ENGINEERING MANAGEMENT SUPPORT, INC.

West Lake OU-1

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #13-04050-OR

May 6, 2013

EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN

TABLE OF CONTENTS

Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 13-04050

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		4/9/13	KC	Sample Log-In
		4/29/13	HBS	Data Compilation
		4-30-13	MLT	First Technical Data Review
		5/1/13	MSA	Second Technical Data Review
		5/2/13		Data Entry/Electronic Deliverable
		5/2/13		Case Narrative
		5/3/13	HBS	Electronic Deliverable Proof
		5/6/13	MSA	Samples Analyzed within Holding Time Yes? [X] No? [ ]
		5/6/13	MSA	QA/QC Review
				Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by: _____ 5/6/13

Laboratory Manager — Date

Copy No. _____

Radiochemistry Services

SECTION I

CHAIN OF CUSTODY
&
pH CHECK SHEET

13-04050

Chain of Custody Record

№ 1604

Eberline Services
601 Scarboro Road
Oak Ridge, TN 37830
(865) 481-0683 Phone • (865) 483-4621 Fax

EBERLINE SERVICES

Project Name: WestLake OU-1	Project Number:
Send Report To: Paul Rosasco	Sampler (Print Name): John D Regan
Address:	Sampler (Print Name):
	Shipment Method: Courier
	Airbill Number: ____
Phone:	Laboratory Receiving:
Fax:	

(1) Lab to filter for dissolved parameters.

Purchase Order #: _____

Field Sample ID	Sample Date	Sample Time	Sample Matrix	Number of Containers	Analysis Requested: Diss U-238, U-335, U-234	Diss Ra-226, Ra-228	Diss Thor 232, 230, 228	Tot U-238, 235, 234	Tot Ra 226, 228	Tot Thor 232, 230, 228	Comments, Special Instructions, etc.	Lab Sample ID (to be completed by lab)
PZ-302-A1	4/3/13	1145	Aqueous	1	X	X	X	X	X	X	(1)	
LR-100		1327			X	X	X	X	X	X		
D-81		1340			X	X	X	X	X	X		
LR-105		1424			X	X	X	X	X	X		
PZ-207-A5		1505			X	X	X	X	X	X		
LR-103	4/3/13	1530			X	X	X	X	X	X		
PZ-1105	4/4/13	1027			X	X	X	X	X	X		
I-62		1042			X	X	X	X	X	X		
4,5- S-8		1132			X	X	X	X	X	X		
6,7- D-13		1155			X	X	X	X	X	X		
8,9- PZ-304-A5		1256			X	X	X	X	X	X		
10,11- PZ-303-A5		1300			X	X	X	X	X	X		
12,13- D-12		1356			X	X	X	X	X	X		
14,15- PZ-111-5D		1352			X	X	X	X	X	X		
16,17- PZ-304-A1		1408			X	X	X	X	X	X		
18,19- I-11		1440	↓	↓	X	X	X	X	X	X		
PZ-105-55	4/4/13	1506	Aqueous	1	X	X	X	X	X	X	(1)	

REC'D APR 09 2013

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature]	First Capitol Courier	4/8/13	0800
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
	Kristen Cowlet	4/9/13	800
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Sample Custodian Remarks (Completed By Laboratory):

QA/QC Level	Turnaround	Sample Receipt	
		Total # Containers Received?	
Level I ☐	Routine ☐	COC Seals Present?	
Level II ☐	24 Hour ☐	COC Seals Intact?	
Level III ☐	1 Week ☐	Received Containers Intact?	
Other ☐	Other ____	Temperature?	

CSS

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	13-04050
Lab Deadline	4/30/2013
Analysis	UUISO - Level 4
Sample Matrix	Water

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
Fxns 04, 06, 08, 10, 12, 14, 16 & 18 are TOTAL Fxns 05, 07, 09, 11, 13, 15, 17 & 19 are DISSOLVED	04	40	V1.0
	05	40	V1.0
	06	47	V1.0
	07	47	V1.0
	08	44	V1.0
	09	44	V1.0
	10	46	V1.0
	11	46	V1.0
	12	45	V1.0
	13	45	V1.0
	14	38	V1.0
	15	38	V1.0
	16	43	V1.0
	17	43	V1.0
	18	35	V1.0
	19	35	V1.0

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room	RT	4/10/13 0850
Relinquished by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room	RT	4/10/13 0930
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	0700 TCM	4/11/13
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	0900 TCM	4/18/13
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	0900	4/18/13
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	LCB	4/18/13 1846
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	13-04050
Lab Deadline	See Comments
Analysis	UUISO - Level 4
Sample Matrix	WA

Comments

Re-Analysis: 2Fxns 04, 06, 08, 10, 12, 14, 16 & 18 are TOTAL

Fxns 05, 07, 09, 11, 13, 15, 17 & 19 are DISSOLVED

Original Lab Deadline: 05/07/13
Rerun Lab Deadline: 05/07/13

Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
04	40	V1.0
05	40	V1.0
06	47	V1.0
07	47	V1.0
08	44	V1.0
09	44	V1.0
10	46	V1.0
11	46	V1.0
12	45	V1.0
13	45	V1.0
14	38	V1.0
15	38	V1.0
16	43	V1.0
17	43	V1.0
18	35	V1.0
19	35	V1.0

	Location (circle one)					Technician Initials
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room	4/19/13 1000
Relinquished by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room	4/19/13 1650
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	4/19/13 1650
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	0830 4/25/13
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	0830 4/25/13
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	1413 4/25/13 1242
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room	
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	

EBERLINE SERVICES Oak Ridge Laboratory	# Internal Chain of Custody	Work Order #	**13-04050**
		Lab Deadline	**4/30/2013**
		Analysis	**ThISO - Level 4**
		Sample Matrix	**Water**

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	40	V1.0
	05	40	V1.0
Fxns 04, 06, 08, 10, 12, 14, 16 & 18 are TOTAL	**06**	47	V1.0
	07	47	V1.0
Fxns 05, 07, 09, 11, 13, 15, 17 & 19 are DISSOLVED	**08**	44	V1.0
	09	44	V1.0
	10	46	V1.0
	11	46	V1.0
	12	45	V1.0
	13	45	V1.0
	14	38	V1.0
	15	38	V1.0
	16	43	V1.0
	17	43	V1.0
	18	35	V1.0
	19	35	V1.0

	Location (circle one)					Initials	Date
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room	JB	4/12/13 0800
Relinquished by	Sample Storage	Rough Prep	(Prep)	Separations	Count Room	JB	4/16/13 0700
Received by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	0700 TAM	4/16/13
Relinquished by	Sample Storage	Rough Prep	Prep	(Separations)	Count Room	0930 TAM	4/18/13
Received by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	0930 [illegible]	4/18/[illegible]
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	(Count Room)	C	4/18/13 0800
Received by	(Sample Storage)	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	13-04050
		Lab Deadline	4/30/2013
		Analysis	Ra226 - Level 4
		Sample Matrix	Water

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
Fxns 04, 06, 08, 10, 12, 14, 16 & 18 are TOTAL	04	40	V1.0
Fxns 05, 07, 09, 11, 13, 15, 17 & 19 are DISSOLVED	05	40	V1.0
	06	47	V1.0
	07	47	V1.0
	08	44	V1.0
	09	44	V1.0
	10	46	V1.0
	11	46	V1.0
	12	45	V1.0
	13	45	V1.0
	14	38	V1.0
	15	38	V1.0
	16	43	V1.0
	17	43	V1.0
	18	35	V1.0
	19	35	V1.0

	Location (circle one)					Initials	Date
Received by	**Sample Storage**	Rough Prep	Prep	Separations	Count Room	JB	4/12/13 0812
Relinquished by	Sample Storage	Rough Prep	**Prep**	Separations	Count Room	JB	4/16/13 1100
Received by	Sample Storage	Rough Prep	Prep	**Separations**	Count Room	AW	4/16/13 1825
Relinquished by	Sample Storage	Rough Prep	Prep	**Separations**	Count Room	AW	4/17/13 1752
Received by	Sample Storage	Rough Prep	Prep	Separations	**Count Room**	KB	4/17/13 1801
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	**Count Room**	C	4/19/13 0847
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES
Oak Ridge Laboratory

Internal Chain of Custody

Work Order #	13-04050
Lab Deadline	4/30/2013
Analysis	Ra228 - Level 4
Sample Matrix	Water

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
Fxns 04, 06, 08, 10, 12, 14, 16 & 18 are TOTAL Fxns 05, 07, 09, 11, 13, 15, 17 & 19 are DISSOLVED	04	40	V1.0
	05	40	V1.0
	06	47	V1.0
	07	47	V1.0
	08	44	V1.0
	09	44	V1.0
	10	46	V1.0
	11	46	V1.0
	12	45	V1.0
	13	45	V1.0
	14	38	V1.0
	15	38	V1.0
	16	43	V1.0
	17	43	V1.0
	18	35	V1.0
	19	35	V1.0

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		4/12/13 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		4/16/13 1100
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		4/16/13 1825
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		4/17/13 1752
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	4/17/13 1801
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		4/17/13 2032
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		4-19-13 0915
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		4-26-13 0902
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		4/26/13 0830
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	4/26/13 1413
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES

Sample Receiving Report
(Volumes, pH, & CPM)

Internal Work Order
13-04050
Received By
KCOULSTON

FR	ClientID	# Btls	Comments	Matrix	Storage	Rec Vol Ttl	CPM Max
01	LCS	0		WA	V1.0		
02	BLANK	0		WA	V1.0		
03	DUP	0		WA	V1.0		
04	S-8 TOT	1		WA	V1.0	9.50	40
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	9.5000	40
05	S-8 DIS	1		WA	V1.0	0.00	40
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1				40
06	D-13 TOT	1		WA	V1.0	9.50	47
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	9.5000	47
07	D-13 DIS	1		WA	V1.0	0.00	47
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1				47
08	PZ-304-AS TOT	1		WA	V1.0	9.50	44
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	9.5000	44
09	PZ-304-AS DIS	1		WA	V1.0	0.00	44
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1				44
10	PZ-303-AS TOT	1		WA	V1.0	9.50	46
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	9.5000	46
11	PZ-303-AS DIS	1		WA	V1.0	0.00	46
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1				46
12	D-12 TOT	1		WA	V1.0	9.50	45
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	9.5000	45
13	D-12 DIS	1		WA	V1.0	0.00	45
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1				45
14	PZ-111-SD TOT	1		WA	V1.0	9.50	38
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	9.5000	38
15	PZ-111-SD DIS	1		WA	V1.0	0.00	38
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1				38
16	PZ-304-AI TOT	1		WA	V1.0	9.50	43
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	9.5000	43
17	PZ-304-AI DIS	1		WA	V1.0	0.00	43
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1				43
18	I-11 TOT	1		WA	V1.0	9.50	35
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1	7	7	9.5000	35
19	I-11 DIS	1		WA	V1.0	0.00	35
			Container Number	pH Orig	pH Final	Volume (L)	CPM
			1				35

1 EJT 04/09/13

Received by: Kristen Coulston Date: 4/9/13

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Engineering Management Support, Inc.	West Lake OU-1	Environmental	04/09/2013	28	13-04050
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
West Lake OU-1	West Lake OU-1	W	04/30/2013	05/06/2013	05/07/2013

Internal ID	Client ID	Sample Date	Matrix	Storage	Ra226	Ra228	Th/ISO	U/ISO																						Ttl
01	LCS	04/09/13	WA	V1.0	X	X	X	X																						4
02	BLANK	04/09/13	WA	V1.0	X	X	X	X																						4
03	DUP	04/09/13	WA	V1.0	X	X	X	X																						4
04	S-8 TOT	04/04/13 11:32	WA	V1.0	X	X	X	X																						4
05	S-8 DIS	04/04/13 11:32	WA	V1.0	X	X	X	X																						4
06	D-13 TOT	04/04/13 11:55	WA	V1.0	X	X	X	X																						4
07	D-13 DIS	04/04/13 11:55	WA	V1.0	X	X	X	X																						4
08	PZ-304-AS TOT	04/04/13 12:56	WA	V1.0	X	X	X	X																						4
09	PZ-304-AS DIS	04/04/13 12:56	WA	V1.0	X	X	X	X																						4
10	PZ-303-AS TOT	04/04/13 13:00	WA	V1.0	X	X	X	X																						4
11	PZ-303-AS DIS	04/04/13 13:00	WA	V1.0	X	X	X	X																						4
12	D-12 TOT	04/04/13 13:50	WA	V1.0	X	X	X	X																						4
13	D-12 DIS	04/04/13 13:50	WA	V1.0	X	X	X	X																						4
14	PZ-111-SD TOT	04/04/13 13:52	WA	V1.0	X	X	X	X																						4
15	PZ-111-SD DIS	04/04/13 13:52	WA	V1.0	X	X	X	X																						4
16	PZ-304-AI TOT	04/04/13 14:08	WA	V1.0	X	X	X	X																						4
17	PZ-304-AI DIS	04/04/13 14:08	WA	V1.0	X	X	X	X																						4
18	I-11 TOT	04/04/13 14:40	WA	V1.0	X	X	X	X																						4
19	I-11 DIS	04/04/13 14:40	WA	V1.0	X	X	X	X																						4
																														0
		Totals Per Analysis (non QA samples)			16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

EBERLINE SERVICES

Sample Log In Report

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621

Invoice		Report Data	
	Paul V. Rosasco, P.E.		Paul V. Rosasco, P.E.
	Engineering Management Support, Inc		Engineering Management Support, Inc
	7220 West Jefferson Avenue, Suite 406		7220 West Jefferson Ave, Suite 406
	Lakewood, CO 80235		Lakewood, CO 80235
Voice	303-640-3426	*Voice*	303-940-3426
Fax		*Fax*	
Contact	Lyn Fitzgerald		
Voice	303-601-4255		
Fax			

Printed: 4/9/2013 1:52 PM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 13-04050

SAMPLE MATRIX/MATRICES: (CIRCLE ONE OR BOTH)

(AQUEOUS) NON-AQUEOUS

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	(Y)	N	
If aqueous, properly preserved	(Y)	N	N/A

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	(Y)	N
Unbroken on outside of package?	(Y)	N
Present on samples?	(Y)	N
Unbroken on samples?	(Y)	N
Was chain of custody present upon sample receipt?	(Y)	N

IF THE RESPONSE TO ANY OF THE ABOVE IS **NO**, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: _____

SIGNATURE: Kristen Carlsten DATE: 4/9/13

SECTION III

CASE NARRATIVE

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-35525

May 7, 2013

Paul V. Rosasco, P.E.
Engineering Management Support, Inc.
7220 West Jefferson Ave, Suite 406
Lakewood, CO 80235

CASE NARRATIVE
Work Order # 13-04050-OR

SAMPLE RECEIPT

This work order contains eight water samples received 04/09/2013. All samples were analyzed as total and dissolved for Isotopic Uranium, Isotopic Thorium and Radium-226/228.

CLIENT ID	LAB ID	CLIENT ID	LAB ID
S-8 TOT	13-04050-04	D-12 TOT	13-04050-12
S-8 DIS	13-04050-05	D-12 DIS	13-04050-13
D-13 TOT	13-04050-06	PZ-111-SD TOT	13-04050-14
D-13 DIS	13-04050-07	PZ-111-SD DIS	13-04050-15
PZ-304-AS TOT	13-04050-08	PZ-304-AI TOT	13-04050-16
PZ-304-AS DIS	13-04050-09	PZ-304-AI DIS	13-04050-17
PZ-303-AS TOT	13-04050-10	I-11 TOT	13-04050-18
PZ-303-AS DIS	13-04050-11	I-11 DIS	13-04050-19

ANALYTICAL METHODS

Isotopic Uranium and Isotopic Thorium were analyzed using Method HASL 300, 4.5.2. Radium-226 was analyzed using EPA Method 903.0. Radium-228 was analyzed using EPA Method 904.0.

Laboratory qualifiers are as follows:

J - Indicates a situation where the result minus the error is less than the detection limit but greater than zero.

U - Indicates a situation where the result minus the error is less than or equal to zero.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

ANALYTICAL RESULTS CONTINUED

SPECIAL CIRCUMSTANCES

Due to the presence of organics, sample fractions -10 and -11 (Client IDs: PZ-303-AS TOT and PZ-303-AS DIS) were muffled prior to chemical preparations.

ISOTOPIC URANIUM

Samples were filtered to disassociate dissolved and total fractions. Volumetric aliquots from dissolved fractions were acidified with HNO_3. All samples were prepared by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

1st Analytical Attempt

Samples demonstrated acceptable results for all Uranium analyses. Chemical recovery was low for sample fractions -08 and -09 (Client IDs: PZ-304-AS TOT and PZ-304-AS DIS). Chemical recovery was acceptable for all other samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234 and Uranium-238 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-235 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

2nd Analytical Attempt

Sample fractions -08 and -09 (Client IDs: PZ-304-AS TOT and PZ-304-AS DIS) were reanalyzed due to low chemical recoveries. Samples demonstrated acceptable results for all Uranium analyses. Chemical recovery was acceptable for all samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234, Uranium-235 and Uranium-238 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

ISOTOPIC THORIUM

Samples were filtered to disassociate dissolved and total fractions. Volumetric aliquots from dissolved fractions were acidified with HNO_3. All samples were prepared by mixed acid digestions as appropriate. Thorium was selectively extracted by ion exchange. Thorium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Thorium-228, Thorium-230 and Thorium-232. Chemical recovery was determined by the use of a Thorium-229 tracer. Activity of the Thorium-229 tracer was determined by alpha spectroscopy using an energy specific region of interest.

Samples demonstrated acceptable results for all Thorium analyses. Chemical recovery was slightly low for sample fraction -11 (Client ID: PZ-303-AS DIS). Chemical recovery was acceptable for all other samples. The Thorium-228 and Thorium-232 method blank demonstrated acceptable results. The

ANALYTICAL RESULTS CONTINUED

ISOTOPIC THORIUM CONTINUED

Thorium-230 method blank demonstrated results slightly greater than the detection limit. Results for the Thorium-228 and Thorium-232 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Thorium-230 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Thorium-228, Thorium-230 and Thorium-232 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-226

Samples were filtered to disassociate dissolved and total fractions. Volumetric aliquots from dissolved fractions were acidified with HNO_3. All samples were prepared by mixed acid digestions as appropriate. This was followed by selective sulfate precipitations of the Radium. Samples were then mounted by semi-micro-precipitations onto micro-porous filters. Samples were counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Samples demonstrated acceptable results for all Radium-226 analyses. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated acceptable results. Results for the Radium-226 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were then counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Samples demonstrated acceptable results for all Radium-228 analyses. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated acceptable results. Results for the Radium-228 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 5/7/2013

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SECTION IV

ANALYTICAL RESULTS SUMMARY

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Engineering Management Support, Inc.
7220 West Jefferson Ave, Suite 406
Lakewood, CO 80235

Project: West Lake OU-1
SDG: 1304050
Received: 04/09/2013
Matrix: Water

Client Sample ID	Lab Sample ID	Analysis Date/Time	Analyte	Method	Result	Error	MDA	Qualifier	Units
LCS13-04050-01	13-04050-01	04/18/2013 15:27:24	Radium-226	E903.0	9.90	1.16	0.19		pCi/l
LCS13-04050-01	13-04050-01	04/26/2013 09:41:49	Radium-228	E904.0	8.63	0.98	1.31		pCi/l
LCS13-04050-01	13-04050-01	04/18/2013 18:29:31	Thorium-228	HASL 300, 4.5.2	5.65	0.92	0.11		pCi/l
LCS13-04050-01	13-04050-01	04/18/2013 18:29:31	Thorium-230	HASL 300, 4.5.2	6.42	1.03	0.12		pCi/l
LCS13-04050-01	13-04050-01	04/18/2013 18:29:31	Thorium-232	HASL 300, 4.5.2	4.71	0.80	0.06		pCi/l
LCS13-04050-01	13-04050-01	04/18/2013 09:33:52	Uranium-234	HASL 300, 4.5.2	7.17	0.94	0.07		pCi/l
LCS13-04050-01	13-04050-01	04/25/2013 08:52:28	Uranium-234	HASL 300, 4.5.2	7.79	1.01	0.07		pCi/l
LCS13-04050-01	13-04050-01	04/18/2013 09:33:52	Uranium-235	HASL 300, 4.5.2	0.84	0.24	0.09		pCi/l
LCS13-04050-01	13-04050-01	04/25/2013 08:52:28	Uranium-235	HASL 300, 4.5.2	0.49	0.18	0.08		pCi/l
LCS13-04050-01	13-04050-01	04/18/2013 09:33:52	Uranium-238	HASL 300, 4.5.2	7.54	0.98	0.07		pCi/l
LCS13-04050-01	13-04050-01	04/25/2013 08:52:28	Uranium-238	HASL 300, 4.5.2	7.72	1.00	0.06		pCi/l
BLANK13-04050-02	13-04050-02	04/18/2013 15:27:25	Radium-226	E903.0	0.02	0.04	0.09	U	pCi/l
BLANK13-04050-02	13-04050-02	04/26/2013 09:41:49	Radium-228	E904.0	0.77	0.42	0.80	J	pCi/l
BLANK13-04050-02	13-04050-02	04/18/2013 18:29:32	Thorium-228	HASL 300, 4.5.2	-0.02	0.04	0.15	U	pCi/l
BLANK13-04050-02	13-04050-02	04/18/2013 18:29:32	Thorium-230	HASL 300, 4.5.2	0.57	0.24	0.12		pCi/l
BLANK13-04050-02	13-04050-02	04/18/2013 18:29:32	Thorium-232	HASL 300, 4.5.2	0.02	0.04	0.08	U	pCi/l
BLANK13-04050-02	13-04050-02	04/18/2013 09:33:53	Uranium-234	HASL 300, 4.5.2	0.07	0.06	0.07	J	pCi/l
BLANK13-04050-02	13-04050-02	04/25/2013 08:52:29	Uranium-234	HASL 300, 4.5.2	0.05	0.05	0.07	U	pCi/l
BLANK13-04050-02	13-04050-02	04/18/2013 09:33:53	Uranium-235	HASL 300, 4.5.2	0.03	0.05	0.08	U	pCi/l
BLANK13-04050-02	13-04050-02	04/25/2013 08:52:29	Uranium-235	HASL 300, 4.5.2	0.02	0.04	0.08	U	pCi/l
BLANK13-04050-02	13-04050-02	04/18/2013 09:33:53	Uranium-238	HASL 300, 4.5.2	0.02	0.03	0.05	U	pCi/l
BLANK13-04050-02	13-04050-02	04/25/2013 08:52:29	Uranium-238	HASL 300, 4.5.2	0.01	0.03	0.07	U	pCi/l
PZ-111-SD TOT DUP	13-04050-03	04/18/2013 15:27:27	Radium-226	E903.0	1.36	0.36	0.12		pCi/l
PZ-111-SD TOT DUP	13-04050-03	04/26/2013 09:41:49	Radium-228	E904.0	1.07	0.43	0.79	J	pCi/l
S-8 TOT DUP	13-04050-03	04/18/2013 18:29:33	Thorium-228	HASL 300, 4.5.2	0.07	0.12	0.20	U	pCi/l
S-8 TOT DUP	13-04050-03	04/18/2013 18:29:33	Thorium-230	HASL 300, 4.5.2	0.23	0.17	0.16	J	pCi/l
S-8 TOT DUP	13-04050-03	04/18/2013 18:29:33	Thorium-232	HASL 300, 4.5.2	0.02	0.08	0.19	U	pCi/l
S-8 TOT DUP	13-04050-03	04/18/2013 09:33:48	Uranium-234	HASL 300, 4.5.2	0.94	0.24	0.06		pCi/l
PZ-304-AS TOT DUP	13-04050-03	04/25/2013 08:52:24	Uranium-234	HASL 300, 4.5.2	0.23	0.45	0.84	U	pCi/l
S-8 TOT DUP	13-04050-03	04/18/2013 09:33:48	Uranium-235	HASL 300, 4.5.2	0.06	0.06	0.08	U	pCi/l
PZ-304-AS TOT DUP	13-04050-03	04/25/2013 08:52:24	Uranium-235	HASL 300, 4.5.2	0.10	0.32	0.75	U	pCi/l
S-8 TOT DUP	13-04050-03	04/18/2013 09:33:48	Uranium-238	HASL 300, 4.5.2	0.79	0.22	0.05		pCi/l
PZ-304-AS TOT DUP	13-04050-03	04/25/2013 08:52:24	Uranium-238	HASL 300, 4.5.2	0.15	0.36	0.76	U	pCi/l

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Project: West Lake OU-1
SDG: 1304050
Received: 04/09/2013
Matrix: Water

Client Sample ID	Lab Sample ID	Analysis Date/Time	Analyte	Method	Result	Error	MDA	Qualifier	Units
S-8 TOT	13-04050-04	04/18/2013 15:27:29	Radium-226	E903.0	0.45	0.22	0.15		pCi/l
S-8 TOT	13-04050-04	04/26/2013 09:41:49	Radium-228	E904.0	1.18	0.43	0.77	J	pCi/l
S-8 TOT	13-04050-04	04/18/2013 18:29:34	Thorium-228	HASL 300, 4.5.2	0.09	0.09	0.11	U	pCi/l
S-8 TOT	13-04050-04	04/18/2013 18:29:34	Thorium-230	HASL 300, 4.5.2	0.24	0.13	0.08		pCi/l
S-8 TOT	13-04050-04	04/18/2013 18:29:34	Thorium-232	HASL 300, 4.5.2	0.00	0.03	0.08	U	pCi/l
S-8 TOT	13-04050-04	04/18/2013 09:33:50	Uranium-234	HASL 300, 4.5.2	0.84	0.24	0.09		pCi/l
S-8 TOT	13-04050-04	04/18/2013 09:33:50	Uranium-235	HASL 300, 4.5.2	0.09	0.08	0.08	J	pCi/l
S-8 TOT	13-04050-04	04/18/2013 09:33:50	Uranium-238	HASL 300, 4.5.2	0.94	0.26	0.09		pCi/l
S-8 DIS	13-04050-05	04/18/2013 15:27:30	Radium-226	E903.0	0.45	0.21	0.12		pCi/l
S-8 DIS	13-04050-05	04/26/2013 09:41:39	Radium-228	E904.0	1.00	0.44	0.81	J	pCi/l
S-8 DIS	13-04050-05	04/18/2013 18:30:08	Thorium-228	HASL 300, 4.5.2	0.00	0.07	0.15	U	pCi/l
S-8 DIS	13-04050-05	04/18/2013 18:30:08	Thorium-230	HASL 300, 4.5.2	0.99	0.37	0.10		pCi/l
S-8 DIS	13-04050-05	04/18/2013 18:30:08	Thorium-232	HASL 300, 4.5.2	0.02	0.05	0.12	U	pCi/l
S-8 DIS	13-04050-05	04/18/2013 12:30:45	Uranium-234	HASL 300, 4.5.2	0.85	0.24	0.06		pCi/l
S-8 DIS	13-04050-05	04/18/2013 12:30:45	Uranium-235	HASL 300, 4.5.2	0.09	0.09	0.11	U	pCi/l
S-8 DIS	13-04050-05	04/18/2013 12:30:45	Uranium-238	HASL 300, 4.5.2	0.55	0.19	0.07		pCi/l
D-13 TOT	13-04050-06	04/18/2013 15:27:32	Radium-226	E903.0	1.20	0.36	0.19		pCi/l
D-13 TOT	13-04050-06	04/26/2013 09:41:40	Radium-228	E904.0	2.52	0.59	1.01		pCi/l
D-13 TOT	13-04050-06	04/18/2013 18:30:10	Thorium-228	HASL 300, 4.5.2	0.39	0.16	0.06		pCi/l
D-13 TOT	13-04050-06	04/18/2013 18:30:10	Thorium-230	HASL 300, 4.5.2	0.37	0.16	0.08		pCi/l
D-13 TOT	13-04050-06	04/18/2013 18:30:10	Thorium-232	HASL 300, 4.5.2	0.07	0.07	0.08	U	pCi/l
D-13 TOT	13-04050-06	04/18/2013 12:30:47	Uranium-234	HASL 300, 4.5.2	0.23	0.13	0.09		pCi/l
D-13 TOT	13-04050-06	04/18/2013 12:30:47	Uranium-235	HASL 300, 4.5.2	0.02	0.06	0.13	U	pCi/l
D-13 TOT	13-04050-06	04/18/2013 12:30:47	Uranium-238	HASL 300, 4.5.2	0.25	0.14	0.08		pCi/l
D-13 DIS	13-04050-07	04/18/2013 15:27:33	Radium-226	E903.0	0.92	0.30	0.13		pCi/l
D-13 DIS	13-04050-07	04/26/2013 09:41:40	Radium-228	E904.0	1.22	0.47	0.87	J	pCi/l
D-13 DIS	13-04050-07	04/18/2013 18:30:11	Thorium-228	HASL 300, 4.5.2	-0.01	0.04	0.09	U	pCi/l
D-13 DIS	13-04050-07	04/18/2013 18:30:11	Thorium-230	HASL 300, 4.5.2	0.44	0.19	0.08		pCi/l
D-13 DIS	13-04050-07	04/18/2013 18:30:11	Thorium-232	HASL 300, 4.5.2	0.00	0.04	0.08	U	pCi/l
D-13 DIS	13-04050-07	04/18/2013 12:30:48	Uranium-234	HASL 300, 4.5.2	0.17	0.10	0.06		pCi/l
D-13 DIS	13-04050-07	04/18/2013 12:30:48	Uranium-235	HASL 300, 4.5.2	0.04	0.05	0.07	U	pCi/l
D-13 DIS	13-04050-07	04/18/2013 12:30:48	Uranium-238	HASL 300, 4.5.2	0.11	0.08	0.05	J	pCi/l

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Project: West Lake OU-1
SDG: 1304050
Received: 04/09/2013
Matrix: Water

Client Sample ID	Lab Sample ID	Analysis Date/Time	Analyte	Method	Result	Error	MDA	Qualifier	Units
PZ-304-AS TOT	13-04050-08	04/18/2013 15:27:35	Radium-226	E903.0	1.34	0.44	0.22		pCi/l
PZ-304-AS TOT	13-04050-08	04/26/2013 09:46:07	Radium-228	E904.0	1.76	0.53	0.94		pCi/l
PZ-304-AS TOT	13-04050-08	04/18/2013 18:30:13	Thorium-228	HASL 300, 4.5.2	0.04	0.06	0.11	U	pCi/l
PZ-304-AS TOT	13-04050-08	04/18/2013 18:30:13	Thorium-230	HASL 300, 4.5.2	0.17	0.11	0.10	J	pCi/l
PZ-304-AS TOT	13-04050-08	04/18/2013 18:30:13	Thorium-232	HASL 300, 4.5.2	0.03	0.05	0.08	U	pCi/l
PZ-304-AS TOT	13-04050-08	04/25/2013 08:52:25	Uranium-234	HASL 300, 4.5.2	0.85	0.68	0.61	J	pCi/l
PZ-304-AS TOT	13-04050-08	04/25/2013 08:52:25	Uranium-235	HASL 300, 4.5.2	0.16	0.44	0.94	U	pCi/l
PZ-304-AS TOT	13-04050-08	04/25/2013 08:52:25	Uranium-238	HASL 300, 4.5.2	-0.04	0.26	0.61	U	pCi/l
PZ-304-AS DIS	13-04050-09	04/18/2013 15:27:37	Radium-226	E903.0	0.47	0.25	0.19		pCi/l
PZ-304-AS DIS	13-04050-09	04/26/2013 09:46:07	Radium-228	E904.0	0.96	0.39	0.72	J	pCi/l
PZ-304-AS DIS	13-04050-09	04/18/2013 18:30:15	Thorium-228	HASL 300, 4.5.2	0.00	0.05	0.11	U	pCi/l
PZ-304-AS DIS	13-04050-09	04/18/2013 18:30:15	Thorium-230	HASL 300, 4.5.2	0.29	0.18	0.11	J	pCi/l
PZ-304-AS DIS	13-04050-09	04/18/2013 18:30:15	Thorium-232	HASL 300, 4.5.2	0.02	0.05	0.11	U	pCi/l
PZ-304-AS DIS	13-04050-09	04/25/2013 08:52:26	Uranium-234	HASL 300, 4.5.2	0.08	0.33	0.84	U	pCi/l
PZ-304-AS DIS	13-04050-09	04/25/2013 08:52:26	Uranium-235	HASL 300, 4.5.2	0.40	0.68	1.19	U	pCi/l
PZ-304-AS DIS	13-04050-09	04/25/2013 08:52:26	Uranium-238	HASL 300, 4.5.2	-0.05	0.32	0.76	U	pCi/l
PZ-303-AS TOT	13-04050-10	04/18/2013 15:27:39	Radium-226	E903.0	1.38	0.39	0.15		pCi/l
PZ-303-AS TOT	13-04050-10	04/26/2013 09:46:07	Radium-228	E904.0	1.61	0.72	1.37	J	pCi/l
PZ-303-AS TOT	13-04050-10	04/18/2013 18:30:16	Thorium-228	HASL 300, 4.5.2	1.03	0.49	0.21		pCi/l
PZ-303-AS TOT	13-04050-10	04/18/2013 18:30:16	Thorium-230	HASL 300, 4.5.2	1.70	0.69	0.26		pCi/l
PZ-303-AS TOT	13-04050-10	04/18/2013 18:30:16	Thorium-232	HASL 300, 4.5.2	0.69	0.41	0.37	J	pCi/l
PZ-303-AS TOT	13-04050-10	04/18/2013 12:30:53	Uranium-234	HASL 300, 4.5.2	0.91	0.24	0.06		pCi/l
PZ-303-AS TOT	13-04050-10	04/18/2013 12:30:53	Uranium-235	HASL 300, 4.5.2	0.05	0.06	0.07	U	pCi/l
PZ-303-AS TOT	13-04050-10	04/18/2013 12:30:53	Uranium-238	HASL 300, 4.5.2	0.80	0.22	0.07		pCi/l
PZ-303-AS DIS	13-04050-11	04/18/2013 15:27:40	Radium-226	E903.0	0.44	0.22	0.14		pCi/l
PZ-303-AS DIS	13-04050-11	04/26/2013 09:46:07	Radium-228	E904.0	0.78	0.57	1.14	J	pCi/l
PZ-303-AS DIS	13-04050-11	04/18/2013 18:30:18	Thorium-228	HASL 300, 4.5.2	-0.01	0.12	0.35	U	pCi/l
PZ-303-AS DIS	13-04050-11	04/18/2013 18:30:18	Thorium-230	HASL 300, 4.5.2	0.19	0.22	0.25	U	pCi/l
PZ-303-AS DIS	13-04050-11	04/18/2013 18:30:18	Thorium-232	HASL 300, 4.5.2	-0.04	0.11	0.30	U	pCi/l
PZ-303-AS DIS	13-04050-11	04/18/2013 12:30:55	Uranium-234	HASL 300, 4.5.2	0.38	0.16	0.10		pCi/l
PZ-303-AS DIS	13-04050-11	04/18/2013 12:30:55	Uranium-235	HASL 300, 4.5.2	0.06	0.08	0.12	U	pCi/l
PZ-303-AS DIS	13-04050-11	04/18/2013 12:30:55	Uranium-238	HASL 300, 4.5.2	0.20	0.12	0.09	J	pCi/l

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Project: West Lake OU-1
SDG: 1304050
Received: 04/09/2013
Matrix: Water

Client Sample ID	Lab Sample ID	Analysis Date/Time	Analyte	Method	Result	Error	MDA	Qualifier	Units
D-12 TOT	13-04050-12	04/18/2013 18:28:51	Radium-226	E903.0	0.96	0.34	0.17		pCi/l
D-12 TOT	13-04050-12	04/26/2013 09:46:12	Radium-228	E904.0	0.56	0.50	1.01	J	pCi/l
D-12 TOT	13-04050-12	04/18/2013 18:30:20	Thorium-228	HASL 300, 4.5.2	0.11	0.13	0.16	U	pCi/l
D-12 TOT	13-04050-12	04/18/2013 18:30:20	Thorium-230	HASL 300, 4.5.2	0.34	0.25	0.23	J	pCi/l
D-12 TOT	13-04050-12	04/18/2013 18:30:20	Thorium-232	HASL 300, 4.5.2	-0.02	0.08	0.20	U	pCi/l
D-12 TOT	13-04050-12	04/18/2013 12:30:57	Uranium-234	HASL 300, 4.5.2	0.13	0.13	0.16	U	pCi/l
D-12 TOT	13-04050-12	04/18/2013 12:30:57	Uranium-235	HASL 300, 4.5.2	0.07	0.11	0.20	U	pCi/l
D-12 TOT	13-04050-12	04/18/2013 12:30:57	Uranium-238	HASL 300, 4.5.2	0.07	0.09	0.11	U	pCi/l
D-12 DIS	13-04050-13	04/18/2013 18:28:52	Radium-226	E903.0	0.19	0.17	0.24	J	pCi/l
D-12 DIS	13-04050-13	04/26/2013 09:46:12	Radium-228	E904.0	1.37	0.48	0.86		pCi/l
D-12 DIS	13-04050-13	04/18/2013 18:30:21	Thorium-228	HASL 300, 4.5.2	0.00	0.03	0.06	U	pCi/l
D-12 DIS	13-04050-13	04/18/2013 18:30:21	Thorium-230	HASL 300, 4.5.2	0.26	0.13	0.09		pCi/l
D-12 DIS	13-04050-13	04/18/2013 18:30:21	Thorium-232	HASL 300, 4.5.2	0.00	0.03	0.07	U	pCi/l
D-12 DIS	13-04050-13	04/18/2013 12:30:59	Uranium-234	HASL 300, 4.5.2	0.24	0.16	0.12	J	pCi/l
D-12 DIS	13-04050-13	04/18/2013 12:30:59	Uranium-235	HASL 300, 4.5.2	0.08	0.10	0.14	U	pCi/l
D-12 DIS	13-04050-13	04/18/2013 12:30:59	Uranium-238	HASL 300, 4.5.2	0.09	0.10	0.10	U	pCi/l
PZ-111-SD TOT	13-04050-14	04/18/2013 18:28:46	Radium-226	E903.0	0.91	0.29	0.20		pCi/l
PZ-111-SD TOT	13-04050-14	04/26/2013 10:13:02	Radium-228	E904.0	0.26	0.45	0.93	U	pCi/l
PZ-111-SD TOT	13-04050-14	04/18/2013 18:30:23	Thorium-228	HASL 300, 4.5.2	0.05	0.06	0.07	U	pCi/l
PZ-111-SD TOT	13-04050-14	04/18/2013 18:30:23	Thorium-230	HASL 300, 4.5.2	0.13	0.10	0.08	J	pCi/l
PZ-111-SD TOT	13-04050-14	04/18/2013 18:30:23	Thorium-232	HASL 300, 4.5.2	0.00	0.05	0.10	U	pCi/l
PZ-111-SD TOT	13-04050-14	04/18/2013 12:31:01	Uranium-234	HASL 300, 4.5.2	0.41	0.15	0.07		pCi/l
PZ-111-SD TOT	13-04050-14	04/18/2013 12:31:01	Uranium-235	HASL 300, 4.5.2	0.03	0.04	0.06	U	pCi/l
PZ-111-SD TOT	13-04050-14	04/18/2013 12:31:01	Uranium-238	HASL 300, 4.5.2	0.18	0.09	0.07		pCi/l
PZ-111-SD DIS	13-04050-15	04/18/2013 18:28:48	Radium-226	E903.0	1.17	0.33	0.12		pCi/l
PZ-111-SD DIS	13-04050-15	04/26/2013 10:13:03	Radium-228	E904.0	0.93	0.44	0.82	J	pCi/l
PZ-111-SD DIS	13-04050-15	04/18/2013 18:30:25	Thorium-228	HASL 300, 4.5.2	0.01	0.05	0.13	U	pCi/l
PZ-111-SD DIS	13-04050-15	04/18/2013 18:30:25	Thorium-230	HASL 300, 4.5.2	0.45	0.23	0.13		pCi/l
PZ-111-SD DIS	13-04050-15	04/18/2013 18:30:25	Thorium-232	HASL 300, 4.5.2	0.00	0.05	0.10	U	pCi/l
PZ-111-SD DIS	13-04050-15	04/18/2013 15:25:41	Uranium-234	HASL 300, 4.5.2	0.43	0.15	0.06		pCi/l
PZ-111-SD DIS	13-04050-15	04/18/2013 15:25:41	Uranium-235	HASL 300, 4.5.2	0.02	0.04	0.07	U	pCi/l
PZ-111-SD DIS	13-04050-15	04/18/2013 15:25:41	Uranium-238	HASL 300, 4.5.2	0.27	0.12	0.07		pCi/l

Paul V. Rosasco, P.E.
Engineering Management Support, Inc.
7220 West Jefferson Ave, Suite 406
Lakewood, CO 80235

Project: West Lake OU-1
SDG: 1304050
Received: 04/09/2013
Matrix: Water

Client Sample ID	Lab Sample ID	Analysis Date/Time	Analyte	Method	Result	Error	MDA	Qualifier	Units
PZ-304-Al TOT	13-04050-16	04/18/2013 18:28:49	Radium-226	E903.0	1.23	0.44	0.24		pCi/l
PZ-304-Al TOT	13-04050-16	04/26/2013 10:13:03	Radium-228	E904.0	1.96	0.47	0.77		pCi/l
PZ-304-Al TOT	13-04050-16	04/19/2013 05:58:57	Thorium-228	HASL 300, 4.5.2	0.01	0.07	0.16	U	pCi/l
PZ-304-Al TOT	13-04050-16	04/19/2013 05:58:57	Thorium-230	HASL 300, 4.5.2	0.41	0.18	0.08		pCi/l
PZ-304-Al TOT	13-04050-16	04/19/2013 05:58:57	Thorium-232	HASL 300, 4.5.2	0.01	0.03	0.08	U	pCi/l
PZ-304-Al TOT	13-04050-16	04/18/2013 15:25:42	Uranium-234	HASL 300, 4.5.2	0.21	0.21	0.28	U	pCi/l
PZ-304-Al TOT	13-04050-16	04/18/2013 15:25:42	Uranium-235	HASL 300, 4.5.2	-0.05	0.10	0.29	U	pCi/l
PZ-304-Al TOT	13-04050-16	04/18/2013 15:25:42	Uranium-238	HASL 300, 4.5.2	0.29	0.22	0.21	J	pCi/l
PZ-304-Al DIS	13-04050-17	04/18/2013 18:28:50	Radium-226	E903.0	0.62	0.28	0.24		pCi/l
PZ-304-Al DIS	13-04050-17	04/26/2013 10:13:03	Radium-228	E904.0	1.23	0.45	0.81	J	pCi/l
PZ-304-Al DIS	13-04050-17	04/19/2013 05:58:58	Thorium-228	HASL 300, 4.5.2	-0.03	0.05	0.14	U	pCi/l
PZ-304-Al DIS	13-04050-17	04/19/2013 05:58:58	Thorium-230	HASL 300, 4.5.2	0.16	0.10	0.11	J	pCi/l
PZ-304-Al DIS	13-04050-17	04/19/2013 05:58:58	Thorium-232	HASL 300, 4.5.2	0.00	0.03	0.08	U	pCi/l
PZ-304-Al DIS	13-04050-17	04/18/2013 15:25:38	Uranium-234	HASL 300, 4.5.2	0.50	0.27	0.24	J	pCi/l
PZ-304-Al DIS	13-04050-17	04/18/2013 15:25:38	Uranium-235	HASL 300, 4.5.2	0.16	0.16	0.21	U	pCi/l
PZ-304-Al DIS	13-04050-17	04/18/2013 15:25:38	Uranium-238	HASL 300, 4.5.2	0.42	0.24	0.18		pCi/l
I-11 TOT	13-04050-18	04/18/2013 18:29:13	Radium-226	E903.0	1.02	0.36	0.24		pCi/l
I-11 TOT	13-04050-18	04/26/2013 11:47:39	Radium-228	E904.0	2.37	0.63	1.08		pCi/l
I-11 TOT	13-04050-18	04/19/2013 05:58:53	Thorium-228	HASL 300, 4.5.2	0.01	0.07	0.14	U	pCi/l
I-11 TOT	13-04050-18	04/19/2013 05:58:53	Thorium-230	HASL 300, 4.5.2	0.19	0.11	0.11	J	pCi/l
I-11 TOT	13-04050-18	04/19/2013 05:58:53	Thorium-232	HASL 300, 4.5.2	0.02	0.04	0.07	U	pCi/l
I-11 TOT	13-04050-18	04/18/2013 15:25:39	Uranium-234	HASL 300, 4.5.2	1.07	0.34	0.09		pCi/l
I-11 TOT	13-04050-18	04/18/2013 15:25:39	Uranium-235	HASL 300, 4.5.2	0.06	0.09	0.17	U	pCi/l
I-11 TOT	13-04050-18	04/18/2013 15:25:39	Uranium-238	HASL 300, 4.5.2	0.71	0.27	0.14		pCi/l
I-11 DIS	13-04050-19	04/18/2013 18:29:14	Radium-226	E903.0	1.24	0.42	0.23		pCi/l
I-11 DIS	13-04050-19	04/26/2013 11:47:39	Radium-228	E904.0	0.88	0.61	1.21	J	pCi/l
I-11 DIS	13-04050-19	04/19/2013 05:58:54	Thorium-228	HASL 300, 4.5.2	0.04	0.07	0.13	U	pCi/l
I-11 DIS	13-04050-19	04/19/2013 05:58:54	Thorium-230	HASL 300, 4.5.2	0.49	0.19	0.07		pCi/l
I-11 DIS	13-04050-19	04/19/2013 05:58:54	Thorium-232	HASL 300, 4.5.2	0.03	0.05	0.10	U	pCi/l
I-11 DIS	13-04050-19	04/18/2013 15:25:40	Uranium-234	HASL 300, 4.5.2	1.24	0.42	0.18		pCi/l
I-11 DIS	13-04050-19	04/18/2013 15:25:40	Uranium-235	HASL 300, 4.5.2	0.07	0.10	0.15	U	pCi/l
I-11 DIS	13-04050-19	04/18/2013 15:25:40	Uranium-238	HASL 300, 4.5.2	1.08	0.39	0.12		pCi/l

SECTION V

ANALYTICAL STANDARDS

QA/QC REVIEWED
Date 1/16/95 Initials [illegible]

U-8

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-238NAT	Customer:	TMA EBERLINE
Half Life:	(4.468 ± 0.005) x 10^9 years	P.O.No.:	OR2778
Catalog No.:	7338	Reference Date:	January 1 1995 12:00 PST.
Source No.:	479-50	Contained Radioactivity:	(Total U) 8.016 μCi
		Contained Radioactivity:	(Total U) 297 kBq

Description of Solution

a. Mass of solution: 65.2896 g in a 50 ml flame sealed ampoule
b. Chemical form: Uranyl Nitrate in H2O
c. Carrier content: None
d. Density: Approximately 1.3202 g/ml @ 20°C.

Radioimpurities: Refer to attached technical data sheet

Radioactive Daughters: Refer to attached technical data sheet

Radionuclide Concentration

(Total U) 0.1228 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration: ±3.0%
b. Random uncertainty in assay: ±0.0%
c. Random uncertainty in weighing(s): ±2.0%
d. Total uncertainty at the 99% confidence level: ±3.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

[signature], ERIC ALLAS
QUALITY CONTROL

29 DECEMBER 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
3017 N. SAN FERNANDO BLVD.
BURBANK, CALIFORNIA 91504
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EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

		CURRENT DATE	9/6/2012 0:00
SOLUTION REFERENCE #	IPL 479-50	SOLUTION #	U-8

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234, 235, 238}U$	4.468E+09	1.632E+12

Radionuclide	$^{234, 235, 238}U$	Reference Date	1/1/1995 0:00
Certified Activity	8.016E+00 µCi		
Certified Concentration	µCi per gram		

Ampoule /Solution Gross	97.6400	Weight, Grams
Empty Ampoule	32.5020	Weight, Grams
Solution Net	65.1380	Weight, Grams
Total Activity in Ampoule	8.0160	µCi

Chemical Composition of Standard Solution

Uranyl nitrate in dilute HNO_3

Dilution Instructions: **Dilution Solvent Used** 1M HNO_3

Dilute to a volume of 1000.00 **milliliters**

Certified Total Activity of 8.0160 µCi **Which Equals** 1.780E+07 **dpm at the date listed above**

And after dilution the activity of this solution is 1.77955E+04 **dpm/ml**

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 6, 2013

Verified & Approved By _____ Date: 9/26/2012 0:00

QC Approval _____ Date: 9/26/12

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SECONDARY DILUTION RECERTIFICATION

	MP-009	Date	9/6/2012 0:00
Solution Reference #	IPL 479-50	Solution #	U-8a

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234, 235, 238}U$	4.468E+09	1.632E+12

Radionuclide of Interest: $^{234, 235, 238}U$
Parent Solution Conc.: 1.7796E+04 dpm/ml

Reference Date: 1/1/1995 0:00

Chemical Composition of Standard Solution
Uranly Nitrate in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 4.0000 ml
Total Activity: 7.1182E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 7.1182E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Isotopic Distribution as:
U-238 Atom % = 48.239 U-238 = 71.182 dpm/ml X 0.48249 = 34.345 dpm/ml
U-235 Atom % = 2.25 U-235 = 71.182 dpm/ml X 0.0225 = 1.602 dpm/ml
U-234 Atom % = 49.501 U-238 = 71.182 dpm/ml X 0.49501 = 35.236 dpm/ml
All values +/- 3.6%

Isotopic ratios from manufacturer's data sheet

Expiration Date: September 6, 2013

Verified & Approved By _____ Date: 9/26/2012 0:00

QC Approval _____ Date: 9/26/12

Tracer Solution for Environmental Analysis & Disequilibrium Studies

Product Description & Measurement Certificate

Description	Principal radionuclide:	**uranium 232** (U-232)	Product code: **UDP10050**
	Daughter Nuclide:	Th-228	Batch Number: 92/232/67
Measurement	Reference date:		01 March 2000
	Radioactive concentration U-232		6.739E+03 becquerels per gram of solution
	which is equivalent to		1.821E-01 microcuries per gram of solution
	Mass of solution		5.35[illegible] grams
	Volume of solution		5.035 millilitres
	Total activity of U-232		3.61E+04 becquerels
	which is equivalent to		9.76E-01 microcuries

Method of measurement (see reverse of this certificate)

Accuracy Random uncertainty is: ± 0.7% Systematic uncertainty: ± 0.5%
Overall uncertainty in the radioactive concentration quoted above: ± 1.7%
Overall uncertainty is defined on the reverse of this certificate.

Radionuclidic Purity Any radioactive impurities measured are listed below, expressed as percentages of the activity of the principle radionuclide at the reference date .

Th-228 and daughter activity removed 2 Feb 2000
U-232 daughters activity will increase with time. By alpha 88% U-232, 12% daughters on 1/3/00

Isotopic Purity The isotopic composition, expressed as atom per cent at the reference date .

Not measured

Chemical Composition Calculated weight of U-232, 4.42E-08 grams, as 2M HNO3 solution in a flame sealed glass vial.
This Tracer solution has been produced 'carrier free'.

Physical Data Recommended half life of uranium 232: 6.980E+01 years
Principle energies of alpha emissions (MeV): 5.263 31.7%, 5.320 68.0%
Branching ratio for alpha emission: 100%
Calculated specific activity of uranium 232: 8.167E+05 Bq per microgram U-232.

Remarks For safety information and notes to ensure correct usage by all persons handling this radioactive Tracer solution please read the instructions accompanying the package.

AEA Technology operates a quality management system which has been independently audited and approved to ISO 9001.

Approved Signatory

Roger Wiltshire

Project Ref. AE2315

Prepared and characterised in the UK, for world wide distribution by **Isotrak, AEA Technology, QSA.**

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Title: Radioactive Reference Standards Solutions & Records

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PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE 12/13/2012 0:00

SOLUTION REFERENCE # AEA/Amersham 92/232/67 **SOLUTION #** U-10

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide ^{232}U **Reference Date** 3/1/2000 0:00

Certified Activity 9.760E-01 µCi

Certified Concentration µCi per gram

Ampoule /Solution Gross Weight, Grams

Empty Ampoule Weight, Grams

Solution Net Weight, Grams

Total Activity in Ampoule 0.9760 µCi

Chemical Composition of Standard Solution

$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions: **Dilution Solvent Used** 2M HNO_3

Dilute to a volume of 1000.00 **milliliters**

Certified Total Activity of 0.9760 µCi **Which Equals** 2.167E+06 **dpm at the date listed above**

And after dilution the activity of this solution is 2.167E+03 **dpm/ml**

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 7, 2013

Verified & Approved By _____ Date: 12/13/2012 0:00

QC Approval _____ Date: 12/13/12

EBERLINE SERVICES | **QUALITY CONTROL PROGRAM**
MP-009

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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

MP-009
Solution Reference # AEA/Amersham 92/232/67
Date 12/7/2012 0:00
Solution # U-10a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide of Interest ^{232}U
Parent Solution Conc. 2.167E+03 dpm/ml
Reference Date 3/1/2000 0:00

Chemical Composition of Standard Solution
$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:
Dilution Solvent Used 2M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.1670E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.1670E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: December 7, 2013

Verified & Approved By _____ Date: 12/13/2012 0:00

QC Approval _____ Date: 12/13/12

QA/QC REVIEWED
Date 10/14/91 Initials WT 10/14/91 WT

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Received
OCT 14 1991
TMA/Eberline
Oak Ridge Lab

Radionuclide	Th-230	Customer:	TMA EBERLINE
Half Life:	(7.54 ± 0.03) x 10^4 years	P.O.No.:	TT4944
Catalog No.:	7230	Reference Date:	November 1 1991 12:00 PST.
Source No.:	388-116	Contained Radioactivity:	1.036 µCi.

Description of Solution

a. Mass of solution:	5.0042	grams.
b. Chemical form:	Th(NO3)4 in 0.1N HNO3	
c. Carrier content:	None added	
d. Density:	1.0016	gram/ml @ 20°C.

Radioimpurities

See attached technical data sheet

Radioactive Daughters

See attached technical data sheet

Radionuclide Concentration

0.207 µCi/gram.

Method of Calibration

Weighed aliquots of the solution were assayed using a liquid scintillation counter.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±2.0%
b. Random uncertainty in assay:	±0.5%
c. Random uncertainty in weighing(s):	±0.2%
d. Total uncertainty at the 99% confidence level:	±2.7%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Notes

1. Nuclear data were taken from "Table of Isotopes", Seventh Edition, edited by Virginia S. Shirley.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay(and later NIST certification) of Standard Reference Materials. (As in NRC Regulatory Guide 4.15)

QUALITY CONTROL

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SECONDARY DILUTION RECERTIFICATION

	MP-009	Date	3/4/2013 0:00
Solution Reference #	IPL 388-116	Solution #	Th-1b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{230}Th	7.540E+04	2.754E+07

Radionuclide of Interest	^{230}Thorium	Reference Date	11/1/1991 0:00
Parent Solution Conc.	2.30E+03 dpm/ml		

Chemical Composition of Standard Solution
$^{230}Th(NO_3)_4$ in 0.1N HNO_3

Dilution Instructions: **Dilution Solvent Used** 0.1N HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	10.0000 ml	Final Activity Concentration:	2.2999E+01 dpm/ml
Total Activity:	2.2999E+04 dpm		
Final Volume:	1000.00 ml		

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: March 4, 2014

Recertified By _____ Date: 3/21/2013 0:00

Verified & Approved By _____ Date: 3/21/13

QC Approval _____ Date: 3/21/13

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RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE	3/4/2013 0:00
SOLUTION REFERENCE #	IPL 388-116
SOLUTION #	Th-1

Principal Radionuclide	Half Life, Years	Half Life, Days
^{230}Th	7.540E+04	2.754E+07

Radionuclide	^{230}Thorium	
Certified Activity	1.036E+00	µCi
Certified Concentration		µCi per gram

Reference Date: 11/1/1991 0:00

Ampoule /Solution Gross	9.2660	Weight, Grams
Empty Ampoule	4.6218	Weight, Grams
Solution Net	4.6442	Weight, Grams
Total Activity in Ampoule	1.0360	µCi

Chemical Composition of Standard Solution

$^{230}Th(NO_3)_4$ in 0.1N HNO_3

Dilution Instructions:

Dilution Solvent Used: 0.1N HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0360 µCi Which Equals 2.300E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.300E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: March 4, 2014

Recertified By _____ Date: 3/21/2013 0:00

QC Approval _____ Date: 3/21/13

Th-8

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Th-232	Customer:	TMA EBERLINE
Half Life:	(1.405 ± 0.006) x 10^10 years	P.O.No.:	VH1632
Catalog No.:	7232	Reference Date:	November 1 1993 12:00 PST.
Source No.:	435-104-2	Contained Radioactivity:	(Th-232) 0.0933 μCi.
		Contained Radioactivity:	(Th-232) 3.45 kBq.

Description of Solution

a. Mass of solution:	11.9712 g (in a 10 ml flame sealed ampoule)
b. Chemical form:	Th(NO3)4 in water
c. Carrier content:	None added
d. Density:	Approx. 1.21 g/ml @ 20°C.

Radioimpurities: None detected (other than daughters).

Radioactive Daughters

Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Po-212, Tl-208

Radionuclide Concentration

(Th-232) 0.00779 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.0%
b. Random uncertainty in assay:	±0.0%
c. Random uncertainty in weighing(s):	±2.0%
d. Total uncertainty at the 99% confidence level:	±3.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Anna U. Khan
QUALITY CONTROL

Nov. 8, 1993
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

		CURRENT DATE	10/9/2012 0:00
SOLUTION REFERENCE #	IPL 435-104-2	SOLUTION #	Th-8

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}Th, ^{228}Th	1.405E+10	5.132E+12

Radionuclide	$^{232\&228}Th$	Reference Date	11/1/1993 0:00
Certified Activity	9.330E-02	µCi	
Certified Concentration		µCi per gram	

Ampoule /Solution Gross	18.8415	Weight, Grams
Empty Ampoule	6.9296	Weight, Grams
Solution Net	11.9119	Weight, Grams
Total Activity in Ampoule	0.0933	µCi

Chemical Composition of Standard Solution

$Th(NO_3)_4$ in H2O

Dilution Instructions: **Dilution Solvent Used** 1% Nitric Acid

Dilute to a volume of 1000.00 **milliliters**

Certified Total Activity of 0.0933 µCi **Which Equals** 2.071E+05 **dpm at the date listed above**

And after dilution the activity of this solution is 2.071E+02 **dpm/ml**

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: October 9, 2013

Verified & Approved By _____ Date: 10/9/2012 0:00

QC Approval _____ Date: 11/12/12

EBERLINE SERVICES | QUALITY CONTROL PROGRAM
MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	MP-009	Date	11/9/2012 0:00
Solution Reference #	IPL 435-104-2	Solution #	Th-8b

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{228\ \&\ 232}Th$	1.405E+10	5.132E+12

Radionuclide of Interest: $^{228\ \&\ 232}Th$
Parent Solution Conc.: 2.07E+02 dpm/ml

Reference Date: 11/1/1993 0:00

Chemical Composition of Standard Solution
$Th(NO_3)_4$ in 1% HNO_3

Dilution Instructions:

Dilution Solvent Used: 1% Nitric Acid

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution:	500.0000	ml
Total Activity:	1.0355E+05	dpm
Final Volume:	1000.00	ml

Final Activity Concentration: 1.0355E+02 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: October 9, 2013

Verified & Approved By _____ Date: 11/9/2012 0:00

QC Approval _____ Date: 11/12/12

Th-18

Isotope Products Laboratories
An Eckert & Ziegler Company

24937 Avenue Tibbitts
Valencia, California 91355

Tel 661•309•1010
Fax 661•257•8303

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Th-229	**Customer:**	EBERLINE SERVICES
Half-life:	7340 ± 160 years	**P.O. No.:**	00009633
Catalog No.:	7229	**Reference Date:**	15-Jan-02 12:00 PST
Source No.:	867-54	**Contained Radioactivity: (Th-229 only)**	1.013 µCi 37.48 kBq

Physical Description:

A. Mass of solution:	5.0147 g in 5 mL flame-sealed ampoule
B. Chemical form:	$Th(NO_3)_4$ in 0.1M HNO_3
C. Carrier content:	10µg Th/mL
D. Density:	1.0016 g/mL @ 20°C.

Radioimpurities:

None detected (daughters in equilibrium)

Radionuclide Concentration: 0.2020 µCi/g, 7.474 kBq/g

Method of Calibration:

This source was prepared from a weighed aliquot of solution whose activity in µCi/g was determined using gamma ray spectrometry.

Peak energy used for integration:	193.5 keV
Branching ratio used:	0.0441 gammas per decay

Uncertainty of Measurement:

A. Type A (random) uncertainty:	± 0.7 %
B. Type B (systematic) uncertainty:	± 3.0 %
C. Uncertainty in aliquot weighing:	± 0.0 %
D. Total uncertainty at the 99% confidence level:	± 3.1 %

Notes:

- See reverse side for leak test(s) performed on this source.
- IPL participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).
- Nuclear data was taken from IAEA Technical Report Series No. 261.
- This solution has a working life of 5 years.

Quality Control

9-Jan-02
Date Signed

IPL Ref. No.: 867-54

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 11/9/2012 0:00

SOLUTION REFERENCE #: IPL 867-54

SOLUTION #: Th-18

Principal Radionuclide	Half Life, Years	Half Life, Days
^{229}Th	7.340E+03	2.681E+06

Radionuclide: ^{229}Th

Reference Date: 1/15/2002 0:00

Certified Activity: 1.013E+00 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross	8.7752	Weight, Grams
Empty Ampoule	3.7591	Weight, Grams
Solution Net	5.0161	Weight, Grams
Total Activity in Ampoule	1.0130	µCi

Chemical Composition of Standard Solution

$^{229}Th(NO_3)_4$ in 0.1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 0.1 M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0130 µCi Which Equals 2.249E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.249E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: October 9, 2013

Verified & Approved By _____ Date: 11/9/2012 0:00

QC Approval _____ Date: 11/12/12

EBERLINE SERVICES | QUALITY CONTROL PROGRAM
MP-009

Rev.7; 9/29/99
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

MP-009

Solution Reference #: IPL 867-54 | Date: 11/9/2012 0:00 | Solution #: Th-18a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{229}Th	7.340E+03	2.681E+06

Radionuclide of Interest: ^{229}Th
Parent Solution Conc.: 2.25E+03 dpm/ml

Reference Date: 1/15/2002 0:00

Chemical Composition of Standard Solution
$TH(NO_3)_4$ in 0.1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 0.1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.2490E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.2490E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: October 9, 2013

Verified & Approved By: _____ Date: 11/9/2012 0:00

QC Approval: _____ Date: 11/12/12

Ba-6
(& 6a)

National Institute of Standards & Technology

Certificate

ORIGINAL

Standard Reference Material 4251C
Barium-133 Radioactivity Standard

ORIGINAL

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
QCP 009-1

CURRENT DATE: 9/20/2012 0:00
SOLUTION REFERENCE #: NIST SRM4251C
SOLUTION #: Ba-6

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Barium	1.048E+01	3.828E+03

Radionuclide: ^{133}Barium
Certified Activity: µCi
Certified Concentration: 1.318E+01 µCi per gram
Reference Date: 9/1/1993 0:00

Ampoule /Solution Gross	9.3081	Weight, Grams
Empty Ampoule	4.2582	Weight, Grams
Solution Net	5.0499	Weight, Grams
Total Activity in Ampoule	66.5577	µCi

Chemical Composition of Standard Solution
$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:
Dilution Solvent Used: 1M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 66.5577 µCi Which Equals 1.478E+08 dpm at the date listed above

And after dilution the activity of this solution is 1.478E+05 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 20, 2013

Verified & Approved By _____ Date: 9/27/12

QC Approval _____ Date: 9/27/12

EBERLINE SERVICES | QUALITY CONTROL PROGRAM
QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

	QCP-009-1-A	Date	9/20/12
Solution Reference #	NIST SRM4251C	Solution #	Ba-6a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Ba	1.048E+01	3.828E+03

Radionuclide of Interest: ^{133}Ba
Parent Solution Conc.: 1.48E+05 dpm/ml

Reference Date: 9/1/1993 0:00

Chemical Composition of Standard Solution
$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used: 1M HCl

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 25.0000 ml
Total Activity: 3.6950E+06 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 3.6950E+03 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 20, 2013

Verified & Approved By _____ Date: 9/27/12

QC Approval _____ Date: 9/27/12

Ra-5

QA/QC REVIEWED
Date 2/8/94 Initials WT

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	Ra-226	Customer:	TMA EBERLINE
Half Life:	1600 ± 7 years	P.O.No.:	VH1888
Catalog No.:	7226	Reference Date:	February 1 1994 12:00 PST.
Source No.:	453-26	Contained Radioactivity: (Ra-226)	1.001 μCi.
		Contained Radioactivity: (Ra-226)	37.0 kBq.

Description of Solution

a. Mass of solution: 5.1864 g (in a 5 ml Flame Sealed Ampoule)

b. Chemical form: Ra(NO3)2 in 1 N HNO3

c. Carrier content: None added

d. Density: 1.0318 g/ml @ 20°C.

Radioimpurities: None detected(other than daughters)

Radioactive Daughters

Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration

(Ra-226) 0.1929 μCi/g.

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:
Energy peak(s) integrated under: 186 keV.
Branching ratio(s) used: 0.0351 gamma rays per decay.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration: ±3.4%

b. Random uncertainty in assay: ±3.1%

c. Random uncertainty in weighing(s): ±0.2%

d. Total uncertainty at the 99% confidence level: ±4.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Ana U. Kuan
QUALITY CONTROL

Feb. 3, 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 11/9/2012 0:00

SOLUTION REFERENCE #: IPL 453-26 | SOLUTION #: Ra-5

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide: ^{226}Radium
Reference Date: 2/1/1994 0:00
Certified Activity: 1.001E+00 µCi
Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams
Empty Ampoule: Weight, Grams
Solution Net: Weight, Grams
Total Activity in Ampoule: 1.0010 µCi

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0010 µCi Which Equals 2.222E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: November 9, 2013

Verified & Approved By _____ Date: 11/9/2012

QC Approval _____ Date: 11/12/12

EBERLINE SERVICES | **QUALITY CONTROL PROGRAM**
MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

MP 009
Solution Reference # IPL-453-26 | Date 11/9/2012 0:00 | Solution # Ra-5b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide of Interest: ^{226}Radium
Parent Solution Conc.: 2.22E+03 dpm/ml
Reference Date: 2/1/1994 0:00

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:
Dilution Solvent Used: 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 20.0000 ml
Total Activity: 4.4440E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 4.4440E+01 dpm/ml
This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: November 9, 2013

Verified & Approved By _____ Date: 11/9/2012 0:00

QC Approval _____ Date: 11/12/12

RA-11

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

62680-416

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. 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:	Ra-228
ACTIVITY (dps):	2.585 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	November 7, 2001 12:00 EST
TOTAL UNCERTAINTY*:	4.0%
SYSTEMATIC:	3.0%
RANDOM:	1.0%

*99% Confidence Level

Impurities: γ-impurities (other than decay products) <0.1%

5.07198 grams 0.1M HCl solution with 50 µg/g Ba carrier.

P O NUMBER 9508, Item 1 (Part #4339A)

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: 11/7/01

New vial from the 6/11/01 Shipment.
P.S. Different activity Level
8/9/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
RECERTIFICATION
MP 009

CURRENT DATE: 4/16/2012 0:00

SOLUTION REFERENCE #: Analytics 62680-416 SOLUTION #: Ra-11

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Ra	5.750E+00	2.100E+03

Radionuclide: ^{226}Ra
Certified Activity: 6.986E-02 µCi
Certified Concentration: µCi per gram

Reference Date: 11/7/2001 0:00

Ampoule /Solution Gross	9.4982	Weight, Grams
Empty Ampoule	4.4895	Weight, Grams
Solution Net	5.0087	Weight, Grams
Total Activity in Ampoule	0.0699	µCi

Chemical Composition of Standard Solution

$^{226}Ra(NO_3)_2$ in 0.5 M HCl

Dilution Instructions:

Dilution Solvent Used: 0.5 M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.0699 µCi Which Equals 1.551E+05 dpm at the date listed above

And after dilution the activity of this solution is 1.551E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: April 12, 2013

Recertified By _____ Date: 4/16/12

Verified & Approved By _____ Date: _____

QC Approval _____ Date: 4/16/12

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	UUISO	1	pCi	l	Engineering Management Support, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
U-234	1.65	88.67%	14.96%	100.00%	3.60%	8.09E+00	2.91E-01	7.17E+00	1.07E+00	U-8a	3.52E+01	3.60E+00	5.10E-01
U-238	0.60	95.61%	14.85%	100.00%	3.60%	7.89E+00	2.84E-01	7.54E+00	1.12E+00	U-8a	3.44E+01	3.60E+00	5.10E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

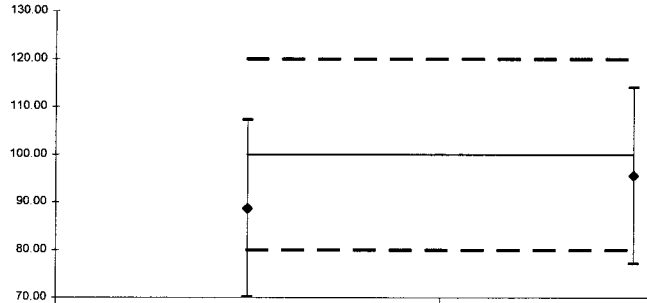
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
U-234	0.54	10.90	8.42E-01	2.48E-01	9.39E-01	2.50E-01
U-238	0.83	17.02	9.42E-01	2.65E-01	7.94E-01	2.25E-01
U-235	0.55	39.21	8.80E-02	8.10E-02	5.92E-02	6.43E-02

QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
0.89	OK	OK			OK	OK
0.96	OK	OK			OK	OK
	OK	OK			NA	OK

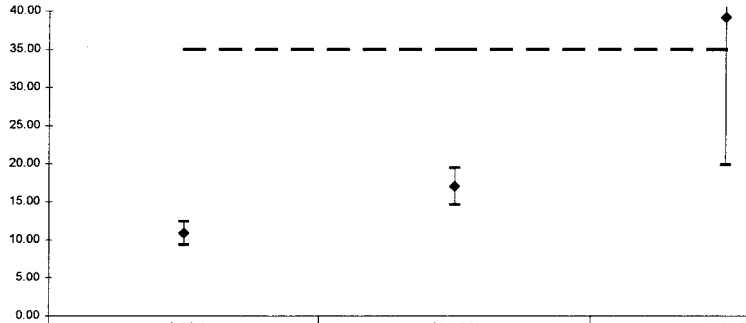
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	UUISO	1	pCi	l	Engineering Management Support, Inc.

LCS % Recovery



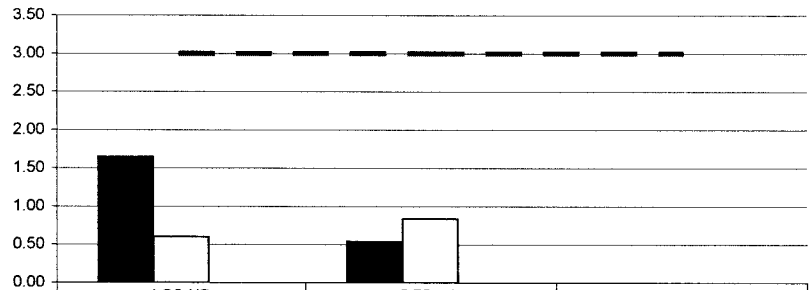
	U-234	U-238
Lower Error	70.11	77.16
Upper Error	107.23	114.05
%R	88.67	95.61
LCL	80	80
Mean	100	100
UCL	120	120

Replicate Sample RPD



	U-234	U-238	U-235
Lower Error	12.42	19.42	58.55
Upper Error	9.37	14.62	19.86
RPD	10.90	17.02	39.21
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
U-234	1.65	0.54	0.00
U-238	0.60	0.83	0.00
	0.00	0.00	0.00
UCL	3	3	3

No Matrix Spike

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	UUISO	2	pCi	l	Engineering Management Support, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
U-234	0.56	95.89%	14.78%	100.00%	3.60%	8.12E+00	2.92E-01	7.79E+00	1.15E+00	U-8a	3.52E+01	3.60E+00	5.12E-01
U-238	0.34	97.45%	14.79%	100.00%	3.60%	7.92E+00	2.85E-01	7.72E+00	1.14E+00	U-8a	3.44E+01	3.60E+00	5.12E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

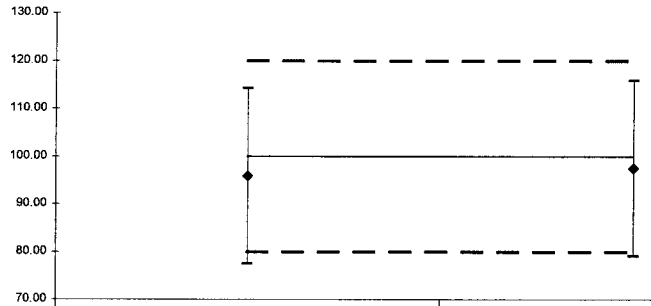
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
U-234	1.49	114.70	8.47E-01	6.79E-01	2.30E-01	4.47E-01
U-238	0.83	368.54	-4.30E-02	2.55E-01	1.45E-01	3.63E-01
U-235	0.20	41.21	1.57E-01	4.36E-01	1.03E-01	3.16E-01

QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
0.96	OK	OK			NA	OK
0.97	OK	OK			NA	OK
	OK	OK			NA	OK

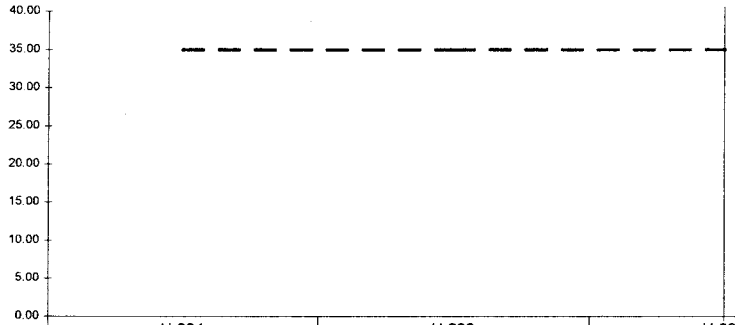
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	UUISO	2	pCi	l	Engineering Management Support, Inc.

LCS % Recovery



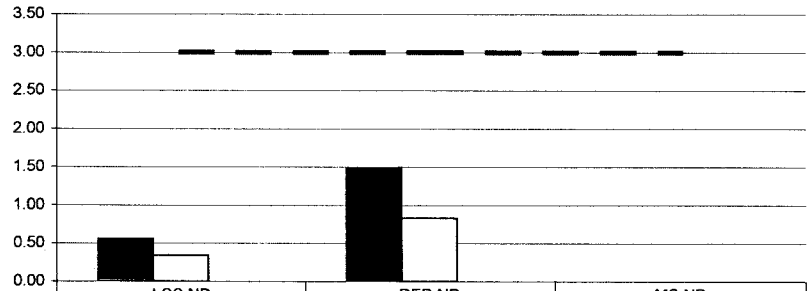
	U-234	U-238
Lower Error	77.51	79.07
Upper Error	114.27	115.84
%R	95.89	97.45
LCL	80	80
Mean	100	100
UCL	120	120

Replicate Sample RPD



	U-234	U-238	U-235
Lower Error	174.65	1484.44	100.75
Upper Error	54.74	-747.36	-18.33
RPD	114.70	368.54	41.21
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
U-234	0.56	1.49	0.00
U-238	0.34	0.83	0.00
	0.00	0.00	0.00
UCL	3	3	3

No Matrix Spike

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	ThISO	1	pCi	l	Engineering Management Support, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
TH-228	1.59	118.22%	18.89%	100.00%	3.60%	4.78E+00	1.72E-01	5.65E+00	1.07E+00	Th-8b	1.04E+02	3.60E+00	1.02E-01
TH-230	1.43	117.39%	20.21%	100.00%	2.70%	5.47E+00	1.48E-01	6.42E+00	1.30E+00	Th-1b	2.35E+01	2.70E+00	5.16E-01
TH-232	0.14	98.66%	19.14%	100.00%	3.60%	4.78E+00	1.72E-01	4.71E+00	9.02E-01	Th-8b	1.04E+02	3.60E+00	1.02E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

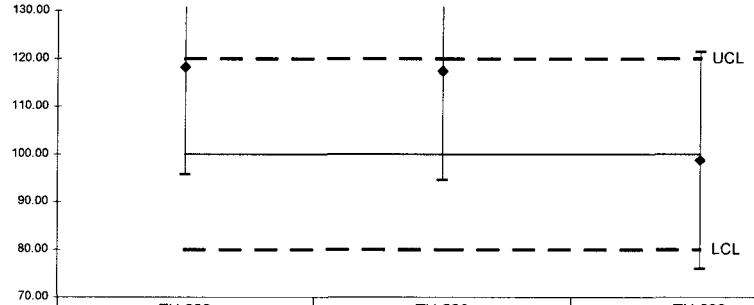
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
TH-228	0.29	26.53	9.20E-02	8.67E-02	7.05E-02	1.17E-01
TH-230	0.09	4.20	2.44E-01	1.30E-01	2.34E-01	1.77E-01
TH-232	0.30	116.67	4.73E-03	3.06E-02	1.80E-02	8.24E-02

QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
1.18	OK	OK			NA	OK
1.17	OK	OK			OK	OK
0.99	OK	OK			NA	OK

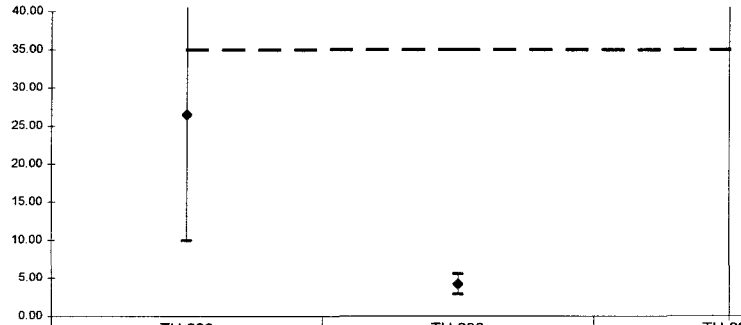
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	ThISO	1	pCi	l	Engineering Management Support, Inc.

LCS % Recovery



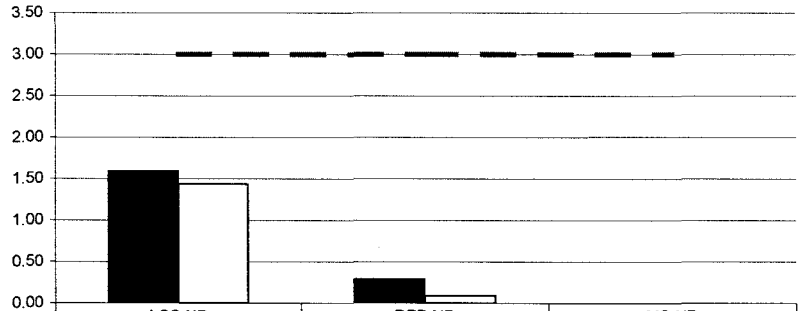
	TH-228	TH-230	TH-232
Lower Error	95.72	94.48	75.92
Upper Error	140.71	140.30	121.40
%R	118.22	117.39	98.66
LCL	80	80	80
Mean	100	100	100
UCL	120	120	120

Replicate Sample RPD



	TH-228	TH-230	TH-232
Lower Error	43.14	5.54	406.93
Upper Error	9.93	2.85	-173.58
RPD	26.53	4.20	116.67
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
TH-228	1.59	0.29	0.00
TH-230	1.43	0.09	0.00
UCL	3	3	3

No Matrix Spike

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	Ra226	1	pCi	l	Engineering Management Support, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-226	0.32	96.15%	24.19%	100.00%	4.60%	1.03E+01	4.74E-01	9.90E+00	2.40E+00	Ra-5b	4.41E+01	4.60E+00	5.19E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

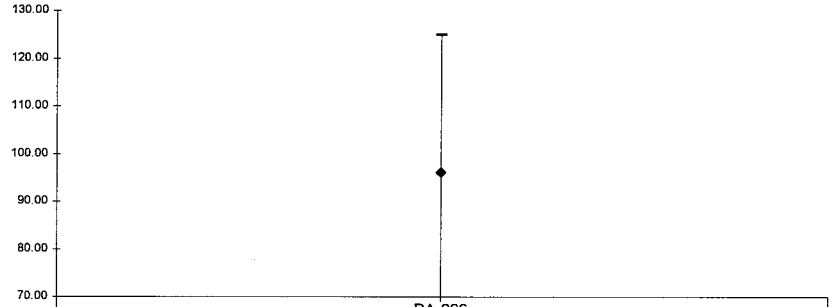
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
RA-226	1.54	39.98	9.05E-01	3.47E-01	1.36E+00	4.61E-01

QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
0.96	OK	OK			INV	OK

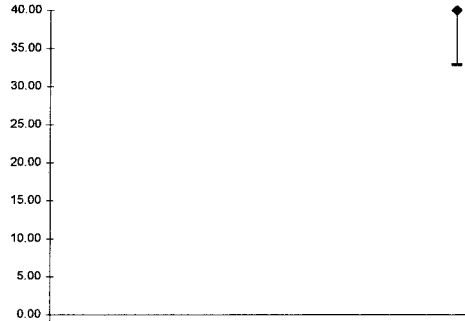
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	Ra226	1	pCi	l	Engineering Management Support, Inc.

LCS % Recovery



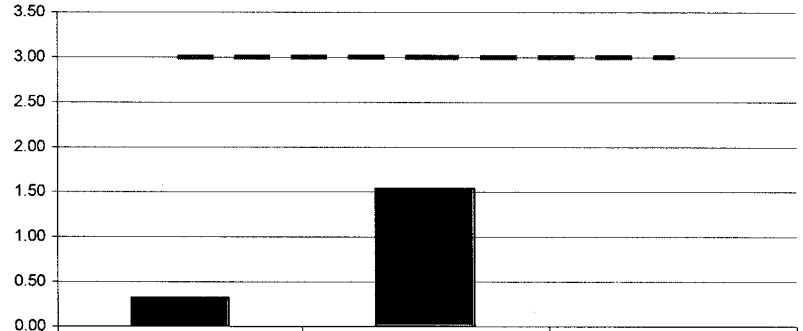
	RA-226
Lower Error	67.36
Upper Error	124.94
%R	96.15
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-226
Lower Error	47.12
Upper Error	32.84
RPD	39.98
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-226	0.32	1.54	0.00
UCL	3	3	3

No Matrix Spike

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	Ra228	1	pCi	l	Engineering Management Support, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-228	0.40	95.09%	25.34%	100.00%	5.10%	9.07E+00	4.63E-01	8.63E+00	2.19E+00	Ra-11	3.91E+01	5.10E+00	5.15E-01

Matrix Spike

Analyte	*Normalized Difference*	*MS Actual % Rec*	*Expected MS Result*	*Expected MS Uncert*	*Actual MS Result*	*Actual MS CSU*	*Sample Result*	*Sample CSU*	*Sample Aliquot*	*Standard ID*	*Standard ACT (dpm)*	*Standard Error %*	*Standard Added (g)*

Replicate Sample

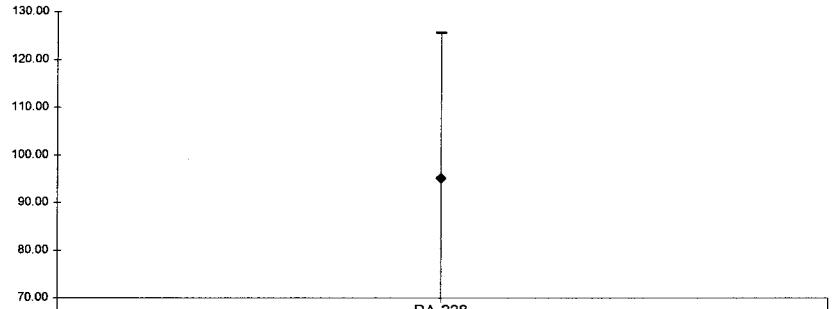
Analyte	*Normalized Difference*	*RPD*	*Original Result*	*Original CSU*	*Replicate Result*	*Replicate CSU*
RA-228	2.37	122.35	2.57E-01	4.52E-01	1.07E+00	4.94E-01

QC Summary

LCS Relative Bias	*LCS % R*	*LCS ND*	*MS % R*	*MS ND*	*Rep RPD*	*Rep ND*
0.95	OK	OK			NA	OK

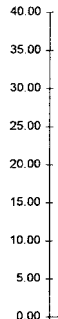
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
13-04050	**Ra228**	**1**	**pCi**	**I**	**Engineering Management Support, Inc.**

LCS % Recovery



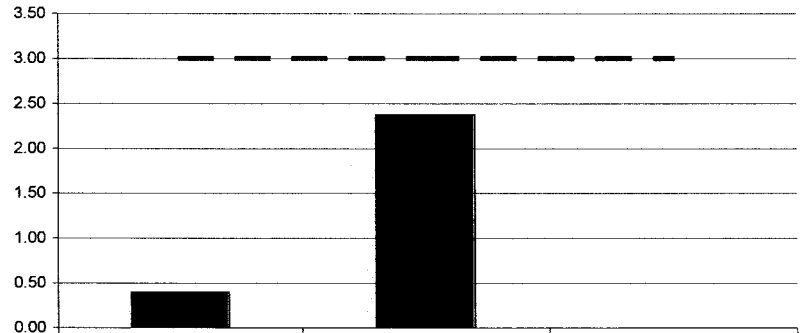
	RA-228
Lower Error	64.65
Upper Error	125.53
%R	95.09
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-228
Lower Error	166.04
Upper Error	78.67
RPD	122.35
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-228	0.40	2.37	0.00
UCL	3	3	3

No Matrix Spike

SECTION VII

LABORATORY TECHNICIAN'S NOTES

ISO U NOTES
Run 1

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	04/12/13 12:41	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PRESERVED SAMPLES WITH HNO3 WITH THE EXCEPTION OF FRACTIONS 10 AND 11 DUE TO ORGANICS BEING PRESENT- DRIED ALL SAMPLES DOWN- MUFFLED FRACTIONS 10 AND 11

4/12/13

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	04/12/13 12:41	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PRESERVED SAMPLES WITH HNO3 WITH THE EXCEPTION OF FRACTIONS 10 AND 11 DUE TO ORGANICS BEING PRESENT- DRIED ALL SAMPLES DOWN- MUFFLED FRACTIONS 10 AND 11
2	04/14/13 07:05	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED- DIGESTED WITH MIXED ACID AND TOOK SAMPLES TO DRYNESS

JBA 4/16/13

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	04/12/13 12:41	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PRESERVED SAMPLES WITH HNO3 WITH THE EXCEPTION OF FRACTIONS 10 AND 11 DUE TO ORGANICS BEING PRESENT- DRIED ALL SAMPLES DOWN- MUFFLED FRACTIONS 10 AND 11
2	04/14/13 07:05	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED- DIGESTED WITH MIXED ACID AND TOOK SAMPLES TO DRYNESS
3	04/17/13 18:12	CHEM	JDEMELAS	Added concentrated HCl to sample beakers and heated to dryness; Added 20 ml 8N HCL to samples and transferred to new, labeled C-Tubes, rinsing with 8N HCl to bring volume to 35 ml; Preconditioned resin columns with 35 ml 8N HCl; Centrifuged samples and loaded onto columns; Rinsed C-Tubes with 20 ml 8N HCl, centrifuged as needed and loaded onto columns; Rinsed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with DI H2O. Set samples aside for later precipitation and filtering.

John DeMelas
4/17/13

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	04/12/13 12:41	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PRESERVED SAMPLES WITH HNO3 WITH THE EXCEPTION OF FRACTIONS 10 AND 11 DUE TO ORGANICS BEING PRESENT- DRIED ALL SAMPLES DOWN- MUFFLED FRACTIONS 10 AND 11
2	04/14/13 07:05	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED- DIGESTED WITH MIXED ACID AND TOOK SAMPLES TO DRYNESS
3	04/17/13 18:12	CHEM	JDEMELAS	Added concentrated HCl to sample beakers and heated to dryness; Added 20 ml 8N HCL to samples and transferred to new, labeled C-Tubes, rinsing with 8N HCl to bring volume to 35 ml; Preconditioned resin columns with 35 ml 8N HCl; Centrifuged samples and loaded onto columns; Rinsed C-Tubes with 20 ml 8N HCl, centrifuged as needed and loaded onto columns; Rinsed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with DI H2O. Set samples aside for later precipitation and filtering.
4	04/18/13 05:54	CHEM	RMARTZ	ADDED 0.1 ML NEODYMIUM CARRIER, 0.3 ML TITANOUS CHLORIDE, & 1 ML HF TO C-TUBES; LET SET SIT IN ICE BATH FOR ONE HOUR. SET UP FILTERS BY ADDING ALCOHOL & CARBON SUBSTRATE THEN ADDED SAMPLES; WHEN SAMPLES WERE THROUGH FILTERS, ADDED 10 ML DI H2O RINSES FROM C-TUBES, REMOVED FILTERS, LET DRY IN DESSICATOR, THEN SENT SET TO COUNT ROOM.

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
13-04050	
Analysis Code	Run
UUISO	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
013624P	Nitric Acid	Reagent Grade	JBARNARD	4/12/2013
013416P	Perchloric Acid	Reagent Grade	JBARNARD	4/14/2013
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	4/14/2013
013666P	Anion Exchange Resin	Reagent Grade	JDEMELAS	4/17/2013
013729S	HCl - HF	6.5N - 0.04N	JDEMELAS	4/17/2013
013573D01	Hydrochloric Acid	0.5N	JDEMELAS	4/17/2013
013712S	Hydrochloric Acid	6.5N	JDEMELAS	4/17/2013
013732S	Hydrochloric Acid	8N	JDEMELAS	4/17/2013
013675P	Hydrochloric Acid	Reagent Grade	JDEMELAS	4/17/2013
013771S	HCl - NH4I	8N - 0.1M	JDEMELAS	4/17/2013
013246S	Carbon substrate	Solution	RMARTZ	4/18/2013
012809P	Ethyl Alcohol	Reagent Grade	RMARTZ	4/18/2013
013221P	Hydrofluoric Acid	Reagent Grade	RMARTZ	4/18/2013
013191S	Neodymium Carrier	1 mg/ml	RMARTZ	4/18/2013
013434P	Titanous Chloride	Reagent Grade	RMARTZ	4/18/2013

Alpha #1

Date	Sample #	Client	[illegible]	CT Time	Analysis	Tech
4/17/13	1304078A (1-7)	Westmore[illegible]	1021	[illegible]	[illegible]	C
4/17/13	1304078A (1)	Westmore[illegible]	1021	[illegible]	[illegible]	C
4/17/13	1304084A (4-6)	MPA	1724	22 hrs	[illegible]	C
4/18/13	Daily Prep	[illegible]	0816	10 min	[illegible]	C
4/18/13	1304098A (1-6)	Westmoreland	0920	24 hrs	[illegible]	C
4/18/13	1304089A (1-4, 6)	UCOR	1228	2hrs 50mins	PU	KB
4/18/13	1304089A (4)	UCOR	1228	2hrs 50 min	PUNT	KB
4/18/13	1304050A (15-19)	Eng. Manag. Ser.	1525	2hrs 50mins	UU	KB
4/18/13	1304048A (1)	PCC	1524	2hrs 50 min	Th	KB

Alpha #3

Date	Sample #	Client	Start Time	Ct Time	Analysis	Tech
4/16/13	1304049A(5-18)	Eng. Man.	0901	24hr	U Iso	C
4/16/13	1304049A(9-19)	Eng. Man.	1100	24hr	Th Iso	C
4/16/13	1304049A(13-19)	Eng. Manag. Su	1613	2hr 50 min	Ra6	KB
4/17/13	Daily Pulser	VA	0579	10 min	N/A	—
4/17/13	1304061A(1-7)	MPA	0604	24hr	Ra6	C
4/17/13	1304043A(1-4)	Unitech	0607	24hr	U Iso	C
4/17/13	1304080A(1-4)	STOGND	0528	24hr	Ra6	C
4/17/13	1304078A(1-4)	TEC	0525	24hr	Ra6	C
4/17/13	1304088A(3,4)	UCOR	1022	24hr	Am24?	C
4/17/13	1304089A(1-4)	UCOR	1232	2hr 50mins	Am^{241}	KB
4/17/13	1304089A(1-4)	UCOR	1233	2hr 50mins	Ra	KB
4/17/13	1304039B(3-5)	WAshen	1503	1 hr	Am^{243}	KB
4/18/13	Daily Pulser	VA	0846	10 min	N/A	—
4/18/13	1304085A(6,7)	Weston Sol.	0971	24hr	U Iso	C
4/18/13	1304088A(1-4)	UCOR	0972	24hr	U Iso	C
4/18/13	1304088A NT(4)	UCOR	0977	24hr	U N7	C
4/18/13	1304050A(1-4)	Eng. Man.	0977	24hr	U Iso	C
4/18/13	1304085A(7)	Weston	1229	2h-50 min	Th	KB
4/18/13	1304050A(5-14)	Eng. Manag. Su.	1230	2h-50 min	U	KB

ISO U NOTES
Run 2

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	UUISO
Run Number	2

#	Date	Dept	User	Notes
1	04/19/13 12:30	PREP	JBARNARD	ALIQUOTED AND FILTERED DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- DRIED SAMPLES DOWN

4/19/13

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	UUISO
Run Number	2

#	Date	Dept	User	Notes
1	04/19/13 12:30	PREP	JBARNARD	ALIQUOTED AND FILTERED DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- DRIED SAMPLES DOWN
2	04/24/13 15:55	CHEM	JDEMELAS	Added concentrated HCl to sample beakers and heated to dryness; Added 20 ml 8N HCL to samples and transferred to new, labeled C-Tubes, rinsing with 8N HCl to bring volume to 35 ml; Preconditioned resin columns with 35 ml 8N HCl; Centrifuged samples and loaded onto columns; Rinsed C-Tubes with 20 ml 8N HCl, centrifuged as needed and loaded onto columns; Rinsed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with DI H2O. Set samples aside for later precipitation and filtering.

4/24/13

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	UUISO
Run Number	2

#	Date	Dept	User	Notes
1	04/19/13 12:30	PREP	JBARNARD	ALIQUOTED AND FILTERED DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- DRIED SAMPLES DOWN
2	04/24/13 15:55	CHEM	JDEMELAS	Added concentrated HCl to sample beakers and heated to dryness; Added 20 ml 8N HCL to samples and transferred to new, labeled C-Tubes, rinsing with 8N HCl to bring volume to 35 ml; Preconditioned resin columns with 35 ml 8N HCl; Centrifuged samples and loaded onto columns; Rinsed C-Tubes with 20 ml 8N HCl, centrifuged as needed and loaded onto columns; Rinsed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with DI H2O. Set samples aside for later precipitation and filtering.
3	04/25/13 05:45	CHEM	RMARTZ	ADDED 0.1 ML NEODYMIUM CARRIER, 0.3 ML TITANOUS CHLORIDE, & 1 ML HF TO C-TUBES; LET SET SIT IN ICE BATH FOR ONE HOUR. SET UP FILTERS BY ADDING ALCOHOL & CARBON SUBSTRATE THEN ADDED SAMPLES; WHEN SAMPLES WERE THROUGH FILTERS, ADDED 10 ML DI H2O RINSES FROM C-TUBES, REMOVED FILTERS, LET DRY IN DESSICATOR, THEN SENT SET TO COUNT ROOM.

RA 4/25/13

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
13-04050	
Analysis Code	Run
UUISO	2

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
013666P	Anion Exchange Resin	Reagent Grade	JDEMELAS	4/24/2013
013774S	HCl - HF	6.5N - 0.04N	JDEMELAS	4/24/2013
013675D01	Hydrochloric Acid	0.5N	JDEMELAS	4/24/2013
013712S	Hydrochloric Acid	6.5N	JDEMELAS	4/24/2013
013779S	Hydrochloric Acid	8N	JDEMELAS	4/24/2013
013675P	Hydrochloric Acid	Reagent Grade	JDEMELAS	4/24/2013
013793S	HCl - NH4I	8N - 0.1M	JDEMELAS	4/24/2013
013246S	Carbon substrate	Solution	RMARTZ	4/25/2013
012809P	Ethyl Alcohol	Reagent Grade	RMARTZ	4/25/2013
013221P	Hydrofluoric Acid	Reagent Grade	RMARTZ	4/25/2013
013191S	Neodymium Carrier	1 mg/ml	RMARTZ	4/25/2013
013434P	Titanous Chloride	Reagent Grade	RMARTZ	4/25/2013

Alpha #1

Date	Sample#	Client	Load Time	CT Time	Analyst	Seal
4/24/17	Daily Pulse	VAB	0804	10	NA	✓
4/24/17	1704176A(1-6)	URENCO	0842	24hr	UUZ50	✓
4/24/17	1704052A(12-18)	Curtis-Wright	0855	24hr	ThZ50	✓
4/24/17	1704055A(4-7)	HYPE	0856	24hr	UUZ50	✓
4/24/17	1704055A(1,2)	Curtis-Wright	0857	24hr	UUZ50	✓
4/24/17	1704057A(3)	Curtis-Wright	1157	24hr	UUZ50	✓
4/24/17	1704174A(1-4)	Urenco	1156	24hr	UUZ50	✓
4/24/17	1704053A(1)	Curtis-Wright	1156	24hr	ThZ50	✓
4/25/17	Daily Pulse	VAB	0822	10	NA	✓
4/25/17	1704050B(1-7,8)	Curtis-Wright	0852	24hr	UUZ50	✓
4/25/17	1704081A(1)	United	0853	24hr	UUZ50	✓

ISO TH NOTES

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Internal Work Order	13-04050
Analysis Code	ThISO
Run Number	1

#	Date	Dept	User	Notes
1	04/12/13 12:41	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PRESERVED SAMPLES WITH HNO3 WITH THE EXCEPTION OF FRACTIONS 10 AND 11 DUE TO ORGANICS BEING PRESENT- DRIED ALL SAMPLES DOWN- MUFFLED FRACTIONS 10 AND 11

4/12/13

EBERLINE SERVICES

Work Order Analysis Notes

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2	04/14/13 07:05	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED- DIGESTED WITH MIXED ACID AND TOOK SAMPLES TO DRYNESS

JBA
4/16/13

EBERLINE SERVICES

Work Order Analysis Notes

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Internal Work Order	13-04050
Analysis Code	ThISO
Run Number	1

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2	04/14/13 07:05	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED- DIGESTED WITH MIXED ACID AND TOOK SAMPLES TO DRYNESS
3	04/17/13 11:08	CHEM	RMARTZ	PRECONDITIONED RESIN COLUMN WITH 50 ML 8N HNO3 & CENTRIFUGED SAMPLES; ADDED SAMPLES TRANSFERRED BY SECOND SHIFT TO COLUMNS; AFTER SAMPLES RAN THROUGH THE COLUMNS, ADDED 40 ML 8N HNO3 & LET RUN THROUGH, & ELUTED SAMPLES WITH 50 ML 8N HCL INTO CLEAN 100 ML BEAKERS. TOOK SAMPLES TO DRYNESS ON HOTPLATE & ADDED 10 ML CONCENTRATED HCL TO SAMPLES; TRANSFERRED SAMPLES INTO C-TUBES WITH D.I. H2O.

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2	04/14/13 07:05	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED- DIGESTED WITH MIXED ACID AND TOOK SAMPLES TO DRYNESS
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4	04/18/13 05:55	CHEM	RMARTZ	ADDED 0.75 ML 0.1MG/ML CERIUM CARRIER & 1 ML HF TO C-TUBES & LET SET SIT IN ICE BATH FOR ONE HOUR; SET UP FILTERS BY ADDING ALCOHOL & CARBON SUBSTRATE THEN ADDED SAMPLES; WHEN SAMPLES WERE THROUGH FILTERS, ADDED 10 ML DI H2O RINSES FROM C-TUBES, REMOVED FILTERS, LET DRY IN DESSICATOR, THEN SENT SET TO COUNT ROOM.

RA 4/18/13

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
13-04050	
Analysis Code	Run
ThISO	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
013624P	Nitric Acid	Reagent Grade	JBARNARD	4/12/2013
013416P	Perchloric Acid	Reagent Grade	JBARNARD	4/14/2013
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	4/14/2013
013666P	Anion Exchange Resin	Reagent Grade	RMARTZ	4/17/2013
013732S	Hydrochloric Acid	8N	RMARTZ	4/17/2013
013733S	Nitric Acid	8N	RMARTZ	4/17/2013
013246S	Carbon substrate	Solution	RMARTZ	4/18/2013
013017S	Cerrium Carrier	0.1mg/ml	RMARTZ	4/18/2013
012809P	Ethyl Alcohol	Reagent Grade	RMARTZ	4/18/2013
013221P	Hydrofluoric Acid	Reagent Grade	RMARTZ	4/18/2013

Alpha #1

Date	Sample #	Client	Load Time	CT Time	Analysis	Tech
4/17/13	1304078B (1-5)	Washington	1021	2hr	[illegible]	C
4/17/13	1304078B (1)	Washington	1021	2hr	[illegible]	C
4/17/13	1304084A (4-6)	MPA	1724	2hr	[illegible]	C
4/18/13	Daily Pulse	[illegible]	0816	10m	[illegible]	C
4/18/13	1304098A (1-6)	Westransol.	0920	2hr	[illegible]	C
4/18/13	1304089A (1-4, 6)	UCOR	1228	2hr 50mins	PU	KB
4/18/13	1304089A (4)	UCOR	1228	2hr 50m	PU NT	KB
4/18/13	1304050A (15-19)	Eng. Manag. Sur	1525	2hr 50mins	UU	KB
4/18/13	1304048A (1)	PCC	1524	2hr 50m	Th	KB
4/18/13	1304050A (12-17)	Eng. Manag. Sur	1828	2hr 50min	Rale	KB
4/19/13	Daily Pulse	[illegible]	0528	10m	[illegible]	C
4/19/13	1304050A (16-19)	Eng. Ma	0558	2hr	Th 230	C
4/19/13	1304112A (1,2)	UCOR	0558	2hr	Rale	C

Date	Sample #	Client	Job #	Time	Analyst	Tech
4/17/13	1304075A(2-5)	Weston Sol.	1021	2hr	Analyst	C
4/17/13	1304085A(1,2)	Weston	1022	2hr	Analyst	C
4/17/13	1304088A (1-4)	Weston	1725	2hr	NP277	C
4/18/13	Daily Pulse	WMS	0716	1hr	WMS	—
4/18/13	1304098A(7)	Weston Sol.	0930	2hr	Analyst	C
4/18/13	1304085A(1-5)	Weston Sol.	0931	2hr	Analyst	C
4/18/13	1304085A(1-6)	Weston	1229	2hr 50	Th	KCB
4/19/13	1304048A (2-7)	PCC	1524	2hr 50 mins	Th	KCB
4/18/13	1304050A (18-19)	Eng. Manag. Su	1929	2hr 50 mins	Rak	KCB
4/19/13	1304050A (1-4)	Eng. Manag. Su.	1829	2hr 50	Th	KCB

Alpha #3

Date	Sample #	Client	Count Time	Count Time	Analysis	Tech
4/16/13	1304049A(5-15)	Eng. man	0801	2 hrs	U/U Zso	c
4/16/13	1304049A(9-19)	Eng. man	1100	2 hrs	Th Zso	c
4/16/13	1304049A(13-19)	Eng. Manag. Su	1613	2hr 50 min	Rab	KB
4/17/13	Daily Pulser	[illegible]	0579	10 min	[illegible]	c
4/17/13	1304061A(1-7)	MPA	0604	2 hrs	Rab	c
4/17/13	1304042A(1-4)	Unitech	0607	2 hrs	U/U Zso	c
4/17/13	1304080A(1-4)	STOGNID	0528	2 hrs	Rab	c
4/17/13	1304075A(1-4)	TEL	0525	2 hrs	Rab	c
4/17/13	1304088A(3,4)	UCOR	1022	2 hrs	Am 243	c
4/17/13	1304089A(1-4)	UCOR	1232	2hr 50 mins	Am^{241}	KB
4/17/13	1304089A(1-4)	UCOR	1233	2hr 50 mins	Ray	KB
4/17/13	1304039B(3-5)	WASHen	1503	1 hr	Am^{243}	KB
4/18/13	Daily Pulser	[illegible]	0546	10 min	[illegible]	c
4/18/13	1304085A(6,7)	Weston Sol.	0571	2 hrs	U/U Zso	c
4/18/13	1304088A(1-4)	UCOR	0572	2 hrs	U/U Zso	c
4/18/13	1304088A NT(4)	UCOR	0577	2 hrs	U/U NT	c
4/18/13	1304050A(1-4)	Eng. Man	0577	2 hrs	U/U Zso	c
4/18/13	1304085A(7)	Weston	1229	2h 50 min	Th	KB
4/18/13	1304050A(5-14)	Eng. Manag. Su.	1230	2h 50 min	U/U	KB
4/18/13	1304050A(1-11)	Eng. Manag. Su.	1527	2hr 50 min	Rab	KB
4/18/13	1304050A(5-15)	Eng. Manag. Su	1830	2hr 50 min	Th	KB

RA-226 NOTES

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	Ra226
Run Number	1

#	Date	Dept	User	Notes
1	04/12/13 12:39	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PH'D ALL SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS- FOR FRACTIONS 10 AND 11- DRIED SAMPLES DOWN AND MUFFLED DUE TO ORGANICS BEING PRESENT

JB 4/12/13

EBERLINE SERVICES

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Analysis Code	Ra226
Run Number	1

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2	04/16/13 08:47	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED THEY WERE DIGESTED WITH MIXED ACIDS AND TAKEN TO DRYNESS- THEN PH'D AND PRECIPITATED

JBT
4/16/13

EBERLINE SERVICES

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2	04/16/13 08:47	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED THEY WERE DIGESTED WITH MIXED ACIDS AND TAKEN TO DRYNESS- THEN PH'D AND PRECIPITATED
3	04/16/13 18:24	PREP	LWALKER	ADDED EDTA TO PRECIP-VORTEX-LET SIT OVERNIGHT TO DIGEST.
4	04/17/13 17:50	PREP	LWALKER	FOLLOWED STEPS 12.1 TO 12.8 IN AP-006 REV 12 FOR RA 226 ANALYSIS (SYRINGE FILTERED SAMPLES-PRECIP-FILTERED-DRIED-OBTAIN FINAL WEIGHT) SUBMIT TO COUNT ROOM.

L. Walker
4/17/13

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
13-04050	
Analysis Code	Run
Ra226	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
013376P	Ammonium Hydroxide	Reagent Grade	JBARNARD	4/12/2013
012766D13	Barium Carrier	1 mg/ml	JBARNARD	4/12/2013
012729D07	Lead Carrier	166 mg/ml	JBARNARD	4/12/2013
013624P	Nitric Acid	Reagent Grade	JBARNARD	4/12/2013
013575D01	Ammonium Sulfate	200 mg/ml	JBARNARD	4/12/2013
013416P	Perchloric Acid	Reagent Grade	JBARNARD	4/16/2013
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	4/16/2013
013698S	EDTA	0.25M	LWALKER	4/16/2013
011383P	Acetic Acid	Reagent Grade	LWALKER	4/17/2013
013377D01	Ammonium Sulfate	200 mg/ml	LWALKER	4/17/2013

Alpha #1

Date	Sample#	Client	Time Start	CT Time	Analysis	Tech
4/17/13	1304078B(1-5)	Westinghouse	1021	2hr	[illegible]	C
4/17/13	1304078B(1)	Westinghouse	1021	2hr	[illegible]	C
4/17/13	1304084A(1-6)	MPA	1724	2hr	Ra6	C
4/18/13	Daily Pulse	[illegible]	0816	10	[illegible]	C
4/18/13	1304098A(1-6)	Westinghouse	0930	2hr	[illegible]	C
4/18/13	1304089A(1-4,6)	UCOR	1228	2hr50mins	PU	KB
4/18/13	1304089A(4)	UCOR	1228	2hr50min	PU/NJ	KB
4/18/13	1304050A(15-19)	Eng. Manag. Sur.	1525	2hr50mins	UU	KB
4/18/13	1304048A(1)	PCC	1524	2hr50min	Th	KB
4/18/13	1304050A(12-17)	Eng. Manag. Sur.	1828	2hr50min	Ra6	KB

Alpha #2

Date	Sample #	Client	Count Time	CT Time	Analysis	Tech
4/17/13	1704075A(2-5)	[illegible]	1021	2hr	[illegible]	c
4/17/13	1704088A(1,2)	[illegible]	1022	2hr	[illegible]	c
4/17/13	1704088A(1-4)	[illegible]	1725	2hr	[illegible]	c
4/18/13	Daily Pulse	[illegible]	0716	1min	[illegible]	—
4/18/13	1704098A(7)	Weston Sol.	0930	2hr	[illegible]	c
4/18/13	1304085A(1-5)	Weston Sol.	0931	2hr	[illegible]	c
4/18/13	1304085A(1-6)	Weston	1229	2hr 50min	Th	KB
4/18/13	1304048A(2-7)	PCC	1524	2hr 50mins	Th	KB
4/18/13	1304050A(18-19)	Eng. Manag. Su	1829	2hr 50mins	Ra	KB
4/18/13	1304050A(1-4)	Eng. Manag. Su.	1829	2hr 50min	Th	KB

Date	Sample #	Client	Count Time	CT Time	Analysis	Tech
4/16/13	1304049A(5-15)	Eng. Man.	0901	2hr	U234	[illegible]
4/16/13	1304049A(9-19)	Eng. Man.	1100	2hr	Th230	[illegible]
4/16/13	1304049A(13-19)	Eng. Manag. Su	1613	2hr 50	Ra	KB
4/17/13	Daily Pulser	LAS	0579	10	[illegible]	[illegible]
4/17/13	1304061A(1-7)	MPA	0604	2hr	Ra	[illegible]
4/17/13	1304042A(1-4)	Unitech	0607	2hr	U234	[illegible]
4/17/13	1304080A(1-4)	STGMD	0578	2hr	Ra	[illegible]
4/17/13	1304075A(1-4)	TEL	0575	2hr	Ra	[illegible]
4/17/13	1304088A(3,4)	UCOR	1022	2hr	Am241	[illegible]
4/17/13	1304089A(1-4)	UCOR	1232	2hr 50mins	Am241	KB
4/17/13	1304089A(1-4)	UCOR	1233	2hr 50mins	Ra	KB
4/17/13	1304039B(3-5)	Washen	1503	1 hr	Am243	KB
4/18/13	Daily Pulser	LAS	0576	10	[illegible]	[illegible]
4/18/13	1304085A(6,7)	Weston Sol.	0571	2hr	U234	[illegible]
4/18/13	1304088A(1-4)	UCOR	0572	2hr	U234	[illegible]
4/18/13	1304088ANT(4)	UCOR	0577	2hr	U4NT	[illegible]
4/18/13	1304050A(1-4)	Eng. Man.	0577	2hr	U234	[illegible]
4/18/13	1304085A(7)	Weston	1229	2hr 50	Th	KB
4/18/13	1304050A(5-14)	Eng. Manag. Su.	1230	2hr 50	UU	KB
4/18/13	1304050A(1-11)	Eng. Manag. Su.	1527	2hr 50	Ra	KB

RA-228 NOTES

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
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Internal Work Order	13-04050
Analysis Code	Ra228
Run Number	1

#	Date	Dept	User	Notes
1	04/12/13 12:40	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PH'D ALL SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS- FOR FRACTIONS 10 AND 11- DRIED SAMPLES DOWN AND MUFFLED DUE TO ORGANICS BEING PRESENT

JB 4/12/13

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JBT 4/16/13

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#	Date	Dept	User	Notes
1	04/12/13 12:40	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PH'D ALL SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS- FOR FRACTIONS 10 AND 11- DRIED SAMPLES DOWN AND MUFFLED DUE TO ORGANICS BEING PRESENT
2	04/16/13 08:47	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED THEY WERE DIGESTED WITH MIXED ACIDS AND TAKEN TO DRYNESS- THEN PH'D AND PRECIPITATED
3	04/19/13 10:45	CHEM	TSMITH	Placed filters from count room into labeled centrifuge tubes. Added EDTA to sampl;es and swirled.
4	04/24/13 15:30	PREP	LWALKER	FOLLOWED STEPS 12.1 TO 12.7 IN AP-007 REV 17 (CHEMICAL CLEANUP FOR RA 228)

L. Walker
4/24/13

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	13-04050
Analysis Code	Ra228
Run Number	1

#	Date	Dept	User	Notes
1	04/12/13 12:40	PREP	JBARNARD	ALIQUOTED ALL SAMPLES- FILTERED SAMPLES FOR DISSOLVED FRACTIONS- ADDED SPIKES AND TRACERS- PH'D ALL SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND AMMONIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- SUBMITTED RADIUM PRECIP TO SEPARATIONS- FOR FRACTIONS 10 AND 11- DRIED SAMPLES DOWN AND MUFFLED DUE TO ORGANICS BEING PRESENT
2	04/16/13 08:47	PREP	JBARNARD	AFTER FRACTIONS 10 AND 11 WERE MUFFLED THEY WERE DIGESTED WITH MIXED ACIDS AND TAKEN TO DRYNESS- THEN PH'D AND PRECIPITATED
3	04/19/13 10:45	CHEM	TSMITH	Placed filters from count room into labeled centrifuge tubes. Added EDTA to sampl;es and swirled.
4	04/24/13 15:30	PREP	LWALKER	FOLLOWED STEPS 12.1 TO 12.7 IN AP-007 REV 17 (CHEMICAL CLEANUP FOR RA 228)
5	04/26/13 08:13	CHEM	TSMITH	Followed steps 12.7 to 12.15 in AP-007 rev. 17 . (Precipitated samples, hot bathed, centrifuged, and discarded supernate. Dissolved precip, precipitated samples, hot bathed, centrifuged, and discarded supernate. Dissolved precip, precipitated and filtered samples, obtained final weights, covered with aluminum foil, and took to count room)

4-26-13

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
13-04050	
Analysis Code	Run
Ra228	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
013376P	Ammonium Hydroxide	Reagent Grade	JBARNARD	4/12/2013
012766D13	Barium Carrier	1 mg/ml	JBARNARD	4/12/2013
012729D07	Lead Carrier	166 mg/ml	JBARNARD	4/12/2013
013624P	Nitric Acid	Reagent Grade	JBARNARD	4/12/2013
013575D01	Ammonium Sulfate	200 mg/ml	JBARNARD	4/12/2013
013416P	Perchloric Acid	Reagent Grade	JBARNARD	4/16/2013
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	4/16/2013
013754S	EDTA	0.25M	TSMITH	4/19/2013
011504D20	Ammonium Sulfide	2%	LWALKER	4/24/2013
012729D08	Lead Carrier	1.5 mg/ml	LWALKER	4/24/2013
013624P	Nitric Acid	Reagent Grade	LWALKER	4/24/2013
013322D01	Sodium Hydroxide	10M	LWALKER	4/24/2013
013587S	Yttrium Carrier	9 mg/ml	LWALKER	4/24/2013
012717D03	Ammonium Oxalate	5%	TSMITH	4/26/2013
013624D03	Nitric Acid	1N	TSMITH	4/26/2013
013290D18	Nitric Acid	6N	TSMITH	4/26/2013
013322D01	Sodium Hydroxide	10M	TSMITH	4/26/2013
013322D03	Sodium Hydroxide	18M	TSMITH	4/26/2013

LB4110 Aqua

Date	Sample#	Client	Load Time	C/O Time	Analyst	Tech
4/22/13	1303107AB(1,6-8)	SCDHEC	1206	2hrs	αβ	KB
4/22/13	1303106AB(8,9)	SCDHEC	1700	2h	LB	C
4/22/13	1303106AB(14-17)	SCDHEC	1409	2hrs	αβ	KB
4/23/13	Blk	LAB	0518	60min	LB	C
4/23/13	Eff	LAB	0621	70min	LB	C
4/23/13	1304134SR(1-4,6)	Ucor	0827	2h	SR707	C
4/23/13	1304134NP(1-4)	Ucor	1028	10min	NP274	C
4/23/13	1304108NP(1-4)	Unitech	1045	10min	NP274	C
4/23/13	1304145AB(1-4)	Hudson Reach	1104	30mins	αβ	KB
4/23/13	1304079RA(1-4)	TEC	1141	2hrs	Ra8	KB
4/24/13	Blk	LAB	0516	60min	LB	C
4/24/13	Eff	LAB	0621	70min	LB	C
4/24/13	1304077SY(1-4,6)	Ucor	0755	2h	SRSoy	C
4/24/13	1304134RA(1)	Ucor	[illegible]	70min	RA8	C
4/24/13	1304080RA(1-4)	STofMD	[illegible]	2h	RA8	C
4/24/13	1304113RA(1)	Ucor	1076	70min	RA8	C
4/24/13	1304113Pb(1)	UCOR	1136	30mins	Pb^{210}	KB
4/24/13	1304121Pb(1-4)	UCOR	1211	2hrs	Pb^{210}	KB
4/24/13	1304135CL(1-3,5)	UCOR	1503	30mins	CL36	KB
4/25/13	Blk	LAB	0517	60min	LB	C
4/25/13	Eff	LAB	0618	70min	LB	C
4/25/13	1304047SR(7,14)	Unitech	0817	2h	SR707	C
4/25/13	1304047SR(1-3)	Unitech	0816	2h	SR707	C
4/25/13	1304047SR(4)	Unitech	1026	2h	SR707	C
4/25/13	1304049RA(7,8,9)	Engmen	1026	2h	RA8	C
4/25/13	1304047SR(1-4)	Unitech	1230	2hrs	TOT Sr	KB
4/26/13	Blk	LAB	0517	60min	LB	C
4/26/13	Eff	LAB	0618	70min	LB	C
4/26/13	1304089SY(1-5)	Ucor	0752	2h	SRSoy	C
4/26/13	1304108NP (1-4)	Ucor	0957	10min	NP274	C
4/26/13	1304050RA(8,9)	~~Eff~~ Engmen	1011	2h	RA8	C

LB4110 RED

Date	Sample #	Client	Load Time	Count Time	Analysis	Tech
4/25/13	1304139Pb(1-8)	USA	1432	2hrs	Pb210	KB
[illegible]	[illegible]	[illegible]	0717	70	[illegible]	C
[illegible]	[illegible]	[illegible]	0746	[illegible]	LB	C
[illegible]	1704062S4(1-4)	Dairyland	0751	[illegible]	SR90	C
[illegible]	1704062S4(1-4)	Dairyland	0751	[illegible]	SR90	C
[illegible]	1704089SR(1-3)	[illegible]	0802	[illegible]	SR7?7	C
[illegible]	1704089SR(4-?)	[illegible]	0877	[illegible]	SR707	C
[illegible]	1704050RA(1-?)	Eng Man	1006	[illegible]	RA?	C
[illegible]	1704050RA(4-17)	Eng Man	1078	[illegible]	RA?	C
4/26/13	1304147Pb(2-5)	USA	1210	2hrs	Pb210	KB
4/26/13	1304050RAA(18-19)	Eng. Manag. Sci.	1212	2hrs	Ra?	KB

SECTION VIII

ANALYTICAL DATA (ISOTOPIC URANIUM)

RUN 1

13-04050
UUISO
Run 1

Work Order	13-04050
Analysis Code	UUISO
Run	1
Date Received	4/9/2013
Lab Deadline	4/30/2013
Client	Engineering Management Support, Inc.
Project	West Lake OU-1
Report Level	4
Activity Units	pCi
Aliquot Units	l
Matrix	WA
Method	NAS NS-3050 Mod
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	U-232
Radiometric Sol#	U-10a
Tracer Act (dpm/g)	19.1
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		04/09/13 00:00	1.0000E+00
02	MBL	BLANK		04/09/13 00:00	1.0000E+00
03	DUP	S-8 TOT	40	04/04/13 11:32	1.0000E+00
04	DO	S-8 TOT	40	04/04/13 11:32	1.0000E+00
05	TRG	S-8 DIS	40	04/04/13 11:32	1.0000E+00
06	TRG	D-13 TOT	47	04/04/13 11:55	1.0000E+00
07	TRG	D-13 DIS	47	04/04/13 11:55	1.0000E+00
08	TRG	PZ-304-AS TOT	44	04/04/13 12:56	1.0000E+00
09	TRG	PZ-304-AS DIS	44	04/04/13 12:56	1.0000E+00
10	TRG	PZ-303-AS TOT	46	04/04/13 13:00	1.0000E+00
11	TRG	PZ-303-AS DIS	46	04/04/13 13:00	1.0000E+00
12	TRG	D-12 TOT	45	04/04/13 13:50	1.0000E+00
13	TRG	D-12 DIS	45	04/04/13 13:50	1.0000E+00
14	TRG	PZ-111-SD TOT	38	04/04/13 13:52	1.0000E+00
15	TRG	PZ-111-SD DIS	38	04/04/13 13:52	1.0000E+00
16	TRG	PZ-304-AI TOT	43	04/04/13 14:08	1.0000E+00
17	TRG	PZ-304-AI DIS	43	04/04/13 14:08	1.0000E+00
18	TRG	I-11 TOT	35	04/04/13 14:40	1.0000E+00
19	TRG	I-11 DIS	35	04/04/13 14:40	1.0000E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

13-04050
UUISO
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6081	11.6		0.00								
02	MBL	0.6039	11.5		0.00								
03	DUP	0.6023	11.5		0.00								
04	DO	0.6008	11.5		0.00								
05	TRG	0.6000	11.5		0.00								
06	TRG	0.5989	11.4		0.00								
07	TRG	0.6009	11.5		0.00								
08	TRG	0.6018	11.5		0.00								
09	TRG	0.5990	11.4		0.00								
10	TRG	0.5984	11.4		0.00								
11	TRG	0.5994	11.4		0.00								
12	TRG	0.5982	11.4		0.00								
13	TRG	0.5976	11.4		0.00								
14	TRG	0.5981	11.4		0.00								
15	TRG	0.5969	11.4		0.00								
16	TRG	0.6004	11.5		0.00								
17	TRG	0.5949	11.4		0.00								
18	TRG	0.5964	11.4		0.00								
19	TRG	0.5948	11.4		0.00								

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			04/12/13 10:48	JBARNARD				
02	MBL			04/12/13 10:48	JBARNARD				
03	DUP			04/12/13 10:48	JBARNARD				
04	DO			04/12/13 10:48	JBARNARD				
05	TRG			04/12/13 10:48	JBARNARD				
06	TRG			04/12/13 10:48	JBARNARD				
07	TRG			04/12/13 10:48	JBARNARD				
08	TRG			04/12/13 10:48	JBARNARD				
09	TRG			04/12/13 10:48	JBARNARD				
10	TRG			04/12/13 10:48	JBARNARD				
11	TRG			04/12/13 10:48	JBARNARD				
12	TRG			04/12/13 10:48	JBARNARD				
13	TRG			04/12/13 10:48	JBARNARD				
14	TRG			04/12/13 10:48	JBARNARD				
15	TRG			04/12/13 10:48	JBARNARD				
16	TRG			04/12/13 10:48	JBARNARD				
17	TRG			04/12/13 10:48	JBARNARD				
18	TRG			04/12/13 10:48	JBARNARD				
19	TRG			04/12/13 10:48	JBARNARD				

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Work Order: 13-04050-UUISO-1

Client: Engineering Management Support, Inc.
Eberline Services Work Order: 13-04050
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-234	LCS	LCS	pCi/l	7.17E+00	9.43E-01	7.17E-02	8.09E+00	88.67	OK		OK	
02	U-234	MBL	BLANK	pCi/l	6.89E-02	6.00E-02	6.88E-02					OK	OK
03	U-234	DUP	S-8 TOT	pCi/l	9.39E-01	2.41E-01	6.27E-02				OK	OK	
04	U-234	DO	S-8 TOT	pCi/l	8.42E-01	2.41E-01	8.86E-02					OK	
05	U-234	TRG	S-8 DIS	pCi/l	8.52E-01	2.43E-01	6.26E-02					OK	
06	U-234	TRG	D-13 TOT	pCi/l	2.30E-01	1.32E-01	8.67E-02					OK	
07	U-234	TRG	D-13 DIS	pCi/l	1.74E-01	9.53E-02	6.08E-02					OK	
08	U-234	TRG	PZ-304-AS TOT	pCi/l	2.65E-01	8.24E-01	1.92E+00					INV	
09	U-234	TRG	PZ-304-AS DIS	pCi/l	3.28E-01	7.23E-01	1.40E+00					INV	
10	U-234	TRG	PZ-303-AS TOT	pCi/l	9.14E-01	2.39E-01	6.36E-02					OK	
11	U-234	TRG	PZ-303-AS DIS	pCi/l	3.76E-01	1.63E-01	9.81E-02					OK	
12	U-234	TRG	D-12 TOT	pCi/l	1.33E-01	1.29E-01	1.59E-01					OK	
13	U-234	TRG	D-12 DIS	pCi/l	2.36E-01	1.55E-01	1.17E-01					OK	
14	U-234	TRG	PZ-111-SD TOT	pCi/l	4.15E-01	1.46E-01	7.11E-02					OK	
15	U-234	TRG	PZ-111-SD DIS	pCi/l	4.28E-01	1.45E-01	5.99E-02					OK	
16	U-234	TRG	PZ-304-AI TOT	pCi/l	2.15E-01	2.07E-01	2.81E-01					OK	
17	U-234	TRG	PZ-304-AI DIS	pCi/l	5.00E-01	2.69E-01	2.38E-01					OK	
18	U-234	TRG	I-11 TOT	pCi/l	1.07E+00	3.37E-01	9.32E-02					OK	
19	U-234	TRG	I-11 DIS	pCi/l	1.24E+00	4.24E-01	1.76E-01					OK	

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 13-04050
Client: Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-234	LCS	04/09/13 00:00	1.00E+00	116.79	0.00	0.00			
02	U-234	MBL	04/09/13 00:00	1.00E+00	129.23	0.00	0.00			
03	U-234	DUP	04/04/13 11:32	1.00E+00	111.19	0.00	0.00			
04	U-234	DO	04/04/13 11:32	1.00E+00	106.97	0.00	0.00			
05	U-234	TRG	04/04/13 11:32	1.00E+00	95.38	0.00	0.00			
06	U-234	TRG	04/04/13 11:55	1.00E+00	80.17	0.00	0.00			
07	U-234	TRG	04/04/13 11:55	1.00E+00	117.10	0.00	0.00			
08	U-234	TRG	04/04/13 12:56	1.00E+00	3.48	0.00	0.00			
09	U-234	TRG	04/04/13 12:56	1.00E+00	5.40	0.00	0.00			
10	U-234	TRG	04/04/13 13:00	1.00E+00	108.09	0.00	0.00			
11	U-234	TRG	04/04/13 13:00	1.00E+00	85.33	0.00	0.00			
12	U-234	TRG	04/04/13 13:50	1.00E+00	55.80	0.00	0.00			
13	U-234	TRG	04/04/13 13:50	1.00E+00	59.71	0.00	0.00			
14	U-234	TRG	04/04/13 13:52	1.00E+00	133.35	0.00	0.00			
15	U-234	TRG	04/04/13 13:52	1.00E+00	133.11	0.00	0.00			
16	U-234	TRG	04/04/13 14:08	1.00E+00	37.97	0.00	0.00			
17	U-234	TRG	04/04/13 14:08	1.00E+00	45.29	0.00	0.00			
18	U-234	TRG	04/04/13 14:40	1.00E+00	60.27	0.00	0.00			
19	U-234	TRG	04/04/13 14:40	1.00E+00	48.43	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-1

Run	Analysis Code	Eberline Services Work Order	Client
1	UUISO	13-04050	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-234	LCS	04/18/13 09:33		A_Spec	Alpha_044	170	6.00 E+02	0.00 E+00	19
02	U-234	MBL	04/18/13 09:33		A_Spec	Alpha_046	170	6.00 E+00	0.00 E+00	17.9
03	U-234	DUP	04/18/13 09:33		A_Spec	Alpha_047	170	7.17 E+01	2.00 E-03	18.2
04	U-234	DO	04/18/13 09:33		A_Spec	Alpha_048	170	5.70 E+01	0.00 E+00	16.8
05	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_034	170	5.68 E+01	1.00 E-03	18.6
06	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_035	170	1.27 E+01	2.00 E-03	18.3
07	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_037	170	1.37 E+01	2.00 E-03	17.8
08	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_040	170	6.60 E-01	2.00 E-03	19
09	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_041	170	1.32 E+00	4.00 E-03	19.8
10	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_042	170	6.87 E+01	2.00 E-03	18.5
11	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_044	170	2.30 E+01	0.00 E+00	19
12	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_046	170	5.00 E+00	0.00 E+00	17.9
13	U-234	TRG	04/18/13 12:30		A_Spec	Alpha_047	170	9.66 E+00	2.00 E-03	18.2
14	U-234	TRG	04/18/13 12:31		A_Spec	Alpha_048	170	3.50 E+01	0.00 E+00	16.8
15	U-234	TRG	04/18/13 15:25		A_Spec	Alpha_003	170.02	3.75 E+01	3.00 E-03	17.5
16	U-234	TRG	04/18/13 15:25		A_Spec	Alpha_004	170.02	5.96 E+00	1.20 E-02	19.4
17	U-234	TRG	04/18/13 15:25		A_Spec	Alpha_010	170.02	1.68 E+01	1.30 E-02	19.7
18	U-234	TRG	04/18/13 15:25		A_Spec	Alpha_011	170.02	4.78 E+01	1.00 E-03	19.7
19	U-234	TRG	04/18/13 15:25		A_Spec	Alpha_013	170.02	4.21 E+01	5.00 E-03	18.7

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-1

Run	Analysis Code	Eberline Services Work Order	Client
1	UUISO	13-04050	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-238	LCS	LCS	pCi/l	7.54E+00	9.81E-01	6.71E-02	7.89E+00	95.61	OK		OK	
02	U-238	MBL	BLANK	pCi/l	2.09E-02	3.20E-02	4.77E-02					OK	OK
03	U-238	DUP	S-8 TOT	pCi/l	7.94E-01	2.18E-01	5.45E-02				OK	OK	
04	U-238	DO	S-8 TOT	pCi/l	9.42E-01	2.56E-01	8.82E-02					OK	
05	U-238	TRG	S-8 DIS	pCi/l	5.48E-01	1.89E-01	7.14E-02					OK	
06	U-238	TRG	D-13 TOT	pCi/l	2.50E-01	1.36E-01	7.54E-02					OK	
07	U-238	TRG	D-13 DIS	pCi/l	1.12E-01	7.55E-02	5.28E-02					OK	
08	U-238	TRG	PZ-304-AS TOT	pCi/l	-2.72E-01	8.42E-01	2.26E+00					INV	
09	U-238	TRG	PZ-304-AS DIS	pCi/l	-1.36E-01	7.59E-01	2.08E+00					INV	
10	U-238	TRG	PZ-303-AS TOT	pCi/l	8.01E-01	2.21E-01	6.95E-02					OK	
11	U-238	TRG	PZ-303-AS DIS	pCi/l	2.01E-01	1.18E-01	9.19E-02					OK	
12	U-238	TRG	D-12 TOT	pCi/l	7.49E-02	9.10E-02	1.10E-01					OK	
13	U-238	TRG	D-12 DIS	pCi/l	9.31E-02	9.65E-02	1.01E-01					OK	
14	U-238	TRG	PZ-111-SD TOT	pCi/l	1.77E-01	9.44E-02	7.08E-02					OK	
15	U-238	TRG	PZ-111-SD DIS	pCi/l	2.75E-01	1.15E-01	6.81E-02					OK	
16	U-238	TRG	PZ-304-AI TOT	pCi/l	2.92E-01	2.18E-01	2.15E-01					OK	
17	U-238	TRG	PZ-304-AI DIS	pCi/l	4.20E-01	2.36E-01	1.78E-01					OK	
18	U-238	TRG	I-11 TOT	pCi/l	7.11E-01	2.69E-01	1.40E-01					OK	
19	U-238	TRG	I-11 DIS	pCi/l	1.08E+00	3.87E-01	1.22E-01					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-1

Run	Analysis Code	Eberline Services Work Order	Client
1	UUISO	13-04050	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-238	LCS	04/09/13 00:00	1.00E+00	116.79	0.00	0.00			
02	U-238	MBL	04/09/13 00:00	1.00E+00	129.23	0.00	0.00			
03	U-238	DUP	04/04/13 11:32	1.00E+00	111.19	0.00	0.00			
04	U-238	DO	04/04/13 11:32	1.00E+00	106.97	0.00	0.00			
05	U-238	TRG	04/04/13 11:32	1.00E+00	95.38	0.00	0.00			
06	U-238	TRG	04/04/13 11:55	1.00E+00	80.17	0.00	0.00			
07	U-238	TRG	04/04/13 11:55	1.00E+00	117.10	0.00	0.00			
08	U-238	TRG	04/04/13 12:56	1.00E+00	3.48	0.00	0.00			
09	U-238	TRG	04/04/13 12:56	1.00E+00	5.40	0.00	0.00			
10	U-238	TRG	04/04/13 13:00	1.00E+00	108.09	0.00	0.00			
11	U-238	TRG	04/04/13 13:00	1.00E+00	85.33	0.00	0.00			
12	U-238	TRG	04/04/13 13:50	1.00E+00	55.80	0.00	0.00			
13	U-238	TRG	04/04/13 13:50	1.00E+00	59.71	0.00	0.00			
14	U-238	TRG	04/04/13 13:52	1.00E+00	133.35	0.00	0.00			
15	U-238	TRG	04/04/13 13:52	1.00E+00	133.11	0.00	0.00			
16	U-238	TRG	04/04/13 14:08	1.00E+00	37.97	0.00	0.00			
17	U-238	TRG	04/04/13 14:08	1.00E+00	45.29	0.00	0.00			
18	U-238	TRG	04/04/13 14:40	1.00E+00	60.27	0.00	0.00			
19	U-238	TRG	04/04/13 14:40	1.00E+00	48.43	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-1

Run	1
Analysis Code	UUISO
Eberline Services Work Order	13-04050
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-238	LCS	04/18/13 09:33		A_Spec	Alpha_044	170	6.33 E+02	4.00 E-03	19
02	U-238	MBL	04/18/13 09:33		A_Spec	Alpha_046	170	1.83 E+00	1.00 E-03	17.9
03	U-238	DUP	04/18/13 09:33		A_Spec	Alpha_047	170	6.08 E+01	1.00 E-03	18.2
04	U-238	DO	04/18/13 09:33		A_Spec	Alpha_048	170	6.40 E+01	0.00 E+00	16.8
05	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_034	170	3.67 E+01	2.00 E-03	18.6
06	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_035	170	1.38 E+01	1.00 E-03	18.3
07	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_037	170	8.83 E+00	1.00 E-03	17.8
08	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_040	170	-6.80 E-01	4.00 E-03	19
09	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_041	170	-5.50 E-01	1.50 E-02	19.8
10	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_042	170	6.05 E+01	3.00 E-03	18.5
11	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_044	170	1.23 E+01	4.00 E-03	19
12	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_046	170	2.83 E+00	1.00 E-03	17.9
13	U-238	TRG	04/18/13 12:30		A_Spec	Alpha_047	170	3.83 E+00	1.00 E-03	18.2
14	U-238	TRG	04/18/13 12:31		A_Spec	Alpha_048	170	1.50 E+01	0.00 E+00	16.8
15	U-238	TRG	04/18/13 15:25		A_Spec	Alpha_003	170.02	2.41 E+01	5.00 E-03	17.5
16	U-238	TRG	04/18/13 15:25		A_Spec	Alpha_004	170.02	8.15 E+00	5.00 E-03	19.4
17	U-238	TRG	04/18/13 15:25		A_Spec	Alpha_010	170.02	1.41 E+01	5.00 E-03	19.7
18	U-238	TRG	04/18/13 15:25		A_Spec	Alpha_011	170.02	3.20 E+01	6.00 E-03	19.7
19	U-238	TRG	04/18/13 15:25		A_Spec	Alpha_013	170.02	3.68 E+01	1.00 E-03	18.7

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 13-04050
Client: Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-235	LCS	LCS	pCi/l	8.41E-01	2.37E-01	8.84E-02					OK	
02	U-235	MBL	BLANK	pCi/l	2.83E-02	4.82E-02	8.49E-02					OK	OK
03	U-235	DUP	S-8 TOT	pCi/l	5.92E-02	6.42E-02	7.73E-02				NA	OK	
04	U-235	DO	S-8 TOT	pCi/l	8.80E-02	8.08E-02	7.61E-02					OK	
05	U-235	TRG	S-8 DIS	pCi/l	9.25E-02	8.95E-02	1.11E-01					OK	
06	U-235	TRG	D-13 TOT	pCi/l	2.24E-02	6.21E-02	1.34E-01					OK	
07	U-235	TRG	D-13 DIS	pCi/l	4.44E-02	5.37E-02	6.55E-02					OK	
08	U-235	TRG	PZ-304-AS TOT	pCi/l	0.00E+00	1.37E+00	2.97E+00					INV	
09	U-235	TRG	PZ-304-AS DIS	pCi/l	-2.08E-01	6.41E-01	1.73E+00					INV	
10	U-235	TRG	PZ-303-AS TOT	pCi/l	4.64E-02	5.62E-02	6.85E-02					OK	
11	U-235	TRG	PZ-303-AS DIS	pCi/l	6.06E-02	7.95E-02	1.21E-01					OK	
12	U-235	TRG	D-12 TOT	pCi/l	6.56E-02	1.12E-01	1.97E-01					OK	
13	U-235	TRG	D-12 DIS	pCi/l	8.01E-02	1.04E-01	1.44E-01					OK	
14	U-235	TRG	PZ-111-SD TOT	pCi/l	2.68E-02	4.09E-02	6.10E-02					OK	
15	U-235	TRG	PZ-111-SD DIS	pCi/l	2.34E-02	3.97E-02	6.74E-02					OK	
16	U-235	TRG	PZ-304-AI TOT	pCi/l	-5.29E-02	9.60E-02	2.93E-01					OK	
17	U-235	TRG	PZ-304-AI DIS	pCi/l	1.59E-01	1.65E-01	2.07E-01					OK	
18	U-235	TRG	I-11 TOT	pCi/l	5.51E-02	9.38E-02	1.65E-01					OK	
19	U-235	TRG	I-11 DIS	pCi/l	6.62E-02	1.02E-01	1.51E-01					OK	

Run	Analysis Code	Eberline Services Work Order	Client
1	UUISO	13-04050	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-235	LCS	04/09/13 00:00	1.00E+00	116.79	0.00	0.00			
02	U-235	MBL	04/09/13 00:00	1.00E+00	129.23	0.00	0.00			
03	U-235	DUP	04/04/13 11:32	1.00E+00	111.19	0.00	0.00			
04	U-235	DO	04/04/13 11:32	1.00E+00	106.97	0.00	0.00			
05	U-235	TRG	04/04/13 11:32	1.00E+00	95.38	0.00	0.00			
06	U-235	TRG	04/04/13 11:55	1.00E+00	80.17	0.00	0.00			
07	U-235	TRG	04/04/13 11:55	1.00E+00	117.10	0.00	0.00			
08	U-235	TRG	04/04/13 12:56	1.00E+00	3.48	0.00	0.00			
09	U-235	TRG	04/04/13 12:56	1.00E+00	5.40	0.00	0.00			
10	U-235	TRG	04/04/13 13:00	1.00E+00	108.09	0.00	0.00			
11	U-235	TRG	04/04/13 13:00	1.00E+00	85.33	0.00	0.00			
12	U-235	TRG	04/04/13 13:50	1.00E+00	55.80	0.00	0.00			
13	U-235	TRG	04/04/13 13:50	1.00E+00	59.71	0.00	0.00			
14	U-235	TRG	04/04/13 13:52	1.00E+00	133.35	0.00	0.00			
15	U-235	TRG	04/04/13 13:52	1.00E+00	133.11	0.00	0.00			
16	U-235	TRG	04/04/13 14:08	1.00E+00	37.97	0.00	0.00			
17	U-235	TRG	04/04/13 14:08	1.00E+00	45.29	0.00	0.00			
18	U-235	TRG	04/04/13 14:40	1.00E+00	60.27	0.00	0.00			
19	U-235	TRG	04/04/13 14:40	1.00E+00	48.43	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-1

Run	1
Analysis Code	UUISO
Eberline Services Work Order	13-04050
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-235	LCS	04/18/13 09:33		A_Spec	Alpha_044	170	5.70 E+01	0.00 E+00	19
02	U-235	MBL	04/18/13 09:33		A_Spec	Alpha_046	170	2.00 E+00	0.00 E+00	17.9
03	U-235	DUP	04/18/13 09:33		A_Spec	Alpha_047	170	3.66 E+00	2.00 E-03	18.2
04	U-235	DO	04/18/13 09:33		A_Spec	Alpha_048	170	4.83 E+00	1.00 E-03	16.8
05	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_034	170	5.00 E+00	0.00 E+00	18.6
06	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_035	170	1.00 E+00	0.00 E+00	18.3
07	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_037	170	2.83 E+00	1.00 E-03	17.8
08	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_040	170	1.00 E+00	0.00 E+00	19
09	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_041	170	-6.80 E-01	4.00 E-03	19.8
10	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_042	170	2.83 E+00	1.00 E-03	18.5
11	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_044	170	3.00 E+00	0.00 E+00	19
12	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_046	170	2.00 E+00	0.00 E+00	17.9
13	U-235	TRG	04/18/13 12:30		A_Spec	Alpha_047	170	2.66 E+00	2.00 E-03	18.2
14	U-235	TRG	04/18/13 12:31		A_Spec	Alpha_048	170	1.83 E+00	1.00 E-03	16.8
15	U-235	TRG	04/18/13 15:25		A_Spec	Alpha_003	170.02	1.66 E+00	2.00 E-03	17.5
16	U-235	TRG	04/18/13 15:25		A_Spec	Alpha_004	170.02	-1.19 E+00	7.00 E-03	19.4
17	U-235	TRG	04/18/13 15:25		A_Spec	Alpha_010	170.02	4.32 E+00	4.00 E-03	19.7
18	U-235	TRG	04/18/13 15:25		A_Spec	Alpha_011	170.02	2.00 E+00	0.00 E+00	19.7
19	U-235	TRG	04/18/13 15:25		A_Spec	Alpha_013	170.02	1.83 E+00	1.00 E-03	18.7

Count Room Report
Client: Engineering Management Su

13-04050-UUISO-1 (pCi/l) in WA
Tracer ID: U-10a

Printed: 4/18/2013 5:56 AM
Page 1 of 1

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	04/09/13 00:00	1.0000	0.6081	11.6147		0.00		
02	MBL	BLANK	04/09/13 00:00	1.0000	0.6039	11.5345		0.00		
03	DUP	S-8 TOT	04/04/13 11:32	1.0000	0.6023	11.5039		0.00		
04	DO	S-8 TOT	04/04/13 11:32	1.0000	0.6008	11.4753		0.00		
05	TRG	S-8 DIS	04/04/13 11:32	1.0000	0.6000	11.4600		0.00		
06	TRG	D-13 TOT	04/04/13 11:55	1.0000	0.5989	11.4390		0.00		
07	TRG	D-13 DIS	04/04/13 11:55	1.0000	0.6009	11.4772		0.00		
08	TRG	PZ-304-AS TOT	04/04/13 12:56	1.0000	0.6018	11.4944		0.00		
09	TRG	PZ-304-AS DIS	04/04/13 12:56	1.0000	0.5990	11.4409		0.00		
10	TRG	PZ-303-AS TOT	04/04/13 13:00	1.0000	0.5984	11.4294		0.00		
11	TRG	PZ-303-AS DIS	04/04/13 13:00	1.0000	0.5994	11.4485		0.00		
12	TRG	D-12 TOT	04/04/13 13:50	1.0000	0.5982	11.4256		0.00		
13	TRG	D-12 DIS	04/04/13 13:50	1.0000	0.5976	11.4142		0.00		
14	TRG	PZ-111-SD TOT	04/04/13 13:52	1.0000	0.5981	11.4237		0.00		
15	TRG	PZ-111-SD DIS	04/04/13 13:52	1.0000	0.5969	11.4008		0.00		
16	TRG	PZ-304-AI TOT	04/04/13 14:08	1.0000	0.6004	11.4676		0.00		
17	TRG	PZ-304-AI DIS	04/04/13 14:08	1.0000	0.5949	11.3626		0.00		
18	TRG	I-11 TOT	04/04/13 14:40	1.0000	0.5964	11.3912		0.00		
19	TRG	I-11 DIS	04/04/13 14:40	1.0000	0.5948	11.3607		0.00		

Spike and Tracer Worksheet

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
13-04050	1	UUISO	4/12/2013 10:45	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
U-234	U-8a	35.240	4/12/2013	0.500	0.5096				8.09	0.291	0.00	0.000	0.00	0.000	0.00	0.000
U-238	U-8a	34.350	4/12/2013	0.500	0.5096				7.89	0.284	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	U-232	U-10a	19.100	4/12/2013	0.6081	0.6300
02	U-232	U-10a	19.100	4/12/2013	0.6039	0.6300
03	U-232	U-10a	19.100	4/12/2013	0.6023	0.6300
04	U-232	U-10a	19.100	4/12/2013	0.6008	0.630
05	U-232	U-10a	19.100	4/12/2013	0.6000	0.630
06	U-232	U-10a	19.100	4/12/2013	0.5989	0.630
07	U-232	U-10a	19.100	4/12/2013	0.6009	0.630
08	U-232	U-10a	19.100	4/12/2013	0.6018	0.6300
09	U-232	U-10a	19.100	4/12/2013	0.5990	0.6300
10	U-232	U-10a	19.100	4/12/2013	0.5984	0.6300
11	U-232	U-10a	19.100	4/12/2013	0.5994	0.6300
12	U-232	U-10a	19.100	4/12/2013	0.5982	0.6300
13	U-232	U-10a	19.100	4/12/2013	0.5976	0.6300
14	U-232	U-10a	19.100	4/12/2013	0.5981	0.6300
15	U-232	U-10a	19.100	4/12/2013	0.5969	0.6300
16	U-232	U-10a	19.100	4/12/2013	0.6004	0.6300
17	U-232	U-10a	19.100	4/12/2013	0.5949	0.6300
18	U-232	U-10a	19.100	4/12/2013	0.5964	0.6300
19	U-232	U-10a	19.100	4/12/2013	0.5948	0.6300

Balance Printer Tapes

Tracer

0.6081 g
0.6039 g
-0.6023 g
-0.6008 g
-0.6000 g
-0.5989 g
-0.6009 g

-0.6018 g
.5990 -0.5984 g
.5994
.5989

LCS

0.5096 g

-0.5976 g
-0.5981 g
-0.5969 g
-0.6004 g
-0.5949 g

-0.5964 g
-0.5948 g

trix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Printed: 4/12/2013 10:49 AM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
13-04050	1	UUISO	liters	4/30/2013	JBARNARD

Lab Fraction	Engineering Management Support, Inc. Client ID	Sample Type	Muffle Data	Dilution Data			Aliquot Data		MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	S-8 TOT	DUP					1.0000E+00	1.0000E+00				
04	S-8 TOT	DO					1.0000E+00	1.0000E+00				
05	S-8 DIS	TRG					1.0000E+00	1.0000E+00				
06	D-13 TOT	TRG					1.0000E+00	1.0000E+00				
07	D-13 DIS	TRG					1.0000E+00	1.0000E+00				
08	PZ-304-AS TOT	TRG					1.0000E+00	1.0000E+00				
09	PZ-304-AS DIS	TRG					1.0000E+00	1.0000E+00				
10	PZ-303-AS TOT	TRG					1.0000E+00	1.0000E+00				
11	PZ-303-AS DIS	TRG					1.0000E+00	1.0000E+00				
12	D-12 TOT	TRG					1.0000E+00	1.0000E+00				
13	D-12 DIS	TRG					1.0000E+00	1.0000E+00				
14	PZ-111-SD TOT	TRG					1.0000E+00	1.0000E+00				
15	PZ-111-SD DIS	TRG					1.0000E+00	1.0000E+00				
16	PZ-304-AI TOT	TRG					1.0000E+00	1.0000E+00				
17	PZ-304-AI DIS	TRG					1.0000E+00	1.0000E+00				
18	I-11 TOT	TRG					1.0000E+00	1.0000E+00				
19	I-11 DIS	TRG					1.0000E+00	1.0000E+00				

Comments	

Technician: JBR Date: 4/12/13

KG 4/18/13

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_044
Chamber Serial Number: 04026481B
Detector Serial Number: 84168
Env. Background: System Bkgd 54589
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/18/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 9:33:52 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.608 mL
Effective Efficiency: 0.2221 +/- 0.0118
Counting Efficiency: 0.1902 +/- 0.0033 on 12/16/2012 5:49:26 PM
Chem. Recovery Factor: 1.1679 +/- 0.0654

Control Certificate Name: NatU_U-8A
Chem. Recov. of Control: U-238 0.931959 +/- 0.067908
Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.273	436.00	9.40	0.00	0.00E+000	11.2
U-234		4.723	600.00	8.01	0.00	0.00E+000	10.9
U-235		4.402	57.00	26.19	0.00	0.00E+000	4.5
U-238		4.145	633.32	7.79	0.68	0.00E+000	27.7

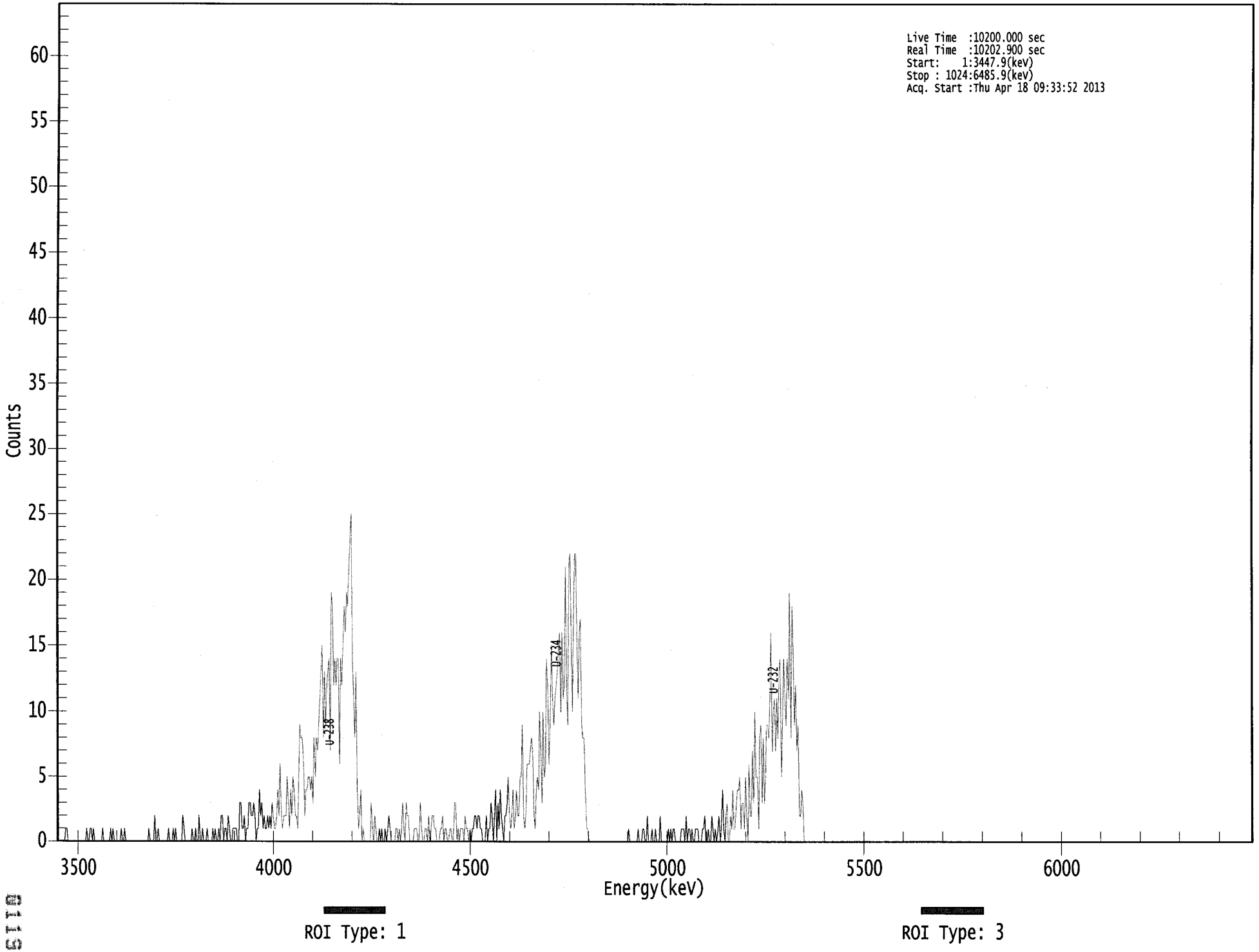
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.994	5302.50*	5.21E+000 +/- 5.43E-001	7.17E-002 +/- 7.47E-003
U-234	0.989	4761.50*	7.17E+000 +/- 9.43E-001	7.17E-002 +/- 7.47E-003
U-235	0.998	4385.50*	8.41E-001 +/- 2.37E-001	8.84E-002 +/- 9.22E-003
U-238	0.989	4184.40*	7.54E+000 +/- 9.81E-001	6.71E-002 +/- 7.00E-003

AG
4/19/13

0000055768.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 01

Elapsed Live time: 10200
Elapsed Real Time: 10203

Channel								
1:	0	0	0	0	0	0	0	1
9:	1	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	1	0	0	1	1	0	1
33:	0	0	0	0	0	0	0	1
41:	0	0	0	0	0	0	1	0
49:	1	0	0	0	0	0	0	1
57:	0	0	1	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	1
81:	0	0	0	0	2	0	0	1
89:	0	0	0	0	0	0	0	0
97:	1	0	0	0	1	0	1	0
105:	0	0	0	0	2	1	0	0
113:	0	0	0	0	1	0	0	1
121:	0	0	2	0	0	1	0	0
129:	0	1	0	0	0	0	1	0
137:	1	0	0	1	0	2	2	0
145:	1	1	0	2	1	0	0	1
153:	1	1	1	0	0	3	3	1
161:	1	2	0	1	1	3	3	2
169:	2	3	2	0	1	1	4	2
177:	3	1	2	1	1	2	1	2
185:	1	3	2	1	1	2	4	2
193:	6	2	1	2	2	2	5	3
201:	1	4	2	5	4	2	2	1
209:	5	9	8	8	6	2	4	4
217:	5	5	4	5	3	8	5	8
225:	7	9	11	13	15	8	13	9
233:	12	13	14	7	19	18	12	14
241:	12	14	14	6	14	12	15	18
249:	16	19	18	21	23	25	14	11
257:	8	13	4	1	2	4	0	1
265:	0	0	0	0	0	0	3	1
273:	0	2	1	0	0	1	0	1
281:	0	0	1	0	1	2	1	0
289:	0	0	0	1	1	0	1	0
297:	1	3	1	0	3	2	2	0
305:	0	0	0	1	1	1	0	0
313:	3	1	0	0	1	1	0	2
321:	0	1	2	2	1	1	0	0
329:	0	1	1	2	0	1	1	0
337:	0	1	1	0	0	3	3	0
345:	1	0	1	1	1	0	2	1
353:	1	0	1	0	1	1	2	2
361:	1	2	2	1	1	0	0	0

369:	2	0	1	1	3	2	0	2

Sample Title: 01

Channel								
377:	4	0	3	1	4	2	1	0
385:	2	2	3	5	2	1	2	4
393:	1	2	4	2	2	5	5	9
401:	2	1	2	6	6	6	7	8
409:	7	2	1	4	5	4	10	7
417:	3	10	5	6	14	12	6	9
425:	15	11	9	11	12	13	15	16
433:	10	16	11	12	21	12	9	21
441:	22	16	10	17	22	22	15	11
449:	16	17	9	8	8	4	1	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	1	0	0	0	0	0
497:	0	0	1	0	0	0	1	1
505:	0	0	2	0	0	0	1	0
513:	0	1	0	0	0	2	0	0
521:	0	0	0	0	1	0	1	0
529:	1	1	0	0	0	0	0	1
537:	1	1	0	2	0	1	1	0
545:	1	0	0	1	1	1	0	0
553:	0	1	1	2	0	0	1	0
561:	0	2	1	0	1	0	1	2
569:	0	1	4	1	0	2	3	0
577:	0	2	1	4	1	1	3	4
585:	4	5	1	3	3	1	5	2
593:	0	6	2	2	7	3	10	5
601:	5	1	8	9	3	8	3	5
609:	9	9	8	11	16	7	10	11
617:	7	11	8	13	14	5	9	14
625:	11	9	14	11	19	8	18	14
633:	9	12	7	9	2	2	4	3
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 01

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB 4/18/13

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_046
Chamber Serial Number: 04026482B
Detector Serial Number: 58762
Env. Background: System Bkgd 54590
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/18/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 9:33:53 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.604 mL
Effective Efficiency: 0.2312 +/- 0.0121
Counting Efficiency: 0.1789 +/- 0.0031 on 12/16/2012 5:49:23 PM
Chem. Recovery Factor: 1.2923 +/- 0.0715

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.282	450.83	9.23	0.17	0.00E+000	12.6
U-234		4.683	6.00	86.43	0.00	0.00E+000	3.0
U-235		4.392	2.00	169.74	0.00	0.00E+000	3.0
U-238		4.154	1.83	152.56	0.17	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.997	5302.50*	5.18E+000 +/- 5.32E-001	4.79E-002 +/- 4.92E-003
U-234	0.957	4761.50*	6.89E-002 +/- 6.00E-002	6.88E-002 +/- 7.07E-003
U-235	1.000	4385.50*	2.83E-002 +/- 4.82E-002	8.49E-002 +/- 8.73E-003
U-238	0.993	4184.40*	2.09E-002 +/- 3.20E-002	4.77E-002 +/- 4.90E-003

AG 4/19/13

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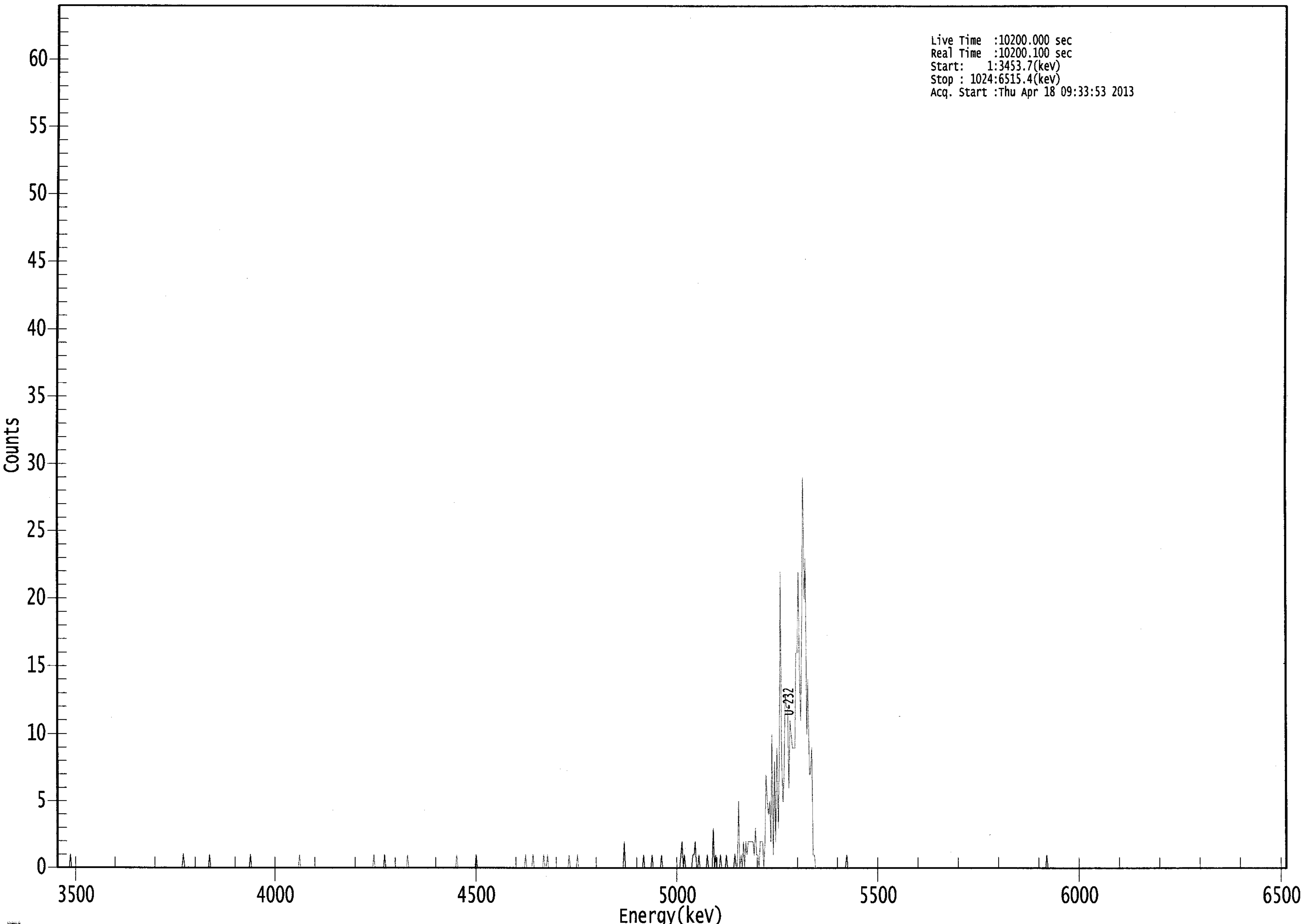


ROI Type: 1

ROI Type: 3

0124

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 02

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	1	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	1	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	1	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	1	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	1	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	1	0	0	0	0	0	0
273:	0	0	1	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	1	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	1	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	1	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	1
393:	0	0	0	0	0	1	0	0
401:	0	0	0	0	0	0	1	0
409:	0	1	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	1	0	0	0	0
433:	0	0	1	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	2	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	1	0	0	0	0	0	0
497:	1	0	0	0	0	0	0	0
505:	1	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	1	2	0	1	0	0	0	0
529:	0	0	1	1	2	0	0	1
537:	0	0	0	0	0	0	1	0
545:	0	0	0	3	0	1	0	0
553:	0	1	0	0	0	0	1	0
561:	0	0	0	0	0	1	0	0
569:	5	0	1	0	2	0	2	1
577:	2	2	2	2	2	1	3	1
585:	1	0	2	2	2	0	2	7
593:	5	4	5	2	10	1	8	2
601:	9	3	8	22	8	5	7	13
609:	12	12	6	11	10	9	9	9
617:	16	16	22	14	11	19	29	20
625:	23	10	14	7	7	9	1	1
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	1	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	1	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

YCB 4/18/13

Apex-Alpha™

Sample Description: S-8 TOT-DUP
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_047
Chamber Serial Number: 02030596A
Detector Serial Number: 91086
Env. Background: System Bkgd 54591
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 9:33:48 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.602 mL
Effective Efficiency: 0.2025 +/- 0.0112
Counting Efficiency: 0.1822 +/- 0.0032 on 12/16/2012 5:49:21 PM
Chem. Recovery Factor: 1.1119 +/- 0.0646

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.281	393.83	9.88	0.17	0.00E+000	7.6
U-234		4.733	71.66	23.22	0.34	0.00E+000	3.7
U-235		4.363	3.66	107.87	0.34	0.00E+000	2.9
U-238		4.154	60.83	25.17	0.17	0.00E+000	6.4

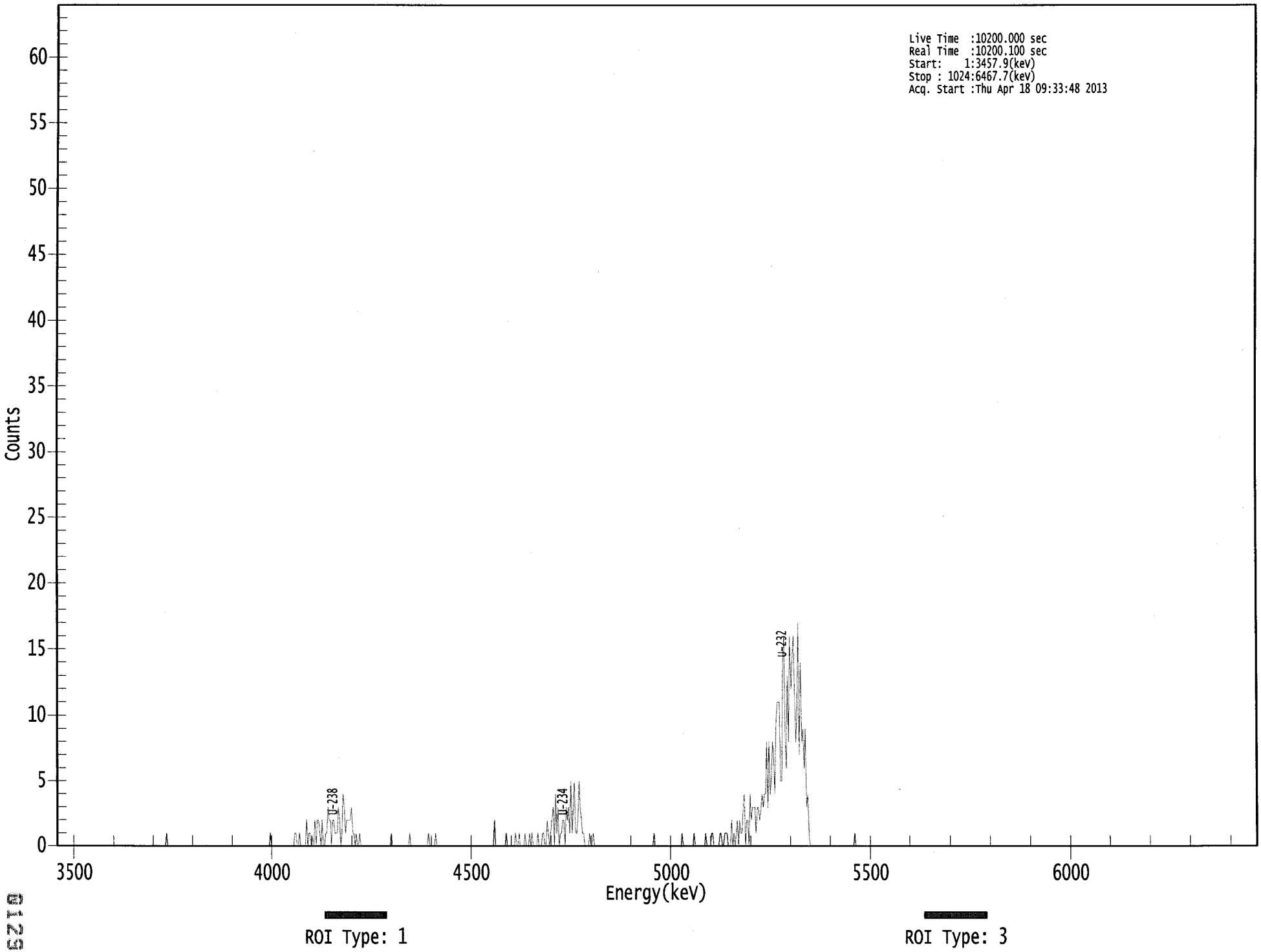
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.997	5302.50*	5.16E+000 +/- 5.61E-001	5.47E-002 +/- 5.94E-003
U-234	0.994	4761.50*	9.39E-001 +/- 2.41E-001	6.27E-002 +/- 6.81E-003
U-235	0.996	4385.50*	5.92E-002 +/- 6.42E-002	7.73E-002 +/- 8.40E-003
U-238	0.994	4184.40*	7.94E-001 +/- 2.18E-001	5.45E-002 +/- 5.92E-003

AC
4/19/13

0000055769.CNF



5719

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 03

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel							
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	1	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	1
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	1	1	0	0
209:	1	0	0	0	0	0	2	0
217:	1	1	0	0	0	2	0	2
225:	2	1	0	2	0	0	1	1
233:	3	2	2	0	2	2	1	1
241:	1	3	2	0	1	4	3	1
249:	2	2	2	2	3	1	1	0
257:	1	0	0	1	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	1	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	1	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	1	0
321:	0	0	0	0	1	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	2	0

Sample Title: 03

Channel								
377:	0	0	0	0	0	0	0	0
385:	1	0	0	0	0	0	0	0
393:	1	0	0	1	0	0	0	0
401:	1	0	0	0	1	0	1	0
409:	0	0	0	1	0	0	0	1
417:	1	0	0	2	1	0	1	2
425:	3	0	4	1	3	0	1	1
433:	2	2	0	3	2	3	1	5
441:	1	3	5	1	1	2	5	3
449:	2	1	1	0	0	0	0	1
457:	0	0	1	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	1	0
537:	0	0	0	0	0	0	0	0
545:	1	0	0	0	0	0	0	0
553:	0	0	1	0	0	0	0	1
561:	1	0	0	0	0	0	1	1
569:	0	0	1	1	1	0	0	0
577:	2	0	1	0	1	2	0	2
585:	1	1	3	4	0	2	2	0
593:	4	2	3	3	3	1	3	3
601:	2	3	4	3	4	4	8	3
609:	8	4	5	8	7	4	9	11
617:	11	11	5	5	14	16	9	6
625:	13	8	16	12	14	16	12	8
633:	10	17	7	14	8	9	6	9
641:	3	4	1	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	1	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 03

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 4/18/13

Apex-Alpha™

Sample Description: S-8 TOT
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_048
Chamber Serial Number: 02030596B
Detector Serial Number: 83111
Env. Background: System Bkgd 54592
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 9:33:50 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.601 mL
Effective Efficiency: 0.1797 +/- 0.0105
Counting Efficiency: 0.1680 +/- 0.0030 on 12/16/2012 5:49:20 PM
Chem. Recovery Factor: 1.0697 +/- 0.0652

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.283	348.49	10.51	0.51	0.00E+000	35.2
U-234		4.742	57.00	26.19	0.00	0.00E+000	4.9
U-235		4.373	4.83	91.00	0.17	0.00E+000	3.0
U-238		4.147	64.00	24.69	0.00	0.00E+000	11.6

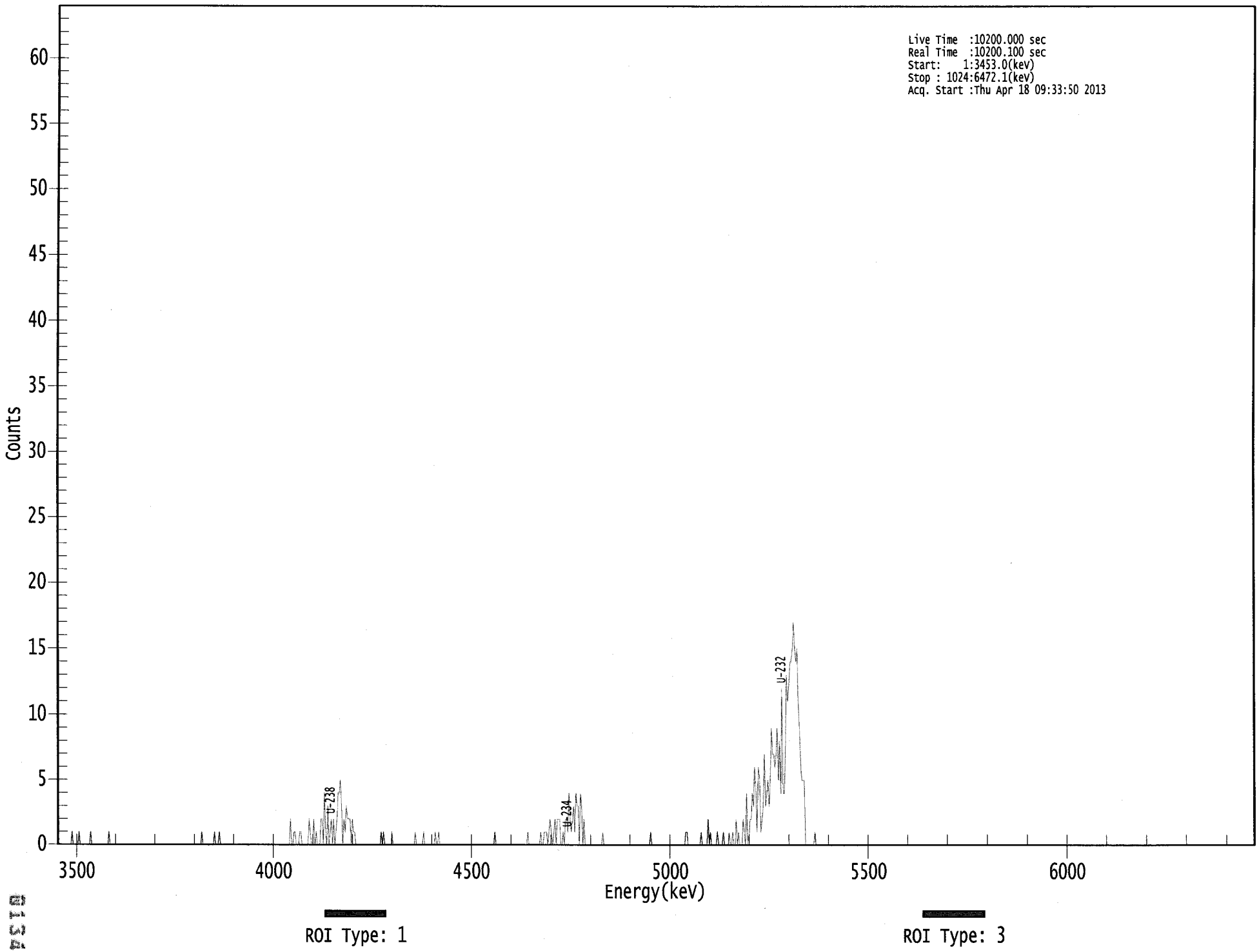
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.997	5302.50*	5.15E+000 +/- 5.89E-001	7.76E-002 +/- 8.87E-003
U-234	0.997	4761.50*	8.42E-001 +/- 2.41E-001	8.86E-002 +/- 1.01E-002
U-235	0.999	4385.50*	8.80E-002 +/- 8.08E-002	7.61E-002 +/- 8.70E-003
U-238	0.990	4184.40*	9.42E-001 +/- 2.56E-001	8.82E-002 +/- 1.01E-002

AG
4/19/13

0000055770.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 04

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	1	0	0	0
17:	0	0	1	0	0	0	0	0
25:	0	0	0	0	1	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	1	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	1	0	0	0
129:	0	0	0	0	0	0	0	1
137:	0	0	0	1	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	2	0	0	1	1	0	0	0
209:	1	1	0	0	0	0	0	0
217:	2	1	0	0	2	0	1	0
225:	0	0	2	2	0	4	1	0
233:	3	0	1	2	0	2	0	1
241:	2	4	4	5	3	0	2	1
249:	3	2	2	2	0	2	1	1
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	1	0
281:	1	0	0	0	0	0	0	1
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	1	0	0	0	0
313:	0	0	1	0	0	0	0	0
321:	0	0	0	0	1	0	0	1
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	1

Sample Title: 04

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	1	0	0	0	0
409:	0	0	0	0	0	0	1	0
417:	0	1	1	1	0	1	2	1
425:	0	1	2	0	2	2	2	0
433:	0	1	0	2	2	1	4	2
441:	1	2	3	1	4	3	3	0
449:	4	3	0	2	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	1	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	1	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	1	1	0	0	0	0
545:	0	0	0	0	0	0	0	1
553:	0	0	0	0	0	2	0	1
561:	0	0	0	0	0	1	0	0
569:	0	0	1	0	0	0	0	1
577:	0	0	1	0	0	2	0	1
585:	0	0	0	2	1	0	4	0
593:	0	2	2	4	3	6	4	1
601:	6	5	1	2	3	7	3	4
609:	5	3	5	9	7	7	6	7
617:	9	5	8	4	12	4	4	7
625:	13	11	12	14	14	15	17	15
633:	14	15	11	9	6	5	5	5
641:	0	0	0	0	0	0	0	0
649:	1	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 04

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description:	S-8 DIS
Spectrum File:	\\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification:	1304050A-UU
Sample Identification:	05
Sample Geometry:	Shelf 2
Procedure Description:	U iso
Detector Name:	Alpha_034
Chamber Serial Number:	04026479B
Detector Serial Number:	91136
Env. Background:	System Bkgd 54583
Reagent Blank:	<not performed>
Sample Size:	1.000E+000 +/- 0.000E+000 liter
Sample Date/Time:	4/4/2013 6:29:13 AM
Acquisition Date/Time:	4/18/2013 12:30:45 PM
Acquisition Live Time:	170.0 minutes
Acquisition Real Time:	170.0 minutes
Tracer Certificate:	U232_UU-10A
Tracer Quantity:	0.600 mL
Effective Efficiency:	0.1770 +/- 0.0104
Counting Efficiency:	0.1856 +/- 0.0032 on 12/16/2012 5:49:43 PM
Chem. Recovery Factor:	0.9538 +/- 0.0584
Peak Match Tolerance:	0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.277	342.83	10.59	0.17	0.00E+000	25.1
U-234		4.727	56.83	26.05	0.17	0.00E+000	4.0
U-235		4.412	5.00	96.02	0.00	0.00E+000	3.0
U-238		4.156	36.66	32.55	0.34	0.00E+000	3.5

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.996	5302.50*	5.14E+000 +/- 5.92E-001	6.26E-002 +/- 7.21E-003
U-234	0.992	4761.50*	8.52E-001 +/- 2.43E-001	6.26E-002 +/- 7.21E-003
U-235	0.995	4385.50*	9.25E-002 +/- 8.95E-002	1.11E-001 +/- 1.28E-002
U-238	0.994	4184.40*	5.48E-001 +/- 1.89E-001	7.14E-002 +/- 8.22E-003

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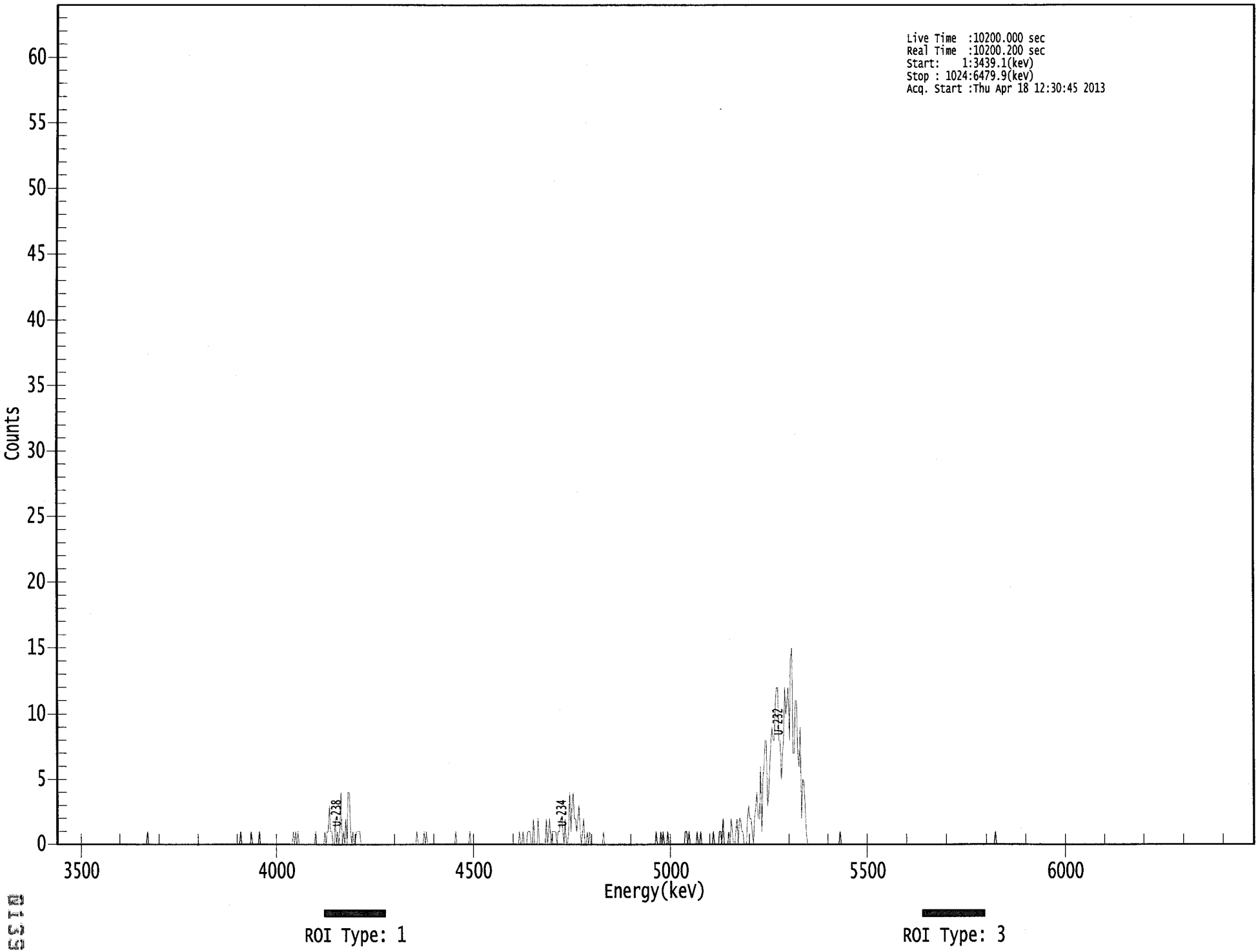
0000055786.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 05

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	1	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	1	0
161:	0	0	0	0	0	0	0	1
169:	0	0	0	0	0	0	1	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	1	0	1	0	1
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	1	0
225:	0	0	0	0	0	0	1	0
233:	1	1	3	1	1	0	0	2
241:	0	1	0	1	4	0	1	0
249:	2	0	4	4	1	0	1	0
257:	0	1	1	1	1	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	1	0	0
313:	0	0	0	1	0	1	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	1	0
345:	0	0	0	0	0	0	0	0
353:	0	0	1	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 05

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	1	0	0	1
401:	0	0	0	1	1	1	0	0
409:	2	0	0	0	2	0	0	0
417:	0	0	0	2	0	1	2	0
425:	1	1	1	1	0	1	1	2
433:	2	1	0	2	0	0	1	4
441:	1	3	4	2	2	1	2	3
449:	1	0	1	2	0	0	1	0
457:	1	0	0	0	0	0	0	0
465:	0	0	0	0	1	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	1	0	0	0	1	0	1
521:	0	0	0	1	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	1	1	0	1	0	0
545:	0	0	0	0	1	0	0	1
553:	0	0	0	0	0	0	0	0
561:	0	0	1	0	0	0	0	1
569:	1	0	2	0	0	0	0	1
577:	0	2	1	0	0	1	2	0
585:	2	2	1	1	0	0	0	2
593:	3	2	2	1	0	2	3	4
601:	2	2	6	1	5	6	8	8
609:	3	4	6	8	9	8	8	11
617:	12	12	8	8	5	7	8	12
625:	10	11	12	8	14	15	7	7
633:	11	11	7	6	9	2	5	5
641:	3	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	1	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	1	0	0	0	0	0

Sample Title: 05

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description:	D-13 TOT
Spectrum File:	\\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification:	1304050A-UU
Sample Identification:	06
Sample Geometry:	Shelf 2
Procedure Description:	U iso
Detector Name:	Alpha_035
Chamber Serial Number:	04026477A
Detector Serial Number:	58771
Env. Background:	System Bkgd 54584
Reagent Blank:	<not performed>
Sample Size:	1.000E+000 +/- 0.000E+000 liter
Sample Date/Time:	4/4/2013 6:29:13 AM
Acquisition Date/Time:	4/18/2013 12:30:47 PM
Acquisition Live Time:	170.0 minutes
Acquisition Real Time:	170.0 minutes
Tracer Certificate:	U232_UU-10A
Tracer Quantity:	0.599 mL
Effective Efficiency:	0.1464 +/- 0.0093
Counting Efficiency:	0.1826 +/- 0.0032 on 12/16/2012 5:49:42 PM
Chem. Recovery Factor:	0.8017 +/- 0.0531
Peak Match Tolerance:	0.150 MeV

PEAK AREA REPORT

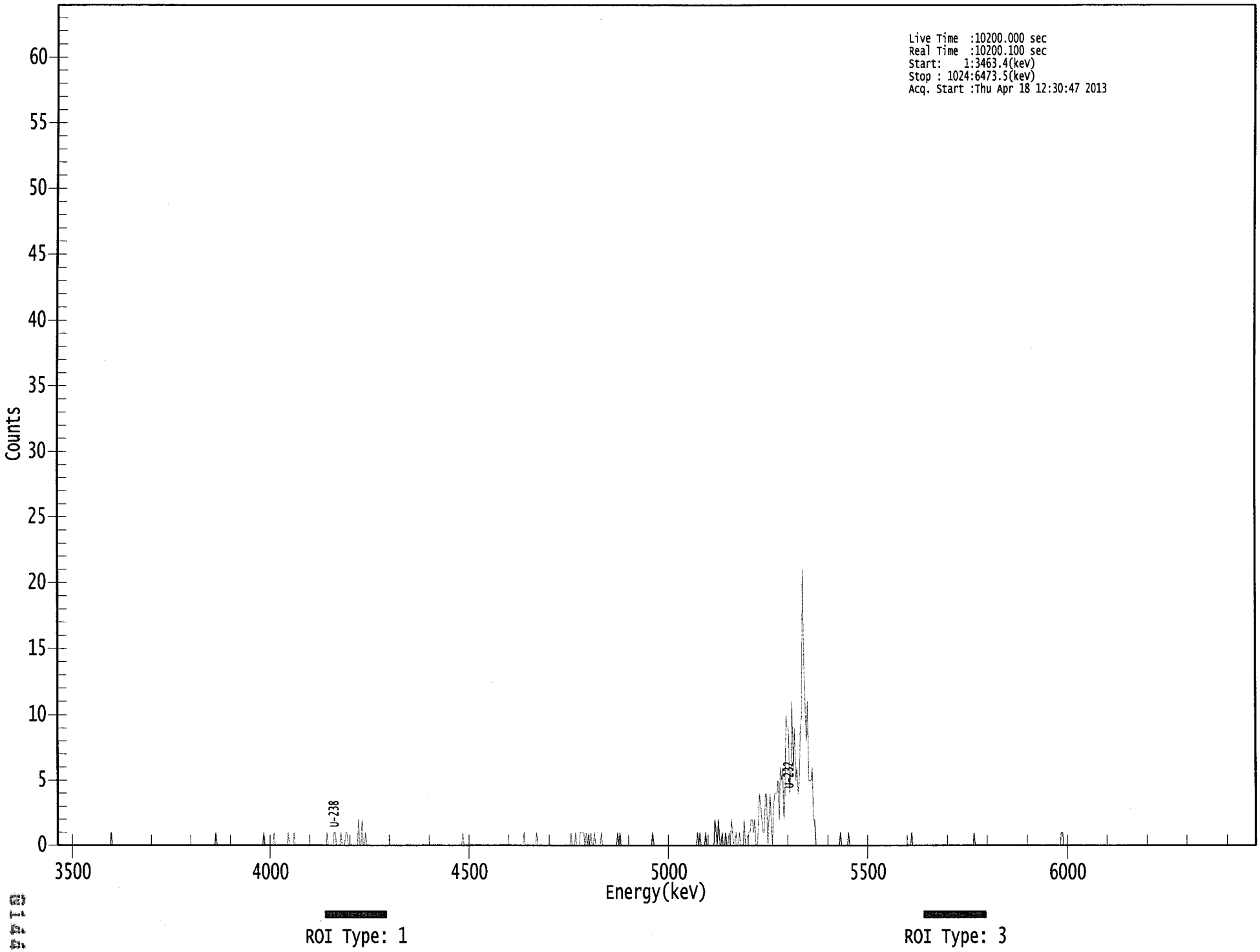
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.305	283.00	11.67	0.00	0.00E+000	9.2
U-234		4.770	12.66	55.94	0.34	0.00E+000	2.9
U-235		4.484	1.00	277.19	0.00	0.00E+000	2.9
U-238		4.164	13.83	53.08	0.17	0.00E+000	2.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	1.000	5302.50*	5.14E+000 +/- 6.43E-001	1.09E-001 +/- 1.36E-002
U-234	1.000	4761.50*	2.30E-001 +/- 1.32E-001	8.67E-002 +/- 1.09E-002
U-235	0.933	4385.50*	2.24E-002 +/- 6.21E-002	1.34E-001 +/- 1.68E-002
U-238	0.997	4184.40*	2.50E-001 +/- 1.36E-001	7.54E-002 +/- 9.43E-003

AG
4/19/13


0000055787.CNF
Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3463.4(keV)
Stop : 1024:6473.5(keV)
Acq. Start :Thu Apr 18 12:30:47 2013
Counts
Energy(keV)
U-238
U-232
ROI Type: 1
ROI Type: 3

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 06

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	1	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	1	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	1	0	0	0	0	0	0
185:	0	0	1	0	0	0	0	0
193:	0	0	0	0	0	0	1	0
201:	0	0	0	1	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	1
233:	0	0	0	0	0	1	1	0
241:	0	0	0	1	0	0	0	1
249:	1	0	0	0	0	0	0	0
257:	0	0	2	0	0	2	0	0
265:	1	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	1	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	1
401:	0	0	0	0	0	0	0	0
409:	0	0	1	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	1
441:	0	0	0	1	0	0	0	1
449:	1	1	1	0	1	0	1	0
457:	1	0	0	1	0	0	0	0
465:	0	1	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	1
481:	0	1	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	1	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	1	0	1	0	0
553:	0	0	1	0	0	0	0	0
561:	0	0	2	1	0	2	0	0
569:	1	0	0	1	0	0	1	0
577:	2	1	0	0	1	0	0	1
585:	0	0	0	2	0	0	0	1
593:	1	2	2	1	2	0	0	1
601:	4	3	2	1	1	4	4	0
609:	2	4	2	0	3	4	4	4
617:	5	2	6	5	6	2	4	10
625:	9	9	4	6	11	6	9	5
633:	6	4	5	9	10	21	14	11
641:	8	11	5	5	5	6	2	2
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	1	0	0
673:	0	0	0	0	1	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	1	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	1
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	1	1	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

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Apex-Alpha™

Sample Description: D-13 DIS
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_037
Chamber Serial Number: 04026478A
Detector Serial Number: 91133
Env. Background: System Bkgd 54585
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 12:30:48 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.601 mL
Effective Efficiency: 0.2088 +/- 0.0114
Counting Efficiency: 0.1783 +/- 0.0033 on 1/26/2013 3:28:25 PM
Chem. Recovery Factor: 1.1710 +/- 0.0678

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.276	405.00	9.75	0.00	0.00E+000	5.0
U-234		4.714	13.66	53.80	0.34	0.00E+000	2.9
U-235		4.397	2.83	120.53	0.17	0.00E+000	2.9
U-238		4.143	8.83	66.70	0.17	0.00E+000	2.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.995	5302.50*	5.15E+000 +/- 5.54E-001	7.63E-002 +/- 8.20E-003
U-234	0.984	4761.50*	1.74E-001 +/- 9.53E-002	6.08E-002 +/- 6.53E-003
U-235	0.999	4385.50*	4.44E-002 +/- 5.37E-002	6.55E-002 +/- 7.03E-003
U-238	0.988	4184.40*	1.12E-001 +/- 7.55E-002	5.28E-002 +/- 5.68E-003

AG
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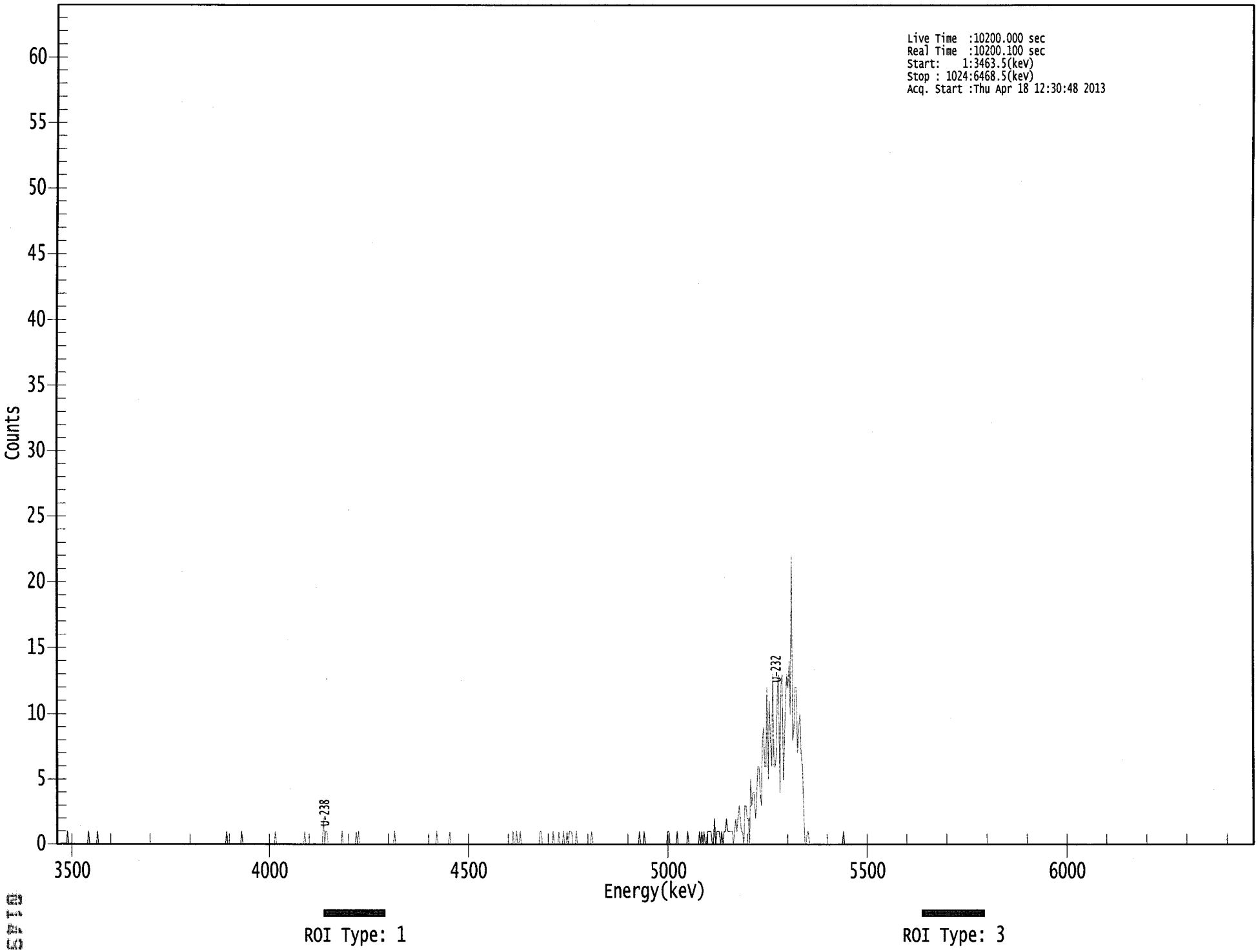
0000055788.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	1	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	1	0	0	0	0
33:	0	0	0	1	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	1	0	0	0	0	0
153:	0	0	0	0	0	0	0	1
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	1	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	1	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	2	0	1
233:	1	0	0	0	0	0	0	0
241:	0	0	0	0	0	1	0	0
249:	0	0	0	0	0	0	0	0
257:	0	1	0	1	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	1	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	1	0
329:	0	0	0	0	0	0	0	0
337:	0	1	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 07

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	1
393:	0	0	1	0	0	1	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	1	1
417:	0	0	0	0	0	0	0	0
425:	0	1	0	0	0	0	1	0
433:	0	0	1	0	0	1	0	1
441:	1	1	0	0	0	1	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	1	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	1	0	0	0	1
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	1	1	0	0	0
529:	0	0	0	1	0	0	0	0
537:	0	0	0	0	1	0	0	0
545:	0	0	0	0	0	0	1	0
553:	1	0	1	0	0	1	1	1
561:	1	0	0	2	0	1	1	1
569:	0	1	0	1	1	2	1	1
577:	1	1	1	0	1	2	1	2
585:	3	2	1	1	0	3	3	2
593:	2	0	5	3	4	4	2	3
601:	6	6	4	3	8	9	6	6
609:	12	5	11	8	6	13	6	6
617:	7	12	13	4	12	13	5	8
625:	11	13	12	14	10	22	8	9
633:	12	12	7	9	10	7	6	3
641:	0	0	1	1	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	1	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 07

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB 4/18/13

Apex-Alpha™

Sample Description: PZ-303-AS TOT
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_042
Chamber Serial Number: 05026930B
Detector Serial Number: 84185
Env. Background: System Bkgd 54588
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 12:30:53 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.598 mL
Effective Efficiency: 0.1995 +/- 0.0112
Counting Efficiency: 0.1846 +/- 0.0032 on 12/16/2012 5:49:29 PM
Chem. Recovery Factor: 1.0809 +/- 0.0633

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.270	385.49	9.99	0.51	0.00E+000	14.5
U-234		4.721	68.66	23.72	0.34	0.00E+000	3.5
U-235		4.411	2.83	120.53	0.17	0.00E+000	3.0
U-238		4.141	60.49	25.32	0.51	0.00E+000	4.0

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.992	5302.50*	5.13E+000 +/- 5.62E-001	6.98E-002 +/- 7.66E-003
U-234	0.988	4761.50*	9.14E-001 +/- 2.39E-001	6.36E-002 +/- 6.97E-003
U-235	0.995	4385.50*	4.64E-002 +/- 5.62E-002	6.85E-002 +/- 7.51E-003
U-238	0.987	4184.40*	8.01E-001 +/- 2.21E-001	6.95E-002 +/- 7.62E-003

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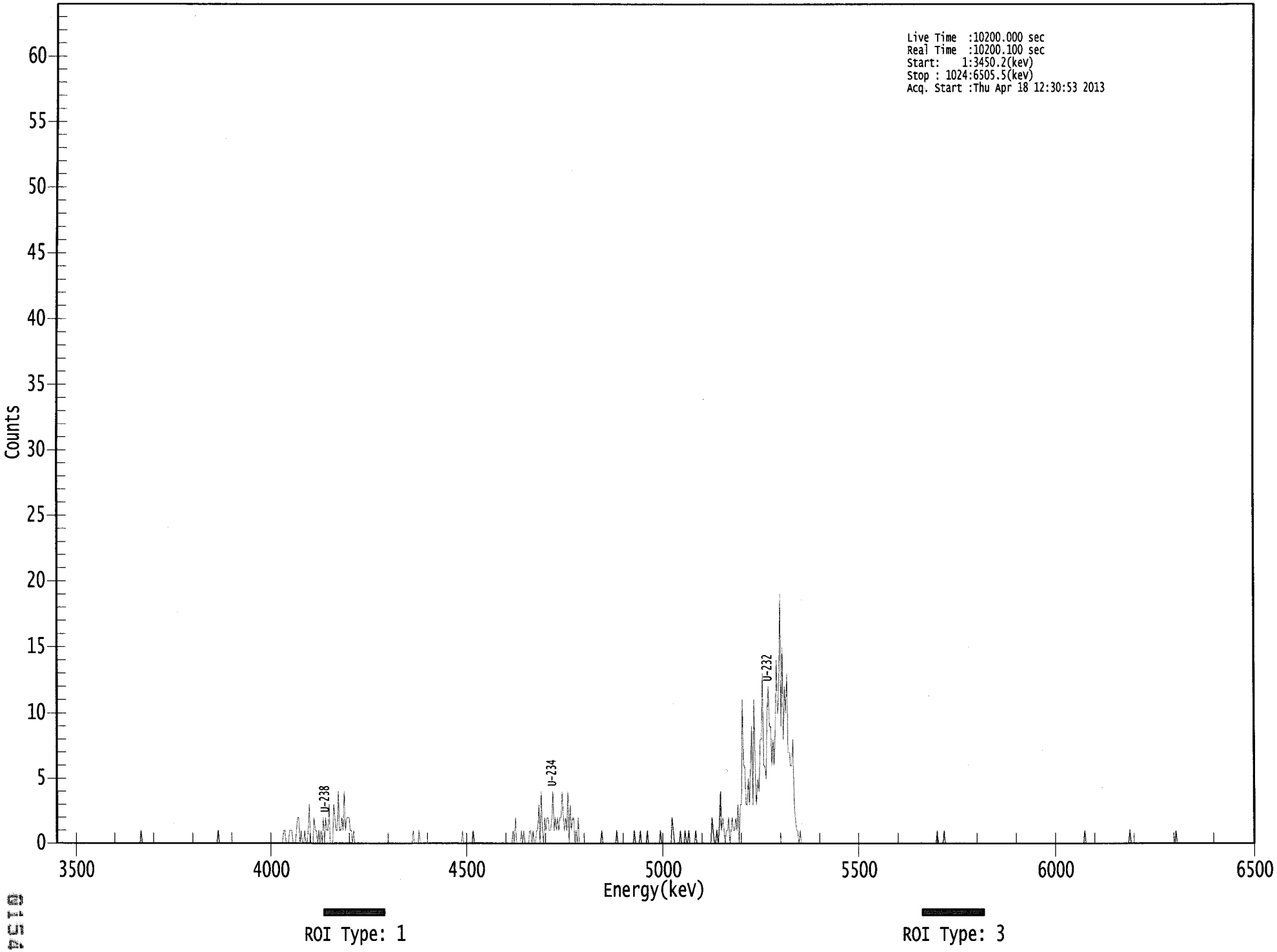
4/19/13

0000055791.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	1	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	1	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	1	1	0	0	0
201:	1	1	1	0	0	0	1	2
209:	2	0	1	0	0	1	0	0
217:	1	3	0	0	0	2	1	1
225:	0	1	0	1	0	2	0	2
233:	1	1	3	0	0	0	3	2
241:	1	1	4	1	1	2	1	4
249:	1	2	2	2	1	1	0	1
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	1	0	0	0	0	1
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	1	0	0	0
353:	0	0	0	0	0	1	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	1
393:	0	2	0	0	0	0	1	0
401:	1	0	0	0	0	1	1	0
409:	1	0	0	1	1	3	0	4
417:	1	0	2	1	2	2	1	1
425:	2	4	1	2	1	2	1	2
433:	2	4	2	1	2	1	4	0
441:	3	1	2	2	0	1	0	2
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	1	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	1	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	1
497:	0	0	0	0	1	0	0	0
505:	0	0	1	0	0	0	0	0
513:	0	0	0	0	0	1	0	0
521:	0	0	0	0	0	0	0	2
529:	1	0	0	0	0	0	1	0
537:	0	0	1	0	0	1	0	0
545:	0	0	0	1	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	2	1	0	0	1	0	1
569:	4	1	2	1	0	1	1	2
577:	0	1	2	1	1	2	1	3
585:	0	3	3	11	6	6	3	3
593:	5	3	6	9	3	11	5	3
601:	5	4	8	8	13	6	6	5
609:	10	12	9	9	6	8	6	9
617:	14	10	11	19	9	15	8	12
625:	10	13	7	7	6	6	8	3
633:	2	1	1	0	1	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	1	0	0	0	0	0	1
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	1
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	1	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	1	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: PZ-303-AS DIS
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 11
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_044
Chamber Serial Number: 04026481B
Detector Serial Number: 84168
Env. Background: System Bkgd 54589
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 12:30:55 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.599 mL
Effective Efficiency: 0.1623 +/- 0.0099
Counting Efficiency: 0.1902 +/- 0.0033 on 12/16/2012 5:49:26 PM
Chem. Recovery Factor: 0.8533 +/- 0.0542

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.285	314.00	11.08	0.00	0.00E+000	10.3
U-234		4.738	23.00	41.75	0.00	0.00E+000	3.0
U-235		4.418	3.00	130.67	0.00	0.00E+000	3.0
U-238		4.157	12.32	57.62	0.68	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.998	5302.50*	5.14E+000 +/- 6.15E-001	9.81E-002 +/- 1.17E-002
U-234	0.996	4761.50*	3.76E-001 +/- 1.63E-001	9.81E-002 +/- 1.17E-002
U-235	0.993	4385.50*	6.06E-002 +/- 7.95E-002	1.21E-001 +/- 1.45E-002
U-238	0.995	4184.40*	2.01E-001 +/- 1.18E-001	9.19E-002 +/- 1.10E-002

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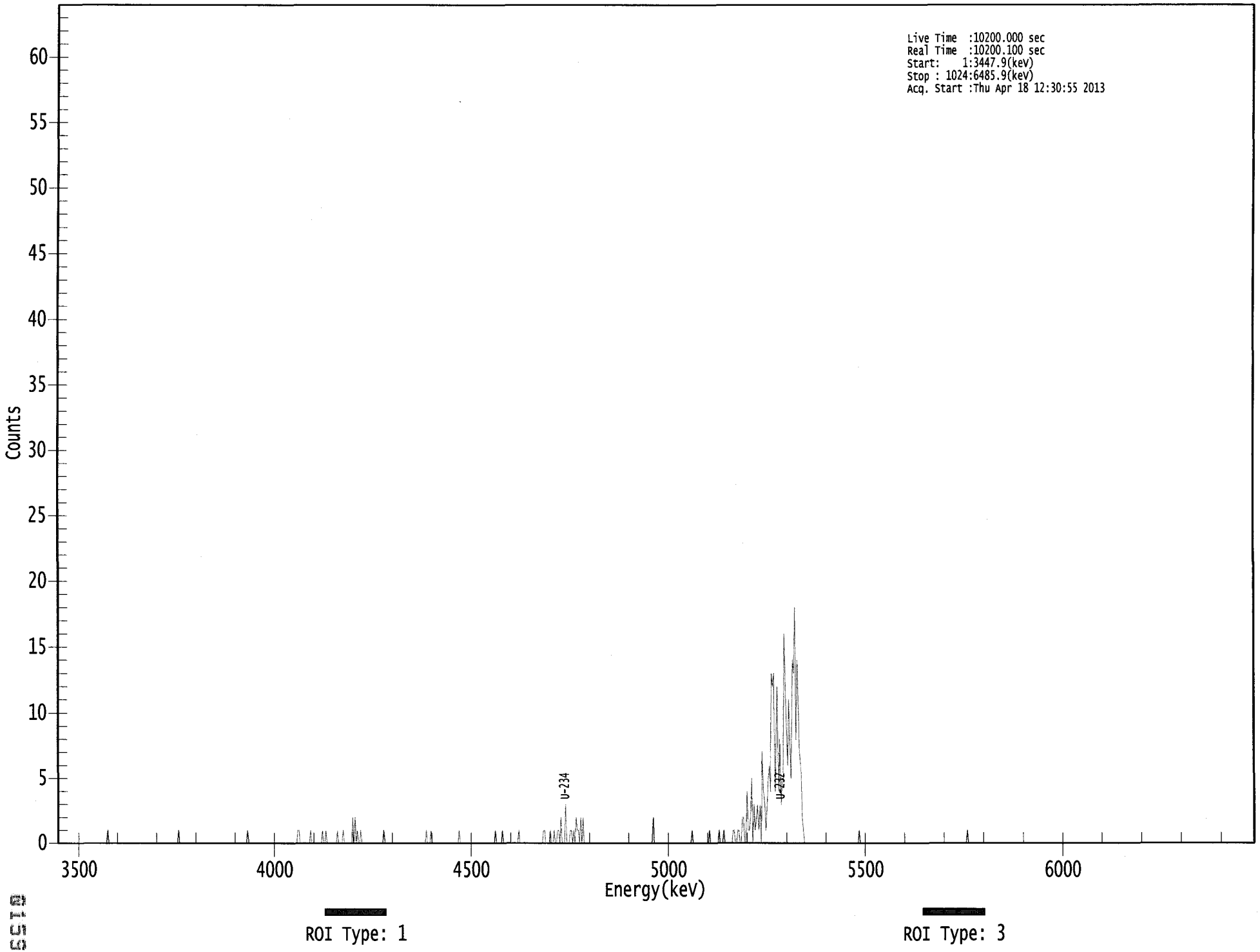
4/19/13

0000055792.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 11

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	1	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	1	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	1	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	1	1
209:	0	0	0	0	0	0	0	0
217:	0	1	0	0	0	0	0	0
225:	0	0	0	1	0	0	1	0
233:	0	0	0	0	0	0	0	0
241:	1	0	0	0	0	1	0	0
249:	0	0	0	0	0	2	0	2
257:	0	1	0	0	1	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	1	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	1	0	0	0
321:	1	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	1	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	1

Sample Title: 11

Channel								
377:	0	0	0	0	0	1	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	1	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	1	1	0	0	0	0	1	0
425:	0	1	0	0	1	1	0	2
433:	0	0	0	3	0	0	0	1
441:	1	0	1	0	2	1	1	0
449:	2	0	2	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	2	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	1
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	1	0
561:	0	0	0	0	0	0	1	0
569:	0	0	1	0	0	0	0	0
577:	0	0	1	1	0	0	1	1
585:	0	0	2	2	0	0	4	1
593:	1	2	5	0	3	1	2	3
601:	1	3	0	7	4	3	1	3
609:	5	6	4	13	12	13	4	8
617:	12	4	8	3	5	5	16	12
625:	9	6	11	7	5	14	13	18
633:	8	14	11	7	6	2	1	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	1	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	1	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 11

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KCB 4/18/13

Apex-Alpha™

Sample Description: D-12 TOT
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 12
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_046
Chamber Serial Number: 04026482B
Detector Serial Number: 58762
Env. Background: System Bkgd 54590
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 12:30:57 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.598 mL
Effective Efficiency: 0.0999 +/- 0.0076
Counting Efficiency: 0.1789 +/- 0.0031 on 12/16/2012 5:49:23 PM
Chem. Recovery Factor: 0.5580 +/- 0.0433

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.278	192.83	14.12	0.17	0.00E+000	5.1
U-234		4.713	5.00	96.02	0.00	0.00E+000	3.0
U-235		4.359	2.00	169.74	0.00	0.00E+000	3.0
U-238		4.160	2.83	120.53	0.17	0.00E+000	6.0

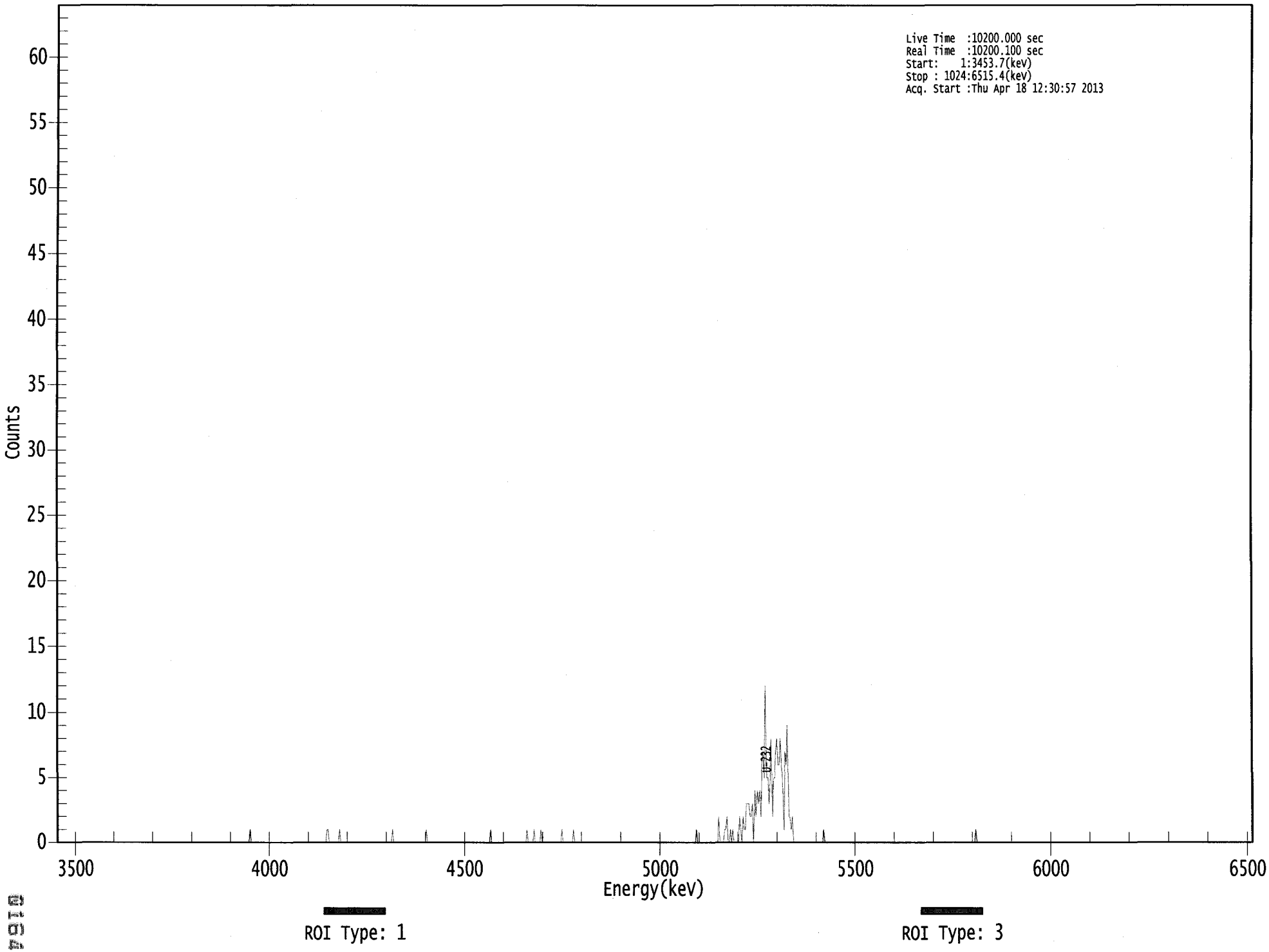
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.996	5302.50*	5.13E+000 +/- 7.60E-001	1.11E-001 +/- 1.65E-002
U-234	0.983	4761.50*	1.33E-001 +/- 1.29E-001	1.59E-001 +/- 2.36E-002
U-235	0.995	4385.50*	6.56E-002 +/- 1.12E-001	1.97E-001 +/- 2.92E-002
U-238	0.996	4184.40*	7.49E-002 +/- 9.10E-002	1.10E-001 +/- 1.64E-002

AC
4/19/13

0000055785.CNF



9165

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 12

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	1	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	1	1	0	0	0	0	0	0
241:	0	0	0	1	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	1	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	1	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	1	0	0	0

Sample Title: 12

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	1	0	0	0	0
409:	0	1	0	0	0	0	0	1
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	1	0	0	0	0	0	0
441:	0	0	0	1	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	1	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	2
569:	0	0	0	0	1	1	2	0
577:	0	1	0	1	0	0	0	0
585:	0	2	1	0	2	1	1	3
593:	3	3	2	2	3	0	4	2
601:	4	3	4	2	6	7	5	12
609:	5	5	3	5	8	2	5	5
617:	7	8	6	6	8	6	4	1
625:	7	6	9	2	2	1	2	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	1	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	1	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 12

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB 4/18/13

Apex-Alpha™

Sample Description: D-12 DIS
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 13
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_047
Chamber Serial Number: 02030596A
Detector Serial Number: 91086
Env. Background: System Bkgd 54591
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 12:30:59 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.598 mL
Effective Efficiency: 0.1088 +/- 0.0079
Counting Efficiency: 0.1822 +/- 0.0032 on 12/16/2012 5:49:21 PM
Chem. Recovery Factor: 0.5971 +/- 0.0447

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.277	209.83	13.54	0.17	0.00E+000	10.1
U-234		4.727	9.66	64.35	0.34	0.00E+000	2.9
U-235		4.351	2.66	128.85	0.34	0.00E+000	5.9
U-238		4.170	3.83	102.72	0.17	0.00E+000	2.9

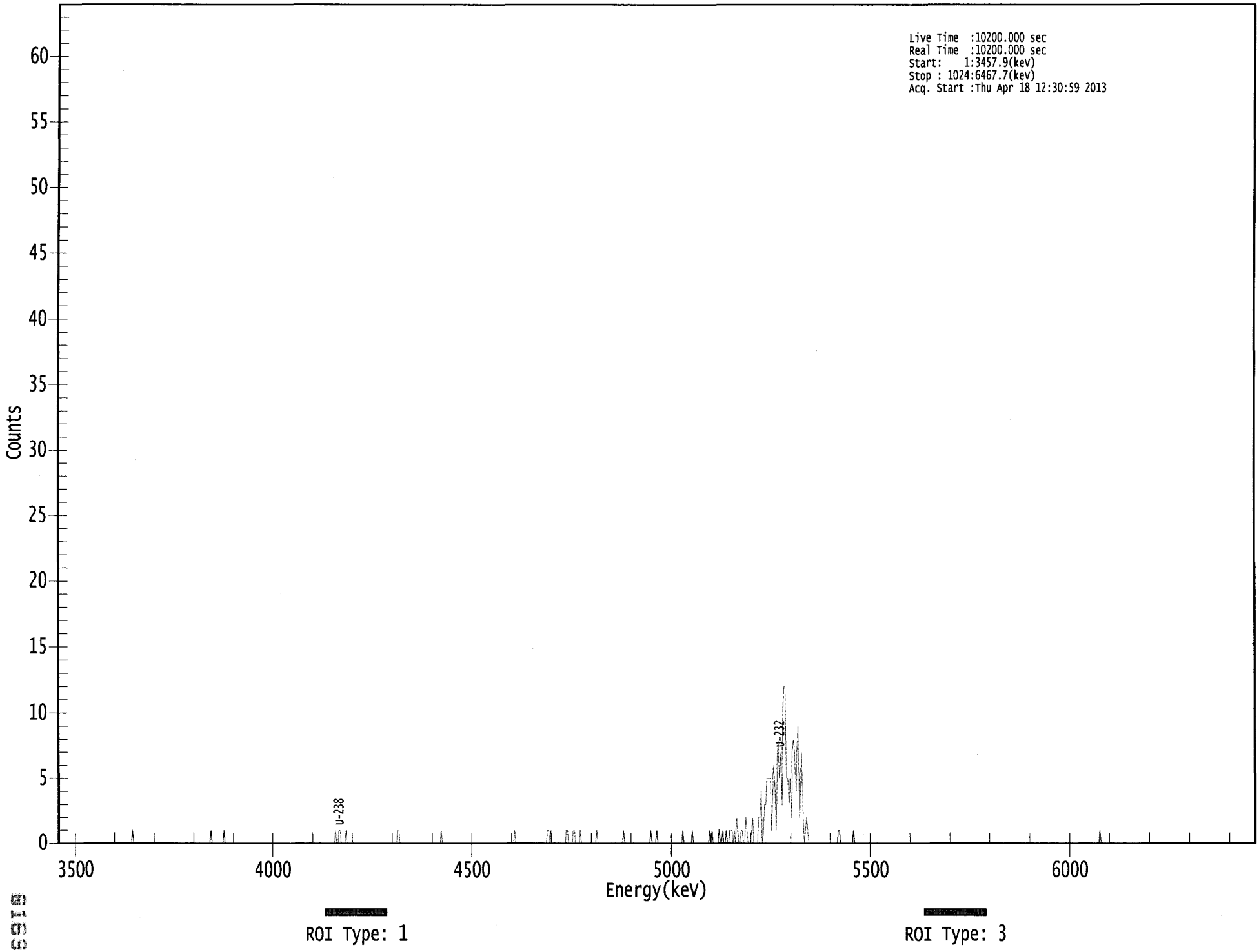
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.996	5302.50*	5.12E+000 +/- 7.31E-001	1.02E-001 +/- 1.45E-002
U-234	0.992	4761.50*	2.36E-001 +/- 1.55E-001	1.17E-001 +/- 1.67E-002
U-235	0.992	4385.50*	8.01E-002 +/- 1.04E-001	1.44E-001 +/- 2.05E-002
U-238	0.998	4184.40*	9.31E-002 +/- 9.65E-002	1.01E-001 +/- 1.45E-002

AG
4/19/13

0000055793.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 13

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	1	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	1	0	0	0	0
137:	0	0	0	0	0	0	1	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	1	0
241:	0	1	1	0	0	0	0	1
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	1	1	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	1	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 13

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	1
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	1	1	0	1	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	1	1	0	0	0
441:	0	1	1	0	0	0	0	1
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	1	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	1	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	1	0	0	0	0
513:	1	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	1	0
537:	0	0	0	0	0	0	1	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	1	0	1
561:	0	0	0	0	0	1	0	0
569:	1	0	0	1	0	0	1	1
577:	1	0	1	0	2	1	0	0
585:	1	1	0	0	2	1	0	0
593:	0	1	2	0	0	0	0	2
601:	2	4	0	1	3	3	5	5
609:	5	5	1	4	6	4	1	6
617:	8	5	7	3	10	12	12	5
625:	5	3	5	2	7	8	7	4
633:	7	9	2	5	7	2	0	1
641:	2	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	1	1	0	0	0
673:	0	0	0	0	0	0	0	0
681:	1	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 13

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	1	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

IGB 4/18/13

Apex-Alpha™

Sample Description: PZ-111-SD TOT
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 14
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_048
Chamber Serial Number: 02030596B
Detector Serial Number: 83111
Env. Background: System Bkgd 54592
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 12:31:01 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.598 mL
Effective Efficiency: 0.2240 +/- 0.0119
Counting Efficiency: 0.1680 +/- 0.0030 on 12/16/2012 5:49:20 PM
Chem. Recovery Factor: 1.3335 +/- 0.0749

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.274	432.49	9.43	0.51	0.00E+000	9.8
U-234		4.729	35.00	33.60	0.00	0.00E+000	3.0
U-235		4.430	1.83	152.56	0.17	0.00E+000	3.0
U-238		4.128	15.00	52.27	0.00	0.00E+000	4.4

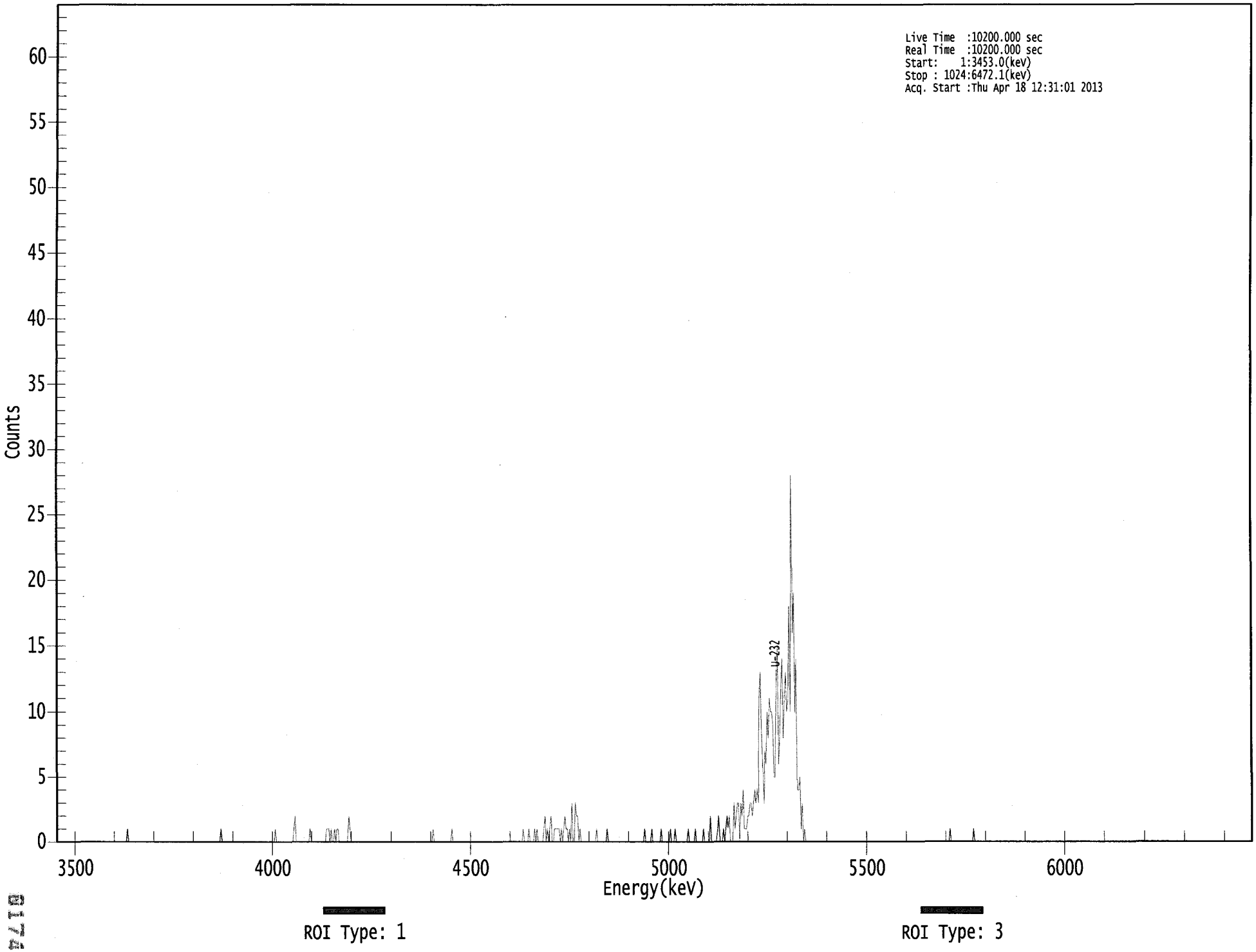
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.994	5302.50*	5.13E+000 +/- 5.36E-001	6.22E-002 +/- 6.51E-003
U-234	0.993	4761.50*	4.15E-001 +/- 1.46E-001	7.11E-002 +/- 7.43E-003
U-235	0.986	4385.50*	2.68E-002 +/- 4.09E-002	6.10E-002 +/- 6.38E-003
U-238	0.978	4184.40*	1.77E-001 +/- 9.44E-002	7.08E-002 +/- 7.40E-003

AG
4/19/13

0000055794.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 14

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	1	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	1	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	1	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	1	2	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	1	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	1	1	1	0	1	0	0	1
241:	0	1	1	0	0	0	0	0
249:	0	0	0	2	1	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	1	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	1	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 14

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	1	0	0	0	0	1	0	0
409:	0	0	1	0	1	0	0	0
417:	0	0	1	2	0	1	0	1
425:	2	0	0	1	1	1	1	1
433:	0	1	0	1	2	1	1	0
441:	1	0	3	0	0	3	2	2
449:	0	1	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	1
465:	0	0	0	0	0	0	0	0
473:	1	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	1	0	0	0	0	0	1	0
513:	0	0	0	0	0	0	1	0
521:	0	0	0	0	0	0	1	0
529:	0	0	1	0	0	0	0	0
537:	0	0	0	0	0	1	0	0
545:	0	0	0	1	0	0	0	0
553:	0	0	1	0	0	0	0	0
561:	2	0	0	0	0	0	1	2
569:	0	0	0	1	0	1	2	1
577:	2	0	0	0	3	1	2	3
585:	3	0	3	2	4	1	1	1
593:	2	2	3	3	2	3	4	3
601:	4	3	11	13	9	6	3	7
609:	6	10	8	11	10	10	9	5
617:	5	13	15	6	8	12	14	8
625:	11	13	10	11	18	10	28	16
633:	19	10	14	4	4	5	1	3
641:	0	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	1	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	1	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 14

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

IGB 4/18/13

Apex-Alpha™

Sample Description: PZ-111-SD DIS
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 15
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_003
Chamber Serial Number:
Detector Serial Number: 3
Env. Background: System Bkgd 54570
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 3:25:41 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.597 mL
Effective Efficiency: 0.2325 +/- 0.0122
Counting Efficiency: 0.1746 +/- 0.0033 on 12/15/2012 11:26:47 AM
Chem. Recovery Factor: 1.3311 +/- 0.0743

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.293	447.98	9.27	1.02	0.00E+000	34.8
U-234		4.744	37.49	32.26	0.51	0.00E+000	3.7
U-235		4.390	1.66	169.38	0.34	0.00E+000	3.0
U-238		4.167	24.15	40.70	0.85	0.00E+000	3.0

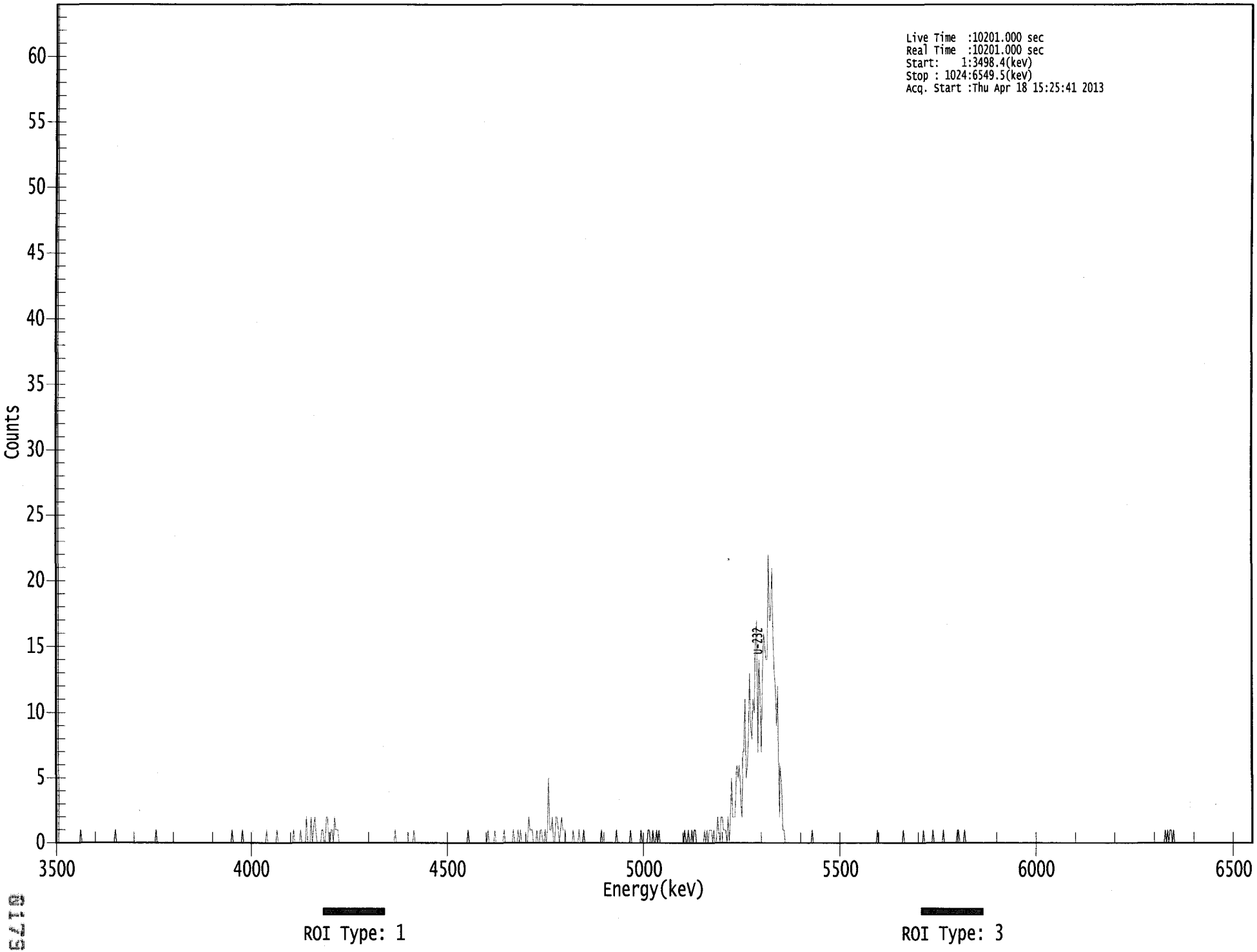
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.999	5302.50*	5.12E+000 +/- 5.28E-001	7.20E-002 +/- 7.42E-003
U-234	0.998	4761.50*	4.28E-001 +/- 1.45E-001	5.99E-002 +/- 6.18E-003
U-235	1.000	4385.50*	2.34E-002 +/- 3.97E-002	6.74E-002 +/- 6.95E-003
U-238	0.998	4184.40*	2.75E-001 +/- 1.15E-001	6.81E-002 +/- 7.02E-003

NG 4/19/13

0000055797.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 15

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	1	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	1	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	1	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	1
153:	0	0	0	0	0	0	0	0
161:	1	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	1	0	0
185:	0	0	0	0	0	0	1	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	1	0	0	0
209:	0	0	1	0	0	0	0	2
217:	0	0	0	2	0	1	2	1
225:	0	0	0	0	1	1	0	0
233:	2	2	0	0	1	1	0	2
241:	1	1	1	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	1	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	1	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	1	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	1	0	0	0	0	0

Sample Title: 15

Channel								
377:	1	0	0	0	0	0	0	0
385:	1	0	0	0	0	0	0	0
393:	1	0	0	0	1	0	1	0
401:	0	0	0	0	0	2	1	1
409:	1	0	0	0	1	0	0	1
417:	1	0	0	1	0	1	5	1
425:	1	2	0	0	2	2	1	0
433:	1	2	1	1	1	0	0	0
441:	0	0	0	1	0	0	0	0
449:	1	0	0	0	1	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	1	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	1	0	0	0	0	0	0	0
489:	0	0	0	0	1	0	0	0
497:	0	0	0	0	0	1	0	0
505:	0	0	0	1	1	0	0	1
513:	0	0	1	0	1	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	1	0	0	1	0	0
545:	1	0	1	1	0	0	0	0
553:	0	0	0	1	0	1	0	1
561:	1	1	0	1	0	0	2	1
569:	0	2	2	1	1	1	0	2
577:	0	2	5	2	2	2	5	6
585:	5	6	3	2	7	7	11	5
593:	6	8	13	9	8	11	10	15
601:	17	7	14	11	7	13	16	15
609:	14	14	22	17	17	21	16	13
617:	12	9	12	2	6	4	1	1
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	1
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	1
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	1	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	1	0
745:	0	0	0	0	0	0	1	0
753:	0	0	0	0	0	0	0	1
761:	0	0	0	0	0	0	0	0
769:	0	0	0	1	1	0	0	0
777:	0	1	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 15

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	1	0	1	0
953:	1	1	0	1	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

JCB 4/18/13

Apex-Alpha™

Sample Description: PZ-304-AI TOT
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 16
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_004
Chamber Serial Number:
Detector Serial Number: 4
Env. Background: System Bkgd 54571
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 3:25:42 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.600 mL
Effective Efficiency: 0.0737 +/- 0.0064
Counting Efficiency: 0.1940 +/- 0.0036 on 12/15/2012 11:26:46 AM
Chem. Recovery Factor: 0.3797 +/- 0.0338

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.284	142.81	16.48	1.19	0.00E+000	16.6
U-234		4.713	5.96	95.01	2.04	0.00E+000	2.9
U-235		4.397	-1.19	180.59	1.19	0.00E+000	0.0
U-238		4.158	8.15	72.72	0.85	0.00E+000	2.9

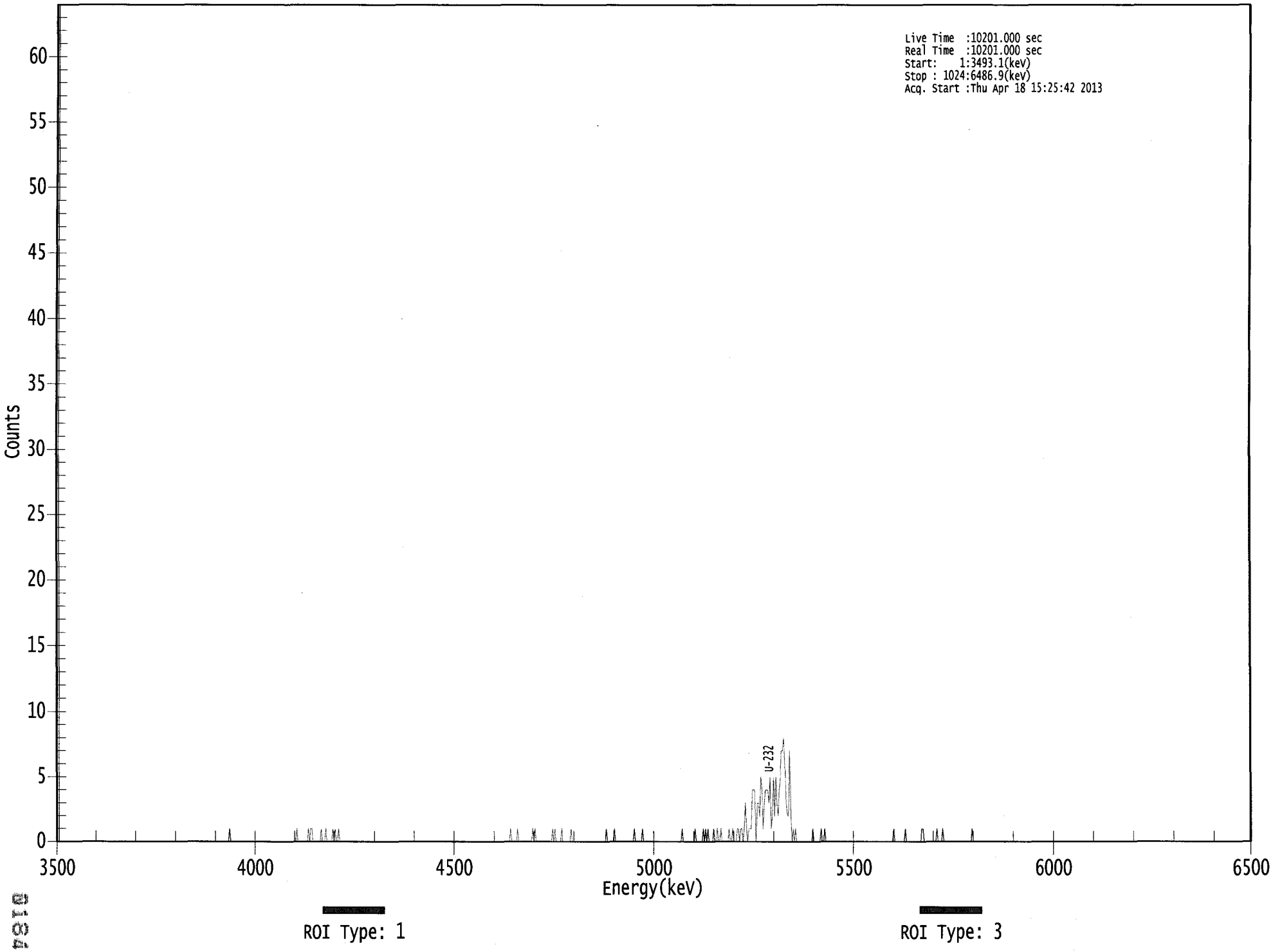
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.998	5302.50*	5.15E+000 +/- 8.80E-001	2.37E-001 +/- 4.06E-002
U-234	0.984	4761.50*	2.15E-001 +/- 2.07E-001	2.81E-001 +/- 4.80E-002
U-235	0.999	4385.50*	-5.29E-002 +/- 9.60E-002	2.93E-001 +/- 5.00E-002
U-238	0.995	4184.40*	2.92E-001 +/- 2.18E-001	2.15E-001 +/- 3.67E-002

AG
4/19/13

0000055798.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 16

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	1	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	1
209:	0	0	0	0	0	0	0	0
217:	0	1	0	1	1	0	0	0
225:	0	0	0	0	1	0	0	0
233:	1	0	0	0	0	0	1	0
241:	1	0	0	1	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 16

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	1	0
393:	0	0	0	0	1	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	1	0	1	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	1	0	1	0	0	0
433:	0	0	1	0	0	0	0	0
441:	0	0	1	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	1	0	0	0	0	0	0	1
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	1	0	0	0	0	0	0	1
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	1	0	0	0	0	0	0
545:	0	0	0	0	1	0	0	0
553:	0	0	0	1	0	1	0	1
561:	0	0	0	0	1	0	0	1
569:	0	0	1	0	0	0	0	0
577:	0	1	0	0	1	0	0	0
585:	1	1	0	1	1	0	1	3
593:	1	0	1	1	1	4	4	4
601:	0	3	3	2	5	4	1	3
609:	4	4	4	3	5	1	2	5
617:	2	5	3	2	4	5	7	7
625:	8	6	3	2	2	7	2	0
633:	1	0	1	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	1	0	0	0	0	0	0
657:	1	0	0	1	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	1	0
721:	0	0	0	0	0	0	0	0
729:	1	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	1	1
745:	0	0	0	0	0	0	0	0
753:	0	0	0	1	0	0	0	0
761:	1	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	1	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 16

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

XDS 4/19/13

Apex-Alpha™

Sample Description: PZ-304-AI DIS
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 17
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_010
Chamber Serial Number:
Detector Serial Number: 10
Env. Background: System Bkgd 54572
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 3:25:38 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.595 mL
Effective Efficiency: 0.0891 +/- 0.0072
Counting Efficiency: 0.1967 +/- 0.0036 on 12/15/2012 11:26:40 AM
Chem. Recovery Factor: 0.4529 +/- 0.0373

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.290	171.13	15.08	1.87	0.00E+000	6.6
U-234		4.722	16.79	51.39	2.21	0.00E+000	7.3
U-235		4.384	4.32	102.62	0.68	0.00E+000	2.9
U-238		4.161	14.15	53.91	0.85	0.00E+000	2.9

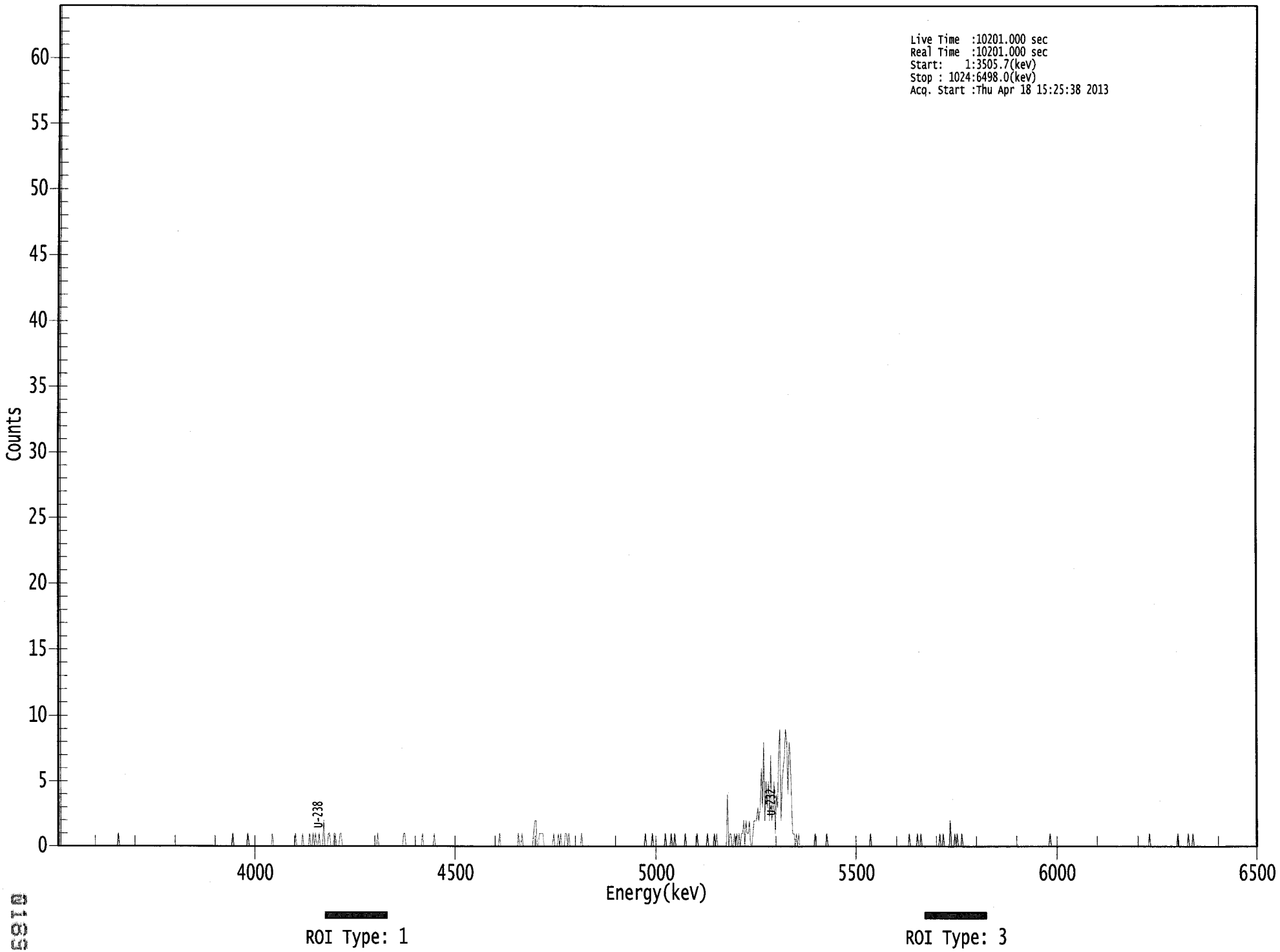
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.999	5302.50*	5.10E+000 +/- 8.03E-001	2.26E-001 +/- 3.55E-002
U-234	0.989	4761.50*	5.00E-001 +/- 2.69E-001	2.38E-001 +/- 3.75E-002
U-235	1.000	4385.50*	1.59E-001 +/- 1.65E-001	2.07E-001 +/- 3.26E-002
U-238	0.996	4184.40*	4.20E-001 +/- 2.36E-001	1.78E-001 +/- 2.80E-002

AG
4/19/13

0000055795.CNF



5918

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 17

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	1	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	1	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	1	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	1	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	1	0	0	0
209:	0	0	1	0	0	0	0	0
217:	1	0	0	1	0	1	0	0
225:	1	0	0	0	2	0	0	0
233:	1	1	0	0	0	1	1	0
241:	0	0	1	1	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	1	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	1	1	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	1	0	0	0	0	0	0	0
321:	0	0	1	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 17

Channel								
377:	0	0	1	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	1	0	0	1	0	0
401:	0	0	0	0	0	0	0	1
409:	2	2	0	0	1	1	1	1
417:	0	0	0	0	0	0	0	0
425:	1	0	0	0	1	0	1	0
433:	0	0	1	1	0	1	0	0
441:	0	0	0	0	0	0	0	0
449:	1	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	1	0
505:	0	0	0	0	1	0	0	0
513:	0	0	0	0	0	0	0	1
521:	0	0	0	0	1	0	0	1
529:	0	0	0	0	0	0	0	0
537:	1	0	0	0	0	0	0	0
545:	0	0	1	0	0	0	0	0
553:	0	0	0	1	0	0	0	0
561:	0	1	0	1	0	0	0	0
569:	0	0	0	0	4	0	1	1
577:	0	0	1	0	1	0	1	0
585:	1	1	2	0	2	1	1	2
593:	0	0	1	2	2	2	3	2
601:	3	6	3	8	2	5	3	5
609:	2	7	2	3	5	1	4	3
617:	7	9	2	5	6	7	9	8
625:	4	8	7	3	1	1	0	1
633:	0	1	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	1
649:	0	0	0	0	0	0	0	0
657:	0	1	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	1	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	1
729:	0	0	0	0	0	0	1	0
737:	0	1	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	1	0	0	1	0	0	0
761:	0	0	2	0	0	0	1	0
769:	1	0	0	0	1	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 17

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	1
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	1	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	1	0	0	0	0
961:	0	0	0	0	1	0	0	0
969:	1	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

KB 4/18/13

Sample Description: I-11 TOT
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 18
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_011
Chamber Serial Number:
Detector Serial Number: 11
Env. Background: System Bkgd 54573
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 3:25:39 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.596 mL
Effective Efficiency: 0.1189 +/- 0.0083
Counting Efficiency: 0.1973 +/- 0.0042 on 12/15/2012 11:28:06 AM
Chem. Recovery Factor: 0.6027 +/- 0.0441

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.279	228.98	12.99	1.02	0.00E+000	3.8
U-234		4.718	47.83	28.40	0.17	0.00E+000	2.7
U-235		4.423	2.00	169.74	0.00	0.00E+000	2.7
U-238		4.149	31.98	35.30	1.02	0.00E+000	5.3

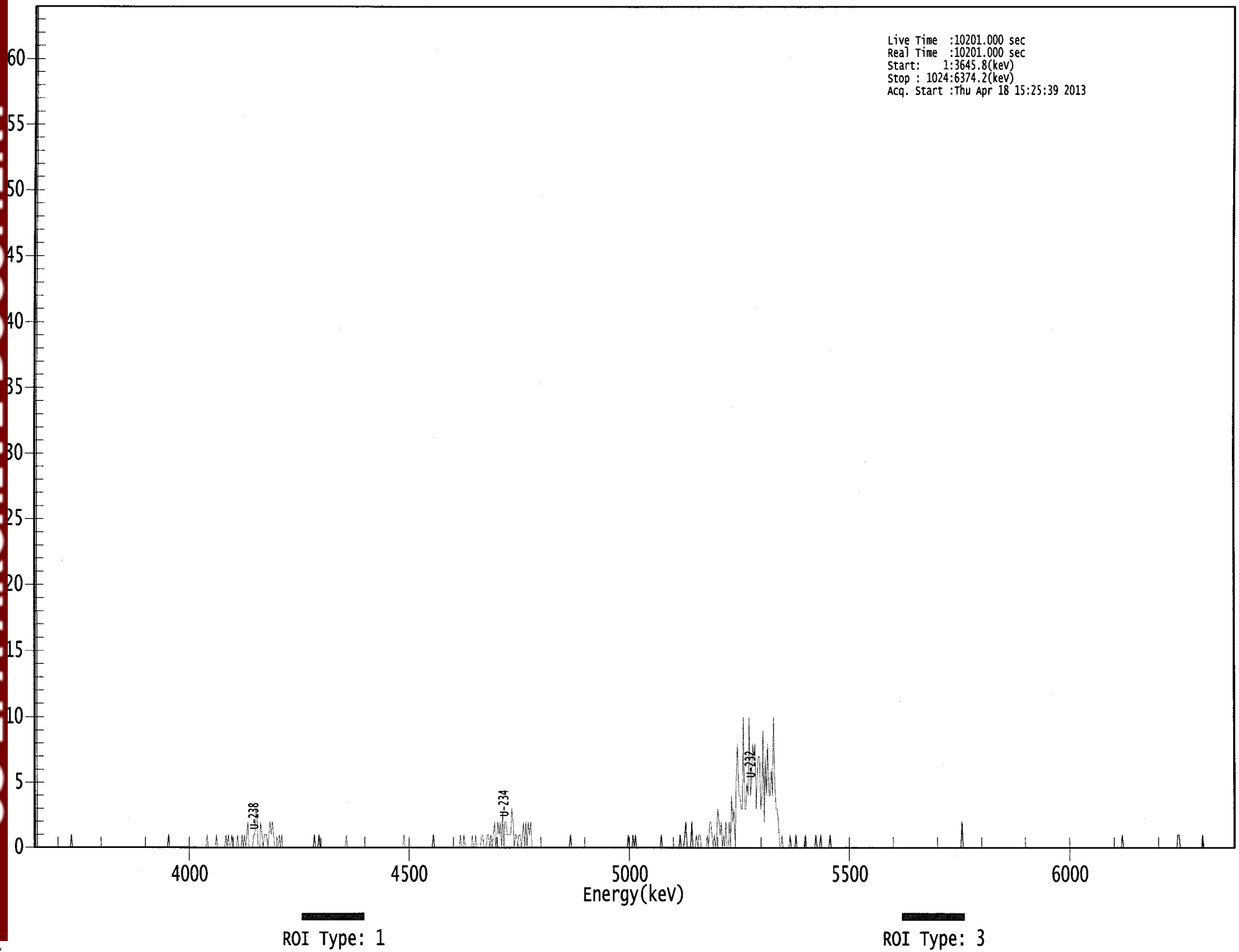
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.996	5302.50*	5.11E+000 +/- 7.03E-001	1.41E-001 +/- 1.93E-002
U-234	0.987	4761.50*	1.07E+000 +/- 3.37E-001	9.32E-002 +/- 1.28E-002
U-235	0.990	4385.50*	5.51E-002 +/- 9.38E-002	1.65E-001 +/- 2.27E-002
U-238	0.991	4184.40*	7.11E-001 +/- 2.69E-001	1.40E-001 +/- 1.93E-002

AG
4/19/13

0000055796.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 18

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	1	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	1	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	1	0	0	0
153:	0	0	0	0	1	0	0	0
161:	0	0	0	0	1	0	1	0
169:	0	1	0	0	0	0	1	0
177:	0	0	1	0	1	0	1	2
185:	0	0	0	0	1	1	3	2
193:	0	0	2	1	0	1	1	1
201:	0	1	2	1	2	1	0	0
209:	0	0	1	0	1	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	1	0	0	0	1	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	1	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	1	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	1	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	1	0	0	1

369:	0	0	0	0	0	0	1	0

Sample Title: 18

Channel								
377:	0	1	0	0	0	0	1	1
385:	0	0	0	1	1	0	1	0
393:	1	2	0	1	2	1	2	0
401:	3	0	2	2	1	1	1	1
409:	3	2	0	1	1	0	1	1
417:	0	1	2	0	2	0	2	1
425:	2	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	1	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	1	0	0	0	1
513:	0	1	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	1
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	1
553:	0	0	0	1	2	0	0	0
561:	0	2	0	0	0	1	0	1
569:	1	0	0	0	0	0	1	0
577:	2	2	1	0	1	0	1	3
585:	2	1	2	0	1	0	2	0
593:	0	2	0	4	2	3	0	5
601:	8	4	4	3	3	10	3	3
609:	5	4	10	4	5	8	7	8
617:	3	6	7	7	3	4	9	2
625:	7	4	8	4	4	6	4	10
633:	5	3	3	2	0	0	1	0
641:	0	0	0	0	0	1	0	0
649:	0	0	1	0	0	0	0	0
657:	0	0	1	0	0	0	0	0
665:	0	0	0	1	0	0	0	1
673:	0	0	0	0	0	0	0	1
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	2
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 18

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	1	1
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	1	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

IGS 4/19/13

Apex-Alpha™

Sample Description: I-11 DIS
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000557
Batch Identification: 1304050A-UU
Sample Identification: 19
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_013
Chamber Serial Number:
Detector Serial Number: 13
Env. Background: System Bkgd 54574
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:29:13 AM
Acquisition Date/Time: 4/18/2013 3:25:40 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.595 mL
Effective Efficiency: 0.0905 +/- 0.0072
Counting Efficiency: 0.1869 +/- 0.0035 on 12/15/2012 11:26:45 AM
Chem. Recovery Factor: 0.4843 +/- 0.0396

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.292	173.81	14.93	1.19	0.00E+000	9.4
U-234		4.743	42.15	30.54	0.85	0.00E+000	3.5
U-235		4.457	1.83	152.56	0.17	0.00E+000	2.8
U-238		4.157	36.83	32.38	0.17	0.00E+000	3.5

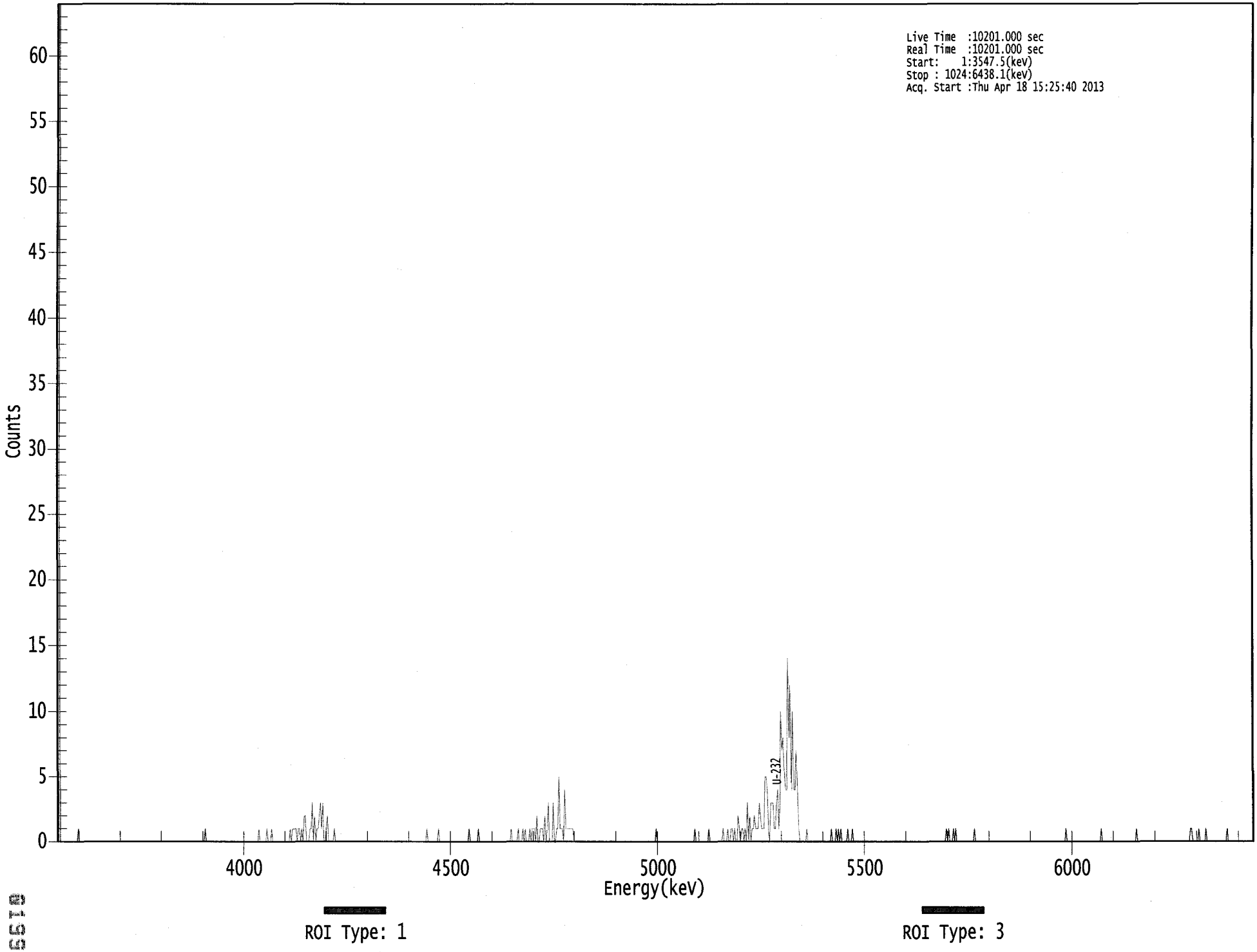
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.999	5302.50*	5.10E+000 +/- 7.95E-001	1.93E-001 +/- 3.01E-002
U-234	0.998	4761.50*	1.24E+000 +/- 4.24E-001	1.76E-001 +/- 2.74E-002
U-235	0.964	4385.50*	6.62E-002 +/- 1.02E-001	1.51E-001 +/- 2.35E-002
U-238	0.995	4184.40*	1.08E+000 +/- 3.87E-001	1.22E-001 +/- 1.90E-002

AG
4/19/13

0000055799.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 19

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	1	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	1
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	1	0	0
177:	0	0	0	0	1	0	0	0
185:	1	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	1	0	1	1	1	1	0	1
209:	1	0	1	0	2	2	0	0
217:	0	1	1	3	0	2	0	1
225:	1	2	3	1	3	0	0	1
233:	2	0	0	0	0	0	1	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	1	0	0
321:	0	0	0	0	0	0	0	1
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	1	0	0	0	0	0	0
361:	0	1	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 19

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	1	0	0
393:	0	0	0	1	0	0	0	1
401:	0	1	0	0	0	1	0	1
409:	1	1	0	2	0	0	1	1
417:	1	0	2	0	1	3	0	0
425:	0	3	0	0	1	1	5	1
433:	1	1	0	4	1	1	1	1
441:	1	1	1	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	1	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	1	0	0	0	0	0
553:	0	0	0	0	0	0	1	0
561:	0	0	0	0	0	0	0	0
569:	0	0	1	0	0	0	1	0
577:	0	1	1	0	1	0	0	2
585:	1	0	1	1	0	1	0	3
593:	0	2	0	1	1	2	1	1
601:	1	3	2	1	1	1	5	5
609:	4	1	0	3	3	3	1	1
617:	3	4	1	3	10	7	8	5
625:	4	4	14	8	12	4	10	4
633:	4	7	4	1	0	0	0	0
641:	0	0	1	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	1
665:	0	0	0	1	0	1	0	1
673:	0	0	0	0	0	1	0	0
681:	0	1	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	1	0	1	0	0	0	1
769:	0	1	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	1	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 19

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	1
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	1	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	1	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	1	1	0	0	0	0	0
977:	1	0	0	0	0	0	1	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	1	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

4/18/2013 5:36:57 AM

Apex-Alpha™

QA SUMMARY REPORT

Review Of QA Results - Pulser Check

Date : 4/18/2013
Time : 5:36:57 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_001	21f	ALL	Not Done	
Alpha_002	21f	ALL	Not Done	
Alpha_003	21f	ALL	Passed	4/18/2013 5:16:12 AM
Alpha_004	21f	ALL	Passed	4/18/2013 5:16:13 AM
Alpha_005	21f	ALL	Not Done	
Alpha_006	21f	ALL	Not Done	
Alpha_007	21f	ALL	Not Done	
Alpha_008	21f	ALL	Not Done	
Alpha_009	21f	ALL	Not Done	
Alpha_010	21f	ALL	Passed	4/18/2013 5:16:14 AM
Alpha_011	21f	ALL	Passed	4/18/2013 5:16:15 AM
Alpha_012	21f	ALL	Not Done	
Alpha_013	21f	ALL	Passed	4/18/2013 5:16:15 AM
Alpha_014	21f	ALL	Passed	4/18/2013 5:16:16 AM
Alpha_015	21f	ALL	Not Done	
Alpha_016	21f	ALL	Not Done	
Alpha_017	AIM730	ALL	Not Done	
Alpha_018	AIM730	ALL	Passed	4/18/2013 5:16:17 AM
Alpha_019	AIM730	ALL	Not Done	
Alpha_020	AIM730	ALL	Not Done	
Alpha_021	AIM730	ALL	Not Done	
Alpha_022	AIM730	ALL	Passed	4/18/2013 5:16:18 AM
Alpha_023	AIM730	ALL	Not Done	
Alpha_024	AIM730	ALL	Passed	4/18/2013 5:16:18 AM
Alpha_025	AIM730	ALL	Passed	4/18/2013 5:16:19 AM
Alpha_026	AIM730	ALL	Not Done	
Alpha_027	AIM730	ALL	Passed	4/18/2013 5:16:20 AM
Alpha_028	AIM730	ALL	Not Done	
Alpha_029	AIM730	ALL	Passed	4/18/2013 5:16:21 AM
Alpha_030	AIM730	ALL	Not Done	
Alpha_031	AIM730	ALL	Not Done	
Alpha_032	AIM730	ALL	Not Done	
Alpha_033	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:22 AM
Alpha_034	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:23 AM
Alpha_035	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:25 AM
Alpha_036	Alpha Analyst100DC	ALL	Not Done	
Alpha_037	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:26 AM
Alpha_038	Alpha Analyst100DC	ALL	Not Done	
Alpha_039	Alpha Analyst100DC	ALL	Not Done	
Alpha_040	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:28 AM
Alpha_041	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:29 AM
Alpha_042	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:31 AM

Review of QA Results - Pulser Check

4/18/2013 5:36:57 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_043	Alpha Analyst100DC	ALL	Not Done	
Alpha_044	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:32 AM
Alpha_045	Alpha Analyst100DC	ALL	Not Done	
Alpha_046	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:34 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:36 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:37 AM

APPROVED BY: _____

APPROVAL DATE: 4/18/13

****
***** L I B R A R Y L I S T I N G R E P O R T *****
****

Nuclide Library Title: Uranium

Nuclide Library Description: U-232,-234,-235,-238

Nuclide Name	Half-Life (Seconds)	Energy (keV)	Energy Uncert. (keV)	Yield (%)	Yield Uncert.(Abs.+-)
U-232	2.174E+009	5302.500*	0.000	99.8000	0.0000
U-234	7.731E+012	4761.500*	0.000	99.8000	0.0000
U-235	2.221E+016	4385.500*	0.000	80.9000	0.0000
U-238	1.410E+017	4184.400*	0.000	100.2300	0.0000

* = key line

TOTALS: 4 Nuclides 4 Energy Lines

RUN 2

Work Order	13-04050
Analysis Code	UUISO
Run	2
Date Received	4/9/2013
Lab Deadline	4/30/2013
Client	Engineering Management Support, Inc.
Project	West Lake OU-1
Report Level	4
Activity Units	pCi
Aliquot Units	l
Matrix	WA
Method	NAS NS-3050 Mod
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	U-232
Radiometric Sol#	U-10a
Tracer Act (dpm/g)	19.096
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		04/09/13 00:00	1.0000E+00
02	MBL	BLANK		04/09/13 00:00	1.0000E+00
03	DUP	PZ-304-AS TOT	44	04/04/13 12:56	2.5000E-01
08	DO	PZ-304-AS TOT	44	04/04/13 12:56	2.5000E-01
09	TRG	PZ-304-AS DIS	44	04/04/13 12:56	2.5000E-01

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

13-04050
UUISO
Run 2

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6045	11.5		0.00								
02	MBL	0.6052	11.6		0.00								
03	DUP	0.6047	11.5		0.00								
08	DO	0.6045	11.5		0.00								
09	TRG	0.6035	11.5		0.00								

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			04/19/13 12:26	JBARNARD				
02	MBL			04/19/13 12:26	JBARNARD				
03	DUP			04/19/13 12:26	JBARNARD				
08	DO			04/19/13 12:26	JBARNARD				
09	TRG			04/19/13 12:26	JBARNARD				

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-2

Client: Engineering Management Support, Inc.
Eberline Services Work Order: 13-04050
Analysis Code: UUISO
Run: 2

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-234	LCS	LCS	pCi/l	7.79E+00	1.01E+00	7.48E-02	8.12E+00	95.89	OK		OK	
02	U-234	MBL	BLANK	pCi/l	5.32E-02	5.43E-02	7.29E-02					OK	OK
03	U-234	DUP	PZ-304-AS TOT	pCi/l	2.30E-01	4.46E-01	8.35E-01				NA	OK	
08	U-234	DO	PZ-304-AS TOT	pCi/l	8.47E-01	6.76E-01	6.08E-01					OK	
09	U-234	TRG	PZ-304-AS DIS	pCi/l	7.87E-02	3.28E-01	8.43E-01					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-2

Run	Analysis Code	Eberline Services Work Order	Client
2	UUISO	13-04050	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-234	LCS	04/09/13 00:00	1.00E+00	128.04	0.00	0.00			
02	U-234	MBL	04/09/13 00:00	1.00E+00	123.64	0.00	0.00			
03	U-234	DUP	04/04/13 12:56	2.50E-01	42.57	0.00	0.00			
08	U-234	DO	04/04/13 12:56	2.50E-01	42.33	0.00	0.00			
09	U-234	TRG	04/04/13 12:56	2.50E-01	35.37	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-2

Run	2
Analysis Code	UUISO
Eberline Services Work Order	13-04050
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-234	LCS	04/25/13 08:52		A_Spec	Alpha_003	170.02	6.56 E+02	6.00 E-03	17.5
02	U-234	MBL	04/25/13 08:52		A_Spec	Alpha_004	170.02	4.81 E+00	7.00 E-03	19.4
03	U-234	DUP	04/25/13 08:52		A_Spec	Alpha_010	170.02	1.81 E+00	7.00 E-03	19.7
08	U-234	DO	04/25/13 08:52		A_Spec	Alpha_011	170.02	6.66 E+00	2.00 E-03	19.7
09	U-234	TRG	04/25/13 08:52		A_Spec	Alpha_013	170.02	4.90 E-01	3.00 E-03	18.7

Client: Engineering Management Support, Inc.
Eberline Services Work Order: 13-04050
Analysis Code: UUISO
Run: 2

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-238	LCS	LCS	pCi/l	7.72E+00	9.99E-01	5.65E-02	7.92E+00	97.45	OK		OK	
02	U-238	MBL	BLANK	pCi/l	8.92E-03	3.21E-02	7.26E-02					OK	OK
03	U-238	DUP	PZ-304-AS TOT	pCi/l	1.45E-01	3.63E-01	7.56E-01				NA	OK	
08	U-238	DO	PZ-304-AS TOT	pCi/l	-4.30E-02	2.55E-01	6.05E-01					OK	
09	U-238	TRG	PZ-304-AS DIS	pCi/l	-5.44E-02	3.23E-01	7.65E-01					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-2

Client: Engineering Management Support, Inc.
Eberline Services Work Order: 13-04050
Analysis Code: UUISO
Run: 2

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-238	LCS	04/09/13 00:00	1.00E+00	128.04	0.00	0.00			
02	U-238	MBL	04/09/13 00:00	1.00E+00	123.64	0.00	0.00			
03	U-238	DUP	04/04/13 12:56	2.50E-01	42.57	0.00	0.00			
08	U-238	DO	04/04/13 12:56	2.50E-01	42.33	0.00	0.00			
09	U-238	TRG	04/04/13 12:56	2.50E-01	35.37	0.00	0.00			

Client: Engineering Management Support, Inc.
Eberline Services Work Order: 13-04050
Analysis Code: UUISO
Run: 2

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-238	LCS	04/25/13 08:52		A_Spec	Alpha_003	170.02	6.53 E+02	2.00 E-03	17.5
02	U-238	MBL	04/25/13 08:52		A_Spec	Alpha_004	170.02	8.10 E-01	7.00 E-03	19.4
03	U-238	DUP	04/25/13 08:52		A_Spec	Alpha_010	170.02	1.15 E+00	5.00 E-03	19.7
08	U-238	DO	04/25/13 08:52		A_Spec	Alpha_011	170.02	-3.40 E-01	2.00 E-03	19.7
09	U-238	TRG	04/25/13 08:52		A_Spec	Alpha_013	170.02	-3.40 E-01	2.00 E-03	18.7

Run: 2
Analysis Code: UUISO
Eberline Services Work Order: 13-04050
Client: Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-235	LCS	LCS	pCi/l	4.91E-01	1.75E-01	7.69E-02					OK	
02	U-235	MBL	BLANK	pCi/l	1.57E-02	3.92E-02	8.17E-02					OK	OK
03	U-235	DUP	PZ-304-AS TOT	pCi/l	1.03E-01	3.16E-01	7.48E-01				NA	OK	
08	U-235	DO	PZ-304-AS TOT	pCi/l	1.57E-01	4.35E-01	9.40E-01					OK	
09	U-235	TRG	PZ-304-AS DIS	pCi/l	3.96E-01	6.76E-01	1.19E+00					INV	

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-2

Client: Engineering Management Support, Inc.
Eberline Services Work Order: 13-04050
Analysis Code: UUISO
Run: 2

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-235	LCS	04/09/13 00:00	1.00E+00	128.04	0.00	0.00			
02	U-235	MBL	04/09/13 00:00	1.00E+00	123.64	0.00	0.00			
03	U-235	DUP	04/04/13 12:56	2.50E-01	42.57	0.00	0.00			
08	U-235	DO	04/04/13 12:56	2.50E-01	42.33	0.00	0.00			
09	U-235	TRG	04/04/13 12:56	2.50E-01	35.37	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 13-04050-UUISO-2

Run	2
Analysis Code	UUISO
Eberline Services Work Order	13-04050
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-235	LCS	04/25/13 08:52		A_Spec	Alpha_003	170.02	3.35 E+01	3.00 E-03	17.5
02	U-235	MBL	04/25/13 08:52		A_Spec	Alpha_004	170.02	1.15 E+00	5.00 E-03	19.4
03	U-235	DUP	04/25/13 08:52		A_Spec	Alpha_010	170.02	6.60 E-01	2.00 E-03	19.7
08	U-235	DO	04/25/13 08:52		A_Spec	Alpha_011	170.02	1.00 E+00	0.00 E+00	19.7
09	U-235	TRG	04/25/13 08:52		A_Spec	Alpha_013	170.02	2.00 E+00	0.00 E+00	18.7

Count Room Report
Client: Engineering Management Su

13-04050-UUISO-2 (pCi/l) in
Tracer ID: U-10a

Printed: 4/25/2013 5:34 AM
Page 1 of 1

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
017	LCS	LCS	04/09/13 00:00	1.0000	0.6045	11.5435		0.00		
02	MBL	BLANK	04/09/13 00:00	1.0000	0.6052	11.5569		0.00		
03	DUP	PZ-304-AS TOT	04/04/13 12:56	0.2500	0.6047	11.5474		0.00		
08	DO	PZ-304-AS TOT	04/04/13 12:56	0.2500	0.6045	11.5435		0.00		
09/7	TRG	PZ-304-AS DIS	04/04/13 12:56	0.2500	0.6035	11.5244		0.00		

Spike and Tracer Worksheet

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
13-04050	2	UUISO	4/19/2013 12:25	JBARNARD	JB	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	*Sol #*	*Activity dpm/g*	*Solution Date*	*Approx Addition*	*Volume Used (g)*	*Volume Used (g)*	*Volume Used (g)*	*Volume Used (g)*	*Known pCi*	*Error Estimate*	*Added pCi*	*Error Estimate*	*Known pCi*	*Error Estimate*	*Added pCi*	*Error Estimate*
U-234	U-8a	35.240	4/19/2013	0.500	0.5117				8.12	0.292	0.00	0.000	0.00	0.000	0.00	0.000
U-238	U-8a	34.350	4/19/2013	0.500	0.5117				7.92	0.285	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	*Isotope*	*Sol #*	*Activity dpm/g*	*Solution Date*	*Volume Used (g)*	*Approx Addition*
01	U-232	U-10a	19.096	4/19/2013	0.6045	0.6300
02	U-232	U-10a	19.096	4/19/2013	0.6052	0.6300
03	U-232	U-10a	19.096	4/19/2013	0.6047	0.6300
08	U-232	U-10a	19.096	4/19/2013	0.6045	0.6300
09	U-232	U-10a	19.096	4/19/2013	0.6035	0.6300

Balance Printer Tapes

Tracer

0.6045 g [redacted]

0.6052 g
0.6047 g
0.6045 g
0.6035 g

LCS

0.5117 g

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Printed: 4/19/2013 12:26 PM

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
13-04050	2	UUISO	liters	4/30/2013	JBARNARD

Lab Fraction	Engineering Management Support, Inc. Client ID	Sample Type	Muffle Data	Dilution Data			Aliquot Data		MS Aliquot Data		H-3 Solids Only	
			Ratio Post/Pre	No of Dils	Dil Factor	Ratio	Aliquot	Net Equiv	Aliquot	Net Equiv	Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	PZ-304-AS TOT	DUP					2.5000E-01	2.5000E-01				
08	PZ-304-AS TOT	DO					2.5000E-01	2.5000E-01				
09	PZ-304-AS DIS	TRG					2.5000E-01	2.5000E-01				

Comments	

Technician: JBA Date: 4/19/13

1726

ICB 4/25/13

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000563
Batch Identification: 1304050B-UU
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_003
Chamber Serial Number:
Detector Serial Number: 3
Env. Background: System Bkgd 55191
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
Sample Date/Time: 4/25/2013 6:20:54 AM
Acquisition Date/Time: 4/25/2013 8:52:28 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.604 mL
Effective Efficiency: 0.2236 +/- 0.0119
Counting Efficiency: 0.1746 +/- 0.0033 on 12/15/2012 11:26:47 AM
Chem. Recovery Factor: 1.2804 +/- 0.0722

Control Certificate Name: NatU_U-8A
Chem. Recov. of Control: U-238 0.949979 +/- 0.068932
Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.283	436.30	9.40	1.70	0.00E+000	5.3
U-234		4.737	655.98	7.66	1.02	0.00E+000	30.5
U-235		4.388	33.49	34.17	0.51	0.00E+000	4.5
U-238		4.156	652.66	7.67	0.34	0.00E+000	31.5

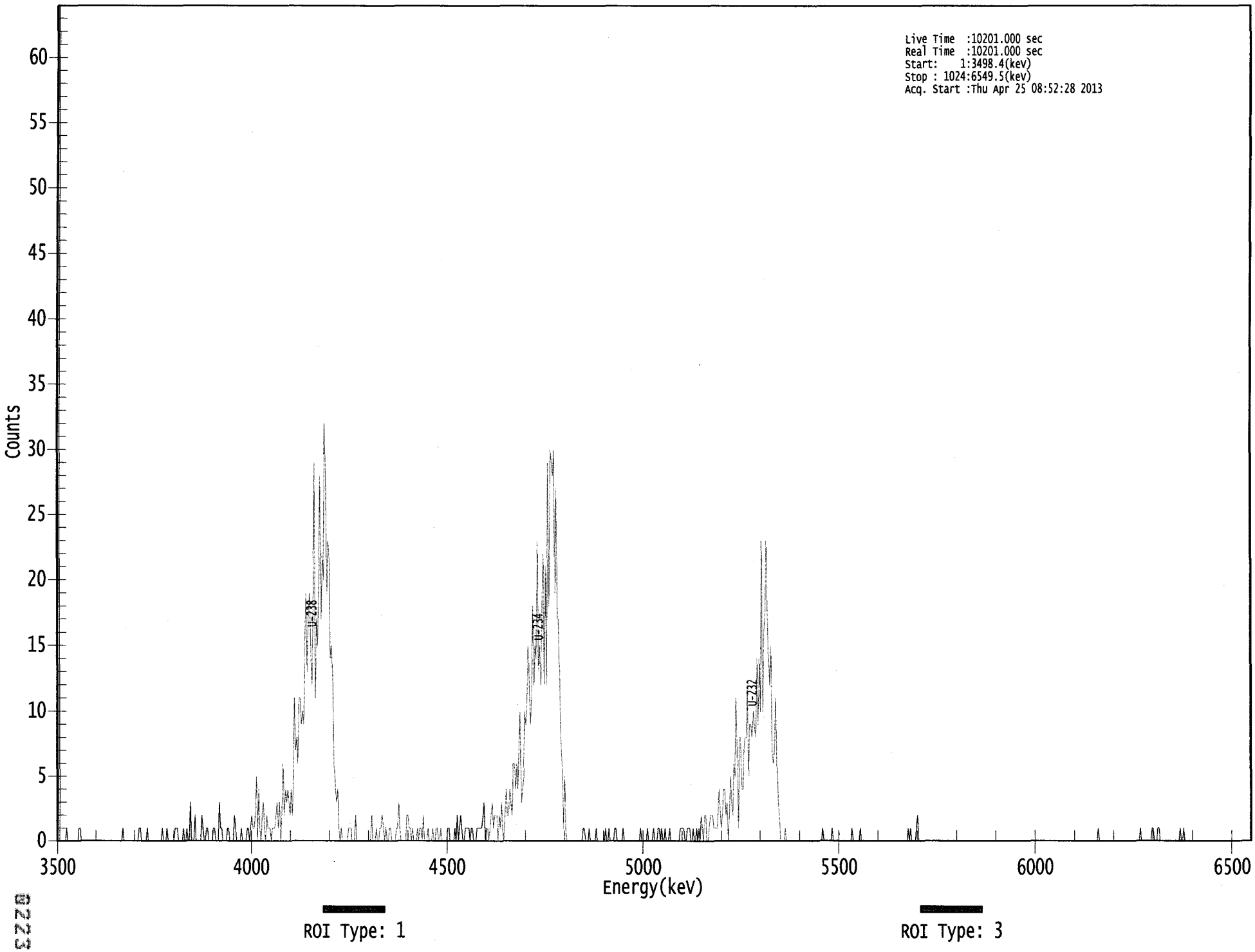
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.997	5302.50*	5.18E+000 +/- 5.40E-001	8.72E-002 +/- 9.10E-003
U-234	0.996	4761.50*	7.79E+000 +/- 1.01E+000	7.48E-002 +/- 7.80E-003
U-235	1.000	4385.50*	4.91E-001 +/- 1.75E-001	7.69E-002 +/- 8.02E-003
U-238	0.994	4184.40*	7.72E+000 +/- 9.99E-001	5.65E-002 +/- 5.90E-003

AG
4/25/13

0000056365.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 01

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	1	0	0	0	0	0	0	0
17:	0	0	0	1	1	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	1	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	1
73:	1	0	0	0	0	0	1	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	1	0	0	0	1
97:	0	0	0	0	0	0	1	1
105:	1	0	0	0	0	1	0	0
113:	1	0	0	3	0	0	0	2
121:	0	0	0	0	0	2	1	0
129:	0	1	1	0	0	0	0	1
137:	1	0	0	0	3	1	1	0
145:	0	0	0	1	1	0	0	0
153:	0	2	1	0	0	0	0	1
161:	0	0	0	0	1	1	0	1
169:	2	1	1	2	5	0	4	1
177:	0	2	3	1	0	2	1	1
185:	1	0	1	1	1	2	3	1
193:	3	0	2	6	2	4	3	4
201:	3	2	4	2	5	11	7	8
209:	6	11	11	9	10	9	15	19
217:	13	17	19	16	12	16	29	11
225:	17	15	20	28	17	22	20	32
233:	28	19	23	22	14	15	12	6
241:	4	3	4	1	0	1	0	0
249:	0	0	0	1	1	1	0	0
257:	0	2	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	2
273:	0	0	0	1	0	0	1	1
281:	2	1	0	1	0	0	1	1
289:	0	0	0	0	1	1	3	1
297:	0	0	0	0	0	2	2	1
305:	1	0	1	0	0	0	1	0
313:	1	1	0	2	0	0	0	1
321:	0	0	0	1	0	0	1	1
329:	0	0	1	0	0	0	0	0
337:	1	1	0	0	0	0	1	0
345:	2	0	1	2	1	0	0	1
353:	1	1	1	0	1	1	0	0
361:	0	1	1	1	1	1	2	3

369:	0	1	1	0	1	2	3	1

Sample Title: 01

Channel								
377:	2	2	2	0	2	1	3	1
385:	0	2	4	2	2	4	3	2
393:	6	6	4	6	4	7	10	3
401:	4	5	10	9	11	15	12	9
409:	11	18	12	15	14	23	13	15
417:	12	18	22	12	21	12	29	18
425:	30	29	28	30	19	27	17	17
433:	12	8	6	1	5	1	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	1	1	0	0
457:	0	1	0	0	0	0	0	1
465:	0	0	0	0	0	0	0	1
473:	0	0	1	0	0	0	0	1
481:	1	0	0	0	0	0	1	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	1	0	0
505:	0	0	0	1	0	0	0	0
513:	1	0	0	0	1	1	0	1
521:	0	0	1	0	0	0	1	0
529:	0	0	0	0	0	0	0	1
537:	1	1	1	0	0	1	1	1
545:	0	0	1	0	0	1	0	1
553:	0	2	1	0	2	2	0	0
561:	1	2	2	2	1	1	1	1
569:	4	3	1	2	4	4	2	3
577:	0	2	5	3	2	6	5	11
585:	7	1	8	8	4	4	7	8
593:	8	12	5	9	9	8	10	9
601:	8	14	9	14	10	23	10	16
609:	17	23	18	14	12	15	7	6
617:	7	11	6	3	2	0	0	0
625:	0	1	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	1	0	0	0	0	0	0
665:	0	1	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	1	0	0	0	0	0
689:	0	1	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	1	0	1	0	0	0
737:	0	1	2	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 01

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	1	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	1	0	0	0	0	0	0	0
937:	0	0	1	1	0	0	0	1
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	1	0	0	1	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ACB 4/25/13

Apex-Alpha™

Sample Description:	BLANK
Spectrum File:	\\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000563
Batch Identification:	1304050B-UU
Sample Identification:	02
Sample Geometry:	Shelf 2
Procedure Description:	U iso
Detector Name:	Alpha_004
Chamber Serial Number:	
Detector Serial Number:	4
Env. Background:	System Bkgd 55192
Reagent Blank:	<not performed>
Sample Size:	1.000E+000 +/- 0.000E+000 liter
Sample Date/Time:	4/25/2013 6:20:54 AM
Acquisition Date/Time:	4/25/2013 8:52:29 AM
Acquisition Live Time:	170.0 minutes
Acquisition Real Time:	170.0 minutes
Tracer Certificate:	U232_UU-10A
Tracer Quantity:	0.605 mL
Effective Efficiency:	0.2399 +/- 0.0124
Counting Efficiency:	0.1940 +/- 0.0036 on 12/15/2012 11:26:46 AM
Chem. Recovery Factor:	1.2364 +/- 0.0678
Peak Match Tolerance:	0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.284	468.64	9.07	1.36	0.00E+000	27.6
U-234		4.742	4.81	101.48	1.19	0.00E+000	2.9
U-235		4.406	1.15	249.61	0.85	0.00E+000	2.9
U-238		4.092	0.81	359.15	1.19	0.00E+000	2.9

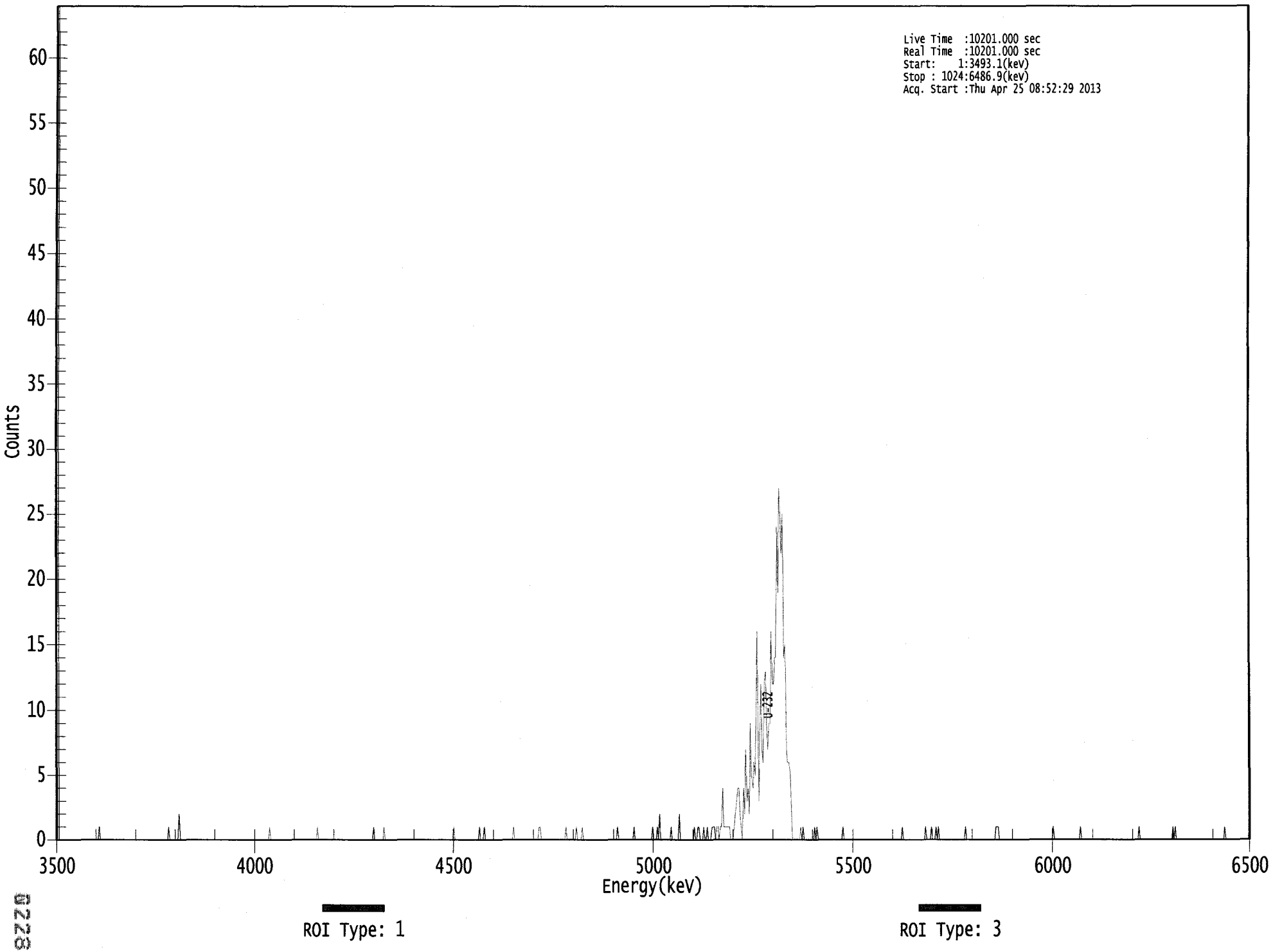
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.998	5302.50*	5.19E+000 +/- 5.25E-001	7.59E-002 +/- 7.69E-003
U-234	0.997	4761.50*	5.32E-002 +/- 5.43E-002	7.29E-002 +/- 7.39E-003
U-235	0.997	4385.50*	1.57E-002 +/- 3.92E-002	8.17E-002 +/- 8.28E-003
U-238	0.941	4184.40*	8.92E-003 +/- 3.21E-002	7.26E-002 +/- 7.35E-003

AG 4/25/13

0000056364.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 02

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel							
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	1	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	1	0	0	0	0	0	0
105:	0	0	2	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	1	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	1	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	1	0	0	0	0	0	0
281:	0	0	1	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	1	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	1	0	0	0

369:	1	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	1	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	1
417:	1	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	1	0
441:	0	0	0	0	0	0	0	1
449:	0	0	0	0	1	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	1	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	1	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	1	0	0	0	1	0	2	0
521:	0	0	0	0	0	0	0	0
529:	1	0	0	0	0	0	0	2
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	1	0	0	1
553:	1	0	0	0	1	0	0	1
561:	0	0	0	1	1	1	0	1
569:	1	0	1	1	4	1	1	1
577:	1	1	1	0	0	0	1	2
585:	3	4	4	2	1	0	4	2
593:	7	3	4	2	9	5	4	6
601:	5	11	16	3	8	12	7	6
609:	12	13	9	7	9	9	16	12
617:	12	14	14	24	19	27	25	22
625:	25	14	15	7	6	6	5	2
633:	0	0	0	0	0	0	0	1
641:	0	1	0	0	0	0	0	0
649:	0	0	0	1	0	1	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	1	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	1	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	1	0	0	0	0	1
753:	0	0	0	1	0	1	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	1	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	1	1

Sample Title: 02

Channel								
809:	1	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	1
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	1	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	1	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	1	0	1
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	1	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	1	0

JCB 4/25/13

Apex-Alpha™

Sample Description: PZ-304-AS TOT-DUP
Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000563
Batch Identification: 1304050B-UU
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_010
Chamber Serial Number:
Detector Serial Number: 10
Env. Background: System Bkgd 55193
Reagent Blank: <not performed>

Sample Size: 2.500E-001 +/- 0.000E+000 liter
Sample Date/Time: 4/4/2013 6:20:54 AM
Acquisition Date/Time: 4/25/2013 8:52:24 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.605 mL
Effective Efficiency: 0.0837 +/- 0.0069
Counting Efficiency: 0.1967 +/- 0.0036 on 12/15/2012 11:26:40 AM
Chem. Recovery Factor: 0.4257 +/- 0.0358

Peak Match Tolerance: 0.150 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.292	163.45	15.47	2.55	0.00E+000	10.6
U-234		4.739	1.81	193.79	1.19	0.00E+000	2.9
U-235		4.471	0.66	305.45	0.34	0.00E+000	2.9
U-238		4.132	1.15	249.60	0.85	0.00E+000	2.9

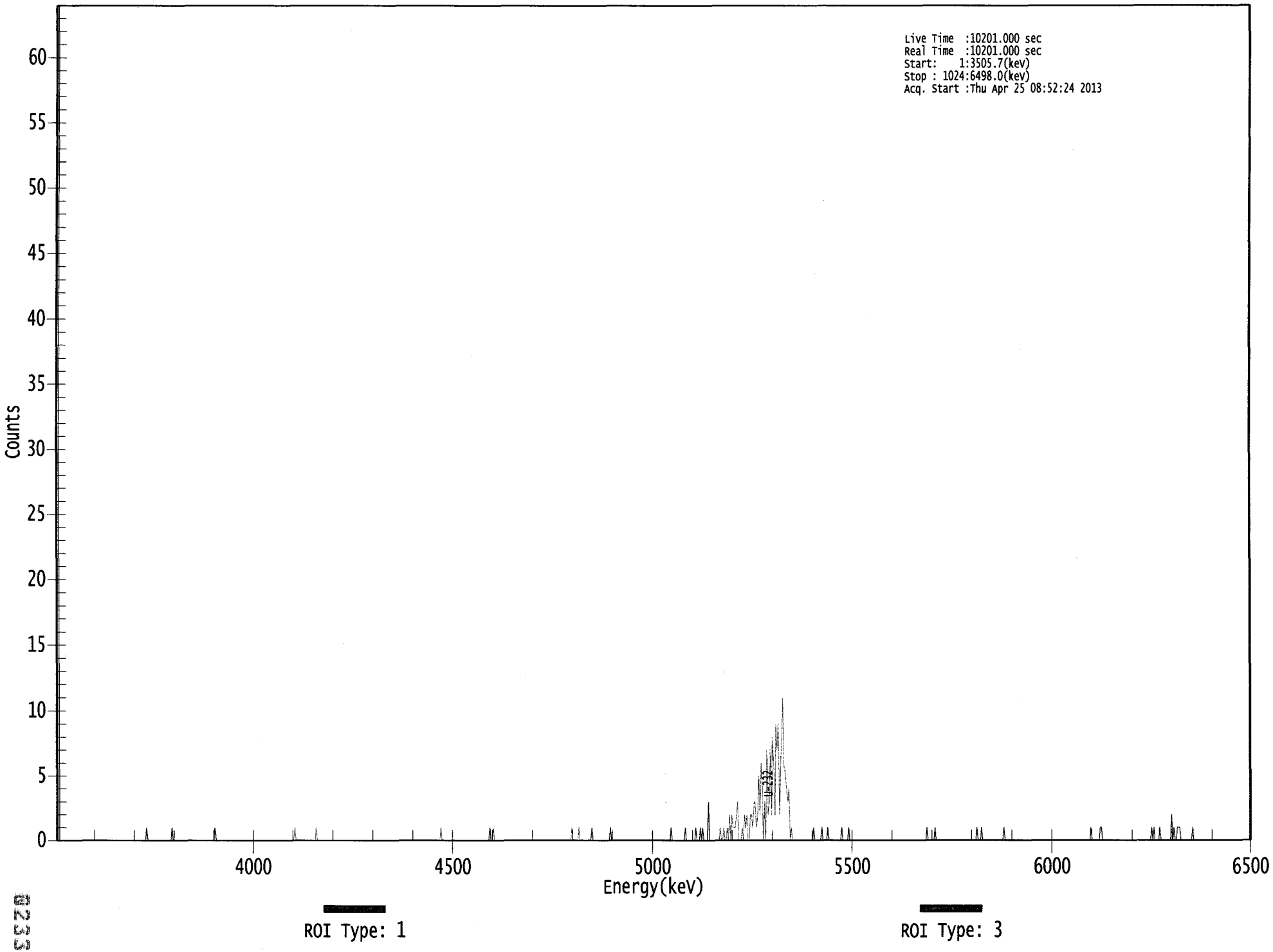
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.999	5302.50*	2.07E+001 +/- 3.34E+000	1.06E+000 +/- 1.72E-001
U-234	0.996	4761.50*	2.30E-001 +/- 4.46E-001	8.35E-001 +/- 1.35E-001
U-235	0.949	4385.50*	1.03E-001 +/- 3.16E-001	7.48E-001 +/- 1.21E-001
U-238	0.980	4184.40*	1.45E-001 +/- 3.63E-001	7.56E-001 +/- 1.22E-001

AG 4/25/13

0000056361.CNF



8233

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 03

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	1	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	1	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	1	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	1	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	1
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	1	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	1	0	0	1

Sample Title: 03

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	1	0	0	0	0	0
449:	1	0	0	0	0	0	0	0
457:	0	0	0	1	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	1	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	1
529:	0	0	0	0	0	0	0	0
537:	0	0	0	1	0	0	0	0
545:	0	0	0	0	1	0	0	0
553:	1	0	1	0	0	0	0	3
561:	0	0	0	0	0	0	0	0
569:	0	1	0	0	1	0	0	1
577:	0	2	0	2	1	1	1	2
585:	3	0	0	0	1	0	2	1
593:	2	0	0	2	2	1	3	3
601:	1	2	5	2	6	4	0	3
609:	0	7	2	3	7	2	8	6
617:	2	9	7	9	2	6	7	11
625:	6	5	4	3	4	0	1	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	1	0	0	0	0	0	0
657:	1	0	0	0	0	1	0	0
665:	0	0	0	0	0	0	0	0
673:	0	1	0	0	0	0	0	1
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	1	0	0	0	0	0
753:	0	1	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	1	0	0
793:	0	1	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 03

Channel								
809:	0	0	0	0	1	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	1	0
889:	0	0	0	0	0	0	1	1
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	1	0	1	0	0	0
945:	0	1	0	0	0	0	0	0
953:	0	0	0	2	0	1	0	0
961:	1	1	1	0	0	0	0	0
969:	0	0	0	0	0	1	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0