

US EPA ARCHIVE DOCUMENT

SECTION IX
ANALYTICAL DATA (ISOTOPIC THORIUM)

ThISO

Run 1

Work Order	13-04051	Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
Analysis Code	ThISO	01	LCS	LCS		04/09/13 00:00	1.0000E+00
Run	1	02	MBL	BLANK		04/09/13 00:00	1.0000E+00
Date Received	4/9/2013	03	DUP	PZ-105-SS TOT	46	04/04/13 15:06	1.0000E+00
Lab Deadline	4/30/2013	04	DO	PZ-105-SS TOT	46	04/04/13 15:06	1.0000E+00
Client	Engineering Management Support, Inc.	05	TRG	PZ-105-SS DIS	46	04/04/13 15:06	1.0000E+00
Project	West Lake OU-1	06	TRG	S-10 TOT	42	04/04/13 15:25	1.0000E+00
Report Level	4	07	TRG	S-10 DIS	42	04/04/13 15:25	1.0000E+00
Activity Units	pCi	08	TRG	LR-104 TOT	45	04/04/13 15:52	1.0000E+00
Aliquot Units	I	09	TRG	LR-104 DIS	45	04/04/13 15:52	1.0000E+00
Matrix	WA	10	TRG	DUP 01 TOT	48	04/04/13 00:00	1.0000E+00
Method	NAS NS-3004 Mod	11	TRG	DUP 01 DIS	48	04/04/13 00:00	1.0000E+00
Instrument Type	Alpha Spectroscopy	12	TRG	DUP 02 TOT	43	04/04/13 00:00	1.0000E+00
Radiometric Tracer	Th-229	13	TRG	DUP 02 DIS	43	04/04/13 00:00	1.0000E+00
Radiometric Sol#	Th-18a	14	TRG	FB at PZ-110-SS TOT	42	04/04/13 09:30	1.0000E+00
Tracer Act (dpm/g)	22.467	15	TRG	FB at PZ-110-SS DIS	42	04/04/13 09:30	1.0000E+00
Carrier		16	TRG	MW-103 TOT	48	04/05/13 09:50	1.0000E+00
Carrier Conc (mg/ml)		17	TRG	MW-103 DIS	48	04/05/13 09:50	1.0000E+00
		18	TRG	PZ-200-SS TOT	37	04/05/13 11:10	1.0000E+00
		19	TRG	PZ-200-SS DIS	37	04/05/13 11:10	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.

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	0.4745	10.7		0.00								
02	MBL	0.2347	5.3		0.00								
03	DUP	0.2168	4.9		0.00								
04	DO	0.2341	5.3		0.00								
05	TRG	0.2315	5.2		0.00								
06	TRG	0.2327	5.2		0.00								
07	TRG	0.2311	5.2		0.00								
08	TRG	0.2321	5.2		0.00								
09	TRG	0.2322	5.2		0.00								
10	TRG	0.2322	5.2		0.00								
11	TRG	0.2294	5.2		0.00								
12	TRG	0.2329	5.2		0.00								
13	TRG	0.2322	5.2		0.00								
14	TRG	0.2318	5.2		0.00								
15	TRG	0.2240	5.0		0.00								
16	TRG	0.2320	5.2		0.00								
17	TRG	0.2316	5.2		0.00								
18	TRG	0.2298	5.2		0.00								
19	TRG	0.2324	5.2		0.00								

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0200

ThISO

Run 1

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			04/16/13 08:20	JBARNARD				
02	MBL			04/16/13 08:20	JBARNARD				
03	DUP			04/16/13 08:20	JBARNARD				
04	DO			04/16/13 08:20	JBARNARD				
05	TRG			04/16/13 08:20	JBARNARD				
06	TRG			04/16/13 08:20	JBARNARD				
07	TRG			04/16/13 08:20	JBARNARD				
08	TRG			04/16/13 08:20	JBARNARD				
09	TRG			04/16/13 08:20	JBARNARD				
10	TRG			04/16/13 08:20	JBARNARD				
11	TRG			04/16/13 08:20	JBARNARD				
12	TRG			04/16/13 08:20	JBARNARD				
13	TRG			04/16/13 08:20	JBARNARD				
14	TRG			04/16/13 08:20	JBARNARD				
15	TRG			04/16/13 08:20	JBARNARD				
16	TRG			04/16/13 08:20	JBARNARD				
17	TRG			04/16/13 08:20	JBARNARD				
18	TRG			04/16/13 08:20	JBARNARD				
19	TRG			04/16/13 08:20	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.

0205

Preliminary Data Report & Analytical Calculations
Work Order: 13-04051-THISO-1

	
Run	1
Analysis Code	THISO
Eberline Services Work Order	13-04051
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	TH-228	LCS	LCS	pCi/l	5.19E+00	8.11E-01	1.38E-01	4.82E+00	107.62	OK		OK	
02	TH-228	MBL	BLANK	pCi/l	-4.07E-03	3.26E-02	8.79E-02					OK	OK
03	TH-228	DUP	PZ-105-SS TOT	pCi/l	-2.07E-02	5.54E-02	1.48E-01				NA	OK	
04	TH-228	DO	PZ-105-SS TOT	pCi/l	4.21E-02	5.81E-02	9.54E-02					OK	
05	TH-228	TRG	PZ-105-SS DIS	pCi/l	8.79E-03	5.13E-02	1.16E-01					OK	
06	TH-228	TRG	S-10 TOT	pCi/l	3.04E-02	8.81E-02	1.76E-01					OK	
07	TH-228	TRG	S-10 DIS	pCi/l	4.96E-02	1.08E-01	2.06E-01					OK	
08	TH-228	TRG	LR-104 TOT	pCi/l	8.25E-02	7.59E-02	9.36E-02					OK	
09	TH-228	TRG	LR-104 DIS	pCi/l	3.44E-02	6.60E-02	1.22E-01					OK	
10	TH-228	TRG	DUP 01 TOT	pCi/l	8.30E-02	9.23E-02	1.32E-01					OK	
11	TH-228	TRG	DUP 01 DIS	pCi/l	6.59E-03	2.75E-02	7.06E-02					OK	
12	TH-228	TRG	DUP 02 TOT	pCi/l	1.03E-01	1.18E-01	1.63E-01					OK	
13	TH-228	TRG	DUP 02 DIS	pCi/l	1.24E-02	2.98E-02	6.24E-02					OK	
14	TH-228	TRG	FB at PZ-110-SS TOT	pCi/l	1.50E-01	1.27E-01	1.07E-01					OK	
15	TH-228	TRG	FB at PZ-110-SS DIS	pCi/l	1.53E-02	3.68E-02	7.71E-02					OK	
16	TH-228	TRG	MW-103 TOT	pCi/l	1.38E+00	3.56E-01	8.51E-02					OK	
17	TH-228	TRG	MW-103 DIS	pCi/l	-2.40E-02	6.13E-02	1.78E-01					OK	
18	TH-228	TRG	PZ-200-SS TOT	pCi/l	-3.77E-03	6.42E-02	1.51E-01					OK	
19	TH-228	TRG	PZ-200-SS DIS	pCi/l	3.06E-02	6.96E-02	1.31E-01					OK	

 Run 1		Analysis Code THISO		Eberline Services Work Order 13-04051		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	TH-228	LCS	04/09/13 00:00	1.00E+00	101.07	0.00	0.00			
								02	TH-228	MBL	04/09/13 00:00	1.00E+00	125.51	0.00	0.00			
								03	TH-228	DUP	04/04/13 15:06	1.00E+00	99.08	0.00	0.00			
								04	TH-228	DO	04/04/13 15:06	1.00E+00	125.42	0.00	0.00			
								05	TH-228	TRG	04/04/13 15:06	1.00E+00	106.96	0.00	0.00			
								06	TH-228	TRG	04/04/13 15:25	1.00E+00	92.66	0.00	0.00			
								07	TH-228	TRG	04/04/13 15:25	1.00E+00	67.00	0.00	0.00			
								08	TH-228	TRG	04/04/13 15:52	1.00E+00	109.30	0.00	0.00			
								09	TH-228	TRG	04/04/13 15:52	1.00E+00	96.70	0.00	0.00			
								10	TH-228	TRG	04/04/13 00:00	1.00E+00	74.58	0.00	0.00			
								11	TH-228	TRG	04/04/13 00:00	1.00E+00	101.24	0.00	0.00			
								12	TH-228	TRG	04/04/13 00:00	1.00E+00	56.32	0.00	0.00			
								13	TH-228	TRG	04/04/13 00:00	1.00E+00	94.78	0.00	0.00			
								14	TH-228	TRG	04/04/13 09:30	1.00E+00	58.71	0.00	0.00			
								15	TH-228	TRG	04/04/13 09:30	1.00E+00	80.10	0.00	0.00			
								16	TH-228	TRG	04/05/13 09:50	1.00E+00	112.76	0.00	0.00			
								17	TH-228	TRG	04/05/13 09:50	1.00E+00	78.97	0.00	0.00			
								18	TH-228	TRG	04/05/13 11:10	1.00E+00	92.08	0.00	0.00			
								19	TH-228	TRG	04/05/13 11:10	1.00E+00	107.85	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 13-04051-THISO-1

	
Run	1
Analysis Code	THISO
Eberline Services Work Order	13-04051
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	TH-228	LCS	04/20/13 13:48		A_Spec	Alpha_010	170	3.88 E+02	2.70 E-02	19.7
02	TH-228	MBL	04/20/13 13:48		A_Spec	Alpha_011	170	-3.80 E-01	1.40 E-02	19.7
03	TH-228	DUP	04/20/13 13:48		A_Spec	Alpha_013	170	-1.42 E+00	2.60 E-02	18.7
04	TH-228	DO	04/20/13 13:48		A_Spec	Alpha_014	170	3.62 E+00	1.40 E-02	18.5
05	TH-228	TRG	04/20/13 13:50		A_Spec	Alpha_018	170	6.20 E-01	1.40 E-02	17.8
06	TH-228	TRG	04/20/13 13:50		A_Spec	Alpha_022	170.02	1.60 E+00	2.00 E-02	15.3
07	TH-228	TRG	04/20/13 13:50		A_Spec	Alpha_024	170	2.11 E+00	1.70 E-02	17.1
08	TH-228	TRG	04/20/13 13:50		A_Spec	Alpha_025	170	5.81 E+00	7.00 E-03	17.4
09	TH-228	TRG	04/20/13 13:50		A_Spec	Alpha_027	170	2.13 E+00	1.10 E-02	17.3
10	TH-228	TRG	04/20/13 13:50		A_Spec	Alpha_029	170	4.47 E+00	9.00 E-03	19.5
11	TH-228	TRG	04/20/13 14:11		A_Spec	Alpha_041	170	4.90 E-01	3.00 E-03	19.8
12	TH-228	TRG	04/20/13 14:11		A_Spec	Alpha_042	170	3.98 E+00	6.00 E-03	18.5
13	TH-228	TRG	04/20/13 14:11		A_Spec	Alpha_044	170	8.30 E-01	1.00 E-03	19
14	TH-228	TRG	04/20/13 14:11		A_Spec	Alpha_046	170	5.83 E+00	1.00 E-03	17.9
15	TH-228	TRG	04/20/13 14:11		A_Spec	Alpha_047	170	8.30 E-01	1.00 E-03	18.2
16	TH-228	TRG	04/20/13 14:11		A_Spec	Alpha_048	170	9.72 E+01	5.00 E-03	16.8
17	TH-228	TRG	04/21/13 14:27		A_Spec	Alpha_003	170	-1.23 E+00	1.90 E-02	17.5
18	TH-228	TRG	04/21/13 14:27		A_Spec	Alpha_004	170	-2.50 E-01	2.50 E-02	19.4
19	TH-228	TRG	04/21/13 14:27		A_Spec	Alpha_010	170	2.41 E+00	2.70 E-02	19.7

9920

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	TH-230	LCS	LCS	pCi/l	5.36E+00	8.30E-01	7.99E-02	5.49E+00	97.59	OK		OK	
02	TH-230	MBL	BLANK	pCi/l	1.04E-01	6.83E-02	5.12E-02					OK	OK
03	TH-230	DUP	PZ-105-SS TOT	pCi/l	1.34E-01	9.22E-02	8.09E-02				NA	OK	
04	TH-230	DO	PZ-105-SS TOT	pCi/l	7.81E-02	6.54E-02	7.55E-02					OK	
05	TH-230	TRG	PZ-105-SS DIS	pCi/l	2.42E-01	1.23E-01	7.88E-02					OK	
06	TH-230	TRG	S-10 TOT	pCi/l	2.65E-01	1.51E-01	1.12E-01					OK	
07	TH-230	TRG	S-10 DIS	pCi/l	1.04E-01	1.16E-01	1.65E-01					OK	
08	TH-230	TRG	LR-104 TOT	pCi/l	1.56E-01	9.89E-02	8.38E-02					OK	
09	TH-230	TRG	LR-104 DIS	pCi/l	6.05E-02	7.18E-02	1.05E-01					OK	
10	TH-230	TRG	DUP 01 TOT	pCi/l	1.89E-01	1.24E-01	1.03E-01					OK	
11	TH-230	TRG	DUP 01 DIS	pCi/l	1.04E-01	8.05E-02	8.73E-02					OK	
12	TH-230	TRG	DUP 02 TOT	pCi/l	1.74E-01	1.38E-01	1.07E-01					OK	
13	TH-230	TRG	DUP 02 DIS	pCi/l	1.47E-01	9.88E-02	8.83E-02					OK	
14	TH-230	TRG	FB at PZ-110-SS TOT	pCi/l	1.47E-01	1.26E-01	1.05E-01					OK	
15	TH-230	TRG	FB at PZ-110-SS DIS	pCi/l	2.49E-01	1.41E-01	8.70E-02					OK	
16	TH-230	TRG	MW-103 TOT	pCi/l	1.22E+00	3.24E-01	5.85E-02					OK	
17	TH-230	TRG	MW-103 DIS	pCi/l	1.15E-01	1.03E-01	1.21E-01					OK	
18	TH-230	TRG	PZ-200-SS TOT	pCi/l	1.41E-01	1.01E-01	1.06E-01					OK	
19	TH-230	TRG	PZ-200-SS DIS	pCi/l	1.02E-01	7.58E-02	7.49E-02					OK	

	
Run	1
Analysis Code	THISO
Eberline Services Work Order	13-04051
Client	Engineering Management Support, Inc.

	
Run	1
Analysis Code	THISO
Eberline Services Work Order	13-04051
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	TH-230	LCS	04/09/13 00:00	1.00E+00	101.07	0.00	0.00			
02	TH-230	MBL	04/09/13 00:00	1.00E+00	125.51	0.00	0.00			
03	TH-230	DUP	04/04/13 15:06	1.00E+00	99.08	0.00	0.00			
04	TH-230	DO	04/04/13 15:06	1.00E+00	125.42	0.00	0.00			
05	TH-230	TRG	04/04/13 15:06	1.00E+00	106.96	0.00	0.00			
06	TH-230	TRG	04/04/13 15:25	1.00E+00	92.66	0.00	0.00			
07	TH-230	TRG	04/04/13 15:25	1.00E+00	67.00	0.00	0.00			
08	TH-230	TRG	04/04/13 15:52	1.00E+00	109.30	0.00	0.00			
09	TH-230	TRG	04/04/13 15:52	1.00E+00	96.70	0.00	0.00			
10	TH-230	TRG	04/04/13 00:00	1.00E+00	74.58	0.00	0.00			
11	TH-230	TRG	04/04/13 00:00	1.00E+00	101.24	0.00	0.00			
12	TH-230	TRG	04/04/13 00:00	1.00E+00	56.32	0.00	0.00			
13	TH-230	TRG	04/04/13 00:00	1.00E+00	94.78	0.00	0.00			
14	TH-230	TRG	04/04/13 09:30	1.00E+00	58.71	0.00	0.00			
15	TH-230	TRG	04/04/13 09:30	1.00E+00	80.10	0.00	0.00			
16	TH-230	TRG	04/05/13 09:50	1.00E+00	112.76	0.00	0.00			
17	TH-230	TRG	04/05/13 09:50	1.00E+00	78.97	0.00	0.00			
18	TH-230	TRG	04/05/13 11:10	1.00E+00	92.08	0.00	0.00			
19	TH-230	TRG	04/05/13 11:10	1.00E+00	107.85	0.00	0.00			

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	TH-230	LCS	04/20/13 13:48		A_Spec	Alpha_010	170	4.01 E+02	5.00 E-03	19.7
02	TH-230	MBL	04/20/13 13:48		A_Spec	Alpha_011	170	9.66 E+00	2.00 E-03	19.7
03	TH-230	DUP	04/20/13 13:48		A_Spec	Alpha_013	170	9.32 E+00	4.00 E-03	18.7
04	TH-230	DO	04/20/13 13:48		A_Spec	Alpha_014	170	6.81 E+00	7.00 E-03	18.5
05	TH-230	TRG	04/20/13 13:50		A_Spec	Alpha_018	170	1.73 E+01	4.00 E-03	17.8
06	TH-230	TRG	04/20/13 13:50		A_Spec	Alpha_022	170.02	1.41 E+01	5.00 E-03	15.3
07	TH-230	TRG	04/20/13 13:50		A_Spec	Alpha_024	170	4.47 E+00	9.00 E-03	17.1
08	TH-230	TRG	04/20/13 13:50		A_Spec	Alpha_025	170	1.12 E+01	5.00 E-03	17.4
09	TH-230	TRG	04/20/13 13:50		A_Spec	Alpha_027	170	3.81 E+00	7.00 E-03	17.3
10	TH-230	TRG	04/20/13 13:50		A_Spec	Alpha_029	170	1.03 E+01	4.00 E-03	19.5
11	TH-230	TRG	04/20/13 14:11		A_Spec	Alpha_041	170	7.81 E+00	7.00 E-03	19.8
12	TH-230	TRG	04/20/13 14:11		A_Spec	Alpha_042	170	6.83 E+00	1.00 E-03	18.5
13	TH-230	TRG	04/20/13 14:11		A_Spec	Alpha_044	170	1.00 E+01	0.00 E+00	19
14	TH-230	TRG	04/20/13 14:11		A_Spec	Alpha_046	170	5.83 E+00	1.00 E-03	17.9
15	TH-230	TRG	04/20/13 14:11		A_Spec	Alpha_047	170	1.37 E+01	2.00 E-03	18.2
16	TH-230	TRG	04/20/13 14:11		A_Spec	Alpha_048	170	8.68 E+01	1.00 E-03	16.8
17	TH-230	TRG	04/21/13 14:27		A_Spec	Alpha_003	170	5.98 E+00	6.00 E-03	17.5
18	TH-230	TRG	04/21/13 14:27		A_Spec	Alpha_004	170	9.47 E+00	9.00 E-03	19.4
19	TH-230	TRG	04/21/13 14:27		A_Spec	Alpha_010	170	8.15 E+00	5.00 E-03	19.7

	Run	1
	Analysis Code	THISO
Eberline Services Work Order	13-04051	
Client	Engineering Management Support, Inc.	

Preliminary Data Report & Analytical Calculations
Work Order: 13-04051-THISO-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	TH-232	LCS	LCS	pCi/l	5.22E+00	8.13E-01	8.40E-02	4.82E+00	108.41	OK		OK	
02	TH-232	MBL	BLANK	pCi/l	-3.64E-03	2.16E-02	5.12E-02					OK	OK
03	TH-232	DUP	PZ-105-SS TOT	pCi/l	1.43E-02	3.97E-02	8.58E-02				NA	OK	
04	TH-232	DO	PZ-105-SS TOT	pCi/l	5.61E-03	2.34E-02	6.01E-02					OK	
05	TH-232	TRG	PZ-105-SS DIS	pCi/l	3.00E-02	4.87E-02	8.35E-02					OK	
06	TH-232	TRG	S-10 TOT	pCi/l	1.21E-01	1.00E-01	9.80E-02					OK	
07	TH-232	TRG	S-10 DIS	pCi/l	1.13E-02	4.73E-02	1.21E-01					OK	
08	TH-232	TRG	LR-104 TOT	pCi/l	5.11E-02	5.58E-02	6.68E-02					OK	
09	TH-232	TRG	LR-104 DIS	pCi/l	-5.71E-03	3.45E-02	1.09E-01					OK	
10	TH-232	TRG	DUP 01 TOT	pCi/l	4.55E-02	6.34E-02	9.58E-02					OK	
11	TH-232	TRG	DUP 01 DIS	pCi/l	-3.82E-02	3.22E-02	1.16E-01					OK	
12	TH-232	TRG	DUP 02 TOT	pCi/l	6.78E-02	8.85E-02	1.22E-01					OK	
13	TH-232	TRG	DUP 02 DIS	pCi/l	0.00E+00	4.08E-02	8.82E-02					OK	
14	TH-232	TRG	FB at PZ-110-SS TOT	pCi/l	3.76E-02	7.19E-02	1.32E-01					OK	
15	TH-232	TRG	FB at PZ-110-SS DIS	pCi/l	-6.17E-03	3.66E-02	8.68E-02					OK	
16	TH-232	TRG	MW-103 TOT	pCi/l	1.19E+00	3.18E-01	5.84E-02					OK	
17	TH-232	TRG	MW-103 DIS	pCi/l	7.03E-02	7.70E-02	9.19E-02					OK	
18	TH-232	TRG	PZ-200-SS TOT	pCi/l	9.49E-03	4.34E-02	1.02E-01					OK	
19	TH-232	TRG	PZ-200-SS DIS	pCi/l	-1.27E-02	2.66E-02	7.87E-02					OK	

Run	1	Analysis Code	THISO	Eberline Services Work Order	13-04051	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	TH-232	LCS	04/09/13 00:00	1.00E+00	101.07	0.00	0.00			
02	TH-232	MBL	04/09/13 00:00	1.00E+00	125.51	0.00	0.00			
03	TH-232	DUP	04/04/13 15:06	1.00E+00	99.08	0.00	0.00			
04	TH-232	DO	04/04/13 15:06	1.00E+00	125.42	0.00	0.00			
05	TH-232	TRG	04/04/13 15:06	1.00E+00	106.96	0.00	0.00			
06	TH-232	TRG	04/04/13 15:25	1.00E+00	92.66	0.00	0.00			
07	TH-232	TRG	04/04/13 15:25	1.00E+00	67.00	0.00	0.00			
08	TH-232	TRG	04/04/13 15:52	1.00E+00	109.30	0.00	0.00			
09	TH-232	TRG	04/04/13 15:52	1.00E+00	96.70	0.00	0.00			
10	TH-232	TRG	04/04/13 00:00	1.00E+00	74.58	0.00	0.00			
11	TH-232	TRG	04/04/13 00:00	1.00E+00	101.24	0.00	0.00			
12	TH-232	TRG	04/04/13 00:00	1.00E+00	56.32	0.00	0.00			
13	TH-232	TRG	04/04/13 00:00	1.00E+00	94.78	0.00	0.00			
14	TH-232	TRG	04/04/13 09:30	1.00E+00	58.71	0.00	0.00			
15	TH-232	TRG	04/04/13 09:30	1.00E+00	80.10	0.00	0.00			
16	TH-232	TRG	04/05/13 09:50	1.00E+00	112.76	0.00	0.00			
17	TH-232	TRG	04/05/13 09:50	1.00E+00	78.97	0.00	0.00			
18	TH-232	TRG	04/05/13 11:10	1.00E+00	92.08	0.00	0.00			
19	TH-232	TRG	04/05/13 11:10	1.00E+00	107.85	0.00	0.00			

Run	1	Analysis Code	THISO	Eberline Services Work Order	13-04051	Client	Engineering Management Support, Inc.

1120

	
Run	1
Analysis Code	THISO
Eberline Services Work Order	13-04051
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	TH-232	LCS	04/20/13 13:48		A_Spec	Alpha_010	170	3.92 E+02	6.00 E-03	19.7
02	TH-232	MBL	04/20/13 13:48		A_Spec	Alpha_011	170	-3.40 E-01	2.00 E-03	19.7
03	TH-232	DUP	04/20/13 13:48		A_Spec	Alpha_013	170	1.00 E+00	0.00 E+00	18.7
04	TH-232	DO	04/20/13 13:48		A_Spec	Alpha_014	170	4.90 E-01	3.00 E-03	18.5
05	TH-232	TRG	04/20/13 13:50		A_Spec	Alpha_018	170	2.15 E+00	5.00 E-03	17.8
06	TH-232	TRG	04/20/13 13:50		A_Spec	Alpha_022	170.02	6.49 E+00	3.00 E-03	15.3
07	TH-232	TRG	04/20/13 13:50		A_Spec	Alpha_024	170	4.90 E-01	3.00 E-03	17.1
08	TH-232	TRG	04/20/13 13:50		A_Spec	Alpha_025	170	3.66 E+00	2.00 E-03	17.4
09	TH-232	TRG	04/20/13 13:50		A_Spec	Alpha_027	170	-3.60 E-01	8.00 E-03	17.3
10	TH-232	TRG	04/20/13 13:50		A_Spec	Alpha_029	170	2.49 E+00	3.00 E-03	19.5
11	TH-232	TRG	04/20/13 14:11		A_Spec	Alpha_041	170	-2.89 E+00	1.70 E-02	19.8
12	TH-232	TRG	04/20/13 14:11		A_Spec	Alpha_042	170	2.66 E+00	2.00 E-03	18.5
13	TH-232	TRG	04/20/13 14:11		A_Spec	Alpha_044	170	1.00 E+00	0.00 E+00	19
14	TH-232	TRG	04/20/13 14:11		A_Spec	Alpha_046	170	1.49 E+00	3.00 E-03	17.9
15	TH-232	TRG	04/20/13 14:11		A_Spec	Alpha_047	170	-3.40 E-01	2.00 E-03	18.2
16	TH-232	TRG	04/20/13 14:11		A_Spec	Alpha_048	170	8.48 E+01	1.00 E-03	16.8
17	TH-232	TRG	04/21/13 14:27		A_Spec	Alpha_003	170	3.66 E+00	2.00 E-03	17.5
18	TH-232	TRG	04/21/13 14:27		A_Spec	Alpha_004	170	6.40 E-01	8.00 E-03	19.4
19	TH-232	TRG	04/21/13 14:27		A_Spec	Alpha_010	170	-1.02 E+00	6.00 E-03	19.7

n.5h

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	0.4745	10.6606		0.00		
02	MBL	BLANK	04/09/13 00:00	1.0000	0.2347	5.2730		0.00		
03	DUP	PZ-105-SS TOT	04/04/13 15:06	1.0000	0.2168	4.8708		0.00		
04	DO	PZ-105-SS TOT	04/04/13 15:06	1.0000	0.2341	5.2595		0.00		
05	TRG	PZ-105-SS DIS	04/04/13 15:06	1.0000	0.2315	5.2011		0.00		
06	TRG	S-10 TOT	04/04/13 15:25	1.0000	0.2327	5.2281		0.00		
07	TRG	S-10 DIS	04/04/13 15:25	1.0000	0.2311	5.1921		0.00		
08	TRG	LR-104 TOT	04/04/13 15:52	1.0000	0.2321	5.2146		0.00		
09	TRG	LR-104 DIS	04/04/13 15:52	1.0000	0.2322	5.2168		0.00		
10	TRG	DUP 01 TOT	04/04/13 00:00	1.0000	0.2322	5.2168		0.00		
11	TRG	DUP 01 DIS	04/04/13 00:00	1.0000	0.2294	5.1539		0.00		
12	TRG	DUP 02 TOT	04/04/13 00:00	1.0000	0.2329	5.2326		0.00		
13	TRG	DUP 02 DIS	04/04/13 00:00	1.0000	0.2322	5.2168		0.00		
14	TRG	FB at PZ-110-SS TOT	04/04/13 09:30	1.0000	0.2318	5.2079		0.00		
15	TRG	FB at PZ-110-SS DIS	04/04/13 09:30	1.0000	0.2240	5.0326		0.00		
16	TRG	MW-103 TOT	04/05/13 09:50	1.0000	0.2320	5.2123		0.00		
17	TRG	MW-103 DIS	04/05/13 09:50	1.0000	0.2316	5.2034		0.00		
18	TRG	PZ-200-SS TOT	04/05/13 11:10	1.0000	0.2298	5.1629		0.00		
19	TRG	PZ-200-SS DIS	04/05/13 11:10	1.0000	0.2324	5.2213		0.00		

0-14
 29
 3-10

Spike and Tracer Worksheet

Internal Work Order					Run	Analysis Code				Date	Technician				Technician Initials	Witness Initials
13-04051					1	ThISO				4/16/2013 8:19	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
Th-228	Th-8b	103.560	4/16/2013	0.100	0.1033				4.82	0.173	0.00	0.000	0.00	0.000	0.00	0.000
Th-230	Th-1b	23.525	4/16/2013	0.500	0.5179				5.49	0.148	0.00	0.000	0.00	0.000	0.00	0.000
Th-232	Th-8b	103.560	4/16/2013	0.100	0.1033				4.82	0.173	0.00	0.000	0.00	0.000	0.00	0.000

Tracers							Balance Printer Tapes	
fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition	Tracer	
01	Th-229	Th-18a	22.467	4/16/2013	0.4745	0.2200	0.4745 g	
02	Th-229	Th-18a	22.467	4/16/2013	0.2347	0.2200	0.2347 g	
03	Th-229	Th-18a	22.467	4/16/2013	0.2168	0.2200	-0.2168 g	
04	Th-229	Th-18a	22.467	4/16/2013	0.2341	0.2200	-0.2341 g	
05	Th-229	Th-18a	22.467	4/16/2013	0.2315	0.2200	-0.2315 g	
06	Th-229	Th-18a	22.467	4/16/2013	0.2327	0.2200	-0.2327 g	
07	Th-229	Th-18a	22.467	4/16/2013	0.2311	0.2200	-0.2311 g	
08	Th-229	Th-18a	22.467	4/16/2013	0.2321	0.2200	-0.2321 g	
09	Th-229	Th-18a	22.467	4/16/2013	0.2322	0.2200	-0.2322 g	
10	Th-229	Th-18a	22.467	4/16/2013	0.2322	0.2200	-0.2322 g	
11	Th-229	Th-18a	22.467	4/16/2013	0.2294	0.2200	-0.2294 g	
12	Th-229	Th-18a	22.467	4/16/2013	0.2329	0.2200	-0.2329 g	
13	Th-229	Th-18a	22.467	4/16/2013	0.2322	0.2200	-0.2322 g	
14	Th-229	Th-18a	22.467	4/16/2013	0.2318	0.2200	-0.2318 g	
15	Th-229	Th-18a	22.467	4/16/2013	0.2240	0.2200	-0.2240 g	
16	Th-229	Th-18a	22.467	4/16/2013	0.2320	0.2200	-0.2320 g	
17	Th-229	Th-18a	22.467	4/16/2013	0.2316	0.2200	-0.2316 g	
18	Th-229	Th-18a	22.467	4/16/2013	0.2298	0.2200	-0.2298 g	
19	Th-229	Th-18a	22.467	4/16/2013	0.2324	0.2200	-0.2324 g	

LCS	
0.5179 g	
0.1033 g	

Matrix Spike	

Aliquot Worksheet

Work Order 13-04051	Run 1	Analysis Code ThISO	Rpt Units liters	Lab Deadline 4/30/2013	Technician JBARNARD
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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-105-SS TOT	DUP					1.0000E+00	1.0000E+00				
04	PZ-105-SS TOT	DO					1.0000E+00	1.0000E+00				
05	PZ-105-SS DIS	TRG					1.0000E+00	1.0000E+00				
06	S-10 TOT	TRG					1.0000E+00	1.0000E+00				
07	S-10 DIS	TRG					1.0000E+00	1.0000E+00				
08	LR-104 TOT	TRG					1.0000E+00	1.0000E+00				
09	LR-104 DIS	TRG					1.0000E+00	1.0000E+00				
10	DUP 01 TOT	TRG					1.0000E+00	1.0000E+00				
11	DUP 01 DIS	TRG					1.0000E+00	1.0000E+00				
12	DUP 02 TOT	TRG					1.0000E+00	1.0000E+00				
13	DUP 02 DIS	TRG					1.0000E+00	1.0000E+00				
14	FB at PZ-110-SS TOT	TRG					1.0000E+00	1.0000E+00				
15	FB at PZ-110-SS DIS	TRG					1.0000E+00	1.0000E+00				
16	MW-103 TOT	TRG					1.0000E+00	1.0000E+00				
17	MW-103 DIS	TRG					1.0000E+00	1.0000E+00				
18	PZ-200-SS TOT	TRG					1.0000E+00	1.0000E+00				
19	PZ-200-SS DIS	TRG					1.0000E+00	1.0000E+00				

Comments	
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5217

Technician: _____

[Signature] Date: 4/16/13



C
4/22/13

Sample Description: SPIKE
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 01
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/19/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:48:50 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.475 mL
 Effective Efficiency: 0.1988 +/- 0.0122
 Counting Efficiency: 0.1967 +/- 0.0036 on 12/15/2012 11:26:40 AM
 Chem. Recovery Factor: 1.0107 +/- 0.0646

Control Certificate Name: NatTh_Th-8
 Chem. Recov. of Control: TH-232 1.084087 +/- 0.092056
 Peak Match Tolerance: 0.175 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.833	26.81	38.82	1.19	0.00E+000	0.0
TH-228	5.385	388.41	10.01	4.59	0.00E+000	33.3
TH-229 T	4.882	360.30	10.35	1.70	0.00E+000	8.8
TH-230	4.640	401.15	9.80	0.85	0.00E+000	32.6
TH-232	3.965	391.98	9.91	1.02	0.00E+000	13.2

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

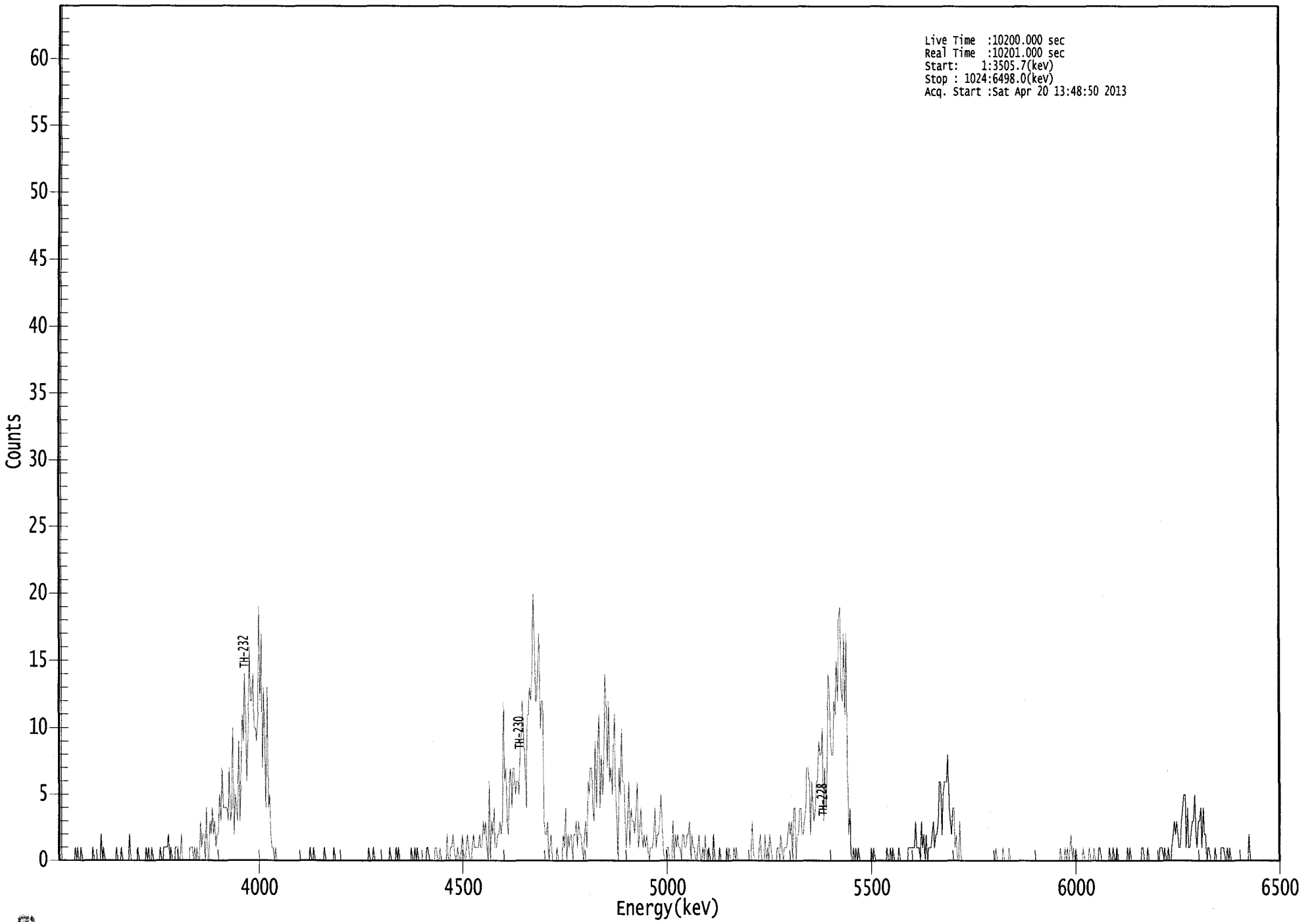
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.998	5850.00*	3.67E-001 +/- 1.49E-001	9.01E-002 +/- 1.08E-002
TH-228	0.999	5400.00*	5.19E+000 +/- 8.11E-001	1.38E-001 +/- 1.66E-002
TH-229	1.000	4872.00*	4.82E+000 +/- 5.79E-001	9.84E-002 +/- 1.18E-002
TH-230	0.995	4672.00*	5.36E+000 +/- 8.30E-001	7.99E-002 +/- 9.60E-003
TH-232	0.995	3997.00*	5.22E+000 +/- 8.13E-001	8.40E-002 +/- 1.01E-002

AG
4/22/13

US EPA ARCHIVE DOCUMENT

000056020.CNF

Live Time :10200.000 sec
Real Time :10201.000 sec
Start: 1:3505.7(kev)
Stop : 1024:6498.0(kev)
Acq. Start :Sat Apr 20 13:48:50 2013



0219

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: 01

Elapsed Live time: 10200

Elapsed Real Time: 10201

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10201	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	1	0
17:	1	0	0	1	0	0	0	0
25:	0	0	0	0	0	1	0	0
33:	0	0	0	0	2	0	1	0
41:	0	0	0	0	0	0	0	0
49:	0	1	0	0	0	1	0	0
57:	0	0	0	0	2	0	0	0
65:	0	0	0	1	0	0	0	0
73:	0	0	1	0	1	0	0	1
81:	0	0	0	0	0	0	1	0
89:	0	1	1	1	1	2	0	1
97:	0	0	0	1	1	1	0	0
105:	2	0	0	0	0	0	0	1
113:	1	1	0	1	0	1	0	0
121:	3	1	2	2	0	4	0	0
129:	3	2	4	2	3	1	2	2
137:	5	3	7	4	4	4	4	3
145:	7	3	4	10	2	5	4	3
153:	9	3	7	11	9	14	10	6
161:	10	16	12	12	14	10	10	9
169:	11	19	12	17	7	13	9	4
177:	13	4	5	2	1	1	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	0	0	0	0
209:	0	0	0	0	1	0	0	1
217:	0	0	0	0	0	0	0	0
225:	1	0	0	0	0	0	0	0
233:	1	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	1	0	0
265:	0	1	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	1
281:	0	0	0	0	1	0	1	0
289:	0	0	0	0	0	0	0	0
297:	0	1	0	0	1	0	1	0
305:	0	0	0	0	0	0	1	1
313:	0	0	0	0	0	1	1	0
321:	0	1	0	0	0	0	0	2
329:	0	0	1	1	2	1	0	0
337:	1	0	0	1	2	0	0	1
345:	2	1	0	0	1	2	1	1
353:	1	1	2	1	1	3	2	3
361:	1	0	6	0	3	2	4	1

369: 1 2 2 3 2 3 12 6

Sample Title: 01

Channel	1	2	3	4	5	6	7	8
377:	7	3	2	6	7	4	7	7
385:	5	6	6	5	8	10	12	9
393:	8	4	11	11	13	12	14	20
401:	17	12	12	15	17	10	12	12
409:	3	2	2	3	0	1	2	0
417:	0	0	0	1	0	0	0	0
425:	2	1	4	0	2	1	2	2
433:	0	2	2	3	1	3	2	2
441:	1	0	2	3	1	6	5	7
449:	7	4	3	9	4	8	11	4
457:	8	5	7	14	12	7	12	6
465:	7	5	8	11	5	3	0	7
473:	5	10	6	6	3	1	3	6
481:	1	4	3	3	2	4	6	1
489:	2	4	2	1	2	1	2	1
497:	0	1	1	1	2	4	1	2
505:	2	3	5	3	1	0	0	1
513:	1	0	0	0	3	0	2	1
521:	2	1	1	0	2	2	1	1
529:	2	2	3	0	2	1	1	0
537:	0	1	2	0	0	1	0	2
545:	0	0	1	0	0	0	2	0
553:	0	0	0	1	0	0	0	0
561:	0	1	0	1	0	0	0	1
569:	0	1	0	0	0	0	0	0
577:	0	0	0	0	0	0	3	1
585:	0	0	0	0	1	2	0	0
593:	0	2	0	1	0	2	1	0
601:	0	0	0	1	1	0	2	1
609:	0	1	1	1	2	3	2	3
617:	0	4	4	0	2	2	4	4
625:	2	2	3	4	7	7	6	2
633:	6	4	3	4	6	6	9	8
641:	8	10	3	7	4	6	14	13
649:	9	8	8	12	11	15	12	18
657:	19	13	12	17	11	17	7	2
665:	4	0	0	1	0	1	0	1
673:	0	0	0	0	0	0	0	0
681:	0	0	1	0	1	0	0	0
689:	0	0	0	0	0	0	0	1
697:	0	0	1	0	1	0	0	0
705:	0	1	0	0	0	0	0	0
713:	0	1	1	1	1	1	1	3
721:	1	1	1	0	3	1	2	0
729:	2	0	1	1	1	2	3	1
737:	2	2	3	6	6	2	5	6
745:	6	6	8	4	3	2	4	4
753:	1	2	0	0	3	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	1	0	0	0	0	0
793:	1	0	0	0	0	1	0	0

801: 0 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:	1	0	0	0	1	0	1	0
849:	1	2	0	1	0	1	0	0
857:	0	0	0	1	0	0	0	0
865:	1	0	0	0	1	0	0	0
873:	1	1	0	0	0	0	0	0
881:	0	1	0	0	1	0	0	1
889:	0	0	0	0	0	0	0	0
897:	1	0	1	0	0	0	0	0
905:	0	0	0	0	1	1	0	0
913:	0	1	0	0	0	0	0	0
921:	0	0	0	1	1	1	0	1
929:	0	0	1	0	0	1	2	3
937:	2	3	2	1	1	3	4	5
945:	5	1	4	1	1	2	3	3
953:	5	2	1	3	3	4	1	4
961:	2	2	0	1	1	0	0	0
969:	0	1	0	0	0	0	1	1
977:	1	0	0	1	0	1	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	2	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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Sample Description: BLANK
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 02
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_011
 Chamber Serial Number:
 Detector Serial Number: 11
 Env. Background: System Bkgd 55194
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/19/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:48:51 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.235 mL
 Effective Efficiency: 0.2476 +/- 0.0183
 Counting Efficiency: 0.1973 +/- 0.0042 on 12/15/2012 11:28:06 AM
 Chem. Recovery Factor: 1.2551 +/- 0.0967

Peak Match Tolerance: 0.175 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.818	3.81	117.33	1.19	0.00E+000	2.7
TH-228	5.385	-0.38	799.90	2.38	0.00E+000	2.7
TH-229 T	4.867	221.98	13.19	1.02	0.00E+000	4.1
TH-230	4.678	9.66	64.35	0.34	0.00E+000	2.7
TH-232	3.947	-0.34	592.91	0.34	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

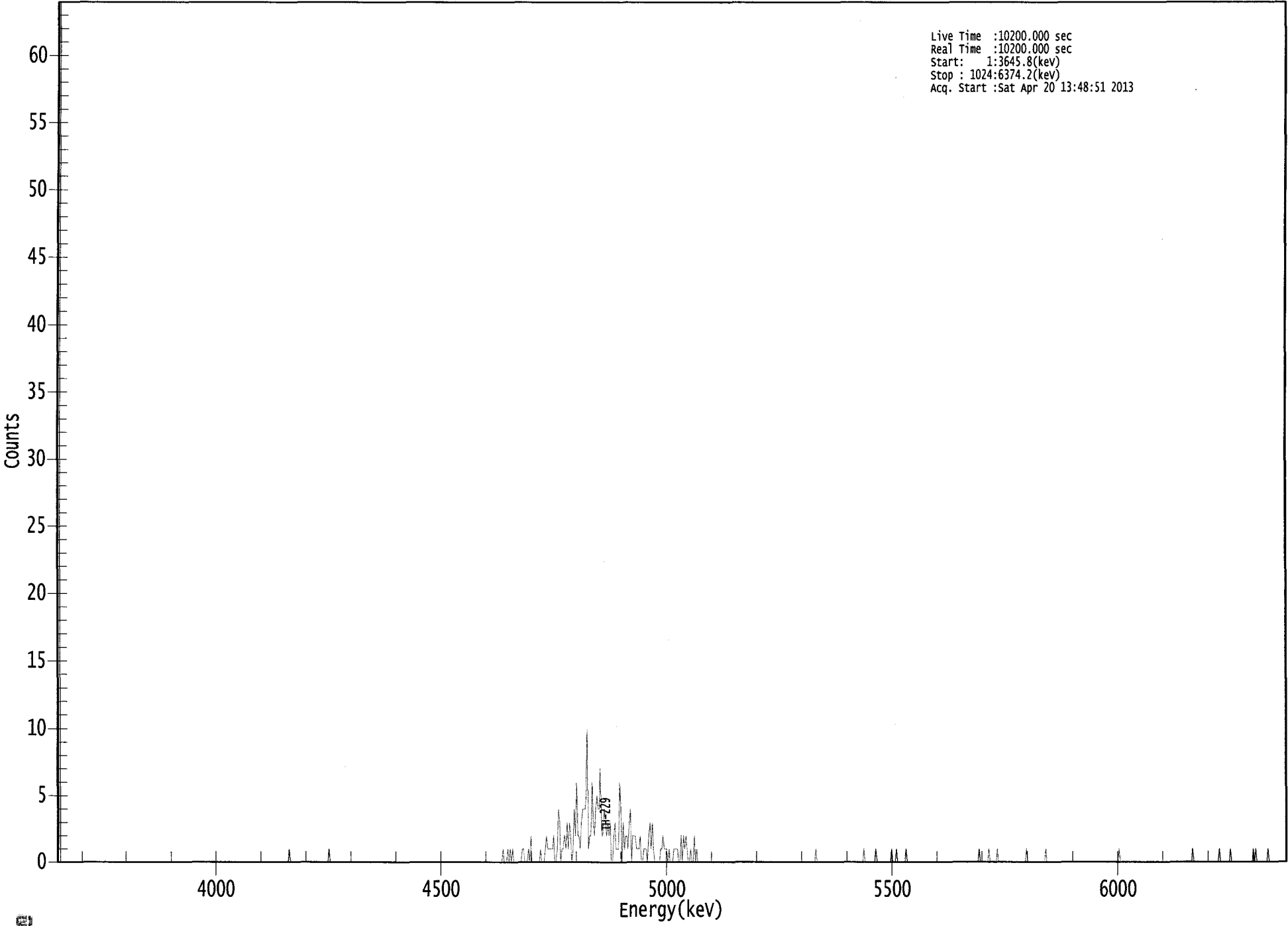
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.995	5850.00*	4.18E-002 +/- 4.94E-002	7.23E-002 +/- 1.05E-002
TH-228	0.999	5400.00*	-4.07E-003 +/- 3.26E-002	8.79E-002 +/- 1.28E-002
TH-229	1.000	4872.00*	2.39E+000 +/- 3.47E-001	6.77E-002 +/- 9.84E-003
TH-230	1.000	4672.00*	1.04E-001 +/- 6.83E-002	5.12E-002 +/- 7.44E-003
TH-232	0.987	3997.00*	-3.64E-003 +/- 2.16E-002	5.12E-002 +/- 7.43E-003

AG
 4/22/13

US EPA ARCHIVE DOCUMENT

000056021.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3645.8(kev)
Stop : 1024:6374.2(kev)
Acq. Start :Sat Apr 20 13:48:51 2013



0224

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: 02

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	0	0	0	0	0
9:	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0
193:	0	0	1	0	0	0	0
201:	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0
225:	0	0	0	1	0	0	0
233:	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0

369: 0 0 0 0 1 0 0 0

Sample Title: 02

Channel	1	2	3	4	5	6	7	8
377:	1	0	1	0	1	0	0	0
385:	0	0	0	0	1	1	0	0
393:	0	1	0	2	0	0	0	0
401:	0	0	0	1	0	0	0	1
409:	2	1	1	1	1	1	2	0
417:	0	1	4	3	0	1	1	2
425:	1	3	1	3	2	0	1	4
433:	2	6	2	2	1	3	4	4
441:	4	5	10	1	2	2	6	3
449:	2	4	5	4	4	7	2	2
457:	4	3	2	3	2	3	0	0
465:	2	3	1	1	1	6	4	0
473:	3	1	2	2	1	3	4	0
481:	2	2	2	1	1	1	2	0
489:	0	1	1	1	0	2	3	1
497:	3	1	0	0	0	0	0	1
505:	1	2	1	1	1	0	1	0
513:	0	0	1	1	1	1	0	0
521:	2	0	2	1	2	1	0	0
529:	1	0	0	2	0	1	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	1	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	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	1	0	0	0	0	0	0	0
681:	0	0	1	0	0	0	0	0
689:	0	0	0	0	0	0	0	1
697:	0	0	0	1	0	0	0	0
705:	0	0	0	1	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:	1	0	0	0	0	0	0	0
777:	1	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 1

Sample Title: 02

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	1
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	1	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	1	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	1
969:	0	0	0	0	0	0	0	0
977:	1	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	1	0	1	0	0
1001:	0	0	0	0	0	0	0	1
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



c
4/22/13

Sample Description: PZ-105-SS TOT-DUP
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 03
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_013
 Chamber Serial Number:
 Detector Serial Number: 13
 Env. Background: System Bkgd 55195
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:48:52 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.217 mL
 Effective Efficiency: 0.1852 +/- 0.0161
 Counting Efficiency: 0.1869 +/- 0.0035 on 12/15/2012 11:26:45 AM
 Chem. Recovery Factor: 0.9908 +/- 0.0878

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.816	4.94	115.81	3.06	0.00E+000	2.8
TH-228	5.334	-1.42	267.35	4.42	0.00E+000	2.8
TH-229 T	4.872	153.32	15.87	0.68	0.00E+000	4.5
TH-230	4.626	9.32	66.89	0.68	0.00E+000	2.8
TH-232	3.850	1.00	277.19	0.00	0.00E+000	2.8

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

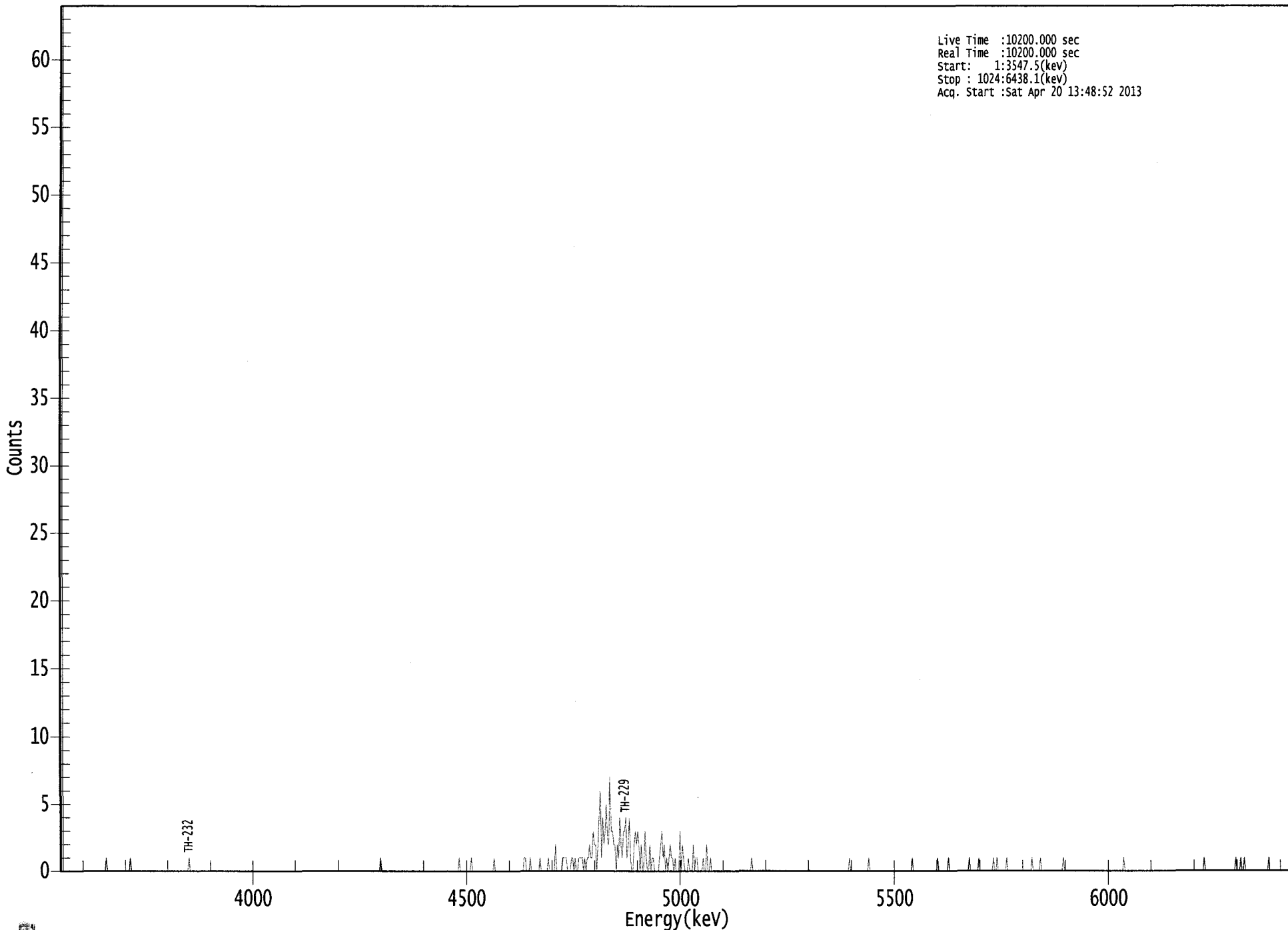
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.994	5850.00*	7.26E-002 +/- 8.50E-002	1.31E-001 +/- 2.23E-002
TH-228	0.978	5400.00*	-2.07E-002 +/- 5.54E-002	1.48E-001 +/- 2.52E-002
TH-229	1.000	4872.00*	2.20E+000 +/- 3.75E-001	8.11E-002 +/- 1.38E-002
TH-230	0.989	4672.00*	1.34E-001 +/- 9.22E-002	8.09E-002 +/- 1.37E-002
TH-232	0.893	3997.00*	1.43E-002 +/- 3.97E-002	8.58E-002 +/- 1.46E-002

AG
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US EPA ARCHIVE DOCUMENT

000056022.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3547.5(kev)
Stop : 1024:6438.1(kev)
Acq. Start :Sat Apr 20 13:48:52 2013



5220

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: 03

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	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	1	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
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	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	1	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:	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	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	1	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	1	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:	1	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0

Sample Title: 03

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	1	1	0	0	0	1	0
393:	0	0	0	0	0	0	1	0
401:	0	0	0	0	0	1	0	0
409:	0	0	0	2	0	0	0	0
417:	0	1	1	1	1	0	0	0
425:	1	1	0	1	0	0	1	1
433:	1	1	0	1	0	1	1	2
441:	1	1	3	2	2	0	2	4
449:	6	1	4	2	3	5	2	2
457:	7	3	3	2	2	0	2	1
465:	4	2	1	3	3	4	1	2
473:	4	1	0	0	2	3	2	3
481:	2	0	2	0	0	3	1	0
489:	0	2	0	1	1	0	0	0
497:	0	1	2	3	1	2	0	1
505:	0	1	2	1	1	0	1	0
513:	0	0	3	0	2	1	0	0
521:	0	1	0	0	0	2	0	1
529:	1	0	0	0	0	1	0	0
537:	2	0	0	1	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	1	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
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	0
649:	0	0	0	0	0	0	1	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	1	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	0	0
737:	1	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	1	0	0	0	0	0	0
761:	0	1	0	0	0	0	0	0
769:	0	0	0	0	0	1	0	0
777:	1	0	0	0	0	0	0	0
785:	1	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 1 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	1
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	1	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	1	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	1	0	0
977:	0	1	0	0	1	0	0	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



e
4/22/13

Sample Description: PZ-105-SS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 04
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_014
 Chamber Serial Number:
 Detector Serial Number: 14
 Env. Background: System Bkgd 55196
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:48:53 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.234 mL
 Effective Efficiency: 0.2315 +/- 0.0177
 Counting Efficiency: 0.1846 +/- 0.0034 on 12/15/2012 11:26:44 AM
 Chem. Recovery Factor: 1.2542 +/- 0.0987

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.858	0.28	1302.5	2.72	0.00E+000	2.9
TH-228	5.353	3.62	137.02	2.38	0.00E+000	2.9
TH-229 T	4.872	206.96	13.70	2.04	0.00E+000	10.0
TH-230	4.669	6.81	82.43	1.19	0.00E+000	2.9
TH-232	3.943	0.49	416.98	0.51	0.00E+000	2.9

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

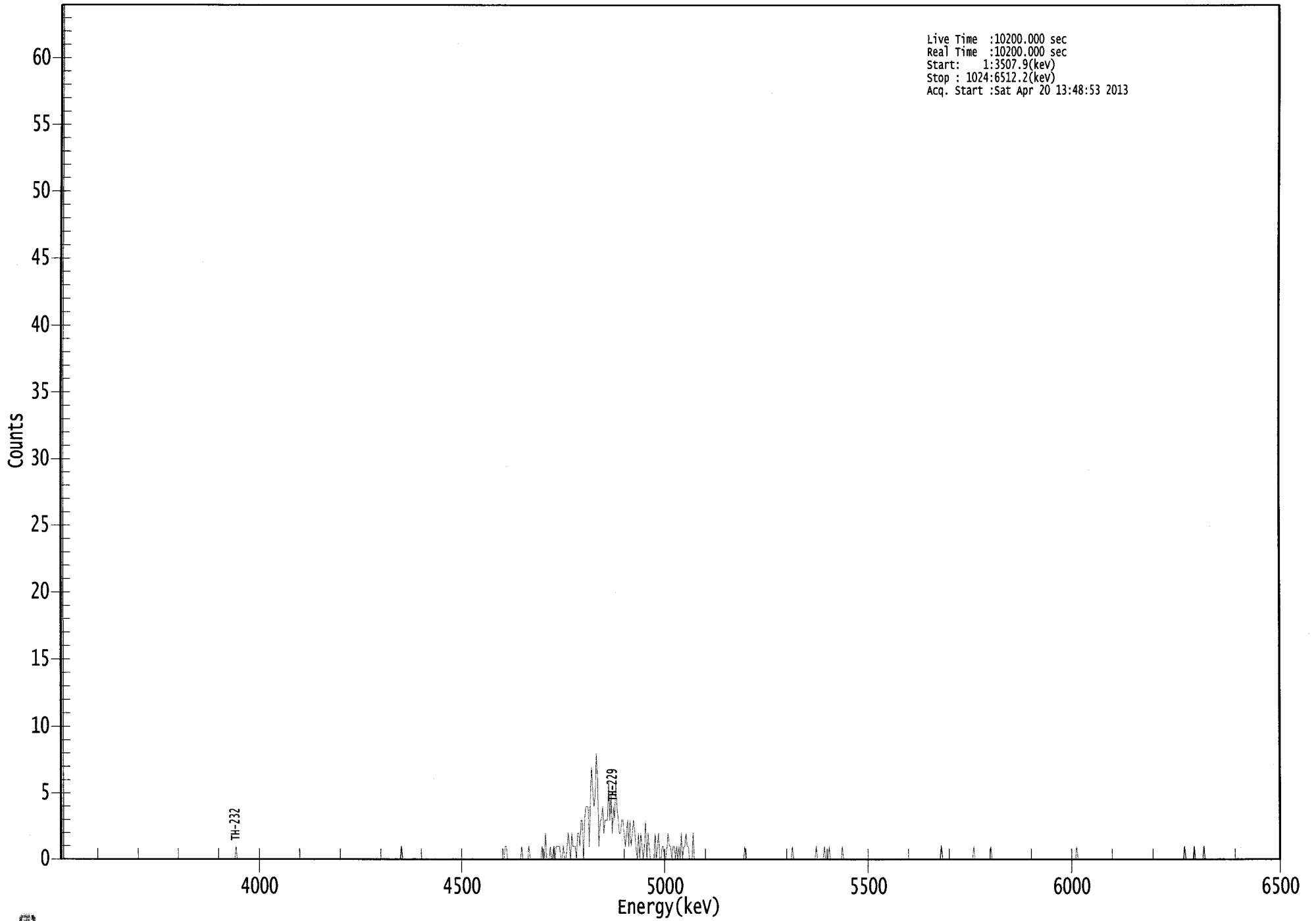
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	1.000	5850.00*	3.29E-003 +/- 4.29E-002	1.01E-001 +/- 1.51E-002
TH-228	0.989	5400.00*	4.21E-002 +/- 5.81E-002	9.54E-002 +/- 1.43E-002
TH-229	1.000	4872.00*	2.38E+000 +/- 3.57E-001	8.96E-002 +/- 1.34E-002
TH-230	1.000	4672.00*	7.81E-002 +/- 6.54E-002	7.55E-002 +/- 1.13E-002
TH-232	0.985	3997.00*	5.61E-003 +/- 2.34E-002	6.01E-002 +/- 9.00E-003

AG
4/22/13

US EPA ARCHIVE DOCUMENT

0000056023.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3507.9(kev)
Stop : 1024:6512.2(kev)
Acq. Start :Sat Apr 20 13:48:53 2013



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: 04

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	0	0	0	0	0
9:	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0
145:	0	0	0	0	1	0	0
153:	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	1
289:	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 1 1

Sample Title: 04

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	1	0	0	0
393:	0	0	1	0	0	0	0	0
401:	0	0	0	0	0	1	0	0
409:	2	0	0	0	1	0	0	1
417:	0	1	1	1	1	0	0	1
425:	0	0	1	2	1	0	2	1
433:	1	1	0	2	2	1	3	3
441:	0	3	4	4	4	1	5	7
449:	5	4	5	8	6	1	3	3
457:	4	2	3	3	3	6	3	5
465:	2	4	3	6	4	3	2	2
473:	3	3	2	1	2	3	1	3
481:	1	2	3	2	1	0	2	0
489:	2	1	0	1	3	0	2	1
497:	0	0	0	0	2	0	1	2
505:	0	0	1	1	0	0	1	2
513:	1	1	0	1	1	0	1	0
521:	1	0	2	0	1	1	2	1
529:	1	0	0	0	2	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	1
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	1
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	0	1	0	0	0	1	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	1	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	1
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	1	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	1	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	1
945:	0	0	0	0	0	0	0	1
953:	0	0	0	0	0	0	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	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



4/12/13

Sample Description: PZ-105-SS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 05
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_018
 Chamber Serial Number:
 Detector Serial Number: 18
 Env. Background: System Bkgd 55197
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:50:08 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.231 mL
 Effective Efficiency: 0.1900 +/- 0.0158
 Counting Efficiency: 0.1776 +/- 0.0033 on 12/15/2012 1:57:26 PM
 Chem. Recovery Factor: 1.0696 +/- 0.0914

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.755	0.47	626.93	1.53	0.00E+000	3.1
TH-228	5.299	0.62	583.31	2.38	0.00E+000	3.1
TH-229 T	4.870	167.98	15.18	1.02	0.00E+000	6.9
TH-230	4.629	17.32	48.17	0.68	0.00E+000	3.1
TH-232	4.016	2.15	161.66	0.85	0.00E+000	3.1

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

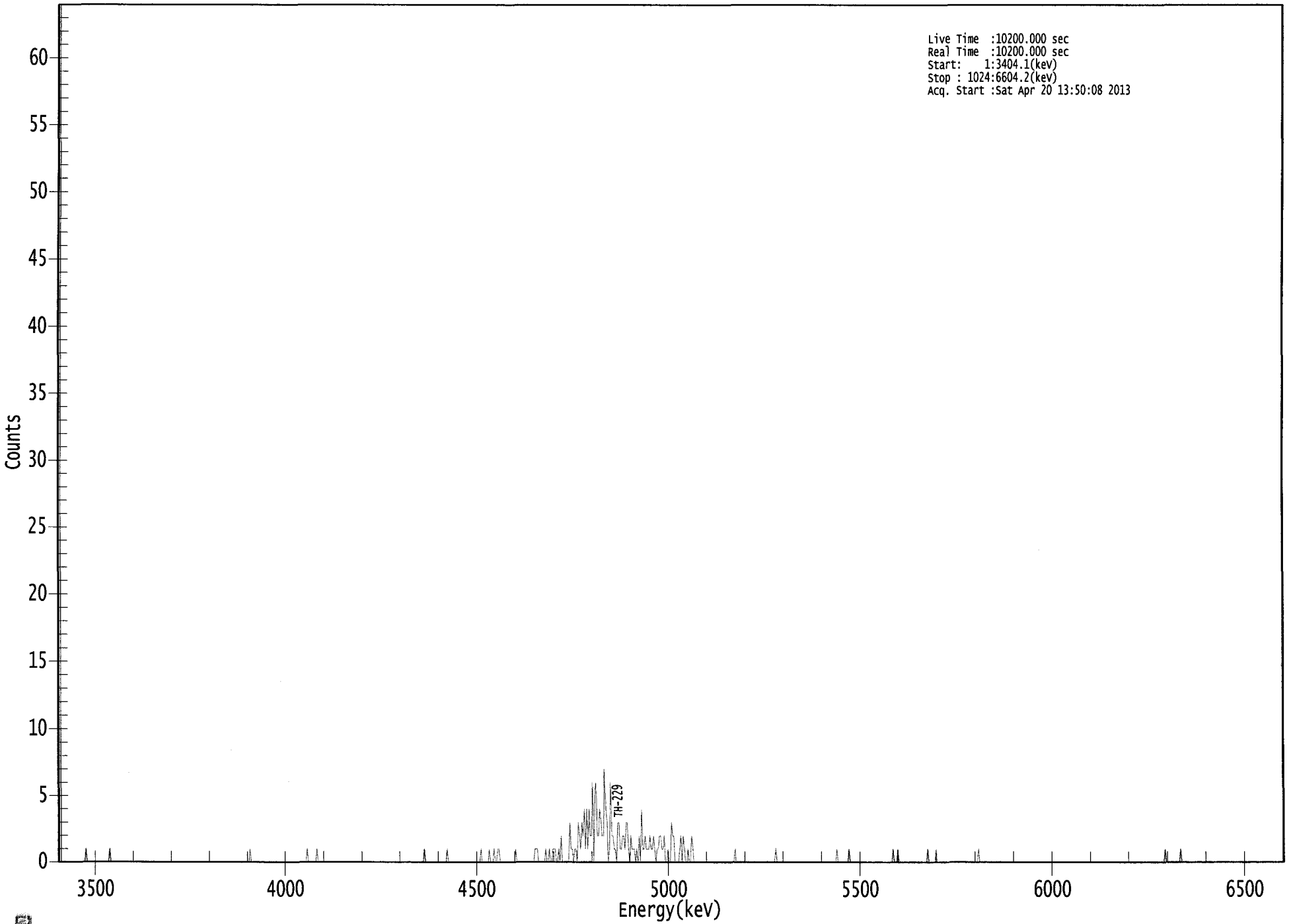
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.954	5850.00*	6.73E-003 +/- 4.22E-002	1.02E-001 +/- 1.66E-002
TH-228	0.948	5400.00*	8.79E-003 +/- 5.13E-002	1.16E-001 +/- 1.90E-002
TH-229	1.000	4872.00*	2.35E+000 +/- 3.85E-001	8.83E-002 +/- 1.44E-002
TH-230	0.991	4672.00*	2.42E-001 +/- 1.23E-001	7.88E-002 +/- 1.29E-002
TH-232	0.998	3997.00*	3.00E-002 +/- 4.87E-002	8.35E-002 +/- 1.36E-002

AG
 4/22/13

US EPA ARCHIVE DOCUMENT

000056026.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3404.1(kev)
Stop : 1024:6604.2(kev)
Acq. Start :Sat Apr 20 13:50:08 2013



5229

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: 05

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	1
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:	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	1	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	1	0	0	0	0	0	0
217:	0	1	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	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	1	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	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	1	0	0	0	0	0
361:	0	1	0	0	0	1	0	0

369: 1 1 0 0 0 0 0 0

Sample Title: 05

Channel	1	2	3	4	5	6	7	8
377:	0	0	0	0	0	0	0	1
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	1
401:	1	1	0	0	0	0	0	0
409:	1	0	0	1	0	0	1	1
417:	1	0	0	1	0	2	0	0
425:	0	0	0	0	3	1	1	0
433:	1	1	0	3	2	1	3	2
441:	4	1	4	1	4	2	2	6
449:	0	5	6	2	2	4	3	2
457:	2	7	4	3	0	1	6	2
465:	2	1	1	0	3	3	1	1
473:	2	2	1	3	3	1	0	2
481:	1	1	1	0	1	0	2	0
489:	4	1	1	2	1	1	1	2
497:	1	1	2	1	0	1	1	2
505:	2	1	1	2	0	0	1	0
513:	0	3	2	2	0	0	0	0
521:	1	2	0	2	1	0	0	1
529:	0	0	2	1	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	1	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	1	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
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	0
649:	0	0	0	1	0	0	0	0
657:	0	0	0	0	0	1	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	1	0	0	0	1	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	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	1	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: 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	1	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	1	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



Sample Description: S-10 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 06
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_022
 Chamber Serial Number:
 Detector Serial Number: 22
 Env. Background: System Bkgd 55198
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:50:09 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.233 mL
 Effective Efficiency: 0.1419 +/- 0.0135
 Counting Efficiency: 0.1531 +/- 0.0029 on 12/15/2012 1:57:26 PM
 Chem. Recovery Factor: 0.9266 +/- 0.0898

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.792	4.45	120.09	2.55	0.00E+000	3.1
TH-228	5.315	1.60	289.38	3.40	0.00E+000	3.1
TH-229 T	4.847	126.13	17.60	1.87	0.00E+000	3.3
TH-230	4.590	14.15	53.91	0.85	0.00E+000	7.8
TH-232	3.954	6.49	80.40	0.51	0.00E+000	3.1

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

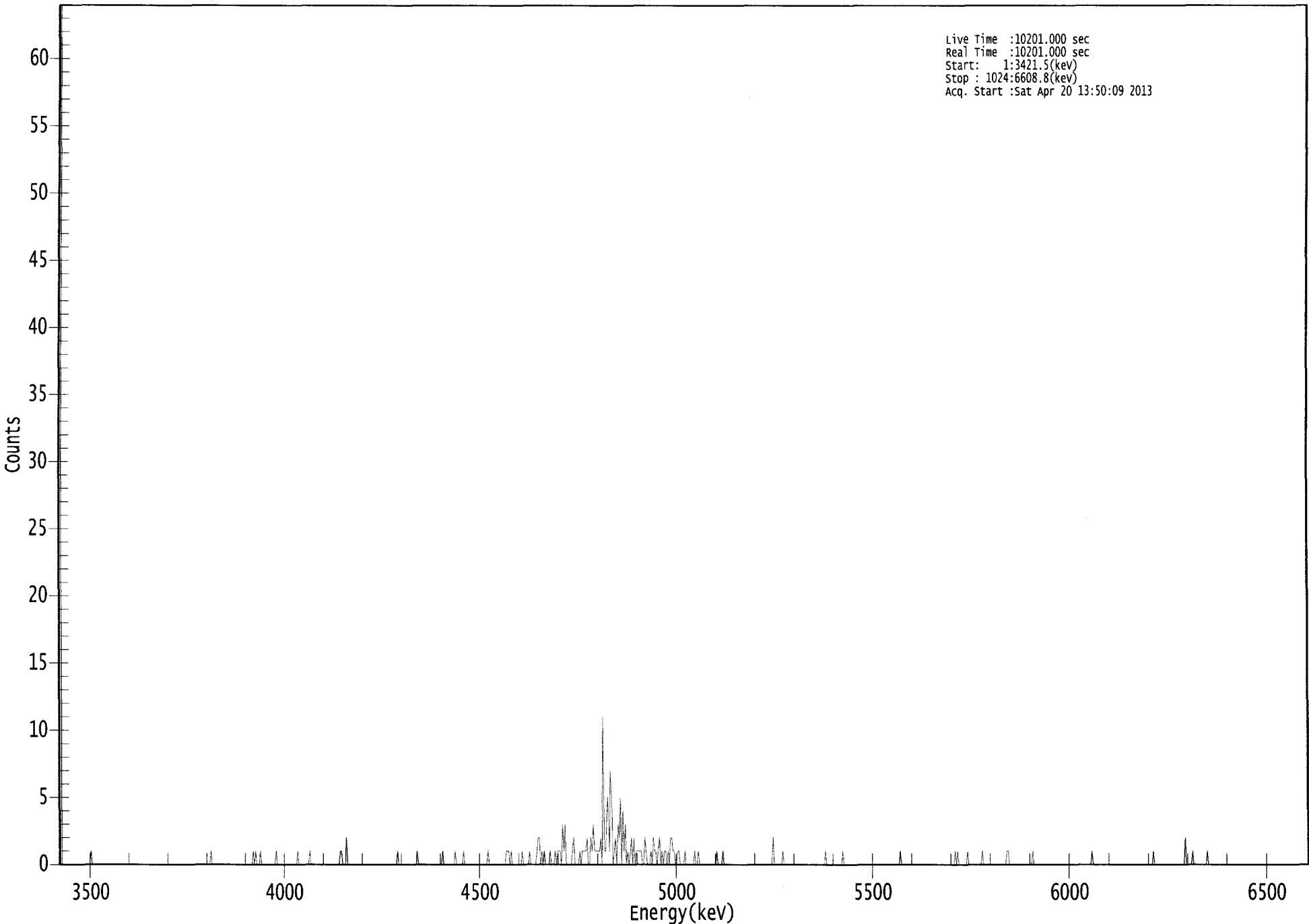
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.983	5850.00*	8.53E-002 +/- 1.04E-001	1.61E-001 +/- 3.00E-002
TH-228	0.963	5400.00*	3.04E-002 +/- 8.81E-002	1.76E-001 +/- 3.28E-002
TH-229	0.997	4872.00*	2.37E+000 +/- 4.41E-001	1.42E-001 +/- 2.65E-002
TH-230	0.966	4672.00*	2.65E-001 +/- 1.51E-001	1.12E-001 +/- 2.09E-002
TH-232	0.990	3997.00*	1.21E-001 +/- 1.00E-001	9.80E-002 +/- 1.82E-002

AG
 4/22/13

US EPA ARCHIVE DOCUMENT

000056096.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3421.5(keV)
Stop : 1024:6608.8(keV)
Acq. Start :Sat Apr 20 13:50:09 2013



0214
1970
ROI Type: 1

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

Sample Title: 06

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	1	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	1	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:	1	0	1	0	0	0	1	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	1	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	1	0	0
201:	0	0	0	0	0	0	0	1
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	2	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	1
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	1
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	1	0
329:	0	0	0	0	0	1	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: 1 1 1 0 1 0 0 0

Sample Title: 06

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

801: 0 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	1	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:	1	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	2	0	0	0	0	0
929:	1	0	0	0	0	0	0	0
937:	0	0	0	0	1	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



Sample Description: S-10 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 07
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_024
 Chamber Serial Number:
 Detector Serial Number: 24
 Env. Background: System Bkgd 55199
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:50:10 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.231 mL
 Effective Efficiency: 0.1146 +/- 0.0121
 Counting Efficiency: 0.1710 +/- 0.0032 on 12/15/2012 2:02:15 PM
 Chem. Recovery Factor: 0.6700 +/- 0.0716

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.772	2.47	163.78	1.53	0.00E+000	3.1
TH-228	5.348	2.11	217.68	2.89	0.00E+000	3.1
TH-229 T	4.826	101.13	19.70	1.87	0.00E+000	4.5
TH-230	4.563	4.47	109.71	1.53	0.00E+000	3.1
TH-232	3.832	0.49	416.98	0.51	0.00E+000	3.1

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

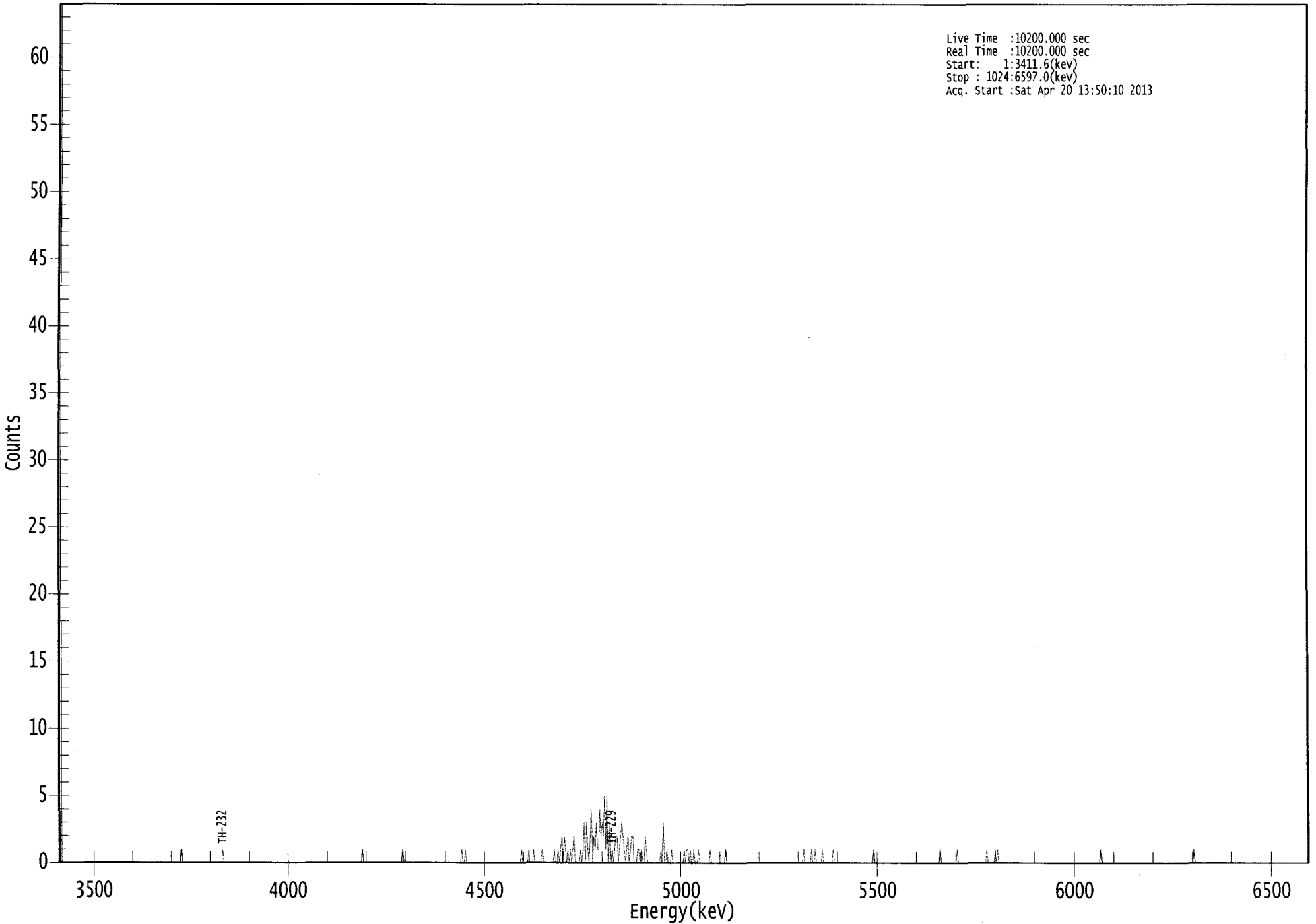
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.969	5850.00*	5.87E-002 +/- 9.68E-002	1.69E-001 +/- 3.48E-002
TH-228	0.986	5400.00*	4.96E-002 +/- 1.08E-001	2.06E-001 +/- 4.24E-002
TH-229	0.989	4872.00*	2.35E+000 +/- 4.84E-001	1.76E-001 +/- 3.63E-002
TH-230	0.939	4672.00*	1.04E-001 +/- 1.16E-001	1.65E-001 +/- 3.39E-002
TH-232	0.867	3997.00*	1.13E-002 +/- 4.73E-002	1.21E-001 +/- 2.50E-002

AG
 4/22/13

US EPA ARCHIVE DOCUMENT

000056097.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3411.6(kev)
Stop : 1024:6597.0(kev)
Acq. Start :Sat Apr 20 13:50:10 2013



6.920
ROI Type: 1

 ***** 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:	10200	10200	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	1	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	1
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:	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	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	1	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	1	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	1	0	0	1	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 0

Sample Title: 07

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	1	0	0	0
385:	0	0	1	0	0	0	1	0
393:	0	0	0	0	0	1	0	0
401:	0	0	0	0	0	0	0	1
409:	0	0	1	0	1	2	0	2
417:	1	0	1	0	1	0	1	2
425:	0	0	0	0	1	0	1	3
433:	0	3	1	0	2	4	0	2
441:	1	3	1	1	4	2	3	2
449:	5	1	5	0	3	0	1	0
457:	1	2	2	0	1	2	3	2
465:	1	0	1	2	0	1	2	2
473:	0	0	0	1	1	0	1	0
481:	0	2	1	0	0	0	0	0
489:	0	0	0	0	0	0	1	0
497:	3	0	0	1	0	0	0	1
505:	0	0	0	0	0	0	0	0
513:	0	1	0	1	1	0	1	0
521:	0	1	0	0	0	1	0	0
529:	0	0	0	0	0	0	1	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	1	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	1	0	0	0	0
617:	0	1	0	0	1	0	0	0
625:	0	0	1	0	0	0	0	0
633:	0	0	0	1	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	0	0	0	0	0	0
665:	0	0	0	0	1	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	1	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	1	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:	1	0	0	0	0	0	0	1
769:	0	1	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	1	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	1	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™

4/22/13

Sample Description: LR-104 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 08
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_025
 Chamber Serial Number:
 Detector Serial Number: 25
 Env. Background: System Bkgd 55200
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:50:11 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1897 +/- 0.0158
 Counting Efficiency: 0.1736 +/- 0.0032 on 12/15/2012 1:57:27 PM
 Chem. Recovery Factor: 1.0930 +/- 0.0933

Peak Match Tolerance: 0.175 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.786	3.81	117.33	1.19	0.00E+000	3.1
TH-228	5.337	5.81	90.53	1.19	0.00E+000	3.1
TH-229 T	4.868	168.15	15.16	0.85	0.00E+000	8.1
TH-230	4.625	11.15	61.26	0.85	0.00E+000	3.1
TH-232	3.963	3.66	107.87	0.34	0.00E+000	3.1

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

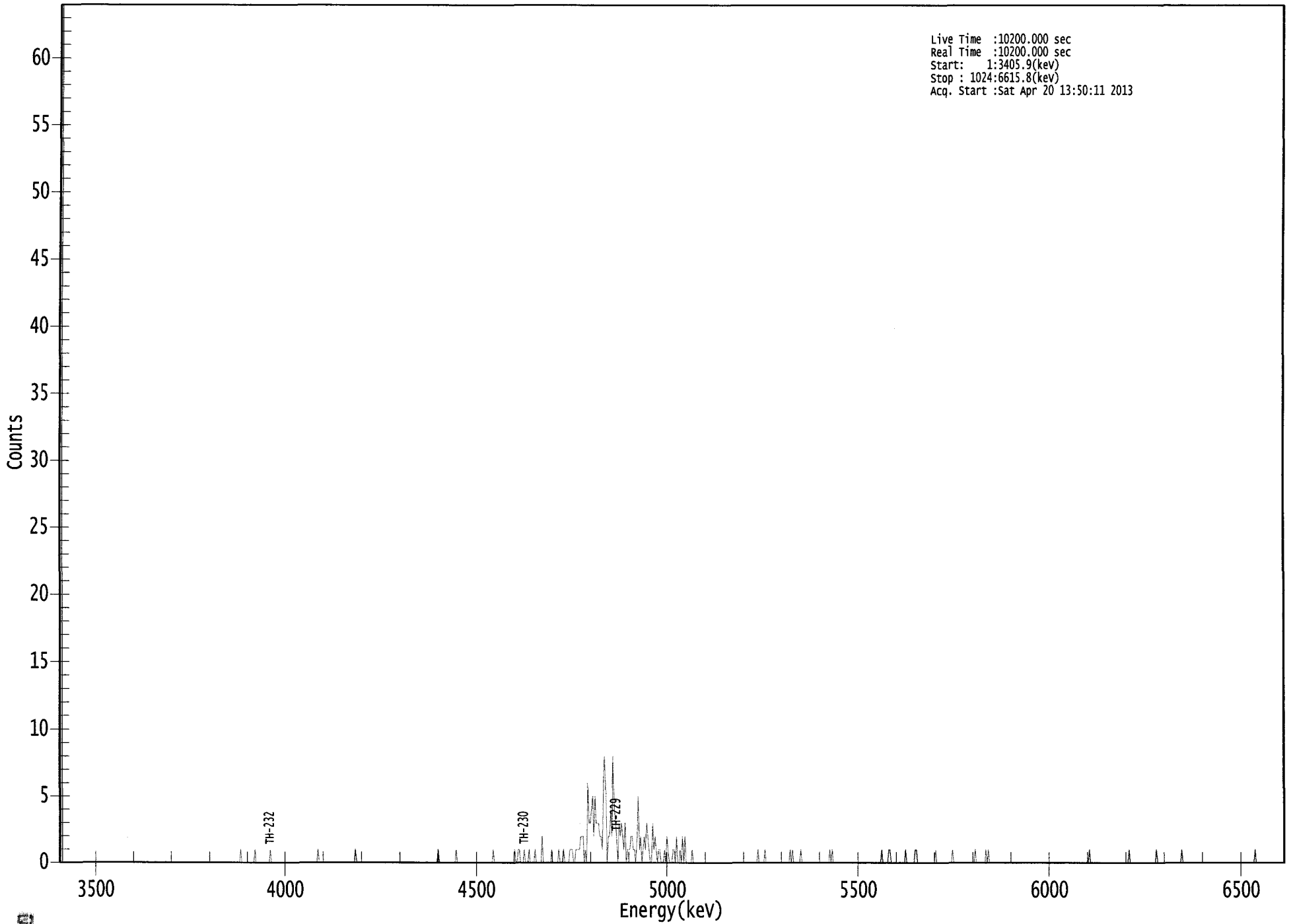
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.979	5850.00*	5.47E-002 +/- 6.48E-002	9.45E-002 +/- 1.54E-002
TH-228	0.979	5400.00*	8.25E-002 +/- 7.59E-002	9.36E-002 +/- 1.53E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 3.85E-001	8.40E-002 +/- 1.37E-002
TH-230	0.989	4672.00*	1.56E-001 +/- 9.89E-002	8.38E-002 +/- 1.37E-002
TH-232	0.994	3997.00*	5.11E-002 +/- 5.58E-002	6.68E-002 +/- 1.09E-002

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US EPA ARCHIVE DOCUMENT

0000056029.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3405.9(kev)
Stop : 1024:6615.8(kev)
Acq. Start :Sat Apr 20 13:50:11 2013



ROI Type: 1

ROI Type: 3

0254

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

Sample Title: 08

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	0	0	0	0	0
9:	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0
153:	1	0	0	0	0	0	0
161:	0	0	0	0	1	0	0
169:	0	0	0	0	0	0	0
177:	0	1	0	0	0	0	0
185:	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0
217:	0	1	0	0	0	0	0
225:	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0
249:	1	0	0	0	0	0	0
257:	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0
313:	0	0	0	0	0	1	0
321:	0	0	0	0	0	0	0
329:	0	0	0	0	1	0	0
337:	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0
361:	0	0	0	1	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 08

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	1	0	0
385:	1	1	0	0	0	1	0	0
393:	0	1	0	0	0	0	1	0
401:	0	0	0	0	2	0	0	0
409:	0	0	0	0	1	0	0	0
417:	0	0	1	0	0	0	1	0
425:	0	0	0	1	1	1	0	0
433:	1	1	1	1	2	2	2	0
441:	1	0	6	3	3	4	5	2
449:	5	3	3	3	2	2	1	5
457:	8	6	0	2	2	4	2	8
465:	4	3	2	0	3	2	3	2
473:	1	3	0	1	1	1	2	2
481:	1	1	0	2	5	1	2	0
489:	1	2	1	3	2	1	0	0
497:	3	1	2	1	0	1	1	0
505:	0	0	1	0	2	1	0	0
513:	0	1	1	0	2	0	0	1
521:	0	2	0	2	0	0	0	0
529:	0	1	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	1	0	0	0	0	0	1	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	1	0	1	0	0
617:	0	0	0	0	1	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	1	0	1	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	1
689:	0	0	0	0	0	1	1	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	1	0	0	0	0
713:	0	0	0	1	1	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	1	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	1	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	1	0
777:	1	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: 08

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	1	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	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	1	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	1	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	1	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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Sample Description: LR-104 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 09
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_027
 Chamber Serial Number:
 Detector Serial Number: 27
 Env. Background: System Bkgd 55201
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:50:12 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1671 +/- 0.0147
 Counting Efficiency: 0.1728 +/- 0.0032 on 12/15/2012 2:27:41 PM
 Chem. Recovery Factor: 0.9670 +/- 0.0871

Peak Match Tolerance: 0.175 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.869	1.81	193.78	1.19	0.00E+000	3.2
TH-228	5.366	2.13	191.21	1.87	0.00E+000	3.2
TH-229 T	4.875	148.15	16.16	0.85	0.00E+000	6.8
TH-230	4.640	3.81	117.33	1.19	0.00E+000	3.2
TH-232	3.924	-0.36	604.15	1.36	0.00E+000	3.2

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

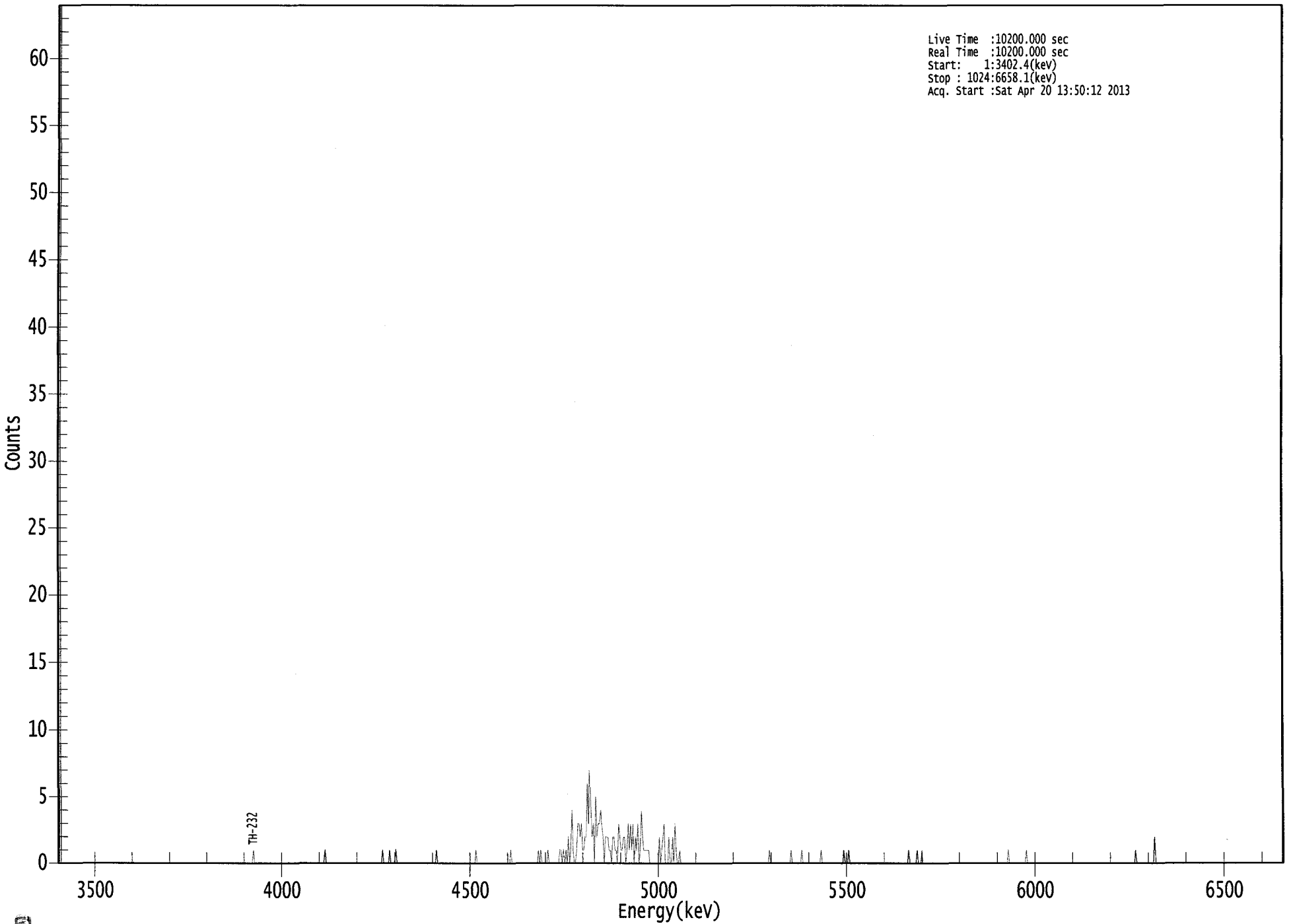
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.998	5850.00*	2.95E-002 +/- 5.74E-002	1.07E-001 +/- 1.85E-002
TH-228	0.994	5400.00*	3.44E-002 +/- 6.60E-002	1.22E-001 +/- 2.11E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 4.08E-001	9.54E-002 +/- 1.65E-002
TH-230	0.995	4672.00*	6.05E-002 +/- 7.18E-002	1.05E-001 +/- 1.81E-002
TH-232	0.973	3997.00*	-5.71E-003 +/- 3.45E-002	1.09E-001 +/- 1.88E-002

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US EPA ARCHIVE DOCUMENT

0000056030.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3402.4(kev)
Stop : 1024:6658.1(kev)
Acq. Start :Sat Apr 20 13:50:12 2013



0259

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: 09

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	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	1	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:	1	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:	1	0	0	0	0	0	1	0
281:	0	0	0	1	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	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	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: 09

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	1	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	1	0	1	0	0	0
409:	0	0	1	0	0	0	0	0
417:	0	0	0	0	1	1	0	1
425:	0	1	0	2	0	1	4	1
433:	0	0	1	3	3	2	3	1
441:	1	2	2	6	3	7	4	2
449:	3	0	5	2	3	3	4	3
457:	2	0	2	2	2	1	1	0
465:	2	2	1	1	0	3	2	1
473:	1	2	2	0	1	3	1	3
481:	1	3	0	2	1	3	0	1
489:	4	2	1	1	1	1	1	0
497:	0	0	0	0	0	0	0	2
505:	0	1	2	3	0	0	0	2
513:	0	0	2	0	3	1	0	0
521:	1	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	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	1	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	1	0	0
617:	0	0	0	0	0	0	1	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	1	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	1	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	1
713:	0	0	0	0	0	0	1	0
721:	0	0	1	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	1	0	0	0	0	0

801: 0 0 0 0 0 0 0 0

Sample Title: 09

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	1	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	1	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	2	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



4/22/13

Sample Description: DUP 01 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 10
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_029
 Chamber Serial Number:
 Detector Serial Number: 29
 Env. Background: System Bkgd 55202
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 1:50:13 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1451 +/- 0.0136
 Counting Efficiency: 0.1945 +/- 0.0036 on 12/15/2012 2:30:02 PM
 Chem. Recovery Factor: 0.7458 +/- 0.0711

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.827	4.15	107.12	0.85	0.00E+000	3.1
TH-228	5.349	4.47	109.71	1.53	0.00E+000	3.1
TH-229 T	4.876	128.66	17.31	0.34	0.00E+000	5.2
TH-230	4.649	10.32	63.32	0.68	0.00E+000	3.1
TH-232	3.897	2.49	138.29	0.51	0.00E+000	3.1

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

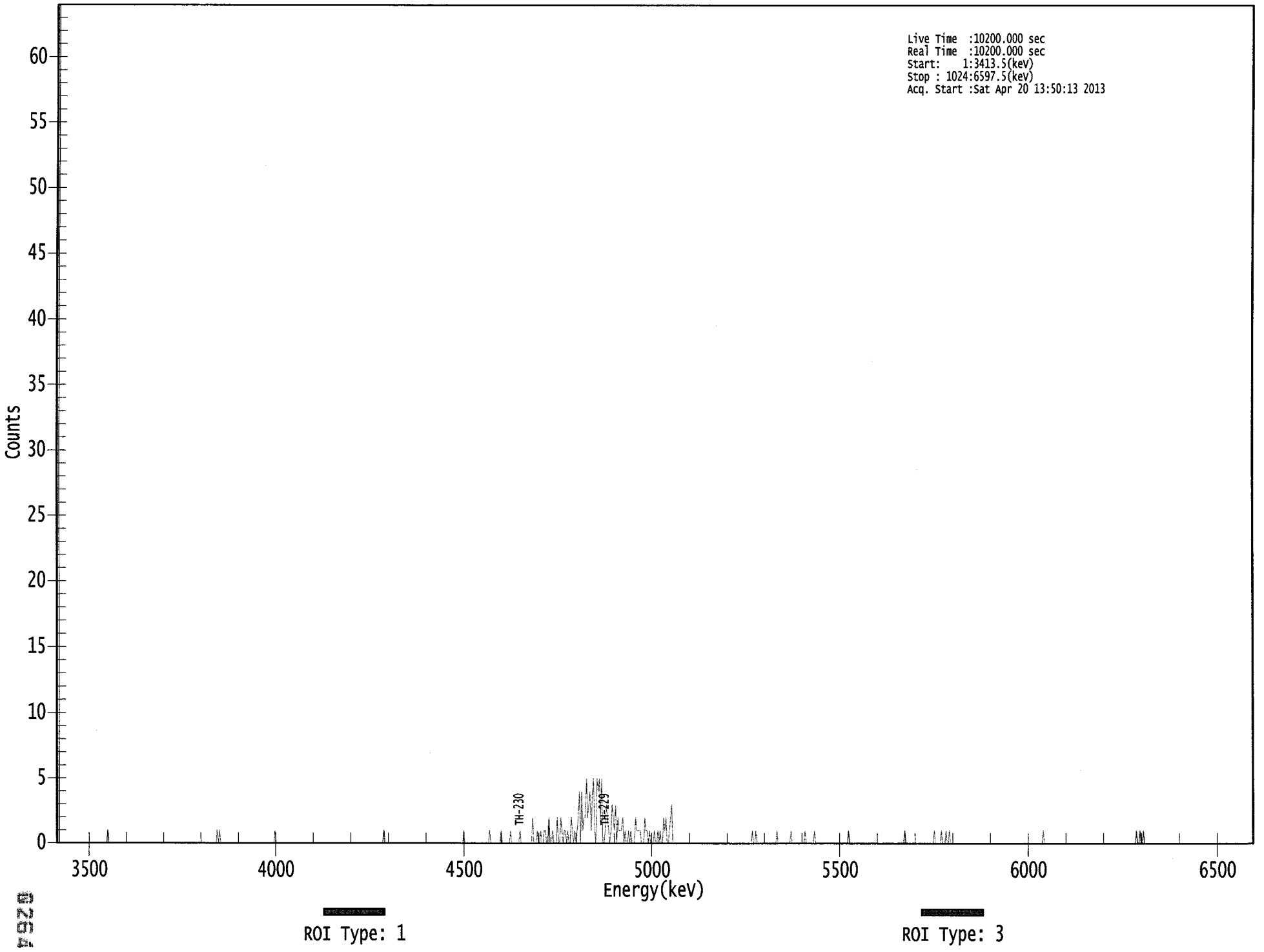
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.997	5850.00*	7.78E-002 +/- 8.46E-002	1.12E-001 +/- 2.06E-002
TH-228	0.986	5400.00*	8.30E-002 +/- 9.23E-002	1.32E-001 +/- 2.42E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 4.33E-001	8.77E-002 +/- 1.61E-002
TH-230	0.997	4672.00*	1.89E-001 +/- 1.24E-001	1.03E-001 +/- 1.89E-002
TH-232	0.949	3997.00*	4.55E-002 +/- 6.34E-002	9.58E-002 +/- 1.76E-002

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US EPA ARCHIVE DOCUMENT

000056031.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3413.5(kev)
Stop : 1024:6597.5(kev)
Acq. Start :Sat Apr 20 13:50:13 2013



 ***** 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:	10200	10200	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	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	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	0	1	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	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	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	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	1	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	1	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369: 0 0 0 1 0 0 0 0

Sample Title: 10

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	1	0	0
385:	0	0	0	0	0	1	0	0
393:	0	0	0	0	0	1	0	0
401:	0	0	0	0	0	0	0	0
409:	2	0	0	0	1	0	0	1
417:	0	0	1	1	0	0	2	0
425:	0	1	0	0	0	2	0	0
433:	2	1	0	1	1	0	1	0
441:	0	2	1	0	1	0	1	2
449:	4	0	4	1	2	2	5	2
457:	3	4	1	4	5	1	0	5
465:	4	5	2	5	0	0	1	3
473:	2	1	0	1	3	2	1	3
481:	0	2	1	1	1	2	0	1
489:	0	0	1	0	1	0	0	0
497:	2	1	1	1	1	0	0	0
505:	2	1	1	0	1	0	0	0
513:	1	0	0	1	0	1	0	0
521:	2	1	2	0	0	1	2	3
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	1	0	0	1
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	1	0	0	0	0	0	0
625:	0	0	0	0	0	1	0	0
633:	0	0	0	0	0	0	0	0
641:	0	1	0	0	0	0	0	0
649:	0	1	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	1	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	0	0	0	0	0	1
753:	0	0	0	0	0	1	0	0
761:	0	1	0	0	1	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	1	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	1	0	0	1	0
929:	0	1	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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4/20/13

Sample Description: DUP 01 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 11
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_041
 Chamber Serial Number: 05026930A
 Detector Serial Number: 91087
 Env. Background: System Bkgd 55211
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 2:11:33 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.229 mL
 Effective Efficiency: 0.2003 +/- 0.0164
 Counting Efficiency: 0.1978 +/- 0.0034 on 12/16/2012 5:49:31 PM
 Chem. Recovery Factor: 1.0124 +/- 0.0846

Peak Match Tolerance: 0.175 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.766	-0.19	1131.1	1.19	0.00E+000	3.0
TH-228	5.280	0.49	416.98	0.51	0.00E+000	3.0
TH-229 T	4.873	175.49	14.82	0.51	0.00E+000	9.0
TH-230	4.650	7.81	76.13	1.19	0.00E+000	3.0
TH-232	3.948	-2.89	82.82	2.89	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

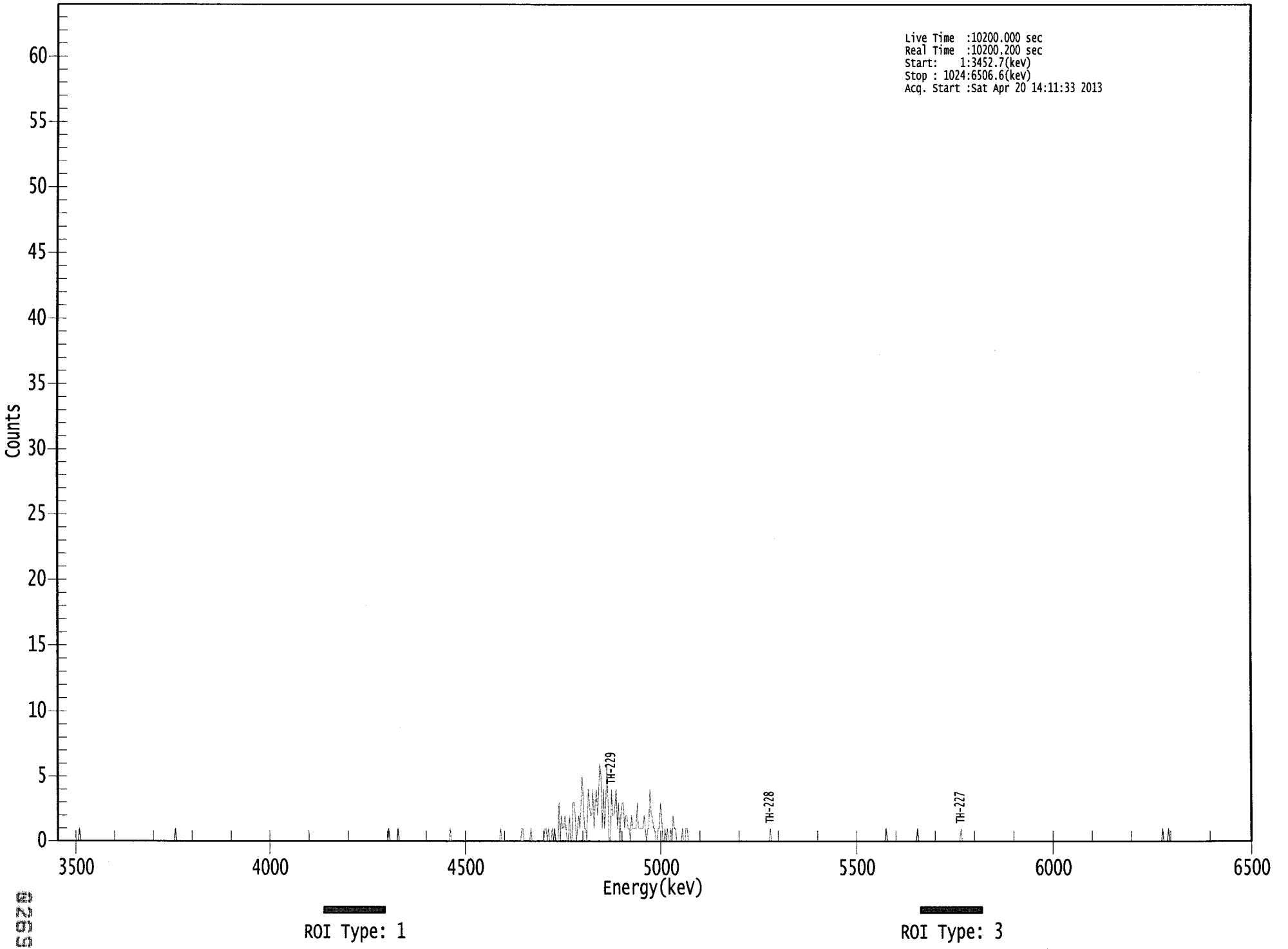
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.964	5850.00*	-2.58E-003 +/- 2.92E-002	8.95E-002 +/- 1.43E-002
TH-228	0.927	5400.00*	6.59E-003 +/- 2.75E-002	7.06E-002 +/- 1.13E-002
TH-229	1.000	4872.00*	2.33E+000 +/- 3.74E-001	6.98E-002 +/- 1.12E-002
TH-230	0.998	4672.00*	1.04E-001 +/- 8.05E-002	8.73E-002 +/- 1.40E-002
TH-232	0.988	3997.00*	-3.82E-002 +/- 3.22E-002	1.16E-001 +/- 1.86E-002

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US EPA ARCHIVE DOCUMENT

000056035.CNF

Live Time :10200.000 sec
Real Time :10200.200 sec
Start: 1:3452.7(kev)
Stop : 1024:6506.6(kev)
Acq. Start :Sat Apr 20 14:11:33 2013



 ***** 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	1	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	1	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	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	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	1	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	0	0
337:	0	0	1	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: 11

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	1	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	1
401:	1	0	0	0	0	0	0	1
409:	0	0	0	0	0	0	0	0
417:	0	0	0	1	1	0	1	0
425:	0	1	0	1	0	0	0	3
433:	0	2	1	1	2	1	0	0
441:	2	0	0	3	3	2	0	1
449:	2	1	3	5	3	1	1	0
457:	4	3	2	2	4	1	3	4
465:	2	4	6	5	1	4	1	3
473:	6	3	0	0	4	2	2	3
481:	4	1	3	0	2	3	3	1
489:	2	2	1	1	0	2	1	1
497:	1	1	3	1	1	1	1	1
505:	2	1	0	1	1	4	2	2
513:	1	1	0	0	1	1	3	2
521:	0	0	1	0	1	0	0	1
529:	0	2	1	1	0	0	0	0
537:	0	1	0	0	1	1	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	1	0	0	0
617:	0	0	0	0	0	0	0	0
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	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	1
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	1	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	1
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: 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	1	0	0	0	0
953:	1	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



Handwritten scribble

Sample Description: DUP 02 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 12
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_042
 Chamber Serial Number: 05026930B
 Detector Serial Number: 84185
 Env. Background: System Bkgd 55212
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 2:11:34 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.233 mL
 Effective Efficiency: 0.1040 +/- 0.0113
 Counting Efficiency: 0.1846 +/- 0.0032 on 12/16/2012 5:49:29 PM
 Chem. Recovery Factor: 0.5632 +/- 0.0621

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.904	1.66	169.38	0.34	0.00E+000	3.0
TH-228	5.342	3.98	112.01	1.02	0.00E+000	3.0
TH-229 T	4.868	92.49	20.45	0.51	0.00E+000	5.0
TH-230	4.655	6.83	76.08	0.17	0.00E+000	3.0
TH-232	3.920	2.66	128.85	0.34	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

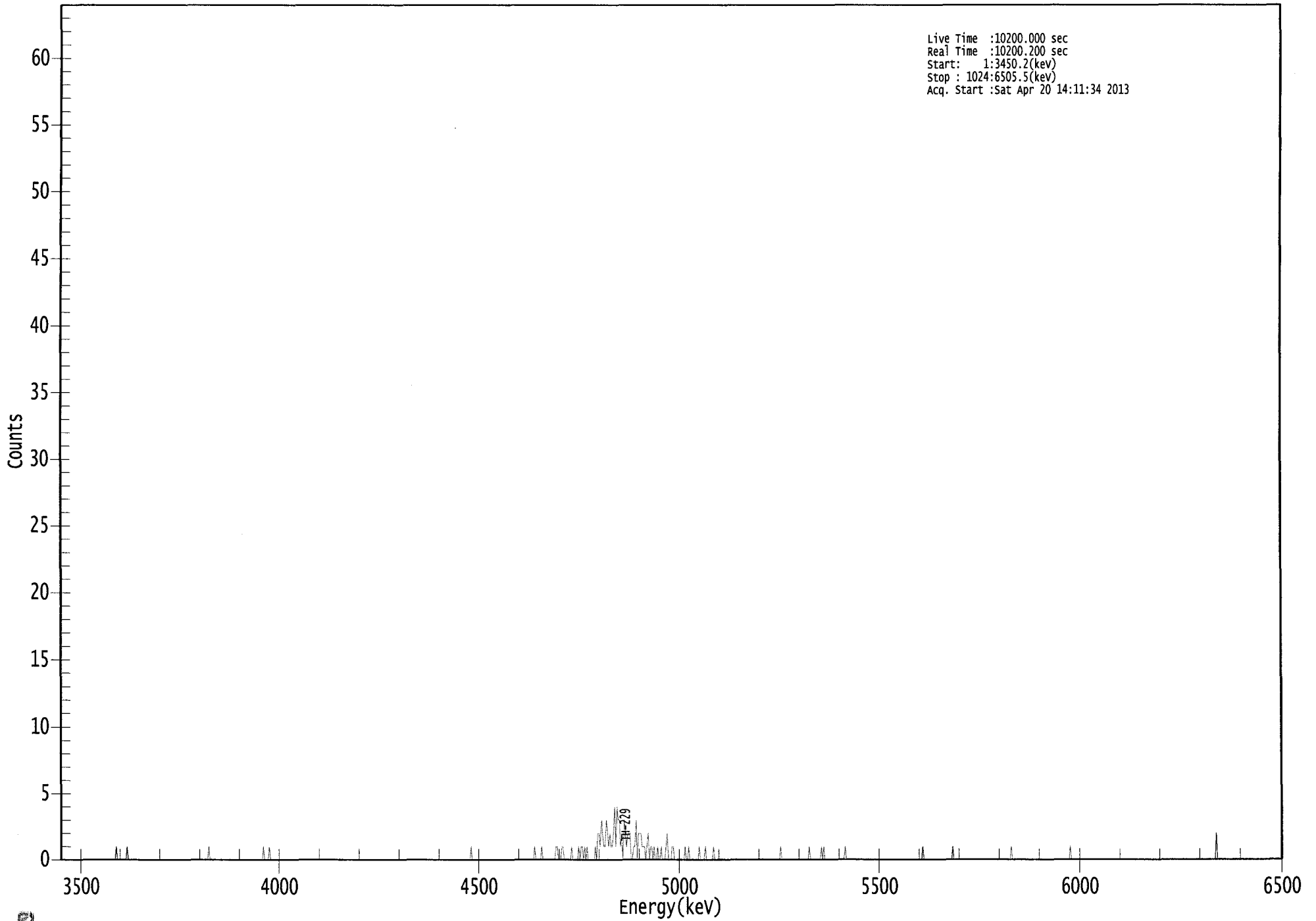
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.985	5850.00*	4.34E-002 +/- 7.42E-002	1.25E-001 +/- 2.67E-002
TH-228	0.983	5400.00*	1.03E-001 +/- 1.18E-001	1.63E-001 +/- 3.48E-002
TH-229	1.000	4872.00*	2.37E+000 +/- 5.05E-001	1.34E-001 +/- 2.87E-002
TH-230	0.998	4672.00*	1.74E-001 +/- 1.38E-001	1.07E-001 +/- 2.27E-002
TH-232	0.970	3997.00*	6.78E-002 +/- 8.85E-002	1.22E-001 +/- 2.60E-002

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US EPA ARCHIVE DOCUMENT

0000056034.CNF

Live Time :10200.000 sec
Real Time :10200.200 sec
Start: 1:3450.2(kev)
Stop : 1024:6505.5(kev)
Acq. Start :Sat Apr 20 14:11:34 2013



ROI Type: 1

ROI Type: 3

0274

***** 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	1
49:	0	0	0	0	0	0	0	0
57:	1	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	1	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	1	0	0	0	0
177:	1	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	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	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	1	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 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	1	0
401:	0	0	0	0	1	0	0	0
409:	0	0	0	0	0	0	0	0
417:	1	1	0	0	0	1	1	0
425:	0	0	0	0	0	1	0	0
433:	0	0	0	1	0	1	1	0
441:	1	0	1	0	0	0	0	0
449:	0	1	0	2	2	1	3	2
457:	1	1	3	2	1	2	1	1
465:	2	4	1	4	3	3	1	2
473:	0	3	2	1	2	2	2	0
481:	0	1	1	3	0	2	2	2
489:	1	1	1	0	1	2	0	1
497:	1	0	1	0	0	1	0	0
505:	1	0	0	0	1	2	0	0
513:	0	1	1	0	0	0	0	0
521:	0	0	0	0	1	0	0	1
529:	0	0	0	0	0	0	0	0
537:	1	0	0	0	0	1	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	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	1	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	1	0	0	0
633:	0	0	0	0	0	0	1	0
641:	1	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	1	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	1	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	1	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	1	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:	2	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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4/22/13

Sample Description: DUP 02 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 13
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_044
 Chamber Serial Number: 04026481B
 Detector Serial Number: 84168
 Env. Background: System Bkgd 55214
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 2:11:30 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1802 +/- 0.0153
 Counting Efficiency: 0.1902 +/- 0.0033 on 12/16/2012 5:49:26 PM
 Chem. Recovery Factor: 0.9478 +/- 0.0822

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.841	0.49	416.98	0.51	0.00E+000	3.0
TH-228	5.242	0.83	239.53	0.17	0.00E+000	3.0
TH-229 T	4.864	159.83	15.51	0.17	0.00E+000	4.8
TH-230	4.696	10.00	65.01	0.00	0.00E+000	3.0
TH-232	3.947	0.00	1960.0	0.00	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

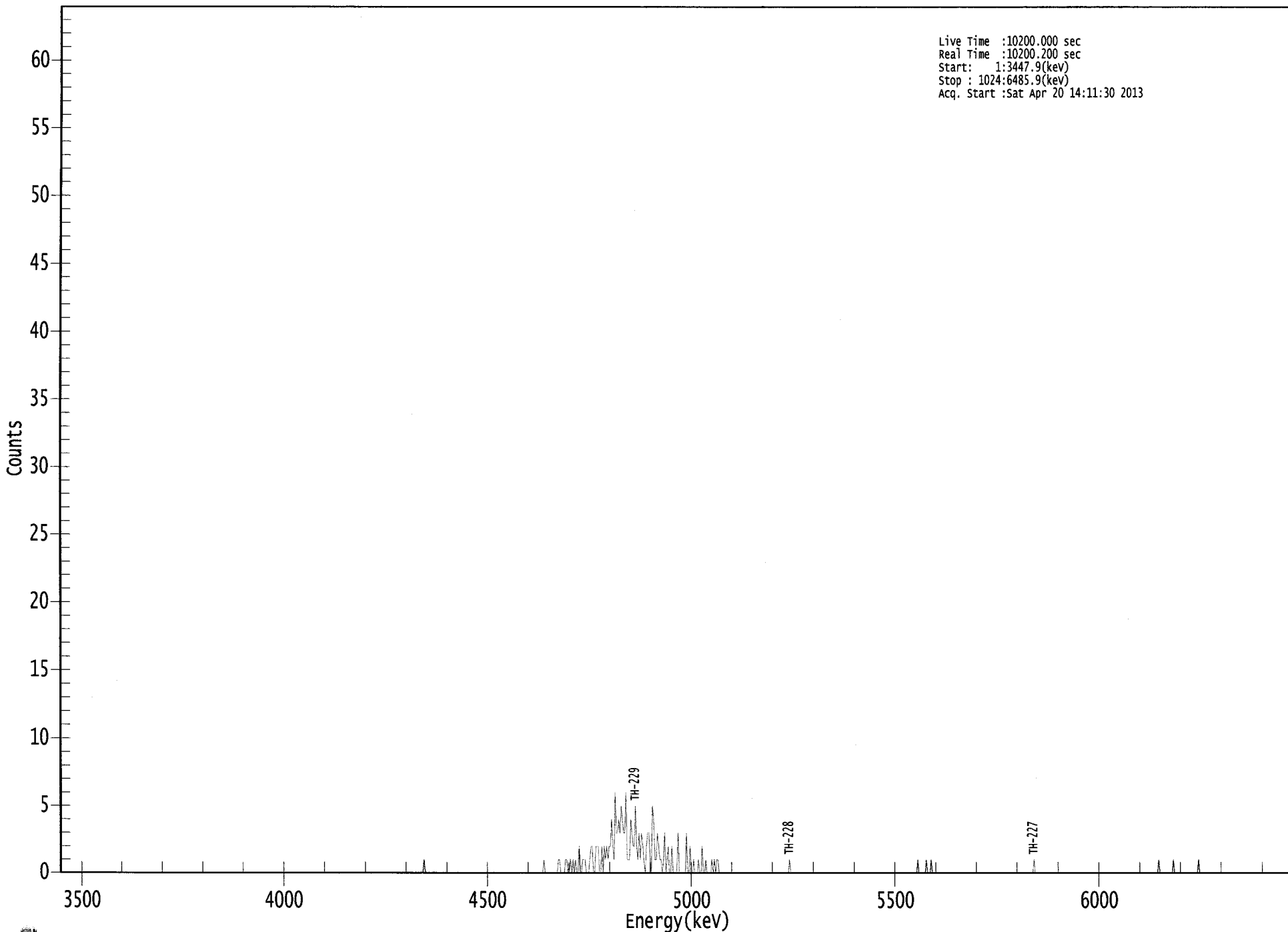
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	1.000	5850.00*	7.40E-003 +/- 3.09E-002	7.92E-002 +/- 1.32E-002
TH-228	0.877	5400.00*	1.24E-002 +/- 2.98E-002	6.24E-002 +/- 1.04E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 3.93E-001	6.17E-002 +/- 1.03E-002
TH-230	0.997	4672.00*	1.47E-001 +/- 9.88E-002	8.83E-002 +/- 1.47E-002
TH-232	0.987	3997.00*	0.00E+000 +/- 4.08E-002	8.82E-002 +/- 1.47E-002

AG
4/22/13

US EPA ARCHIVE DOCUMENT

000056032.CNF

Live Time :10200.000 sec
Real Time :10200.200 sec
Start: 1:3447.9(kev)
Stop : 1024:6485.9(kev)
Acq. Start :Sat Apr 20 14:11:30 2013



0279

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: 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:	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	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	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	1	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 0

Sample Title: 13

Channel	1	2	3	4	5	6	7	8
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	1	0	0	0	0	0	0
409:	0	0	0	0	0	1	1	0
417:	0	0	0	1	1	0	0	1
425:	0	1	0	1	0	0	2	0
433:	0	1	1	1	0	0	0	1
441:	2	2	0	0	2	2	2	0
449:	0	2	0	2	1	2	1	2
457:	2	4	2	1	6	3	3	4
465:	3	5	4	3	3	6	1	1
473:	1	4	3	2	2	5	2	1
481:	3	1	3	2	1	0	2	3
489:	3	1	0	5	4	1	1	3
497:	2	1	1	0	1	3	0	1
505:	2	0	0	2	0	0	0	0
513:	3	0	0	0	0	0	0	3
521:	0	0	2	0	0	1	0	0
529:	0	1	0	0	2	0	0	1
537:	0	0	0	0	1	0	1	0
545:	1	1	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	1	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
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	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	1	0
713:	0	0	0	0	0	1	0	0
721:	0	1	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 1 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	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	1	0	0
913:	0	0	0	0	0	0	0	0
921:	0	1	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	1	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



4/20/13

Sample Description: FB AT PZ-110-SS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 14
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_046
 Chamber Serial Number: 04026482B
 Detector Serial Number: 58762
 Env. Background: System Bkgd 55215
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 2:11:31 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1051 +/- 0.0114
 Counting Efficiency: 0.1789 +/- 0.0031 on 12/16/2012 5:49:23 PM
 Chem. Recovery Factor: 0.5871 +/- 0.0647

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.793	3.66	107.87	0.34	0.00E+000	3.0
TH-228	5.332	5.83	82.55	0.17	0.00E+000	3.0
TH-229 T	4.863	93.00	20.43	0.00	0.00E+000	5.0
TH-230	4.674	5.83	82.55	0.17	0.00E+000	3.0
TH-232	3.961	1.49	190.02	0.51	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

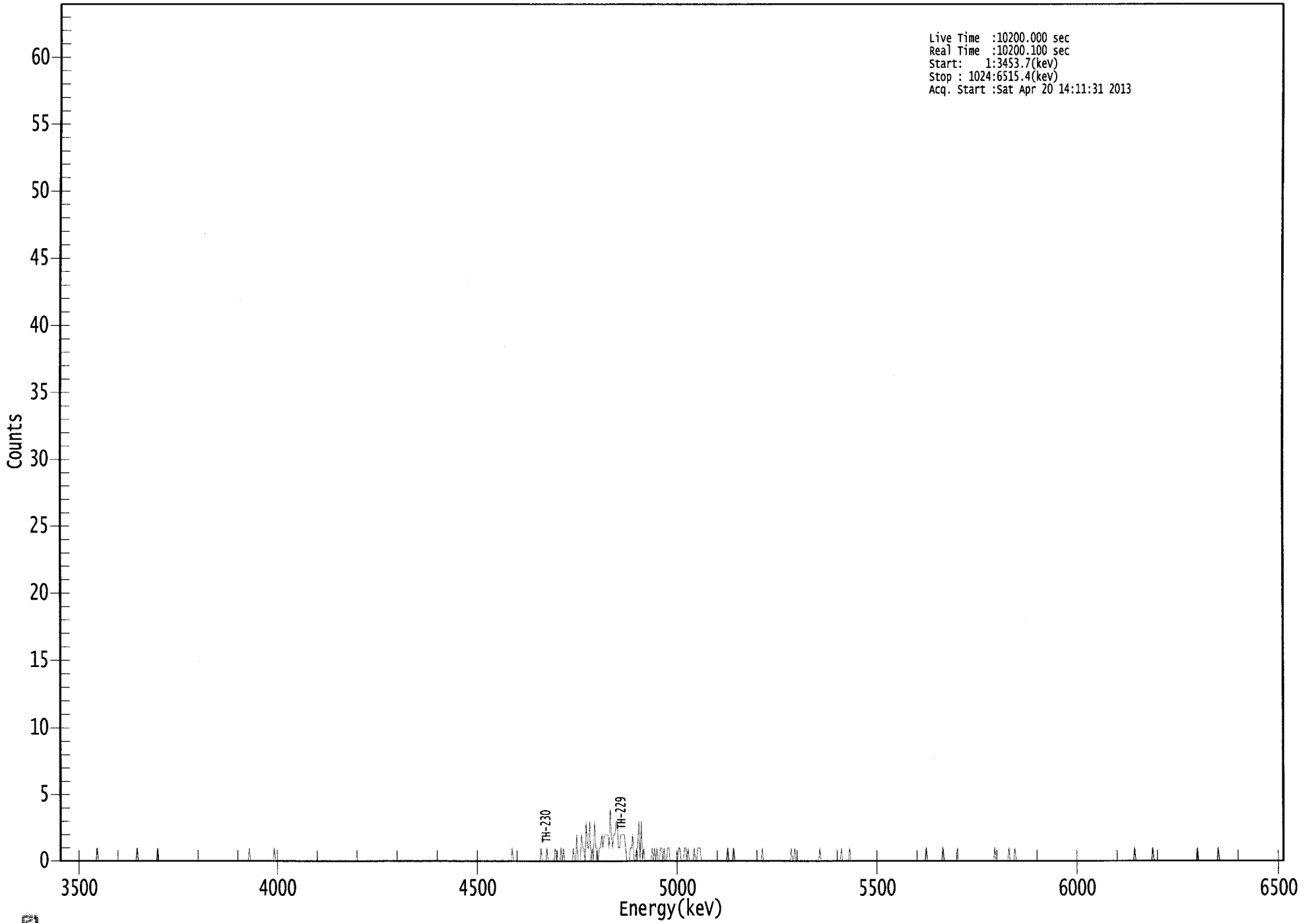
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.983	5850.00*	9.48E-002 +/- 1.04E-001	1.24E-001 +/- 2.64E-002
TH-228	0.976	5400.00*	1.50E-001 +/- 1.27E-001	1.07E-001 +/- 2.28E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 5.02E-001	1.52E-001 +/- 3.24E-002
TH-230	1.000	4672.00*	1.47E-001 +/- 1.26E-001	1.05E-001 +/- 2.25E-002
TH-232	0.993	3997.00*	3.76E-002 +/- 7.19E-002	1.32E-001 +/- 2.82E-002

AG
 4/22/13

US EPA ARCHIVE DOCUMENT

000056033.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3453.7(keV)
Stop : 1024:6515.4(keV)
Acq. Start :Sat Apr 20 14:11:31 2013



0284

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: 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	1
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	1	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	1	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	1
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	1	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	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	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: 14

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	1	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:	1	0	0	0	0	0	0	1
417:	0	0	0	0	1	0	1	0
425:	0	0	0	0	0	0	1	0
433:	0	2	0	0	0	2	1	1
441:	0	3	1	1	3	0	1	0
449:	3	1	1	0	1	1	2	1
457:	2	2	2	2	1	4	2	1
465:	2	2	3	3	1	1	2	2
473:	2	2	1	0	0	0	1	1
481:	2	0	0	1	1	3	0	3
489:	0	1	0	0	0	0	0	0
497:	1	0	1	0	1	0	0	1
505:	1	0	1	0	0	1	1	0
513:	0	0	0	0	0	0	1	1
521:	0	0	0	1	1	0	1	0
529:	0	0	0	1	0	0	1	1
537:	1	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	1
561:	0	0	0	0	1	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	1	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	1	0	0	1
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	1	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	1	0
657:	0	0	0	0	0	1	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	1	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	1	0	0	0	0
745:	0	0	0	0	0	0	0	1
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	1	0
785:	0	0	0	0	0	0	0	0
793:	0	0	1	0	0	0	0	1

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	1	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	1	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	1
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	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



4246

Sample Description: FB AT PZ-110-SS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 15
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_047
 Chamber Serial Number: 02030596A
 Detector Serial Number: 91086
 Env. Background: System Bkgd 55216
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 2:11:27 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.224 mL
 Effective Efficiency: 0.1459 +/- 0.0138
 Counting Efficiency: 0.1822 +/- 0.0032 on 12/16/2012 5:49:21 PM
 Chem. Recovery Factor: 0.8010 +/- 0.0772

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.776	2.00	169.74	0.00	0.00E+000	2.9
TH-228	5.338	0.83	239.53	0.17	0.00E+000	2.9
TH-229 T	4.858	124.83	17.56	0.17	0.00E+000	6.5
TH-230	4.642	13.66	53.80	0.34	0.00E+000	2.9
TH-232	3.949	-0.34	592.90	0.34	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

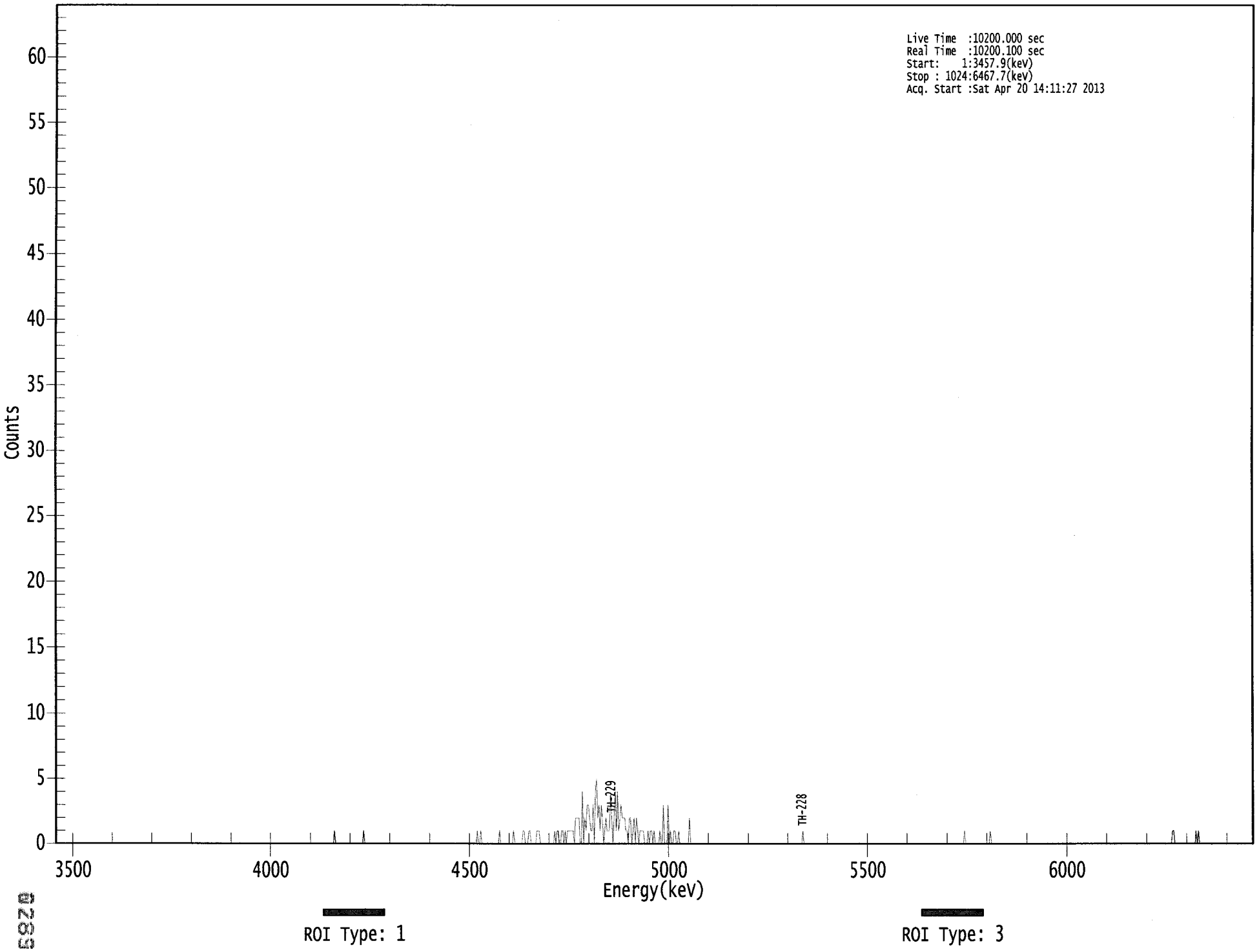
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.972	5850.00*	3.73E-002 +/- 6.37E-002	1.12E-001 +/- 2.08E-002
TH-228	0.980	5400.00*	1.53E-002 +/- 3.68E-002	7.71E-002 +/- 1.43E-002
TH-229	0.999	4872.00*	2.28E+000 +/- 4.23E-001	7.61E-002 +/- 1.41E-002
TH-230	0.995	4672.00*	2.49E-001 +/- 1.41E-001	8.70E-002 +/- 1.62E-002
TH-232	0.988	3997.00*	-6.17E-003 +/- 3.66E-002	8.68E-002 +/- 1.61E-002

AG
 4/22/13

US EPA ARCHIVE DOCUMENT

0000056036.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3457.9(keV)
Stop : 1024:6467.7(keV)
Acq. Start :Sat Apr 20 14:11:27 2013



5920

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: 15

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	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	0	1
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:	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	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	1	0	0	1	0	0	0

369: 0 0 0 0 0 0 0 0

Sample Title: 15

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

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	0	0	0	0
953:	0	0	1	1	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	1	0
977:	1	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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Sample Description: MW-103 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 16
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_048
 Chamber Serial Number: 02030596B
 Detector Serial Number: 83111
 Env. Background: System Bkgd 55217
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/5/2013 7:36:23 AM
 Acquisition Date/Time: 4/20/2013 2:11:28 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1894 +/- 0.0158
 Counting Efficiency: 0.1680 +/- 0.0030 on 12/16/2012 5:49:20 PM
 Chem. Recovery Factor: 1.1276 +/- 0.0959

Peak Match Tolerance: 0.175 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.842	6.83	76.08	0.17	0.00E+000	3.0
TH-228	5.370	97.15	19.99	0.85	0.00E+000	20.7
TH-229 T	4.871	167.83	15.14	0.17	0.00E+000	17.0
TH-230	4.632	86.83	21.06	0.17	0.00E+000	5.8
TH-232	3.957	84.83	21.31	0.17	0.00E+000	6.9

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

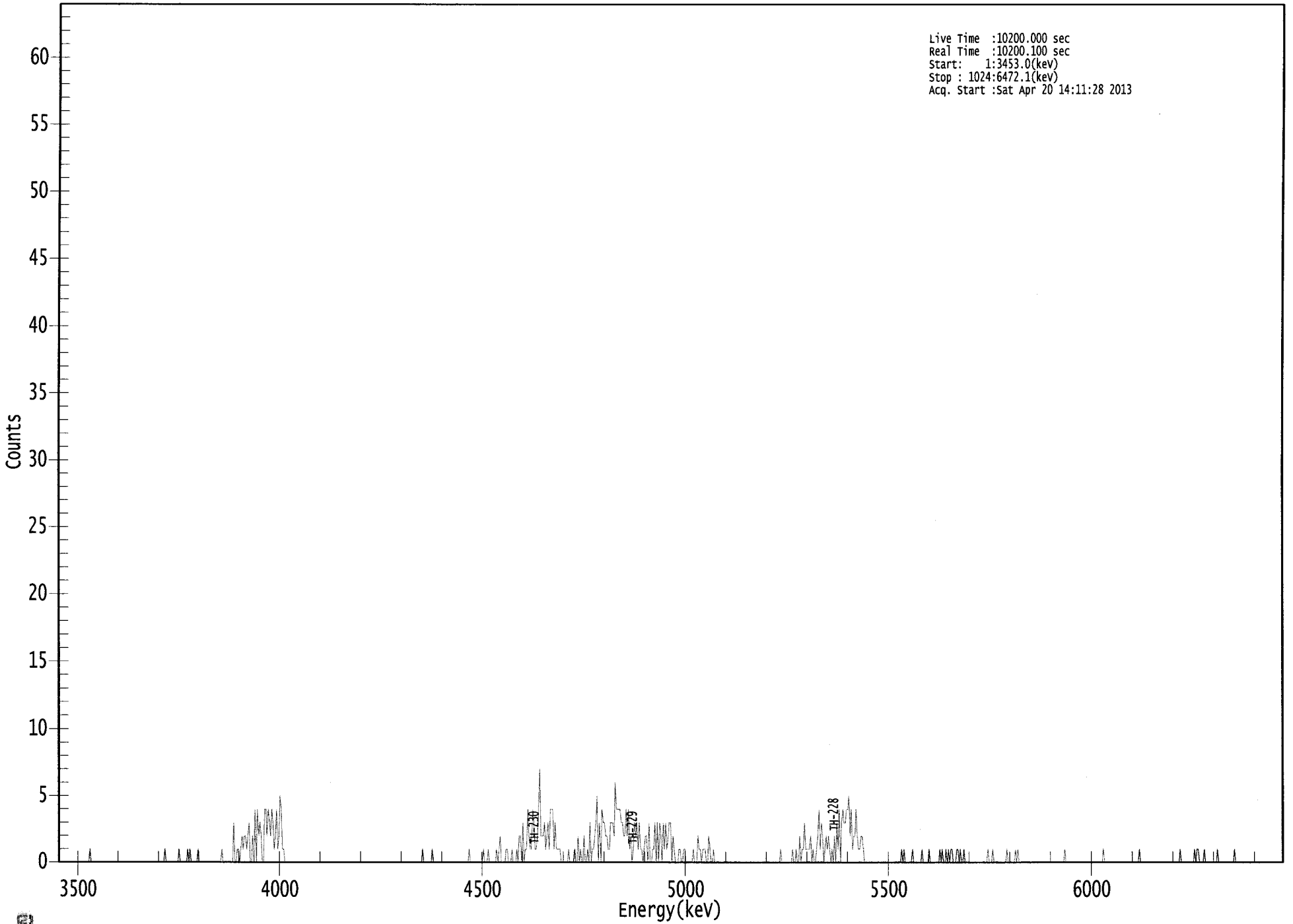
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	1.000	5850.00*	9.81E-002 +/- 7.64E-002	6.00E-002 +/- 9.78E-003
TH-228	0.995	5400.00*	1.38E+000 +/- 3.56E-001	8.51E-002 +/- 1.39E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 3.85E-001	5.87E-002 +/- 9.57E-003
TH-230	0.992	4672.00*	1.22E+000 +/- 3.24E-001	5.85E-002 +/- 9.54E-003
TH-232	0.991	3997.00*	1.19E+000 +/- 3.18E-001	5.84E-002 +/- 9.52E-003

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US EPA ARCHIVE DOCUMENT

000056037.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3453.0(keV)
Stop : 1024:6472.1(keV)
Acq. Start :Sat Apr 20 14:11:28 2013



0294

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: 16

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	1	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	1	0	0	0	0	0	0
97:	0	0	0	0	0	1	0	0
105:	0	0	0	0	1	0	1	0
113:	0	0	0	0	0	1	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	1	0	0	0	0	0	0
145:	0	0	0	3	0	0	1	1
153:	0	1	2	1	2	2	1	2
161:	3	0	0	2	0	4	0	4
169:	2	3	2	0	0	4	4	2
177:	4	3	2	4	3	1	2	4
185:	1	2	5	4	1	1	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	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	1	0	0	0	0	0	0
313:	0	1	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:	1	0	0	0	0	0	0	0
353:	0	0	0	0	1	0	0	0
361:	1	0	0	0	0	0	0	1

369: 0 1 2 0 0 0 0 1

Sample Title: 16

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

801: 1 0 1 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	1	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	1	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	1
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	1	0	0	0	0	0	0
945:	0	0	0	0	0	1	0	1
953:	1	0	0	0	0	1	0	0
961:	0	0	0	0	0	0	0	0
969:	1	0	0	0	0	0	0	0
977:	0	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:	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



c
yprms

Sample Description: MW-103 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 17
 Sample Geometry: Shelf 2
 Procedure Description: Th 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: 4/5/2013 7:36:23 AM
 Acquisition Date/Time: 4/21/2013 2:27:41 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1379 +/- 0.0133
 Counting Efficiency: 0.1746 +/- 0.0033 on 12/15/2012 11:26:47 AM
 Chem. Recovery Factor: 0.7897 +/- 0.0773

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.863	-1.10	393.09	5.10	0.00E+000	3.0
TH-228	5.421	-1.23	254.42	3.23	0.00E+000	3.0
TH-229 T	4.875	121.98	17.83	1.02	0.00E+000	5.2
TH-230	4.670	5.98	87.78	1.02	0.00E+000	3.0
TH-232	3.936	3.66	107.87	0.34	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

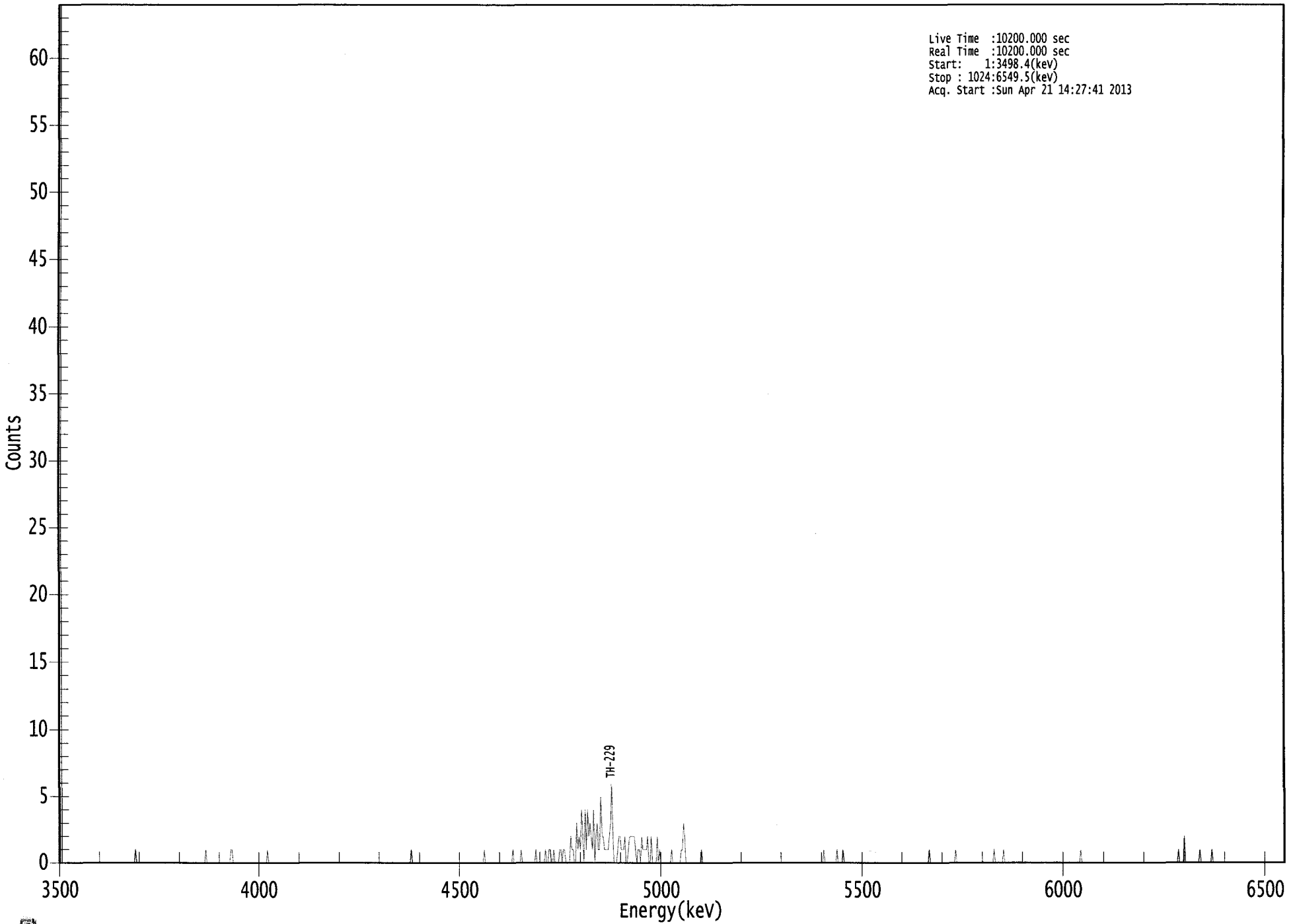
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.999	5850.00*	-2.17E-002 +/- 8.54E-002	2.12E-001 +/- 3.99E-002
TH-228	0.998	5400.00*	-2.40E-002 +/- 6.13E-002	1.78E-001 +/- 3.35E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 4.44E-001	1.22E-001 +/- 2.29E-002
TH-230	1.000	4672.00*	1.15E-001 +/- 1.03E-001	1.21E-001 +/- 2.28E-002
TH-232	0.981	3997.00*	7.03E-002 +/- 7.70E-002	9.19E-002 +/- 1.73E-002

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US EPA ARCHIVE DOCUMENT

0000056070.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3498.4(kev)
Stop : 1024:6549.5(kev)
Acq. Start :Sun Apr 21 14:27:41 2013



0299

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: 17

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	0	0	0	0	0
9:	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0
65:	1	0	0	0	0	0	0
73:	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0
121:	0	0	0	1	0	0	0
129:	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0
145:	1	1	0	0	0	0	0
153:	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	1
177:	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	1
297:	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0
353:	0	0	0	0	1	0	0
361:	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 17

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	1	0	0	0
385:	0	0	0	1	0	0	0	0
393:	0	0	0	0	0	0	0	1
401:	0	0	0	0	0	0	0	1
409:	0	0	1	1	0	0	1	0
417:	0	0	0	1	1	0	1	1
425:	0	0	0	0	2	1	1	0
433:	0	3	1	2	1	4	2	0
441:	4	1	4	2	3	2	1	4
449:	0	2	3	1	1	5	2	2
457:	1	1	1	1	2	3	6	2
465:	0	0	0	1	2	2	1	1
473:	1	2	0	0	1	2	2	2
481:	2	2	1	0	1	1	0	2
489:	1	1	1	1	2	0	0	2
497:	0	0	0	0	2	0	1	0
505:	0	0	0	0	0	0	0	0
513:	1	0	0	0	0	0	0	0
521:	1	1	3	2	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	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	1
641:	0	0	0	0	0	0	0	0
649:	0	0	1	0	0	0	0	1
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	1
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	1	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	1	0	0
785:	0	0	0	0	0	1	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	0
849:	0	0	0	0	0	1	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	1	0
937:	0	0	0	2	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	1	0	0	0	0	0	0	0
961:	0	0	1	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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Sample Description: PZ-200-SS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 18
 Sample Geometry: Shelf 2
 Procedure Description: Th 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: 4/5/2013 7:36:23 AM
 Acquisition Date/Time: 4/21/2013 2:27:42 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.230 mL
 Effective Efficiency: 0.1787 +/- 0.0154
 Counting Efficiency: 0.1940 +/- 0.0036 on 12/15/2012 11:26:46 AM
 Chem. Recovery Factor: 0.9208 +/- 0.0810

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.846	5.13	103.36	1.87	0.00E+000	2.9
TH-228	5.378	-0.25	1703.7	4.25	0.00E+000	2.9
TH-229 T	4.851	156.81	15.72	1.19	0.00E+000	3.5
TH-230	4.656	9.47	69.45	1.53	0.00E+000	2.9
TH-232	3.954	0.64	457.45	1.36	0.00E+000	2.9

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

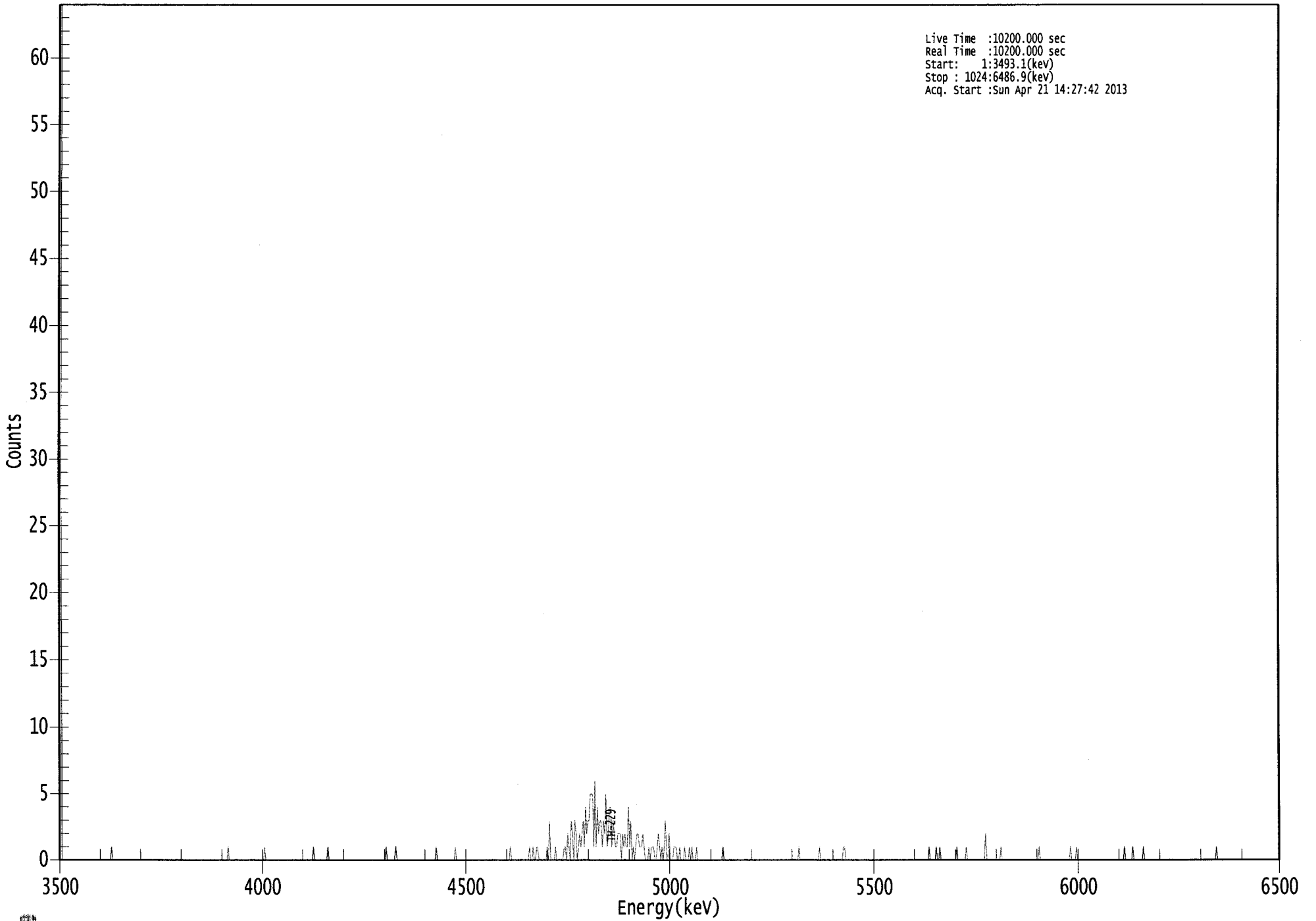
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	1.000	5850.00*	7.81E-002 +/- 8.18E-002	1.15E-001 +/- 1.94E-002
TH-228	0.997	5400.00*	-3.77E-003 +/- 6.42E-002	1.51E-001 +/- 2.55E-002
TH-229	0.998	4872.00*	2.34E+000 +/- 3.94E-001	9.82E-002 +/- 1.65E-002
TH-230	0.999	4672.00*	1.41E-001 +/- 1.01E-001	1.06E-001 +/- 1.78E-002
TH-232	0.990	3997.00*	9.49E-003 +/- 4.34E-002	1.02E-001 +/- 1.71E-002

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US EPA ARCHIVE DOCUMENT

000056069.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3493.1(kev)
Stop : 1024:6486.9(kev)
Acq. Start :Sun Apr 21 14:27:42 2013



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: 18

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	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	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	0	0	0	0
129:	0	0	0	0	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	1	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	1	0
217:	0	0	0	0	0	0	0	0
225:	0	0	1	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	1	0	0	0	0
281:	0	0	0	1	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	0
329:	0	0	0	0	0	1	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 0

Sample Title: 18

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

801: 0 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	1	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:	1	0	0	0	0	1	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	1	0	0
897:	0	0	0	0	1	0	0	0
905:	0	0	0	0	0	1	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	1	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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Sample Description: PZ-200-SS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-TH
 Sample Identification: 19
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/5/2013 7:36:23 AM
 Acquisition Date/Time: 4/21/2013 2:27:40 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.2122 +/- 0.0169
 Counting Efficiency: 0.1967 +/- 0.0036 on 12/15/2012 11:26:40 AM
 Chem. Recovery Factor: 1.0785 +/- 0.0880

Peak Match Tolerance: 0.175 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-227	5.752	5.81	90.53	1.19	0.00E+000	2.9
TH-228	5.322	2.41	226.84	4.59	0.00E+000	2.9
TH-229 T	4.871	188.30	14.36	1.70	0.00E+000	4.0
TH-230	4.665	8.15	72.72	0.85	0.00E+000	2.9
TH-232	3.947	-1.02	208.15	1.02	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 ----- NUCLIDE ANALYSIS RESULTS -----

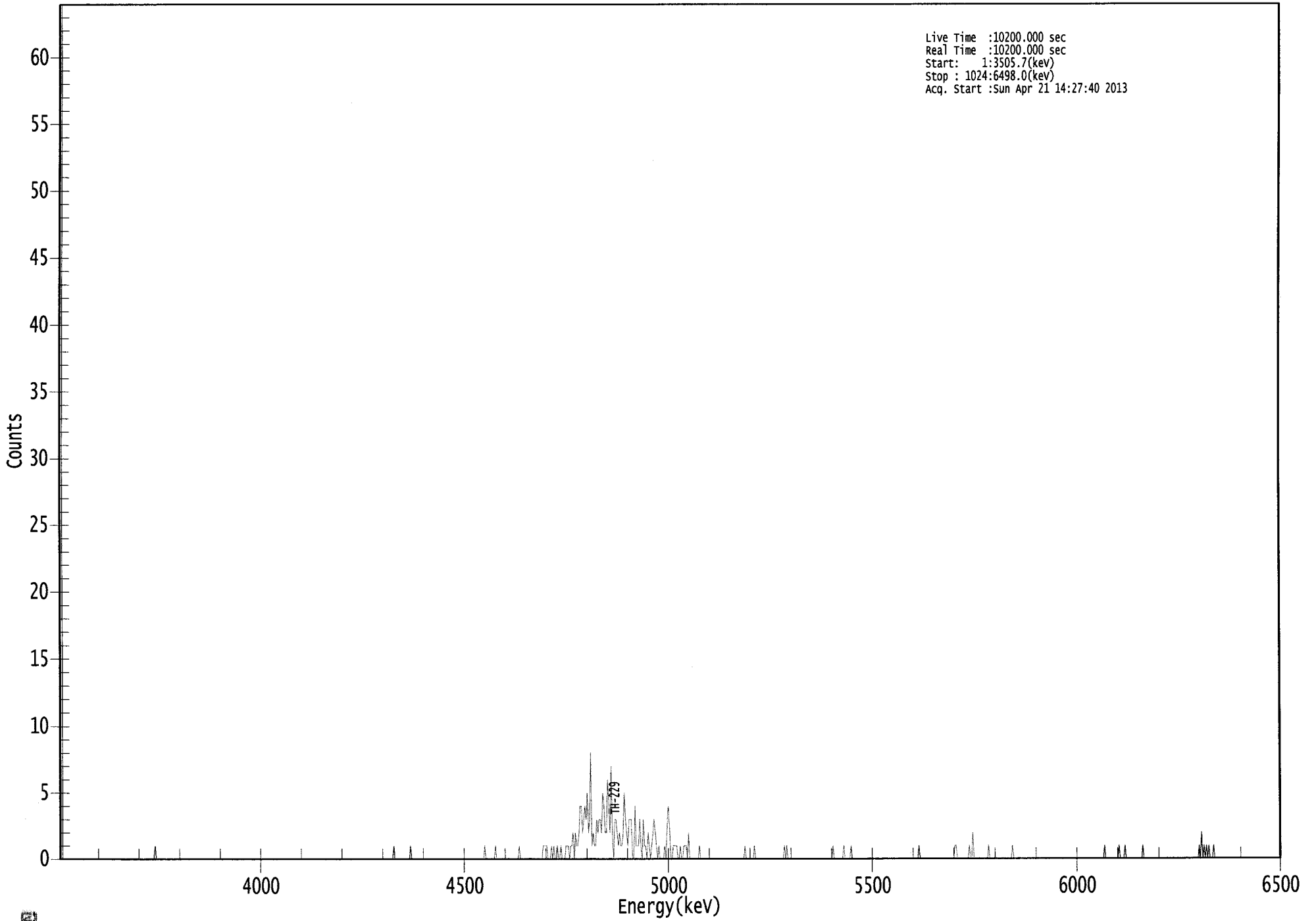
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.951	5850.00*	7.45E-002 +/- 6.85E-002	8.45E-002 +/- 1.32E-002
TH-228	0.969	5400.00*	3.06E-002 +/- 6.96E-002	1.31E-001 +/- 2.05E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 3.68E-001	9.22E-002 +/- 1.44E-002
TH-230	1.000	4672.00*	1.02E-001 +/- 7.58E-002	7.49E-002 +/- 1.17E-002
TH-232	0.987	3997.00*	-1.27E-002 +/- 2.66E-002	7.87E-002 +/- 1.23E-002

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US EPA ARCHIVE DOCUMENT

000056068.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3505.7(kev)
Stop : 1024:6498.0(kev)
Acq. Start :Sun Apr 21 14:27:40 2013



ROI Type: 1

ROI Type: 3

0000

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

Sample Title: 19

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	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:	1	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	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	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	1	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	1
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	1	0	0
361:	0	0	0	0	0	0	1	0

369: 0 0 0 0 0 0 0 0 0

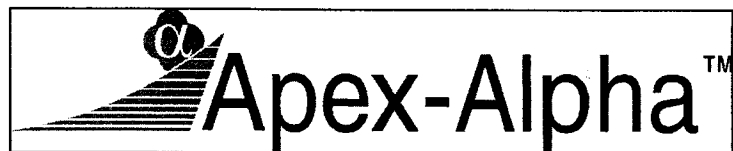
Sample Title: 19

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	0	1	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	1	1
409:	1	1	0	0	0	1	0	1
417:	0	0	1	0	0	1	0	0
425:	0	1	1	1	0	1	1	2
433:	0	2	1	1	2	4	4	2
441:	3	4	3	5	2	3	8	1
449:	2	1	1	3	2	3	3	2
457:	5	4	2	2	6	4	2	7
465:	2	0	3	3	2	1	2	1
473:	1	2	5	3	2	1	3	3
481:	3	0	0	4	1	1	1	3
489:	1	0	3	1	1	0	2	1
497:	0	1	2	3	2	1	0	1
505:	0	0	0	0	1	0	3	4
513:	2	0	0	1	1	1	1	0
521:	0	1	0	0	1	1	1	0
529:	2	0	0	0	0	0	0	0
537:	0	1	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	1
577:	0	0	0	0	0	0	0	1
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	1	0	1	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
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	0
649:	0	1	0	0	0	0	0	0
657:	0	0	1	0	0	0	0	0
665:	1	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	1	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	1
753:	1	0	0	0	0	0	0	0
761:	0	0	0	1	0	0	2	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	1	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	1

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	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	1	0	0	0
881:	0	0	0	0	0	0	0	0
889:	1	0	0	0	0	1	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	1	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	1	0	2	0	1
961:	0	1	0	1	0	0	0	1
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




QA SUMMARY REPORT

Review Of QA Results - Pulser Check

Date : 4/19/2013
Time : 5:45:48 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 001	21f	ALL	Not Done	
Alpha 002	21f	ALL	Not Done	
Alpha 003	21f	ALL	Passed	4/19/2013 5:25:30 AM
Alpha 004	21f	ALL	Passed	4/19/2013 5:25:31 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	4/19/2013 5:25:31 AM
Alpha 011	21f	ALL	Passed	4/19/2013 5:25:32 AM
Alpha 012	21f	ALL	Not Done	
Alpha 013	21f	ALL	Passed	4/19/2013 5:25:33 AM
Alpha 014	21f	ALL	Passed	4/19/2013 5:25:34 AM
Alpha 015	21f	ALL	Not Done	
Alpha 016	21f	ALL	Not Done	
Alpha 017	AIM730	ALL	Not Done	
Alpha 018	AIM730	ALL	Passed	4/19/2013 5:25:35 AM
Alpha 019	AIM730	ALL	Not Done	
Alpha 020	AIM730	ALL	Not Done	
Alpha 021	AIM730	ALL	Not Done	
Alpha 022	AIM730	ALL	Passed	4/19/2013 5:25:35 AM
Alpha 023	AIM730	ALL	Not Done	
Alpha 024	AIM730	ALL	Passed	4/19/2013 5:25:36 AM
Alpha 025	AIM730	ALL	Passed	4/19/2013 5:25:37 AM
Alpha 026	AIM730	ALL	Not Done	
Alpha 027	AIM730	ALL	Passed	4/19/2013 5:25:38 AM
Alpha 028	AIM730	ALL	Not Done	
Alpha 029	AIM730	ALL	Passed	4/19/2013 5:25:39 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	4/19/2013 5:25:40 AM
Alpha 034	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:41 AM
Alpha 035	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:43 AM
Alpha 036	Alpha Analyst100DC	ALL	Not Done	
Alpha 037	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:44 AM
Alpha 038	Alpha Analyst100DC	ALL	Not Done	
Alpha 039	Alpha Analyst100DC	ALL	Not Done	
Alpha 040	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:46 AM
Alpha 041	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:47 AM
Alpha 042	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:49 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 043	Alpha Analyst100DC	ALL	Not Done	
Alpha 044	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:50 AM
Alpha 045	Alpha Analyst100DC	ALL	Not Done	
Alpha 046	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:52 AM
Alpha 047	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:53 AM
Alpha 048	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:55 AM

APPROVED BY: _____ 

APPROVAL DATE: 4/19/13

US EPA ARCHIVE DOCUMENT



QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 4/20/2013
Time : 10:55:28 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 003	21f	ALL	Passed	4/20/2013 10:41:32 AM
Alpha 004	21f	ALL	Passed	4/20/2013 10:41:33 AM
Alpha 010	21f	ALL	Passed	4/20/2013 10:41:34 AM
Alpha 011	21f	ALL	Passed	4/20/2013 10:41:35 AM
Alpha 013	21f	ALL	Passed	4/20/2013 10:41:36 AM
Alpha 014	21f	ALL	Passed	4/20/2013 10:41:37 AM
Alpha 018	AIM730	ALL	Passed	4/20/2013 10:41:38 AM
Alpha 022	AIM730	ALL	Passed	4/20/2013 10:41:39 AM
Alpha 024	AIM730	ALL	Passed	4/20/2013 10:41:39 AM
Alpha 025	AIM730	ALL	Passed	4/20/2013 10:41:40 AM
Alpha 027	AIM730	ALL	Passed	4/20/2013 10:41:41 AM
Alpha 029	AIM730	ALL	Passed	4/20/2013 10:41:42 AM
Alpha 033	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:44 AM
Alpha 034	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:45 AM
Alpha 035	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:46 AM
Alpha 036	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:48 AM
Alpha 037	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:50 AM
Alpha 038	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:52 AM
Alpha 039	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:54 AM
Alpha 040	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:56 AM
Alpha 041	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:58 AM
Alpha 042	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:00 AM
Alpha 043	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:02 AM
Alpha 044	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:04 AM
Alpha 046	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:07 AM
Alpha 047	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:09 AM
Alpha 048	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:12 AM

APPROVED BY: AG

APPROVAL DATE: 4/20/13

US EPA ARCHIVE DOCUMENT



QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 4/21/2013
Time : 2:12:53 PM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 003	21f	ALL	Passed	4/21/2013 1:58:57 PM
Alpha 004	21f	ALL	Passed	4/21/2013 1:58:58 PM
Alpha 010	21f	ALL	Passed	4/21/2013 1:58:59 PM
Alpha 011	21f	ALL	Passed	4/21/2013 1:59:00 PM
Alpha 013	21f	ALL	Passed	4/21/2013 1:59:01 PM
Alpha 014	21f	ALL	Passed	4/21/2013 1:59:01 PM
Alpha 018	AIM730	ALL	Passed	4/21/2013 1:59:02 PM
Alpha 022	AIM730	ALL	Passed	4/21/2013 1:59:03 PM
Alpha 024	AIM730	ALL	Passed	4/21/2013 1:59:04 PM
Alpha 025	AIM730	ALL	Passed	4/21/2013 1:59:05 PM
Alpha 027	AIM730	ALL	Passed	4/21/2013 1:59:06 PM
Alpha 029	AIM730	ALL	Passed	4/21/2013 1:59:07 PM
Alpha 033	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:08 PM
Alpha 034	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:09 PM
Alpha 035	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:11 PM
Alpha 037	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:13 PM
Alpha 040	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:14 PM
Alpha 041	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:16 PM
Alpha 042	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:17 PM
Alpha 044	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:19 PM
Alpha 046	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:20 PM
Alpha 047	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:22 PM
Alpha 048	Alpha Analyst100DC	ALL	Passed	4/21/2013 1:59:24 PM

APPROVED BY: AL

APPROVAL DATE: 4/21/13

***** LIBRARY LISTING REPORT *****

Nuclide Library Title: Thorium

Nuclide Library Description: Th-227,-228,-229,-230,-232

Nuclide Name	Half-Life (Seconds)	Energy (keV)	Energy Uncert. (keV)	Yield (%)	Yield Uncert. (Abs.+ -)
TH-227	6.873E+008	5850.000*	0.000	97.5000	0.0000
TH-228	6.034E+007	5400.000*	0.000	99.9400	0.0000
TH-229	2.487E+011	4872.000*	0.000	99.5200	0.0000
TH-230	2.379E+012	4672.000*	0.000	99.8200	0.0000
TH-232	4.434E+017	3997.000*	0.000	100.0000	0.0000

* = key line

TOTALS: 5 Nuclides 5 Energy Lines

SECTION X
ANALYTICAL DATA (RADIUM-226)

Work Order	13-04051	Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
Analysis Code	Ra226	01	LCS	LCS		04/09/13 00:00	1.0000E+00
Run	1	02	MBL	BLANK		04/09/13 00:00	1.5000E+00
Date Received	4/9/2013	03	DUP	FB at PZ-110-SS TOT	42	04/04/13 09:30	1.5000E+00
Lab Deadline	4/30/2013	04	TRG	PZ-105-SS TOT	46	04/04/13 15:06	1.5000E+00
Client	Engineering Management Support, Inc.	05	TRG	PZ-105-SS DIS	46	04/04/13 15:06	1.5000E+00
Project	West Lake OU-1	06	TRG	S-10 TOT	42	04/04/13 15:25	1.5000E+00
Report Level	4	07	TRG	S-10 DIS	42	04/04/13 15:25	1.5000E+00
Activity Units	pCi	08	TRG	LR-104 TOT	45	04/04/13 15:52	1.5000E+00
Aliquot Units	I	09	TRG	LR-104 DIS	45	04/04/13 15:52	1.5000E+00
Matrix	WA	10	TRG	DUP 01 TOT	48	04/04/13 00:00	1.5000E+00
Method	EPA 903.0 Modified	11	TRG	DUP 01 DIS	48	04/04/13 00:00	1.5000E+00
Instrument Type	Alpha Spectroscopy	12	TRG	DUP 02 TOT	43	04/04/13 00:00	1.5000E+00
Radiometric Tracer	Ba-133	13	TRG	DUP 02 DIS	43	04/04/13 00:00	1.5000E+00
Radiometric Sol#	Ba-6a	14	DO	FB at PZ-110-SS TOT	42	04/04/13 09:30	1.5000E+00
Tracer Act (dpm/g)	1010.693	15	TRG	FB at PZ-110-SS DIS	42	04/04/13 09:30	1.5000E+00
Carrier		16	TRG	MW-103 TOT	48	04/05/13 09:50	1.5000E+00
Carrier Conc (mg/ml)		17	TRG	MW-103 DIS	48	04/05/13 09:50	1.5000E+00
		18	TRG	PZ-200-SS TOT	37	04/05/13 11:10	1.5000E+00
		19	TRG	PZ-200-SS DIS	37	04/05/13 11:10	1.5000E+00

0313

* 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	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	0.9204	930.2	425.4	101.52		0.0225	0.0279	0.0054		101.52	1.91	1.00
02	MBL	0.9109	920.6	417.4	100.65		0.0224	0.0281	0.0057		100.65	2.04	1.00
03	DUP	0.9127	922.5	387.4	93.23		0.0223	0.0272	0.0049		93.23	1.66	1.00
04	TRG	0.9095	919.2	362.8	87.62		0.0224	0.0279	0.0055		87.62	1.95	1.00
05	TRG	0.9069	916.6	366.0	88.65		0.0229	0.0284	0.0055		88.65	1.95	1.00
06	TRG	0.8979	907.5	298.3	72.97		0.0229	0.0271	0.0042		72.97	1.25	1.00
07	TRG	0.9032	912.9	393.7	95.74		0.0228	0.0278	0.0050		95.74	1.71	1.00
08	TRG	0.9036	913.3	358.7	87.19		0.0228	0.0293	0.0065		87.19	2.34	1.00
09	TRG	0.9058	915.5	391.1	94.84		0.0224	0.0279	0.0055		94.84	1.95	1.00
10	TRG	0.8975	907.1	390.4	95.55		0.0228	0.0287	0.0059		95.55	2.12	1.00
11	TRG	0.9049	914.6	344.0	83.50		0.0225	0.0281	0.0056		83.50	2.00	1.00
12	TRG	0.9032	912.9	366.0	89.01		0.0230	0.0292	0.0062		89.01	2.23	1.00
13	TRG	0.9021	911.7	369.8	90.04		0.0229	0.0289	0.0060		90.04	2.16	1.00
14	DO	0.9028	912.5	352.6	85.79		0.0229	0.0274	0.0045		85.79	1.43	1.00
15	TRG	0.9009	910.5	351.7	85.75		0.0227	0.0273	0.0046		85.75	1.49	1.00
16	TRG	0.9040	913.7	398.7	96.87		0.0227	0.0285	0.0058		96.87	2.08	1.00
17	TRG	0.9061	915.8	404.1	97.96		0.0230	0.0288	0.0058		97.96	2.08	1.00
18	TRG	0.9030	912.7	292.5	71.15		0.0225	0.0291	0.0066		71.15	2.37	1.00
19	TRG	0.9015	911.1	391.8	95.46		0.0228	0.0308	0.0080		95.46	2.77	1.00

* 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			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
02	MBL			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
03	DUP			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
04	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
05	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
06	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
07	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
08	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
09	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
10	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
11	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
12	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
13	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
14	DO			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
15	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
16	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
17	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
18	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		
19	TRG			04/16/13 08:03	JBARNARD	04/18/13 12:49	LWALKER		

0521

* SAE1 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: 13-04051-Ra226-1

Run	1
Eberline Services Work Order	13-04051
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	RA-226	LCS	LCS	pCi/l	1.06E+01	1.15E+00	1.71E-01	1.03E+01	102.89	OK		OK	
02	RA-226	MBL	BLANK	pCi/l	1.25E-01	1.25E-01	1.73E-01					OK	OK
03	RA-226	DUP	FB at PZ-110-SS TOT	pCi/l	-2.54E-02	4.27E-02	1.51E-01				INV	OK	
04	RA-226	TRG	PZ-105-SS TOT	pCi/l	1.79E+00	4.03E-01	1.36E-01					OK	
05	RA-226	TRG	PZ-105-SS DIS	pCi/l	1.22E+00	3.34E-01	1.70E-01					OK	
06	RA-226	TRG	S-10 TOT	pCi/l	3.08E-02	5.43E-02	9.80E-02					OK	
07	RA-226	TRG	S-10 DIS	pCi/l	8.47E-03	3.53E-02	9.07E-02					OK	
08	RA-226	TRG	LR-104 TOT	pCi/l	6.30E-01	2.52E-01	1.22E-01					OK	
09	RA-226	TRG	LR-104 DIS	pCi/l	3.88E-01	1.75E-01	1.04E-01					OK	
10	RA-226	TRG	DUP 01 TOT	pCi/l	3.19E-01	1.68E-01	1.15E-01					OK	
11	RA-226	TRG	DUP 01 DIS	pCi/l	1.93E-01	1.32E-01	1.06E-01					OK	
12	RA-226	TRG	DUP 02 TOT	pCi/l	4.50E-01	2.08E-01	1.69E-01					OK	
13	RA-226	TRG	DUP 02 DIS	pCi/l	1.22E-01	1.11E-01	1.29E-01					OK	
14	RA-226	DO	FB at PZ-110-SS TOT	pCi/l	1.21E-01	8.61E-02	6.46E-02					OK	
15	RA-226	TRG	FB at PZ-110-SS DIS	pCi/l	3.14E-02	4.79E-02	7.16E-02					OK	
16	RA-226	TRG	MW-103 TOT	pCi/l	7.77E-01	2.53E-01	1.17E-01					OK	
17	RA-226	TRG	MW-103 DIS	pCi/l	2.42E-01	1.46E-01	9.32E-02					OK	
18	RA-226	TRG	PZ-200-SS TOT	pCi/l	2.44E+00	5.76E-01	2.48E-01					OK	
19	RA-226	TRG	PZ-200-SS DIS	pCi/l	1.84E+00	4.46E-01	2.17E-01					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 13-04051-Ra226-1

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	RA-226	LCS	04/09/13 00:00	1.00E+00	100.00	0.00	101.52		4/18/2013 12:49	
02	RA-226	MBL	04/09/13 00:00	1.50E+00	100.00	0.00	100.65		4/18/2013 12:49	
03	RA-226	DUP	04/04/13 09:30	1.50E+00	93.23	0.00	93.23		4/18/2013 12:49	
04	RA-226	TRG	04/04/13 15:06	1.50E+00	87.62	0.00	87.62		4/18/2013 12:49	
05	RA-226	TRG	04/04/13 15:06	1.50E+00	88.65	0.00	88.65		4/18/2013 12:49	
06	RA-226	TRG	04/04/13 15:25	1.50E+00	72.97	0.00	72.97		4/18/2013 12:49	
07	RA-226	TRG	04/04/13 15:25	1.50E+00	95.74	0.00	95.74		4/18/2013 12:49	
08	RA-226	TRG	04/04/13 15:52	1.50E+00	87.19	0.00	87.19		4/18/2013 12:49	
09	RA-226	TRG	04/04/13 15:52	1.50E+00	94.84	0.00	94.84		4/18/2013 12:49	
10	RA-226	TRG	04/04/13 00:00	1.50E+00	95.55	0.00	95.55		4/18/2013 12:49	
11	RA-226	TRG	04/04/13 00:00	1.50E+00	83.50	0.00	83.50		4/18/2013 12:49	
12	RA-226	TRG	04/04/13 00:00	1.50E+00	89.01	0.00	89.01		4/18/2013 12:49	
13	RA-226	TRG	04/04/13 00:00	1.50E+00	90.04	0.00	90.04		4/18/2013 12:49	
14	RA-226	DO	04/04/13 09:30	1.50E+00	85.79	0.00	85.79		4/18/2013 12:49	
15	RA-226	TRG	04/04/13 09:30	1.50E+00	85.75	0.00	85.75		4/18/2013 12:49	
16	RA-226	TRG	04/05/13 09:50	1.50E+00	96.87	0.00	96.87		4/18/2013 12:49	
17	RA-226	TRG	04/05/13 09:50	1.50E+00	97.96	0.00	97.96		4/18/2013 12:49	
18	RA-226	TRG	04/05/13 11:10	1.50E+00	71.15	0.00	71.15		4/18/2013 12:49	
19	RA-226	TRG	04/05/13 11:10	1.50E+00	95.46	0.00	95.46		4/18/2013 12:49	

	
Run	1
Analysis Code	Ra226
Eberline Services Work Order	13-04051
Client	Engineering Management Support, Inc.

Preliminary Data Report & Analytical Calculations
Work Order: 13-04051-Ra226-1

	
Run	1
Analysis Code	Ra226
Eberline Services Work Order	13-04051
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	04/19/13 14:39		A_Spec	Alpha_018	170	3.73 E+02	5.00 E-03	17.8
02	RA-226	MBL	04/19/13 14:39		A_Spec	Alpha_022	170	5.30 E+00	1.00 E-02	15.3
03	RA-226	DUP	04/19/13 14:39		A_Spec	Alpha_024	170	-1.38 E+00	1.40 E-02	17.1
04	RA-226	TRG	04/19/13 14:39		A_Spec	Alpha_025	170	7.92 E+01	5.00 E-03	17.4
05	RA-226	TRG	04/19/13 14:39		A_Spec	Alpha_027	170	5.41 E+01	1.10 E-02	17.3
06	RA-226	TRG	04/19/13 14:39		A_Spec	Alpha_029	170	1.98 E+00	6.00 E-03	19.5
07	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_033	170	4.90 E-01	3.00 E-03	18.2
08	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_034	170	2.47 E+01	2.00 E-03	18.6
09	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_035	170	1.95 E+01	3.00 E-03	18.3
10	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_037	170	1.45 E+01	3.00 E-03	17.8
11	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_040	170	8.66 E+00	2.00 E-03	19
12	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_041	170	2.01 E+01	1.10 E-02	19.8
13	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_042	170	5.32 E+00	4.00 E-03	18.5
14	RA-226	DO	04/19/13 15:00		A_Spec	Alpha_044	170	7.83 E+00	1.00 E-03	19
15	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_046	170	1.83 E+00	1.00 E-03	17.9
16	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_047	170	3.73 E+01	4.00 E-03	18.2
17	RA-226	TRG	04/19/13 15:00		A_Spec	Alpha_048	170	1.08 E+01	1.00 E-03	16.8
18	RA-226	TRG	04/20/13 13:48		A_Spec	Alpha_003	170	7.23 E+01	1.00 E-02	17.5
19	RA-226	TRG	04/20/13 13:48		A_Spec	Alpha_004	170	6.96 E+01	1.40 E-02	19.4

13-04051

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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	0.9204	930.2418	425.4000	101.52	1.91	1.00
02	MBL	BLANK	04/09/13 00:00	1.5000	0.9109	920.6403	417.4000	100.65	2.04	1.00
03	DUP	FB at PZ-110-SS TOT	04/04/13 09:30	1.5000	0.9127	922.4595	387.4000	93.23	1.66	1.00
04	TRG	PZ-105-SS TOT	04/04/13 15:06	1.5000	0.9095	919.2253	362.8000	87.62	1.95	1.00
05	TRG	PZ-105-SS DIS	04/04/13 15:06	1.5000	0.9069	916.5975	366.0000	88.65	1.95	1.00
06	TRG	S-10 TOT	04/04/13 15:25	1.5000	0.8979	907.5012	298.3000	72.97	1.25	1.00
07	TRG	S-10 DIS	04/04/13 15:25	1.5000	0.9032	912.8579	393.7000	95.74	1.71	1.00
08	TRG	LR-104 TOT	04/04/13 15:52	1.5000	0.9036	913.2622	358.7000	87.19	2.34	1.00
09	TRG	LR-104 DIS	04/04/13 15:52	1.5000	0.9058	915.4857	391.1000	94.84	1.95	1.00
10	TRG	DUP 01 TOT	04/04/13 00:00	1.5000	0.8975	907.0970	390.4000	95.55	2.12	1.00
11	TRG	DUP 01 DIS	04/04/13 00:00	1.5000	0.9049	914.5761	344.0000	83.50	2.00	1.00
12	TRG	DUP 02 TOT	04/04/13 00:00	1.5000	0.9032	912.8579	366.0000	89.01	2.23	1.00
13	TRG	DUP 02 DIS	04/04/13 00:00	1.5000	0.9021	911.7462	369.8000	90.04	2.16	1.00
14	DO	FB at PZ-110-SS TOT	04/04/13 09:30	1.5000	0.9028	912.4536	352.6000	85.79	1.43	1.00
15	TRG	FB at PZ-110-SS DIS	04/04/13 09:30	1.5000	0.9009	910.5333	351.7000	85.75	1.49	1.00
16	TRG	MW-103 TOT	04/05/13 09:50	1.5000	0.9040	913.6665	398.7000	96.87	2.08	1.00
17	TRG	MW-103 DIS	04/05/13 09:50	1.5000	0.9061	915.7889	404.1000	97.96	2.08	1.00
18	TRG	PZ-200-SS TOT	04/05/13 11:10	1.5000	0.9030	912.6558	292.5000	71.15	2.37	1.00
19	TRG	PZ-200-SS DIS	04/05/13 11:10	1.5000	0.9015	911.1397	391.8000	95.46	2.77	1.00

33-47

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0325

Spike and Tracer Worksheet

Internal Work Order					Run	Analysis Code				Date	Technician				Technician Initials		Witness Initials	
13-04051					1	Ra226				4/16/2013 8:02	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		
Ra-226	Ra-5b	44.072	4/16/2013	0.500	0.5205				10.33	0.475	0.00	0.000	0.00	0.000	0.00	0.000		

Tracers							Balance Printer Tapes			
fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition	Tracer		LCS	
01	Ba-133	Ba-6a	1010.693	4/16/2013	0.9204	1.0000				
02	Ba-133	Ba-6a	1010.693	4/16/2013	0.9109	1.0000				
03	Ba-133	Ba-6a	1010.693	4/16/2013	0.9127	1.0000				
04	Ba-133	Ba-6a	1010.693	4/16/2013	0.9095	1.0000				
05	Ba-133	Ba-6a	1010.693	4/16/2013	0.9069	1.0000				
06	Ba-133	Ba-6a	1010.693	4/16/2013	0.8979	1.0000				
07	Ba-133	Ba-6a	1010.693	4/16/2013	0.9032	1.0000				
08	Ba-133	Ba-6a	1010.693	4/16/2013	0.9036	1.0000				
09	Ba-133	Ba-6a	1010.693	4/16/2013	0.9058	1.0000				
10	Ba-133	Ba-6a	1010.693	4/16/2013	0.8975	1.0000				
11	Ba-133	Ba-6a	1010.693	4/16/2013	0.9049	1.0000				
12	Ba-133	Ba-6a	1010.693	4/16/2013	0.9032	1.0000				
13	Ba-133	Ba-6a	1010.693	4/16/2013	0.9021	1.0000				
14	Ba-133	Ba-6a	1010.693	4/16/2013	0.9028	1.0000				
15	Ba-133	Ba-6a	1010.693	4/16/2013	0.9009	1.0000				
16	Ba-133	Ba-6a	1010.693	4/16/2013	0.9040	1.0000				
17	Ba-133	Ba-6a	1010.693	4/16/2013	0.9061	1.0000				
18	Ba-133	Ba-6a	1010.693	4/16/2013	0.9030	1.0000				
19	Ba-133	Ba-6a	1010.693	4/16/2013	0.9015	1.0000				

0.9204 g
0.9109 g
-0.9127 g
-0.9095 g
-0.9069 g
-0.8979 g
-0.9032 g
-0.9036 g
-0.9058 g
-0.8975 g
-0.9049 g
-0.9032 g
-0.9028 g
-0.9009 g
-0.9040 g
-0.9061 g
-0.9030 g
-0.9015 g

0.5205 g

0.5152 g

Matrix Spike

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
13-04051	1	Ra226	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					1.5000E+00	1.5000E+00				
03	FB at PZ-110-SS TOT	DUP					1.5000E+00	1.5000E+00				
04	PZ-105-SS TOT	TRG					1.5000E+00	1.5000E+00				
05	PZ-105-SS DIS	TRG					1.5000E+00	1.5000E+00				
06	S-10 TOT	TRG					1.5000E+00	1.5000E+00				
07	S-10 DIS	TRG					1.5000E+00	1.5000E+00				
08	LR-104 TOT	TRG					1.5000E+00	1.5000E+00				
09	LR-104 DIS	TRG					1.5000E+00	1.5000E+00				
10	DUP 01 TOT	TRG					1.5000E+00	1.5000E+00				
11	DUP 01 DIS	TRG					1.5000E+00	1.5000E+00				
12	DUP 02 TOT	TRG					1.5000E+00	1.5000E+00				
13	DUP 02 DIS	TRG					1.5000E+00	1.5000E+00				
14	FB at PZ-110-SS TOT	DO					1.5000E+00	1.5000E+00				
15	FB at PZ-110-SS DIS	TRG					1.5000E+00	1.5000E+00				
16	MW-103 TOT	TRG					1.5000E+00	1.5000E+00				
17	MW-103 DIS	TRG					1.5000E+00	1.5000E+00				
18	PZ-200-SS TOT	TRG					1.5000E+00	1.5000E+00				
19	PZ-200-SS DIS	TRG					1.5000E+00	1.5000E+00				

Comments	
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0527

Technician: _____

JB Date: 4/16/13

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
13-04051	1	Ra226			LWALKER

TRetec Fraction	Engineering Management Support, Inc. Client ID	Sample Type	Carrier Data Carrier Added (ml)	Filter Data			Gravimetric % Recovery
				Filter Tare (g)	Filter Final (g)	Filter Net (g)	
01	LCS	LCS		0.0225	0.0279	0.0054	
02	BLANK	MBL		0.0224	0.0281	0.0057	
03	DUP	DUP		0.0223	0.0272	0.0049	
04	PZ-105-SS TOT	TRG		0.0224	0.0279	0.0055	
05	PZ-105-SS DIS	TRG		0.0229	0.0284	0.0055	
06	S-10 TOT	TRG		0.0229	0.0271	0.0042	
07	S-10 DIS	TRG		0.0228	0.0278	0.0050	
08	LR-104 TOT	TRG		0.0228	0.0293	0.0065	
09	LR-104 DIS	TRG		0.0224	0.0279	0.0055	
10	DUP 01 TOT	TRG		0.0228	0.0287	0.0059	
11	DUP 01 DIS	TRG		0.0225	0.0281	0.0056	
12	DUP 02 TOT	TRG		0.0230	0.0292	0.0062	
13	DUP 02 DIS	TRG		0.0229	0.0289	0.0060	
14	FB at PZ-110-SS TOT	DO		0.0229	0.0274	0.0045	
15	FB at PZ-110-SS DIS	TRG		0.0227	0.0273	0.0046	
16	MW-103 TOT	TRG		0.0227	0.0285	0.0058	
17	MW-103 DIS	TRG		0.0230	0.0288	0.0058	
18	PZ-200-SS TOT	TRG		0.0225	0.0291	0.0066	
19	PZ-200-SS DIS	TRG		0.0228	0.0308	0.0080	

0328

Technician: J. Walker

Date: 4, 18, 13



Sample Description: SPIKE
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-RA
 Sample Identification: 01
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_018
 Chamber Serial Number:
 Detector Serial Number: 18
 Env. Background: System Bkgd 55197
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.910E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/19/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 2:39:26 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
 Counting Efficiency: 0.1776 +/- 0.0033 on 12/15/2012 1:57:26 PM
 Effective Efficiency: 0.1776 +/- 0.0033

Control Certificate Name: Ra226_Ra-5b
 Chem. Recov. of Control: RA-226 0.538658 +/- 0.033780
 Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.527	595.41	8.07	4.59	0.00E+000	6.2
RA-226	4.660	373.15	10.16	0.85	0.00E+000	12.9

 NUCLIDE ANALYSIS RESULTS

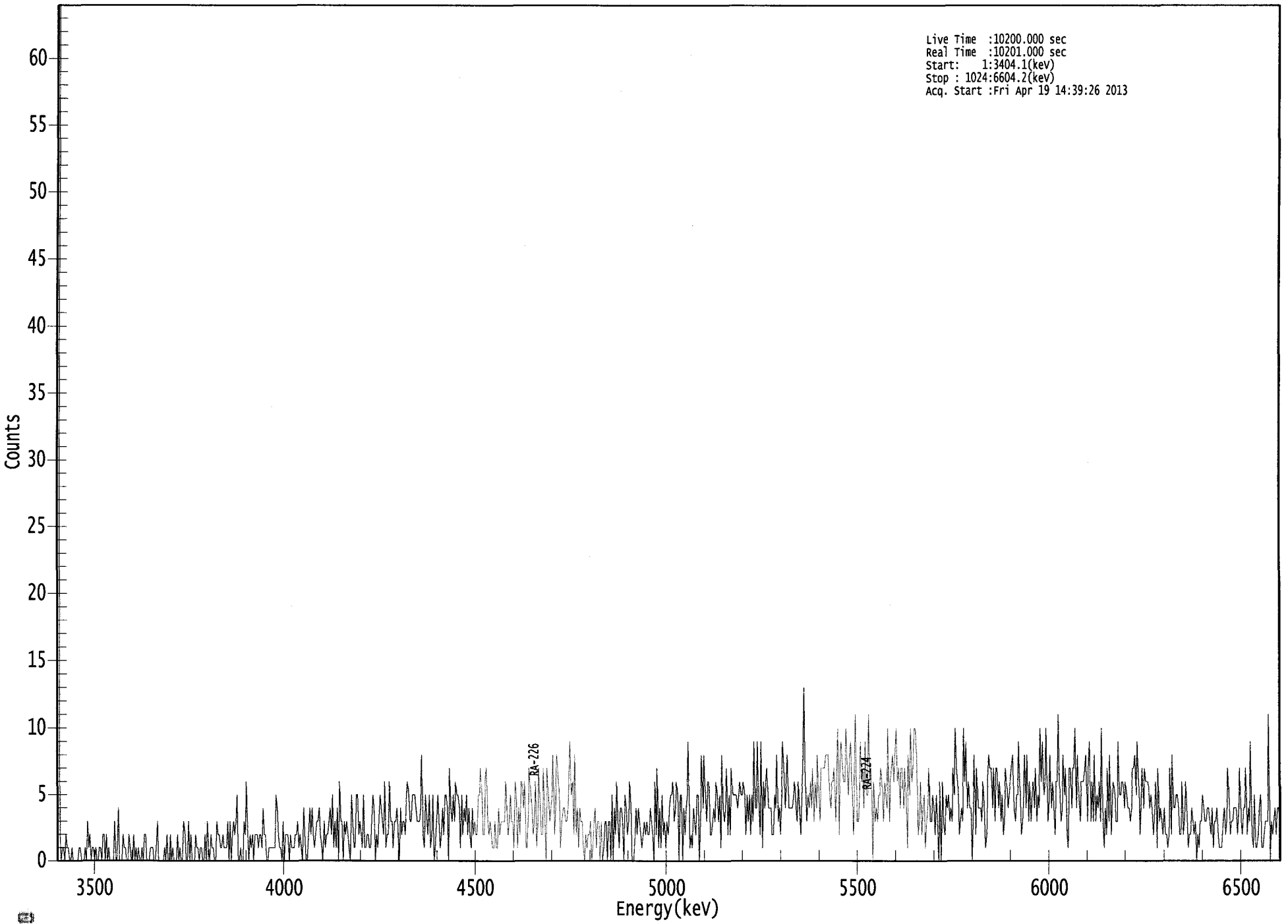
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.968	5685.50*	1.81E+001 +/- 3.57E+002	3.14E-001 +/- 6.20E+000
RA-226	0.980	4785.00*	1.06E+001 +/- 1.15E+000	1.71E-001 +/- 6.22E-003

AG
 4/22/13

US EPA ARCHIVE DOCUMENT

000056044.CNF

Live Time :10200.000 sec
Real Time :10201.000 sec
Start: 1:3404.1(kev)
Stop : 1024:6604.2(kev)
Acq. Start :Fri Apr 19 14:39:26 2013



0000
0000
0000
ROI Type: 1

 ***** 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: 10201

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10201	10200	2	0	1	1	0	2
9:	1	1	0	0	1	0	0	0
17:	0	0	1	1	0	0	0	1
25:	0	3	1	2	0	1	1	0
33:	1	0	0	1	1	0	2	2
41:	0	2	0	1	0	0	0	0
49:	3	0	0	4	0	0	0	2
57:	1	1	0	0	2	1	0	0
65:	2	0	1	0	1	0	0	1
73:	0	2	2	0	0	0	1	1
81:	1	0	0	1	3	0	0	0
89:	0	0	1	0	2	0	0	2
97:	0	1	0	0	0	2	0	1
105:	0	0	3	2	0	0	3	0
113:	2	0	0	0	2	1	1	0
121:	1	1	0	0	2	0	3	1
129:	0	2	1	1	0	0	3	2
137:	2	1	1	2	1	1	1	3
145:	0	3	0	2	3	2	3	5
153:	0	0	1	0	0	3	2	6
161:	2	0	2	1	2	0	2	2
169:	2	1	2	2	1	4	2	2
177:	0	0	1	1	1	1	1	1
185:	5	4	2	1	1	0	3	0
193:	2	2	2	0	2	1	1	1
201:	2	2	3	1	2	1	0	4
209:	2	0	0	2	4	2	4	2
217:	1	2	3	3	4	2	1	0
225:	3	1	2	2	3	4	2	5
233:	1	3	1	4	0	6	3	3
241:	0	3	2	3	2	1	0	5
249:	3	1	1	5	5	2	3	2
257:	1	5	1	1	2	2	1	1
265:	3	5	4	0	2	1	3	5
273:	4	3	2	6	1	2	2	6
281:	3	3	1	3	3	4	2	0
289:	4	2	3	3	2	5	6	5
297:	3	3	5	5	5	4	3	3
305:	3	4	8	2	1	5	3	2
313:	5	1	2	5	0	1	3	5
321:	3	1	2	4	2	5	5	4
329:	0	7	4	3	5	3	6	5
337:	5	4	1	5	2	4	3	5
345:	2	4	2	1	4	2	3	2
353:	2	5	5	7	5	2	2	6
361:	7	3	2	3	2	1	1	3

369: 1 1 4 2 3 3 3 3

Sample Title: 01

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

801: 8 4 3 5 5 9 5 2

Sample Title: 01

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	3	5	8	4	8	3	6	3
817:	5	6	4	7	3	5	4	10
825:	6	9	5	6	10	3	4	8
833:	4	6	4	2	6	6	11	5
841:	3	4	8	5	7	2	1	7
849:	7	4	7	7	10	4	8	5
857:	3	6	6	6	7	8	3	7
865:	9	3	6	3	8	3	5	4
873:	6	3	10	3	1	4	2	7
881:	3	8	2	5	6	5	3	3
889:	9	5	5	6	6	4	6	5
897:	4	4	3	4	7	7	8	5
905:	9	6	2	5	7	4	7	6
913:	6	6	4	5	4	2	4	6
921:	1	7	3	4	3	2	4	2
929:	2	1	2	7	2	8	4	4
937:	5	5	4	2	2	6	2	3
945:	6	4	1	2	2	4	3	2
953:	3	0	2	1	3	3	5	4
961:	3	3	4	4	3	2	4	1
969:	3	3	4	2	1	1	1	3
977:	4	2	3	7	5	2	3	3
985:	4	4	4	2	4	7	3	2
993:	4	4	7	2	4	3	9	2
1001:	1	5	1	1	2	4	5	1
1009:	1	2	3	3	3	11	0	3
1017:	2	3	4	2	4	4	3	4



Sample Description: BLANK
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 02
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_022
 Chamber Serial Number:
 Detector Serial Number: 22
 Env. Background: System Bkgd 55198
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.040E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/19/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 2:39:27 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
 Counting Efficiency: 0.1531 +/- 0.0029 on 12/15/2012 1:57:26 PM
 Effective Efficiency: 0.1531 +/- 0.0029

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.498	5.13	103.36	1.87	0.00E+000	3.1
RA-226	4.646	5.30	99.84	1.70	0.00E+000	6.2

 NUCLIDE ANALYSIS RESULTS

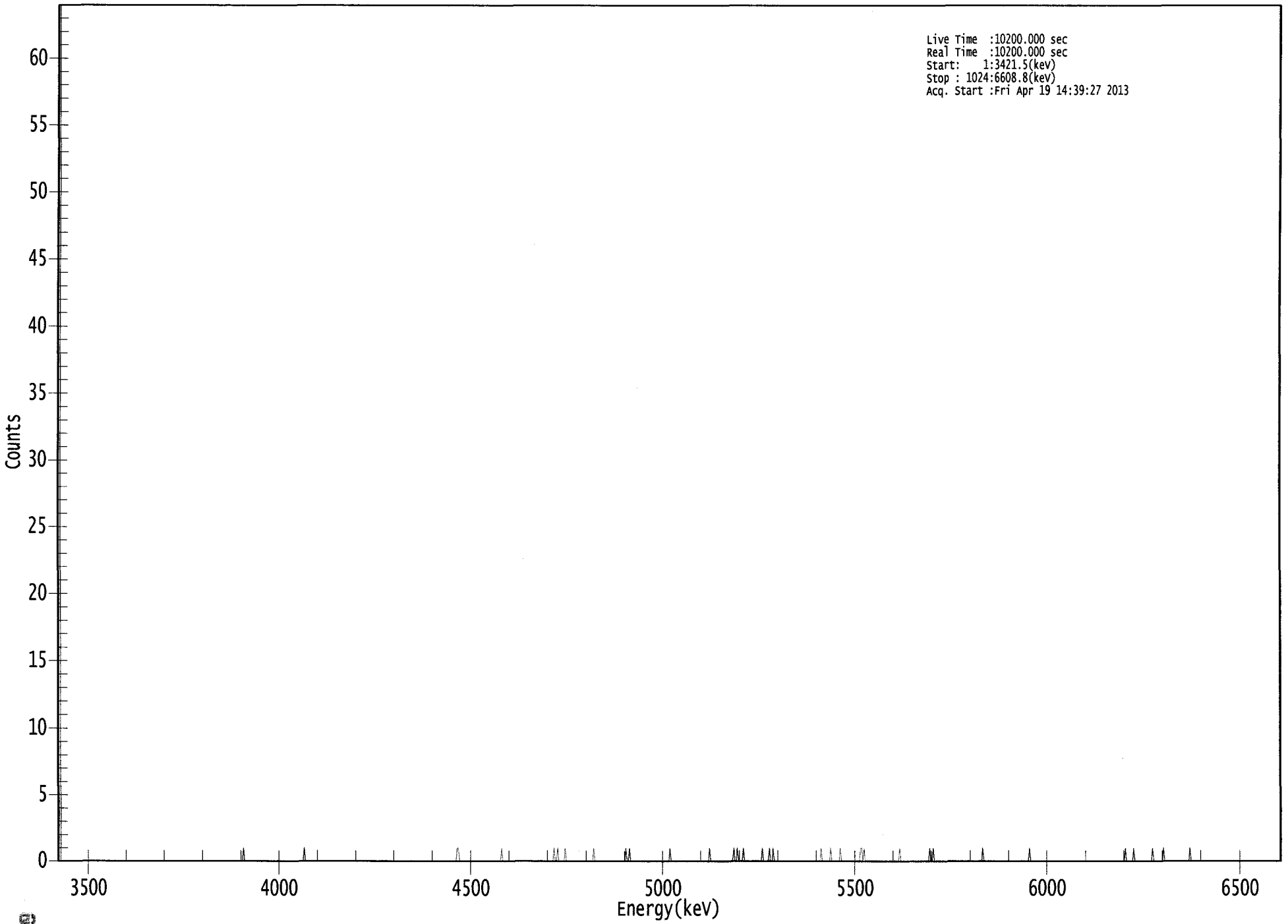
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.955	5685.50*	1.29E-001 +/- 2.55E+000	1.90E-001 +/- 3.75E+000
RA-226	0.975	4785.00*	1.25E-001 +/- 1.25E-001	1.73E-001 +/- 6.45E-003

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US EPA ARCHIVE DOCUMENT

0000055945.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3421.5(kev)
Stop : 1024:6608.8(kev)
Acq. Start :Fri Apr 19 14:39:27 2013



0555

ROI Type: 1

***** 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:	10200	10200	0	0	0	0	0
9:	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0
153:	0	0	0	0	1	0	0
161:	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	1
209:	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	1
337:	1	0	0	0	0	0	0
345:	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0

369: 0 0 0 0 1 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	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:	1	0	0	1	0	0	0	0
425:	0	1	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	1	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	1	0	0	1
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	0	0
561:	0	0	0	0	0	0	1	0
569:	0	1	0	0	0	0	1	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	1	0
593:	0	0	0	0	1	0	0	1
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	1
641:	0	0	0	0	0	0	0	1
649:	0	0	0	0	0	0	0	1
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	1	1	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	1	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	1	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	1	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	1	0
817:	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0
889:	0	0	0	0	0	1	0
897:	0	0	0	0	1	0	0
905:	0	0	0	0	0	0	0
913:	0	0	0	0	1	0	0
921:	0	0	0	0	0	1	0
929:	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0
945:	0	0	0	1	0	0	0
953:	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0



Sample Description: FB AT PZ-110-SS TOT-DUP
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 03
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_024
 Chamber Serial Number:
 Detector Serial Number: 24
 Env. Background: System Bkgd 55199
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.660E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 2:39:28 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9323 +/- 0.0000
 Counting Efficiency: 0.1710 +/- 0.0032 on 12/15/2012 2:02:15 PM
 Effective Efficiency: 0.1594 +/- 0.0030

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.565	4.43	129.80	3.57	0.00E+000	3.1
RA-226	4.710	-1.38	168.33	2.38	0.00E+000	3.1

 NUCLIDE ANALYSIS RESULTS

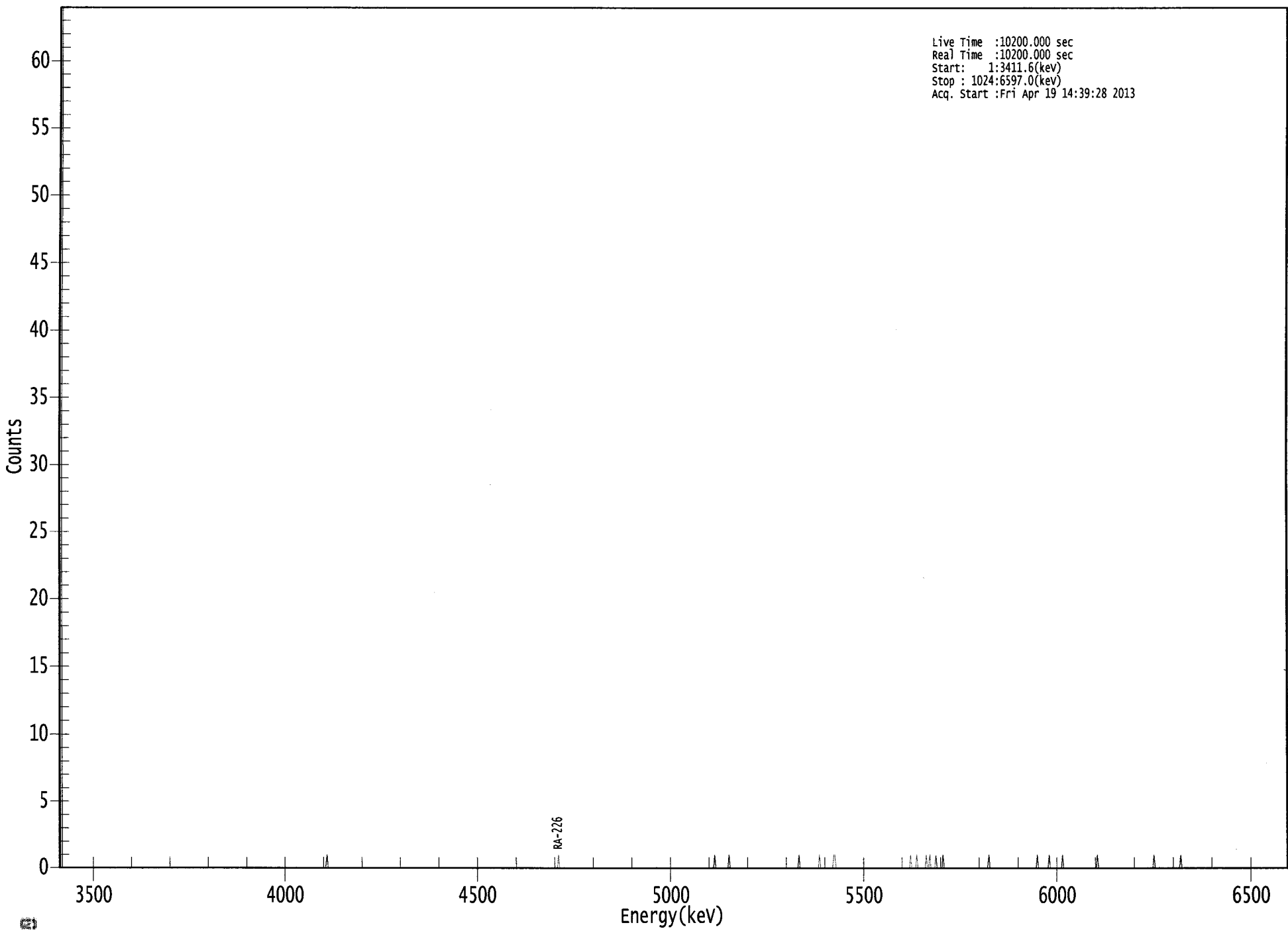
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.981	5685.50*	1.05E-001 +/- 2.93E+001	2.24E-001 +/- 6.24E+001
RA-226	0.993	4785.00*	-2.54E-002 +/- 4.27E-002	1.51E-001 +/- 5.52E-003

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US EPA ARCHIVE DOCUMENT

000055946.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3411.6(kev)
Stop : 1024:6597.0(kev)
Acq. Start :Fri Apr 19 14:39:28 2013



03
04
05
ROI Type: 1

 ***** 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:	10200	10200	0	0	0	0	0
9:	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0
225:	1	0	0	0	0	0	0
233:	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0

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	1	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	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	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	1	0	0	0	0
553:	0	0	0	0	0	0	0	1
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	1	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	1	0	0	0	0	0
641:	0	0	0	0	0	0	1	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	0
705:	0	0	0	0	0	0	1	0
713:	0	0	0	1	0	0	0	0
721:	0	0	0	1	0	0	1	0
729:	0	0	0	1	0	0	0	0
737:	0	1	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	1
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 0

Sample Title: 03

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	1
817:	0	0	0	0	0	0	0	0
825:	0	1	0	0	0	0	0	0
833:	0	0	0	0	1	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	1	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:	1	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	1	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



Sample Description: PZ-105-SS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 04
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_025
 Chamber Serial Number:
 Detector Serial Number: 25
 Env. Background: System Bkgd 55200
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.950E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 2:39:28 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8762 +/- 0.0000
 Counting Efficiency: 0.1736 +/- 0.0032 on 12/15/2012 1:57:27 PM
 Effective Efficiency: 0.1521 +/- 0.0028

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.506	17.47	49.24	1.53	0.00E+000	4.7
RA-226	4.615	79.15	22.17	0.85	0.00E+000	4.7

 ----- NUCLIDE ANALYSIS RESULTS -----

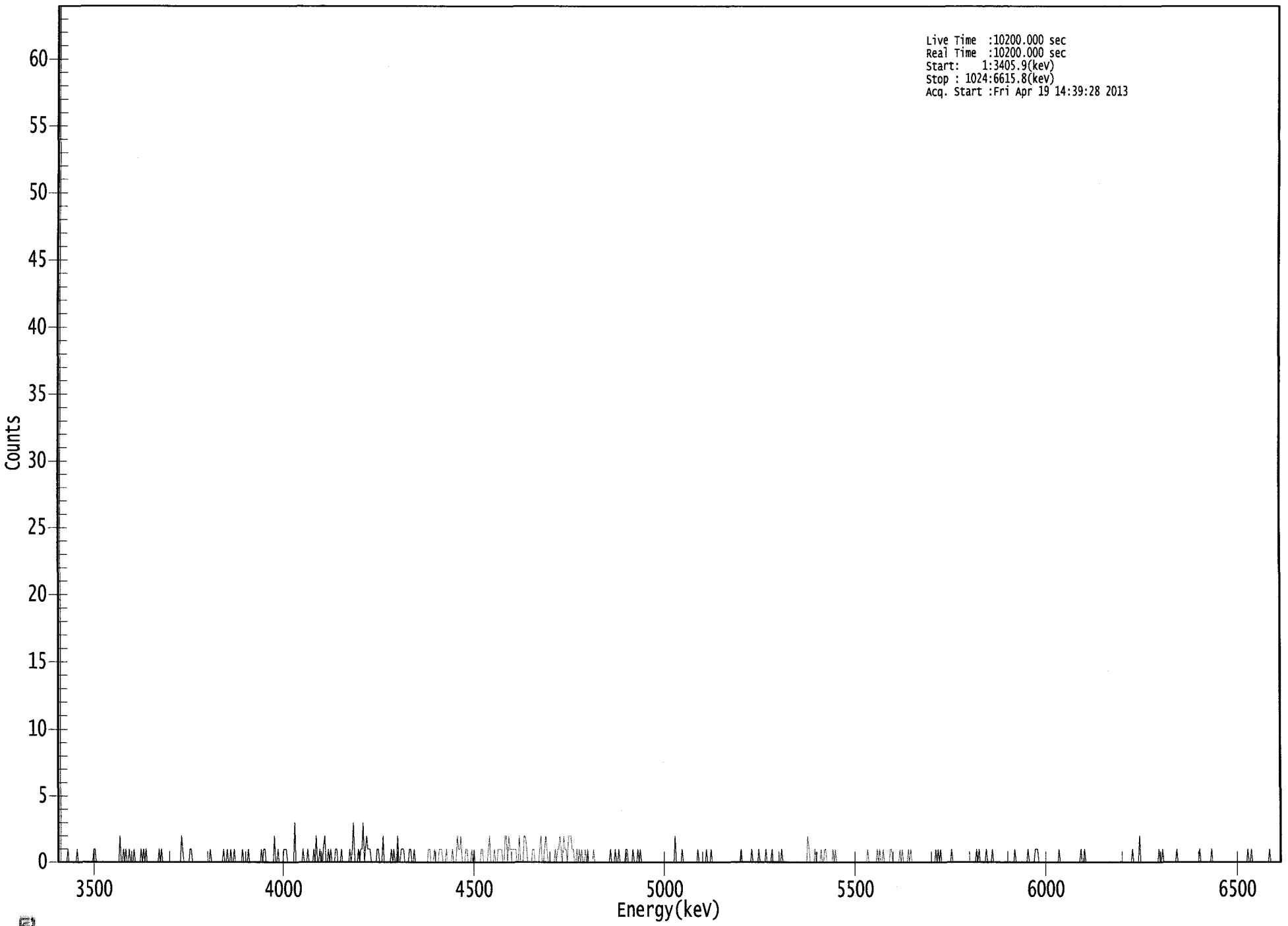
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.959	5685.50*	5.10E-001 +/- 1.42E+002	2.08E-001 +/- 5.79E+001
RA-226	0.963	4785.00*	1.79E+000 +/- 4.03E-001	1.36E-001 +/- 4.95E-003

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US EPA ARCHIVE DOCUMENT

000055947.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3405.9(kev)
Stop : 1024:6615.8(kev)
Acq. Start :Fri Apr 19 14:39:28 2013



0515
0415

ROI Type: 1

 ***** 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:	10200	10200	0	0	0	0	0	0
9:	1	0	0	0	0	0	0	0
17:	1	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	1	1
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	2	0	0	1
57:	0	1	0	0	1	0	0	0
65:	1	0	0	0	0	0	1	0
73:	1	0	1	0	0	0	0	0
81:	0	0	0	0	0	1	0	1
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	2	1	0	0	0	0	0	1
113:	1	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	1	0	0	1	0
145:	0	1	0	0	1	0	0	0
153:	0	0	0	1	0	0	0	0
161:	1	0	0	0	0	0	0	0
169:	0	0	0	1	0	1	1	0
177:	0	0	0	0	0	0	2	0
185:	0	1	0	0	0	0	1	1
193:	1	0	0	0	0	0	0	3
201:	0	0	0	0	0	0	1	0
209:	0	0	1	0	0	0	0	1
217:	0	2	0	0	1	0	0	1
225:	2	0	0	1	0	1	0	0
233:	0	1	1	0	0	0	1	0
241:	0	0	0	0	0	1	0	1
249:	3	0	0	0	1	0	1	1
257:	3	0	1	2	1	1	1	0
265:	0	0	0	0	1	1	0	0
273:	0	2	0	0	0	0	0	0
281:	1	0	1	0	0	2	0	0
289:	1	1	1	0	0	0	0	1
297:	1	0	0	1	0	0	0	0
305:	0	0	0	0	0	0	0	1
313:	1	0	0	0	1	0	0	0
321:	1	1	1	0	0	0	1	0
329:	0	0	0	1	0	0	0	2
337:	1	1	2	0	0	0	1	1
345:	0	0	0	1	0	1	0	0
353:	0	0	0	1	1	0	0	0
361:	0	1	2	0	0	0	1	0

369: 0 1 1 1 1 0 0 2

Sample Title: 04

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

801: 0 1 0 0 0 0 0 0 0

Sample Title: 04

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	1	0	0	0
817:	0	0	1	1	1	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	1	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	1	0	0	1	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	1	0	0	0	0
905:	0	2	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	1	0	0	1	0	0	0
929:	0	0	0	0	0	0	0	0
937:	1	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	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	1	0	0	1	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	1	0	0
1017:	0	0	0	0	0	0	0	0



Sample Description: PZ-105-SS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 05
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_027
 Chamber Serial Number:
 Detector Serial Number: 27
 Env. Background: System Bkgd 55201
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.950E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 2:39:29 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8865 +/- 0.0000
 Counting Efficiency: 0.1728 +/- 0.0032 on 12/15/2012 2:27:41 PM
 Effective Efficiency: 0.1531 +/- 0.0029

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.503	15.81	51.42	1.19	0.00E+000	3.2
RA-226	4.605	54.13	27.17	1.87	0.00E+000	3.2

 NUCLIDE ANALYSIS RESULTS

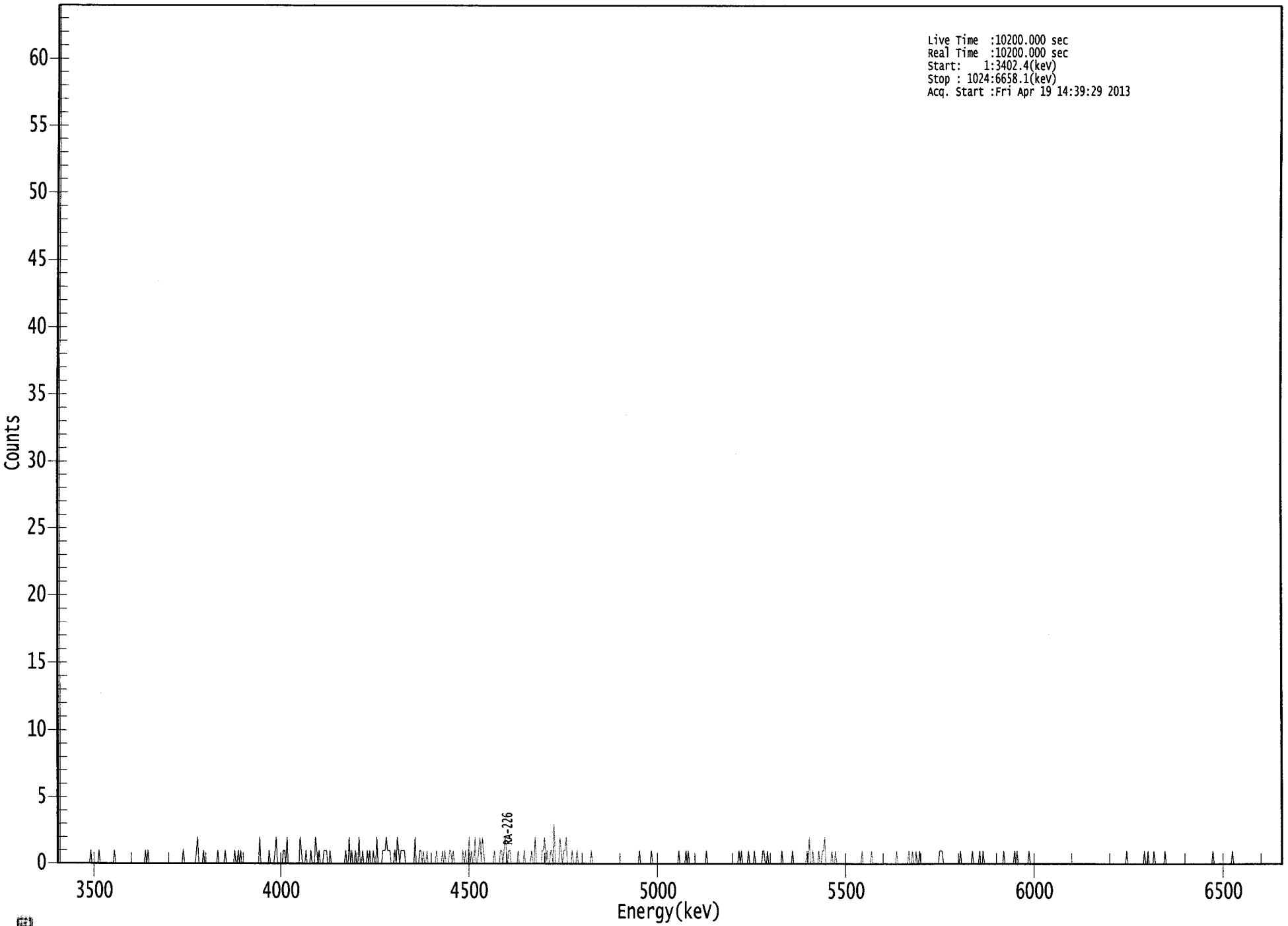
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.957	5685.50*	4.58E-001 +/- 1.28E+002	1.91E-001 +/- 5.33E+001
RA-226	0.959	4785.00*	1.22E+000 +/- 3.34E-001	1.70E-001 +/- 6.26E-003

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US EPA ARCHIVE DOCUMENT

000055948.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3402.4(kev)
Stop : 1024:6658.1(kev)
Acq. Start :Fri Apr 19 14:39:29 2013



0000

ROI Type: 1

 ***** 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:	10200	10200	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	1	0	0	0
33:	0	0	0	1	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	1	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	1	0	1	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	1	2	0
121:	0	0	0	1	0	0	0	0
129:	0	0	0	0	0	0	0	1
137:	0	0	0	0	0	1	0	0
145:	0	0	0	0	0	1	0	0
153:	1	0	1	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	2	0	0	0	0	0
177:	0	0	1	0	0	0	0	1
185:	2	0	0	0	0	0	1	1
193:	0	2	0	0	0	0	0	0
201:	0	0	0	0	2	1	0	0
209:	0	1	0	0	0	1	0	0
217:	0	2	1	0	1	0	0	0
225:	1	1	1	0	0	1	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	1	0	0	2	0	1
249:	0	0	1	0	0	2	0	0
257:	1	0	0	0	1	0	1	0
265:	0	1	0	0	2	0	0	0
273:	0	1	1	1	2	1	1	1
281:	0	0	0	1	0	2	1	0
289:	1	1	1	1	0	0	0	0
297:	0	0	0	0	2	0	0	0
305:	1	1	0	1	0	0	1	0
313:	0	0	0	0	0	0	1	0
321:	0	0	0	1	0	1	0	0
329:	0	1	1	0	1	0	0	0
337:	0	0	0	0	1	0	1	0
345:	0	2	0	1	0	0	2	0
353:	0	1	2	0	2	1	0	0
361:	0	0	0	0	0	0	1	0

369: 0 0 0 1 1 0 1 2

Sample Title: 05

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	1	0	1	1	0	0	0	0
385:	0	0	1	0	0	0	0	1
393:	0	0	0	0	0	1	0	0
401:	2	0	0	0	0	0	1	1
409:	2	0	1	0	0	1	1	0
417:	3	0	0	0	0	2	1	0
425:	1	1	2	0	0	0	0	1
433:	0	0	0	1	0	0	0	0
441:	0	0	0	0	0	0	0	1
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	1
489:	0	0	0	0	0	0	0	0
497:	0	1	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:	1	0	0	0	0	0	1	0
529:	1	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	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	1	0	1	0	0	0
577:	0	0	1	0	0	0	0	1
585:	0	0	0	0	0	0	1	1
593:	0	0	1	0	0	0	0	0
601:	0	0	0	0	0	0	1	0
609:	0	0	0	0	0	0	0	1
617:	0	0	0	0	0	0	0	0
625:	0	0	0	1	0	2	0	0
633:	1	0	0	0	0	1	0	0
641:	1	1	2	0	0	0	0	0
649:	1	0	0	1	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	1	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	1	0
705:	0	0	0	0	0	0	0	0
713:	1	0	0	1	0	0	1	0
721:	0	1	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	1	1	1	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	1	0	0	0	0
761:	0	0	0	0	0	1	0	0
769:	0	0	0	1	0	0	1	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	1
793:	0	0	0	0	0	0	0	0

801: 1 0 1 0 0 0 0 0

Sample Title: 05

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	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	1	0	0	1
913:	0	0	0	0	1	0	0	0
921:	0	0	0	0	0	1	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	1	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	1	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



Sample Description: S-10 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 06
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_029
 Chamber Serial Number:
 Detector Serial Number: 29
 Env. Background: System Bkgd 55202
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.250E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 2:39:30 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.7297 +/- 0.0000
 Counting Efficiency: 0.1945 +/- 0.0036 on 12/15/2012 2:30:02 PM
 Effective Efficiency: 0.1420 +/- 0.0026

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.505	3.13	144.40	1.87	0.00E+000	6.2
RA-226	4.492	1.98	176.34	1.02	0.00E+000	3.1

 ----- NUCLIDE ANALYSIS RESULTS -----

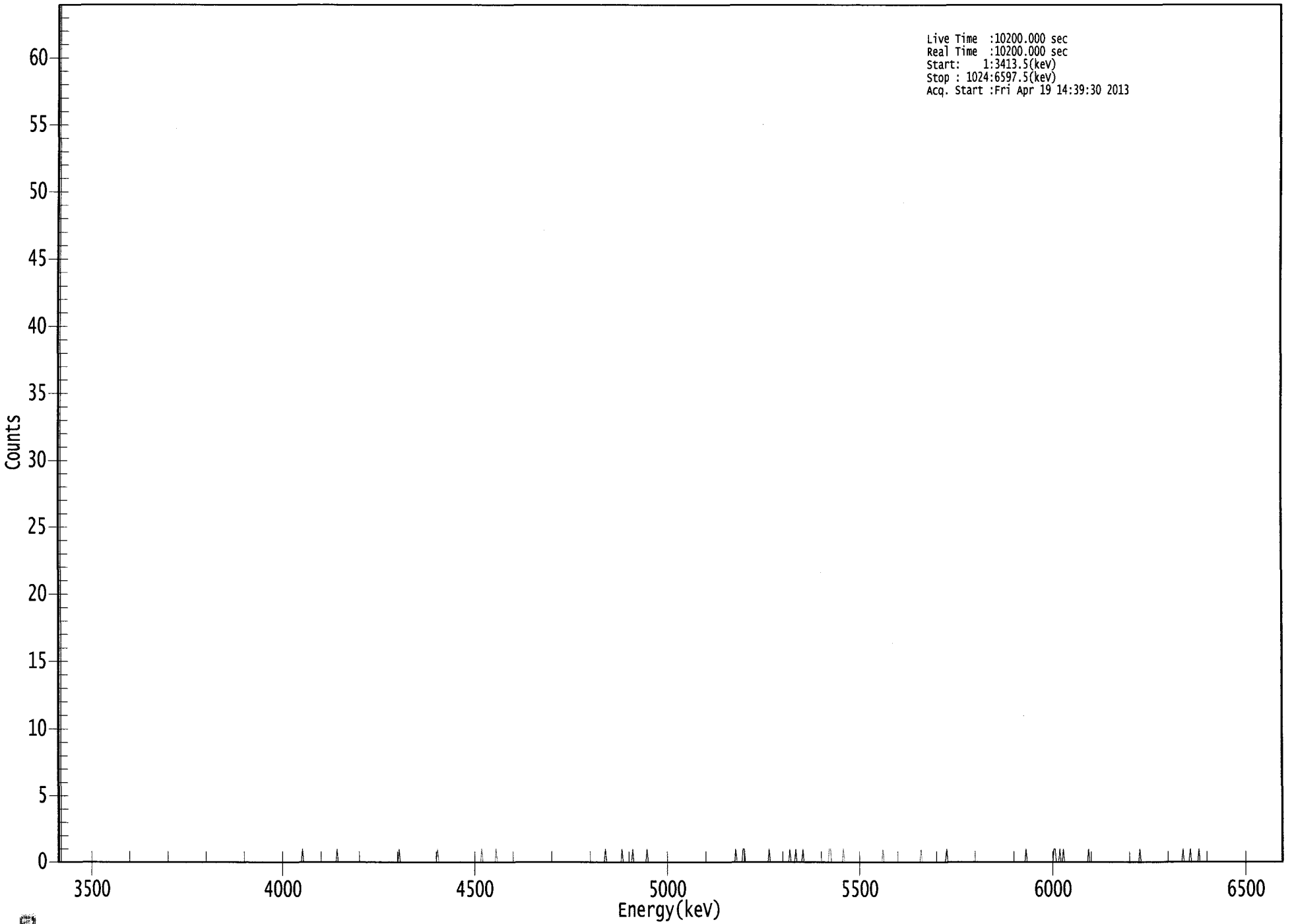
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.958	5685.50*	6.28E-002 +/- 1.75E+001	1.52E-001 +/- 4.24E+001
RA-226	0.894	4785.00*	3.08E-002 +/- 5.43E-002	9.80E-002 +/- 3.53E-003

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US EPA ARCHIVE DOCUMENT

0000055949.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3413.5(kev)
Stop : 1024:6597.5(kev)
Acq. Start :Fri Apr 19 14:39:30 2013



ROI Type: 1

***** 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:	10200	10200	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	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	0
225:	0	0	0	0	0	0	0	0
233:	0	0	1	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	1	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	1	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	1	0	0	0	0
361:	0	0	0	0	0	0	0	1

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	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	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:	1	0	0	0	0	0	0	0
481:	0	1	0	0	0	0	0	0
489:	0	0	0	0	0	1	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	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	1
569:	0	0	0	0	0	1	1	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	1	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	1	0	0	0
617:	0	1	0	0	0	0	0	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	1	1	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	1	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	1	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	1
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: 06

Channel	1	2	3	4	5	6	7	8
809:	0	1	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:	1	1	0	0	0	1	0	0
841:	1	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	1	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:	1	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	1	0	0	0
945:	0	0	1	0	0	0	0	0
953:	0	1	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



Sample Description: S-10 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 07
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_033
 Chamber Serial Number: 04026479A
 Detector Serial Number: 91132
 Env. Background: System Bkgd 55203
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.710E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:27 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.9574 +/- 0.0000
 Counting Efficiency: 0.1825 +/- 0.0032 on 12/16/2012 5:49:18 PM
 Effective Efficiency: 0.1747 +/- 0.0031

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.517	1.81	193.78	1.19	0.00E+000	3.0
RA-226	4.701	0.49	416.98	0.51	0.00E+000	3.0

 ----- NUCLIDE ANALYSIS RESULTS -----

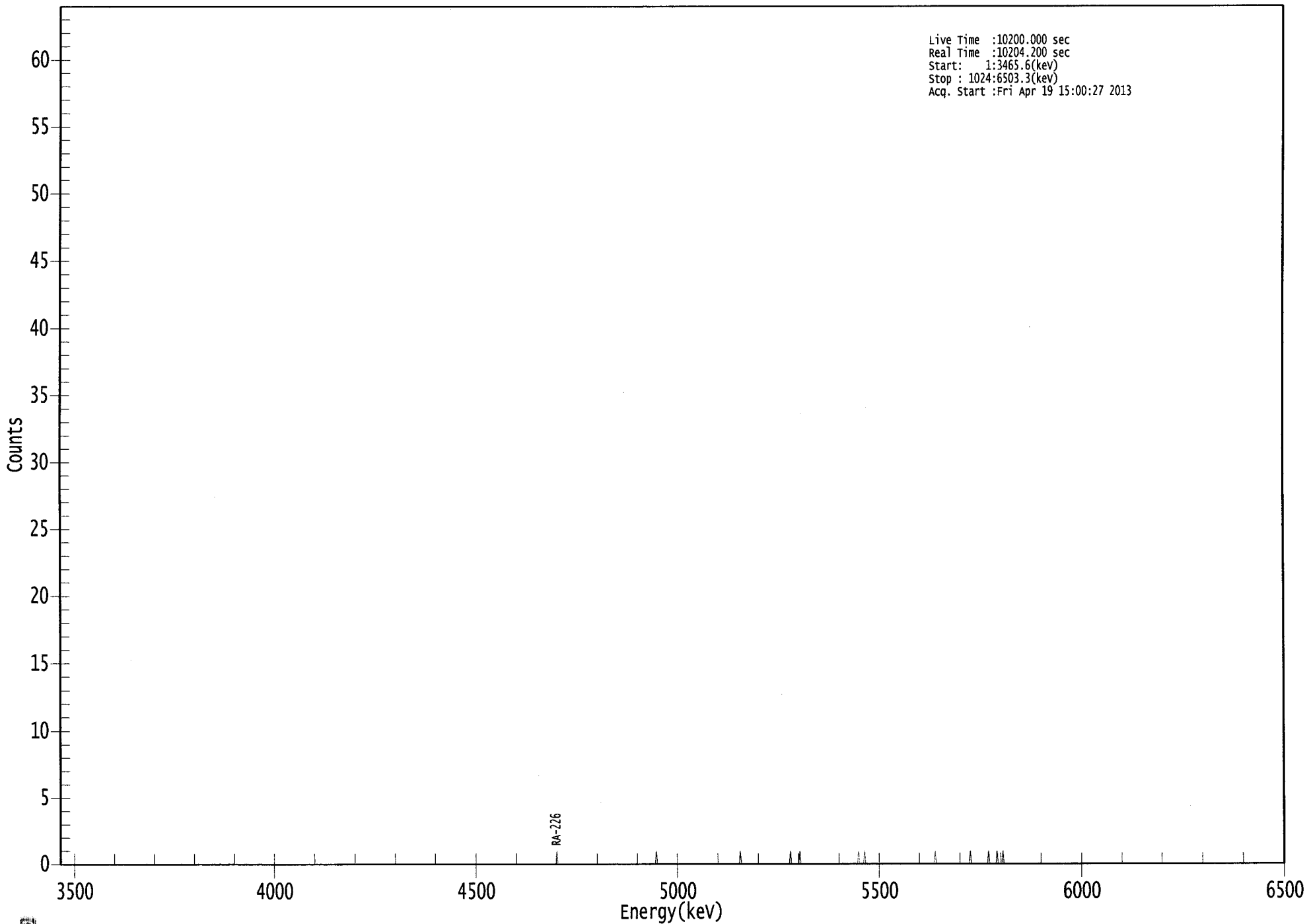
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.963	5685.50*	4.05E-002 +/- 1.14E+001	1.47E-001 +/- 4.16E+001
RA-226	0.991	4785.00*	8.47E-003 +/- 3.53E-002	9.07E-002 +/- 3.12E-003

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 4/22/13

US EPA ARCHIVE DOCUMENT

0000055951.CNF

Live Time :10200.000 sec
Real Time :10204.200 sec
Start: 1:3465.6(kev)
Stop : 1024:6503.3(kev)
Acq. Start :Fri Apr 19 15:00:27 2013



0360
0960
ROI Type: 1

***** 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: 10204

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	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	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	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 0

Sample Title: 07

Channel	1	2	3	4	5	6	7	8
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:	1	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	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	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	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	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	1	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	1	0	0	0	0
617:	0	0	0	1	0	0	0	0
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	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	1	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	1	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	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	1	0	0	0	0	0	0	1
785:	0	0	0	0	1	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



Sample Description: LR-104 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 08
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_034
 Chamber Serial Number: 04026479B
 Detector Serial Number: 91136
 Env. Background: System Bkgd 55204
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.340E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:29 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.8719 +/- 0.0000
 Counting Efficiency: 0.1856 +/- 0.0032 on 12/16/2012 5:49:43 PM
 Effective Efficiency: 0.1618 +/- 0.0028

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.563	14.49	52.54	0.51	0.00E+000	3.0
RA-226	4.562	24.66	39.79	0.34	0.00E+000	3.0

 ----- NUCLIDE ANALYSIS RESULTS -----

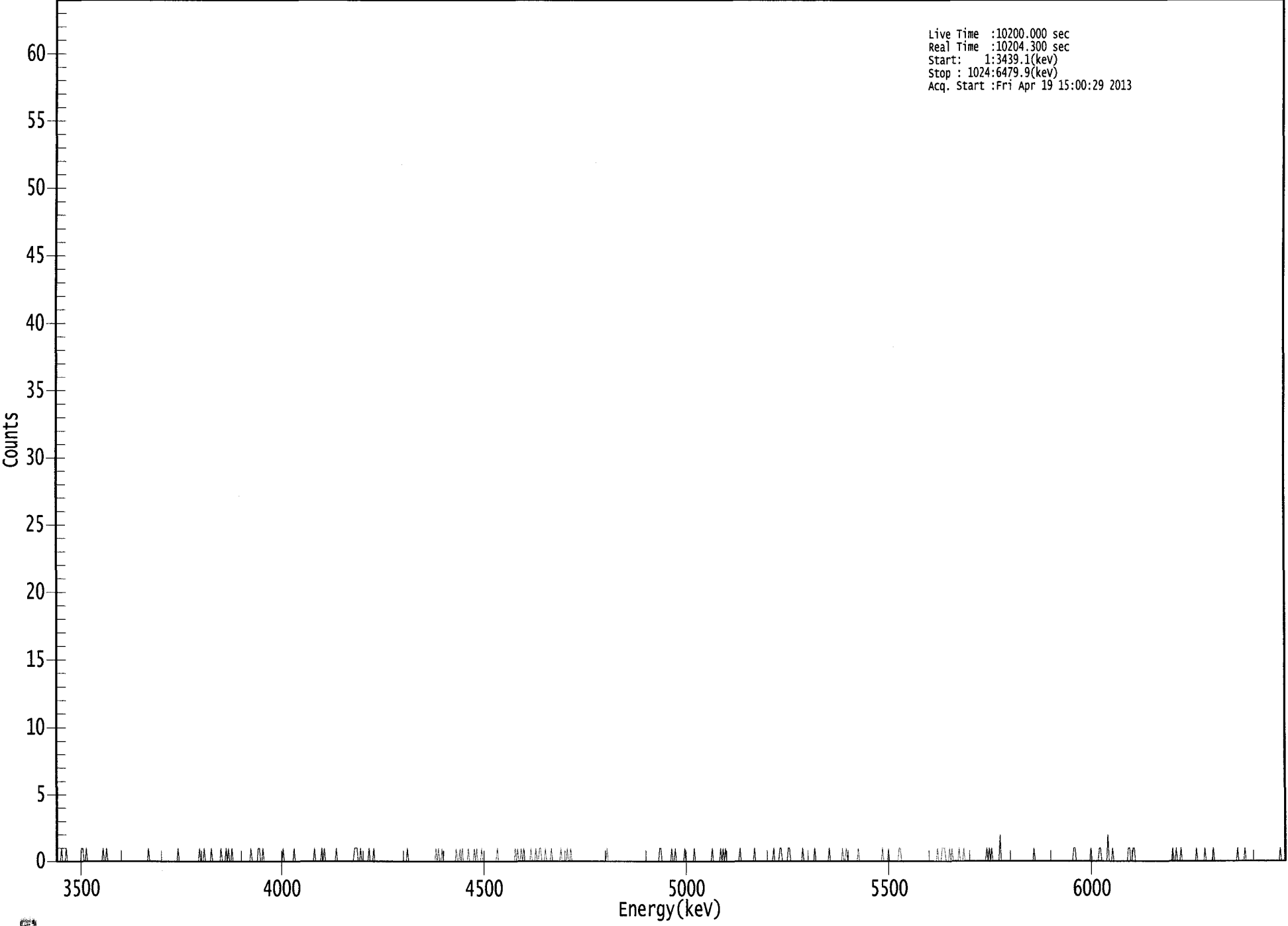
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.980	5685.50*	4.79E-001 +/- 1.35E+002	1.73E-001 +/- 4.90E+001
RA-226	0.937	4785.00*	6.30E-001 +/- 2.52E-001	1.22E-001 +/- 4.17E-003

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US EPA ARCHIVE DOCUMENT

0000055952.CNF

Live Time :10200.000 sec
Real Time :10204.300 sec
Start: 1:3439.1(kev)
Stop : 1024:6479.9(kev)
Acq. Start :Fri Apr 19 15:00:29 2013



0000055952
ROI Type: 1

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

Sample Title: 08

Elapsed Live time: 10200

Elapsed Real Time: 10204

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	1	0	0	0
9:	1	0	0	0	0	0	0	0
17:	0	0	0	0	0	1	1	0
25:	0	1	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	1
41:	0	0	1	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	0	0	0	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	1	0	0	0	1	0	0	0
129:	0	0	1	0	0	0	0	0
137:	0	0	1	0	0	0	1	0
145:	1	0	0	1	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	1	0	0	0	0
169:	0	1	1	0	0	1	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	1	0
193:	0	0	0	0	0	0	0	1
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	1	0	0	0	0	0	1	0
225:	1	0	0	0	0	0	0	0
233:	0	0	1	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	1	1	1	0	0	1	0
257:	0	0	0	0	0	1	0	0
265:	0	1	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	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	1	0	1
321:	0	0	1	0	0	0	0	0
329:	0	0	0	0	0	0	1	0
337:	0	1	0	1	0	0	0	0
345:	1	0	0	0	0	1	0	1
353:	0	0	0	1	0	0	0	0
361:	0	0	0	0	0	0	0	0

369: 1 0 0 0 0 0 0 0 0

Sample Title: 08

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	1
385:	0	1	0	0	1	0	1	0
393:	0	0	0	0	1	0	0	0
401:	1	0	0	1	1	0	0	0
409:	1	0	0	0	0	1	0	0
417:	0	0	0	0	0	1	0	0
425:	0	0	1	0	0	1	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	0	1	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	1
505:	1	0	0	0	0	0	0	0
513:	0	1	0	0	1	0	0	0
521:	0	0	0	0	1	0	0	0
529:	0	0	0	0	1	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	1	0	0	0	0
553:	0	0	1	0	1	0	1	0
561:	0	0	0	0	0	0	0	0
569:	0	0	1	0	0	0	0	0
577:	0	0	0	0	0	0	1	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	1	0
601:	0	0	0	1	1	0	0	0
609:	0	0	1	1	0	0	0	0
617:	0	0	0	0	0	0	1	0
625:	0	0	0	0	0	0	0	0
633:	1	0	0	0	0	0	0	0
641:	0	0	0	0	1	0	0	0
649:	0	0	0	0	0	0	0	1
657:	0	0	1	0	0	0	0	0
665:	0	0	0	0	1	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	1	0	0	0	0	1	0	0
697:	0	0	0	0	0	0	1	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	0	0	0
729:	0	0	0	0	0	0	1	0
737:	0	0	1	1	1	0	0	0
745:	1	0	1	0	0	0	0	0
753:	1	0	0	0	1	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	1
777:	0	1	0	1	0	0	0	0
785:	0	0	2	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 08

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	1	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:	1	0	0	0	0	0	0	0
857:	0	0	0	0	0	1	0	0
865:	0	0	0	0	1	1	0	0
873:	0	0	0	2	0	0	0	1
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	1	1	0	0
897:	1	1	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	1	0	0	1	0	0	0
937:	1	0	0	0	0	0	0	0
945:	0	0	0	0	0	1	0	0
953:	0	0	0	0	1	0	0	0
961:	0	0	0	1	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	1
985:	0	0	0	0	0	1	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	1	0	0	0	0	0



Sample Description: LR-104 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 09
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_035
 Chamber Serial Number: 04026477A
 Detector Serial Number: 58771
 Env. Background: System Bkgd 55205
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.950E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:31 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.9484 +/- 0.0000
 Counting Efficiency: 0.1826 +/- 0.0032 on 12/16/2012 5:49:42 PM
 Effective Efficiency: 0.1732 +/- 0.0030

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.519	12.00	58.89	0.00	0.00E+000	2.9
RA-226	4.623	19.49	45.07	0.51	0.00E+000	2.9

 NUCLIDE ANALYSIS RESULTS

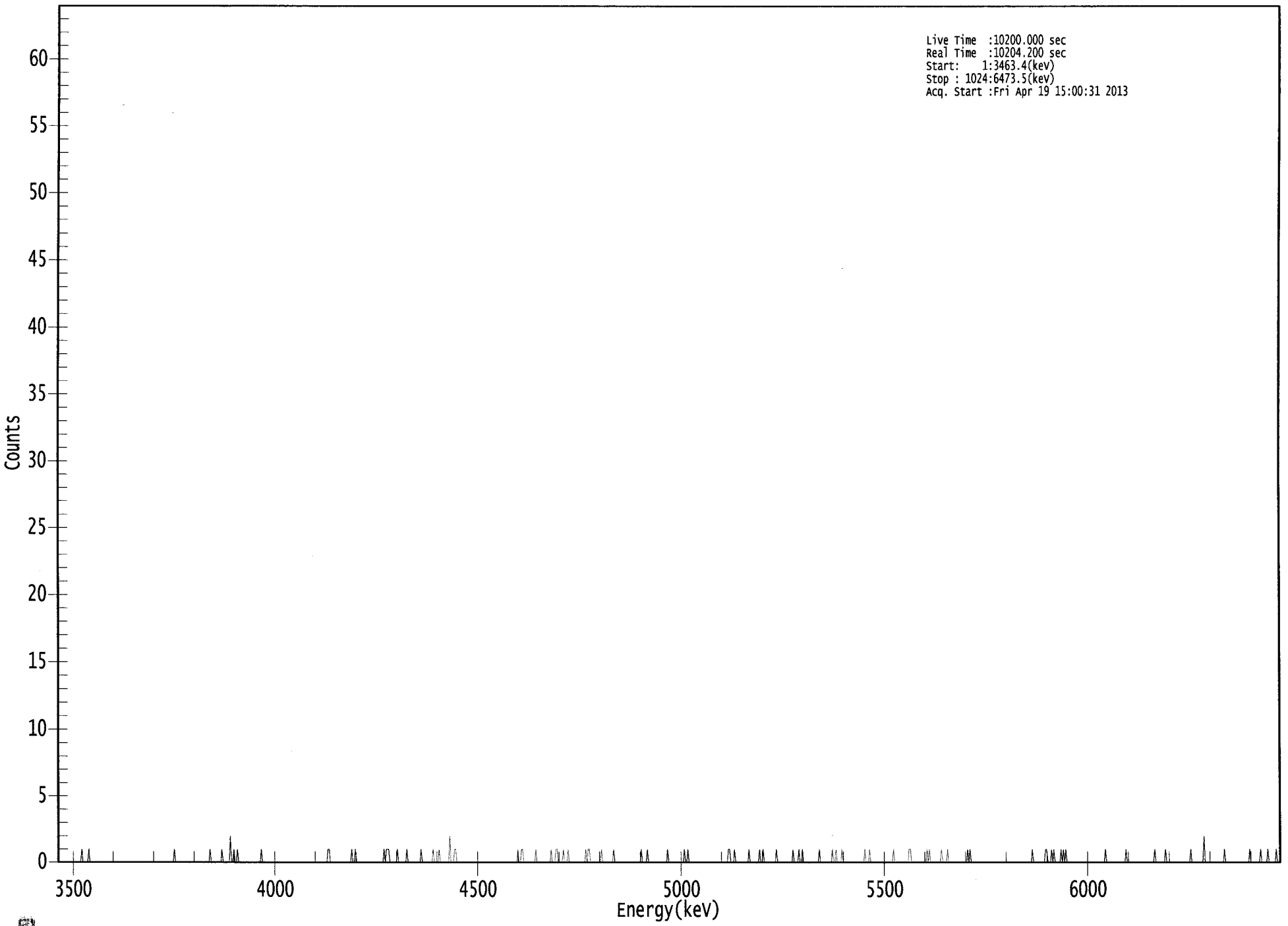
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.964	5685.50*	3.09E-001 +/- 8.73E+001	1.54E-001 +/- 4.36E+001
RA-226	0.966	4785.00*	3.88E-001 +/- 1.75E-001	1.04E-001 +/- 3.57E-003

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 4/22/13

US EPA ARCHIVE DOCUMENT

0000055953.CNF

Live Time :10200.000 sec
Real Time :10204.200 sec
Start: 1:3463.4(kev)
Stop : 1024:6473.5(kev)
Acq. Start :Fri Apr 19 15:00:31 2013



0270

ROI Type: 1

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

Sample Title: 09

Elapsed Live time: 10200

Elapsed Real Time: 10204

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	1	0	0	0
25:	0	0	1	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	1	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:	1	0	0	0	0	0	0	0
137:	0	0	1	0	0	0	0	0
145:	0	2	0	0	1	0	0	1
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	1	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	1	1	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	1
249:	0	0	1	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	1	1	1	0
281:	0	0	0	0	0	1	0	0
289:	0	0	0	0	0	1	0	0
297:	0	0	0	0	0	0	0	0
305:	0	1	0	0	0	0	0	0
313:	0	0	0	1	0	0	0	0
321:	1	0	0	0	0	0	0	0
329:	0	2	0	0	0	1	1	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 0

Sample Title: 09

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	0	1	0	0	1	1	0
393:	0	0	0	0	0	0	0	0
401:	0	1	0	0	0	0	0	0
409:	0	0	0	0	0	0	1	0
417:	0	0	1	1	0	0	0	0
425:	1	0	0	0	1	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	1	0	1	1	0
449:	0	0	0	0	0	0	0	0
457:	1	0	0	0	0	0	0	0
465:	0	0	1	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	1	0	0	0	0	1	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	1
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	1	0	0
529:	1	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	1	1	0	0	0	1
569:	0	0	0	0	0	0	0	0
577:	0	0	0	1	0	0	0	0
585:	0	0	0	0	1	0	0	1
593:	0	0	0	0	0	0	0	0
601:	0	0	1	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	1	0	0	0	0	1	0	0
625:	1	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	1	0
641:	0	0	0	0	0	0	0	0
649:	0	1	0	0	1	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	1	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	1	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	1	1	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	1	0	1	0	0	0	0	0
737:	0	0	0	0	1	0	0	0
745:	0	1	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	1	0	1	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: 09

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	1	0	0	0	0	0	0	0
825:	0	0	0	1	1	0	0	0
833:	1	0	1	0	0	0	0	0
841:	1	0	1	0	1	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	1	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	1	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	1	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	1	0	0	0
953:	0	0	0	0	0	0	0	2
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	1	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	1	0	0
1001:	0	0	0	0	0	0	1	0
1009:	0	0	0	0	1	0	0	0
1017:	0	0	0	1	0	0	0	0



Sample Description: DUP 01 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 10
 Sample Geometry: Shelf 2
 Procedure Description: Ra

 Detector Name: Alpha_037
 Chamber Serial Number: 04026478A
 Detector Serial Number: 91133
 Env. Background: System Bkgd 55207
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.120E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:32 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.9555 +/- 0.0000
 Counting Efficiency: 0.1783 +/- 0.0033 on 1/26/2013 3:28:25 PM
 Effective Efficiency: 0.1704 +/- 0.0032

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.545	3.66	107.87	0.34	0.00E+000	2.9
RA-226	4.524	14.49	52.54	0.51	0.00E+000	2.9

 ----- NUCLIDE ANALYSIS RESULTS -----

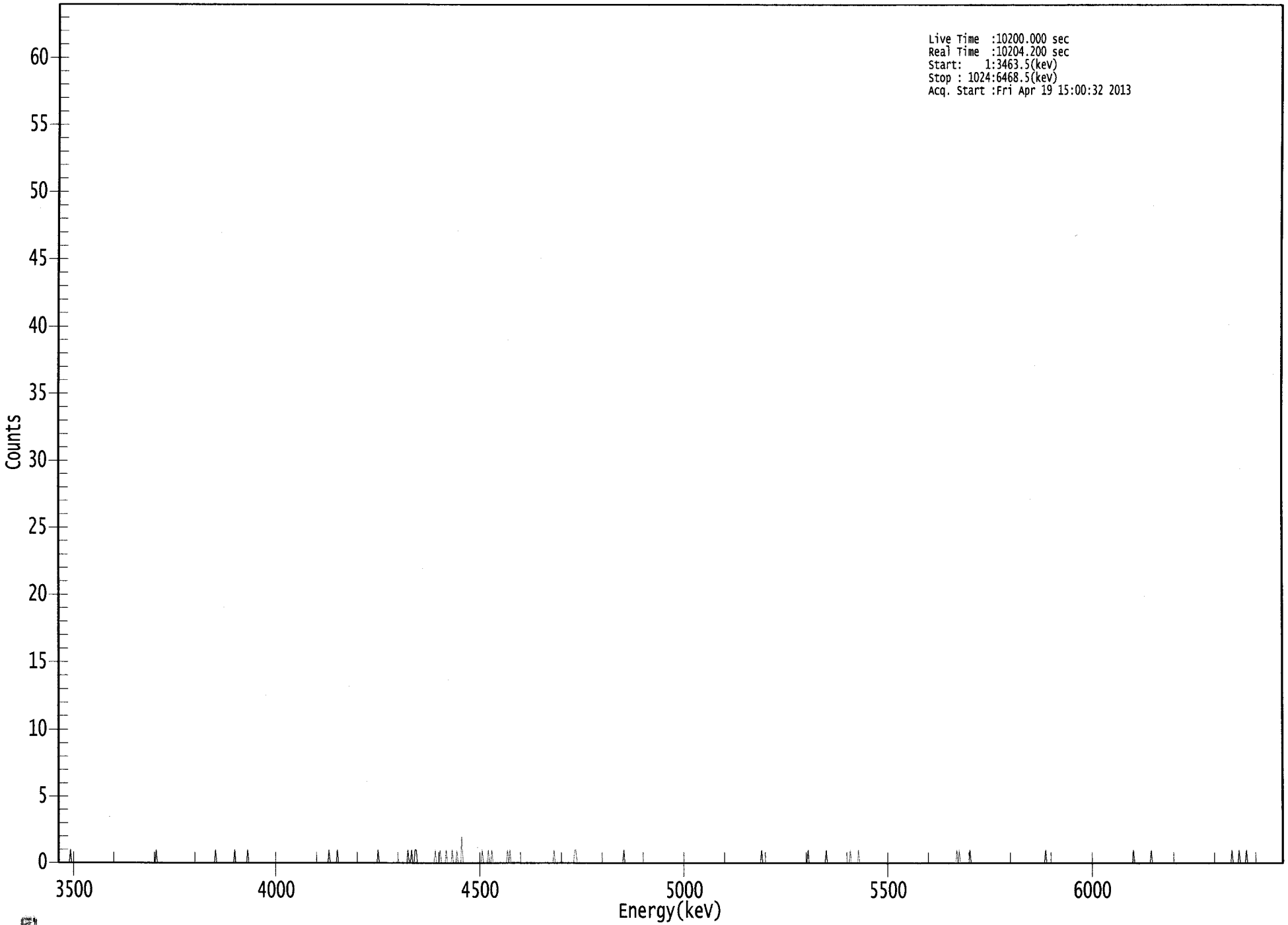
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.974	5685.50*	1.04E-001 +/- 2.94E+001	1.36E-001 +/- 3.84E+001
RA-226	0.915	4785.00*	3.19E-001 +/- 1.68E-001	1.15E-001 +/- 4.20E-003

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 4/22/13

US EPA ARCHIVE DOCUMENT

0000055954.CNF

Live Time :10200.000 sec
Real Time :10204.200 sec
Start: 1:3463.5(kev)
Stop : 1024:6468.5(kev)
Acq. Start :Fri Apr 19 15:00:32 2013



0375

ROI Type: 1

 ***** 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: 10204

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	1	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	1	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	1	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	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	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	1	0	0	0	0
233:	0	0	1	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	1	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	1	0	0
297:	1	0	0	1	1	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	1	0	0
329:	0	0	1	0	0	0	1	0
337:	0	0	2	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	1	0	0	0	0
361:	1	0	0	1	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 10

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	1	0	1	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	1
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	1	1	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	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	1	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	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	1	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	1	0	0	0	0
633:	0	0	0	0	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	1	0
665:	0	0	0	0	0	1	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	1
753:	0	1	0	0	0	0	0	0
761:	0	0	1	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	1	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	1	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	1	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	1	0	0	0
985:	0	0	1	0	0	0	0	0
993:	1	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



Sample Description: DUP 01 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 11
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_040
 Chamber Serial Number: 06027396B
 Detector Serial Number: 91135
 Env. Background: System Bkgd 55210
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.000E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:35 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.8350 +/- 0.0000
 Counting Efficiency: 0.1900 +/- 0.0033 on 12/16/2012 5:49:33 PM
 Effective Efficiency: 0.1587 +/- 0.0028

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.584	5.49	88.08	0.51	0.00E+000	3.0
RA-226	4.574	8.66	68.12	0.34	0.00E+000	3.0

 ----- NUCLIDE ANALYSIS RESULTS -----

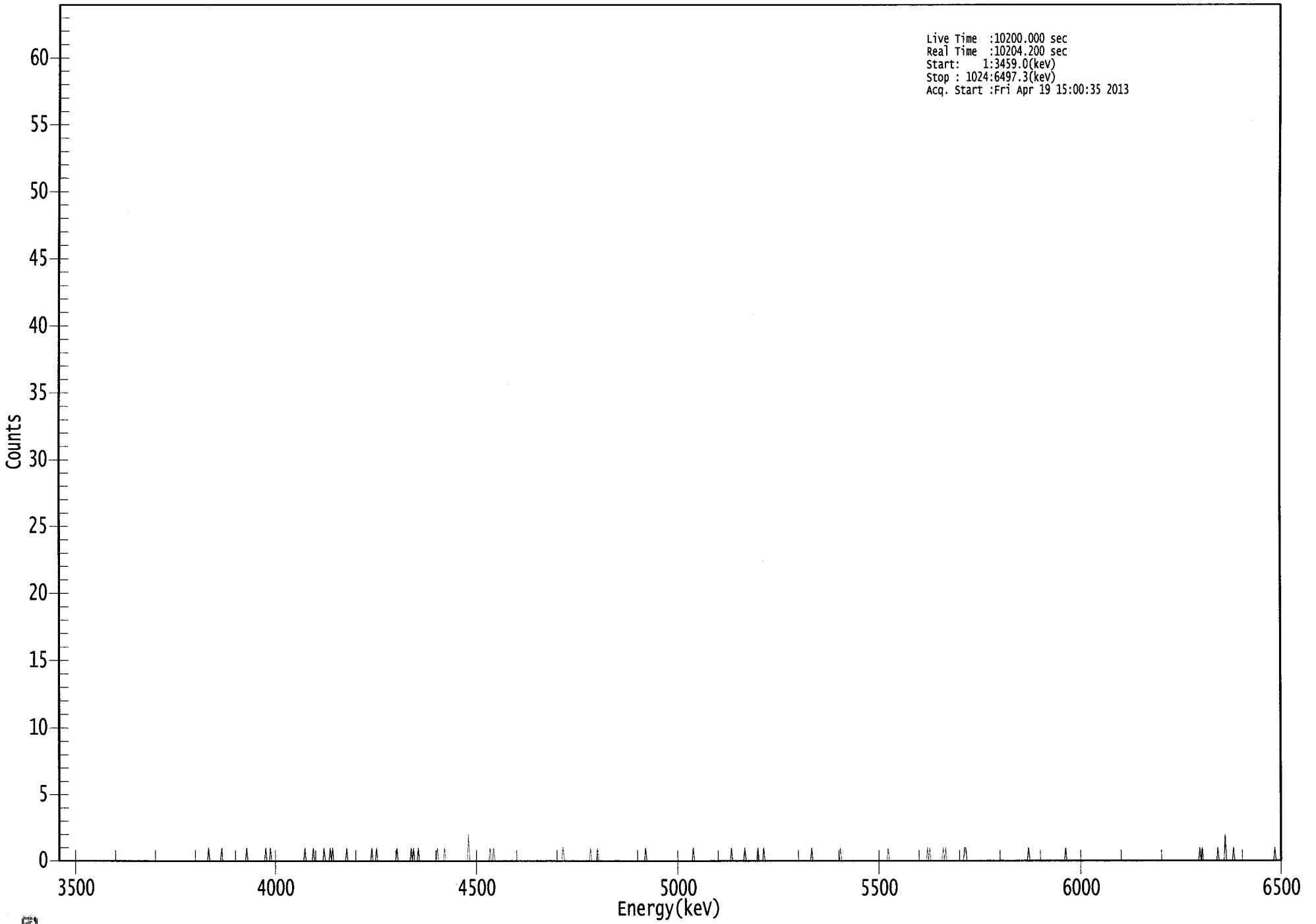
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.986	5685.50*	1.58E-001 +/- 4.47E+001	1.51E-001 +/- 4.27E+001
RA-226	0.943	4785.00*	1.93E-001 +/- 1.32E-001	1.06E-001 +/- 3.62E-003

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 4/22/13

US EPA ARCHIVE DOCUMENT

000055955.CNF

Live Time :10200.000 sec
Real Time :10204.200 sec
Start: 1:3459.0(kev)
Stop : 1024:6497.3(kev)
Acq. Start :Fri Apr 19 15:00:35 2013



0000
ROI Type: 1

 ***** 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: 10204

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	1	0
129:	0	0	0	0	0	0	0	0
137:	0	1	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	0
169:	0	0	0	0	0	0	1	0
177:	0	0	1	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	1	0
217:	0	0	0	0	0	0	0	1
225:	0	0	0	0	1	0	1	0
233:	0	0	0	0	0	0	0	0
241:	0	0	1	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	1
265:	0	0	0	1	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	1	0	0	0
289:	0	0	0	0	0	0	0	0
297:	1	0	1	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:	2	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	1	0	0	1	0	0

369: 0 0 0 0 0 0 0 0

Sample Title: 11

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	1
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	1	0
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	0	0	0	0	0	0
489:	0	0	0	0	1	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	1	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	1	0	0	0
569:	0	0	0	0	0	0	0	1
577:	0	0	0	0	0	0	0	0
585:	0	0	1	0	0	0	0	1
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	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	1
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	1
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:	1	0	1	0	0	0	0	0
737:	0	0	0	0	0	1	0	1
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	1
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	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	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	1	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	1	0	1	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	1	0	0	0	0	0
977:	2	0	0	0	0	0	0	1
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	1	0	0	0	0	0	0



Sample Description: DUP 02 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 12
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_041
 Chamber Serial Number: 05026930A
 Detector Serial Number: 91087
 Env. Background: System Bkgd 55211
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.230E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:37 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.8901 +/- 0.0000
 Counting Efficiency: 0.1978 +/- 0.0034 on 12/16/2012 5:49:31 PM
 Effective Efficiency: 0.1761 +/- 0.0030

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.519	10.15	64.46	0.85	0.00E+000	3.0
RA-226	4.609	20.13	46.00	1.87	0.00E+000	3.0

 NUCLIDE ANALYSIS RESULTS

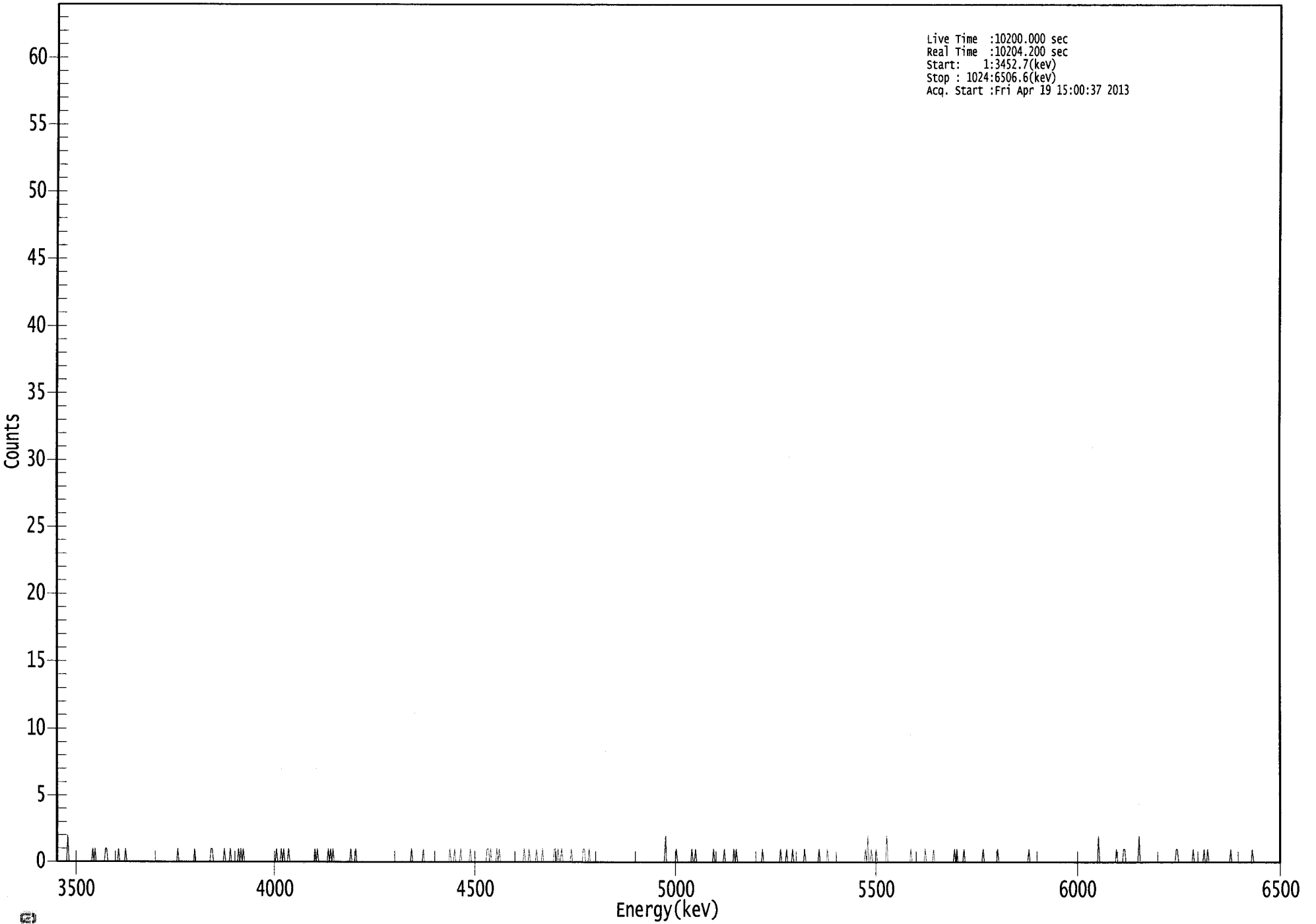
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.964	5685.50*	2.94E-001 +/- 8.30E+001	1.73E-001 +/- 4.90E+001
RA-226	0.960	4785.00*	4.50E-001 +/- 2.08E-001	1.69E-001 +/- 5.73E-003

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US EPA ARCHIVE DOCUMENT

000055959.CNF

Live Time :10200.000 sec
Real Time :10204.200 sec
Start: 1:3452.7(kev)
Stop : 1024:6506.6(kev)
Acq. Start :Fri Apr 19 15:00:37 2013



6500
6000
5500
5000
4500
4000
3500
ROI Type: 1

 ***** 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: 10204

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	2	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	1	0
33:	1	0	0	0	0	0	0	0
41:	0	1	1	0	0	0	0	0
49:	0	0	0	0	1	0	0	0
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	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	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	1	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	1	0	0	0	0
137:	0	0	0	0	0	1	0	0
145:	0	0	1	0	0	0	0	0
153:	0	1	0	1	0	1	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	1	0	0	0	1	0	1
193:	0	0	0	1	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	1	0	1	0	0	0	0
225:	0	0	0	0	1	0	1	0
233:	1	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	1
249:	0	0	0	1	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	1	0	0	0	0	0
305:	0	0	0	0	1	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	1	0
337:	0	0	0	1	0	0	0	0
345:	0	0	0	1	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	1	1	0	1	0	0	0

369: 0 1 0 1 0 0 0 0

Sample Title: 12

Channel	1	2	3	4	5	6	7	8
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	1	0	0	0	1	0	0	0
401:	0	0	1	0	0	0	0	1
409:	0	0	0	0	0	0	0	0
417:	0	1	1	0	1	0	0	1
425:	0	0	0	0	0	0	0	1
433:	0	0	0	0	0	0	0	0
441:	0	1	1	0	0	0	1	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	2	0
513:	0	0	0	0	0	0	0	1
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	1
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	1	0
553:	0	0	0	0	0	0	0	1
561:	0	0	0	0	0	0	0	1
569:	0	1	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	1
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	1	0
609:	0	0	0	1	0	0	0	0
617:	1	0	0	0	0	0	0	0
625:	0	0	1	0	0	0	0	0
633:	0	0	0	0	0	0	1	0
641:	0	0	0	0	0	1	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	1	0	2
681:	0	0	1	0	0	0	1	0
689:	0	0	0	0	0	0	0	2
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	1	0	0	0	0
721:	0	0	0	0	0	0	0	1
729:	0	0	0	0	0	0	1	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	1
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	1
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	1	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	2
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	1	0
889:	0	0	0	0	1	1	0	0
897:	0	0	0	0	0	0	0	0
905:	0	2	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:	1	1	0	0	0	0	0	0
945:	0	0	0	0	0	0	1	0
953:	0	0	0	0	0	0	0	1
961:	0	0	1	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	1	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	1
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	1



Sample Description: DUP 02 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 13
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_042
 Chamber Serial Number: 05026930B
 Detector Serial Number: 84185
 Env. Background: System Bkgd 55212
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.160E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:40 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.9004 +/- 0.0000
 Counting Efficiency: 0.1846 +/- 0.0032 on 12/16/2012 5:49:29 PM
 Effective Efficiency: 0.1662 +/- 0.0029

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.526	8.66	68.12	0.34	0.00E+000	0.0
RA-226	4.664	5.32	91.11	0.68	0.00E+000	6.0

 NUCLIDE ANALYSIS RESULTS

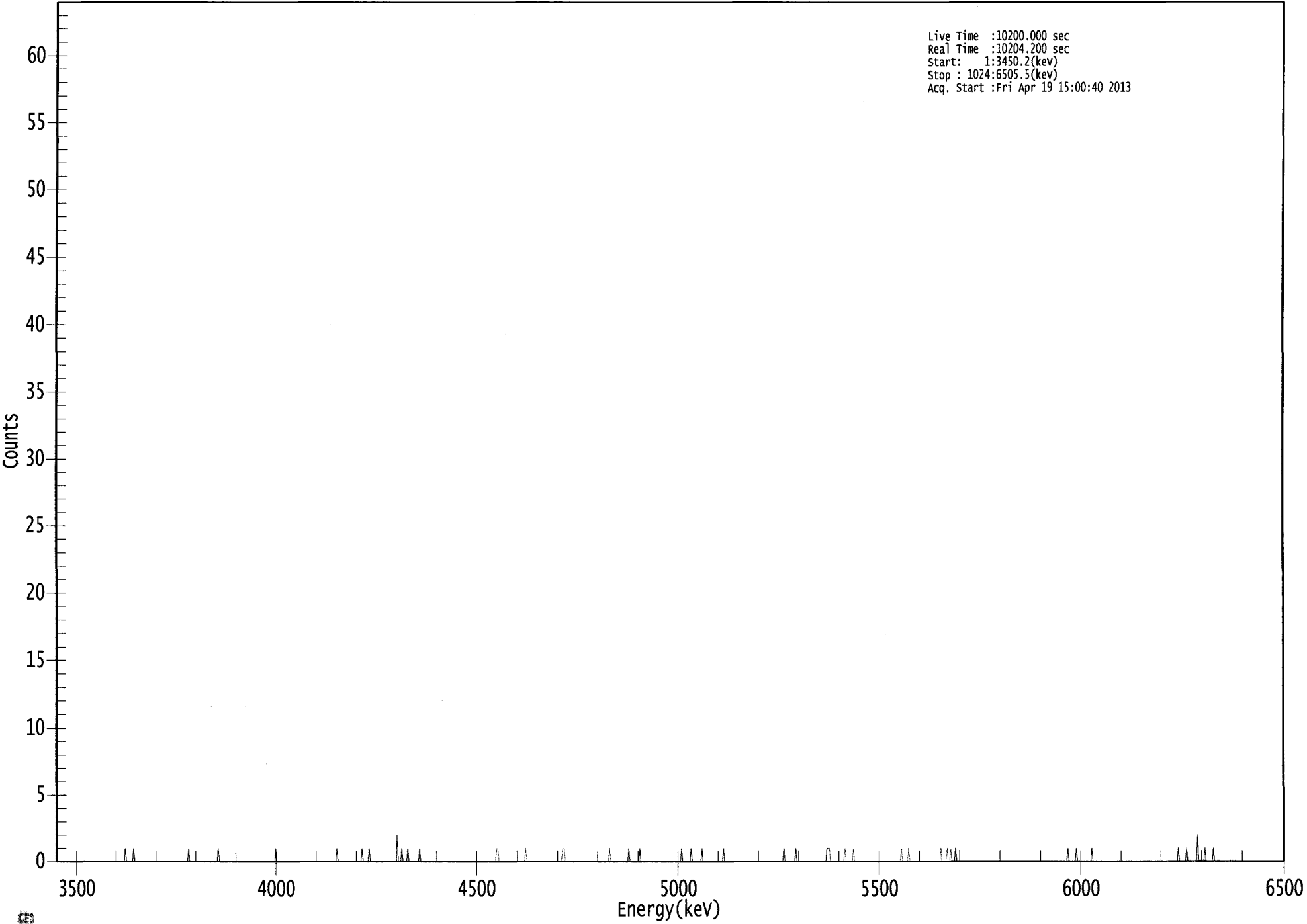
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.967	5685.50*	2.57E-001 +/- 7.27E+001	1.42E-001 +/- 4.01E+001
RA-226	0.981	4785.00*	1.22E-001 +/- 1.11E-001	1.29E-001 +/- 4.41E-003

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US EPA ARCHIVE DOCUMENT

0000055960.CNF

Live Time :10200.000 sec
Real Time :10204.200 sec
Start: 1:3450.2(kev)
Stop : 1024:6505.5(kev)
Acq. Start :Fri Apr 19 15:00:40 2013



0.50
0.50
0.50
ROI Type: 1

 ***** 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: 10204

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	1	0	0	0	0	0
65:	0	1	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	1
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:	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	0	0	0	0	0	0	0
233:	0	0	0	1	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	1	0	0	0	0	0	1	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	2	0	0
289:	0	1	0	0	0	0	1	0
297:	0	0	0	0	0	0	0	0
305:	1	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: 1 1 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	0
393:	1	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	1
425:	1	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	0	0	0	0	1	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	1	0
481:	0	0	0	0	0	0	0	1
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	1	0	0	0	0	0
529:	0	0	1	0	0	0	0	0
537:	0	0	0	1	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	1	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	1
609:	0	0	0	0	0	0	0	0
617:	0	1	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	1	1	1	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	1	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	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	1	0	0	0	0	0	1
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	1	0	0	0	0	1
745:	0	0	1	0	0	0	1	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	1	0	0	0	0
849:	0	0	1	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	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	1
937:	0	0	0	0	0	0	1	0
945:	0	0	0	0	0	0	0	2
953:	0	0	0	0	0	1	0	0
961:	0	0	0	0	1	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



Sample Description: FB AT PZ-110-SS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 14
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_044
 Chamber Serial Number: 04026481B
 Detector Serial Number: 84168
 Env. Background: System Bkgd 55214
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.430E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:42 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.8579 +/- 0.0000
 Counting Efficiency: 0.1902 +/- 0.0033 on 12/16/2012 5:49:26 PM
 Effective Efficiency: 0.1631 +/- 0.0028

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.405	1.66	169.38	0.34	0.00E+000	3.0
RA-226	4.626	7.83	70.93	0.17	0.00E+000	3.0

 NUCLIDE ANALYSIS RESULTS

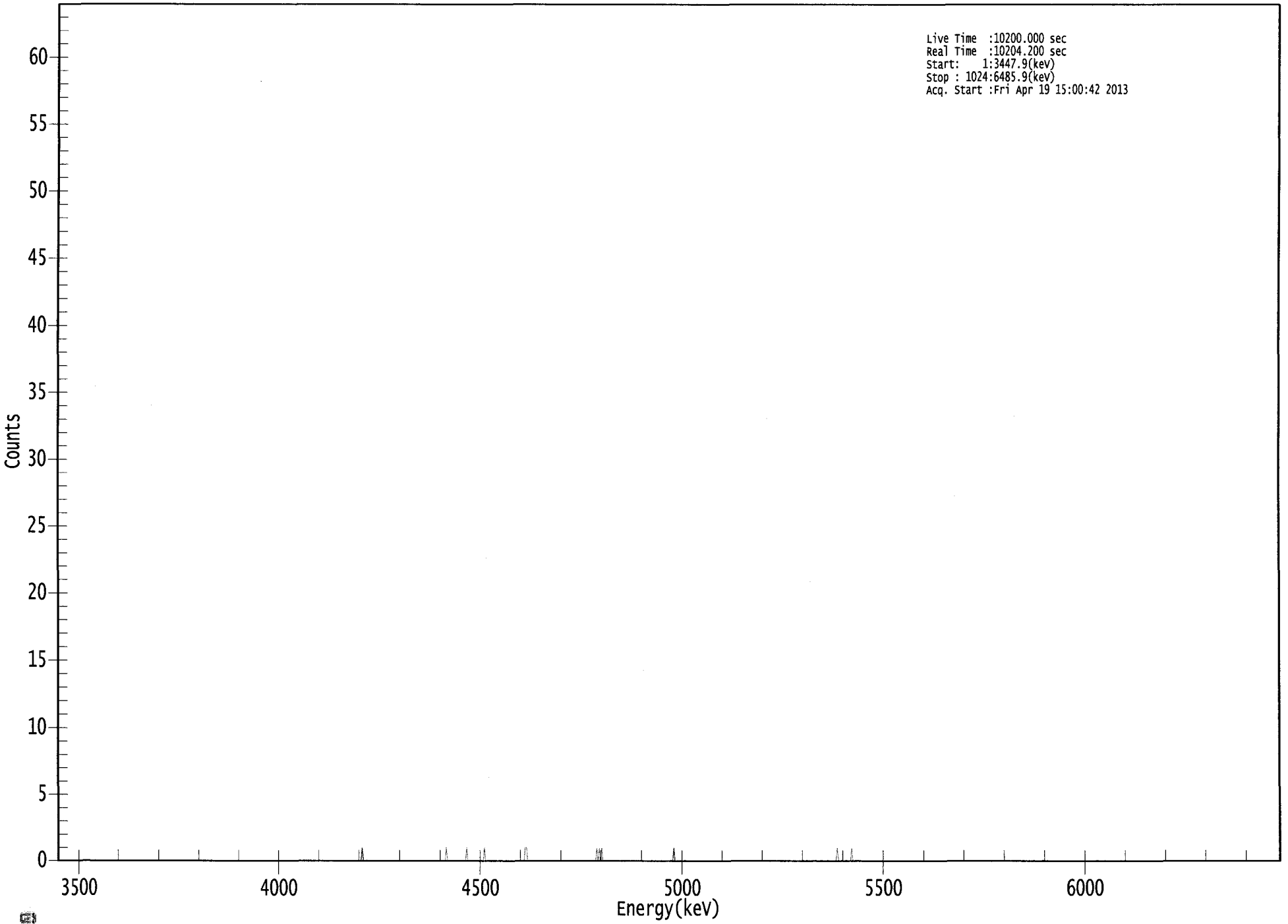
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.902	5685.50*	3.32E-002 +/- 9.40E+000	9.57E-002 +/- 2.71E+001
RA-226	0.968	4785.00*	1.21E-001 +/- 8.61E-002	6.46E-002 +/- 2.21E-003

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 4/22/13

US EPA ARCHIVE DOCUMENT

0000055956.CNF

Live Time :10200.000 sec
Real Time :10204.200 sec
Start: 1:3447.9(kev)
Stop : 1024:6485.9(kev)
Acq. Start :Fri Apr 19 15:00:42 2013



ROI Type: 1

 ***** 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: 10204

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	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	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	1	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	1	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	1
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	1	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:	1	1	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	0	0	0	0	0	0
449:	0	0	0	0	1	0	1	0
457:	1	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	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	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
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	0
649:	0	0	0	0	0	1	0	0
657:	0	0	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	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: 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



Sample Description: FB AT PZ-110-SS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 15
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_046
 Chamber Serial Number: 04026482B
 Detector Serial Number: 58762
 Env. Background: System Bkgd 55215
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 1.490E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:44 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8575 +/- 0.0000
 Counting Efficiency: 0.1789 +/- 0.0031 on 12/16/2012 5:49:23 PM
 Effective Efficiency: 0.1534 +/- 0.0027

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.531	-0.17	1169.4	0.17	0.00E+000	0.0
RA-226	4.741	1.83	152.56	0.17	0.00E+000	3.0

 ----- NUCLIDE ANALYSIS RESULTS -----

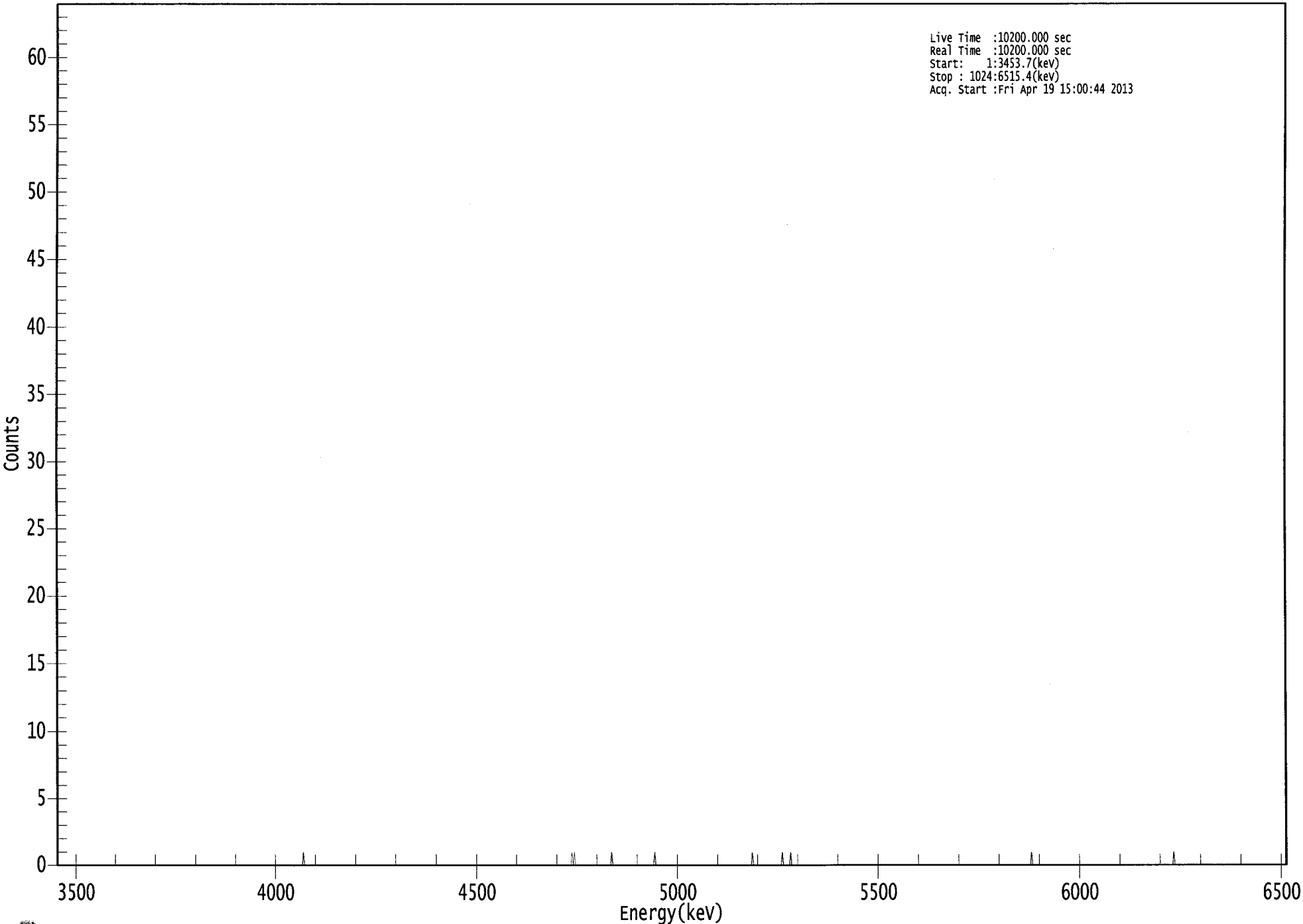
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.969	5685.50*	-3.77E-003 +/- 1.07E+000	9.26E-002 +/- 2.62E+001
RA-226	0.997	4785.00*	3.14E-002 +/- 4.79E-002	7.16E-002 +/- 2.46E-003

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US EPA ARCHIVE DOCUMENT

0000055950.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3453.7(kev)
Stop : 1024:6515.4(kev)
Acq. Start :Fri Apr 19 15:00:44 2013



0070
ROI Type: 1

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

Sample Title: 15

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	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	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	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 0

Sample Title: 15

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	1	0	1
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	0	0	0	0	1	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	1	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	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	1	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	1	0	0	0
609:	0	0	0	1	0	0	0	0
617:	0	0	0	0	0	0	0	0
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	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: 15

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	1	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	1	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



Sample Description: MW-103 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 16
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_047
 Chamber Serial Number: 02030596A
 Detector Serial Number: 91086
 Env. Background: System Bkgd 55216
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.080E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:47 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9687 +/- 0.0000
 Counting Efficiency: 0.1822 +/- 0.0032 on 12/16/2012 5:49:21 PM
 Effective Efficiency: 0.1765 +/- 0.0031

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.524	46.66	28.82	0.34	0.00E+000	3.7
RA-226	4.547	37.32	32.42	0.68	0.00E+000	4.4

 NUCLIDE ANALYSIS RESULTS

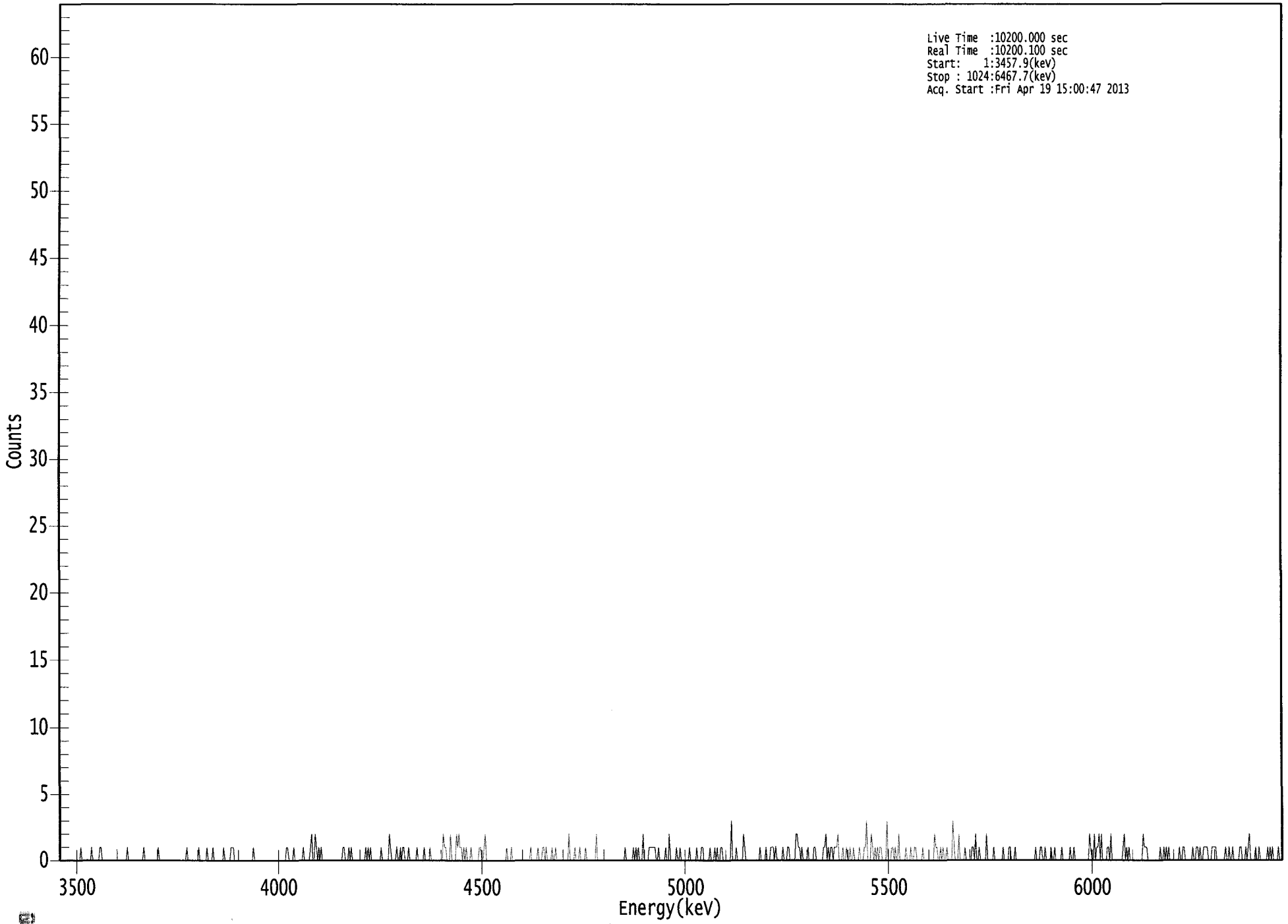
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.966	5685.50*	1.26E+000 +/- 3.55E+002	1.29E-001 +/- 3.64E+001
RA-226	0.928	4785.00*	7.77E-001 +/- 2.53E-001	1.17E-001 +/- 4.03E-003

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 4/22/13

US EPA ARCHIVE DOCUMENT

0000055957.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3457.9(kev)
Stop : 1024:6467.7(kev)
Acq. Start :Fri Apr 19 15:00:47 2013



0405

ROI Type: 1

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

Sample Title: 16

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	1	0	0	0	0	0
25:	0	0	0	1	0	0	0	0
33:	0	0	1	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	1	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	1
73:	0	0	0	0	0	0	0	0
81:	0	0	0	1	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	1	0	0	0	0
113:	0	0	0	0	0	1	0	0
121:	0	0	0	0	1	0	0	0
129:	0	1	0	0	0	0	0	0
137:	0	0	1	0	0	0	0	0
145:	1	1	1	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	1
193:	1	0	0	0	0	1	0	0
201:	0	0	0	0	0	1	0	0
209:	0	0	0	1	2	0	0	2
217:	1	0	1	0	1	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	1	1
241:	0	0	0	1	0	1	0	0
249:	0	0	0	0	0	0	0	0
257:	0	1	0	1	0	1	0	0
265:	0	0	0	0	0	0	1	0
273:	0	0	0	0	0	2	1	0
281:	0	0	0	1	0	0	1	0
289:	1	1	0	0	0	1	0	0
297:	0	0	0	0	1	0	0	0
305:	0	0	1	0	0	0	0	1
313:	0	0	0	0	0	0	0	0
321:	0	0	2	1	1	0	0	0
329:	2	0	0	0	0	2	1	2
337:	1	1	0	1	0	1	0	0
345:	0	1	0	0	0	0	0	0
353:	1	1	0	0	1	2	0	0
361:	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 1

Sample Title: 16

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

801: 1 0 0 0 0 0 0 0 0

Sample Title: 16

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



Sample Description: MW-103 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000559
 Batch Identification: 1304051A-RA
 Sample Identification: 17
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_048
 Chamber Serial Number: 02030596B
 Detector Serial Number: 83111
 Env. Background: System Bkgd 55217
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.080E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/19/2013 3:00:50 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9796 +/- 0.0000
 Counting Efficiency: 0.1680 +/- 0.0030 on 12/16/2012 5:49:20 PM
 Effective Efficiency: 0.1645 +/- 0.0029

Peak Match Tolerance: 0.350 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.537	9.98	65.65	1.02	0.00E+000	3.0
RA-226	4.643	10.83	60.10	0.17	0.00E+000	3.0

 NUCLIDE ANALYSIS RESULTS

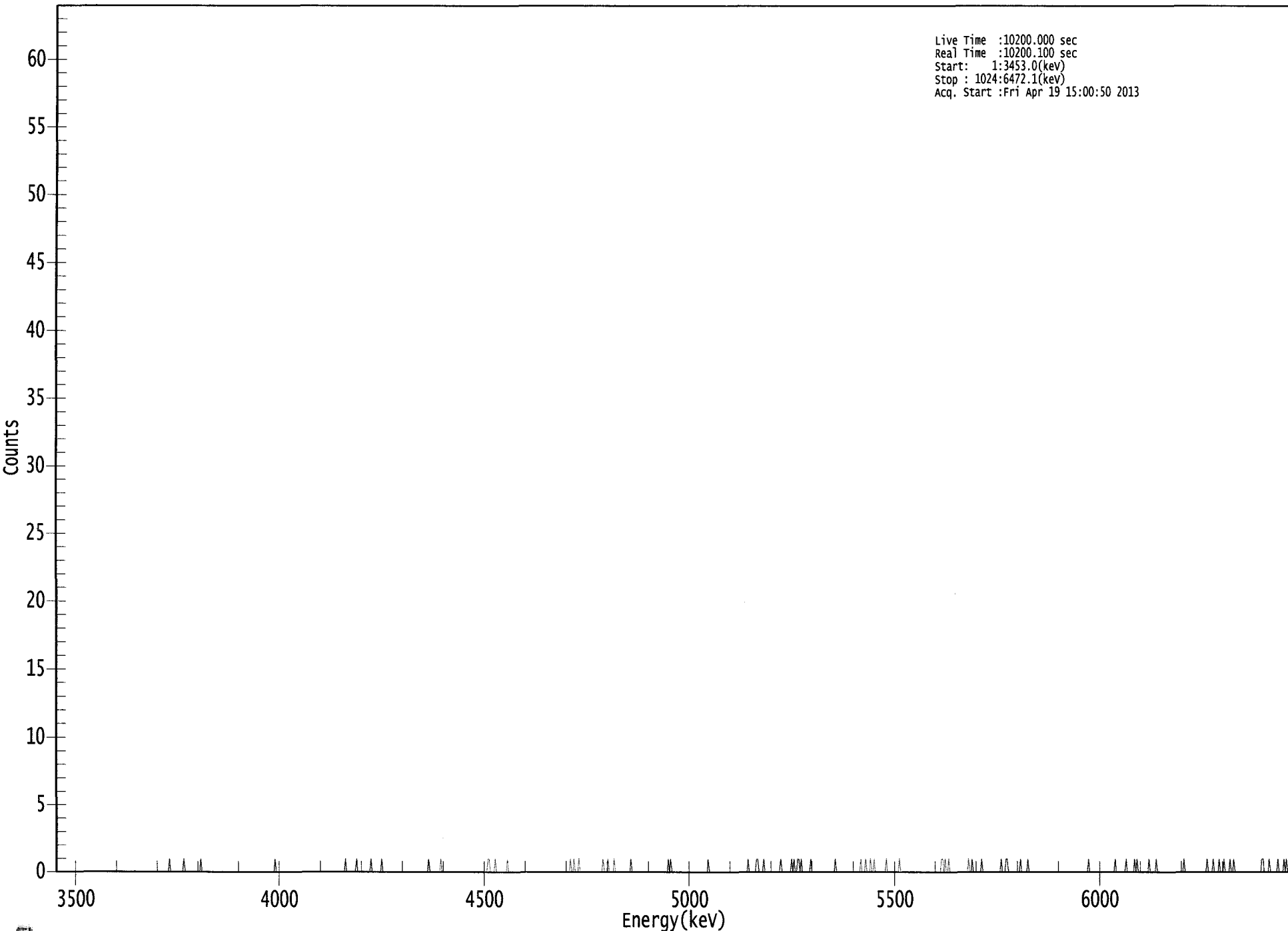
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.971	5685.50*	2.88E-001 +/- 8.15E+001	1.82E-001 +/- 5.15E+001
RA-226	0.974	4785.00*	2.42E-001 +/- 1.46E-001	9.32E-002 +/- 3.23E-003

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US EPA ARCHIVE DOCUMENT

0000055958.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3453.0(kev)
Stop : 1024:6472.1(kev)
Acq. Start :Fri Apr 19 15:00:50 2013



ROI Type: 1

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

Sample Title: 17

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	1	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	1	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	1	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	0	0
241:	1	0	0	0	0	0	0	0
249:	0	1	0	0	0	0	0	0
257:	0	0	0	0	0	1	0	0
265:	0	0	0	0	0	0	1	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	0	0	0	0	1
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	1	1
361:	0	0	0	0	1	0	0	0

369: 0 0 0 0 0 0 1 0

Sample Title: 17

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	1	0	0	1	0	0
433:	0	1	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	1	0	0
457:	0	1	0	0	0	0	1	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	1	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	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	1	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	1	0	0
577:	0	0	0	0	1	1	0	0
585:	0	0	1	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	1	0	0	0	0	0	0	0
609:	0	1	0	1	0	0	1	1
617:	0	1	0	0	0	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	1	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	1	0	0	0	1	0
673:	0	0	1	0	0	1	0	0
681:	0	0	0	0	0	0	0	1
689:	0	0	0	0	0	0	0	0
697:	0	0	1	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	1	1	0
737:	1	0	0	1	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	1	0	0	1	0
761:	0	0	0	0	0	0	1	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	1	0
785:	0	0	1	1	0	0	0	0
793:	0	0	0	0	0	0	1	0

801: 0 0 0 0 1 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	0
849:	0	0	0	0	0	0	1	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	1	0	0	0
881:	0	0	0	0	0	1	0	0
889:	0	0	0	0	1	0	1	0
897:	0	0	0	0	0	0	0	0
905:	1	0	0	0	0	0	1	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	1	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	1	0	0	0	0	1	0	0
961:	0	0	1	0	0	0	1	0
969:	0	0	0	1	0	0	1	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	1	1	0
1001:	0	0	0	1	0	0	0	0
1009:	0	0	1	0	0	0	0	1
1017:	0	1	0	0	0	0	1	0



Sample Description: PZ-200-SS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-RA
 Sample Identification: 18
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.370E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/20/2013 1:48:54 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.7115 +/- 0.0000
 Counting Efficiency: 0.1746 +/- 0.0033 on 12/15/2012 11:26:47 AM
 Effective Efficiency: 0.1243 +/- 0.0023

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.537	25.94	41.05	3.06	0.00E+000	3.0
RA-226	4.602	72.30	23.37	1.70	0.00E+000	3.0

 ----- NUCLIDE ANALYSIS RESULTS -----

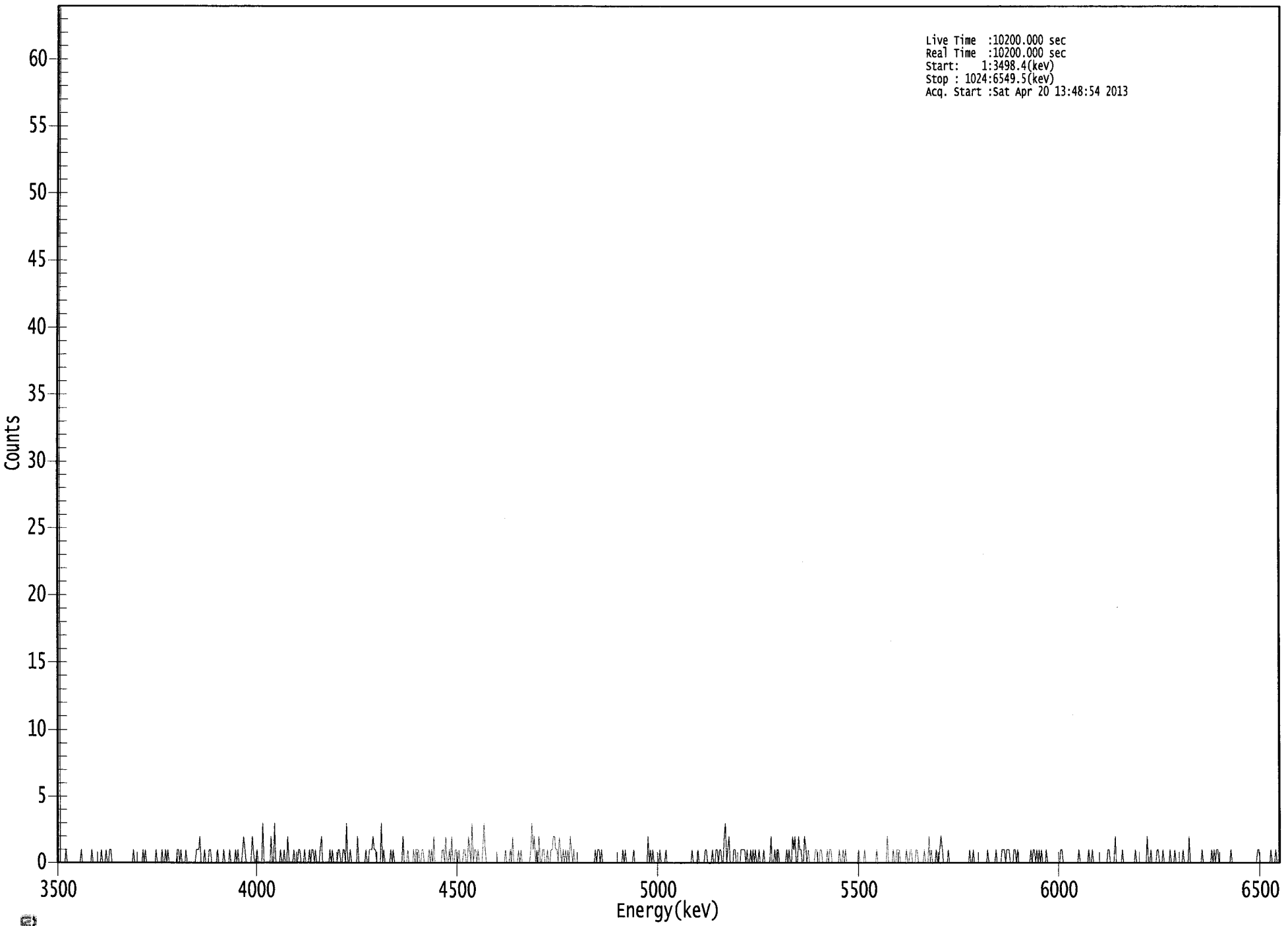
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.970	5685.50*	1.35E+000 +/- 7.16E+002	4.66E-001 +/- 2.46E+002
RA-226	0.957	4785.00*	2.44E+000 +/- 5.76E-001	2.48E-001 +/- 9.07E-003

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US EPA ARCHIVE DOCUMENT

000056024.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3498.4(kev)
Stop : 1024:6549.5(kev)
Acq. Start :Sat Apr 20 13:48:54 2013



0415
ROI Type: 1

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

Sample Title: 18

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	0	0	0	0	0	1
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	1	0	0	0
25:	0	0	0	0	0	1	0	0
33:	0	0	0	0	0	1	0	0
41:	0	1	0	0	1	1	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:	1	0	1	0	0	0	0	0
81:	0	0	0	1	0	0	0	0
89:	1	0	0	1	0	1	0	0
97:	0	0	0	0	0	1	1	0
105:	1	0	0	0	1	0	0	0
113:	0	0	0	0	0	1	1	1
121:	2	0	0	0	1	0	0	0
129:	1	1	0	0	0	0	0	1
137:	0	0	0	0	1	0	0	0
145:	0	1	0	0	0	0	1	0
153:	1	0	0	0	1	2	1	0
161:	0	0	0	0	2	1	0	0
169:	1	0	0	0	0	3	0	0
177:	0	0	0	0	2	0	0	3
185:	0	0	0	0	1	0	0	1
193:	0	0	2	0	0	0	0	1
201:	0	0	0	1	1	0	0	0
209:	1	0	0	0	1	0	1	1
217:	0	1	0	0	0	1	2	0
225:	0	0	0	0	0	1	0	1
233:	0	0	0	0	1	1	0	0
241:	1	1	0	3	0	0	1	0
249:	0	0	0	0	2	0	0	0
257:	0	0	0	1	0	0	1	1
265:	1	2	1	1	0	0	0	0
273:	3	0	1	0	0	0	0	0
281:	1	0	1	0	0	0	0	0
289:	0	0	2	0	0	0	1	0
297:	0	0	0	1	0	1	1	1
305:	0	0	1	1	0	0	0	0
313:	1	0	1	0	2	0	0	0
321:	0	0	0	1	1	0	2	0
329:	0	1	0	2	0	0	1	1
337:	0	1	0	0	0	1	1	0
345:	0	2	1	0	3	0	1	1
353:	0	1	0	0	0	1	3	1
361:	0	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0

Sample Title: 18

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

801: 0 1 1 0 1 0 0 0

Sample Title: 18

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



Sample Description: PZ-200-SS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000560
 Batch Identification: 1304051A-RA
 Sample Identification: 19
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_004
 Chamber Serial Number:
 Detector Serial Number: 4
 Env. Background: System Bkgd 55192
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.770E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 12:49:50 PM
 Acquisition Date/Time: 4/20/2013 1:48:55 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9546 +/- 0.0000
 Counting Efficiency: 0.1940 +/- 0.0036 on 12/15/2012 11:26:46 AM
 Effective Efficiency: 0.1852 +/- 0.0034

Peak Match Tolerance: 0.350 MeV

 ----- PEAK AREA REPORT -----

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
RA-224	5.524	37.09	34.11	3.91	0.00E+000	2.9
RA-226	4.586	69.62	23.96	2.38	0.00E+000	3.7

 ----- NUCLIDE ANALYSIS RESULTS -----

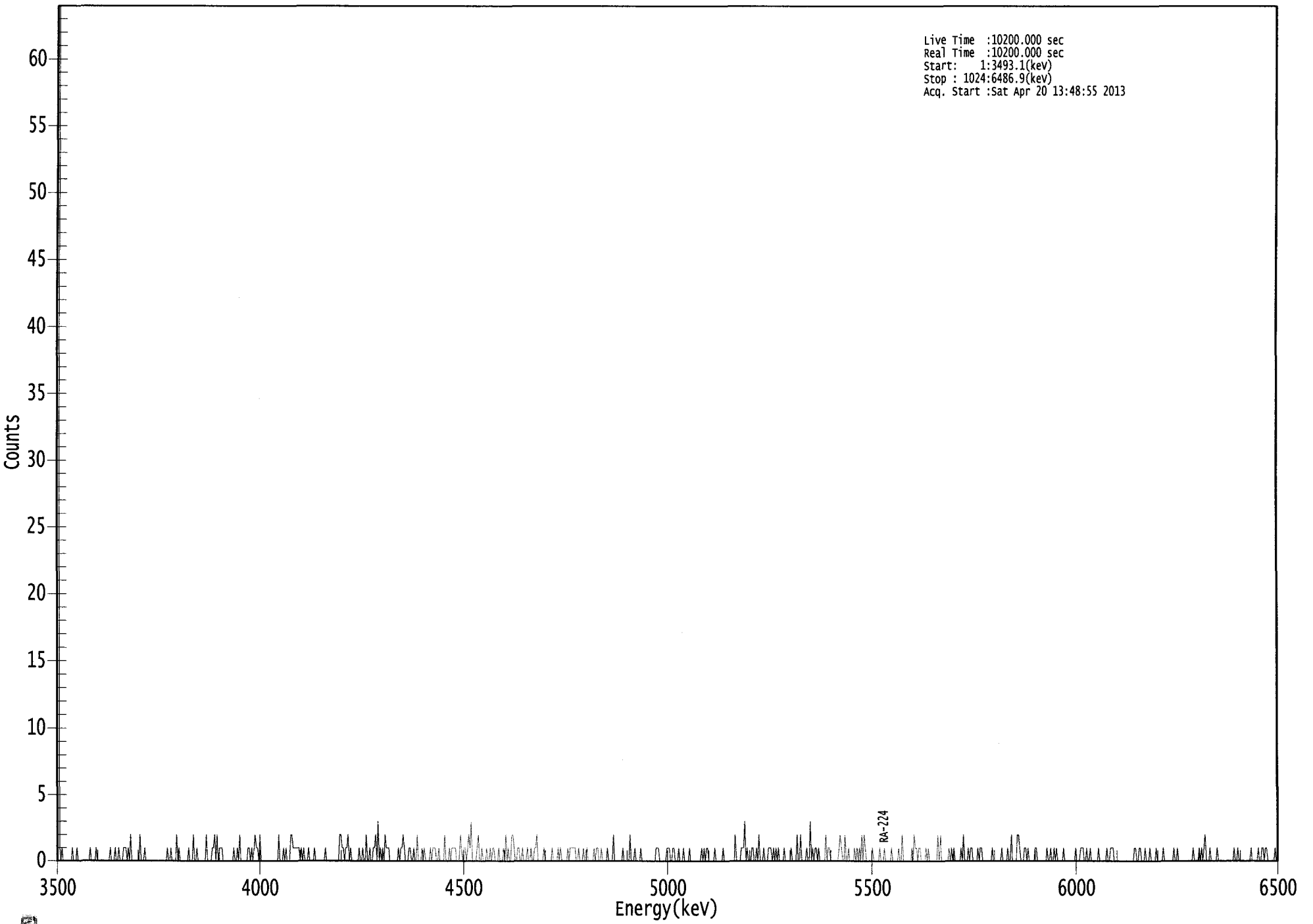
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.965	5685.50*	1.52E+000 +/- 8.03E+002	3.98E-001 +/- 2.11E+002
RA-226	0.950	4785.00*	1.84E+000 +/- 4.46E-001	2.17E-001 +/- 7.80E-003

AG
4/22/13

US EPA ARCHIVE DOCUMENT

000056025.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3493.1(kev)
Stop : 1024:6486.9(kev)
Acq. Start :Sat Apr 20 13:48:55 2013



04275
ROI Type: 1

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

Sample Title: 19

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10200	10200	1	0	1	0	0	0
9:	0	0	0	0	0	1	0	0
17:	0	1	0	0	0	0	0	0
25:	0	0	0	0	1	0	0	0
33:	0	1	0	0	0	0	0	0
41:	0	0	0	0	0	1	0	0
49:	0	1	0	0	1	0	0	0
57:	1	1	1	0	1	0	2	0
65:	0	0	0	0	0	0	2	0
73:	0	0	1	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	1	0	0
97:	1	0	0	0	0	2	0	1
105:	0	0	0	0	0	0	0	1
113:	0	0	0	2	0	0	1	0
121:	0	0	0	0	0	0	2	0
129:	0	0	0	1	1	2	0	2
137:	0	1	1	1	0	0	0	0
145:	0	0	0	0	0	1	0	0
153:	1	0	2	0	0	0	0	0
161:	0	1	1	0	1	0	1	2
169:	1	1	0	2	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	2	0	0	0	1
193:	0	1	0	0	0	2	2	1
201:	1	1	1	1	1	0	1	0
209:	1	0	0	0	1	0	0	0
217:	0	1	0	0	0	0	0	0
225:	0	0	1	0	0	0	0	0
233:	0	0	0	0	0	0	2	2
241:	1	1	0	1	1	2	0	1
249:	0	0	0	0	0	0	1	0
257:	0	1	0	0	2	0	0	1
265:	0	0	1	1	2	0	3	0
273:	1	0	1	0	2	1	1	1
281:	0	0	0	0	0	0	0	1
289:	0	1	1	2	1	0	0	0
297:	1	1	0	0	1	0	0	2
305:	0	0	0	1	0	1	0	0
313:	0	0	1	0	1	1	1	0
321:	0	1	0	0	0	0	2	0
329:	0	0	1	0	1	1	1	1
337:	0	0	0	2	1	0	1	1
345:	0	1	2	1	3	0	0	0
353:	0	1	2	0	0	1	0	0
361:	0	1	0	0	1	0	1	1

369: 0 0 0 1 0 0 0 1

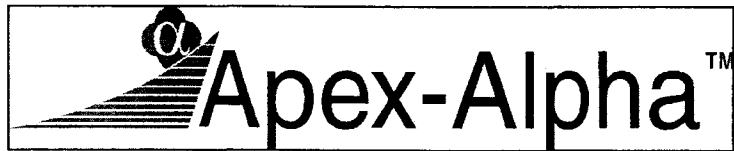
Sample Title: 19

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

801: 2 0 0 0 0 2 2 1

Sample Title: 19

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



QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 4/19/2013
Time : 5:45:48 AM

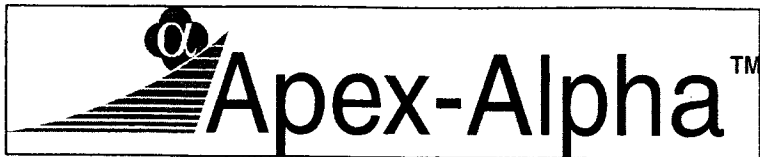
CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 001	21f	ALL	Not Done	
Alpha 002	21f	ALL	Not Done	
Alpha 003	21f	ALL	Passed	4/19/2013 5:25:30 AM
Alpha 004	21f	ALL	Passed	4/19/2013 5:25:31 AM
Alpha 005	21f	ALL	Not Done	
Alpha 006	21f	ALL	Not Done	
Alpha 007	21f	ALL	Not Done	
Alpha 008	21f	ALL	Not Done	
Alpha 009	21f	ALL	Not Done	
Alpha 010	21f	ALL	Passed	4/19/2013 5:25:31 AM
Alpha 011	21f	ALL	Passed	4/19/2013 5:25:32 AM
Alpha 012	21f	ALL	Not Done	
Alpha 013	21f	ALL	Passed	4/19/2013 5:25:33 AM
Alpha 014	21f	ALL	Passed	4/19/2013 5:25:34 AM
Alpha 015	21f	ALL	Not Done	
Alpha 016	21f	ALL	Not Done	
Alpha 017	AIM730	ALL	Not Done	
Alpha 018	AIM730	ALL	Passed	4/19/2013 5:25:35 AM
Alpha 019	AIM730	ALL	Not Done	
Alpha 020	AIM730	ALL	Not Done	
Alpha 021	AIM730	ALL	Not Done	
Alpha 022	AIM730	ALL	Passed	4/19/2013 5:25:35 AM
Alpha 023	AIM730	ALL	Not Done	
Alpha 024	AIM730	ALL	Passed	4/19/2013 5:25:36 AM
Alpha 025	AIM730	ALL	Passed	4/19/2013 5:25:37 AM
Alpha 026	AIM730	ALL	Not Done	
Alpha 027	AIM730	ALL	Passed	4/19/2013 5:25:38 AM
Alpha 028	AIM730	ALL	Not Done	
Alpha 029	AIM730	ALL	Passed	4/19/2013 5:25:39 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	4/19/2013 5:25:40 AM
Alpha 034	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:41 AM
Alpha 035	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:43 AM
Alpha 036	Alpha Analyst100DC	ALL	Not Done	
Alpha 037	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:44 AM
Alpha 038	Alpha Analyst100DC	ALL	Not Done	
Alpha 039	Alpha Analyst100DC	ALL	Not Done	
Alpha 040	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:46 AM
Alpha 041	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:47 AM
Alpha 042	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:49 AM

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CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 043	Alpha Analyst100DC	ALL	Not Done	
Alpha 044	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:50 AM
Alpha 045	Alpha Analyst100DC	ALL	Not Done	
Alpha 046	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:52 AM
Alpha 047	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:53 AM
Alpha 048	Alpha Analyst100DC	ALL	Passed	4/19/2013 5:25:55 AM

APPROVED BY: _____ C

APPROVAL DATE: _____ 4/19/13



QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 4/20/2013
Time : 10:55:28 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 003	21f	ALL	Passed	4/20/2013 10:41:32 AM
Alpha 004	21f	ALL	Passed	4/20/2013 10:41:33 AM
Alpha 010	21f	ALL	Passed	4/20/2013 10:41:34 AM
Alpha 011	21f	ALL	Passed	4/20/2013 10:41:35 AM
Alpha 013	21f	ALL	Passed	4/20/2013 10:41:36 AM
Alpha 014	21f	ALL	Passed	4/20/2013 10:41:37 AM
Alpha 018	AIM730	ALL	Passed	4/20/2013 10:41:38 AM
Alpha 022	AIM730	ALL	Passed	4/20/2013 10:41:39 AM
Alpha 024	AIM730	ALL	Passed	4/20/2013 10:41:39 AM
Alpha 025	AIM730	ALL	Passed	4/20/2013 10:41:40 AM
Alpha 027	AIM730	ALL	Passed	4/20/2013 10:41:41 AM
Alpha 029	AIM730	ALL	Passed	4/20/2013 10:41:42 AM
Alpha 033	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:44 AM
Alpha 034	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:45 AM
Alpha 035	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:46 AM
Alpha 036	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:48 AM
Alpha 037	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:50 AM
Alpha 038	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:52 AM
Alpha 039	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:54 AM
Alpha 040	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:56 AM
Alpha 041	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:58 AM
Alpha 042	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:00 AM
Alpha 043	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:02 AM
Alpha 044	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:04 AM
Alpha 046	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:07 AM
Alpha 047	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:09 AM
Alpha 048	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:12 AM

APPROVED BY: AG

APPROVAL DATE: 4/20/13

***** LIBRARY LISTING REPORT *****

Nuclide Library Title: Radium

Nuclide Library Description: Ra-226, Po-218, Rn-222

Nuclide Name	Half-Life (Seconds)	Energy (keV)	Energy Uncert. (keV)	Yield (%)	Yield Uncert. (Abs.+)
PO-218	5.049E+010	6003.000*	0.000	99.9800	0.0000
RN-222	5.049E+010	5490.000*	0.000	99.9200	0.0000
RA-226	5.049E+010	4785.000*	0.000	100.0000	0.0000

* = key line

TOTALS: 3 Nuclides 3 Energy Lines

**SECTION XI
ANALYTICAL DATA (RADIUM-228)**

Work Order	13-04051	Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
Analysis Code	Ra228	01	LCS	LCS		04/09/13 00:00	1.0000E+00
Run	1	02	MBL	BLANK		04/09/13 00:00	1.5000E+00
Date Received	4/9/2013	03	DUP	FB at PZ-110-SS TOT	42	04/04/13 09:30	1.5000E+00
Lab Deadline	4/30/2013	04	TRG	PZ-105-SS TOT	46	04/04/13 15:06	1.5000E+00
Client	Engineering Management Support, Inc.	05	TRG	PZ-105-SS DIS	46	04/04/13 15:06	1.5000E+00
Project	West Lake OU-1	06	TRG	S-10 TOT	42	04/04/13 15:25	1.5000E+00
Report Level	4	07	TRG	S-10 DIS	42	04/04/13 15:25	1.5000E+00
Activity Units	pCi	08	TRG	LR-104 TOT	45	04/04/13 15:52	1.5000E+00
Aliquot Units	I	09	TRG	LR-104 DIS	45	04/04/13 15:52	1.5000E+00
Matrix	WA	10	TRG	DUP 01 TOT	48	04/04/13 00:00	1.5000E+00
Method	EPA 904.0 Modified	11	TRG	DUP 01 DIS	48	04/04/13 00:00	1.5000E+00
Instrument Type	Alpha/Beta GPC	12	TRG	DUP 02 TOT	43	04/04/13 00:00	1.5000E+00
Radiometric Tracer	Ba-133	13	TRG	DUP 02 DIS	43	04/04/13 00:00	1.5000E+00
Radiometric Sol#	Ba-6a	14	DO	FB at PZ-110-SS TOT	42	04/04/13 09:30	1.5000E+00
Tracer Act (dpm/g)	1010.693	15	TRG	FB at PZ-110-SS DIS	42	04/04/13 09:30	1.5000E+00
Carrier	Yttrium	16	TRG	MW-103 TOT	48	04/05/13 09:50	1.5000E+00
Carrier Conc (mg/ml)	34	17	TRG	MW-103 DIS	48	04/05/13 09:50	1.5000E+00
		18	TRG	PZ-200-SS TOT	37	04/05/13 11:10	1.5000E+00
		19	TRG	PZ-200-SS DIS	37	04/05/13 11:10	1.5000E+00

0429

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	0.9204	930.2	425.4	101.52	2.000	0.0925	0.1488	0.0563	82.79	84.05	1.00	1.00
02	MBL	0.9109	920.6	417.4	100.65	2.000	0.0923	0.1472	0.0549	80.74	81.26	1.00	1.00
03	DUP	0.9127	922.5	387.4	93.23	2.000	0.0940	0.1493	0.0553	81.32	75.82	1.00	1.00
04	TRG	0.9095	919.2	362.8	87.62	2.000	0.0920	0.1473	0.0553	81.32	71.25	1.00	1.00
05	TRG	0.9069	916.6	366.0	88.65	2.000	0.0923	0.1480	0.0557	81.91	72.61	1.00	1.00
06	TRG	0.8979	907.5	298.3	72.97	2.000	0.0938	0.1485	0.0547	80.44	58.70	1.00	1.00
07	TRG	0.9032	912.9	393.7	95.74	2.000	0.0921	0.1466	0.0545	80.15	76.74	1.00	1.00
08	TRG	0.9036	913.3	358.7	87.19	2.000	0.0922	0.1486	0.0564	82.94	72.32	1.00	1.00
09	TRG	0.9058	915.5	391.1	94.84	2.000	0.0938	0.1480	0.0542	79.71	75.59	1.00	1.00
10	TRG	0.8975	907.1	390.4	95.55	2.000	0.0924	0.1474	0.0550	80.88	77.28	1.00	1.00
11	TRG	0.9049	914.6	344.0	83.50	2.000	0.0924	0.1474	0.0550	80.88	67.54	1.00	1.00
12	TRG	0.9032	912.9	366.0	89.01	2.000	0.0940	0.1482	0.0542	79.71	70.94	1.00	1.00
13	TRG	0.9021	911.7	369.8	90.04	2.000	0.0949	0.1520	0.0571	83.97	75.61	1.00	1.00
14	DO	0.9028	912.5	352.6	85.79	2.000	0.0948	0.1518	0.0570	83.82	71.91	1.00	1.00
15	TRG	0.9009	910.5	351.7	85.75	2.000	0.0946	0.1511	0.0565	83.09	71.25	1.00	1.00
16	TRG	0.9040	913.7	398.7	96.87	2.000	0.0951	0.1529	0.0578	85.00	82.34	1.00	1.00
17	TRG	0.9061	915.8	404.1	97.96	2.000	0.0949	0.1514	0.0565	83.09	81.39	1.00	1.00
18	TRG	0.9030	912.7	292.5	71.15	2.000	0.0945	0.1512	0.0567	83.38	59.33	1.00	1.00
19	TRG	0.9015	911.1	391.8	95.46	2.000	0.0956	0.1528	0.0572	84.12	80.30	1.00	1.00

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			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
02	MBL			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
03	DUP			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
04	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
05	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
06	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
07	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
08	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
09	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
10	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
11	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
12	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
13	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
14	DO			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
15	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
16	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
17	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
18	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH
19	TRG			04/16/13 08:05	JBARNARD	04/18/13 12:49	LWALKER	04/29/13 05:22	TSMITH

Preliminary Data Report & Analytical Calculations
Work Order: 13-04051-Ra228-1

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	RA-228	LCS	LCS	pCi/l	9.72E+00	8.87E-01	1.04E+00	9.06E+00	107.19	OK		OK	
02	RA-228	MBL	BLANK	pCi/l	5.87E-01	3.85E-01	7.59E-01					OK	OK
03	RA-228	DUP	FB at PZ-110-SS TOT	pCi/l	1.34E-01	4.32E-01	9.07E-01				NA	OK	
04	RA-228	TRG	PZ-105-SS TOT	pCi/l	8.73E-01	4.56E-01	8.79E-01					OK	
05	RA-228	TRG	PZ-105-SS DIS	pCi/l	1.03E+00	4.19E-01	7.67E-01					OK	
06	RA-228	TRG	S-10 TOT	pCi/l	6.26E-02	5.13E-01	1.09E+00					OK	
07	RA-228	TRG	S-10 DIS	pCi/l	3.74E-01	3.64E-01	7.34E-01					OK	
08	RA-228	TRG	LR-104 TOT	pCi/l	1.58E+00	4.62E-01	7.98E-01					OK	
09	RA-228	TRG	LR-104 DIS	pCi/l	9.96E-01	4.65E-01	8.85E-01					OK	
10	RA-228	TRG	DUP 01 TOT	pCi/l	8.87E-01	4.29E-01	8.15E-01					OK	
11	RA-228	TRG	DUP 01 DIS	pCi/l	6.50E-01	4.51E-01	8.87E-01					OK	
12	RA-228	TRG	DUP 02 TOT	pCi/l	1.61E+00	4.83E-01	8.47E-01					OK	
13	RA-228	TRG	DUP 02 DIS	pCi/l	8.47E-01	5.00E-01	9.71E-01					OK	
14	RA-228	DO	FB at PZ-110-SS TOT	pCi/l	1.16E+00	5.67E-01	1.08E+00					OK	
15	RA-228	TRG	FB at PZ-110-SS DIS	pCi/l	4.51E-01	5.94E-01	1.22E+00					OK	
16	RA-228	TRG	MW-103 TOT	pCi/l	8.78E-01	4.95E-01	9.61E-01					OK	
17	RA-228	TRG	MW-103 DIS	pCi/l	1.08E+00	5.73E-01	1.09E+00					OK	
18	RA-228	TRG	PZ-200-SS TOT	pCi/l	1.38E+00	8.82E-01	1.73E+00					OK	
19	RA-228	TRG	PZ-200-SS DIS	pCi/l	1.37E+00	6.02E-01	1.12E+00					OK	

Run	1	Analysis Code	Ra228	Eberline Services Work Order	13-04051	Client	Engineering Management Support, Inc.

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Preliminary Data Report & Analytical Calculations
Work Order: 13-04051-Ra228-1

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	RA-228	LCS	04/09/13 00:00	1.00E+00	101.52	82.79	84.05	1.00	4/18/2013 12:49	4/29/2013 5:22
02	RA-228	MBL	04/09/13 00:00	1.50E+00	100.65	80.74	81.26	1.00	4/18/2013 12:49	4/29/2013 5:22
03	RA-228	DUP	04/04/13 09:30	1.50E+00	93.23	81.32	75.82	1.00	4/18/2013 12:49	4/29/2013 5:22
04	RA-228	TRG	04/04/13 15:06	1.50E+00	87.62	81.32	71.25	1.00	4/18/2013 12:49	4/29/2013 5:22
05	RA-228	TRG	04/04/13 15:06	1.50E+00	88.65	81.91	72.61	1.00	4/18/2013 12:49	4/29/2013 5:22
06	RA-228	TRG	04/04/13 15:25	1.50E+00	72.97	80.44	58.70	1.00	4/18/2013 12:49	4/29/2013 5:22
07	RA-228	TRG	04/04/13 15:25	1.50E+00	95.74	80.15	76.74	1.00	4/18/2013 12:49	4/29/2013 5:22
08	RA-228	TRG	04/04/13 15:52	1.50E+00	87.19	82.94	72.32	1.00	4/18/2013 12:49	4/29/2013 5:22
09	RA-228	TRG	04/04/13 15:52	1.50E+00	94.84	79.71	75.59	1.00	4/18/2013 12:49	4/29/2013 5:22
10	RA-228	TRG	04/04/13 00:00	1.50E+00	95.55	80.88	77.28	1.00	4/18/2013 12:49	4/29/2013 5:22
11	RA-228	TRG	04/04/13 00:00	1.50E+00	83.50	80.88	67.54	1.00	4/18/2013 12:49	4/29/2013 5:22
12	RA-228	TRG	04/04/13 00:00	1.50E+00	89.01	79.71	70.94	1.00	4/18/2013 12:49	4/29/2013 5:22
13	RA-228	TRG	04/04/13 00:00	1.50E+00	90.04	83.97	75.61	1.00	4/18/2013 12:49	4/29/2013 5:22
14	RA-228	DO	04/04/13 09:30	1.50E+00	85.79	83.82	71.91	1.00	4/18/2013 12:49	4/29/2013 5:22
15	RA-228	TRG	04/04/13 09:30	1.50E+00	85.75	83.09	71.25	1.00	4/18/2013 12:49	4/29/2013 5:22
16	RA-228	TRG	04/05/13 09:50	1.50E+00	96.87	85.00	82.34	1.00	4/18/2013 12:49	4/29/2013 5:22
17	RA-228	TRG	04/05/13 09:50	1.50E+00	97.96	83.09	81.39	1.00	4/18/2013 12:49	4/29/2013 5:22
18	RA-228	TRG	04/05/13 11:10	1.50E+00	71.15	83.38	59.33	1.00	4/18/2013 12:49	4/29/2013 5:22
19	RA-228	TRG	04/05/13 11:10	1.50E+00	95.46	84.12	80.30	1.00	4/18/2013 12:49	4/29/2013 5:22

Run	1
Analysis Code	Ra228
Eberline Services Work Order	13-04051
Client	Engineering Management Support, Inc.

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
Preliminary Data Report & Analytical Calculations
Work Order: 13-04051-Ra228-1

	
Run	1
Analysis Code	Ra228
Eberline Services Work Order	13-04051
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	04/29/13 08:17		LB4110R	C1	120	793	1.15	0.4705
02	RA-228	MBL	04/29/13 08:17		LB4110R	C2	120	211	1.283333333	0.4676
03	RA-228	DUP	04/29/13 08:17		LB4110R	C3	120	200	1.566666667	0.4614
04	RA-228	TRG	04/29/13 08:17		LB4110R	C4	120	237	1.35	0.4714
05	RA-228	TRG	04/29/13 09:09		LB4110R	A1	120	189	0.883333333	0.4776
06	RA-228	TRG	04/29/13 09:09		LB4110R	A2	120	142	1.15	0.4699
07	RA-228	TRG	04/29/13 09:09		LB4110R	A3	120	142	0.916666667	0.4809
08	RA-228	TRG	04/29/13 09:09		LB4110R	A4	120	237	0.933333333	0.4732
09	RA-228	TRG	04/29/13 09:09		LB4110R	B1	120	237	1.283333333	0.4754
10	RA-228	TRG	04/29/13 09:09		LB4110R	B2	120	204	1.083333333	0.4658
11	RA-228	TRG	04/29/13 09:09		LB4110R	B3	120	168	1	0.4713
12	RA-228	TRG	04/29/13 09:09		LB4110R	B4	120	250	1.033333333	0.4773
13	RA-228	TRG	04/29/13 10:21		LB4110R	C1	120	199	1.15	0.4705
14	RA-228	DO	04/29/13 10:21		LB4110R	C2	120	233	1.283333333	0.4676
15	RA-228	TRG	04/29/13 10:21		LB4110R	C3	120	218	1.566666667	0.4614
16	RA-228	TRG	04/29/13 10:21		LB4110R	C4	120	231	1.35	0.4714
17	RA-228	TRG	04/29/13 13:17		LB4110R	A1	120	167	0.883333333	0.4776
18	RA-228	TRG	04/29/13 13:17		LB4110R	A2	120	194	1.15	0.4699
19	RA-228	TRG	04/29/13 13:17		LB4110R	A3	120	187	0.916666667	0.4809

P579

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	0.9204	930.2418	425.4000	101.52	1.00	1.00
02	MBL	BLANK	04/09/13 00:00	1.5000	0.9109	920.6403	417.4000	100.65	1.00	1.00
03	DUP	FB at PZ-110-SS TOT	04/04/13 09:30	1.5000	0.9127	922.4595	387.4000	93.23	1.00	1.00
04	TRG	PZ-105-SS TOT	04/04/13 15:06	1.5000	0.9095	919.2253	362.8000	87.62	1.00	1.00
05	TRG	PZ-105-SS DIS	04/04/13 15:06	1.5000	0.9069	916.5975	366.0000	88.65	1.00	1.00
06	TRG	S-10 TOT	04/04/13 15:25	1.5000	0.8979	907.5012	298.3000	72.97	1.00	1.00
07	TRG	S-10 DIS	04/04/13 15:25	1.5000	0.9032	912.8579	393.7000	95.74	1.00	1.00
08	TRG	LR-104 TOT	04/04/13 15:52	1.5000	0.9036	913.2622	358.7000	87.19	1.00	1.00
09	TRG	LR-104 DIS	04/04/13 15:52	1.5000	0.9058	915.4857	391.1000	94.84	1.00	1.00
10	TRG	DUP 01 TOT	04/04/13 00:00	1.5000	0.8975	907.0970	390.4000	95.55	1.00	1.00
11	TRG	DUP 01 DIS	04/04/13 00:00	1.5000	0.9049	914.5761	344.0000	83.50	1.00	1.00
12	TRG	DUP 02 TOT	04/04/13 00:00	1.5000	0.9032	912.8579	366.0000	89.01	1.00	1.00
13	TRG	DUP 02 DIS	04/04/13 00:00	1.5000	0.9021	911.7462	369.8000	90.04	1.00	1.00
14	DO	FB at PZ-110-SS TOT	04/04/13 09:30	1.5000	0.9028	912.4536	352.6000	85.79	1.00	1.00
15	TRG	FB at PZ-110-SS DIS	04/04/13 09:30	1.5000	0.9009	910.5333	351.7000	85.75	1.00	1.00
16	TRG	MW-103 TOT	04/05/13 09:50	1.5000	0.9040	913.6665	398.7000	96.87	1.00	1.00
17	TRG	MW-103 DIS	04/05/13 09:50	1.5000	0.9061	915.7889	404.1000	97.96	1.00	1.00
18	TRG	PZ-200-SS TOT	04/05/13 11:10	1.5000	0.9030	912.6558	292.5000	71.15	1.00	1.00
19	TRG	PZ-200-SS DIS	04/05/13 11:10	1.5000	0.9015	911.1397	391.8000	95.46	1.00	1.00

Internal Work Order		Run	Analysis Code		Date	Technician		Technician Initials		Witness Initials	
13-04051		1	Ra228		4/16/2013 8:04	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
Ra-228	Ra-11	39.058	4/16/2013	0.510	0.5152				9.06	0.462	0.00	0.000	0.00	0.000	0.00	0.000

Tracers							Balance Printer Tapes			
fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition	Tracer		LCS	
01	Ba-133	Ba-6a	1010.693	4/16/2013	0.9204	1.0000				
02	Ba-133	Ba-6a	1010.693	4/16/2013	0.9109	1.0000				
03	Ba-133	Ba-6a	1010.693	4/16/2013	0.9127	1.0000				
04	Ba-133	Ba-6a	1010.693	4/16/2013	0.9095	1.0000				
05	Ba-133	Ba-6a	1010.693	4/16/2013	0.9069	1.0000				
06	Ba-133	Ba-6a	1010.693	4/16/2013	0.8979	1.0000				
07	Ba-133	Ba-6a	1010.693	4/16/2013	0.9032	1.0000				
08	Ba-133	Ba-6a	1010.693	4/16/2013	0.9036	1.0000				
09	Ba-133	Ba-6a	1010.693	4/16/2013	0.9058	1.0000				
10	Ba-133	Ba-6a	1010.693	4/16/2013	0.8975	1.0000				
11	Ba-133	Ba-6a	1010.693	4/16/2013	0.9049	1.0000				
12	Ba-133	Ba-6a	1010.693	4/16/2013	0.9032	1.0000				
13	Ba-133	Ba-6a	1010.693	4/16/2013	0.9021	1.0000				
14	Ba-133	Ba-6a	1010.693	4/16/2013	0.9028	1.0000				
15	Ba-133	Ba-6a	1010.693	4/16/2013	0.9009	1.0000				
16	Ba-133	Ba-6a	1010.693	4/16/2013	0.9040	1.0000				
17	Ba-133	Ba-6a	1010.693	4/16/2013	0.9061	1.0000				
18	Ba-133	Ba-6a	1010.693	4/16/2013	0.9030	1.0000				
19	Ba-133	Ba-6a	1010.693	4/16/2013	0.9015	1.0000				
									Matrix Spike	

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
13-04051	1	Ra228	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					1.5000E+00	1.5000E+00				
03	FB at PZ-110-SS TOT	DUP					1.5000E+00	1.5000E+00				
04	PZ-105-SS TOT	TRG					1.5000E+00	1.5000E+00				
05	PZ-105-SS DIS	TRG					1.5000E+00	1.5000E+00				
06	S-10 TOT	TRG					1.5000E+00	1.5000E+00				
07	S-10 DIS	TRG					1.5000E+00	1.5000E+00				
08	LR-104 TOT	TRG					1.5000E+00	1.5000E+00				
09	LR-104 DIS	TRG					1.5000E+00	1.5000E+00				
10	DUP 01 TOT	TRG					1.5000E+00	1.5000E+00				
11	DUP 01 DIS	TRG					1.5000E+00	1.5000E+00				
12	DUP 02 TOT	TRG					1.5000E+00	1.5000E+00				
13	DUP 02 DIS	TRG					1.5000E+00	1.5000E+00				
14	FB at PZ-110-SS TOT	DO					1.5000E+00	1.5000E+00				
15	FB at PZ-110-SS DIS	TRG					1.5000E+00	1.5000E+00				
16	MW-103 TOT	TRG					1.5000E+00	1.5000E+00				
17	MW-103 DIS	TRG					1.5000E+00	1.5000E+00				
18	PZ-200-SS TOT	TRG					1.5000E+00	1.5000E+00				
19	PZ-200-SS DIS	TRG					1.5000E+00	1.5000E+00				

Comments	
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0437

Technician: _____

 Date: 4/16/13

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
13-04051	1	Ra228	Yttrium	34.0000	TSMITH

TRetec Fraction	Engineering Management Support, Inc. Client ID	Sample Type	Carrier Data		Filter Data		Gravimetric % Recovery
			Carrier Added (ml)	Filter Tare (g)	Filter Final (g)	Filter Net (g)	
01	LCS	LCS	2.0000	0.0925	0.1488	0.0563	82.79
02	BLANK	MBL	2.0000	0.0923	0.1472	0.0549	80.74
03	DUP	DUP	2.0000	0.0940	0.1493	0.0553	81.32
04	PZ-105-SS TOT	TRG	2.0000	0.0920	0.1473	0.0553	81.32
05	PZ-105-SS DIS	TRG	2.0000	0.0923	0.1480	0.0557	81.91
06	S-10 TOT	TRG	2.0000	0.0938	0.1485	0.0547	80.44
07	S-10 DIS	TRG	2.0000	0.0921	0.1466	0.0545	80.15
08	LR-104 TOT	TRG	2.0000	0.0922	0.1486	0.0564	82.94
09	LR-104 DIS	TRG	2.0000	0.0938	0.1480	0.0542	79.71
10	DUP 01 TOT	TRG	2.0000	0.0924	0.1474	0.0550	80.88
11	DUP 01 DIS	TRG	2.0000	0.0924	0.1474	0.0550	80.88
12	DUP 02 TOT	TRG	2.0000	0.0940	0.1482	0.0542	79.71
13	DUP 02 DIS	TRG	2.0000	0.0949	0.1520	0.0571	83.97
14	FB at PZ-110-SS TOT	DO	2.0000	0.0948	0.1518	0.0570	83.82
15	FB at PZ-110-SS DIS	TRG	2.0000	0.0946	0.1511	0.0565	83.09
16	MW-103 TOT	TRG	2.0000	0.0951	0.1529	0.0578	85.00
17	MW-103 DIS	TRG	2.0000	0.0949	0.1514	0.0565	83.09
18	PZ-200-SS TOT	TRG	2.0000	0.0945	0.1512	0.0567	83.38
19	PZ-200-SS DIS	TRG	2.0000	0.0956	0.1528	0.0572	84.12

Technician: _____

TSMITH

Date: _____

4/29/13

(R)
4/29/13
KBS

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1304051-01	36	793	120	1400	4/29/13 10:17
C2	1304051-02	16	211	120	1400	4/29/13 10:17
C3	1304051-03	7	200	120	1400	4/29/13 10:17
C4	1304051-04	14	237	120	1400	4/29/13 10:17

Ⓜ
4/29/13
ICB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
A1	1304051-05	10	189	120	1400	4/29/13 11:09
A2	1304051-06	14	142	120	1400	4/29/13 11:09
A3	1304051-07	13	142	120	1400	4/29/13 11:09
A4	1304051-08	11	237	120	1400	4/29/13 11:09
B1	1304051-09	12	237	120	1400	4/29/13 11:09
B2	1304051-10	13	204	120	1400	4/29/13 11:09
B3	1304051-11	23	168	120	1400	4/29/13 11:09
B4	1304051-12	17	250	120	1400	4/29/13 11:09

4/29/13
⑫

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1304051-13	8	199	120	1400	4/29/13 12:21
C2	1304051-14	17	233	120	1400	4/29/13 12:21
C3	1304051-15	14	218	120	1400	4/29/13 12:21
C4	1304051-16	8	231	120	1400	4/29/13 12:21

Ⓜ
4/29/13
KB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
A1	1304051-17	19	167	120	1400	4/29/13 15:17
A2	1304051-18	13	194	120	1400	4/29/13 15:17
A3	1304051-19	14	187	120	1400	4/29/13 15:17

GPC Detector Report
(ALL Backgrounds)

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4129117

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	4/29/2013	5.00E-02	P	-2.19E+01	2.94E-01	2.24E+01
LB4110A - A2	Alpha	11/18/2007	4/29/2013	5.00E-02	P	-1.86E+01	2.63E-01	1.91E+01
LB4110A - A3	Alpha	11/18/2007	4/29/2013	6.67E-02	P	-1.81E+01	2.25E-01	1.85E+01
LB4110A - A4	Alpha	11/18/2007	4/29/2013	6.67E-02	P	-1.92E+01	2.46E-01	1.97E+01
LB4110A - B1	Alpha	11/18/2007	4/29/2013	6.67E-02	P	-9.90E-02	7.51E-02	2.49E-01
LB4110A - B2	Alpha	11/18/2007	4/29/2013	1.67E-02	P	-7.96E-02	7.27E-02	2.25E-01
LB4110A - B3	Alpha	11/18/2007	4/29/2013	1.50E-01	W	-6.40E-02	5.32E-02	1.70E-01
LB4110A - B4	Alpha	11/18/2007	4/29/2013	3.33E-02	P	-1.44E-01	7.91E-02	3.02E-01
LB4110A - C1	Alpha	11/18/2007	4/29/2013	5.00E-02	P	-1.53E-01	8.92E-02	3.31E-01
LB4110A - C2	Alpha	11/18/2007	4/29/2013	5.00E-02	P	-1.80E-01	8.84E-02	3.57E-01
LB4110A - C3	Alpha	11/18/2007	4/29/2013	5.00E-02	P	-1.76E-01	1.01E-01	3.79E-01
LB4110A - C4	Alpha	11/18/2007	4/29/2013	3.33E-02	P	-6.28E-02	6.89E-02	2.01E-01
LB4110A - D1	Alpha	11/18/2007	4/29/2013	3.33E-02	P	-5.35E-02	8.43E-02	2.22E-01
LB4110A - D2	Alpha	11/18/2007	4/29/2013	0.00E+00	P	-7.05E-02	6.03E-02	1.91E-01
LB4110A - D3	Alpha	11/18/2007	4/29/2013	8.33E-02	P	-4.75E-02	7.21E-02	1.92E-01
LB4110A - D4	Alpha	11/18/2007	4/29/2013	5.00E-02	P	-5.75E-02	7.09E-02	1.99E-01
LB4110R - A1	Alpha	11/24/2006	4/29/2013	1.00E-01	P	-1.01E-01	1.01E-01	3.03E-01
LB4110R - A2	Alpha	11/24/2006	4/29/2013	6.67E-02	P	-9.05E-02	7.74E-02	2.45E-01
LB4110R - A3	Alpha	11/24/2006	4/29/2013	6.67E-02	P	-7.39E-02	7.68E-02	2.27E-01
LB4110R - A4	Alpha	11/24/2006	4/29/2013	6.67E-02	P	-5.31E-02	7.18E-02	1.97E-01
LB4110R - B1	Alpha	11/24/2006	4/26/2013	5.00E-02	P	-9.60E-02	6.21E-02	2.20E-01
LB4110R - B2	Alpha	11/24/2006	4/26/2013	6.67E-02	P	-6.95E-02	6.44E-02	1.98E-01
LB4110R - B3	Alpha	11/24/2006	4/26/2013	1.17E-01	P	-6.55E-02	7.00E-02	2.05E-01
LB4110R - B4	Alpha	11/24/2006	4/26/2013	3.33E-02	P	-6.47E-02	7.08E-02	2.06E-01
LB4110R - C1	Alpha	11/24/2006	4/29/2013	1.67E-02	P	-7.81E-02	7.44E-02	2.27E-01
LB4110R - C2	Alpha	11/24/2006	4/29/2013	1.67E-02	P	-7.53E-02	7.23E-02	2.20E-01
LB4110R - C3	Alpha	11/24/2006	4/29/2013	1.67E-02	P	-8.93E-02	8.48E-02	2.59E-01
LB4110R - C4	Alpha	11/24/2006	4/29/2013	1.67E-02	P	-6.23E-02	8.22E-02	2.27E-01
LB4110R - D1	Alpha	11/24/2006	4/29/2013	0.00E+00	P	-9.89E-02	7.34E-02	2.46E-01
LB4110R - D2	Alpha	11/24/2006	4/29/2013	0.00E+00	P	-7.29E-02	7.28E-02	2.18E-01
LB4110R - D3	Alpha	11/24/2006	4/29/2013	0.00E+00	P	-7.82E-02	7.25E-02	2.23E-01
LB4110R - D4	Alpha	11/24/2006	4/29/2013	0.00E+00	P	-6.95E-02	7.75E-02	2.24E-01
LB5100 - 1	Alpha	7/10/2006	10/26/2007	5.00E-02	P	-1.56E-02	9.58E-02	2.07E-01

GPC Detector Report
(ALL Backgrounds)

C
4/29/13

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	4/29/2013	1.97E+01	P	-2.97E+02	7.63E+00	3.12E+02
LB4110A - A2	Beta	11/18/2007	4/29/2013	1.44E+01	P	-3.12E+01	2.54E+00	3.63E+01
LB4110A - A3	Beta	11/18/2007	4/29/2013	3.06E+01	P	-5.14E+01	2.68E+00	5.68E+01
LB4110A - A4	Beta	11/18/2007	4/29/2013	1.83E+01	P	-3.35E+01	3.01E+00	3.95E+01
LB4110A - B1	Beta	11/18/2007	4/29/2013	8.17E+01	F	-1.05E+01	3.26E+00	1.70E+01
LB4110A - B2	Beta	11/18/2007	4/29/2013	1.02E+01	W	-7.57E+00	1.99E+00	1.16E+01
LB4110A - B3	Beta	11/18/2007	4/29/2013	8.10E+00	F	1.04E-01	1.36E+00	2.62E+00
LB4110A - B4	Beta	11/18/2007	4/29/2013	8.13E+00	P	-7.63E+00	1.97E+00	1.16E+01
LB4110A - C1	Beta	11/18/2007	4/29/2013	2.63E+00	P	-5.52E+00	2.16E+00	9.84E+00
LB4110A - C2	Beta	11/18/2007	4/29/2013	2.15E+00	W	3.79E-01	1.27E+00	2.17E+00
LB4110A - C3	Beta	11/18/2007	4/29/2013	1.87E+00	P	4.69E-01	1.47E+00	2.47E+00
LB4110A - C4	Beta	11/18/2007	4/29/2013	1.87E+00	P	-1.77E+00	2.14E+00	6.06E+00
LB4110A - D1	Beta	11/18/2007	4/29/2013	8.28E+00	F	-2.39E+00	2.59E+00	7.57E+00
LB4110A - D2	Beta	11/18/2007	4/29/2013	7.87E+00	F	-6.85E-01	1.57E+00	3.82E+00
LB4110A - D3	Beta	11/18/2007	4/29/2013	7.73E+00	F	1.22E+00	4.47E+00	7.73E+00
LB4110A - D4	Beta	11/18/2007	4/29/2013	6.22E+00	F	-4.55E-01	1.38E+00	3.21E+00
LB4110R - A1	Beta	11/24/2006	4/29/2013	8.83E-01	P	-6.21E+01	3.79E+00	6.97E+01
LB4110R - A2	Beta	11/24/2006	4/29/2013	1.15E+00	P	-4.94E+01	2.06E+00	5.35E+01
LB4110R - A3	Beta	11/24/2006	4/29/2013	9.17E-01	P	-4.57E+01	2.80E+00	5.13E+01
LB4110R - A4	Beta	11/24/2006	4/29/2013	9.33E-01	P	-4.56E+01	2.03E+00	4.96E+01
LB4110R - B1	Beta	11/24/2006	4/26/2013	1.28E+00	P	-4.80E+01	2.05E+00	5.21E+01
LB4110R - B2	Beta	11/24/2006	4/26/2013	1.08E+00	P	-4.80E+01	2.08E+00	5.21E+01
LB4110R - B3	Beta	11/24/2006	4/26/2013	1.00E+00	P	-4.77E+01	2.71E+00	5.32E+01
LB4110R - B4	Beta	11/24/2006	4/26/2013	1.03E+00	P	-4.81E+01	1.95E+00	5.20E+01
LB4110R - C1	Beta	11/24/2006	4/29/2013	1.15E+00	P	-4.78E+01	3.04E+00	5.39E+01
LB4110R - C2	Beta	11/24/2006	4/29/2013	1.28E+00	P	-4.78E+01	2.76E+00	5.34E+01
LB4110R - C3	Beta	11/24/2006	4/29/2013	1.57E+00	P	-4.83E+01	2.56E+00	5.35E+01
LB4110R - C4	Beta	11/24/2006	4/29/2013	1.35E+00	P	-5.45E+01	2.99E+00	6.05E+01
LB4110R - D1	Beta	11/24/2006	4/29/2013	0.00E+00	P	-4.52E+01	5.81E+00	5.68E+01
LB4110R - D2	Beta	11/24/2006	4/29/2013	0.00E+00	P	-4.88E+01	1.96E+00	5.27E+01
LB4110R - D3	Beta	11/24/2006	4/29/2013	0.00E+00	P	-5.21E+01	5.78E+00	6.36E+01
LB4110R - D4	Beta	11/24/2006	4/29/2013	0.00E+00	P	-4.84E+01	2.33E+00	5.31E+01
LB5100 - 1	Beta	7/10/2006	10/26/2007	4.52E+00	F	-3.19E-01	1.58E+00	3.48E+00

GPC Detector Report
(ALL Efficiencies)

C
4/25/13

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	4/29/2013	0.2423	P	-0.0195	0.2145	0.4486
LB4110A - A2	Alpha	11/18/2007	4/29/2013	0.2051	P	-0.0569	0.1724	0.4017
LB4110A - A3	Alpha	11/18/2007	4/29/2013	0.2042	P	-0.0806	0.1612	0.4029
LB4110A - A4	Alpha	11/18/2007	4/29/2013	0.2166	P	-0.0590	0.1801	0.4193
LB4110A - B1	Alpha	11/18/2007	4/29/2013	0.2069	P	0.1943	0.2247	0.2551
LB4110A - B2	Alpha	11/18/2007	4/29/2013	0.2013	P	0.1930	0.2218	0.2507
LB4110A - B3	Alpha	11/18/2007	4/29/2013	0.2344	P	0.1290	0.2326	0.3362
LB4110A - B4	Alpha	11/18/2007	4/29/2013	0.2334	P	0.2090	0.2368	0.2645
LB4110A - C1	Alpha	11/18/2007	4/29/2013	0.2175	P	0.1973	0.2208	0.2444
LB4110A - C2	Alpha	11/18/2007	4/29/2013	0.2319	P	0.1966	0.2252	0.2539
LB4110A - C3	Alpha	11/18/2007	4/29/2013	0.2493	P	0.2227	0.2494	0.2760
LB4110A - C4	Alpha	11/18/2007	4/29/2013	0.2229	P	0.1965	0.2258	0.2551
LB4110A - D1	Alpha	11/18/2007	4/29/2013	0.2178	P	0.2037	0.2335	0.2633
LB4110A - D2	Alpha	11/18/2007	4/29/2013	0.2538	P	0.2279	0.2585	0.2891
LB4110A - D3	Alpha	11/18/2007	4/29/2013	0.2537	P	0.2315	0.2640	0.2964
LB4110A - D4	Alpha	11/18/2007	4/29/2013	0.1809	P	0.1652	0.2000	0.2347
LB4110R - A1	Alpha	11/24/2006	4/29/2013	0.2376	P	0.2030	0.2389	0.2748
LB4110R - A2	Alpha	11/24/2006	4/29/2013	0.2138	P	0.1899	0.2207	0.2515
LB4110R - A3	Alpha	11/24/2006	4/29/2013	0.2221	P	0.1963	0.2249	0.2535
LB4110R - A4	Alpha	11/24/2006	4/29/2013	0.2443	P	0.2159	0.2457	0.2756
LB4110R - B1	Alpha	11/24/2006	4/26/2013	0.2185	P	0.1877	0.2261	0.2646
LB4110R - B2	Alpha	11/24/2006	4/26/2013	0.2091	P	0.1801	0.2176	0.2551
LB4110R - B3	Alpha	11/24/2006	4/26/2013	0.2456	P	0.2066	0.2440	0.2814
LB4110R - B4	Alpha	11/24/2006	4/26/2013	0.2187	P	0.1938	0.2321	0.2703
LB4110R - C1	Alpha	11/24/2006	4/29/2013	0.2077	P	0.1861	0.2153	0.2446
LB4110R - C2	Alpha	11/24/2006	4/29/2013	0.2188	P	0.1963	0.2249	0.2534
LB4110R - C3	Alpha	11/24/2006	4/29/2013	0.2354	P	0.2063	0.2398	0.2732
LB4110R - C4	Alpha	11/24/2006	4/29/2013	0.2094	P	0.1860	0.2230	0.2601
LB4110R - D1	Alpha	11/24/2006	4/29/2013	0.0000	F	0.0429	0.2083	0.3737
LB4110R - D2	Alpha	11/24/2006	4/29/2013	0.0000	F	0.0496	0.2369	0.4242
LB4110R - D3	Alpha	11/24/2006	4/29/2013	0.0000	F	0.0488	0.2327	0.4167
LB4110R - D4	Alpha	11/24/2006	4/29/2013	0.0000	F	0.0376	0.1876	0.3376
LB5100 - 1	Alpha	7/10/2006	10/26/2007	0.3368	P	0.3332	0.3455	0.3578

C
4/29/13

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	4/29/2013	0.5367	P	0.2025	0.5629	0.9232
LB4110A - A2	Beta	11/18/2007	4/29/2013	0.4760	P	0.1532	0.4632	0.7731
LB4110A - A3	Beta	11/18/2007	4/29/2013	0.4408	P	0.0804	0.4570	0.8335
LB4110A - A4	Beta	11/18/2007	4/29/2013	0.4993	P	0.1328	0.4875	0.8423
LB4110A - B1	Beta	11/18/2007	4/29/2013	0.4136	F	0.4638	0.5307	0.5976
LB4110A - B2	Beta	11/18/2007	4/29/2013	0.4854	P	0.4638	0.5277	0.5916
LB4110A - B3	Beta	11/18/2007	4/29/2013	0.5285	P	0.3184	0.5321	0.7457
LB4110A - B4	Beta	11/18/2007	4/29/2013	0.5294	P	0.4922	0.5547	0.6172
LB4110A - C1	Beta	11/18/2007	4/29/2013	0.5059	P	0.4500	0.5027	0.5554
LB4110A - C2	Beta	11/18/2007	4/29/2013	0.4971	P	0.4278	0.5012	0.5746
LB4110A - C3	Beta	11/18/2007	4/29/2013	0.6076	P	0.5275	0.5901	0.6527
LB4110A - C4	Beta	11/18/2007	4/29/2013	0.5183	P	0.4567	0.5251	0.5936
LB4110A - D1	Beta	11/18/2007	4/29/2013	0.5164	P	0.4800	0.5544	0.6289
LB4110A - D2	Beta	11/18/2007	4/29/2013	0.5519	P	0.4908	0.5890	0.6873
LB4110A - D3	Beta	11/18/2007	4/29/2013	0.6062	P	0.5367	0.6156	0.6945
LB4110A - D4	Beta	11/18/2007	4/29/2013	0.4351	P	0.3867	0.4737	0.5607
LB4110R - A1	Beta	11/24/2006	4/29/2013	0.5621	P	0.4812	0.5680	0.6548
LB4110R - A2	Beta	11/24/2006	4/29/2013	0.5087	P	0.4207	0.5089	0.5971
LB4110R - A3	Beta	11/24/2006	4/29/2013	0.5195	P	0.4579	0.5398	0.6218
LB4110R - A4	Beta	11/24/2006	4/29/2013	0.6000	P	0.5098	0.5917	0.6737
LB4110R - B1	Beta	11/24/2006	4/26/2013	0.5287	P	0.4533	0.5428	0.6323
LB4110R - B2	Beta	11/24/2006	4/26/2013	0.5094	P	0.4311	0.5203	0.6095
LB4110R - B3	Beta	11/24/2006	4/26/2013	0.6093	P	0.5013	0.5912	0.6811
LB4110R - B4	Beta	11/24/2006	4/26/2013	0.5199	P	0.4624	0.5501	0.6379
LB4110R - C1	Beta	11/24/2006	4/29/2013	0.4629	P	0.4245	0.5035	0.5825
LB4110R - C2	Beta	11/24/2006	4/29/2013	0.5101	P	0.4503	0.5293	0.6084
LB4110R - C3	Beta	11/24/2006	4/29/2013	0.5573	P	0.4812	0.5714	0.6615
LB4110R - C4	Beta	11/24/2006	4/29/2013	0.5005	P	0.4326	0.5267	0.6208
LB4110R - D1	Beta	11/24/2006	4/29/2013	0.0000	F	0.1017	0.4982	0.8947
LB4110R - D2	Beta	11/24/2006	4/29/2013	0.0000	F	0.1150	0.5598	1.0046
LB4110R - D3	Beta	11/24/2006	4/29/2013	0.0000	F	0.1117	0.5437	0.9757
LB4110R - D4	Beta	11/24/2006	4/29/2013	0.0000	F	0.0883	0.4475	0.8068
LB5100 - 1	Beta	7/10/2006	10/26/2007	0.4428	F	0.4555	0.4731	0.4906

SECTION XII
BARIUM-133 ANALYTICAL TRACER DATA

4/19/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405101_GE5_BAFIL_190676.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : SPIKE
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 07:27:35
 Sample ID : 1304051-01 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	6.30	21	18	0.89	65.88	58	13	2.29E-02	49.0	
2	0	16.23	14	6	0.85	161.14	154	12	1.56E-02	44.0	
3	2	19.84	31	21	0.60	195.76	190	31	3.42E-02	26.4	2.42E+00
4	2	21.03	83	22	0.61	207.20	190	31	9.25E-02	18.3	
5	0	25.65	26	7	1.02	251.54	244	16	2.92E-02	30.7	
6	0	30.93	2164	95	0.82	302.16	289	31	2.40E+00	2.5	
7	6	34.86	272	49	0.47	339.93	333	25	3.02E-01	9.0	3.18E+00
8	6	35.61	186	66	0.98	347.07	333	25	2.06E-01	16.5	
9	0	44.48	9	13	0.21	432.20	420	17	1.05E-02	92.1	
10	6	52.09	9	7	0.33	505.26	503	23	1.05E-02	43.5	1.01E+00
11	6	53.24	49	28	0.95	516.31	503	23	5.44E-02	26.0	
12	0	61.67	263	40	0.69	597.13	584	24	2.92E-01	8.2	
13	1	65.68	78	8	0.72	635.63	626	27	8.62E-02	15.1	1.10E+00
14	1	66.66	47	2	0.66	645.00	626	27	5.17E-02	21.8	
15	1	79.43	116	30	0.76	767.61	752	43	1.29E-01	15.5	2.93E+00
16	1	80.87	843	30	0.69	781.44	752	43	9.36E-01	3.7	
17	2	110.95	46	13	0.76	1070.00	1063	24	5.12E-02	28.7	3.42E+00
18	2	111.57	212	18	0.91	1075.95	1063	24	2.35E-01	8.2	
19	4	115.06	26	15	0.93	1109.44	1101	28	2.90E-02	40.7	1.31E+00
20	4	115.85	34	18	0.77	1117.00	1101	28	3.80E-02	36.9	
21	4	116.51	15	8	0.56	1123.41	1101	28	1.66E-02	50.6	
22	1	275.08	23	9	1.03	2645.00	2634	25	2.52E-02	39.8	9.74E-01
23	1	275.71	41	5	1.03	2651.00	2634	25	4.54E-02	19.3	
24	1	301.55	58	7	1.06	2899.00	2886	26	6.47E-02	20.0	1.77E+00
25	1	302.49	32	3	1.06	2908.00	2886	26	3.58E-02	16.3	
26	1	332.09	69	4	1.10	3192.00	3180	25	7.64E-02	13.4	1.87E+00
27	1	332.82	38	4	0.99	3199.05	3180	25	4.25E-02	18.8	
28	0	354.68	376	15	0.82	3408.82	3392	29	4.18E-01	5.6	
29	0	382.40	75	12	1.33	3674.78	3658	27	8.37E-02	14.8	
30	1	385.03	81	17	1.16	3700.00	3689	28	9.01E-02	15.8	1.97E+00
31	1	386.17	48	6	1.16	3711.00	3689	28	5.37E-02	19.5	
32	0	413.32	25	8	0.61	3971.47	3956	25	2.81E-02	28.4	

Total number of lines in spectrum 32
 Number of unidentified lines 27
 Number of lines tentatively identified by NID 5 15.63%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	4.254E+02	4.254E+02	0.722E+02	16.97	
Total Activity :			4.254E+02	4.254E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
TH-234	4.47E+09Y	1.00	2.375E+02	2.375E+02	0.401E+02	16.89	
Total Activity :			2.375E+02	2.375E+02			

Grand Total Activity : 6.629E+02 6.629E+02

Flags: "K" = Keyline not found "M" = Manually accepted
 "E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.254E+02	4.254E+02	16.97	OK
	302.84	17.80	2.575E+00	2.112E+02	2.112E+02	41.89	OK
	356.01	60.00	4.312E+00	4.370E+02	4.370E+02	18.27	OK

Final Mean for 3 Valid Peaks = 4.254E+02+/- 7.220E+01 (16.97%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.375E+02	2.375E+02	16.89	OK

Final Mean for 1 Valid Peaks = 2.375E+02+/- 4.013E+01 (16.89%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.254E+02	7.220E+01	1.528E+01	2.249E+00	27.842
TH-234	2.375E+02	4.013E+01	2.278E+01	2.931E-01	10.427

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-5.239E+00		1.568E+01	2.722E+01	9.227E+00	-0.192
CD-109	5.277E+00		1.096E+02	1.989E+02	1.915E+01	0.027
PA-231	-7.225E-01		9.709E-01	1.574E+00	1.772E-02	-0.459
PA-234	3.853E+00	+	1.419E+00	2.115E+00	2.381E-02	1.822
NP-237	-1.680E+01		2.649E+01	4.411E+01	3.891E+00	-0.381
AM-241	4.476E-01		1.436E+00	2.334E+00	2.627E-02	0.192

VAX/VMS Peak Search Report Generated 19-APR-2013 08:00:35.04

4115117

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405102_GE5_BAFIL_190677.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : BLANK
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 07:45:16
 Sample ID : 1304051-02 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.15 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.33	64	46	0.36	210.03	201	19	7.08E-02	30.6	
2	0	25.24	9	28	0.33	247.56	239	14	1.00E-02	129.1	
3	0	29.12	18	59	0.84	284.85	273	16	1.97E-02	100.6	
4	0	30.96	2086	109	0.74	302.49	290	30	2.32E+00	2.7	
5	3	35.12	471	22	0.75	342.36	329	29	5.24E-01	5.5	2.87E+00
6	3	35.92	122	10	0.62	350.05	329	29	1.36E-01	16.8	
7	0	37.28	8	2	0.12	363.09	358	10	8.72E-03	51.4	
8	8	53.10	41	13	0.63	514.88	509	14	4.58E-02	23.4	2.16E+00
9	8	53.61	10	1	0.29	519.80	509	14	1.16E-02	50.7	
10	1	61.45	140	15	0.65	595.00	584	25	1.56E-01	12.6	3.52E+00
11	1	62.38	64	11	0.65	604.00	584	25	7.08E-02	14.2	
12	2	65.65	70	34	0.80	635.33	623	31	7.82E-02	23.3	7.50E-01
13	2	66.14	58	28	0.80	640.06	623	31	6.40E-02	28.9	
14	3	79.49	52	23	0.81	768.19	760	41	5.80E-02	23.7	1.02E+00
15	3	80.93	827	27	0.70	781.95	760	41	9.19E-01	3.7	
16	0	88.97	10	11	0.78	859.13	847	16	1.15E-02	68.0	
17	0	92.36	20	2	0.21	891.61	885	13	2.21E-02	25.9	
18	1	111.26	34	26	0.76	1073.00	1064	25	3.75E-02	50.1	1.13E+00
19	1	111.88	162	31	0.77	1079.00	1064	25	1.80E-01	11.2	
20	0	116.29	23	40	0.84	1121.27	1111	17	2.59E-02	56.8	
21	0	174.20	11	12	0.12	1676.91	1665	17	1.19E-02	66.3	
22	0	275.57	53	3	0.33	2649.69	2635	26	5.91E-02	15.3	
23	0	301.97	143	7	0.83	2902.97	2887	26	1.59E-01	9.1	
24	0	306.45	28	7	1.07	2946.00	2932	23	3.10E-02	25.6	
25	1	332.09	46	3	1.10	3192.00	3181	28	5.16E-02	17.4	1.57E+00
26	1	332.82	64	2	1.10	3199.00	3181	28	7.09E-02	12.9	
27	0	354.97	393	6	0.71	3411.56	3395	28	4.37E-01	5.2	
28	1	382.63	119	8	1.16	3677.00	3661	29	1.32E-01	9.4	2.17E+00
29	1	383.15	12	4	1.16	3682.00	3661	29	1.31E-02	82.1	
30	1	385.24	146	6	1.16	3702.00	3693	26	1.62E-01	7.1	1.30E+01
31	1	385.65	12	12	1.16	3706.00	3693	26	1.31E-02	108.4	
32	1	386.28	98	10	1.16	3712.00	3693	26	1.09E-01	10.3	
33	0	413.83	25	9	0.52	3976.38	3955	29	2.74E-02	31.2	

Total number of lines in spectrum 33
 Number of unidentified lines 25
 Number of lines tentatively identified by NID 8 24.24%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr	2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter				
CD-109	464.00D	1.00	7.234E+01	7.238E+01	9.880E+01	136.50		
BA-133	10.50Y	1.00	4.174E+02	4.174E+02	0.709E+02	16.97		
Total Activity :			4.897E+02	4.898E+02				

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr	2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter				
TH-234	4.47E+09Y	1.00	5.751E+01	5.751E+01	1.646E+01	28.62		
AM-241	432.20Y	1.00	1.171E+01	1.171E+01	0.300E+01	25.58		
Total Activity :			6.922E+01	6.922E+01				

Grand Total Activity : 5.589E+02 5.590E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
CD-109	88.03	3.72*	1.153E+01	7.234E+01	7.238E+01	136.50	OK

Final Mean for 1 Valid Peaks = 7.238E+01+/- 9.880E+01 (136.50%)

BA-133	81.00	33.00*	1.802E+01	4.174E+02	4.174E+02	16.97	OK
	302.84	17.80	2.575E+00	9.352E+02	9.353E+02	32.11	OK
	356.01	60.00	4.312E+00	4.567E+02	4.567E+02	17.79	OK

Final Mean for 3 Valid Peaks = 4.174E+02+/- 7.085E+01 (16.97%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	5.751E+01	5.751E+01	28.62	OK

Final Mean for 1 Valid Peaks = 5.751E+01+/- 1.646E+01 (28.62%)

AM-241	59.54	35.90*	1.000E+02	1.171E+01	1.171E+01	25.58	OK
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Final Mean for 1 Valid Peaks = 1.171E+01+/- 2.996E+00 (25.58%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CD-109	7.238E+01	9.880E+01	1.855E+02	1.785E+01	0.390
BA-133	4.174E+02	7.085E+01	1.381E+01	2.033E+00	30.226
TH-234	5.751E+01	1.646E+01	2.063E+01	2.655E-01	2.787
AM-241	1.171E+01	2.996E+00	2.273E+00	2.559E-02	5.151

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.091E+01		1.709E+01	3.324E+01	1.127E+01	0.629
PA-231	2.505E-01		9.070E-01	1.731E+00	1.949E-02	0.145
PA-234	2.947E+00	+	1.810E+00	1.995E+00	2.246E-02	1.477
NP-237	8.349E+00		2.867E+01	4.723E+01	4.166E+00	0.177

VAX/VMS Peak Search Report Generated 19-APR-2013 08:23:18.76

C
4/19/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405103_GE5_BAFIL_190681.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : FB AT PZ-110-SS TOT
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 08:08:02
 Sample ID : 1304051-03 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.11	77	26	0.49	207.95	198	17	8.58E-02	18.8	
2	0	30.97	1809	107	0.77	302.53	292	30	2.01E+00	3.0	
3	2	35.07	413	10	0.68	341.94	330	28	4.59E-01	5.6	1.02E+00
4	2	35.99	91	8	0.65	350.72	330	28	1.02E-01	18.9	
5	0	53.30	27	18	0.60	516.86	509	16	3.01E-02	41.3	
6	0	61.76	201	43	0.70	597.97	585	23	2.23E-01	10.0	
7	4	64.87	21	0	0.54	627.88	625	28	2.29E-02	22.8	2.14E+00
8	4	65.61	67	3	0.66	635.00	625	28	7.44E-02	17.8	
9	4	66.19	29	5	0.79	640.48	625	28	3.28E-02	42.2	
10	4	79.32	34	21	1.01	766.53	752	40	3.78E-02	61.3	9.28E-01
11	4	80.96	767	23	0.71	782.25	752	40	8.52E-01	3.8	
12	6	110.37	21	4	0.41	1064.48	1063	24	2.30E-02	18.2	9.03E-01
13	6	111.65	192	24	0.96	1076.71	1063	24	2.14E-01	8.9	
14	0	115.56	36	17	1.29	1114.25	1103	20	3.97E-02	30.6	
15	0	275.75	34	13	0.57	2651.36	2638	25	3.72E-02	27.5	
16	0	302.05	99	2	0.91	2903.72	2888	26	1.10E-01	10.5	
17	0	332.77	66	3	0.56	3198.51	3181	28	7.29E-02	13.4	
18	0	355.03	354	22	0.65	3412.17	3395	33	3.94E-01	6.0	
19	1	382.53	61	11	1.16	3676.00	3663	29	6.81E-02	17.1	8.51E+00
20	1	382.94	91	13	1.16	3680.00	3663	29	1.01E-01	11.6	
21	1	385.24	52	14	1.16	3702.00	3692	28	5.77E-02	21.9	1.26E+00
22	1	385.86	75	17	1.16	3708.00	3692	28	8.32E-02	17.9	
23	4	413.27	54	2	1.19	3971.00	3957	24	6.03E-02	11.7	2.13E+00
24	4	414.00	9	0	0.78	3977.98	3957	24	1.05E-02	32.4	

Total number of lines in spectrum 24
 Number of unidentified lines 18
 Number of lines tentatively identified by NID 6 25.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
BA-133	10.50Y	1.00	3.873E+02	3.874E+02	0.661E+02	17.06		
Total Activity :			3.873E+02	3.874E+02				

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
TH-234	4.47E+09Y	1.00	1.812E+02	1.812E+02	0.372E+02	20.51		
Total Activity :			1.812E+02	1.812E+02				

Grand Total Activity : 5.686E+02 5.686E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr		2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	pCi/filter		
BA-133	81.00	33.00*	1.802E+01	3.873E+02	3.874E+02	17.06	OK		
	302.84	17.80	2.575E+00	6.481E+02	6.482E+02	33.73	OK		
	356.01	60.00	4.312E+00	4.111E+02	4.111E+02	18.80	OK		

Final Mean for 3 Valid Peaks = 3.874E+02+/- 6.609E+01 (17.06%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr		2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	pCi/filter		
TH-234	63.29	3.80*	8.750E+01	1.812E+02	1.812E+02	20.51	OK		

Final Mean for 1 Valid Peaks = 1.812E+02+/- 3.717E+01 (20.51%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.874E+02	6.609E+01	1.235E+01	1.818E+00	31.364
TH-234	1.812E+02	3.717E+01	1.294E+01	1.665E-01	14.002

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	6.854E+00		1.576E+01	3.022E+01	1.024E+01	0.227
CD-109	6.613E+01		9.408E+01	1.879E+02	1.808E+01	0.352
PA-231	-2.954E-02		8.869E-01	1.624E+00	1.829E-02	-0.018
PA-234	3.572E+00	+	1.354E+00	1.873E+00	2.108E-02	1.908
NP-237	-6.407E+00		2.626E+01	4.645E+01	4.097E+00	-0.138
AM-241	4.377E-01		1.534E+00	2.458E+00	2.767E-02	0.178

C
4119117

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405104_GE5_BAFIL_190682.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-105-SS TOT
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 08:23:30
 Sample ID : 1304051-04 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.20 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	15.99	12	0	0.15	158.83	152	12	1.33E-02	28.9	
2	0	21.10	86	11	0.27	207.83	200	17	9.55E-02	14.3	
3	0	25.45	13	11	0.48	249.64	238	14	1.44E-02	60.1	
4	0	30.98	1915	112	0.75	302.68	290	31	2.13E+00	2.9	
5	9	35.04	343	49	0.59	341.62	331	28	3.81E-01	7.2	2.46E+00
6	9	36.16	42	30	0.57	352.33	331	28	4.71E-02	39.8	
7	0	53.31	29	32	0.29	516.95	503	18	3.18E-02	49.7	
8	4	59.65	30	6	0.94	577.81	569	41	3.38E-02	26.1	1.13E+00
9	4	61.64	223	14	0.95	596.88	569	41	2.48E-01	8.0	
10	0	66.10	88	36	1.49	639.70	627	25	9.81E-02	19.0	
11	0	81.00	719	98	0.65	782.62	771	29	7.98E-01	5.2	
12	0	111.65	194	37	0.82	1076.73	1063	24	2.15E-01	10.0	
13	0	115.96	39	14	0.62	1118.07	1111	16	4.37E-02	23.9	
14	1	275.40	49	7	1.03	2648.00	2635	30	5.39E-02	18.2	1.10E+00
15	1	276.02	32	6	1.03	2654.00	2635	30	3.58E-02	26.3	
16	0	302.08	106	2	1.08	2904.09	2890	25	1.18E-01	10.1	
17	0	306.38	30	2	0.42	2945.34	2932	23	3.34E-02	20.3	
18	1	354.18	11	4	1.12	3404.00	3395	31	1.27E-02	124.2	1.75E+00
19	1	354.96	387	6	1.05	3411.45	3395	31	4.30E-01	5.0	
20	1	382.32	15	10	1.16	3674.00	3661	28	1.72E-02	70.6	1.91E+00
21	1	382.94	115	10	1.16	3680.00	3661	28	1.28E-01	9.0	
22	2	385.33	55	14	1.40	3702.89	3693	28	6.13E-02	21.4	7.25E+00
23	2	385.97	146	15	1.16	3709.00	3693	28	1.62E-01	8.8	

Summary of Nuclide Activity

Sample ID : 1304051-04

Acquisition date : 19-APR-2013 08:23:30

Total number of lines in spectrum 23
 Number of unidentified lines 16
 Number of lines tentatively identified by NID 7 30.43%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
BA-133	10.50Y	1.00	3.628E+02	3.628E+02	0.668E+02	18.43		
Total Activity :			3.628E+02	3.628E+02				

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
TH-234	4.47E+09Y	1.00	2.016E+02	2.016E+02	0.334E+02	16.58		
AM-241	432.20Y	1.00	2.543E+00	2.543E+00	1.333E+00	52.42		
Total Activity :			2.042E+02	2.042E+02				

Grand Total Activity : 5.669E+02 5.670E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.628E+02	3.628E+02	18.43	OK
	302.84	17.80	2.575E+00	6.932E+02	6.933E+02	33.24	OK
	356.01	60.00	4.312E+00	4.494E+02	4.495E+02	17.62	OK

Final Mean for 3 Valid Peaks = 3.628E+02+/- 6.685E+01 (18.43%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.016E+02	2.016E+02	16.58	OK

Final Mean for 1 Valid Peaks = 2.016E+02+/- 3.344E+01 (16.58%)

AM-241	59.54	35.90*	1.000E+02	2.543E+00	2.543E+00	52.42	OK
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Final Mean for 1 Valid Peaks = 2.543E+00+/- 1.333E+00 (52.42%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.628E+02	6.685E+01	1.783E+01	2.625E+00	20.349
TH-234	2.016E+02	3.344E+01	2.237E+01	2.878E-01	9.014
AM-241	2.543E+00	1.333E+00	1.408E+00	1.585E-02	1.806

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	1.322E-01		1.417E+01	2.629E+01	8.913E+00	0.005
CD-109	1.165E+02		9.769E+01	2.033E+02	1.956E+01	0.573
PA-231	2.826E-01		8.623E-01	1.670E+00	1.880E-02	0.169
PA-234	3.975E+00	+	1.150E+00	1.885E+00	2.121E-02	2.109
NP-237	-1.382E+01		2.744E+01	4.660E+01	4.111E+00	-0.297

4/19/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405105_GE5_BAFIL_190683.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-105-SS DIS
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 08:41:11
 Sample ID : 1304051-05 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.08 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4.30	15	11	0.25	46.65	44	7	1.69E-02	45.3	
2	0	10.35	13	3	0.13	104.72	98	12	1.45E-02	38.2	
3	1	20.70	23	19	0.50	204.00	196	26	2.50E-02	55.0	1.77E+00
4	1	21.32	69	9	0.51	210.00	196	26	7.71E-02	17.4	
5	0	28.69	22	42	0.37	280.66	272	14	2.48E-02	65.0	
6	0	30.96	1747	143	0.82	302.45	291	24	1.94E+00	3.0	
7	0	35.25	424	17	0.69	343.60	333	28	4.71E-01	5.5	
8	0	53.22	26	11	0.56	516.09	511	12	2.92E-02	32.5	
9	0	61.76	233	40	0.82	598.03	583	31	2.59E-01	9.5	
10	1	65.58	70	10	0.72	634.63	627	22	7.81E-02	16.6	1.21E+00
11	1	65.99	41	18	0.72	638.63	627	22	4.57E-02	33.8	
12	0	80.96	725	35	0.60	782.30	774	20	8.05E-01	4.1	
13	2	111.22	104	16	0.84	1072.66	1063	26	1.16E-01	15.2	4.85E+00
14	2	111.68	140	15	0.80	1077.07	1063	26	1.56E-01	11.9	
15	0	275.72	31	6	0.95	2651.15	2635	23	3.47E-02	23.4	
16	1	301.66	54	2	1.06	2900.00	2885	27	5.97E-02	16.9	1.14E+00
17	1	302.39	38	2	1.06	2907.00	2885	27	4.17E-02	14.8	
18	2	332.08	55	4	1.33	3191.89	3182	26	6.12E-02	12.6	3.36E+00
19	2	332.71	46	4	1.10	3198.00	3182	26	5.12E-02	16.7	
20	0	354.97	355	5	0.84	3411.55	3393	32	3.94E-01	5.5	
21	0	382.72	85	6	0.62	3677.88	3660	30	9.44E-02	12.3	
22	1	385.12	16	4	1.27	3700.89	3693	25	1.77E-02	68.0	2.34E+00
23	1	385.76	179	7	1.16	3707.00	3693	25	1.99E-01	7.0	
24	1	390.03	13	4	1.16	3748.00	3734	26	1.45E-02	51.0	1.52E+00
25	1	390.55	36	4	1.16	3753.00	3734	26	3.98E-02	15.5	

Summary of Nuclide Activity

Sample ID : 1304051-05

Acquisition date : 19-APR-2013 08:41:11

Total number of lines in spectrum 25
 Number of unidentified lines 19
 Number of lines tentatively identified by NID 6 24.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
BA-133	10.50Y	1.00	3.659E+02	3.660E+02	0.635E+02	17.34	
Total Activity :			3.659E+02	3.660E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
PA-231	3.28E+04Y	1.00	9.362E-01	9.362E-01	7.161E-01	76.49	
PA-234	4.47E+09Y	1.00	3.213E+00	3.213E+00	1.127E+00	35.08	
TH-234	4.47E+09Y	1.00	2.105E+02	2.105E+02	0.408E+02	19.39	
Total Activity :			2.147E+02	2.147E+02			

Grand Total Activity : 5.806E+02 5.806E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.659E+02	3.660E+02	17.34	OK
	302.84	17.80	2.575E+00	2.458E+02	2.458E+02	39.66	OK
	356.01	60.00	4.312E+00	4.117E+02	4.117E+02	18.17	OK

Final Mean for 3 Valid Peaks = 3.660E+02+/- 6.347E+01 (17.34%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	9.362E-01	9.362E-01	76.49	OK
	10.11	20.20	1.000E+02	1.947E+00	1.947E+00	76.49	OK
	283.67	1.60	2.191E+00	-----	Line Not Found	-----	Absent
	302.67	2.30	2.572E+00	1.905E+03	1.905E+03	38.38	OK

Final Mean for 3 Valid Peaks = 9.362E-01+/- 7.161E-01 (76.49%)

PA-234	9.89	89.00	1.000E+02	4.418E-01	4.418E-01	76.49	OK
	21.72	64.90*	1.000E+02	3.213E+00	3.213E+00	35.08	OK
	37.93	23.75	1.000E+02	-----	Line Not Found	-----	Absent
	131.42	20.40	2.473E+00	-----	Line Not Found	-----	Absent

Final Mean for 2 Valid Peaks = 3.213E+00+/- 1.127E+00 (35.08%)

TH-234	63.29	3.80*	8.750E+01	2.105E+02	2.105E+02	19.39	OK
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Final Mean for 1 Valid Peaks = 2.105E+02+/- 4.082E+01 (19.39%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.660E+02	6.347E+01	2.146E+01	3.159E+00	17.054
PA-231	9.362E-01	7.161E-01	1.375E+00	1.548E-02	0.681
PA-234	3.213E+00	1.127E+00	9.774E-01	1.100E-02	3.287
TH-234	2.105E+02	4.082E+01	1.653E+01	2.127E-01	12.733

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity K.L. (pCi/filter) Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	3.710E-01	1.341E+01	2.511E+01	8.513E+00	0.015
CD-109	3.729E+01	7.984E+01	1.597E+02	1.537E+01	0.233
NP-237	-9.628E+00	2.073E+01	3.588E+01	3.165E+00	-0.268
AM-241	-9.944E-02	1.523E+00	2.297E+00	2.586E-02	-0.043

4118115

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405106_GE5_BAFIL_190684.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : S-10 TOT
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 09:00:18
 Sample ID : 1304051-06 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	7.08	17	6	1.21	73.36	66	15	1.86E-02	42.8	
2	0	21.10	83	21	0.74	207.84	196	20	9.24E-02	17.2	
3	0	30.95	1430	79	0.85	302.39	292	26	1.59E+00	3.2	
4	0	35.24	314	53	0.57	343.53	330	27	3.49E-01	8.6	
5	0	53.42	36	8	0.71	518.00	509	18	3.98E-02	25.6	
6	0	61.78	152	35	0.52	598.24	585	22	1.69E-01	11.6	
7	0	70.16	14	13	0.49	678.59	669	15	1.60E-02	52.9	
8	1	79.43	36	42	0.76	767.56	755	40	3.95E-02	41.7	1.40E+00
9	1	80.94	591	22	0.71	782.05	755	40	6.57E-01	4.4	
10	0	111.71	156	36	0.64	1077.35	1064	24	1.73E-01	11.8	
11	0	115.88	31	20	0.81	1117.34	1106	21	3.40E-02	36.5	
12	0	275.60	29	3	0.32	2649.97	2635	24	3.17E-02	22.4	
13	1	301.55	39	7	1.06	2899.00	2889	26	4.36E-02	26.5	9.74E-01
14	1	302.09	70	6	1.08	2904.19	2889	26	7.83E-02	15.1	
15	0	332.72	42	8	1.32	3198.09	3180	28	4.70E-02	20.3	
16	1	354.49	176	12	1.12	3407.00	3396	31	1.95E-01	9.8	6.38E+00
17	1	355.22	183	8	1.12	3414.00	3396	31	2.04E-01	9.9	
18	0	382.48	66	2	0.49	3675.53	3656	31	7.30E-02	13.4	
19	7	385.98	170	2	1.70	3709.11	3691	28	1.89E-01	6.4	3.55E+00
20	7	386.38	12	1	1.16	3713.00	3691	28	1.31E-02	73.1	
21	0	389.89	25	2	0.59	3746.64	3736	19	2.82E-02	21.8	

Summary of Nuclide Activity

Sample ID : 1304051-06

Acquisition date : 19-APR-2013 09:00:18

Total number of lines in spectrum 21
 Number of unidentified lines 16
 Number of lines tentatively identified by NID 5 23.81%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	2.983E+02	2.983E+02	0.527E+02	17.66	
Total Activity :			2.983E+02	2.983E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
TH-234	4.47E+09Y	1.00	1.371E+02	1.371E+02	0.322E+02	23.50	
Total Activity :			1.371E+02	1.371E+02			

Grand Total Activity : 4.354E+02 4.354E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr	2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	%Error	
BA-133	81.00	33.00*	1.802E+01	2.983E+02	2.983E+02	17.66	OK	
	302.84	17.80	2.575E+00	4.615E+02	4.615E+02	40.12	OK	
	356.01	60.00	4.312E+00	2.127E+02	2.127E+02	24.52	OK	

Final Mean for 3 Valid Peaks = 2.983E+02+/- 5.268E+01 (17.66%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr	2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	%Error	
TH-234	63.29	3.80*	8.750E+01	1.371E+02	1.371E+02	23.50	OK	

Final Mean for 1 Valid Peaks = 1.371E+02+/- 3.222E+01 (23.50%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	2.983E+02	5.268E+01	1.162E+01	1.710E+00	25.684
TH-234	1.371E+02	3.222E+01	2.752E+01	3.540E-01	4.982

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	3.339E+00		1.081E+01	2.184E+01	7.402E+00	0.153
CD-109	5.023E+01		7.151E+01	1.509E+02	1.452E+01	0.333
PA-231	2.860E-01		7.823E-01	1.549E+00	1.744E-02	0.185
PA-234	3.846E+00	+	1.331E+00	1.945E+00	2.190E-02	1.977
NP-237	-1.468E+01		1.826E+01	2.925E+01	2.580E+00	-0.502
AM-241	4.294E-01		1.328E+00	2.188E+00	2.463E-02	0.196

C
4/19/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405107_GE5_BAFIL_190689.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : S-10 DIS
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 09:17:08
 Sample ID : 1304051-07 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	12.56	12	13	1.07	125.93	120	16	1.36E-02	69.9	
2	0	14.29	6	4	0.24	142.46	137	9	6.78E-03	73.5	
3	0	21.19	73	33	0.60	208.67	201	18	8.15E-02	22.3	
4	0	25.21	15	9	0.16	247.32	242	10	1.63E-02	47.6	
5	0	28.30	9	24	0.27	276.94	269	11	1.02E-02	109.5	
6	4	28.81	24	7	0.79	281.86	279	33	2.63E-02	23.0	3.25E+00
7	4	29.72	40	25	0.59	290.52	279	33	4.47E-02	48.4	
8	4	30.97	1757	23	0.80	302.57	279	33	1.95E+00	2.5	
9	0	35.25	416	63	0.60	343.64	332	27	4.62E-01	7.4	
10	0	53.29	37	17	0.52	516.77	509	15	4.06E-02	30.5	
11	0	61.69	209	57	0.70	597.39	583	29	2.32E-01	11.2	
12	2	65.71	86	21	0.80	635.94	625	27	9.55E-02	16.7	8.49E-01
13	2	66.41	33	19	0.73	642.63	625	27	3.72E-02	40.7	
14	0	80.81	780	30	0.79	780.82	761	32	8.66E-01	4.0	
15	0	84.64	10	26	1.15	817.55	799	23	1.10E-02	118.5	
16	0	111.57	175	34	0.49	1075.95	1063	26	1.94E-01	10.9	
17	0	115.68	45	15	0.81	1115.45	1102	21	4.97E-02	24.6	
18	0	134.05	7	8	0.35	1291.64	1281	14	7.68E-03	87.7	
19	0	275.62	36	13	0.63	2650.19	2634	26	4.00E-02	26.5	
20	0	301.83	95	12	1.04	2901.61	2886	29	1.06E-01	12.4	
21	3	332.24	34	6	1.33	3193.46	3181	25	3.79E-02	21.7	5.89E-01
22	3	332.93	13	1	0.99	3200.05	3181	25	1.50E-02	41.8	
23	0	354.76	326	15	0.81	3409.56	3393	29	3.62E-01	6.1	
24	0	382.40	46	10	1.25	3674.81	3658	25	5.07E-02	20.5	
25	4	384.71	14	10	1.04	3697.00	3690	26	1.58E-02	58.0	3.54E+00
26	4	385.44	74	15	1.16	3704.00	3690	26	8.26E-02	17.6	
27	4	386.05	47	6	0.76	3709.85	3690	26	5.27E-02	19.7	

Total number of lines in spectrum 27
 Number of unidentified lines 21
 Number of lines tentatively identified by NID 6 22.22%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
BA-133	10.50Y	1.00	3.937E+02	3.937E+02	0.677E+02	17.19	
NP-237	2.14E+06Y	1.00	1.878E+01	1.878E+01	4.455E+01	237.19	
Total Activity :			4.125E+02	4.125E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
TH-234	4.47E+09Y	1.00	1.888E+02	1.888E+02	0.430E+02	22.76	
Total Activity :			1.888E+02	1.888E+02			

Grand Total Activity : 6.013E+02 6.013E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.937E+02	3.937E+02	17.19	OK
	302.84	17.80	2.575E+00	6.249E+02	6.250E+02	36.27	OK
	356.01	60.00	4.312E+00	3.787E+02	3.787E+02	18.88	OK

Final Mean for 3 Valid Peaks = 3.937E+02+/- 6.767E+01 (17.19%)

NP-237	86.50	12.60*	1.262E+01	1.878E+01	1.878E+01	237.19	OK
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Final Mean for 1 Valid Peaks = 1.878E+01+/- 4.455E+01 (237.19%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.888E+02	1.888E+02	22.76	OK

Final Mean for 1 Valid Peaks = 1.888E+02+/- 4.296E+01 (22.76%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.937E+02	6.767E+01	1.097E+01	1.615E+00	35.905
TH-234	1.888E+02	4.296E+01	2.593E+01	3.336E-01	7.281
NP-237	1.878E+01	4.455E+01	3.814E+01	3.365E+00	0.492

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.095E+01		1.443E+01	2.259E+01	7.658E+00	-0.485
CD-109	-2.025E+01		7.732E+01	1.388E+02	1.336E+01	-0.146
PA-231	-1.493E-01		8.149E-01	1.470E+00	1.655E-02	-0.102
PA-234	3.395E+00	+	1.522E+00	1.924E+00	2.166E-02	1.764
AM-241	6.985E-01		1.465E+00	2.439E+00	2.745E-02	0.286

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411910

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405108_GE5_BAFIL_190690.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : LR-104 TOT
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 09:34:55
 Sample ID : 1304051-08 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.20 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.23	95	35	0.71	209.06	195	23	1.05E-01	19.2	
2	6	28.70	35	40	0.95	280.76	261	55	3.91E-02	49.5	1.16E+00
3	6	30.93	2024	22	0.80	302.22	261	55	2.25E+00	2.3	
4	1	35.05	323	36	0.62	341.69	330	29	3.59E-01	7.6	1.28E+00
5	1	35.91	74	32	0.57	350.00	330	29	8.25E-02	27.5	
6	0	53.26	38	29	0.22	516.44	504	20	4.17E-02	39.2	
7	5	61.13	40	31	0.65	592.00	584	26	4.47E-02	43.4	8.78E-01
8	5	61.78	168	45	0.75	598.25	584	26	1.87E-01	12.2	
9	1	65.51	40	15	0.66	634.00	622	34	4.49E-02	32.3	1.06E+00
10	1	66.24	40	17	0.66	641.00	622	34	4.40E-02	33.6	
11	0	80.92	710	53	0.69	781.83	774	17	7.89E-01	4.3	
12	6	111.44	136	35	0.84	1074.73	1066	20	1.51E-01	12.6	2.89E+00
13	6	112.18	30	5	0.41	1081.81	1066	20	3.32E-02	29.8	
14	0	275.56	47	4	1.05	2649.53	2633	26	5.23E-02	16.7	
15	0	301.95	104	7	0.90	2902.81	2886	33	1.16E-01	11.0	
16	1	331.88	12	1	1.10	3190.00	3182	26	1.31E-02	53.5	1.42E+00
17	1	332.61	72	5	1.10	3197.00	3182	26	8.02E-02	11.7	
18	7	354.76	265	17	0.98	3409.60	3393	30	2.95E-01	7.9	4.81E+00
19	7	355.22	210	17	1.12	3414.00	3393	30	2.33E-01	9.3	
20	0	382.59	90	13	1.19	3676.57	3661	28	9.99E-02	13.3	
21	0	385.67	132	15	0.46	3706.14	3690	26	1.46E-01	10.2	

Total number of lines in spectrum 21
 Number of unidentified lines 15
 Number of lines tentatively identified by NID 6 28.57%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
BA-133	10.50Y	1.00	3.587E+02	3.587E+02	0.627E+02	17.49	
Total Activity :			3.587E+02	3.587E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
TH-234	4.47E+09Y	1.00	1.516E+02	1.516E+02	0.374E+02	24.67	
AM-241	432.20Y	1.00	3.368E+00	3.368E+00	2.927E+00	86.89	
Total Activity :			1.550E+02	1.550E+02			

Grand Total Activity : 5.137E+02 5.137E+02

Flags: "K" = Keyline not found "M" = Manually accepted
 "E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.587E+02	3.587E+02	17.49	OK
	302.84	17.80	2.575E+00	6.839E+02	6.839E+02	34.41	OK
	356.01	60.00	4.312E+00	2.437E+02	2.437E+02	23.51	OK

Final Mean for 3 Valid Peaks = 3.587E+02 +/- 6.274E+01 (17.49%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.516E+02	1.516E+02	24.67	OK

Final Mean for 1 Valid Peaks = 1.516E+02 +/- 3.740E+01 (24.67%)

AM-241	59.54	35.90*	1.000E+02	3.368E+00	3.368E+00	86.89	OK
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Final Mean for 1 Valid Peaks = 3.368E+00 +/- 2.927E+00 (86.89%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.587E+02	6.274E+01	2.062E+01	3.035E+00	17.399
TH-234	1.516E+02	3.740E+01	2.063E+01	2.655E-01	7.348
AM-241	3.368E+00	2.927E+00	1.721E+00	1.937E-02	1.957

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	5.351E+00		1.511E+01	2.896E+01	9.816E+00	0.185
CD-109	6.467E+00		8.684E+01	1.625E+02	1.564E+01	0.040
PA-231	-1.816E-01		7.814E-01	1.403E+00	1.580E-02	-0.129
PA-234	4.378E+00	+	1.687E+00	2.044E+00	2.301E-02	2.142
NP-237	5.792E+00		2.336E+01	4.481E+01	3.953E+00	0.129

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4/18/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405109_GE5_BAFIL_190691.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : LR-104 DIS
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 09:53:20
 Sample ID : 1304051-09 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	6.53	12	7	0.17	68.05	62	11	1.33E-02	53.9	
2	0	10.94	13	5	0.47	110.38	105	10	1.44E-02	42.5	
3	0	28.03	44	19	0.65	274.34	264	19	4.83E-02	28.4	
4	0	30.93	1817	138	0.81	302.14	291	23	2.02E+00	2.9	
5	0	35.19	509	20	0.65	343.09	331	28	5.66E-01	5.1	
6	0	53.30	47	17	0.82	516.85	507	19	5.23E-02	26.4	
7	0	61.58	244	8	0.84	596.32	585	23	2.71E-01	6.9	
8	6	65.30	41	29	0.66	632.00	625	26	4.61E-02	30.8	1.90E+00
9	6	65.83	32	20	0.38	637.07	625	26	3.57E-02	37.0	
10	6	66.24	12	34	0.66	641.00	625	26	1.31E-02	130.2	
11	1	79.52	47	6	0.76	768.46	758	37	5.18E-02	23.3	1.21E+00
12	1	80.90	775	3	0.72	781.67	758	37	8.61E-01	3.7	
13	0	111.62	172	56	0.89	1076.46	1061	26	1.91E-01	12.6	
14	0	115.95	37	25	0.65	1118.05	1108	23	4.16E-02	34.3	
15	0	160.24	31	5	0.62	1542.99	1532	20	3.44E-02	22.5	
16	4	275.17	43	0	1.01	2645.80	2636	22	4.80E-02	14.8	2.38E+00
17	4	276.02	45	0	1.03	2654.00	2636	22	5.00E-02	10.4	
18	1	301.87	89	7	1.06	2902.00	2888	27	9.87E-02	11.8	2.09E+00
19	1	302.28	25	6	1.06	2906.00	2888	27	2.73E-02	39.2	
20	0	306.45	26	11	0.60	2945.99	2933	23	2.83E-02	31.2	
21	0	332.65	66	8	0.97	3197.38	3181	28	7.33E-02	15.0	
22	0	336.94	23	5	0.81	3238.61	3225	21	2.59E-02	27.5	
23	0	354.93	395	3	0.92	3411.19	3394	36	4.38E-01	5.1	
24	0	382.65	101	5	0.76	3677.14	3661	28	1.13E-01	10.9	
25	0	385.67	117	17	1.12	3706.21	3694	24	1.30E-01	11.3	
26	0	389.75	32	6	0.28	3745.34	3731	24	3.59E-02	23.0	

Total number of lines in spectrum 26
 Number of unidentified lines 21
 Number of lines tentatively identified by NID 5 19.23%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter				
BA-133	10.50Y	1.00	3.911E+02	3.911E+02	0.662E+02	16.92		
Total Activity :			3.911E+02	3.911E+02				

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter				
PA-231	3.28E+04Y	1.00	9.295E-01	9.295E-01	7.907E-01	85.07		
TH-234	4.47E+09Y	1.00	2.206E+02	2.206E+02	0.317E+02	14.36		
Total Activity :			2.216E+02	2.216E+02				

Grand Total Activity : 6.127E+02 6.127E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr		2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	pCi/filter		
BA-133	81.00	33.00*	1.802E+01	3.911E+02	3.911E+02	3.911E+02	3.911E+02	16.92	OK
	302.84	17.80	2.575E+00	1.609E+02	1.609E+02	1.609E+02	1.609E+02	82.70	OK
	356.01	60.00	4.312E+00	4.580E+02	4.580E+02	4.581E+02	4.581E+02	17.74	OK

Final Mean for 3 Valid Peaks = 3.911E+02+/- 6.617E+01 (16.92%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr		2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	pCi/filter		
PA-231	9.28	42.00*	1.000E+02	9.295E-01	9.295E-01	9.295E-01	9.295E-01	85.07	OK
	10.11	20.20	1.000E+02	1.933E+00	1.933E+00	1.933E+00	1.933E+00	85.07	OK
	283.67	1.60	2.191E+00	-----	Line Not Found	-----	-----	-----	Absent
	302.67	2.30	2.572E+00	1.247E+03	1.247E+03	1.247E+03	1.247E+03	82.10	OK

Final Mean for 3 Valid Peaks = 9.295E-01+/- 7.907E-01 (85.07%)

TH-234	63.29	3.80*	8.750E+01	2.206E+02	2.206E+02	2.206E+02	2.206E+02	14.36	OK
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Final Mean for 1 Valid Peaks = 2.206E+02+/- 3.169E+01 (14.36%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.911E+02	6.617E+01	1.106E+01	1.629E+00	35.359
PA-231	9.295E-01	7.907E-01	1.499E+00	1.688E-02	0.620
TH-234	2.206E+02	3.169E+01	3.023E+01	3.889E-01	7.298

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-7.852E+00		1.174E+01	1.890E+01	6.405E+00	-0.416
CD-109	9.184E+01		9.596E+01	1.960E+02	1.886E+01	0.469
PA-234	9.426E-01		1.019E+00	1.919E+00	2.161E-02	0.491
NP-237	-7.357E-01		2.417E+01	4.443E+01	3.919E+00	-0.017
AM-241	-2.315E-01		1.459E+00	2.168E+00	2.441E-02	-0.107

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411917

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405110_GE5_BAFIL_190692.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : DUP 01 TOT
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 10:12:51
 Sample ID : 1304051-10 Sample Quantity : 1.000000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.18 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	8	19.89	16	12	0.68	196.25	192	23	1.81E-02	39.7	1.44E+00
2	8	21.11	90	17	0.69	207.91	192	23	9.98E-02	14.7	
3	0	25.23	6	11	0.85	247.50	241	9	6.83E-03	105.8	
4	0	30.91	1887	100	0.77	301.96	289	25	2.10E+00	2.7	
5	2	35.04	347	43	0.61	341.60	332	28	3.85E-01	7.2	1.29E+00
6	2	35.91	62	22	0.57	350.00	332	28	6.89E-02	33.4	
7	0	53.12	43	36	0.78	515.14	500	24	4.78E-02	39.9	
8	0	61.74	219	50	0.72	597.85	585	29	2.44E-01	10.5	
9	1	65.79	110	33	0.72	636.67	626	30	1.22E-01	14.3	2.92E+00
10	1	66.86	40	22	0.66	647.00	626	30	4.43E-02	33.8	
11	2	79.40	41	27	0.84	767.28	757	38	4.52E-02	35.9	6.86E-01
12	2	80.84	773	30	0.70	781.08	757	38	8.59E-01	3.9	
13	1	111.54	167	45	0.84	1075.73	1065	20	1.85E-01	11.1	2.32E+00
14	1	112.09	32	11	0.77	1081.00	1065	20	3.51E-02	32.2	
15	0	115.51	44	24	0.25	1113.77	1100	23	4.91E-02	29.6	
16	0	160.21	20	7	1.00	1542.73	1533	18	2.24E-02	32.3	
17	0	275.70	29	13	0.84	2650.95	2633	25	3.17E-02	31.4	
18	7	300.74	29	3	2.06	2891.21	2884	28	3.20E-02	19.4	2.78E+00
19	7	301.76	110	13	1.06	2901.00	2884	28	1.23E-01	10.6	
20	7	302.39	10	8	0.51	2906.99	2884	28	1.14E-02	62.3	
21	1	331.61	26	2	0.99	3187.40	3180	27	2.84E-02	18.3	6.08E+00
22	1	332.61	85	2	1.10	3197.00	3180	27	9.40E-02	8.7	
23	1	354.28	192	11	1.12	3405.00	3393	28	2.14E-01	10.5	5.79E+00
24	1	355.22	145	12	1.12	3414.00	3393	28	1.61E-01	11.9	
25	1	382.42	141	8	1.16	3675.00	3658	27	1.56E-01	6.9	6.34E+00
26	1	383.05	12	5	1.16	3681.00	3658	27	1.31E-02	51.9	
27	0	385.42	131	13	0.74	3703.73	3689	26	1.45E-01	10.2	

Total number of lines in spectrum 27
 Number of unidentified lines 22
 Number of lines tentatively identified by NID 5 18.52%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	3.903E+02	3.904E+02	0.669E+02	17.13	
Total Activity :			3.903E+02	3.904E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
TH-234	4.47E+09Y	1.00	1.982E+02	1.982E+02	0.423E+02	21.32	
Total Activity :			1.982E+02	1.982E+02			

Grand Total Activity : 5.885E+02 5.885E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.903E+02	3.904E+02	17.13	OK
	302.84	17.80	2.575E+00	6.724E+01	6.724E+01	127.32	OK
	356.01	60.00	4.312E+00	1.679E+02	1.679E+02	27.83	OK

Final Mean for 3 Valid Peaks = 3.904E+02+/- 6.688E+01 (17.13%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.982E+02	1.982E+02	21.32	OK

Final Mean for 1 Valid Peaks = 1.982E+02+/- 4.226E+01 (21.32%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.904E+02	6.688E+01	1.289E+01	1.897E+00	30.294
TH-234	1.982E+02	4.226E+01	2.651E+01	3.410E-01	7.475

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-4.660E+00		1.347E+01	2.356E+01	7.985E+00	-0.198
CD-109	3.691E+01		8.475E+01	1.671E+02	1.608E+01	0.221
PA-231	-6.936E-01		9.046E-01	1.459E+00	1.643E-02	-0.475
PA-234	4.156E+00	+	1.237E+00	2.060E+00	2.319E-02	2.017
NP-237	9.106E-02		2.430E+01	4.486E+01	3.957E+00	0.002
AM-241	-3.748E-01		1.541E+00	2.244E+00	2.526E-02	-0.167

C
4115117

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405111_GE5_BAFIL_190696.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : DUP 01 DIS
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 10:28:31
 Sample ID : 1304051-11 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	5.35	13	0	0.16	56.69	53	9	1.44E-02	27.7	
2	0	17.01	5	7	0.21	168.59	160	10	5.23E-03	117.8	
3	0	21.00	78	18	0.51	206.87	197	18	8.65E-02	17.1	
4	0	23.02	12	3	0.31	226.30	218	12	1.29E-02	42.1	
5	0	30.90	1820	126	0.74	301.87	289	30	2.02E+00	3.0	
6	0	35.18	428	21	0.73	342.92	332	27	4.75E-01	5.9	
7	0	47.64	8	13	0.17	462.52	447	18	8.39E-03	119.8	
8	0	53.18	58	6	0.95	515.69	507	20	6.50E-02	16.1	
9	4	61.09	101	12	0.70	591.55	587	20	1.12E-01	9.8	2.72E+00
10	4	61.73	87	23	0.42	597.72	587	20	9.64E-02	17.3	
11	4	62.31	31	18	0.43	603.33	587	20	3.44E-02	31.4	
12	1	65.30	26	14	0.66	632.00	625	23	2.85E-02	44.9	9.04E-01
13	1	66.03	64	22	0.66	639.00	625	23	7.11E-02	20.9	
14	0	80.87	681	54	0.64	781.38	771	21	7.57E-01	4.5	
15	0	100.34	20	3	0.31	968.22	958	18	2.21E-02	28.4	
16	0	101.64	11	2	0.38	980.74	975	12	1.21E-02	37.9	
17	0	111.60	171	34	0.70	1076.26	1062	30	1.90E-01	11.4	
18	0	115.91	20	24	0.61	1117.60	1109	17	2.21E-02	54.2	
19	0	275.29	34	8	1.05	2646.94	2631	24	3.75E-02	24.6	
20	0	301.62	111	3	0.77	2899.66	2884	26	1.23E-01	9.9	
21	1	331.88	78	5	1.10	3190.00	3178	25	8.62E-02	11.1	1.84E+00
22	1	332.50	11	6	1.10	3196.00	3178	25	1.24E-02	69.3	
23	0	354.60	350	17	1.21	3408.03	3391	31	3.89E-01	5.9	
24	0	382.20	67	2	0.52	3672.85	3658	26	7.42E-02	13.0	
25	2	384.51	12	7	1.16	3695.00	3686	26	1.31E-02	85.0	1.13E+00
26	2	385.12	101	17	1.40	3700.85	3686	26	1.12E-01	12.8	
27	0	413.04	27	0	0.68	3968.81	3954	27	3.00E-02	19.2	

Total number of lines in spectrum 27
 Number of unidentified lines 21
 Number of lines tentatively identified by NID 6 22.22%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
BA-133	10.50Y	1.00	3.439E+02	3.440E+02	0.609E+02	17.69		
Total Activity :			3.439E+02	3.440E+02				

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
TH-234	4.47E+09Y	1.00	2.797E+01	2.797E+01	1.760E+01	62.93		
AM-241	432.20Y	1.00	8.419E+00	8.419E+00	1.681E+00	19.96		
Total Activity :			3.639E+01	3.639E+01				

Grand Total Activity : 3.803E+02 3.804E+02

Flags: "K" = Keyline not found "M" = Manually accepted
 "E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.439E+02	3.440E+02	17.69	OK
	302.84	17.80	2.575E+00	7.266E+02	7.267E+02	33.01	OK
	356.01	60.00	4.312E+00	4.059E+02	4.059E+02	18.66	OK

Final Mean for 3 Valid Peaks = 3.440E+02 +/- 6.085E+01 (17.69%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.797E+01	2.797E+01	62.93	OK

Final Mean for 1 Valid Peaks = 2.797E+01 +/- 1.760E+01 (62.93%)

AM-241	59.54	35.90*	1.000E+02	8.419E+00	8.419E+00	19.96	OK
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Final Mean for 1 Valid Peaks = 8.419E+00 +/- 1.681E+00 (19.96%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.440E+02	6.085E+01	1.188E+01	1.750E+00	28.946
TH-234	2.797E+01	1.760E+01	2.817E+01	3.624E-01	0.993
AM-241	8.419E+00	1.681E+00	1.979E+00	2.228E-02	4.254

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.629E-01		1.245E+01	2.340E+01	7.932E+00	-0.007
CD-109	6.702E+01		8.016E+01	1.678E+02	1.614E+01	0.400
PA-231	3.699E-01		9.015E-01	1.753E+00	1.973E-02	0.211
PA-234	3.601E+00	+	1.240E+00	1.763E+00	1.984E-02	2.043
NP-237	-1.304E+01		2.083E+01	3.488E+01	3.076E+00	-0.374

4/19/13

VAX/VMS Peak Search Report Generated 19-APR-2013 11:00:36.89

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE]SMP_130405112_GE5_BAFIL_190697.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : DUP 02 TOT
 Deposition Date :
 Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 10:45:16
 Sample ID : 1304051-12 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE5 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
 Start channel : 25 End channel : 4096
 Sensitivity : 3.00000 Gaussian : 10.00000
 Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.24	47	31	0.41	209.17	203	13	5.22E-02	31.2	
2	0	25.37	7	15	0.30	248.80	242	11	7.50E-03	114.6	
3	0	30.80	1929	113	0.79	300.90	289	24	2.14E+00	2.7	
4	0	34.85	320	120	0.49	339.77	331	17	3.56E-01	9.8	
5	0	35.92	32	47	0.34	350.04	347	10	3.54E-02	50.6	
6	0	53.12	55	14	0.70	515.08	507	18	6.06E-02	22.5	
7	4	61.02	81	28	0.63	590.88	583	26	8.95E-02	21.2	1.08E+00
8	4	61.55	138	35	0.65	596.00	583	26	1.54E-01	13.7	
9	0	65.71	113	24	0.54	635.91	624	24	1.26E-01	13.5	
10	0	80.58	725	67	0.86	778.59	765	24	8.05E-01	4.5	
11	0	101.38	12	11	1.11	978.22	968	16	1.37E-02	58.2	
12	0	111.19	212	49	0.87	1072.36	1057	30	2.36E-01	10.7	
13	0	159.63	20	21	1.19	1537.13	1522	24	2.23E-02	50.9	
14	0	275.01	30	17	0.67	2644.30	2627	23	3.31E-02	33.0	
15	1	301.03	68	20	1.06	2894.00	2879	27	7.55E-02	17.6	2.01E+00
16	1	301.66	30	5	0.95	2900.02	2879	27	3.31E-02	30.6	
17	0	332.43	15	28	0.11	3195.26	3180	20	1.72E-02	65.7	
18	2	353.03	87	62	1.12	3393.00	3385	29	9.65E-02	17.1	2.27E+00
19	2	353.87	44	59	1.12	3401.00	3385	29	4.92E-02	48.5	
20	2	354.33	151	25	0.91	3405.42	3385	29	1.68E-01	11.5	
21	0	385.01	66	25	0.63	3699.79	3687	24	7.36E-02	18.8	

Total number of lines in spectrum 21
 Number of unidentified lines 15
 Number of lines tentatively identified by NID 6 28.57%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	3.660E+02	3.660E+02	0.647E+02	17.68	
Total Activity :			3.660E+02	3.660E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
TH-234	4.47E+09Y	1.00	1.249E+02	1.249E+02	0.346E+02	27.71	
AM-241	432.20Y	1.00	6.739E+00	6.739E+00	2.869E+00	42.57	
Total Activity :			1.316E+02	1.316E+02			

Grand Total Activity : 4.976E+02 4.976E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.660E+02	3.660E+02	17.68	OK
	302.84	17.80	2.575E+00	1.954E+02	1.954E+02	66.62	OK
	356.01	60.00	4.312E+00	1.758E+02	1.758E+02	27.16	OK

Final Mean for 3 Valid Peaks = 3.660E+02+/- 6.471E+01 (17.68%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.249E+02	1.249E+02	27.71	OK

Final Mean for 1 Valid Peaks = 1.249E+02+/- 3.459E+01 (27.71%)

AM-241	59.54	35.90*	1.000E+02	6.739E+00	6.739E+00	42.57	OK
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Final Mean for 1 Valid Peaks = 6.739E+00+/- 2.869E+00 (42.57%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.660E+02	6.471E+01	1.444E+01	2.126E+00	25.346
TH-234	1.249E+02	3.459E+01	3.121E+01	4.015E-01	4.001
AM-241	6.739E+00	2.869E+00	2.273E+00	2.559E-02	2.964

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.228E+00		1.435E+01	2.621E+01	8.884E+00	-0.047
CD-109	1.306E+00		8.601E+01	1.597E+02	1.537E+01	0.008
PA-231	3.972E-02		8.474E-01	1.580E+00	1.778E-02	0.025
PA-234	2.175E+00	+	1.361E+00	1.724E+00	1.941E-02	1.261
NP-237	1.940E+01		2.310E+01	4.773E+01	4.210E+00	0.406

KB
4/19/13

VAX/VMS Peak Search Report Generated 19-APR-2013 11:16:25.48

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405113_GE5_BAFIL_190699.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : DUP 02 DIS
Deposition Date :
Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 11:01:09
Sample ID : 1304051-13 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.10 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	20.91	51	15	0.50	206.00	188	28	5.65E-02	24.7	3.98E+00
2	1	21.53	35	7	0.51	212.00	188	28	3.93E-02	18.1	
3	0	30.85	2030	118	0.81	301.45	289	25	2.26E+00	2.6	
4	3	34.95	473	27	0.75	340.80	329	25	5.26E-01	5.6	1.21E+00
5	3	35.93	56	12	0.41	350.11	329	25	6.19E-02	20.0	
6	4	52.63	25	6	0.57	510.37	506	15	2.81E-02	28.0	1.26E+00
7	4	53.39	13	6	0.41	517.74	506	15	1.39E-02	39.6	
8	0	61.53	251	33	0.89	595.80	584	30	2.79E-01	8.8	
9	0	80.71	732	83	0.84	779.87	768	27	8.14E-01	4.8	
10	8	111.01	73	34	0.98	1070.57	1062	24	8.09E-02	21.6	1.54E+00
11	8	111.68	98	27	0.77	1077.00	1062	24	1.09E-01	17.0	
12	4	301.24	55	34	1.06	2896.00	2879	32	6.12E-02	26.3	1.14E+00
13	4	302.17	27	4	0.79	2904.92	2879	32	2.98E-02	26.8	
14	0	332.16	48	13	0.78	3192.70	3178	25	5.33E-02	20.0	
15	3	353.97	11	96	1.12	3402.00	3390	28	1.27E-02	194.3	1.21E+00
16	3	354.46	209	60	0.97	3406.65	3390	28	2.33E-01	10.0	
17	0	382.31	61	43	0.59	3673.93	3658	31	6.78E-02	25.3	
18	1	384.82	67	42	1.16	3698.00	3688	24	7.43E-02	20.0	5.40E+00
19	1	385.44	30	34	1.16	3704.00	3688	24	3.31E-02	43.0	

Summary of Nuclide Activity

Sample ID : 1304051-13

Acquisition date : 19-APR-2013 11:01:09

Total number of lines in spectrum 19
 Number of unidentified lines 14
 Number of lines tentatively identified by NID 5 26.32%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
BA-133	10.50Y	1.00	3.698E+02	3.698E+02	0.669E+02	18.08		
Total Activity :			3.698E+02	3.698E+02				

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
TH-234	4.47E+09Y	1.00	2.268E+02	2.268E+02	0.409E+02	18.02		
AM-241	432.20Y	1.00	2.101E+01	2.101E+01	0.378E+01	18.01		
Total Activity :			2.478E+02	2.478E+02				

Grand Total Activity : 6.176E+02 6.177E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.698E+02	3.698E+02	18.08	OK
	302.84	17.80	2.575E+00	1.755E+02	1.755E+02	59.74	OK
	356.01	60.00	4.312E+00	2.431E+02	2.431E+02	24.65	OK

Final Mean for 3 Valid Peaks = 3.698E+02+/- 6.685E+01 (18.08%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.268E+02	2.268E+02	18.02	OK

Final Mean for 1 Valid Peaks = 2.268E+02+/- 4.087E+01 (18.02%)

AM-241	59.54	35.90*	1.000E+02	2.101E+01	2.101E+01	18.01	OK
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Final Mean for 1 Valid Peaks = 2.101E+01+/- 3.783E+00 (18.01%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.698E+02	6.685E+01	1.783E+01	2.625E+00	20.744
TH-234	2.268E+02	4.087E+01	3.447E+01	4.435E-01	6.580
AM-241	2.101E+01	3.783E+00	2.590E+00	2.915E-02	8.112

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-3.432E+00		1.481E+01	2.630E+01	8.916E+00	-0.130
CD-109	6.159E+01		9.554E+01	1.891E+02	1.820E+01	0.326
PA-231	-1.081E+00		9.172E-01	1.357E+00	1.527E-02	-0.797
PA-234	1.638E+00	+	5.982E-01	1.748E+00	1.967E-02	0.937
NP-237	-1.194E+01		2.660E+01	4.562E+01	4.024E+00	-0.262

KS
4/11/13

VAX/VMS Peak Search Report Generated 19-APR-2013 11:32:15.03

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405114_GE5_BAFIL_190700.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : FB AT PZ-110-SS TOT
Deposition Date :
Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 11:16:37
Sample ID : 1304051-14 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.02	79	30	0.64	207.13	194	20	8.78E-02	20.4	
2	0	30.93	1755	101	0.81	302.13	291	23	1.95E+00	2.8	
3	2	35.01	353	20	0.62	341.38	331	29	3.92E-01	6.5	1.26E+00
4	2	35.87	85	12	0.62	349.63	331	29	9.39E-02	24.4	
5	0	53.16	35	11	0.42	515.49	508	16	3.84E-02	28.1	
6	2	61.24	77	31	0.65	593.00	585	31	8.55E-02	21.3	1.53E+00
7	2	61.87	120	28	0.71	599.06	585	31	1.34E-01	14.8	
8	0	65.85	106	23	0.66	637.24	626	26	1.18E-01	14.1	
9	3	79.29	40	8	0.92	766.18	756	38	4.39E-02	30.8	1.86E+00
10	3	79.68	17	8	0.69	770.00	756	38	1.84E-02	107.5	
11	3	80.82	698	15	0.75	780.95	756	38	7.76E-01	4.0	
12	0	111.55	170	27	0.80	1075.79	1064	23	1.89E-01	10.2	
13	0	115.34	36	19	1.71	1112.11	1101	19	4.00E-02	29.8	
14	0	160.42	14	13	0.37	1544.69	1536	14	1.50E-02	53.1	
15	0	301.81	101	12	0.29	2901.43	2885	26	1.12E-01	12.0	
16	0	332.88	20	16	0.61	3199.57	3179	24	2.21E-02	43.9	
17	6	354.57	303	2	0.85	3407.77	3392	31	3.37E-01	6.5	1.01E+00
18	6	355.12	97	3	1.12	3413.00	3392	31	1.08E-01	19.9	
19	0	382.43	47	15	0.84	3675.06	3657	28	5.28E-02	22.0	
20	5	384.81	21	22	1.27	3697.89	3687	28	2.38E-02	62.6	1.48E+00
21	5	385.55	77	15	0.68	3705.06	3687	28	8.51E-02	17.2	
22	5	385.97	12	7	1.16	3709.00	3687	28	1.31E-02	90.3	
23	0	389.83	21	7	0.12	3746.07	3727	26	2.33E-02	33.1	

Total number of lines in spectrum 23
 Number of unidentified lines 17
 Number of lines tentatively identified by NID 6 26.09%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	3.526E+02	3.526E+02	0.608E+02	17.24	
Total Activity :			3.526E+02	3.526E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
TH-234	4.47E+09Y	1.00	1.086E+02	1.086E+02	0.326E+02	29.99	
AM-241	432.20Y	1.00	6.436E+00	6.436E+00	2.758E+00	42.86	
Total Activity :			1.151E+02	1.151E+02			

Grand Total Activity : 4.677E+02 4.677E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.526E+02	3.526E+02	17.24	OK
	302.84	17.80	2.575E+00	6.588E+02	6.589E+02	35.74	OK
	356.01	60.00	4.312E+00	1.131E+02	1.131E+02	42.36	OK

Final Mean for 3 Valid Peaks = 3.526E+02+/- 6.077E+01 (17.24%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.086E+02	1.086E+02	29.99	OK

Final Mean for 1 Valid Peaks = 1.086E+02+/- 3.258E+01 (29.99%)

AM-241	59.54	35.90*	1.000E+02	6.436E+00	6.436E+00	42.86	OK
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Final Mean for 1 Valid Peaks = 6.436E+00+/- 2.758E+00 (42.86%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.526E+02	6.077E+01	1.162E+01	1.710E+00	30.355
TH-234	1.086E+02	3.258E+01	1.531E+01	1.969E-01	7.098
AM-241	6.436E+00	2.758E+00	2.132E+00	2.400E-02	3.019

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	5.701E+00		1.555E+01	2.969E+01	1.007E+01	0.192
CD-109	2.245E+00		9.079E+01	1.678E+02	1.614E+01	0.013
PA-231	-2.291E-01		8.542E-01	1.512E+00	1.702E-02	-0.151
PA-234	3.655E+00	+	1.497E+00	1.858E+00	2.092E-02	1.967
NP-237	-1.493E+01		2.255E+01	3.745E+01	3.303E+00	-0.399

100
4/19/13

VAX/VMS Peak Search Report Generated 19-APR-2013 11:47:24.45

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405115_GE5_BAFIL_190704.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : FB AT PZ-110-SS DIS
Deposition Date :
Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 11:32:06
Sample ID : 1304051-15 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	17.51	26	3	0.34	173.39	166	15	2.84E-02	25.7	
2	4	20.00	31	10	0.73	197.26	192	23	3.42E-02	23.4	1.49E+00
3	4	21.02	50	11	0.64	207.08	192	23	5.57E-02	23.3	
4	0	25.16	17	11	0.34	246.85	238	14	1.92E-02	46.5	
5	0	30.93	1795	86	0.72	302.20	290	25	1.99E+00	2.7	
6	4	35.03	373	4	0.78	341.51	331	32	4.15E-01	5.6	1.74E+00
7	4	36.23	55	7	0.57	353.00	331	32	6.11E-02	24.3	
8	0	53.54	26	33	0.59	519.18	504	18	2.92E-02	53.9	
9	0	61.59	221	21	0.87	596.42	584	25	2.46E-01	8.2	
10	0	65.79	101	35	0.49	636.71	624	26	1.13E-01	16.7	
11	0	80.88	697	74	0.69	781.46	768	22	7.74E-01	4.6	
12	3	107.17	20	4	0.95	1033.76	1028	18	2.23E-02	21.6	6.85E-01
13	3	107.76	21	5	0.90	1039.42	1028	18	2.36E-02	28.2	
14	0	111.61	202	35	0.71	1076.33	1060	30	2.24E-01	10.1	
15	3	115.10	22	2	0.72	1109.85	1104	21	2.42E-02	28.7	1.01E+00
16	3	115.95	56	9	0.77	1118.00	1104	21	6.22E-02	15.3	
17	0	275.52	32	6	0.52	2649.23	2635	23	3.58E-02	22.9	
18	6	301.42	40	2	1.09	2897.69	2885	26	4.49E-02	25.4	2.64E+00
19	6	301.97	70	2	1.06	2903.00	2885	26	7.74E-02	13.6	
20	1	331.88	44	6	1.10	3190.00	3180	24	4.88E-02	17.6	2.00E+00
21	1	332.29	20	8	1.21	3193.95	3180	24	2.20E-02	40.2	
22	4	354.47	234	8	1.10	3406.79	3392	30	2.60E-01	8.0	9.28E+00
23	4	355.12	199	8	1.12	3413.00	3392	30	2.21E-01	8.6	
24	0	382.43	52	16	1.25	3675.08	3659	26	5.82E-02	19.9	
25	1	384.92	27	11	1.16	3699.00	3687	29	3.05E-02	45.3	2.38E+00
26	1	385.44	169	10	1.16	3704.00	3687	29	1.88E-01	7.6	
27	0	413.00	38	0	0.87	3968.37	3953	28	4.22E-02	16.2	

Total number of lines in spectrum 27
 Number of unidentified lines 21
 Number of lines tentatively identified by NID 6 22.22%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	2-Sigma Error	%Error	Flags
			Uncorrected	Decay Corr					
BA-133	10.50Y	1.00	3.516E+02	3.517E+02			0.625E+02	17.78	
Total Activity :			3.516E+02	3.517E+02					

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	2-Sigma Error	%Error	Flags
			Uncorrected	Decay Corr					
TH-234	4.47E+09Y	1.00	1.997E+02	1.997E+02			0.338E+02	16.93	
Total Activity :			1.997E+02	1.997E+02					

Grand Total Activity : 5.514E+02 5.514E+02

Flags: "K" = Keyline not found "M" = Manually accepted
 "E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.516E+02	3.517E+02	17.78	OK
	302.84	17.80	2.575E+00	4.561E+02	4.561E+02	37.86	OK
	356.01	60.00	4.312E+00	2.312E+02	2.312E+02	22.48	OK

Final Mean for 3 Valid Peaks = 3.517E+02 +/- 6.255E+01 (17.78%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.997E+02	1.997E+02	16.93	OK

Final Mean for 1 Valid Peaks = 1.997E+02 +/- 3.381E+01 (16.93%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.517E+02	6.255E+01	1.444E+01	2.126E+00	24.354
TH-234	1.997E+02	3.381E+01	2.817E+01	3.624E-01	7.090

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.369E+00		1.336E+01	2.558E+01	8.670E+00	0.093
CD-109	-1.824E+01		9.214E+01	1.646E+02	1.584E+01	-0.111
PA-231	-5.503E-01		7.989E-01	1.308E+00	1.473E-02	-0.421
PA-234	2.318E+00	+	1.084E+00	1.690E+00	1.903E-02	1.371
NP-237	-1.308E+01		2.471E+01	4.196E+01	3.701E+00	-0.312
AM-241	8.517E-01		1.269E+00	2.240E+00	2.521E-02	0.380

103
2119117

VAX/VMS Peak Search Report Generated 19-APR-2013 12:02:56.74

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405116_GE5_BAFIL_190705.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : MW-103 TOT
Deposition Date :
Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 11:47:32
Sample ID : 1304051-16 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.18	69	29	0.63	208.64	199	17	7.64E-02	21.8	
2	4	25.51	9	13	0.37	250.15	248	13	9.50E-03	61.3	6.94E-01
3	4	26.19	14	9	0.49	256.70	248	13	1.55E-02	50.6	
4	0	30.87	1898	67	0.75	301.64	290	25	2.11E+00	2.6	
5	2	34.94	330	17	0.66	340.69	330	27	3.66E-01	6.6	1.05E+00
6	2	35.90	83	2	0.62	349.90	330	27	9.19E-02	18.0	
7	6	61.67	210	10	1.06	597.12	582	24	2.34E-01	7.6	3.92E+00
8	6	62.22	30	1	0.46	602.43	582	24	3.39E-02	25.9	
9	0	65.80	121	31	1.41	636.81	622	31	1.34E-01	14.6	
10	0	70.33	45	11	2.10	680.23	661	33	5.00E-02	24.0	
11	1	79.49	44	16	0.76	768.17	755	37	4.89E-02	42.6	1.53E+00
12	1	80.76	790	22	0.76	780.33	755	37	8.77E-01	3.8	
13	0	111.46	159	43	0.80	1074.95	1063	24	1.77E-01	12.2	
14	0	115.69	36	35	0.46	1115.53	1104	22	4.00E-02	39.8	
15	0	160.09	19	20	0.27	1541.58	1530	20	2.11E-02	49.7	
16	0	275.02	46	0	1.50	2644.43	2632	23	5.11E-02	14.7	
17	0	301.35	94	2	0.52	2897.07	2881	27	1.04E-01	10.8	
18	0	305.83	18	9	0.23	2940.00	2924	24	1.99E-02	39.4	
19	7	331.39	51	0	1.31	3185.35	3177	26	5.70E-02	14.0	2.21E+00
20	7	331.88	11	0	1.10	3190.00	3177	26	1.24E-02	77.1	
21	7	332.42	22	0	0.53	3195.16	3177	26	2.47E-02	34.3	
22	0	354.22	334	15	0.89	3404.40	3387	30	3.71E-01	6.0	
23	4	381.05	19	2	1.69	3661.86	3656	26	2.15E-02	24.1	4.75E+00
24	4	382.21	121	2	1.16	3673.00	3656	26	1.34E-01	7.0	
25	1	384.61	181	5	1.16	3696.00	3683	26	2.01E-01	6.6	5.13E+00
26	1	385.24	12	3	1.16	3702.00	3683	26	1.31E-02	92.4	

Total number of lines in spectrum 26
 Number of unidentified lines 21
 Number of lines tentatively identified by NID 5 19.23%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	3.987E+02	3.987E+02	0.678E+02	17.00	
Total Activity :			3.987E+02	3.987E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
TH-234	4.47E+09Y	1.00	2.753E+01	2.753E+01	1.432E+01	52.03	
Total Activity :			2.753E+01	2.753E+01			

Grand Total Activity : 4.262E+02 4.263E+02

Flags: "K" = Keyline not found "M" = Manually accepted
 "E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr	2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	%Error	
BA-133	81.00	33.00*	1.802E+01	3.987E+02	3.987E+02	17.00	OK	
	302.84	17.80	2.575E+00	6.146E+02	6.147E+02	34.15	OK	
	356.01	60.00	4.312E+00	3.877E+02	3.878E+02	18.81	OK	

Final Mean for 3 Valid Peaks = 3.987E+02+/- 6.780E+01 (17.00%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr	2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	%Error	
TH-234	63.29	3.80*	8.750E+01	2.753E+01	2.753E+01	52.03	OK	

Final Mean for 1 Valid Peaks = 2.753E+01+/- 1.432E+01 (52.03%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.987E+02	6.780E+01	1.139E+01	1.677E+00	34.998
TH-234	2.753E+01	1.432E+01	2.441E+00	3.141E-02	11.275

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-3.737E+00		1.621E+01	2.859E+01	9.691E+00	-0.131
CD-109	9.317E+01		9.617E+01	1.966E+02	1.892E+01	0.474
PA-231	5.706E-01		7.781E-01	1.623E+00	1.827E-02	0.351
PA-234	3.182E+00	+	1.393E+00	1.881E+00	2.117E-02	1.692
NP-237	-1.255E+01		2.479E+01	4.225E+01	3.727E+00	-0.297
AM-241	1.143E-01		1.547E+00	2.389E+00	2.689E-02	0.048

K03
4/11/13

VAX/VMS Peak Search Report Generated 19-APR-2013 12:19:17.44

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405117_GE5_BAFIL_190706.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : MW-103 DIS
Deposition Date :
Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 12:03:58
Sample ID : 1304051-17 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	11.00	12	13	0.66	110.90	104	11	1.39E-02	63.5	
2	0	21.15	92	27	0.73	208.29	198	22	1.02E-01	18.9	
3	3	28.54	29	52	0.72	279.29	269	52	3.26E-02	58.2	2.94E+00
4	3	29.45	25	39	0.54	288.00	269	52	2.77E-02	65.1	
5	3	30.91	1899	35	0.73	302.00	269	52	2.11E+00	2.5	
6	3	34.95	367	10	0.75	340.79	332	26	4.08E-01	6.1	1.37E+00
7	3	35.86	113	2	0.69	349.53	332	26	1.25E-01	15.8	
8	0	43.02	7	2	0.18	418.24	416	7	7.35E-03	52.5	
9	2	52.80	20	19	0.62	512.00	504	18	2.19E-02	61.3	1.63E+00
10	2	53.25	38	5	0.54	516.33	504	18	4.17E-02	24.3	
11	2	61.48	169	42	0.78	595.30	586	20	1.88E-01	11.7	1.08E+00
12	2	62.06	56	21	0.53	600.94	586	20	6.20E-02	26.5	
13	0	65.68	154	0	0.64	635.65	622	29	1.71E-01	8.1	
14	2	79.31	49	23	0.84	766.40	757	36	5.39E-02	25.1	7.91E-01
15	2	80.71	800	17	0.78	779.86	757	36	8.89E-01	3.8	
16	0	111.38	179	36	0.91	1074.16	1061	24	1.98E-01	10.6	
17	0	115.40	19	23	0.82	1112.69	1105	15	2.16E-02	50.9	
18	0	159.81	23	10	0.71	1538.87	1531	16	2.57E-02	31.4	
19	0	274.82	38	5	0.48	2642.46	2630	22	4.26E-02	19.9	
20	4	300.74	57	0	0.69	2891.24	2878	29	6.34E-02	17.3	1.52E+00
21	4	301.34	11	0	1.06	2897.00	2878	29	1.20E-02	101.6	
22	4	301.89	37	0	0.78	2902.24	2878	29	4.11E-02	17.5	
23	1	331.15	15	0	1.10	3183.00	3174	26	1.68E-02	43.4	1.92E+00
24	1	331.88	63	0	1.10	3190.00	3174	26	6.95E-02	11.6	
25	0	354.08	351	10	0.86	3403.07	3386	31	3.90E-01	5.6	
26	2	381.58	60	19	1.14	3666.89	3651	28	6.66E-02	19.7	5.48E-01
27	2	382.21	25	12	1.16	3673.00	3651	28	2.82E-02	34.3	
28	1	384.56	66	19	1.27	3695.55	3682	27	7.35E-02	21.3	2.41E+00
29	1	385.34	94	7	1.16	3703.00	3682	27	1.05E-01	10.2	

Total number of lines in spectrum 29
 Number of unidentified lines 22
 Number of lines tentatively identified by NID 7 24.14%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
BA-133	10.50Y	1.00	4.041E+02	4.041E+02	0.687E+02	17.00		
Total Activity :			4.041E+02	4.041E+02				

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected	Decay Corr				
PA-231	3.28E+04Y	1.00	8.923E-01	8.923E-01	11.34E-01	127.08		
PA-234	4.47E+09Y	1.00	4.251E+00	4.251E+00	1.614E+00	37.96		
TH-234	4.47E+09Y	1.00	5.041E+01	5.041E+01	2.680E+01	53.16		
AM-241	432.20Y	1.00	1.412E+01	1.412E+01	0.336E+01	23.81		
Total Activity :			6.967E+01	6.967E+01				

Grand Total Activity : 4.737E+02 4.738E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.041E+02	4.041E+02	17.00	OK
	302.84	17.80	2.575E+00	2.423E+02	2.424E+02	43.87	OK
	356.01	60.00	4.312E+00	4.079E+02	4.080E+02	18.31	OK

Final Mean for 3 Valid Peaks = 4.041E+02+/- 6.871E+01 (17.00%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	8.923E-01	8.923E-01	127.08	OK
	10.11	20.20	1.000E+02	1.855E+00	1.855E+00	127.08	OK
	283.67	1.60	2.191E+00	-----	Line Not Found	-----	Absent
	302.67	2.30	2.572E+00	1.878E+03	1.878E+03	42.72	OK

Final Mean for 3 Valid Peaks = 8.923E-01+/- 1.134E+00 (127.08%)

PA-234	9.89	89.00	1.000E+02	4.211E-01	4.211E-01	127.08	OK
	21.72	64.90*	1.000E+02	4.251E+00	4.251E+00	37.96	OK
	37.93	23.75	1.000E+02	-----	Line Not Found	-----	Absent
	131.42	20.40	2.473E+00	-----	Line Not Found	-----	Absent

Final Mean for 2 Valid Peaks = 4.251E+00+/- 1.614E+00 (37.96%)

TH-234	63.29	3.80*	8.750E+01	5.041E+01	5.041E+01	53.16	OK
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Final Mean for 1 Valid Peaks = 5.041E+01+/- 2.680E+01 (53.16%)

AM-241	59.54	35.90*	1.000E+02	1.412E+01	1.412E+01	23.81	OK
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Final Mean for 1 Valid Peaks = 1.412E+01+/- 3.361E+00 (23.81%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.041E+02	6.871E+01	1.323E+01	1.948E+00	30.544
PA-231	8.923E-01	1.134E+00	1.966E+00	2.213E-02	0.454
PA-234	4.251E+00	1.614E+00	8.382E-01	9.435E-03	5.072
TH-234	5.041E+01	2.680E+01	2.063E+01	2.655E-01	2.443
AM-241	1.412E+01	3.361E+00	2.057E+00	2.316E-02	6.863

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity K.L. (pCi/filter) Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-8.825E+00	1.422E+01	2.319E+01	7.861E+00	-0.381
CD-109	4.943E+01	9.367E+01	1.836E+02	1.767E+01	0.269
NP-237	-4.467E-01	2.297E+01	4.253E+01	3.752E+00	-0.011

KB
4/19/13

VAX/VMS Peak Search Report Generated 19-APR-2013 12:34:59.95

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405118_GE5_BAFIL_190707.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : PZ-200-SS TOT
Deposition Date :
Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 12:19:41
Sample ID : 1304051-18 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	20.03	39	3	0.67	197.59	190	25	4.31E-02	22.2	2.59E+00
2	3	20.91	20	9	0.50	206.00	190	25	2.28E-02	51.9	
3	3	21.41	45	7	0.56	210.81	190	25	5.03E-02	16.7	
4	0	30.91	1655	93	0.66	302.01	289	27	1.84E+00	3.0	
5	1	35.05	317	32	0.62	341.68	329	28	3.53E-01	7.4	1.49E+00
6	1	35.91	83	22	0.57	350.00	329	28	9.19E-02	20.4	
7	0	53.37	34	19	0.84	517.50	505	18	3.73E-02	34.5	
8	0	61.65	229	29	0.81	596.99	583	29	2.54E-01	8.7	
9	0	65.92	81	29	1.03	637.92	627	19	9.02E-02	17.4	
10	0	80.89	579	55	0.52	781.56	771	21	6.44E-01	5.0	
11	0	111.64	188	29	0.45	1076.66	1065	24	2.09E-01	9.9	
12	0	275.48	39	3	0.81	2648.84	2635	23	4.30E-02	18.3	
13	2	301.34	32	4	1.06	2897.00	2886	26	3.61E-02	29.9	1.37E+00
14	2	302.01	64	6	1.05	2903.41	2886	26	7.08E-02	15.2	
15	2	302.60	16	3	1.06	2909.00	2886	26	1.77E-02	25.7	
16	0	332.25	35	12	0.49	3193.58	3177	25	3.85E-02	27.5	
17	0	354.80	301	12	0.59	3409.97	3394	30	3.34E-01	6.2	
18	1	382.21	34	5	1.16	3673.00	3659	29	3.73E-02	25.9	1.35E+00
19	1	383.06	28	3	1.04	3681.11	3659	29	3.07E-02	24.0	
20	7	384.94	66	5	1.27	3699.11	3691	26	7.29E-02	15.1	1.06E+00
21	7	385.24	12	7	1.16	3702.00	3691	26	1.31E-02	98.5	
22	7	385.98	41	8	0.55	3709.17	3691	26	4.56E-02	25.0	

Total number of lines in spectrum 22
 Number of unidentified lines 17
 Number of lines tentatively identified by NID 5 22.73%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter				
BA-133	10.50Y	1.00	2.925E+02	2.925E+02	0.533E+02	18.21		
Total Activity :			2.925E+02	2.925E+02				

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma Error	2-Sigma	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter				
TH-234	4.47E+09Y	1.00	2.068E+02	2.068E+02	0.371E+02	17.93		
Total Activity :			2.068E+02	2.068E+02				

Grand Total Activity : 4.993E+02 4.993E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr		2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	%Error		
BA-133	81.00	33.00*	1.802E+01	2.925E+02	2.925E+02	18.21	OK		
	302.84	17.80	2.575E+00	1.042E+02	1.042E+02	57.83	OK		
	356.01	60.00	4.312E+00	3.491E+02	3.491E+02	19.07	OK		

Final Mean for 3 Valid Peaks = 2.925E+02+/- 5.327E+01 (18.21%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected		Decay Corr		2-Sigma	Status
				pCi/filter	pCi/filter	pCi/filter	%Error		
TH-234	63.29	3.80*	8.750E+01	2.068E+02	2.068E+02	17.93	OK		

Final Mean for 1 Valid Peaks = 2.068E+02+/- 3.708E+01 (17.93%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	2.925E+02	5.327E+01	1.139E+01	1.677E+00	25.675
TH-234	2.068E+02	3.708E+01	2.817E+01	3.624E-01	7.342

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.178E+00		1.272E+01	2.351E+01	7.970E+00	-0.050
CD-109	9.080E+00		7.734E+01	1.479E+02	1.424E+01	0.061
PA-231	-1.231E-01		7.637E-01	1.393E+00	1.568E-02	-0.088
PA-234	2.096E+00	+	7.041E-01	1.720E+00	1.936E-02	1.219
NP-237	1.716E+01		2.137E+01	4.470E+01	3.943E+00	0.384
AM-241	1.118E+00		1.122E+00	2.149E+00	2.419E-02	0.520

KS
4/19/13

VAX/VMS Peak Search Report Generated 19-APR-2013 12:50:57.39

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405119_GE5_BAFIL_190711.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : PZ-200-SS DIS
Deposition Date :
Sample Date : 19-APR-2013 00:00:00 Acquisition date : 19-APR-2013 12:35:21
Sample ID : 1304051-19 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.12 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.05	76	52	0.49	207.39	194	23	8.50E-02	27.0	
2	0	25.23	19	12	0.28	247.51	242	10	2.15E-02	40.8	
3	0	30.92	2017	111	0.76	302.10	290	25	2.24E+00	2.6	
4	3	34.98	384	30	0.72	341.09	330	30	4.27E-01	6.7	1.29E+00
5	3	35.96	102	8	0.62	350.46	330	30	1.13E-01	21.5	
6	0	51.66	31	14	0.56	501.14	490	19	3.40E-02	34.7	
7	0	53.13	49	14	0.36	515.18	509	17	5.48E-02	22.0	
8	0	61.67	240	40	0.97	597.18	585	28	2.67E-01	9.1	
9	3	65.30	26	26	0.66	632.00	625	30	2.85E-02	50.4	4.10E+00
10	3	65.74	113	36	0.79	636.19	625	30	1.25E-01	14.9	
11	0	80.81	776	73	0.63	780.86	765	26	8.62E-01	4.3	
12	0	108.25	19	18	1.44	1044.15	1029	21	2.11E-02	52.3	
13	0	111.61	191	57	0.97	1076.35	1061	29	2.13E-01	12.0	
14	0	154.91	12	11	0.13	1491.83	1478	22	1.31E-02	61.9	
15	0	275.62	39	13	0.90	2650.17	2635	24	4.36E-02	23.9	
16	1	301.14	11	0	1.06	2895.00	2883	28	1.20E-02	102.9	3.10E+00
17	1	301.76	153	0	1.06	2901.00	2883	28	1.70E-01	7.3	
18	1	332.19	12	8	1.10	3193.00	3180	27	1.36E-02	72.6	3.59E+00
19	1	332.82	71	4	1.10	3199.00	3180	27	7.85E-02	10.7	
20	0	354.59	403	6	0.75	3407.89	3391	32	4.48E-01	5.1	
21	1	382.21	144	6	1.16	3673.00	3657	27	1.60E-01	7.0	2.31E+00
22	1	382.63	12	6	1.16	3677.00	3657	27	1.31E-02	78.3	
23	0	385.34	134	9	1.29	3703.01	3687	27	1.49E-01	9.6	

Total number of lines in spectrum 23
 Number of unidentified lines 17
 Number of lines tentatively identified by NID 6 26.09%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
BA-133	10.50Y	1.00	3.917E+02	3.918E+02	0.687E+02	17.55	
Total Activity :			3.917E+02	3.918E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
TH-234	4.47E+09Y	1.00	2.167E+02	2.167E+02	0.404E+02	18.66	
Total Activity :			2.167E+02	2.167E+02			

Grand Total Activity : 6.084E+02 6.085E+02

Flags: "K" = Keyline not found
 "E" = Manually edited

"M" = Manually accepted
 "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.917E+02	3.918E+02	17.55	OK
	302.84	17.80	2.575E+00	1.000E+03	1.000E+03	30.16	OK
	356.01	60.00	4.312E+00	4.678E+02	4.678E+02	17.75	OK

Final Mean for 3 Valid Peaks = 3.918E+02 +/- 6.874E+01 (17.55%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.167E+02	2.167E+02	18.66	OK

Final Mean for 1 Valid Peaks = 2.167E+02 +/- 4.045E+01 (18.66%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.918E+02	6.874E+01	1.482E+01	2.182E+00	26.435
TH-234	2.167E+02	4.045E+01	2.593E+01	3.336E-01	8.358

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-6.198E+00		1.328E+01	2.260E+01	7.661E+00	-0.274
CD-109	-4.646E+01		9.016E+01	1.533E+02	1.475E+01	-0.303
PA-231	-5.593E-01		9.255E-01	1.539E+00	1.732E-02	-0.363
PA-234	3.538E+00	+	1.915E+00	1.836E+00	2.067E-02	1.927
NP-237	-4.214E+00		2.543E+01	4.562E+01	4.024E+00	-0.092
AM-241	1.840E+00		1.447E+00	2.700E+00	3.040E-02	0.681