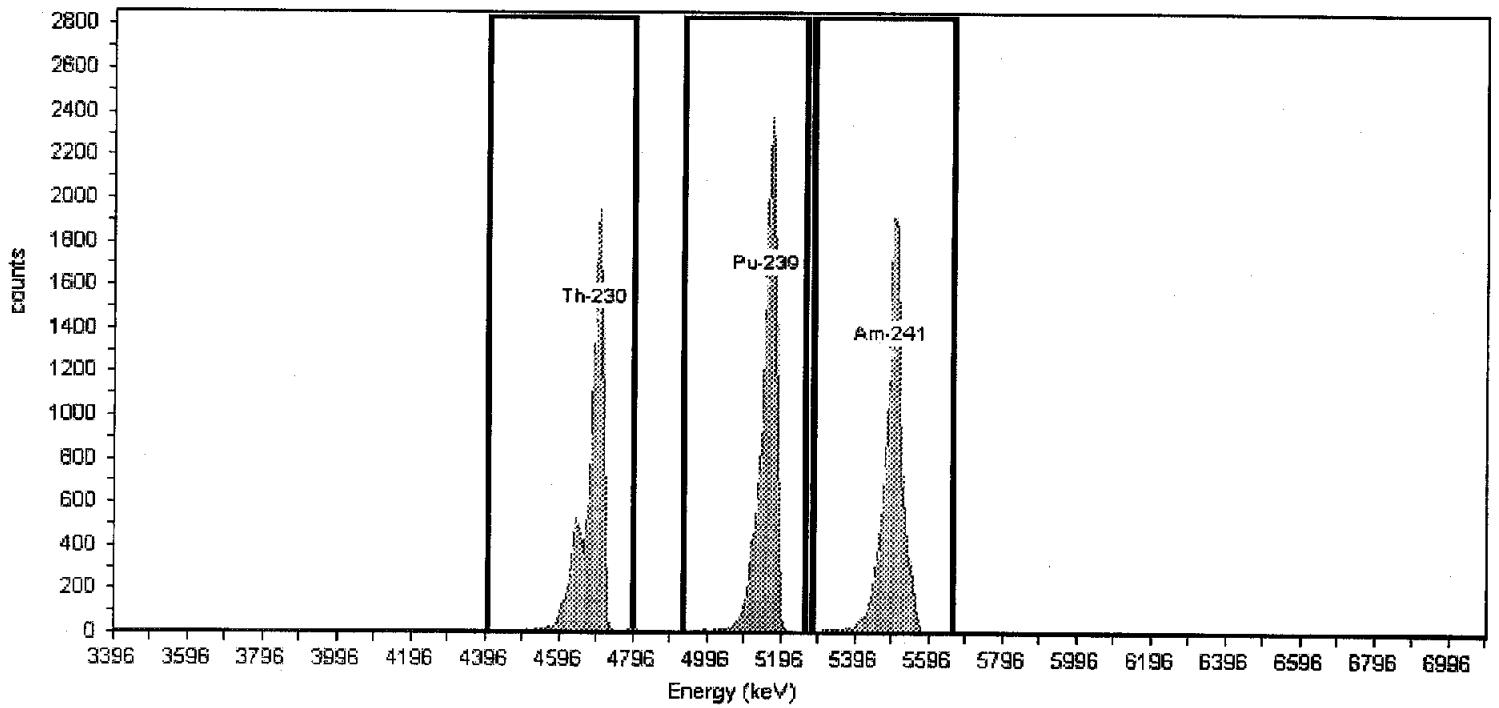
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV11 , SN: 41-172Q3
Acquisition Start Date: 12/27/2006 2:35:06PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 26.74% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,253.00	87.52
Pu-239	243	5.16	212	258	13,999.00	99.99
Am-241	289	5.49	261	313	13,237.00	94.55

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV12

4:55:50PM 12/27/2006

Calibration

Name: Dec2006_AV12
Description:

Calibration Date: 12/27/2006 4:55:46PM

Source Info

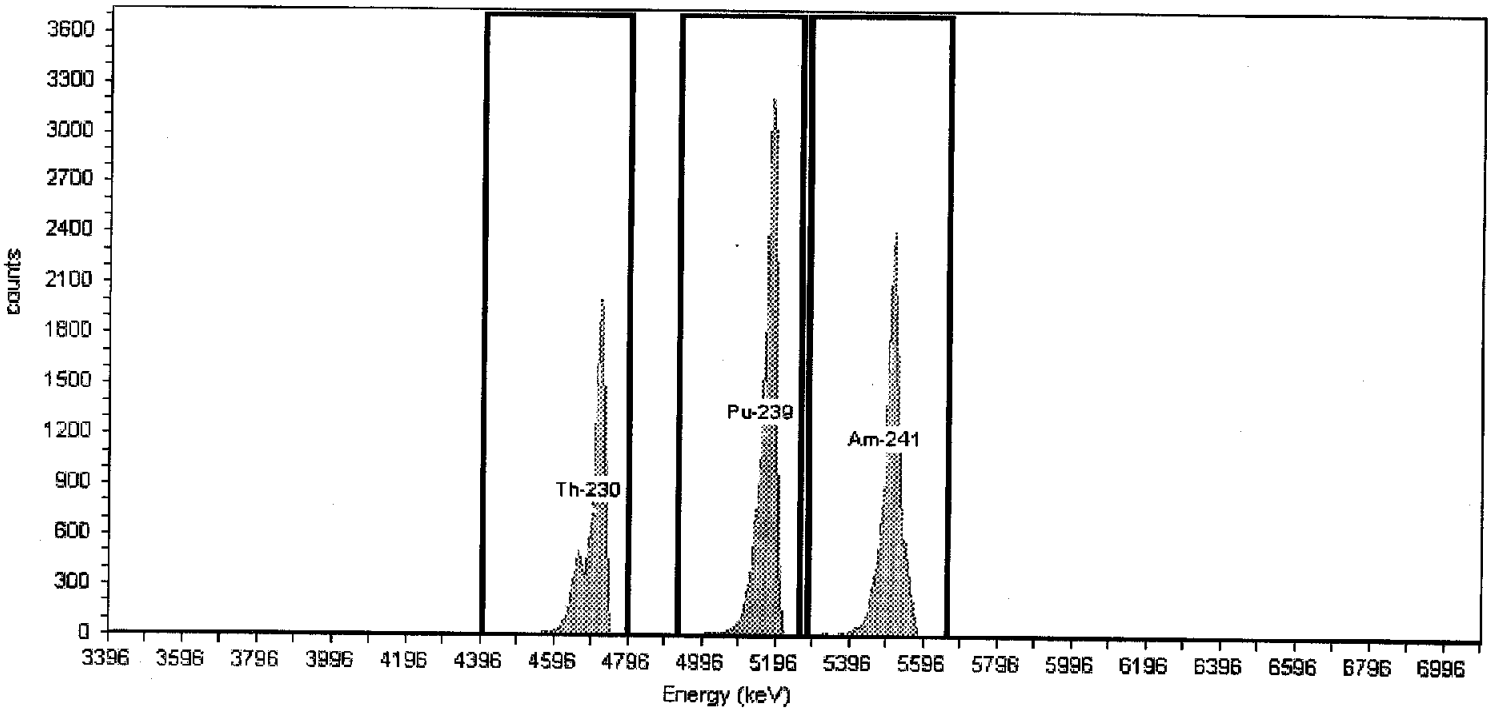
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV12 , SN: 41-172Q2
Acquisition Start Date: 12/27/2006 2:35:07PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 27.99% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,043.00	86.02
Pu-239	243	5.16	212	258	18,417.00	131.55
Am-241	289	5.49	261	313	15,549.00	111.06

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV13

7:37:16PM 12/27/2006

Calibration

Name: Dec2006_AV13
Description:

Calibration Date: 12/27/2006 7:37:13PM

Source Info

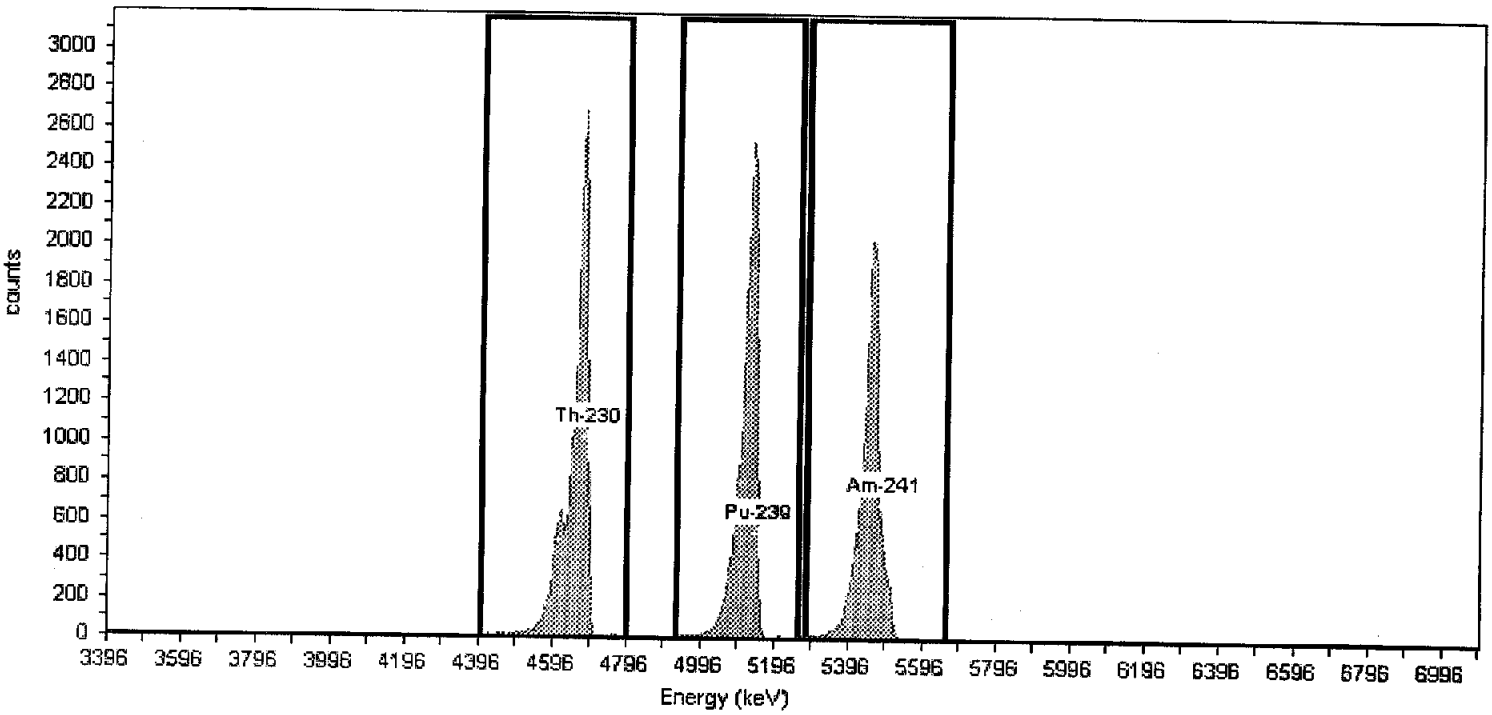
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV13 , SN: 41-172Q1
Acquisition Start Date: 12/27/2006 4:59:58PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 26.89% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,484.00	117.74
Pu-239	243	5.16	212	258	15,700.00	112.14
Am-241	289	5.49	261	313	14,611.00	104.36

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:54:51PM 12/27/2006

Analyst: 60040
Detector: AV14

Calibration

Name: Dec2006_AV14
Description:

Calibration Date: 12/27/2006 4:54:47PM

Source Info

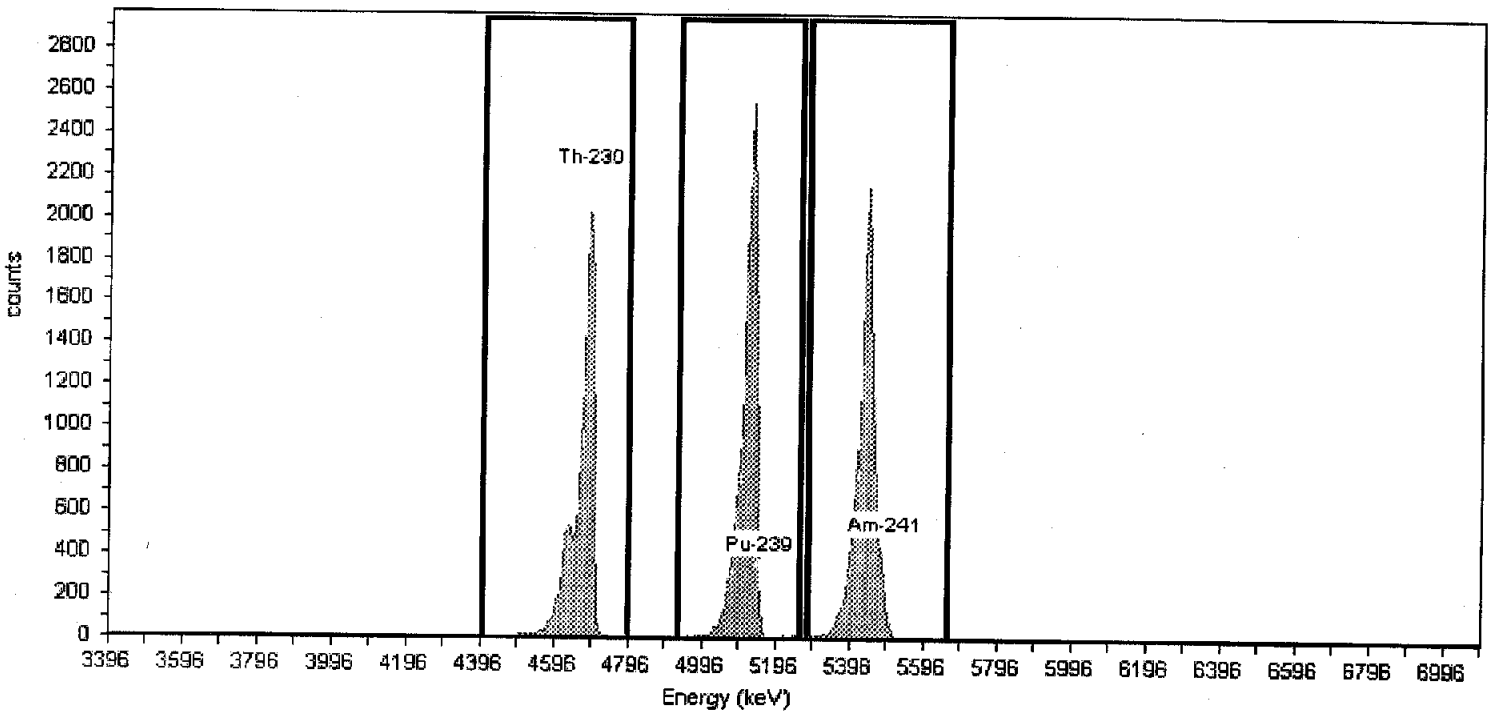
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV14 , SN: 41-172C4
Acquisition Start Date: 12/27/2006 2:34:40PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 26.70% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,544.00	89.60
Pu-239	243	5.16	212	258	14,719.00	105.14
Am-241	289	5.49	261	313	14,124.00	100.89

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:37:23PM 12/27/2006

Analyst: 60040
Detector: AV15

Calibration

Name: Dec2006_AV15
Description:

Calibration Date: 12/27/2006 7:37:20PM

Source Info

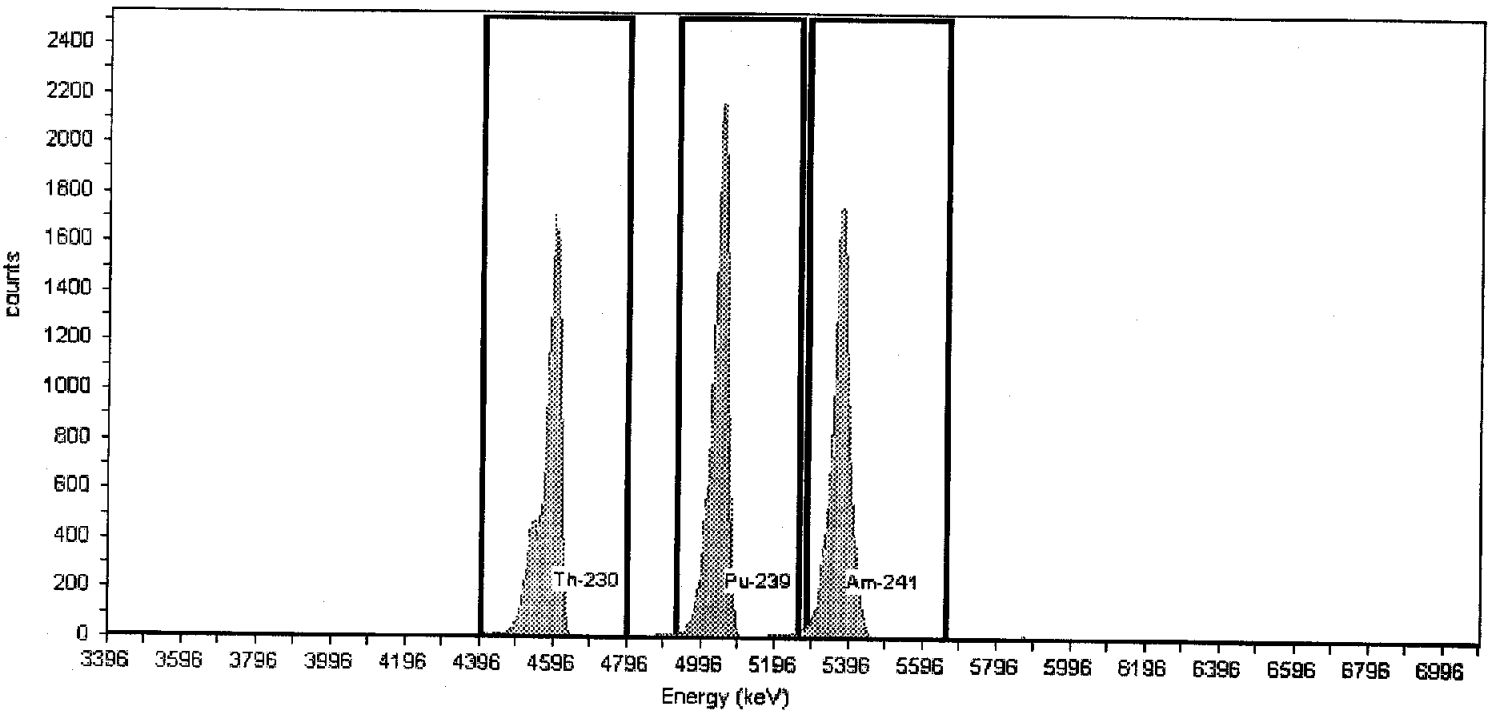
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV15 , SN: 41-172C5
Acquisition Start Date: 12/27/2006 5:00:31PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 26.88% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,248.00	87.49
Pu-239	243	5.16	212	258	14,283.00	102.02
Am-241	289	5.49	261	313	13,183.00	94.16

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV16

7:37:28PM 12/27/2006

Calibration

Name: Dec2006_AV16
Description:

Calibration Date: 12/27/2006 7:37:25PM

Source Info

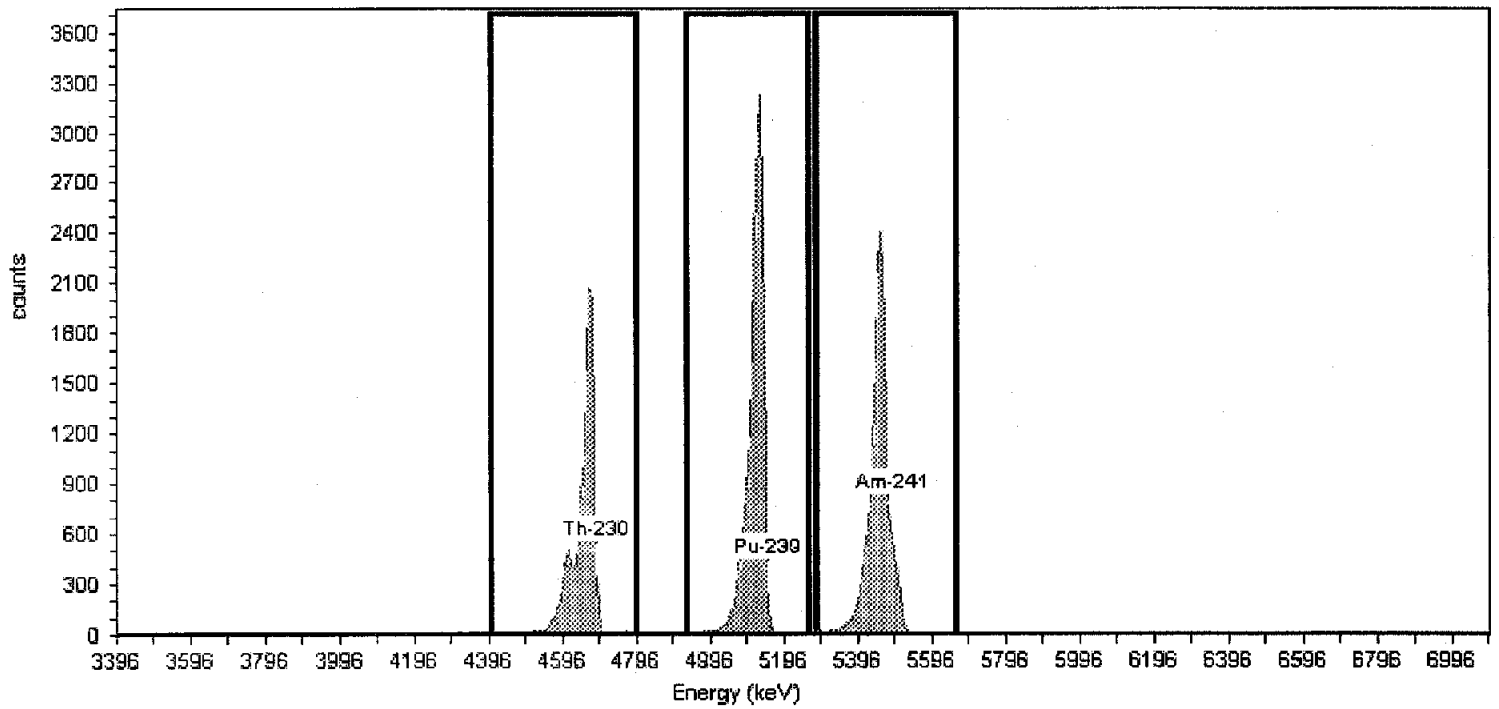
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV16 , SN: 41-172Q7
Acquisition Start Date: 12/27/2006 5:00:33PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 28.55% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,536.00	89.54
Pu-239	243	5.16	212	258	18,401.00	131.44
Am-241	289	5.49	261	313	16,014.00	114.39

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:55:27PM 12/26/2006

Analyst: 60040
Detector: AV17

Calibration

Name: Dec2006_AV17
Description:

Calibration Date: 12/26/2006 12:55:23PM

Source Info

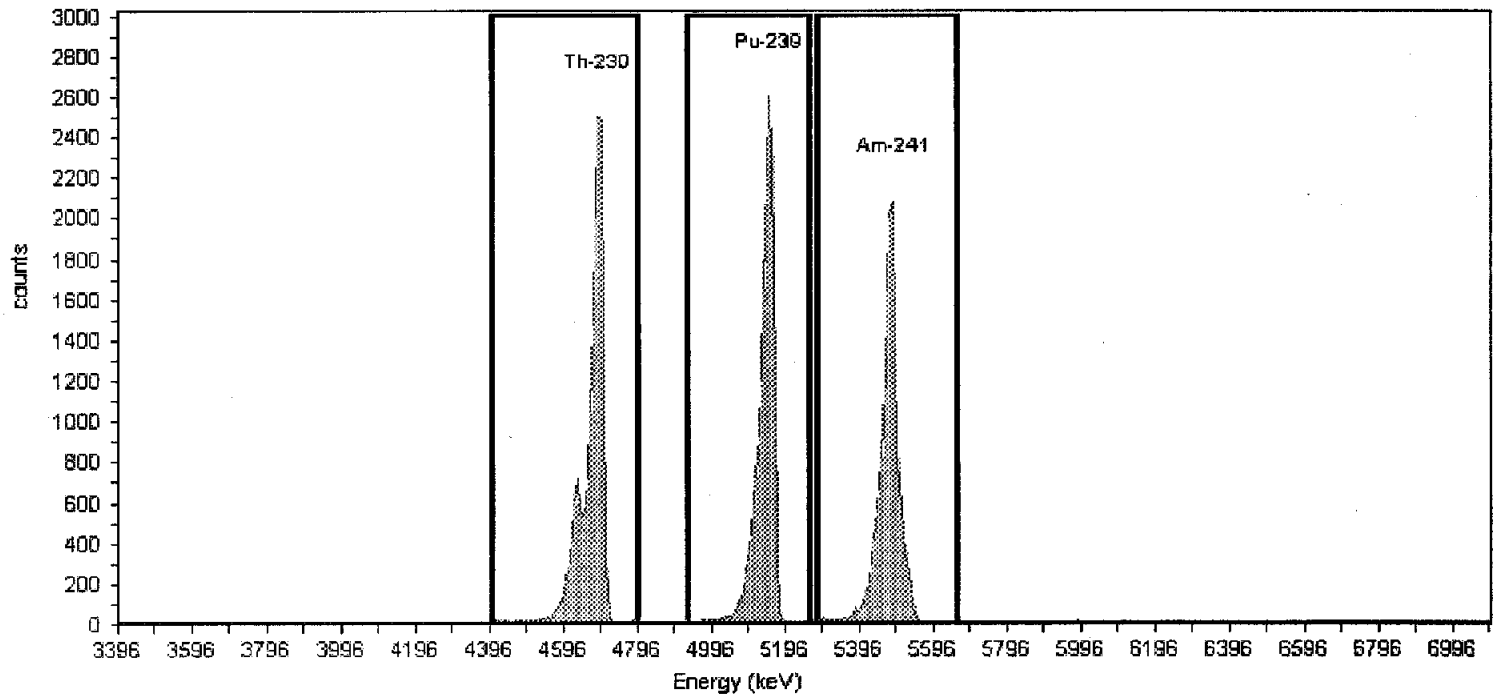
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV17 , SN: 41-172Q4
Acquisition Start Date: 12/26/2006 10:28:19AM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.59% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,440.00	117.43
Pu-239	243	5.16	212	258	15,368.00	109.77
Am-241	289	5.49	261	313	14,510.00	103.64

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:55:36PM 12/26/2006

Analyst: 60040
Detector: AV18

Calibration

Name: Dec2006_AV18
Description:

Calibration Date: 12/26/2006 12:55:33PM

Source Info

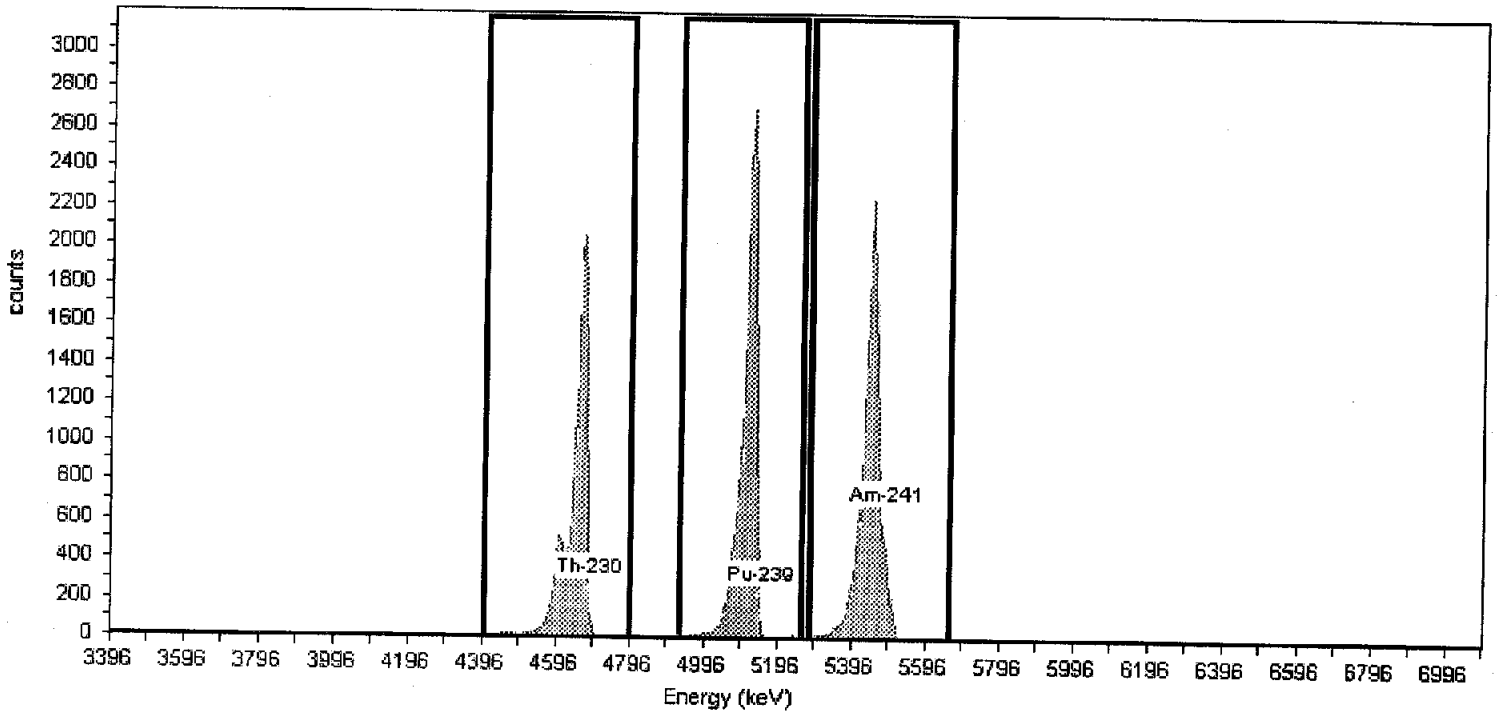
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV18 , SN: 41-172C6
Acquisition Start Date: 12/26/2006 10:28:21AM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 27.08% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,447.00	88.91
Pu-239	243	5.16	212	258	15,181.00	108.44
Am-241	289	5.49	261	313	14,563.00	104.02

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:55:47PM 12/26/2006

Analyst: 60040
Detector: AV19

Calibration

Name: Dec2006_AV19
Description:

Calibration Date: 12/26/2006 12:55:41PM

Source Info

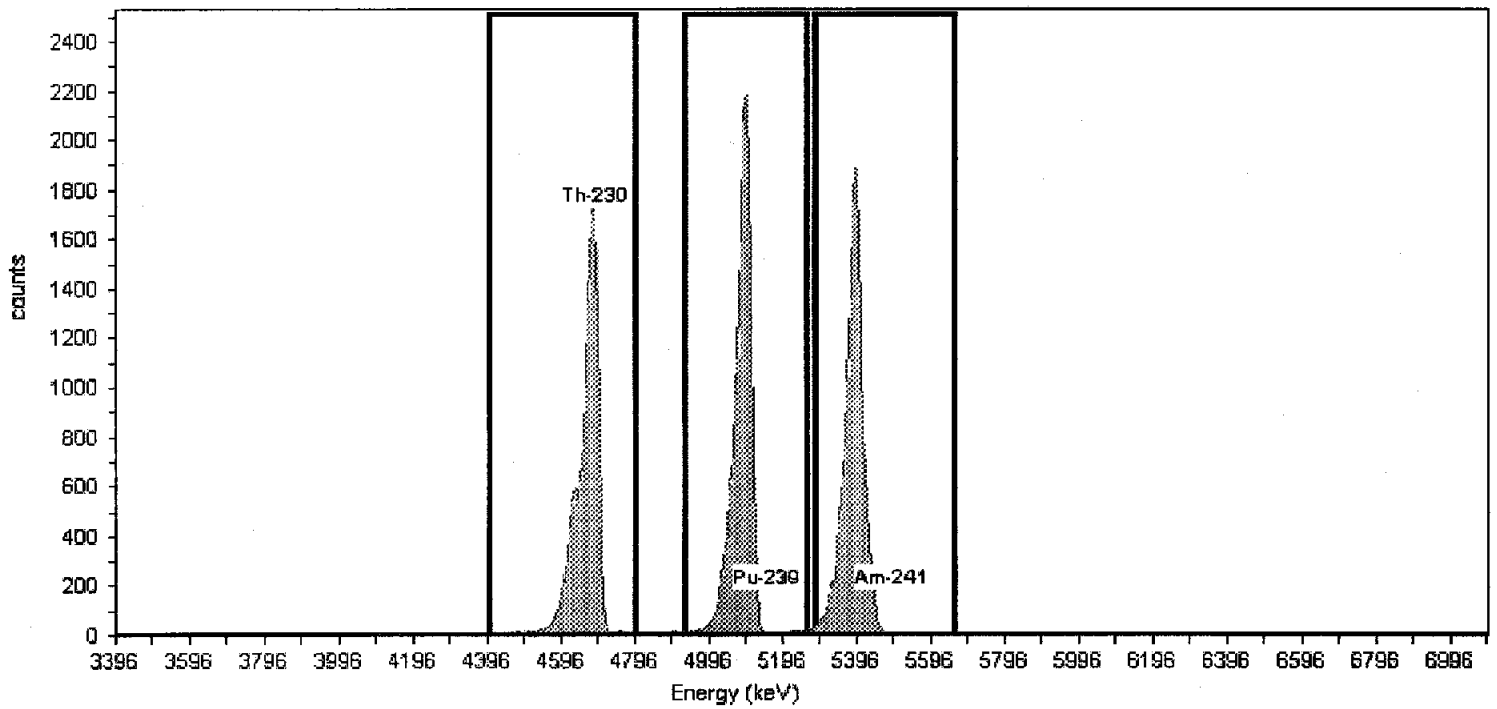
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV19 , SN: 41-172Q6
Acquisition Start Date: 12/26/2006 10:28:50AM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 28.86% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	13,434.00	95.96
Pu-239	243	5.16	212	258	15,057.00	107.55
Am-241	289	5.49	261	313	14,129.00	100.92

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:55:54PM 12/26/2006

Analyst: 60040
Detector: AV20

Calibration

Name: Dec2006_AV20
Calibration Date: 12/26/2006 12:55:51PM
Description:

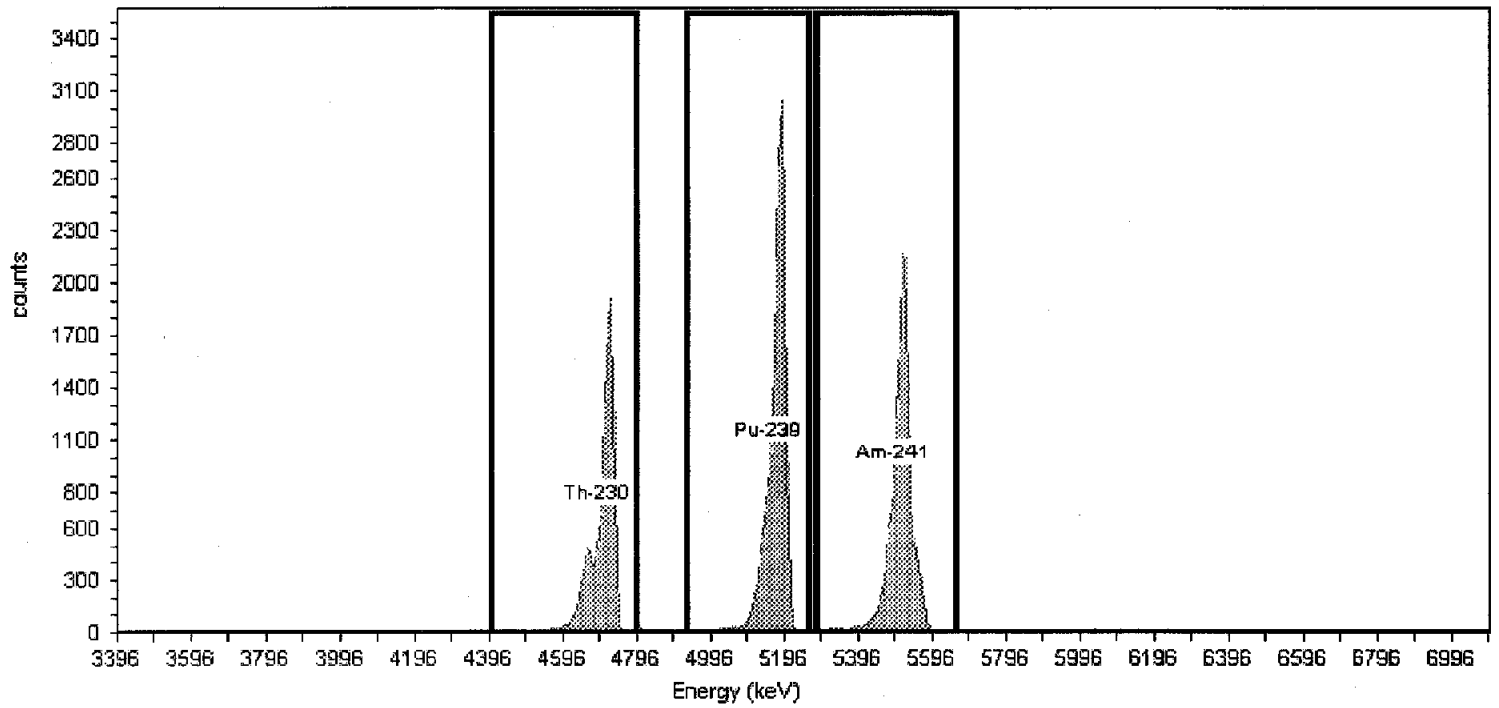
Source Info

Certificate ID: 63509A-334
Certification Date: 5/30/2002 12:00:00PM
Prepared by: Analytics
Description:

Acquisition

Detector: AV20 , SN: 41-172R2
Acquisition Start Date: 12/26/2006 10:28:51AM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.83% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Initial Calibration: No
Algorithm: Linear
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,644.00	83.17
Pu-239	243	5.16	212	258	17,509.00	125.06
Am-241	289	5.49	261	313	14,962.00	106.87

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:51:12AM 12/27/2006

Analyst: 60040
Detector: AV21

Calibration

Name: Dec2006_AV21
Description:

Calibration Date: 12/27/2006 8:51:08AM

Source Info

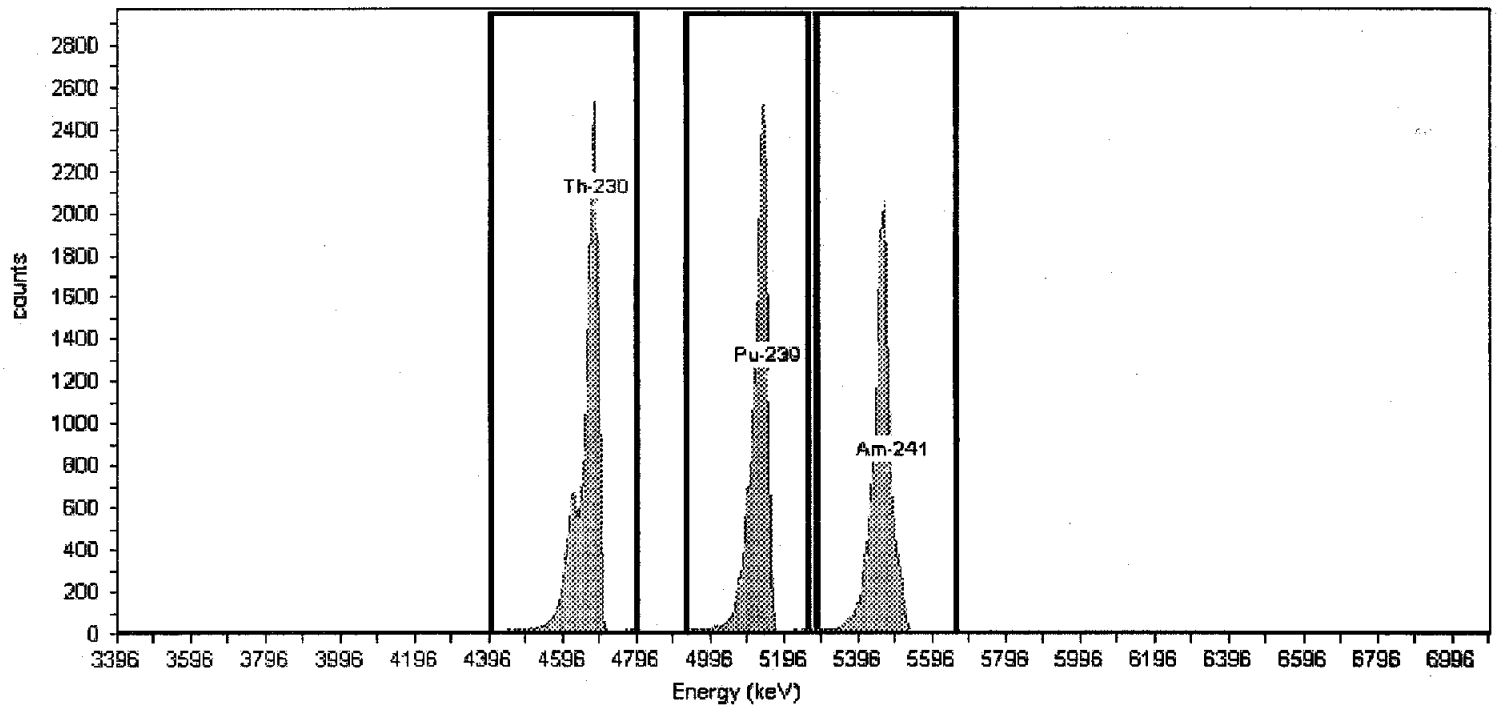
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV21 , SN: 41-172C7
Acquisition Start Date: 12/26/2006 3:25:54PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 26.12% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,100.00	115.00
Pu-239	243	5.16	212	258	15,144.00	108.17
Am-241	289	5.49	261	313	14,242.00	101.73

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:51:19AM 12/27/2006

Analyst: 60040
Detector: AV22

Calibration

Name: Dec2006_AV22
Description:

Calibration Date: 12/27/2006 8:51:16AM

Source Info

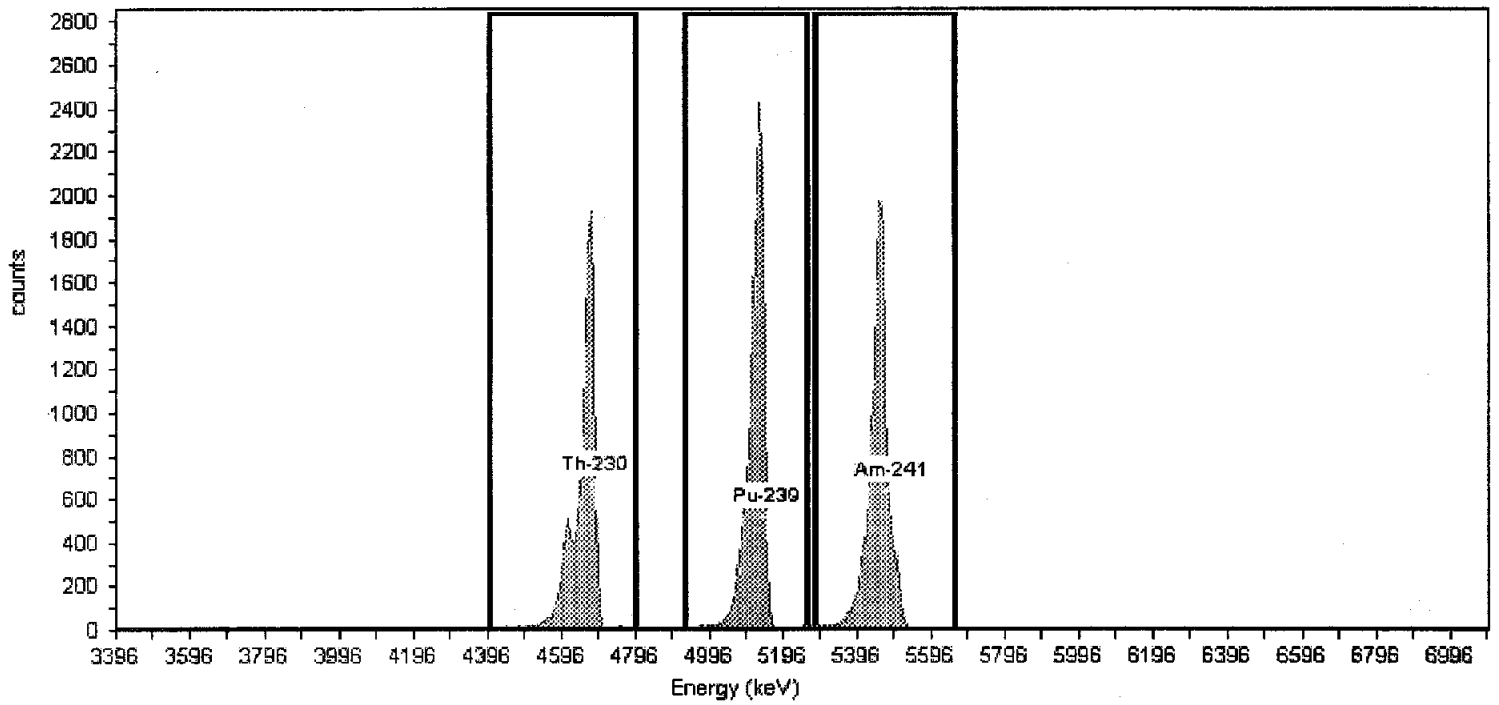
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV22 , SN: 41-172Q5
Acquisition Start Date: 12/26/2006 3:26:33PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 25.53% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,010.00	85.79
Pu-239	243	5.16	212	258	14,051.00	100.36
Am-241	289	5.49	261	313	13,499.00	96.42

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:51:28AM 12/27/2006

Analyst: 60040
Detector: AV23

Calibration

Name: Dec2006_AV23
Description:

Calibration Date: 12/27/2006 8:51:24AM

Source Info

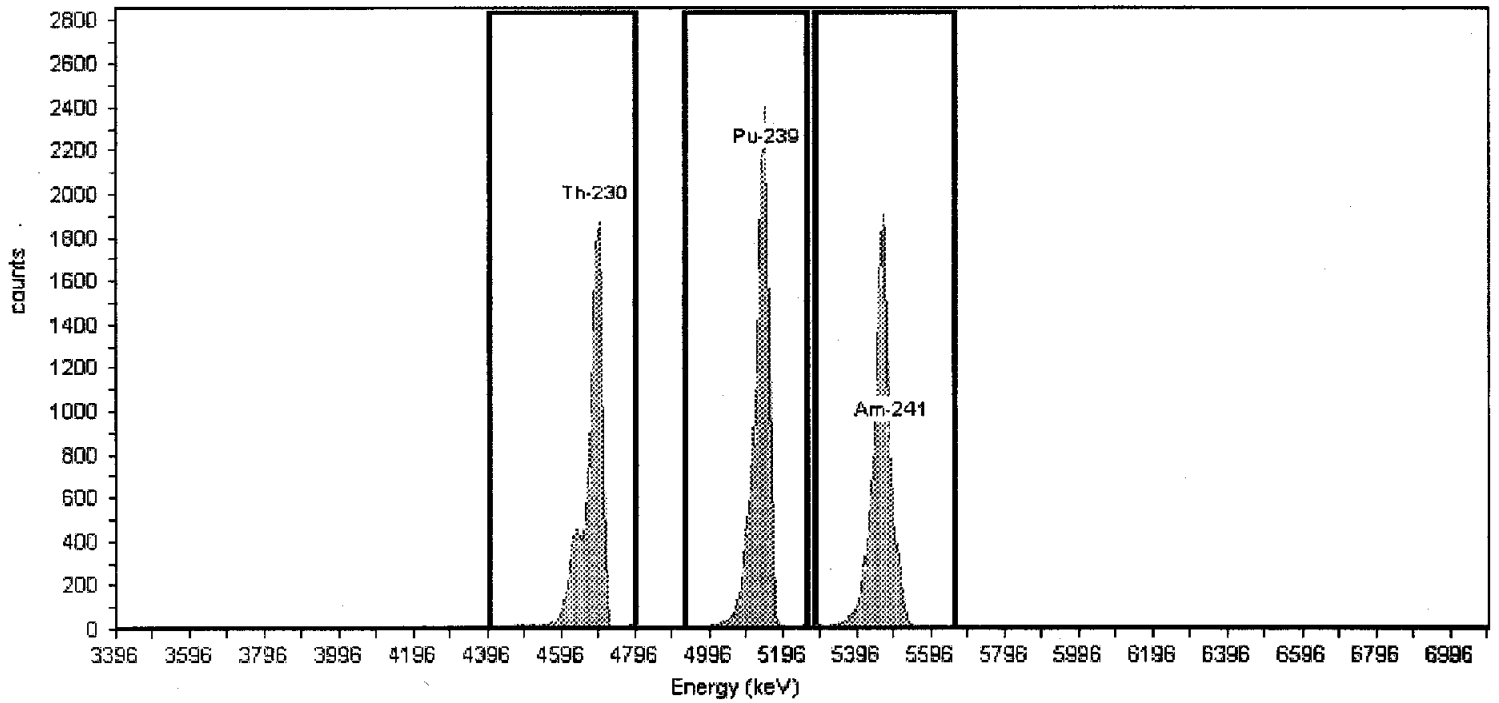
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV23 , SN: 41-172R4
Acquisition Start Date: 12/26/2006 3:26:36PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 26.89% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,240.00	87.43
Pu-239	243	5.16	212	258	14,257.00	101.84
Am-241	289	5.49	261	313	13,227.00	94.48

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
8:51:46AM 12/27/2006

Analyst: 60040
Detector: AV24

Calibration

Name: Dec2006_AV24
Description:

Calibration Date: 12/27/2006 8:51:32AM

Source Info

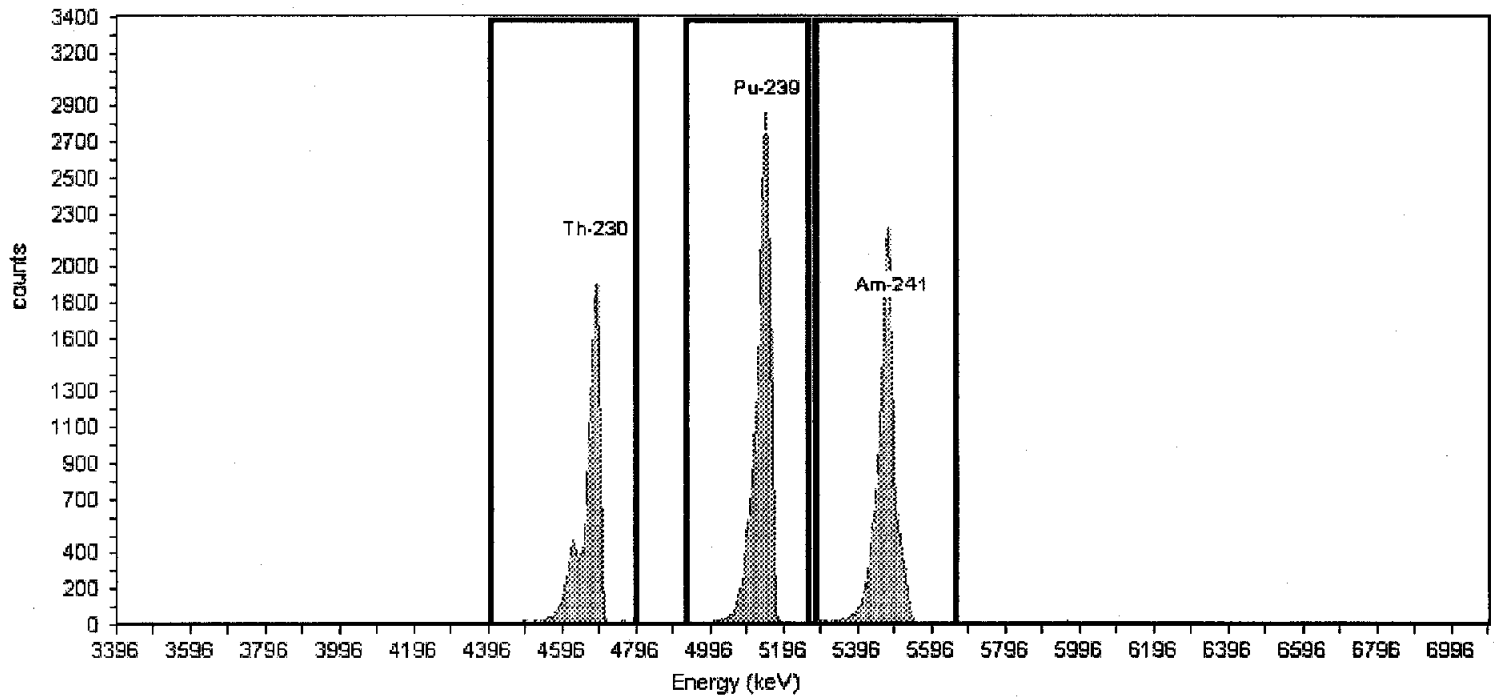
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV24 , SN: 41-172R5
Acquisition Start Date: 12/26/2006 3:27:09PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 26.47% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,559.00	82.56
Pu-239	243	5.16	212	258	17,113.00	122.24
Am-241	289	5.49	261	313	14,852.00	106.09

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:46:52AM 12/29/2006

Analyst: 60040
Detector: AV45

Calibration

Name: DEC2006_AV45
Description:

Calibration Date: 12/29/2006 10:46:47AM

Source Info

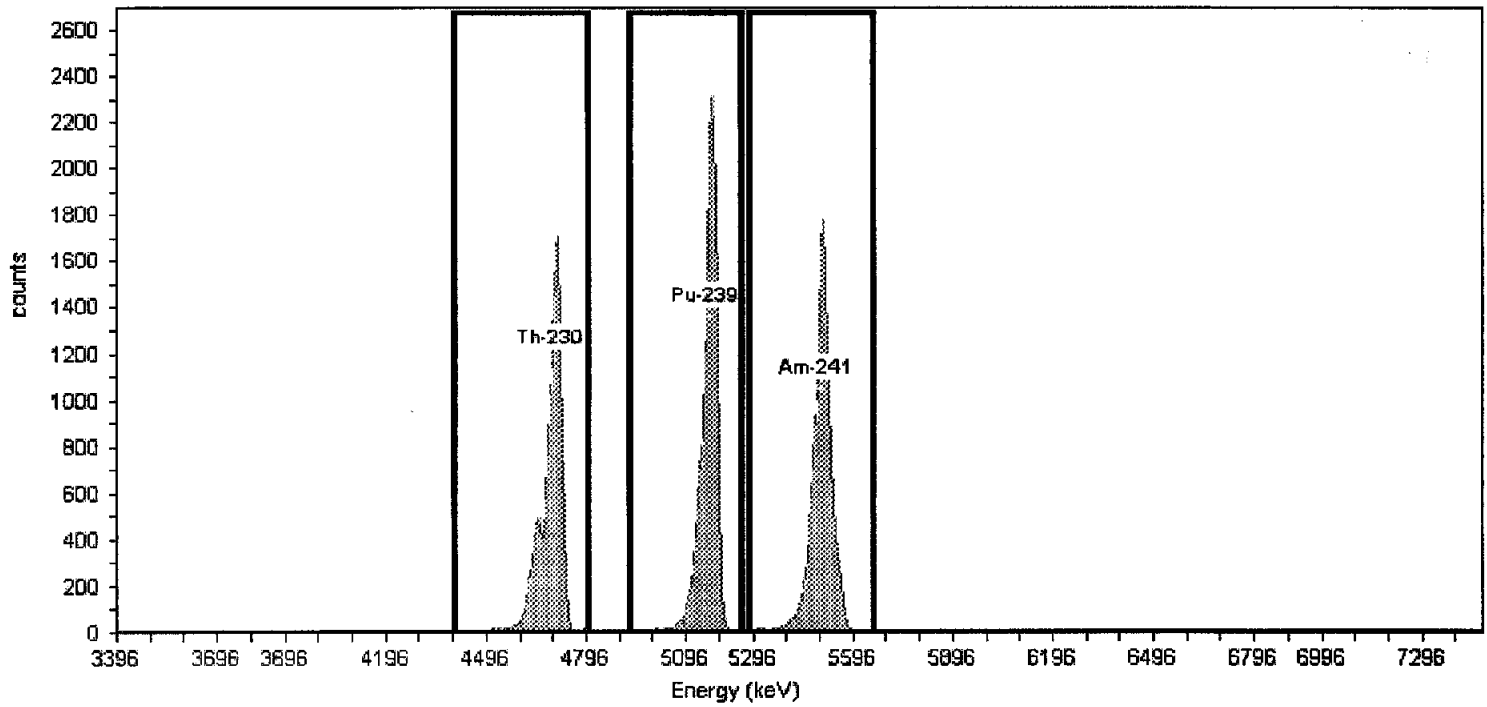
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV45 , SN: AV45
Acquisition Start Date: 12/29/2006 8:24:43AM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 27.79% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,553.00	89.66
Pu-239	243	5.16	212	258	14,773.00	105.52
Am-241	289	5.49	261	313	13,727.00	98.05

ST SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:57:20AM 12/29/2006

Analyst: 60040
Detector: AV46

Calibration

Name: DEC2006_AV46
Description:

Calibration Date: 12/29/2006 6:57:16AM

Source Info

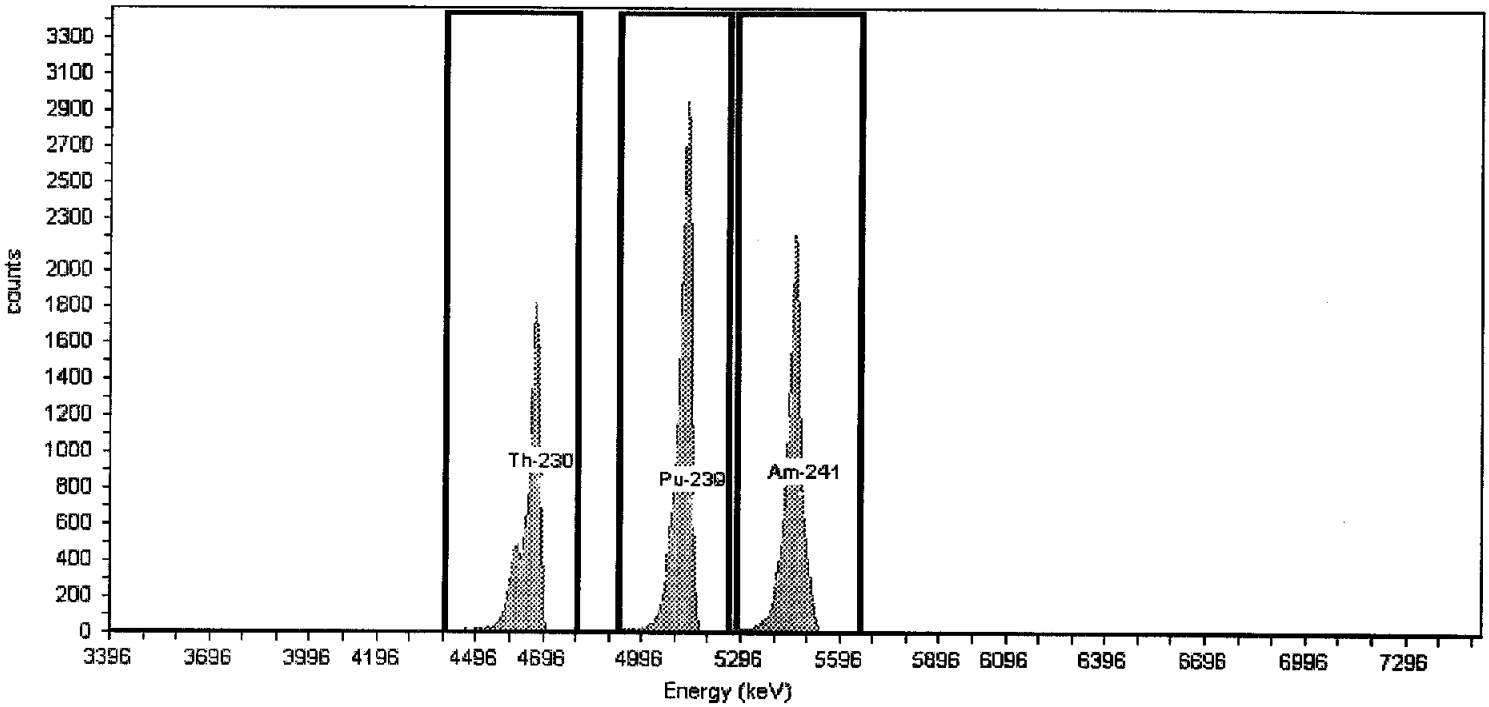
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV46 , SN: AV46
Acquisition Start Date: 12/28/2006 10:15:08PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 27.35% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,702.00	83.59
Pu-239	243	5.16	212	258	18,033.00	128.81
Am-241	289	5.49	261	313	15,229.00	108.78

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV48
7:37:33PM 12/27/2006

Calibration

Name: Dec2006_AV48
Calibration Date: 12/27/2006 7:37:30PM
Description:

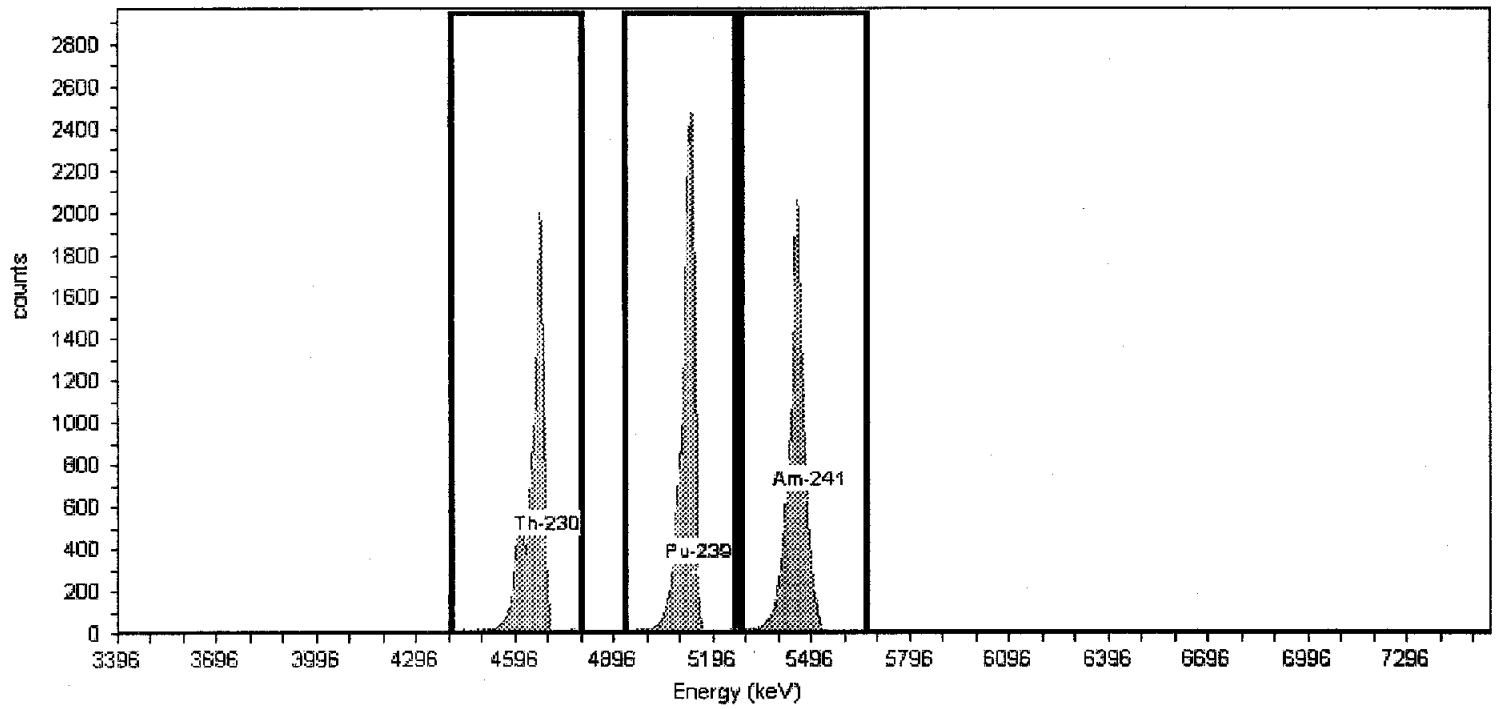
Source Info

Certificate ID: 63507-334
Certification Date: 5/30/2002 12:00:00PM
Prepared by: Analytics
Description:

Acquisition

Detector: AV48 , SN: AV48
Acquisition Start Date: 12/27/2006 5:02:08PM
Live Time: 140.00 min.
Real Time: 140.01 min.
Efficiency: 26.67% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Initial Calibration: No
Algorithm: Linear
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,543.00	89.59
Pu-239	243	5.16	212	258	14,580.00	104.14
Am-241	289	5.49	261	313	14,222.00	101.59

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV49
7:27:35AM 12/28/2006

Calibration

Name: DEC2006_AV49
Calibration Date: 12/28/2006 7:27:31AM
Description:

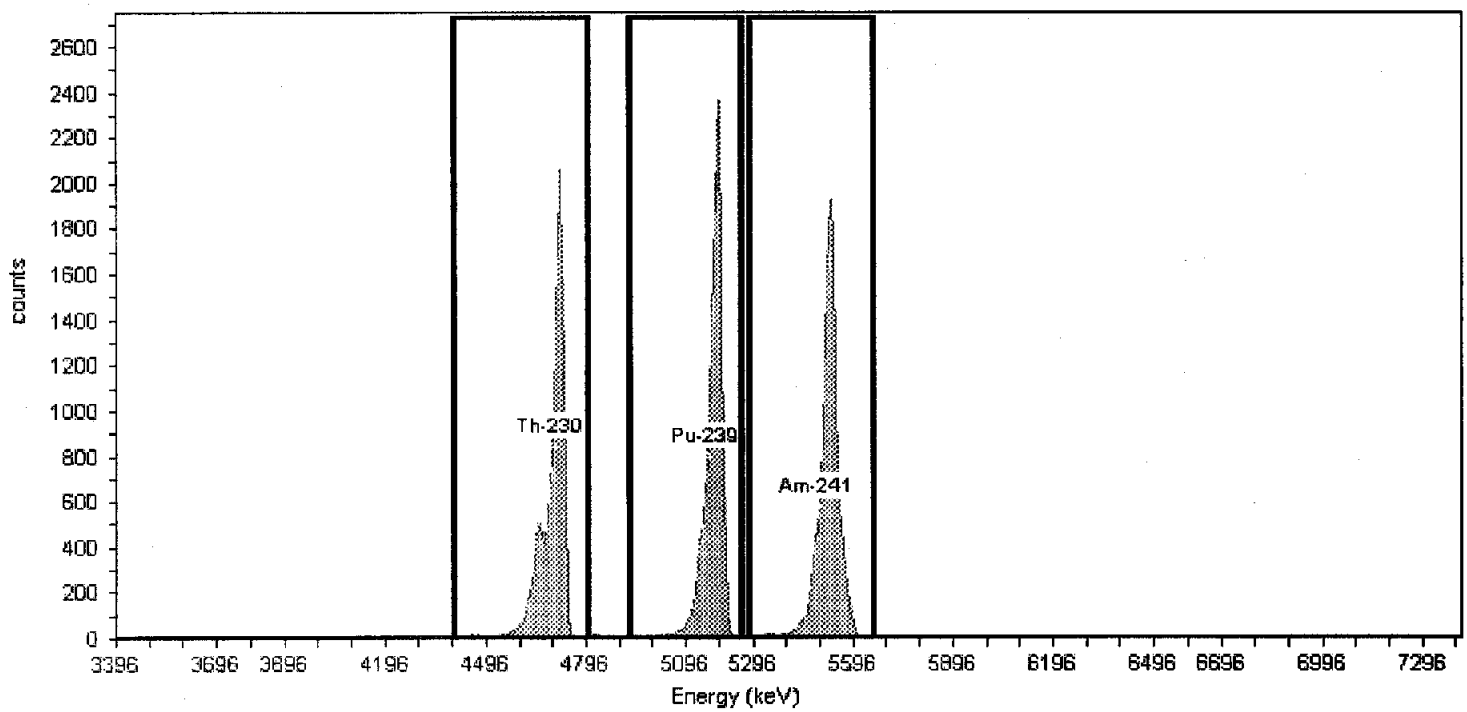
Source Info

Certificate ID: 63508A-334
Certification Date: 5/30/2002 12:00:00PM
Prepared by: Analytics
Description:

Acquisition

Detector: AV49 , SN: AV49
Acquisition Start Date: 12/27/2006 8:06:47PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 27.82% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear
Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,992.00	92.80
Pu-239	243	5.16	212	258	14,458.00	103.27
Am-241	289	5.49	261	313	13,635.00	97.39

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:27:30AM 12/28/2006

Analyst: 60040
Detector: AV50

Calibration

Name: DEC2006_AV50
Description:

Calibration Date: 12/28/2006 7:27:27AM

Source Info

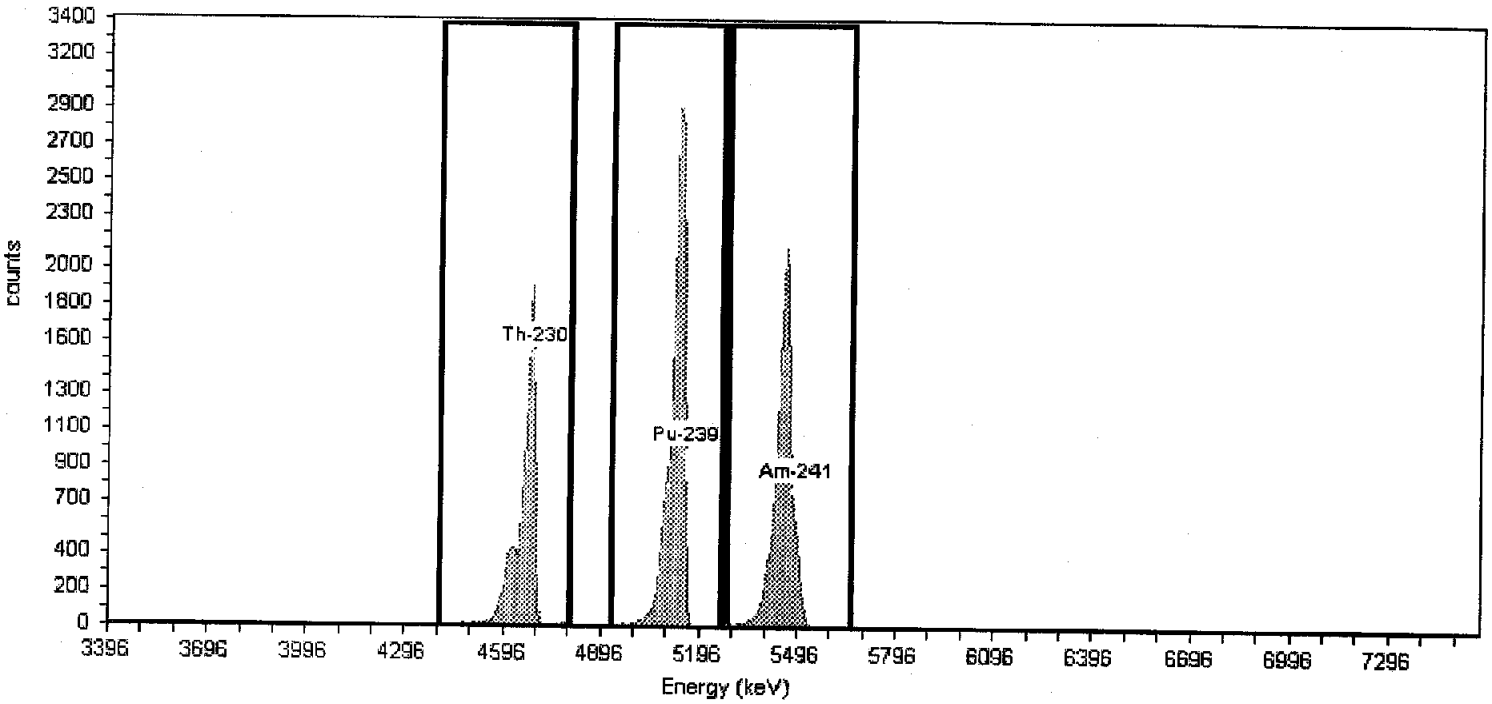
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV50 , SN: AV50
Acquisition Start Date: 12/27/2006 8:06:32PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 27.20% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,791.00	84.22
Pu-239	243	5.16	212	258	17,750.00	126.79
Am-241	289	5.49	261	313	15,169.00	108.35

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:27:26AM 12/28/2006

Analyst: 60040
Detector: AV51

Calibration

Name: DEC2006_AV51
Description:

Calibration Date: 12/28/2006 7:27:23AM

Source Info

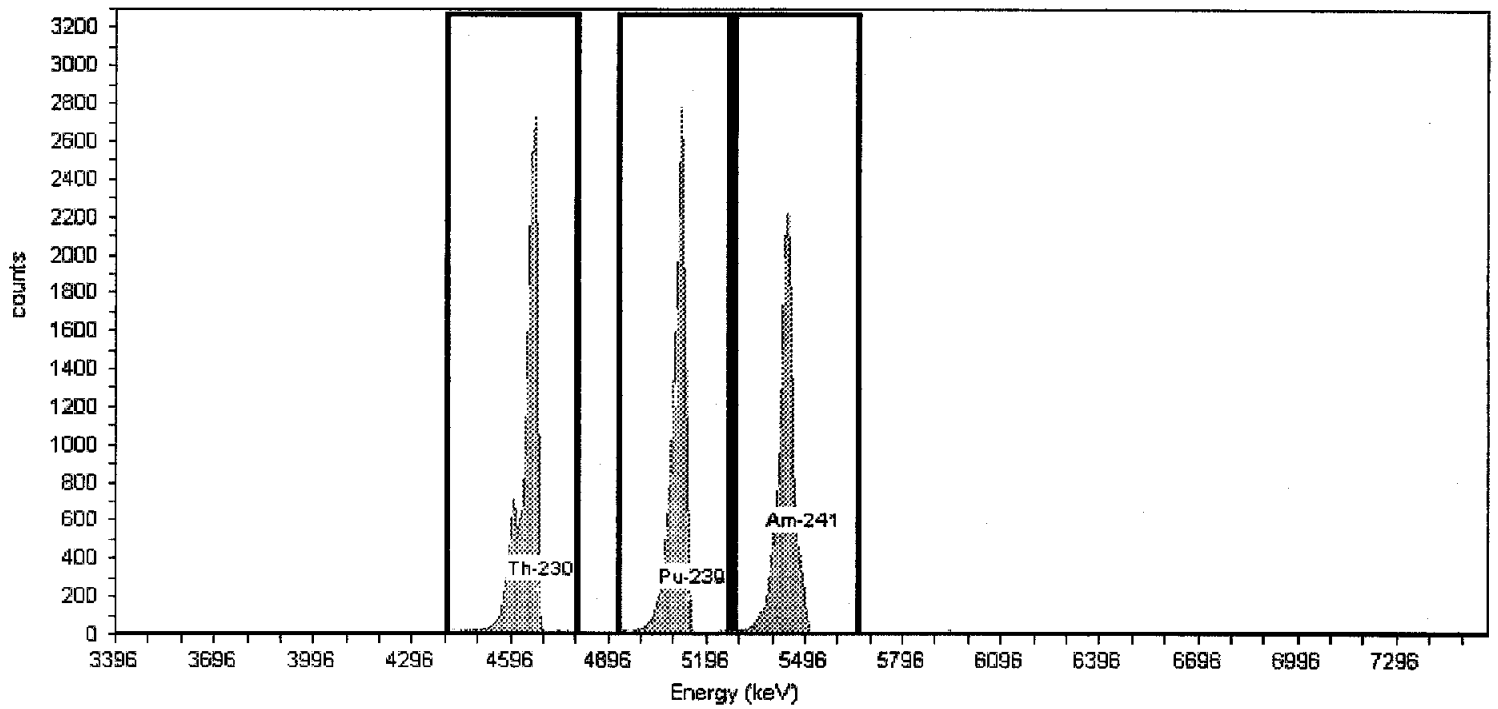
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV51 , SN:
Acquisition Start Date: 12/27/2006 8:06:14PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 27.08% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,386.00	117.04
Pu-239	243	5.16	212	258	15,823.00	113.02
Am-241	289	5.49	261	313	14,826.00	105.90

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

Analyst: 60040
Detector: AV52

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:46:57AM 12/29/2006

Calibration

Name: DEC2006_AV52
Description:

Calibration Date: 12/29/2006 10:46:54AM

Source Info

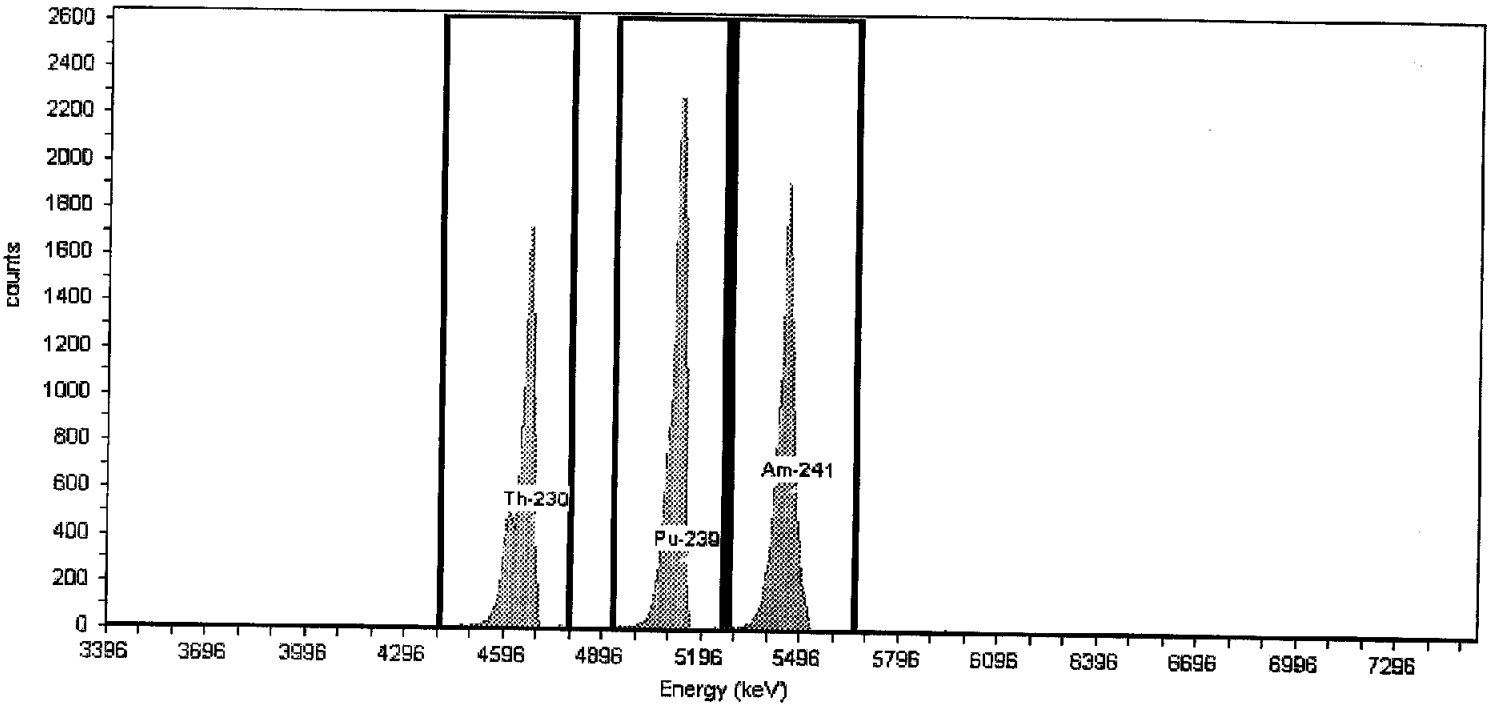
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV52 , SN:
Acquisition Start Date: 12/29/2006 8:24:57AM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 26.37% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,216.00	87.26
Pu-239	243	5.16	212	258	14,707.00	105.05
Am-241	289	5.49	261	313	14,080.00	100.57

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:57:31AM 12/29/2006

Analyst: 60040
Detector: AV53

Calibration

Name: DEC2006_AV53
Description:

Calibration Date: 12/29/2006 6:57:21AM

Source Info

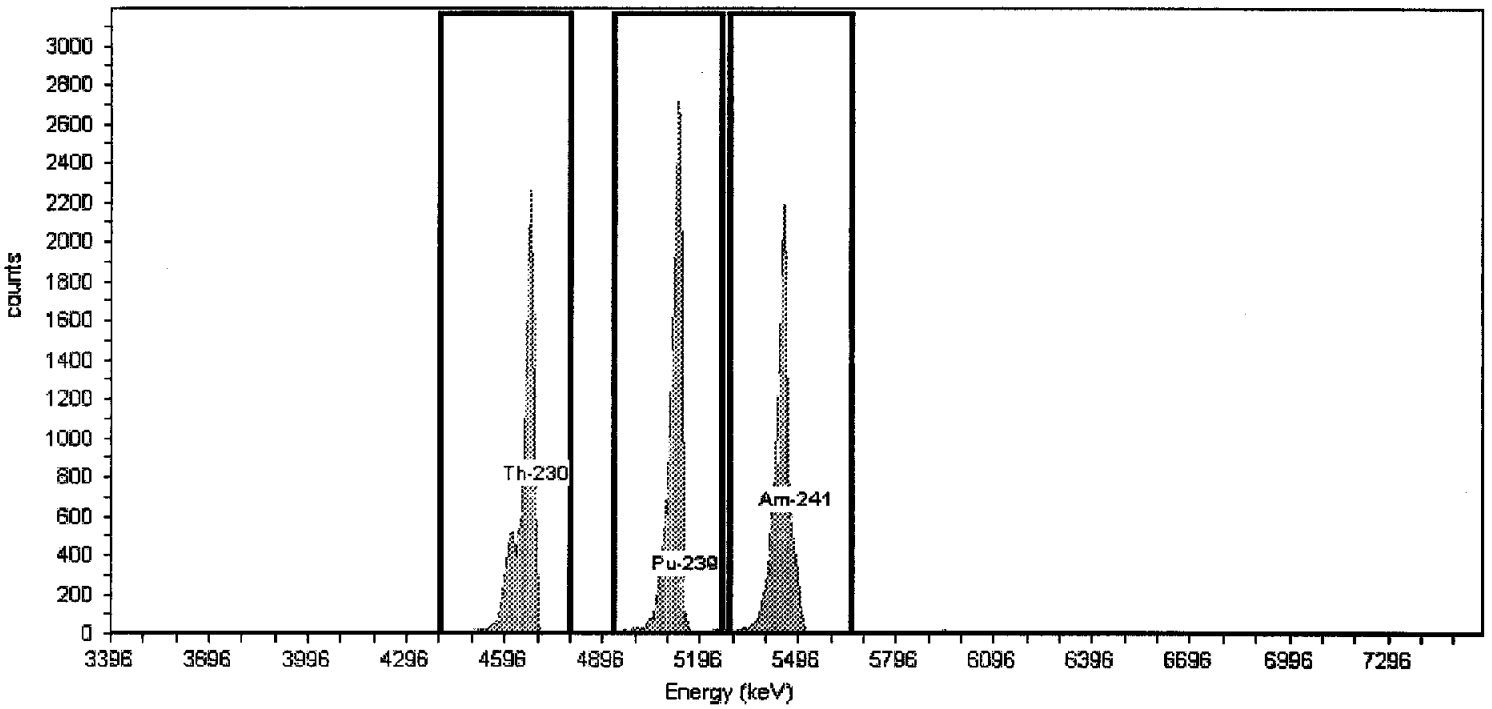
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV53 , SN:
Acquisition Start Date: 12/28/2006 10:15:42PM
Live Time: 140.00 min.
Real Time: 140.01 min.
Efficiency: 27.78% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,741.00	91.01
Pu-239	243	5.16	212	258	14,769.00	105.49
Am-241	289	5.49	261	313	13,529.00	96.64

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:47:01AM 12/29/2006

Analyst: 60040
Detector: AV54

Calibration

Name: DEC2006_AV54
Description:

Calibration Date: 12/29/2006 10:46:58AM

Source Info

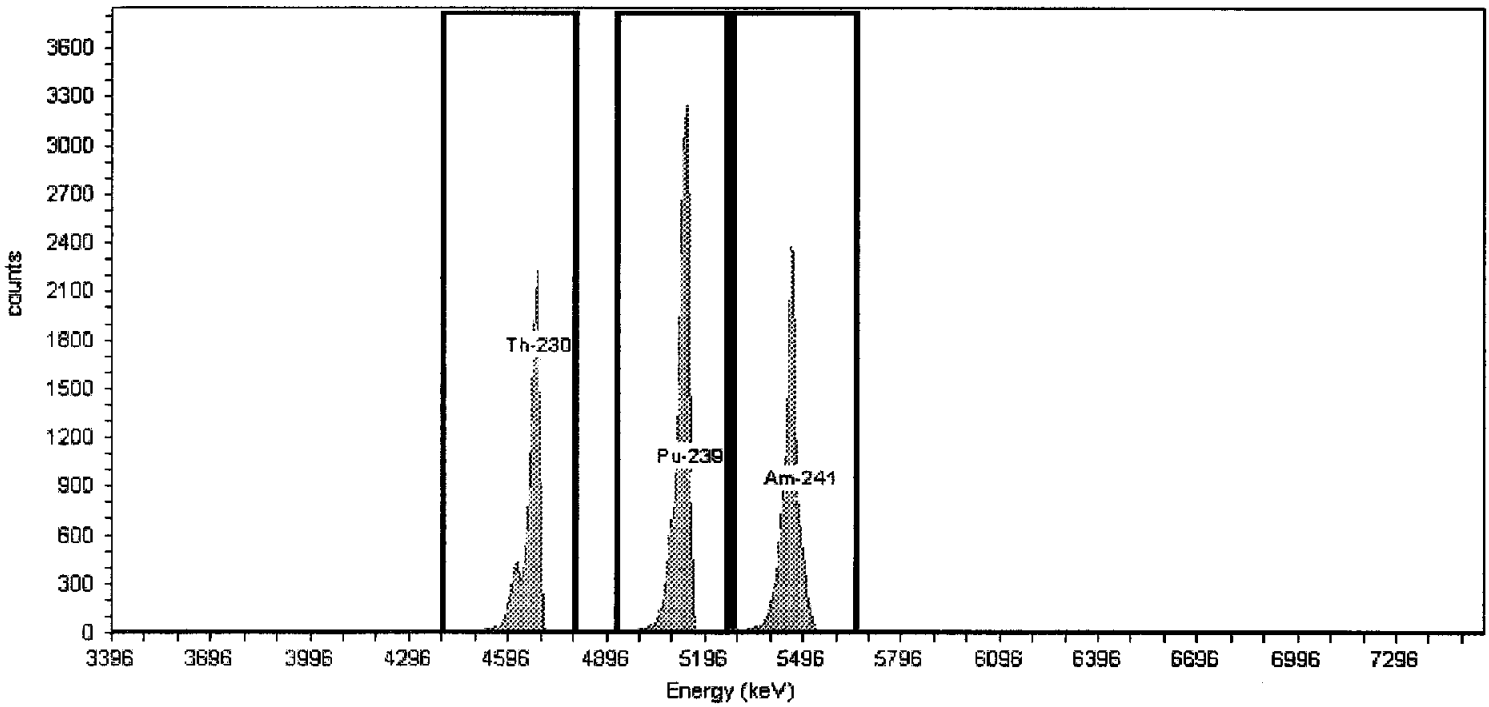
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV54 , SN:
Acquisition Start Date: 12/29/2006 8:25:10AM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 26.91% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,709.00	83.64
Pu-239	243	5.16	212	258	17,481.00	124.86
Am-241	289	5.49	261	313	15,044.00	107.46

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
7:27:22AM 12/28/2006

Analyst: 60040
Detector: AV56

Calibration

Name: DEC2006_AV56
Description:

Calibration Date: 12/28/2006 7:27:19AM

Source Info

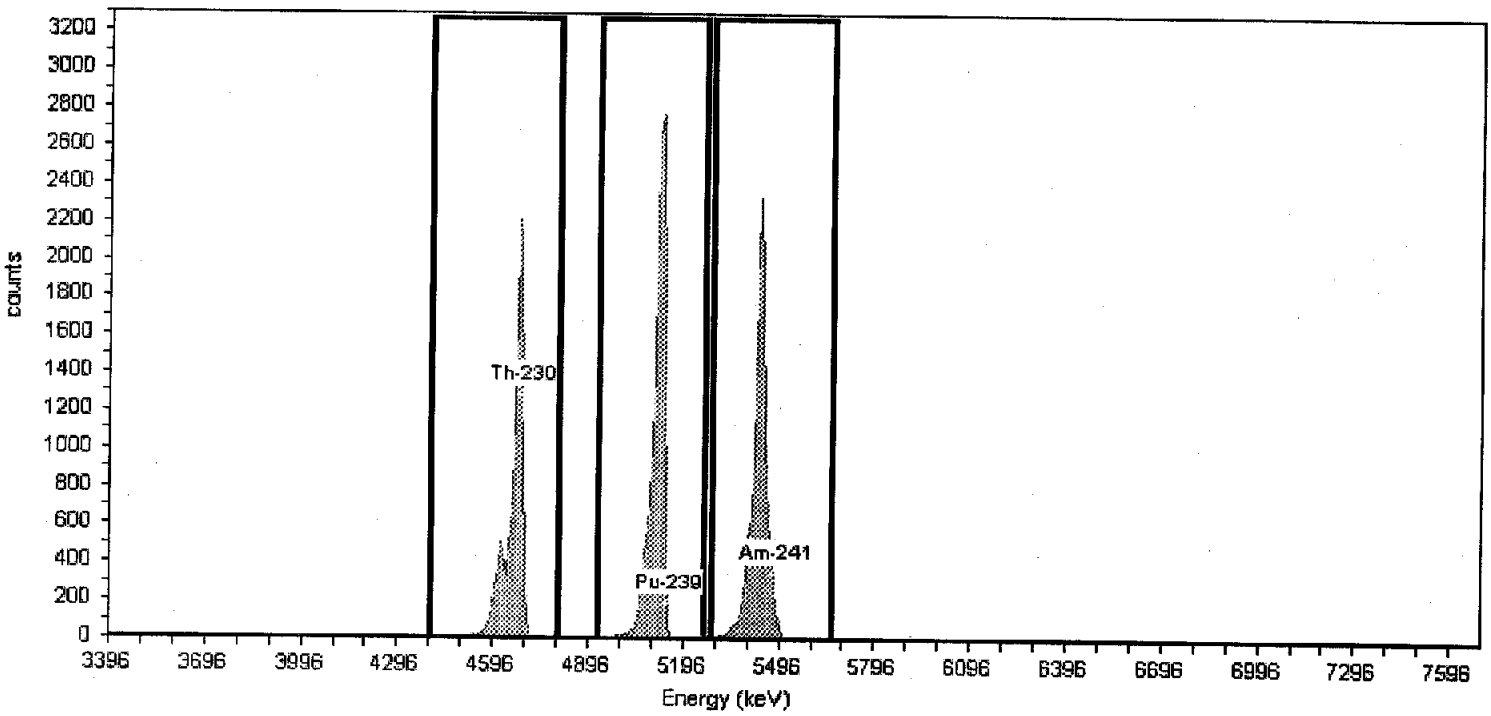
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV56 , SN:
Acquisition Start Date: 12/27/2006 8:05:58PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 26.20% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,262.00	87.59
Pu-239	243	5.16	212	258	14,482.00	103.44
Am-241	289	5.49	261	313	13,897.00	99.26

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV57

3:40:11PM 12/28/2006

Calibration

Name: Dec2006_AV57
Description:

Calibration Date: 12/28/2006 3:40:06PM

Source Info

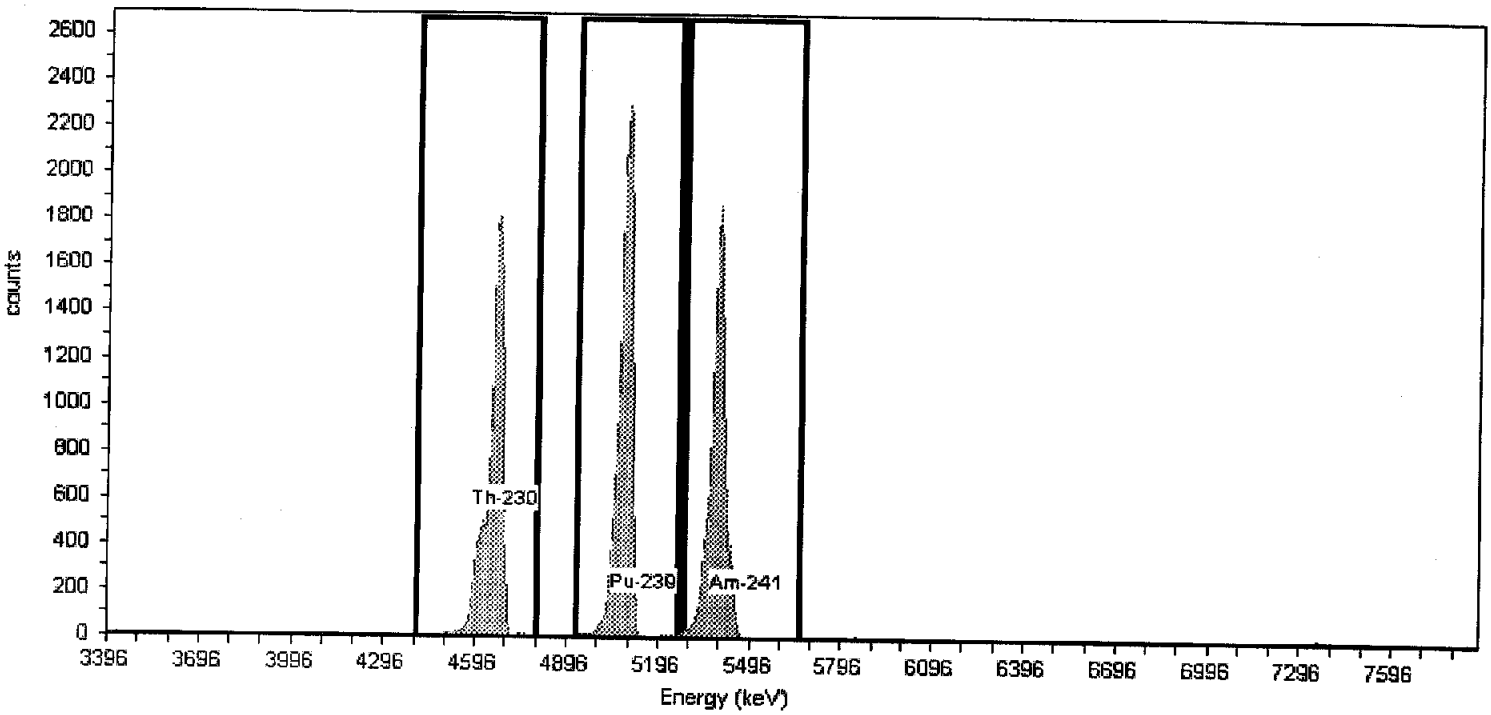
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV57 , SN:
Acquisition Start Date: 12/28/2006 1:19:51PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 27.41% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,525.00	89.46
Pu-239	243	5.16	212	258	14,693.00	104.95
Am-241	289	5.49	261	313	13,289.00	94.92

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:40:52PM 12/28/2006

Analyst: 60040
Detector: AV58

Calibration

Name: Dec2006_AV58
Description:

Calibration Date: 12/28/2006 3:40:46PM

Source Info

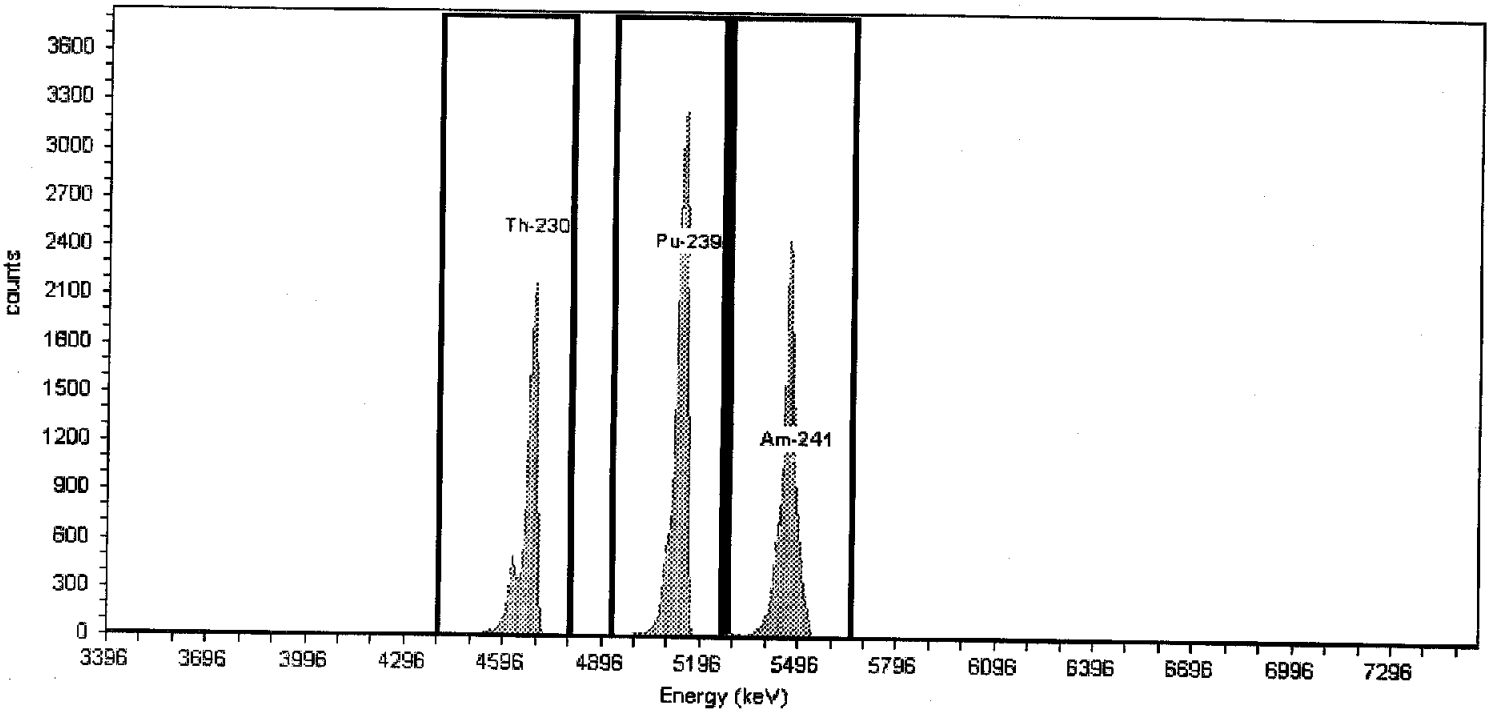
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV58 , SN:
Acquisition Start Date: 12/28/2006 1:20:19PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 27.57% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,923.00	85.16
Pu-239	243	5.16	212	258	17,788.00	127.06
Am-241	289	5.49	261	313	15,614.00	111.53

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
3:53:32PM 12/28/2006

Analyst: 60040
Detector: AV59

Calibration

Name: Dec2006_AV59a
Description:

Calibration Date: 12/28/2006 3:53:29PM

Source Info

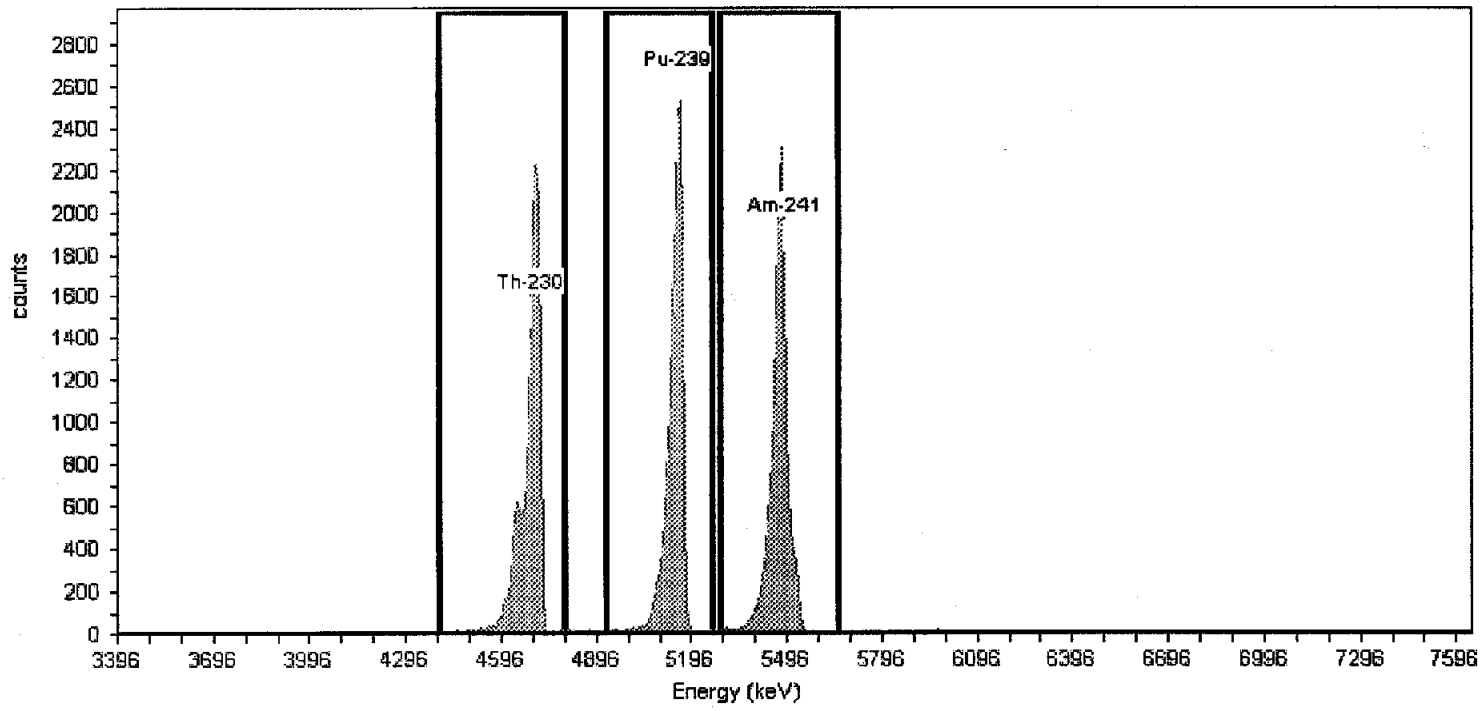
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV59 , SN:
Acquisition Start Date: 12/28/2006 1:18:51PM
Live Time: 140.00 min.
Real Time: 152.52 min.
Efficiency: 26.83% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	14,935.00	106.68
Pu-239	243	5.16	212	258	15,835.00	113.11
Am-241	289	5.49	261	313	15,432.00	110.23

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV60

3:52:40PM 12/28/2006

Calibration

Name: Dec2006_AV60
Description:

Calibration Date: 12/28/2006 3:52:37PM

Source Info

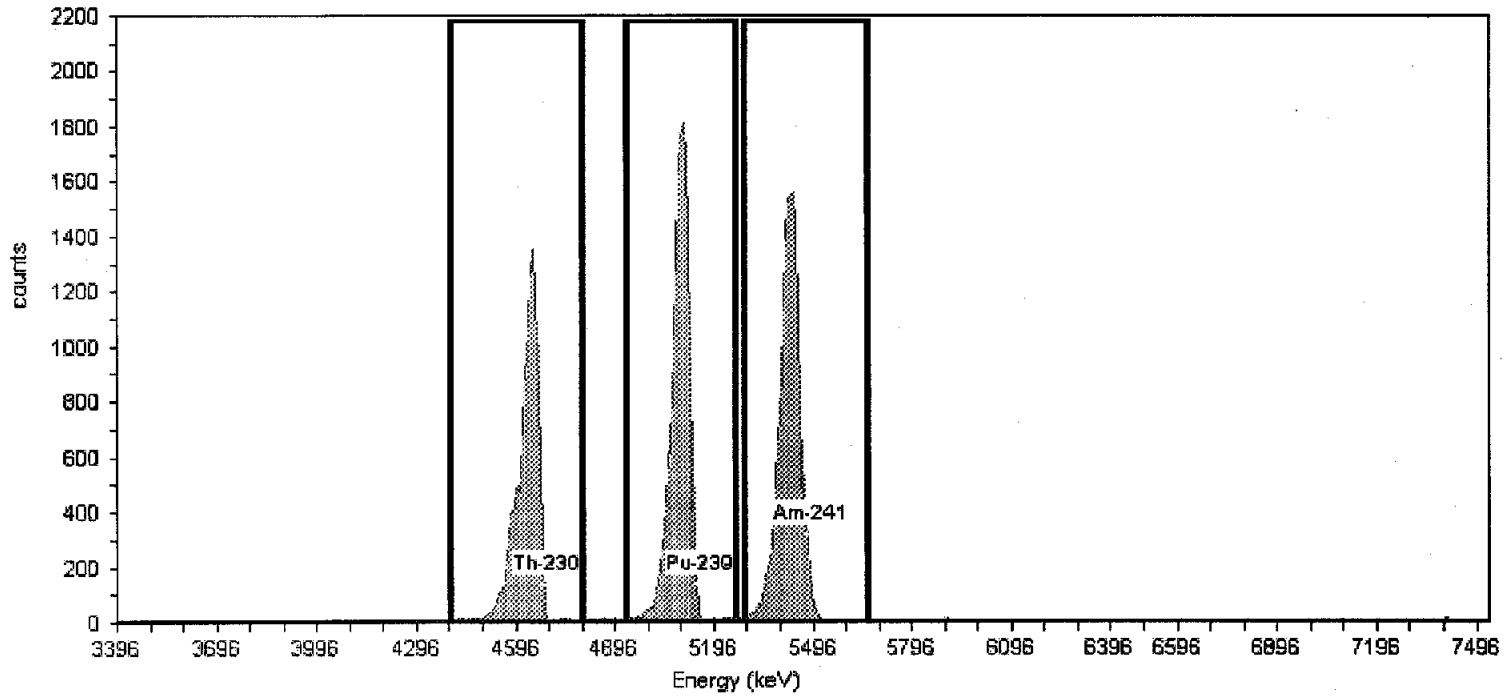
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV60 , SN:
Acquisition Start Date: 12/28/2006 1:19:16PM
Live Time: 140.00 min.
Real Time: 152.53 min.
Efficiency: 26.94% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,835.00	84.54
Pu-239	243	5.16	212	258	15,274.00	109.10
Am-241	289	5.49	261	313	15,478.00	110.56

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:39:26PM 12/28/2006

Analyst: 60040
Detector: AV63

Calibration

Name: Dec2006_AV63
Description:

Calibration Date: 12/28/2006 12:39:23PM

Source Info

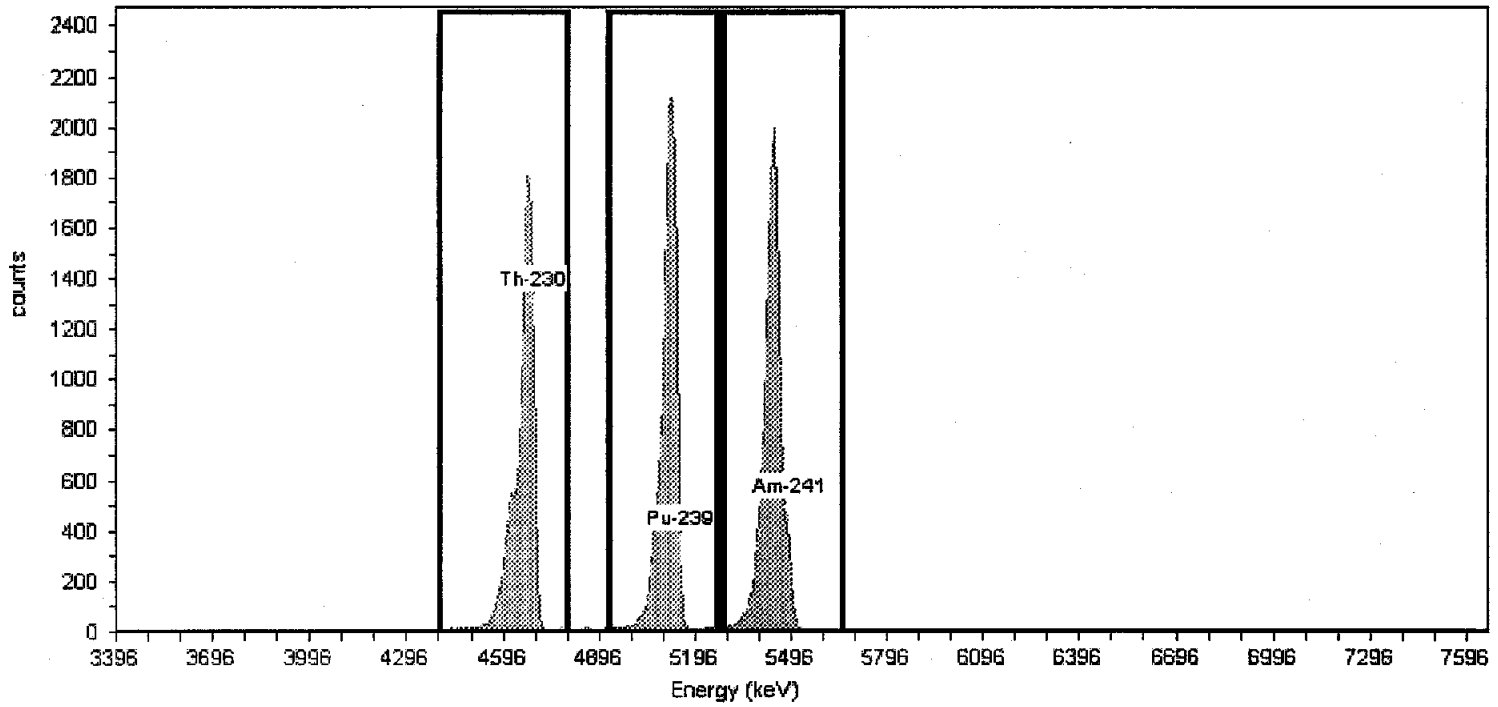
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV63 , SN:
Acquisition Start Date: 12/28/2006 9:40:37AM
Live Time: 140.00 min.
Real Time: 173.66 min.
Efficiency: 25.98% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	13,766.00	98.33
Pu-239	243	5.16	212	258	15,326.00	109.47
Am-241	289	5.49	261	313	15,549.00	111.06

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:39:46PM 12/28/2006

Analyst: 60040
Detector: AV64

Calibration

Name: Dec2006_AV64
Description:

Calibration Date: 12/28/2006 12:39:39PM

Source Info

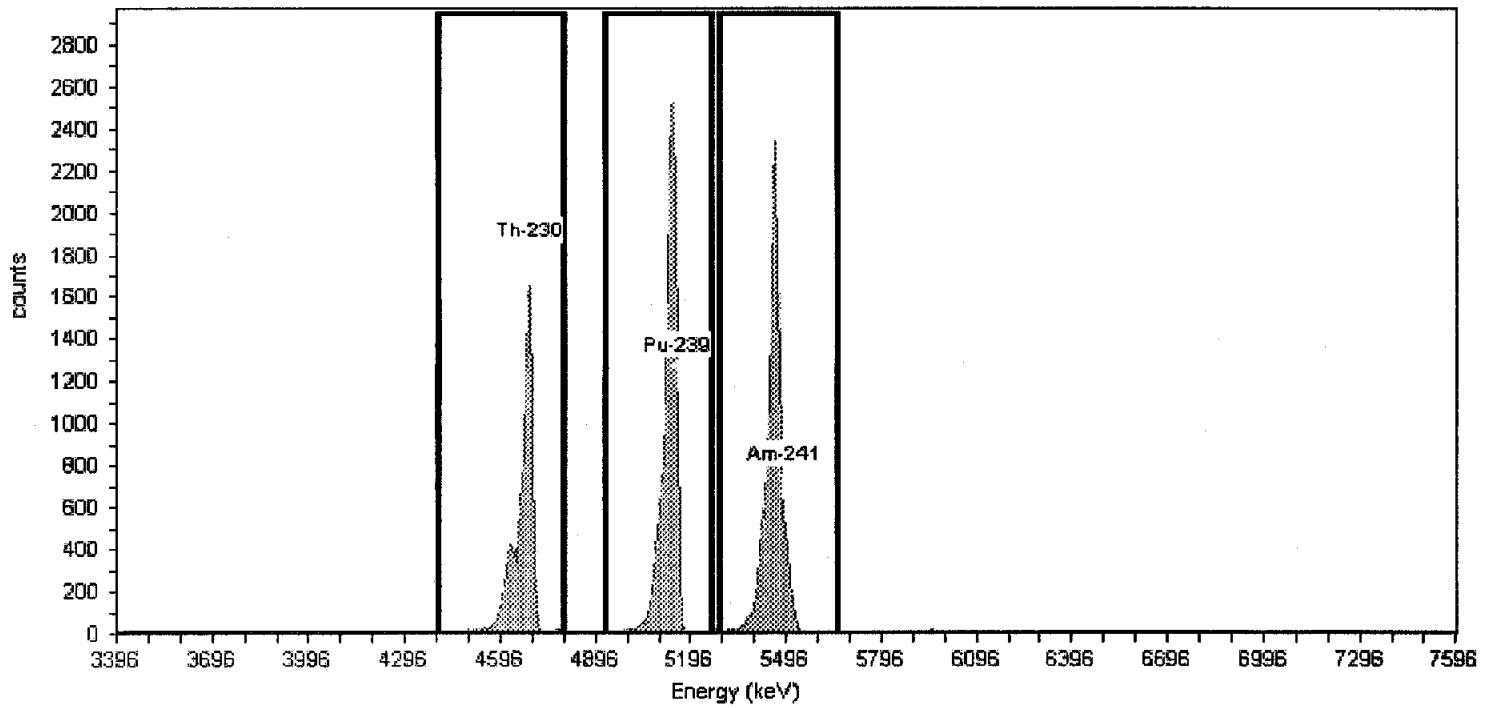
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV64 , SN:
Acquisition Start Date: 12/28/2006 9:40:50AM
Live Time: 140.00 min.
Real Time: 173.66 min.
Efficiency: 24.59% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	10,363.00	74.02
Pu-239	243	5.16	212	258	14,387.00	102.76
Am-241	289	5.49	261	313	14,740.00	105.29

SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:14:56PM 12/28/2006

Analyst: 60040
Detector: AV65

Calibration

Name: Dec2006_AV65
Description:

Calibration Date: 12/28/2006 1:14:52PM

Source Info

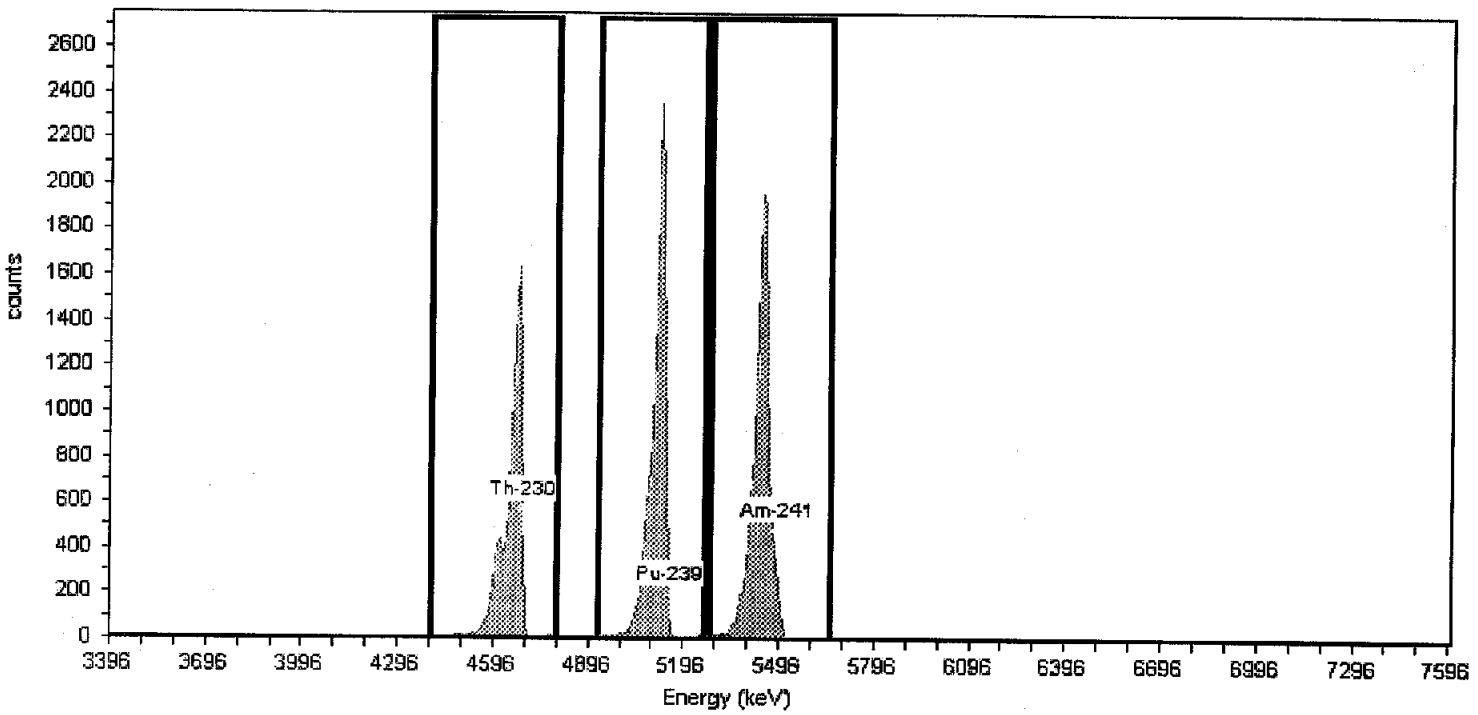
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV65 , SN:
Acquisition Start Date: 12/28/2006 9:40:52AM
Live Time: 140.00 min.
Real Time: 173.73 min.
Efficiency: 25.80% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	10,430.00	74.50
Pu-239	243	5.16	212	258	14,125.00	100.89
Am-241	289	5.49	261	313	13,948.00	99.63

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

Analyst: 60040
Detector: AV66

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:15:24PM 12/28/2006

Calibration

Name: Dec2006_AV66
Description:

Calibration Date: 12/28/2006 1:15:19PM

Source Info

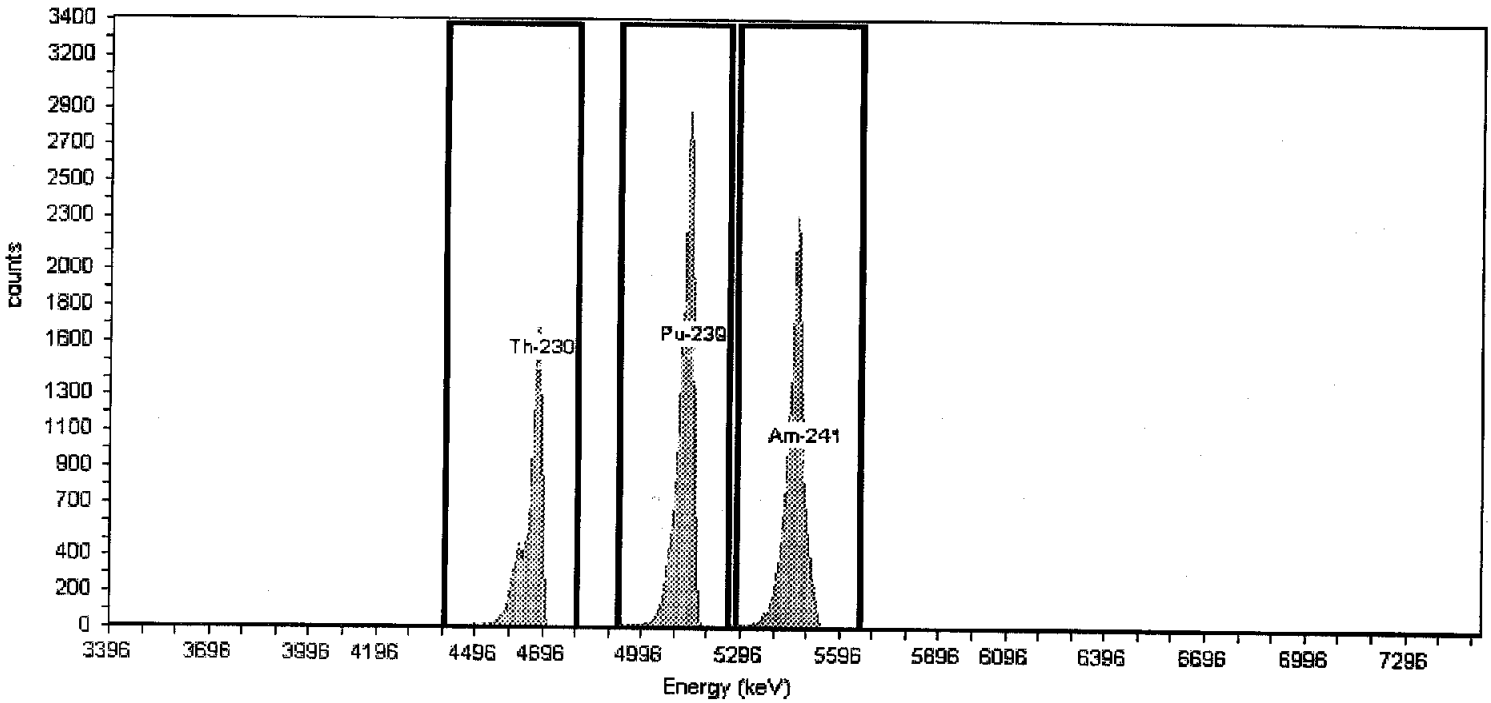
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV66 , SN:
Acquisition Start Date: 12/28/2006 9:41:07AM
Live Time: 140.00 min.
Real Time: 173.65 min.
Efficiency: 27.17% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	10,407.00	74.34
Pu-239	243	5.16	212	258	18,043.00	128.88
Am-241	289	5.49	261	313	16,457.00	117.55

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:33:32PM 12/28/2006

Analyst: 60040
Detector: AV67

Calibration

Name: Dec2006_AV67
Description:

Calibration Date: 12/28/2006 6:33:28PM

Source Info

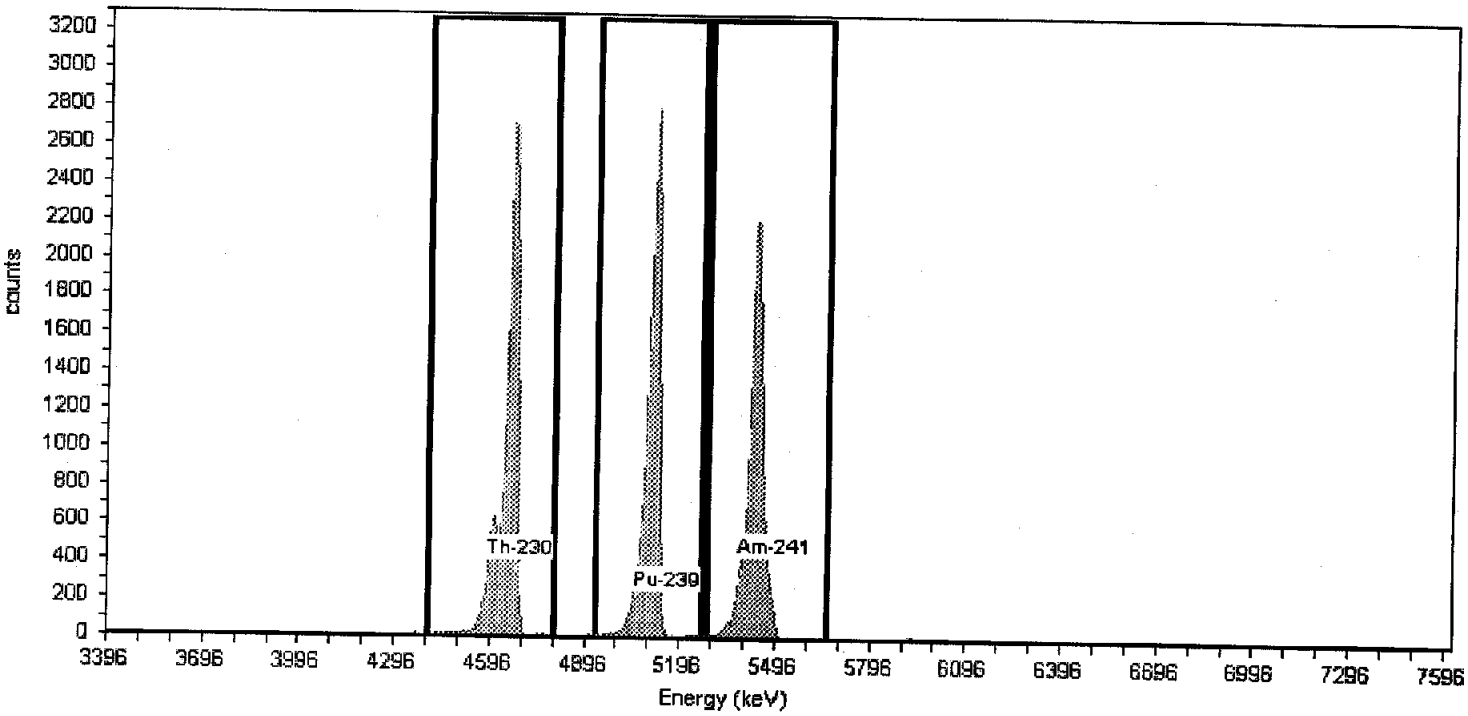
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV67 , SN:
Acquisition Start Date: 12/28/2006 3:55:13PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 27.81% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	17,116.00	122.26
Pu-239	243	5.16	212	258	16,233.00	115.95
Am-241	289	5.49	261	313	15,084.00	107.74

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV68

6:33:36PM 12/28/2006

Calibration

Name: Dec2006_AV68
Description:

Calibration Date: 12/28/2006 6:33:33PM

Source Info

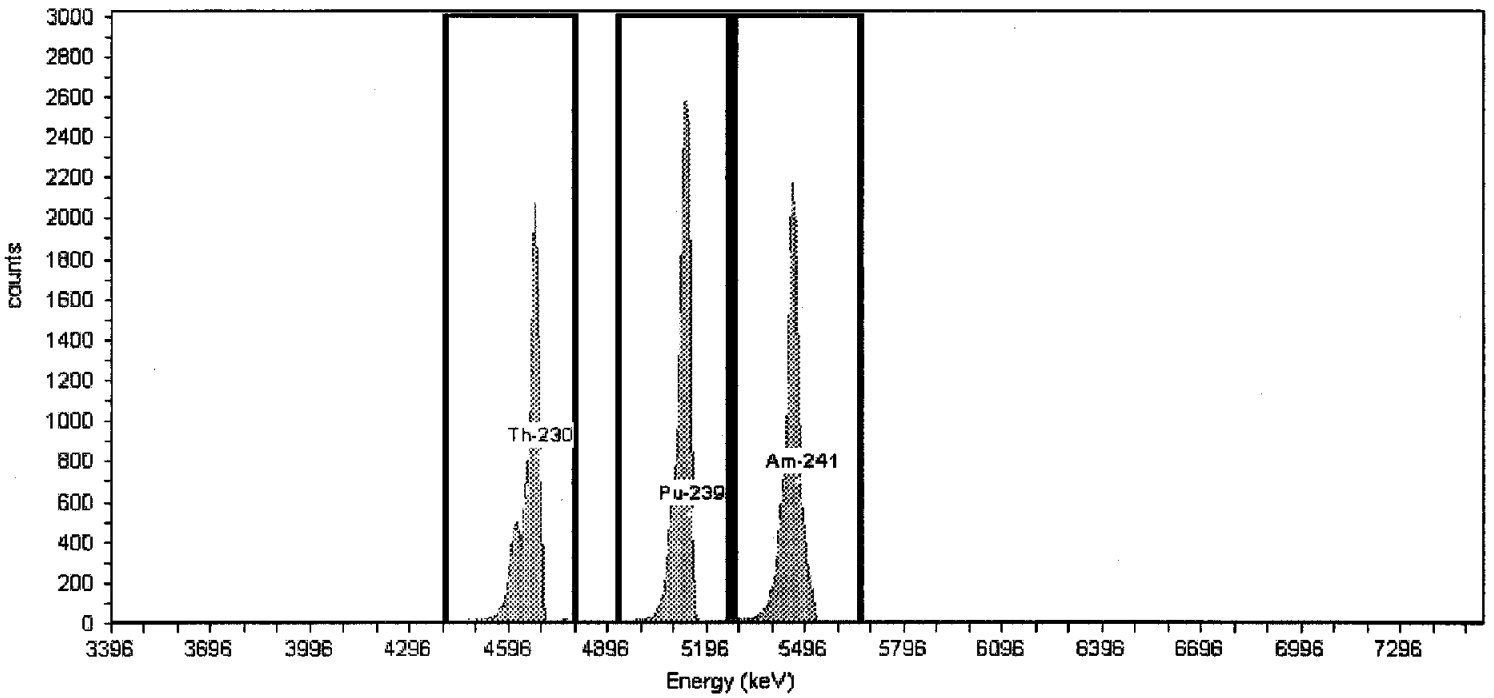
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV68 , SN:
Acquisition Start Date: 12/28/2006 3:55:32PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 26.59% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,359.00	88.28
Pu-239	243	5.16	212	258	14,661.00	104.72
Am-241	289	5.49	261	313	14,302.00	102.16

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:33:41PM 12/28/2006

Analyst: 60040
Detector: AV69

Calibration

Name: Dec2006_AV69
Description:

Calibration Date: 12/28/2006 6:33:38PM

Source Info

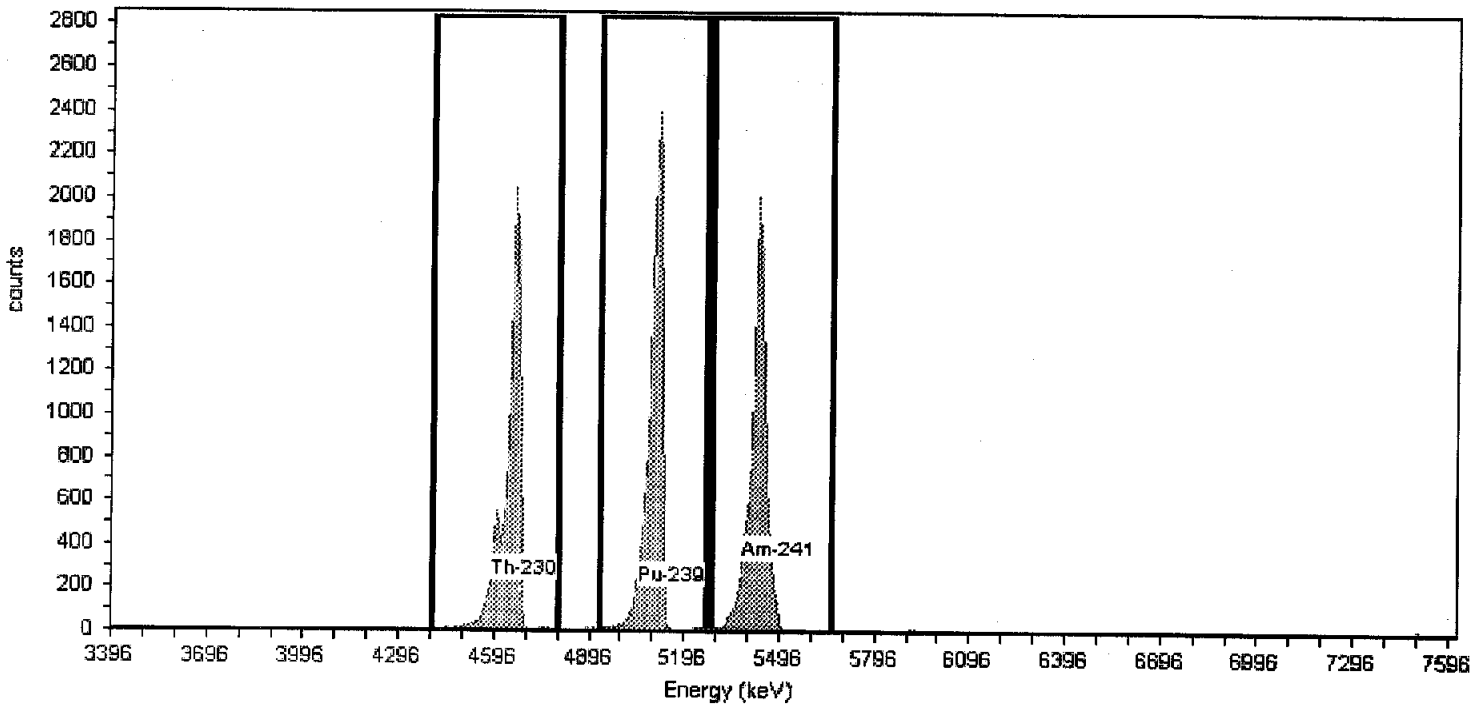
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV69 , SN:
Acquisition Start Date: 12/28/2006 3:55:55PM
Live Time: 140.00 min.
Real Time: 140.05 min.
Efficiency: 27.98% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,945.00	92.46
Pu-239	243	5.16	212	258	14,734.00	105.24
Am-241	289	5.49	261	313	13,653.00	97.52

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV70
6:33:46PM 12/28/2006

Calibration

Name: Dec2006_AV70
Description:

Calibration Date: 12/28/2006 6:33:43PM

Source Info

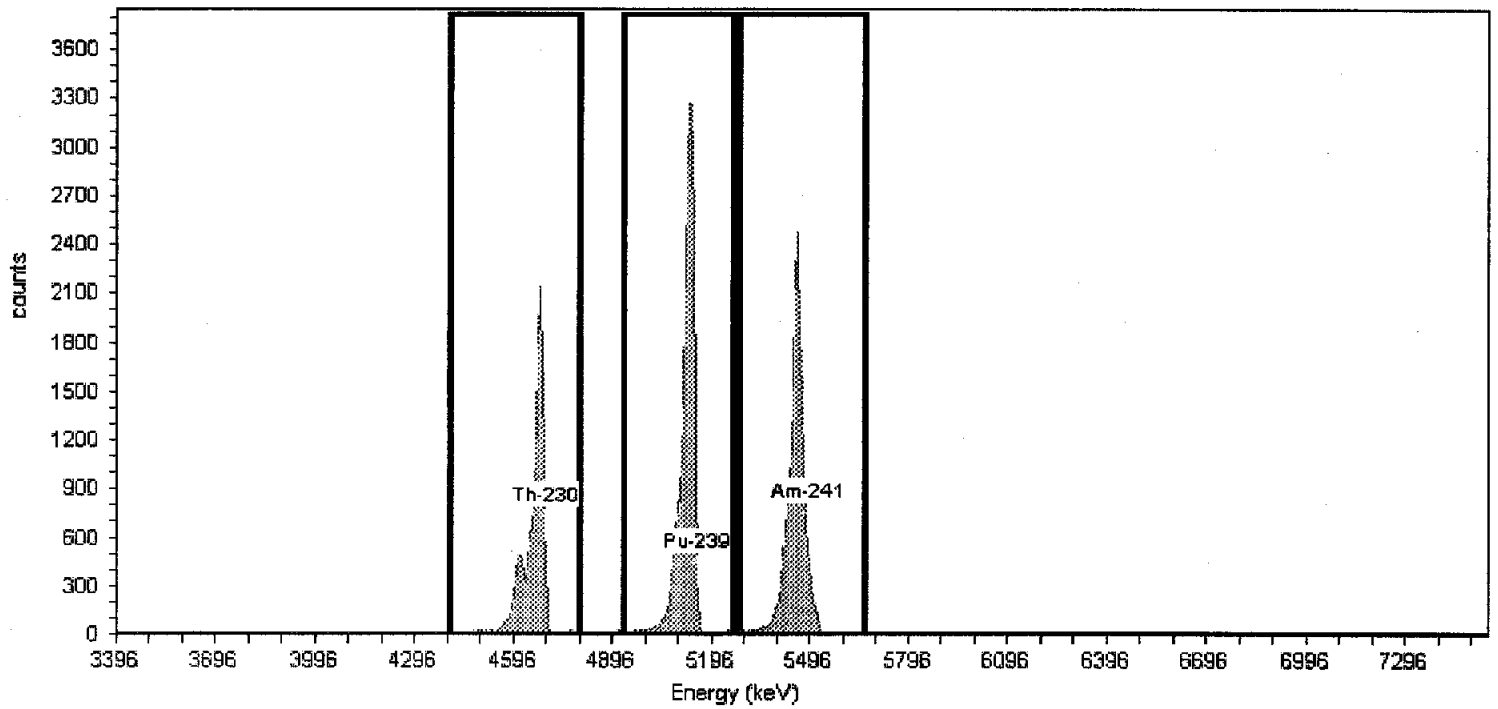
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV70 , SN:
Acquisition Start Date: 12/28/2006 3:56:30PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 27.24% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,808.00	84.34
Pu-239	243	5.16	212	258	17,595.00	125.68
Am-241	289	5.49	261	313	15,374.00	109.81

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

Analyst: 60040
Detector: AV71

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
10:47:05AM 12/29/2006

Calibration

Name: DEC2006_AV71
Description:

Calibration Date: 12/29/2006 10:47:02AM

Source Info

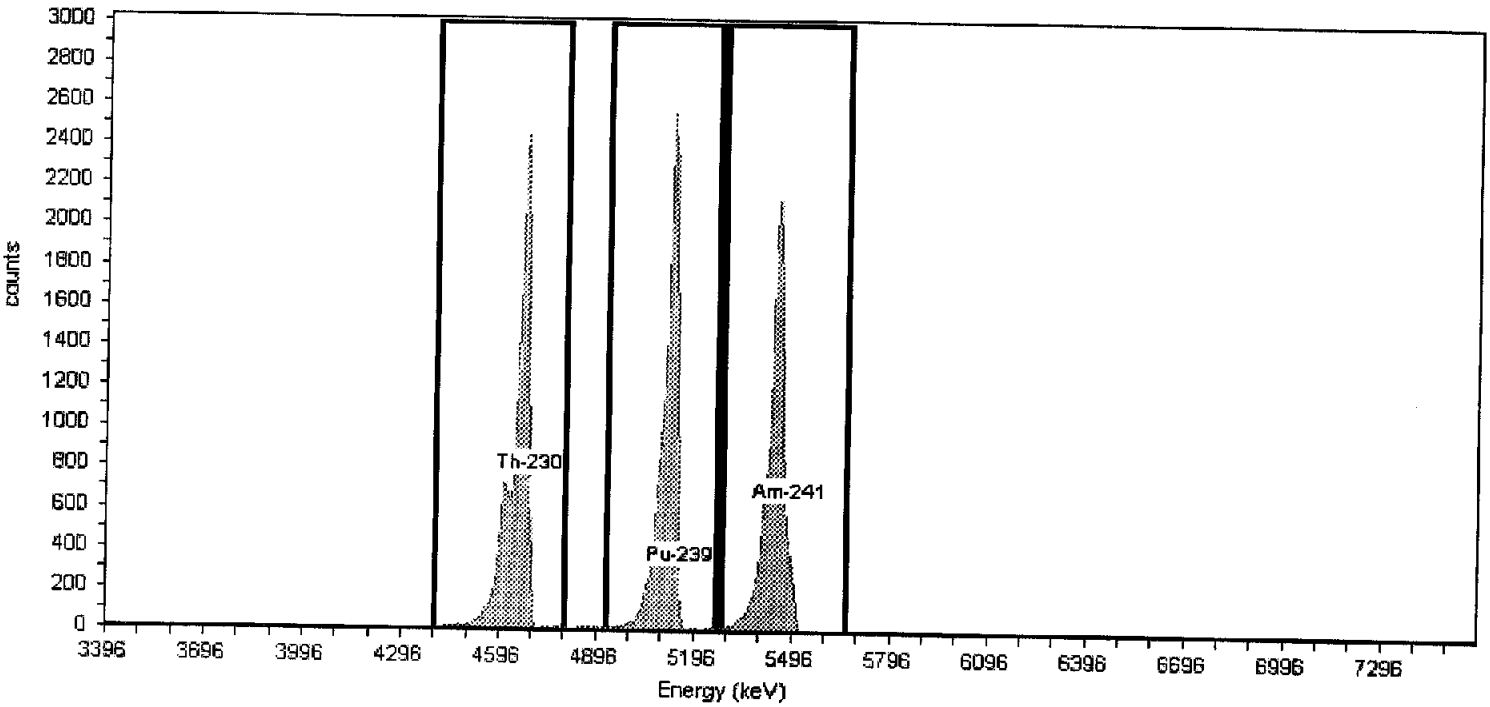
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV71 , SN:
Acquisition Start Date: 12/29/2006 8:25:27AM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.88% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,819.00	120.14
Pu-239	243	5.16	212	258	16,320.00	116.57
Am-241	289	5.49	261	313	15,265.00	109.04

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV72

7:37:04PM 12/29/2006

Calibration

Name: Dec2006_AV72
Description:

Calibration Date: 12/29/2006 7:36:53PM

Source Info

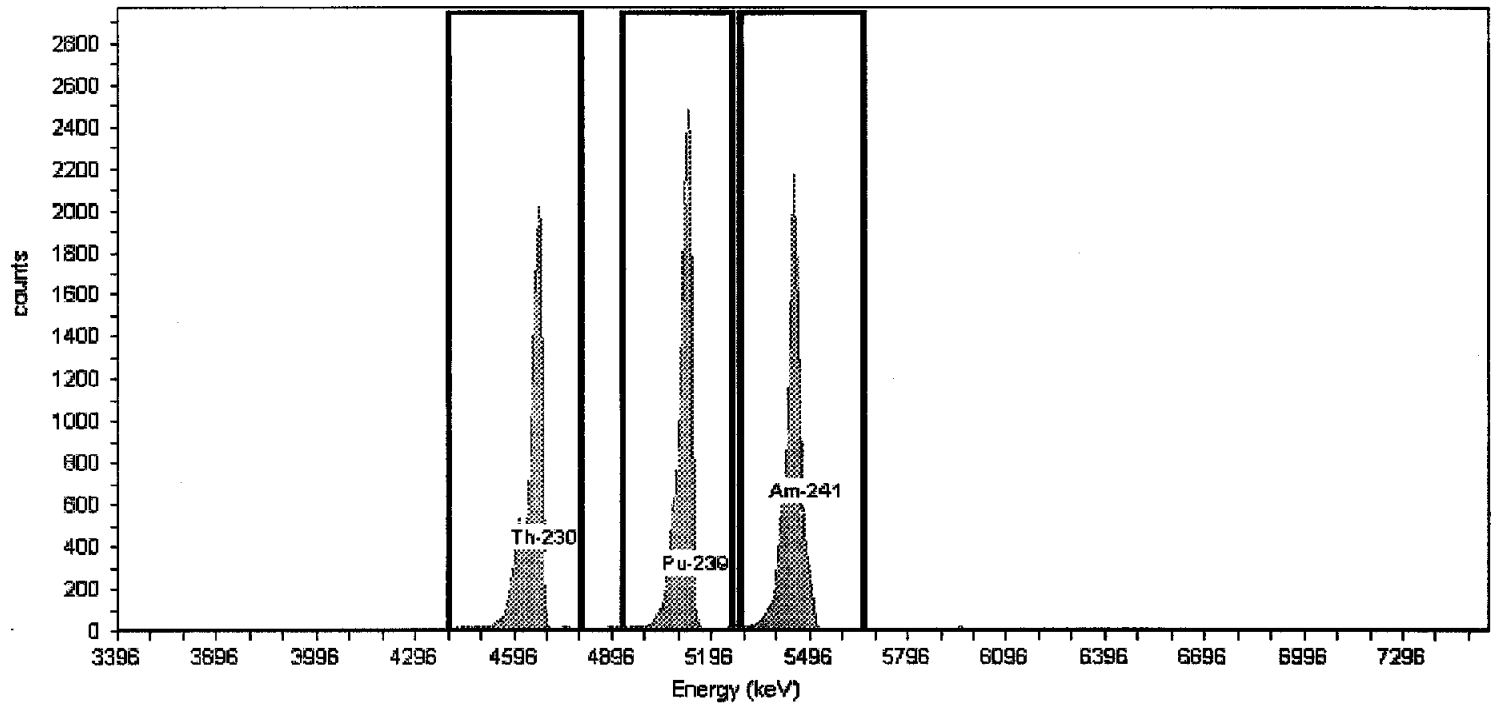
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV72 , SN:
Acquisition Start Date: 12/29/2006 4:32:07PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 27.17% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,819.00	91.56
Pu-239	243	5.16	212	258	14,863.00	106.16
Am-241	289	5.49	261	313	14,410.00	102.93

ST

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:43:40PM 12/29/2006

Analyst: 60040
Detector: AV73

Calibration

Name: DEC2006_AV73
Description:

Calibration Date: 12/29/2006 9:43:36PM

Source Info

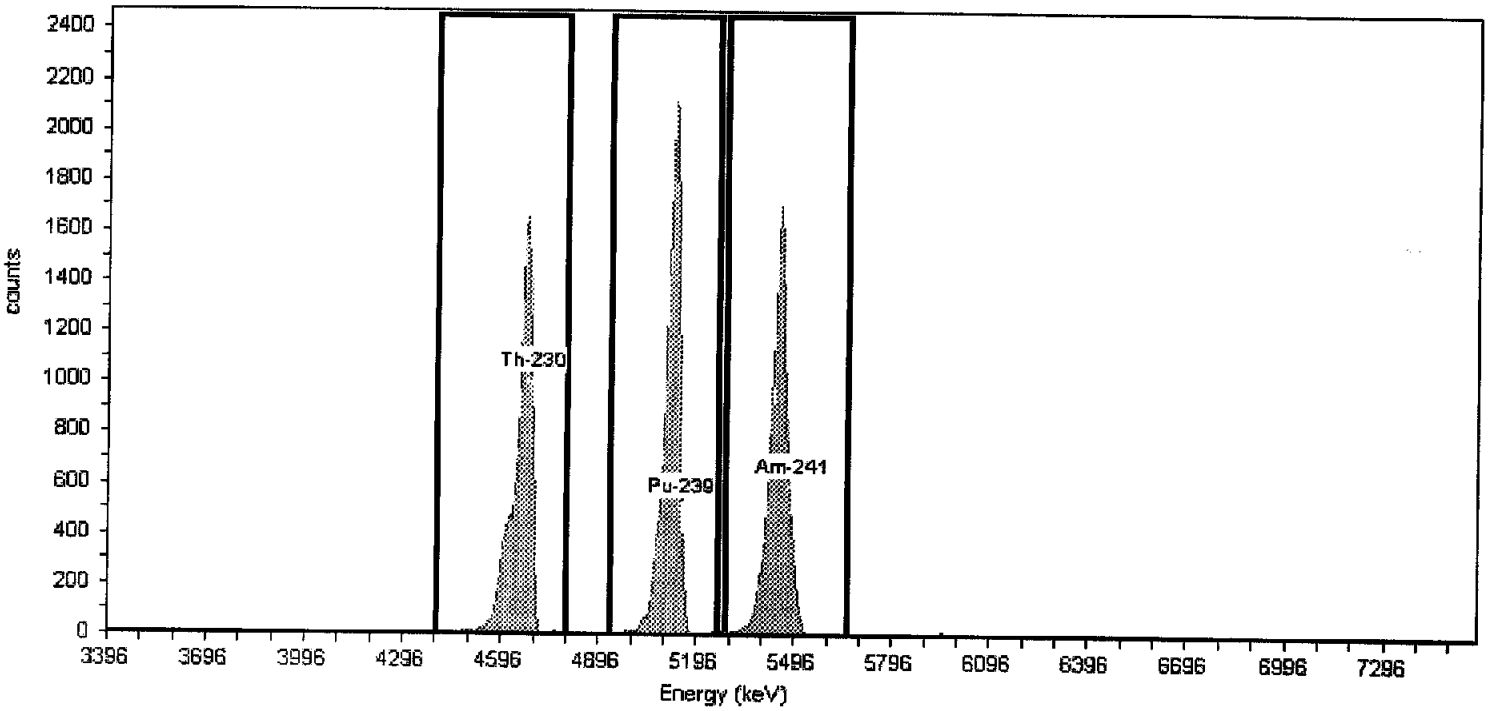
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV73 , SN:
Acquisition Start Date: 12/29/2006 6:42:43PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 27.40% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,646.00	90.33
Pu-239	243	5.16	212	258	14,372.00	102.66
Am-241	289	5.49	261	313	13,441.00	96.01

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:16:11PM 12/29/2006

Analyst: 60040
Detector: AV75

Calibration

Name: DEC2006_AV75
Description:

Calibration Date: 12/29/2006 1:16:08PM

Source Info

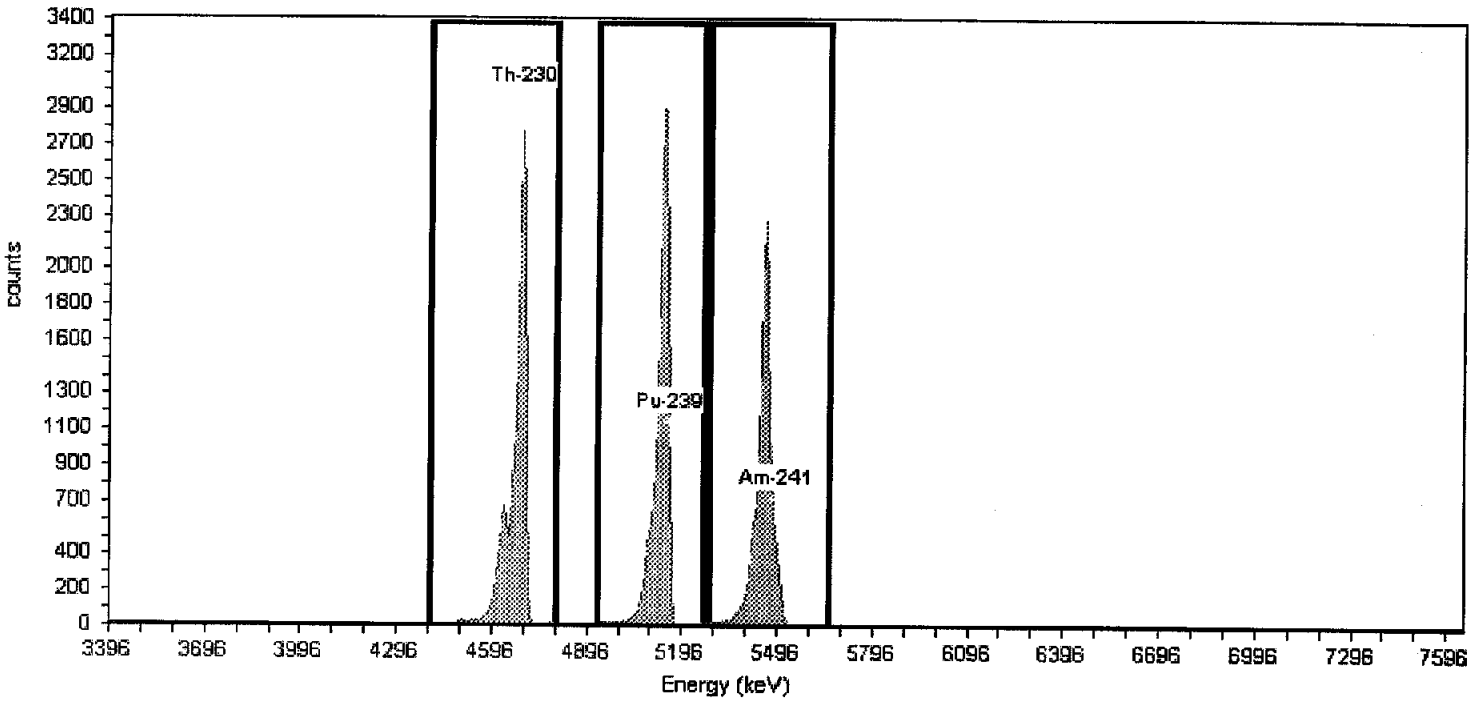
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV75 , SN: 46-033P6
Acquisition Start Date: 12/29/2006 10:54:33AM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 26.63% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,283.00	116.31
Pu-239	243	5.16	212	258	15,498.00	110.70
Am-241	289	5.49	261	313	14,536.00	103.83

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:15:10PM 12/30/2006

Analyst: 60040
Detector: AV76

Calibration

Name: Dec2006_AV76
Description:

Calibration Date: 12/30/2006 12:15:05PM

Source Info

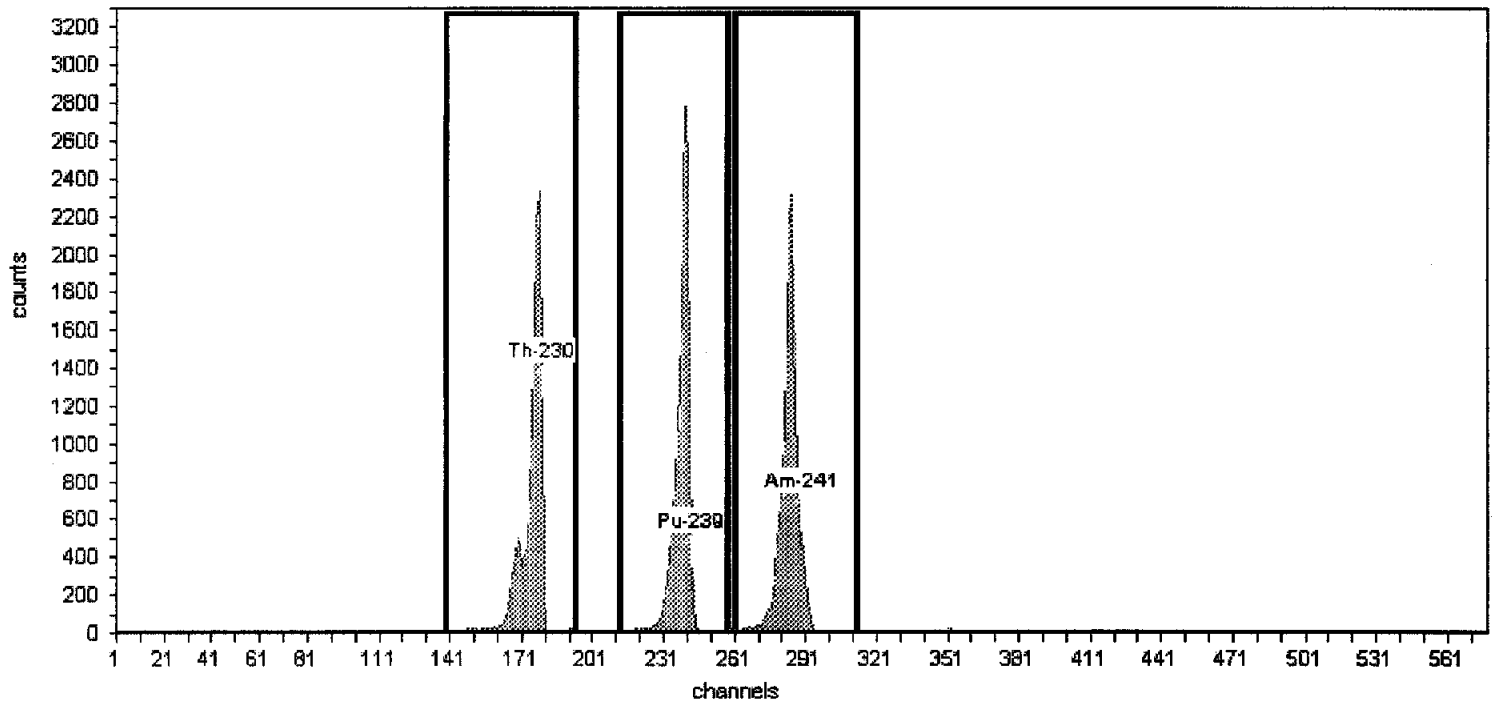
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV76 , SN: 46-033Q4
Acquisition Start Date: 12/30/2006 9:49:41AM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.74% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,629.00	90.21
Pu-239	243	5.16	212	258	14,559.00	103.99
Am-241	289	5.49	261	313	14,221.00	101.58

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:15:17PM 12/30/2006

Analyst: 60040
Detector: AV77

Calibration

Name: Dec2006_AV77
Description:

Calibration Date: 12/30/2006 12:15:14PM

Source Info

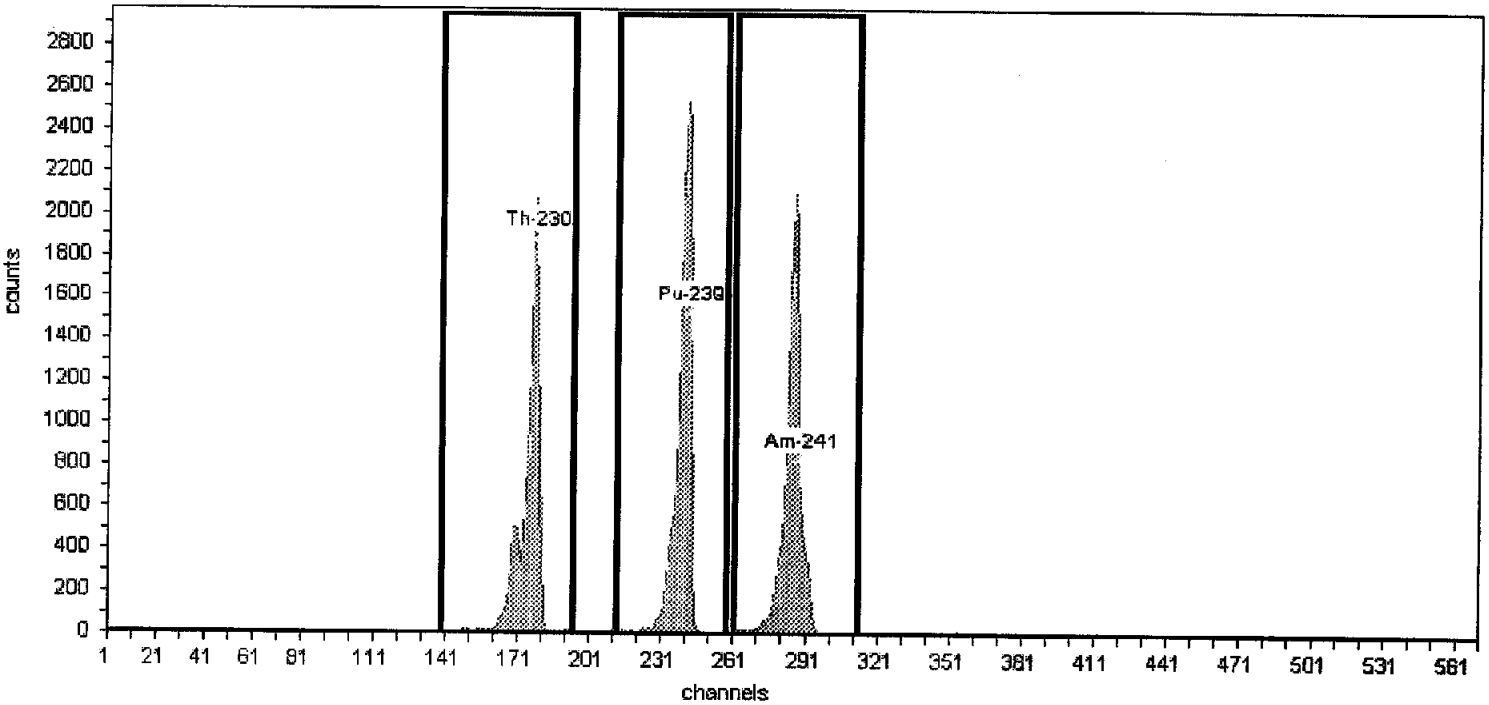
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV77 , SN: 46-033Q7
Acquisition Start Date: 12/30/2006 9:49:58AM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.83% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,319.00	87.99
Pu-239	243	5.16	212	258	14,207.00	101.48
Am-241	289	5.49	261	313	13,111.00	93.65

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:15:24PM 12/30/2006

Analyst: 60040
Detector: AV78

Calibration

Name: Dec2006_AV78
Description:

Calibration Date: 12/30/2006 12:15:21PM

Source Info

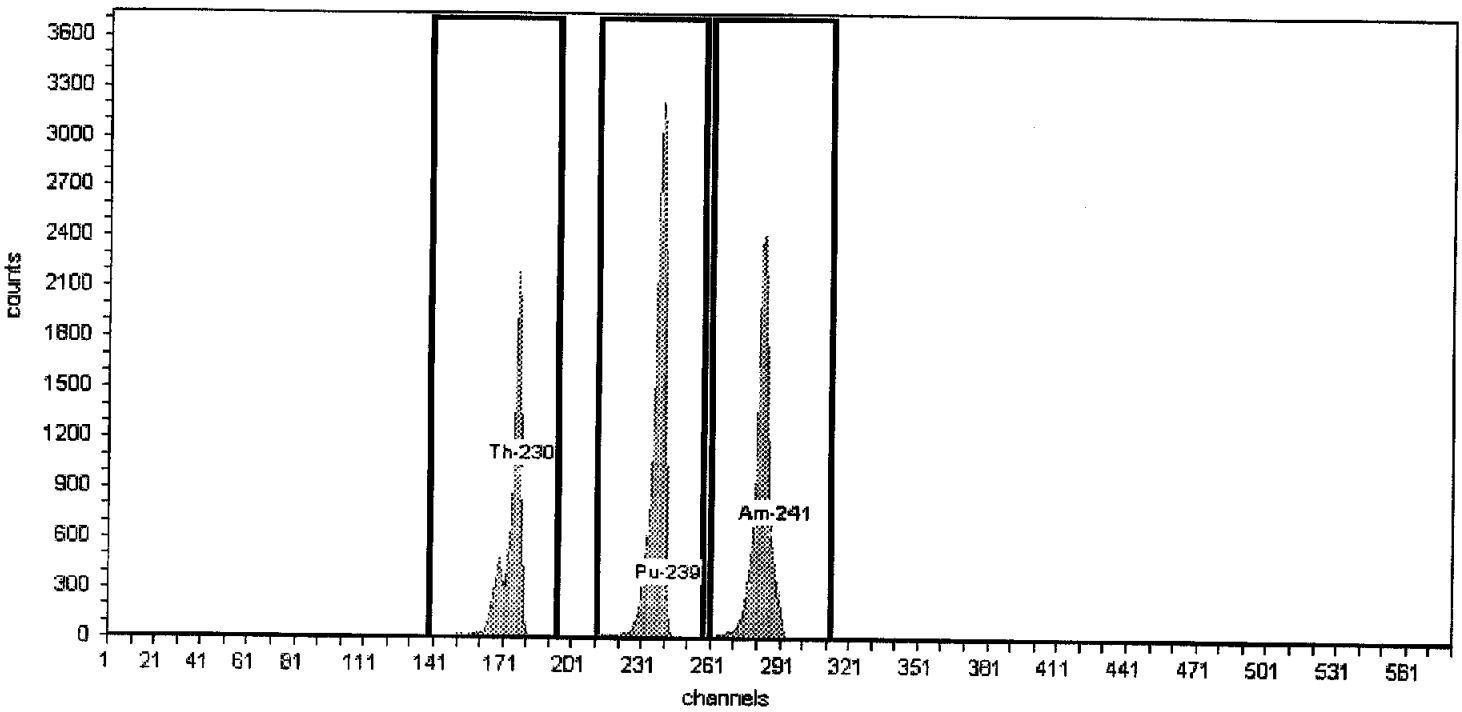
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV78 , SN: 46-033FF4
Acquisition Start Date: 12/30/2006 9:50:23AM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.48% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,476.00	81.97
Pu-239	243	5.16	212	258	17,241.00	123.15
Am-241	289	5.49	261	313	14,815.00	105.82

ST

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
12:15:31PM 12/30/2006

Analyst: 60040
Detector: AV79

Calibration

Name: Dec2006_AV79
Description:

Calibration Date: 12/30/2006 12:15:28PM

Source Info

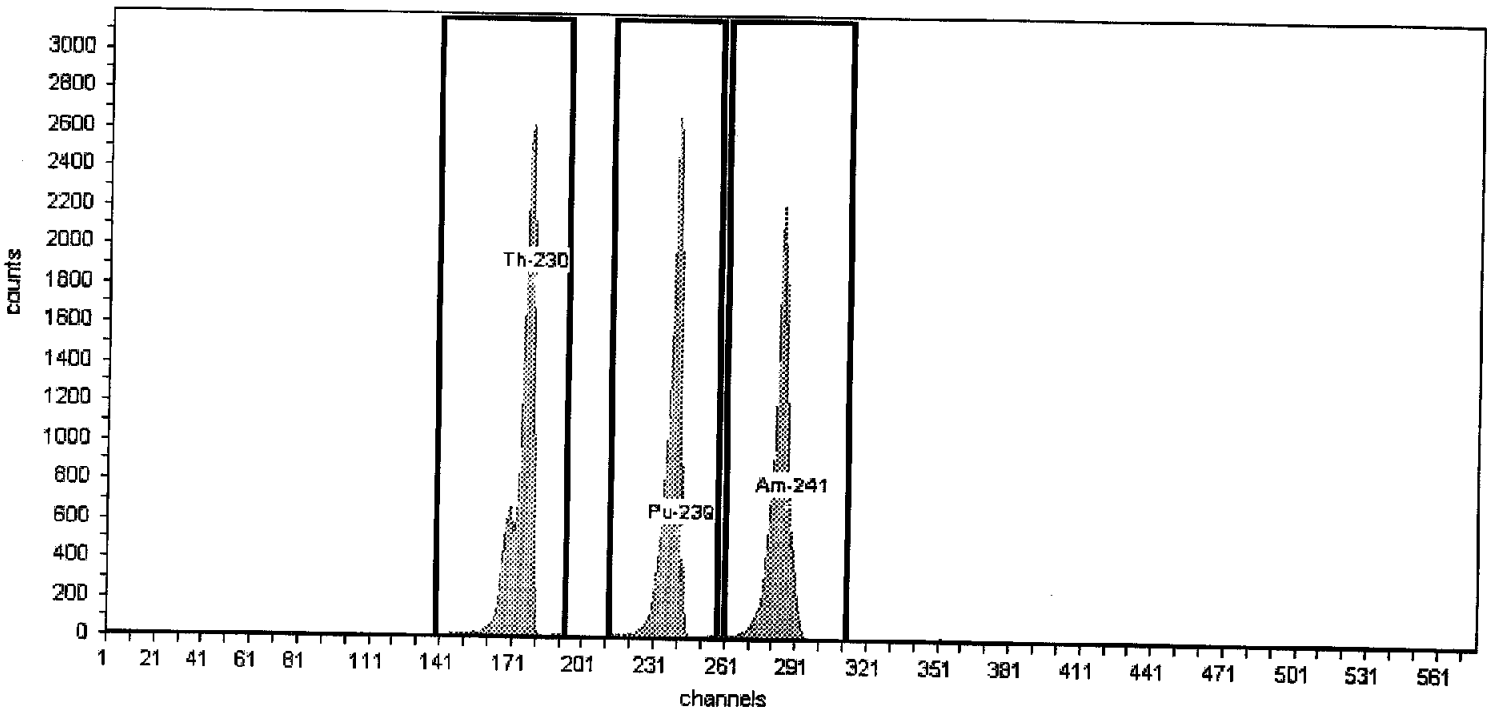
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV79 , SN: 46-033Q5
Acquisition Start Date: 12/30/2006 9:50:38AM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 27.17% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,500.00	117.86
Pu-239	243	5.16	212	258	15,944.00	113.89
Am-241	289	5.49	261	313	14,781.00	105.58

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:48:30PM 12/30/2006

Analyst: 60040
Detector: AV80

Calibration

Name: Dec2006_AV80
Description:

Calibration Date: 12/30/2006 2:48:27PM

Source Info

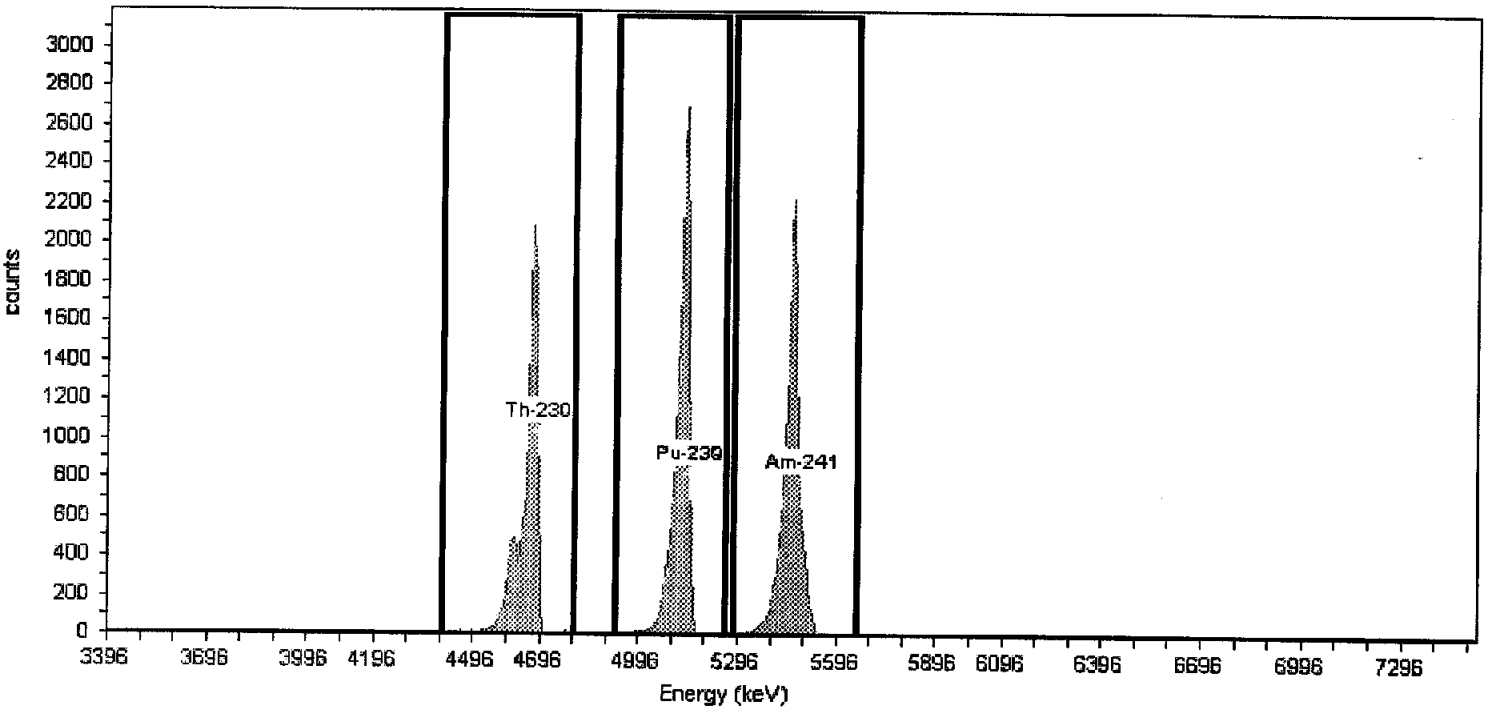
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV80 , SN: 46-03305
Acquisition Start Date: 12/30/2006 12:18:28PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 26.12% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,177.00	86.98
Pu-239	243	5.16	212	258	14,485.00	103.46
Am-241	289	5.49	261	313	13,902.00	99.30

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:48:38PM 12/30/2006

Analyst: 60040
Detector: AV81

Calibration

Name: Dec2006_AV81
Description:

Calibration Date: 12/30/2006 2:48:35PM

Source Info

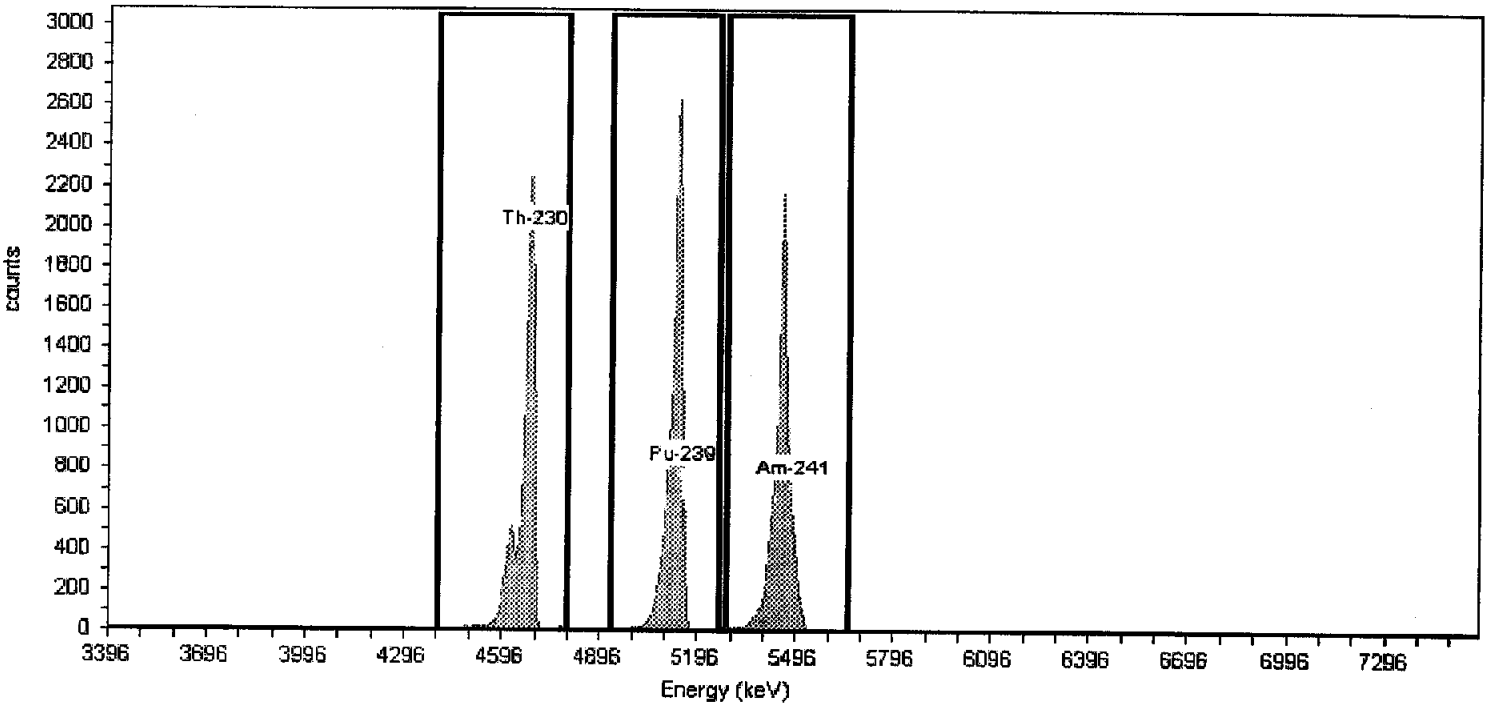
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV81 , SN: 46-03307
Acquisition Start Date: 12/30/2006 12:18:31PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.11% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,525.00	89.46
Pu-239	243	5.16	212	258	14,202.00	101.44
Am-241	289	5.49	261	313	13,306.00	95.04

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV82
2:48:47PM 12/30/2006

Calibration

Name: Dec2006_AV82
Description:

Calibration Date: 12/30/2006 2:48:43PM

Source Info

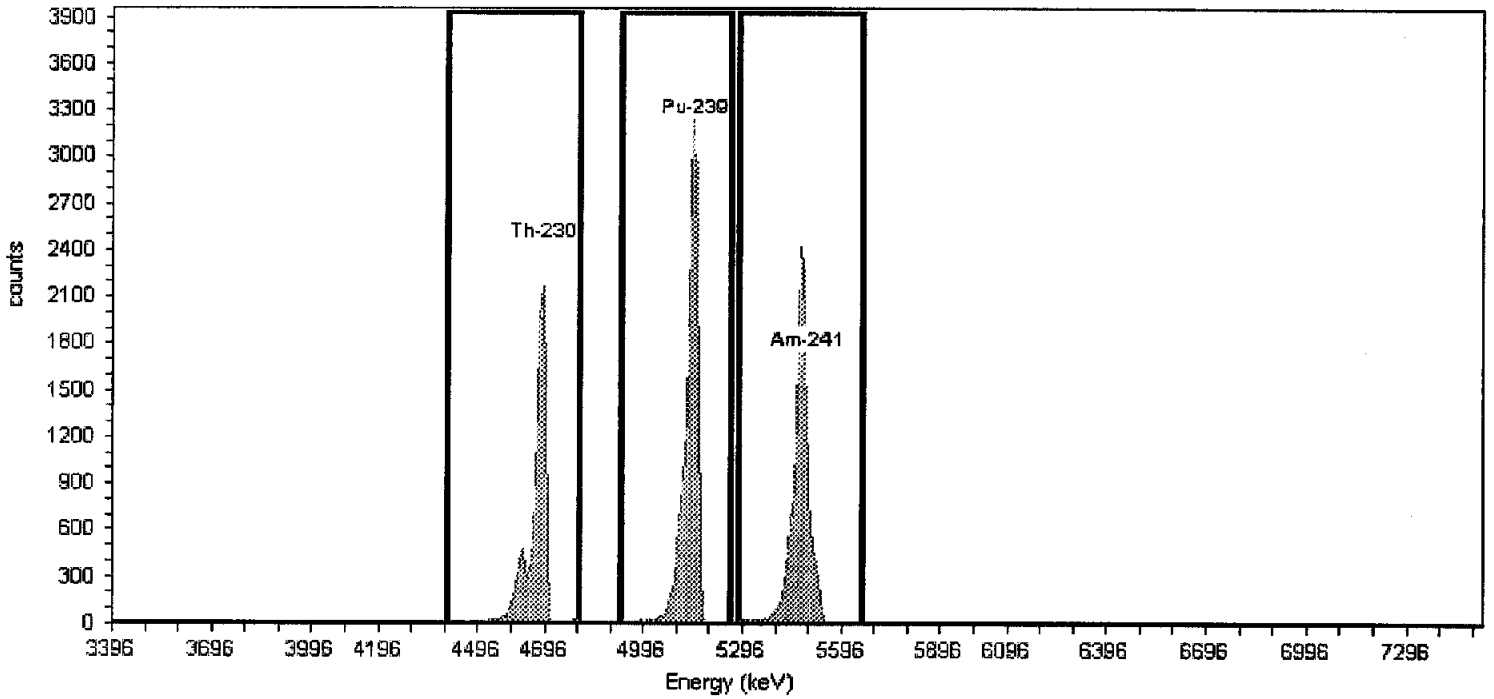
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV82 , SN: 46-032EE5
Acquisition Start Date: 12/30/2006 12:18:33PM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 27.26% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,839.00	84.56
Pu-239	243	5.16	212	258	17,734.00	126.67
Am-241	289	5.49	261	313	15,248.00	108.91

ST

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
2:48:54PM 12/30/2006

Analyst: 60040
Detector: AV83

Calibration

Name: Dec2006_AV83
Description:

Calibration Date: 12/30/2006 2:48:51PM

Source Info

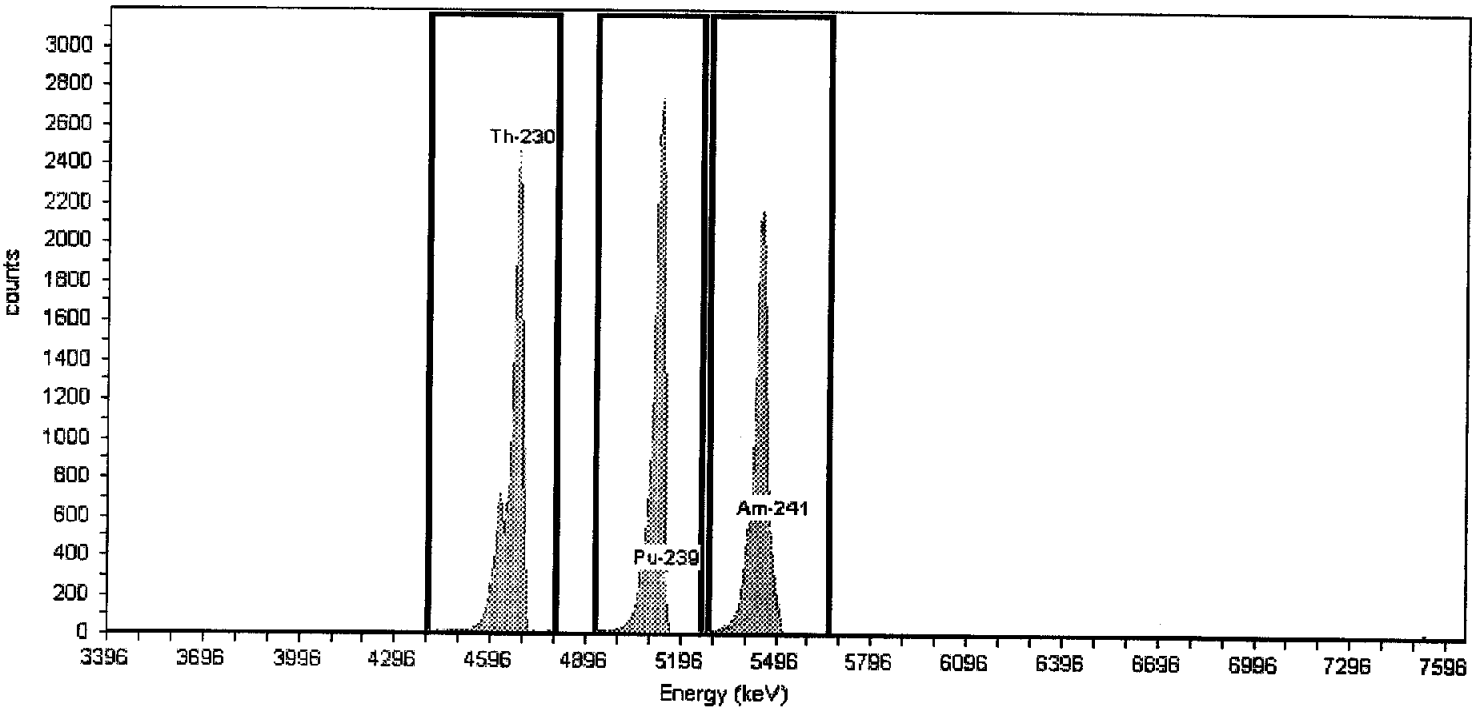
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV83 , SN: 46-03306
Acquisition Start Date: 12/30/2006 12:19:13PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 26.74% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,355.00	116.82
Pu-239	243	5.16	212	258	15,589.00	111.35
Am-241	289	5.49	261	313	14,570.00	104.07

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
5:17:48PM 12/30/2006

Analyst: 60040
Detector: AV84

Calibration

Name: Dec2006_AV84
Description:

Calibration Date: 12/30/2006 5:17:44PM

Source Info

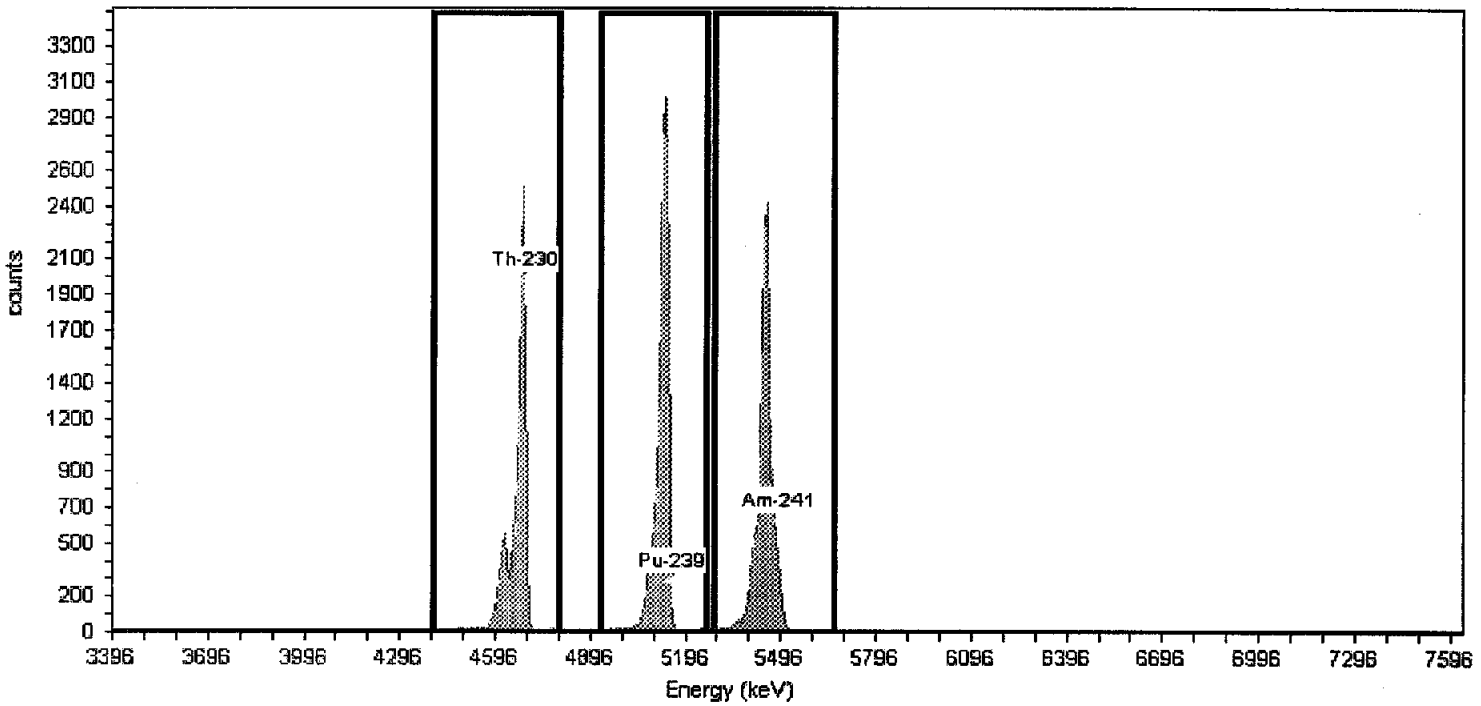
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV84 , SN: 46-033FF3
Acquisition Start Date: 12/30/2006 2:52:33PM
Live Time: 140.00 min.
Real Time: 140.02 min.
Efficiency: 26.92% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,515.00	89.39
Pu-239	243	5.16	212	258	14,952.00	106.80
Am-241	289	5.49	261	313	14,362.00	102.59

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:39:38PM 12/29/2006

Analyst: 60040
Detector: AV85

Calibration

Name: Dec2006_AV85
Description:

Calibration Date: 12/29/2006 6:39:35PM

Source Info

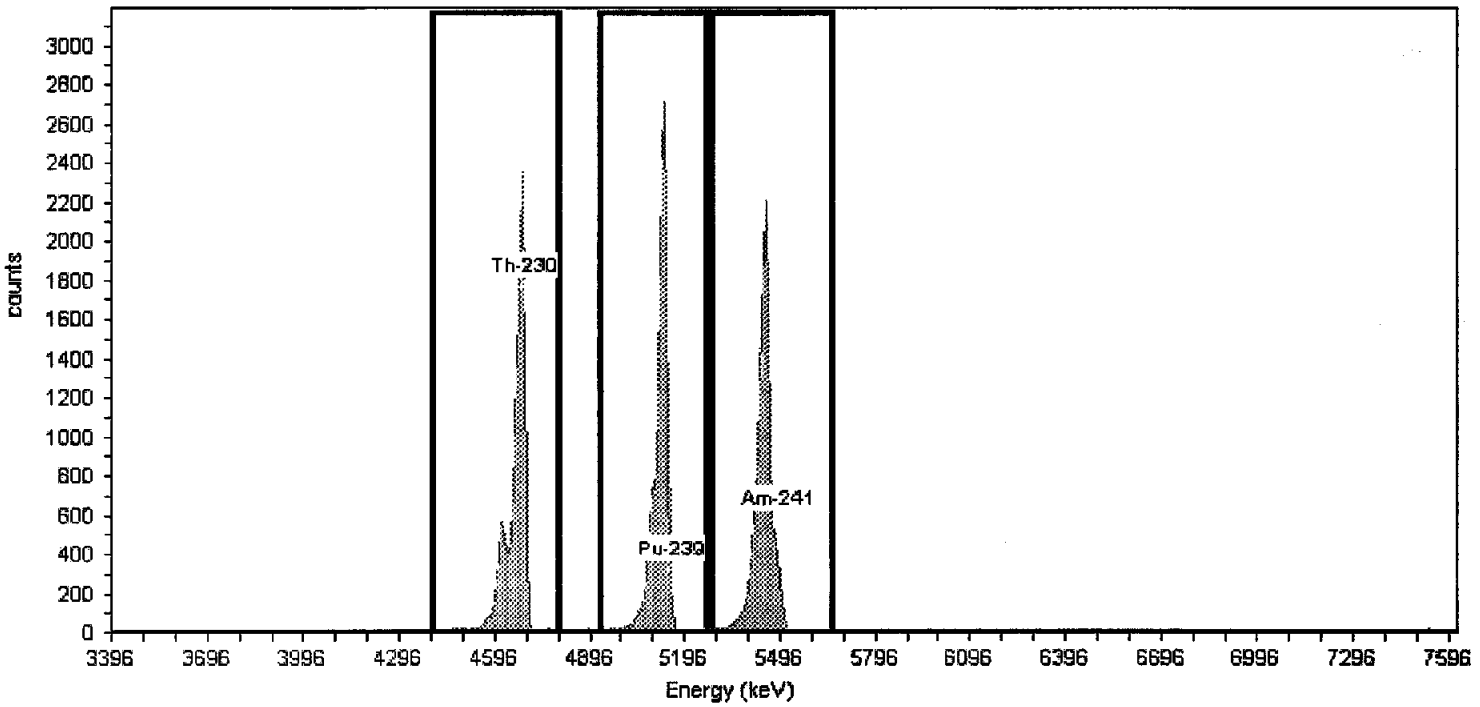
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV85 , SN: 46-032EE7
Acquisition Start Date: 12/29/2006 4:07:12PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 27.80% +/- 0.30% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	13,002.00	92.87
Pu-239	243	5.16	212	258	14,548.00	103.91
Am-241	289	5.49	261	313	13,503.00	96.45

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
6:39:42PM 12/29/2006

Analyst: 60040
Detector: AV86

Calibration

Name: Dec2006_AV86
Description:

Calibration Date: 12/29/2006 6:39:39PM

Source Info

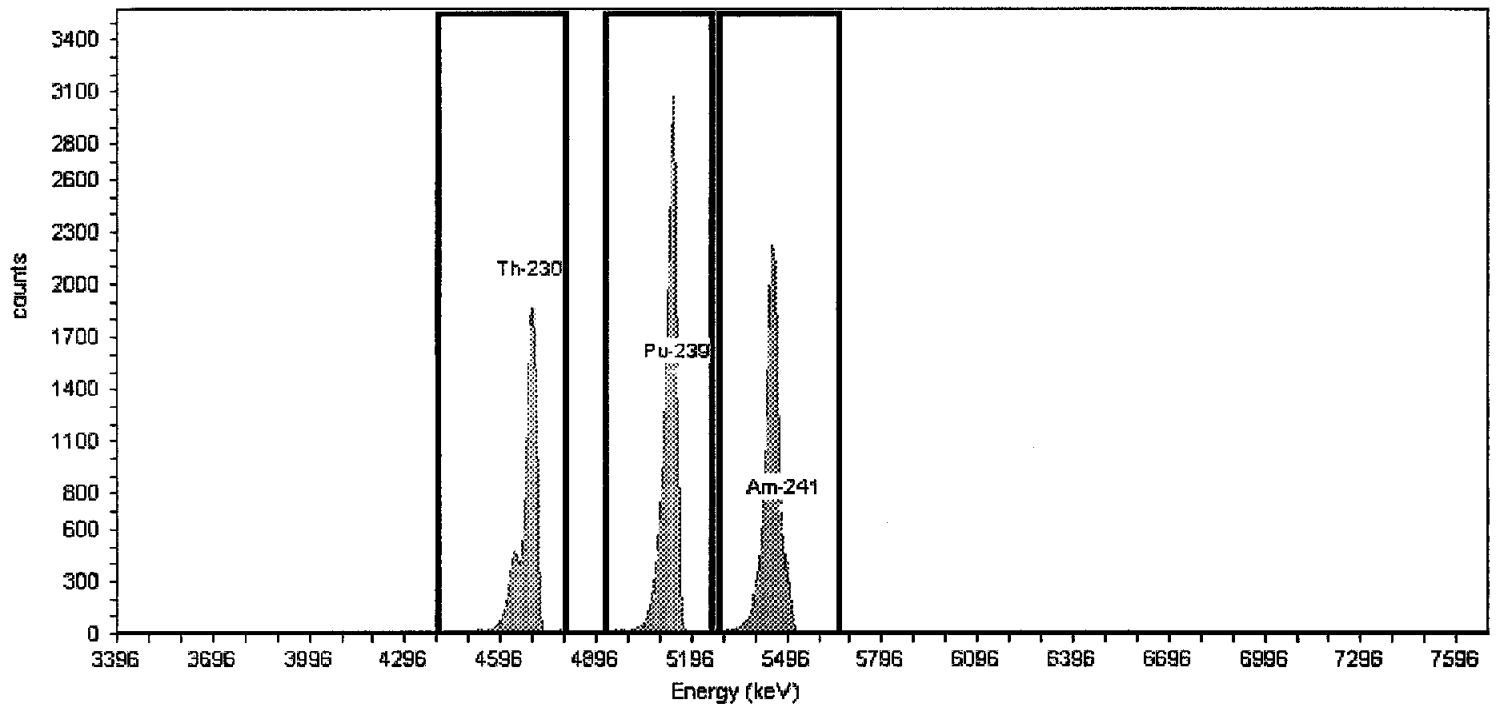
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV86 , SN: 46-033Q6
Acquisition Start Date: 12/29/2006 4:07:46PM
Live Time: 140.00 min.
Real Time: 140.03 min.
Efficiency: 26.96% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,726.00	83.76
Pu-239	243	5.16	212	258	17,516.00	125.11
Am-241	289	5.49	261	313	15,083.00	107.74

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:00:43PM 12/29/2006

Analyst: 60040
Detector: AV87

Calibration

Name: DEC2006_AV87
Description:

Calibration Date: 12/29/2006 4:00:40PM

Source Info

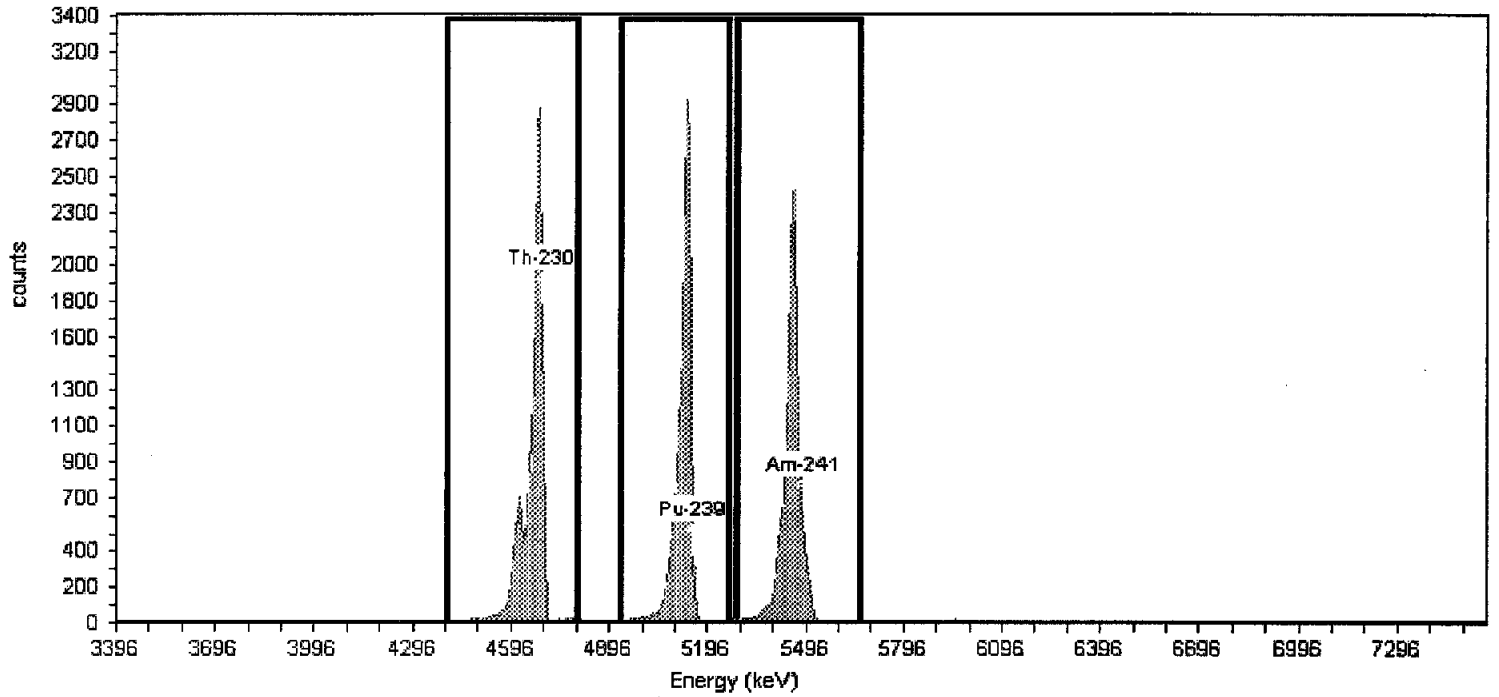
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV87 , SN: 46-033FF5
Acquisition Start Date: 12/29/2006 1:38:23PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.83% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,355.00	116.82
Pu-239	243	5.16	212	258	15,574.00	111.24
Am-241	289	5.49	261	313	14,714.00	105.10

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:00:50PM 12/29/2006

Analyst: 60040
Detector: AV88

Calibration

Name: DEC2006_AV88
Description:

Calibration Date: 12/29/2006 4:00:47PM

Source Info

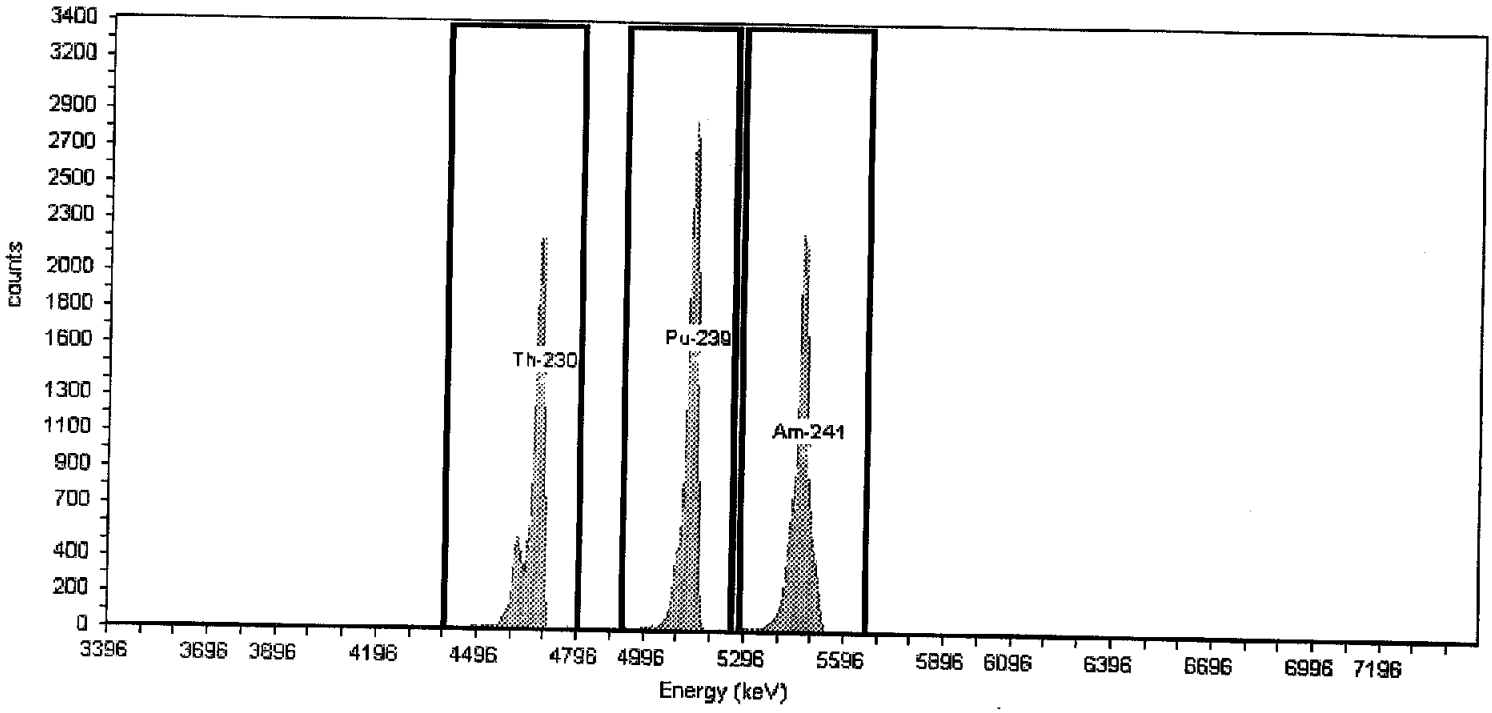
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV88 , SN: 76-033FF1
Acquisition Start Date: 12/29/2006 1:39:27PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.30% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,264.00	87.60
Pu-239	243	5.16	212	258	14,580.00	104.14
Am-241	289	5.49	261	313	13,994.00	99.96

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
4:01:00PM 12/29/2006

Analyst: 60040
Detector: AV89

Calibration

Name: DEC2006_AV89
Description:

Calibration Date: 12/29/2006 4:00:55PM

Source Info

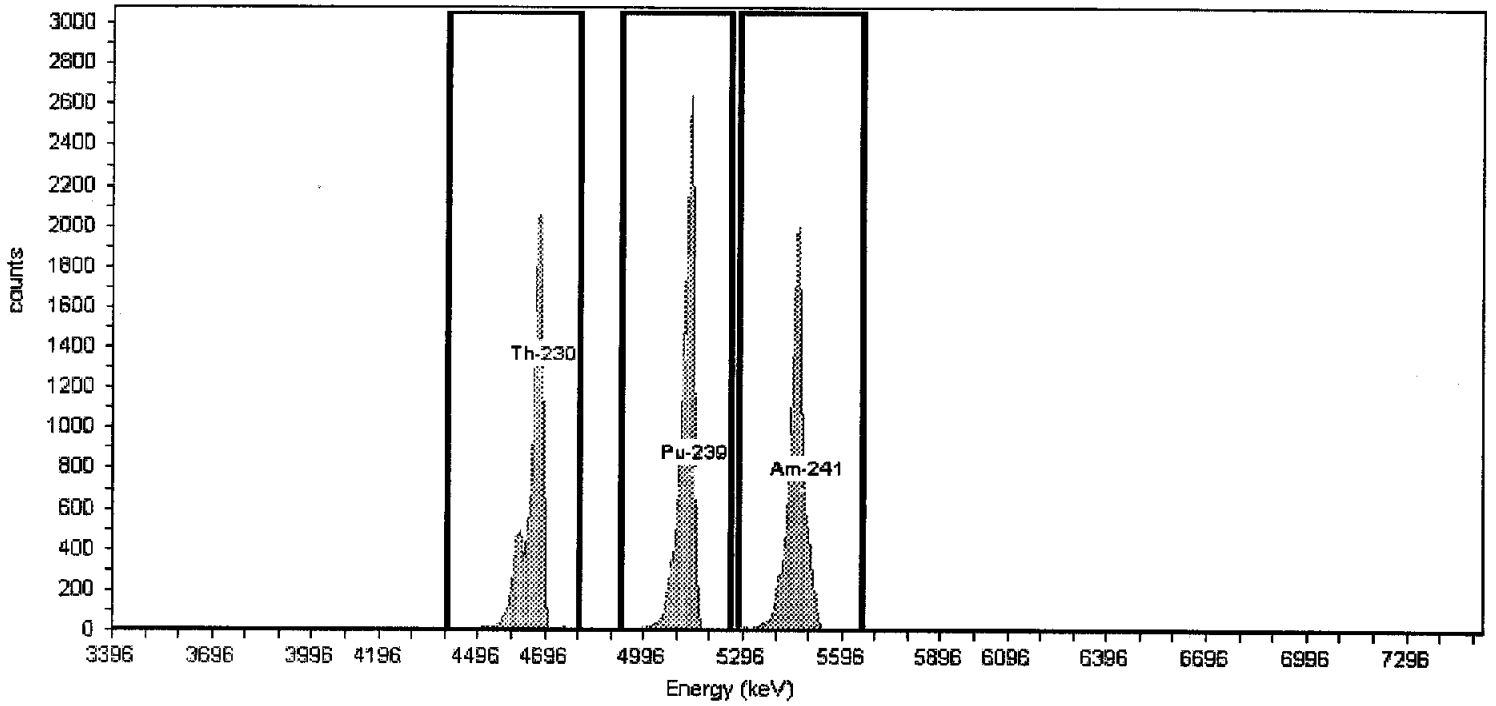
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV89 , SN: 46-033P5
Acquisition Start Date: 12/29/2006 1:39:28PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.95% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,272.00	87.66
Pu-239	243	5.16	212	258	14,403.00	102.88
Am-241	289	5.49	261	313	13,149.00	93.92

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV90

4:01:09PM 12/29/2006

Calibration

Name: DEC2006_AV90
Description:

Calibration Date: 12/29/2006 4:01:05PM

Source Info

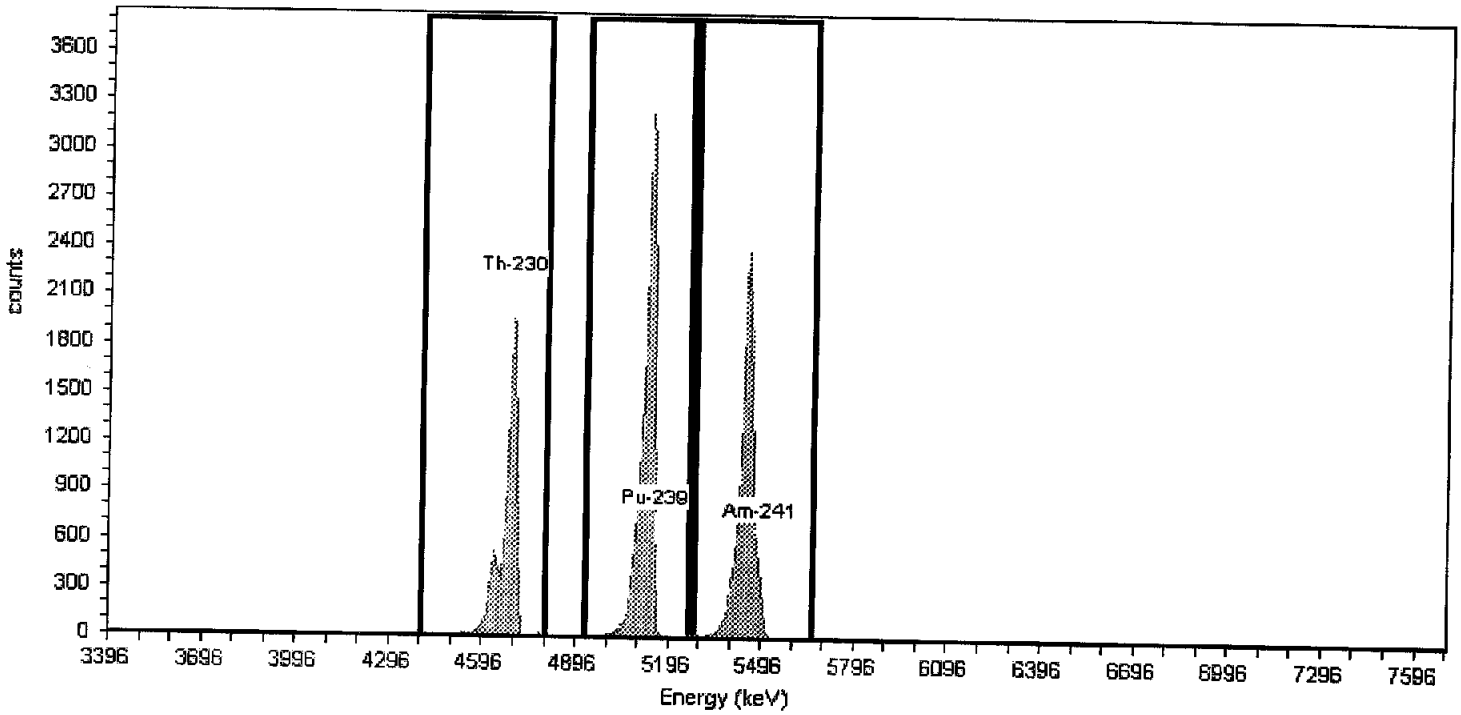
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV90 , SN: 46-033Q1
Acquisition Start Date: 12/29/2006 1:39:29PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 27.58% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,848.00	84.63
Pu-239	243	5.16	212	258	17,998.00	128.56
Am-241	289	5.49	261	313	15,487.00	110.62

ST SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:16:57PM 12/29/2006

Analyst: 60040
Detector: AV92

Calibration

Name: DEC2006_AV92
Description:

Calibration Date: 12/29/2006 1:16:55PM

Source Info

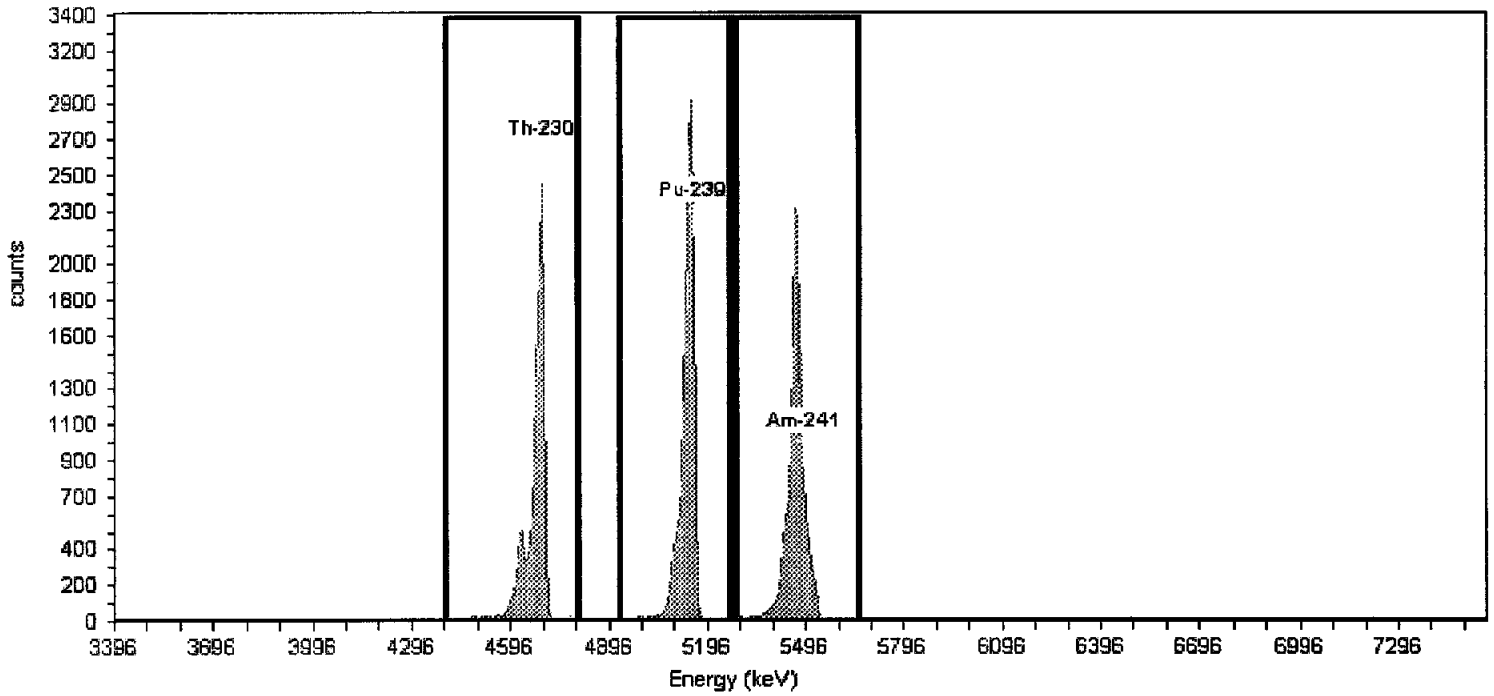
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV92 , SN: 46-033FF2
Acquisition Start Date: 12/29/2006 10:56:43AM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 26.58% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,451.00	88.94
Pu-239	243	5.16	212	258	14,621.00	104.44
Am-241	289	5.49	261	313	14,151.00	101.08

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:17:04PM 12/29/2006

Analyst: 60040
Detector: AV93

Calibration

Name: DEC2006_AV93
Description:

Calibration Date: 12/29/2006 1:17:01PM

Source Info

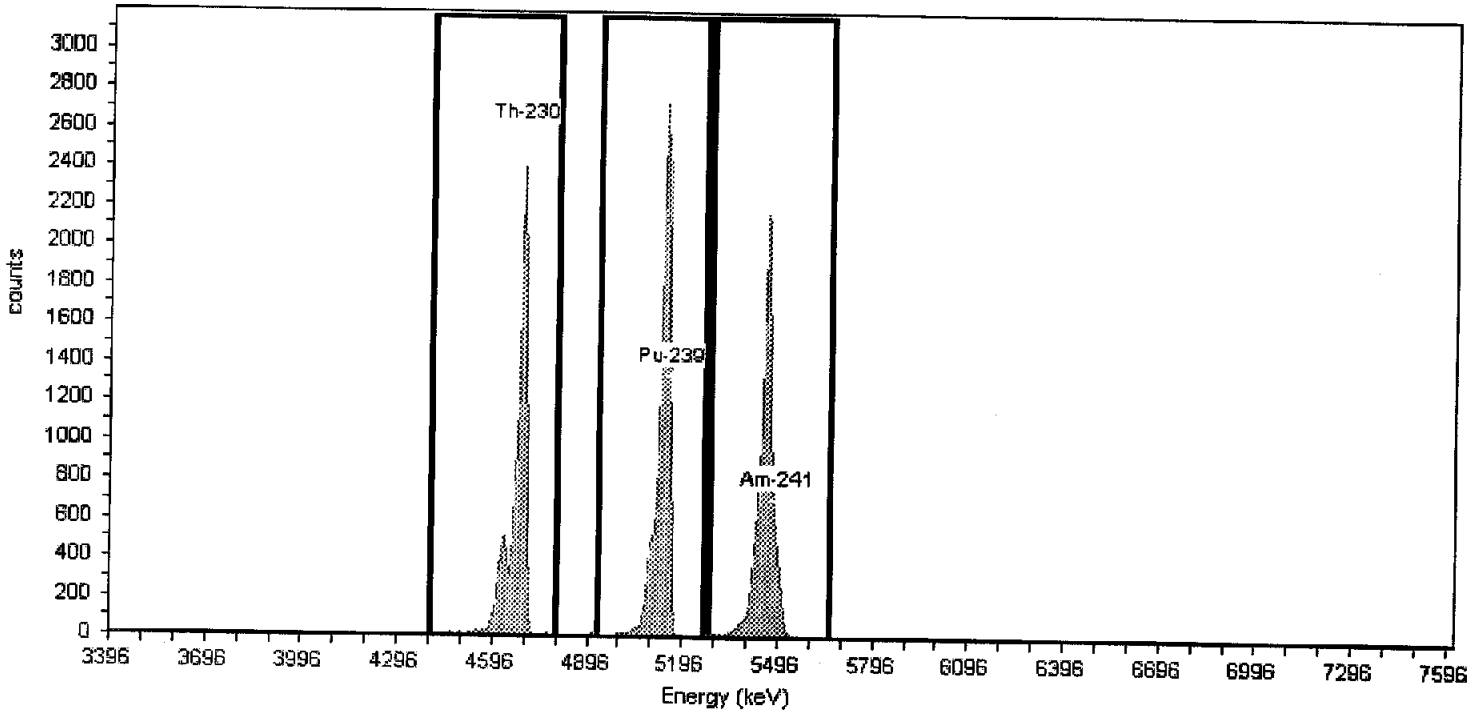
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV93 , SN: 46-033Q2
Acquisition Start Date: 12/29/2006 10:56:45AM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 26.58% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,371.00	88.36
Pu-239	243	5.16	212	258	13,785.00	98.46
Am-241	289	5.49	261	313	13,093.00	93.52

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
1:17:08PM 12/29/2006

Analyst: 60040
Detector: AV94

Calibration

Name: DEC2006_AV94
Description:

Calibration Date: 12/29/2006 1:17:06PM

Source Info

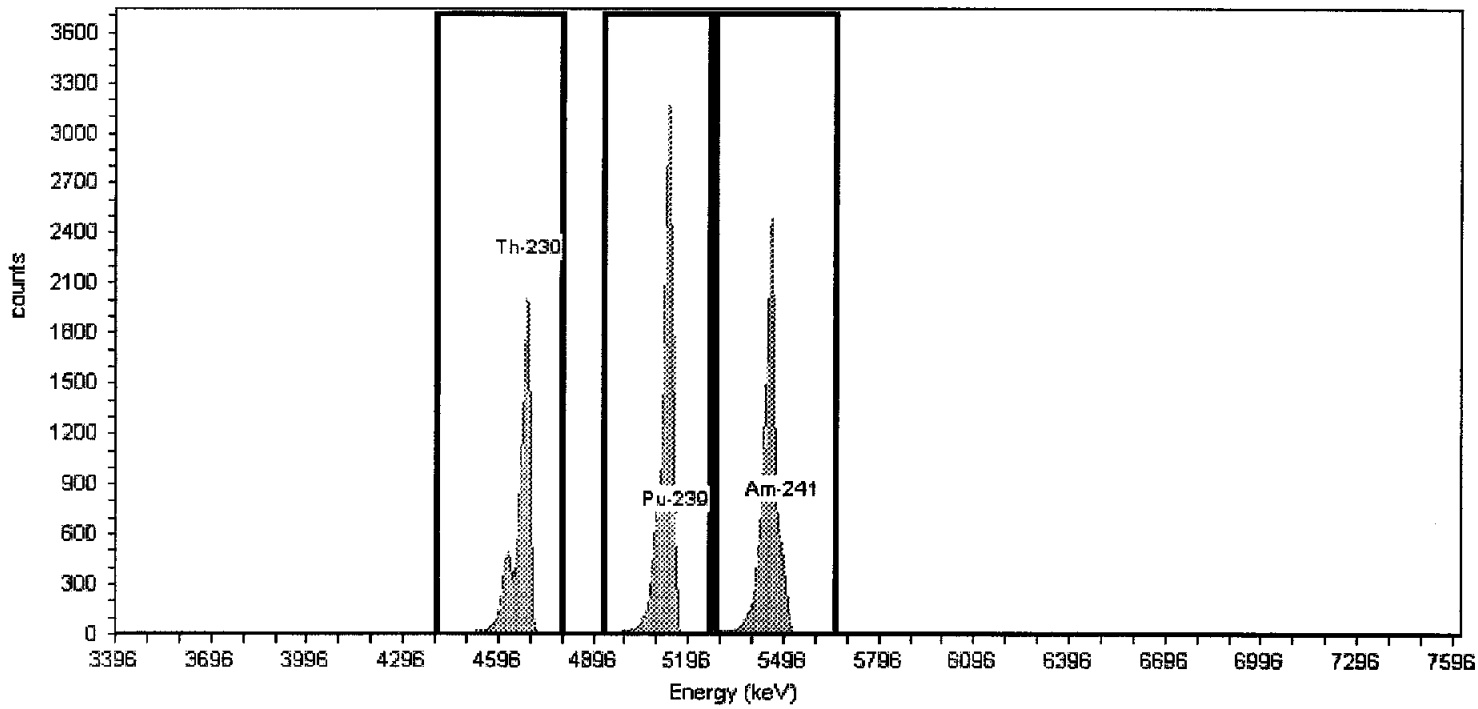
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV94 , SN: 46-032EE6
Acquisition Start Date: 12/29/2006 10:56:46AM
Live Time: 140.00 min.
Real Time: 140.04 min.
Efficiency: 26.68% +/- 0.27% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,531.00	82.36
Pu-239	243	5.16	212	258	17,173.00	122.66
Am-241	289	5.49	261	313	15,155.00	108.25

ST SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:59:24PM 12/28/2006

Analyst: 60040
Detector: AV95

Calibration

Name: DEC2006_AV2006
Description:

Calibration Date: 12/28/2006 9:59:21PM

Source Info

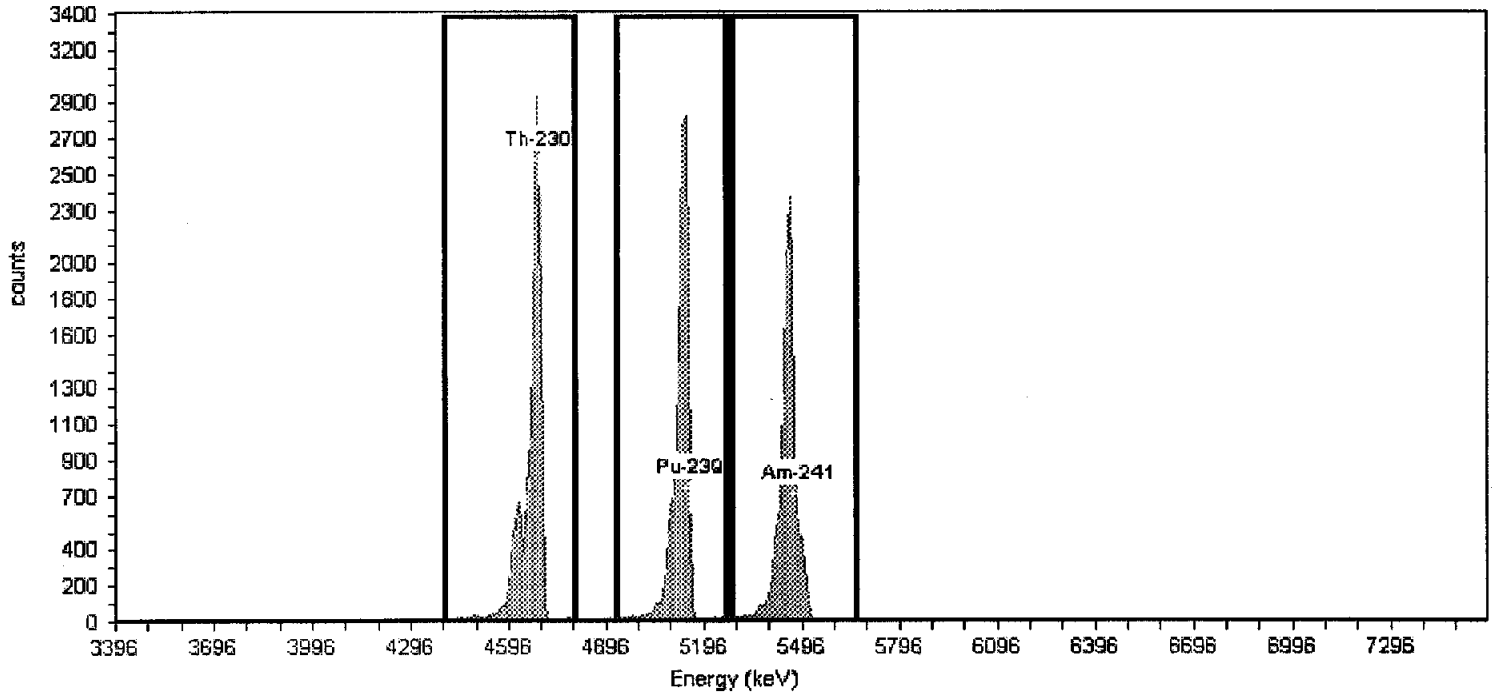
Certificate ID: 63506-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:07PM

Acquisition

Detector: AV95 , SN: 46-033P4
Acquisition Start Date: 12/28/2006 6:42:46PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.60% +/- 0.26% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	16,257.00	116.12
Pu-239	243	5.16	212	258	15,537.00	110.98
Am-241	289	5.49	261	313	14,469.00	103.35

STL SEVERN TRENT STL

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Analyst: 60040
Detector: AV96

9:59:32PM 12/28/2006

Calibration

Name: DEC2006_AV96
Description:

Calibration Date: 12/28/2006 9:59:29PM

Source Info

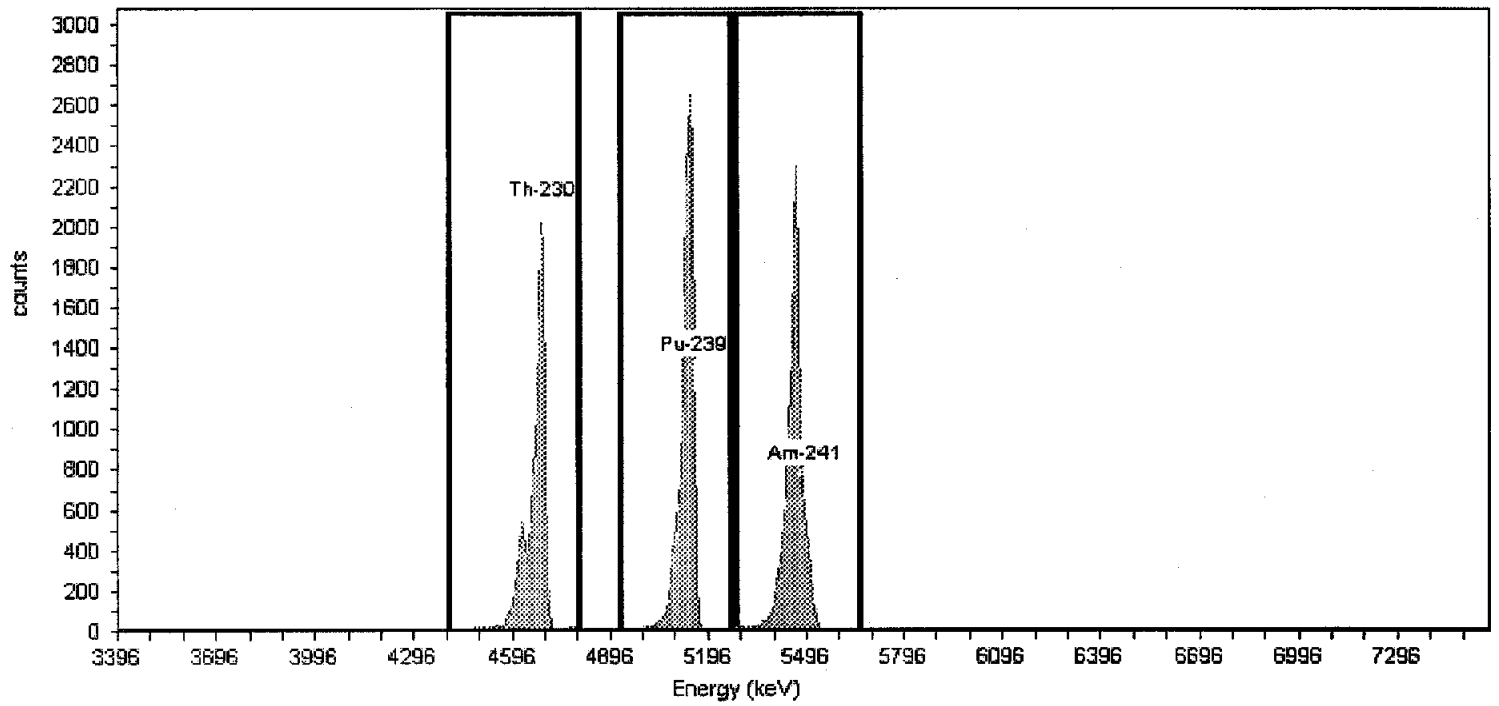
Certificate ID: 63507-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV96 , SN: 46-033P1
Acquisition Start Date: 12/28/2006 6:42:47PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 26.12% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch^2



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,116.00	86.54
Pu-239	243	5.16	212	258	14,440.00	103.14
Am-241	289	5.49	261	313	14,061.00	100.44

STL SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:59:36PM 12/28/2006

Analyst: 60040
Detector: AV97

Calibration

Name: DEC2006_AV97
Description:

Calibration Date: 12/28/2006 9:59:33PM

Source Info

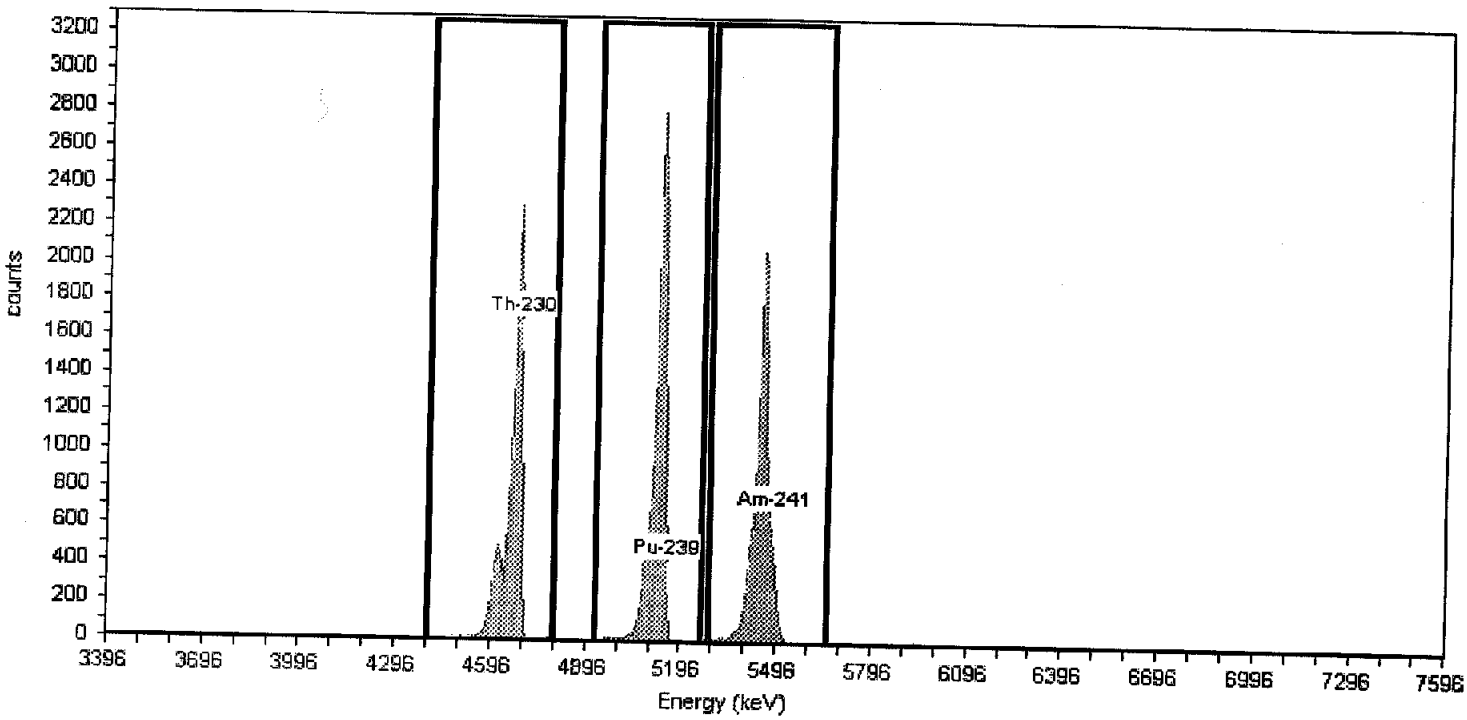
Certificate ID: 63508A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV97 , SN: 76-03393
Acquisition Start Date: 12/28/2006 6:42:49PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 27.11% +/- 0.29% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	12,514.00	89.39
Pu-239	243	5.16	212	258	14,352.00	102.51
Am-241	289	5.49	261	313	13,187.00	94.19

STL

SEVERN TRENT **STL**

Alpha-Spectroscopy Calibration Report

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045
9:59:54PM 12/28/2006

Analyst: 60040
Detector: AV98

Calibration

Name: DEC2006_AV98
Description:

Calibration Date: 12/28/2006 9:59:38PM

Source Info

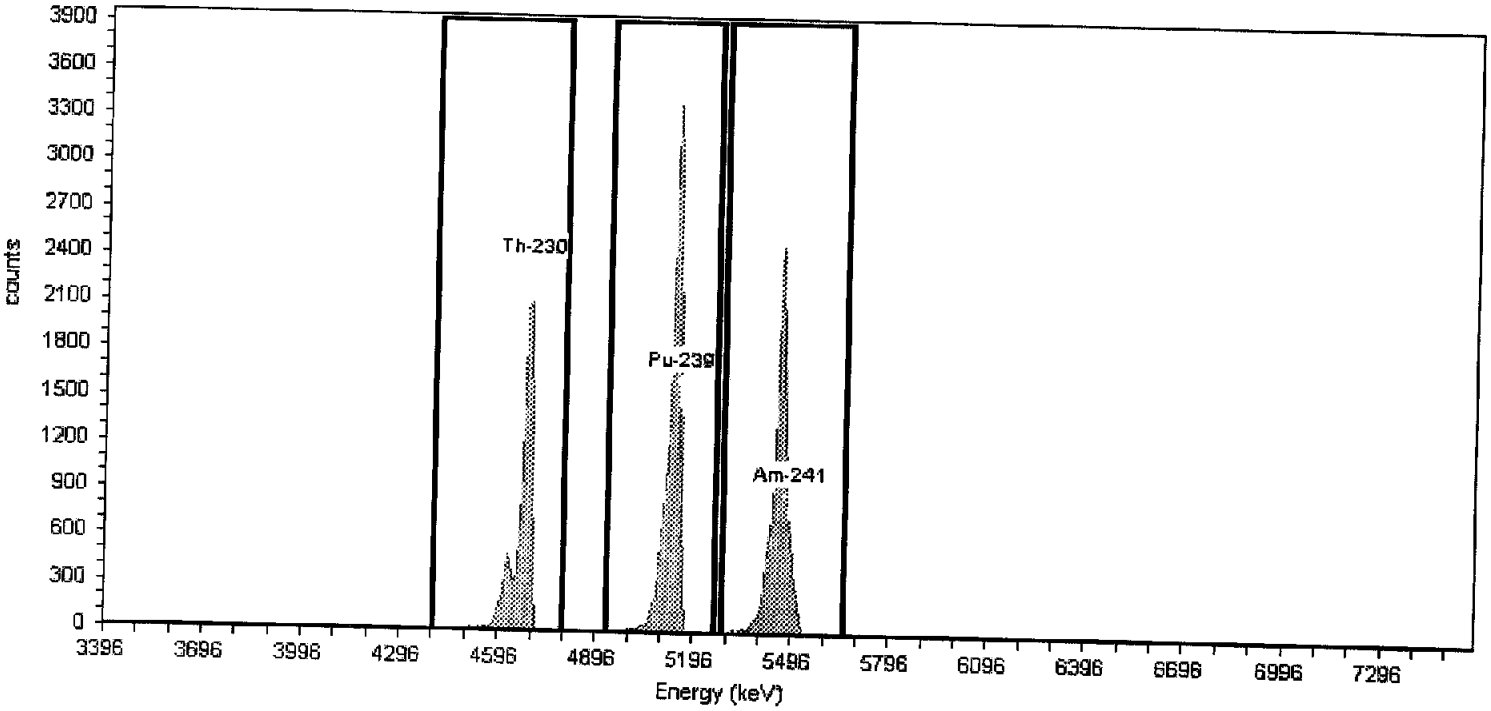
Certificate ID: 63509A-334
Prepared by: Analytics
Description:

Certification Date: 5/30/2002 12:00:00PM

Acquisition

Detector: AV98 , SN: 46-033Q3
Acquisition Start Date: 12/28/2006 6:44:22PM
Live Time: 140.00 min.
Real Time: 140.06 min.
Efficiency: 27.32% +/- 0.28% TPU(2 sigma)

Energy Calibration Equation:
Gain = 7.2598 keV / Ch
Offset = 3,388.96 keV
Quadratic = 0.0000 keV / Ch²



General Analysis

Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: No
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
Th-230	179	4.69	139	194	11,772.00	84.09
Pu-239	243	5.16	212	258	17,806.00	127.19
Am-241	289	5.49	261	313	15,324.00	109.46

GAS FLOW PROPORTIONAL COUNTING

SEVERN TRENT STL

Gas Flow Proportional Counting Radium

SEVERN TRENT STL

Analysis Report for Radium 226

Batch: 7009195 **Operator:** 402630

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

SampID / WRKNO	Aliquot / Sigma	Truncate Yields / Dilution	Ba Mass / BaYield	Ingrowth / Eff	Cnt Date Time / InstrID	Ba Precip Time / Cal Type	SampCntDur / BkgCntDur	SampCnt / BkgCnt	Activity	UncTotal / UncCount	MDA / DLC
F7A090000-195B	1.0000g	False	0.0356	1.1482	1/26/07 15:22	1/26/07 10:20	200	11	**3.374E-002**	9.150E-002	1.655E-001
JMJ831AA	2.00	1.00	105.01%	0.1771	Protean10	2	1000	39	pCi/g	9.144E-002	6.851E-002
F7A090000-195C	1.0000g	False	0.0369	1.1483	1/26/07 15:22	1/26/07 10:20	200	1048	**1.046E+001**	1.237E+000	2.135E-001
JMJ831AC	2.00	1.00	108.85%	0.1779	Protean12	2	1000	78	pCi/g	6.608E-001	9.309E-002
F7A090121-001	1.0151g	False	0.0301	1.1483	1/26/07 15:22	1/26/07 10:20	200	85	**7.810E-001**	2.422E-001	2.452E-001
JMJ4V1AA	2.00	1.00	88.79%	0.1911	Protean14	2	1000	82	pCi/g	2.293E-001	1.073E-001
F7A090121-001X	1.0048g	False	0.0369	1.1483	1/26/07 15:22	1/26/07 10:20	200	111	**9.691E-001**	2.423E-001	1.976E-001
JMJ4V1AF	2.00	1.00	108.85%	0.1802	Protean15	2	1000	68	pCi/g	2.221E-001	8.536E-002
F7A090121-002	1.0214g	False	0.0353	1.1493	1/26/07 15:25	1/26/07 10:20	200	164	**1.402E+000**	2.753E-001	1.474E-001
JMJ4W1AA	2.00	1.00	104.13%	0.2043	RedA1	2	1000	43	pCi/g	2.370E-001	6.153E-002
F7A090121-003	1.0067g	True	0.0380	1.1493	1/26/07 15:25	1/26/07 10:20	200	111	**9.980E-001**	2.392E-001	1.721E-001
JMJ4X1AA	2.00	1.00	100.00%	0.1970	RedA2	2	1000	50	pCi/g	2.174E-001	7.269E-002
F7A090121-004	1.0119g	False	0.0357	1.1493	1/26/07 15:25	1/26/07 10:20	200	128	**1.078E+000**	2.365E-001	1.459E-001
JMJ401AA	2.00	1.00	105.31%	0.2041	RedA4	2	1000	42	pCi/g	2.105E-001	6.076E-002
F7A090121-005	1.0082g	False	0.0356	1.1493	1/26/07 15:25	1/26/07 10:20	200	98	**9.472E-001**	2.251E-001	1.236E-001
JMJ411AA	2.00	1.00	105.01%	0.1833	RedB3	2	1000	21	pCi/g	2.042E-001	4.814E-002
F7A090121-006	1.0106g	False	0.0355	1.1493	1/26/07 15:25	1/26/07 10:20	200	123	**1.038E+000**	2.359E-001	1.600E-001
JMJ421AA	2.00	1.00	104.72%	0.2016	RedB4	2	1000	50	pCi/g	2.119E-001	6.758E-002
F7A090121-007	1.0011g	False	0.0351	1.1495	1/26/07 15:26	1/26/07 10:20	200	114	**9.714E-001**	2.250E-001	1.471E-001
JMJ461AA	2.00	1.00	103.54%	0.2059	RedC1	2	1000	41	pCi/g	2.030E-001	6.117E-002
F7A090121-008	1.0016g	True	0.0411	1.1495	1/26/07 15:26	1/26/07 10:20	200	127	**1.211E+000**	2.703E-001	1.784E-001
JMJ471AA	2.00	1.00	100.00%	0.1894	RedC2	2	1000	49	pCi/g	2.416E-001	7.523E-002
F7A090121-009	1.0139g	True	0.0435	1.1495	1/26/07 15:26	1/26/07 10:20	200	122	**1.309E+000**	2.824E-001	1.387E-001
JMJ491AA	2.00	1.00	100.00%	0.1737	RedC3	2	1000	22	pCi/g	2.502E-001	5.430E-002
F7A090121-010	1.0011g	True	0.0422	1.1495	1/26/07 15:26	1/26/07 10:20	200	102	**9.640E-001**	2.346E-001	1.586E-001
JMJ5A1AA	2.00	1.00	100.00%	0.1916	RedC4	2	1000	38	pCi/g	2.138E-001	6.550E-002
F7A090121-011	1.0018g	False	0.0343	1.1496	1/26/07 15:26	1/26/07 10:20	200	140	**1.200E+000**	2.577E-001	1.670E-001
JMJ5C1AA	2.00	1.00	101.18%	0.2082	RedD1	2	1000	54	pCi/g	2.280E-001	7.098E-002

SampID / WRKNO	Aliquot / Sigma	Truncate Yields / Dilution	Ba Mass / BaYield	Ingrowth / Eff	Cnt Date Time / InstrID	Ba Precip Time / Cal Type	SampCntDur / BkgCntDur	SampCnt / BkgCnt	Activity	UncTotal / UncCount	MDA / DLC

Laboratory Control Sample Information

SampID	WRKNO	Analyte	Activity	StdAdded	Recovery	LCL	UCL
F7A090000-195C	JMJ831AC	RA-226	1.046E+001 pCi/g	1.119E+001	93.43 %	53.00	113.00

Sample Duplicate Information

SampID	SampDupID	Activity	DupActivity	RPD	RER	DER
F7A090121-001	F7A090121-001X	7.810E-001	9.691E-001	21.50%	3.882E-001	5.490E-001

Matrix Spike Information

SampID	SampMSID	WRKNO	Analyte	Activity	MSActivity	StdAdded	Recovery

SEVERN TRENT STL

Analysis Report for Radium 228

Batch: 7009196 **Operator:** 402630

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

SampID / WRKNO	Aliquot / Mass	Eff	BaYield / YYield	Truncate / Yields	CountDateTime / InstrID	Y Ingrowth Time / Y Precip Time	SampCntD / BkgCntDur	SampCnt / BkgCnt	Cal Type / Sigma	Activity	UncTotal / UncCount	MDA / DLC
F7A090000-196B	1.0000 g	0.4386	105.01	False	1/26/07 11:21	1/12/07 16:00	200	265	1	3.123E-001	3.982E-001	6.534E-001
JMJ891AA	0.0356 g		90.66		YellowB3	1/26/07 8:30	1000	1150	2.00	pCi/g	3.970E-001	3.148E-001
F7A090000-196C	1.0000 g	0.4379	108.85	False	1/26/07 11:21	1/12/07 16:00	200	1104	1	8.314E+000	1.063E+000	6.253E-001
JMJ891AC	0.0369 g		85.16		YellowB4	1/26/07 8:30	1000	990	2.00	pCi/g	6.623E-001	3.004E-001
F7A090121-001	1.0151 g	0.3944	88.79	False	1/26/07 11:21	1/12/07 16:00	200	271	1	9.980E-001	5.527E-001	8.482E-001
JMJ4V1AC	0.0301 g		82.97		YellowC1	1/26/07 8:30	1000	960	2.00	pCi/g	5.436E-001	4.072E-001
F7A090121-001X	1.0048 g	0.3983	108.85	False	1/26/07 11:21	1/12/07 16:00	200	243	1	7.491E-001	4.006E-001	6.092E-001
JMJ4V1AG	0.0369 g		87.91		YellowC2	1/26/07 8:30	1000	830	2.00	pCi/g	3.935E-001	2.916E-001
F7A090121-002	1.0214 g	0.3959	104.13	False	1/26/07 11:21	1/12/07 16:00	200	273	1	9.217E-001	4.632E-001	7.005E-001
JMJ4W1AC	0.0353 g		83.52		YellowC3	1/26/07 8:30	1000	930	2.00	pCi/g	4.539E-001	3.361E-001
F7A090121-003	1.0067 g	0.4072	100.00	True	1/26/07 11:21	1/12/07 16:00	200	265	1	7.258E-001	3.969E-001	6.075E-001
JMJ4X1AC	0.0380 g		98.90		YellowC4	1/26/07 8:30	1000	930	2.00	pCi/g	3.902E-001	2.915E-001
F7A090121-004	1.0119 g	0.3791	105.31	False	1/26/07 11:21	1/12/07 16:00	200	245	1	8.392E-001	3.610E-001	5.270E-001
JMJ401AC	0.0357 g		104.40		YellowD1	1/26/07 8:30	1000	750	2.00	pCi/g	3.511E-001	2.517E-001
F7A090121-005	1.0082 g	0.3740	105.01	False	1/26/07 11:21	1/12/07 16:00	200	303	1	9.972E-001	4.644E-001	6.963E-001
JMJ411AC	0.0356 g		93.41		YellowD2	1/26/07 8:30	1000	1020	2.00	pCi/g	4.536E-001	3.347E-001
F7A090121-006	1.0106 g	0.3851	104.72	False	1/26/07 11:21	1/12/07 16:00	200	221	1	7.090E-001	3.691E-001	5.568E-001
JMJ421AC	0.0355 g		96.70		YellowD3	1/26/07 8:30	1000	730	2.00	pCi/g	3.622E-001	2.657E-001
F7A090121-007	1.0011 g	0.3824	103.54	False	1/26/07 11:21	1/12/07 16:00	200	280	1	8.497E-001	4.858E-001	7.495E-001
JMJ461AC	0.0351 g		86.26		YellowD4	1/26/07 8:30	1000	1010	2.00	pCi/g	4.783E-001	3.602E-001
F7A090121-008	1.0016 g	0.4097	100.00	True	1/26/07 11:12	1/12/07 16:00	200	202	1	7.645E-001	3.441E-001	5.018E-001
JMJ471AC	0.0411 g		95.60		Protean0	1/26/07 8:30	1000	601	2.00	pCi/g	3.355E-001	2.384E-001
F7A090121-009	1.0139 g	0.4083	100.00	True	1/26/07 11:12	1/12/07 16:00	200	149	1	5.070E-001	3.087E-001	4.707E-001
JMJ491AC	0.0435 g		91.21		Protean1	1/26/07 8:30	1000	484	2.00	pCi/g	3.045E-001	2.223E-001
F7A090121-010	1.0011 g	0.4075	100.00	True	1/26/07 11:12	1/12/07 16:00	200	211	1	6.437E-001	3.427E-001	5.180E-001
JMJ5A1AC	0.0422 g		100.00		Protean2	1/26/07 8:30	1000	697	2.00	pCi/g	3.366E-001	2.469E-001
F7A090121-011	1.0018 g	0.3963	101.18	False	1/26/07 11:12	1/12/07 16:00	200	116	1	1.824E-001	2.971E-001	4.941E-001
JMJ5C1AC	0.0343 g		90.11		Protean3	1/26/07 8:30	1000	490	2.00	pCi/g	2.966E-001	2.334E-001

SampID / WRKNO	Aliquot / Mass	Eff	BaYield / YYield	Truncate Yields	CountDateTime / InstrID	Y Ingrowth Time / Y Precip Time	SampCntD / BkgCntDur	SampCnt / BkgCnt	Cal Type / Sigma	Activity	UncTotal / UncCount	MDA / DLC

Laboratory Control Sample Information

SampID	WRKNO	ComponentName	Activity	StdAdded	Recovery	LCL	UCL
F7A090000-196C	JMJ891AC	RA-228	8.314E+000 pCi/g	9.314E+000 pCi/g	89.27 %	54.00	130.00

Sample Duplicate Information

SampID	SampDupID	Activity	DupActivity	RPD	RER	DER
F7A090121-001	F7A090121-001X	9.980E-001	7.491E-001	28.49%	2.611E-001	3.646E-001

Matrix Spike Information

SampID	SampMSID	Sample Activity	MS Activity	StdAdded	MSRecovery
					%

SEVERN TRENT STL

Instrument Checks

SEVERN TRENT STL

Gas Proportional Counter Daily Quality Control Checks

Friday, January 26, 2007

Instrument: *Protean*

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha Std. Dev.	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta Std. Dev.	Beta Deviation	Beta Flag
0	Efficiency	12382.50	12438.95	90.72	-56.45	Pass	39128.92	39393.30	125.07	-264.38	WARNING
	Background	0.067	0.054	0.056	0.013	Pass	0.700	0.727	0.276	-0.027	Pass
1	Efficiency	10993.00	10948.58	103.93	44.42	Pass	39732.63	40103.78	148.41	-371.15	WARNING
	Background	0.033	0.085	0.057	-0.052	Pass	0.633	0.585	0.243	0.048	Pass
10	Efficiency	11410.50	11350.29	72.87	60.21	Pass	26311.02	26788.33	617.21	-477.31	Pass
	Background	0.033	0.048	0.033	-0.015	Pass	0.433	0.663	0.376	-0.230	Pass
11	Efficiency	11365.00	11416.80	73.68	-51.80	Pass	34287.65	34370.70	170.34	-83.05	Pass
	Background	0.067	0.065	0.038	0.002	Pass	0.367	0.538	0.190	-0.172	Pass
12	Efficiency	11839.50	11834.33	77.65	5.17	Pass	30029.45	31028.09	349.77	-998.64	WARNING
	Background	0.100	0.082	0.071	0.018	Pass	0.400	0.505	0.208	-0.105	Pass
13	Efficiency	11984.50	11755.73	59.18	228.77	FAIL	26432.36	26744.32	145.13	-311.95	WARNING
	Background	0.067	0.063	0.055	0.003	Pass	0.333	0.370	0.164	-0.037	Pass
14	Efficiency	11672.50	11669.92	74.98	2.58	Pass	33993.60	34102.93	190.40	-109.32	Pass
	Background	0.067	0.055	0.067	0.012	Pass	0.600	0.308	0.110	0.292	Pass
15	Efficiency	12457.00	12475.03	74.63	-18.02	Pass	32978.02	32925.32	143.10	52.69	Pass
	Background	0.033	0.070	0.053	-0.037	Pass	0.533	0.420	0.187	0.113	Pass
2	Efficiency	11808.00	11615.03	64.25	192.98	FAIL	26970.11	27229.97	110.97	-259.86	WARNING
	Background	0.100	0.067	0.045	0.033	Pass	0.700	0.662	0.184	0.038	Pass
3	Efficiency	11590.50	11621.48	67.85	-30.98	Pass	34080.20	34333.78	172.20	-253.57	Pass
	Background	0.033	0.047	0.044	-0.013	Pass	0.533	0.503	0.132	0.030	Pass
4	Efficiency	11905.00	11876.42	66.44	28.58	Pass	30473.05	30755.88	142.37	-282.83	Pass
	Background	0.033	0.025	0.026	0.008	Pass	0.300	0.422	0.172	-0.122	Pass
5	Efficiency	11811.50	11742.05	100.58	69.45	Pass	26962.56	26965.53	141.56	-2.96	Pass
	Background	0.033	0.063	0.054	-0.030	Pass	0.367	0.455	0.113	-0.088	Pass
6	Efficiency	11548.00	11597.23	93.35	-49.23	Pass	33809.82	33815.97	150.95	-6.16	Pass
	Background	0.067	0.037	0.032	0.030	Pass	0.400	0.378	0.159	0.022	Pass
7	Efficiency	12420.00	12362.35	80.91	57.65	Pass	32483.06	32648.92	156.35	-165.86	Pass
	Background	0.067	0.060	0.041	0.007	Pass	0.667	0.490	0.209	0.177	Pass
8	Efficiency	11804.00	11879.92	87.36	-75.92	Pass	37690.39	37928.10	223.11	-237.71	Pass
	Background	0.000	0.047	0.042	-0.047	Pass	3.500	0.410	0.129	3.090	FAIL
9	Efficiency	10923.50	10828.78	75.31	94.73	Pass	39171.21	39110.95	193.52	60.26	Pass
	Background	0.067	0.063	0.057	0.003	Pass	0.433	0.387	0.139	0.047	Pass

1/26/2007 9:25:06 AM

IQC version 2.3, updated 4/5/2006

SEVERN TRENT STL

Gas Proportional Counter Daily Quality Control Checks

Friday, January 26, 2007

Instrument: *Red*

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha Std. Dev.	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta Std. Dev.	Beta Deviation	Beta Flag
A1	Efficiency	13459.50	13544.80	189.46	-85.30	Pass	43787.53	43712.30	367.50	75.23	Pass
	Background	0.100	0.033	0.034	0.067	Pass	1.200	1.278	0.453	-0.078	Pass
A2	Efficiency	12398.50	12206.25	157.10	192.25	Pass	45363.29	44601.90	515.92	761.39	Pass
	Background	0.133	0.053	0.035	0.080	Pass	1.733	1.415	0.254	0.318	Pass
A3	Efficiency	13407.50	12993.26	98.32	414.24	FAIL	30661.56	30359.28	329.92	302.28	Pass
	Background	0.033	0.037	0.034	-0.003	Pass	1.233	1.332	0.165	-0.098	Pass
A4	Efficiency	13057.50	13025.60	138.41	31.90	Pass	39549.87	39880.93	367.71	-331.06	Pass
	Background	0.000	0.050	0.054	-0.050	Pass	1.500	1.660	0.225	-0.160	Pass
B1	Efficiency	13026.50	13412.83	137.01	-386.33	WARNING	33350.19	34359.65	193.46	-1009.46	FAIL
	Background	0.000	0.048	0.049	-0.048	Pass	1.033	1.233	0.240	-0.200	Pass
B2	Efficiency	13068.50	13513.28	93.74	-444.77	FAIL	29691.39	30676.45	122.04	-985.06	FAIL
	Background	0.133	0.035	0.035	0.098	Pass	1.267	1.333	0.199	-0.067	Pass
B3	Efficiency	12548.00	12545.25	65.52	2.75	Pass	37015.03	37126.10	156.21	-111.07	Pass
	Background	0.100	0.033	0.032	0.067	Pass	1.533	1.412	0.172	0.122	Pass
B4	Efficiency	13836.50	14124.95	97.02	-288.45	WARNING	36510.28	37251.82	259.10	-741.54	WARNING
	Background	0.000	0.052	0.054	-0.052	Pass	1.200	1.223	0.230	-0.023	Pass
C1	Efficiency	13605.00	13232.20	495.25	372.80	Pass	43095.21	42730.90	1439.88	364.31	Pass
	Background	0.067	0.032	0.028	0.035	Pass	1.267	1.197	0.198	0.070	Pass
C2	Efficiency	12105.50	12107.55	148.33	-2.05	Pass	44461.71	44620.45	604.30	-158.74	Pass
	Background	0.133	0.040	0.040	0.093	Pass	1.067	1.677	0.245	-0.610	Pass
C3	Efficiency	12375.00	12550.00	165.44	-175.00	Pass	29432.72	29871.25	322.53	-438.53	Pass
	Background	0.033	0.050	0.044	-0.017	Pass	1.033	1.277	0.225	-0.243	Pass
C4	Efficiency	12833.00	12954.83	149.14	-121.83	Pass	39679.96	39969.45	296.48	-289.49	Pass
	Background	0.067	0.060	0.047	0.007	Pass	1.467	1.348	0.266	0.118	Pass
D1	Efficiency	13797.50	13580.88	135.99	216.63	Pass	34140.34	34073.74	415.79	66.60	Pass
	Background	0.033	0.062	0.058	-0.028	Pass	1.067	1.260	0.257	-0.193	Pass
D2	Efficiency	13370.00	13319.13	163.77	50.88	Pass	29594.07	29892.00	170.30	-297.93	Pass
	Background	0.033	0.038	0.027	-0.005	Pass	0.933	1.262	0.210	-0.328	Pass
D3	Efficiency	13238.50	13079.67	128.36	158.83	Pass	37742.66	37793.43	164.21	-50.77	Pass
	Background	0.067	0.048	0.055	0.018	Pass	1.433	1.247	0.193	0.187	Pass
D4	Efficiency	14231.00	14105.55	187.58	125.45	Pass	36948.47	37181.18	131.81	-232.70	Pass
	Background	0.100	0.030	0.032	0.070	Pass	1.567	1.298	0.206	0.268	Pass

SEVERN TRENT STL

Gas Proportional Counter Daily Quality Control Checks

Friday, January 26, 2007

Instrument: *Yellow*

Detector ID	Check Type	Alpha CPM	Alpha Mean	Alpha Std. Dev.	Alpha Deviation	Alpha Flag	Beta CPM	Beta Mean	Beta Std. Dev.	Beta Deviation	Beta Flag
A1	Efficiency	12698.00	13200.85	194.75	-502.85	WARNING	43327.66	43477.65	642.26	-149.99	Pass
	Background	0.100	0.080	0.056	0.020	Pass	1.000	1.065	0.222	-0.065	Pass
A2	Efficiency	11359.00	11708.60	176.43	-349.60	Pass	43436.07	44177.80	610.61	-741.73	Pass
	Background	0.100	0.055	0.042	0.045	Pass	0.900	1.177	0.168	-0.277	Pass
~~A3~~	Efficiency	12237.50	12749.20	157.19	-511.70	FAIL	30268.25	30405.67	489.13	-137.43	Pass
	Background	0.067	0.065	0.049	0.002	Pass	1.633	1.238	0.182	0.395	Pass
A4	Efficiency	12142.50	12583.80	182.38	-441.30	WARNING	39066.80	39475.45	754.66	-408.65	Pass
	Background	0.067	0.103	0.082	-0.037	Pass	1.033	1.153	0.191	-0.120	Pass
~~B1~~ OK 1-26-7	Efficiency	12941.00	13162.92	128.27	-221.92	Pass	34357.16	34319.63	346.36	37.54	Pass
	Background	0.033	0.083	0.063	-0.050	Pass	1.167	1.313	0.265	-0.147	Pass
~~B2~~	Efficiency	12893.50	13166.98	95.92	-273.48	WARNING	29100.92	30219.00	221.39	-1118.08	FAIL
	Background	0.033	0.050	0.038	-0.017	Pass	1.267	1.245	0.286	0.022	Pass
B3	Efficiency	12703.00	12819.03	72.09	-116.02	Pass	37632.23	37636.03	370.99	-3.80	Pass
	Background	0.033	0.045	0.036	-0.012	Pass	1.167	1.323	0.199	-0.157	Pass
B4	Efficiency	13258.50	13562.15	106.71	-303.65	WARNING	36234.97	36687.47	274.36	-452.51	Pass
	Background	0.033	0.063	0.078	-0.030	Pass	0.833	1.110	0.223	-0.277	Pass
C1	Efficiency	11283.00	11574.75	171.09	-291.75	Pass	38196.48	38926.35	667.24	-729.87	Pass
	Background	0.133	0.045	0.039	0.088	Pass	0.667	1.037	0.207	-0.370	Pass
C2	Efficiency	10220.00	10567.03	124.39	-347.02	WARNING	39711.73	40028.95	1137.90	-317.22	Pass
	Background	0.033	0.035	0.038	-0.002	Pass	0.733	0.880	0.209	-0.147	Pass
C3	Efficiency	10493.00	10914.77	142.65	-421.77	WARNING	25927.72	26432.10	324.13	-504.38	Pass
	Background	0.000	0.060	0.061	-0.060	Pass	0.800	0.895	0.221	-0.095	Pass
C4	Efficiency	11417.50	11531.14	143.10	-113.64	Pass	36239.00	36664.47	510.82	-425.47	Pass
	Background	0.033	0.052	0.044	-0.018	Pass	0.700	0.985	0.202	-0.285	Pass
D1	Efficiency	10701.50	10804.80	97.81	-103.30	Pass	28459.53	28533.70	764.59	-74.17	Pass
	Background	0.000	0.020	0.023	-0.020	Pass	0.700	0.928	0.186	-0.228	Pass
D2	Efficiency	10815.50	10937.48	366.33	-121.98	Pass	25637.27	25621.58	660.46	15.70	Pass
	Background	0.033	0.042	0.048	-0.008	Pass	1.500	1.265	0.193	0.235	Pass
D3	Efficiency	10534.50	10664.18	160.79	-129.68	Pass	31624.16	31558.65	664.59	65.51	Pass
	Background	0.000	0.075	0.058	-0.075	Pass	0.633	1.060	0.464	-0.427	Pass
D4	Efficiency	11433.00	11248.23	154.70	184.77	Pass	31549.03	30711.30	757.47	837.73	Pass
	Background	0.000	0.053	0.048	-0.053	Pass	1.067	1.078	0.155	-0.012	Pass

SEVERN TRENT STL

Backgrounds
Yellow -December 2006

Group A	I.ID.	Time	Counts α	Counts β	BKG α	BKG β
1	BKG	1000	53	1043	0.05	1.04
2	BKG	1000	44	1085	0.04	1.09
3	BKG	1000	34	1181	0.03	1.18
4	BKG	1000	48	1008	0.05	1.01
Group B						
1	BKG	1000	49	1096	0.05	1.10
2	BKG	1000	39	1188	0.04	1.19
3	BKG	1000	37	1147	0.04	1.15
4	BKG	1000	25	992	0.03	0.99
Group C						
1	BKG	1000	48	955	0.05	0.96
2	BKG	1000	44	827	0.04	0.83
3	BKG	1000	43	930	0.04	0.93
4	BKG	1000	49	931	0.05	0.93
Group D						
1	BKG	1000	37	746	0.04	0.75
2	BKG	1000	46	1015	0.05	1.02
3	BKG	1000	75	726	0.08	0.73
4	BKG	1000	34	1006	0.03	1.01

SEVERN TRENT STL

Protean Long Backgrounds December 2006

SN	SAMPLE ID	TIME		ACPM	B	BCPM	COMMENT	BATCH ID
0	LB0	1/2/2007 6:38:11 AM	33	0.033	601	0.601	Long Background Detector 0	Long Backgrounds
1	LB1	1/2/2007 6:38:54 AM	63	0.063	484	0.484	Long Background Detector 1	Long Backgrounds
2	LB2	1/2/2007 6:38:56 AM	55	0.055	697	0.697	Long Background Detector 2	Long Backgrounds
3	LB3	1/2/2007 6:39:00 AM	47	0.047	490	0.49	Long Background Detector 3	Long Backgrounds
4	LB4	1/2/2007 6:39:15 AM	33	0.033	380	0.38	Long Background Detector 4	Long Backgrounds
5	LB5	1/2/2007 6:39:28 AM	48	0.048	378	0.378	Long Background Detector 5	Long Backgrounds
6	LB6	1/2/2007 6:39:36 AM	92	0.092	450	0.45	Long Background Detector 6	Long Backgrounds
7	LB7	1/2/2007 6:39:46 AM	43	0.043	531	0.531	Long Background Detector 7	Long Backgrounds
8	LB8	1/2/2007 6:39:50 AM	73	0.073	467	0.467	Long Background Detector 8	Long Backgrounds
9	LB9	1/2/2007 6:39:51 AM	36	0.036	323	0.323	Long Background Detector 9	Long Backgrounds
10	LB10	1/2/2007 6:40:09 AM	39	0.039	421	0.421	Long Background Detector 10	Long Backgrounds
11	LB11	1/2/2007 6:40:10 AM	59	0.059	457	0.457	Long Background Detector 11	Long Backgrounds
12	LB12	1/2/2007 6:40:37 AM	78	0.078	432	0.432	Long Background Detector 12	Long Backgrounds
13	LB13	1/2/2007 6:40:52 AM	62	0.062	399	0.399	Long Background Detector 13	Long Backgrounds
14	LB14	1/2/2007 6:40:53 AM	82	0.082	467	0.467	Long Background Detector 14	Long Backgrounds
15	LB15	1/2/2007 6:40:54 AM	68	0.068	379	0.379	Long Background Detector 15	Long Backgrounds

SEVERN TRENT STL

Long Backgrounds – Red
December 2006

Detector ID	Sample ID	Alpha	Beta	Guard	Count Count Time	Event	Voltage	TOD
A1	A1-01	43	1149	521570	1000	0	1410	39084.28
A2	A2-01	50	1361	521571	1000	0	1410	39084.28
A3	A3-01	47	1190	521571	1000	0	1410	39084.28
A4	A4-01	42	1535	521567	1000	0	1410	39084.28
B1	B1-01	39	1240	536137	1000	0	1440	39084.28
B2	B2-01	52	1254	536127	1000	0	1440	39084.28
B3	B3-01	21	1145	536125	1000	0	1440	39084.28
B4	B4-01	50	1200	536126	1000	0	1440	39084.28
C1	C1-01	41	1186	534942	1000	0	1410	39084.28
C2	C2-01	49	1250	534944	1000	0	1410	39084.28
C3	C3-01	22	1140	534941	1000	0	1410	39084.28
C4	C4-01	38	1291	534939	1000	0	1410	39084.28
D1	D1-01	54	1162	537196	1000	0	1410	39084.28
D2	D2-01	29	1126	537197	1000	0	1410	39084.28
D3	D3-01	55	1189	537196	1000	0	1410	39084.28
D4	D4-01	47	1373	537195	1000	0	1410	39084.28

SEVERN TRENT STL

Run Log

Logbook No.: 2906

STL
St. Louis Laboratory

Gas Proportional Counter Runlog

Date	Batch #	Sample #	Detector	Count Time	Analysis	Initials
1-26-7	7020031	F7A200000-031B	7	200 min	ABT	[illegible]
		-031CQ	9			
		-031CB	11			
1-26-7	7009195	F7A090000-195B	10		Ra-228	[illegible]
		-195C	12			
		F7A090121-001	14			
		-001X	15			
	M070476	LCS I	0		SR90	SR
		II	1			
		III	2			
		IV	3			
		V	5			
		VI	6			
1-27-07	Daily	Bkg + Source	0-15	30+2 min	QA	GS
1-27-07	7023132	F7A200137-001	1	600 min.	ABT	GS
		F7A190301-013	0			
		F7A200137-002	2			
		-003	3			
		-003Sa	4			
		-003X	6			
		-004	7			
		-005	8			
		F7A230000-132B	9			
		-132Ca	11			
1-28-07	Daily	Bkg + Source	0-15	30+2 min.	QA	GS
1-29-7	Daily	Bkg + Source	0-15	30 min + 2 min	QA	—
1-29-7	M070475	LCS I	0	200 min	Ra-228	—

Reviewed By: [signature] Date: 1-29-7

SOP References: STL-RD-0403 Rev 5 01/16/06
Form: SL-RAD-0025, Revised 8/14/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

Logbook No.: 2905

STL
St. Louis Laboratory

Gas Proportional Counter Runlog

Date	Batch #	Sample #	Detector	Count Time	Analysis	Initials
1-26-7	7020030	F7A190280-001	Red A2	200min	Ra-226	N
		-001SA	A4			
		-001SB	B2			
		-001X	B4			
		-002	C1			
		-003	C2			
		-004	C3			
		-005	C4			
		-006	D1			
		-007	D2			
		-008	D3			
		-009	D4			
		-010	Blue A1			
		-011	A2			
		-012	A4			
		-013	B2			
		F7A190294-001 ~~-014~~	B4			
		F7A200100-030B	C2			
		-030CA	C3			
		-030CB	C4			
1-26-7	7009195	F7A090121-002	Red A1	200min	Ra-226	N
		-003	A2			
		-004	A4			
		-005	B3			
		-006	B4			
		-007	C1			
		-008	C2			

Reviewed By: [signature] Date: 1-26-7

SOP References: STL-RD-0403 Rev 5 01/16/06
Form: SL-RAD-0025, Revised 8/14/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

Logbook No.: 2905

STL
St. Louis Laboratory

Gas Proportional Counter Runlog

Date	Batch #	Sample #	Detector	Count Time	Analysis	Initials
1-26-7	7009195	F7A090121-009	Red C3	200 min	Ra-226	✓
		-010	C4			
		-011	D1			
1-26-7	7018072	F7A170197-019	D2	200 min	Sr-90	✓
		-020	D3			
		-021	D4			
		F7A180000-072B	Blue A1			
		-072C	A2			
		-072D	A4			
1-26-7	7022211	F7A220000-211B	Blue ~~B3~~ B2		Sr	✓
		-211C	B4			
		F7A220121-001	C2			
		-001X	C3			
		-002	C4			
1-27-07	Daily	Bkg Source	Red/Blue	30+2 min.	QC	GS
1-27-07	7023132	F7A190301-001	Red A1	500 min.	AST	GS
		-002	A2			
		-003	A3			
		-004	A4			
		-004Sa	B3			
		-004X	B4			
		-005	C1			
		-006	C2			
		-007	C3			
		-008	C4			
		-009	D1			
		-010	D2			

Reviewed By: GS Date: 1-27-07

SOP References: STL-RD-0403 Rev 5 01/16/06
Form: SL-RAD-0025, Revised 8/14/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

SEVERN TRENT STL

Run Log

Logbook No.: 2849

STL
St. Louis Laboratory

Gas Proportional Counter Runlog
(Yellow)

Date	Time	Batch #	Filename	Sample #	Det.	Count Time	Analysis	Initials
1-25-7	8:13	—	Day611	Bkgd	—	30min	QA	
	9:02	—	DQC663	Sources	—	2min		
	9:07	—	664		—			
	9:59	—	665		—			
	10:02	—	667		—			
1-26-7	7:48	—	Day612	Bkgd	—	30min	QA	
	8:58	—	DQC668	Sources	—	2min		
	9:02	—	DQC669		—			
	9:34	—	DQC670		—	2min		
1-26-07	11:21	7010208	012607A.	D7A090265-001	A1	300min	Ra228	RL
				F7A100000-208B	A2			
				-208C	A4			
				-208L	B1			
		7009196		F7A090000-196B	B3			
				-196C	B4			
				F7A090121-001	C1			
				-001X	C2			
				-002	C3			
				-003	C4			
				-004	D1			
				-005	D2			
				-006	D3			
				-007	D4			
				-00				RL 1/26/07
1-26-7	15:59	7022211	0126078	F7A220121-003	A1	200min	TSr	
				-004	A2			
				-005	A4			

Reviewed By: _____ Date: 1-26-7

SOP References: STL-RD-0403 Rev 5 01/16/06
Form: SL-RAD-0053, Revised 7/26/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

SEVERN TRENT STL

Run Log

Logbook No.: 2906

STL
St. Louis Laboratory

Gas Proportional Counter Runlog

Date	Batch #	Sample #	Detector	Count Time	Analysis	Initials
1/24/07	7015077	F7A130154-010	5	200min	Sr90	KW
		-011	6			
		-012	7			
		F7A150000-077B	8			
		-077C	9			
1/25/7	Daily	Bkg + Source	0-15	30+2min	QA	JW/
1-26-7	Daily	Bkg + Source	0-15	30min Lunch	QA	—
1-26-07	7009196	F7A090121-008	0	200min	Ra228	DR
		-009	1			
		-010	2			
		-011	3			
	7020031	D7A180162-001	4		ABT	DR
		-001Sa	5			
		-001Sb	6			
		-001X	7			
		-002	9			
		-003	11			
		-004	12			
		-005	14			
		-006	15			
1-26-7	7010206	D7A090265-001	0	200min	Ra-226	—
		F7A190000-206B	1			
		-206C	2			
		-206L	3			
	7020031	D7A180162-007	4		ABT	—
		D7A190181-001	5			
		-002	6			

Reviewed By: _____ Date: 1-26-7

SOP References: STL-RD-0403 Rev 5 01/16/06
Form: SL-RAD-0025, Revised 8/14/06
QC Type Suffixes: B=Blank; C=Laboratory Control Sample; L=Laboratory Control Sample Duplicate; S=Matrix Spike; D=Matrix Spike Duplicate; X=Sample Duplicate.

SEVERN TRENT **STL**

Prep Report for Radium 226

Batch: 7009195 **Prep Analyst:** 403301

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

SampID	WRKNO	Aliquot	Gross / Tare	Mass / Ba Yield	Dilution	Ba Precipitation Time / BaYieldAdjusted	Carrier ID / Carrier Added
F7A090000-195B	JMJ831AA	1.0000g	9.0148g / 8.9792g	0.0356g / 105.01%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090000-195C	JMJ831AC	1.0000g	8.9891g / 8.9522g	0.0369g / 108.85%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-001	JMJ4V1AA	1.0151g	8.9813g / 8.9512g	0.0301g / 88.79%	1.00	1/26/07 10:20 / 88.79%	Ba 36 / 0.0339
F7A090121-001X	JMJ4V1AF	1.0048g	8.9963g / 8.9594g	0.0369g / 108.85%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-002	JMJ4W1AA	1.0214g	8.9967g / 8.9614g	0.0353g / 104.13%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-003	JMJ4X1AA	1.0067g	8.9814g / 8.9434g	0.0380g / 112.09%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-004	JMJ401AA	1.0119g	9.0418g / 9.0061g	0.0357g / 105.31%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-005	JMJ411AA	1.0082g	8.9890g / 8.9534g	0.0356g / 105.01%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-006	JMJ421AA	1.0106g	9.0305g / 8.9950g	0.0355g / 104.72%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-007	JMJ461AA	1.0011g	8.9869g / 8.9518g	0.0351g / 103.54%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-008	JMJ471AA	1.0016g	9.0302g / 8.9891g	0.0411g / 121.24%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-009	JMJ491AA	1.0139g	8.9960g / 8.9525g	0.0435g / 128.32%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-010	JMJ5A1AA	1.0011g	8.9721g / 8.9299g	0.0422g / 124.48%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339
F7A090121-011	JMJ5C1AA	1.0018g	9.0013g / 8.9670g	0.0343g / 101.18%	1.00	1/26/07 10:20 / 100%	Ba 36 / 0.0339

Spike Information

Sample ID	Standard ID	Analyte	Std Conc	Aliquot	Ref Date	StdAdded
F7A090000-195C	rad06-0058	RA-226	2.502E+001 dpm/mL	1.00 mL	9/9/1991 12:00:00AM	1.120E+001 pCi/g

JB — Spiked By

Spike Verified By

01-12-07 — Spike Date

SampID	WRKNO	Aliquot	Gross / Tare	Mass / Ba Yield	Dilution	Ba Precipitation Time / BaYieldAdjusted	Carrier ID / Carrier Added

Standard Operating Procedures

SOPNumber	Title	Revision
☑ STL-RC-0002	Planchet Preparation For Radiochemistry And Radiological Screening Analysis	4.00
☐ STL-RC-0003	Drying And Grinding Of Soil And Solid Samples	6.00
☐ STL-RC-0004	Preparation Of Soil, Sludge, And Filter Paper Samples For Radiochemical Analysis	10.00
☐ STL-RC-0040	Total Alpha Emitting Isotopes Of Radium	3.00
☐ STL-RD-0403	Daily Calibration Verification And Maintenance Of The Low Background Gas Flow Proportional Counting System	3.00

Reviewed By	Review Date		
	1/26/7		
Analyst/Relenquished By	Release Date	Received By	Receipt Date
	01-26-07		1/26/7

SEVERN TRENT **STL**

Prep Report for Radium 228

Batch: 7009196 **Prep Analyst:** 403301

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

SampID	WRKNO	Aliquot		Carrier ID	Carrier Added	Gross	Tare	Mass	Yield	Adj Yield	Precip Time
F7A090000-196B	JMJ891AA	1.0000g	Ba:	Ba 36	0.0339 g	9.0148 g	8.9792 g	0.0356 g	105.01%	100%	1/12/07 16:00
			Y:	Y 42A	0.0182	8.9829	8.9664	0.0165	90.66%	90.66%	1/26/07 8:30
		Yellow B3			012607A	11:21					
F7A090000-196C	JMJ891AC	1.0000g	Ba:	Ba 36	0.0339 g	8.9891 g	8.9522 g	0.0369 g	108.85%	100%	1/12/07 16:00
		B4	Y:	Y 42A	0.0182	9.0402	9.0247	0.0155	85.16%	85.16%	1/26/07 8:30
F7A090121-001	JMJ4V1AC	1.0151g	Ba:	Ba 36	0.0339 g	8.9813 g	8.9512 g	0.0301 g	88.79%	88.79%	1/12/07 16:00
		C1	Y:	Y 42A	0.0182	8.9880	8.9729	0.0151	82.97%	82.97%	1/26/07 8:30
F7A090121-001X	JMJ4V1AG	1.0048g	Ba:	Ba 36	0.0339 g	8.9963 g	8.9594 g	0.0369 g	108.85%	100%	1/12/07 16:00
		C2	Y:	Y 42A	0.0182	9.0093	8.9933	0.0160	87.91%	87.91%	1/26/07 8:30
F7A090121-002	JMJ4W1AC	1.0214g	Ba:	Ba 36	0.0339 g	8.9967 g	8.9614 g	0.0353 g	104.13%	100%	1/12/07 16:00
		C3	Y:	Y 42A	0.0182	9.0074	8.9922	0.0152	83.52%	83.52%	1/26/07 8:30
F7A090121-003	JMJ4X1AC	1.0067g	Ba:	Ba 36	0.0339 g	8.9814 g	8.9434 g	0.0380 g	112.09%	100%	1/12/07 16:00
		C4	Y:	Y 42A	0.0182	8.9554	8.9374	0.0180	98.90%	98.90%	1/26/07 8:30
F7A090121-004	JMJ401AC	1.0119g	Ba:	Ba 36	0.0339 g	9.0418 g	9.0061 g	0.0357 g	105.31%	100%	1/12/07 16:00
		D1	Y:	Y 42A	0.0182	8.9714	8.9524	0.0190	104.40%	100%	1/26/07 8:30
F7A090121-005	JMJ411AC	1.0082g	Ba:	Ba 36	0.0339 g	8.9890 g	8.9534 g	0.0356 g	105.01%	100%	1/12/07 16:00
		D2	Y:	Y 42A	0.0182	8.9903	8.9733	0.0170	93.41%	93.41%	1/26/07 8:30
F7A090121-006	JMJ421AC	1.0106g	Ba:	Ba 36	0.0339 g	9.0305 g	8.9950 g	0.0355 g	104.72%	100%	1/12/07 16:00
		D3	Y:	Y 42A	0.0182	8.9975	8.9799	0.0176	96.70%	96.70%	1/26/07 8:30
F7A090121-007	JMJ461AC	1.0011g	Ba:	Ba 36	0.0339 g	8.9869 g	8.9518 g	0.0351 g	103.54%	100%	1/12/07 16:00
		D4	Y:	Y 42A	0.0182	8.9686	8.9529	0.0157	86.26%	86.26%	1/26/07 8:30
F7A090121-008	JMJ471AC	1.0016g	Ba:	Ba 36	0.0339 g	9.0302 g	8.9891 g	0.0411 g	121.24%	100%	1/12/07 16:00
		O	Y:	Y 42A	0.0182	8.9781	8.9607	0.0174	95.60%	95.60%	1/26/07 8:30

SampID	WRKNO	Aliquot		Carrier ID	Carrier Added	Gross	Tare	Mass	Yield	Adj Yield	Precip Time
F7A090121-009	JMJ491AC	1.0139g	*Ba:*	Ba 36	0.0339 g	8.9960 g	8.9525 g	0.0435 g	128.32%	100%	1/12/07 16:00
		1	*Y:*	Y 42A	0.0182	8.9881	8.9715	0.0166	91.21%	91.21%	1/26/07 8:30
F7A090121-010	JMJ5A1AC	1.0011g	*Ba:*	Ba 36	0.0339 g	8.9721 g	8.9299 g	0.0422 g	124.48%	100%	1/12/07 16:00
		2	*Y:*	Y 42A	0.0182	8.9755	8.9558	0.0197	108.24%	100%	1/26/07 8:30
F7A090121-011	JMJ5C1AC	1.0018g	*Ba:*	Ba 36	0.0339 g	9.0013 g	8.9670 g	0.0343 g	101.18%	100%	1/12/07 16:00
		3	*Y:*	Y 42A	0.0182	8.9631	8.9467	0.0164	90.11%	90.11%	1/26/07 8:30

Spike Information

Sample ID	Standard ID	Analyte	Std Conc	Aliquot	Ref Date	StdAdded
F7A090000-196C	RAD06-0057	RA-228	2.324E+001 dpm/mL	1.00 mL	2/6/2006 12:00:00AM	9.482E+000 pCi/g

JB — Spiked By

SD — Spike Verified By

01-12-07 — Spike Date

Standard Operating Procedures

	SOPNumber	Title	Revision
☑	STL-RC-0002	Planchet Preparation For Radiochemistry And Radiological Screening Analysis	4.00
☐	STL-RC-0003	Drying And Grinding Of Soil And Solid Samples	6.00
☑	STL-RC-0004	Preparation Of Soil, Sludge, And Filter Paper Samples For Radiochemical Analysis	10.00
☑	STL-RC-0041	Radium 228 In Water	3.00
☐	STL-RD-0403	Daily Calibration Verification And Maintenance Of The Low Background Gas Flow Proportional Counting System	3.00

& — Reviewed By

1/26/7 — Review Date

SD — Analyst/Relinquished By

01-26-07 — Release Date

RR — Received By

01-26-07 — Receipt Date

- reprint per missing weight data. & 1/26/7

Low Level Alpha/Beta Count Results
Sample Activity Report

Instrument 3 - C **Address:** *10*

Sample ID *F7A090000-195B* **Repeat** *1*

Batch ID *7009195*

Count Routine *Gross Alpha Beta* **Detector Volts** *1,515.0*

Sample Qty 0.000 **sd** 0.000

Residual Wt 0.000 *mg* **sd** 0.000 *mg*

Count Date 1/26/2007 15:22 **Collection Date 1** **Half Life** 0.00 *days*
Collection Date 2 **Decay Factor** 1.000

Sample Count Time 200.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.039	11	0.055	0.016
sd	0.000			0.006	3.317	0.017	0.018
Alpha to Beta	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.421	59	0.295	-0.126
sd	0.000			0.021	7.681	0.038	0.056

	Net Activity dpm	LLD dpm	Net Concentration *	MDC	Limits	% of Limits
Alpha	0.000	0.000	0.000 ± 0.000	0.000	1.000	0.000
sd	0.000		0.000			
Beta	0.000	0.000	0.000 ± 0.000	0.000	1.000	0.000
sd	0.000		0.000			

*** Note: Decay Corrected MDC Method -** **Tb = Ts < 10**
Error = 0.00 **x sd**

Low Level Alpha/Beta Count Results
Sample Activity Report

Instrument 4 - A **Address:** *12*

Sample ID *F7A090000-195C* **Repeat** *1*

Batch ID *7009195*

Count Routine *Gross Alpha Beta* **Detector Volts** *1,515.0*

Sample Qty 0.000 **sd** 0.000

Residual Wt 0.000 *mg* **sd** 0.000 *mg*

Count Date 1/26/2007 15:22 **Collection Date 1** **Half Life** 0.00 *days*
Collection Date 2 **Decay Factor** 1.000

Sample Count Time 200.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.078	1,048	5.240	5.162
sd	0.000			0.009	32.373	0.162	0.162
Alpha to Beta	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.432	1,367	6.835	6.403
sd	0.000			0.021	36.973	0.185	0.186

	Net Activity dpm	LLD dpm	Net Concentration *	MDC	Limits	% of Limits
Alpha	0.000	0.000	0.000 ± 0.000	0.000	1.000	0.000
sd	0.000		0.000			
Beta	0.000	0.000	0.000 ± 0.000	0.000	1.000	0.000
sd	0.000		0.000			

* Note: Decay Corrected MDC Method - Tb = Ts < 10
Error = 0.00 x sd

Low Level Alpha/Beta Count Results
Sample Activity Report

Instrument 4 - C **Address:** *14*

Sample ID *F7A090121-001* **Repeat** *1*

Batch ID *7009195*

Count Routine *Gross Alpha Beta* **Detector Volts** *1,515.0*

Sample Qty 0.000 **sd** 0.000

Residual Wt 0.000 *mg* **sd** 0.000 *mg*

Count Date 1/26/2007 15:22 **Collection Date 1** **Half Life** 0.00 *days*
Collection Date 2 **Decay Factor** 1.000

Sample Count Time 200.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.082	85	0.425	0.343
sd	0.000			0.009	9.220	0.046	0.047
Alpha to Beta	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.467	139	0.695	0.228
sd	0.000			0.022	11.790	0.059	0.063

	Net Activity dpm	LLD dpm	Net Concentration *	MDC	Limits	% of Limits
Alpha	0.000	0.000	0.000 ± 0.000	0.000	1.000	0.000
sd	0.000		0.000			
Beta	0.000	0.000	0.000 ± 0.000	0.000	1.000	0.000
sd	0.000		0.000			

* Note: Decay Corrected MDC Method - Tb = Ts < 10
Error = 0.00 x sd

Low Level Alpha/Beta Count Results
Sample Activity Report

Instrument 4 - D **Address:** *15*

Sample ID *F7A090121-001X* **Repeat** *1*

Batch ID *7009195*

Count Routine *Gross Alpha Beta* **Detector Volts** *1,515.0*

Sample Qty 0.000 **sd** 0.000

Residual Wt 0.000 *mg* **sd** 0.000 *mg*

Count Date 1/26/2007 15:22 **Collection Date 1** **Half Life** 0.00 *days*
Collection Date 2 **Decay Factor** 1.000

Sample Count Time 200.00 *mins* **Background Count Time** 1,000.00 *mins*

	Efficiency %	Attenuation Factor	Activity Divisor	Background cpm	Gross counts	Gross cpm	Net cpm
Alpha	0.000	1.000	1.000	0.068	111	0.555	0.487
sd	0.000			0.008	10.536	0.053	0.053
Alpha to Beta	0.000	1.000				0.000	
sd	0.000					0.000	
Beta	0.000	1.000	1.000	0.379	185	0.925	0.546
sd	0.000			0.019	13.601	0.068	0.071

	Net Activity dpm	LLD dpm	Net Concentration *	MDC	Limits	% of Limits
Alpha	0.000	0.000	0.000 ± 0.000	0.000	1.000	0.000
sd	0.000		0.000			
Beta	0.000	0.000	0.000 ± 0.000	0.000	1.000	0.000
sd	0.000		0.000			

* Note: Decay Corrected MDC Method - Tb = Ts < 10
Error = 0.00 x sd

SEVERN TRENT SERVICES

LB4100/W General Counting Application

Unit Type: LB4100/W
Counting Unit ID: Red
Data file name: 7009195

Reviewed By: SE

Batch ID: RA226 IV 1/26/7 IV

Date: 1/26/7

Sample ID		Det. ID	Count Date/Time	Count Duration	Sample Alpha	Sample Beta	Bkgd Time	Background Alpha	Background Beta	CalType	Net CPM Alpha	Net CPM Beta
F7A090121-002	Red	A1	1/26/2007 15:25	200	164	360	1000	43	1149	1	0.78	0.65
F7A090121-003	Red	A2	1/26/2007 15:25	200	111	402	1000	50	1361	1	0.51	0.65
F7A090121-004	Red	A4	1/26/2007 15:25	200	128	421	1000	42	1535	1	0.60	0.57
F7A090121-005	Red	B3	1/26/2007 15:25	200	98	387	1000	21	1145	1	0.47	0.79
F7A090121-006	Red	B4	1/26/2007 15:25	200	123	343	1000	50	1200	1	0.57	0.52
F7A090121-007	Red	C1	1/26/2007 15:26	200	114	336	1000	41	1186	1	0.53	0.49
F7A090121-008	Red	C2	1/26/2007 15:26	200	127	418	1000	49	1250	1	0.59	0.84
F7A090121-009	Red	C3	1/26/2007 15:26	200	122	383	1000	22	1140	1	0.59	0.78
F7A090121-010	Red	C4	1/26/2007 15:26	200	102	391	1000	38	1291	1	0.47	0.66
F7A090121-011	Red	D1	1/26/2007 15:26	200	140	383	1000	54	1162	1	0.65	0.75

		F7A090000-196B	200.00	10	265	0.00	0.00	0.04	1.15
	4	F7A090000-196C	200.00	26	1104	0.00	0.00	0.03	0.99
GROUP C	1	F7A090121-001	200.00	27	271	0.00	0.00	0.05	0.96
11:21:30	2	F7A090121-001X	200.00	18	243	0.00	0.00	0.04	0.83
200.00	3	F7A090121-002	200.00	21	273	0.00	0.00	0.04	0.93
	4	F7A090121-003	200.00	15	265	0.00	0.00	0.05	0.93
GROUP D	1	F7A090121-004	200.00	9	245	0.00	0.00	0.04	0.75
11:21:30	2	F7A090121-005	200.00	13	303	0.00	0.00	0.05	1.02
200.00	3	F7A090121-006	200.00	36	221	0.00	0.00	0.08	0.73
	4	F7A090121-007	200.00	16	280	0.00	0.00	0.03	1.01

Group C channel 3 COUNT TERMINATED

[TENNELEC LB4000] [PAGE 1]

14:48:41		I.D.	TIME	COUNTS α	COUNTS β	αEFF	βEFF	BKGα	BKGβ
GROUP A	1	D7A090265-001	200.00	12	232	0.00	0.00	0.05	1.04
11:21:30	2	F7A100000-208B	200.00	12	250	0.00	0.00	0.04	1.09
200.00	3		0.00	0	0	0.00	0.00	0.03	1.18
	4	F7A100000-208C	200.00	31	1201	0.00	0.00	0.05	1.01
GROUP B	1	F7A100000-208L	200.00	39	1255	0.00	0.00	0.05	1.10
11:21:30	2		0.00	0	0	0.00	0.00	0.04	1.19
200.00	3	F7A090000-196B	200.00	10	265	0.00	0.00	0.04	1.15
	4	F7A090000-196C	200.00	26	1104	0.00	0.00	0.03	0.99
GROUP C	1	F7A090121-001	200.00	27	271	0.00	0.00	0.05	0.96
11:21:30	2	F7A090121-001X	200.00	18	243	0.00	0.00	0.04	0.83
200.00	3	F7A090121-002	200.00	21	273	0.00	0.00	0.04	0.93
	4	F7A090121-003	200.00	15	265	0.00	0.00	0.05	0.93
GROUP D	1	F7A090121-004	200.00	9	245	0.00	0.00	0.04	0.75
11:21:30	2	F7A090121-005	200.00	13	303	0.00	0.00	0.05	1.02
200.00	3	F7A090121-006	200.00	36	221	0.00	0.00	0.08	0.73
	4	F7A090121-007	200.00	16	280	0.00	0.00	0.03	1.01

Group C channel 3 COUNT TERMINATED

YELLOW

Filename 012607A.

Date 1/26/07

Analyst RR

Nuclide Ra228

Batch 7009196

7010208

SEVERN TRENT STL

Protean Alpha/Beta Calibration

2006

SEVERN TRENT STL

Protean Alpha Calibration

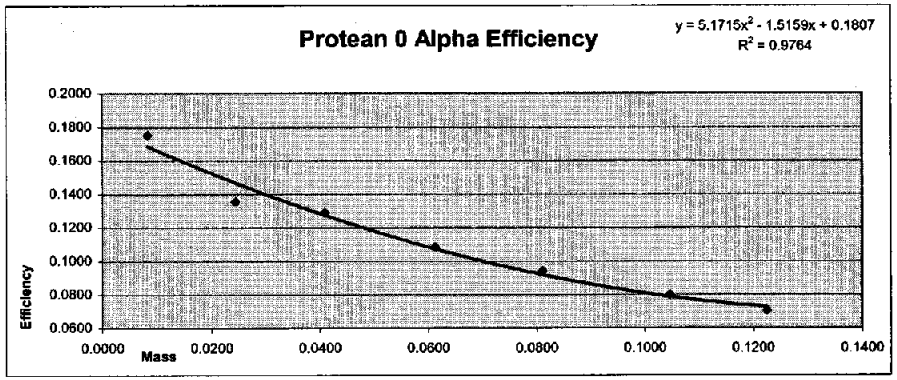
2006

SEVERN TRENT STL

Detector Efficiency Curves

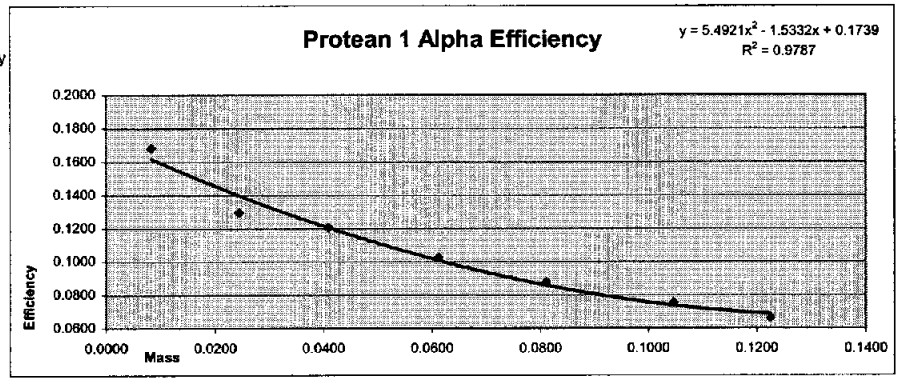
Protean 0 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1823	0.1682	0.1753
0.0249	0.0240	0.0245	0.1421	0.1289	0.1355
0.0406	0.0412	0.0409	0.1293	0.1288	0.1291
0.0611	0.0613	0.0612	0.0998	0.1170	0.1084
0.0800	0.0821	0.0811	0.0960	0.0924	0.0942
0.1037	0.1055	0.1046	0.0790	0.0812	0.0801
0.1217	0.1234	0.1226	0.0702	0.0708	0.0705



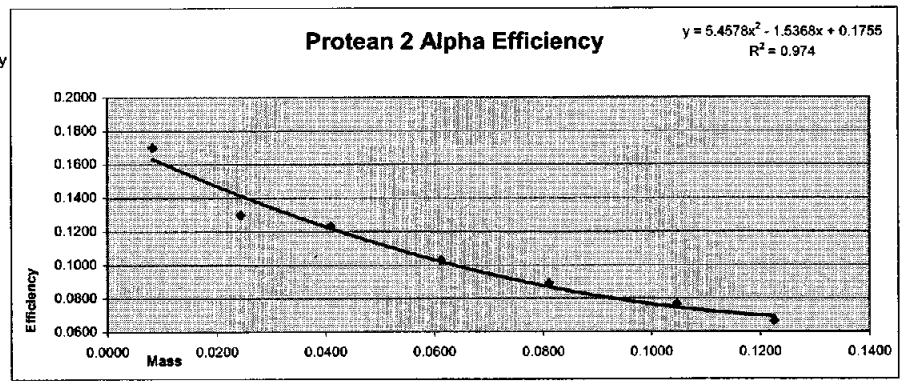
Protean 1 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1761	0.1601	0.1681
0.0249	0.0240	0.0245	0.1357	0.1237	0.1297
0.0406	0.0412	0.0409	0.1210	0.1203	0.1207
0.0611	0.0613	0.0612	0.0950	0.1100	0.1025
0.0800	0.0821	0.0811	0.0893	0.0862	0.0878
0.1037	0.1055	0.1046	0.0741	0.0771	0.0756
0.1217	0.1234	0.1226	0.0658	0.0665	0.0661



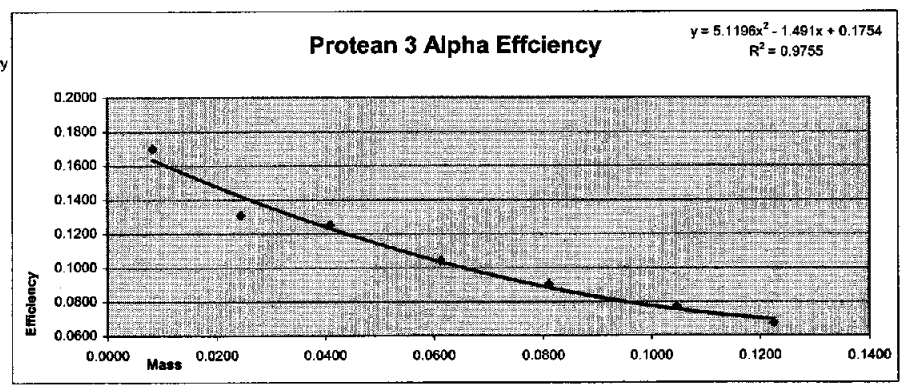
Protean 2 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1775	0.1628	0.1702
0.0249	0.0240	0.0245	0.1357	0.1238	0.1298
0.0406	0.0412	0.0409	0.1240	0.1224	0.1232
0.0611	0.0613	0.0612	0.0948	0.1113	0.1031
0.0800	0.0821	0.0811	0.0903	0.0876	0.0890
0.1037	0.1055	0.1046	0.0755	0.0778	0.0766
0.1217	0.1234	0.1226	0.0660	0.0671	0.0665



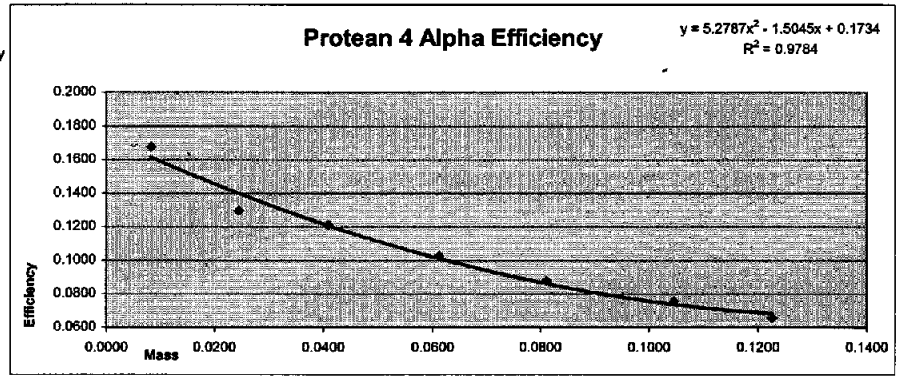
Protean 3 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1766	0.1634	0.1700
0.0249	0.0240	0.0245	0.1377	0.1239	0.1308
0.0406	0.0412	0.0409	0.1257	0.1243	0.1250
0.0611	0.0613	0.0612	0.0962	0.1121	0.1042
0.0800	0.0821	0.0811	0.0923	0.0880	0.0902
0.1037	0.1055	0.1046	0.0762	0.0784	0.0773
0.1217	0.1234	0.1226	0.0672	0.0673	0.0672



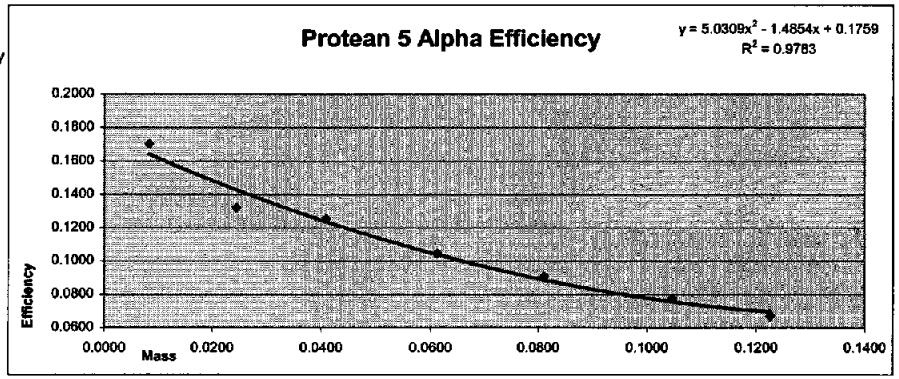
Protean 4 08/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1733	0.1622	0.1677
0.0249	0.0240	0.0245	0.1345	0.1248	0.1296
0.0406	0.0412	0.0409	0.1213	0.1210	0.1211
0.0611	0.0613	0.0612	0.0944	0.1113	0.1028
0.0800	0.0821	0.0811	0.0891	0.0867	0.0879
0.1037	0.1055	0.1046	0.0750	0.0768	0.0759
0.1217	0.1234	0.1226	0.0647	0.0669	0.0658



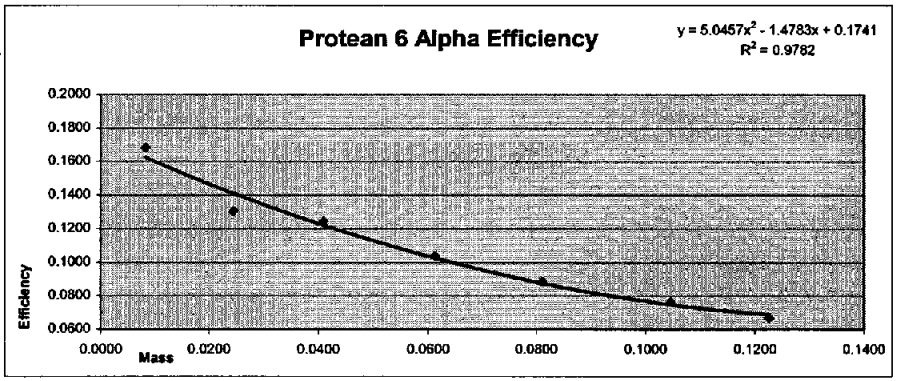
Protean 5 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1766	0.1639	0.1703
0.0249	0.0240	0.0245	0.1389	0.1254	0.1321
0.0406	0.0412	0.0409	0.1263	0.1245	0.1254
0.0611	0.0613	0.0612	0.0965	0.1125	0.1045
0.0800	0.0821	0.0811	0.0919	0.0894	0.0906
0.1037	0.1055	0.1046	0.0774	0.0776	0.0775
0.1217	0.1234	0.1226	0.0665	0.0677	0.0671



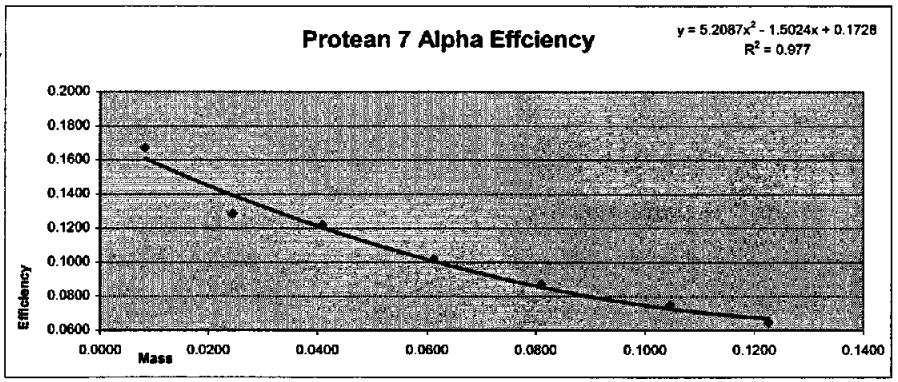
Protean 6 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1758	0.1608	0.1683
0.0249	0.0240	0.0245	0.1346	0.1262	0.1304
0.0406	0.0412	0.0409	0.1249	0.1238	0.1243
0.0611	0.0613	0.0612	0.0954	0.1120	0.1037
0.0800	0.0821	0.0811	0.0898	0.0874	0.0886
0.1037	0.1055	0.1046	0.0758	0.0771	0.0765
0.1217	0.1234	0.1226	0.0663	0.0671	0.0667



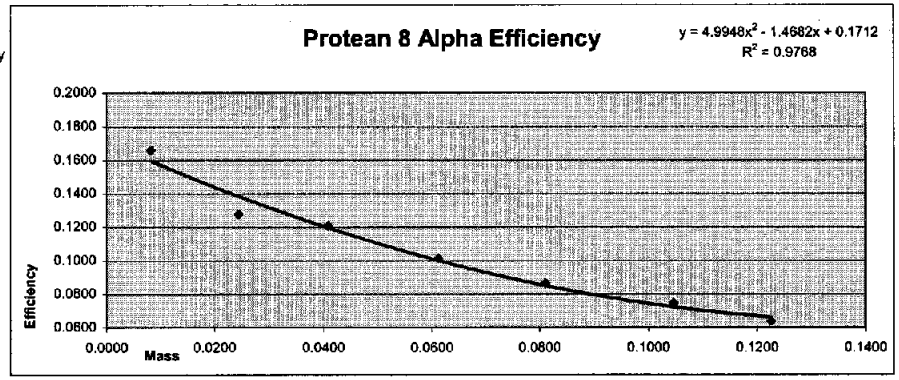
Protean 7 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1732	0.1613	0.1672
0.0249	0.0240	0.0245	0.1343	0.1226	0.1284
0.0406	0.0412	0.0409	0.1227	0.1207	0.1217
0.0611	0.0613	0.0612	0.0927	0.1108	0.1017
0.0800	0.0821	0.0811	0.0883	0.0856	0.0869
0.1037	0.1055	0.1046	0.0733	0.0761	0.0747
0.1217	0.1234	0.1226	0.0636	0.0656	0.0646



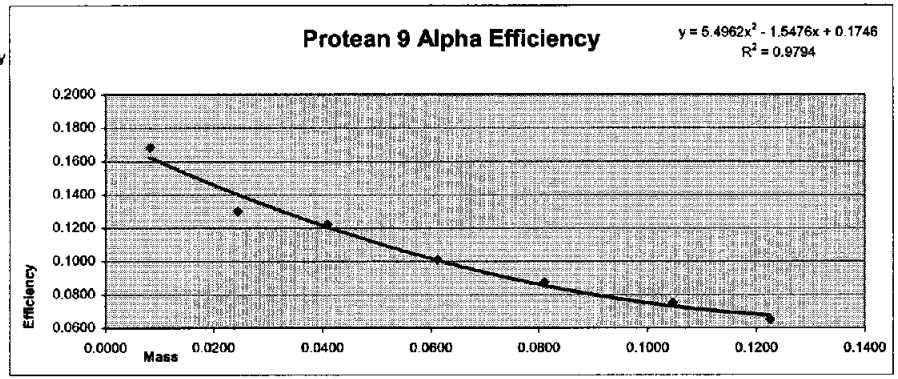
Protean 8 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1715	0.1604	0.1659
0.0249	0.0240	0.0245	0.1333	0.1221	0.1277
0.0406	0.0412	0.0409	0.1206	0.1211	0.1209
0.0611	0.0613	0.0612	0.0932	0.1099	0.1016
0.0800	0.0821	0.0811	0.0864	0.0867	0.0866
0.1037	0.1055	0.1046	0.0728	0.0765	0.0746
0.1217	0.1234	0.1226	0.0624	0.0653	0.0638



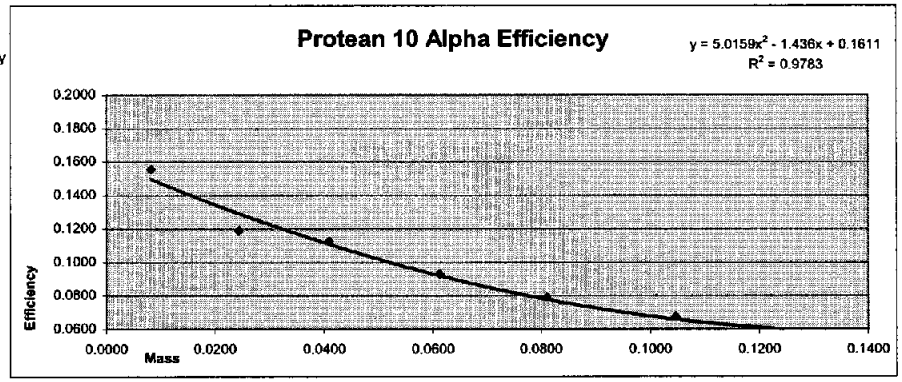
Protean 9 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1733	0.1635	0.1684
0.0249	0.0240	0.0245	0.1340	0.1258	0.1299
0.0406	0.0412	0.0409	0.1211	0.1232	0.1222
0.0611	0.0613	0.0612	0.0917	0.1102	0.1010
0.0800	0.0821	0.0811	0.0878	0.0870	0.0874
0.1037	0.1055	0.1046	0.0727	0.0776	0.0751
0.1217	0.1234	0.1226	0.0640	0.0660	0.0650



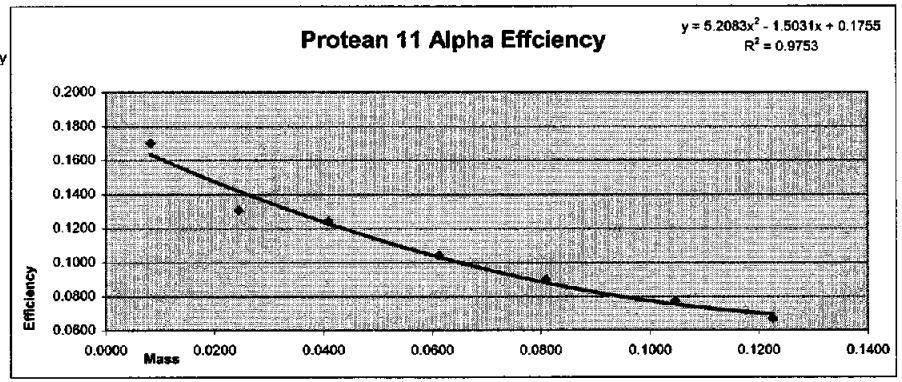
Protean 10 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1608	0.1501	0.1554
0.0249	0.0240	0.0245	0.1238	0.1141	0.1190
0.0406	0.0412	0.0409	0.1120	0.1132	0.1126
0.0611	0.0613	0.0612	0.0846	0.1016	0.0931
0.0800	0.0821	0.0811	0.0795	0.0786	0.0791
0.1037	0.1055	0.1046	0.0661	0.0689	0.0675
0.1217	0.1234	0.1226	0.0569	0.0598	0.0584



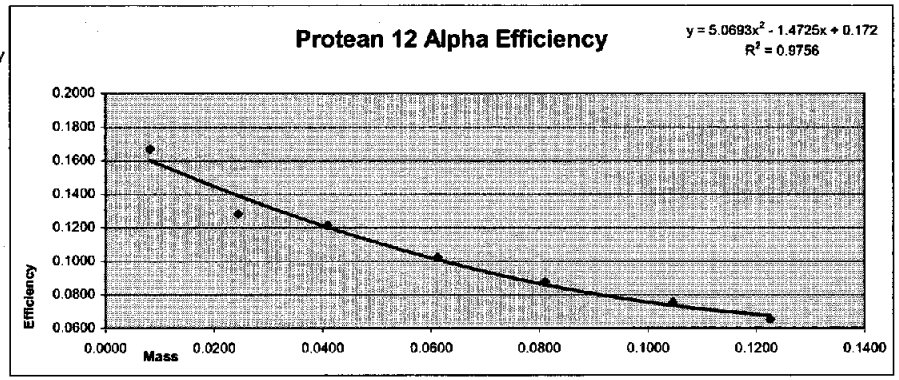
Protean 11 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1750	0.1654	0.1702
0.0249	0.0240	0.0245	0.1346	0.1268	0.1307
0.0406	0.0412	0.0409	0.1245	0.1238	0.1241
0.0611	0.0613	0.0612	0.0942	0.1140	0.1041
0.0800	0.0821	0.0811	0.0902	0.0898	0.0900
0.1037	0.1055	0.1046	0.0753	0.0793	0.0773
0.1217	0.1234	0.1226	0.0648	0.0692	0.0670



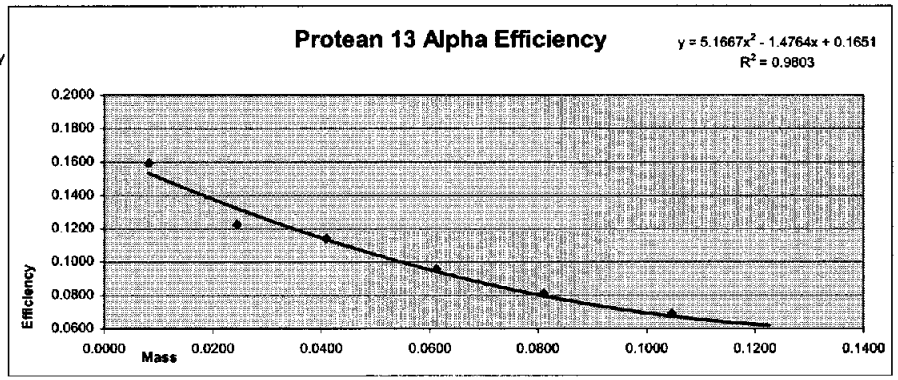
Protean 12 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1720	0.1618	0.1669
0.0249	0.0240	0.0245	0.1323	0.1241	0.1282
0.0406	0.0412	0.0409	0.1200	0.1229	0.1214
0.0611	0.0613	0.0612	0.0918	0.1130	0.1024
0.0800	0.0821	0.0811	0.0886	0.0873	0.0880
0.1037	0.1055	0.1046	0.0734	0.0776	0.0755
0.1217	0.1234	0.1226	0.0645	0.0661	0.0653



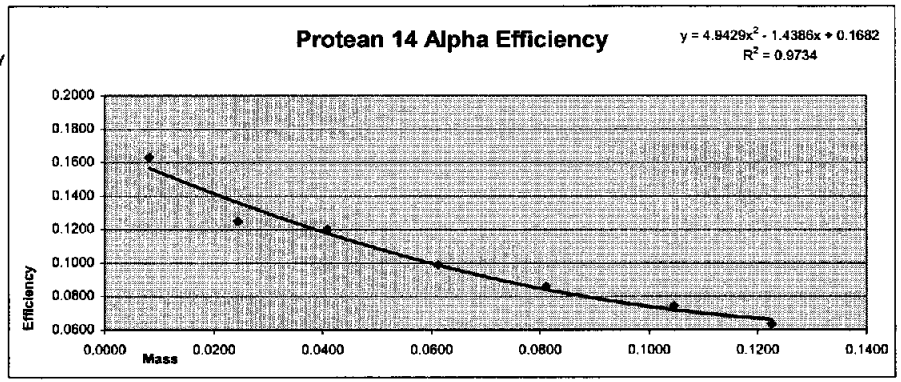
Protean 13 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1633	0.1553	0.1593
0.0249	0.0240	0.0245	0.1264	0.1186	0.1225
0.0406	0.0412	0.0409	0.1134	0.1147	0.1141
0.0611	0.0613	0.0612	0.0869	0.1045	0.0957
0.0800	0.0821	0.0811	0.0819	0.0801	0.0810
0.1037	0.1055	0.1046	0.0675	0.0706	0.0691
0.1217	0.1234	0.1226	0.0590	0.0602	0.0596



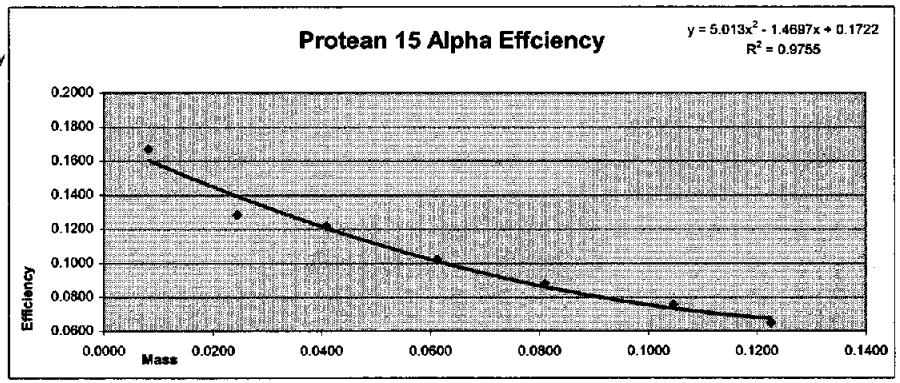
Protean 14 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1708	0.1556	0.1632
0.0249	0.0240	0.0245	0.1308	0.1190	0.1249
0.0406	0.0412	0.0409	0.1193	0.1209	0.1201
0.0611	0.0613	0.0612	0.0903	0.1075	0.0989
0.0800	0.0821	0.0811	0.0864	0.0857	0.0861
0.1037	0.1055	0.1046	0.0724	0.0762	0.0743
0.1217	0.1234	0.1226	0.0618	0.0652	0.0635



Protean 15 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1722	0.1620	0.1671
0.0249	0.0240	0.0245	0.1324	0.1242	0.1283
0.0406	0.0412	0.0409	0.1215	0.1219	0.1217
0.0611	0.0613	0.0612	0.0931	0.1115	0.1023
0.0800	0.0821	0.0811	0.0882	0.0878	0.0880
0.1037	0.1055	0.1046	0.0740	0.0770	0.0755
0.1217	0.1234	0.1226	0.0636	0.0660	0.0648



Alpha Attenuation Protean Detector 0
07_2006

Data Set 1

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
0	A11	0.0084	40.00	33311	832.775	4567.9	0.1823
0	A12	0.0160	40.00	36134	903.350	4567.9	0.1978
0	A13	0.0249	40.00	25973	649.325	4567.9	0.1421
0	A14	0.0406	40.00	23623	590.575	4567.9	0.1293
0	A15	0.0611	40.00	18241	456.025	4567.9	0.0998
0	A16	0.0800	40.00	35087	877.175	9135.8	0.0960
0	A17	0.1037	40.00	28865	721.625	9135.8	0.0790
0	A18	0.1217	40.00	25645	641.125	9135.8	0.0702

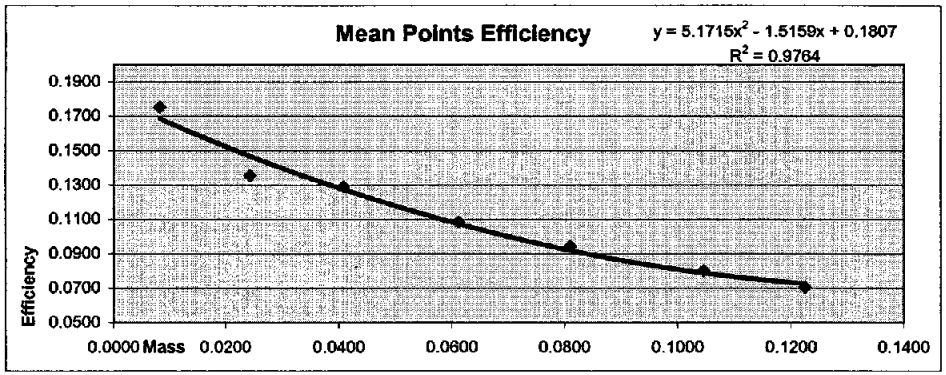
Alpha Attenuation Protean Detector 0
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
0	A21	0.0081	40.00	30735	768.375	4567.9	0.1682
0	A22	0.0161	40.00	24993	624.825	4567.9	0.1368
0	A23	0.0240	40.00	23561	589.025	4567.9	0.1289
0	A24	0.0412	40.00	23539	588.475	4567.9	0.1288
0	A25	0.0613	40.00	21384	534.600	4567.9	0.1170
0	A26	0.0821	40.00	33766	844.150	9135.8	0.0924
0	A27	0.1055	40.00	29687	742.175	9135.8	0.0812
0	A28	0.1234	40.00	25881	647.025	9135.8	0.0708

Protean 0

Protean 0 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1823	0.1682	0.1753	4.02%	-4.02%
0.0249	0.0240	0.0245	0.1421	0.1289	0.1355	4.87%	-4.87%
0.0406	0.0412	0.0409	0.1293	0.1288	0.1291	0.18%	-0.18%
0.0611	0.0613	0.0612	0.0998	0.1170	0.1084	-7.93%	7.93%
0.0800	0.0821	0.0811	0.0960	0.0924	0.0942	1.92%	-1.92%
0.1037	0.1055	0.1046	0.0790	0.0812	0.0801	-1.40%	1.40%
0.1217	0.1234	0.1226	0.0702	0.0708	0.0705	-0.46%	0.46%



Alpha Attenuation Protean Detector 1
07_2006

Data Set 1

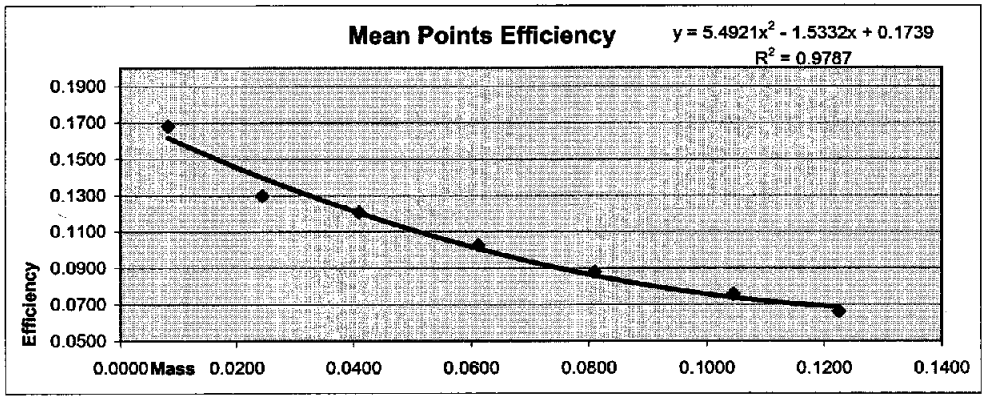
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
1	A11	0.0084	40.00	32170	804.250	4567.9	0.1761
1	A12	0.0160	40.00	34394	859.850	4567.9	0.1882
1	A13	0.0249	40.00	24799	619.975	4567.9	0.1357
1	A14	0.0406	40.00	22116	552.900	4567.9	0.1210
1	A15	0.0611	40.00	17360	434.000	4567.9	0.0950
1	A16	0.0800	40.00	32632	815.800	9135.8	0.0893
1	A17	0.1037	40.00	27075	676.875	9135.8	0.0741
1	A18	0.1217	40.00	24043	601.075	9135.8	0.0658

Alpha Attenuation Protean Detector 1
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
1	A21	0.0081	40.00	29260	731.500	4567.9	0.1601
1	A22	0.0161	40.00	24189	604.725	4567.9	0.1324
1	A23	0.0240	40.00	22598	564.950	4567.9	0.1237
1	A24	0.0412	40.00	21977	549.425	4567.9	0.1203
1	A25	0.0613	40.00	20092	502.300	4567.9	0.1100
1	A26	0.0821	40.00	31517	787.925	9135.8	0.0862
1	A27	0.1055	40.00	28167	704.175	9135.8	0.0771
1	A28	0.1234	40.00	24291	607.275	9135.8	0.0665

Protean 1 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1761	0.1601	0.1681	4.74%	-4.74%
0.0249	0.0240	0.0245	0.1357	0.1237	0.1297	4.64%	-4.64%
0.0406	0.0412	0.0409	0.1210	0.1203	0.1207	0.32%	-0.32%
0.0611	0.0613	0.0612	0.0950	0.1100	0.1025	-7.29%	7.29%
0.0800	0.0821	0.0811	0.0893	0.0862	0.0878	1.74%	-1.74%
0.1037	0.1055	0.1046	0.0741	0.0771	0.0756	-1.98%	1.98%
0.1217	0.1234	0.1226	0.0658	0.0665	0.0661	-0.51%	0.51%



Alpha Attenuation Protean Detector 2
07_2006

Data Set 1

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
2	A11	0.0084	40.00	32435	810.875	4567.9	0.1775
2	A12	0.0160	40.00	35060	876.500	4567.9	0.1919
2	A13	0.0249	40.00	24788	619.700	4567.9	0.1357
2	A14	0.0406	40.00	22658	566.450	4567.9	0.1240
2	A15	0.0611	40.00	17325	433.125	4567.9	0.0948
2	A16	0.0800	40.00	33005	825.125	9135.8	0.0903
2	A17	0.1037	40.00	27577	689.425	9135.8	0.0755
2	A18	0.1217	40.00	24108	602.700	9135.8	0.0660

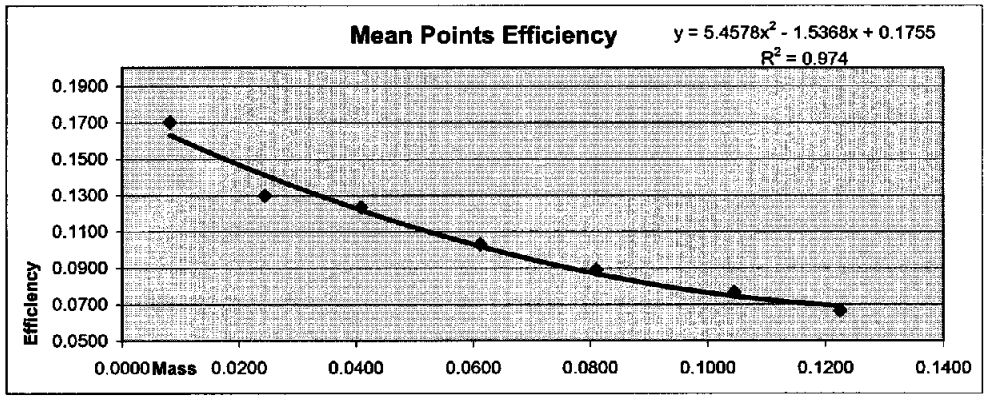
Alpha Attenuation Protean Detector 2
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
2	A21	0.0081	40.00	29747	743.675	4567.9	0.1628
2	A22	0.0161	40.00	24207	605.175	4567.9	0.1325
2	A23	0.0240	40.00	22628	565.700	4567.9	0.1238
2	A24	0.0412	40.00	22364	559.100	4567.9	0.1224
2	A25	0.0613	40.00	20334	508.350	4567.9	0.1113
2	A26	0.0821	40.00	32022	800.550	9135.8	0.0876
2	A27	0.1055	40.00	28435	710.875	9135.8	0.0778
2	A28	0.1234	40.00	24506	612.650	9135.8	0.0671

Protean 2

Protean 2 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1775	0.1628	0.1702	4.32%	-4.32%
0.0249	0.0240	0.0245	0.1357	0.1238	0.1298	4.56%	-4.56%
0.0406	0.0412	0.0409	0.1240	0.1224	0.1232	0.65%	-0.65%
0.0611	0.0613	0.0612	0.0948	0.1113	0.1031	-7.99%	7.99%
0.0800	0.0821	0.0811	0.0903	0.0876	0.0890	1.51%	-1.51%
0.1037	0.1055	0.1046	0.0755	0.0778	0.0766	-1.53%	1.53%
0.1217	0.1234	0.1226	0.0660	0.0671	0.0665	-0.82%	0.82%



Alpha Attenuation Protean Detector 3
07_2006

Data Set 1

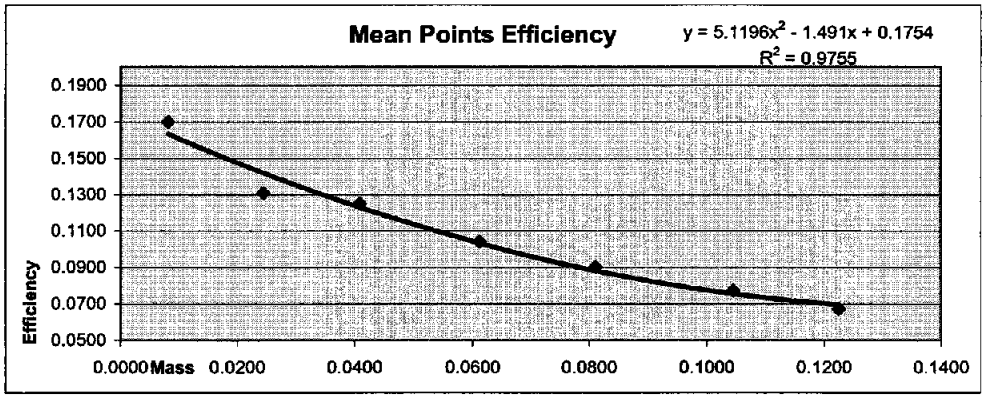
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
3	A11	0.0084	40.00	32270	806.750	4567.9	0.1766
3	A12	0.0160	40.00	34724	868.100	4567.9	0.1900
3	A13	0.0249	40.00	25164	629.100	4567.9	0.1377
3	A14	0.0406	40.00	22971	574.275	4567.9	0.1257
3	A15	0.0611	40.00	17584	439.600	4567.9	0.0962
3	A16	0.0800	40.00	33739	843.475	9135.8	0.0923
3	A17	0.1037	40.00	27844	696.100	9135.8	0.0762
3	A18	0.1217	40.00	24557	613.925	9135.8	0.0672

Alpha Attenuation Protean Detector 3
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
3	A21	0.0081	40.00	29856	746.400	4567.9	0.1634
3	A22	0.0161	40.00	24182	604.550	4567.9	0.1323
3	A23	0.0240	40.00	22644	566.100	4567.9	0.1239
3	A24	0.0412	40.00	22708	567.700	4567.9	0.1243
3	A25	0.0613	40.00	20487	512.175	4567.9	0.1121
3	A26	0.0821	40.00	32170	804.250	9135.8	0.0880
3	A27	0.1055	40.00	28646	716.150	9135.8	0.0784
3	A28	0.1234	40.00	24593	614.825	9135.8	0.0673

Protean 3 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1766	0.1634	0.1700	3.89%	-3.89%
0.0249	0.0240	0.0245	0.1377	0.1239	0.1308	5.27%	-5.27%
0.0406	0.0412	0.0409	0.1257	0.1243	0.1250	0.58%	-0.58%
0.0611	0.0613	0.0612	0.0962	0.1121	0.1042	-7.63%	7.63%
0.0800	0.0821	0.0811	0.0923	0.0880	0.0902	2.38%	-2.38%
0.1037	0.1055	0.1046	0.0762	0.0784	0.0773	-1.42%	1.42%
0.1217	0.1234	0.1226	0.0672	0.0673	0.0672	-0.07%	0.07%



Alpha Attenuation Protean Detector 4
08_2006

Data Set 1

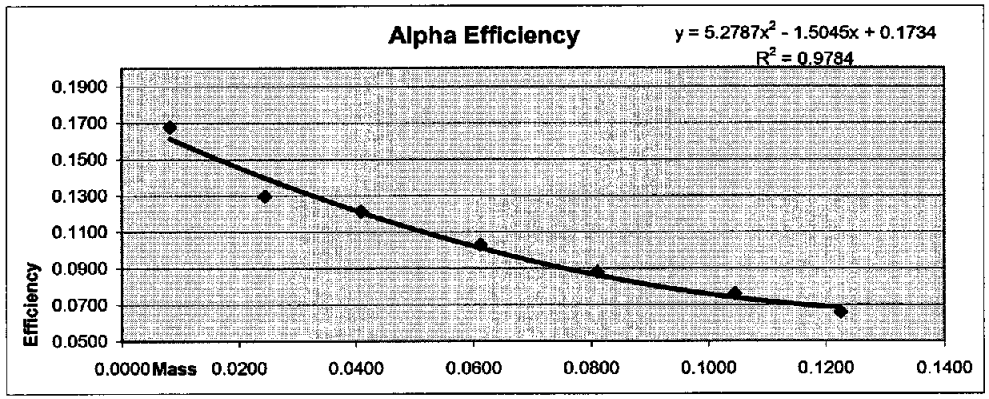
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
4	A11	0.0084	40.00	31662	791.550	4567.9	0.1733
4	A12	0.0160	40.00	34514	862.850	4567.9	0.1889
4	A13	0.0249	40.00	24568	614.200	4567.9	0.1345
4	A14	0.0406	40.00	22158	553.950	4567.9	0.1213
4	A15	0.0611	40.00	17242	431.050	4567.9	0.0944
4	A16	0.0800	40.00	32565	814.125	9135.8	0.0891
4	A17	0.1037	40.00	27408	685.200	9135.8	0.0750
4	A18	0.1217	40.00	23641	591.025	9135.8	0.0647

Alpha Attenuation Protean Detector 4
08_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
4	A21	0.0081	40.00	29638	740.950	4567.9	0.1622
4	A22	0.0161	40.00	24041	601.025	4567.9	0.1316
4	A23	0.0240	40.00	22805	570.125	4567.9	0.1248
4	A24	0.0412	40.00	22113	552.825	4567.9	0.1210
4	A25	0.0613	40.00	20338	508.450	4567.9	0.1113
4	A26	0.0821	40.00	31678	791.950	9135.8	0.0867
4	A27	0.1055	40.00	28082	702.050	9135.8	0.0768
4	A28	0.1234	40.00	24462	611.550	9135.8	0.0669

Protean 4 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1733	0.1622	0.1677	3.30%	-3.30%
0.0249	0.0240	0.0245	0.1345	0.1248	0.1296	3.72%	-3.72%
0.0406	0.0412	0.0409	0.1213	0.1210	0.1211	0.10%	-0.10%
0.0611	0.0613	0.0612	0.0944	0.1113	0.1028	-8.24%	8.24%
0.0800	0.0821	0.0811	0.0891	0.0867	0.0879	1.38%	-1.38%
0.1037	0.1055	0.1046	0.0750	0.0768	0.0759	-1.21%	1.21%
0.1217	0.1234	0.1226	0.0647	0.0669	0.0658	-1.71%	1.71%



Alpha Attenuation Protean Detector 5
07_2006

Data Set 1

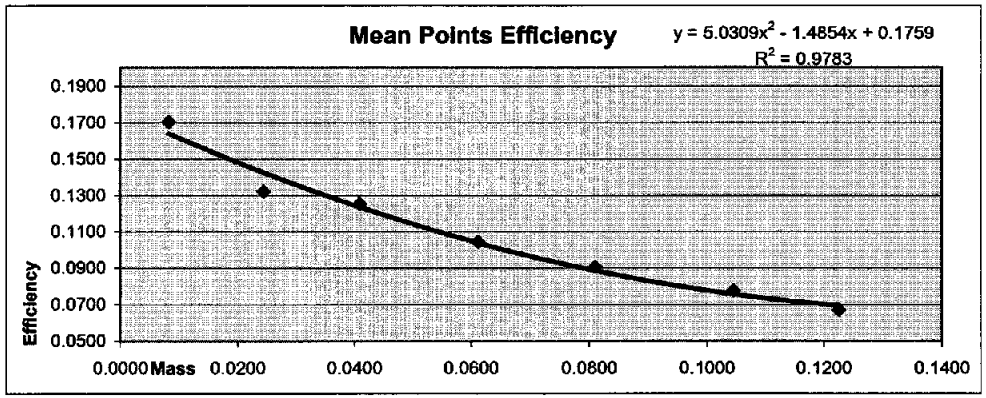
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
5	A11	0.0084	40.00	32267	806.675	4567.9	0.1766
5	A12	0.0160	40.00	35198	879.950	4567.9	0.1926
5	A13	0.0249	40.00	25371	634.275	4567.9	0.1389
5	A14	0.0406	40.00	23070	576.750	4567.9	0.1263
5	A15	0.0611	40.00	17624	440.600	4567.9	0.0965
5	A16	0.0800	40.00	33591	839.775	9135.8	0.0919
5	A17	0.1037	40.00	28297	707.425	9135.8	0.0774
5	A18	0.1217	40.00	24288	607.200	9135.8	0.0665

Alpha Attenuation Protean Detector 5
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
5	A21	0.0081	40.00	29950	748.750	4567.9	0.1639
5	A22	0.0161	40.00	24232	605.800	4567.9	0.1326
5	A23	0.0240	40.00	22908	572.700	4567.9	0.1254
5	A24	0.0412	40.00	22749	568.725	4567.9	0.1245
5	A25	0.0613	40.00	20552	513.800	4567.9	0.1125
5	A26	0.0821	40.00	32653	816.325	9135.8	0.0894
5	A27	0.1055	40.00	28367	709.175	9135.8	0.0776
5	A28	0.1234	40.00	24751	618.775	9135.8	0.0677

Protean 5 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1766	0.1639	0.1703	3.72%	-3.72%
0.0249	0.0240	0.0245	0.1389	0.1254	0.1321	5.10%	-5.10%
0.0406	0.0412	0.0409	0.1263	0.1245	0.1254	0.70%	-0.70%
0.0611	0.0613	0.0612	0.0965	0.1125	0.1045	-7.67%	7.67%
0.0800	0.0821	0.0811	0.0919	0.0894	0.0906	1.42%	-1.42%
0.1037	0.1055	0.1046	0.0774	0.0776	0.0775	-0.12%	0.12%
0.1217	0.1234	0.1226	0.0665	0.0677	0.0671	-0.94%	0.94%



Alpha Attenuation Protean Detector 6
07_2006

Data Set 1

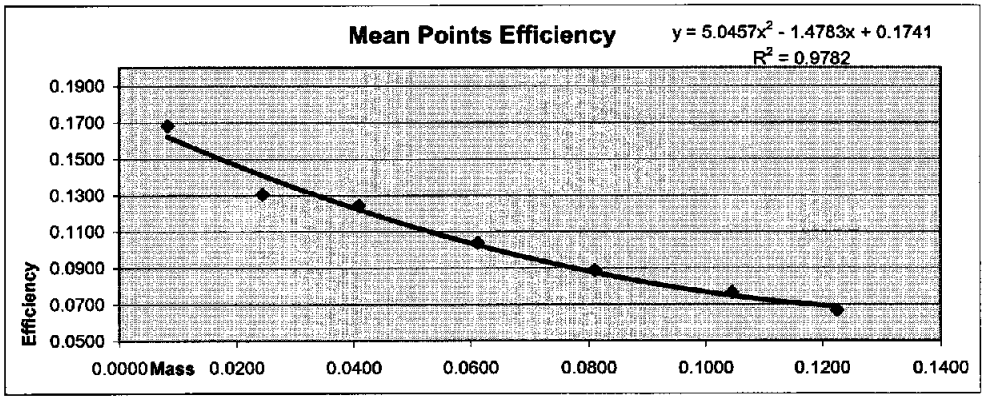
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
6	A11	0.0084	40.00	32115	802.875	4567.9	0.1758
6	A12	0.0160	40.00	34891	872.275	4567.9	0.1910
6	A13	0.0249	40.00	24596	614.900	4567.9	0.1346
6	A14	0.0406	40.00	22817	570.425	4567.9	0.1249
6	A15	0.0611	40.00	17438	435.950	4567.9	0.0954
6	A16	0.0800	40.00	32813	820.325	9135.8	0.0898
6	A17	0.1037	40.00	27715	692.875	9135.8	0.0758
6	A18	0.1217	40.00	24221	605.525	9135.8	0.0663

Alpha Attenuation Protean Detector 6
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
6	A21	0.0081	40.00	29381	734.525	4567.9	0.1608
6	A22	0.0161	40.00	23957	598.925	4567.9	0.1311
6	A23	0.0240	40.00	23058	576.450	4567.9	0.1262
6	A24	0.0412	40.00	22615	565.375	4567.9	0.1238
6	A25	0.0613	40.00	20464	511.600	4567.9	0.1120
6	A26	0.0821	40.00	31945	798.625	9135.8	0.0874
6	A27	0.1055	40.00	28184	704.600	9135.8	0.0771
6	A28	0.1234	40.00	24511	612.775	9135.8	0.0671

Protean 6 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1758	0.1608	0.1683	4.45%	-4.45%
0.0249	0.0240	0.0245	0.1346	0.1262	0.1304	3.23%	-3.23%
0.0406	0.0412	0.0409	0.1249	0.1238	0.1243	0.44%	-0.44%
0.0611	0.0613	0.0612	0.0954	0.1120	0.1037	-7.98%	7.98%
0.0800	0.0821	0.0811	0.0898	0.0874	0.0886	1.34%	-1.34%
0.1037	0.1055	0.1046	0.0758	0.0771	0.0765	-0.84%	0.84%
0.1217	0.1234	0.1226	0.0663	0.0671	0.0667	-0.60%	0.60%



Alpha Attenuation Protean Detector 7
07_2006

Data Set 1

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
7	A11	0.0084	40.00	31641	791.025	4567.9	0.1732
7	A12	0.0160	40.00	34234	855.850	4567.9	0.1874
7	A13	0.0249	40.00	24532	613.300	4567.9	0.1343
7	A14	0.0406	40.00	22413	560.325	4567.9	0.1227
7	A15	0.0611	40.00	16929	423.225	4567.9	0.0927
7	A16	0.0800	40.00	32252	806.300	9135.8	0.0883
7	A17	0.1037	40.00	26797	669.925	9135.8	0.0733
7	A18	0.1217	40.00	23245	581.125	9135.8	0.0636

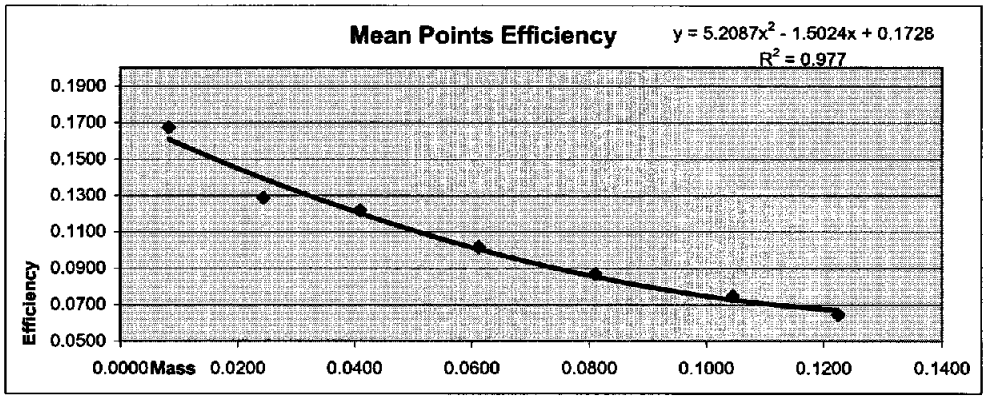
Alpha Attenuation Protean Detector 7
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
7	A21	0.0081	40.00	29477	736.925	4567.9	0.1613
7	A22	0.0161	40.00	23734	593.350	4567.9	0.1299
7	A23	0.0240	40.00	22406	560.150	4567.9	0.1226
7	A24	0.0412	40.00	22053	551.325	4567.9	0.1207
7	A25	0.0613	40.00	20241	506.025	4567.9	0.1108
7	A26	0.0821	40.00	31280	782.000	9135.8	0.0856
7	A27	0.1055	40.00	27817	695.425	9135.8	0.0761
7	A28	0.1234	40.00	23973	599.325	9135.8	0.0656

Protean 7

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1732	0.1613	0.1672	3.54%	-3.54%
0.0249	0.0240	0.0245	0.1343	0.1226	0.1284	4.53%	-4.53%
0.0406	0.0412	0.0409	0.1227	0.1207	0.1217	0.81%	-0.81%
0.0611	0.0613	0.0612	0.0927	0.1108	0.1017	-8.91%	8.91%
0.0800	0.0821	0.0811	0.0883	0.0856	0.0869	1.53%	-1.53%
0.1037	0.1055	0.1046	0.0733	0.0761	0.0747	-1.87%	1.87%
0.1217	0.1234	0.1226	0.0636	0.0656	0.0646	-1.54%	1.54%



Alpha Attenuation Protean Detector 8
07_2006

Data Set 1

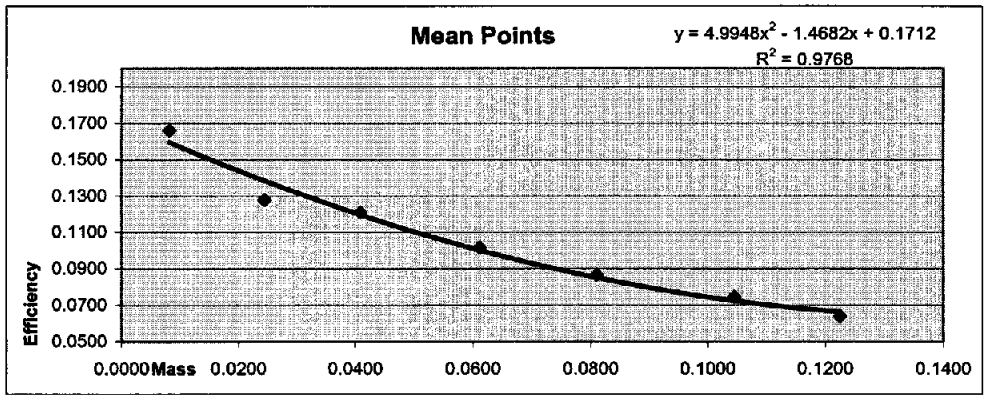
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
8	A11	0.0084	40.00	31331	783.275	4567.9	0.1715
8	A12	0.0160	40.00	34093	852.325	4567.9	0.1866
8	A13	0.0249	40.00	24356	608.900	4567.9	0.1333
8	A14	0.0406	40.00	22035	550.875	4567.9	0.1206
8	A15	0.0611	40.00	17025	425.625	4567.9	0.0932
8	A16	0.0800	40.00	31586	789.650	9135.8	0.0864
8	A17	0.1037	40.00	26613	665.325	9135.8	0.0728
8	A18	0.1217	40.00	22797	569.925	9135.8	0.0624

Alpha Attenuation Protean Detector 8
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
8	A21	0.0081	40.00	29308	732.700	4567.9	0.1604
8	A22	0.0161	40.00	23702	592.550	4567.9	0.1297
8	A23	0.0240	40.00	22303	557.575	4567.9	0.1221
8	A24	0.0412	40.00	22134	553.350	4567.9	0.1211
8	A25	0.0613	40.00	20088	502.200	4567.9	0.1099
8	A26	0.0821	40.00	31671	791.775	9135.8	0.0867
8	A27	0.1055	40.00	27940	698.500	9135.8	0.0765
8	A28	0.1234	40.00	23862	596.550	9135.8	0.0653

Protean 8 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1715	0.1604	0.1659	3.34%	-3.34%
0.0249	0.0240	0.0245	0.1333	0.1221	0.1277	4.40%	-4.40%
0.0406	0.0412	0.0409	0.1206	0.1211	0.1209	-0.22%	0.22%
0.0611	0.0613	0.0612	0.0932	0.1099	0.1016	-8.25%	8.25%
0.0800	0.0821	0.0811	0.0864	0.0867	0.0866	-0.13%	0.13%
0.1037	0.1055	0.1046	0.0728	0.0765	0.0746	-2.43%	2.43%
0.1217	0.1234	0.1226	0.0624	0.0653	0.0638	-2.28%	2.28%



Alpha Attenuation Protean Detector 9
07_2006

Data Set 1

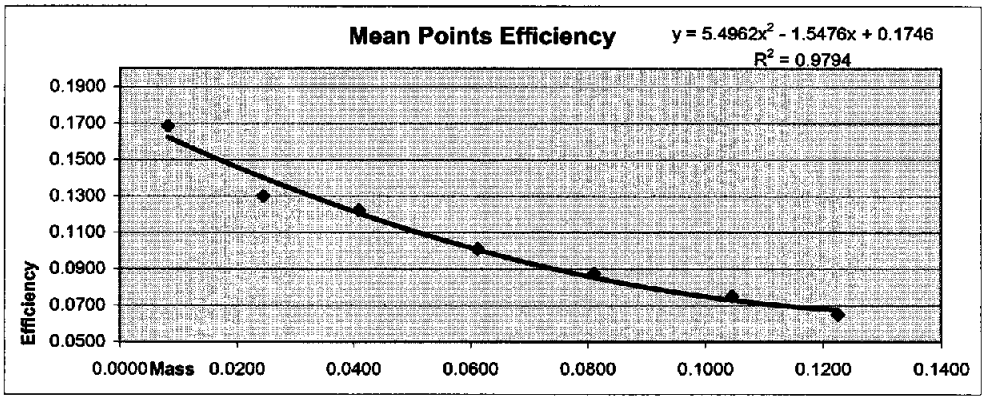
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
9	A11	0.0084	40.00	31658	791.450	4567.9	0.1733
9	A12	0.0160	40.00	34181	854.525	4567.9	0.1871
9	A13	0.0249	40.00	24491	612.275	4567.9	0.1340
9	A14	0.0406	40.00	22136	553.400	4567.9	0.1211
9	A15	0.0611	40.00	16756	418.900	4567.9	0.0917
9	A16	0.0800	40.00	32073	801.825	9135.8	0.0878
9	A17	0.1037	40.00	26567	664.175	9135.8	0.0727
9	A18	0.1217	40.00	23395	584.875	9135.8	0.0640

Alpha Attenuation Protean Detector 9
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
9	A21	0.0081	40.00	29882	747.050	4567.9	0.1635
9	A22	0.0161	40.00	24228	605.700	4567.9	0.1326
9	A23	0.0240	40.00	22993	574.825	4567.9	0.1258
9	A24	0.0412	40.00	22507	562.675	4567.9	0.1232
9	A25	0.0613	40.00	20142	503.550	4567.9	0.1102
9	A26	0.0821	40.00	31801	795.025	9135.8	0.0870
9	A27	0.1055	40.00	28351	708.775	9135.8	0.0776
9	A28	0.1234	40.00	24135	603.375	9135.8	0.0660

Protean 9 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1733	0.1635	0.1684	2.89%	-2.89%
0.0249	0.0240	0.0245	0.1340	0.1258	0.1299	3.15%	-3.15%
0.0406	0.0412	0.0409	0.1211	0.1232	0.1222	-0.83%	0.83%
0.0611	0.0613	0.0612	0.0917	0.1102	0.1010	-9.18%	9.18%
0.0800	0.0821	0.0811	0.0878	0.0870	0.0874	0.43%	-0.43%
0.1037	0.1055	0.1046	0.0727	0.0776	0.0751	-3.25%	3.25%
0.1217	0.1234	0.1226	0.0640	0.0660	0.0650	-1.56%	1.56%



Alpha Attenuation Protean Detector 10
07_2006

Data Set 1

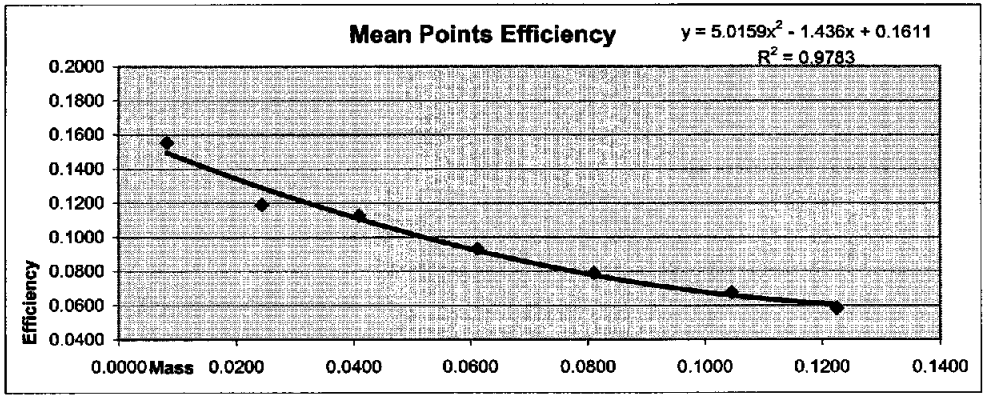
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
10	A11	0.0084	40.00	29372	734.300	4567.9	0.1608
10	A12	0.0160	40.00	31574	789.350	4567.9	0.1728
10	A13	0.0249	40.00	22624	565.600	4567.9	0.1238
10	A14	0.0406	40.00	20456	511.400	4567.9	0.1120
10	A15	0.0611	40.00	15451	386.275	4567.9	0.0846
10	A16	0.0800	40.00	29054	726.350	9135.8	0.0795
10	A17	0.1037	40.00	24158	603.950	9135.8	0.0661
10	A18	0.1217	40.00	20807	520.175	9135.8	0.0569

Alpha Attenuation Protean Detector 10
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
10	A21	0.0081	40.00	27429	685.725	4567.9	0.1501
10	A22	0.0161	40.00	22343	558.575	4567.9	0.1223
10	A23	0.0240	40.00	20849	521.225	4567.9	0.1141
10	A24	0.0412	40.00	20677	516.925	4567.9	0.1132
10	A25	0.0613	40.00	18558	463.950	4567.9	0.1016
10	A26	0.0821	40.00	28729	718.225	9135.8	0.0786
10	A27	0.1055	40.00	25193	629.825	9135.8	0.0689
10	A28	0.1234	40.00	21859	546.475	9135.8	0.0598

Protean 10 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1608	0.1501	0.1554	3.42%	-3.42%
0.0249	0.0240	0.0245	0.1238	0.1141	0.1190	4.08%	-4.08%
0.0406	0.0412	0.0409	0.1120	0.1132	0.1126	-0.54%	0.54%
0.0611	0.0613	0.0612	0.0846	0.1016	0.0931	-9.14%	9.14%
0.0800	0.0821	0.0811	0.0795	0.0786	0.0791	0.56%	-0.56%
0.1037	0.1055	0.1046	0.0661	0.0689	0.0675	-2.10%	2.10%
0.1217	0.1234	0.1226	0.0569	0.0598	0.0584	-2.47%	2.47%



Alpha Attenuation Protean Detector 11
07_2006

Data Set 1

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
11	A11	0.0084	40.00	31974	799.350	4567.9	0.1750
11	A12	0.0160	40.00	34833	870.825	4567.9	0.1906
11	A13	0.0249	40.00	24600	615.000	4567.9	0.1346
11	A14	0.0406	40.00	22750	568.750	4567.9	0.1245
11	A15	0.0611	40.00	17212	430.300	4567.9	0.0942
11	A16	0.0800	40.00	32970	824.250	9135.8	0.0902
11	A17	0.1037	40.00	27527	688.175	9135.8	0.0753
11	A18	0.1217	40.00	23671	591.775	9135.8	0.0648

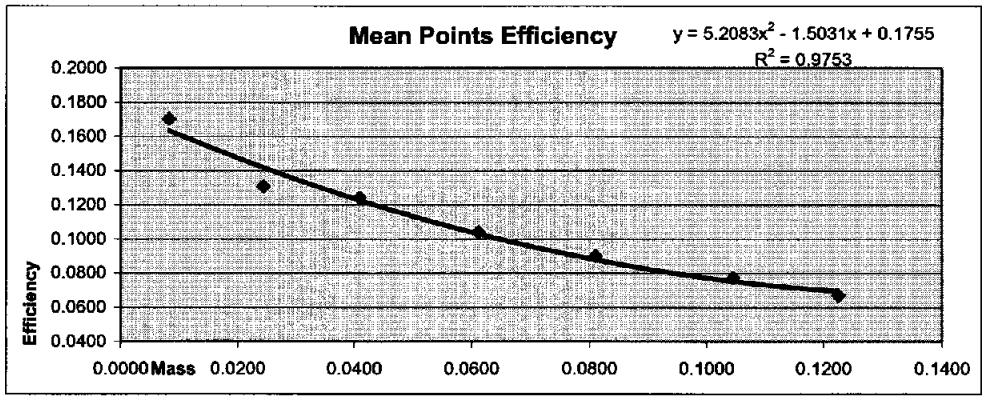
Alpha Attenuation Protean Detector 11
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
11	A21	0.0081	40.00	30221	755.525	4567.9	0.1654
11	A22	0.0161	40.00	24574	614.350	4567.9	0.1345
11	A23	0.0240	40.00	23172	579.300	4567.9	0.1268
11	A24	0.0412	40.00	22613	565.325	4567.9	0.1238
11	A25	0.0613	40.00	20835	520.875	4567.9	0.1140
11	A26	0.0821	40.00	32809	820.225	9135.8	0.0898
11	A27	0.1055	40.00	28974	724.350	9135.8	0.0793
11	A28	0.1234	40.00	25283	632.075	9135.8	0.0692

Protean 11

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1750	0.1654	0.1702	2.82%	-2.82%
0.0249	0.0240	0.0245	0.1346	0.1268	0.1307	2.99%	-2.99%
0.0406	0.0412	0.0409	0.1245	0.1238	0.1241	0.30%	-0.30%
0.0611	0.0613	0.0612	0.0942	0.1140	0.1041	-9.52%	9.52%
0.0800	0.0821	0.0811	0.0902	0.0898	0.0900	0.24%	-0.24%
0.1037	0.1055	0.1046	0.0753	0.0793	0.0773	-2.56%	2.56%
0.1217	0.1234	0.1226	0.0648	0.0692	0.0670	-3.29%	3.29%



Alpha Attenuation Protean Detector 12
07_2006

Data Set 1

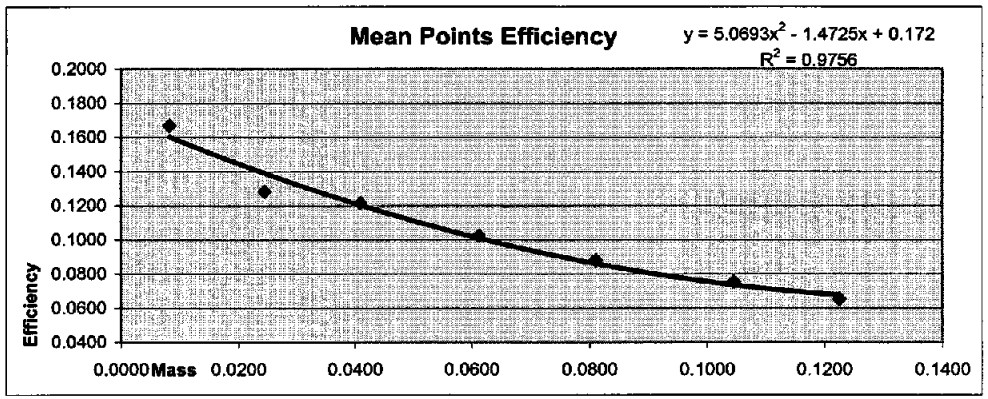
Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
12	A11	0.0084	40.00	31423	785.575	4567.9	0.1720
12	A12	0.0160	40.00	34348	858.700	4567.9	0.1880
12	A13	0.0249	40.00	24181	604.525	4567.9	0.1323
12	A14	0.0406	40.00	21922	548.050	4567.9	0.1200
12	A15	0.0611	40.00	16765	419.125	4567.9	0.0918
12	A16	0.0800	40.00	32367	809.175	9135.8	0.0886
12	A17	0.1037	40.00	26813	670.325	9135.8	0.0734
12	A18	0.1217	40.00	23560	589.000	9135.8	0.0645

Alpha Attenuation Protean Detector 12
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
12	A21	0.0081	40.00	29572	739.300	4567.9	0.1618
12	A22	0.0161	40.00	24373	609.325	4567.9	0.1334
12	A23	0.0240	40.00	22668	566.700	4567.9	0.1241
12	A24	0.0412	40.00	22447	561.175	4567.9	0.1229
12	A25	0.0613	40.00	20648	516.200	4567.9	0.1130
12	A26	0.0821	40.00	31914	797.850	9135.8	0.0873
12	A27	0.1055	40.00	28360	709.000	9135.8	0.0776
12	A28	0.1234	40.00	24155	603.875	9135.8	0.0661

Protean 12 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1720	0.1618	0.1669	3.03%	-3.03%
0.0249	0.0240	0.0245	0.1323	0.1241	0.1282	3.23%	-3.23%
0.0406	0.0412	0.0409	0.1200	0.1229	0.1214	-1.18%	1.18%
0.0611	0.0613	0.0612	0.0918	0.1130	0.1024	-10.38%	10.38%
0.0800	0.0821	0.0811	0.0886	0.0873	0.0880	0.70%	-0.70%
0.1037	0.1055	0.1046	0.0734	0.0776	0.0755	-2.80%	2.80%
0.1217	0.1234	0.1226	0.0645	0.0661	0.0653	-1.25%	1.25%



Alpha Attenuation Protean Detector 13
07_2006

Data Set 1

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
13	A11	0.0084	40.00	29835	745.875	4567.9	0.1633
13	A12	0.0160	40.00	32293	807.325	4567.9	0.1767
13	A13	0.0249	40.00	23101	577.525	4567.9	0.1264
13	A14	0.0406	40.00	20721	518.025	4567.9	0.1134
13	A15	0.0611	40.00	15878	396.950	4567.9	0.0869
13	A16	0.0800	40.00	29943	748.575	9135.8	0.0819
13	A17	0.1037	40.00	24669	616.725	9135.8	0.0675
13	A18	0.1217	40.00	21550	538.750	9135.8	0.0590

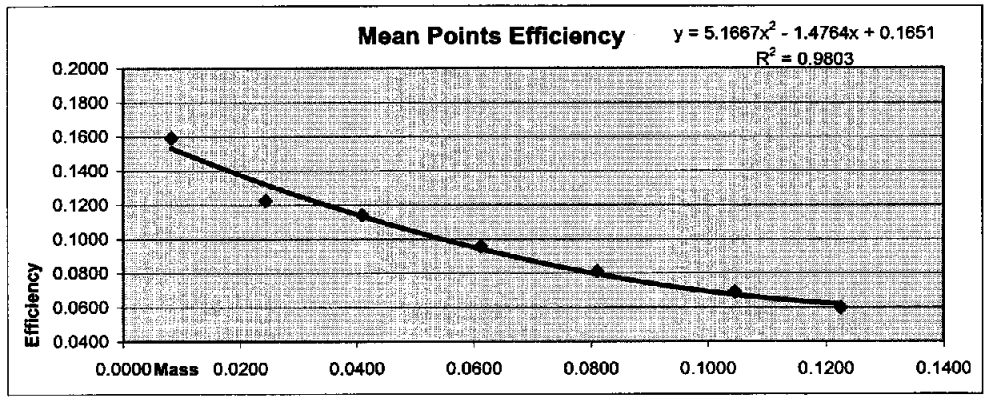
Alpha Attenuation Protean Detector 13
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
13	A21	0.0081	40.00	28368	709.200	4567.9	0.1553
13	A22	0.0161	40.00	22493	562.325	4567.9	0.1231
13	A23	0.0240	40.00	21671	541.775	4567.9	0.1186
13	A24	0.0412	40.00	20963	524.075	4567.9	0.1147
13	A25	0.0613	40.00	19100	477.500	4567.9	0.1045
13	A26	0.0821	40.00	29285	732.125	9135.8	0.0801
13	A27	0.1055	40.00	25808	645.200	9135.8	0.0706
13	A28	0.1234	40.00	21999	549.975	9135.8	0.0602

Protean 13

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1633	0.1553	0.1593	2.52%	-2.52%
0.0249	0.0240	0.0245	0.1264	0.1186	0.1225	3.19%	-3.19%
0.0406	0.0412	0.0409	0.1134	0.1147	0.1141	-0.58%	0.58%
0.0611	0.0613	0.0612	0.0869	0.1045	0.0957	-9.21%	9.21%
0.0800	0.0821	0.0811	0.0819	0.0801	0.0810	1.11%	-1.11%
0.1037	0.1055	0.1046	0.0675	0.0706	0.0691	-2.26%	2.26%
0.1217	0.1234	0.1226	0.0590	0.0602	0.0596	-1.03%	1.03%



Alpha Attenuation Protean Detector 14
07_2006

Data Set 1

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
14	A11	0.0084	40.00	31206	780.150	4567.9	0.1708
14	A12	0.0160	40.00	33671	841.775	4567.9	0.1843
14	A13	0.0249	40.00	23901	597.525	4567.9	0.1308
14	A14	0.0406	40.00	21797	544.925	4567.9	0.1193
14	A15	0.0611	40.00	16507	412.675	4567.9	0.0903
14	A16	0.0800	40.00	31585	789.625	9135.8	0.0864
14	A17	0.1037	40.00	26457	661.425	9135.8	0.0724
14	A18	0.1217	40.00	22597	564.925	9135.8	0.0618

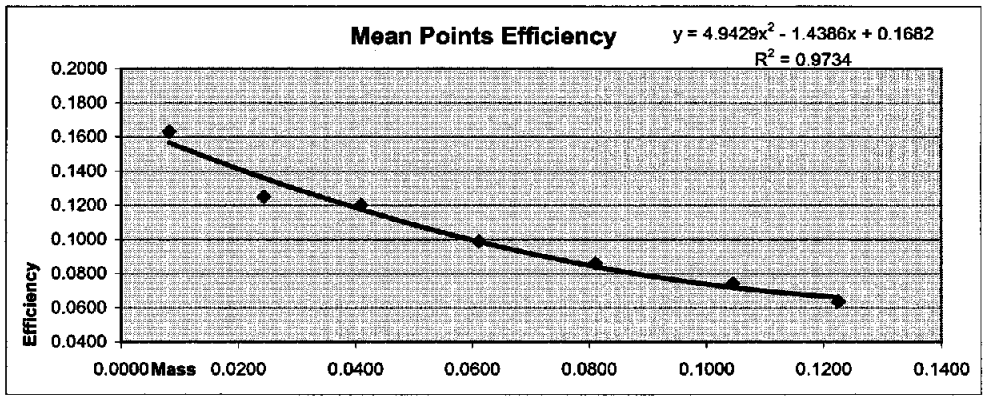
Alpha Attenuation Protean Detector 14
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
14	A21	0.0081	40.00	28425	710.625	4567.9	0.1556
14	A22	0.0161	40.00	23506	587.650	4567.9	0.1286
14	A23	0.0240	40.00	21742	543.550	4567.9	0.1190
14	A24	0.0412	40.00	22083	552.075	4567.9	0.1209
14	A25	0.0613	40.00	19638	490.950	4567.9	0.1075
14	A26	0.0821	40.00	31307	782.675	9135.8	0.0857
14	A27	0.1055	40.00	27836	695.900	9135.8	0.0762
14	A28	0.1234	40.00	23839	595.975	9135.8	0.0652

Protean 14

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1708	0.1556	0.1632	4.66%	-4.66%
0.0249	0.0240	0.0245	0.1308	0.1190	0.1249	4.73%	-4.73%
0.0406	0.0412	0.0409	0.1193	0.1209	0.1201	-0.65%	0.65%
0.0611	0.0613	0.0612	0.0903	0.1075	0.0989	-8.66%	8.66%
0.0800	0.0821	0.0811	0.0864	0.0857	0.0861	0.44%	-0.44%
0.1037	0.1055	0.1046	0.0724	0.0762	0.0743	-2.54%	2.54%
0.1217	0.1234	0.1226	0.0618	0.0652	0.0635	-2.67%	2.67%



Alpha Attenuation Protean Detector 15
07_2006

Data Set 1

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
15	A11	0.0084	40.00	31467	786.675	4567.9	0.1722
15	A12	0.0160	40.00	33889	847.225	4567.9	0.1855
15	A13	0.0249	40.00	24200	605.000	4567.9	0.1324
15	A14	0.0406	40.00	22209	555.225	4567.9	0.1215
15	A15	0.0611	40.00	17003	425.075	4567.9	0.0931
15	A16	0.0800	40.00	32240	806.000	9135.8	0.0882
15	A17	0.1037	40.00	27047	676.175	9135.8	0.0740
15	A18	0.1217	40.00	23248	581.200	9135.8	0.0636

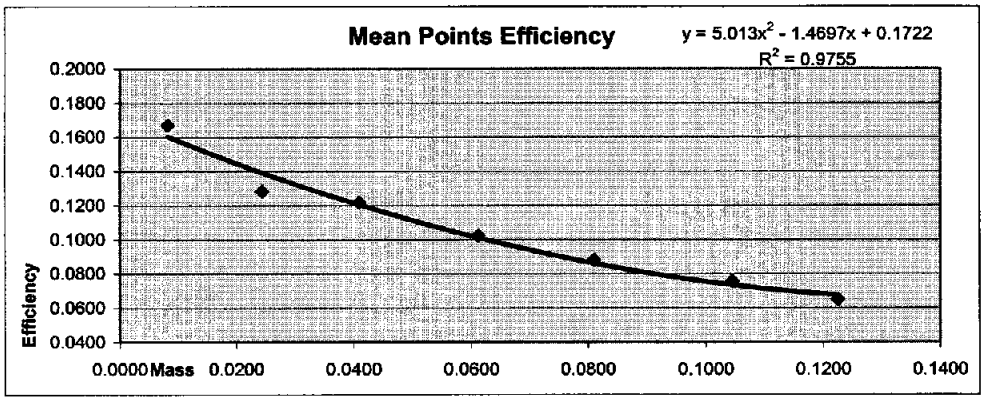
Alpha Attenuation Protean Detector 15
07_2006

Data Set 2

Detector ID	Sample ID	Mass	Count Time	Alpha Counts	CPM	DPM	Th-230 Efficiency
15	A21	0.0081	40.00	29597	739.925	4567.9	0.1620
15	A22	0.0161	40.00	23850	596.250	4567.9	0.1305
15	A23	0.0240	40.00	22697	567.425	4567.9	0.1242
15	A24	0.0412	40.00	22280	557.000	4567.9	0.1219
15	A25	0.0613	40.00	20365	509.125	4567.9	0.1115
15	A26	0.0821	40.00	32075	801.875	9135.8	0.0878
15	A27	0.1055	40.00	28137	703.425	9135.8	0.0770
15	A28	0.1234	40.00	24132	603.300	9135.8	0.0660

Protean 15

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0084	0.0081	0.0083	0.1722	0.1620	0.1671	3.06%	-3.06%
0.0249	0.0240	0.0245	0.1324	0.1242	0.1283	3.20%	-3.20%
0.0406	0.0412	0.0409	0.1215	0.1219	0.1217	-0.16%	0.16%
0.0611	0.0613	0.0612	0.0931	0.1115	0.1023	-9.00%	9.00%
0.0800	0.0821	0.0811	0.0882	0.0878	0.0880	0.26%	-0.26%
0.1037	0.1055	0.1046	0.0740	0.0770	0.0755	-1.98%	1.98%
0.1217	0.1234	0.1226	0.0636	0.0660	0.0648	-1.87%	1.87%



SEVERN TRENT STL

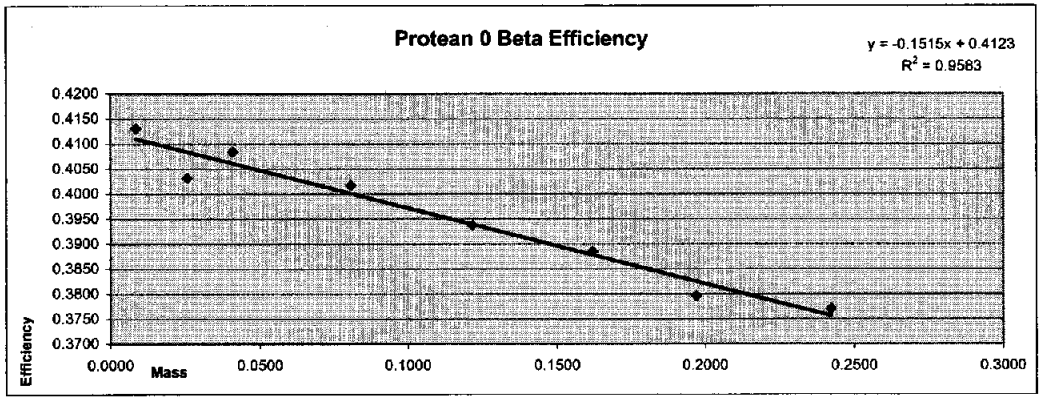
Protean Beta Calibration

2006

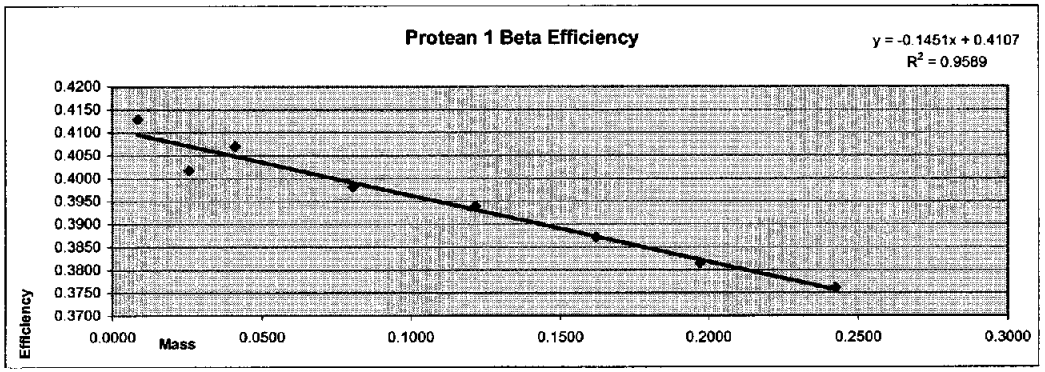
SEVERN TRENT STL

Detector Efficiency Curves

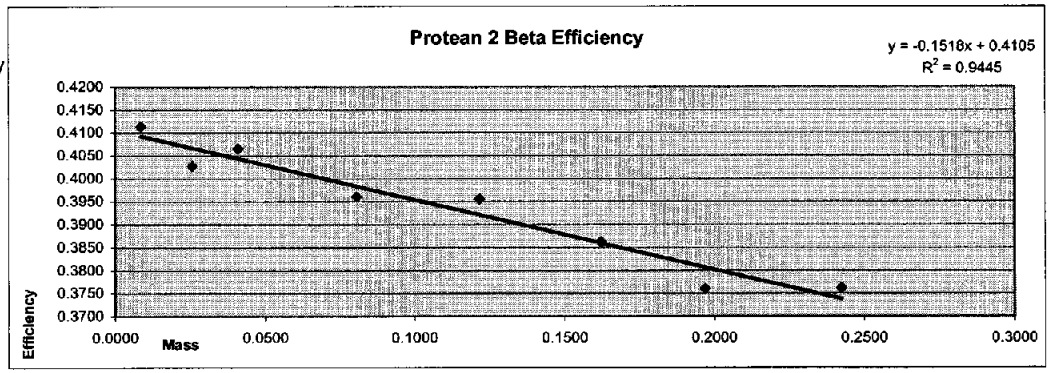
Protean 0 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4256	0.4006	0.4131
0.0251	0.0262	0.0257	0.4210	0.3852	0.4031
0.0412	0.0407	0.0410	0.4153	0.4015	0.4084
0.0796	0.0820	0.0808	0.4024	0.4009	0.4017
0.1212	0.1220	0.1216	0.3945	0.3930	0.3937
0.1629	0.1612	0.1621	0.3840	0.3929	0.3884
0.1996	0.1945	0.1971	0.3759	0.3832	0.3796
0.2420	0.2429	0.2425	0.3794	0.3746	0.3770



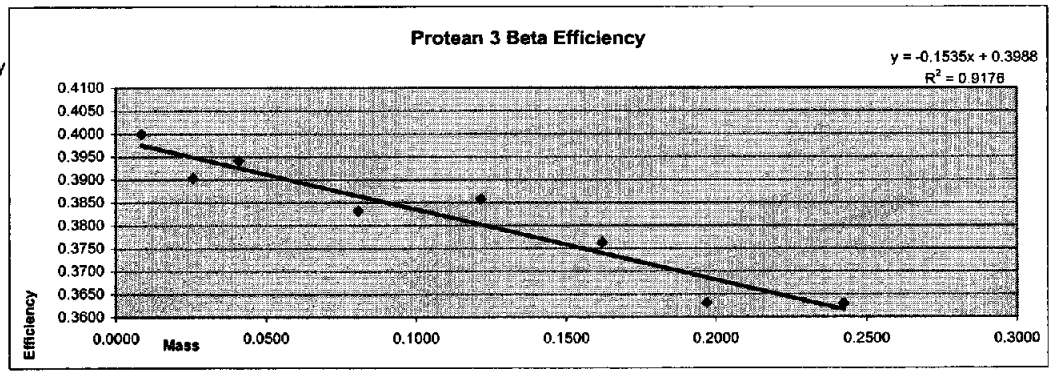
Protean 1 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4232	0.4025	0.4129
0.0251	0.0262	0.0257	0.4177	0.3858	0.4017
0.0412	0.0407	0.0410	0.4172	0.3967	0.4069
0.0796	0.0820	0.0808	0.4002	0.3961	0.3982
0.1212	0.1220	0.1216	0.3924	0.3954	0.3939
0.1629	0.1612	0.1621	0.3783	0.3960	0.3871
0.1996	0.1945	0.1971	0.3737	0.3894	0.3815
0.2420	0.2429	0.2425	0.3753	0.3768	0.3761



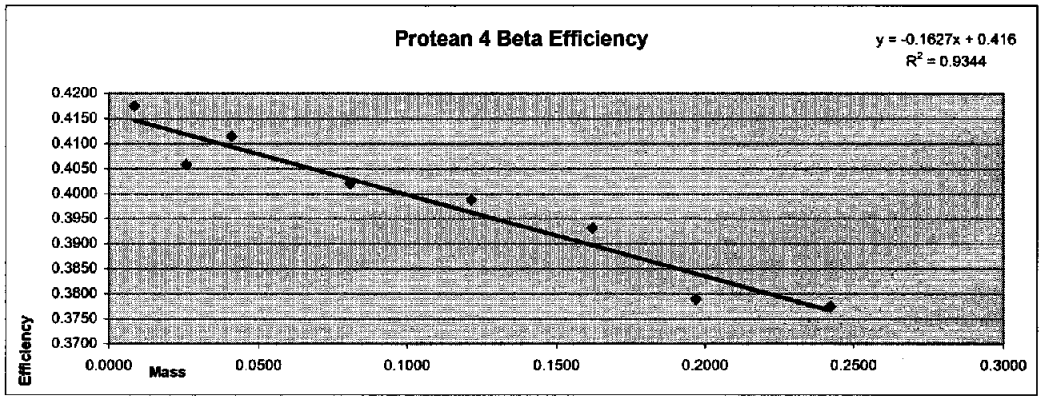
Protean 2 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4251	0.3976	0.4114
0.0251	0.0262	0.0257	0.4185	0.3869	0.4027
0.0412	0.0407	0.0410	0.4134	0.3995	0.4064
0.0796	0.0820	0.0808	0.3935	0.3985	0.3960
0.1212	0.1220	0.1216	0.3958	0.3952	0.3955
0.1629	0.1612	0.1621	0.3824	0.3900	0.3862
0.1996	0.1945	0.1971	0.3727	0.3792	0.3759
0.2420	0.2429	0.2425	0.3785	0.3737	0.3761



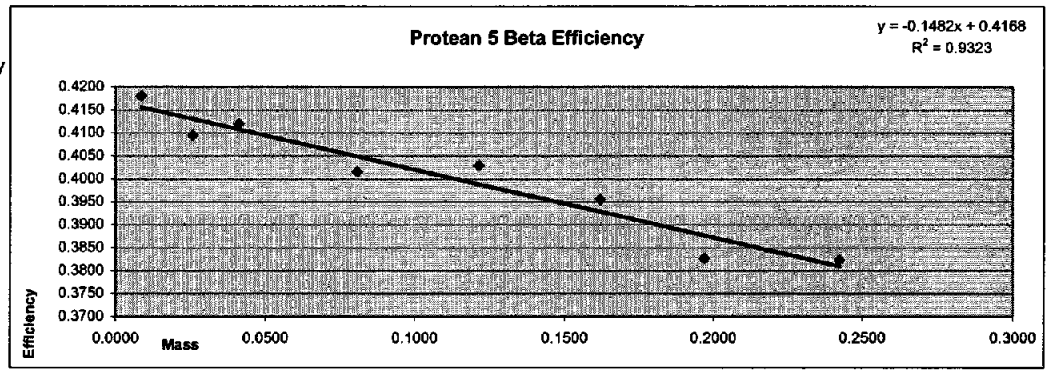
Protean 3 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4084	0.3914	0.3999
0.0251	0.0262	0.0257	0.4036	0.3769	0.3903
0.0412	0.0407	0.0410	0.4033	0.3850	0.3941
0.0796	0.0820	0.0808	0.3800	0.3863	0.3831
0.1212	0.1220	0.1216	0.3849	0.3865	0.3857
0.1629	0.1612	0.1621	0.3729	0.3795	0.3762
0.1996	0.1945	0.1971	0.3596	0.3666	0.3631
0.2420	0.2429	0.2425	0.3639	0.3617	0.3628



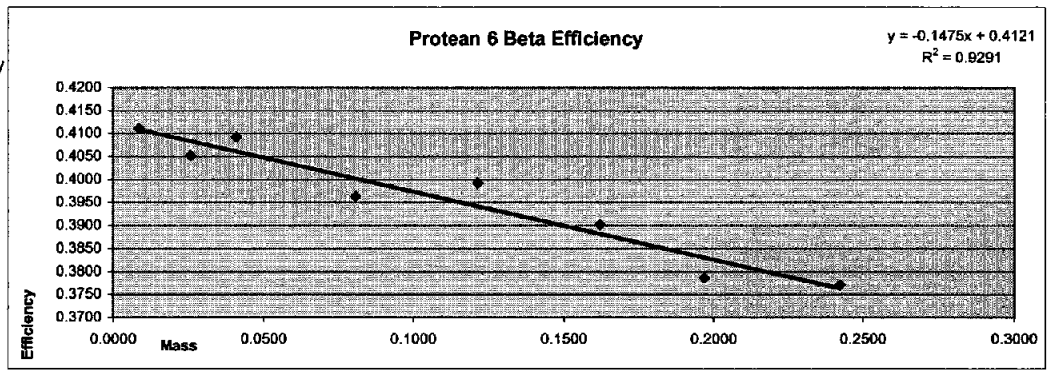
Protean 4 Mass Set 1	08/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4289	0.4061	0.4175
0.0251	0.0262	0.0257	0.4207	0.3909	0.4058
0.0412	0.0407	0.0410	0.4159	0.4071	0.4115
0.0796	0.0820	0.0808	0.4020	0.4020	0.4020
0.1212	0.1220	0.1216	0.4002	0.3974	0.3988
0.1629	0.1612	0.1621	0.3877	0.3986	0.3931
0.1996	0.1945	0.1971	0.3720	0.3859	0.3789
0.2420	0.2429	0.2425	0.3783	0.3767	0.3775



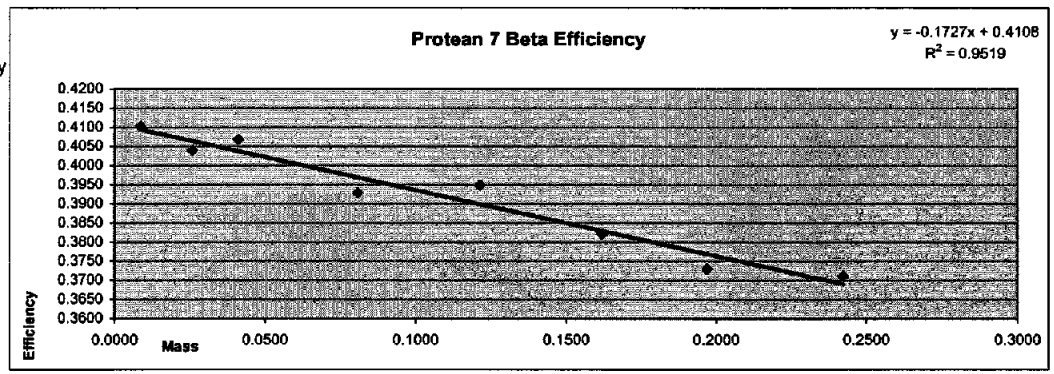
Protean 5 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4344	0.4016	0.4180
0.0251	0.0262	0.0257	0.4267	0.3921	0.4094
0.0412	0.0407	0.0410	0.4186	0.4053	0.4120
0.0796	0.0820	0.0808	0.4039	0.3993	0.4016
0.1212	0.1220	0.1216	0.4064	0.3993	0.4029
0.1629	0.1612	0.1621	0.3894	0.4016	0.3955
0.1996	0.1945	0.1971	0.3771	0.3882	0.3826
0.2420	0.2429	0.2425	0.3832	0.3813	0.3823



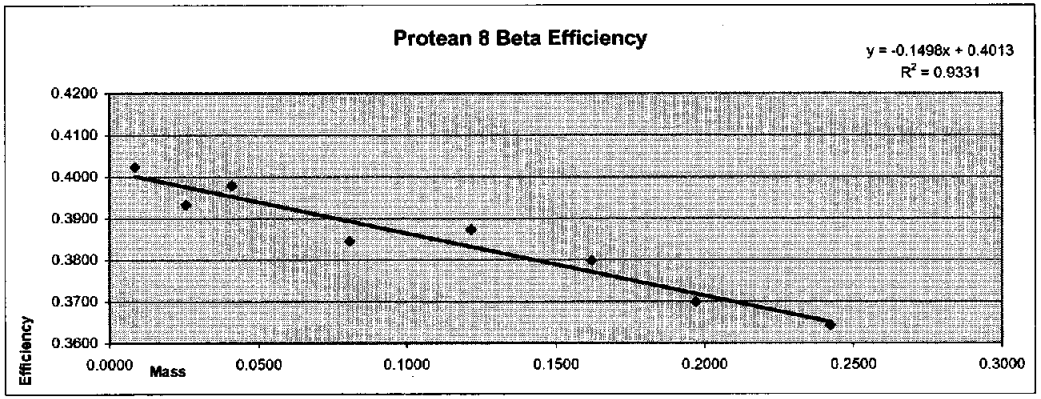
Protean 6 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4226	0.3996	0.4111
0.0251	0.0262	0.0257	0.4205	0.3899	0.4052
0.0412	0.0407	0.0410	0.4144	0.4040	0.4092
0.0796	0.0820	0.0808	0.3962	0.3964	0.3963
0.1212	0.1220	0.1216	0.3993	0.3992	0.3992
0.1629	0.1612	0.1621	0.3849	0.3954	0.3902
0.1996	0.1945	0.1971	0.3748	0.3824	0.3786
0.2420	0.2429	0.2425	0.3783	0.3757	0.3770



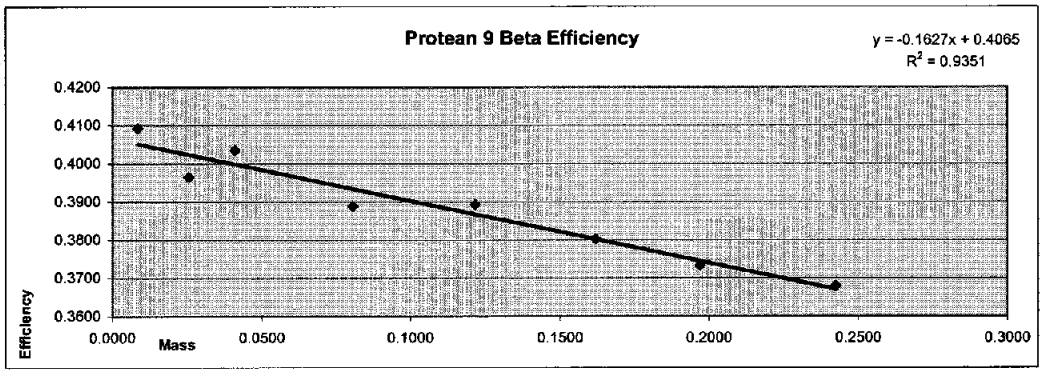
Protean 7 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4210	0.3994	0.4102
0.0251	0.0262	0.0257	0.4173	0.3905	0.4039
0.0412	0.0407	0.0410	0.4148	0.3988	0.4068
0.0796	0.0820	0.0808	0.3937	0.3920	0.3929
0.1212	0.1220	0.1216	0.3966	0.3930	0.3948
0.1629	0.1612	0.1621	0.3760	0.3881	0.3821
0.1996	0.1945	0.1971	0.3659	0.3801	0.3730
0.2420	0.2429	0.2425	0.3714	0.3707	0.3711



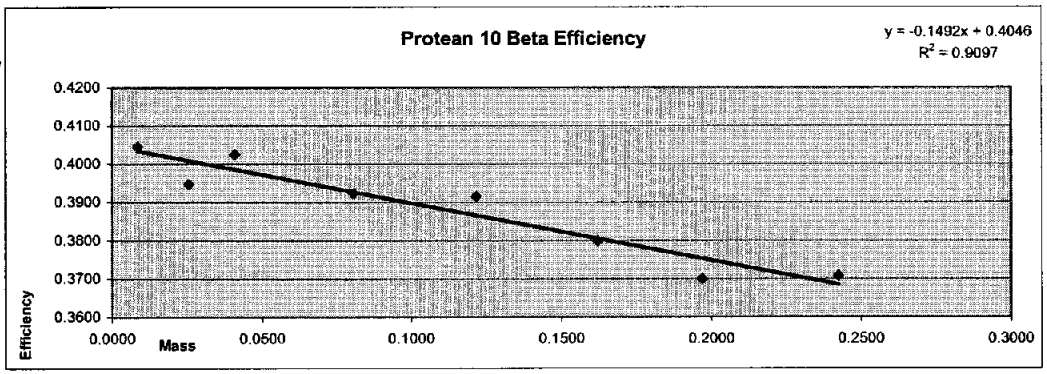
Protean 8 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4128	0.3919	0.4023
0.0251	0.0262	0.0257	0.4111	0.3753	0.3932
0.0412	0.0407	0.0410	0.4053	0.3904	0.3978
0.0796	0.0820	0.0808	0.3856	0.3835	0.3845
0.1212	0.1220	0.1216	0.3841	0.3904	0.3873
0.1629	0.1612	0.1621	0.3748	0.3849	0.3798
0.1996	0.1945	0.1971	0.3638	0.3759	0.3698
0.2420	0.2429	0.2425	0.3624	0.3660	0.3642



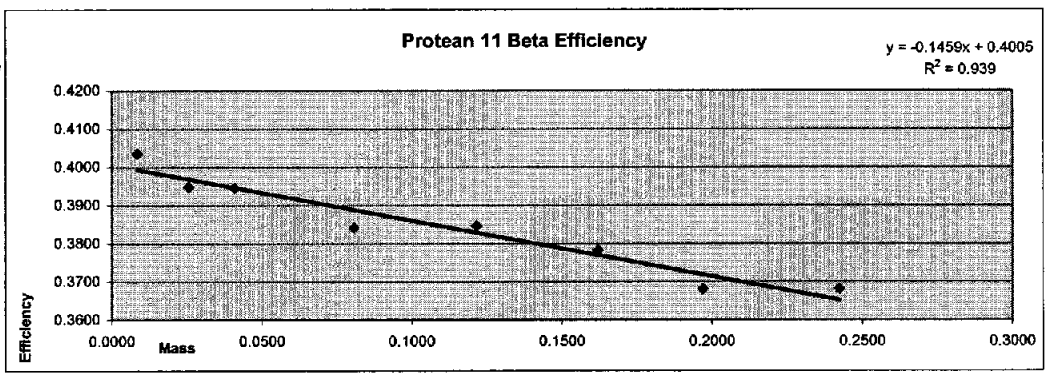
Protean 9 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4205	0.3981	0.4093
0.0251	0.0262	0.0257	0.4116	0.3814	0.3965
0.0412	0.0407	0.0410	0.4107	0.3963	0.4035
0.0796	0.0820	0.0808	0.3904	0.3874	0.3889
0.1212	0.1220	0.1216	0.3904	0.3881	0.3893
0.1629	0.1612	0.1621	0.3748	0.3856	0.3802
0.1996	0.1945	0.1971	0.3690	0.3777	0.3733
0.2420	0.2429	0.2425	0.3717	0.3642	0.3680



Protean 10 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4133	0.3957	0.4045
0.0251	0.0262	0.0257	0.4118	0.3776	0.3947
0.0412	0.0407	0.0410	0.4088	0.3962	0.4025
0.0796	0.0820	0.0808	0.3920	0.3926	0.3923
0.1212	0.1220	0.1216	0.3908	0.3921	0.3914
0.1629	0.1612	0.1621	0.3722	0.3875	0.3798
0.1996	0.1945	0.1971	0.3637	0.3761	0.3699
0.2420	0.2429	0.2425	0.3715	0.3700	0.3708

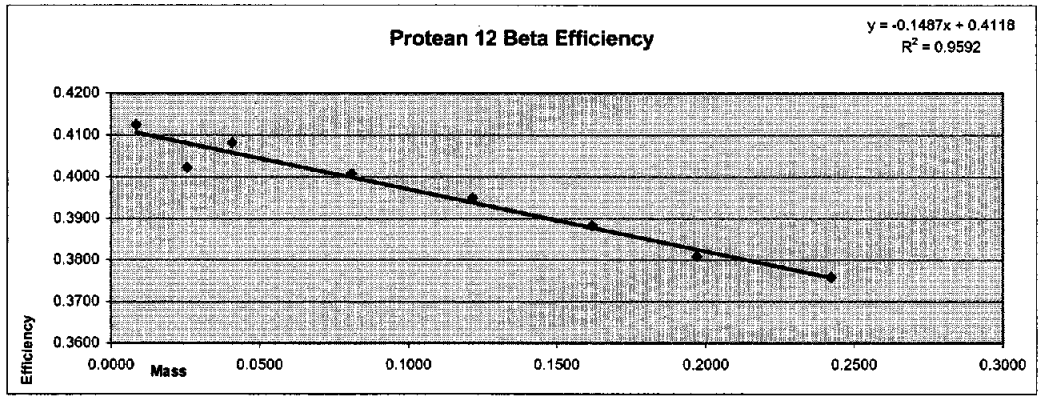


Protean 11 Mass Set 1	07/2006 Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4161	0.3910	0.4036
0.0251	0.0262	0.0257	0.4111	0.3786	0.3948
0.0412	0.0407	0.0410	0.4033	0.3857	0.3945
0.0796	0.0820	0.0808	0.3852	0.3831	0.3841
0.1212	0.1220	0.1216	0.3867	0.3824	0.3846
0.1629	0.1612	0.1621	0.3724	0.3840	0.3782
0.1996	0.1945	0.1971	0.3645	0.3715	0.3680
0.2420	0.2429	0.2425	0.3685	0.3675	0.3680



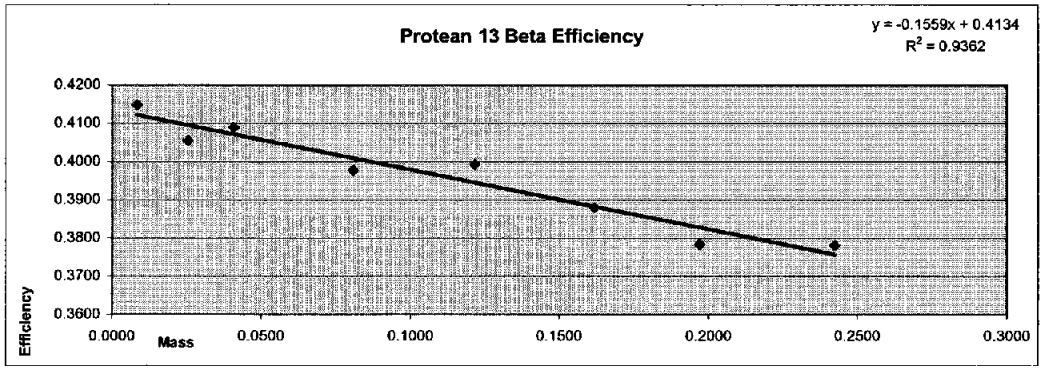
Protean 12 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4250	0.4000	0.4125
0.0251	0.0262	0.0257	0.4172	0.3872	0.4022
0.0412	0.0407	0.0410	0.4155	0.4009	0.4082
0.0796	0.0820	0.0808	0.4008	0.4008	0.4008
0.1212	0.1220	0.1216	0.3982	0.3914	0.3948
0.1629	0.1612	0.1621	0.3811	0.3953	0.3882
0.1996	0.1945	0.1971	0.3768	0.3849	0.3809
0.2420	0.2429	0.2425	0.3789	0.3729	0.3759



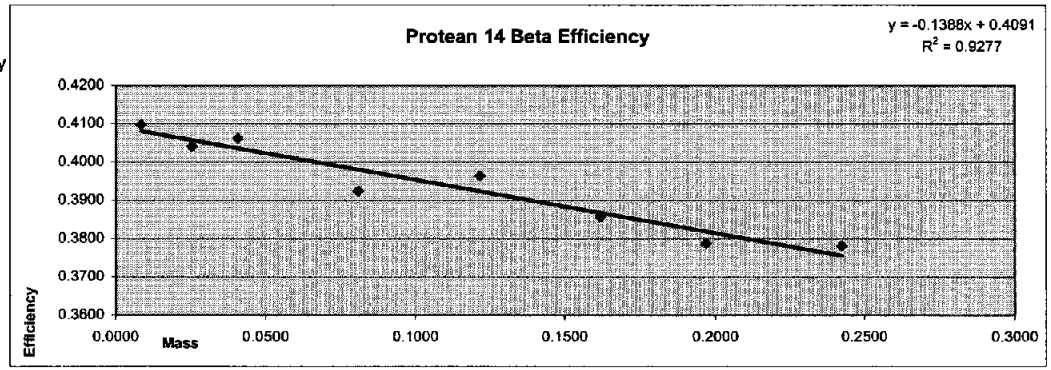
Protean 13 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4258	0.4038	0.4148
0.0251	0.0262	0.0257	0.4208	0.3901	0.4055
0.0412	0.0407	0.0410	0.4155	0.4023	0.4089
0.0796	0.0820	0.0808	0.3983	0.3972	0.3977
0.1212	0.1220	0.1216	0.3987	0.3998	0.3992
0.1629	0.1612	0.1621	0.3848	0.3911	0.3879
0.1996	0.1945	0.1971	0.3727	0.3839	0.3783
0.2420	0.2429	0.2425	0.3780	0.3781	0.3781



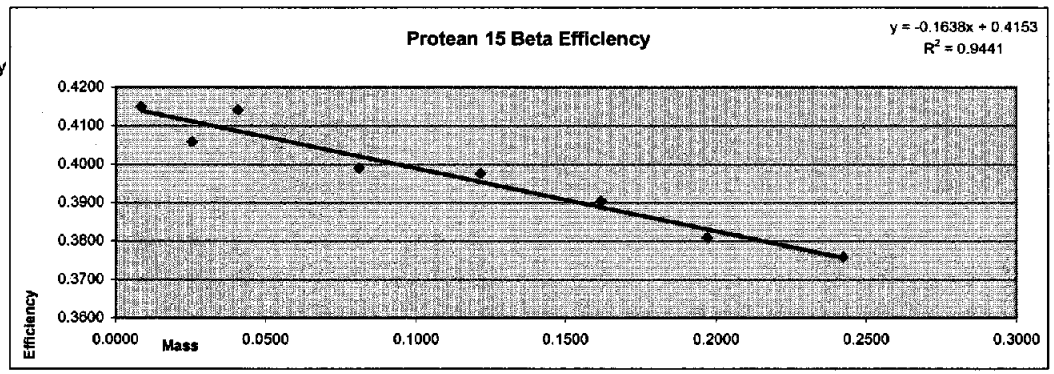
Protean 14 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4195	0.3999	0.4097
0.0251	0.0262	0.0257	0.4191	0.3890	0.4041
0.0412	0.0407	0.0410	0.4169	0.3954	0.4061
0.0796	0.0820	0.0808	0.3916	0.3933	0.3924
0.1212	0.1220	0.1216	0.3964	0.3962	0.3963
0.1629	0.1612	0.1621	0.3785	0.3926	0.3856
0.1996	0.1945	0.1971	0.3722	0.3853	0.3787
0.2420	0.2429	0.2425	0.3818	0.3744	0.3781



Protean 15 07/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4247	0.4051	0.4149
0.0251	0.0262	0.0257	0.4204	0.3912	0.4058
0.0412	0.0407	0.0410	0.4218	0.4064	0.4141
0.0796	0.0820	0.0808	0.3986	0.3994	0.3990
0.1212	0.1220	0.1216	0.3983	0.3968	0.3975
0.1629	0.1612	0.1621	0.3857	0.3950	0.3904
0.1996	0.1945	0.1971	0.3788	0.3829	0.3808
0.2420	0.2429	0.2425	0.3775	0.3740	0.3758



Beta Attenuation Protean Detector 0
Set 1 06/22,23/06

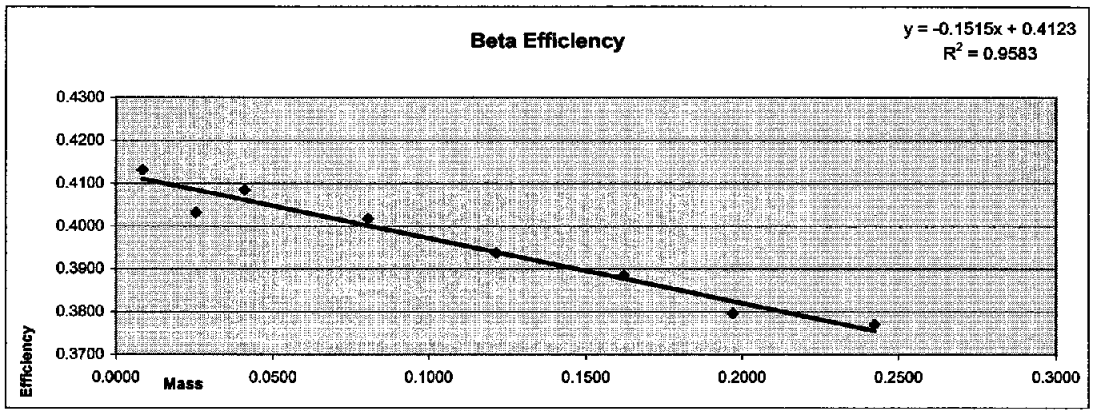
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	35028	1751.400	0.42561
B12	0.0251	20	34651	1732.550	0.42103
B13	0.0412	20	34179	1708.950	0.41530
B14	0.0796	20	33118	1655.900	0.40241
B15	0.1212	20	32464	1623.200	0.39446
B16	0.1629	20	31605	1580.250	0.38402
B17	0.1996	20	30940	1547.000	0.37594
B18	0.2420	20	31225	1561.250	0.37940

Beta Attenuation Protean Detector 0
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32968	1648.400	0.40058
B22	0.0262	20	31705	1585.250	0.38524
B23	0.0407	20	33045	1652.250	0.40152
B24	0.0820	20	32998	1649.900	0.40095
B25	0.1220	20	32342	1617.100	0.39298
B26	0.1612	20	32332	1616.600	0.39286
B27	0.1945	20	31541	1577.050	0.38324
B28	0.2429	20	30830	1541.500	0.37461

Protean 0

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4256	0.4006	0.4131	3.03%	-3.03%
0.0251	0.0262	0.0257	0.4210	0.3852	0.4031	4.44%	-4.44%
0.0412	0.0407	0.0410	0.4153	0.4015	0.4084	1.69%	-1.69%
0.0796	0.0820	0.0808	0.4024	0.4009	0.4017	0.18%	-0.18%
0.1212	0.1220	0.1216	0.3945	0.3930	0.3937	0.19%	-0.19%
0.1629	0.1612	0.1621	0.3840	0.3929	0.3884	-1.14%	1.14%
0.1996	0.1945	0.1971	0.3759	0.3832	0.3796	-0.96%	0.96%
0.2420	0.2429	0.2425	0.3794	0.3746	0.3770	0.64%	-0.64%



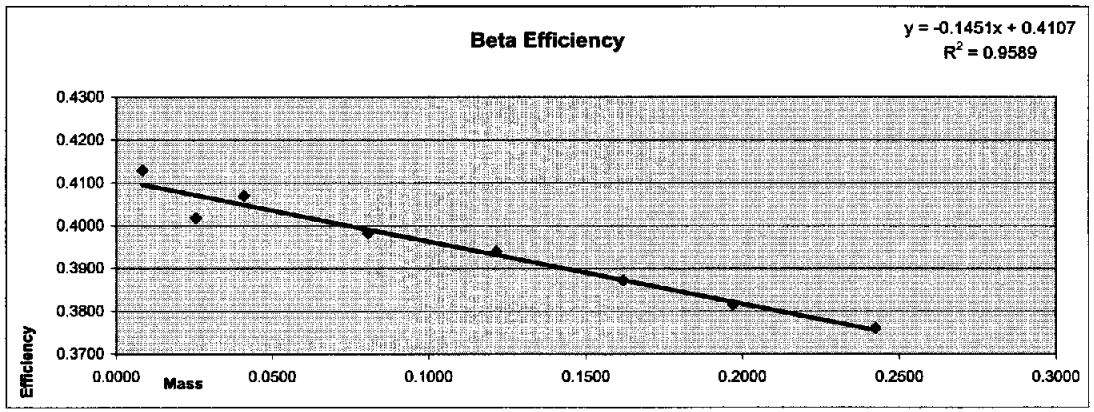
Beta Attenuation Protean Detector 1
Set 1 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34831	1741.550	0.42322
B12	0.0251	20	34375	1718.750	0.41768
B13	0.0412	20	34333	1716.650	0.41717
B14	0.0796	20	32936	1646.800	0.40019
B15	0.1212	20	32293	1614.650	0.39238
B16	0.1629	20	31130	1556.500	0.37825
B17	0.1996	20	30752	1537.600	0.37366
B18	0.2420	20	30886	1544.300	0.37529

Beta Attenuation Protean Detector 1
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	33126	1656.300	0.40250
B22	0.0262	20	31748	1587.400	0.38576
B23	0.0407	20	32648	1632.400	0.39670
B24	0.0820	20	32601	1630.050	0.39612
B25	0.1220	20	32545	1627.250	0.39544
B26	0.1612	20	32590	1629.500	0.39599
B27	0.1945	20	32044	1602.200	0.38936
B28	0.2429	20	31014	1550.700	0.37684

Protean 1 Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4232	0.4025	0.4129	2.51%	-2.51%
0.0251	0.0262	0.0257	0.4177	0.3858	0.4017	3.97%	-3.97%
0.0412	0.0407	0.0410	0.4172	0.3967	0.4069	2.52%	-2.52%
0.0796	0.0820	0.0808	0.4002	0.3961	0.3982	0.51%	-0.51%
0.1212	0.1220	0.1216	0.3924	0.3954	0.3939	-0.39%	0.39%
0.1629	0.1612	0.1621	0.3783	0.3960	0.3871	-2.29%	2.29%
0.1996	0.1945	0.1971	0.3737	0.3894	0.3815	-2.06%	2.06%
0.2420	0.2429	0.2425	0.3753	0.3768	0.3761	-0.21%	0.21%



Beta Attenuation Protean Detector 2
Set 1 06/22,23/06

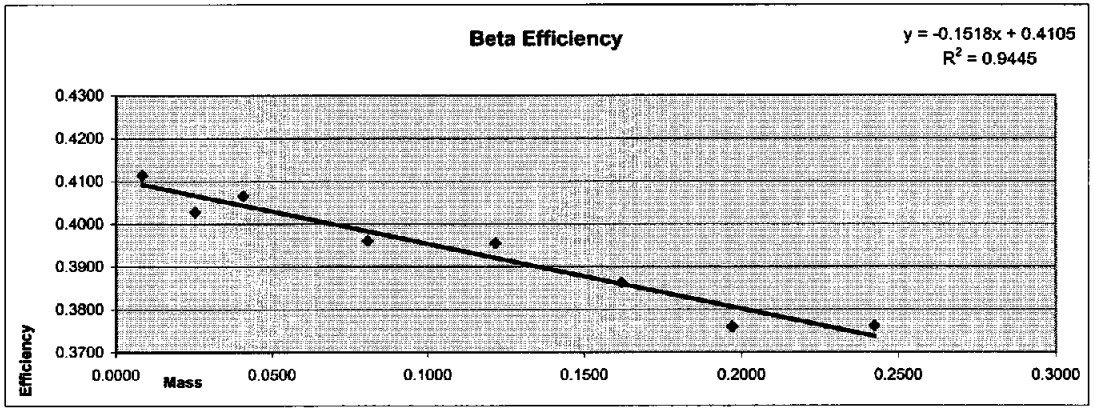
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34986	1749.300	0.42510
B12	0.0251	20	34441	1722.050	0.41848
B13	0.0412	20	34023	1701.150	0.41340
B14	0.0796	20	32388	1619.400	0.39354
B15	0.1212	20	32571	1628.550	0.39576
B16	0.1629	20	31475	1573.750	0.38244
B17	0.1996	20	30671	1533.550	0.37267
B18	0.2420	20	31153	1557.650	0.37853

Beta Attenuation Protean Detector 2
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32726	1636.300	0.39764
B22	0.0262	20	31842	1592.100	0.38690
B23	0.0407	20	32877	1643.850	0.39948
B24	0.0820	20	32799	1639.950	0.39853
B25	0.1220	20	32528	1626.400	0.39524
B26	0.1612	20	32096	1604.800	0.38999
B27	0.1945	20	31210	1560.500	0.37922
B28	0.2429	20	30757	1537.850	0.37372

Protean 2

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4251	0.3976	0.4114	3.34%	-3.34%
0.0251	0.0262	0.0257	0.4185	0.3869	0.4027	3.92%	-3.92%
0.0412	0.0407	0.0410	0.4134	0.3995	0.4064	1.71%	-1.71%
0.0796	0.0820	0.0808	0.3935	0.3985	0.3960	-0.63%	0.63%
0.1212	0.1220	0.1216	0.3958	0.3952	0.3955	0.07%	-0.07%
0.1629	0.1612	0.1621	0.3824	0.3900	0.3862	-0.98%	0.98%
0.1996	0.1945	0.1971	0.3727	0.3792	0.3759	-0.87%	0.87%
0.2420	0.2429	0.2425	0.3785	0.3737	0.3761	0.64%	-0.64%



Beta Attenuation Protean Detector 3
Set 1 06/22,23/06

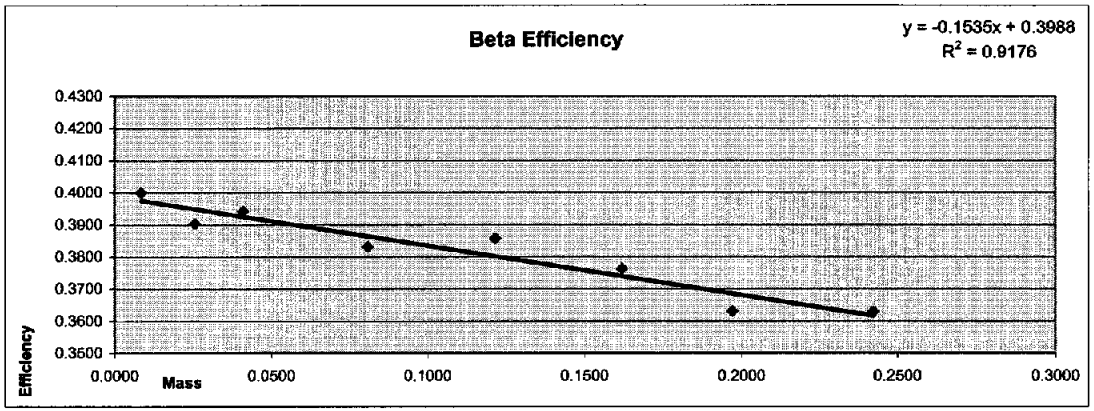
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	33611	1680.550	0.40840
B12	0.0251	20	33220	1661.000	0.40365
B13	0.0412	20	33189	1659.450	0.40327
B14	0.0796	20	31272	1563.600	0.37998
B15	0.1212	20	31675	1583.750	0.38487
B16	0.1629	20	30688	1534.400	0.37288
B17	0.1996	20	29594	1479.700	0.35959
B18	0.2420	20	29951	1497.550	0.36392

Beta Attenuation Protean Detector 3
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32213	1610.650	0.39141
B22	0.0262	20	31017	1550.850	0.37688
B23	0.0407	20	31683	1584.150	0.38497
B24	0.0820	20	31789	1589.450	0.38626
B25	0.1220	20	31812	1590.600	0.38654
B26	0.1612	20	31234	1561.700	0.37951
B27	0.1945	20	30172	1508.600	0.36661
B28	0.2429	20	29771	1488.550	0.36174

Protean 3

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4084	0.3914	0.3999	2.12%	-2.12%
0.0251	0.0262	0.0257	0.4036	0.3769	0.3903	3.43%	-3.43%
0.0412	0.0407	0.0410	0.4033	0.3850	0.3941	2.32%	-2.32%
0.0796	0.0820	0.0808	0.3800	0.3863	0.3831	-0.82%	0.82%
0.1212	0.1220	0.1216	0.3849	0.3865	0.3857	-0.22%	0.22%
0.1629	0.1612	0.1621	0.3729	0.3795	0.3762	-0.88%	0.88%
0.1996	0.1945	0.1971	0.3596	0.3666	0.3631	-0.97%	0.97%
0.2420	0.2429	0.2425	0.3639	0.3617	0.3628	0.30%	-0.30%



Beta Attenuation Protean Detector 4
Set 1 08_06

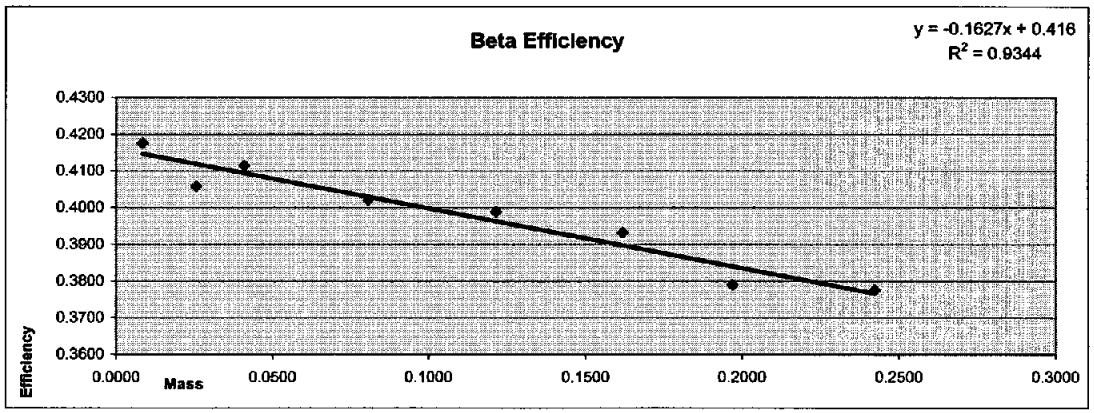
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4104.67 CPM	Sr-90 Eff
B11	0.0089	20	35206	1760.300	0.42885
B12	0.0251	20	34537	1726.850	0.42070
B13	0.0412	20	34140	1707.000	0.41587
B14	0.0796	20	33005	1650.250	0.40204
B15	0.1212	20	32857	1642.850	0.40024
B16	0.1629	20	31824	1591.200	0.38766
B17	0.1996	20	30538	1526.900	0.37199
B18	0.2420	20	31060	1553.000	0.37835

Beta Attenuation Protean Detector 4
Set 2 08_06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4104.67 CPM	Sr-90 Eff
B21	0.0082	20	33342	1667.100	0.40615
B22	0.0262	20	32089	1604.450	0.39088
B23	0.0407	20	33418	1670.900	0.40707
B24	0.0820	20	33002	1650.100	0.40201
B25	0.1220	20	32625	1631.250	0.39741
B26	0.1612	20	32719	1635.950	0.39856
B27	0.1945	20	31679	1583.950	0.38589
B28	0.2429	20	30927	1546.350	0.37673

Protean 4

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4289	0.4061	0.4175	2.72%	-2.72%
0.0251	0.0262	0.0257	0.4207	0.3909	0.4058	3.67%	-3.67%
0.0412	0.0407	0.0410	0.4159	0.4071	0.4115	1.07%	-1.07%
0.0796	0.0820	0.0808	0.4020	0.4020	0.4020	0.00%	0.00%
0.1212	0.1220	0.1216	0.4002	0.3974	0.3988	0.35%	-0.35%
0.1629	0.1612	0.1621	0.3877	0.3986	0.3931	-1.39%	1.39%
0.1996	0.1945	0.1971	0.3720	0.3859	0.3789	-1.83%	1.83%
0.2420	0.2429	0.2425	0.3783	0.3767	0.3775	0.21%	-0.21%



Beta Attenuation Protean Detector 5
Set 1 06/22,23/06

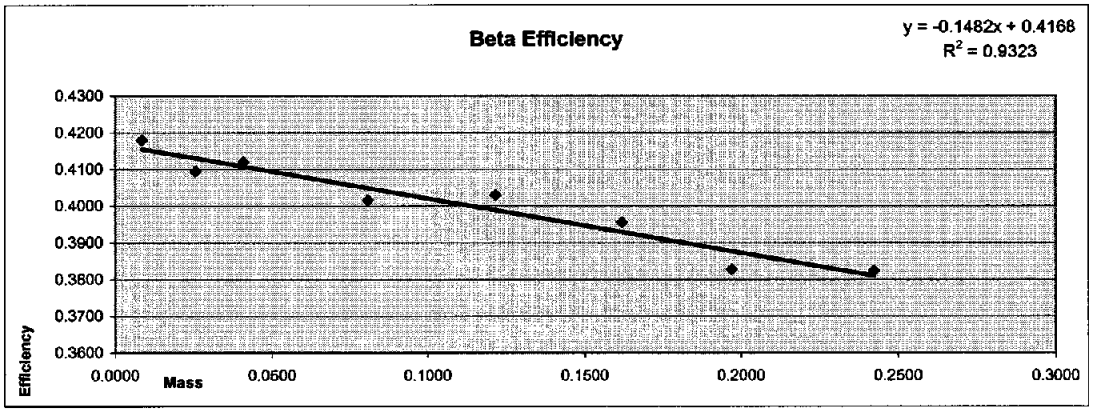
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	35753	1787.650	0.43442
B12	0.0251	20	35121	1756.050	0.42674
B13	0.0412	20	34452	1722.600	0.41861
B14	0.0796	20	33245	1662.250	0.40395
B15	0.1212	20	33450	1672.500	0.40644
B16	0.1629	20	32049	1602.450	0.38942
B17	0.1996	20	31038	1551.900	0.37713
B18	0.2420	20	31536	1576.800	0.38318

Beta Attenuation Protean Detector 5
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	33052	1652.600	0.40160
B22	0.0262	20	32273	1613.650	0.39214
B23	0.0407	20	33356	1667.800	0.40530
B24	0.0820	20	32860	1643.000	0.39927
B25	0.1220	20	32866	1643.300	0.39934
B26	0.1612	20	33050	1652.500	0.40158
B27	0.1945	20	31946	1597.300	0.38817
B28	0.2429	20	31383	1569.150	0.38132

Protean 5

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4344	0.4016	0.4180	3.93%	-3.93%
0.0251	0.0262	0.0257	0.4267	0.3921	0.4094	4.23%	-4.23%
0.0412	0.0407	0.0410	0.4186	0.4053	0.4120	1.62%	-1.62%
0.0796	0.0820	0.0808	0.4039	0.3993	0.4016	0.58%	-0.58%
0.1212	0.1220	0.1216	0.4064	0.3993	0.4029	0.88%	-0.88%
0.1629	0.1612	0.1621	0.3894	0.4016	0.3955	-1.54%	1.54%
0.1996	0.1945	0.1971	0.3771	0.3882	0.3826	-1.44%	1.44%
0.2420	0.2429	0.2425	0.3832	0.3813	0.3823	0.24%	-0.24%



Beta Attenuation Protean Detector 6
Set 1 06/22,23/06

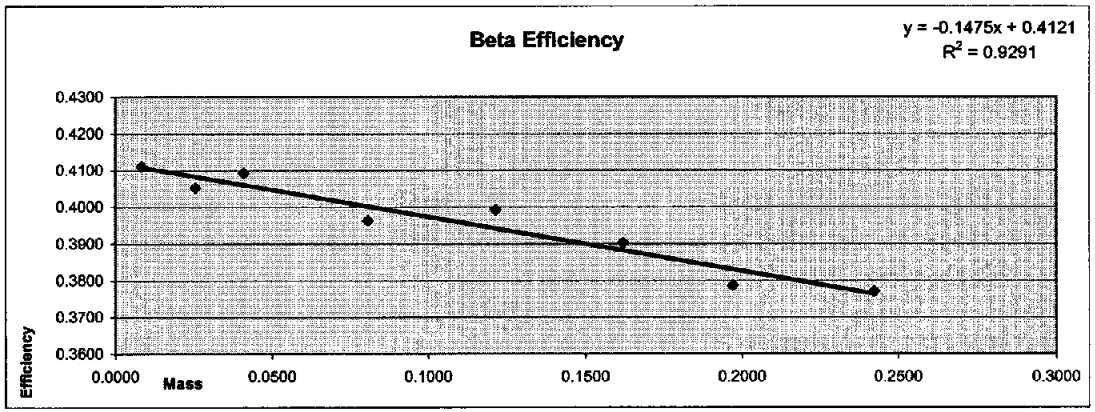
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34780	1739.000	0.42260
B12	0.0251	20	34607	1730.350	0.42050
B13	0.0412	20	34108	1705.400	0.41443
B14	0.0796	20	32606	1630.300	0.39618
B15	0.1212	20	32861	1643.050	0.39928
B16	0.1629	20	31678	1583.900	0.38491
B17	0.1996	20	30850	1542.500	0.37485
B18	0.2420	20	31135	1556.750	0.37831

Beta Attenuation Protean Detector 6
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32885	1644.250	0.39957
B22	0.0262	20	32090	1604.500	0.38991
B23	0.0407	20	33248	1662.400	0.40399
B24	0.0820	20	32622	1631.100	0.39638
B25	0.1220	20	32855	1642.750	0.39921
B26	0.1612	20	32544	1627.200	0.39543
B27	0.1945	20	31469	1573.450	0.38237
B28	0.2429	20	30922	1546.100	0.37572

Protean 6

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4226	0.3996	0.4111	2.80%	-2.80%
0.0251	0.0262	0.0257	0.4205	0.3899	0.4052	3.77%	-3.77%
0.0412	0.0407	0.0410	0.4144	0.4040	0.4092	1.28%	-1.28%
0.0796	0.0820	0.0808	0.3962	0.3964	0.3963	-0.02%	0.02%
0.1212	0.1220	0.1216	0.3993	0.3992	0.3992	0.01%	-0.01%
0.1629	0.1612	0.1621	0.3849	0.3954	0.3902	-1.35%	1.35%
0.1996	0.1945	0.1971	0.3748	0.3824	0.3786	-0.99%	0.99%
0.2420	0.2429	0.2425	0.3783	0.3757	0.3770	0.34%	-0.34%



Beta Attenuation Protean Detector 7
Set 1 06/22,23/06

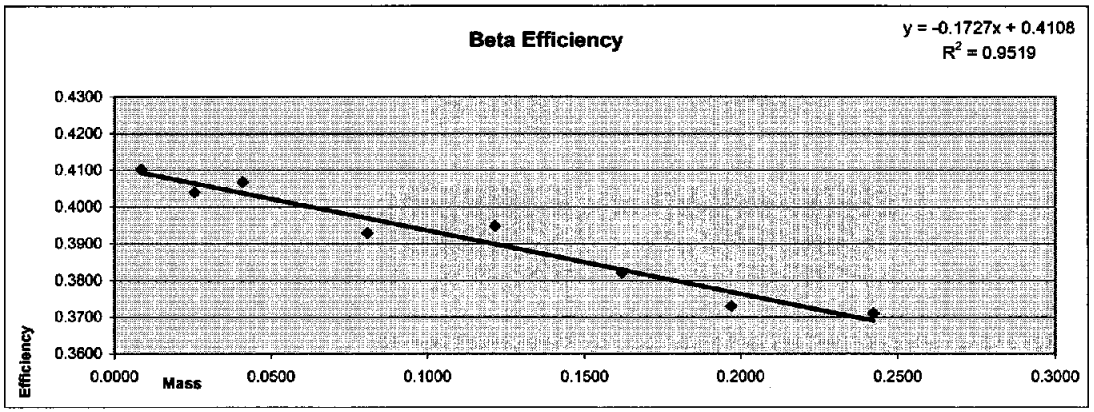
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34645	1732.250	0.42096
B12	0.0251	20	34347	1717.350	0.41734
B13	0.0412	20	34138	1706.900	0.41480
B14	0.0796	20	32404	1620.200	0.39373
B15	0.1212	20	32640	1632.000	0.39660
B16	0.1629	20	30947	1547.350	0.37603
B17	0.1996	20	30110	1505.500	0.36586
B18	0.2420	20	30567	1528.350	0.37141

Beta Attenuation Protean Detector 7
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32871	1643.550	0.39940
B22	0.0262	20	32138	1606.900	0.39050
B23	0.0407	20	32818	1640.900	0.39876
B24	0.0820	20	32260	1613.000	0.39198
B25	0.1220	20	32348	1617.400	0.39305
B26	0.1612	20	31944	1597.200	0.38814
B27	0.1945	20	31279	1563.950	0.38006
B28	0.2429	20	30512	1525.600	0.37074

Protean 7

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4210	0.3994	0.4102	2.63%	-2.63%
0.0251	0.0262	0.0257	0.4173	0.3905	0.4039	3.32%	-3.32%
0.0412	0.0407	0.0410	0.4148	0.3988	0.4068	1.97%	-1.97%
0.0796	0.0820	0.0808	0.3937	0.3920	0.3929	0.22%	-0.22%
0.1212	0.1220	0.1216	0.3966	0.3930	0.3948	0.45%	-0.45%
0.1629	0.1612	0.1621	0.3760	0.3881	0.3821	-1.59%	1.59%
0.1996	0.1945	0.1971	0.3659	0.3801	0.3730	-1.90%	1.90%
0.2420	0.2429	0.2425	0.3714	0.3707	0.3711	0.09%	-0.09%



Beta Attenuation Protean Detector 8
Set 1 06/22,23/06

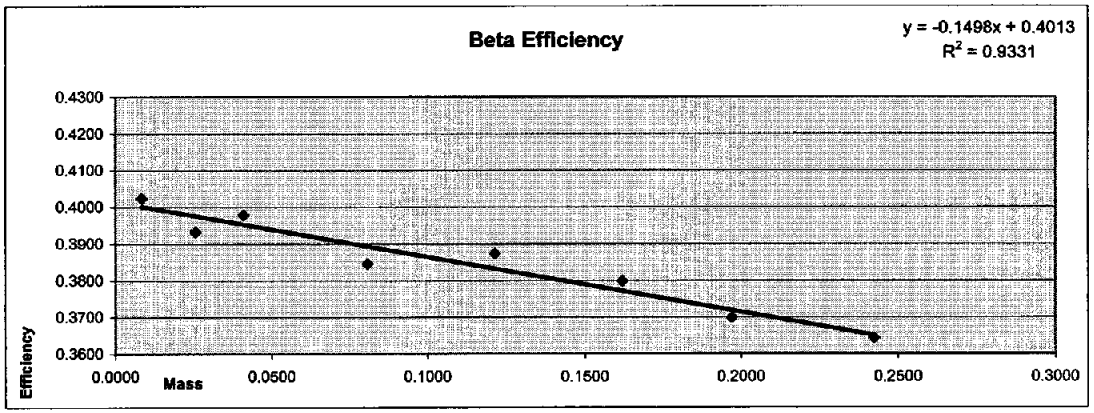
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	33974	1698.700	0.41281
B12	0.0251	20	33833	1691.650	0.41109
B13	0.0412	20	33358	1667.900	0.40532
B14	0.0796	20	31732	1586.600	0.38557
B15	0.1212	20	31615	1580.750	0.38414
B16	0.1629	20	30842	1542.100	0.37475
B17	0.1996	20	29939	1496.950	0.36378
B18	0.2420	20	29829	1491.450	0.36244

Beta Attenuation Protean Detector 8
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32250	1612.500	0.39186
B22	0.0262	20	30888	1544.400	0.37531
B23	0.0407	20	32126	1606.300	0.39035
B24	0.0820	20	31560	1578.000	0.38348
B25	0.1220	20	32128	1606.400	0.39038
B26	0.1612	20	31675	1583.750	0.38487
B27	0.1945	20	30934	1546.700	0.37587
B28	0.2429	20	30123	1506.150	0.36601

Protean 8

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4128	0.3919	0.4023	2.60%	-2.60%
0.0251	0.0262	0.0257	0.4111	0.3753	0.3932	4.55%	-4.55%
0.0412	0.0407	0.0410	0.4053	0.3904	0.3978	1.88%	-1.88%
0.0796	0.0820	0.0808	0.3856	0.3835	0.3845	0.27%	-0.27%
0.1212	0.1220	0.1216	0.3841	0.3904	0.3873	-0.80%	0.80%
0.1629	0.1612	0.1621	0.3748	0.3849	0.3798	-1.33%	1.33%
0.1996	0.1945	0.1971	0.3638	0.3759	0.3698	-1.63%	1.63%
0.2420	0.2429	0.2425	0.3624	0.3660	0.3642	-0.49%	0.49%



Beta Attenuation Protean Detector 9
Set 1 06/22,23/06

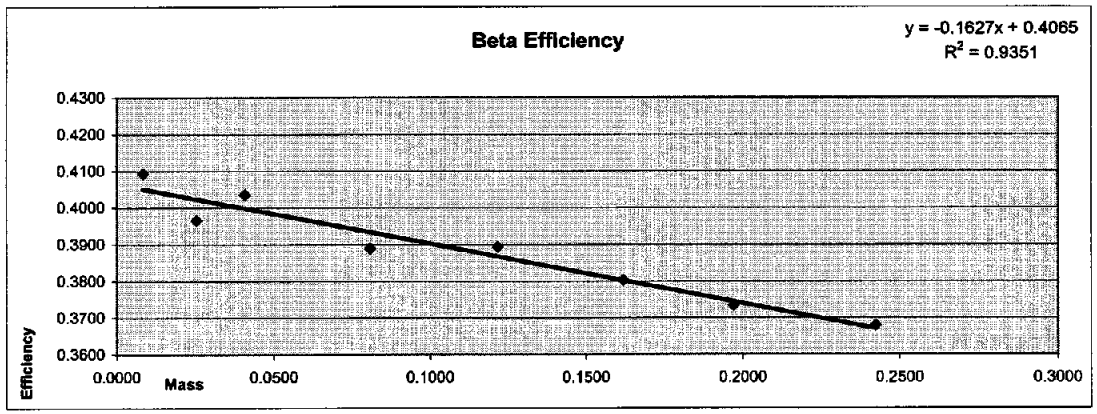
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34606	1730.300	0.42049
B12	0.0251	20	33878	1693.900	0.41164
B13	0.0412	20	33803	1690.150	0.41073
B14	0.0796	20	32126	1606.300	0.39035
B15	0.1212	20	32133	1606.650	0.39044
B16	0.1629	20	30848	1542.400	0.37482
B17	0.1996	20	30369	1518.450	0.36900
B18	0.2420	20	30593	1529.650	0.37173

Beta Attenuation Protean Detector 9
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32767	1638.350	0.39814
B22	0.0262	20	31386	1569.300	0.38136
B23	0.0407	20	32615	1630.750	0.39629
B24	0.0820	20	31883	1594.150	0.38740
B25	0.1220	20	31942	1597.100	0.38812
B26	0.1612	20	31732	1586.600	0.38557
B27	0.1945	20	31083	1554.150	0.37768
B28	0.2429	20	29972	1498.600	0.36418

Protean 9

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4205	0.3981	0.4093	2.73%	-2.73%
0.0251	0.0262	0.0257	0.4116	0.3814	0.3965	3.82%	-3.82%
0.0412	0.0407	0.0410	0.4107	0.3963	0.4035	1.79%	-1.79%
0.0796	0.0820	0.0808	0.3904	0.3874	0.3889	0.38%	-0.38%
0.1212	0.1220	0.1216	0.3904	0.3881	0.3893	0.30%	-0.30%
0.1629	0.1612	0.1621	0.3748	0.3856	0.3802	-1.41%	1.41%
0.1996	0.1945	0.1971	0.3690	0.3777	0.3733	-1.16%	1.16%
0.2420	0.2429	0.2425	0.3717	0.3642	0.3680	1.03%	-1.03%



Beta Attenuation Protean Detector 10
Set 1 06/22,23/06

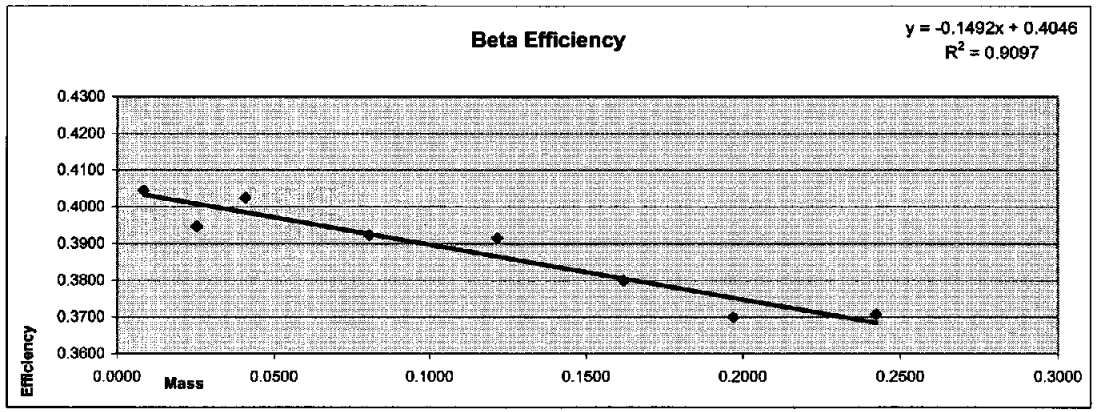
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34012	1700.600	0.41327
B12	0.0251	20	33890	1694.500	0.41179
B13	0.0412	20	33646	1682.300	0.40882
B14	0.0796	20	32258	1612.900	0.39196
B15	0.1212	20	32165	1608.250	0.39083
B16	0.1629	20	30633	1531.650	0.37221
B17	0.1996	20	29935	1496.750	0.36373
B18	0.2420	20	30576	1528.800	0.37152

Beta Attenuation Protean Detector 10
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32566	1628.300	0.39570
B22	0.0262	20	31079	1553.950	0.37763
B23	0.0407	20	32604	1630.200	0.39616
B24	0.0820	20	32314	1615.700	0.39264
B25	0.1220	20	32267	1613.350	0.39207
B26	0.1612	20	31889	1594.450	0.38747
B27	0.1945	20	30955	1547.750	0.37612
B28	0.2429	20	30450	1522.500	0.36999

Protean 10

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4133	0.3957	0.4045	2.17%	-2.17%
0.0251	0.0262	0.0257	0.4118	0.3776	0.3947	4.33%	-4.33%
0.0412	0.0407	0.0410	0.4088	0.3962	0.4025	1.57%	-1.57%
0.0796	0.0820	0.0808	0.3920	0.3926	0.3923	-0.09%	0.09%
0.1212	0.1220	0.1216	0.3908	0.3921	0.3914	-0.16%	0.16%
0.1629	0.1612	0.1621	0.3722	0.3875	0.3798	-2.01%	2.01%
0.1996	0.1945	0.1971	0.3637	0.3761	0.3699	-1.68%	1.68%
0.2420	0.2429	0.2425	0.3715	0.3700	0.3708	0.21%	-0.21%



Beta Attenuation Protean Detector 11
Set 1 06/22,23/06

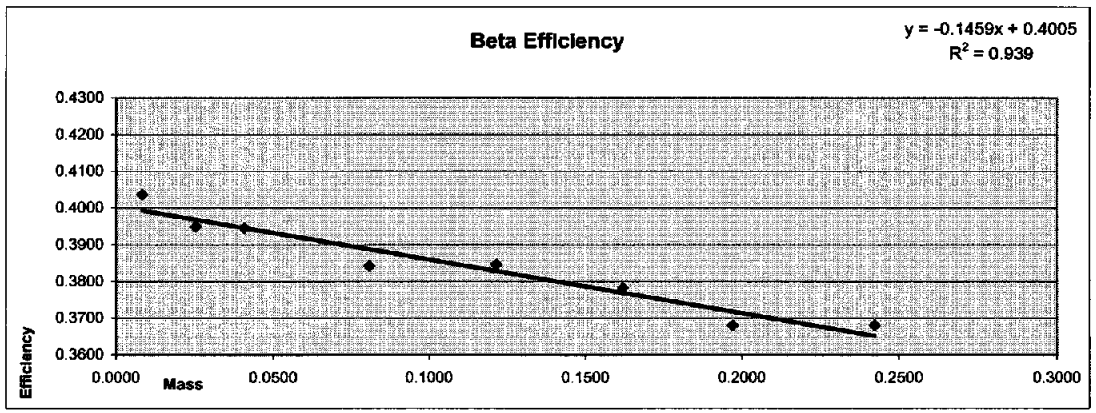
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34249	1712.450	0.41615
B12	0.0251	20	33831	1691.550	0.41107
B13	0.0412	20	33190	1659.500	0.40328
B14	0.0796	20	31698	1584.900	0.38515
B15	0.1212	20	31828	1591.400	0.38673
B16	0.1629	20	30646	1532.300	0.37237
B17	0.1996	20	29999	1499.950	0.36451
B18	0.2420	20	30324	1516.200	0.36846

Beta Attenuation Protean Detector 11
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32177	1608.850	0.39097
B22	0.0262	20	31161	1558.050	0.37863
B23	0.0407	20	31747	1587.350	0.38575
B24	0.0820	20	31527	1576.350	0.38307
B25	0.1220	20	31471	1573.550	0.38239
B26	0.1612	20	31600	1580.000	0.38396
B27	0.1945	20	30576	1528.800	0.37152
B28	0.2429	20	30247	1512.350	0.36752

Protean 11

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4161	0.3910	0.4036	3.12%	-3.12%
0.0251	0.0262	0.0257	0.4111	0.3786	0.3948	4.11%	-4.11%
0.0412	0.0407	0.0410	0.4033	0.3857	0.3945	2.22%	-2.22%
0.0796	0.0820	0.0808	0.3852	0.3831	0.3841	0.27%	-0.27%
0.1212	0.1220	0.1216	0.3867	0.3824	0.3846	0.56%	-0.56%
0.1629	0.1612	0.1621	0.3724	0.3840	0.3782	-1.53%	1.53%
0.1996	0.1945	0.1971	0.3645	0.3715	0.3680	-0.95%	0.95%
0.2420	0.2429	0.2425	0.3685	0.3675	0.3680	0.13%	-0.13%



Beta Attenuation Protean Detector 12
Set 1 06/22,23/06

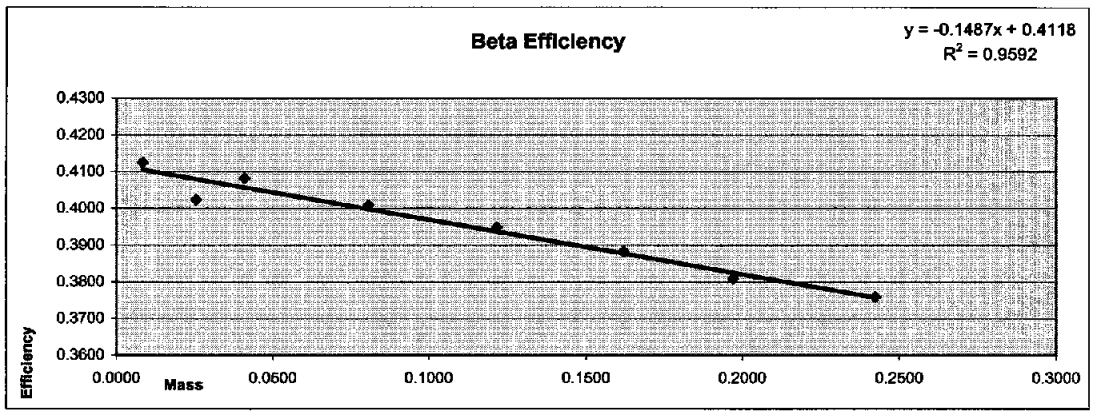
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34976	1748.800	0.42498
B12	0.0251	20	34339	1716.950	0.41724
B13	0.0412	20	34192	1709.600	0.41546
B14	0.0796	20	32982	1649.100	0.40075
B15	0.1212	20	32769	1638.450	0.39817
B16	0.1629	20	31366	1568.300	0.38112
B17	0.1996	20	31012	1550.600	0.37682
B18	0.2420	20	31183	1559.150	0.37889

Beta Attenuation Protean Detector 12
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32919	1645.950	0.39999
B22	0.0262	20	31869	1593.450	0.38723
B23	0.0407	20	32993	1649.650	0.40089
B24	0.0820	20	32984	1649.200	0.40078
B25	0.1220	20	32214	1610.700	0.39142
B26	0.1612	20	32533	1626.650	0.39530
B27	0.1945	20	31679	1583.950	0.38492
B28	0.2429	20	30686	1534.300	0.37286

Protean 12

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4250	0.4000	0.4125	3.03%	-3.03%
0.0251	0.0262	0.0257	0.4172	0.3872	0.4022	3.73%	-3.73%
0.0412	0.0407	0.0410	0.4155	0.4009	0.4082	1.78%	-1.78%
0.0796	0.0820	0.0808	0.4008	0.4008	0.4008	0.00%	0.00%
0.1212	0.1220	0.1216	0.3982	0.3914	0.3948	0.85%	-0.85%
0.1629	0.1612	0.1621	0.3811	0.3953	0.3882	-1.83%	1.83%
0.1996	0.1945	0.1971	0.3768	0.3849	0.3809	-1.06%	1.06%
0.2420	0.2429	0.2425	0.3789	0.3729	0.3759	0.80%	-0.80%



Beta Attenuation Protean Detector 13
Set 1 06/22,23/06

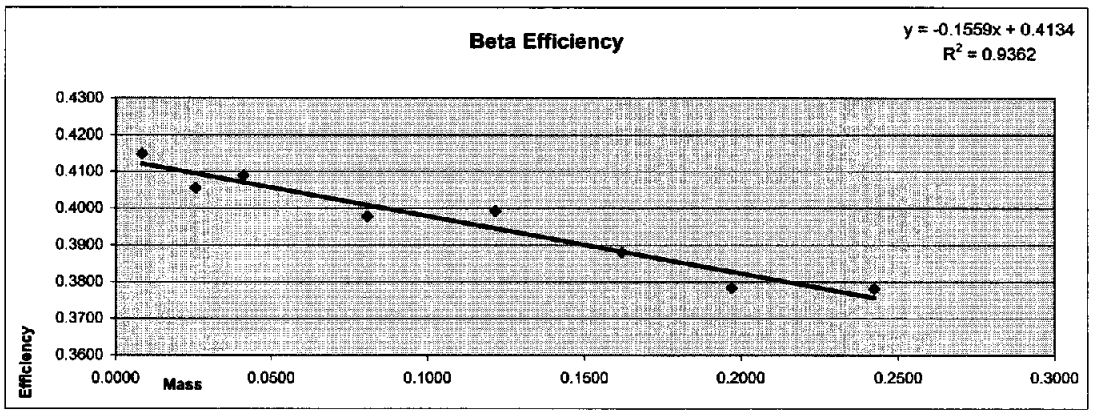
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	35047	1752.350	0.42584
B12	0.0251	20	34634	1731.700	0.42083
B13	0.0412	20	34198	1709.900	0.41553
B14	0.0796	20	32778	1638.900	0.39827
B15	0.1212	20	32809	1640.450	0.39865
B16	0.1629	20	31669	1583.450	0.38480
B17	0.1996	20	30673	1533.650	0.37270
B18	0.2420	20	31110	1555.500	0.37801

Beta Attenuation Protean Detector 13
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	33230	1661.500	0.40377
B22	0.0262	20	32107	1605.350	0.39012
B23	0.0407	20	33113	1655.650	0.40235
B24	0.0820	20	32688	1634.400	0.39718
B25	0.1220	20	32906	1645.300	0.39983
B26	0.1612	20	32187	1609.350	0.39109
B27	0.1945	20	31593	1579.650	0.38388
B28	0.2429	20	31119	1555.950	0.37812

Protean 13

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4258	0.4038	0.4148	2.66%	-2.66%
0.0251	0.0262	0.0257	0.4208	0.3901	0.4055	3.79%	-3.79%
0.0412	0.0407	0.0410	0.4155	0.4023	0.4089	1.61%	-1.61%
0.0796	0.0820	0.0808	0.3983	0.3972	0.3977	0.14%	-0.14%
0.1212	0.1220	0.1216	0.3987	0.3998	0.3992	-0.15%	0.15%
0.1629	0.1612	0.1621	0.3848	0.3911	0.3879	-0.81%	0.81%
0.1996	0.1945	0.1971	0.3727	0.3839	0.3783	-1.48%	1.48%
0.2420	0.2429	0.2425	0.3780	0.3781	0.3781	-0.01%	0.01%



Beta Attenuation Protean Detector 14
Set 1 06/22,23/06

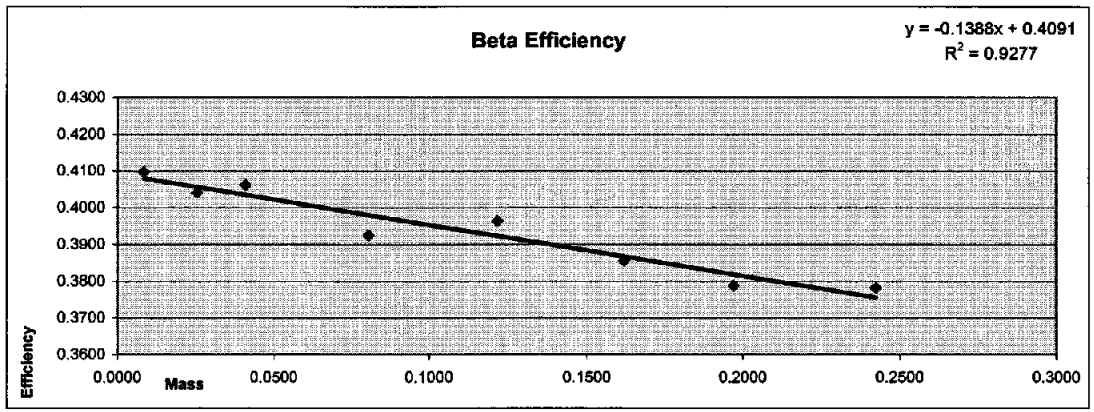
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34522	1726.100	0.41947
B12	0.0251	20	34494	1724.700	0.41913
B13	0.0412	20	34309	1715.450	0.41688
B14	0.0796	20	32225	1611.250	0.39156
B15	0.1212	20	32625	1631.250	0.39642
B16	0.1629	20	31152	1557.600	0.37852
B17	0.1996	20	30632	1531.600	0.37220
B18	0.2420	20	31425	1571.250	0.38183

Beta Attenuation Protean Detector 14
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	32915	1645.750	0.39994
B22	0.0262	20	32013	1600.650	0.38898
B23	0.0407	20	32540	1627.000	0.39538
B24	0.0820	20	32367	1618.350	0.39328
B25	0.1220	20	32609	1630.450	0.39622
B26	0.1612	20	32312	1615.600	0.39261
B27	0.1945	20	31710	1585.500	0.38530
B28	0.2429	20	30810	1540.500	0.37436

Protean 14

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4195	0.3999	0.4097	2.38%	-2.38%
0.0251	0.0262	0.0257	0.4191	0.3890	0.4041	3.73%	-3.73%
0.0412	0.0407	0.0410	0.4169	0.3954	0.4061	2.65%	-2.65%
0.0796	0.0820	0.0808	0.3916	0.3933	0.3924	-0.22%	0.22%
0.1212	0.1220	0.1216	0.3964	0.3962	0.3963	0.02%	-0.02%
0.1629	0.1612	0.1621	0.3785	0.3926	0.3856	-1.83%	1.83%
0.1996	0.1945	0.1971	0.3722	0.3853	0.3787	-1.73%	1.73%
0.2420	0.2429	0.2425	0.3818	0.3744	0.3781	0.99%	-0.99%



Beta Attenuation Protean Detector 15
Set 1 06/22,23/06

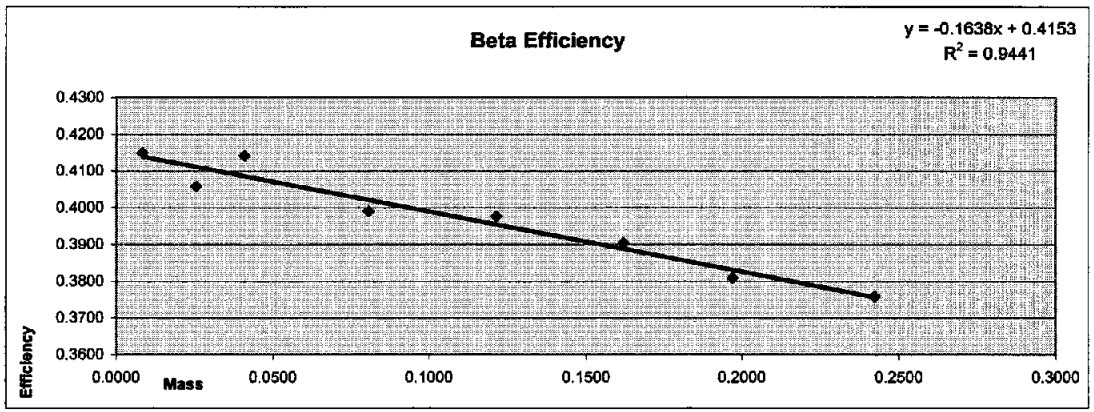
Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B11	0.0089	20	34953	1747.650	0.42470
B12	0.0251	20	34598	1729.900	0.42039
B13	0.0412	20	34718	1735.900	0.42185
B14	0.0796	20	32805	1640.250	0.39860
B15	0.1212	20	32777	1638.850	0.39826
B16	0.1629	20	31746	1587.300	0.38574
B17	0.1996	20	31172	1558.600	0.37876
B18	0.2420	20	31068	1553.400	0.37750

Beta Attenuation Protean Detector 15
Set 2 06/22,23/06

Std ID	Sample Wt	Count Time	Beta Counts	DPM 4115 CPM	Sr-90 Eff
B21	0.0082	20	33340	1667.000	0.40510
B22	0.0262	20	32195	1609.750	0.39119
B23	0.0407	20	33444	1672.200	0.40637
B24	0.0820	20	32869	1643.450	0.39938
B25	0.1220	20	32657	1632.850	0.39680
B26	0.1612	20	32506	1625.300	0.39497
B27	0.1945	20	31515	1575.750	0.38293
B28	0.2429	20	30784	1539.200	0.37405

Protean 15

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency	Percent Δ Efficiency Set 1	Percent Δ Efficiency Set 2
0.0089	0.0082	0.0086	0.4247	0.4051	0.4149	2.36%	-2.36%
0.0251	0.0262	0.0257	0.4204	0.3912	0.4058	3.60%	-3.60%
0.0412	0.0407	0.0410	0.4218	0.4064	0.4141	1.87%	-1.87%
0.0796	0.0820	0.0808	0.3986	0.3994	0.3990	-0.10%	0.10%
0.1212	0.1220	0.1216	0.3983	0.3968	0.3975	0.18%	-0.18%
0.1629	0.1612	0.1621	0.3857	0.3950	0.3904	-1.18%	1.18%
0.1996	0.1945	0.1971	0.3788	0.3829	0.3808	-0.55%	0.55%
0.2420	0.2429	0.2425	0.3775	0.3740	0.3758	0.46%	-0.46%



SEVERN TRENT STL

Voltage Plateaus

and

Discriminator Settings

Unit #1

MPC 9604 FACTORY PERFORMANCE EVALUATION

Factory performed tests for Instrument Serial Number: 233126-BO

Voltage Settings

Alpha & Beta Voltage 1515

Alpha Only Voltage 705

ULD Settings

A 7 C 7

B 7 D 7

Efficiencies: DETECTOR A

Sr/y 90 56.08 %

Tc-99 36.544 %

Ni-63 16.2 %

Th-230 @ A/B Voltage 24.895 %

Th-230 @ A only Voltage 22.403 %

Efficiencies: DETECTOR B

Sr/y 90 55.438 %

Tc-99 36.418 %

Ni-63 15.62 %

Th-230 @ A/B Voltage 24.341 %

Th-230 @ A only Voltage 22.350 %

Efficiencies: DETECTOR C

Sr/y 90 56.114 %

Tc-99 36.527 %

Ni-63 15.9 %

Th-230 @ A/B Voltage 24.466 %

Th-230 @ A only Voltage 22.627 %

Efficiencies: DETECTOR D

Sr/y 90 53.276 %

Tc-99 34.957 %

Ni-63 15.78 %

Th-230 @ A/B Voltage 24.717 %

Th-230 @ A only Voltage 23.019 %

Backgrounds

Detector A:

Alpha Background 0.07
Beta Background 0.64

Detector B:

Alpha Background 0.05
Beta Background 0.52

Detector C:

Alpha Background 0.06
Beta Background 0.47

Detector D:

Alpha Background 0.05
Beta Background 0.51

Background Count Time was 1000 Minutes.

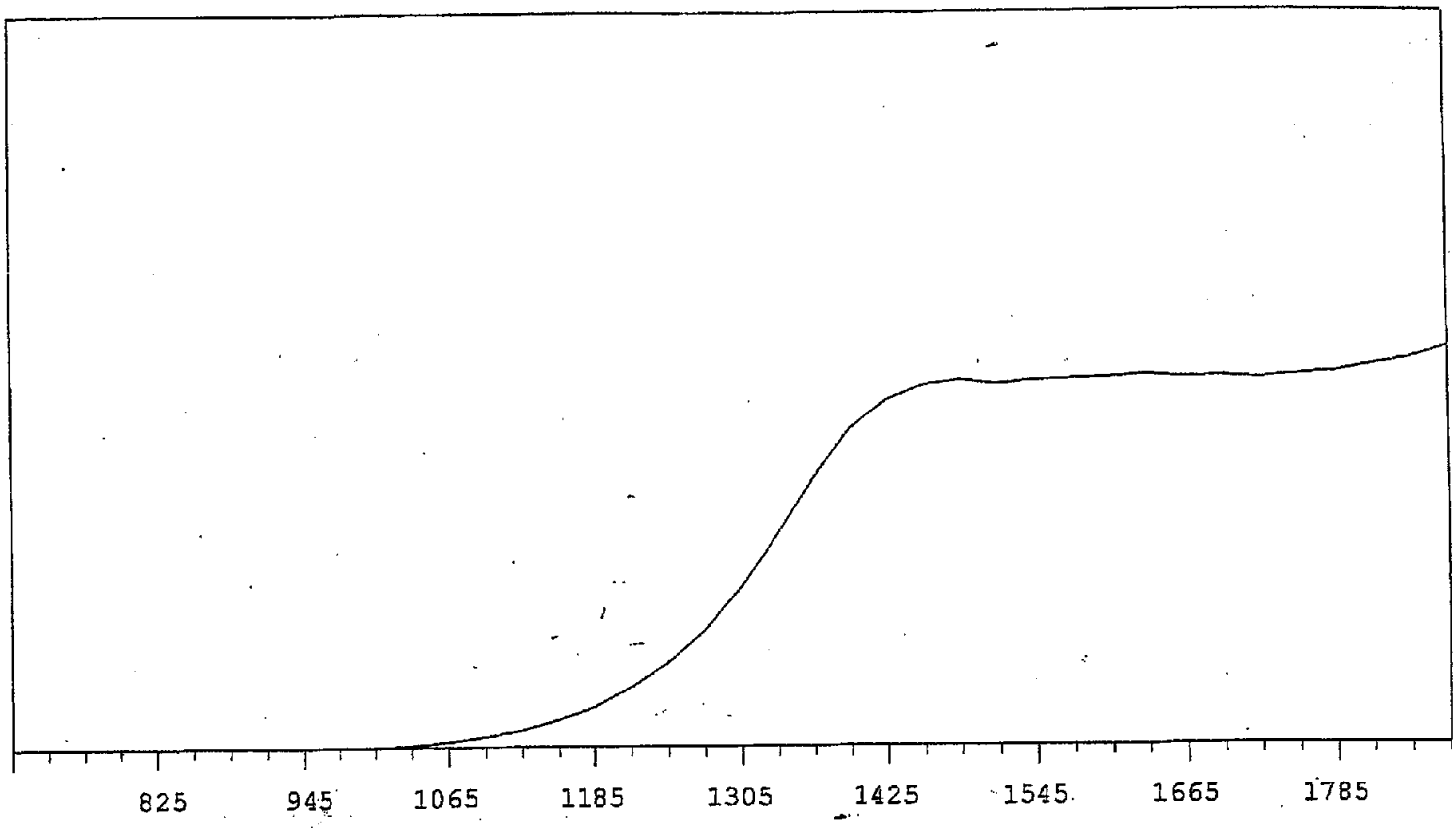
Tests performed and recorded by: Gregory D. Walker

Date: 11/26/02

*ALL EFFICIENCIES WERE OBTAINED USING A 2" DISTRIBUTED SOURCE AT OPTIMAL GEOMETRY EXCEPT Th-230, WHICH WAS AT A DEPTH OF ¼".

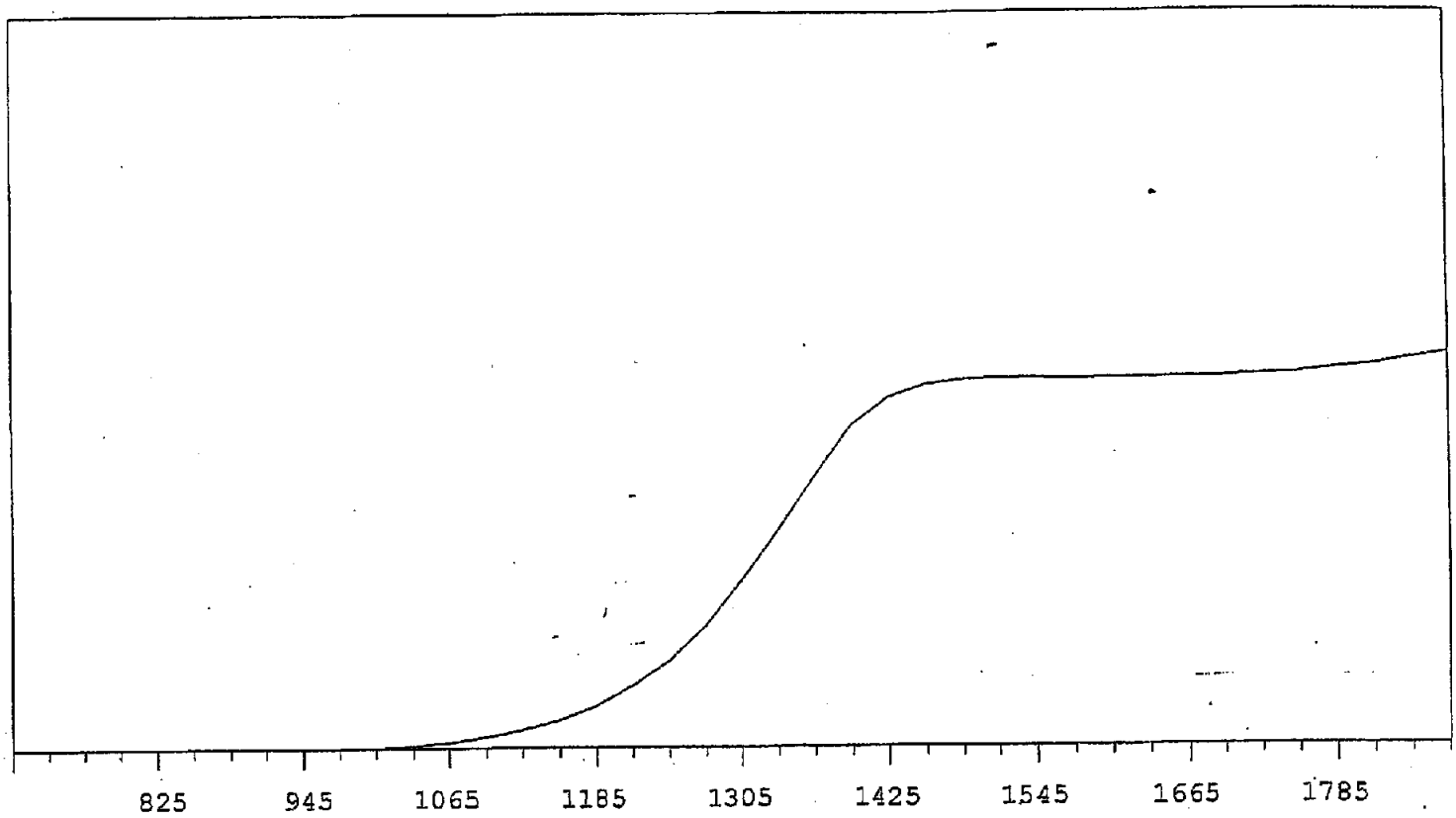
Unit #1

MPC 9604 Plateau 1 MPC 9604 Detector A 11/18/2002
Alpha Volts: 705 Beta Volts: 1515



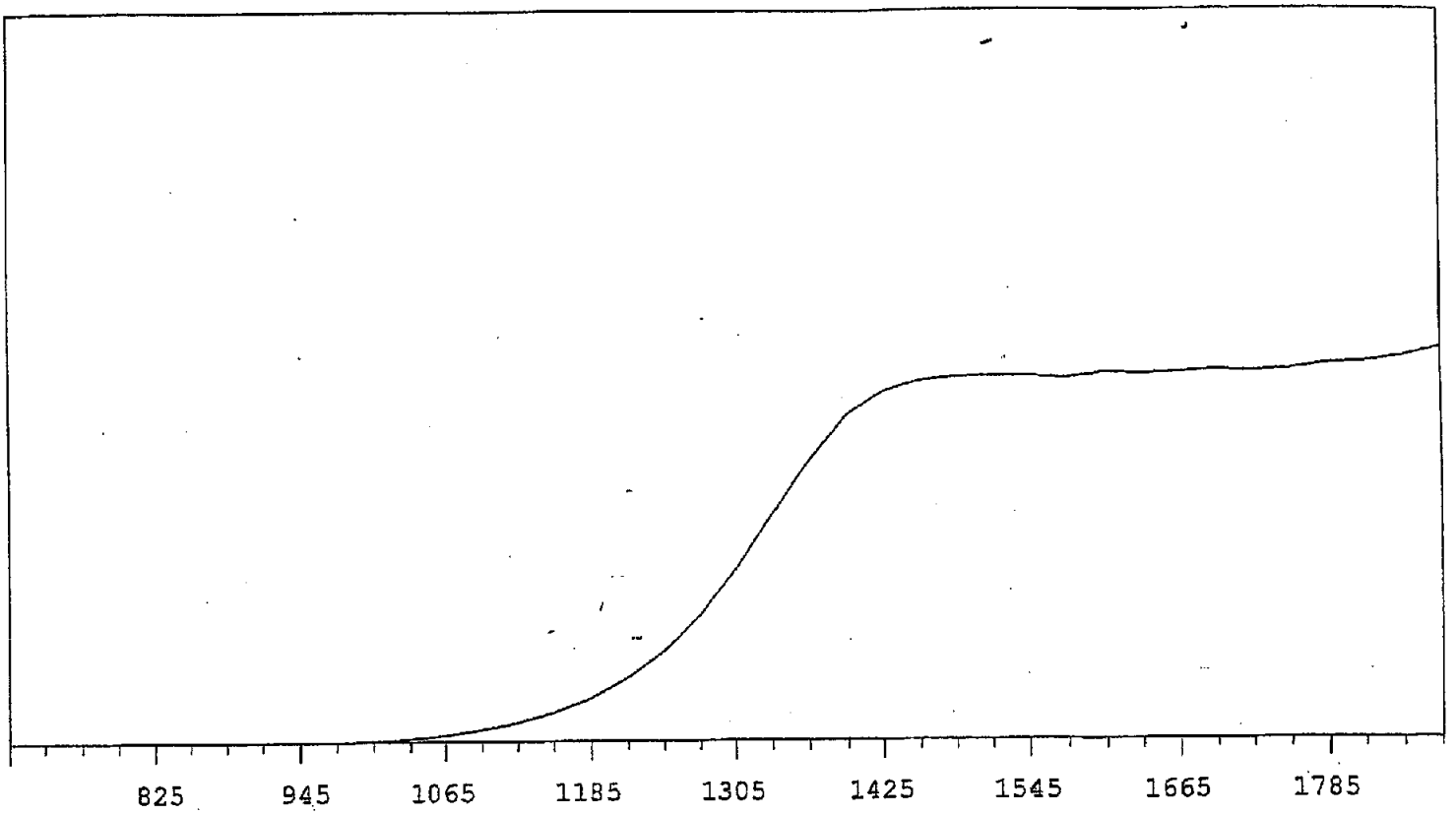
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16470	+92.44
735	2		1335	21902	+79.58
765	0	-33.33	1365	27818	+60.78
795	1	-33.33	1395	32763	+41.06
825	1	+0.00	1425	35569	+23.50
855	1	>100	1455	37141	+10.27
885	0	+41.67	1485	37680	+3.87
915	0	>100	1515	37264	+1.20
945	2	>100	1545	37658	+1.01
975	13	>100	1575	37826	+1.90
1005	48	>100	1605	37972	+0.72
1035	196	>100	1635	38183	+0.12
1065	548	>100	1665	37888	-0.71
1095	1042	>100	1695	37936	-0.41
1125	1730	>100	1725	37694	+0.85
1155	2776	>100	1755	38048	+2.46
1185	4064	>100	1785	38316	+4.39
1215	6147	>100	1815	39036	+6.01
1245	8704	>100	1845	39740	
1275	11959	>100	1875	40868	
1305	16470	+92.44			
1335	21902	+79.58			

MPC 9604 Plateau 1 MPC 9604 Detector B 11/18/2002
Alpha Volts: 705 Beta Volts: 1515



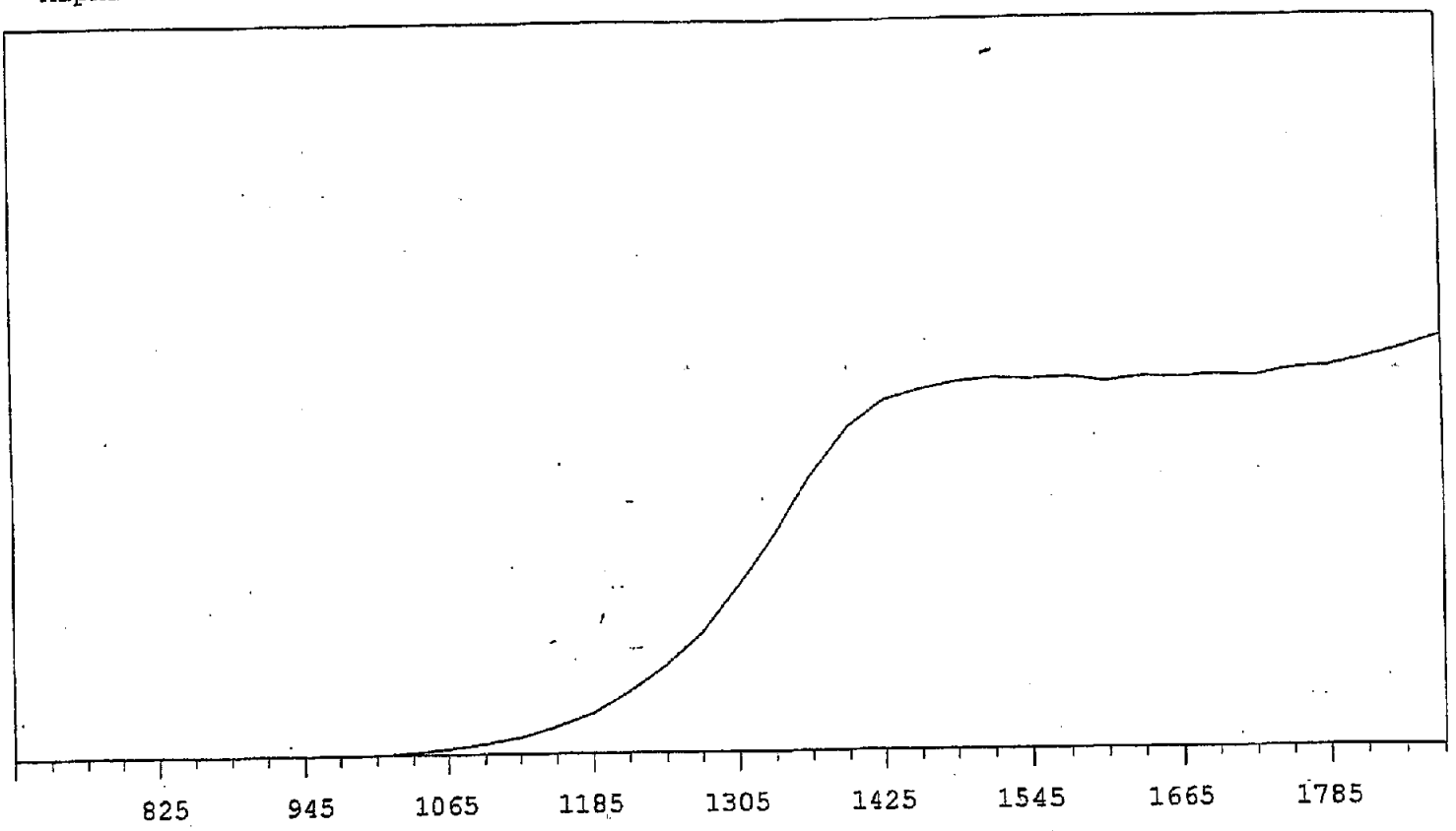
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	3		1305	37846	+89.73
735	2		1335	49400	+76.76
765	2		1365	61824	+59.37
795	0	>100	1395	73411	+40.47
825	0	>100	1425	79657	+23.20
855	0	>100	1455	82603	+10.52
885	1	>100	1485	83765	+4.29
915	0	>100	1515	84094	+1.27
945	1	>100	1545	84247	+0.38
975	20	>100	1575	83954	+0.14
1005	136	>100	1605	84310	+0.17
1035	480	>100	1635	84238	+0.30
1065	1292	>100	1665	84323	+0.33
1095	2449	>100	1695	84330	+0.75
1125	4069	>100	1725	84682	+1.66
1155	6233	>100	1755	85015	+2.61
1185	9445	>100	1785	86099	+3.67
1215	14086	>100	1815	86967	+4.57
1245	19724	>100	1845	88449	
1275	27772	+99.39	1875	89824	
1305	37846	+89.73			
1335	49400	+76.76			

MPC 9604 Plateau 1 MPC 9604 Detector C 11/19/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	2		1305	39510	+89.34
735	1		1335	52183	+75.00
765	2		1365	64681	+56.02
795	0	-83.33	1395	75266	+36.30
825	0	>100	1425	80414	+19.94
855	1	>100	1455	83043	+8.78
885	0	>100	1485	83971	+3.46
915	1	>100	1515	84202	+0.54
945	5	>100	1545	84151	+0.51
975	40	>100	1575	83636	+0.50
1005	178	>100	1605	84901	+0.90
1035	611	>100	1635	84465	+1.26
1065	1455	>100	1665	84881	+0.31
1095	2686	>100	1695	85245	+0.76
1125	4338	>100	1725	84904	+1.52
1155	6682	>100	1755	85423	+2.21
1185	9895	>100	1785	86741	+3.54
1215	14706	>100	1815	87179	+4.71
1245	20868	>100	1845	88620	
1275	29167	+99.72	1875	90675	
1305	39510	+89.34			
1335	52183	+75.00			

MPC 9604 Plateau 1 MPC 9604 Detector D 11/19/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	3	+0.00
795	2	>100
825	0	-95.24
855	0	-83.33
885	2	+0.00
915	0	>100
945	0	>100
975	8	>100
1005	61	>100
1035	224	>100
1065	577	>100
1095	1071	>100
1125	1681	>100
1155	2740	>100
1185	4109	>100
1215	6232	>100
1245	8882	>100
1275	12116	>100
1305	16823	+91.81
1335	22142	+78.78

VOLTS	COUNTS	%/100 Volts
1305	16823	+91.81
1335	22142	+78.78
1365	28133	+59.68
1395	32974	+39.42
1425	35720	+22.04
1455	36766	+10.79
1485	37553	+4.71
1515	37914	+2.42
1545	37768	+0.04
1575	38025	-0.08
1605	37519	+0.04
1635	37994	+0.32
1665	37808	+0.54
1695	38062	+1.00
1725	37790	+2.13
1755	38573	+3.55
1785	38772	+5.80
1815	39626	+7.23
1845	40662	
1875	41958	

#2

MPC 9604 FACTORY PERFORMANCE EVALUATION

Factory performed tests for Instrument Serial Number: 236534

Voltage Settings | **ULD Settings**

Alpha & Beta Voltage 1515 | A 7.0 C 7.0

Alpha Only Voltage 705 | B 7.0 D 7.0

Efficiencies: DETECTOR A

Sr/y 90 55.844 % | Tc-99 36.440 %

Ni-63 16.731 % | Th-230 @ A/B Voltage 25.353 %

Th-230 @ A only Voltage 22.314 %

Efficiencies: DETECTOR B

Sr/y 90 55.898 % | Tc-99 36.482 %

Ni-63 16.199 % | Th-230 @ A/B Voltage 24.934 %

Th-230 @ A only Voltage 22.030 %

Efficiencies: DETECTOR C

Sr/y 90 55.644 % | Tc-99 37.968 %

Ni-63 15.840 % | Th-230 @ A/B Voltage 24.941 %

Th-230 @ A only Voltage 22.747 %

Efficiencies: DETECTOR D

Sr/y 90 54.607 % | Tc-99 37.028 %

Ni-63 16.089 % | Th-230 @ A/B Voltage 24.430 %

Th-230 @ A only Voltage 21.638 %

Backgrounds

Detector A:

Alpha Background 0.06
Beta Background 0.452

Detector B:

Alpha Background 0.07
Beta Background 0.475

Detector C:

Alpha Background 0.08
Beta Background 0.470

Detector D:

Alpha Background 0.083
Beta Background 0.481

Background Count Time was 500 Minutes.

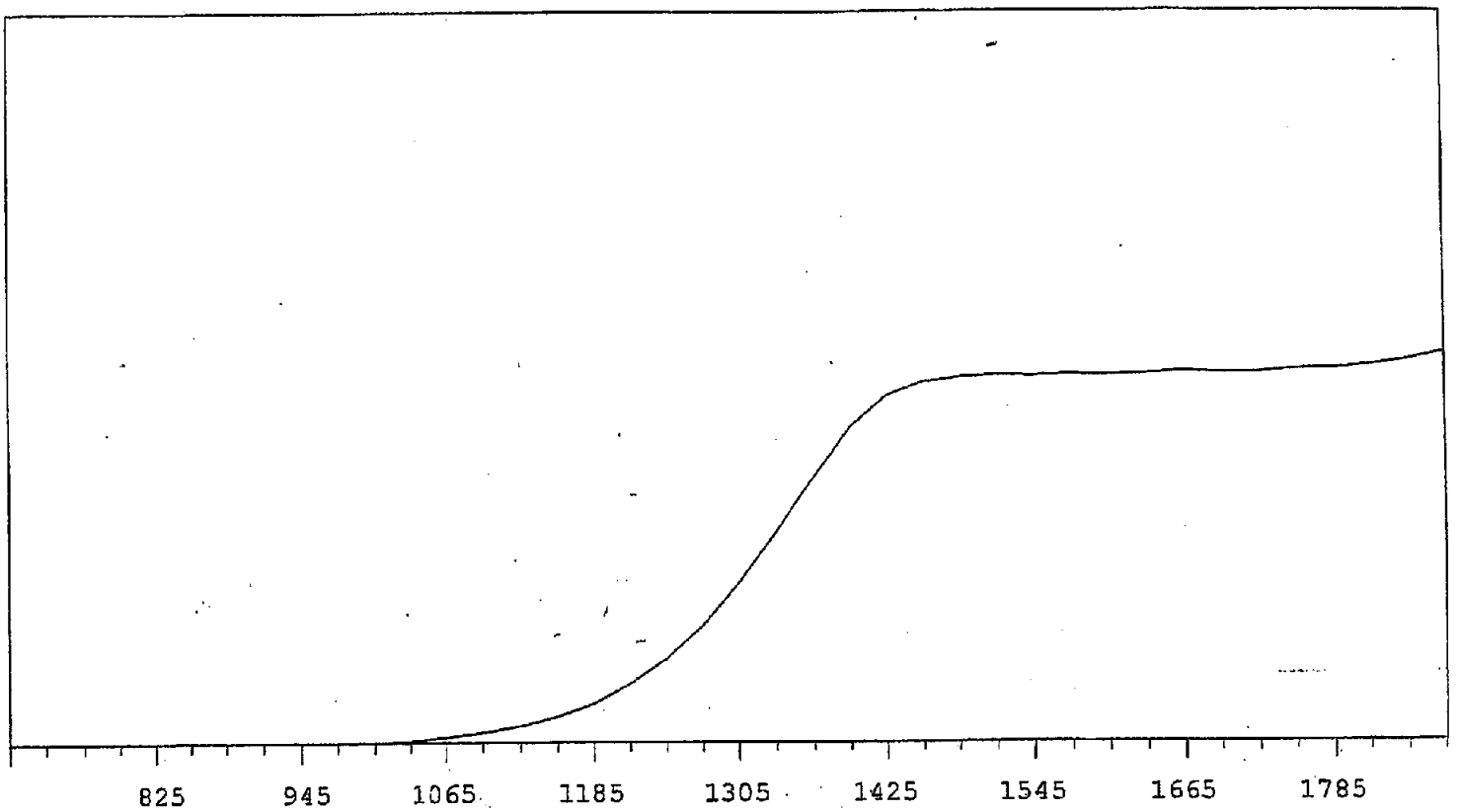
Tests performed and recorded by: [signature]

Date: 12/31/02

*ALL EFFICIENCIES WERE OBTAINED USING A 2" DISTRIBUTED SOURCE AT OPTIMAL GEOMETRY EXCEPT Th-230, WHICH WAS AT A DEPTH OF ¼".

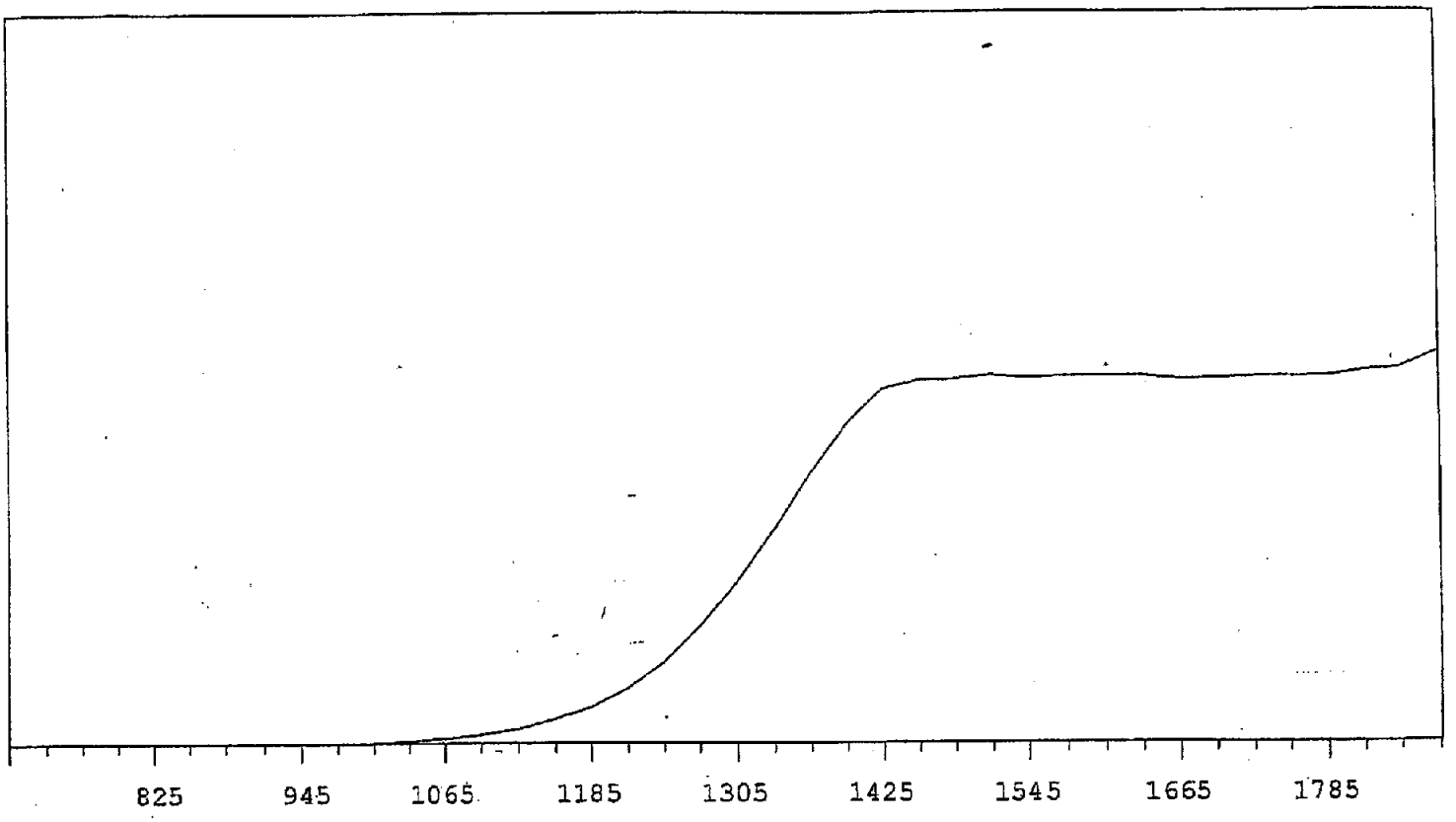
Unit #B2 JK 1-26-04

MPC 9604 Plateau 1 MPC 9604 Detector A 12/16/2002
Alpha Volts: 705 Beta Volts: 1335



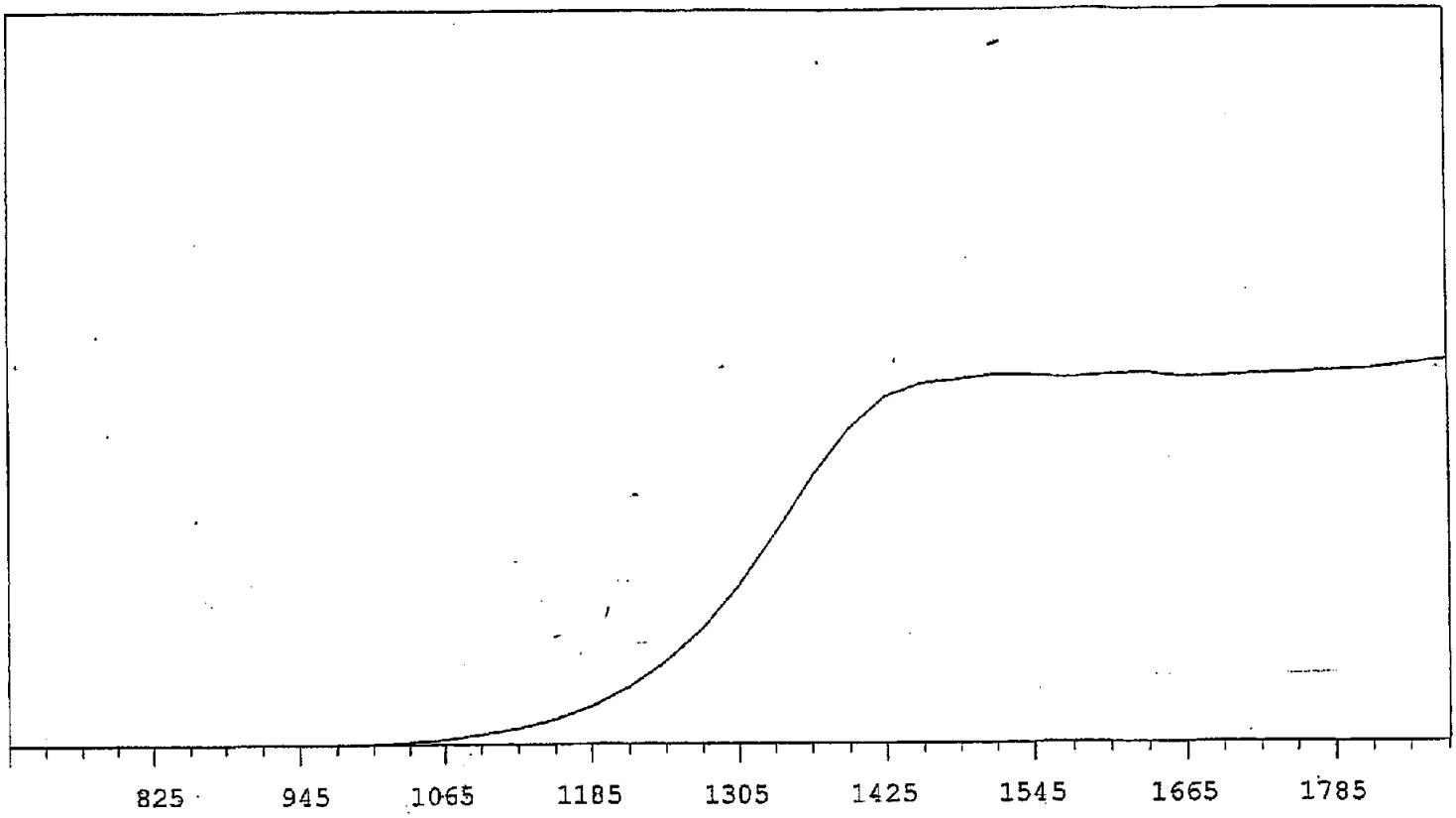
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	36094	+91.50
735	1		1335	47847	+79.16
765	0		1365	60405	+61.85
795	1	>100	1395	71873	+42.39
825	0	+83.33	1425	78827	+24.53
855	0	+55.56	1455	81991	+11.59
885	1	>100	1485	83024	+4.37
915	1	>100	1515	83664	+1.56
945	1	>100	1545	83373	+0.42
975	19	>100	1575	83766	+0.14
1005	129	>100	1605	83496	+0.77
1035	425	>100	1635	83774	+0.43
1065	1183	>100	1665	84339	+0.47
1095	2313	>100	1695	83891	+0.57
1125	3764	>100	1725	84026	+0.69
1155	5857	>100	1755	84655	+1.58
1185	8765	>100	1785	84828	+2.39
1215	13328	>100	1815	85494	+3.58
1245	19028	>100	1845	86654	
1275	26407	>100	1875	88364	
1305	36094	+91.50			
1335	47847	+79.16			

MPC 9604 Plateau 1 MPC 9604 Detector B 12/17/2002
Alpha Volts: 705 Beta Volts: 1335



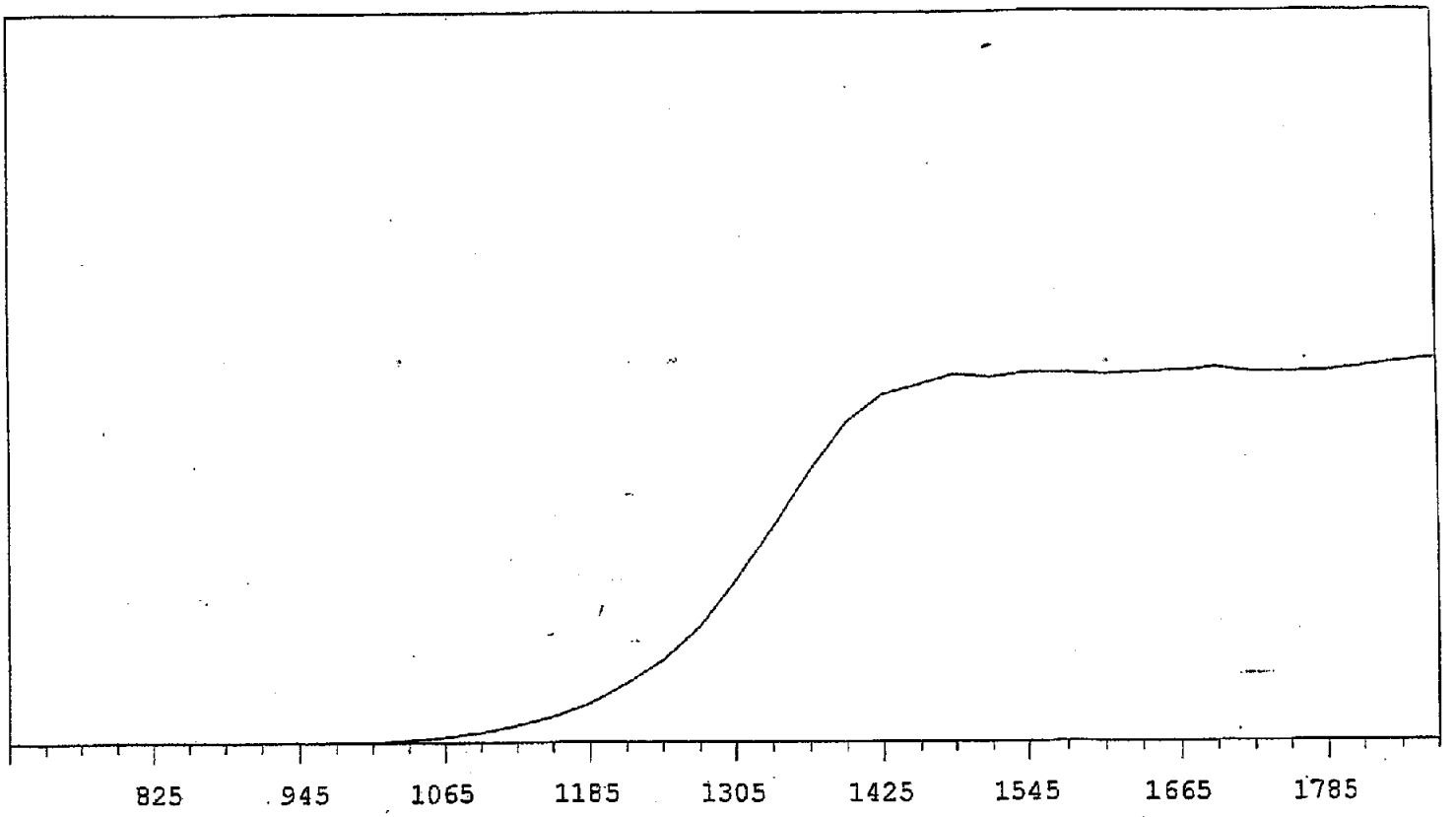
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	18047	+94.23
735	2		1335	23993	+79.11
765	0		1365	30302	+61.92
795	0	>100	1395	35719	+41.62
825	0	>100	1425	39617	+22.93
855	0	>100	1455	40588	+10.10
885	1	>100	1485	40726	+2.37
915	0	>100	1515	41160	+0.87
945	3	>100	1545	40771	+0.55
975	10	>100	1575	41098	+0.19
1005	58	>100	1605	41093	-0.14
1035	228	>100	1635	41116	-0.87
1065	543	>100	1665	40678	-0.49
1095	1009	>100	1695	40773	+0.05
1125	1647	>100	1725	40966	+0.68
1155	2812	>100	1755	41000	+1.27
1185	4080	>100	1785	40979	+1.90
1215	6168	>100	1815	41547	+4.96
1245	9044	>100	1845	41867	
1275	13094	>100	1875	43664	
1305	18047	+94.23			
1335	23993	+79.11			

MPC 9604 Plateau 1 MPC 9604 Detector C 12/16/2002
Alpha Volts: 705 Beta Volts: 1335



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	35990	+92.57
735	1		1335	47931	+79.59
765	0	+83.33	1365	60935	+62.26
795	0	>100	1395	71927	+42.50
825	1	>100	1425	79292	+24.26
855	2	-55.56	1455	82417	+11.85
885	0	>100	1485	83187	+4.61
915	0	>100	1515	84234	+1.35
945	0	>100	1545	84096	+0.71
975	14	>100	1575	83650	+0.45
1005	106	>100	1605	84371	+0.14
1035	468	>100	1635	84668	+0.04
1065	1134	>100	1665	83768	-0.23
1095	2223	>100	1695	83996	+0.27
1125	3673	>100	1725	84414	+1.38
1155	5797	>100	1755	84690	+1.53
1185	8786	>100	1785	85170	+2.05
1215	13052	>100	1815	85563	+2.91
1245	18927	>100	1845	86605	
1275	26347	>100	1875	87723	
1305	35990	+92.57			
1335	47931	+79.59			

MPC 9604 Plateau 1 MPC 9604 Detector D 12/16/2002
Alpha Volts: 705 Beta Volts: 1335



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16474	+93.61
735	1		1335	21880	+79.65
765	0	+0.00	1365	27760	+60.71
795	1	>100	1395	32659	+40.09
825	0	>100	1425	35549	+23.08
855	0	+83.33	1455	36556	+10.47
885	2	>100	1485	37588	+4.60
915	1	>100	1515	37281	+2.31
945	1	>100	1545	37736	+0.31
975	6	>100	1575	37775	+0.67
1005	51	>100	1605	37518	+0.27
1035	240	>100	1635	37766	+1.07
1065	524	>100	1665	37896	+0.77
1095	1011	>100	1695	38192	-0.15
1125	1744	>100	1725	37742	-0.45
1155	2674	>100	1755	37757	+0.29
1185	4004	>100	1785	37860	+2.27
1215	6095	>100	1815	38301	+3.24
1245	8485	>100	1845	38765	
1275	11865	>100	1875	39170	
1305	16474	+93.61			
1335	21880	+79.65			

#3

MPC 9604 FACTORY PERFORMANCE EVALUATION

Factory performed tests for Instrument Serial Number: 236532

Voltage Settings | **ULD Settings**

Alpha & Beta Voltage 1515 | A 7.0 C 7.0

Alpha Only Voltage 705 | B 7.0 D 7.0

Efficiencies: DETECTOR A

Sr/y 90 54.530 % Tc-99 35.69 %

Ni-63 14.385 % Th-230 @ A/B Voltage 24.440 %

Th-230 @ A only Voltage 22.047 %

Efficiencies: DETECTOR B

Sr/y 90 54.993 % Tc-99 36.209 %

Ni-63 15.309 % Th-230 @ A/B Voltage 24.041 %

Th-230 @ A only Voltage 21.872 %

Efficiencies: DETECTOR C

Sr/y 90 54.541 % Tc-99 35.67 %

Ni-63 15.117 % Th-230 @ A/B Voltage 24.212 %

Th-230 @ A only Voltage 21.800 %

Efficiencies: DETECTOR D

Sr/y 90 54.296 % Tc-99 35.380 %

Ni-63 13.326 % Th-230 @ A/B Voltage 24.802 %

Th-230 @ A only Voltage 22.584 %

Backgrounds

Detector A:

Alpha Background 0.05
Beta Background 0.619

Detector B:

Alpha Background 0.06
Beta Background 0.497

Detector C:

Alpha Background 0.04
Beta Background 0.516

Detector D:

Alpha Background 0.05
Beta Background 0.716

Background Count Time was 500 Minutes.

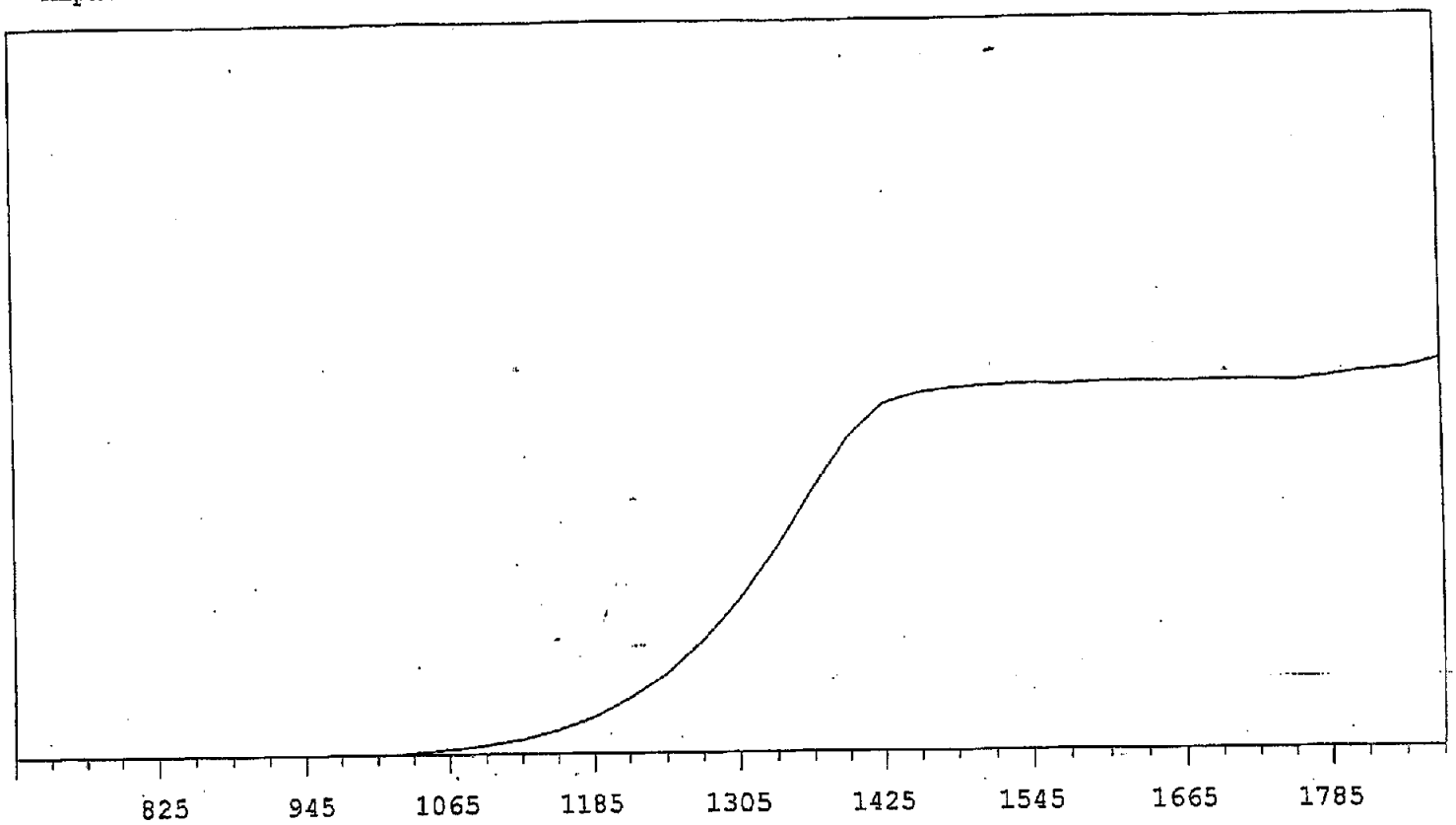
Tests performed and recorded by: [signature]

Date: 12/31/02

*ALL EFFICIENCIES WERE OBTAINED USING A 2" DISTRIBUTED SOURCE AT OPTIMAL GEOMETRY EXCEPT Th-230, WHICH WAS AT A DEPTH OF ¼".

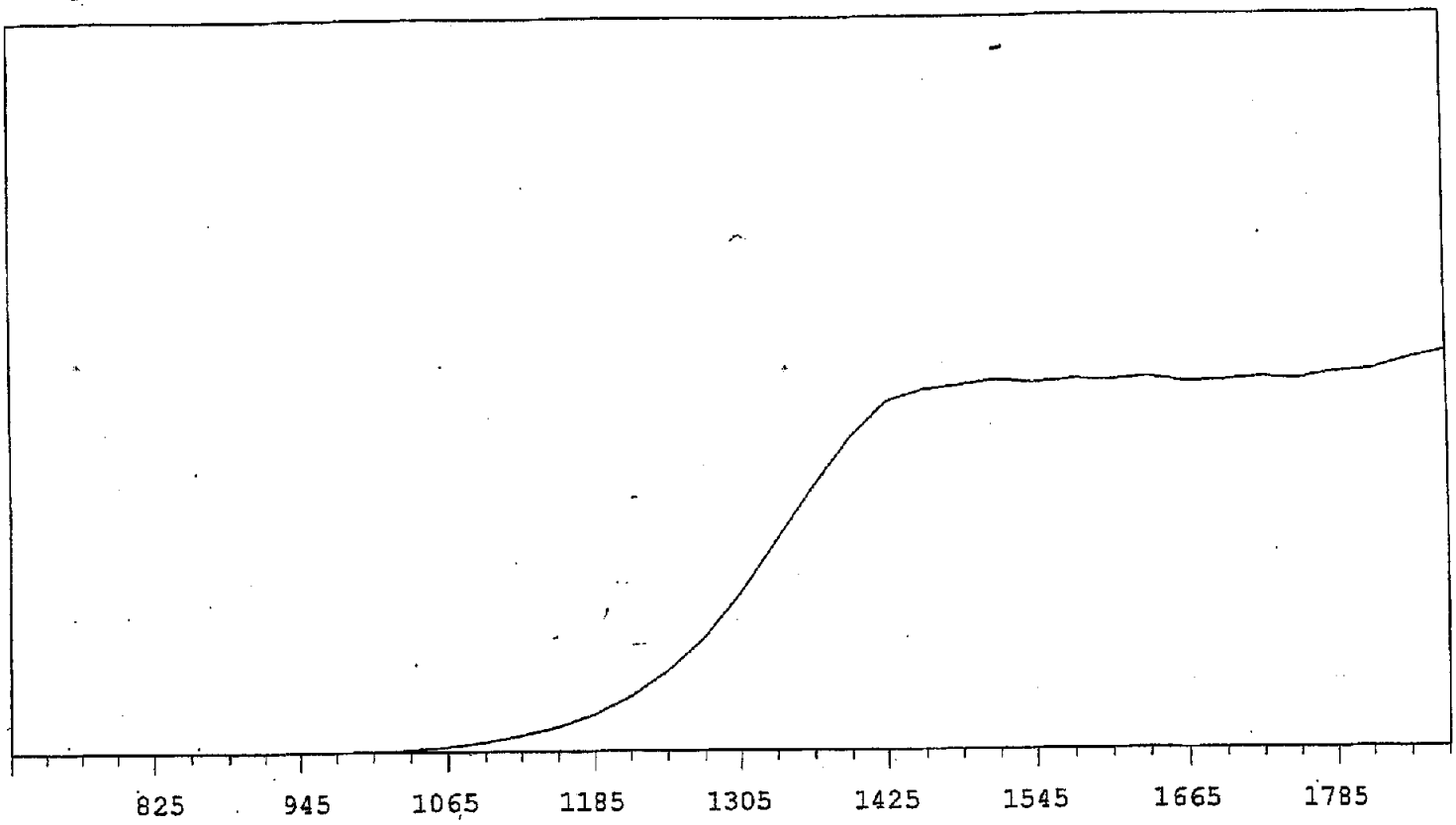
Unit #3

MPC 9604 Plateau 3 MPC 9604 Detector A 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



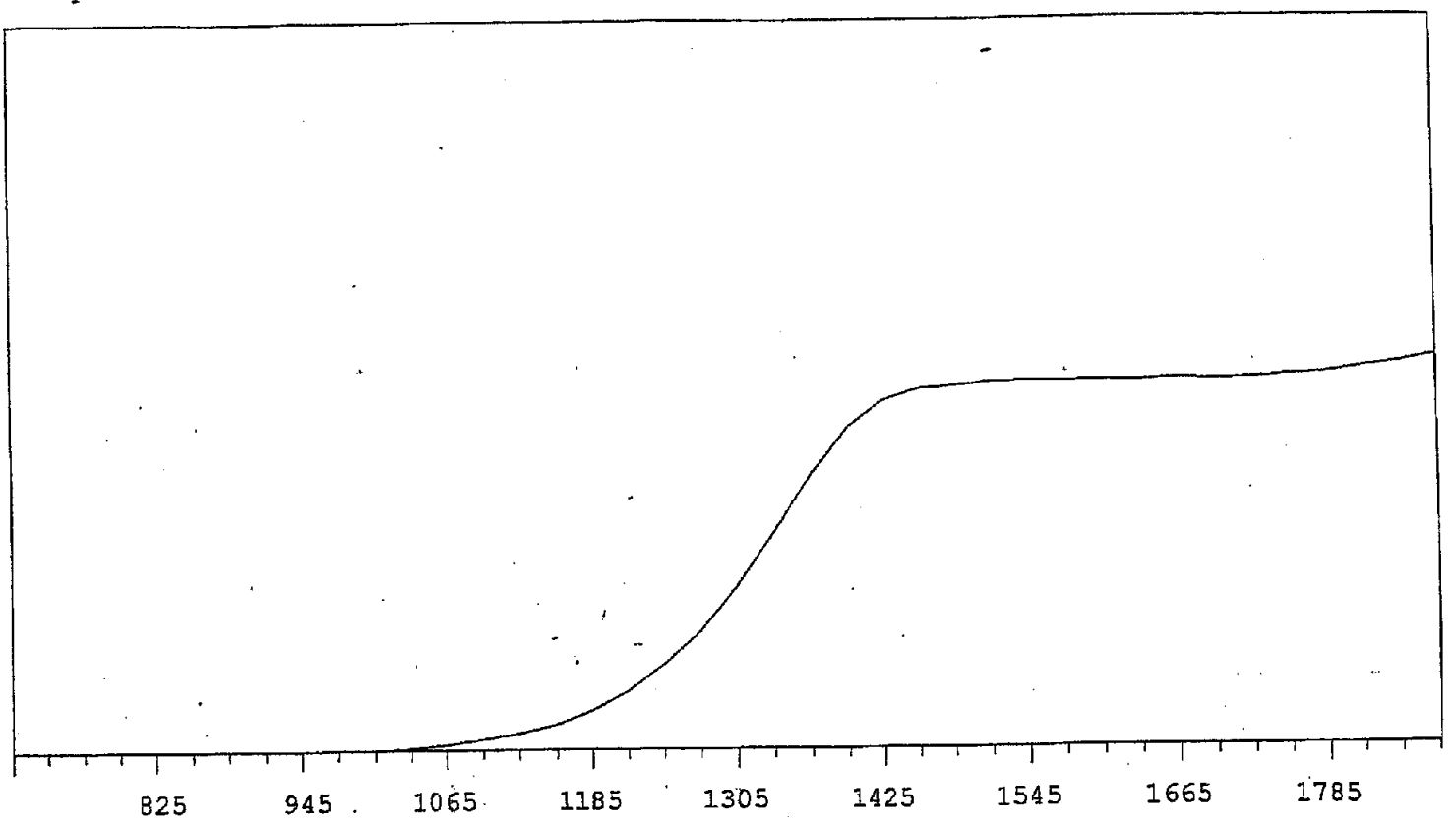
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	35294	+94.49
735	1		1335	47171	+81.80
765	1	-41.67	1365	60476	+64.73
795	0	+0.00	1395	72428	+43.87
825	1	-55.56	1425	80027	+24.74
855	1	-83.33	1455	82481	+11.18
885	0	>100	1485	83577	+4.19
915	0	>100	1515	84156	+1.60
945	4	>100	1545	84396	+0.77
975	3	>100	1575	84086	+0.47
1005	70	>100	1605	84586	+0.33
1035	340	>100	1635	84651	+0.59
1065	1026	>100	1665	84530	+0.30
1095	2029	>100	1695	84858	+0.13
1125	3406	>100	1725	84861	+0.66
1155	5535	>100	1755	84646	+1.63
1185	8369	>100	1785	85477	+2.55
1215	12673	>100	1815	86640	+4.05
1245	18158	>100	1845	87146	
1275	25828	>100	1875	89075	
1305	35294	+94.49			
1335	47171	+81.80			

MPC 9604 Plateau 3 MPC 9604 Detector B 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	2		1305	16243	+93.24
735	1		1335	21731	+79.13
765	0		1365	27200	+62.01
795	0	>100	1395	32178	+42.43
825	1	>100	1425	35788	+25.03
855	4	-33.33	1455	37031	+12.41
885	0	>100	1485	37518	+4.25
915	0	-20.83	1515	38036	+1.82
945	1	>100	1545	37656	+0.52
975	3	>100	1575	37987	+0.42
1005	51	>100	1605	37837	+0.14
1035	181	>100	1635	38182	-0.55
1065	497	>100	1665	37639	+0.15
1095	964	>100	1695	37774	-0.05
1125	1656	>100	1725	38127	+1.81
1155	2551	>100	1755	37910	+2.19
1185	3834	>100	1785	38605	+3.76
1215	5718	>100	1815	38791	+5.71
1245	8336	>100	1845	39868	
1275	11756	>100	1875	40630	
1305	16243	+93.24			
1335	21731	+79.13			

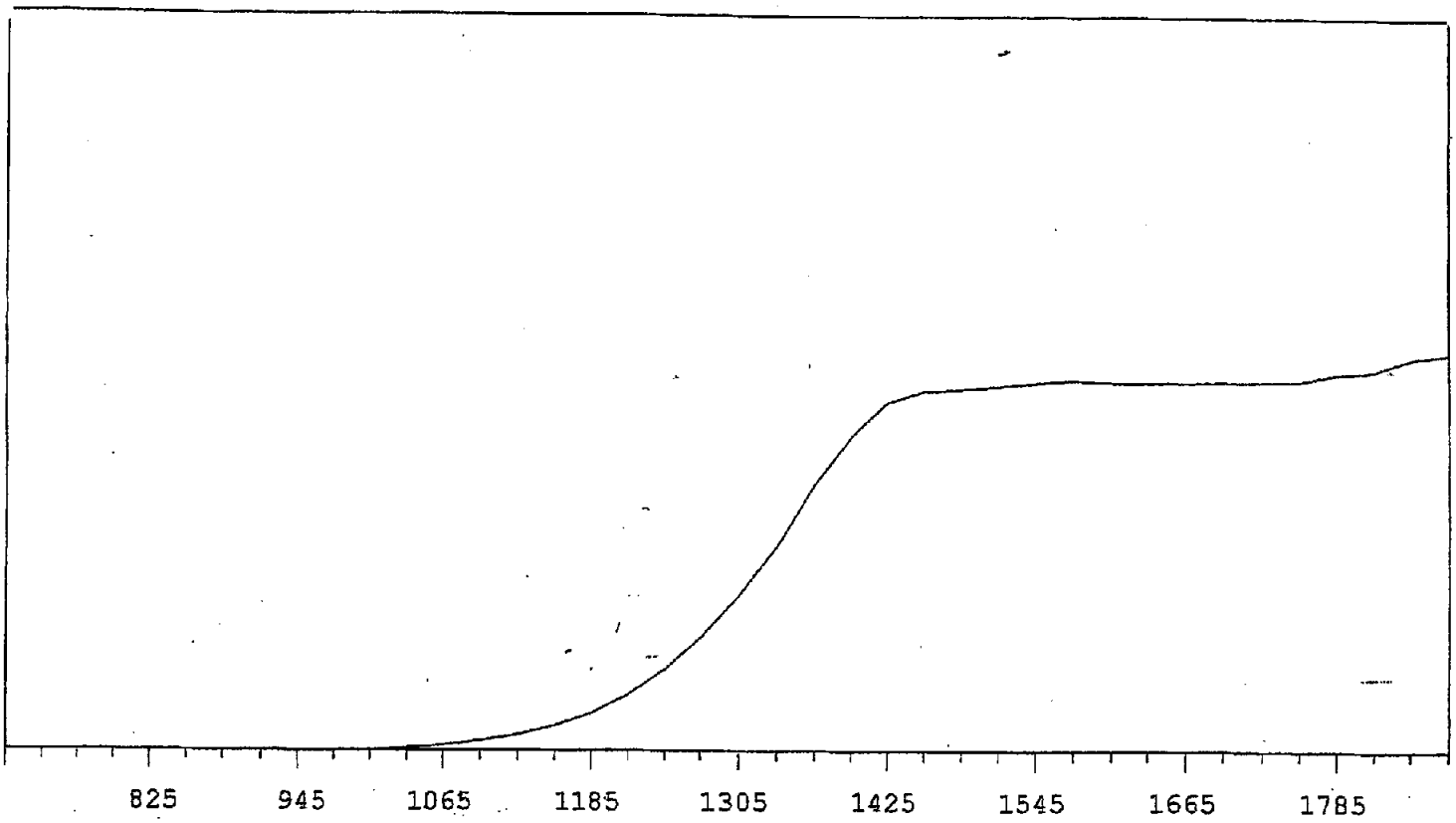
MPC 9604 Plateau 3 MPC 9604 Detector C 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	0	-55.56
795	0	-83.33
825	1	+0.00
855	0	>100
885	0	>100
915	0	>100
945	3	>100
975	22	>100
1005	101	>100
1035	486	>100
1065	1178	>100
1095	2481	>100
1125	3840	>100
1155	5896	>100
1185	9085	>100
1215	13626	>100
1245	19695	>100
1275	27244	>100
1305	37587	+92.10
1335	49689	+78.64

VOLTS	COUNTS	%/100 Volts
1305	37587	+92.10
1335	49689	+78.64
1365	62948	+59.67
1395	73852	+39.59
1425	79926	+21.65
1455	82659	+10.02
1485	83402	+4.31
1515	84267	+1.73
1545	84482	+0.88
1575	84291	+0.00
1605	84505	+0.24
1635	84261	+0.22
1665	84807	+0.24
1695	84420	+0.83
1725	84730	+1.15
1755	85357	+2.52
1785	85810	+3.26
1815	87107	+4.16
1845	88075	
1875	89672	

MPC 9604 Plateau 3 MPC 9604 Detector D 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15935	+93.94
735	0		1335	21039	+81.17
765	0		1365	27326	+63.87
795	0	>100	1395	32222	+43.56
825	0	>100	1425	35674	+23.86
855	0	>100	1455	36879	+11.05
885	0	>100	1485	37110	+4.30
915	0	>100	1515	37448	+2.64
945	1	>100	1545	37776	+1.77
975	9	>100	1575	38028	+0.73
1005	46	>100	1605	37822	-0.15
1035	205	>100	1635	37836	-0.25
1065	519	>100	1665	37786	+0.15
1095	975	>100	1695	37906	+0.36
1125	1608	>100	1725	37873	+1.75
1155	2563	>100	1755	37997	+2.80
1185	3812	>100	1785	38738	+5.15
1215	5780	>100	1815	39085	+6.13
1245	8319	>100	1845	40328	
1275	11591	>100	1875	40827	
1305	15935	+93.94			
1335	21039	+81.17			

#4

MPC 9604 FACTORY PERFORMANCE EVALUATION

Factory performed tests for Instrument Serial Number: 236533

Voltage Settings **ULD Settings**

Alpha & Beta Voltage 1515 A 7.0 C 7.0

Alpha Only Voltage 705 B 7.0 D 7.0

Efficiencies: DETECTOR A

Sr/y 90 55.116 % Tc-99 36.67 %

Ni-63 16.083 % Th-230 @ A/B Voltage 24.835 %

Th-230 @ A only Voltage 21.648 %

Efficiencies: DETECTOR B

Sr/y 90 54.972 % Tc-99 36.409 %

Ni-63 15.648 % Th-230 @ A/B Voltage 24.479 %

Th-230 @ A only Voltage 22.123 %

Efficiencies: DETECTOR C

Sr/y 90 55.152 % Tc-99 36.257 %

Ni-63 15.587 % Th-230 @ A/B Voltage 23.546 %

Th-230 @ A only Voltage 21.714 %

Efficiencies: DETECTOR D

Sr/y 90 54.815 % Tc-99 36.269 %

Ni-63 15.94 % Th-230 @ A/B Voltage 24.314 %

Th-230 @ A only Voltage 22.574 %

Backgrounds

Detector A:

Alpha Background 0.05
Beta Background 0.609

Detector B:

Alpha Background 0.04
Beta Background 0.718

Detector C:

Alpha Background 0.06
Beta Background 0.462

Detector D:

Alpha Background 0.05
Beta Background 0.521

Background Count Time was 500 Minutes.

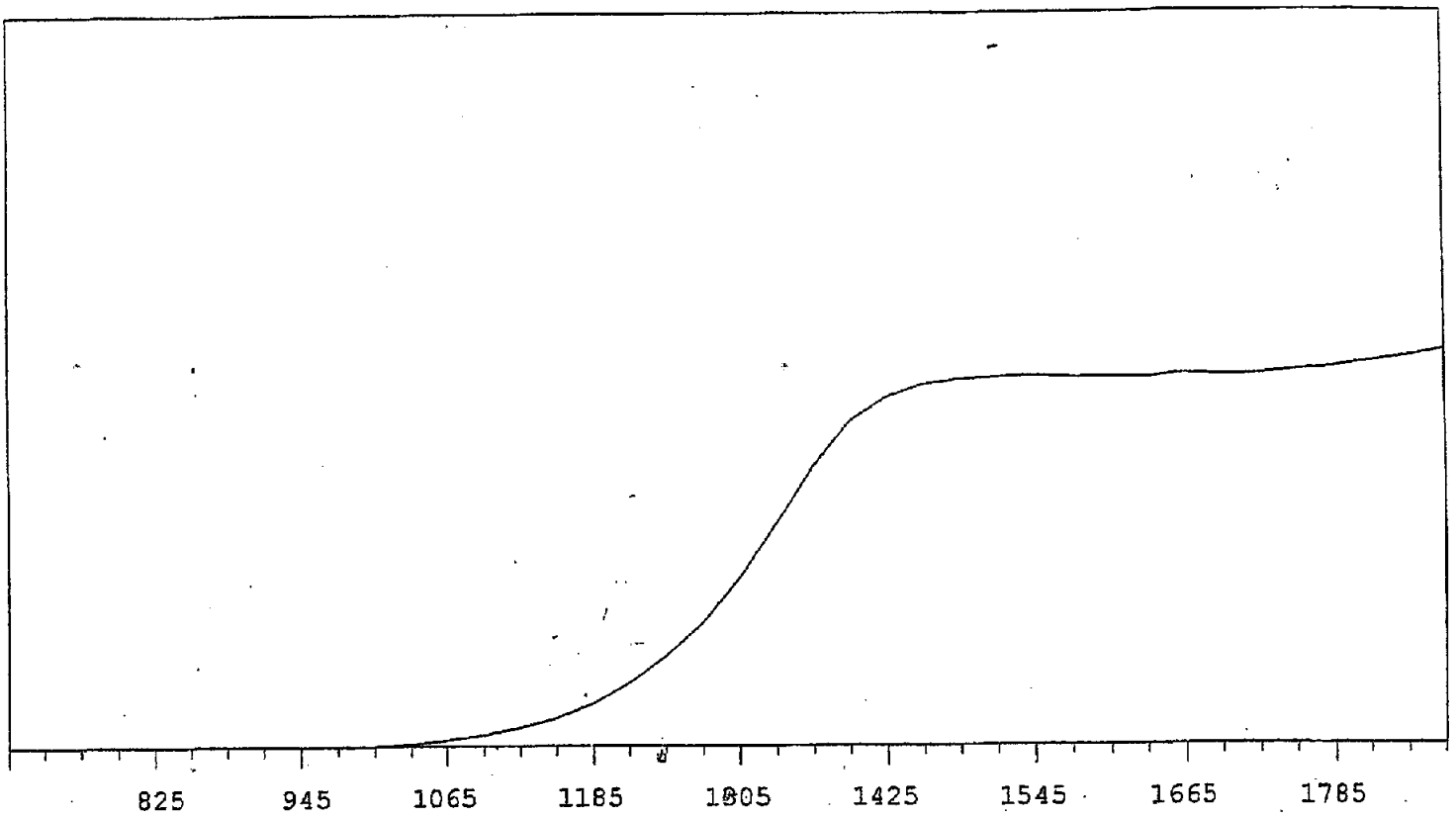
Tests performed and recorded by: [signature]

Date: 12/31/02

*ALL EFFICIENCIES WERE OBTAINED USING A 2" DISTRIBUTED SOURCE AT OPTIMAL GEOMETRY EXCEPT Th-230, WHICH WAS AT A DEPTH OF ¼".

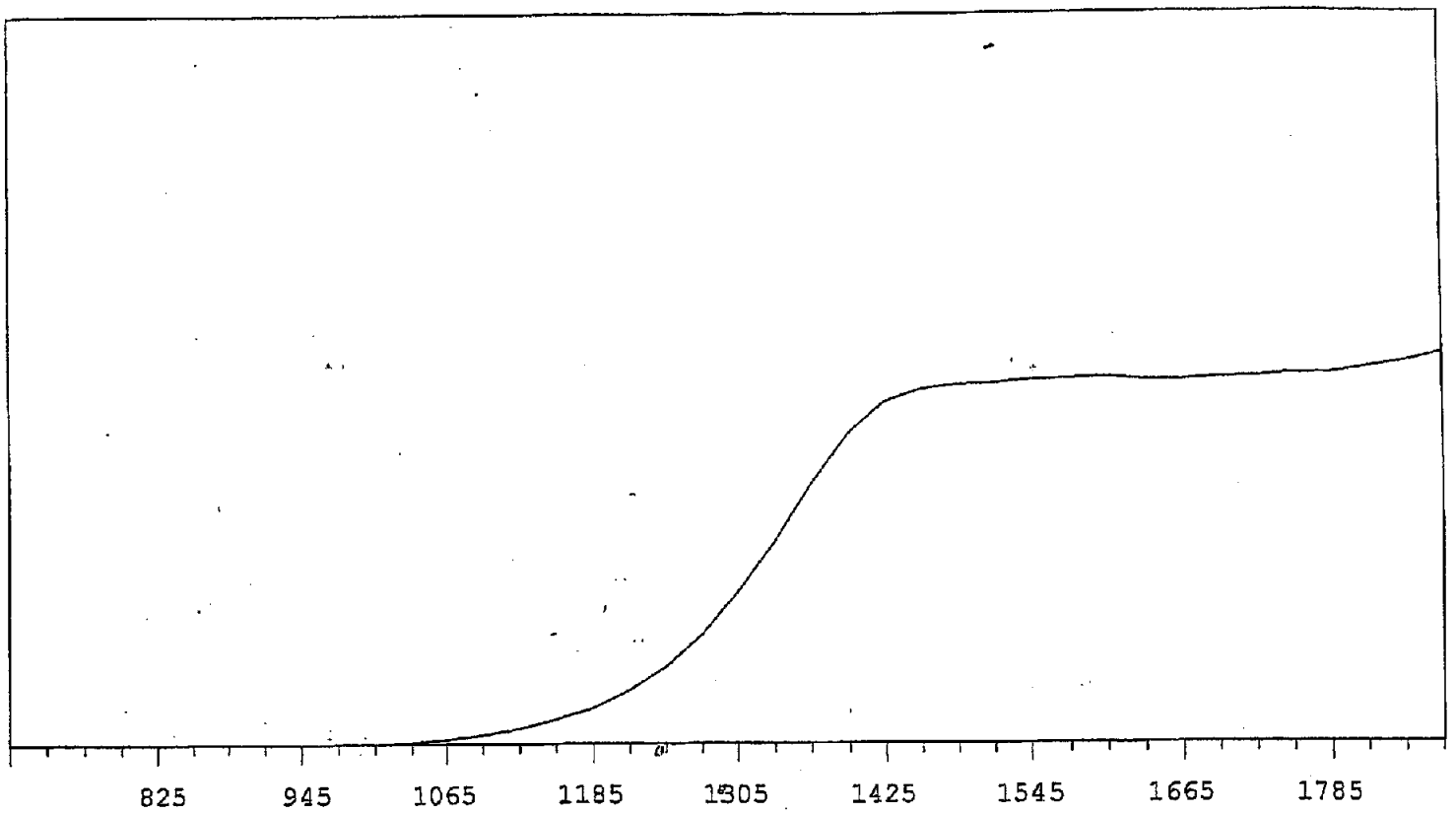
Unit #4

MPC 9604 Plateau PIC MPC 9604 MPC 9604 Detector A 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



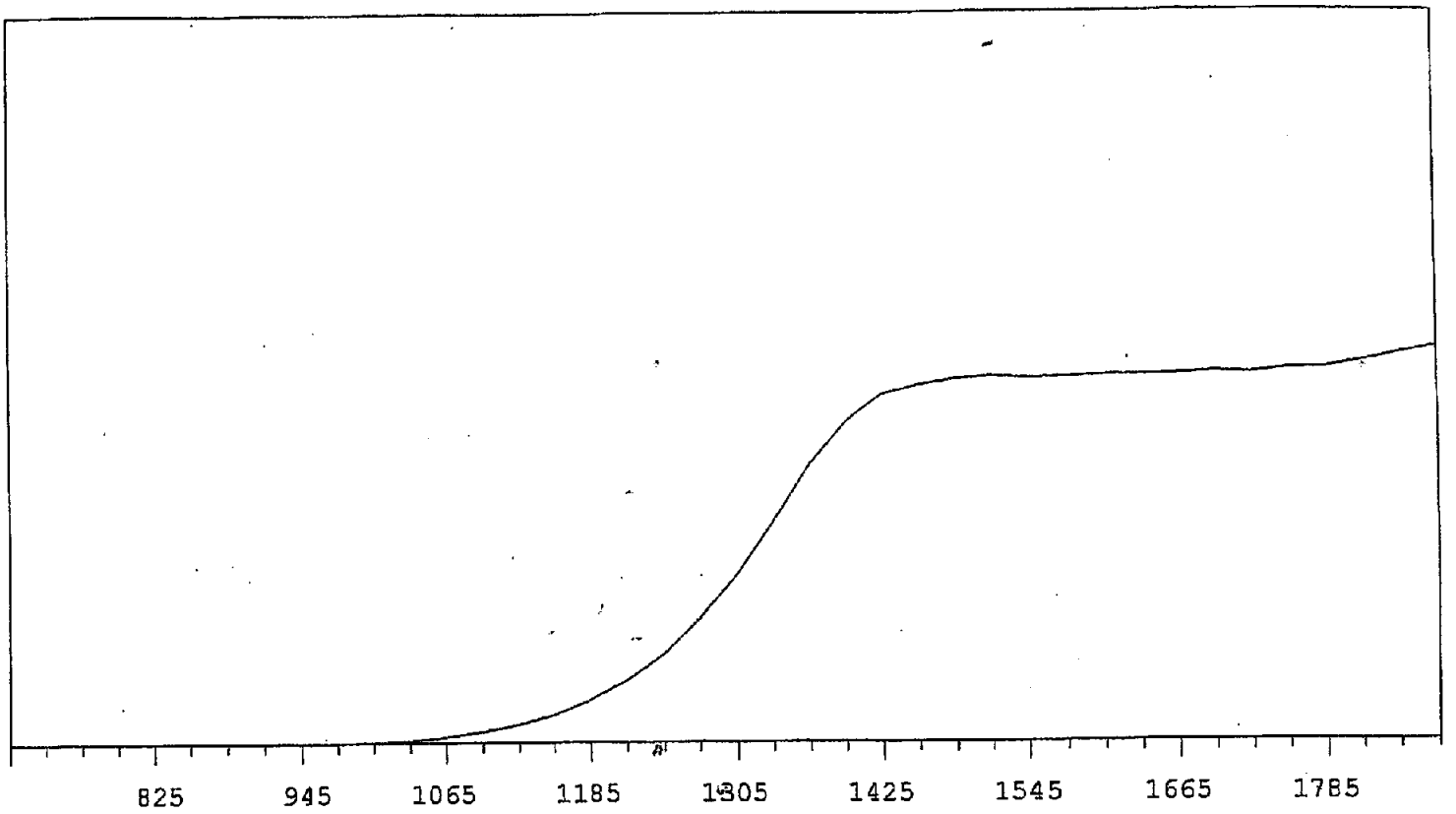
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	38210	+90.30
735	0		1335	50662	+76.50
765	0		1365	63624	+57.39
795	0	>100	1395	73884	+37.39
825	1	+83.33	1425	79213	+20.55
855	1	-83.33	1455	82067	+9.64
885	0	-55.56	1485	83080	+4.47
915	0	>100	1515	83570	+1.53
945	1	>100	1545	83988	+0.34
975	23	>100	1575	83523	-0.31
1005	147	>100	1605	83529	+0.24
1035	549	>100	1635	83417	+0.69
1065	1389	>100	1665	84345	+0.71
1095	2484	>100	1695	83979	+1.14
1125	4165	>100	1725	84139	+1.49
1155	6311	>100	1755	84965	+2.96
1185	9672	>100	1785	85741	+3.84
1215	14399	>100	1815	86960	+4.42
1245	20400	>100	1845	88088	
1275	28174	+99.15	1875	89563	
1305	38210	+90.30			
1335	50662	+76.50			

MPC 9604 Plateau PIC MPC 9604 MPC 9604 Detector B 12/20/2002
Alpha Volts: 705 Beta Volts: 1515



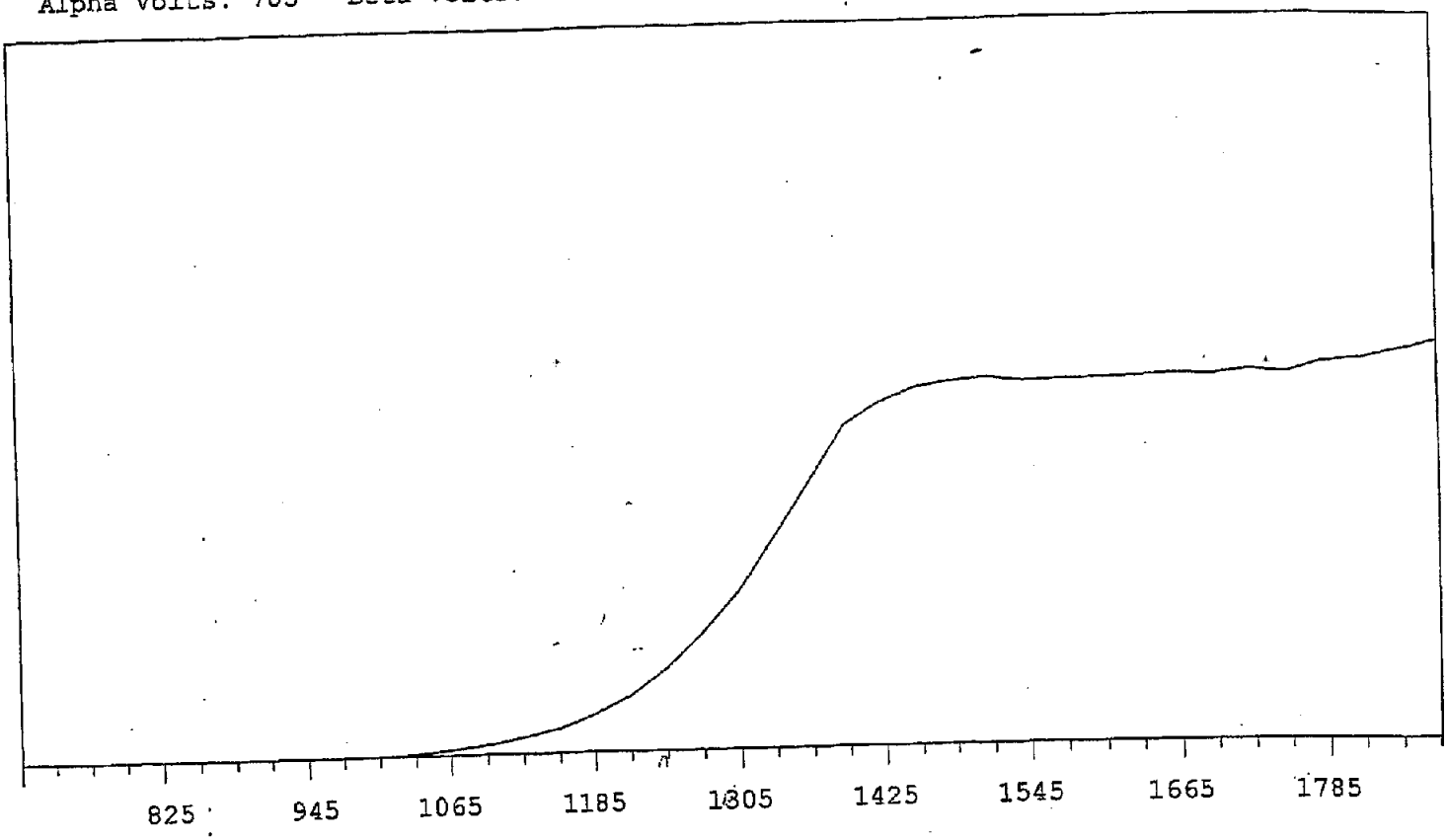
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	28036	+95.44
735	0		1335	37302	+82.32
765	1	+0.00	1365	47958	+64.46
795	0	>100	1395	57350	+44.02
825	0	>100	1425	63237	+24.93
855	0	>100	1455	65497	+11.29
885	0	>100	1485	66351	+4.62
915	1	>100	1515	66601	+2.36
945	1	>100	1545	67246	+1.77
975	8	>100	1575	67408	+0.73
1005	50	>100	1605	67730	-0.41
1035	303	>100	1635	67091	-0.29
1065	774	>100	1665	66992	+0.10
1095	1655	>100	1695	67480	+1.42
1125	2759	>100	1725	67633	+1.52
1155	4503	>100	1755	68211	+1.98
1185	6596	>100	1785	68168	+3.14
1215	9932	>100	1815	69236	+4.56
1245	14227	>100	1845	70353	
1275	20184	>100	1875	71882	
1305	28036	+95.44			
1335	37302	+82.32			

MPC 9604 Plateau PIC MPC 9604 MPC 9604 Detector C 12/19/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	38804	+90.25
735	1		1335	50930	+75.33
765	0		1365	64318	+57.13
795	0	+0.00	1395	73878	+37.15
825	0	>100	1425	80131	+20.35
855	1	+83.33	1455	82188	+9.94
885	1	+55.56	1485	83615	+3.79
915	0	>100	1515	84189	+1.56
945	1	>100	1545	83835	+0.57
975	16	>100	1575	84039	+0.31
1005	161	>100	1605	84413	+0.74
1035	557	>100	1635	84290	+0.90
1065	1352	>100	1665	84650	+0.53
1095	2565	>100	1695	85061	+1.02
1125	4126	>100	1725	84700	+0.98
1155	6348	>100	1755	85564	+2.08
1185	9862	>100	1785	85649	+3.84
1215	14356	>100	1815	87256	+5.01
1245	20454	>100	1845	88828	
1275	28653	+99.54	1875	90557	
1305	38804	+90.25			
1335	50930	+75.33			

MPC 9604 Plateau PIC MPC 9604 MPC 9604 Detector D 12/19/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	>100
855	1	+41.67
885	2	-33.33
915	0	>100
945	1	>100
975	4	>100
1005	34	>100
1035	189	>100
1065	520	>100
1095	1010	>100
1125	1686	>100
1155	2549	>100
1185	3953	>100
1215	5794	>100
1245	8550	>100
1275	12147	>100
1305	16347	+92.19
1335	21926	+79.96

VOLTS	COUNTS	%/100 Volts
1305	16347	+92.19
1335	21926	+79.96
1365	27606	+61.43
1395	33199	+40.79
1425	35516	+23.07
1455	36964	+10.43
1485	37545	+4.16
1515	37853	+0.87
1545	37385	-0.13
1575	37533	-0.03
1605	37633	+1.20
1635	37712	+0.83
1665	37973	+1.27
1695	37835	+0.66
1725	38293	+1.93
1755	37926	+3.14
1785	39032	+4.51
1815	39280	+6.41
1845	40250	
1875	41116	

SEVERN TRENT STL

Standard and Calibration Data

Beta calibration stds. 8/31/2005 salt solution SLRB-B SET 1

Beta standard, RAD04-0095, 2316.6 dpm/mL Sr/Y90 on 08/07/2001

Std #	mLs RAD04-0095	mLs salt solution	gross mass	tare mass	net mass	projected mass, mg	reweigh 1/9/6	mass 1-9-6
1	1	0.1000	8.8980	8.8888	0.0092	0.0081	8.8977	0.0089
2	1	0.3000	8.9490	8.9230	0.0260	0.0243	8.9481	0.0251
3	1	0.5000	9.0149	8.9703	0.0446	0.0405	9.0115	0.0412
4	1	1.0000	9.0419	8.9602	0.0817	0.0809	9.0398	0.0796
5	1	1.5000	9.0033	8.8764	0.1269	0.1214	8.9976	0.1212
6	1	2.0000	9.0833	8.9072	0.1761	0.1619	9.0701	0.1629
7	1	2.5000	9.1219	8.9194	0.2025	0.2023	9.1190	0.1996
8	1	3.0000	9.1769	8.9241	0.2528	0.2428	9.1661	0.2420

Alpha calibration standards salt solution SLRB-B

Alpha standard, 03-071, 4567.9 dpm/mL Th-230 on 10/07/2003

Std #	mLs 03-071	mLs salt solution	gross mass	tare mass	net mass	projected mass	reweigh 1/9/6	mass 1-9-6
1	1	0.1000	8.9369	8.9273	0.0096	0.0081	8.9357	0.0084
2	1	0.2000	8.9958	8.9783	0.0175	0.0162	8.9943	0.0160
3	1	0.3000	8.9737	8.9470	0.0267	0.0243	8.9719	0.0249
4	1	0.5000	8.9206	8.8766	0.0440	0.0405	8.9172	0.0406
5	1	0.7500	8.9565	8.8888	0.0677	0.0607	8.9499	0.0611
6	2	1.0000	9.0043	8.9170	0.0873	0.0809	8.9970	0.0800
7	2	1.3000	9.0092	8.8992	0.1100	0.1052	9.0029	0.1037
8	2	1.5000	9.0413	8.9088	0.1325	0.1214	9.0305	0.1217

spiked by: Joel Kempema verified by: Sarah Hurst

Beta calibration stds. 9/9/2005 salt solution SLRB-B SET 2

Beta standard, RAD04-0095, 1043.5 dpm/mL Sr/Y90 on 08/07/2001.

Std #	mLs RAD04-0095	mLs salt solution	gross mass	tare mass	net mass	projected mass, mg	reweigh 1/9/6	mass 1/9/6	
1 no 2	1	0.1	8.9140	8.9056	0.0084	0.0081	8.9138	0.0082	
1	1	0.1000	8.9006	8.8876	0.0130	0.0081	8.8979	0.0103	<--unused
2	1	0.3000	8.9226	8.8939	0.0287	0.0243	8.9201	0.0262	
3	1	0.5000	8.8978	8.8559	0.0419	0.0405	8.8966	0.0407	
4	1	1.0000	8.9580	8.8715	0.0865	0.0809	8.9535	0.0820	
5	1	1.5000	9.0437	8.9139	0.1298	0.1214	9.0359	0.1220	
6	1	2.0000	9.0249	8.8592	0.1657	0.1619	9.0204	0.1612	
7	1	2.5000	9.1269	8.9239	0.2030	0.2023	9.1184	0.1945	
8	1	3.0000	9.1390	8.8872	0.2518	0.2428	9.1301	0.2429	

Alpha calibration standards salt solution SLRB-B

Alpha standard, 03-071, 4567.9 dpm/mL Th-230 on 10/07/2003

Std #	mLs 03-071	mLs salt solution	gross mass	tare mass	net mass	projected mass	reweigh 1/9/6	mass 1/9/6
1	1	0.1000	8.9143	8.9061	0.0082	0.0081	8.9142	0.0081
2	1	0.2000	8.9348	8.9182	0.0166	0.0162	8.9343	0.0161
3	1	0.3000	8.9231	8.8980	0.0251	0.0243	8.9220	0.0240
4	1	0.5000	8.9518	8.9082	0.0436	0.0405	8.9494	0.0412
5	1	0.7500	8.9683	8.9026	0.0657	0.0607	8.9639	0.0613
6	2	1.0000	9.0179	8.9303	0.0876	0.0809	9.0124	0.0821
7	2	1.3000	8.9901	8.8763	0.1138	0.1052	8.9818	0.1055
8	2	1.5000	9.0533	8.9206	0.1327	0.1214	9.0449	0.1243

spiked by: Joel Kempema verified by: Ivan Vania

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

65090-334

Th-230 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Th-230
ACTIVITY (dps):	7.654 E3
HALF-LIFE:	7.538 E4 Years
CALIBRATION DATE:	December 19, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.5%
SYSTEMATIC:	2.6%
RANDOM:	0.9%

*99% Confidence Level

Impurities: γ-impurities <0.1%, α-impurities <0.05%

5.17738 grams 0.5M HNO_3 solution.

P O NUMBER 1614557-000 OP, Item 3

SOURCE PREPARED BY: M. D. Currie for
M. Taskaeva, Radiochemist

Q A APPROVED: 12-19-02

STL St. Louis

Standards Preparation Logbook Record

Jan-05-2006

Logbook: \\Qstlmo01\Stdslog\RAD_STD.std

RAD03-0085, Th 230 03-071 Analyst: hicksb

Vendor: Analytics
Solvent: 0.5M HNO3
Date Prep./Opened: 10-07-2003 Date Received: 12-19-2002
Date Expires(1): 10-07-2008 (5 Years)
Date Expires(2): 10-07-2008 (5 Years)
parent, vial# 65090-334

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Th230	4,567.9	4,567.9

RAD06-0001, Th-230 Analyst: dillardj

Solvent: 0.5M HNO3 Volume (ml): 200.00
Date Prep./Opened: 01-04-2006
Date Expires(1): 01-04-2007 (1 Year)
Date Expires(2): 01-04-2007 (1 Year)

Parent Std No.: RAD03-0085, Th 230 03-071 Aliquot Amount (ml): 1.0000
Parent Date Expires(1): 10-07-2008 Parent Date Expires(2): 10-07-2008

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Th230	4,567.9	22.840

Reviewed By: _____

Thorium 230

10/7/03

ANALYTICS

SOURCE ID: 65090-334

Radioactivity: 7,654 dps

Reference time: 12-19-2002 12:00 EST

Useful life: indefinite

Initial mass = 5.17738 grams

Mass transferred = 5.1498 grams

$$\frac{5.1498\,g}{5.17738\,g} \times 7{,}654\ dps \times \frac{60\ dpm}{1\ dps} \div 100\,mL = \boxed{4{,}567.9\ \frac{dpm}{mL}}$$

ANALYTICS

1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677

Th-230

SRS 65090-334 Amount 0.207 µCi QA MM

Date 12/19/02 12:00 EST Exp. ----------

PO # 1614557-000 OP, Item 3

5.17738 grams 0.5M HNO3 solution

CAUTION RADIOACTIVE MATERIAL

SEVERN TRENT SERVICES

Logbook: 2060

Radiochemistry
Standards Preparation Logbook

Date Prep'd	Expir. Date	Standard ID Number	Isotope	Parent ID Number	Parent Activity	Parent Ref. Date	Aliquot	Dilution Volume	Change in Time	T ½	Final Activity	Solvent/ Lot #	Prep'd Initials	Cal. Ver. Initials	Comments
11-12-03	11-12-04	03082	P32	IPL 7032	1.103 µCi/g ~~11,991.266.6 dpm~~	15 NOV 03	4.8989 g	100 ml		14.29 d	119,957 dpm/ml ~~119,912.8~~	MCA-4-01	SDB	MFM	From Pg 10 STEVES
11-12-03	11-12-04	03-083	P32	03052	119,957 dpm/ml ~~119,912.8~~	15 NOV 03	1 ml	50 ml		14.29 d	~~2,398.2~~ dpm/ml 2399.15	MCA-4-01	SDB	MFM	LaB Book
9-11-03	9-11-04	03-069	Pu238	02-032	68.235 ~~136.194~~	11-15-99	95 ml	190 ml	1396 days	87.7 y	decay corr ~~33.5069~~ 33.6622	~~1.21~~ 1.091 1M HNO3	11/03 MFM	MC	from page 28
9-11-03	9-11-04	03-069	Pu239	02-031 ~~02-033~~	64.025 ~~128.05~~	11-15-99	95 ml	190 ml	1396 days	24110 y	32.0125 ~~32.025~~	1M HNO3	MFM	MC	from page 28
11-21-03	11-21-04	Rad03-0083 ~~03-070~~	Tc-99	02-028	95,341.2 dpm/ml	10-96	1 ml	200 ml		2.1E5	476.7 dpm/ml	KOH	SDB		Rad Capture ID Rad03-0083
12-9-03	12-9-04	03-084	Ra228	01012	1,018 dpm/mL	2/16/01	2 mL	100 mL		5.75 y	20.36 dpm/mL	0.5M HNO3	BH	~~BH~~	
12-9-03	12-9-04	03-085	Th230	03-071	4,567.9 dpm/mL	12/19/02	1 mL	200 mL		7.538 E4	22.84 dpm/mL	0.5M HNO3	BH	LE	
12/31/03	12/31/08	03-086	Fe-55	681-78-3	.203 µCi/g	1/1/2000	4.9917 g	100 mL		999 days	10,133.2 pCi/mL	0.5M HNO3	BH		
12/31/03	12/31/04	03-087	Fe-55	03-086	10,133.2 pCi/mL	1/1/2000	5 mL	100 mL		999 days	506.7 pCi/mL	0.5M HNO3	BH		
1-5-04	1-5-05	RN04-001	UNAT	01-018	235.76 dpm/mL	3-201	20 mL	80 mL	N/A	4.5 E9 yrs	58.94 dpm/mL	0.5M HNO3	MFM		
1/12/04	1/12/05	Rad04-0007	Ra228	01012	1,018 dpm/mL	2/16/01	2 mL	100 mL		5.75 y	20.36 dpm/mL	0.5M HNO3	BH	DBF	
2/12/04	2/12/04	RAD-0015	Sr90	03-038	2,316.57 dpm/mL	9/19/01	5 mL	500 mL		28.5 y	23.16 dpm/mL	0.5M HNO3	BH	BBF	

Additional Comments:

SL-RAD-044, revised 3/2/01
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Decay Correction

Strontium 90						
Initial Activity:	2316.6	dpm				
Reference Date:	8/7/2001					
Current Date:	6/22/2006		(or date at which you wish to determine activity)			
Elapsed Time:	1780.000	days				
Half Life:	10409.625	days				
Exponential Term:	0.888229509					
Corrected Activity:	2057.672481	dpm	926.8794958	pCi	34.29454	Bq
Activity (Sr/Y-90)	4115.344962	dpm	1853.758992	pCi	68.58908	Bq

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62204-334

Sr-90 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Sr-90
ACTIVITY (dps):	3.897 E4
HALF-LIFE:	28.79 years
CALIBRATION DATE:	August 7, 2001 12:00 EST
TOTAL UNCERTAINTY*:	4.0%
SYSTEMATIC:	3.5%
RANDOM:	0.5%

*99% Confidence Level

Impurities: γ-impurities <0.1%

4.99897 grams 0.1M HCl solution with 30 μg/g Sr carrier.

P O NUMBER 1097166, Item 1

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: 8-8-01

STL St. Louis

Standards Preparation Logbook Record

Feb-14-2006

Logbook: \\Qstlmo01\Stdslog\RAD_STD.std

RAD01-0025, Sr 90 01-093 Analyst: hicksb

Vendor: Analytics Vendor's Expiration Date: 08-07-2006
Solvent: 1M HNO3
Date Prep./Opened: 09-19-2001 Date Received: 08-07-2001
Date Expires(1): 09-19-2006 (5 Years)
Date Expires(2): 09-19-2006 (5 Years)
Current Sr 90, beta spike parent, vial# 62204-334

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Sr 90	23,166	23,166

RAD04-0095, Sr-90 Analyst: hicksb

Solvent: 0.5M HNO3 Volume (ml): 100.00
Date Prep./Opened: 10-07-2004 Date Consumed: 01-05-2006
Date Expires(1): 10-07-2005 (1 Year)
Date Expires(2): 04-17-2004 (1 Year)

Parent Std No.: RAD01-0025, Sr 90 01-093 Aliquot Amount (ml): 10.000
Parent Date Expires(1): 09-19-2006 Parent Date Expires(2): 09-19-2006

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Sr 90	23,166	2,316.6

Reviewed By: _____

Page 1 of 1

SR-90 Parent Ampoule for 2nd source CPC cal.

9/19/01
BMW

#62204-334

ampoule activity: ~~38,970 dps~~ 38,970 dps.
½ life: 28.79 yrs
Calibration date: August 7, 2001 12:00 EST
Uncertainty 4.0%

STANDARDS LOG PARENT DILUTION # 01-093

$\left(\frac{38970 \text{ dps}}{1 \text{ sec}}\right)\left(\frac{60 \text{ sec}}{1 \text{ min}}\right) = 2,338,200$ dpm in ampoule.

$\left(\frac{2338200}{2.22}\right) = 1053243.2$ pCi/m in ampoule - Actual, 1043563.363 pCi/m
÷100 = 10435.8 pCi/ml

Actual Amount Transferred.... 4.9531 g

093 4.9531 g / 4.99897 actual = 0.9908 0.9908 x 2.3382×10^6 = 2,316,688.56 dpm

-094 $\left(\frac{2,316,688}{100 \text{ ml}}\right)$ = 23,166 dpm/ml or 104.3 pCi/ml

231.66 dpm/ml
JK 12-13-02

ANALYTICS
1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677

Sr-90
SRS 62204-334 Amount 1.053 µCi QA MN
Date 08/07/01 12:00 EST Exp. ———
PO # 1097166, Item 1
4.99897 grams 0.1M HCl solution

CAUTION RADIOACTIVE MATERIAL

SEVERN TRENT SERVICES

R ochemistry
Standards Preparation Logbook

Date Prep'd	Expir. Date	Standard ID Number	Isotope	Parent ID Number	Parent Activity	Parent Ref. Date	Aliquot	Dilution Volume	Change in Time	T ½	Final Activity	Solvent/ Lot #	Prep'd Initials	Cal. Ver. Initials	Comments
9/18/01	12/18/01	01-087	UNAT CAL STD	01085	10 µg/mL	9/18/01	1.5 mL	100 mL	N/A	N/A	150 ng/mL	.8 M HNO3	BMW	JTK	nanogram/mL
		01-088					1.0 mL				100 ng/mL			JTK	
		01-089					0.5 mL				50 ng/mL			JTK	
		01-090		01088	100 ng/mL		10 mL	100 mL			10 ng/mL			JTK	
		01-091		01-089	50 ng/mL		10 mL	100.0 mL			5 ng/mL			JTK	
		01-092		01-088	100 ng/mL		1.0 mL	100.0 mL			1 ng/mL			JTK	
9/19/01	9/19/06	01-093	SR-90	ampule C2204-334	38,897 dps	8/7/01	4.7531 g	100.0 mL	N/A	28.79 K	~~104.3 pCi/mL~~ 10435 pCi/mL 23,166 dpm/mL	.8 M HNO3	BMW	JTK	
9/19/01	9/19/02	01-094	SR90	01093	10435.8 pCi/mL	9/19/01	1.0 mL	100.0 mL	N/A	28.79 K	104.3 pCi/mL 231.66 dpm/mL	.8 M HNO3	BMW	JTK	
9/26/01	9/26/02	Ba-28	STD. Barium Carrier	Mo38-KPCM BaCl2	N/A	3/23/98	28.46 g	1000.0 mL	N/A	N/A	27.2 mg/mL	Reagent 1/20	BMW	JTK	See Ind capture weight sheet.
10/4/01	10/4/02 ~~10/4/06~~ 10/4/03	01-095	U-232	97-105	10,994 dpm/mL	9-6-97	1 mL	500 mL	—	70 yr	21.99 dpm	1M HNO3	CMA	JTK	
10/12/01	10/12/02	01-096	Ra226	98-006	1316 dpm/mL	2/12/98	1.0 mL	100.0 mL	—	1600 yr	13.16 dpm/mL	1M HNO3	AM	JTK	
10/18/01	10/18/02 ~~10/18/01~~ 10/18/03	01-097	(ABT) SR90/Y90	01032	1765.4 dpm/mL	3/28/03	2.0 mL	100.0 mL	N/A	28.5 yr	(35.31) total ~~23.99~~ dpm/mL decay corrected 34.83	~~1M~~ HNO3	BMW	AW	Decay Correct = 1699.65 dpm/mL

JTK 10-29-01

Additional Comments:

SL-RAD-044, revised 3/2/01
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SEVERN TRENT STL

Calibration for Protean

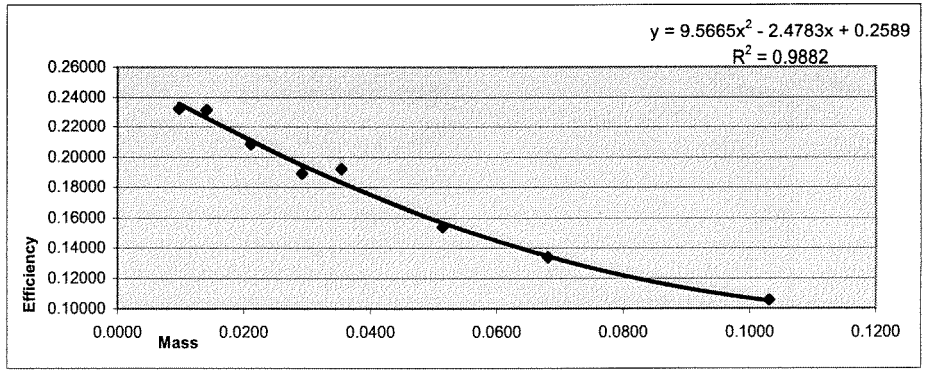
Alpha Th-230 BaSO4 for Ra-226

SEVERN TRENT STL

Detector Efficiency Curves

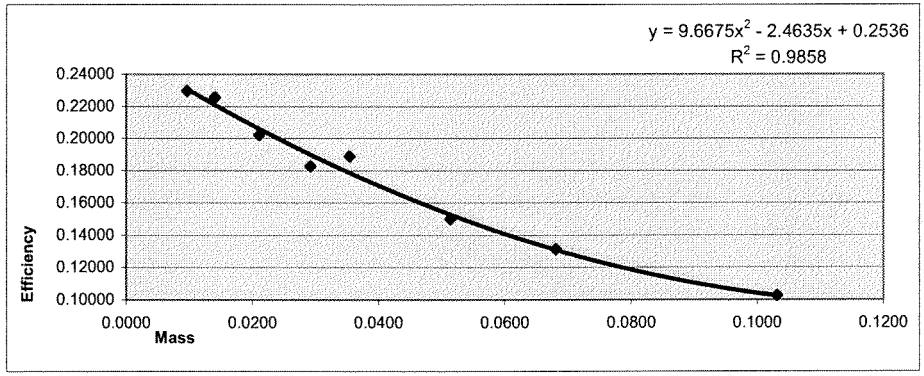
Alpha BaSO4 Th-230 Attenuation Protean 0
4/23/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
0	0.0097	40	40794	1019.850	0.23213
0	0.0141	40	40686	1017.150	0.23152
0	0.0211	40	36676	916.900	0.20870
0	0.0292	40	33213	830.325	0.18899
0	0.0354	40	33783	844.575	0.19224
0	0.0514	40	27051	676.275	0.15393
0	0.0681	40	23509	587.725	0.13377
0	0.1031	40	18547	463.675	0.10554



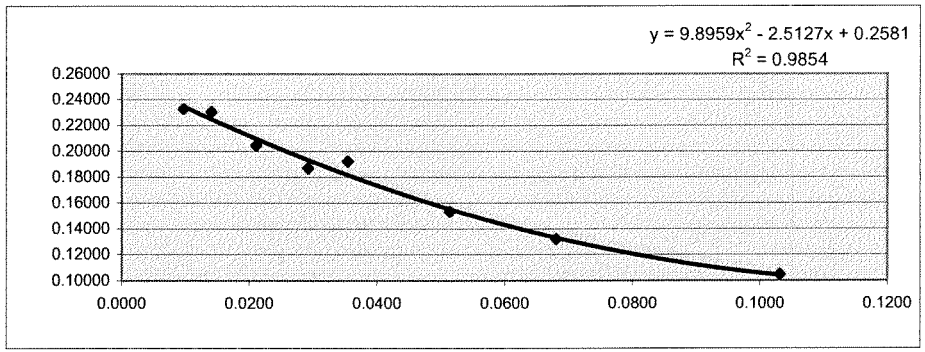
Alpha BaSO4 Th-230 Attenuation Protean 1
4/23/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
1	0.0097	40	40335	1008.375	0.22952
1	0.0141	40	39614	990.350	0.22542
1	0.0211	40	35521	888.025	0.20213
1	0.0292	40	32086	802.150	0.18258
1	0.0354	40	33159	828.975	0.18869
1	0.0514	40	26308	657.700	0.14970
1	0.0681	40	23046	576.150	0.13114
1	0.1031	40	17997	449.925	0.10241



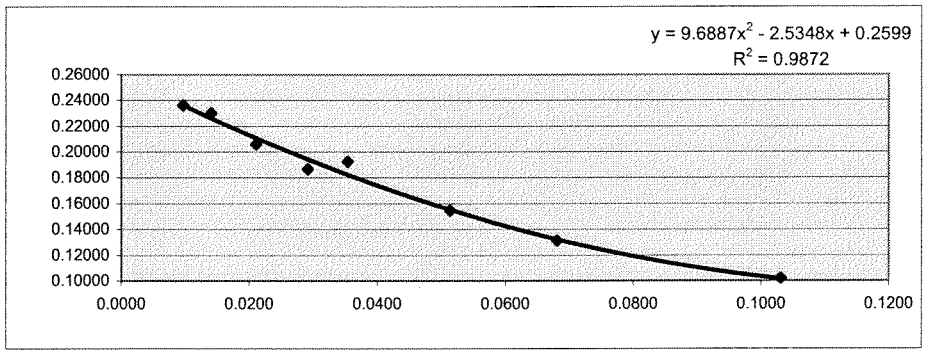
Alpha BaSO4 Th-230 Attenuation Protean 2
4/23/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
2	0.0097	40	40891	1022.275	0.23268
2	0.0141	40	40499	1012.475	0.23045
2	0.0211	40	35923	898.075	0.20441
2	0.0292	40	32801	820.025	0.18665
2	0.0354	40	33712	842.800	0.19183
2	0.0514	40	26936	673.400	0.15328
2	0.0681	40	23173	579.325	0.13186
2	0.1031	40	18376	459.400	0.10457



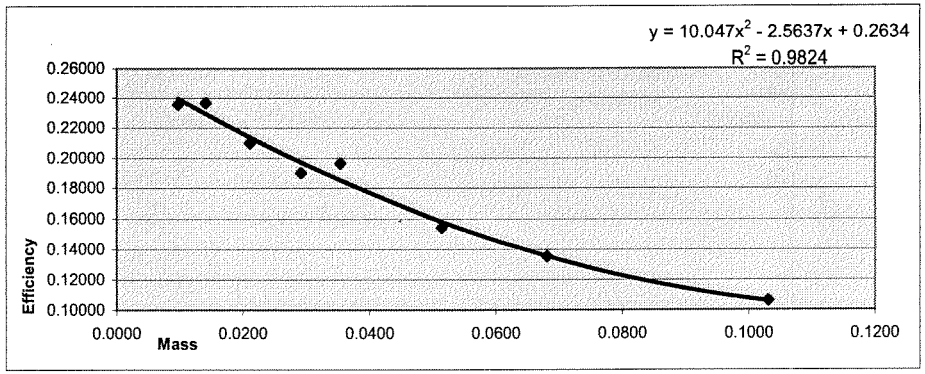
Alpha BaSO4 Th-230 Attenuation Protean 3
4/23/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
3	0.0097	40	41477	1036.925	0.23602
3	0.0141	40	40456	1011.400	0.23021
3	0.0211	40	36148	903.700	0.20569
3	0.0292	40	32806	820.150	0.18668
3	0.0354	40	33802	845.050	0.19235
3	0.0514	40	27165	679.125	0.15458
3	0.0681	40	23023	575.575	0.13101
3	0.1031	40	17879	446.975	0.10174



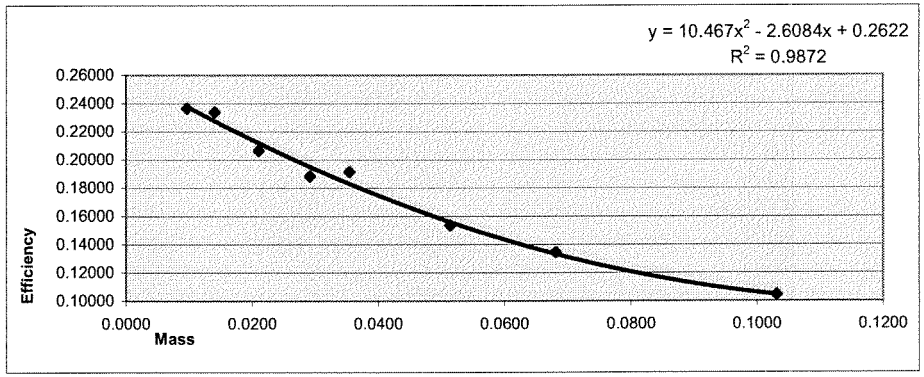
Alpha BaSO4 Th-230 Attenuation Protean 4
4/23/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
4	0.0097	40	41394	1034.850	0.23555
4	0.0141	40	41566	1039.150	0.23653
4	0.0211	40	36901	922.525	0.20998
4	0.0292	40	33382	834.550	0.18996
4	0.0354	40	34528	863.200	0.19648
4	0.0514	40	27135	678.375	0.15441
4	0.0681	40	23757	593.925	0.13519
4	0.1031	40	18666	466.650	0.10622



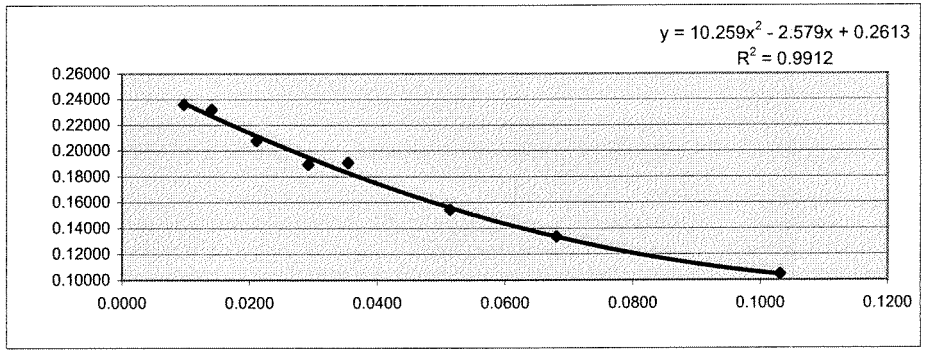
Alpha BaSO4 Th-230 Attenuation Protean 5
4/23/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
5	0.0097	40	41544	1038.600	0.23640
5	0.0141	40	41117	1027.925	0.23397
5	0.0211	40	36265	906.625	0.20636
5	0.0292	40	33082	827.050	0.18825
5	0.0354	40	33650	841.250	0.19148
5	0.0514	40	26950	673.750	0.15336
5	0.0681	40	23600	590.000	0.13429
5	0.1031	40	18315	457.875	0.10422



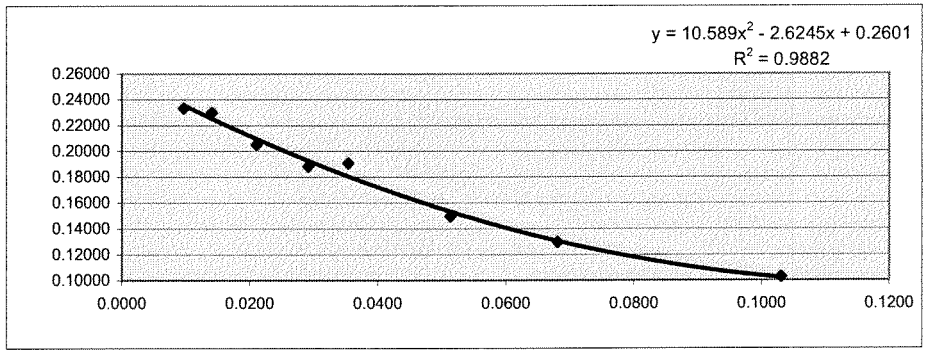
Alpha BaSO4 Th-230 Attenuation Protean 6
4/23/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
6	0.0097	40	41453	1036.325	0.23588
6	0.0141	40	40746	1018.650	0.23186
6	0.0211	40	36462	911.550	0.20748
6	0.0292	40	33258	831.450	0.18925
6	0.0354	40	33508	837.700	0.19067
6	0.0514	40	27106	677.650	0.15424
6	0.0681	40	23411	585.275	0.13322
6	0.1031	40	18374	459.350	0.10455



Alpha BaSO4 Th-230 Attenuation Protean 7
4/23/2004

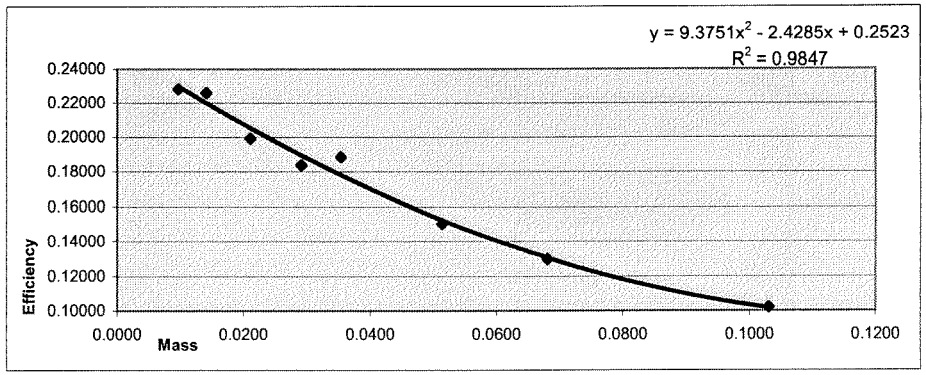
Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
7	0.0097	40	40973	1024.325	0.23315
7	0.0141	40	40422	1010.550	0.23002
7	0.0211	40	36048	901.200	0.20513
7	0.0292	40	33071	826.775	0.18819
7	0.0354	40	33499	837.475	0.19062
7	0.0514	40	26293	657.325	0.14962
7	0.0681	40	22789	569.725	0.12968
7	0.1031	40	18026	450.650	0.10257



Alpha BaSO4 Th-230 Attenuation Protean 8

4/21/2004

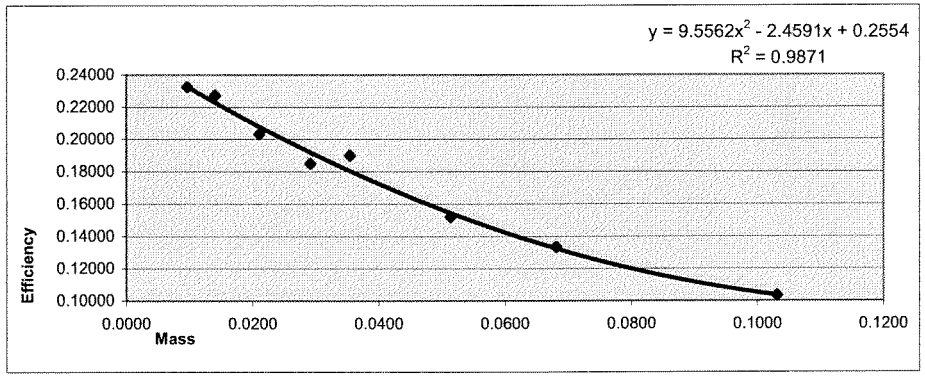
Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
8	0.0097	40	40072	1001.800	0.22802
8	0.0141	40	39669	991.725	0.22573
8	0.0211	40	35008	875.200	0.19921
8	0.0292	40	32272	806.800	0.18364
8	0.0354	40	33119	827.975	0.18846
8	0.0514	40	26378	659.450	0.15010
8	0.0681	40	22782	569.550	0.12964
8	0.1031	40	17906	447.650	0.10189



Alpha BaSO4 Th-230 Attenuation Protean 9

4/21/2004

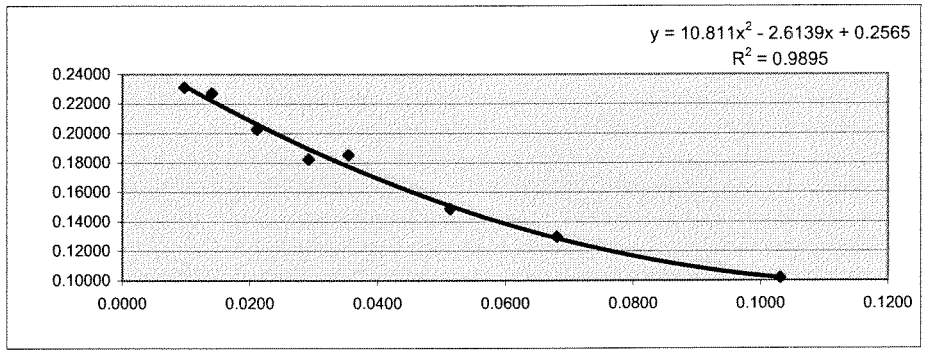
Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
9	0.0097	40	40808	1020.200	0.23221
9	0.0141	40	39904	997.600	0.22707
9	0.0211	40	35690	892.250	0.20309
9	0.0292	40	32466	811.650	0.18474
9	0.0354	40	33340	833.500	0.18972
9	0.0514	40	26681	667.025	0.15182
9	0.0681	40	23402	585.050	0.13317
9	0.1031	40	18149	453.725	0.10327



Alpha BaSO4 Th-230 Attenuation Protean 10

4/21/2004

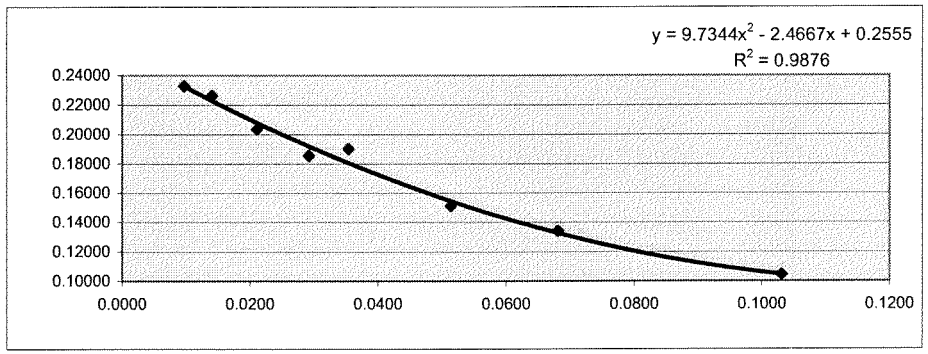
Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
10	0.0097	40	40565	1014.125	0.23083
10	0.0141	40	39891	997.275	0.22699
10	0.0211	40	35621	890.525	0.20270
10	0.0292	40	32048	801.200	0.18236
10	0.0354	40	32563	814.075	0.18529
10	0.0514	40	26129	653.225	0.14868
10	0.0681	40	22777	569.425	0.12961
10	0.1031	40	17867	446.675	0.10167



Alpha BaSO4 Th-230 Attenuation Protean 11

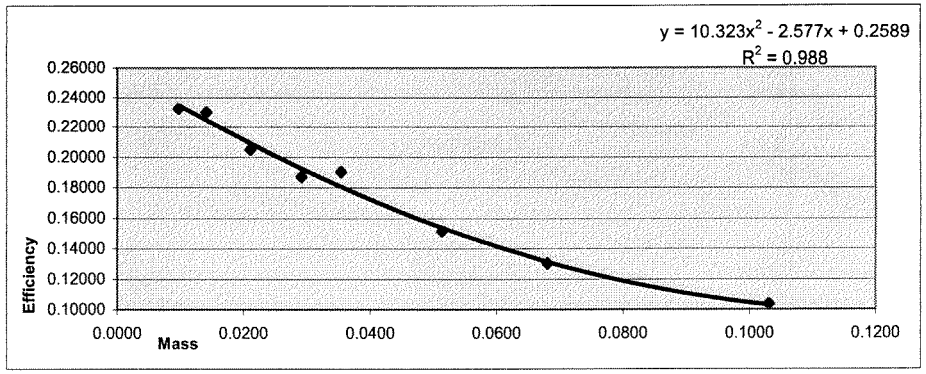
4/21/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
11	0.0097	40	40868	1021.700	0.23255
11	0.0141	40	39736	993.400	0.22611
11	0.0211	40	35749	893.725	0.20342
11	0.0292	40	32565	814.125	0.18531
11	0.0354	40	33378	834.450	0.18993
11	0.0514	40	26552	663.800	0.15109
11	0.0681	40	23532	588.300	0.13391
11	0.1031	40	18353	458.825	0.10444



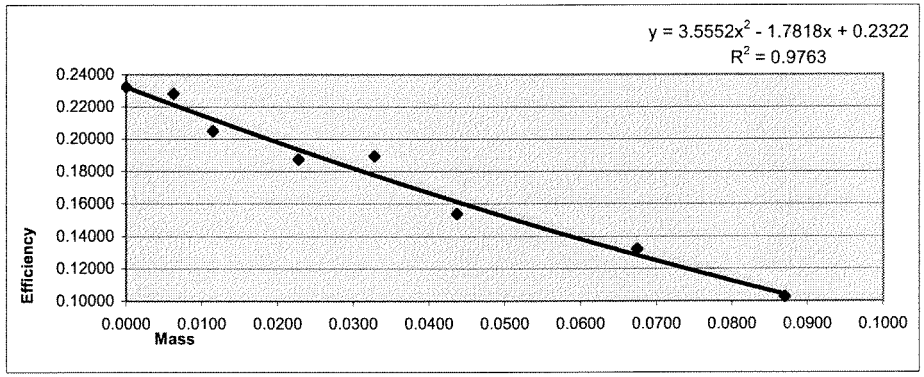
Alpha BaSO4 Th-230 Attenuation Protean 12
4/21/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
12	0.0097	40	40834	1020.850	0.23236
12	0.0141	40	40412	1010.300	0.22996
12	0.0211	40	36036	900.900	0.20506
12	0.0292	40	32876	821.900	0.18708
12	0.0354	40	33445	836.125	0.19031
12	0.0514	40	26597	664.925	0.15135
12	0.0681	40	22881	572.025	0.13020
12	0.1031	40	18172	454.300	0.10341



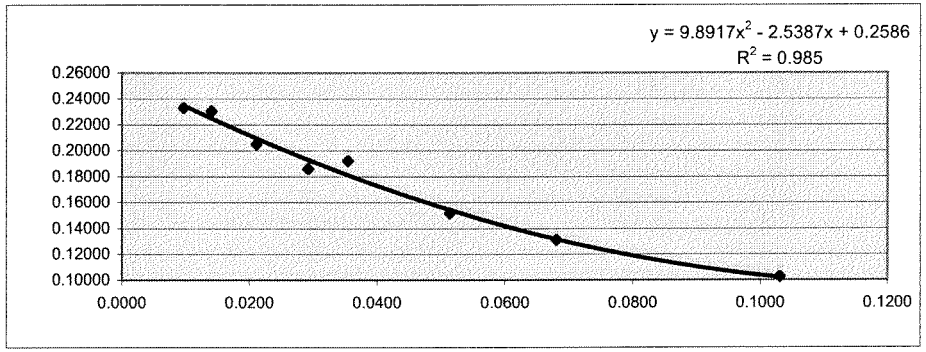
Alpha BaSO4 Th-230 Attenuation Protean 13
4/21/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
13	0.0000	40	40801	1020.025	0.23217
13	0.0063	40	40071	1001.775	0.22802
13	0.0115	40	35986	899.650	0.20477
13	0.0228	40	32929	823.225	0.18738
13	0.0328	40	33274	831.850	0.18934
13	0.0437	40	26995	674.875	0.15361
13	0.0675	40	23178	579.450	0.13189
13	0.0870	40	18018	450.450	0.10253



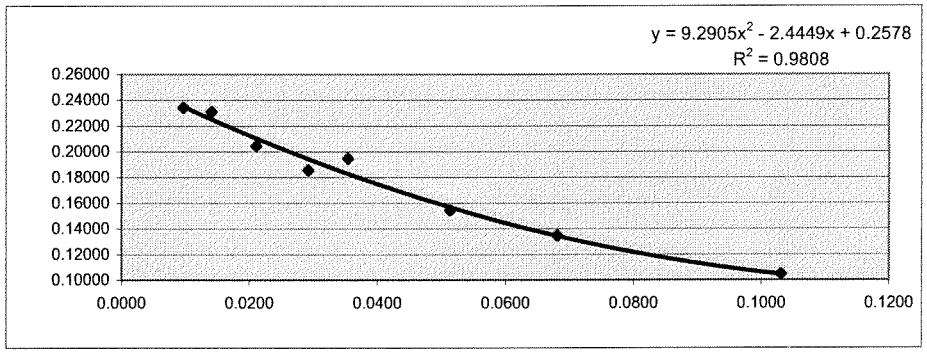
Alpha BaSO4 Th-230 Attenuation Protean 14
4/21/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
14	0.0097	40	40924	1023.100	0.23287
14	0.0141	40	40490	1012.250	0.23040
14	0.0211	40	36020	900.500	0.20497
14	0.0292	40	32662	816.550	0.18586
14	0.0354	40	33744	843.600	0.19202
14	0.0514	40	26665	666.625	0.15173
14	0.0681	40	23020	575.500	0.13099
14	0.1031	40	17980	449.500	0.10231



Alpha BaSO4 Th-230 Attenuation Protean 15
4/21/2004

Detector ID	Sample Wt	Count Time	Alpha	DPM 4393.4 CPM	Th230 Eff
15	0.0097	40	41162	1029.050	0.23423
15	0.0141	40	40588	1014.700	0.23096
15	0.0211	40	35908	897.700	0.20433
15	0.0292	40	32636	815.900	0.18571
15	0.0354	40	34175	854.375	0.19447
15	0.0514	40	27122	678.050	0.15433
15	0.0681	40	23656	591.400	0.13461
15	0.1031	40	18346	458.650	0.10440



Alpha Calibration Standards for Ra-226

Standard used: 1mL of Th-230 03-071 4567.9 dpm/mL 12/24/03

Std #	mL Ba Carrier	Gross wt	Tare Wt	Mass BaSO4
1	0.25	8.4779	8.4682	0.0097
2	0.4	8.3925	8.3784	0.0141
3	0.6	8.4768	8.4557	0.0211
4	0.8	8.4605	8.4313	0.0292
5	1	8.4726	8.4372	0.0354
6	1.5	8.4687	8.4173	0.0514
7	2	8.5100	8.4419	0.0681
8	3	8.5684	8.4653	0.1031

SEVERN TRENT STL

Voltage Plateaus and Discriminator Settings

Unit #1

MPC 9604 FACTORY PERFORMANCE EVALUATION

Factory performed tests for Instrument Serial Number: 233126-BO

Voltage Settings | **ULD Settings**

Alpha & Beta Voltage 1515 | A 7 C 7

Alpha Only Voltage 705 | B 7 D 7

Efficiencies: DETECTOR A

Sr/y 90 56.08 % | Tc-99 36.544 %

Ni-63 16.2 % | Th-230 @ A/B Voltage 24.895 %

Th-230 @ A only Voltage 22.403 %

Efficiencies: DETECTOR B

Sr/y 90 55.438 % | Tc-99 36.418 %

Ni-63 15.62 % | Th-230 @ A/B Voltage 24.341 %

Th-230 @ A only Voltage 22.350 %

Efficiencies: DETECTOR C

Sr/y 90 56.114 % | Tc-99 36.527 %

Ni-63 15.9 % | Th-230 @ A/B Voltage 24.466 %

Th-230 @ A only Voltage 22.627 %

Efficiencies: DETECTOR D

Sr/y 90 53.276 % | Tc-99 34.957 %

Ni-63 15.78 % | Th-230 @ A/B Voltage 24.717 %

Th-230 @ A only Voltage 23.019 %

Backgrounds

Detector A:

Alpha Background 0.07
Beta Background 0.64

Detector B:

Alpha Background 0.05
Beta Background 0.52

Detector C:

Alpha Background 0.06
Beta Background 0.47

Detector D:

Alpha Background 0.05
Beta Background 0.51

Background Count Time was 1000 Minutes.

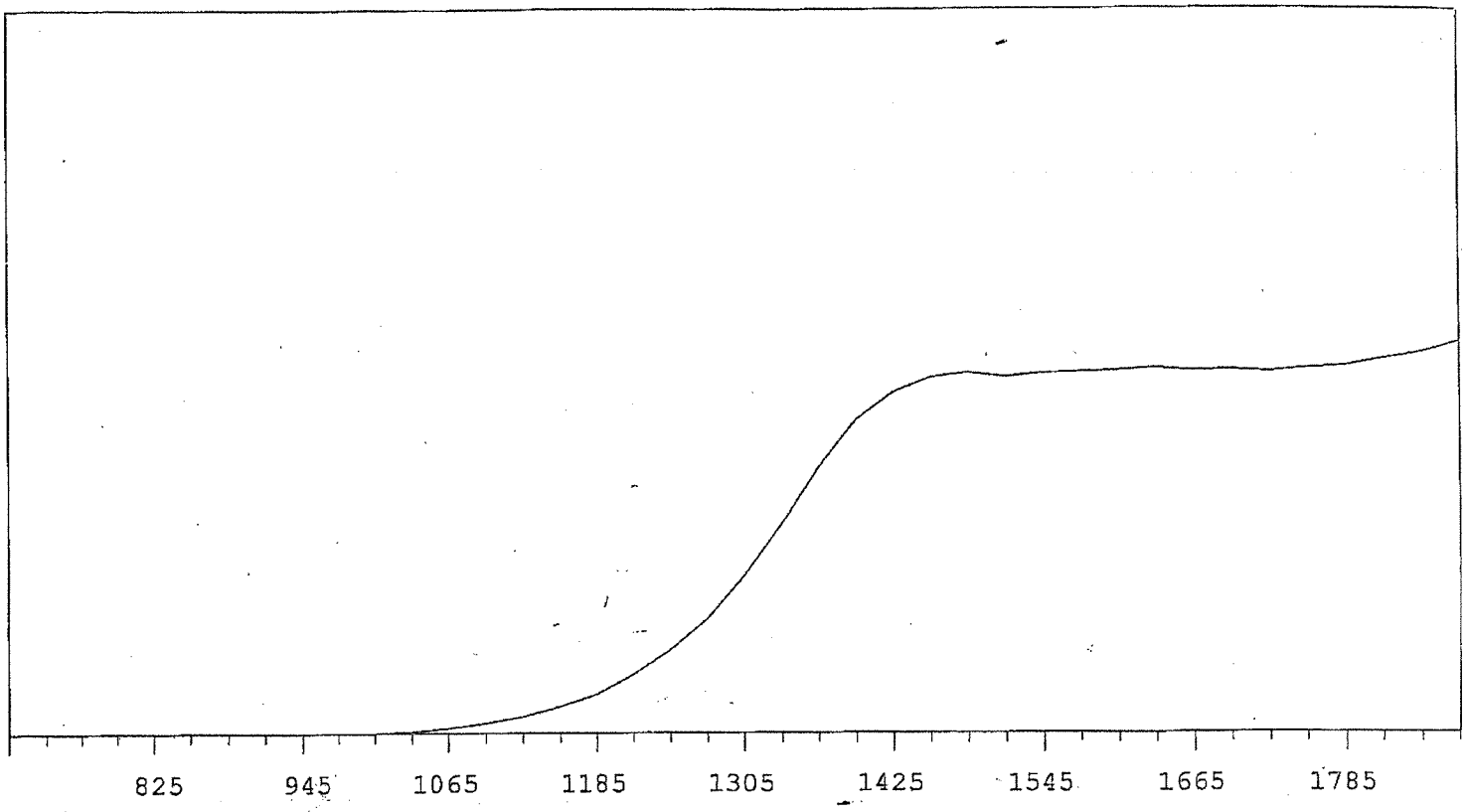
Tests performed and recorded by: Gregory D. Watson

Date: 11/26/02

*ALL EFFICIENCIES WERE OBTAINED USING A 2" DISTRIBUTED SOURCE AT OPTIMAL GEOMETRY EXCEPT Th-230, WHICH WAS AT A DEPTH OF ¼".

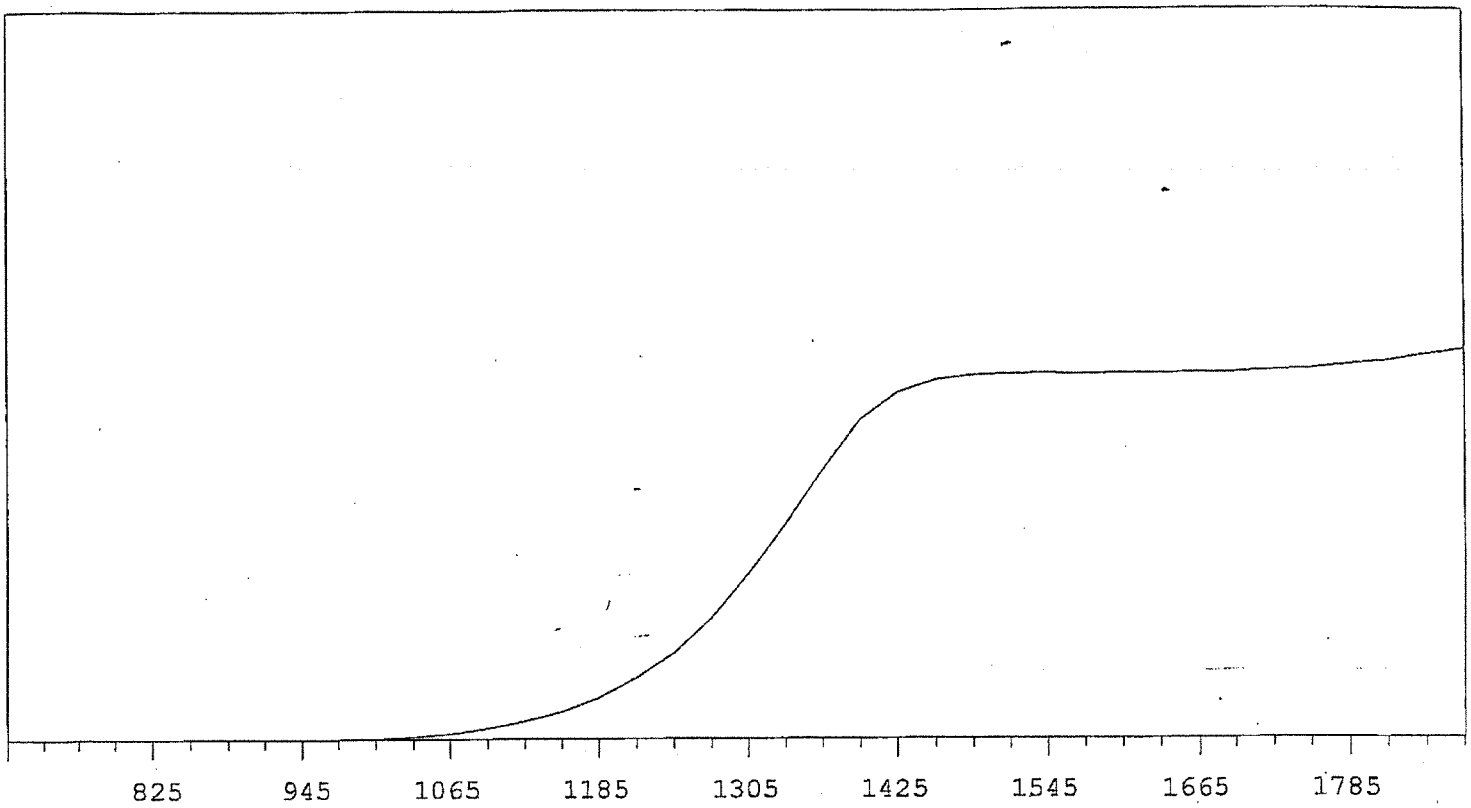
Unit #1

MPC 9604 Plateau 1 MPC 9604 Detector A 11/18/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16470	+92.44
735	2		1335	21902	+79.58
765	0	-33.33	1365	27818	+60.78
795	1	-33.33	1395	32763	+41.06
825	1	+0.00	1425	35569	+23.50
855	1	>100	1455	37141	+10.27
885	0	+41.67	1485	37680	+3.87
915	0	>100	1515	37264	+1.20
945	2	>100	1545	37658	+1.01
975	13	>100	1575	37826	+1.90
1005	48	>100	1605	37972	+0.72
1035	196	>100	1635	38183	+0.12
1065	548	>100	1665	37888	-0.71
1095	1042	>100	1695	37936	-0.41
1125	1730	>100	1725	37694	+0.85
1155	2776	>100	1755	38048	+2.46
1185	4064	>100	1785	38316	+4.39
1215	6147	>100	1815	39036	+6.01
1245	8704	>100	1845	39740	
1275	11959	>100	1875	40868	
1305	16470	+92.44			
1335	21902	+79.58			

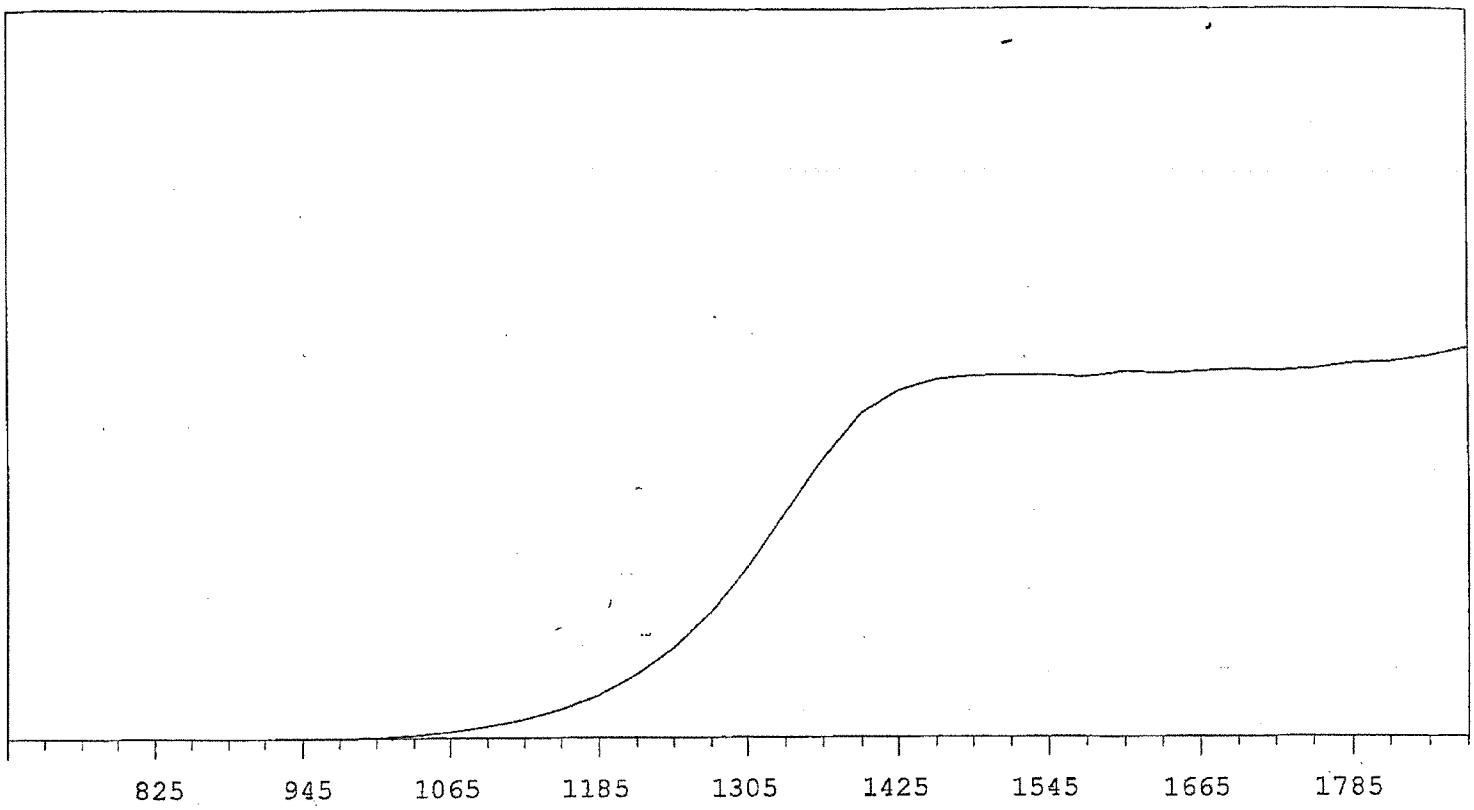
MPC 9604 Plateau 1 MPC 9604 Detector B 11/18/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	3	
735	2	
765	2	
795	0	>100
825	0	>100
855	0	>100
885	1	>100
915	0	>100
945	1	>100
975	20	>100
1005	136	>100
1035	480	>100
1065	1292	>100
1095	2449	>100
1125	4069	>100
1155	6233	>100
1185	9445	>100
1215	14086	>100
1245	19724	>100
1275	27772	+99.39
1305	37846	+89.73
1335	49400	+76.76

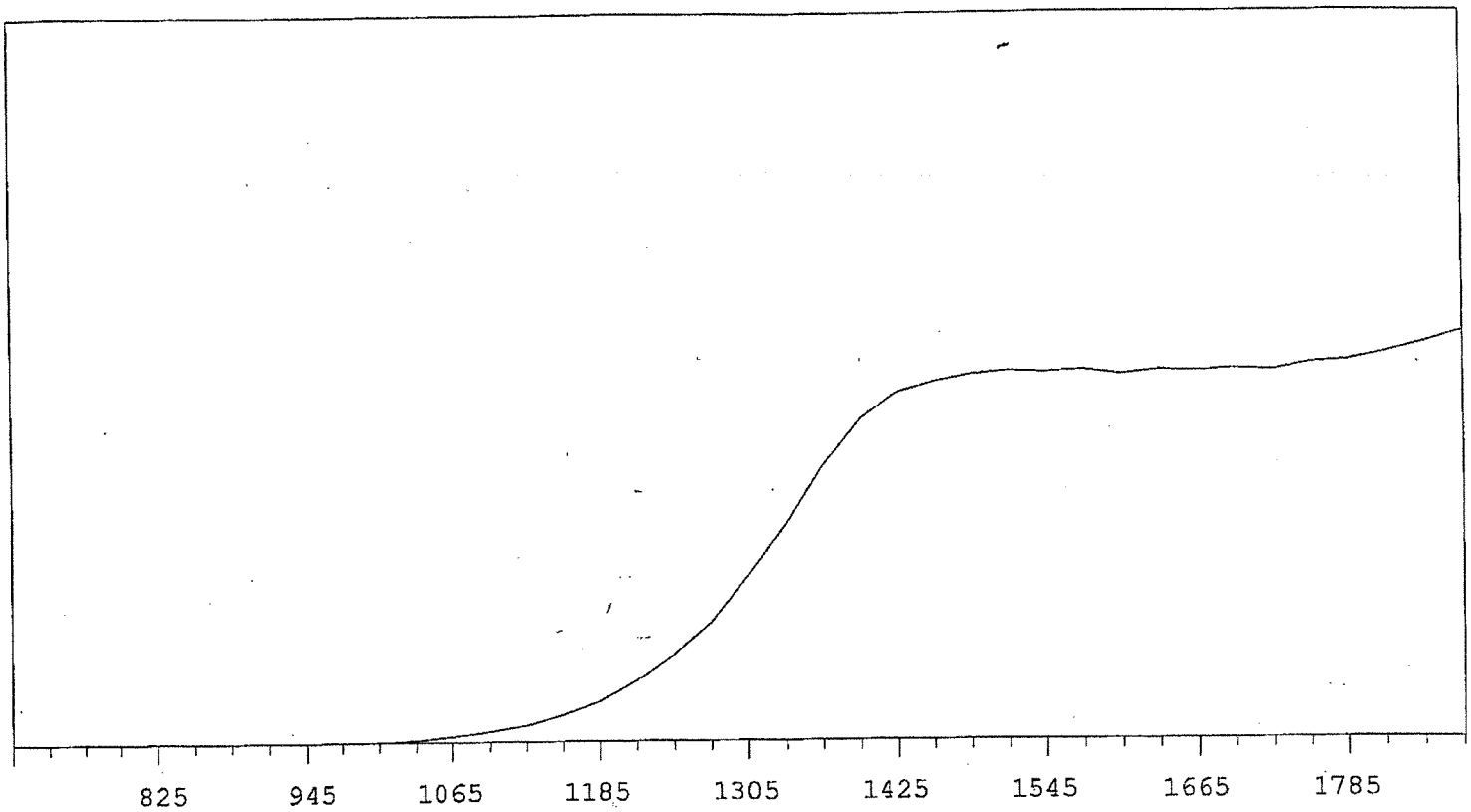
VOLTS	COUNTS	%/100 Volts
1305	37846	+89.73
1335	49400	+76.76
1365	61824	+59.37
1395	73411	+40.47
1425	79657	+23.20
1455	82603	+10.52
1485	83765	+4.29
1515	84094	+1.27
1545	84247	+0.38
1575	83954	+0.14
1605	84310	+0.17
1635	84238	+0.30
1665	84323	+0.33
1695	84330	+0.75
1725	84682	+1.66
1755	85015	+2.61
1785	86099	+3.67
1815	86967	+4.57
1845	88449	
1875	89824	

MPC 9604 Plateau 1 MPC 9604 Detector C 11/19/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	2		1305	39510	+89.34
735	1		1335	52183	+75.00
765	2		1365	64681	+56.02
795	0	-83.33	1395	75266	+36.30
825	0	>100	1425	80414	+19.94
855	1	>100	1455	83043	+8.78
885	0	>100	1485	83971	+3.46
915	1	>100	1515	84202	+0.54
945	5	>100	1545	84151	+0.51
975	40	>100	1575	83636	+0.50
1005	178	>100	1605	84901	+0.90
1035	611	>100	1635	84465	+1.26
1065	1455	>100	1665	84881	+0.31
1095	2686	>100	1695	85245	+0.76
1125	4338	>100	1725	84904	+1.52
1155	6682	>100	1755	85423	+2.21
1185	9895	>100	1785	86741	+3.54
1215	14706	>100	1815	87179	+4.71
1245	20868	>100	1845	88620	
1275	29167	+99.72	1875	90675	
1305	39510	+89.34			
1335	52183	+75.00			

MPC 9604 Plateau 1 MPC 9604 Detector D 11/19/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	3	+0.00
795	2	>100
825	0	-95.24
855	0	-83.33
885	2	+0.00
915	0	>100
945	0	>100
975	8	>100
1005	61	>100
1035	224	>100
1065	577	>100
1095	1071	>100
1125	1681	>100
1155	2740	>100
1185	4109	>100
1215	6232	>100
1245	8882	>100
1275	12116	>100
1305	16823	+91.81
1335	22142	+78.78

VOLTS	COUNTS	%/100 Volts
1305	16823	+91.81
1335	22142	+78.78
1365	28133	+59.68
1395	32974	+39.42
1425	35720	+22.04
1455	36766	+10.79
1485	37553	+4.71
1515	37914	+2.42
1545	37768	+0.04
1575	38025	-0.08
1605	37519	+0.04
1635	37994	+0.32
1665	37808	+0.54
1695	38062	+1.00
1725	37790	+2.13
1755	38573	+3.55
1785	38772	+5.80
1815	39626	+7.23
1845	40662	
1875	41958	

#2

MPC 9604 FACTORY PERFORMANCE EVALUATION

Factory performed tests for Instrument Serial Number: 236534

Voltage Settings | **ULD Settings**

Alpha & Beta Voltage 1515 | A 7.0 C 7.0

Alpha Only Voltage 705 | B 7.0 D 7.0

Efficiencies: DETECTOR A

Sr/y 90 55.844 % | Tc-99 36.440 %

Ni-63 16.731 % | Th-230 @ A/B Voltage 25.353 %

Th-230 @ A only Voltage 22.314 %

Efficiencies: DETECTOR B

Sr/y 90 55.898 % | Tc-99 36.482 %

Ni-63 16.599 % | Th-230 @ A/B Voltage 24.934 %

Th-230 @ A only Voltage 22.030 %

Efficiencies: DETECTOR C

Sr/y 90 55.644 % | Tc-99 37.968 %

Ni-63 15.840 % | Th-230 @ A/B Voltage 24.941 %

Th-230 @ A only Voltage 22.747 %

Efficiencies: DETECTOR D

Sr/y 90 54.607 % | Tc-99 37.028 %

Ni-63 16.089 % | Th-230 @ A/B Voltage 24.430 %

Th-230 @ A only Voltage 21.638 %

Backgrounds

Detector A:

Alpha Background 0.06
Beta Background 0.452

Detector B:

Alpha Background 0.07
Beta Background 0.475

Detector C:

Alpha Background 0.08
Beta Background 0.470

Detector D:

Alpha Background 0.083
Beta Background 0.481

Background Count Time was 500 Minutes.

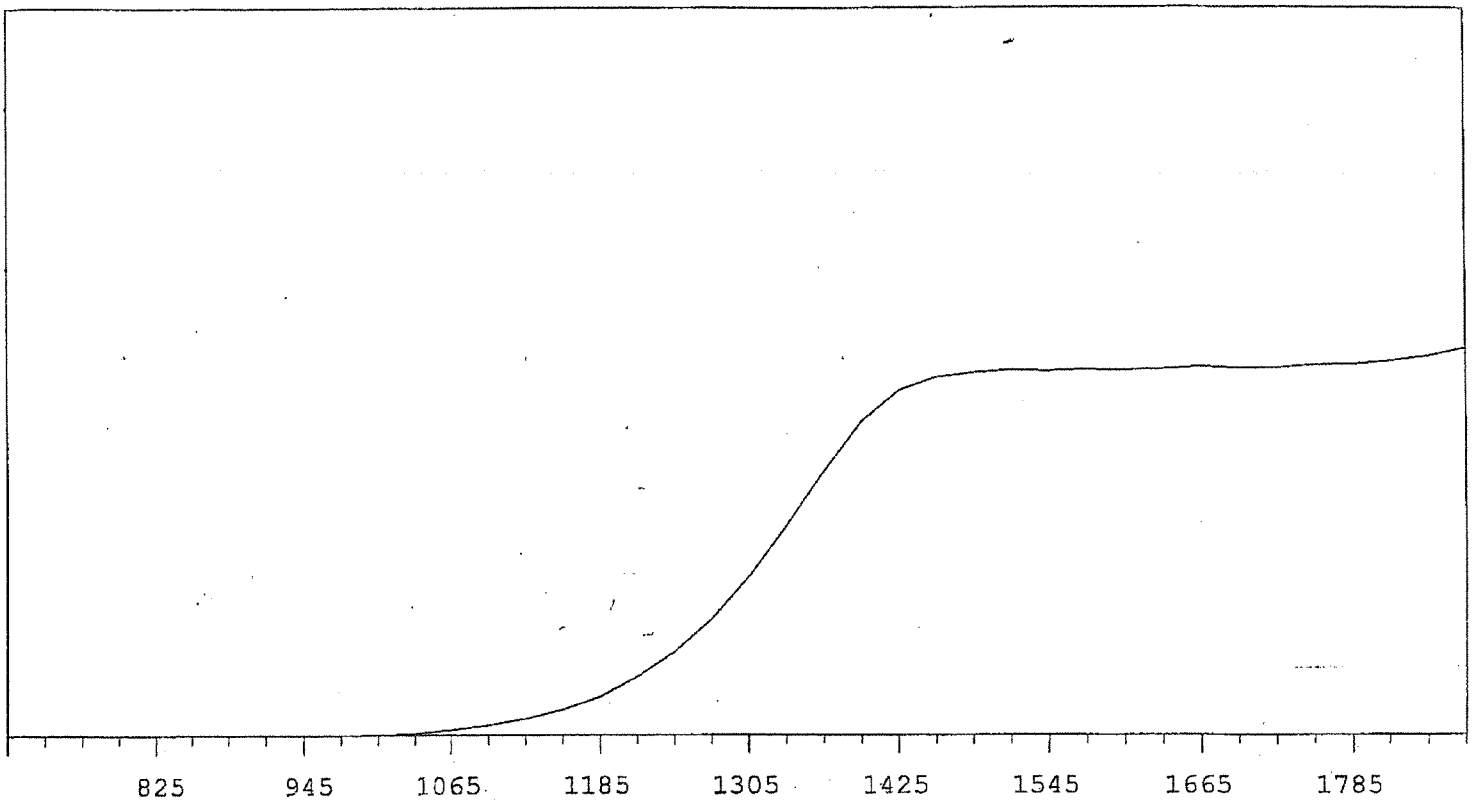
Tests performed and recorded by: [signature]

Date: 12/31/02

*ALL EFFICIENCIES WERE OBTAINED USING A 2" DISTRIBUTED SOURCE AT OPTIMAL GEOMETRY EXCEPT Th-230, WHICH WAS AT A DEPTH OF ¼".

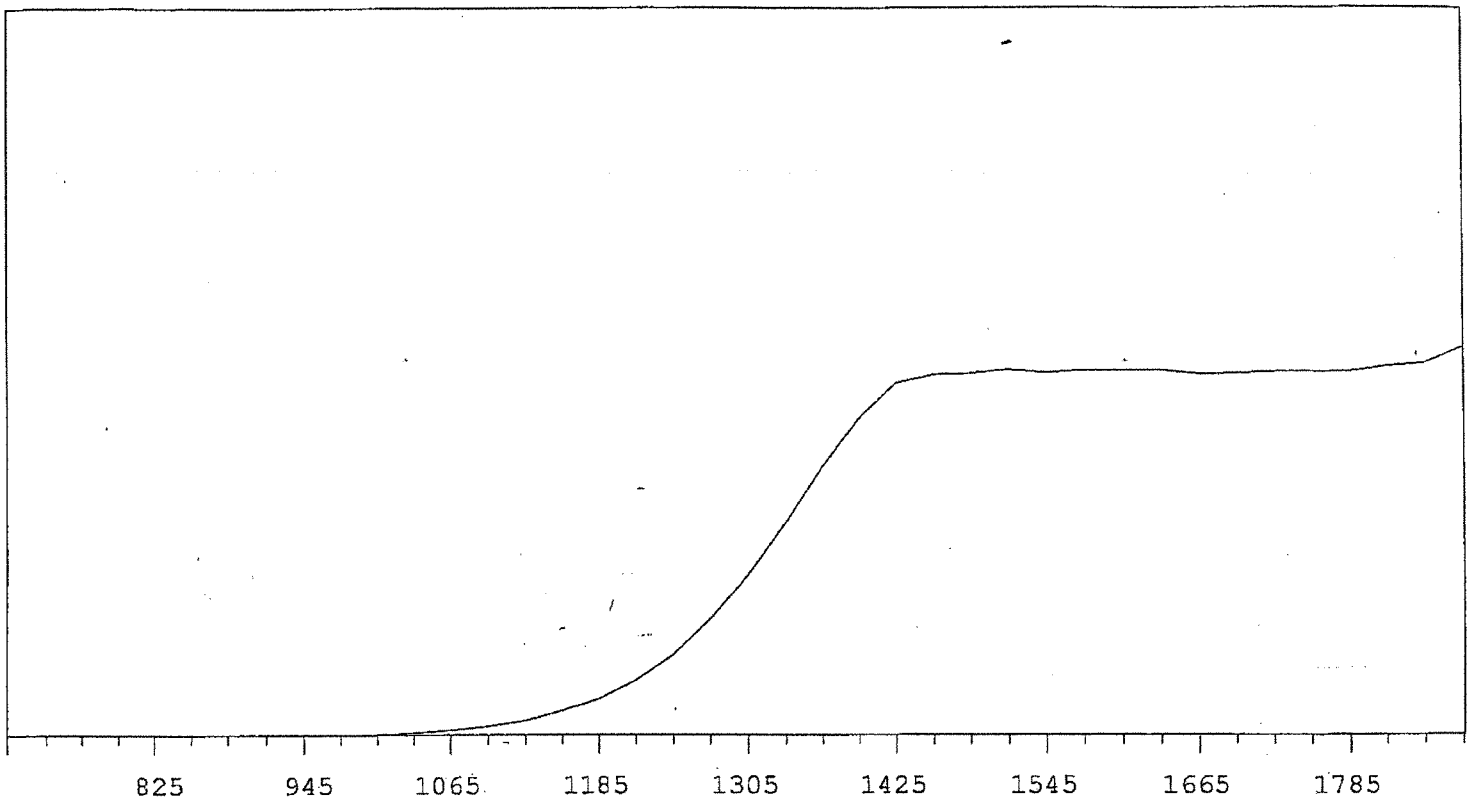
Unit #B2
TJK 1-26-04

MPC 9604 Plateau 1 MPC 9604 Detector A 12/16/2002
Alpha Volts: 705 Beta Volts: 1335



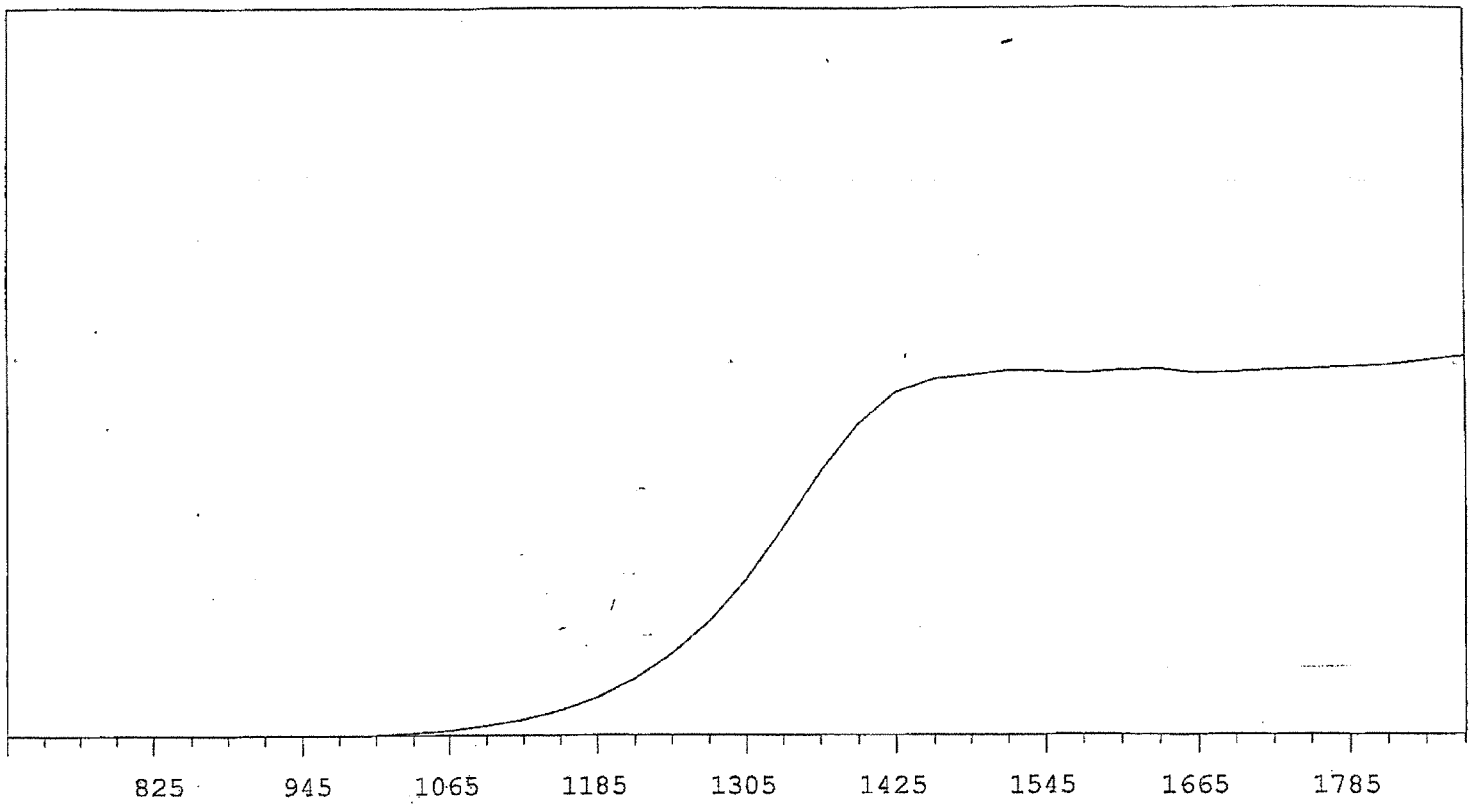
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	36094	+91.50
735	1		1335	47847	+79.16
765	0		1365	60405	+61.85
795	1	>100	1395	71873	+42.39
825	0	+83.33	1425	78827	+24.53
855	0	+55.56	1455	81991	+11.59
885	1	>100	1485	83024	+4.37
915	1	>100	1515	83664	+1.56
945	1	>100	1545	83373	+0.42
975	19	>100	1575	83766	+0.14
1005	129	>100	1605	83496	+0.77
1035	425	>100	1635	83774	+0.43
1065	1183	>100	1665	84339	+0.47
1095	2313	>100	1695	83891	+0.57
1125	3764	>100	1725	84026	+0.69
1155	5857	>100	1755	84655	+1.58
1185	8765	>100	1785	84828	+2.39
1215	13328	>100	1815	85494	+3.58
1245	19028	>100	1845	86654	
1275	26407	>100	1875	88364	
1305	36094	+91.50			
1335	47847	+79.16			

MPC 9604 Plateau 1 MPC 9604 Detector B 12/17/2002
Alpha Volts: 705 Beta Volts: 1335



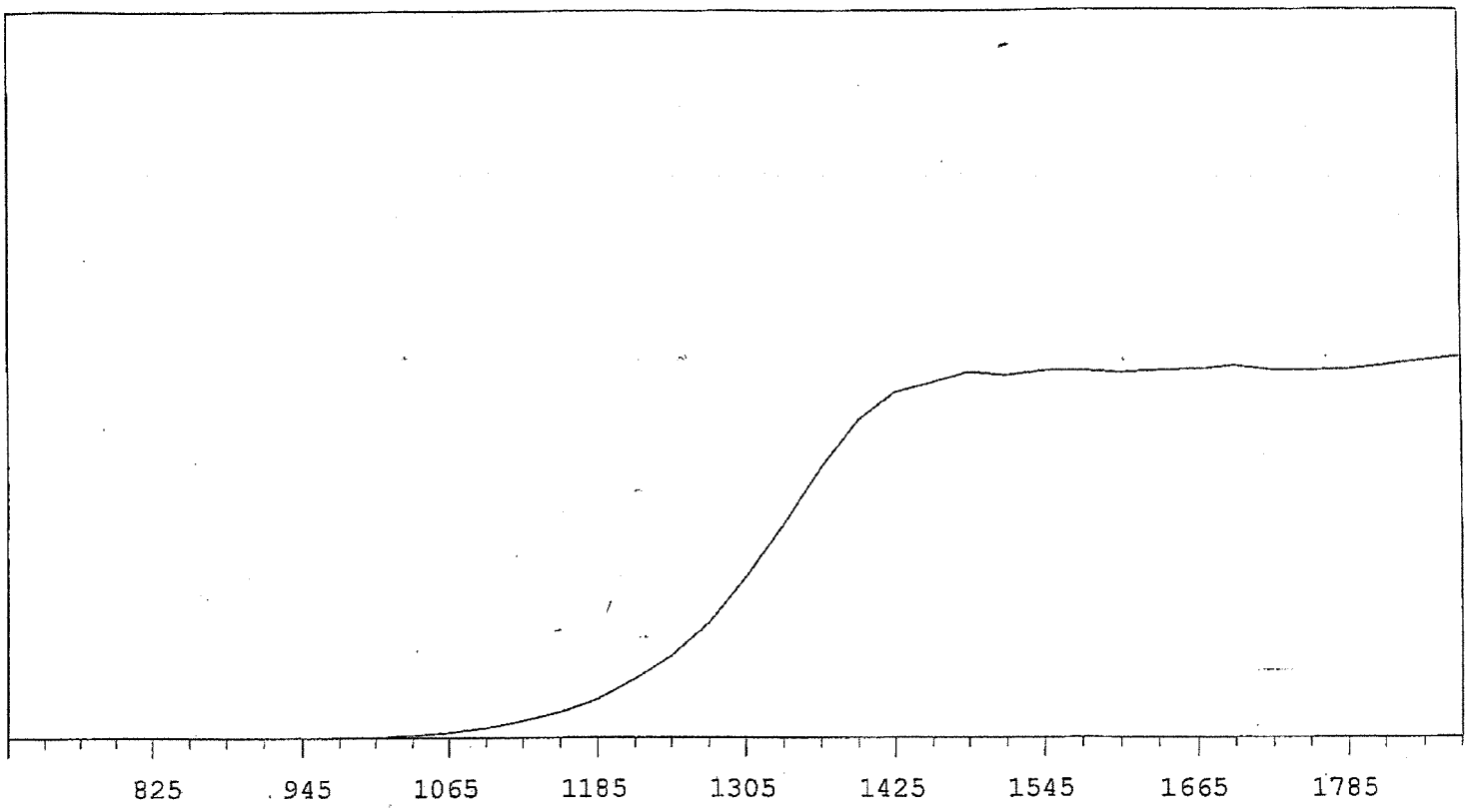
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	18047	+94.23
735	2		1335	23993	+79.11
765	0		1365	30302	+61.92
795	0	>100	1395	35719	+41.62
825	0	>100	1425	39617	+22.93
855	0	>100	1455	40588	+10.10
885	1	>100	1485	40726	+2.37
915	0	>100	1515	41160	+0.87
945	3	>100	1545	40771	+0.55
975	10	>100	1575	41098	+0.19
1005	58	>100	1605	41093	-0.14
1035	228	>100	1635	41116	-0.87
1065	543	>100	1665	40678	-0.49
1095	1009	>100	1695	40773	+0.05
1125	1647	>100	1725	40966	+0.68
1155	2812	>100	1755	41000	+1.27
1185	4080	>100	1785	40979	+1.90
1215	6168	>100	1815	41547	+4.96
1245	9044	>100	1845	41867	
1275	13094	>100	1875	43664	
1305	18047	+94.23			
1335	23993	+79.11			

MPC 9604 Plateau 1 MPC 9604 Detector C 12/16/2002
Alpha Volts: 705 Beta Volts: 1335



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	35990	+92.57
735	1		1335	47931	+79.59
765	0	+83.33	1365	60935	+62.26
795	0	>100	1395	71927	+42.50
825	1	>100	1425	79292	+24.26
855	2	-55.56	1455	82417	+11.85
885	0	>100	1485	83187	+4.61
915	0	>100	1515	84234	+1.35
945	0	>100	1545	84096	+0.71
975	14	>100	1575	83650	+0.45
1005	106	>100	1605	84371	+0.14
1035	468	>100	1635	84668	+0.04
1065	1134	>100	1665	83768	-0.23
1095	2223	>100	1695	83996	+0.27
1125	3673	>100	1725	84414	+1.38
1155	5797	>100	1755	84690	+1.53
1185	8786	>100	1785	85170	+2.05
1215	13052	>100	1815	85563	+2.91
1245	18927	>100	1845	86605	
1275	26347	>100	1875	87723	
1305	35990	+92.57			
1335	47931	+79.59			

MPC 9604 Plateau 1 MPC 9604 Detector D 12/16/2002
Alpha Volts: 705 Beta Volts: 1335



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16474	+93.61
735	1		1335	21880	+79.65
765	0	+0.00	1365	27760	+60.71
795	1	>100	1395	32659	+40.09
825	0	>100	1425	35549	+23.08
855	0	+83.33	1455	36556	+10.47
885	2	>100	1485	37588	+4.60
915	1	>100	1515	37281	+2.31
945	1	>100	1545	37736	+0.31
975	6	>100	1575	37775	+0.67
1005	51	>100	1605	37518	+0.27
1035	240	>100	1635	37766	+1.07
1065	524	>100	1665	37896	+0.77
1095	1011	>100	1695	38192	-0.15
1125	1744	>100	1725	37742	-0.45
1155	2674	>100	1755	37757	+0.29
1185	4004	>100	1785	37860	+2.27
1215	6095	>100	1815	38301	+3.24
1245	8485	>100	1845	38765	
1275	11865	>100	1875	39170	
1305	16474	+93.61			
1335	21880	+79.65			

#3

MPC 9604 FACTORY PERFORMANCE EVALUATION

Factory performed tests for Instrument Serial Number: 236532

Voltage Settings | **ULD Settings**

Alpha & Beta Voltage 1515 | A 7.0 C 7.0

Alpha Only Voltage 705 | B 7.0 D 7.0

Efficiencies: DETECTOR A

Sr/y 90 54.530 % Tc-99 35.69 %

Ni-63 14.385 % Th-230 @ A/B Voltage 24.440 %

Th-230 @ A only Voltage 22.047 %

Efficiencies: DETECTOR B

Sr/y 90 54.993 % Tc-99 36.209 %

Ni-63 15.309 % Th-230 @ A/B Voltage 24.041 %

Th-230 @ A only Voltage 21.872 %

Efficiencies: DETECTOR C

Sr/y 90 54.541 % Tc-99 35.67 %

Ni-63 15.117 % Th-230 @ A/B Voltage 24.212 %

Th-230 @ A only Voltage 21.800 %

Efficiencies: DETECTOR D

Sr/y 90 54.296 % Tc-99 35.380 %

Ni-63 13.326 % Th-230 @ A/B Voltage 24.802 %

Th-230 @ A only Voltage 22.584 %

Backgrounds

Detector A:		Detector B:	
Alpha Background	0.05	Alpha Background	0.06
Beta Background	0.619	Beta Background	0.497

Detector C:		Detector D:	
Alpha Background	0.04	Alpha Background	0.05
Beta Background	0.516	Beta Background	0.716

Background Count Time was 500 Minutes.

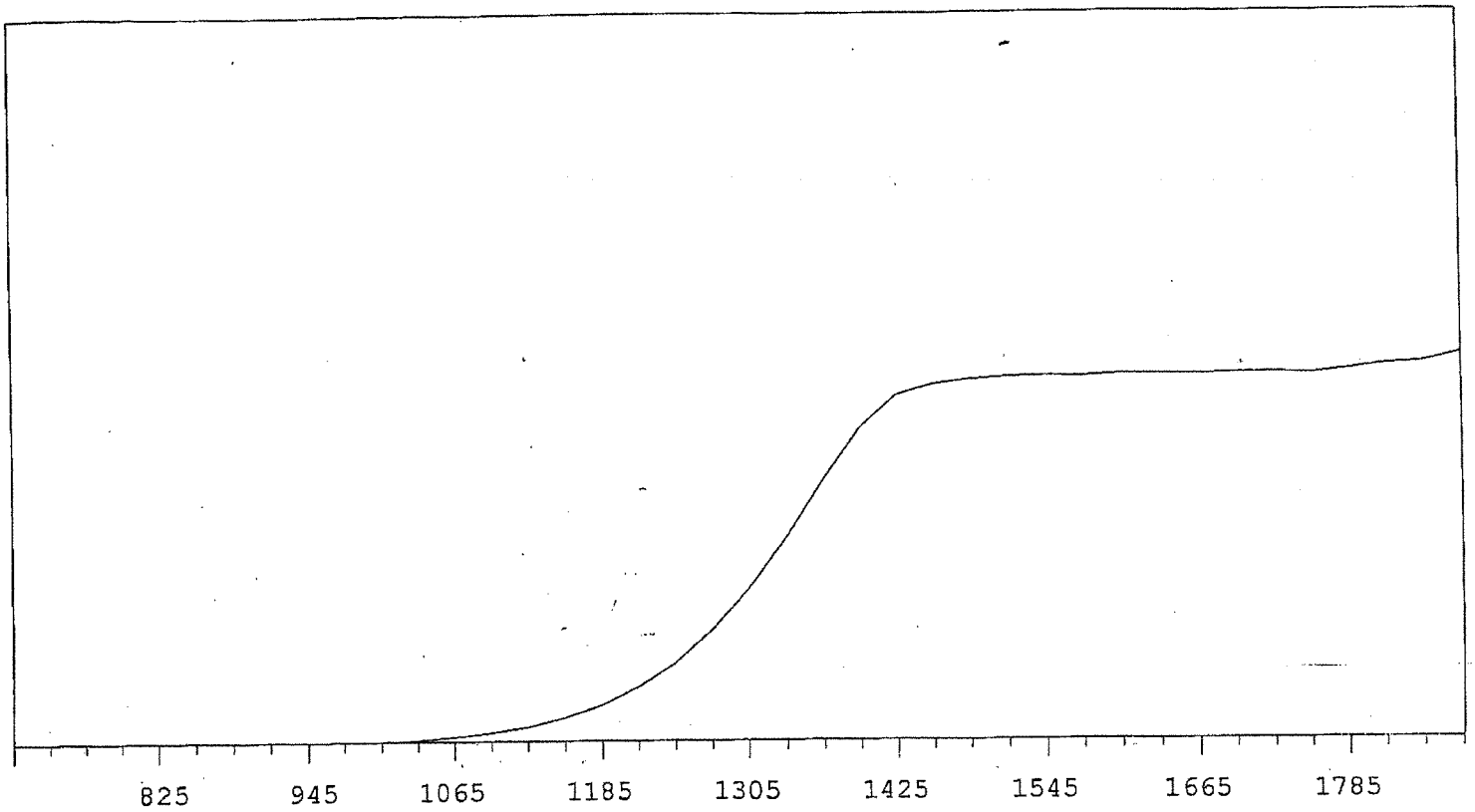
Tests performed and recorded by: [signature]

Date: 12/31/02

*ALL EFFICIENCIES WERE OBTAINED USING A 2" DISTRIBUTED SOURCE AT OPTIMAL GEOMETRY EXCEPT Th-230, WHICH WAS AT A DEPTH OF ¼".

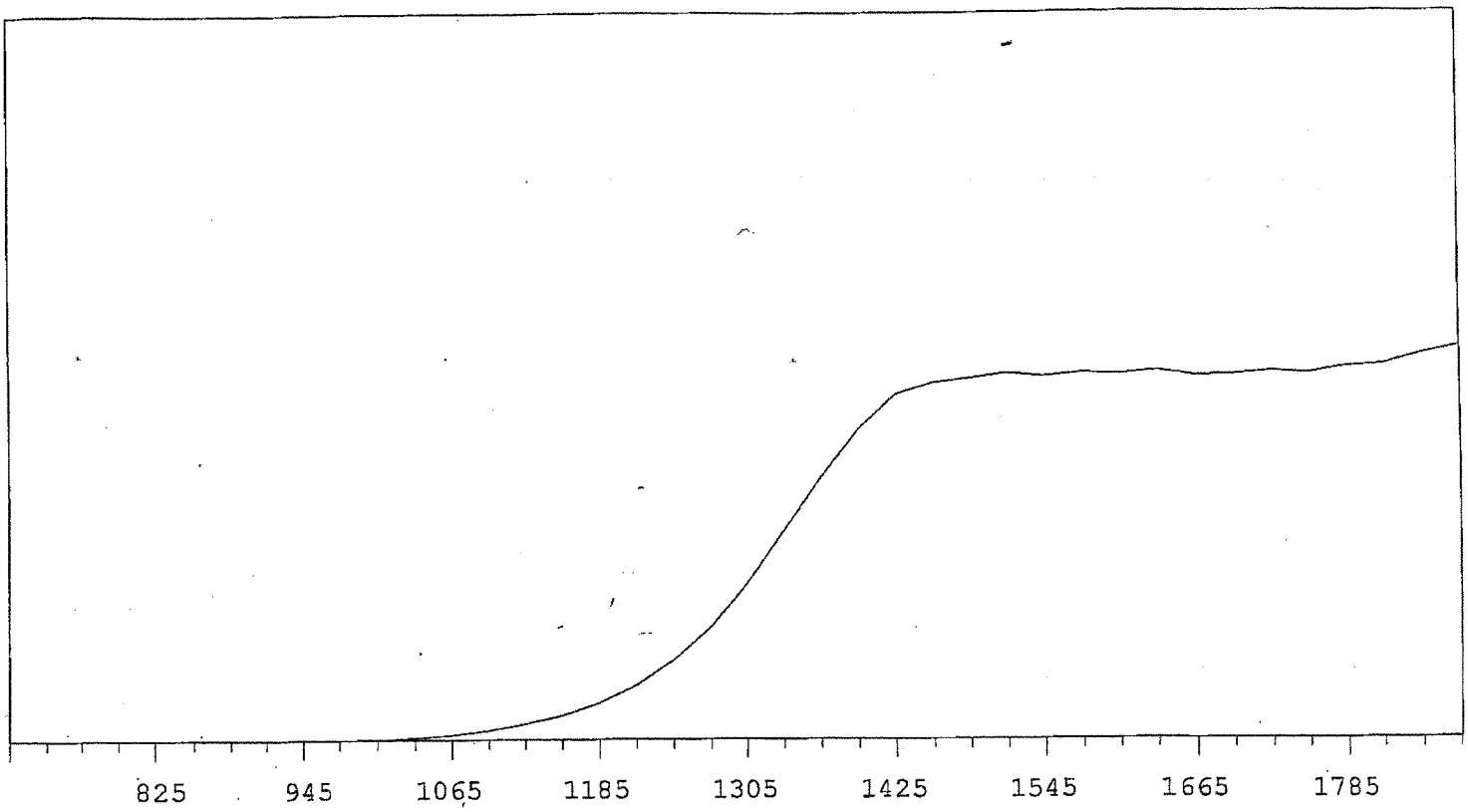
Unit #3

MPC 9604 Plateau 3 MPC 9604 Detector A 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



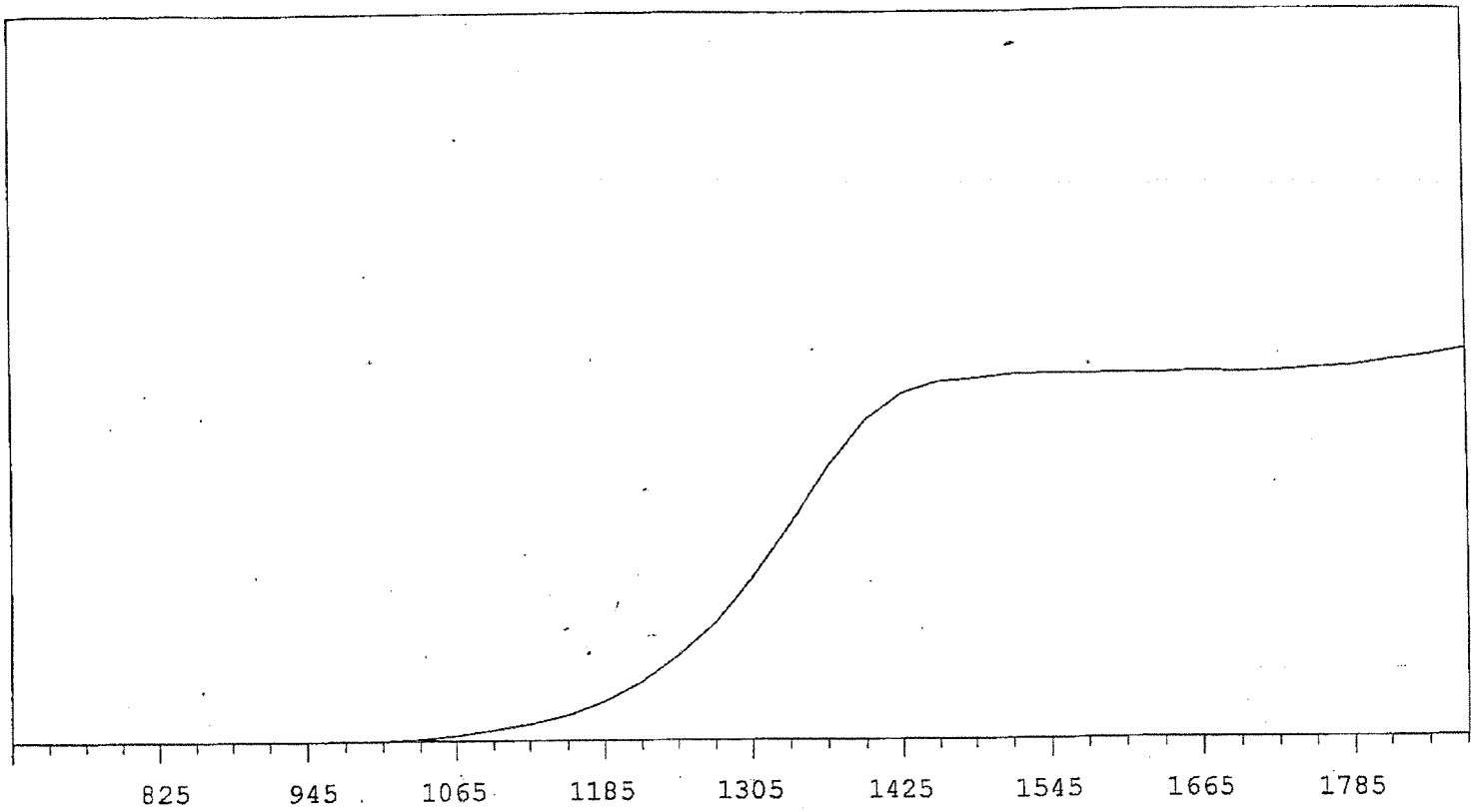
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	35294	+94.49
735	1		1335	47171	+81.80
765	1	-41.67	1365	60476	+64.73
795	0	+0.00	1395	72428	+43.87
825	1	-55.56	1425	80027	+24.74
855	1	-83.33	1455	82481	+11.18
885	0	>100	1485	83577	+4.19
915	0	>100	1515	84156	+1.60
945	4	>100	1545	84396	+0.77
975	3	>100	1575	84086	+0.47
1005	70	>100	1605	84586	+0.33
1035	340	>100	1635	84651	+0.59
1065	1026	>100	1665	84530	+0.30
1095	2029	>100	1695	84858	+0.13
1125	3406	>100	1725	84861	+0.66
1155	5535	>100	1755	84646	+1.63
1185	8369	>100	1785	85477	+2.55
1215	12673	>100	1815	86640	+4.05
1245	18158	>100	1845	87146	
1275	25828	>100	1875	89075	
1305	35294	+94.49			
1335	47171	+81.80			

MPC 9604 Plateau 3 MPC 9604 Detector B 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	2		1305	16243	+93.24
735	1		1335	21731	+79.13
765	0		1365	27200	+62.01
795	0	>100	1395	32178	+42.43
825	1	>100	1425	35788	+25.03
855	4	-33.33	1455	37031	+12.41
885	0	>100	1485	37518	+4.25
915	0	-20.83	1515	38036	+1.82
945	1	>100	1545	37656	+0.52
975	3	>100	1575	37987	+0.42
1005	51	>100	1605	37837	+0.14
1035	181	>100	1635	38182	-0.55
1065	497	>100	1665	37639	+0.15
1095	964	>100	1695	37774	-0.05
1125	1656	>100	1725	38127	+1.81
1155	2551	>100	1755	37910	+2.19
1185	3834	>100	1785	38605	+3.76
1215	5718	>100	1815	38791	+5.71
1245	8336	>100	1845	39868	
1275	11756	>100	1875	40630	
1305	16243	+93.24			
1335	21731	+79.13			

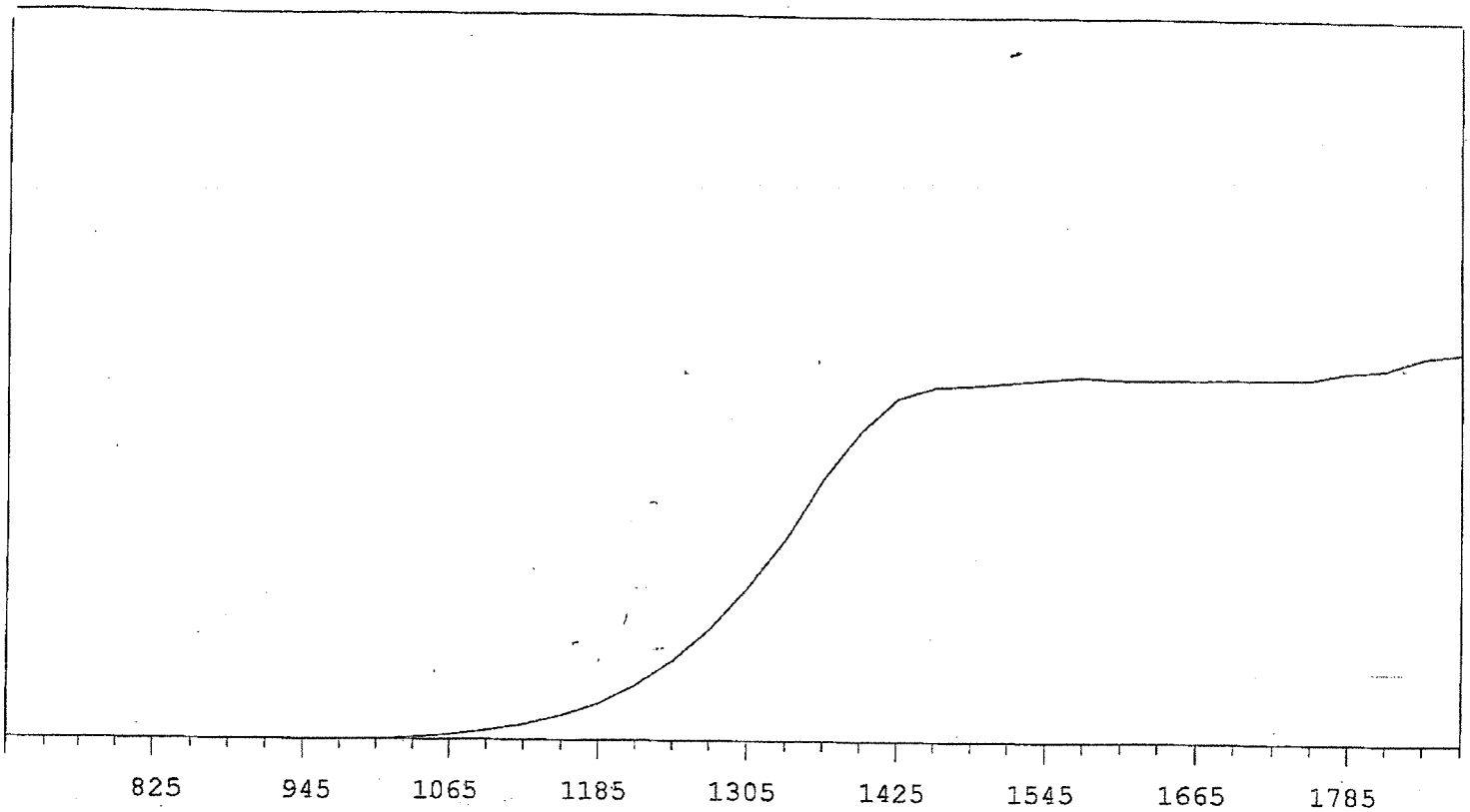
MPC 9604 Plateau 3 MPC 9604 Detector C 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	1	
735	1	
765	0	-55.56
795	0	-83.33
825	1	+0.00
855	0	>100
885	0	>100
915	0	>100
945	3	>100
975	22	>100
1005	101	>100
1035	486	>100
1065	1178	>100
1095	2481	>100
1125	3840	>100
1155	5896	>100
1185	9085	>100
1215	13626	>100
1245	19695	>100
1275	27244	>100
1305	37587	+92.10
1335	49689	+78.64

VOLTS	COUNTS	%/100 Volts
1305	37587	+92.10
1335	49689	+78.64
1365	62948	+59.67
1395	73852	+39.59
1425	79926	+21.65
1455	82659	+10.02
1485	83402	+4.31
1515	84267	+1.73
1545	84482	+0.88
1575	84291	+0.00
1605	84505	+0.24
1635	84261	+0.22
1665	84807	+0.24
1695	84420	+0.83
1725	84730	+1.15
1755	85357	+2.52
1785	85810	+3.26
1815	87107	+4.16
1845	88075	
1875	89672	

MPC 9604 Plateau 3 MPC 9604 Detector D 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	9	>100
1005	46	>100
1035	205	>100
1065	519	>100
1095	975	>100
1125	1608	>100
1155	2563	>100
1185	3812	>100
1215	5780	>100
1245	8319	>100
1275	11591	>100
1305	15935	+93.94
1335	21039	+81.17

VOLTS	COUNTS	%/100 Volts
1305	15935	+93.94
1335	21039	+81.17
1365	27326	+63.87
1395	32222	+43.56
1425	35674	+23.86
1455	36879	+11.05
1485	37110	+4.30
1515	37448	+2.64
1545	37776	+1.77
1575	38028	+0.73
1605	37822	-0.15
1635	37836	-0.25
1665	37786	+0.15
1695	37906	+0.36
1725	37873	+1.75
1755	37997	+2.80
1785	38738	+5.15
1815	39085	+6.13
1845	40328	
1875	40827	

#4

MPC 9604 FACTORY PERFORMANCE EVALUATION

Factory performed tests for Instrument Serial Number: 236533

Voltage Settings **ULD Settings**

Alpha & Beta Voltage 1515 A 7.0 C 7.0

Alpha Only Voltage 705 B 7.0 D 7.0

Efficiencies: DETECTOR A

Sr/y 90 55.116 % Tc-99 36.67 %

Ni-63 16.083 % Th-230 @ A/B Voltage 24.835 %

Th-230 @ A only Voltage 21.648 %

Efficiencies: DETECTOR B

Sr/y 90 54.972 % Tc-99 36.409 %

Ni-63 15.648 % Th-230 @ A/B Voltage 24.479 %

Th-230 @ A only Voltage 22.123 %

Efficiencies: DETECTOR C

Sr/y 90 55.152 % Tc-99 36.257 %

Ni-63 15.587 % Th-230 @ A/B Voltage 23.546 %

Th-230 @ A only Voltage 21.714 %

Efficiencies: DETECTOR D

Sr/y 90 54.815 % Tc-99 36.269 %

Ni-63 15.94 % Th-230 @ A/B Voltage 24.314 %

Th-230 @ A only Voltage 22.574 %

Backgrounds

Detector A:		Detector B:	
Alpha Background	0.05	Alpha Background	0.04
Beta Background	0.609	Beta Background	0.718

Detector C:		Detector D:	
Alpha Background	0.06	Alpha Background	0.05
Beta Background	0.462	Beta Background	0.521

Background Count Time was 500 Minutes.

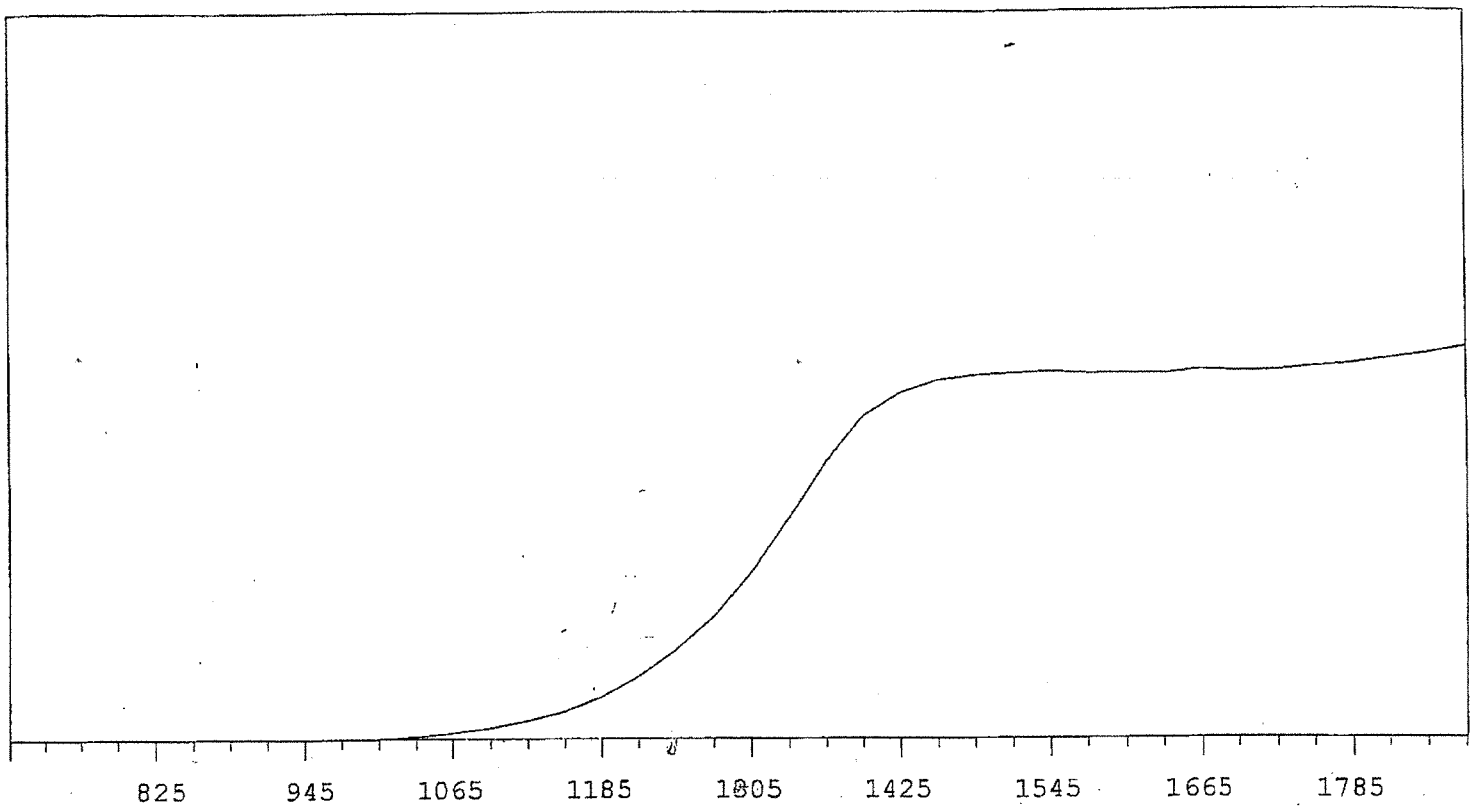
Tests performed and recorded by: [signature]

Date: 12/31/02

*ALL EFFICIENCIES WERE OBTAINED USING A 2" DISTRIBUTED SOURCE AT OPTIMAL GEOMETRY EXCEPT Th-230, WHICH WAS AT A DEPTH OF ¼".

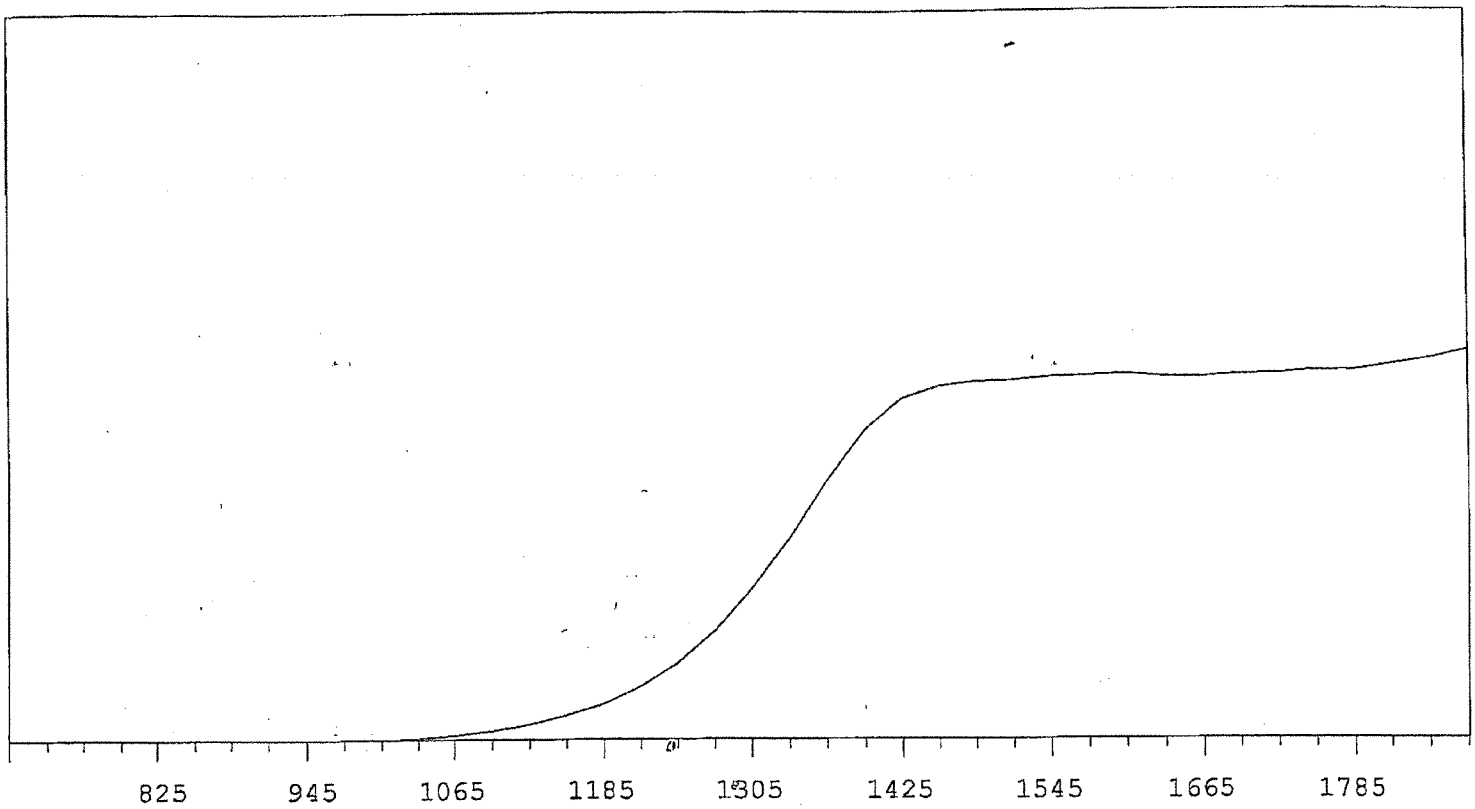
Unit #4

MPC 9604 Plateau PIC MPC 9604 MPC 9604 Detector A 12/18/2002
Alpha Volts: 705 Beta Volts: 1515



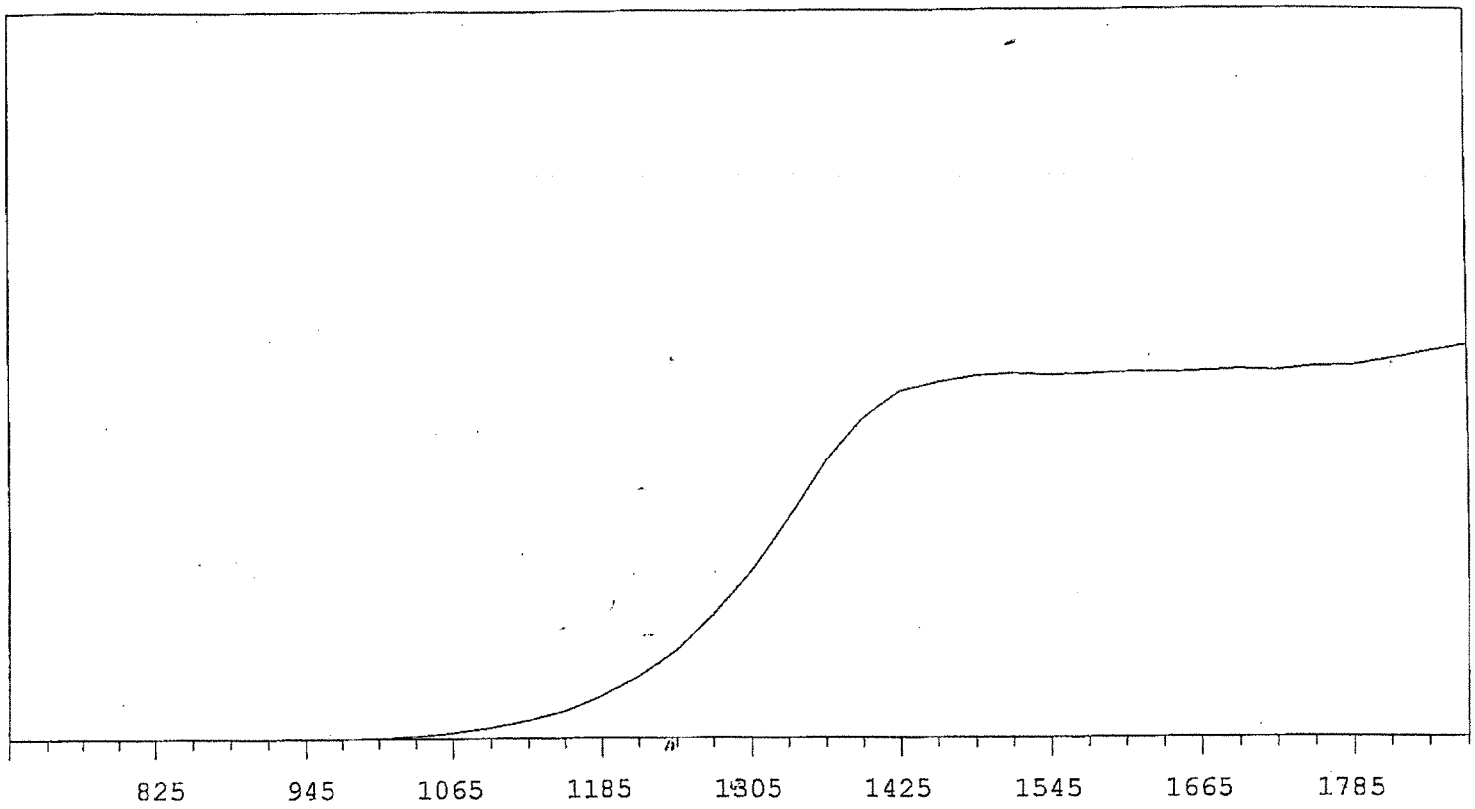
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	38210	+90.30
735	0		1335	50662	+76.50
765	0		1365	63624	+57.39
795	0	>100	1395	73884	+37.39
825	1	+83.33	1425	79213	+20.55
855	1	-83.33	1455	82067	+9.64
885	0	-55.56	1485	83080	+4.47
915	0	>100	1515	83570	+1.53
945	1	>100	1545	83988	+0.34
975	23	>100	1575	83523	-0.31
1005	147	>100	1605	83529	+0.24
1035	549	>100	1635	83417	+0.69
1065	1389	>100	1665	84345	+0.71
1095	2484	>100	1695	83979	+1.14
1125	4165	>100	1725	84139	+1.49
1155	6311	>100	1755	84965	+2.96
1185	9672	>100	1785	85741	+3.84
1215	14399	>100	1815	86960	+4.42
1245	20400	>100	1845	88088	
1275	28174	+99.15	1875	89563	
1305	38210	+90.30			
1335	50662	+76.50			

MPC 9604 Plateau PIC MPC 9604 MPC 9604 Detector B 12/20/2002
Alpha Volts: 705 Beta Volts: 1515



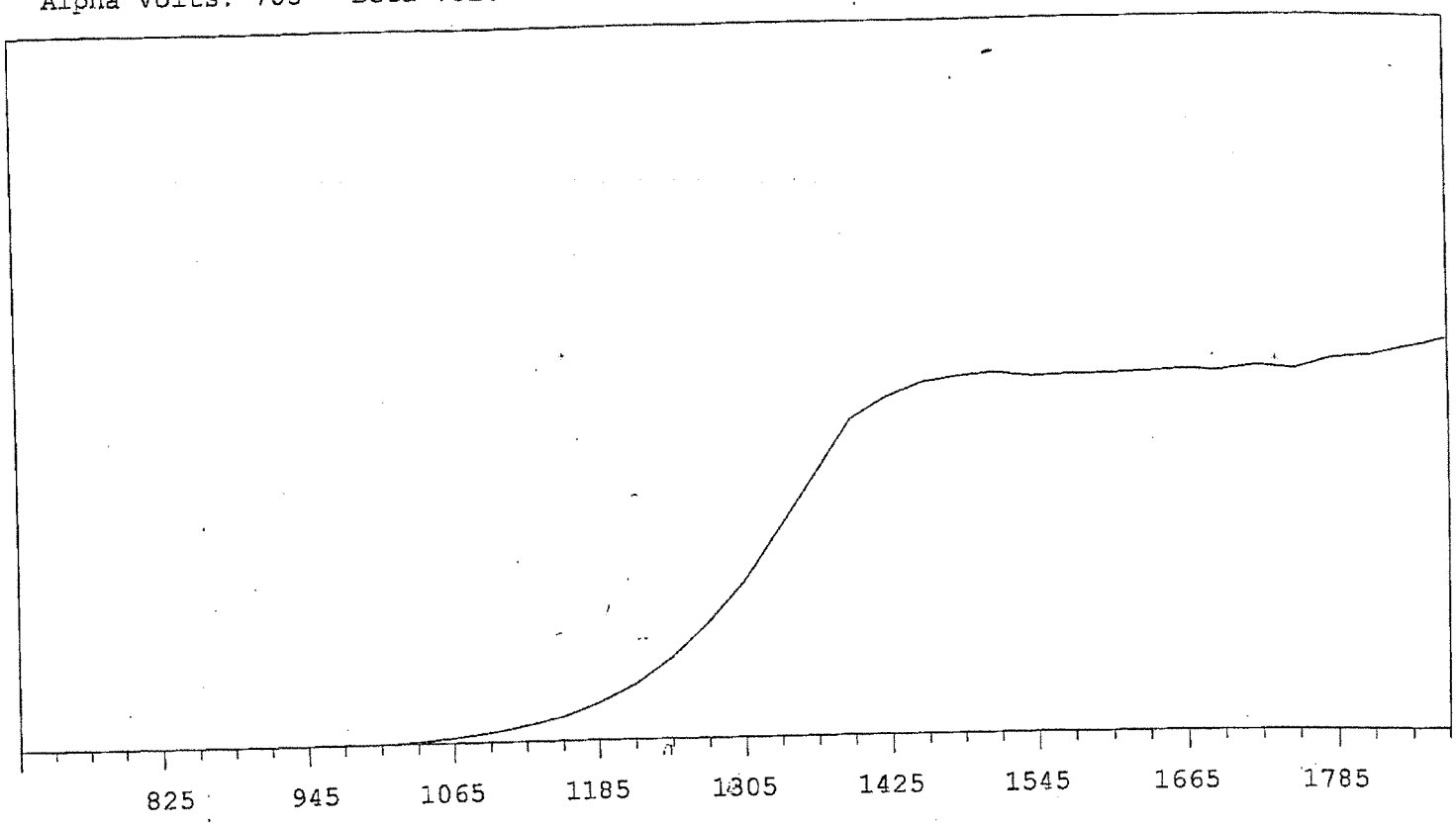
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	28036	+95.44
735	0		1335	37302	+82.32
765	1	+0.00	1365	47958	+64.46
795	0	>100	1395	57350	+44.02
825	0	>100	1425	63237	+24.93
855	0	>100	1455	65497	+11.29
885	0	>100	1485	66351	+4.62
915	1	>100	1515	66601	+2.36
945	1	>100	1545	67246	+1.77
975	8	>100	1575	67408	+0.73
1005	50	>100	1605	67730	-0.41
1035	303	>100	1635	67091	-0.29
1065	774	>100	1665	66992	+0.10
1095	1655	>100	1695	67480	+1.42
1125	2759	>100	1725	67633	+1.52
1155	4503	>100	1755	68211	+1.98
1185	6596	>100	1785	68168	+3.14
1215	9932	>100	1815	69236	+4.56
1245	14227	>100	1845	70353	
1275	20184	>100	1875	71882	
1305	28036	+95.44			
1335	37302	+82.32			

MPC 9604 Plateau PIC MPC 9604 MPC 9604 Detector C 12/19/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	38804	+90.25
735	1		1335	50930	+75.33
765	0		1365	64318	+57.13
795	0	+0.00	1395	73878	+37.15
825	0	>100	1425	80131	+20.35
855	1	+83.33	1455	82188	+9.94
885	1	+55.56	1485	83615	+3.79
915	0	>100	1515	84189	+1.56
945	1	>100	1545	83835	+0.57
975	16	>100	1575	84039	+0.31
1005	161	>100	1605	84413	+0.74
1035	557	>100	1635	84290	+0.90
1065	1352	>100	1665	84650	+0.53
1095	2565	>100	1695	85061	+1.02
1125	4126	>100	1725	84700	+0.98
1155	6348	>100	1755	85564	+2.08
1185	9862	>100	1785	85649	+3.84
1215	14356	>100	1815	87256	+5.01
1245	20454	>100	1845	88828	
1275	28653	+99.54	1875	90557	
1305	38804	+90.25			
1335	50930	+75.33			

MPC 9604 Plateau PIC MPC 9604 MPC 9604 Detector D 12/19/2002
Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	>100
855	1	+41.67
885	2	-33.33
915	0	>100
945	1	>100
975	4	>100
1005	34	>100
1035	189	>100
1065	520	>100
1095	1010	>100
1125	1686	>100
1155	2549	>100
1185	3953	>100
1215	5794	>100
1245	8550	>100
1275	12147	>100
1305	16347	+92.19
1335	21926	+79.96

VOLTS	COUNTS	%/100 Volts
1305	16347	+92.19
1335	21926	+79.96
1365	27606	+61.43
1395	33199	+40.79
1425	35516	+23.07
1455	36964	+10.43
1485	37545	+4.16
1515	37853	+0.87
1545	37385	-0.13
1575	37533	-0.03
1605	37633	+1.20
1635	37712	+0.83
1665	37973	+1.27
1695	37835	+0.66
1725	38293	+1.93
1755	37926	+3.14
1785	39032	+4.51
1815	39280	+6.41
1845	40250	
1875	41116	

SEVERN TRENT STL

Standard and Calibration Data

Alpha Calibration Standards for Ra-226

Standard used: 1mL of Th-230 03-071 4567.9 dpm/mL 12/24/03

Std #	mL Ba Carrier	Gross wt	Tare Wt	Mass BaSO4
1	0.25	8.4779	8.4682	0.0097
2	0.4	8.3925	8.3784	0.0141
3	0.6	8.4768	8.4557	0.0211
4	0.8	8.4605	8.4313	0.0292
5	1	8.4726	8.4372	0.0354
6	1.5	8.4687	8.4173	0.0514
7	2	8.5100	8.4419	0.0681
8	3	8.5684	8.4653	0.1031

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

65090-334

Th-230 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Th-230
ACTIVITY (dps):	7.654 E3
HALF-LIFE:	7.538 E4 Years
CALIBRATION DATE:	December 19, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.5%
SYSTEMATIC:	2.6%
RANDOM:	0.9%

*99% Confidence Level

Impurities: γ-impurities <0.1%, α-impurities <0.05%

5.17738 grams 0.5M HNO_3 solution.

P O NUMBER 1614557-000 OP, Item 3

SOURCE PREPARED BY: M. Taskaeva, Radiochemist

Q A APPROVED: 12-19-02

SEVERN TRENT SERVICES

Logbook: 2060

Radiochemistry
Standards Preparation Logbook

Date Prep'd	Expir. Date	Standard ID Number	Isotope	Parent ID Number	Parent Activity	Parent Ref. Date	Aliquot	Dilution Volume	Change in Time	T ½	Final Activity	Solvent/ Lot #	Prep'd Initials	Cal. Ver. Initials	Comments
~~9-11-03~~	~~9-11-08~~	~~03-069~~ ~~03-0269~~ MC 9-22-03	~~Pu 238~~	02-026	132.98	2-23-02	0.5mL	↓	1356 days	32022.4 d, 75	~~33 10 22 dpm/g~~ ~~66.41 dpm/mL~~	MFM			re-certification of 03-031, 02-03-2 b/and 66.20 dpm/mL
~~↓~~	~~↓~~	~~↓~~	~~Pu 239~~	~~02-023~~	~~128.05~~	~~2-23-02~~	~~0.5mL~~	~~150mL~~	11-16-03 MC	24110 yr	~~32.9 dpm/g~~ ~~64.025 dpm/mL~~	MFM			↓ 62.025 dpm/mL
9-11-03	9-11-08	~~03-070~~ ~~03-0270~~ MC 9-22-03	Am 243	98-011	1161 dpm/g	2-28-98	15.0 ~~16 gm~~	200mL		7.37 E+3 yr	87.075 ~~9.2.22 dpm/mL~~	MFM			
10-6-03	10-6-08	03-071	Th230	65090-334	7,654 dps	10-19-02	5.1498g	100mL	N/A	7.538 E4	4,567.9 dpm/mL	0.5M HNO3	BH	BBF	
10-6-03	10-6-08	03-072	Th230	03-071	4,567.9 dpm/mL	12-19-02	1mL	200mL	N/A	7.538 E4	22.84 dpm/mL	0.5M HNO3	BH	BBF	
10-11-03	10-11-0	03-073	Clean U-232	047-105	10994 dpm/mL	9-16-97	10mL	1000L		70 yr	103.85 dpm/mL	DI H2O 2M H2SO4 KOH pH 1.5	MFM BBF		Rad 03-0078 in Rad Capture
10/31/03	10/31/08	03-074	I-129	681-78-4	1.059 uCi	1-1-2000	1mL	100mL	N/A	1.57E+07	10.54 nCi/mL	0.1M NaOH	BH	BBF	
10/31/03	10/31/04	03-075	I-129	03-074	10.54 nCi/mL	1-1-2000	1mL	100mL	N/A	1.57E7	105.4 pCi/mL	0.1M NaOH	BH	BBF	
10/31/03	10/31/04	03-076	Ra 228	01012	1,018 dpm/mL	2/16/01	2mL	100mL	NA	5.75y	20.36 dpm/mL	0.5M HNO3	BH	BBF	
10/31/03	10/31/04	03-077	Pu-242	92-242-5-1	129.63 Bq/g	12/18/89	5.0723	100mL	NA	3.73 X 10^5 y	78.9027	.5M HNO3	MFM	MO	
11/3/03	11/3/04	SR19	Std SR counter	Sr(NO3)2	N/A	N/A	120.77g	1 Liter	N/A	N/A		dilH2O	[illegible]	BBF	Reported in Rad capture
11-5-03	11-5-04	RAP03-0032	Th-229	02-005	2134.75 dpm/mL	1-28-02	17.5mL	500mL	N/A	7.3E+3	74.716 dpm/mL	.5M HNO3	MFM	JMW	

Additional Comments:

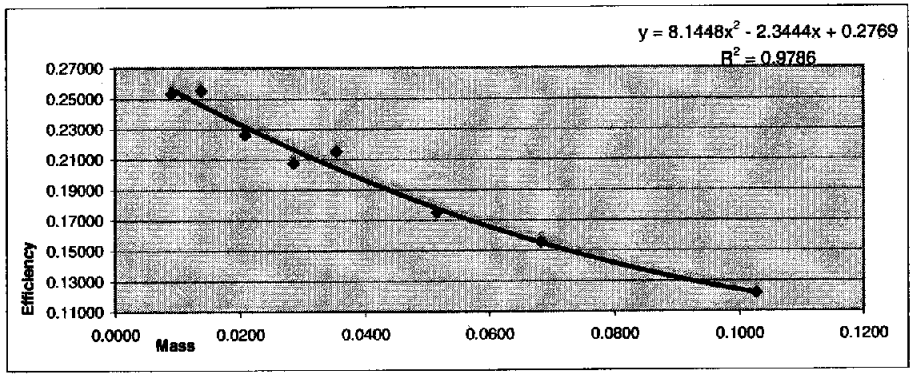
SEVERN TRENT STL

Red Calibration for Th-230 Alpha

with $BaSo_4$ Carrier for Ra-226 Analysis

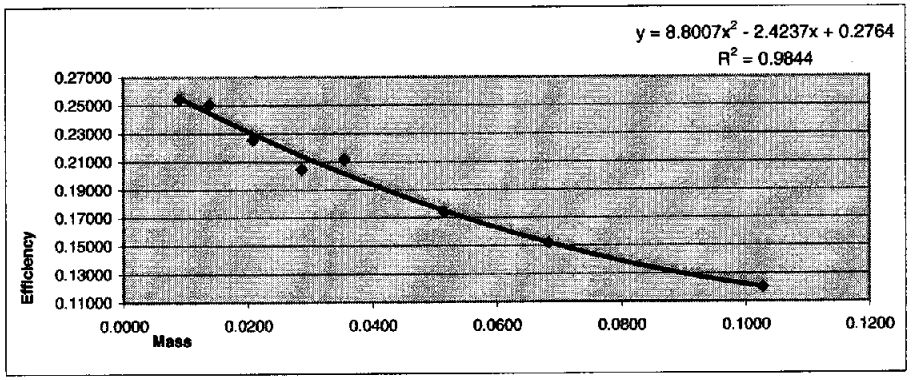
Alpha Th-230 Attenuation Red A1 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A1	0.0090	34.58	40019	1157.287	0.25335
A1	0.0138	34.33	40019	1165.715	0.25520
A1	0.0208	38.72	40003	1033.135	0.22617
A1	0.0286	42.22	40007	947.584	0.20744
A1	0.0354	40.71	40004	982.658	0.21512
A1	0.0515	45.00	36004	800.089	0.17515
A1	0.0682	45.00	31952	710.044	0.15544
A1	0.1027	45.00	25082	557.378	0.12202



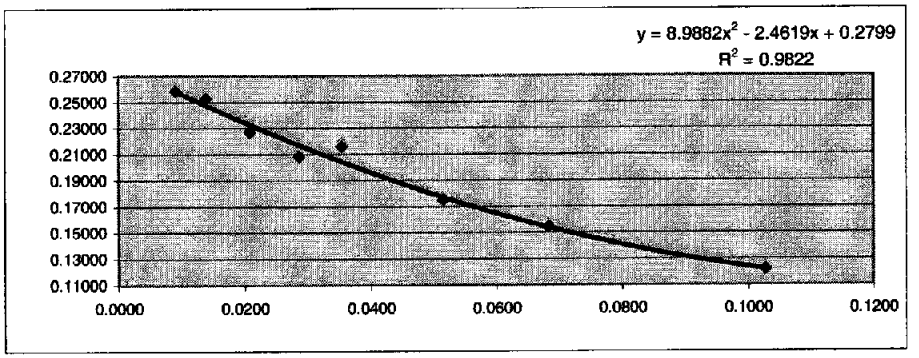
Alpha Th-230 Attenuation Red A2 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A2	0.0090	34.42	40004	1162.231	0.25443
A2	0.0138	34.96	40005	1144.308	0.25051
A2	0.0208	38.85	40016	1030.013	0.22549
A2	0.0286	42.80	40020	935.047	0.20470
A2	0.0354	41.41	40010	966.192	0.21152
A2	0.0515	45.00	35784	795.200	0.17408
A2	0.0682	45.00	31230	694.000	0.15193
A2	0.1027	45.00	24708	549.067	0.12020



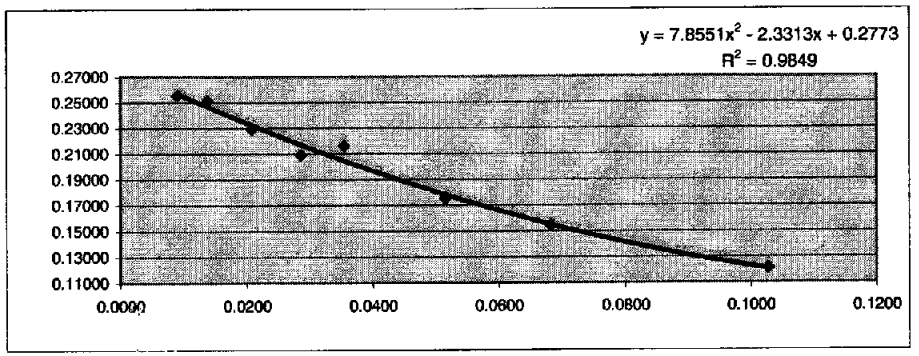
Alpha Th-230 Attenuation Red A3 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A3	0.0090	33.89	40020	1180.879	0.25852
A3	0.0138	34.65	40021	1155.007	0.25285
A3	0.0208	38.63	40002	1035.516	0.22669
A3	0.0286	42.14	40016	949.597	0.20788
A3	0.0354	40.58	40017	986.126	0.21588
A3	0.0515	45.00	35966	799.244	0.17497
A3	0.0682	45.00	31623	702.733	0.15384
A3	0.1027	45.00	25050	556.667	0.12186



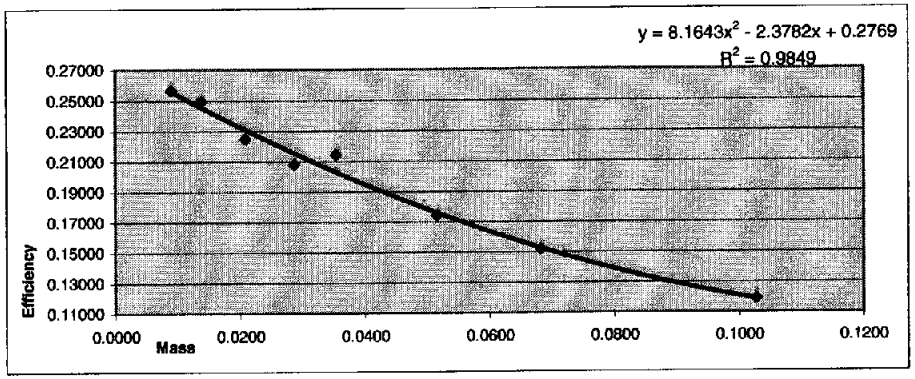
Alpha Th-230 Attenuation Red A4 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A4	0.0090	34.30	40031	1167.085	0.25550
A4	0.0138	34.88	40007	1146.990	0.25110
A4	0.0208	38.26	40019	1045.975	0.22898
A4	0.0286	41.90	40007	954.821	0.20903
A4	0.0354	40.54	40023	987.247	0.21613
A4	0.0515	45.00	36008	800.178	0.17517
A4	0.0682	45.00	31718	704.844	0.15430
A4	0.1027	45.00	24883	552.956	0.12105



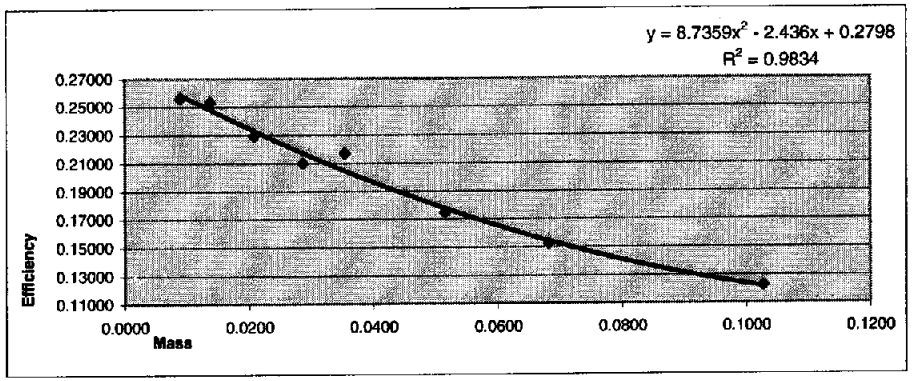
Alpha Th-230 Attenuation Red B1 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A1	0.0090	34.14	40030	1172.525	0.25669
A1	0.0138	35.10	40027	1140.370	0.24965
A1	0.0208	38.98	40016	1026.578	0.22474
A1	0.0286	42.10	40009	950.333	0.20805
A1	0.0354	40.88	40010	978.718	0.21426
A1	0.0515	45.00	35872	797.156	0.17451
A1	0.0682	45.00	31224	693.867	0.15190
A1	0.1027	45.00	24440	543.111	0.11890



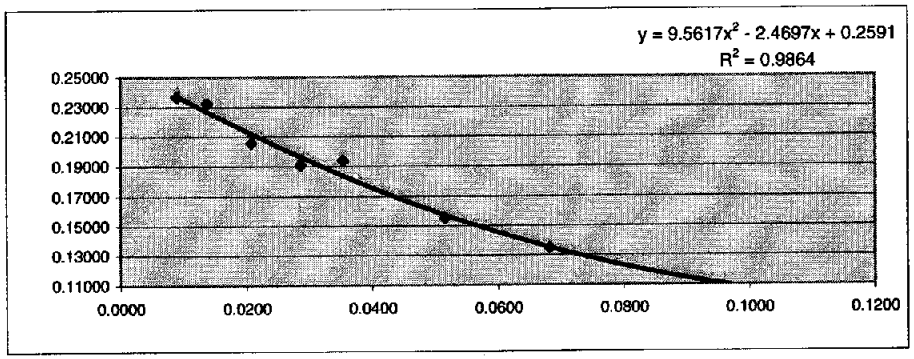
Alpha Th-230 Attenuation Red B2 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A2	0.0090	34.23	40026	1169.325	0.25599
A2	0.0138	34.57	40004	1157.188	0.25333
A2	0.0208	38.23	40013	1046.639	0.22913
A2	0.0286	41.70	40007	959.400	0.21003
A2	0.0354	40.39	40006	990.493	0.21684
A2	0.0515	45.00	35907	797.933	0.17468
A2	0.0682	45.00	31367	697.044	0.15260
A2	0.1027	45.00	25179	559.533	0.12249



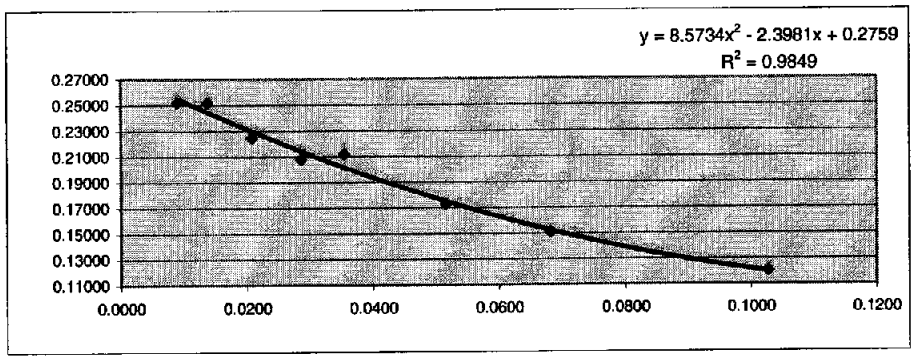
Alpha Th-230 Attenuation Red B3 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A3	0.0090	37.01	40016	1081.221	0.23670
A3	0.0138	37.73	40025	1060.827	0.23224
A3	0.0208	42.59	40000	939.188	0.20561
A3	0.0286	45.00	39188	870.844	0.19064
A3	0.0354	45.00	39786	884.133	0.19355
A3	0.0515	45.00	31884	708.533	0.15511
A3	0.0682	45.00	27683	615.178	0.13467
A3	0.1027	45.00	21889	486.422	0.10649



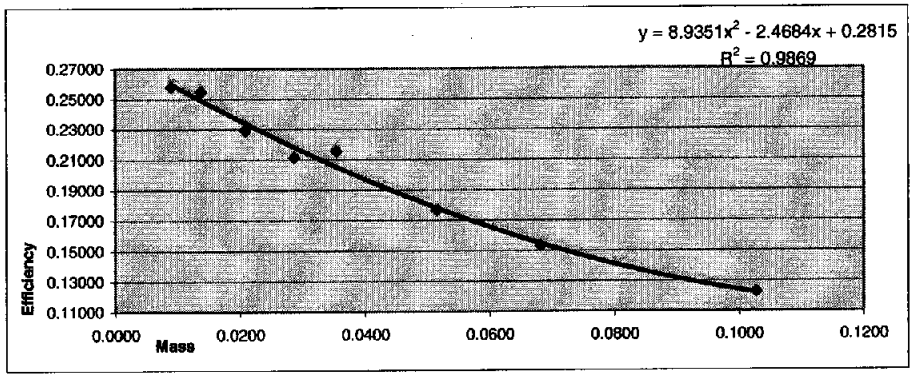
Alpha Th-230 Attenuation Red B4 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A4	0.0090	34.78	40021	1150.690	0.25191
A4	0.0138	34.81	40029	1149.928	0.25174
A4	0.0208	39.04	40017	1025.026	0.22440
A4	0.0286	42.08	40015	950.927	0.20818
A4	0.0354	41.36	40008	967.311	0.21176
A4	0.0515	45.00	35554	790.089	0.17297
A4	0.0682	45.00	31062	690.267	0.15111
A4	0.1027	45.00	24756	550.133	0.12043



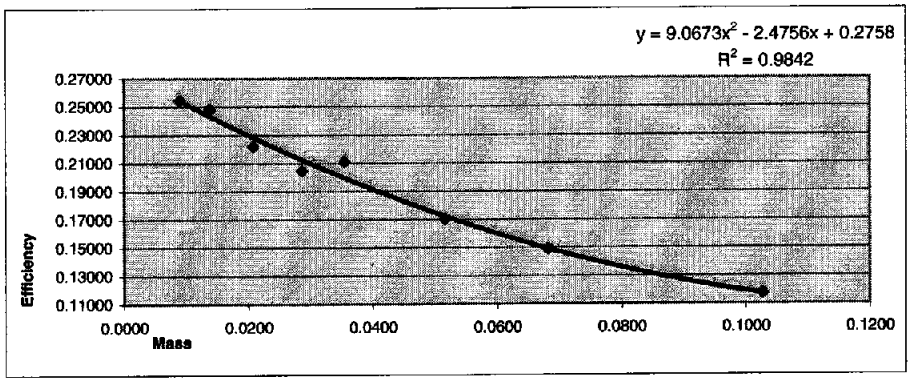
Alpha Th-230 Attenuation Red C1 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A1	0.0090	33.96	40016	1178.327	0.25796
A1	0.0138	34.37	40018	1164.329	0.25489
A1	0.0208	38.21	40004	1046.951	0.22920
A1	0.0286	41.41	40014	966.288	0.21154
A1	0.0354	40.66	40013	984.088	0.21544
A1	0.0515	45.00	36295	806.556	0.17657
A1	0.0682	45.00	31485	699.667	0.15317
A1	0.1027	45.00	25210	560.222	0.12264



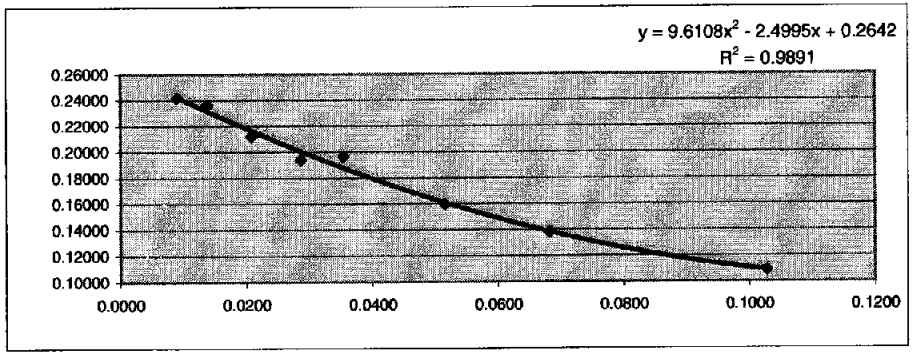
Alpha Th-230 Attenuation Red C2 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A2	0.0090	34.43	40019	1162.329	0.25446
A2	0.0138	35.33	40034	1133.145	0.24807
A2	0.0208	39.46	40011	1013.964	0.22198
A2	0.0286	42.82	40022	934.657	0.20461
A2	0.0354	41.53	40004	963.255	0.21087
A2	0.0515	45.00	34995	777.667	0.17025
A2	0.0682	45.00	30632	680.711	0.14902
A2	0.1027	45.00	24089	535.311	0.11719



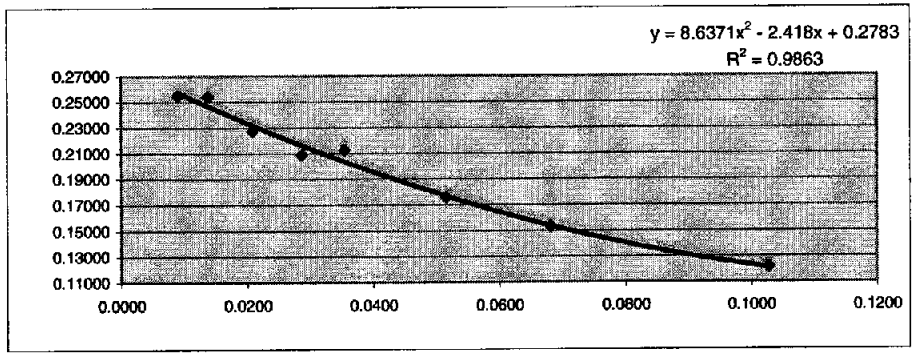
Alpha Th-230 Attenuation Red C3 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A3	0.0090	36.23	40011	1104.361	0.24177
A3	0.0138	37.09	40022	1079.051	0.23622
A3	0.0208	41.31	40005	968.410	0.21200
A3	0.0286	45.00	39832	885.156	0.19378
A3	0.0354	44.55	40004	897.957	0.19658
A3	0.0515	45.00	32825	729.444	0.15969
A3	0.0682	45.00	28384	630.756	0.13808
A3	0.1027	45.00	22394	497.644	0.10894



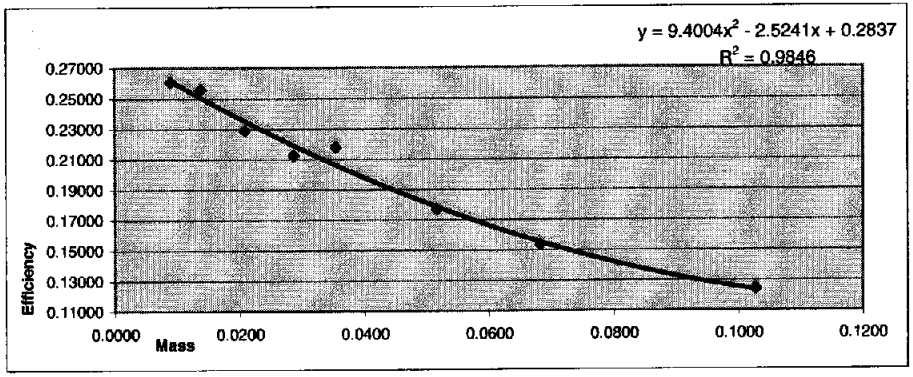
Alpha Th-230 Attenuation Red C4 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A4	0.0090	34.38	40005	1163.613	0.25474
A4	0.0138	34.51	40009	1159.345	0.25380
A4	0.0208	38.57	40006	1037.231	0.22707
A4	0.0286	41.95	40017	953.921	0.20883
A4	0.0354	41.22	40015	970.767	0.21252
A4	0.0515	45.00	36122	802.711	0.17573
A4	0.0682	45.00	31403	697.844	0.15277
A4	0.1027	45.00	24928	553.956	0.12127



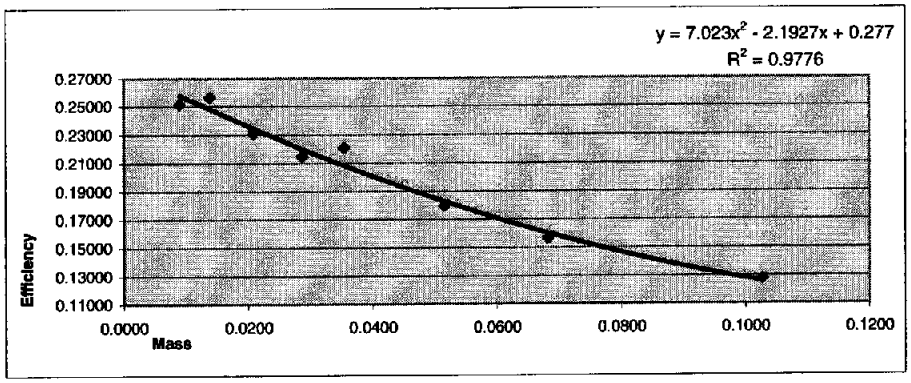
Alpha Th-230 Attenuation Red D1 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A1	0.0090	33.60	40014	1190.893	0.26071
A1	0.0138	34.22	40002	1168.966	0.25591
A1	0.0208	38.24	40007	1046.208	0.22903
A1	0.0286	41.20	40011	971.141	0.21260
A1	0.0354	40.22	40015	994.903	0.21780
A1	0.0515	45.00	36363	808.067	0.17690
A1	0.0682	45.00	31574	701.644	0.15360
A1	0.1027	45.00	25516	567.022	0.12413



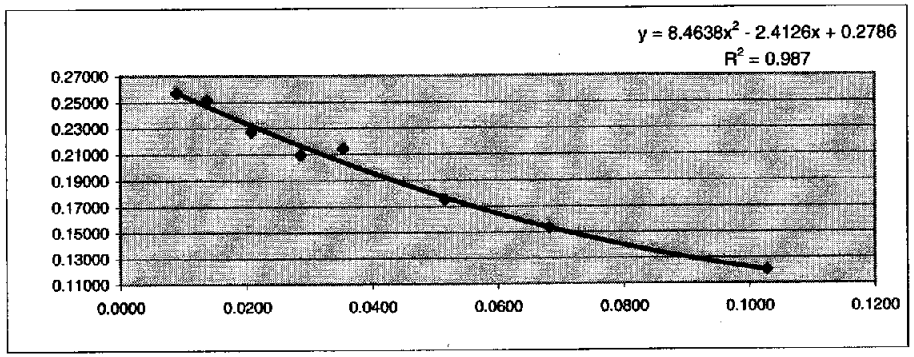
Alpha Th-230 Attenuation Red D2 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A2	0.0090	34.84	40027	1148.881	0.25151
A2	0.0138	34.17	40014	1171.027	0.25636
A2	0.0208	37.94	40013	1054.639	0.23088
A2	0.0286	40.80	40022	980.931	0.21474
A2	0.0354	39.69	40025	1008.440	0.22077
A2	0.0515	45.00	36896	819.911	0.17949
A2	0.0682	45.00	32161	714.689	0.15646
A2	0.1027	45.00	26175	581.667	0.12734



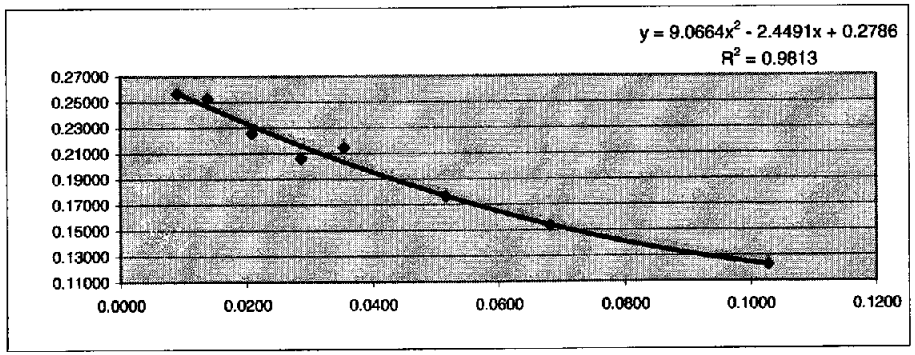
Alpha Th-230 Attenuation Red D3 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A3	0.0090	34.07	40024	1174.758	0.25718
A3	0.0138	34.82	40009	1149.024	0.25154
A3	0.0208	38.60	40014	1036.632	0.22694
A3	0.0286	41.84	40010	956.262	0.20934
A3	0.0354	40.90	40009	978.215	0.21415
A3	0.0515	45.00	35959	799.089	0.17494
A3	0.0682	45.00	31464	699.200	0.15307
A3	0.1027	45.00	24712	549.156	0.12022



Alpha Th-230 Attenuation Red D4 — 1/17/2006

Detector ID	Sample Wt	Count Time	Alpha	DPM 4567.9 CPM	Th230 Eff
A4	0.0090	34.14	40026	1172.408	0.25666
A4	0.0138	34.63	40020	1155.645	0.25299
A4	0.0208	38.80	40013	1031.263	0.22576
A4	0.0286	42.49	40002	941.445	0.20610
A4	0.0354	40.89	40008	978.430	0.21420
A4	0.0515	45.00	36190	804.222	0.17606
A4	0.0682	45.00	31477	699.489	0.15313
A4	0.1027	45.00	25217	560.378	0.12268

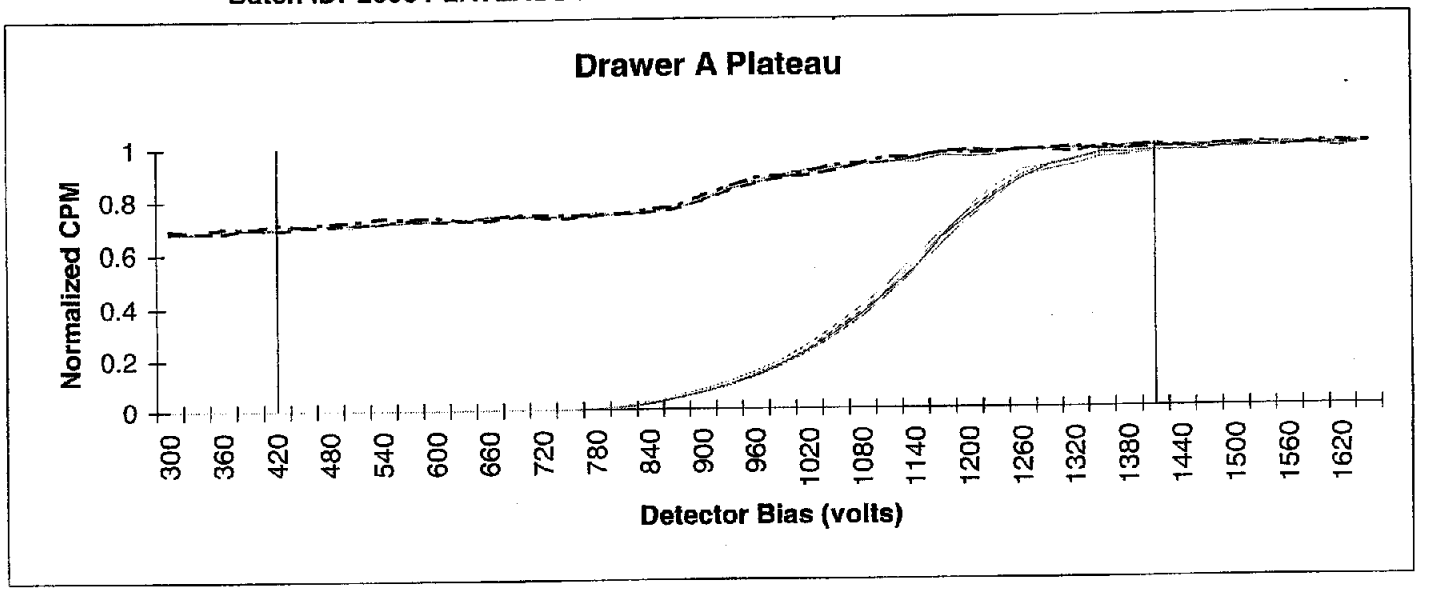


SEVERN TRENT STL

Voltage Plateaus

Unit Type: LB4100/W
Date Performed: 1/8/06 17:34
FileName: PLAT000
Batch ID: 2006 PLATEAUS RED 1/8/6 IV

Unit Id: Red
Application Revision: 2
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1410

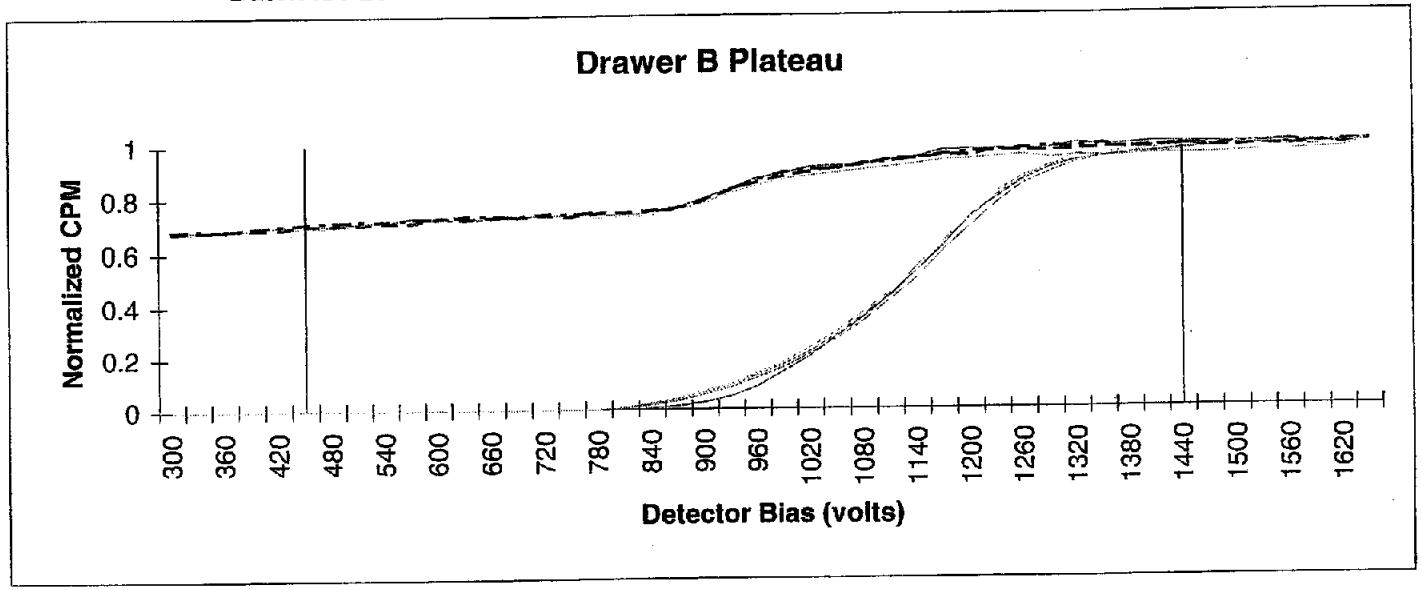
Optimum alpha only operating voltage: 420

	A1	A2	A3	A4
Beta slope at beta voltage	0.50%	2.75%	2.81%	2.35%
Alpha slope at beta voltage	0.89%	-0.68%	0.81%	0.71%
Alpha slope at alpha voltage	2.10%	2.34%	1.57%	1.90%

Printed 1/9/2006 9:25 AM

Unit Type: LB4100/W
Date Performed: 1/8/06 17:34
FileName: PLAT000
Batch ID: 2006 PLATEAUS RED 1/8/6 IV

Unit Id: Red
Application Revision: 2
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1440

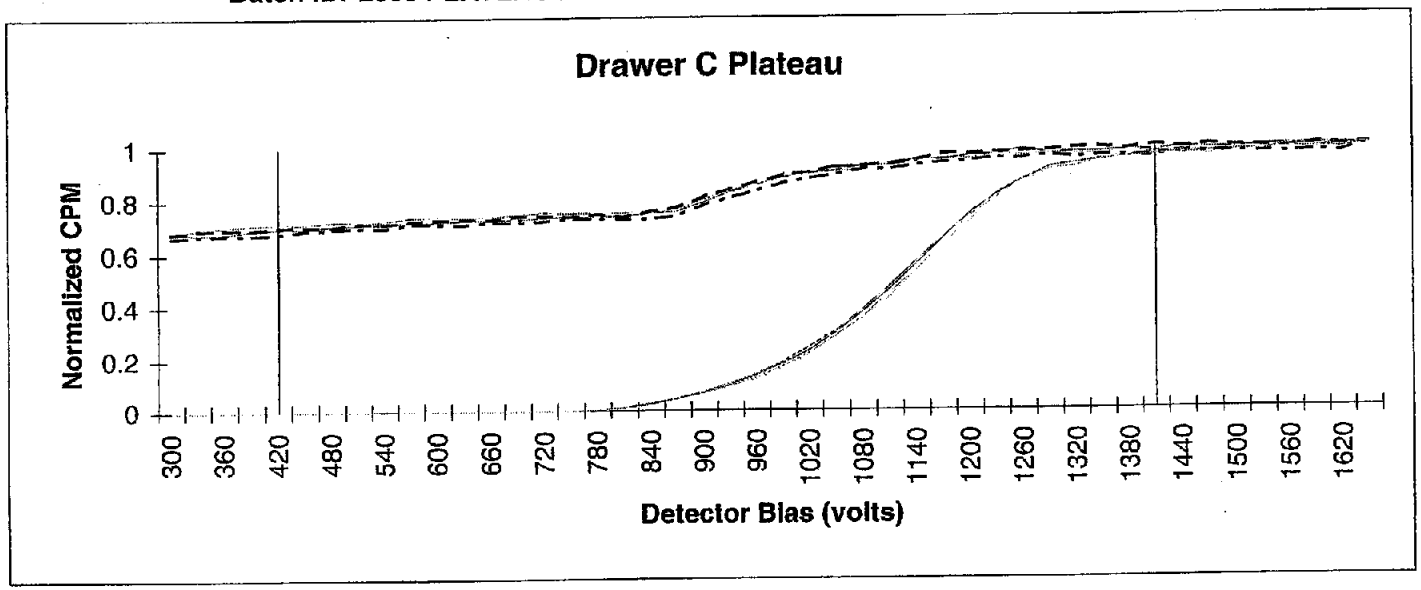
Optimum alpha only operating voltage: 450

	B1	B2	B3	B4
Beta slope at beta voltage	2.43%	3.46%	2.45%	2.02%
Alpha slope at beta voltage	-0.16%	-0.19%	0.34%	1.20%
Alpha slope at alpha voltage	2.43%	2.58%	1.40%	2.84%

Printed 1/9/2006 9:25 AM

Unit Type: LB4100/W
Date Performed: 1/8/06 17:34
FileName: PLAT000
Batch ID: 2006 PLATEAUS RED 1/8/6 IV

Unit Id: Red
Application Revision: 2
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1410

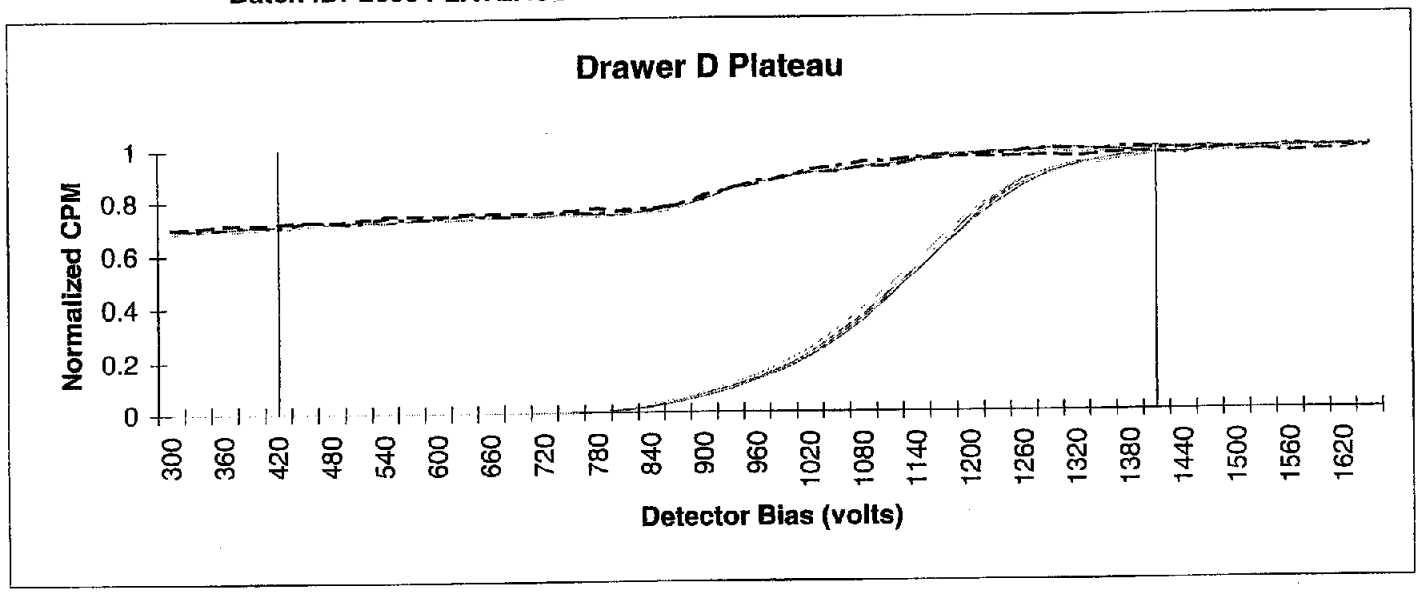
Optimum alpha only operating voltage: 420

	C1	C2	C3	C4
Beta slope at beta voltage	2.15%	1.38%	2.60%	3.11%
Alpha slope at beta voltage	0.92%	0.56%	0.06%	0.89%
Alpha slope at alpha voltage	3.03%	0.89%	1.83%	2.64%

Printed 1/9/2006 9:25 AM

Unit Type: LB4100/W
Date Performed: 1/8/06 17:34
FileName: PLAT000
Batch ID: 2006 PLATEAUS RED 1/8/6 IV

Unit Id: Red
Application Revision: 2
Application Version: Standard



Optimum alpha beta simultaneous operating voltage: 1410

Optimum alpha only operating voltage: 420

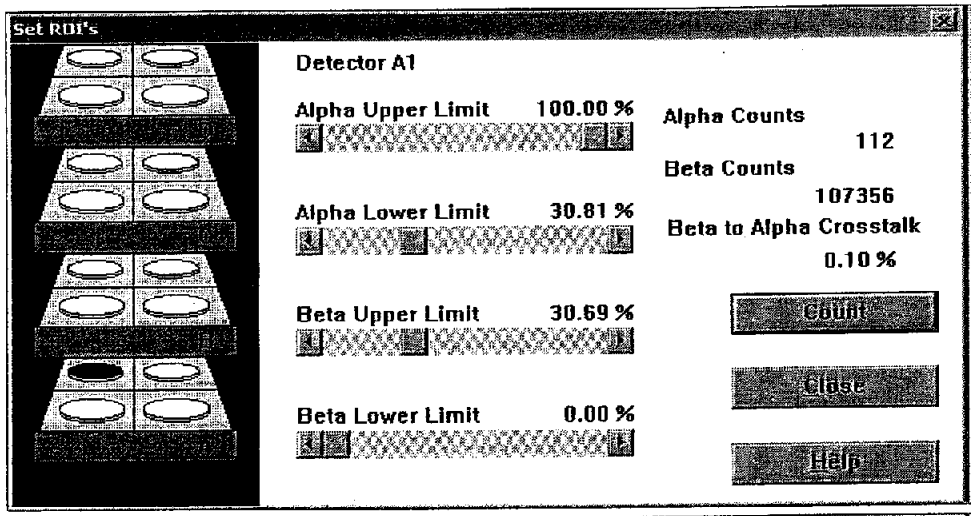
	D1	D2	D3	D4
Beta slope at beta voltage	2.44%	2.68%	2.88%	2.03%
Alpha slope at beta voltage	0.75%	0.64%	0.90%	-0.42%
Alpha slope at alpha voltage	2.03%	1.29%	3.26%	2.50%

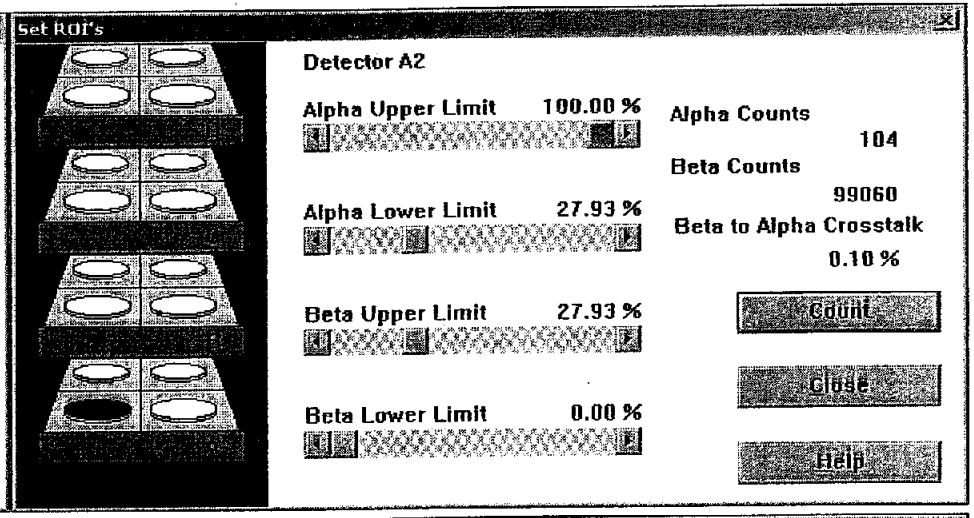
Printed 1/9/2006 9:25 AM

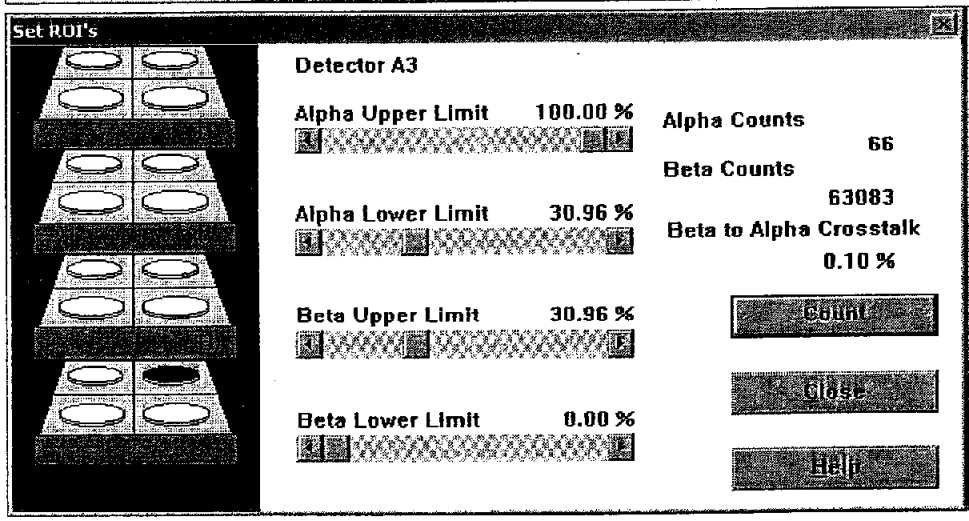
SEVERN TRENT STL

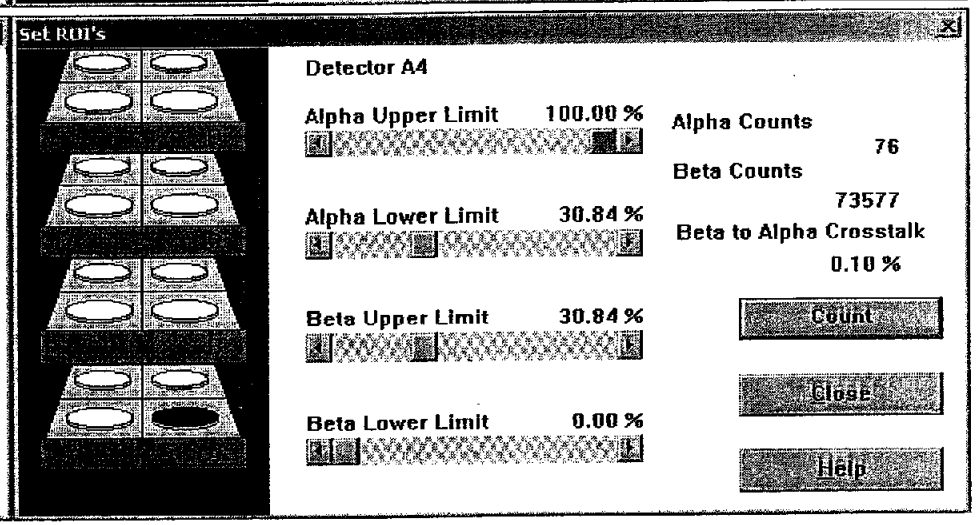
Discriminator Settings

RED A drawer ROI's

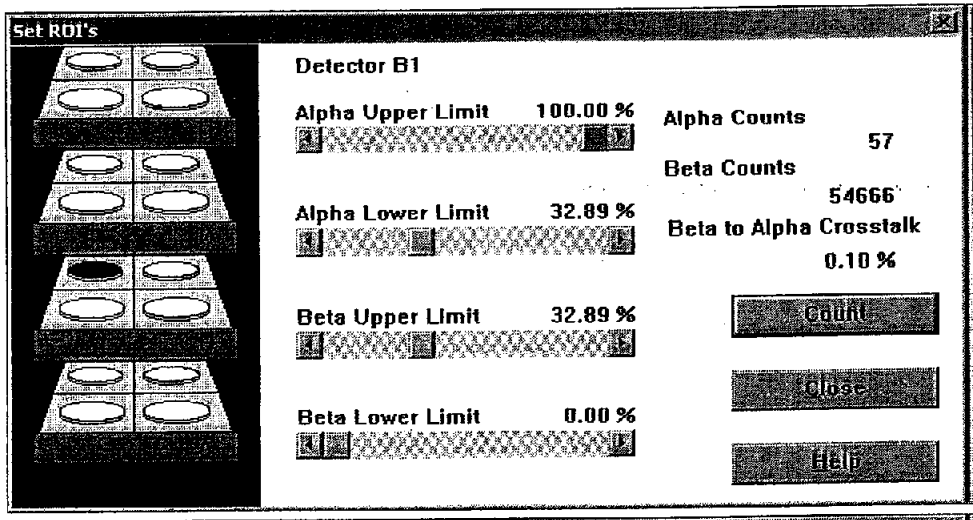


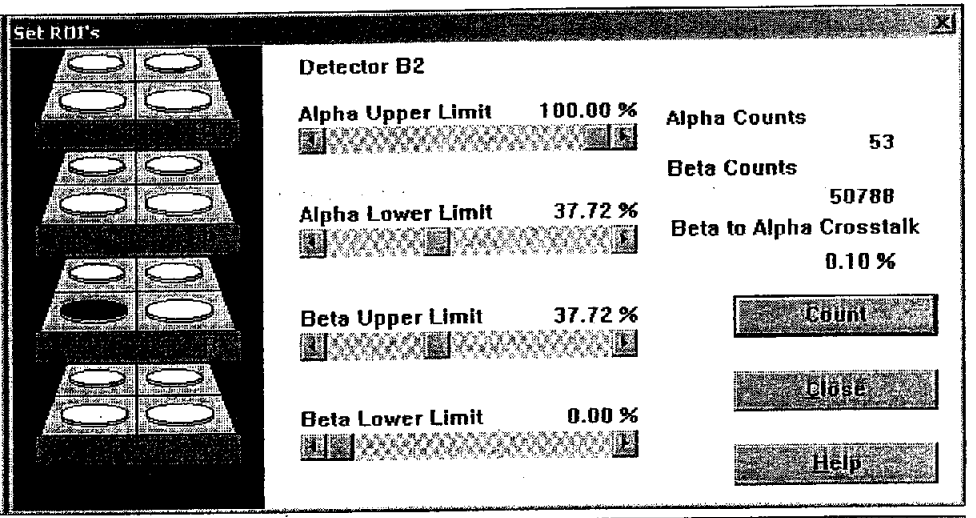


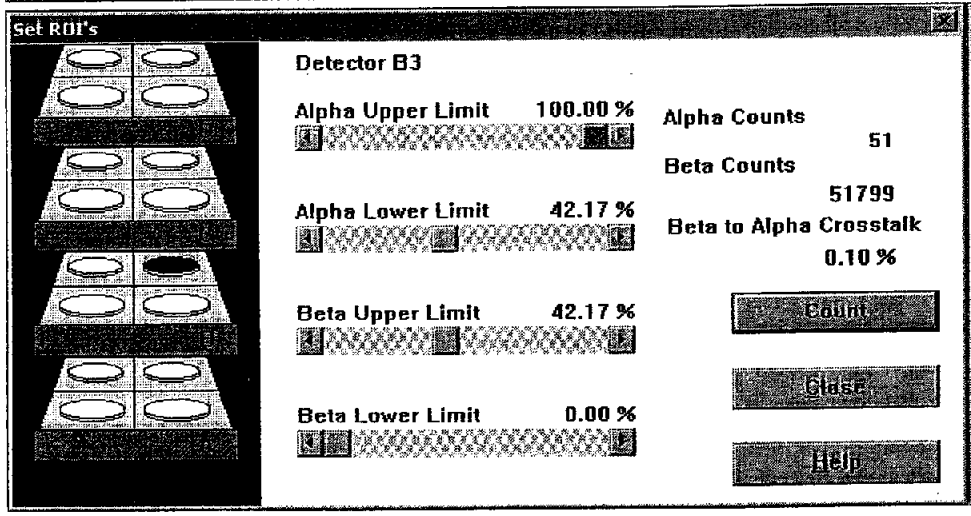


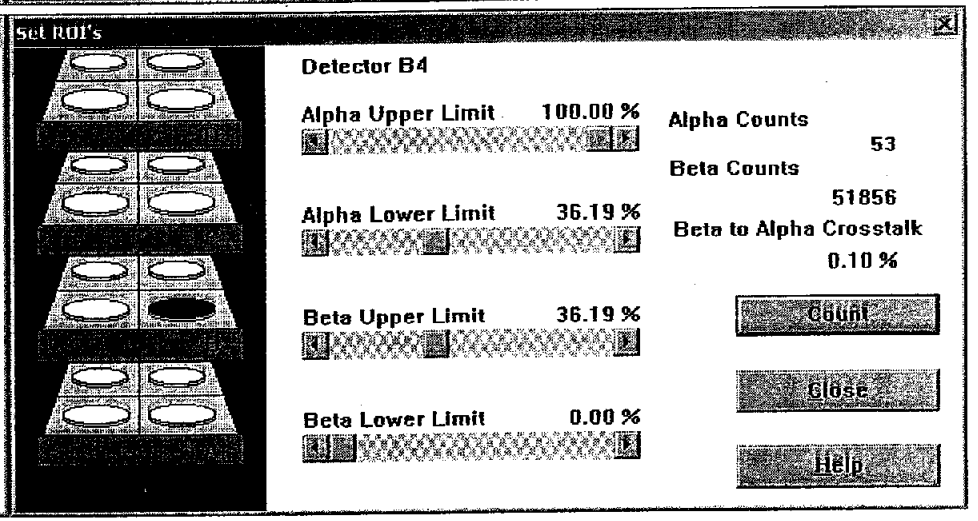


RED B drawer ROI's

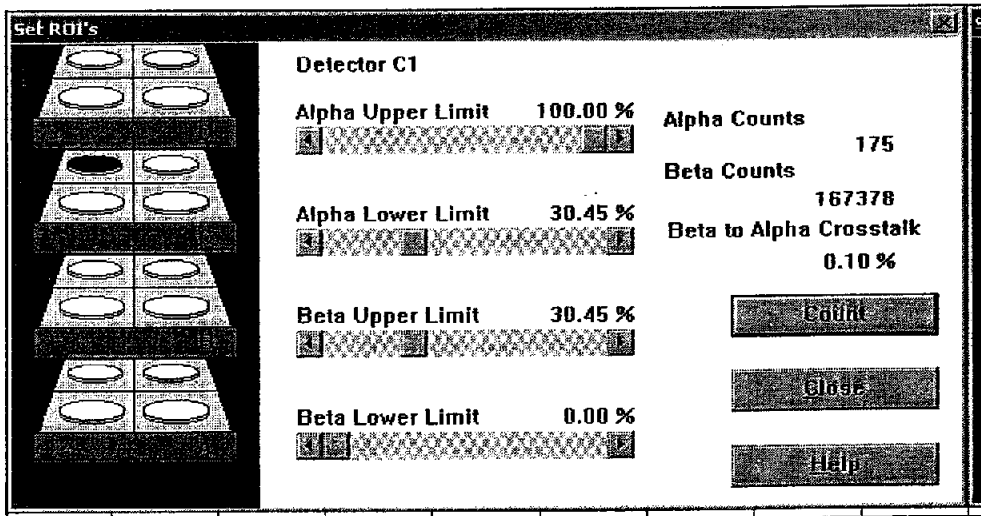


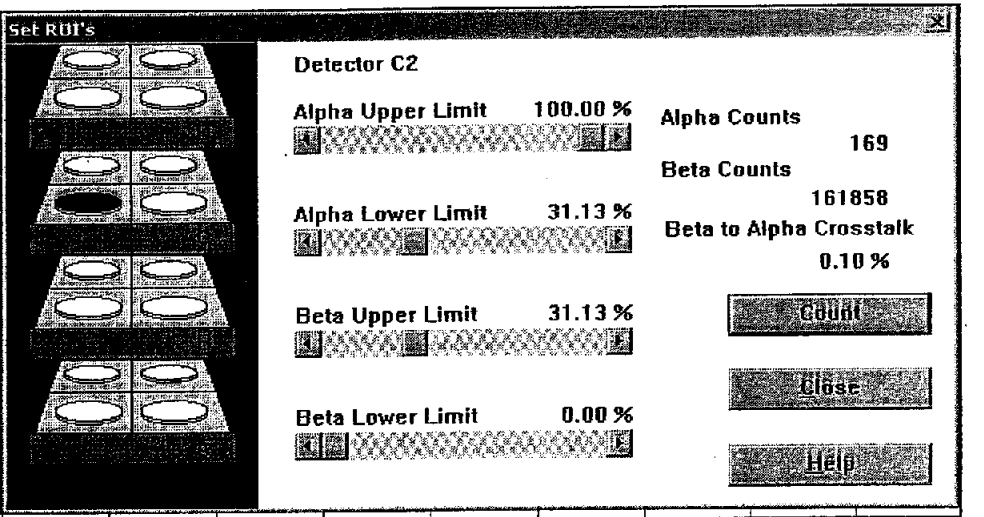


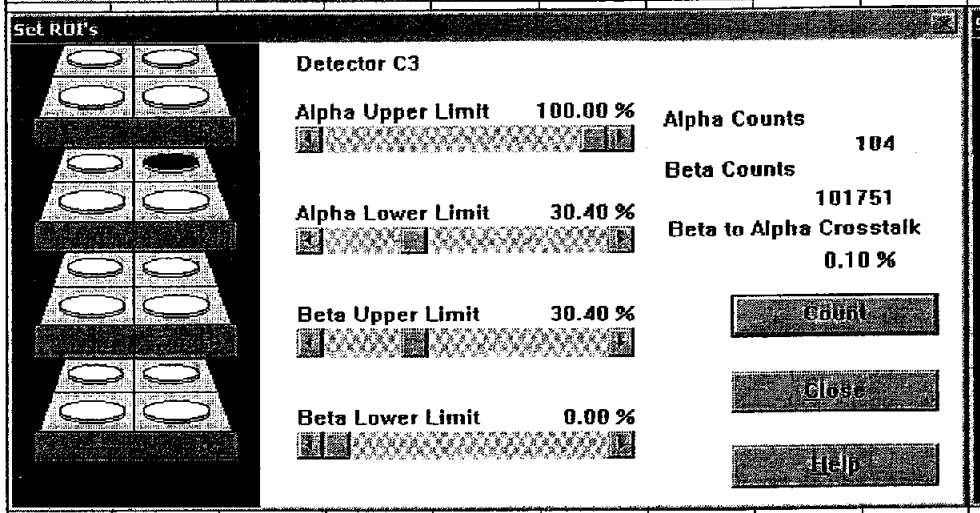


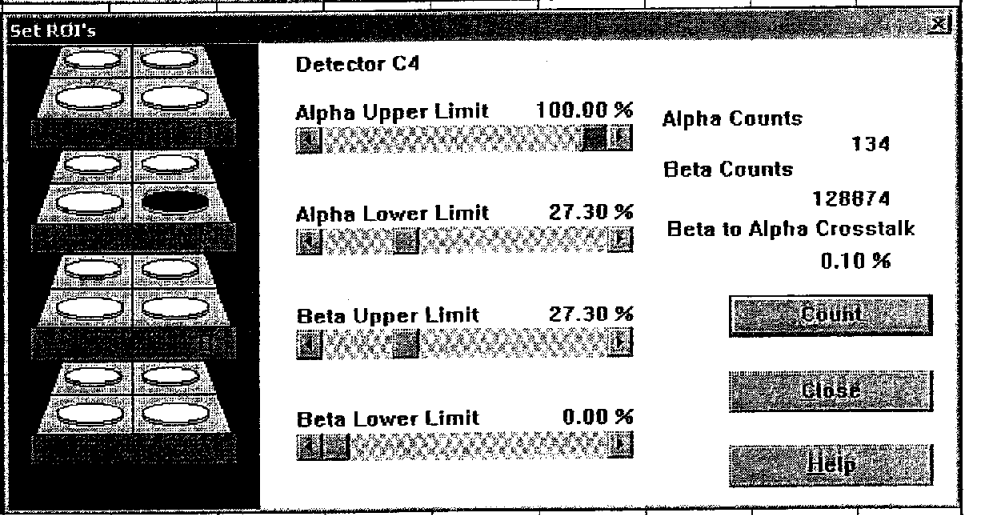


RED C drawer ROI's

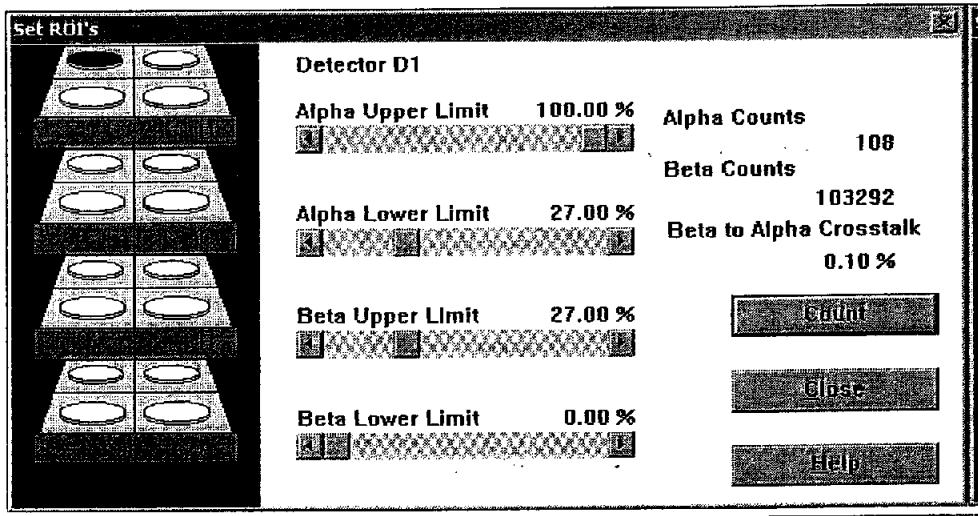


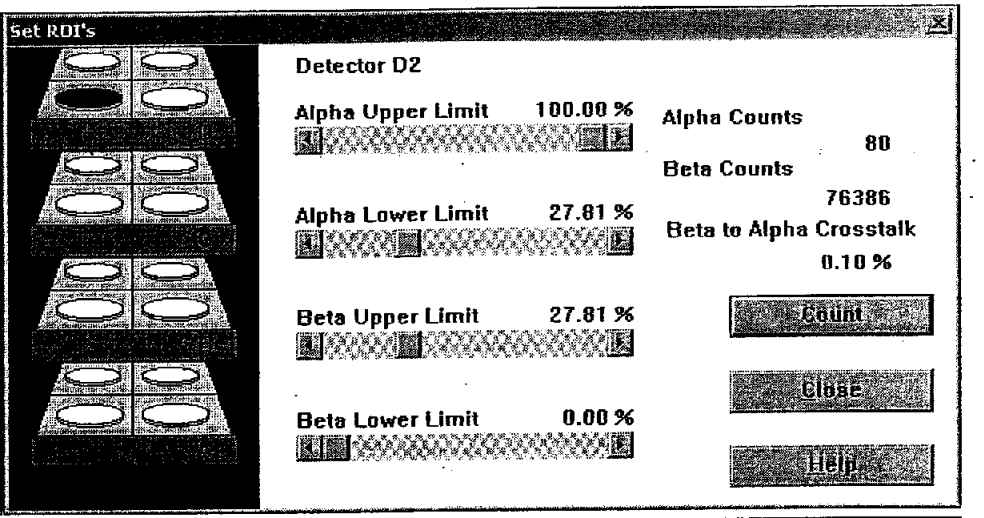


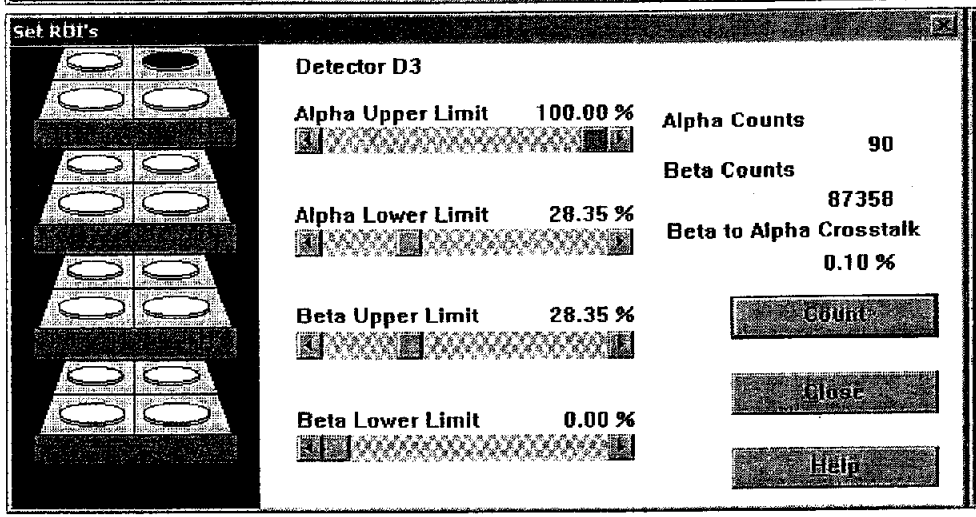


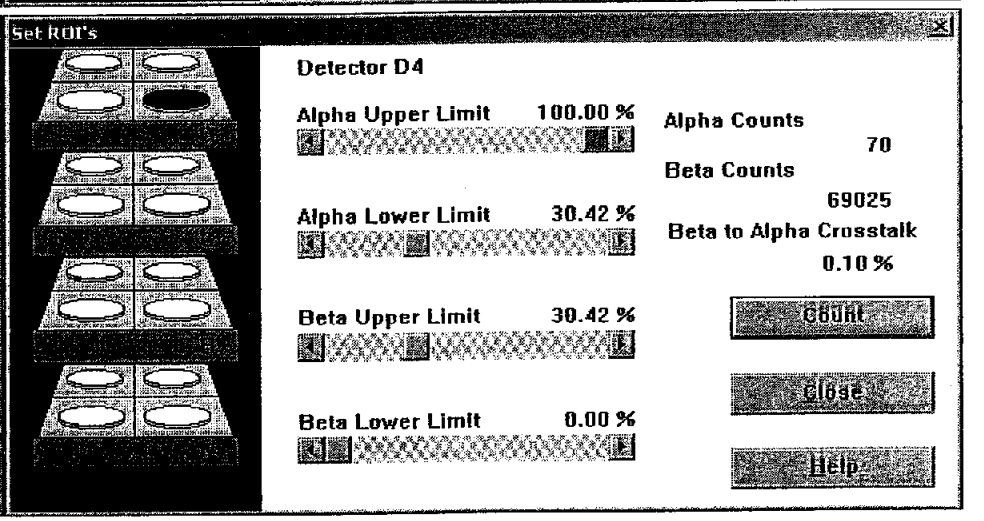


RED D drawer ROI's









SEVERN TRENT STL

Calibration Standards and Certificates

Th-230 Alpha with $BaSo_4$ Carrier for Ra-226 Analysis

Th-230 Alpha Calibration Standards for Ra-226

Standard used: 1mL of Th-230 03-071 4567.9 dpm/mL 12/24/03

Std #	mL Ba Carrier	Gross wt	Tare Wt	Mass BaSO4	Reweigh 1/17/6
1	0.25	8.4779	8.4682	0.0097	8.4772
2	0.4	8.3925	8.3784	0.0141	8.3922
3	0.6	8.4768	8.4557	0.0211	8.4765
4	0.8	8.4605	8.4313	0.0292	8.4599
5	1	8.4726	8.4372	0.0354	8.4726
6	1.5	8.4687	8.4173	0.0514	8.4688
7	2	8.5100	8.4419	0.0681	8.5101
8	3	8.5684	8.4653	0.1031	8.5680

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

65090-334

Th-230 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Th-230
ACTIVITY (dps):	7.654 E3
HALF-LIFE:	7.538 E4 Years
CALIBRATION DATE:	December 19, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.5%
SYSTEMATIC:	2.6%
RANDOM:	0.9%

*99% Confidence Level

Impurities: γ-impurities <0.1%, α-impurities <0.05%

5.17738 grams 0.5M HNO_3 solution.

P O NUMBER 1614557-000 OP, Item 3

SOURCE PREPARED BY: M. Taskaeva, Radiochemist

Q A APPROVED: 12-19-02

SEVERN TRENT SERVICES

Logbook: 2060

Radiochemistry
Standards Preparation Logbook

Date Prep'd	Expir. Date	Standard ID Number	Isotope	Parent ID Number	Parent Activity	Parent Ref. Date	Aliquot	Dilution Volume	Change in Time	T ½	Final Activity	Solvent/ Lot #	Prep'd Initials	Cal. Ver. Initials	Comments
~~9-11-03~~	~~9-11-04~~	03-069 ~~03-0169~~ MAC 9-22-03	Pa 238	02-026	132.98	2-23-02	95 ml	1	1556 hrs	32022.4 d 6.75	66.20 ~~33.10~~ dpm/ml	MFM			re-certification of 03-031, 03-03-6 and 66.20
~~1~~	~~1~~	~~1~~	~~Pa 239~~	~~00-025~~	~~128.05~~	~~2-23-02~~	~~95 ml~~	~~150 ml~~	11-18-03 MAC	~~24110 yr~~	~~66.025 dpm/ml~~ ~~32.0125 dpm/ml~~	MFM			~~1~~ 66.025 dpm/ml
9-11-03	9-11-08	03-070 ~~03-0170~~ MAC 9-22-03	Am 243	98-011	1161 dpm/g	2-28-98	15 ~~16 gm~~	200 ml		7.37 E+3 y MFM	87.075 ~~9.2.88~~ dpm/ml	MFM			
10-6-03	10-6-08	03-071	Th 230	65090-334	7,654 dps	12-19-02	5.1498 g	100 mL	N/A	7.538 E4	4,567.9 dpm/mL	0.5 M HNO3	BH	BBF	
10-6-03	10-6-08	03-072	Th 230	03-071	4,567.9 dpm/mL	12-19-02	1 mL	200 mL	N/A	7.538 E4	22.84 dpm/mL	0.5 M HNO3	BH	BBF	
10-11-03	10-11-0	03-073	Clean U-233	097-105	10994 dpm/ml	9-16-97	10 ml	1000 L		70 yr	103.85 dpm/L	DI H2O 2M H2SO4 IRON pH 1.5	MFM BBF		Rad 03-0078 in Rad Capture
10/31/03	10/31/08	03-074	I-129	681-78-4	1.059 uCi	1-1-2000	1 mL	100 mL	N/A	1.57 E+07	10.54 nCi/mL	0.1 M NaOH	BH	BBF	
10/31/03	10/31/04	03-075	I-129	03-074	10.54 nCi/mL	1-1-2000	1 mL	100 mL	N/A	1.57 E7	105.4 pCi/mL	0.1 M NaOH	BH	BBF	
10/31/03	10/31/04	03-076	Ra 228	01012	1,018 dpm/mL	3/16/01	2 mL	100 mL	NA	5.75 y	20.36 dpm/mL	0.5 M HNO3	BH	BBF	
10/31/03	10/31/04	03-081	Pa-242	92-242-5-1	129.63 Bq/g	12/18/89	5.0723	500 mL	NA	3.73 x 10^5 y	78.9027	.5 M HNO3	MFM	MO	
11/3/03	11/3/04	SR19	Std SR carrier	(Sr(NO3)2)	N/A	N/A	120.77 g	1 Liter	N/A	N/A		di H2O	~~BBF~~	BBF	Reported in Rad capture
11-5-03	11-5-04	RAD03-0032	Th-229	02-006	2134.75 dpm/ml	1-28-02	17.5 mL	500 mL	N/A	7.3 e+3	74.716 dpm/mL	.5 M HNO3	MFM	JMW	

Additional Comments:

SEVERN TRENT STL

Calibration for LB4000

Yellow

Alpha and Beta

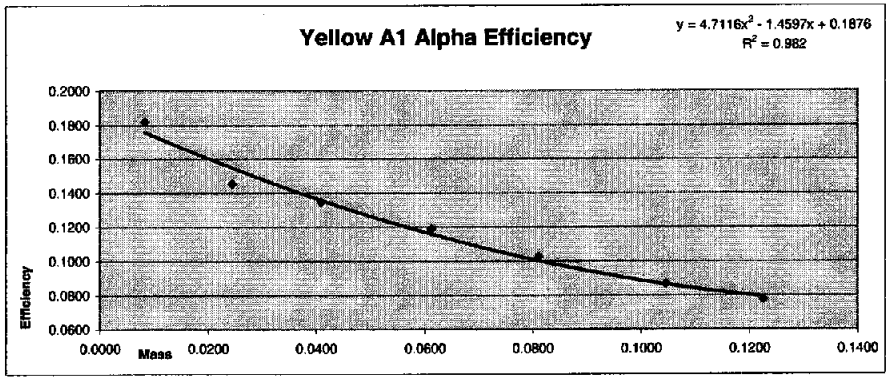
2006

SEVERN TRENT STL

Detector Efficiency Curves

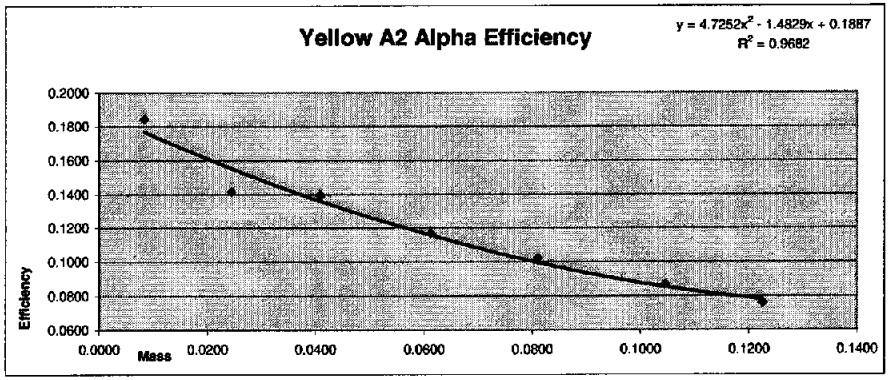
Yellow A1 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1916	0.1724	0.1820
0.0249	0.0240	0.0245	0.1516	0.1392	0.1454
0.0406	0.0412	0.0409	0.1326	0.1369	0.1348
0.0611	0.0613	0.0612	0.1101	0.1277	0.1189
0.0800	0.0821	0.0811	0.1039	0.1010	0.1025
0.1037	0.1055	0.1046	0.0847	0.0890	0.0868
0.1217	0.1234	0.1226	0.0776	0.0781	0.0778



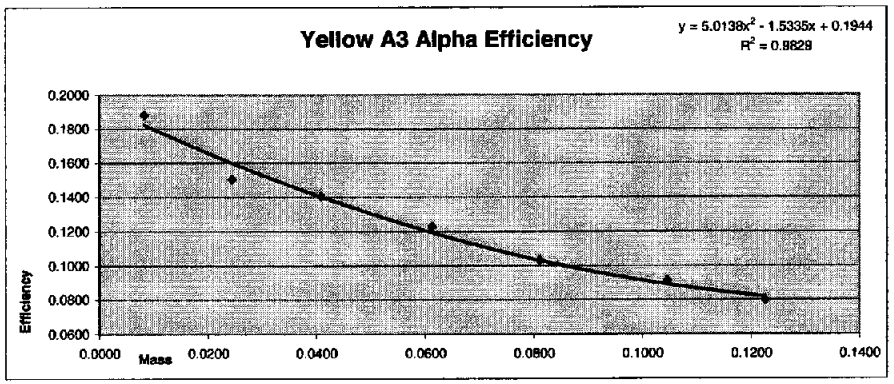
Yellow A2 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1938	0.1752	0.1845
0.0249	0.0240	0.0245	0.1435	0.1400	0.1417
0.0406	0.0412	0.0409	0.1414	0.1373	0.1394
0.0611	0.0613	0.0612	0.1054	0.1278	0.1166
0.0800	0.0821	0.0811	0.1044	0.0994	0.1019
0.1037	0.1055	0.1046	0.0861	0.0875	0.0868
0.1217	0.1234	0.1226	0.0744	0.0771	0.0758



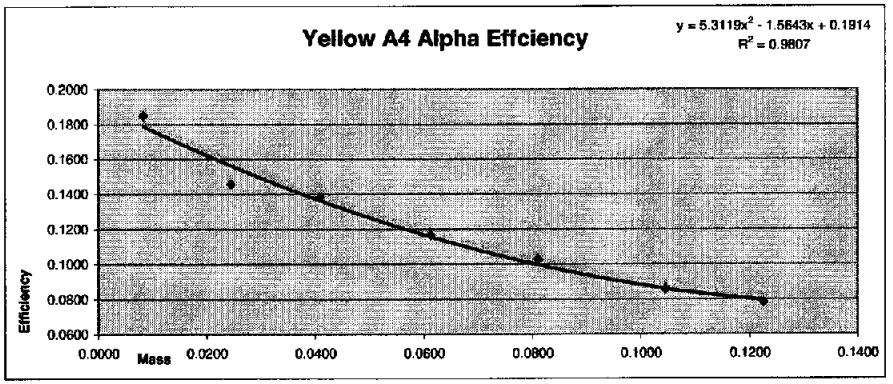
Yellow A3 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1966	0.1796	0.1881
0.0249	0.0240	0.0245	0.1570	0.1438	0.1504
0.0406	0.0412	0.0409	0.1383	0.1422	0.1403
0.0611	0.0613	0.0612	0.1133	0.1319	0.1226
0.0800	0.0821	0.0811	0.1036	0.1030	0.1033
0.1037	0.1055	0.1046	0.0909	0.0911	0.0910
0.1217	0.1234	0.1226	0.0797	0.0797	0.0797



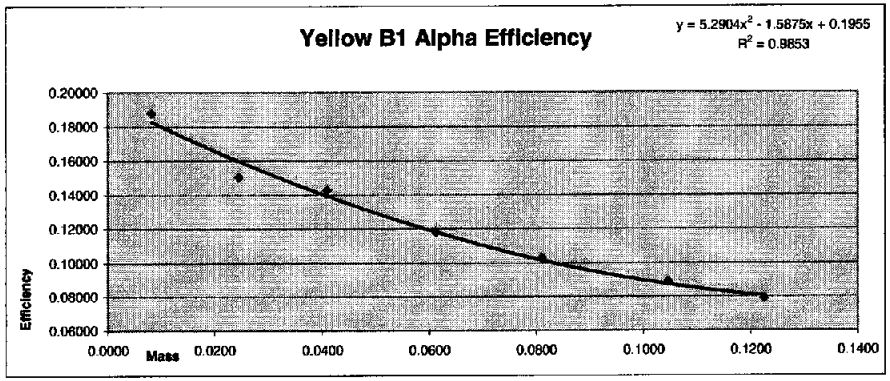
Yellow A4 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1937	0.1763	0.1850
0.0249	0.0240	0.0245	0.1520	0.1397	0.1459
0.0406	0.0412	0.0409	0.1383	0.1381	0.1382
0.0611	0.0613	0.0612	0.1065	0.1264	0.1165
0.0800	0.0821	0.0811	0.1053	0.0998	0.1025
0.1037	0.1055	0.1046	0.0841	0.0874	0.0857
0.1217	0.1234	0.1226	0.0782	0.0784	0.0783



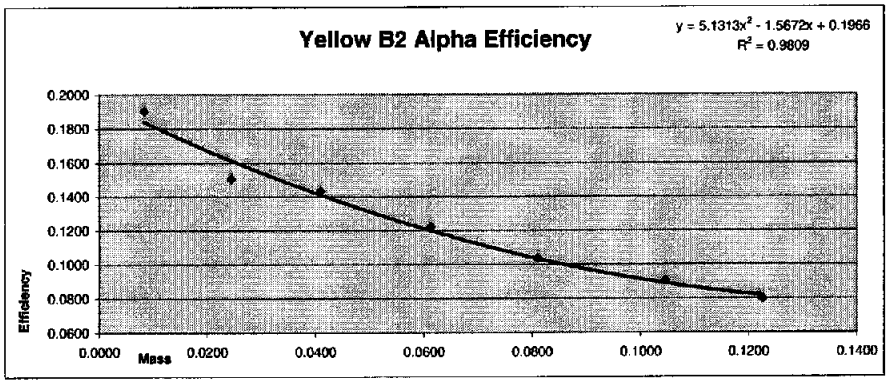
Yellow B1 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.19513	0.18046	0.18779
0.0249	0.0240	0.0245	0.15747	0.14345	0.15046
0.0406	0.0412	0.0409	0.14487	0.14056	0.14271
0.0611	0.0613	0.0612	0.10734	0.12865	0.11800
0.0800	0.0821	0.0811	0.10381	0.10197	0.10289
0.1037	0.1055	0.1046	0.08829	0.08935	0.08882
0.1217	0.1234	0.1226	0.0791	0.0784	0.0787



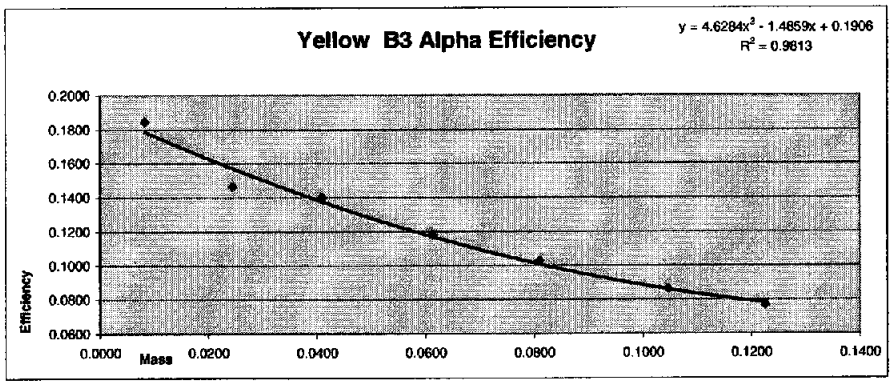
Yellow B2 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.2014	0.1788	0.1901
0.0249	0.0240	0.0245	0.1576	0.1435	0.1506
0.0406	0.0412	0.0409	0.1446	0.1421	0.1434
0.0611	0.0613	0.0612	0.1127	0.1313	0.1220
0.0800	0.0821	0.0811	0.1048	0.1026	0.1037
0.1037	0.1055	0.1046	0.0902	0.0912	0.0907
0.1217	0.1234	0.1226	0.0792	0.0802	0.0797



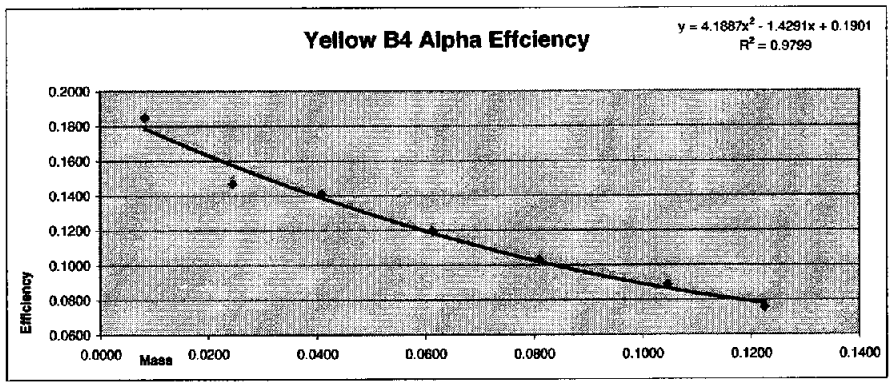
Yellow B3 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1930	0.1763	0.1847
0.0249	0.0240	0.0245	0.1525	0.1405	0.1465
0.0406	0.0412	0.0409	0.1409	0.1390	0.1399
0.0611	0.0613	0.0612	0.1102	0.1262	0.1182
0.0800	0.0821	0.0811	0.1041	0.1012	0.1026
0.1037	0.1055	0.1046	0.0838	0.0887	0.0862
0.1217	0.1234	0.1226	0.0778	0.0757	0.0767



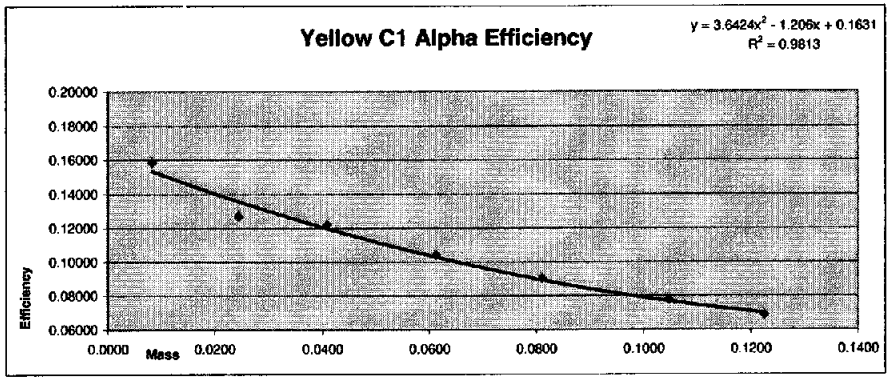
Yellow B4 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1944	0.1753	0.1849
0.0249	0.0240	0.0245	0.1542	0.1398	0.1470
0.0406	0.0412	0.0409	0.1429	0.1388	0.1408
0.0611	0.0613	0.0612	0.1110	0.1277	0.1193
0.0800	0.0821	0.0811	0.1050	0.1011	0.1031
0.1037	0.1055	0.1046	0.0878	0.0898	0.0888
0.1217	0.1234	0.1226	0.0740	0.0771	0.0755



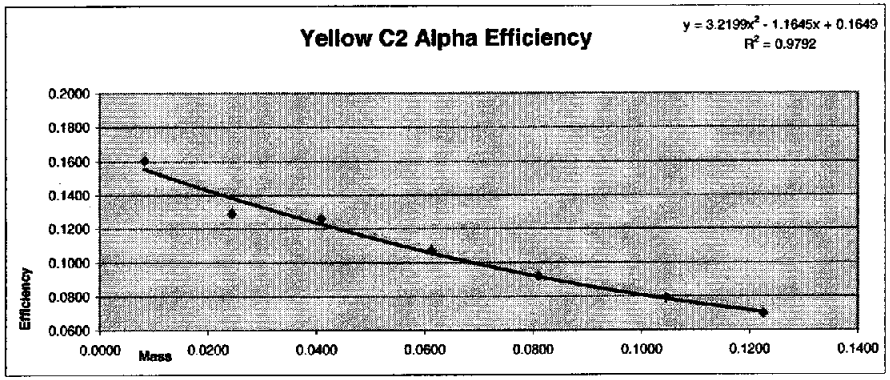
Yellow C1 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.16695	0.14961	0.15828
0.0249	0.0240	0.0245	0.13259	0.12147	0.12703
0.0406	0.0412	0.0409	0.11947	0.12425	0.12186
0.0611	0.0613	0.0612	0.09358	0.11454	0.10406
0.0800	0.0821	0.0811	0.09044	0.08990	0.09017
0.1037	0.1055	0.1046	0.07485	0.08092	0.07789
0.1217	0.1234	0.1226	0.0656	0.0715	0.0686



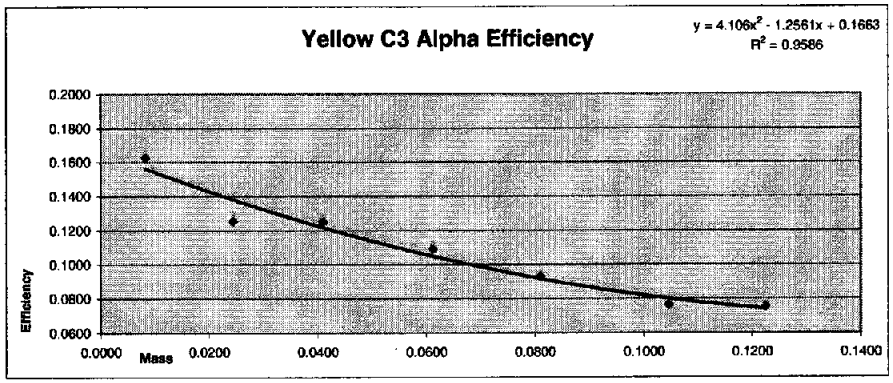
Yellow C2 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1687	0.1521	0.1604
0.0249	0.0240	0.0245	0.1357	0.1221	0.1289
0.0406	0.0412	0.0409	0.1242	0.1275	0.1258
0.0611	0.0613	0.0612	0.0958	0.1181	0.1070
0.0800	0.0821	0.0811	0.0917	0.0924	0.0920
0.1037	0.1055	0.1046	0.0754	0.0825	0.0790
0.1217	0.1234	0.1226	0.0667	0.0724	0.0695



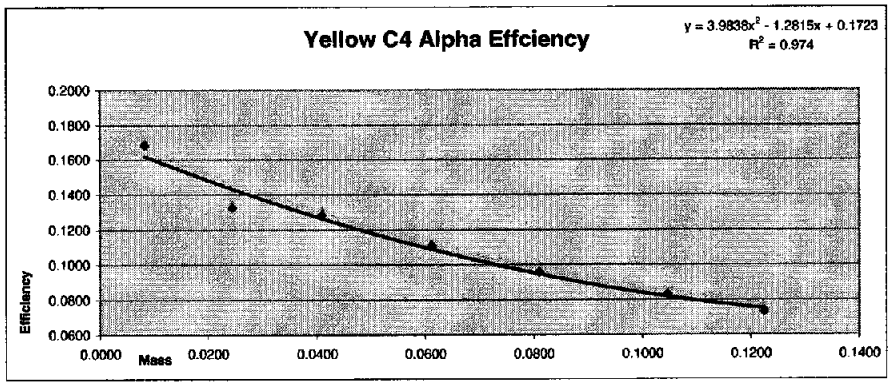
Yellow C3 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1697	0.1555	0.1626
0.0249	0.0240	0.0245	0.1303	0.1205	0.1254
0.0406	0.0412	0.0409	0.1258	0.1243	0.1250
0.0611	0.0613	0.0612	0.0971	0.1207	0.1089
0.0800	0.0821	0.0811	0.0933	0.0925	0.0929
0.1037	0.1055	0.1046	0.0679	0.0847	0.0763
0.1217	0.1234	0.1226	0.0776	0.0725	0.0751



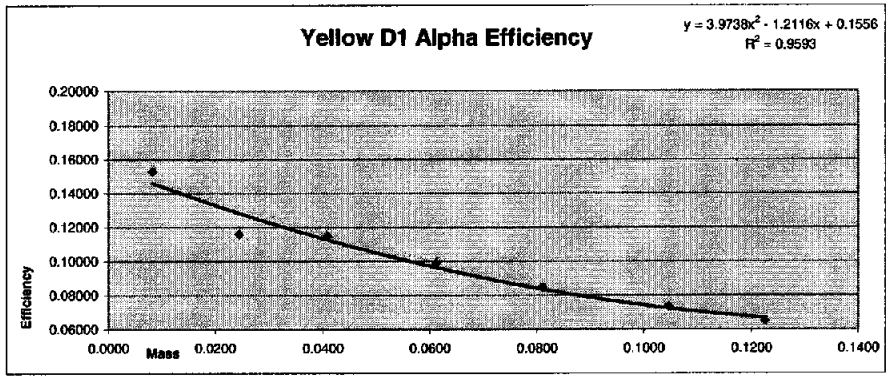
Yellow C4 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1746	0.1618	0.1682
0.0249	0.0240	0.0245	0.1382	0.1270	0.1326
0.0406	0.0412	0.0409	0.1278	0.1285	0.1282
0.0611	0.0613	0.0612	0.1002	0.1215	0.1108
0.0800	0.0821	0.0811	0.0960	0.0953	0.0956
0.1037	0.1055	0.1046	0.0798	0.0868	0.0833
0.1217	0.1234	0.1226	0.0693	0.0770	0.0732



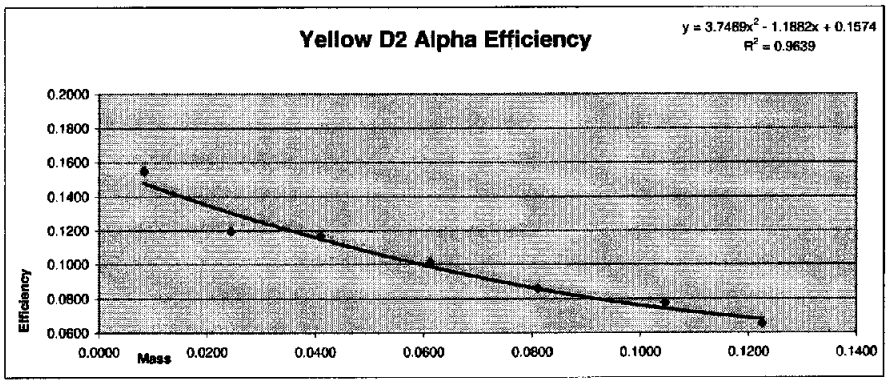
Yellow D1 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.15979	0.14615	0.15297
0.0249	0.0240	0.0245	0.12056	0.11139	0.11598
0.0406	0.0412	0.0409	0.11266	0.11734	0.11500
0.0611	0.0613	0.0612	0.08856	0.10905	0.09881
0.0800	0.0821	0.0811	0.08483	0.08458	0.08470
0.1037	0.1055	0.1046	0.07028	0.07689	0.07359
0.1217	0.1234	0.1226	0.0626	0.0674	0.0650



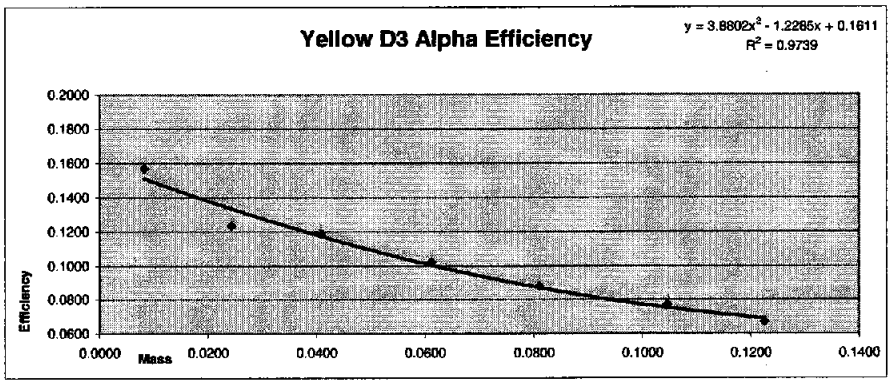
Yellow D2 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1603	0.1489	0.1546
0.0249	0.0240	0.0245	0.1270	0.1117	0.1194
0.0406	0.0412	0.0409	0.1161	0.1171	0.1166
0.0611	0.0613	0.0612	0.0902	0.1120	0.1011
0.0800	0.0821	0.0811	0.0865	0.0853	0.0859
0.1037	0.1055	0.1046	0.0732	0.0816	0.0774
0.1217	0.1234	0.1226	0.0623	0.0683	0.0653



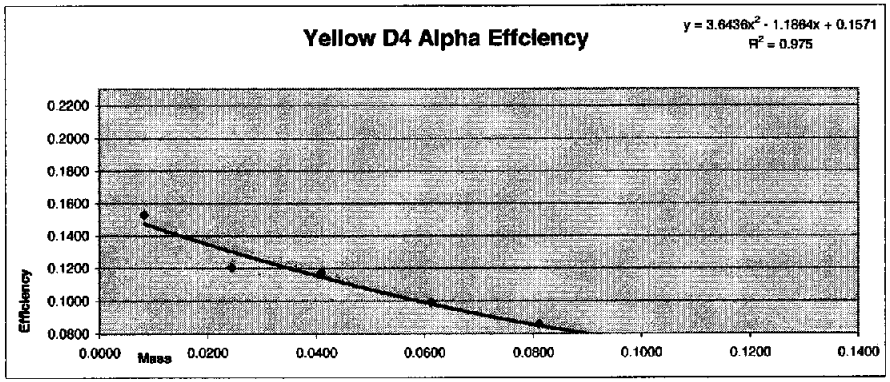
Yellow D3 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1623	0.1520	0.1571
0.0249	0.0240	0.0245	0.1267	0.1198	0.1233
0.0406	0.0412	0.0409	0.1176	0.1201	0.1188
0.0611	0.0613	0.0612	0.0914	0.1133	0.1023
0.0800	0.0821	0.0811	0.0874	0.0882	0.0878
0.1037	0.1055	0.1046	0.0747	0.0790	0.0769
0.1217	0.1234	0.1226	0.0642	0.0694	0.0668



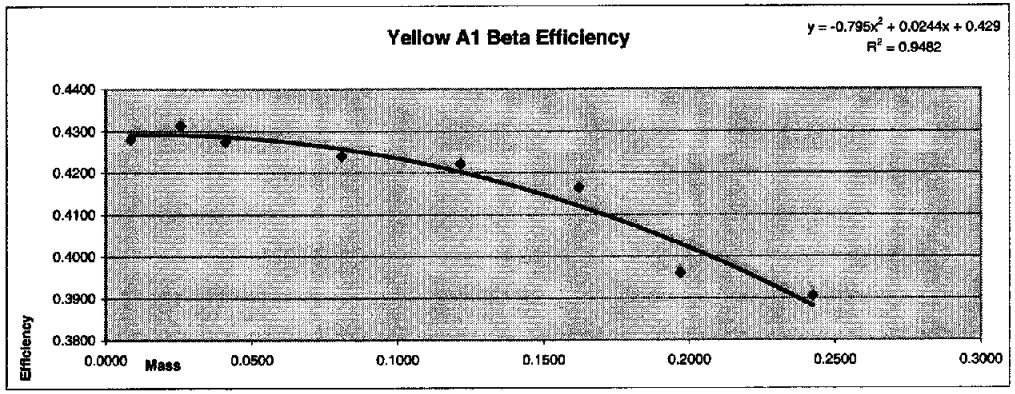
Yellow D4 3/13,14/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0084	0.0081	0.0083	0.1590	0.1472	0.1531
0.0249	0.0240	0.0245	0.1242	0.1168	0.1205
0.0406	0.0412	0.0409	0.1166	0.1178	0.1172
0.0611	0.0613	0.0612	0.0901	0.1083	0.0992
0.0800	0.0821	0.0811	0.0856	0.0863	0.0860
0.1037	0.1055	0.1046	0.0715	0.0774	0.0745
0.1217	0.1234	0.1226	0.0622	0.0673	0.0647



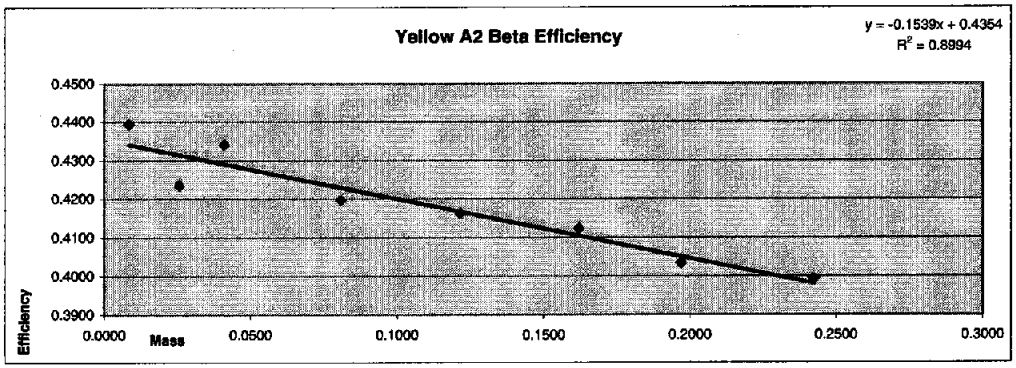
Yellow A1 4/3,4/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4521	0.4041	0.4281
0.0251	0.0262	0.0257	0.4480	0.4146	0.4313
0.0412	0.0407	0.0410	0.4282	0.4269	0.4276
0.0796	0.0820	0.0808	0.4239	0.4241	0.4240
0.1212	0.1220	0.1216	0.4169	0.4272	0.4221
0.1629	0.1612	0.1621	0.4115	0.4211	0.4163
0.1996	0.1945	0.1971	0.3882	0.4038	0.3960
0.2420	0.2429	0.2425	0.3877	0.3934	0.3905



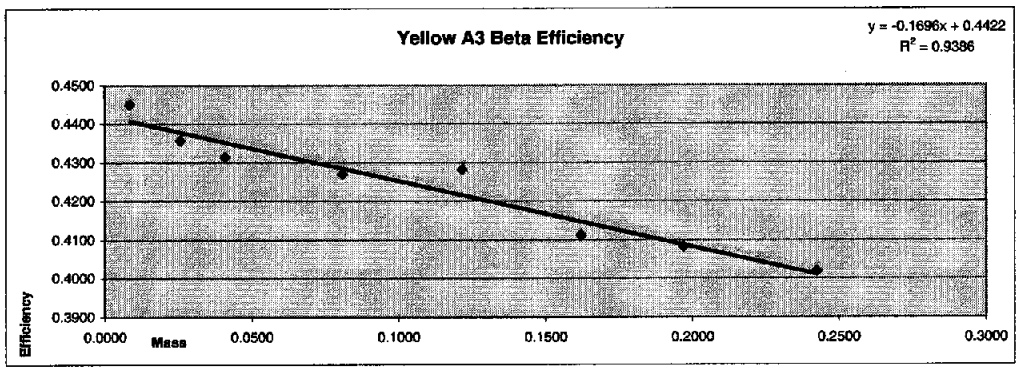
Yellow A2 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4510	0.4276	0.4393
0.0251	0.0262	0.0257	0.4341	0.4127	0.4234
0.0412	0.0407	0.0410	0.4430	0.4251	0.4340
0.0796	0.0820	0.0808	0.4189	0.4205	0.4197
0.1212	0.1220	0.1216	0.4231	0.4094	0.4162
0.1629	0.1612	0.1621	0.4064	0.4182	0.4123
0.1996	0.1945	0.1971	0.4005	0.4063	0.4034
0.2420	0.2429	0.2425	0.3967	0.4018	0.3993



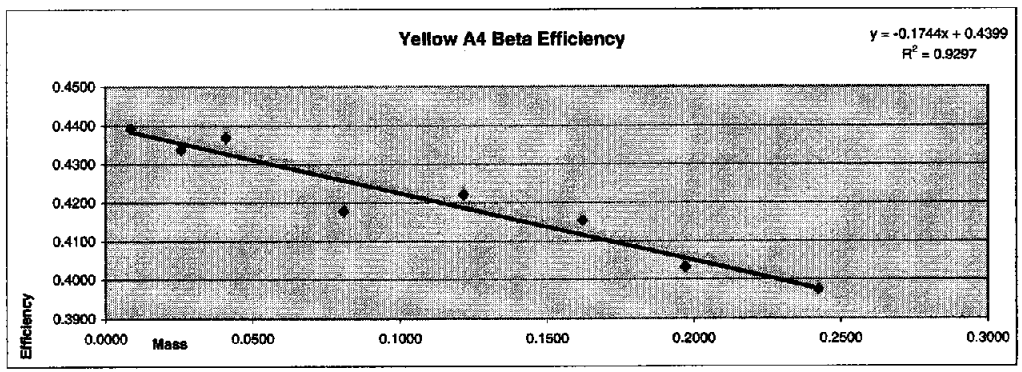
Yellow A3 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4607	0.4292	0.4450
0.0251	0.0262	0.0257	0.4512	0.4202	0.4357
0.0412	0.0407	0.0410	0.4332	0.4297	0.4314
0.0796	0.0820	0.0808	0.4282	0.4258	0.4270
0.1212	0.1220	0.1216	0.4275	0.4288	0.4281
0.1629	0.1612	0.1621	0.4126	0.4097	0.4111
0.1996	0.1945	0.1971	0.4032	0.4134	0.4083
0.2420	0.2429	0.2425	0.4031	0.4004	0.4018



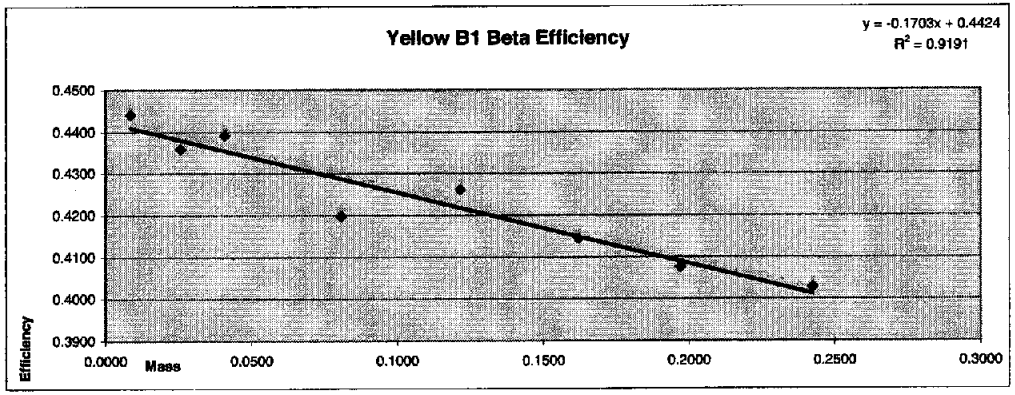
Yellow A4 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4556	0.4228	0.4392
0.0251	0.0262	0.0257	0.4510	0.4165	0.4337
0.0412	0.0407	0.0410	0.4437	0.4302	0.4369
0.0796	0.0820	0.0808	0.4152	0.4202	0.4177
0.1212	0.1220	0.1216	0.4218	0.4223	0.4221
0.1629	0.1612	0.1621	0.4087	0.4220	0.4154
0.1996	0.1945	0.1971	0.4028	0.4036	0.4032
0.2420	0.2429	0.2425	0.3988	0.3959	0.3973



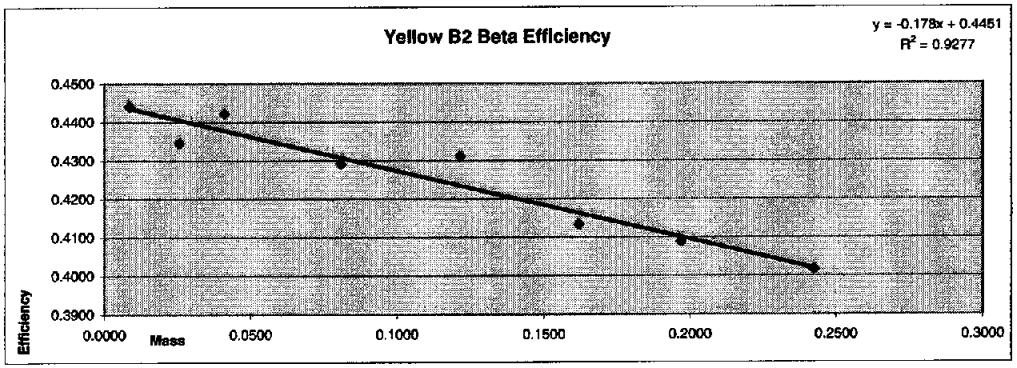
Yellow B1 4/3,4/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4566	0.4316	0.4441
0.0251	0.0262	0.0257	0.4518	0.4201	0.4359
0.0412	0.0407	0.0410	0.4495	0.4289	0.4392
0.0796	0.0820	0.0808	0.4141	0.4255	0.4198
0.1212	0.1220	0.1216	0.4268	0.4252	0.4260
0.1629	0.1612	0.1621	0.4068	0.4220	0.4144
0.1996	0.1945	0.1971	0.4022	0.4129	0.4075
0.2420	0.2429	0.2425	0.4063	0.3993	0.4028



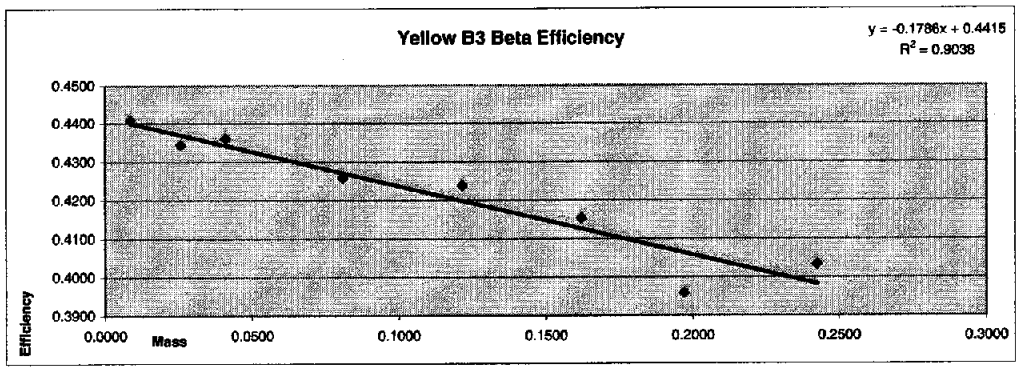
Yellow B2 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4600	0.4281	0.4440
0.0251	0.0262	0.0257	0.4524	0.4166	0.4345
0.0412	0.0407	0.0410	0.4494	0.4349	0.4422
0.0796	0.0820	0.0808	0.4254	0.4328	0.4291
0.1212	0.1220	0.1216	0.4352	0.4270	0.4311
0.1629	0.1612	0.1621	0.4152	0.4115	0.4134
0.1996	0.1945	0.1971	0.4008	0.4169	0.4089
0.2420	0.2429	0.2425	0.4041	0.3991	0.4016



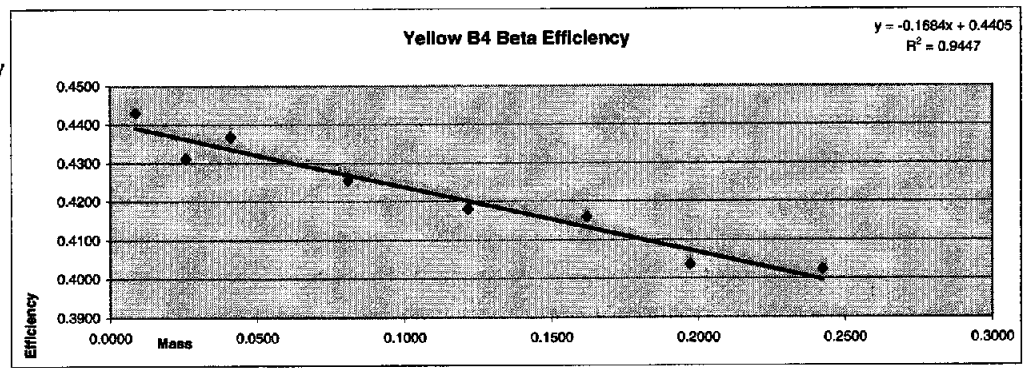
Yellow B3 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4526	0.4289	0.4408
0.0251	0.0262	0.0257	0.4528	0.4160	0.4344
0.0412	0.0407	0.0410	0.4418	0.4302	0.4360
0.0796	0.0820	0.0808	0.4234	0.4282	0.4258
0.1212	0.1220	0.1216	0.4248	0.4229	0.4238
0.1629	0.1612	0.1621	0.4112	0.4194	0.4153
0.1996	0.1945	0.1971	0.3976	0.3940	0.3958
0.2420	0.2429	0.2425	0.4045	0.4022	0.4034



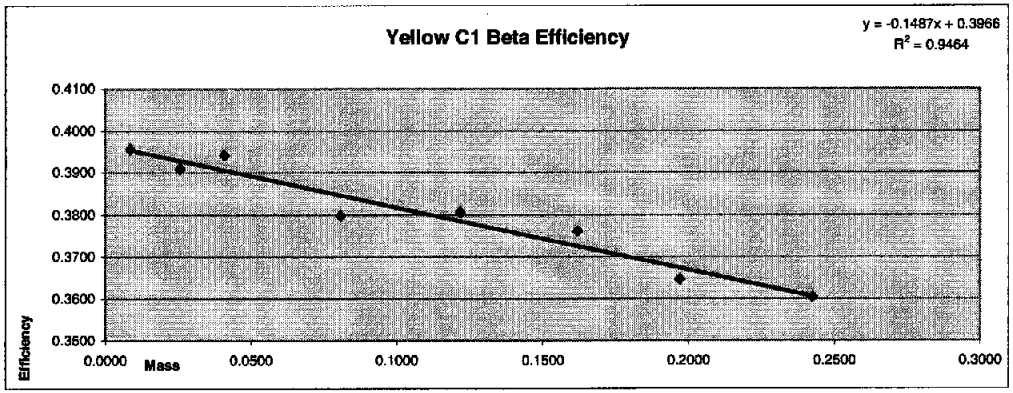
Yellow B4 4/3,4/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4558	0.4301	0.4430
0.0251	0.0262	0.0257	0.4486	0.4138	0.4312
0.0412	0.0407	0.0410	0.4441	0.4293	0.4367
0.0796	0.0820	0.0808	0.4254	0.4255	0.4255
0.1212	0.1220	0.1216	0.4148	0.4208	0.4178
0.1629	0.1612	0.1621	0.4078	0.4238	0.4158
0.1996	0.1945	0.1971	0.3987	0.4085	0.4036
0.2420	0.2429	0.2425	0.4045	0.4003	0.4024



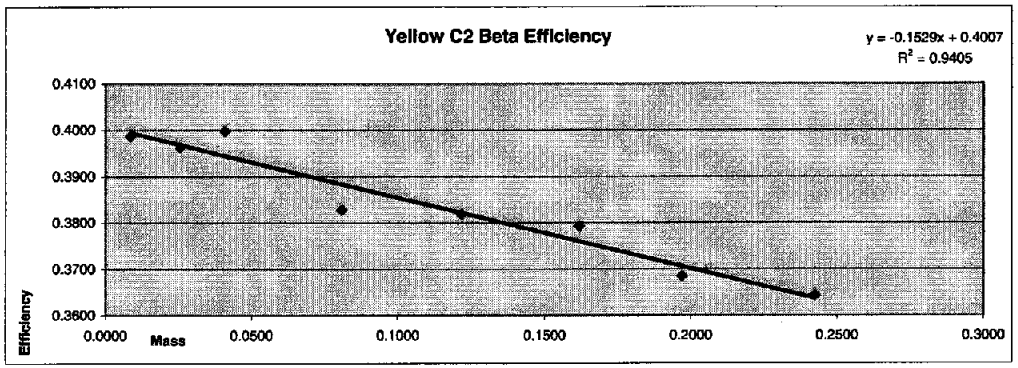
Yellow C1 4/3,4/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4064	0.3846	0.3955
0.0251	0.0262	0.0257	0.4058	0.3759	0.3908
0.0412	0.0407	0.0410	0.4013	0.3869	0.3941
0.0796	0.0820	0.0808	0.3776	0.3820	0.3798
0.1212	0.1220	0.1216	0.3836	0.3776	0.3806
0.1629	0.1612	0.1621	0.3724	0.3798	0.3761
0.1996	0.1945	0.1971	0.3591	0.3701	0.3646
0.2420	0.2429	0.2425	0.3622	0.3586	0.3604



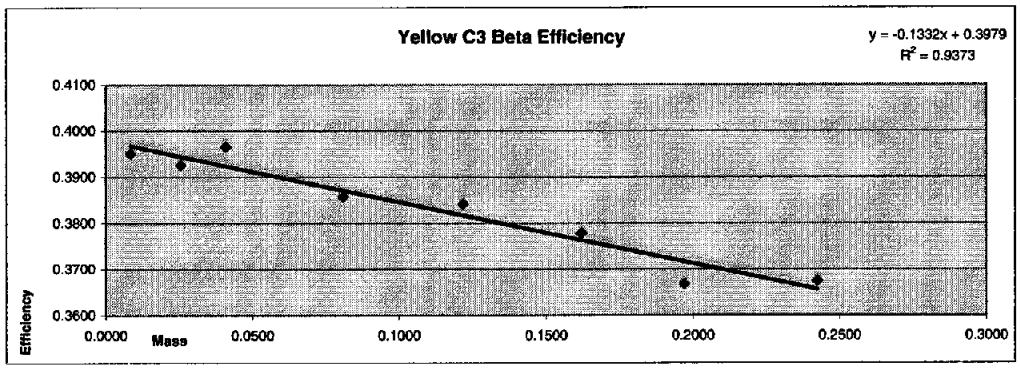
Yellow C2 4/3,4/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4104	0.3868	0.3986
0.0251	0.0262	0.0257	0.4097	0.3827	0.3962
0.0412	0.0407	0.0410	0.4039	0.3956	0.3997
0.0796	0.0820	0.0808	0.3825	0.3831	0.3828
0.1212	0.1220	0.1216	0.3809	0.3827	0.3818
0.1629	0.1612	0.1621	0.3739	0.3845	0.3792
0.1996	0.1945	0.1971	0.3642	0.3728	0.3685
0.2420	0.2429	0.2425	0.3698	0.3589	0.3643



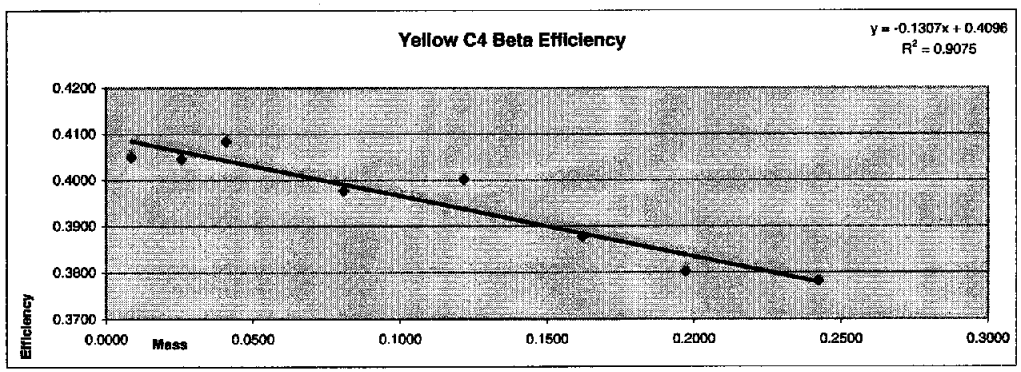
Yellow C3 4/3,4/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4125	0.3777	0.3951
0.0251	0.0262	0.0257	0.4095	0.3758	0.3926
0.0412	0.0407	0.0410	0.4089	0.3841	0.3965
0.0796	0.0820	0.0808	0.3866	0.3848	0.3857
0.1212	0.1220	0.1216	0.3822	0.3860	0.3841
0.1629	0.1612	0.1621	0.3742	0.3814	0.3778
0.1996	0.1945	0.1971	0.3637	0.3697	0.3667
0.2420	0.2429	0.2425	0.3700	0.3649	0.3674



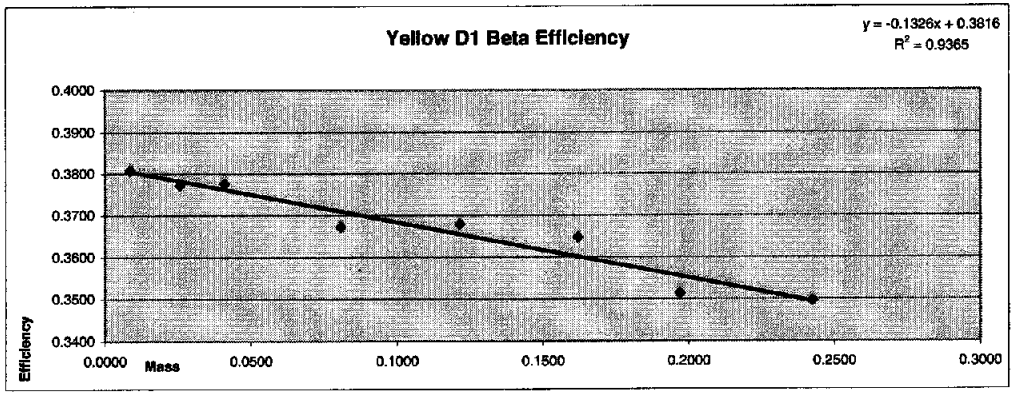
Yellow C4 4/3,4/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4187	0.3914	0.4050
0.0251	0.0262	0.0257	0.4226	0.3865	0.4046
0.0412	0.0407	0.0410	0.4191	0.3977	0.4084
0.0796	0.0820	0.0808	0.3957	0.3996	0.3976
0.1212	0.1220	0.1216	0.4018	0.3984	0.4001
0.1629	0.1612	0.1621	0.3802	0.3953	0.3878
0.1996	0.1945	0.1971	0.3745	0.3858	0.3802
0.2420	0.2429	0.2425	0.3807	0.3757	0.3782



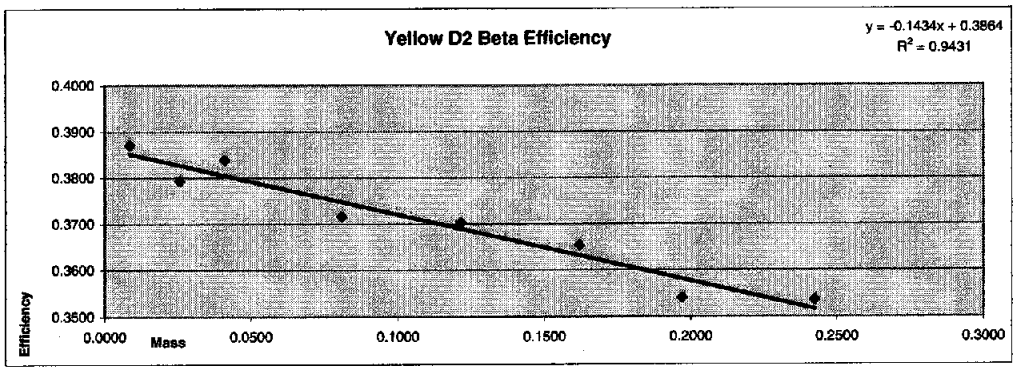
Yellow D1 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.3942	0.3672	0.3807
0.0251	0.0262	0.0257	0.3898	0.3645	0.3772
0.0412	0.0407	0.0410	0.3874	0.3676	0.3775
0.0796	0.0820	0.0808	0.3666	0.3677	0.3672
0.1212	0.1220	0.1216	0.3664	0.3692	0.3678
0.1629	0.1612	0.1621	0.3560	0.3735	0.3648
0.1996	0.1945	0.1971	0.3460	0.3568	0.3514
0.2420	0.2429	0.2425	0.3518	0.3473	0.3496



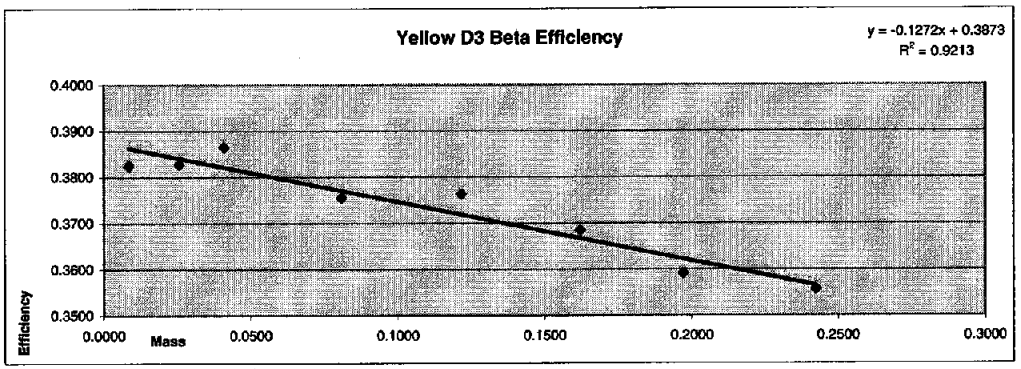
Yellow D2 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.4072	0.3670	0.3871
0.0251	0.0262	0.0257	0.3957	0.3629	0.3793
0.0412	0.0407	0.0410	0.3916	0.3759	0.3838
0.0796	0.0820	0.0808	0.3718	0.3713	0.3716
0.1212	0.1220	0.1216	0.3683	0.3722	0.3702
0.1629	0.1612	0.1621	0.3590	0.3717	0.3653
0.1996	0.1945	0.1971	0.3505	0.3575	0.3540
0.2420	0.2429	0.2425	0.3569	0.3504	0.3536



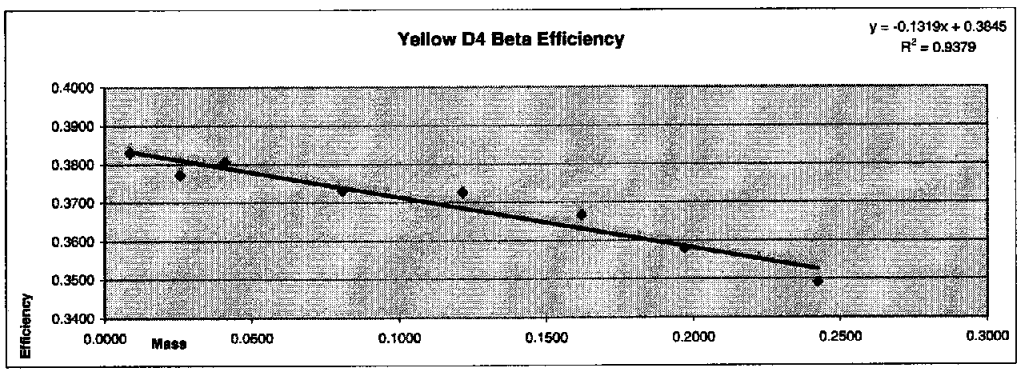
Yellow D3 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.3971	0.3677	0.3824
0.0251	0.0262	0.0257	0.3969	0.3686	0.3827
0.0412	0.0407	0.0410	0.3935	0.3794	0.3864
0.0796	0.0820	0.0808	0.3740	0.3771	0.3755
0.1212	0.1220	0.1216	0.3769	0.3757	0.3763
0.1629	0.1612	0.1621	0.3668	0.3701	0.3684
0.1996	0.1945	0.1971	0.3543	0.3640	0.3591
0.2420	0.2429	0.2425	0.3599	0.3514	0.3556



Yellow D4 3/23/2006

Mass Set 1	Mass Set 2	Mean Mass	Efficiency Set 1	Efficiency Set 2	Mean Efficiency
0.0089	0.0082	0.0086	0.3980	0.3679	0.3830
0.0251	0.0262	0.0257	0.3898	0.3647	0.3772
0.0412	0.0407	0.0410	0.3882	0.3730	0.3806
0.0796	0.0820	0.0808	0.3746	0.3716	0.3731
0.1212	0.1220	0.1216	0.3715	0.3736	0.3725
0.1629	0.1612	0.1621	0.3655	0.3677	0.3666
0.1996	0.1945	0.1971	0.3516	0.3643	0.3579
0.2420	0.2429	0.2425	0.3525	0.3456	0.3491

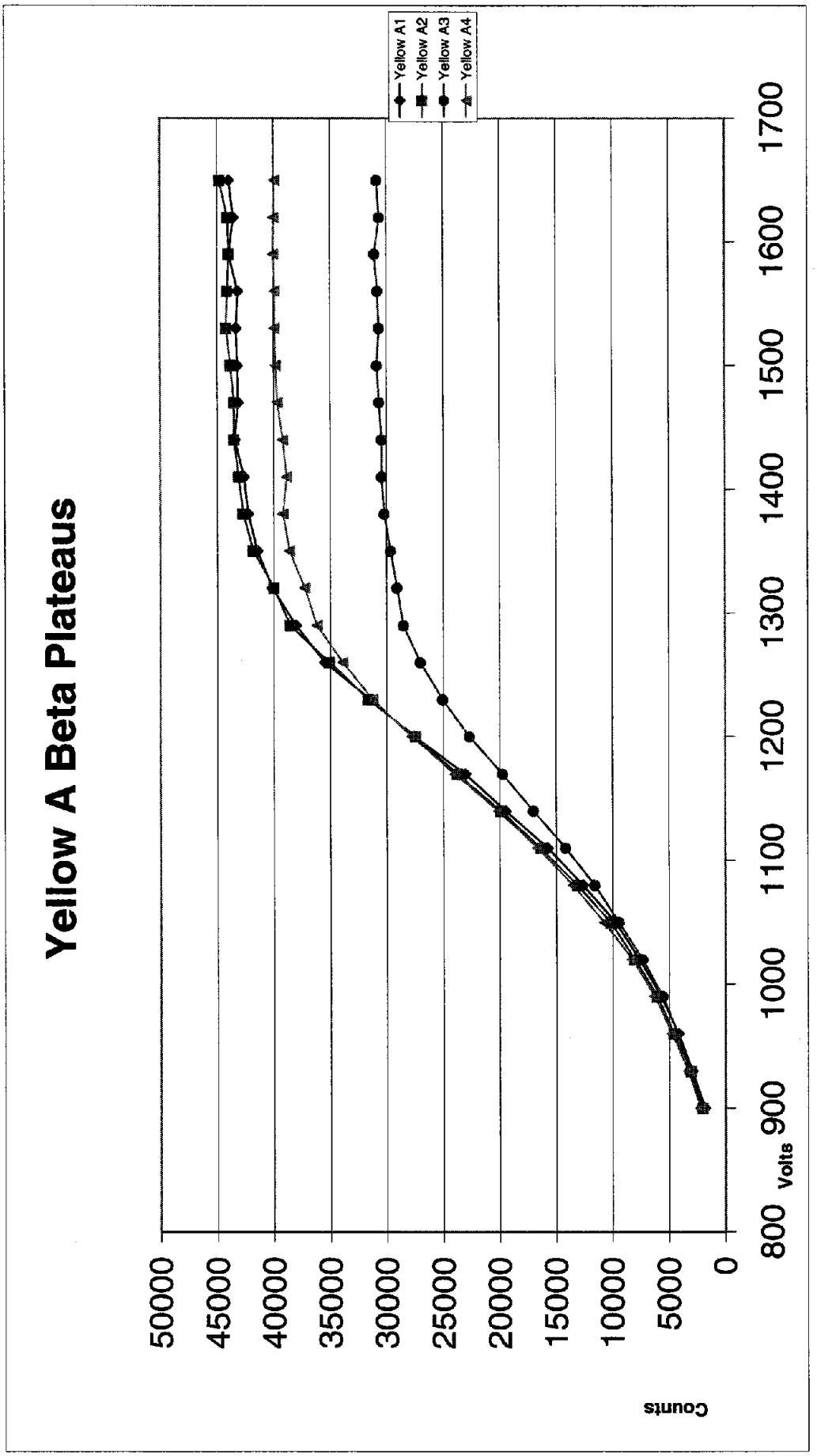


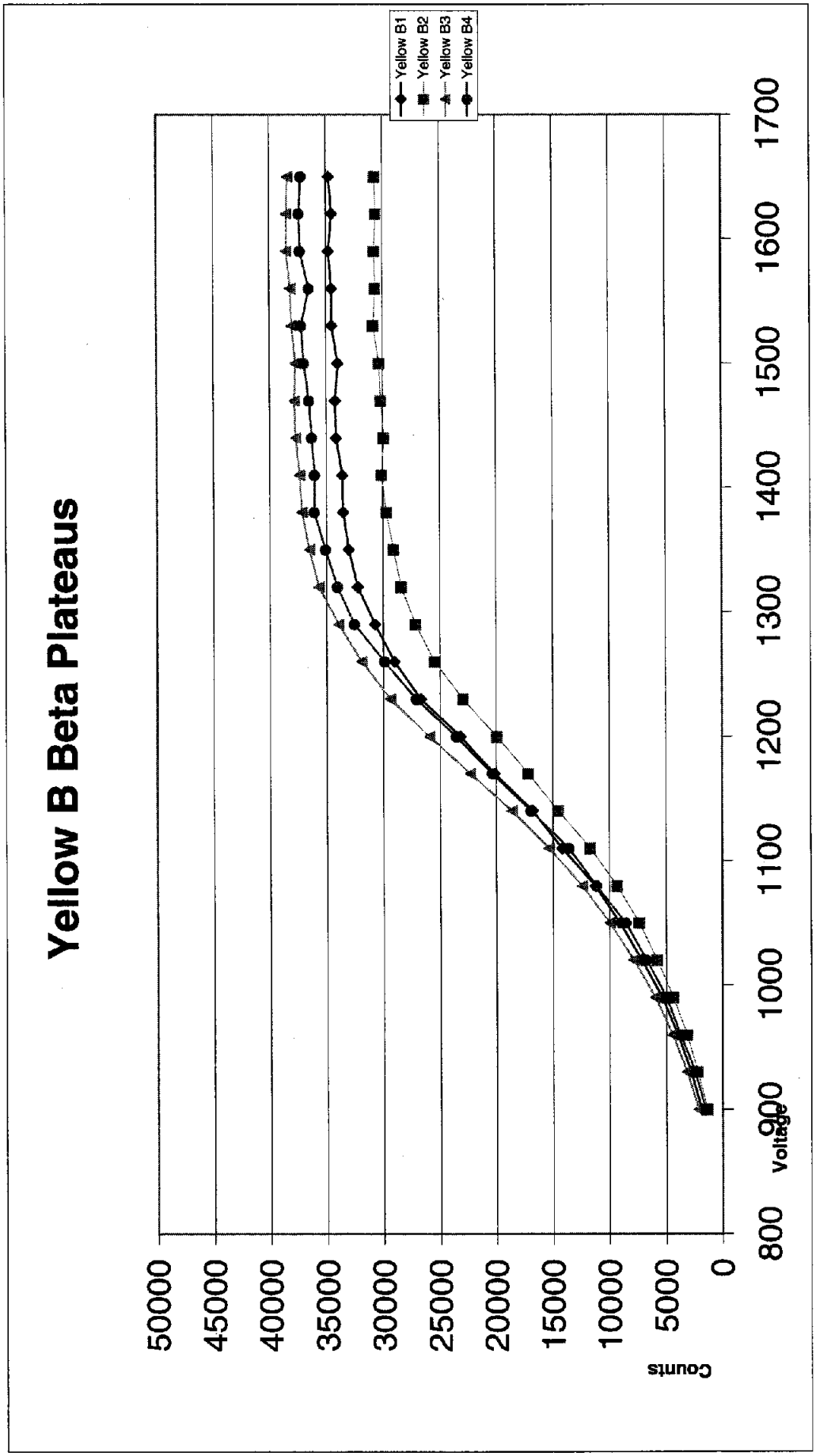
SEVERN TRENT STL

Voltage Plateaus

Plateau BET2_1_6
Counting time: 1.00

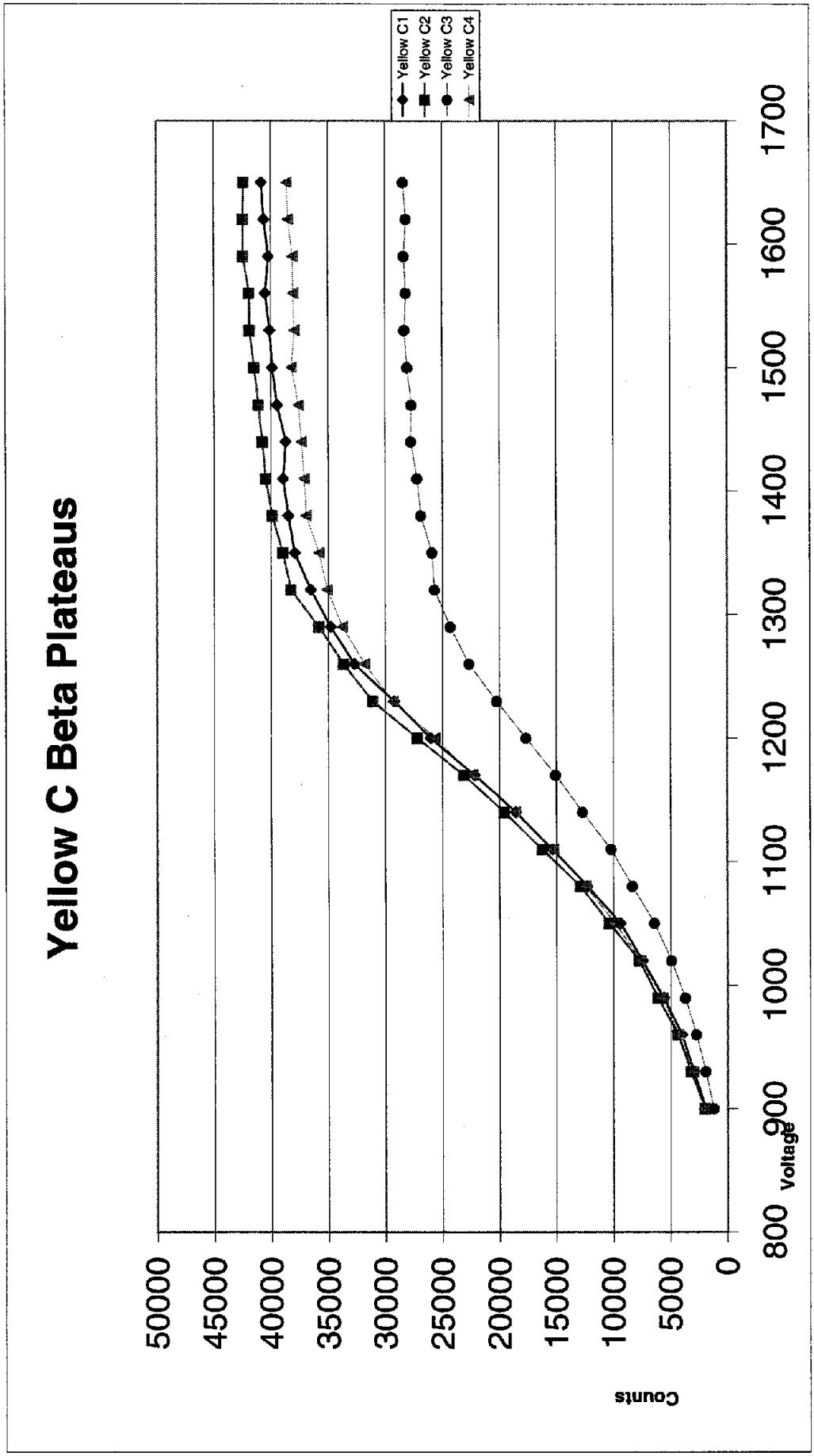
Voltage	2/24/2006 Guard 1	2/24/2006 Guard 2	2/24/2006 Chan 1 Yellow A1	2/24/2006 Chan 2 Yellow A2	2/24/2006 Chan 3 Yellow A3	2/24/2006 Chan 4 Yellow A4	2/24/2006 Chan 5 Yellow B1	2/24/2006 Chan 6 Yellow B2	2/24/2006 Chan 7 Yellow B3	2/24/2006 Chan 8 Yellow B4
900	55	66	1838	2030	2124	2198	1881	1348	2123	1528
930	81	97	2969	3057	3182	3305	2807	2222	3164	2439
960	84	104	4171	4568	4251	4727	3965	3162	4443	3755
990	110	143	5729	6053	5554	6288	5353	4370	5968	4979
1020	167	190	7636	8047	7358	8251	7173	5819	7878	6743
1050	202	252	9741	10152	9447	10723	9077	7389	9962	8565
1080	276	320	12631	13116	11572	13531	11243	9320	12412	11153
1110	395	426	15746	16383	14176	16602	14206	11698	15341	13597
1140	417	466	19471	19892	17002	20111	16779	14526	18625	16947
1170	513	483	23031	23748	19735	23941	20152	17166	22267	20328
1200	469	499	27575	27437	22686	27739	23158	19913	25911	23538
1230	485	482	31449	31630	25066	31223	26660	22925	29338	27064
1260	501	518	35462	35067	27027	33894	28983	25471	31904	29883
1290	490	480	38024	38539	28501	36164	30717	27127	33923	32519
1320	489	513	40122	39975	29073	37230	32224	28386	35658	34018
1350	528	517	41422	41787	29638	38587	33019	29048	36516	35090
1380	531	513	42243	42678	30197	39167	33515	29672	37174	36074
1410	528	508	42617	43093	30410	38846	33577	30111	37365	36041
1440	536	532	43421	43500	30426	39183	34109	29898	37706	36279
1470	527	531	43128	43495	30638	39658	34186	30146	37821	36512
1500	507	525	43198	43800	30827	39819	33952	30299	37703	36975
1530	543	559	43297	44185	30637	39912	34485	30790	38042	37187
1560	538	571	43160	44101	30782	39879	34498	30637	38162	36529
1590	547	524	43951	43945	31045	40020	34766	30730	38518	37296
1620	559	527	43539	44089	30608	39966	34488	30602	38496	37390
1650	599	577	43936	44802	30838	39897	34746	30691	38398	37213

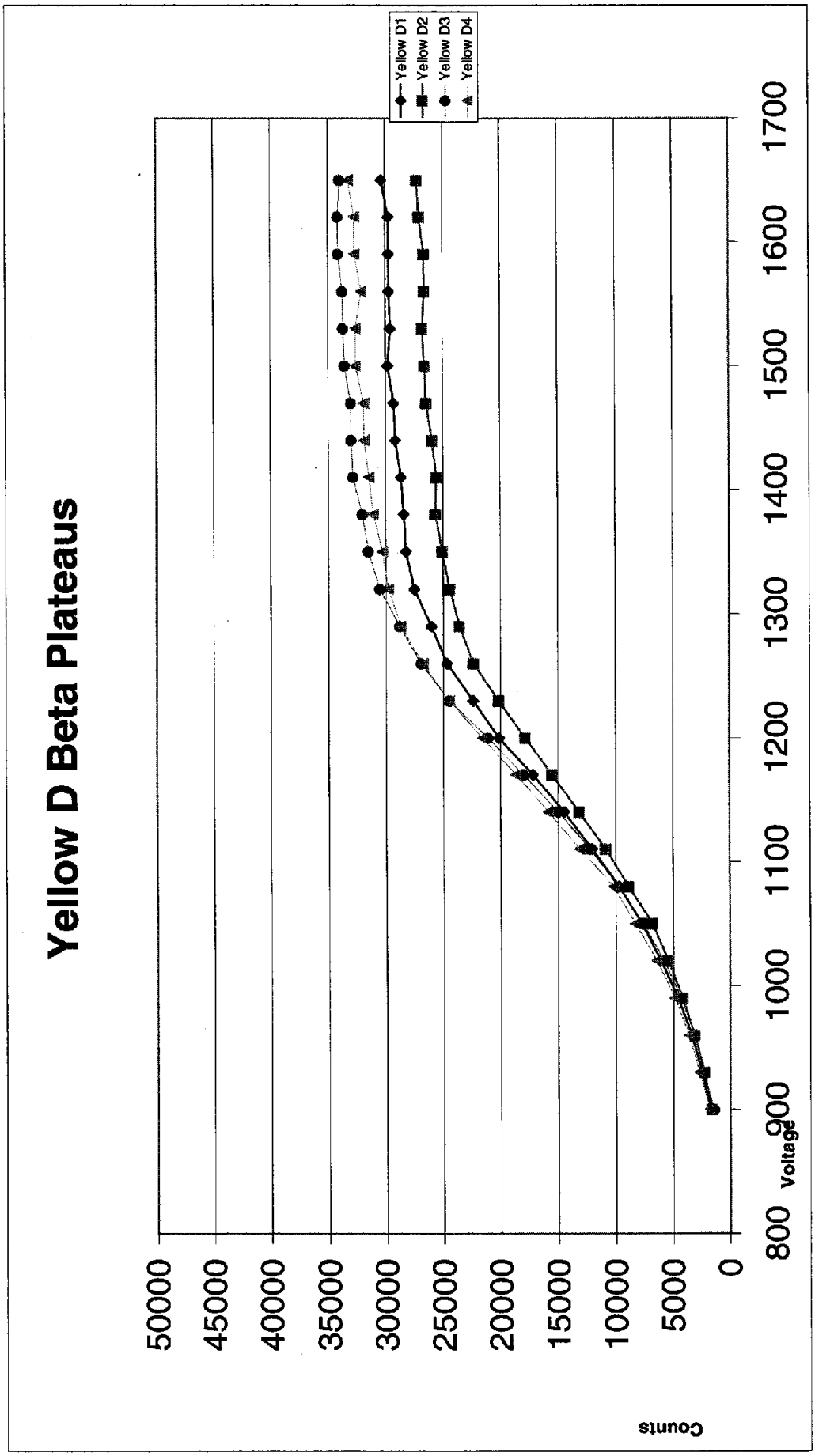

Yellow A Beta Plateaus
Yellow A1
Yellow A2
Yellow A3
Yellow A4
Counts
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
800
900
1000
1100
1200
1300
1400
1500
1600
1700
Volts


Yellow B Beta Plateaus
Yellow B1
Yellow B2
Yellow B3
Yellow B4
Counts
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
800
900
1000
1100
1200
1300
1400
1500
1600
1700
Voltage

Counting time: 1.00

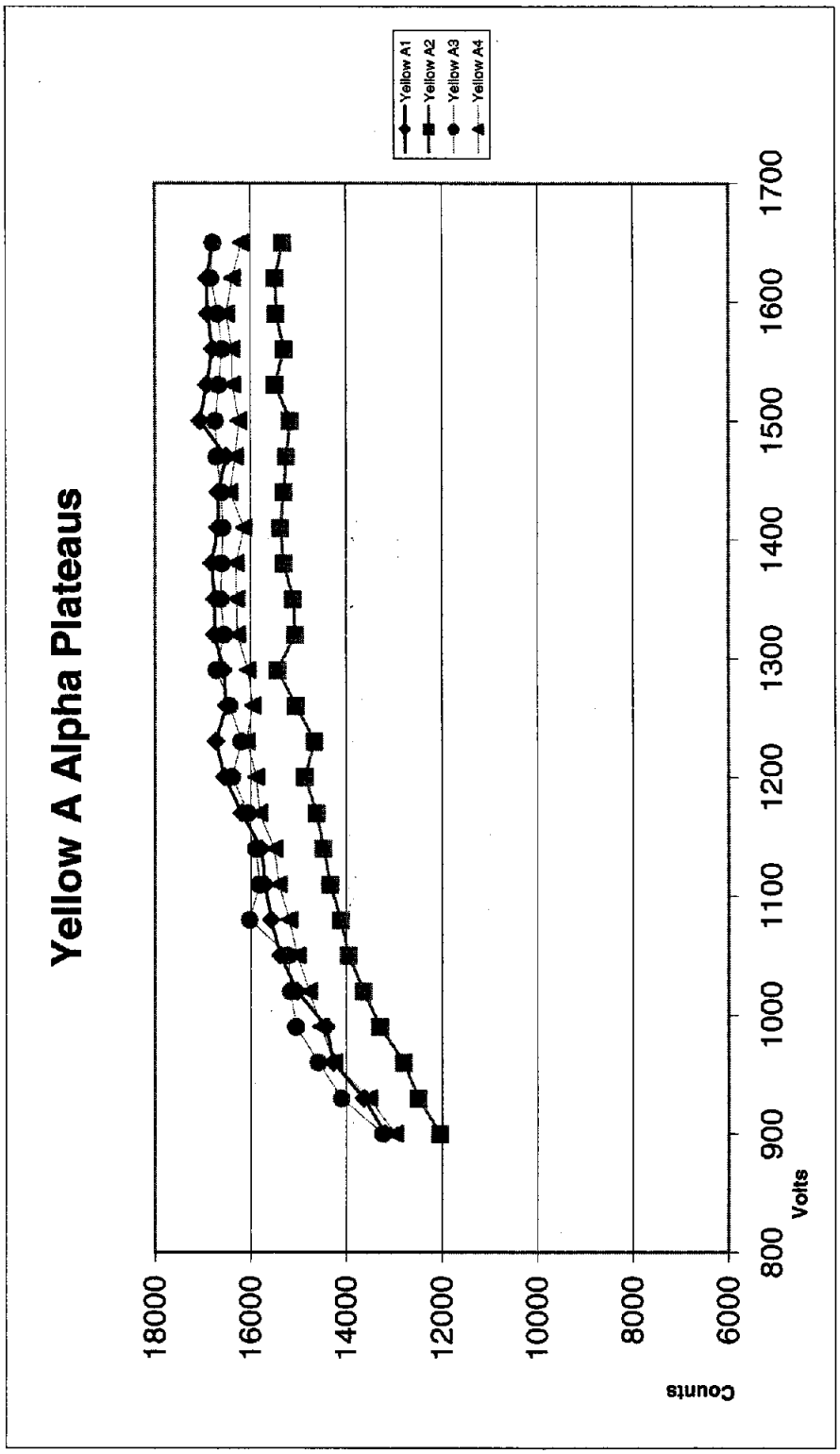
Voltage	2/24/2006 Guard 3	2/24/2006 Guard 4	2/24/2006 Yellow C1 Chan 9	2/24/2006 Yellow C2 Chan 10	2/24/2006 Yellow C3 Chan 11	2/24/2006 Yellow C4 Chan 12	2/24/2006 Yellow D1 Chan 13	2/24/2006 Yellow D2 Chan 14	2/24/2006 Yellow D3 Chan 15	2/24/2006 Yellow D4 Chan 16
900	67	76	1934	2012	1231	2091	1667	1604	1409	1747
930	76	98	2981	3216	1933	3036	2485	2255	2348	2690
960	84	141	4016	4375	2752	4314	3376	3116	3133	3604
990	126	164	5605	6104	3734	5712	4585	4181	4316	4871
1020	201	257	7491	7765	4929	7620	6051	5415	5801	6400
1050	254	300	9415	10359	6419	9863	7695	6781	7582	8295
1080	351	350	12263	12896	8360	12407	9700	8858	9804	10201
1110	407	422	15343	16221	10209	15262	12040	10879	12207	13078
1140	488	459	18561	19579	12689	18606	14477	13168	15007	15839
1170	519	504	22193	23117	15056	22318	17189	15520	18021	18631
1200	503	541	26025	27201	17651	25625	20138	17866	21092	21605
1230	543	533	29215	31071	20247	29324	22382	20168	24462	24465
1260	518	510	32711	33653	22662	31802	24671	22379	26928	26771
1290	575	557	34802	35820	24301	33746	26014	23578	28802	28692
1320	572	562	36513	38245	25677	35087	27498	24415	30516	29782
1350	546	577	37900	38950	25892	35798	28228	25073	31491	30289
1380	556	549	38460	39895	26876	36902	28424	25638	32023	31084
1410	531	526	38939	40471	27212	37067	28669	25579	32828	31450
1440	608	568	38690	40754	27745	37314	29153	25918	32979	31853
1470	589	598	39435	41078	27711	37551	29284	26438	32992	31875
1500	564	536	39864	41450	28054	38162	29802	26562	33541	32556
1530	585	564	40095	41830	28304	37913	29568	26778	33675	32575
1560	611	555	40490	41877	28176	38047	29682	26568	33711	32063
1590	606	591	40187	42402	28356	38059	29713	26617	34084	32653
1620	608	566	40591	42412	28177	38454	29738	27043	34134	32665
1650	597	568	40825	42383	28420	38564	30329	27226	33960	33210

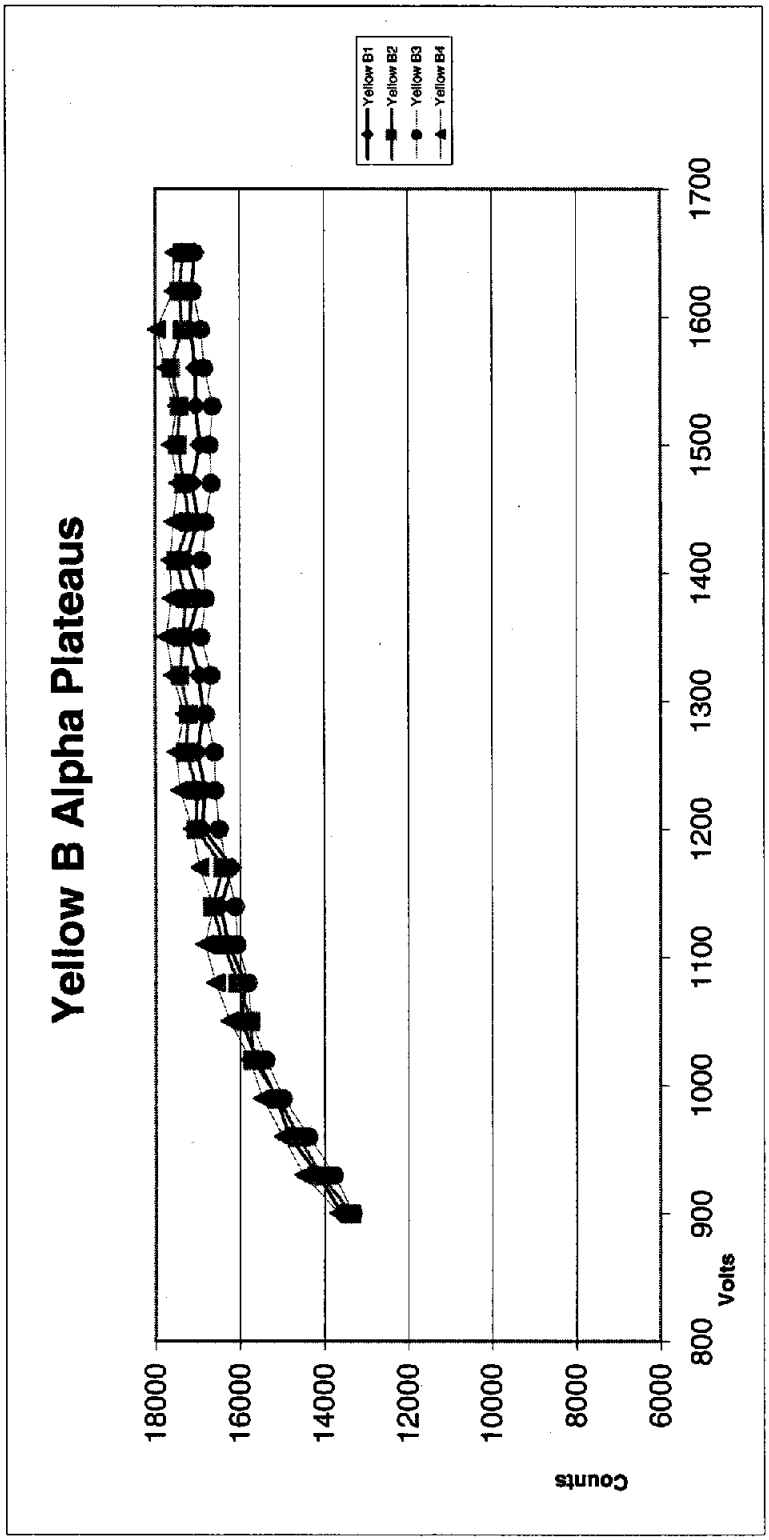

Yellow C Beta Plateaus
Yellow C1
Yellow C2
Yellow C3
Yellow C4
Counts
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
800
900
1000
1100
1200
1300
1400
1500
1600
1700
Voltage


Yellow D Beta Plateaus
Yellow D1
Yellow D2
Yellow D3
Yellow D4
Counts
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
800
900
1000
1100
1200
1300
1400
1500
1600
1700
Voltage

Plateau AL1_2_6
Counting time: 1.00

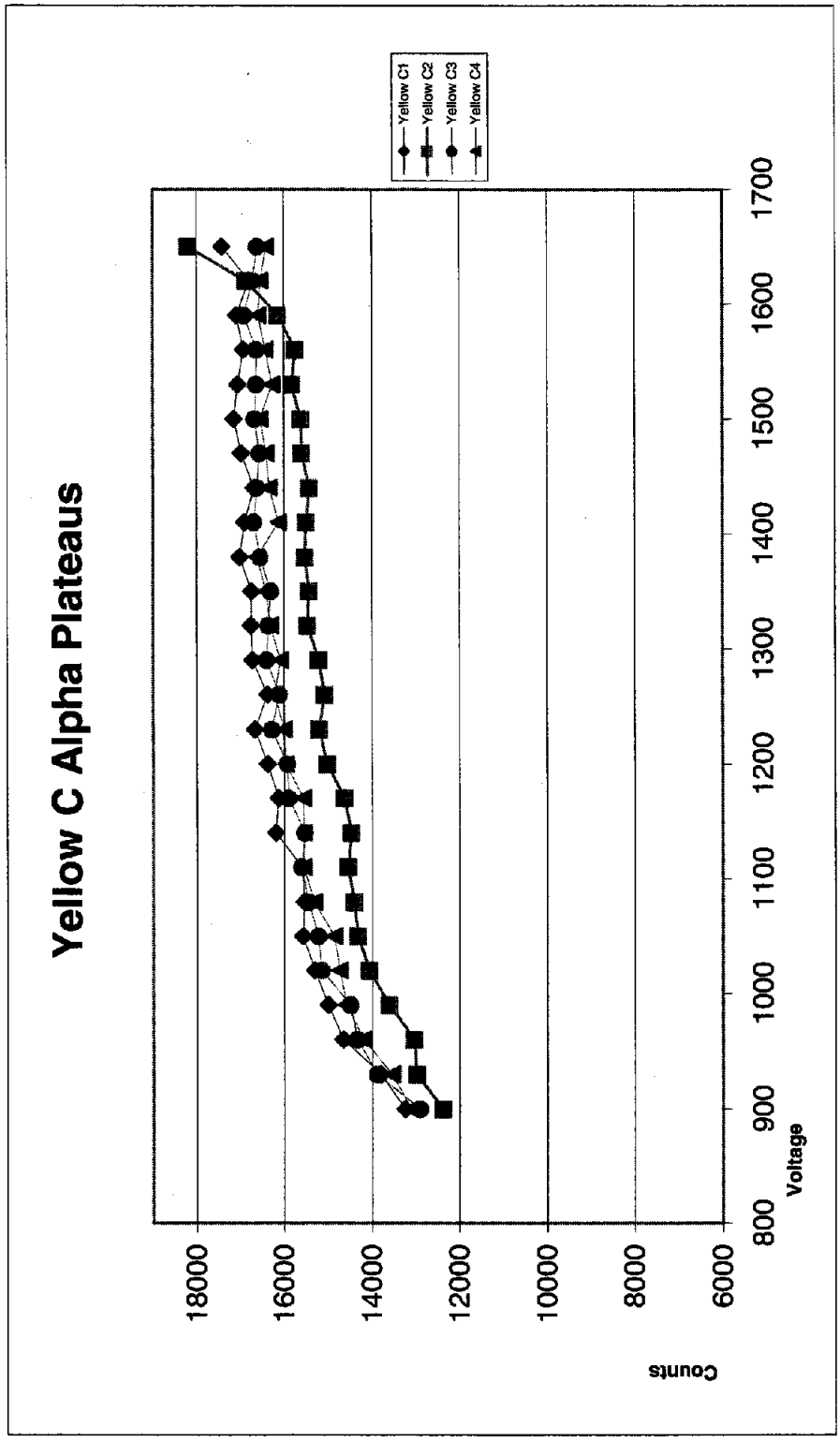
Voltage	2/24/2006 Guard 1	2/24/2006 Guard 2	2/24/2006 Chan 1 Yellow A1	2/24/2006 Chan 2 Yellow A2	2/24/2006 Chan 3 Yellow A3	2/24/2006 Chan 4 Yellow A4	2/24/2006 Chan 5 Yellow B1	2/24/2006 Chan 6 Yellow B2	2/24/2006 Chan 7 Yellow B3	2/24/2006 Chan 8 Yellow B4
900	54	53	13189	12044	13242	12991	13593	13349	13311	13655
930	73	67	13635	12497	14100	13526	14143	14087	13761	14488
960	69	92	14275	12804	14586	14261	14831	14613	14369	14987
990	111	129	14419	13303	15048	14531	15136	15098	14970	15469
1020	142	185	15027	13635	15162	14777	15609	15706	15384	15773
1050	195	250	15379	13951	15211	15026	15976	15753	15743	16247
1080	299	328	15574	14115	16026	15194	15894	16052	15812	16583
1110	354	354	15693	14335	15819	15407	16275	16403	16071	16827
1140	445	453	15783	14477	15895	15506	16467	16657	16117	16644
1170	475	465	16192	14618	16062	15819	16192	16409	16321	16960
1200	503	537	16551	14866	16388	15883	16880	17035	16485	17127
1230	510	540	16724	14657	16198	16080	16828	17011	16583	17421
1260	536	532	16506	15051	16435	15958	17000	17282	16597	17508
1290	543	547	16560	15427	16707	16049	16870	17212	16789	17316
1320	508	526	16753	15059	16558	16280	16963	17407	16669	17581
1350	535	524	16747	15098	16618	16290	17219	17337	16912	17745
1380	519	516	16810	15301	16598	16303	16967	17281	16797	17621
1410	560	537	16684	15368	16582	16137	17253	17504	16894	17654
1440	552	521	16678	15303	16613	16429	16990	17192	16805	17574
1470	520	493	16509	15250	16709	16325	17115	17325	16660	17462
1500	577	560	17052	15164	16734	16248	16948	17466	16709	17638
1530	555	552	16914	15478	16662	16378	17038	17412	16633	17481
1560	521	583	16790	15294	16593	16394	17042	17620	16841	17749
1590	564	571	16894	15460	16685	16503	17157	17354	16907	17968
1620	577	588	16906	15478	16827	16385	17144	17433	17093	17568
1650	634	669	16790	15321	16776	16193	17050	17334	17064	17546

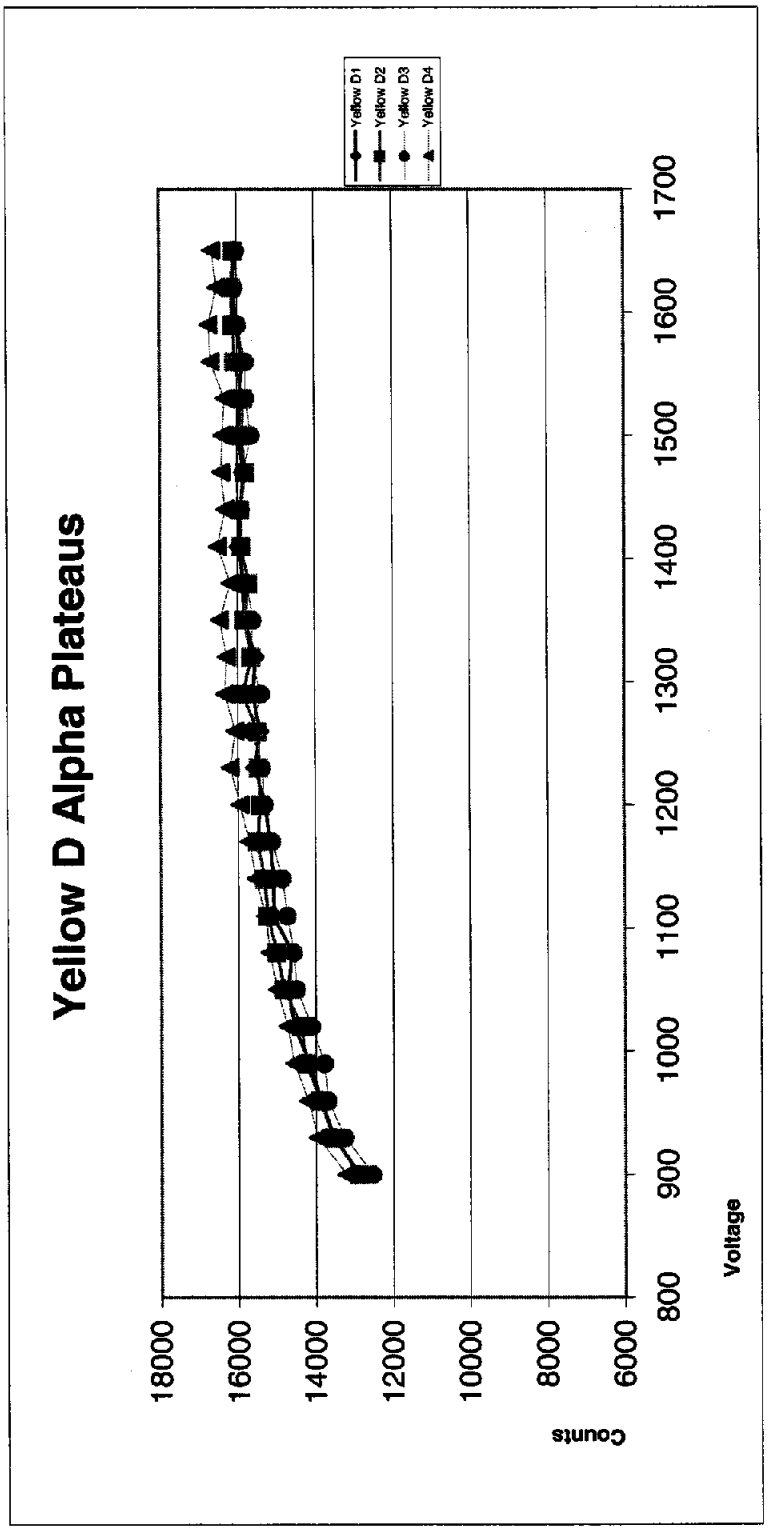

Yellow A Alpha Plateaus
Yellow A1
Yellow A2
Yellow A3
Yellow A4
Counts
18000
16000
14000
12000
10000
8000
6000
800
900
1000
1100
1200
1300
1400
1500
1600
1700
Volts


Yellow B Alpha Plateaus
Yellow B1
Yellow B2
Yellow B3
Yellow B4
Counts
18000
16000
14000
12000
10000
8000
6000
Volts
800
900
1000
1100
1200
1300
1400
1500
1600
1700

Plateau AL2_2_6
Counting time: 1.00

Voltage	2/24/2006 Guard 3	2/24/2006 Guard 4	2/24/2006 Chan 9 Yellow C1	2/24/2006 Chan 10 Yellow C2	2/24/2006 Chan 11 Yellow C3	2/24/2006 Chan 12 Yellow C4	2/24/2006 Chan 13 Yellow D1	2/24/2006 Chan 14 Yellow D2	2/24/2006 Chan 15 Yellow D3	2/24/2006 Chan 16 Yellow D4
900	67	79	13244	12383	12901	13106	12880	12902	12532	13212
930	71	91	13800	12986	13880	13545	13537	13545	13258	13947
960	118	147	14663	13031	14339	14194	13860	13889	13684	14202
990	133	152	14998	13610	14494	14587	14163	14234	13773	14558
1020	224	237	15304	14055	15148	14733	14554	14370	14107	14729
1050	232	253	15570	14318	15222	14855	14718	14822	14485	14998
1080	343	394	15537	14407	15448	15319	14610	15014	14571	15190
1110	369	409	15587	14543	15599	15546	15091	15241	14729	15299
1140	492	478	16192	14471	15526	15543	15089	15328	14860	15548
1170	538	517	16129	14628	15887	15561	15183	15504	15129	15716
1200	508	530	16373	15018	15923	15955	15309	15415	15317	15948
1230	545	577	16669	15190	16280	16002	15560	15467	15387	16195
1260	519	502	16379	15075	16109	16211	15436	15489	15628	16062
1290	498	500	16724	15199	16394	16080	15610	15874	15398	16326
1320	551	563	16760	15461	16360	16312	15541	15638	15659	16278
1350	573	534	16744	15425	16305	16411	15811	15820	15609	16453
1380	548	545	17008	15512	16544	16620	15848	15718	15747	16178
1410	575	559	16900	15497	16691	16124	15956	15899	15912	16497
1440	562	543	16691	15417	16624	16333	15917	15909	15911	16310
1470	555	576	16976	15590	16566	16408	15841	15798	15832	16406
1500	539	541	17150	15613	16679	16543	15961	15889	15647	16374
1530	565	567	17058	15821	16632	16274	15934	15835	15783	16321
1560	599	566	16927	15731	16626	16425	15862	16058	15781	16671
1590	558	512	17089	16138	16917	16595	16017	16107	15979	16728
1620	622	536	16797	16871	16715	16537	16124	16136	16071	16516
1650	749	577	17414	18202	16615	16406	16054	16080	16030	16644


Yellow C Alpha Plateaus
Yellow C1
Yellow C2
Yellow C3
Yellow C4
Counts
18000
16000
14000
12000
10000
8000
6000
800
900
1000
1100
1200
1300
1400
1500
1600
1700
Voltage


Yellow D Alpha Plateaus
Yellow D1
Yellow D2
Yellow D3
Yellow D4
Counts
18000
16000
14000
12000
10000
8000
6000
800
900
1000
1100
1200
1300
1400
1500
1600
1700
Voltage

SEVERN TRENT STL

Discriminator Settings

TENNELEC LB4000 PAGE 3

#1 Channel	GROUP >	A	B	C	D
Discriminator Settings	Beta LL	0	0	0	0
	Beta UL	1550	1690	1890	2300
	Alpha LL	1554	1694	1894	2304
	Alpha UL	4095	4095	4095	4095
	Threshold	25	25	25	25
Automatic Sequence	Print Enable	YES	YES	YES	YES
	Save Enable	NO	NO	NO	NO
	Print	QUANTERA	QUANTERA	QUANTERA	QUANTERA
	Save	leebkg.dat	leebkg.dat	leebkg.dat	leebkg.dat
	Repeat	0	0	0	0
Detector Bias	Alpha	802.5			
	Beta	1470.0			

Count Mode Simultaneous
(ALT T to select Count Mode, CTL PgUp and CTL PgDn for other channels)
(ALT I to configure the Print & Save commands and the Autoexecute Batch Name)

TENNELEC LB4000 PAGE 3

#2 Channel	GROUP >	A	B	C	D
Discriminator Settings	Beta LL	0	0	0	0
	Beta UL	1520	1630	1740	2250
	Alpha LL	1524	1364	1744	2254
	Alpha UL	4095	4095	4095	4095
	Threshold	25	25	25	25
Automatic Sequence	Print Enable	YES	YES	YES	YES
	Save Enable	NO	NO	NO	NO
	Print	QUANTERA	QUANTERA	QUANTERA	QUANTERA
	Save	leebkg.dat	leebkg.dat	leebkg.dat	leebkg.dat
	Repeat	0	0	0	0
Detector Bias	Alpha	802.5			
	Beta	1470.0			

Count Mode Simultaneous
(ALT T to select Count Mode, CTL PgUp and CTL PgDn for other channels)
(ALT I to configure the Print & Save commands and the Autoexecute Batch Name)

TENNELEC LB4000 PAGE 3

#3 Channel	GROUP >	A	B	C	D
Discriminator Settings	Beta LL	0	0	0	0
	Beta UL	1900	1720	1900	1910
	Alpha LL	1904	1724	1904	1914
	Alpha UL	4095	4095	4095	4095
	Threshold	25	25	25	25
Automatic Sequence	Print Enable	YES	YES	YES	YES
	Save Enable	NO	NO	NO	NO
	Print	QUANTERA	QUANTERA	QUANTERA	QUANTERA
	Save	leebkg.dat	leebkg.dat	leebkg.dat	leebkg.dat
	Repeat	0	0	0	0
Detector Bias	Alpha	802.5			
	Beta	1470.0			

Count Mode Simultaneous

(ALT T to select Count Mode, CTL PgUp and CTL PgDn for other channels)
(ALT X to configure the Print & Save commands and the Autoexecute Batch Name)

TENNELEC LB4000 PAGE 3

#4 Channel	GROUP >	A	B	C	D
Discriminator Settings	Beta LL	0	0	0	0
	Beta UL	1720	1280	2100	2050
	Alpha LL	1724	1284	2104	2054
	Alpha UL	4095	4095	4095	4095
	Threshold	25	25	25	25
Automatic Sequence	Print Enable	YES	YES	YES	YES
	Save Enable	NO	NO	NO	NO
	Print	QUANTERA	QUANTERA	QUANTERA	QUANTERA
	Save	leebkg.dat	leebkg.dat	leebkg.dat	leebkg.dat
	Repeat	0	0	0	0
Detector Bias	Alpha	802.5			
	Beta	1470.0			

Count Mode Simultaneous

(ALT T to select Count Mode, CTL PgUp and CTL PgDn for other channels)
(ALT X to configure the Print & Save commands and the Autoexecute Batch Name)

SEVERN TRENT STL

Calibration Standards and Certificates

Yellow

Alpha and Beta

Beta calibration stds. 8/31/2005 salt solution SLRB-B SET 1

Beta standard, RAD04-0095, 2316.6 dpm/mL Sr/Y90 on 08/07/2001

Std #	mLs RAD04-0095	mLs salt solution	gross mass	tare mass	net mass	projected mass, mg	reweigh 1/9/6	mass 1-9-6
1	1	0.1000	8.8980	8.8888	0.0092	0.0081	8.8977	0.0089
2	1	0.3000	8.9490	8.9230	0.0260	0.0243	8.9481	0.0251
3	1	0.5000	9.0149	8.9703	0.0446	0.0405	9.0115	0.0412
4	1	1.0000	9.0419	8.9602	0.0817	0.0809	9.0398	0.0796
5	1	1.5000	9.0033	8.8764	0.1269	0.1214	8.9976	0.1212
6	1	2.0000	9.0833	8.9072	0.1761	0.1619	9.0701	0.1629
7	1	2.5000	9.1219	8.9194	0.2025	0.2023	9.1190	0.1996
8	1	3.0000	9.1769	8.9241	0.2528	0.2428	9.1661	0.2420

Alpha calibration standards salt solution SLRB-B

Alpha standard, 03-071, 4567.9 dpm/mL Th-230 on 10/07/2003

Std #	mLs 03-071	mLs salt solution	gross mass	tare mass	net mass	projected mass	reweigh 1/9/6	mass 1-9-6
1	1	0.1000	8.9369	8.9273	0.0096	0.0081	8.9357	0.0084
2	1	0.2000	8.9958	8.9783	0.0175	0.0162	8.9943	0.0160
3	1	0.3000	8.9737	8.9470	0.0267	0.0243	8.9719	0.0249
4	1	0.5000	8.9206	8.8766	0.0440	0.0405	8.9172	0.0406
5	1	0.7500	8.9565	8.8888	0.0677	0.0607	8.9499	0.0611
6	2	1.0000	9.0043	8.9170	0.0873	0.0809	8.9970	0.0800
7	2	1.3000	9.0092	8.8992	0.1100	0.1052	9.0029	0.1037
8	2	1.5000	9.0413	8.9088	0.1325	0.1214	9.0305	0.1217

spiked by: Joel Kempema verified by: Sarah Hurst

Beta calibration stds. 9/9/2005 salt solution SLRB-B SET 2

Beta standard, RAD04-0095, 1043.5 dpm/mL Sr/Y90 on 08/07/2001.

Std #	mLs RAD04-0095	mLs salt solution	gross mass	tare mass	net mass	projected mass, mg	reweigh 1/9/6	mass 1/9/6	
1 no 2	1	0.1	8.9140	8.9056	0.0084	0.0081	8.9138	0.0082	
1	1	0.1000	8.9006	8.8876	0.0130	0.0081	8.8979	0.0103	<--unused
2	1	0.3000	8.9226	8.8939	0.0287	0.0243	8.9201	0.0262	
3	1	0.5000	8.8978	8.8559	0.0419	0.0405	8.8966	0.0407	
4	1	1.0000	8.9580	8.8715	0.0865	0.0809	8.9535	0.0820	
5	1	1.5000	9.0437	8.9139	0.1298	0.1214	9.0359	0.1220	
6	1	2.0000	9.0249	8.8592	0.1657	0.1619	9.0204	0.1612	
7	1	2.5000	9.1269	8.9239	0.2030	0.2023	9.1184	0.1945	
8	1	3.0000	9.1390	8.8872	0.2518	0.2428	9.1301	0.2429	

Alpha calibration standards salt solution SLRB-B

Alpha standard, 03-071, 4567.9 dpm/mL Th-230 on 10/07/2003

Std #	mLs 03-071	mLs salt solution	gross mass	tare mass	net mass	projected mass	reweigh 1/9/6	mass 1/9/6
1	1	0.1000	8.9143	8.9061	0.0082	0.0081	8.9142	0.0081
2	1	0.2000	8.9348	8.9182	0.0166	0.0162	8.9343	0.0161
3	1	0.3000	8.9231	8.8980	0.0251	0.0243	8.9220	0.0240
4	1	0.5000	8.9518	8.9082	0.0436	0.0405	8.9494	0.0412
5	1	0.7500	8.9683	8.9026	0.0657	0.0607	8.9639	0.0613
6	2	1.0000	9.0179	8.9303	0.0876	0.0809	9.0124	0.0821
7	2	1.3000	8.9901	8.8763	0.1138	0.1052	8.9818	0.1055
8	2	1.5000	9.0533	8.9206	0.1327	0.1214	9.0449	0.1243

spiked by: Joel Kempema verified by: Ivan Vania

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

65090-334

Th-230 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Th-230
ACTIVITY (dps):	7.654 E3
HALF-LIFE:	7.538 E4 Years
CALIBRATION DATE:	December 19, 2002 12:00 EST
TOTAL UNCERTAINTY*:	3.5%
SYSTEMATIC:	2.6%
RANDOM:	0.9%

*99% Confidence Level

Impurities: γ-impurities <0.1%, α-impurities <0.05%

5.17738 grams 0.5M HNO_3 solution.

P O NUMBER 1614557-000 OP, Item 3

SOURCE PREPARED BY: M. Taskaeva, Radiochemist

Q A APPROVED: 12-19-02

STL St. Louis

Standards Preparation Logbook Record

Jan-05-2006

Logbook: \\Qstlmo01\Stdslog\RAD_STD.std

RAD03-0085, Th 230 03-071 Analyst: hicksb

Vendor: Analytics
Solvent: 0.5M HNO3
Date Prep./Opened: 10-07-2003 Date Received: 12-19-2002
Date Expires(1): 10-07-2008 (5 Years)
Date Expires(2): 10-07-2008 (5 Years)
parent, vial# 65090-334

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Th230	4,567.9	4,567.9

RAD06-0001, Th-230 Analyst: dillardj

Solvent: 0.5M HNO3 Volume (ml): 200.00
Date Prep./Opened: 01-04-2006
Date Expires(1): 01-04-2007 (1 Year)
Date Expires(2): 01-04-2007 (1 Year)

Parent Std No.: RAD03-0085, Th 230 03-071 Aliquot Amount (ml): 1.0000
Parent Date Expires(1): 10-07-2008 Parent Date Expires(2): 10-07-2008

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Th230	4,567.9	22.840

Reviewed By: _____

Thorium 230

10/7/03

ANALYTICS

SOURCE ID: 65090-334

Radioactivity: 7,654 dps

Reference time: 12-19-2002 12:00 EST

Useful life: indefinite

Initial mass = 5.17738 grams

Mass transferred = 5.1498 grams

$$\frac{5.1498\,g}{5.17738\,g} \times 7{,}654\ dps \times \frac{60\ dpm}{1\ dps} \div 100\,mL = \boxed{4{,}567.9\ \frac{dpm}{mL}}$$

ANALYTICS

1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677

Th-230

SRS 65090-334 Amount 0.207 µCi QA

Date 12/19/02 12:00 EST Exp. ——————

PO # 1614557-000 OP, Item 3

5.17738 grams 0.5M HNO_3 solution

CAUTION RADIOACTIVE MATERIAL

Logbook: 2060

SEVERN TRENT SERVICES

Radiochemistry
Standards Preparation Logbook

Date Prep'd	Expir. Date	Standard ID Number	Isotope	Parent ID Number	Parent Activity	Parent Ref. Date	Aliquot	Dilution Volume	Change in Time	T ½	Final Activity	Solvent/ Lot #	Prep'd Initials	Cal. Ver. Initials	Comments
11-12-03	11-12-04	03-082	P32	IPL 7032	1.103 µCi/g ~~11,991 dpm~~ ~~11,991,766.6~~	15 Nov 03	4.8989 g	100 ml		14.29 days	119,957 dpm/ml ~~119,912.0~~	JTC 2-4-04	SDB	MFM	From Pg 10 Steves
11-12-03	11-12-04	03-083	P32	03052	119957 dpm/ml ~~119,912.0~~	15 Nov 03	1 ml	50 ml		14.29 days	dpm/ml ~~2,398.2~~	2399.15 JTC 2-4-04	SDB	MFM	Lab Book
9-11-03	9-11-04	03-069	Pu238	02-032	68.235 JTC 11-19-03 ~~136.17~~ dpm/ml	11-15-99	95 ml	190 ml	1396 days	87.7 y	decay corrected to 9/11/03 33.1022 ~~33.5068~~	1M HNO3	MFM	JTC	from page 28
9-11-03	9-11-04	03-069	Pu239	02-031 ~~02-033~~ JTC 11-19-03	64.025 11-19-03 ~~128.05~~ dpm/ml	11-15-99	95 ml	190 ml	1396 days	24110 y	32.0125 ~~32.025~~ JTC 11-19-03	1M HNO3	MFM	JTC	from page 28
11-21-03	11-21-04	Rad03-0083 ~~03-070~~	Tc-99	02-028	95,341.2 dpm/ml	10.96	1 ml	200 ml		2.1 Es	426.2 dpm/ml	KOH	SDB		Rad Capture ID Rad03-0083
12-9-03	12-9-04	03-084	Ra228	01012	1,018 dpm/mL	2/16/01	2 mL	100 mL		5.75 y	20.36 dpm/mL	0.5M HNO3	BH	[illegible]	
12-9-03	12-9-04	03-085	Th230	03-071	4,567.9 dpm/mL	12/19/02	1 mL	200 mL		7.538 E4	22.84 dpm/mL	0.5M HNO3	BH	LE	
12/31/03	12/31/08	03-086	Fe-55	681-78-3	.203 µCi/g	1/1/2000	4.9917 g	100 mL		999 days	10,133.2 pCi/mL	0.5M HNO3	BH		
12/31/03	12/31/04	03-087	Fe-55	03-086	10,133.2 pCi/mL	1/1/2000	5 mL	100 mL		999 days	506.7 pCi/mL	0.5M HNO3	BH		
1-5-04	1-5-05	Rad04-0001	UNAT	01-018	235.76 dpm/mL	3-201	20 mL	80 mL	N/A	4.5 E19 yrs	58.94 dpm/mL	0.5M HNO3	MFM		
1/12/04	1/12/05	Rad04-0007	Ra228	01012	1,018 dpm/mL	2/16/01	2 mL	100 mL		5.75 y	20.36 dpm/mL	0.5M HNO3	BH	BBF	
2/12/04	2/12/04	RAD-0015	Sr90	03-038	2,316.57 dpm/mL	9/19/01	5 mL	500 mL		28.5 y	23.16 dpm/mL	0.5M HNO3	BH	BBF	

Additional Comments:

SL-RAD-044, revised 3/2/01
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ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

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CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62204-334

Sr-90 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Sr-90
ACTIVITY (dps):	3.897 E4
HALF-LIFE:	28.79 years
CALIBRATION DATE:	August 7, 2001 12:00 EST
TOTAL UNCERTAINTY*:	4.0%
SYSTEMATIC:	3.5%
RANDOM:	0.5%

*99% Confidence Level

Impurities: γ-impurities <0.1%

4.99897 grams 0.1M HCl solution with 30 μg/g Sr carrier.

P O NUMBER 1097166, Item 1

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: 8-8-01

STL St. Louis

Standards Preparation Logbook Record

Feb-14-2006

Logbook: \\QstImo01\Stdslog\RAD_STD.std

RAD01-0025, Sr 90 01-093 Analyst: hicksb

Vendor: Analytics Vendor's Expiration Date: 08-07-2006
Solvent: 1M HNO3
Date Prep./Opened: 09-19-2001 Date Received: 08-07-2001
Date Expires(1): 09-19-2006 (5 Years)
Date Expires(2): 09-19-2006 (5 Years)
Current Sr 90, beta spike parent, vial# 62204-334

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Sr 90	23,166	23,166

RAD04-0095, Sr-90 Analyst: hicksb

Solvent: 0.5M HNO3 Volume (ml): 100.00
Date Prep./Opened: 10-07-2004 Date Consumed: 01-05-2006
Date Expires(1): 10-07-2005 (1 Year)
Date Expires(2): 04-17-2004 (1 Year)

Parent Std No.: RAD01-0025, Sr 90 01-093 Aliquot Amount (ml): 10.000
Parent Date Expires(1): 09-19-2006 Parent Date Expires(2): 09-19-2006

Component	Initial Conc (dpm/mL)	Final Conc (dpm/mL)
Sr 90	23,166	2,316.6

Reviewed By: _____

49

SR-90 Parent Ampoule for 2nd source CPC cal.

9/19/01
BMW

#62204-334

ampoule activity: ~~3,8970 dps~~ 38,970 dps.
½ life : 28.79 yrs
Calibration date : August 7, 2001 12:00 EST
Uncertainty 4.0%

STANDARDS LOG PARENT DILUTION # 01-093

$\left(\frac{38970 \text{ decays}}{1 \text{ sec}}\right)\left(\frac{60 \text{ sec}}{1 \text{ min}}\right) = 2,338,200$ dpm in ampoule.

$\left(\frac{2338200}{2.22}\right) = 1053243.2$ pCi/m in ampoule - Actual, 1043553.363 pCi/m
÷100 = 10435.8 pCi/ml

Actual Amount Transferred .... 4.9531 g

093 4.9531 g / 4.99897 actual = 0.9908 0.9908 x 2.3382×10^6 = 2,316,688.56 dpm

-094 $\left(\frac{2,316,688}{100 \text{ ml}}\right)$ = 23,166 dpm/ml or 104.3 pCi/ml
231,166 dpm/ml
MC 12-13-02

ANALYTICS
1380 Seaboard Ind Blvd * Atlanta, GA 30318 * USA * 404-352-8677
Sr-90
SRS 62204-334 Amount 1.053 µCi QA VMA
Date 08/07/01 12:00 EST Exp. ----------
PO # 1097166, Item 1
4.99897 grams 0.1M HCl solution
CAUTION RADIOACTIVE MATERIAL

SEVERN TRENT SERVICES

R ochemistry
Standards Preparation Logbook

Date Prep'd	Expir. Date	Standard ID Number	Isotope	Parent ID Number	Parent Activity	Parent Ref. Date	Aliquot	Dilution Volume	Change in Time	T ½	Final Activity	Solvent/ Lot #	Prep'd Initials	Cal. Ver. Initials	Comments
9/18/01	12/18/01	01-087	UNAT CAL STD	01085	10 µg/mL	9/18/01	1.5 mL	100 mL	N/A	N/A	150 ng/mL	.8 M HNO3	BMW	JTK	nanogram/mL
		01-088					1.0 mL				100 ng/mL			JTK	
		01-089					0.5 mL				50 ng/mL			JTK	
		01-090		01088	100 ng/mL		10 mL	100 mL			10 ng/mL			JTK	
		01-091		01-089	50 ng/mL		10 mL	100.0 mL			5 ng/mL			JTK	
		01-092		01-088	100 ng/mL		1.0 mL	100.0 mL			1 ng/mL			JTK	
9/19/01	9/19/06	01-093	SR-90	ampule C2204-334	38,897 dps	8/7/01	4.9531 g	100.0 mL	N/A	28.79 K	~~104.3 pCi/mL~~ 10435 pCi/mL BMW 11/19/01 23,166 dpm/mL	.8 M HNO3	BMW	JTK	
9/19/01	9/19/02	01-094	SR90	01093	10435.8 pCi/mL	9/19/01	1.0 mL	100.0 mL	N/A	28.79 K	104.3 pCi/mL 231.66 dpm/mL	.8 M HNO3	BMW	JTK	
9/26/01	9/26/02	Ba-28	STD. Barium Carrier	Mo38-KPCM BaCl2	N/A	3/23/98	28.46 g	1000.0 mL	N/A	N/A	27.2 mg/mL	Reagent H2O	BMW	JTK	See Ant capture weight sheet.
10/4/01	10/4/02 ~~10/4/06~~ 10/4/03	01-095	U-232	97-105	10,994 dpm/mL	9-6-97	1 mL	500 mL	—	70 yr	21.99 dpm	1M HNO3	CMA	JTK	
10/12/01	10/12/02	01-096	Ra226	98-006	1316 dpm/mL	2/13/98	1.0 mL	100.0 mL	—	1600 yr	13.16 dpm/mL	1M HNO3	AM	JTK	
10/18/01	10/18/02 ~~10/18/01~~ 10/18/03	01-097	(GBT) SR90/Y90	01032	1765.4 dpm/mL	3/28/01	2.0 mL	100.0 mL	N/A	28.5 yr	(35.31) total ~~23.99~~ dpm/mL decay corrected 34.87 JTK 10-29-01	~~1.995 dpm/mL~~ 1M HNO3	BMW	AW	Decay Correct = 1699.65 dpm/mL

Additional Comments:

SL-RAD-044, revised 3/2/01
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