

US EPA ARCHIVE DOCUMENT

143
4/25/13

Apex-Alpha™

Sample Description: PZ-304-AS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000563
 Batch Identification: 1304050B-UU
 Sample Identification: 08
 Sample Geometry: Shelf 2
 Procedure Description: U iso

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

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

Tracer Certificate: U232_UU-10A
 Tracer Quantity: 0.604 mL
 Effective Efficiency: 0.0835 +/- 0.0068
 Counting Efficiency: 0.1973 +/- 0.0042 on 12/15/2012 11:28:06 AM
 Chem. Recovery Factor: 0.4233 +/- 0.0358

Peak Match Tolerance: 0.150 MeV

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

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T 5.278	162.98	15.41	1.02	0.00E+000	3.5
U-234	4.762	6.66	78.18	0.34	0.00E+000	2.7
U-235	4.457	1.00	277.19	0.00	0.00E+000	2.7
U-238	4.134	-0.34	592.85	0.34	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

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

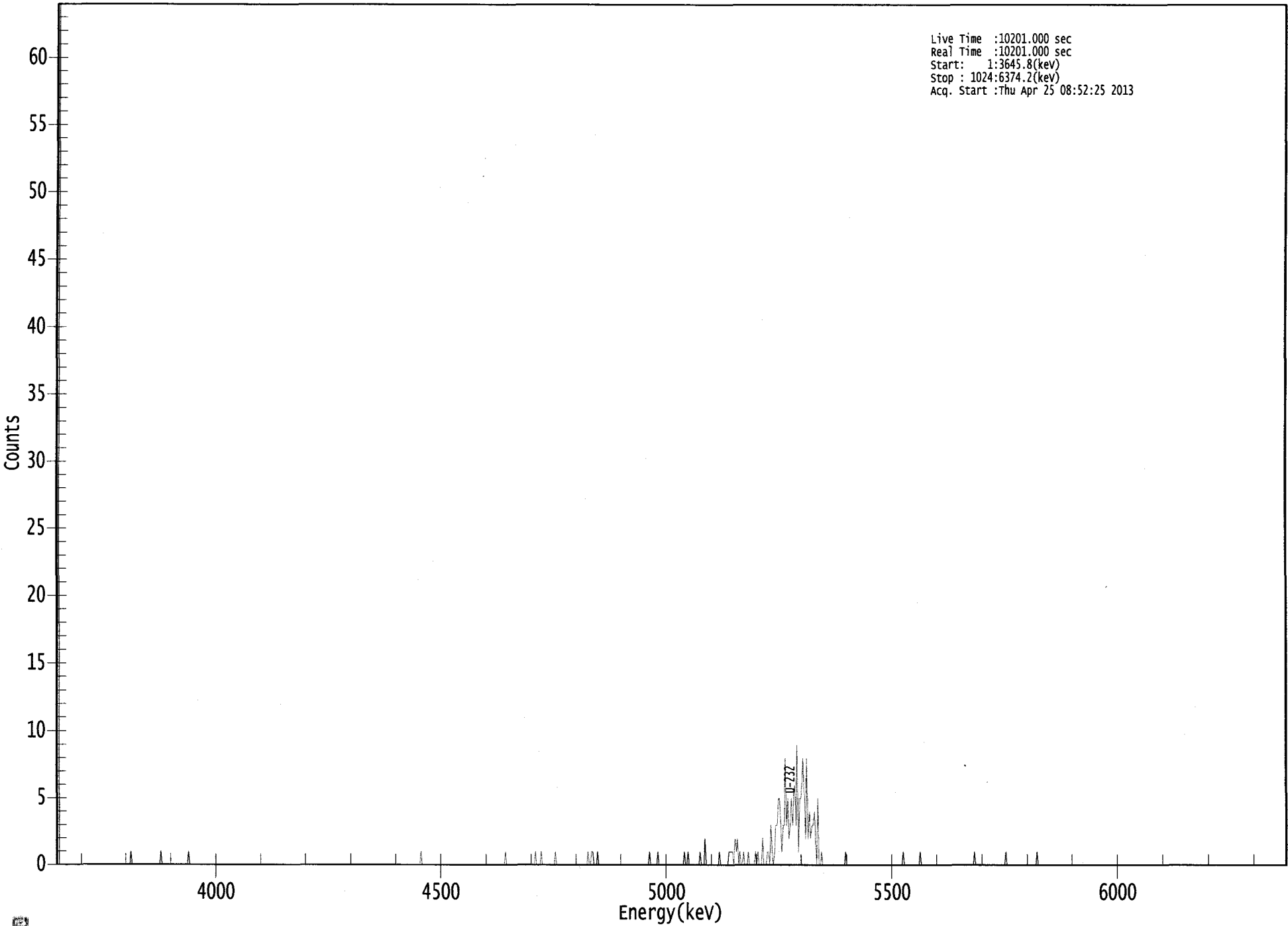
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.996	5302.50*	2.07E+001 +/- 3.33E+000	8.01E-001 +/- 1.29E-001
U-234	1.000	4761.50*	8.47E-001 +/- 6.76E-001	6.08E-001 +/- 9.76E-002
U-235	0.965	4385.50*	1.57E-001 +/- 4.35E-001	9.40E-001 +/- 1.51E-001
U-238	0.982	4184.40*	-4.30E-002 +/- 2.55E-001	6.05E-001 +/- 9.72E-002

AG
4/25/13

US EPA ARCHIVE DOCUMENT

000056362.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3645.8(kev)
Stop : 1024:6374.2(kev)
Acq. Start :Thu Apr 25 08:52:25 2013



0258
9578

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: 08

Elapsed Live time: 10201

Elapsed Real Time: 10201

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	1	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	1
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	1	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:	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: 0 0 0 0 0 0 0 1 0

Sample Title: 08

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	1
401:	0	0	0	0	1	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	1	0	0	1	1
449:	0	0	0	1	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	1	0
497:	0	0	0	0	0	1	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	1	0	0	1	0
529:	0	0	0	0	0	0	0	0
537:	1	0	0	0	2	0	0	0
545:	0	0	0	0	0	0	0	0
553:	1	0	0	0	0	0	0	0
561:	1	1	1	1	0	2	1	2
569:	0	1	0	0	1	0	0	0
577:	1	0	0	0	0	0	1	0
585:	1	0	0	0	2	0	0	0
593:	1	1	0	3	1	0	1	3
601:	3	5	5	3	1	3	3	8
609:	3	5	2	3	5	3	5	6
617:	3	9	1	5	5	6	8	5
625:	2	8	2	4	2	3	3	4
633:	2	0	5	0	0	1	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	1	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	1	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	1
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	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	1	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:	1	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



KCB
4/25/13

Sample Description: PZ-304-AS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000563
 Batch Identification: 1304050B-UU
 Sample Identification: 09
 Sample Geometry: Shelf 2
 Procedure Description: U iso

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

Sample Size: 2.500E-001 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 6:20:54 AM
 Acquisition Date/Time: 4/25/2013 8:52:26 AM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
 Tracer Quantity: 0.604 mL
 Effective Efficiency: 0.0661 +/- 0.0061
 Counting Efficiency: 0.1869 +/- 0.0035 on 12/15/2012 11:26:45 AM
 Chem. Recovery Factor: 0.3537 +/- 0.0332

Peak Match Tolerance: 0.150 MeV

 PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T 5.286	128.79	17.44	2.21	0.00E+000	14.6
U-234	4.613	0.49	417.02	0.51	0.00E+000	2.8
U-235	4.405	2.00	169.74	0.00	0.00E+000	2.8
U-238	4.132	-0.34	592.85	0.34	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

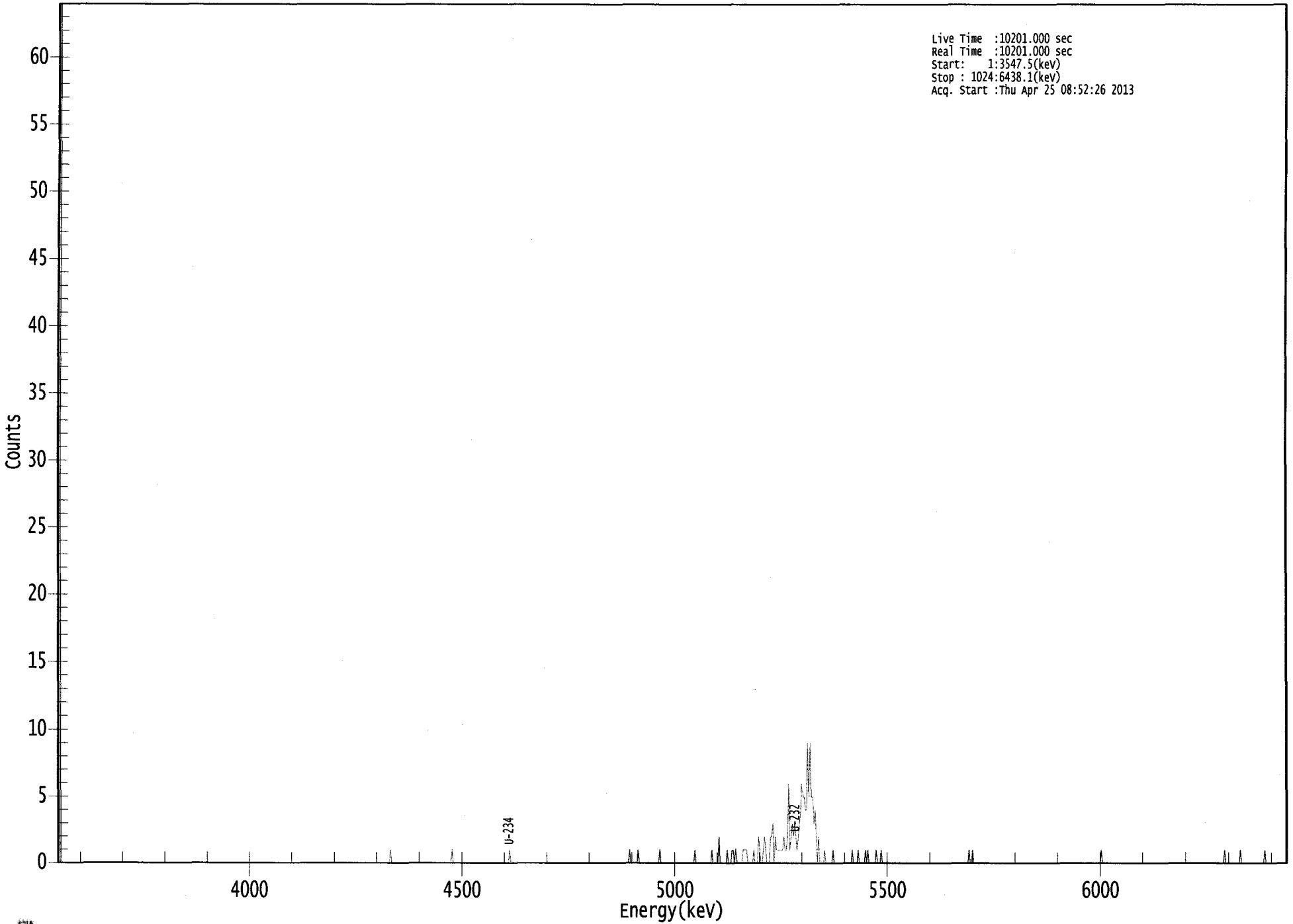
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
U-232	0.998	5302.50*	2.07E+001 +/- 3.73E+000	1.29E+000 +/- 2.32E-001
U-234	0.854	4761.50*	7.87E-002 +/- 3.28E-001	8.43E-001 +/- 1.52E-001
U-235	0.997	4385.50*	3.96E-001 +/- 6.76E-001	1.19E+000 +/- 2.14E-001
U-238	0.981	4184.40*	-5.44E-002 +/- 3.23E-001	7.65E-001 +/- 1.38E-001

AG
4/25/13

US EPA ARCHIVE DOCUMENT

000056363.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3547.5(keV)
Stop : 1024:6438.1(keV)
Acq. Start :Thu Apr 25 08:52:26 2013



5720

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: 10201

Elapsed Real Time: 10201

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	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	1	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	1	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: 09

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	1	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	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	1	0	0
481:	0	0	0	0	1	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	1	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	1	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	1	0	0	0	0	0	2
553:	0	0	0	0	0	0	1	0
561:	0	0	1	1	0	1	0	0
569:	0	0	0	1	1	1	1	0
577:	0	0	0	0	1	0	0	0
585:	2	1	0	0	1	2	1	0
593:	0	0	2	2	3	0	2	1
601:	1	1	1	1	1	2	1	1
609:	2	6	1	2	3	2	3	2
617:	1	2	3	4	6	5	5	4
625:	4	9	5	9	5	5	3	4
633:	2	0	2	0	0	0	0	1
641:	0	0	0	0	0	0	1	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	1	0
665:	0	0	0	1	0	0	0	0
673:	0	1	0	1	0	0	0	0
681:	0	0	1	0	0	0	1	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	1
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: 09

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	1	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	1	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	1	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	1	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 : 4/25/2013
Time : 5:37:47 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 001	21f	ALL	Not Done	
Alpha 002	21f	ALL	Not Done	
Alpha 003	21f	ALL	Passed	4/25/2013 5:23:02 AM
Alpha 004	21f	ALL	Passed	4/25/2013 5:23:03 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	4/25/2013 5:23:03 AM
Alpha 011	21f	ALL	Passed	4/25/2013 5:23:04 AM
Alpha 012	21f	ALL	Not Done	
Alpha 013	21f	ALL	Passed	4/25/2013 5:23:05 AM
Alpha 014	21f	ALL	Passed	4/25/2013 5:23:06 AM
Alpha 015	21f	ALL	Not Done	
Alpha 016	21f	ALL	Not Done	
Alpha 017	AIM730	ALL	Not Done	
Alpha 018	AIM730	ALL	Passed	4/25/2013 5:23:07 AM
Alpha 019	AIM730	ALL	Not Done	
Alpha 020	AIM730	ALL	Not Done	
Alpha 021	AIM730	ALL	Not Done	
Alpha 022	AIM730	ALL	Passed	4/25/2013 5:23:08 AM
Alpha 023	AIM730	ALL	Not Done	
Alpha 024	AIM730	ALL	Passed	4/25/2013 5:23:08 AM
Alpha 025	AIM730	ALL	Passed	4/25/2013 5:23:09 AM
Alpha 026	AIM730	ALL	Not Done	
Alpha 027	AIM730	ALL	Passed	4/25/2013 5:23:10 AM
Alpha 028	AIM730	ALL	Not Done	
Alpha 029	AIM730	ALL	Passed	4/25/2013 5:23:11 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	4/25/2013 5:23:12 AM
Alpha 034	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:13 AM
Alpha 035	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:15 AM
Alpha 036	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:41:48 AM
Alpha 037	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:16 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	4/25/2013 5:23:18 AM
Alpha 041	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:20 AM
Alpha 042	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:21 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 043	Alpha Analyst100DC	ALL	Passed	4/20/2013 10:42:02 AM
Alpha 044	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:23 AM
Alpha 045	Alpha Analyst100DC	ALL	Not Done	
Alpha 046	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:24 AM
Alpha 047	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:26 AM
Alpha 048	Alpha Analyst100DC	ALL	Passed	4/25/2013 5:23:28 AM

APPROVED BY: _____ APPROVAL DATE: _____ 4/25/13

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

Nuclide Library Title: Uranium

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

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

* = key line

TOTALS: 4 Nuclides 4 Energy Lines

SECTION IX
ANALYTICAL DATA (ISOTOPIC THORIUM)

ThISO

Run 1

Work Order	13-04050
Analysis Code	ThISO
Run	1
Date Received	4/9/2013
Lab Deadline	4/30/2013
Client	Engineering Management Support, Inc.
Project	West Lake OU-1
Report Level	4
Activity Units	pCi
Aliquot Units	I
Matrix	WA
Method	NAS NS-3004 Mod
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	Th-229
Radiometric Sol#	Th-18a
Tracer Act (dpm/g)	22.467
Carrier	
Carrier Conc (mg/ml)	

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

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

ThISO

Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.4734	10.6		0.00								
02	MBL	0.2349	5.3		0.00								
03	DUP	0.2351	5.3		0.00								
04	DO	0.2326	5.2		0.00								
05	TRG	0.2324	5.2		0.00								
06	TRG	0.2323	5.2		0.00								
07	TRG	0.2335	5.2		0.00								
08	TRG	0.2334	5.2		0.00								
09	TRG	0.2330	5.2		0.00								
10	TRG	0.2321	5.2		0.00								
11	TRG	0.2313	5.2		0.00								
12	TRG	0.2324	5.2		0.00								
13	TRG	0.2310	5.2		0.00								
14	TRG	0.2301	5.2		0.00								
15	TRG	0.2317	5.2		0.00								
16	TRG	0.2319	5.2		0.00								
17	TRG	0.2304	5.2		0.00								
18	TRG	0.2309	5.2		0.00								
19	TRG	0.2317	5.2		0.00								

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

0252

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

0253

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-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-228	LCS	LCS	pCi/l	5.65E+00	9.25E-01	1.11E-01	4.78E+00	118.22	OK		OK	
02	TH-228	MBL	BLANK	pCi/l	-2.04E-02	4.48E-02	1.53E-01					OK	OK
03	TH-228	DUP	S-8 TOT	pCi/l	7.05E-02	1.16E-01	2.03E-01				NA	OK	
04	TH-228	DO	S-8 TOT	pCi/l	9.20E-02	8.63E-02	1.14E-01					OK	
05	TH-228	TRG	S-8 DIS	pCi/l	0.00E+00	6.98E-02	1.51E-01					OK	
06	TH-228	TRG	D-13 TOT	pCi/l	3.91E-01	1.59E-01	5.86E-02					OK	
07	TH-228	TRG	D-13 DIS	pCi/l	-6.34E-03	3.76E-02	8.91E-02					OK	
08	TH-228	TRG	PZ-304-AS TOT	pCi/l	3.61E-02	6.15E-02	1.08E-01					OK	
09	TH-228	TRG	PZ-304-AS DIS	pCi/l	-4.54E-03	5.31E-02	1.11E-01					OK	
10	TH-228	TRG	PZ-303-AS TOT	pCi/l	1.03E+00	4.86E-01	2.12E-01					OK	
11	TH-228	TRG	PZ-303-AS DIS	pCi/l	-1.02E-02	1.16E-01	3.55E-01					OK	
12	TH-228	TRG	D-12 TOT	pCi/l	1.08E-01	1.33E-01	1.59E-01					OK	
13	TH-228	TRG	D-12 DIS	pCi/l	-2.46E-03	2.88E-02	6.04E-02					OK	
14	TH-228	TRG	PZ-111-SD TOT	pCi/l	5.00E-02	6.10E-02	7.38E-02					OK	
15	TH-228	TRG	PZ-111-SD DIS	pCi/l	1.22E-02	5.08E-02	1.30E-01					OK	
16	TH-228	TRG	PZ-304-AI TOT	pCi/l	1.34E-02	7.30E-02	1.59E-01					OK	
17	TH-228	TRG	PZ-304-AI DIS	pCi/l	-2.94E-02	4.57E-02	1.40E-01					OK	
18	TH-228	TRG	I-11 TOT	pCi/l	8.05E-03	6.53E-02	1.41E-01					OK	
19	TH-228	TRG	I-11 DIS	pCi/l	3.59E-02	7.23E-02	1.35E-01					OK	

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

P.520

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-THISO-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	TH-228	LCS	04/09/13 00:00	1.00E+00	99.55	0.00	0.00			
02	TH-228	MBL	04/09/13 00:00	1.00E+00	77.81	0.00	0.00			
03	TH-228	DUP	04/04/13 11:32	1.00E+00	54.56	0.00	0.00			
04	TH-228	DO	04/04/13 11:32	1.00E+00	92.09	0.00	0.00			
05	TH-228	TRG	04/04/13 11:32	1.00E+00	58.55	0.00	0.00			
06	TH-228	TRG	04/04/13 11:55	1.00E+00	103.16	0.00	0.00			
07	TH-228	TRG	04/04/13 11:55	1.00E+00	79.02	0.00	0.00			
08	TH-228	TRG	04/04/13 12:56	1.00E+00	83.69	0.00	0.00			
09	TH-228	TRG	04/04/13 12:56	1.00E+00	53.03	0.00	0.00			
10	TH-228	TRG	04/04/13 13:00	1.00E+00	33.73	0.00	0.00			
11	TH-228	TRG	04/04/13 13:00	1.00E+00	27.07	0.00	0.00			
12	TH-228	TRG	04/04/13 13:50	1.00E+00	37.12	0.00	0.00			
13	TH-228	TRG	04/04/13 13:50	1.00E+00	103.78	0.00	0.00			
14	TH-228	TRG	04/04/13 13:52	1.00E+00	83.49	0.00	0.00			
15	TH-228	TRG	04/04/13 13:52	1.00E+00	64.47	0.00	0.00			
16	TH-228	TRG	04/04/13 14:08	1.00E+00	88.35	0.00	0.00			
17	TH-228	TRG	04/04/13 14:08	1.00E+00	98.19	0.00	0.00			
18	TH-228	TRG	04/04/13 14:40	1.00E+00	98.55	0.00	0.00			
19	TH-228	TRG	04/04/13 14:40	1.00E+00	86.67	0.00	0.00			



Run 1

Analysis Code THISO

Eberline Services Work Order 13-04050

Client Engineering Management Support, Inc.

0020

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-THISO-1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	TH-228	LCS	04/18/13 18:29		A_Spec	Alpha_024	170	3.62 E+02	9.00 E-03	17.1
02	TH-228	MBL	04/18/13 18:29		A_Spec	Alpha_025	170	-1.04 E+00	1.20 E-02	17.4
03	TH-228	DUP	04/18/13 18:29		A_Spec	Alpha_027	170.02	2.47 E+00	9.00 E-03	17.3
04	TH-228	DO	04/18/13 18:29		A_Spec	Alpha_029	170	6.13 E+00	1.10 E-02	19.5
05	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_033	170	1.00 E+00	0.00 E+00	18.2
06	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_034	170	2.78 E+01	1.00 E-03	18.6
07	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_035	170	-3.40 E-01	2.00 E-03	18.3
08	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_037	170	2.00 E+00	0.00 E+00	17.8
09	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_040	170	-1.70 E-01	1.00 E-03	19
10	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_041	170	2.55 E+01	3.00 E-03	19.8
11	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_042	170	-1.90 E-01	7.00 E-03	18.5
12	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_044	170	2.83 E+00	1.00 E-03	19
13	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_046	170	-1.70 E-01	1.00 E-03	17.9
14	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_047	170	2.83 E+00	1.00 E-03	18.2
15	TH-228	TRG	04/18/13 18:30		A_Spec	Alpha_048	170	4.90 E-01	3.00 E-03	16.8
16	TH-228	TRG	04/19/13 05:58		A_Spec	Alpha_003	170	7.70 E-01	1.90 E-02	17.5
17	TH-228	TRG	04/19/13 05:58		A_Spec	Alpha_004	170	-2.08 E+00	2.40 E-02	19.4
18	TH-228	TRG	04/19/13 05:58		A_Spec	Alpha_010	170	5.80 E-01	2.60 E-02	19.7
19	TH-228	TRG	04/19/13 05:58		A_Spec	Alpha_011	170	2.28 E+00	1.60 E-02	19.7



Run 1

Analysis Code THISO

Eberline Services Work Order 13-04050

Client Engineering Management Support, Inc.

0529

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-THISO-1

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

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	TH-230	LCS	LCS	pCi/l	6.42E+00	1.03E+00	1.21E-01	5.47E+00	117.39	OK		OK	
02	TH-230	MBL	BLANK	pCi/l	5.73E-01	2.38E-01	1.18E-01					OK	OK
03	TH-230	DUP	S-8 TOT	pCi/l	2.34E-01	1.75E-01	1.59E-01				OK	OK	
04	TH-230	DO	S-8 TOT	pCi/l	2.44E-01	1.27E-01	7.77E-02					OK	
05	TH-230	TRG	S-8 DIS	pCi/l	9.90E-01	3.72E-01	1.04E-01					OK	
06	TH-230	TRG	D-13 TOT	pCi/l	3.74E-01	1.56E-01	8.31E-02					OK	
07	TH-230	TRG	D-13 DIS	pCi/l	4.38E-01	1.94E-01	7.68E-02					OK	
08	TH-230	TRG	PZ-304-AS TOT	pCi/l	1.66E-01	1.15E-01	1.00E-01					OK	
09	TH-230	TRG	PZ-304-AS DIS	pCi/l	2.85E-01	1.82E-01	1.10E-01					OK	
10	TH-230	TRG	PZ-303-AS TOT	pCi/l	1.70E+00	6.86E-01	2.62E-01					OK	
11	TH-230	TRG	PZ-303-AS DIS	pCi/l	1.94E-01	2.18E-01	2.54E-01					OK	
12	TH-230	TRG	D-12 TOT	pCi/l	3.38E-01	2.49E-01	2.25E-01					OK	
13	TH-230	TRG	D-12 DIS	pCi/l	2.57E-01	1.29E-01	8.57E-02					OK	
14	TH-230	TRG	PZ-111-SD TOT	pCi/l	1.34E-01	1.00E-01	8.34E-02					OK	
15	TH-230	TRG	PZ-111-SD DIS	pCi/l	4.53E-01	2.30E-01	1.29E-01					OK	
16	TH-230	TRG	PZ-304-AI TOT	pCi/l	4.07E-01	1.81E-01	8.23E-02					OK	
17	TH-230	TRG	PZ-304-AI DIS	pCi/l	1.55E-01	1.03E-01	1.06E-01					OK	
18	TH-230	TRG	I-11 TOT	pCi/l	1.89E-01	1.13E-01	1.09E-01					OK	
19	TH-230	TRG	I-11 DIS	pCi/l	4.91E-01	1.92E-01	7.42E-02					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-THISO-1

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

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	TH-230	LCS	04/09/13 00:00	1.00E+00	99.55	0.00	0.00			
02	TH-230	MBL	04/09/13 00:00	1.00E+00	77.81	0.00	0.00			
03	TH-230	DUP	04/04/13 11:32	1.00E+00	54.56	0.00	0.00			
04	TH-230	DO	04/04/13 11:32	1.00E+00	92.09	0.00	0.00			
05	TH-230	TRG	04/04/13 11:32	1.00E+00	58.55	0.00	0.00			
06	TH-230	TRG	04/04/13 11:55	1.00E+00	103.16	0.00	0.00			
07	TH-230	TRG	04/04/13 11:55	1.00E+00	79.02	0.00	0.00			
08	TH-230	TRG	04/04/13 12:56	1.00E+00	83.69	0.00	0.00			
09	TH-230	TRG	04/04/13 12:56	1.00E+00	53.03	0.00	0.00			
10	TH-230	TRG	04/04/13 13:00	1.00E+00	33.73	0.00	0.00			
11	TH-230	TRG	04/04/13 13:00	1.00E+00	27.07	0.00	0.00			
12	TH-230	TRG	04/04/13 13:50	1.00E+00	37.12	0.00	0.00			
13	TH-230	TRG	04/04/13 13:50	1.00E+00	103.78	0.00	0.00			
14	TH-230	TRG	04/04/13 13:52	1.00E+00	83.49	0.00	0.00			
15	TH-230	TRG	04/04/13 13:52	1.00E+00	64.47	0.00	0.00			
16	TH-230	TRG	04/04/13 14:08	1.00E+00	88.35	0.00	0.00			
17	TH-230	TRG	04/04/13 14:08	1.00E+00	98.19	0.00	0.00			
18	TH-230	TRG	04/04/13 14:40	1.00E+00	98.55	0.00	0.00			
19	TH-230	TRG	04/04/13 14:40	1.00E+00	86.67	0.00	0.00			

9520

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-THISO-1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	TH-230	LCS	04/18/13 18:29		A_Spec	Alpha_024	170	4.12 E+02	1.20 E-02	17.1
02	TH-230	MBL	04/18/13 18:29		A_Spec	Alpha_025	170	2.91 E+01	5.00 E-03	17.4
03	TH-230	DUP	04/18/13 18:29		A_Spec	Alpha_027	170.02	8.32 E+00	4.00 E-03	17.3
04	TH-230	DO	04/18/13 18:29		A_Spec	Alpha_029	170	1.65 E+01	3.00 E-03	19.5
05	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_033	170	3.98 E+01	1.00 E-03	18.2
06	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_034	170	2.70 E+01	0.00 E+00	18.6
07	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_035	170	2.38 E+01	1.00 E-03	18.3
08	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_037	170	9.32 E+00	4.00 E-03	17.8
09	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_040	170	1.08 E+01	1.00 E-03	19
10	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_041	170	4.28 E+01	7.00 E-03	19.8
11	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_042	170	3.66 E+00	2.00 E-03	18.5
12	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_044	170	9.00 E+00	0.00 E+00	19
13	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_046	170	1.80 E+01	0.00 E+00	17.9
14	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_047	170	7.66 E+00	2.00 E-03	18.2
15	TH-230	TRG	04/18/13 18:30		A_Spec	Alpha_048	170	1.85 E+01	3.00 E-03	16.8
16	TH-230	TRG	04/19/13 05:58		A_Spec	Alpha_003	170	2.37 E+01	2.00 E-03	17.5
17	TH-230	TRG	04/19/13 05:58		A_Spec	Alpha_004	170	1.11 E+01	1.10 E-02	19.4
18	TH-230	TRG	04/19/13 05:58		A_Spec	Alpha_010	170	1.38 E+01	1.30 E-02	19.7
19	TH-230	TRG	04/19/13 05:58		A_Spec	Alpha_011	170	3.17 E+01	2.00 E-03	19.7

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

5520

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-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	4.71E+00	8.01E-01	6.49E-02	4.78E+00	98.66	OK		OK	
02	TH-232	MBL	BLANK	pCi/l	1.63E-02	3.91E-02	8.19E-02					OK	OK
03	TH-232	DUP	S-8 TOT	pCi/l	1.80E-02	8.24E-02	1.93E-01				NA	OK	
04	TH-232	DO	S-8 TOT	pCi/l	4.73E-03	3.06E-02	8.34E-02					OK	
05	TH-232	TRG	S-8 DIS	pCi/l	1.64E-02	5.01E-02	1.19E-01					OK	
06	TH-232	TRG	D-13 TOT	pCi/l	7.36E-02	6.81E-02	7.81E-02					OK	
07	TH-232	TRG	D-13 DIS	pCi/l	-3.12E-03	3.65E-02	7.66E-02					OK	
08	TH-232	TRG	PZ-304-AS TOT	pCi/l	2.95E-02	5.02E-02	8.49E-02					OK	
09	TH-232	TRG	PZ-304-AS DIS	pCi/l	2.18E-02	5.25E-02	1.10E-01					OK	
10	TH-232	TRG	PZ-303-AS TOT	pCi/l	6.92E-01	4.05E-01	3.74E-01					OK	
11	TH-232	TRG	PZ-303-AS DIS	pCi/l	-3.61E-02	1.10E-01	2.99E-01					OK	
12	TH-232	TRG	D-12 TOT	pCi/l	-1.91E-02	7.68E-02	1.97E-01					OK	
13	TH-232	TRG	D-12 DIS	pCi/l	-4.85E-03	2.88E-02	6.82E-02					OK	
14	TH-232	TRG	PZ-111-SD TOT	pCi/l	0.00E+00	4.83E-02	1.04E-01					OK	
15	TH-232	TRG	PZ-111-SD DIS	pCi/l	-4.16E-03	4.87E-02	1.02E-01					OK	
16	TH-232	TRG	PZ-304-AI TOT	pCi/l	1.13E-02	3.47E-02	8.21E-02					OK	
17	TH-232	TRG	PZ-304-AI DIS	pCi/l	4.45E-03	2.88E-02	7.85E-02					OK	
18	TH-232	TRG	I-11 TOT	pCi/l	2.27E-02	3.86E-02	6.53E-02					OK	
19	TH-232	TRG	I-11 DIS	pCi/l	3.07E-02	5.44E-02	9.76E-02					OK	

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

0920

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep 10 Date/Time	Sep 11 Date/Time
01	TH-232	LCS	04/09/13 00:00	1.00E+00	99.55	0.00	0.00			
02	TH-232	MBL	04/09/13 00:00	1.00E+00	77.81	0.00	0.00			
03	TH-232	DUP	04/04/13 11:32	1.00E+00	54.56	0.00	0.00			
04	TH-232	DO	04/04/13 11:32	1.00E+00	92.09	0.00	0.00			
05	TH-232	TRG	04/04/13 11:32	1.00E+00	58.55	0.00	0.00			
06	TH-232	TRG	04/04/13 11:55	1.00E+00	103.16	0.00	0.00			
07	TH-232	TRG	04/04/13 11:55	1.00E+00	79.02	0.00	0.00			
08	TH-232	TRG	04/04/13 12:56	1.00E+00	83.69	0.00	0.00			
09	TH-232	TRG	04/04/13 12:56	1.00E+00	53.03	0.00	0.00			
10	TH-232	TRG	04/04/13 13:00	1.00E+00	33.73	0.00	0.00			
11	TH-232	TRG	04/04/13 13:00	1.00E+00	27.07	0.00	0.00			
12	TH-232	TRG	04/04/13 13:50	1.00E+00	37.12	0.00	0.00			
13	TH-232	TRG	04/04/13 13:50	1.00E+00	103.78	0.00	0.00			
14	TH-232	TRG	04/04/13 13:52	1.00E+00	83.49	0.00	0.00			
15	TH-232	TRG	04/04/13 13:52	1.00E+00	64.47	0.00	0.00			
16	TH-232	TRG	04/04/13 14:08	1.00E+00	88.35	0.00	0.00			
17	TH-232	TRG	04/04/13 14:08	1.00E+00	98.19	0.00	0.00			
18	TH-232	TRG	04/04/13 14:40	1.00E+00	98.55	0.00	0.00			
19	TH-232	TRG	04/04/13 14:40	1.00E+00	86.67	0.00	0.00			



Run 1

Analysis Code THISO

Eberline Services Work Order 13-04050

Client Engineering Management Support, Inc.

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-THISO-1

	
Run	1
Analysis Code	THISO
Eberline Services Work Order	13-04050
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	04/18/13 18:29		A_Spec	Alpha_024	170	3.03 E+02	1.00 E-03	17.1
02	TH-232	MBL	04/18/13 18:29		A_Spec	Alpha_025	170	8.30 E-01	1.00 E-03	17.4
03	TH-232	DUP	04/18/13 18:29		A_Spec	Alpha_027	170.02	6.40 E-01	8.00 E-03	17.3
04	TH-232	DO	04/18/13 18:29		A_Spec	Alpha_029	170	3.20 E-01	4.00 E-03	19.5
05	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_033	170	6.60 E-01	2.00 E-03	18.2
06	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_034	170	5.32 E+00	4.00 E-03	18.6
07	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_035	170	-1.70 E-01	1.00 E-03	18.3
08	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_037	170	1.66 E+00	2.00 E-03	17.8
09	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_040	170	8.30 E-01	1.00 E-03	19
10	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_041	170	1.74 E+01	2.10 E-02	19.8
11	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_042	170	-6.80 E-01	4.00 E-03	18.5
12	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_044	170	-5.10 E-01	3.00 E-03	19
13	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_046	170	-3.40 E-01	2.00 E-03	17.9
14	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_047	170	1.00 E+00	0.00 E+00	18.2
15	TH-232	TRG	04/18/13 18:30		A_Spec	Alpha_048	170	-1.70 E-01	1.00 E-03	16.8
16	TH-232	TRG	04/19/13 05:58		A_Spec	Alpha_003	170	6.60 E-01	2.00 E-03	17.5
17	TH-232	TRG	04/19/13 05:58		A_Spec	Alpha_004	170	3.20 E-01	4.00 E-03	19.4
18	TH-232	TRG	04/19/13 05:58		A_Spec	Alpha_010	170	1.66 E+00	2.00 E-03	19.7
19	TH-232	TRG	04/19/13 05:58		A_Spec	Alpha_011	170	1.98 E+00	6.00 E-03	19.7

2920

Internal Work Order		Run	Analysis Code		Date	Technician		Technician Initials		Witness Initials	
13-04050		1	ThISO		4/12/2013 10:15	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	4/12/2013	0.100	0.1024				4.78	0.172	0.00	0.000	0.00	0.000	0.00	0.000
Th-230	Th-1b	23.525	4/12/2013	0.500	0.5163				5.47	0.148	0.00	0.000	0.00	0.000	0.00	0.000
Th-232	Th-8b	103.560	4/12/2013	0.100	0.1024				4.78	0.172	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	Th-229	Th-18a	22.467	4/12/2013	0.4734	0.2200		
02	Th-229	Th-18a	22.467	4/12/2013	0.2349	0.2200		
03	Th-229	Th-18a	22.467	4/12/2013	0.2351	0.2200		
04	Th-229	Th-18a	22.467	4/12/2013	0.2326	0.2200		
05	Th-229	Th-18a	22.467	4/12/2013	0.2324	0.2200		
06	Th-229	Th-18a	22.467	4/12/2013	0.2323	0.2200		
07	Th-229	Th-18a	22.467	4/12/2013	0.2335	0.2200		
08	Th-229	Th-18a	22.467	4/12/2013	0.2334	0.2200		
09	Th-229	Th-18a	22.467	4/12/2013	0.2330	0.2200		
10	Th-229	Th-18a	22.467	4/12/2013	0.2321	0.2200		
11	Th-229	Th-18a	22.467	4/12/2013	0.2313	0.2200		
12	Th-229	Th-18a	22.467	4/12/2013	0.2324	0.2200		
13	Th-229	Th-18a	22.467	4/12/2013	0.2310	0.2200		
14	Th-229	Th-18a	22.467	4/12/2013	0.2301	0.2200		
15	Th-229	Th-18a	22.467	4/12/2013	0.2317	0.2200		
16	Th-229	Th-18a	22.467	4/12/2013	0.2319	0.2200		
17	Th-229	Th-18a	22.467	4/12/2013	0.2304	0.2200		
18	Th-229	Th-18a	22.467	4/12/2013	0.2309	0.2200		
19	Th-229	Th-18a	22.467	4/12/2013	0.2317	0.2200		

0.4734 g
0.2349 g

0.2321 g
0.2313 g
0.5163 g
0.1024 g

.2324
2310
- 2301
.2317

-0.2351 g
-0.2326 g
-0.2324 g
-0.2323 g
-0.2335 g
-0.2334 g
-0.2330 g

-0.2319 g
-0.2304 g

-0.2309 g
-0.2317 g

Aliquot Worksheet

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

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

Comments

Technician: _____

JB Date: *4/12/13*

6926



C
4/19/13

Sample Description: SPIKE
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 01
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_024
 Chamber Serial Number:
 Detector Serial Number: 24
 Env. Background: System Bkgd 54578
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/18/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:29:31 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.473 mL
 Effective Efficiency: 0.1703 +/- 0.0110
 Counting Efficiency: 0.1710 +/- 0.0032 on 12/15/2012 2:02:15 PM
 Chem. Recovery Factor: 0.9955 +/- 0.0672

Control Certificate Name: NatTh_Th-8
 Chem. Recov. of Control: TH-232 0.986609 +/- 0.090510
 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	5.861	20.13	46.00	1.87	0.00E+000	3.1
TH-228	5.328	362.47	10.32	1.53	0.00E+000	11.1
TH-229 T	4.847	307.83	11.17	0.17	0.00E+000	4.8
TH-230	4.605	411.96	9.68	2.04	0.00E+000	14.3
TH-232	3.926	302.83	11.27	0.17	0.00E+000	5.8

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

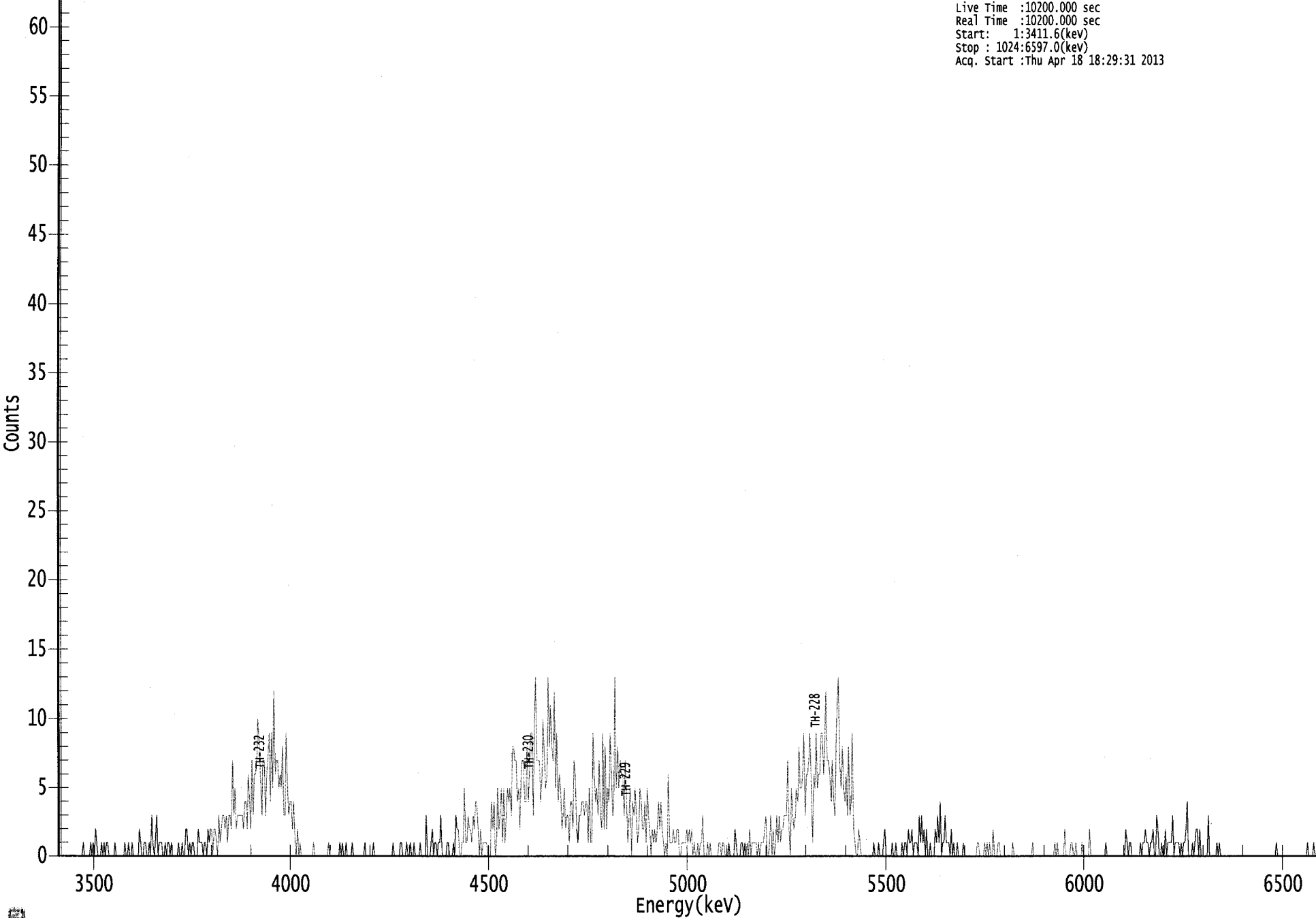
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.999	5850.00*	3.21E-001 +/- 1.53E-001	1.21E-001 +/- 1.54E-002
TH-228	0.973	5400.00*	5.65E+000 +/- 9.25E-001	1.11E-001 +/- 1.41E-002
TH-229	0.997	4872.00*	4.81E+000 +/- 6.12E-001	6.53E-002 +/- 8.30E-003
TH-230	0.977	4672.00*	6.42E+000 +/- 1.03E+000	1.21E-001 +/- 1.54E-002
TH-232	0.974	3997.00*	4.71E+000 +/- 8.01E-001	6.49E-002 +/- 8.26E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055826.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3411.6(kev)
Stop : 1024:6597.0(kev)
Acq. Start :Thu Apr 18 18:29:31 2013



ROI Type: 1

ROI Type: 3

0267

 ***** 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: 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	1	0	0	0
25:	0	0	1	0	1	0	2	1
33:	0	0	0	1	0	1	0	1
41:	1	0	0	0	0	0	1	0
49:	0	0	0	0	0	0	1	0
57:	0	1	0	0	1	0	0	0
65:	0	0	2	1	0	0	1	1
73:	0	0	1	0	3	1	0	1
81:	3	0	1	1	1	0	0	1
89:	0	1	1	0	1	0	0	0
97:	0	0	1	0	0	1	0	0
105:	2	2	0	1	0	1	1	0
113:	0	0	2	1	1	1	0	1
121:	1	0	2	1	2	2	0	2
129:	2	1	0	3	1	2	3	3
137:	2	3	1	3	3	2	7	3
145:	5	2	3	3	3	3	3	2
153:	4	4	2	6	4	2	7	3
161:	6	6	7	10	8	6	3	7
169:	7	3	6	7	9	4	9	5
177:	12	6	7	7	5	6	5	8
185:	3	3	9	5	3	4	4	2
193:	4	1	0	2	0	1	0	0
201:	0	0	0	0	0	0	0	0
209:	1	0	0	0	0	0	0	0
217:	0	0	0	0	1	0	0	0
225:	0	0	0	0	0	1	0	1
233:	0	0	1	0	0	0	0	1
241:	0	0	0	0	0	0	0	0
249:	0	1	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:	1	0	0	0	0	0	1	1
281:	0	0	0	1	0	0	1	0
289:	0	1	0	0	0	0	1	0
297:	0	0	0	3	0	0	0	1
305:	2	0	1	1	0	1	1	3
313:	0	0	0	0	1	1	0	0
321:	0	1	0	3	2	2	0	0
329:	1	1	5	1	1	3	2	2
337:	1	3	2	4	4	2	0	2
345:	0	1	1	1	1	0	0	0
353:	4	2	4	0	1	5	2	3
361:	5	1	5	1	3	5	4	5

369: 3 8 8 7 7 4 5 2

Sample Title: 01

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

801: 0 0 0 0 0 0 0 0

Sample Title: 01

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	1	0	1	0	0	0	0	0
817:	2	0	0	0	0	1	1	0
825:	0	1	0	0	0	0	1	0
833:	0	0	0	0	2	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	1	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	2	1	0	1	1	0	0
873:	0	0	0	0	0	1	0	1
881:	1	2	1	1	0	1	1	2
889:	0	0	3	2	0	0	1	0
897:	0	2	0	1	1	1	1	3
905:	0	1	1	1	1	0	1	0
913:	1	1	2	4	0	0	0	1
921:	0	1	2	2	0	2	0	0
929:	0	0	0	0	3	0	0	0
937:	0	0	0	1	0	1	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	1	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	1	0	0	0
1017:	0	1	0	0	0	0	1	0



24109117

Sample Description: BLANK
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 02
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_025
 Chamber Serial Number:
 Detector Serial Number: 25
 Env. Background: System Bkgd 54579
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/18/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:29:32 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: 0.1350 +/- 0.0130
 Counting Efficiency: 0.1736 +/- 0.0032 on 12/15/2012 1:57:27 PM
 Chem. Recovery Factor: 0.7781 +/- 0.0764

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	5.802	2.47	163.78	1.53	0.00E+000	3.1
TH-228	5.257	-1.04	218.71	2.04	0.00E+000	3.1
TH-229 T	4.839	121.15	17.88	0.85	0.00E+000	4.0
TH-230	4.633	29.15	36.92	0.85	0.00E+000	3.1
TH-232	3.977	0.83	239.53	0.17	0.00E+000	3.1

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

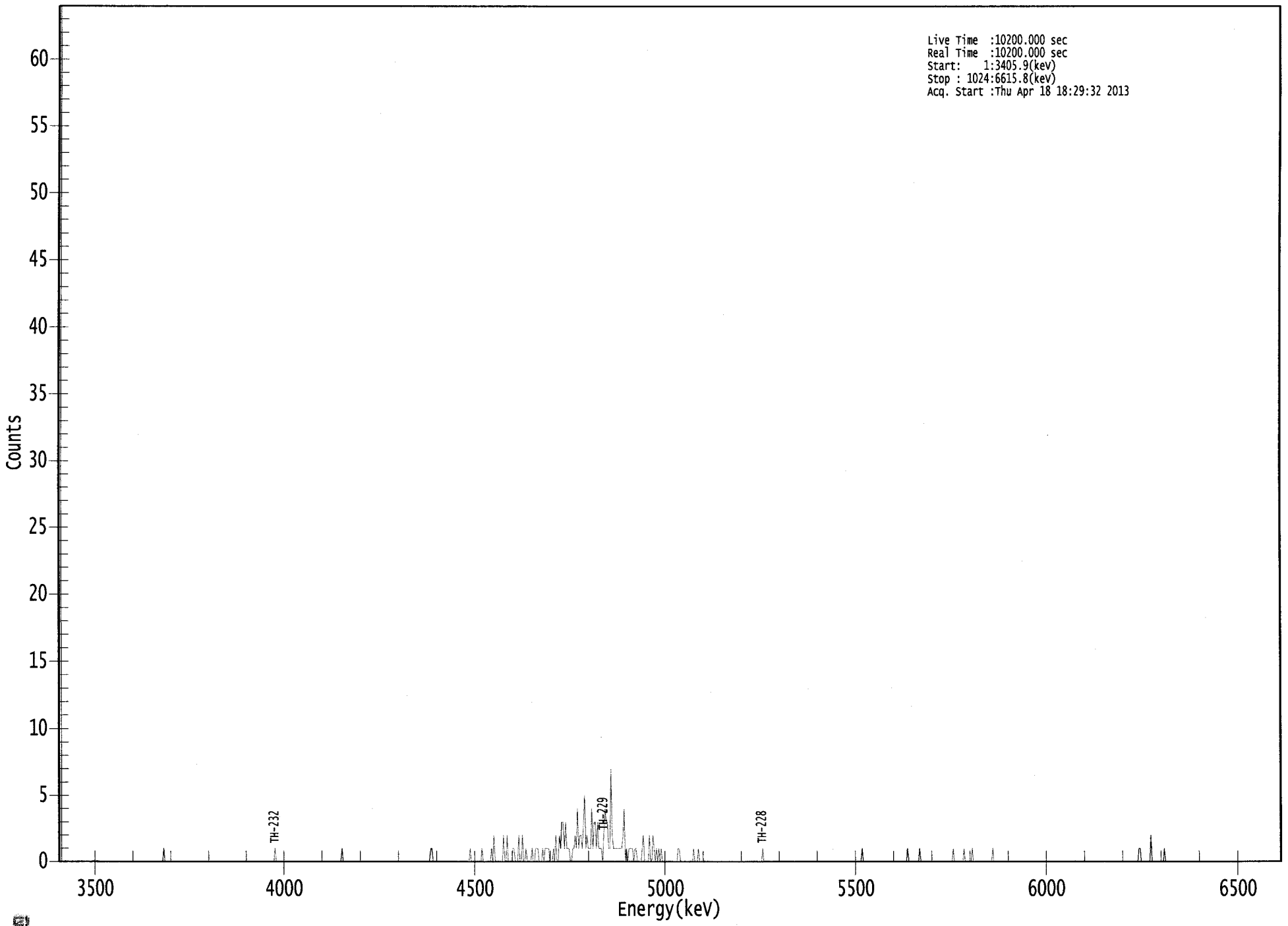
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.988	5850.00*	4.97E-002 +/- 8.20E-002	1.43E-001 +/- 2.70E-002
TH-228	0.899	5400.00*	-2.04E-002 +/- 4.48E-002	1.53E-001 +/- 2.89E-002
TH-229	0.994	4872.00*	2.39E+000 +/- 4.51E-001	1.18E-001 +/- 2.23E-002
TH-230	0.992	4672.00*	5.73E-001 +/- 2.38E-001	1.18E-001 +/- 2.22E-002
TH-232	0.998	3997.00*	1.63E-002 +/- 3.91E-002	8.19E-002 +/- 1.55E-002

AG
 4/19/13

US EPA ARCHIVE DOCUMENT

0000055827.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3405.9(kev)
Stop : 1024:6615.8(kev)
Acq. Start :Thu Apr 18 18:29:32 2013



0272

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	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:	1	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	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	1	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	1	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:	0	1	0	0	0	0	0	0
353:	0	0	0	1	0	0	0	0
361:	0	0	0	1	0	2	0	0

369: 0 0 0 0 0 2 0 0

Sample Title: 02

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	2	0	0	0	0	1	1	0
385:	0	0	2	0	0	2	0	0
393:	1	0	0	0	0	1	0	0
401:	1	1	1	0	0	0	1	0
409:	1	1	1	1	0	0	0	1
417:	0	2	0	0	2	1	3	3
425:	1	3	1	1	1	0	0	1
433:	1	2	1	4	1	2	2	1
441:	3	5	1	2	1	1	1	4
449:	1	3	3	1	3	1	1	1
457:	0	2	4	3	3	1	1	7
465:	2	1	1	1	1	1	1	1
473:	1	2	4	0	1	0	1	1
481:	1	1	0	1	1	0	0	0
489:	0	1	2	0	0	0	0	2
497:	0	0	2	1	0	1	0	1
505:	0	1	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	1
521:	1	0	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	0
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	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	1	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	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	1	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	1
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	1	0	0
753:	0	0	0	0	0	0	1	0
761:	0	0	0	0	0	1	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	1	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0

Sample Title: 02

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	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:	1	1	0	0	0	0	0	0
913:	0	0	2	0	0	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	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-8 TOT-DUP
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 03
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_027
 Chamber Serial Number:
 Detector Serial Number: 27
 Env. Background: System Bkgd 54580
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:29:33 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: 0.0943 +/- 0.0107
 Counting Efficiency: 0.1728 +/- 0.0032 on 12/15/2012 2:27:41 PM
 Chem. Recovery Factor: 0.5456 +/- 0.0630

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	4.96	107.11	2.04	0.00E+000	3.2
TH-228	5.310	2.47	163.79	1.53	0.00E+000	3.2
TH-229 T	4.796	84.64	21.50	1.36	0.00E+000	3.2
TH-230	4.584	8.32	71.13	0.68	0.00E+000	3.2
TH-232	3.858	0.64	457.55	1.36	0.00E+000	3.2

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

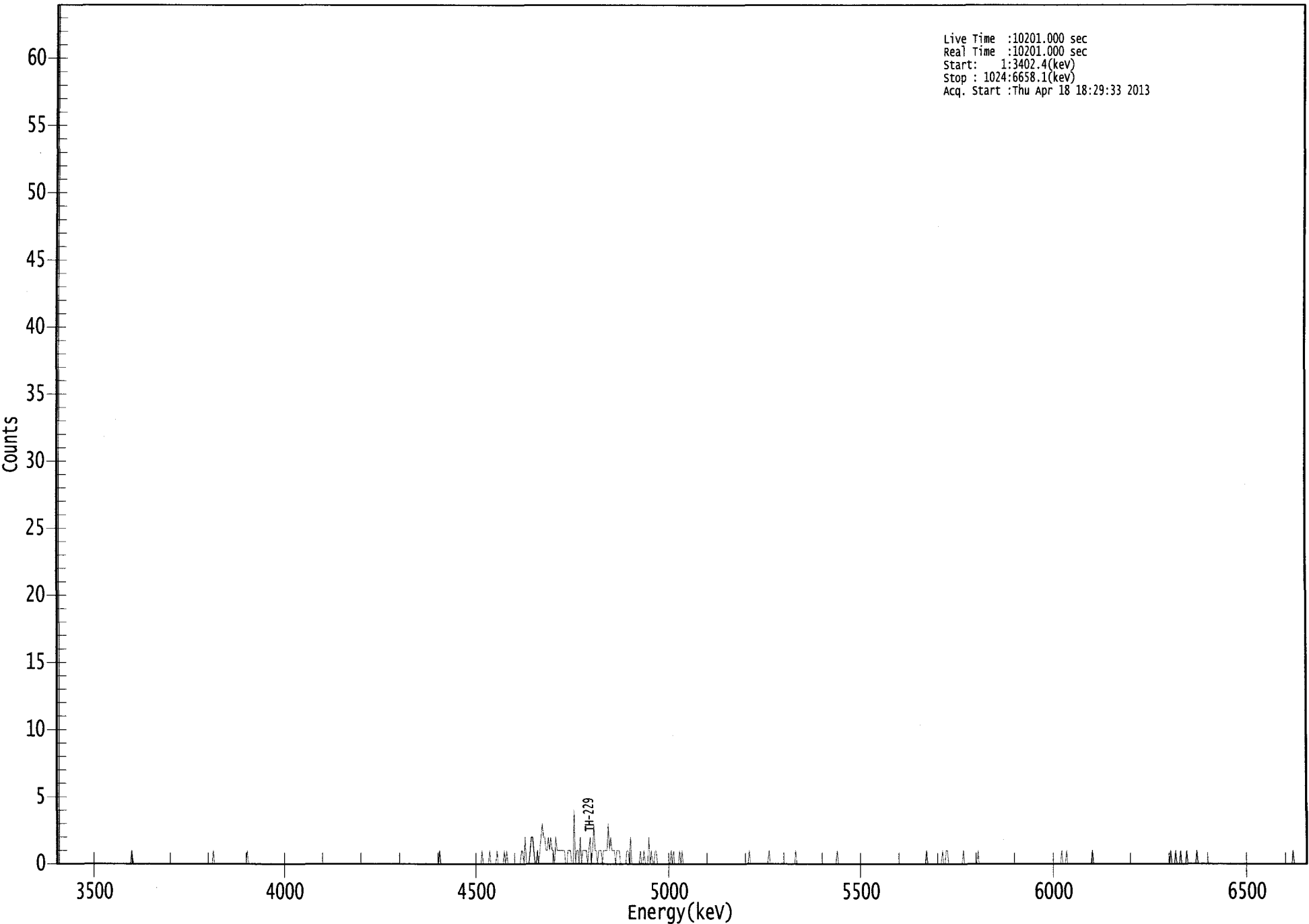
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.997	5850.00*	1.43E-001 +/- 1.57E-001	2.25E-001 +/- 5.02E-002
TH-228	0.959	5400.00*	7.05E-002 +/- 1.16E-001	2.03E-001 +/- 4.53E-002
TH-229	0.970	4872.00*	2.39E+000 +/- 5.34E-001	1.94E-001 +/- 4.33E-002
TH-230	0.960	4672.00*	2.34E-001 +/- 1.75E-001	1.59E-001 +/- 3.55E-002
TH-232	0.903	3997.00*	1.80E-002 +/- 8.24E-002	1.93E-001 +/- 4.31E-002

AG
 4/19/13

US EPA ARCHIVE DOCUMENT

0000055884.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start : 1:3402.4(kev)
Stop : 1024:6658.1(kev)
Acq. Start :Thu Apr 18 18:29:33 2013



0277
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: 10201

Elapsed Real Time: 10201

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	1	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	1	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	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	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	1	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	1	0
353:	0	0	0	0	1	0	0	0
361:	0	0	1	0	0	0	0	0

369: 1 0 1 0 0 0 0 0

Sample Title: 03

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	1	1
385:	0	2	0	0	0	1	2	2
393:	1	0	0	1	0	1	2	3
401:	2	2	1	1	2	1	2	1
409:	1	0	2	1	1	1	1	1
417:	1	1	0	0	1	1	1	0
425:	0	4	0	1	1	0	2	0
433:	1	1	1	1	0	1	2	0
441:	1	3	1	1	0	1	1	1
449:	0	1	1	1	1	3	1	2
457:	1	1	1	0	1	1	1	0
465:	0	0	0	0	1	1	0	2
473:	0	0	0	0	0	0	0	1
481:	0	0	1	0	0	0	2	0
489:	1	0	0	1	1	0	0	0
497:	0	0	0	0	0	0	0	0
505:	1	0	1	0	0	0	0	1
513:	0	1	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	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:	1	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	1	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	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	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	1	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	1	0	0	0	0	0	0
721:	0	0	0	0	0	0	1	0
729:	0	1	1	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	1	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0

Sample Title: 03

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	1
825:	0	0	0	1	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	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:	1	0	0	0	1	0	0	0
921:	1	0	0	0	0	1	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:	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	1	0	0	0	0
1017:	0	0	0	0	0	0	0	0



C
4/19/13

Sample Description: S-8 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 04
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_029
 Chamber Serial Number:
 Detector Serial Number: 29
 Env. Background: System Bkgd 54581
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:29:34 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: 0.1792 +/- 0.0153
 Counting Efficiency: 0.1945 +/- 0.0036 on 12/15/2012 2:30:02 PM
 Chem. Recovery Factor: 0.9209 +/- 0.0804

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	6.81	82.43	1.19	0.00E+000	3.1
TH-228	5.331	6.13	92.22	1.87	0.00E+000	3.1
TH-229 T	4.868	159.15	15.58	0.85	0.00E+000	4.0
TH-230	4.608	16.49	49.13	0.51	0.00E+000	3.1
TH-232	3.933	0.32	646.93	0.68	0.00E+000	3.1

T = Tracer Peak used for Effective Efficiency

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

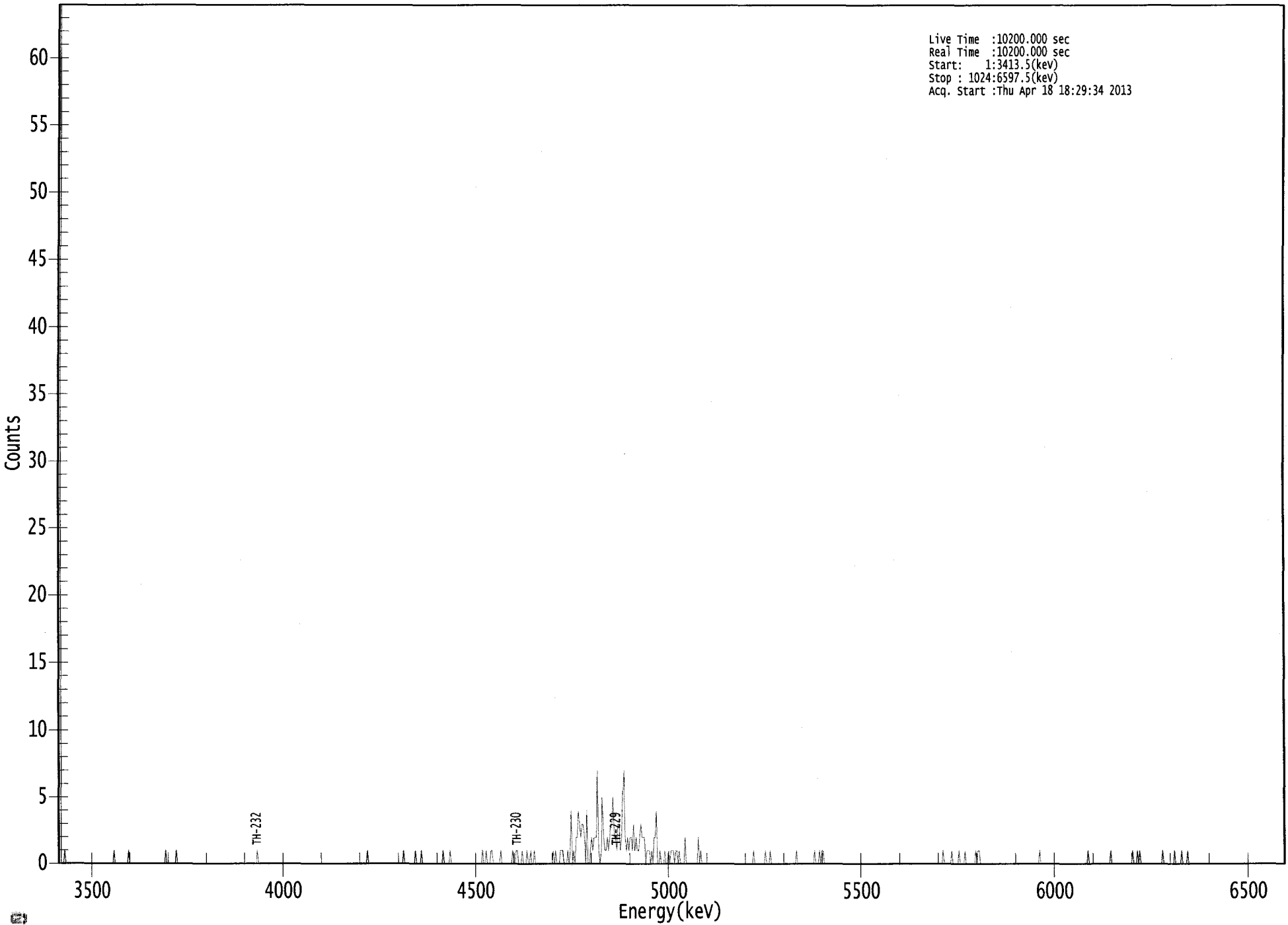
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.983	5850.00*	1.03E-001 +/- 8.70E-002	1.00E-001 +/- 1.67E-002
TH-228	0.976	5400.00*	9.20E-002 +/- 8.63E-002	1.14E-001 +/- 1.90E-002
TH-229	1.000	4872.00*	2.37E+000 +/- 3.96E-001	8.90E-002 +/- 1.49E-002
TH-230	0.979	4672.00*	2.44E-001 +/- 1.27E-001	7.77E-002 +/- 1.30E-002
TH-232	0.979	3997.00*	4.73E-003 +/- 3.06E-002	8.34E-002 +/- 1.40E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055829.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3413.5(kev)
Stop : 1024:6597.5(kev)
Acq. Start :Thu Apr 18 18:29:34 2013



ROI Type: 1

ROI Type: 3

2826

 ***** 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	1	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:	0	0	0	1	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	1	0	0	0	0	0
97:	0	0	0	1	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	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	1
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	1	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	1	0	0	0	0	0	0
297:	0	0	0	1	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	1	0	0	0	0	0
329:	1	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	1	0	0	1	0
361:	0	0	1	1	0	0	0	0

369: 0 0 1 0 0 0 0 0

Sample Title: 04

Channel	1	2	3	4	5	6	7	8
377:	0	0	0	0	1	0	0	1
385:	1	0	0	0	1	0	0	0
393:	1	0	0	1	0	0	1	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	1	0
417:	1	0	0	0	1	1	1	0
425:	0	0	1	0	1	4	0	1
433:	0	2	2	4	3	2	3	3
441:	2	0	4	0	0	1	2	1
449:	2	2	2	7	1	0	1	5
457:	2	1	1	2	1	2	3	3
465:	5	2	2	1	3	3	1	2
473:	5	7	2	1	2	1	2	2
481:	1	3	1	2	1	1	2	3
489:	2	2	2	0	1	1	1	0
497:	1	0	2	2	4	0	0	1
505:	0	0	0	1	0	0	1	0
513:	1	1	1	0	1	1	0	1
521:	0	0	0	0	2	0	0	0
529:	0	0	0	0	0	0	0	2
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	1	0	0
585:	0	0	0	0	0	0	0	1
593:	0	0	0	1	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:	1	0	0	0	1	0	1	1
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	1	0	0	0	0
745:	0	0	1	0	0	0	0	0
753:	1	0	0	0	0	1	0	0
761:	0	0	0	0	0	0	1	0
769:	1	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: 04

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	1	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	1	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	1	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	1	0	0	0	1	0	1	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	1	0	0	0	0	0	0
929:	0	0	0	1	0	0	0	0
937:	0	1	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



C
4/11/13

Sample Description: S-8 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 05
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_033
 Chamber Serial Number: 04026479A
 Detector Serial Number: 91132
 Env. Background: System Bkgd 54582
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:08 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: 0.1068 +/- 0.0115
 Counting Efficiency: 0.1825 +/- 0.0032 on 12/16/2012 5:49:18 PM
 Chem. Recovery Factor: 0.5855 +/- 0.0637

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	6.83	76.08	0.17	0.00E+000	5.9
TH-228	5.298	0.00	1960.0	0.00	0.00E+000	0.0
TH-229 T	4.841	94.83	20.15	0.17	0.00E+000	3.7
TH-230	4.647	39.83	31.13	0.17	0.00E+000	3.0
TH-232	4.074	0.66	305.43	0.34	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

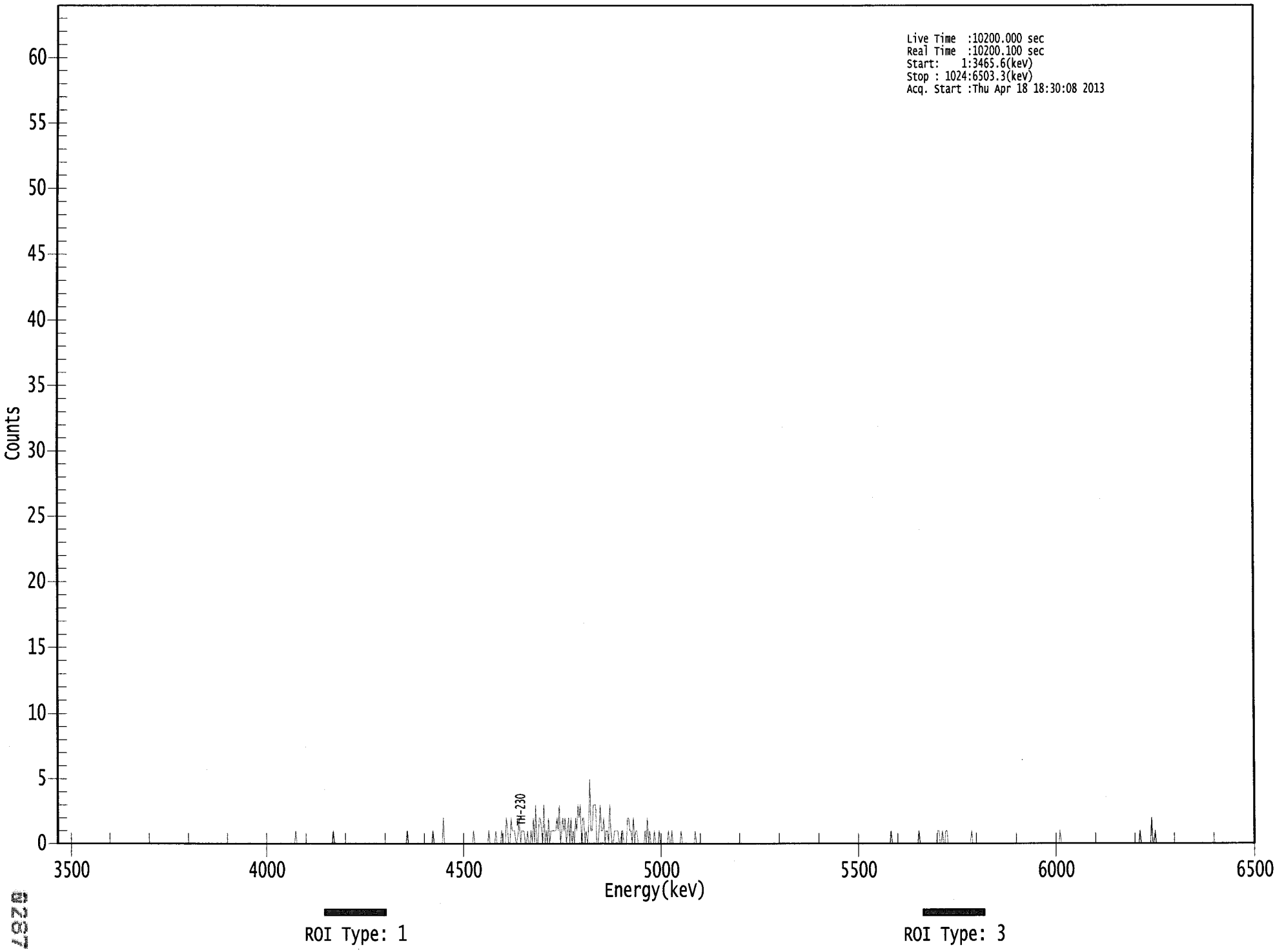
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.964	5850.00*	1.74E-001 +/- 1.37E-001	1.06E-001 +/- 2.24E-002
TH-228	0.947	5400.00*	0.00E+000 +/- 6.98E-002	1.51E-001 +/- 3.18E-002
TH-229	0.995	4872.00*	2.36E+000 +/- 4.97E-001	1.04E-001 +/- 2.19E-002
TH-230	0.997	4672.00*	9.90E-001 +/- 3.72E-001	1.04E-001 +/- 2.18E-002
TH-232	0.969	3997.00*	1.64E-002 +/- 5.01E-002	1.19E-001 +/- 2.50E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055835.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3465.6(keV)
Stop : 1024:6503.3(keV)
Acq. Start :Thu Apr 18 18:30:08 2013



0287

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

Sample Title: 05

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	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	0	0	0	1	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	1	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	1	0	0	0	0	0
329:	0	0	0	2	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	0	0

369: 0 0 1 0 0 0 0 0 0

Sample Title: 05

Channel	1	2	3	4	5	6	7	8	9
377:	1	0	0	0	0	1	0	0	
385:	0	2	1	0	0	2	1	1	
393:	1	0	0	1	2	0	1	1	
401:	1	0	0	1	0	0	1	0	
409:	2	0	3	0	0	2	2	1	
417:	0	3	0	1	0	2	0	1	
425:	1	1	1	1	2	1	3	0	
433:	1	2	1	2	0	1	2	0	
441:	2	0	1	0	2	1	3	2	
449:	3	0	2	2	0	1	0	1	
457:	5	1	1	3	3	3	0	0	
465:	1	3	1	1	2	0	1	1	
473:	0	3	1	0	0	1	1	1	
481:	1	0	0	1	1	0	0	0	
489:	2	2	1	1	0	2	0	1	
497:	1	0	0	0	0	0	0	1	
505:	0	2	0	1	0	0	0	1	
513:	0	0	0	1	0	0	0	0	
521:	0	0	0	1	0	0	1	0	
529:	0	0	0	0	0	0	1	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	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	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	1	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	1	0	0	0	0	0	0	
745:	0	0	0	0	0	0	0	0	
753:	0	1	1	0	0	1	0	0	
761:	1	1	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	0	0	0	0	0	0	

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



C
4/15/13

Sample Description: D-13 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 06
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_034
 Chamber Serial Number: 04026479B
 Detector Serial Number: 91136
 Env. Background: System Bkgd 54583
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:10 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: 0.1914 +/- 0.0159
 Counting Efficiency: 0.1856 +/- 0.0032 on 12/16/2012 5:49:43 PM
 Chem. Recovery Factor: 1.0316 +/- 0.0873

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	1.83	152.56	0.17	0.00E+000	3.0
TH-228	5.361	27.83	37.29	0.17	0.00E+000	3.5
TH-229 T	4.846	169.83	15.05	0.17	0.00E+000	4.8
TH-230	4.653	27.00	38.41	0.00	0.00E+000	3.7
TH-232	3.920	5.32	91.11	0.68	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

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

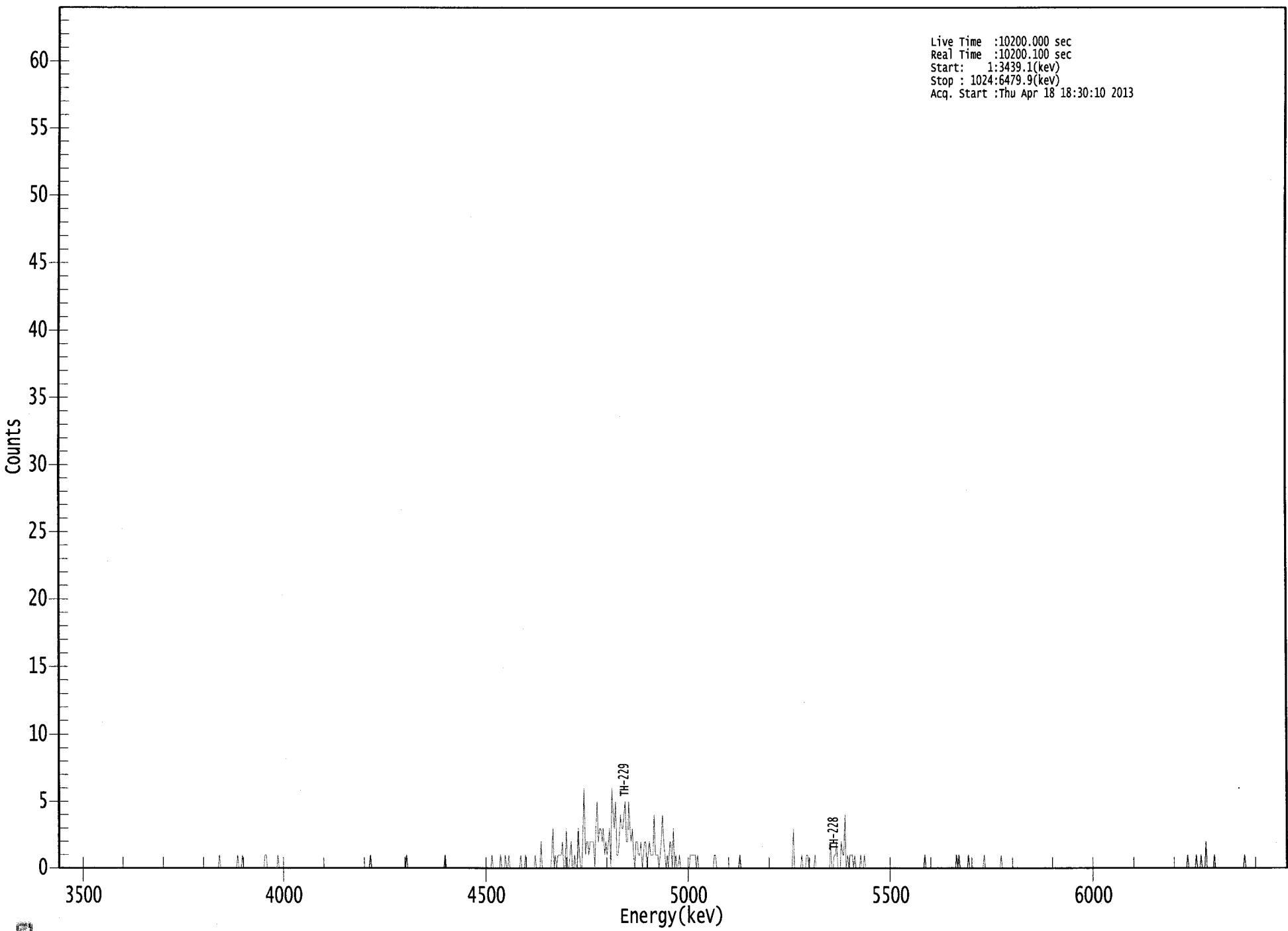
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.951	5850.00*	2.60E-002 +/- 3.99E-002	5.93E-002 +/- 9.63E-003
TH-228	0.992	5400.00*	3.91E-001 +/- 1.59E-001	5.86E-002 +/- 9.52E-003
TH-229	0.996	4872.00*	2.36E+000 +/- 3.83E-001	5.80E-002 +/- 9.42E-003
TH-230	0.998	4672.00*	3.74E-001 +/- 1.56E-001	8.31E-002 +/- 1.35E-002
TH-232	0.969	3997.00*	7.36E-002 +/- 6.81E-002	7.81E-002 +/- 1.27E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055836.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3439.1(kev)
Stop : 1024:6479.9(kev)
Acq. Start :Thu Apr 18 18:30:10 2013



ROI Type: 1

ROI Type: 3

0222

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

Sample Title: 06

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	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	1
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	1	0
153:	0	0	1	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	1	1	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	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	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	1	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	1	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	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	1	0	0	0	0	0

369: 0 1 0 0 0 1 0 0

Sample Title: 06

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

801: 0 0 0 0 0 0 0 0

Sample Title: 06

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	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	1	0	0	0
945:	0	0	0	1	0	0	0	1
953:	0	0	0	2	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	1	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
4/19/13

Sample Description: D-13 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 07
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_035
 Chamber Serial Number: 04026477A
 Detector Serial Number: 58771
 Env. Background: System Bkgd 54584
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:11 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: 0.1443 +/- 0.0135
 Counting Efficiency: 0.1826 +/- 0.0032 on 12/16/2012 5:49:42 PM
 Chem. Recovery Factor: 0.7902 +/- 0.0752

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	5.997	0.83	239.53	0.17	0.00E+000	2.9
TH-228	5.299	-0.34	592.90	0.34	0.00E+000	0.0
TH-229 T	4.857	128.66	17.31	0.34	0.00E+000	5.9
TH-230	4.642	23.83	40.32	0.17	0.00E+000	6.6
TH-232	3.949	-0.17	1169.4	0.17	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

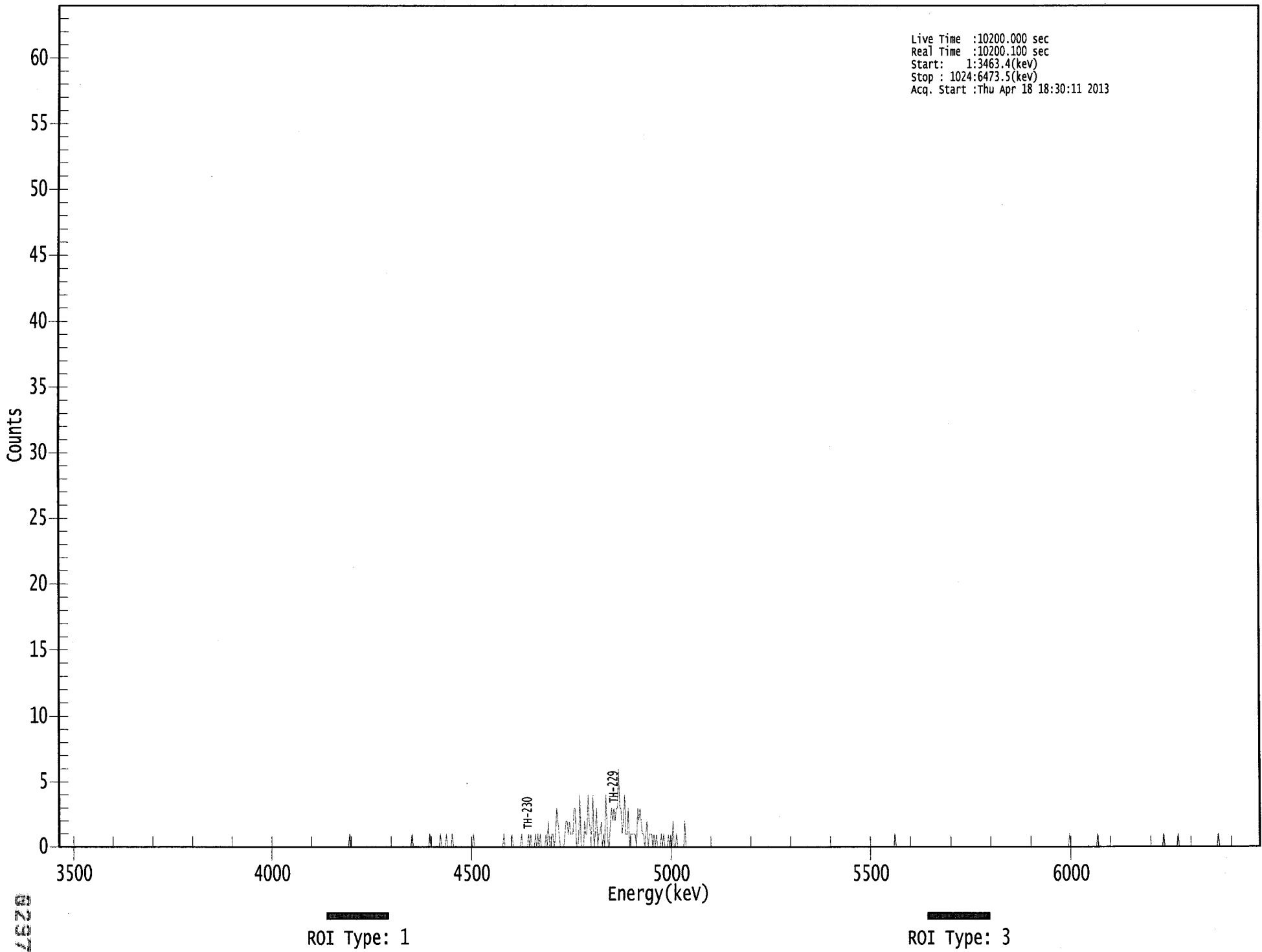
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.893	5850.00*	1.57E-002 +/- 3.76E-002	7.87E-002 +/- 1.44E-002
TH-228	0.949	5400.00*	-6.34E-003 +/- 3.76E-002	8.91E-002 +/- 1.63E-002
TH-229	0.999	4872.00*	2.37E+000 +/- 4.36E-001	8.82E-002 +/- 1.62E-002
TH-230	0.995	4672.00*	4.38E-001 +/- 1.94E-001	7.68E-002 +/- 1.41E-002
TH-232	0.988	3997.00*	-3.12E-003 +/- 3.65E-002	7.66E-002 +/- 1.41E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055830.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3463.4(kev)
Stop : 1024:6473.5(kev)
Acq. Start :Thu Apr 18 18:30:11 2013



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

Sample Title: 07

Elapsed Live time: 10200
 Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	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	1	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	1	0	0
321:	0	0	0	0	0	0	1	0
329:	0	0	0	1	0	0	0	0
337:	1	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	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0

Sample Title: 07

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	1	0	0	0
385:	0	0	0	1	0	0	0	0
393:	0	0	0	1	0	0	0	0
401:	0	1	0	1	0	0	0	1
409:	0	1	0	1	0	0	0	0
417:	1	0	2	0	0	1	1	0
425:	1	3	2	1	0	0	0	0
433:	1	2	2	1	2	1	1	1
441:	3	3	0	0	1	4	0	0
449:	0	2	1	1	4	2	1	1
457:	4	0	1	3	0	1	1	2
465:	0	1	0	4	2	0	0	2
473:	3	2	3	2	3	3	6	3
481:	3	1	2	4	1	1	3	0
489:	1	1	1	1	1	0	3	2
497:	3	2	1	1	0	1	2	0
505:	1	1	1	0	1	0	1	0
513:	0	0	1	0	1	0	0	0
521:	1	0	1	0	2	0	0	1
529:	0	0	0	0	0	0	2	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	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	1	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0

Sample Title: 07

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	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	1	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	1	0	0
945:	0	0	0	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	1	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
4/19/13

Sample Description: PZ-304-AS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 08
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:13 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: 0.1492 +/- 0.0138
 Counting Efficiency: 0.1783 +/- 0.0033 on 1/26/2013 3:28:25 PM
 Chem. Recovery Factor: 0.8369 +/- 0.0789

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	5.798	7.00	79.20	0.00	0.00E+000	2.9
TH-228	5.417	2.00	169.74	0.00	0.00E+000	2.9
TH-229 T	4.884	133.00	17.06	0.00	0.00E+000	3.4
TH-230	4.665	9.32	66.89	0.68	0.00E+000	2.9
TH-232	3.957	1.66	169.38	0.34	0.00E+000	2.9

T = Tracer Peak used for Effective Efficiency

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

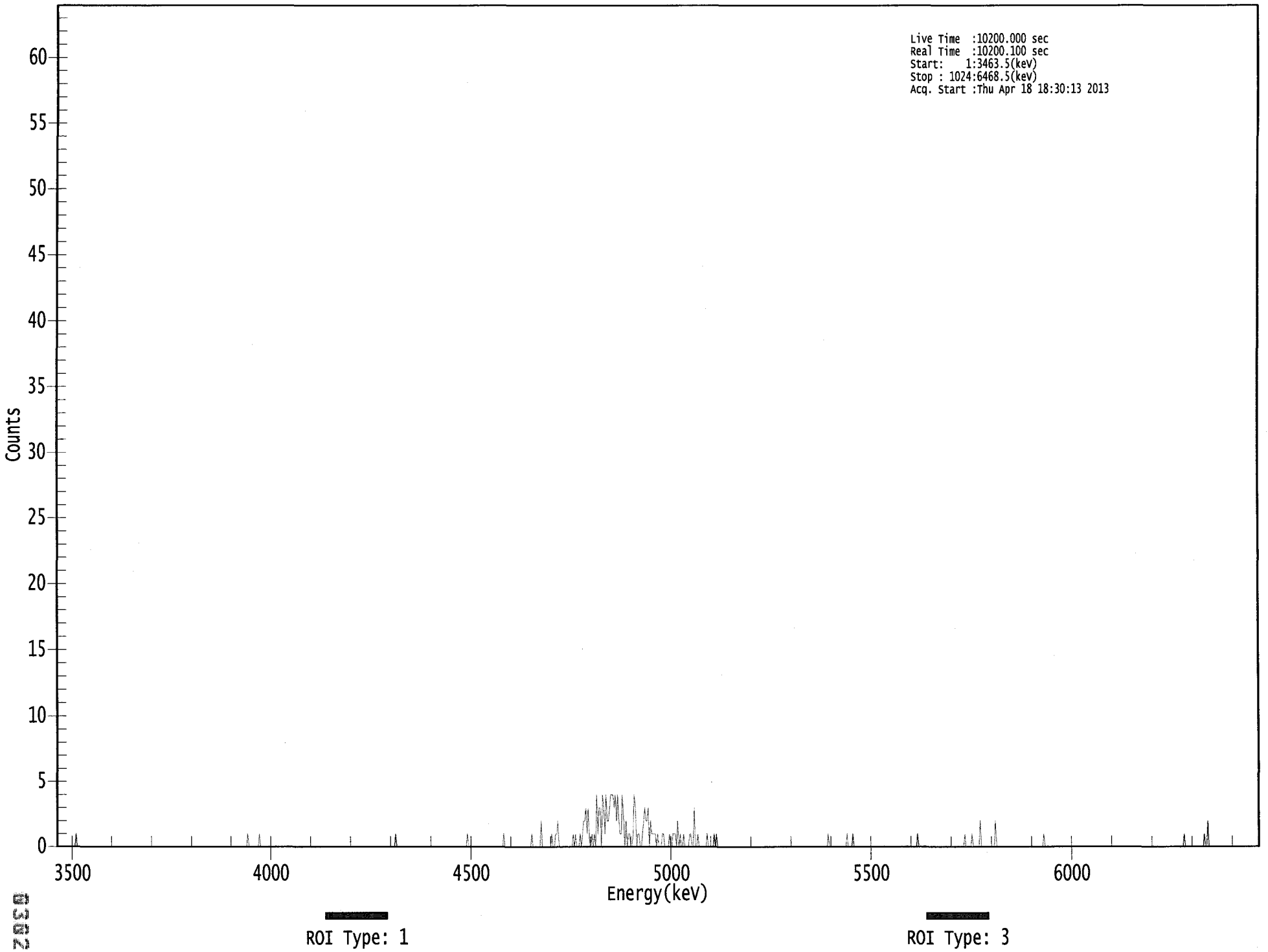
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.986	5850.00*	1.28E-001 +/- 1.04E-001	1.09E-001 +/- 1.98E-002
TH-228	0.998	5400.00*	3.61E-002 +/- 6.15E-002	1.08E-001 +/- 1.96E-002
TH-229	0.999	4872.00*	2.37E+000 +/- 4.30E-001	1.07E-001 +/- 1.94E-002
TH-230	1.000	4672.00*	1.66E-001 +/- 1.15E-001	1.00E-001 +/- 1.82E-002
TH-232	0.992	3997.00*	2.95E-002 +/- 5.02E-002	8.49E-002 +/- 1.54E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055831.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3463.5(kev)
Stop : 1024:6468.5(kev)
Acq. Start :Thu Apr 18 18:30:13 2013



 ***** 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:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	1	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	1	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	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	1	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	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 0

Sample Title: 08

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	0
401:	0	0	0	0	0	1	0	0
409:	0	0	0	0	0	2	0	0
417:	0	0	0	0	0	0	1	0
425:	0	1	1	2	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	1	0	1	0	0	0	1	0
449:	1	2	2	3	1	3	0	0
457:	1	0	1	0	4	1	3	3
465:	0	4	3	1	4	2	2	3
473:	4	4	4	3	4	2	4	2
481:	1	1	4	2	0	2	0	1
489:	1	0	0	1	4	3	0	1
497:	1	0	0	1	2	3	2	2
505:	3	0	2	1	1	1	1	0
513:	1	0	0	0	1	1	0	0
521:	0	0	1	0	0	1	1	1
529:	0	2	0	1	0	0	1	0
537:	0	0	0	1	1	0	0	3
545:	0	0	1	0	0	0	0	0
553:	0	0	1	0	0	0	0	0
561:	1	0	1	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	0	0	0
657:	0	1	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	1	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	0	0
729:	0	0	0	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	1	0	0
777:	0	0	0	1	0	0	0	0
785:	0	0	2	0	0	0	0	0
793:	0	0	0	0	0	0	0	2

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:	1	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	1
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	1	0	0	2	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-304-AS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 09
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_040
 Chamber Serial Number: 06027396B
 Detector Serial Number: 91135
 Env. Background: System Bkgd 54586
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:15 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: 0.1008 +/- 0.0111
 Counting Efficiency: 0.1900 +/- 0.0033 on 12/16/2012 5:49:33 PM
 Chem. Recovery Factor: 0.5303 +/- 0.0592

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	5.756	1.83	152.56	0.17	0.00E+000	3.0
TH-228	5.330	-0.17	1169.4	0.17	0.00E+000	0.0
TH-229 T	4.855	89.66	20.75	0.34	0.00E+000	9.4
TH-230	4.642	10.83	60.10	0.17	0.00E+000	3.0
TH-232	4.056	0.83	239.53	0.17	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

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

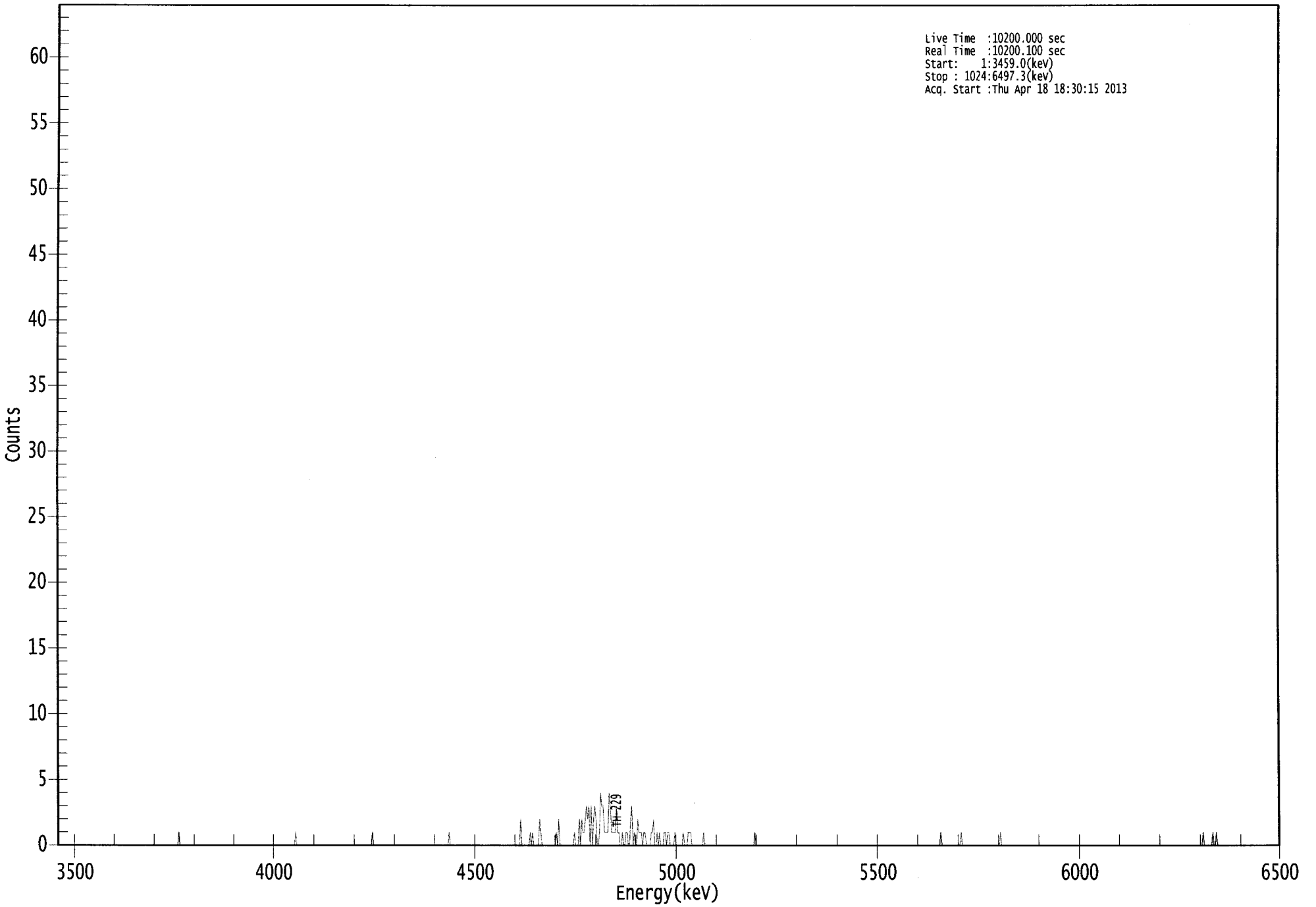
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.955	5850.00*	4.94E-002 +/- 7.62E-002	1.13E-001 +/- 2.44E-002
TH-228	0.975	5400.00*	-4.54E-003 +/- 5.31E-002	1.11E-001 +/- 2.41E-002
TH-229	0.999	4872.00*	2.37E+000 +/- 5.12E-001	1.26E-001 +/- 2.73E-002
TH-230	0.995	4672.00*	2.85E-001 +/- 1.82E-001	1.10E-001 +/- 2.38E-002
TH-232	0.982	3997.00*	2.18E-002 +/- 5.25E-002	1.10E-001 +/- 2.37E-002

AG
 4/19/13

US EPA ARCHIVE DOCUMENT

000055885.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start : 1:3459.0(keV)
Stop : 1024:6497.3(keV)
Acq. Start :Thu Apr 18 18:30:15 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: 09

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	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	1	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	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	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	1	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: 09

Channel	1	2	3	4	5	6	7	8	9
377:	0	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	2	0	0
393:	0	0	0	0	0	0	1	0	1
401:	0	0	0	0	0	0	2	1	0
409:	0	0	0	0	0	0	0	0	0
417:	0	0	0	1	0	0	2	0	0
425:	0	0	0	0	0	0	0	0	0
433:	0	0	1	0	0	0	0	2	0
441:	2	1	1	2	3	2	2	3	0
449:	3	0	2	3	2	0	0	0	1
457:	4	3	3	1	1	1	1	1	4
465:	3	1	1	1	1	1	3	1	1
473:	0	0	1	0	0	0	1	1	0
481:	0	2	3	0	1	0	0	0	2
489:	1	1	1	0	1	1	1	0	0
497:	0	0	1	1	2	0	0	0	1
505:	0	1	0	0	0	0	1	1	0
513:	1	1	0	0	0	0	0	1	0
521:	0	0	0	0	0	0	1	0	0
529:	0	1	1	1	0	0	0	0	0
537:	0	0	0	0	0	0	0	1	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	1	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	0	0
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	1	0	0	0
745:	0	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	1	0	0
761:	0	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	1	0
793:	0	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:	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	1
961:	0	0	0	0	0	0	0	1
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



C
4/19/13

Sample Description: PZ-303-AS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 10
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

Detector Name: Alpha_041
 Chamber Serial Number: 05026930A
 Detector Serial Number: 91087
 Env. Background: System Bkgd 54587
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:16 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: 0.0667 +/- 0.0090
 Counting Efficiency: 0.1978 +/- 0.0034 on 12/16/2012 5:49:31 PM
 Chem. Recovery Factor: 0.3373 +/- 0.0458

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	5.862	2.49	138.29	0.51	0.00E+000	3.0
TH-228	5.353	25.49	39.27	0.51	0.00E+000	6.0
TH-229 T	4.855	59.15	25.70	0.85	0.00E+000	3.5
TH-230	4.606	42.81	30.44	1.19	0.00E+000	3.7
TH-232	3.937	17.43	52.27	3.57	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

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

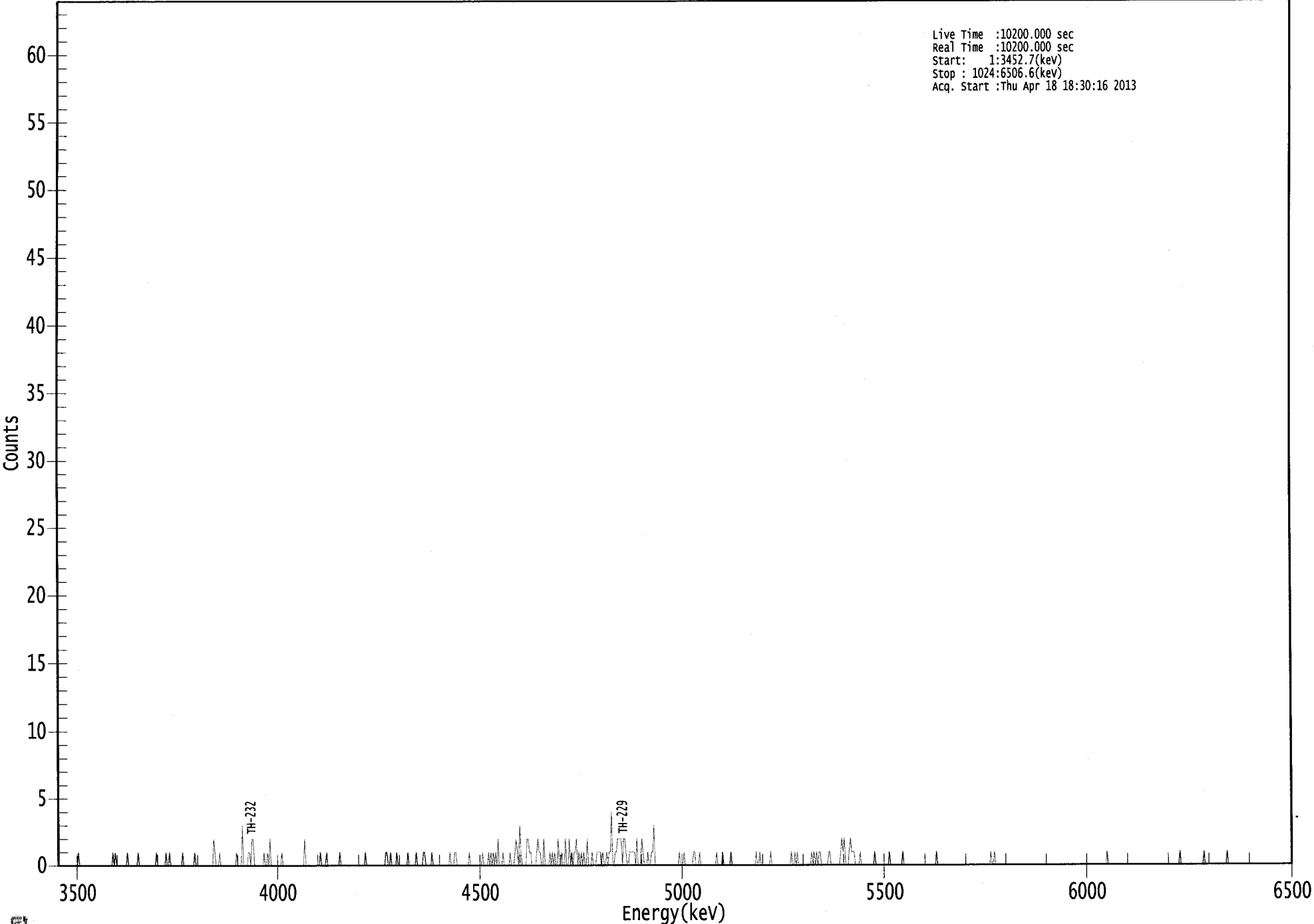
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.999	5850.00*	1.02E-001 +/- 1.43E-001	2.14E-001 +/- 5.65E-002
TH-228	0.988	5400.00*	1.03E+000 +/- 4.86E-001	2.12E-001 +/- 5.59E-002
TH-229	0.999	4872.00*	2.36E+000 +/- 6.23E-001	2.39E-001 +/- 6.31E-002
TH-230	0.977	4672.00*	1.70E+000 +/- 6.86E-001	2.62E-001 +/- 6.92E-002
TH-232	0.981	3997.00*	6.92E-001 +/- 4.05E-001	3.74E-001 +/- 9.89E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055837.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3452.7(keV)
Stop : 1024:6506.6(keV)
Acq. Start :Thu Apr 18 18:30:16 2013



5312
2156

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: 10

Elapsed Live time: 10200

Elapsed Real Time: 10200

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

369: 0 0 1 0 0 0 0 0 0

Sample Title: 10

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	1	0	0	0	1	2	1	0
385:	3	1	0	0	0	0	2	2
393:	1	1	0	0	0	0	1	2
401:	1	1	0	0	2	0	0	0
409:	0	1	0	1	0	1	0	0
417:	2	0	0	1	0	0	2	0
425:	0	2	0	1	0	1	1	2
433:	0	1	0	1	0	1	0	0
441:	2	0	0	0	1	0	0	0
449:	1	1	1	1	0	1	0	0
457:	1	0	1	1	4	0	0	1
465:	1	2	2	2	2	0	2	2
473:	1	0	0	1	1	1	1	1
481:	0	2	0	0	0	2	1	0
489:	0	0	1	0	0	1	1	3
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:	1	0	0	0	0	0	0	0
529:	1	1	0	0	0	1	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	1	0	0	0	0
553:	1	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	1	0	0	1
585:	0	0	0	0	0	0	0	0
593:	1	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	1	0	0	1	0	1	0
617:	0	0	0	0	0	0	0	0
625:	0	0	1	0	1	0	1	0
633:	1	1	0	0	0	0	0	0
641:	1	1	0	0	0	0	0	0
649:	0	0	1	2	1	2	0	0
657:	0	1	2	1	1	1	0	0
665:	0	0	1	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	1	0	0	0	0	0
697:	0	0	0	0	0	1	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	1	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	1	0
777:	0	1	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 10

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	1	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	1	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	1	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	1	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



461517

Sample Description: PZ-303-AS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 11
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:18 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: 0.0500 +/- 0.0078
 Counting Efficiency: 0.1846 +/- 0.0032 on 12/16/2012 5:49:29 PM
 Chem. Recovery Factor: 0.2707 +/- 0.0423

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	5.801	1.32	215.97	0.68	0.00E+000	3.0
TH-228	5.365	-0.19	1131.1	1.19	0.00E+000	3.0
TH-229 T	4.867	44.15	29.83	0.85	0.00E+000	3.7
TH-230	4.655	3.66	107.87	0.34	0.00E+000	3.0
TH-232	3.949	-0.68	304.44	0.68	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

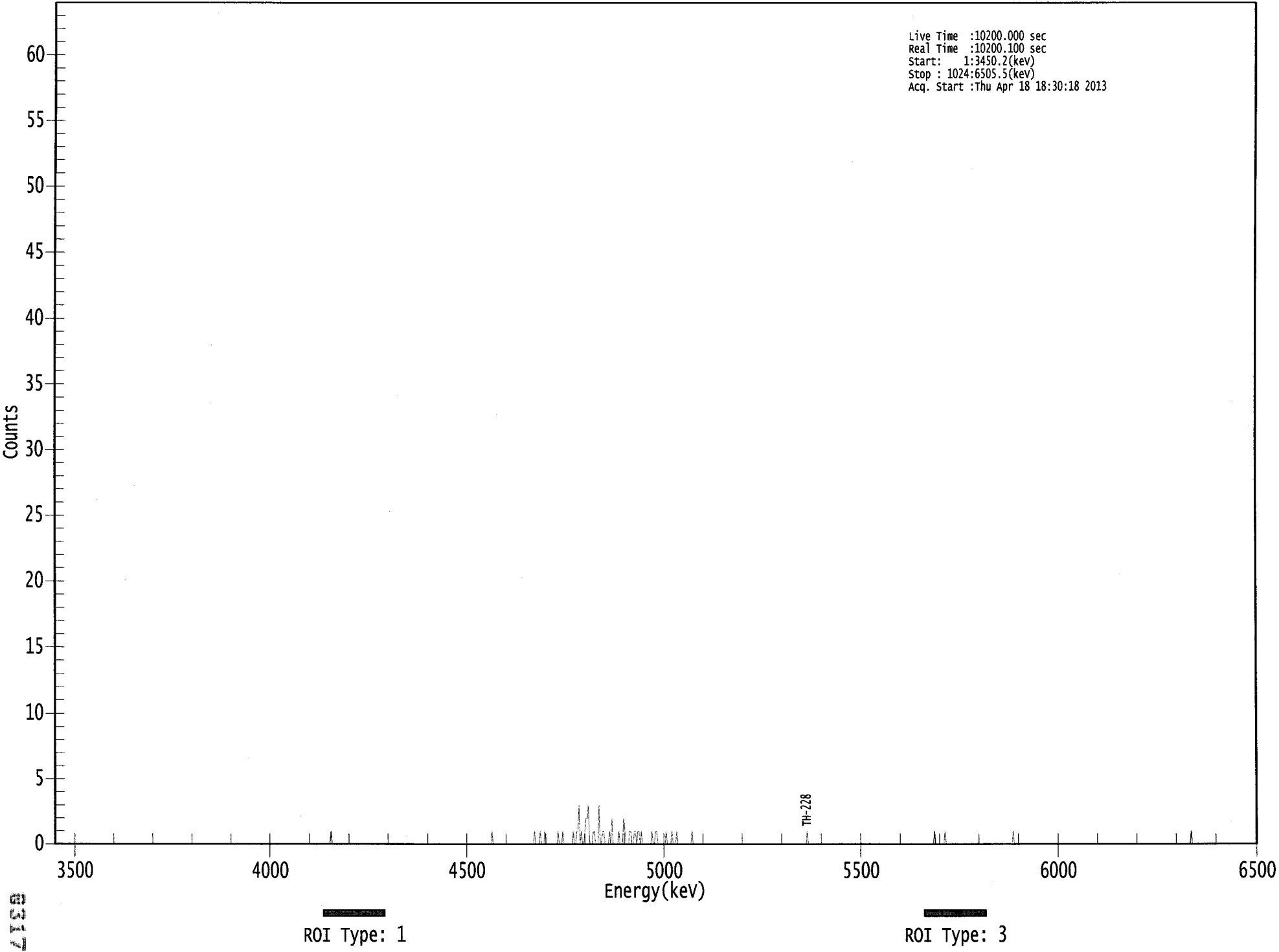
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.987	5850.00*	7.19E-002 +/- 1.57E-001	3.07E-001 +/- 9.35E-002
TH-228	0.993	5400.00*	-1.02E-002 +/- 1.16E-001	3.55E-001 +/- 1.08E-001
TH-229	1.000	4872.00*	2.35E+000 +/- 7.16E-001	3.19E-001 +/- 9.71E-002
TH-230	0.999	4672.00*	1.94E-001 +/- 2.18E-001	2.54E-001 +/- 7.73E-002
TH-232	0.988	3997.00*	-3.61E-002 +/- 1.10E-001	2.99E-001 +/- 9.10E-002

AG
 4/19/13

US EPA ARCHIVE DOCUMENT

0000055838.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3450.2(kev)
Stop : 1024:6505.5(kev)
Acq. Start :Thu Apr 18 18:30:18 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	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	1	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 1 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	1	0	0	0	0	1	0
417:	0	0	1	0	0	0	0	0
425:	0	0	0	0	0	1	0	0
433:	0	1	0	0	0	0	0	0
441:	0	0	1	0	0	1	1	3
449:	0	1	0	0	1	2	2	3
457:	0	0	0	1	1	0	0	0
465:	3	0	0	1	1	0	0	0
473:	0	1	0	2	0	0	0	0
481:	0	1	0	0	0	2	1	0
489:	0	0	1	1	0	0	1	1
497:	0	1	1	0	1	0	0	0
505:	0	0	0	0	0	1	0	0
513:	1	1	0	0	0	0	0	0
521:	0	1	0	0	0	0	1	0
529:	0	0	1	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	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	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	1	0	0
753:	0	0	0	0	0	0	1	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: 11

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	1	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	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



2/1/13

Sample Description: D-12 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 12
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:20 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: 0.0706 +/- 0.0092
 Counting Efficiency: 0.1902 +/- 0.0033 on 12/16/2012 5:49:26 PM
 Chem. Recovery Factor: 0.3712 +/- 0.0489

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	5.785	5.83	82.55	0.17	0.00E+000	3.0
TH-228	5.284	2.83	120.53	0.17	0.00E+000	3.0
TH-229 T	4.845	62.66	24.84	0.34	0.00E+000	5.9
TH-230	4.660	9.00	68.87	0.00	0.00E+000	3.0
TH-232	3.947	-0.51	400.63	0.51	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

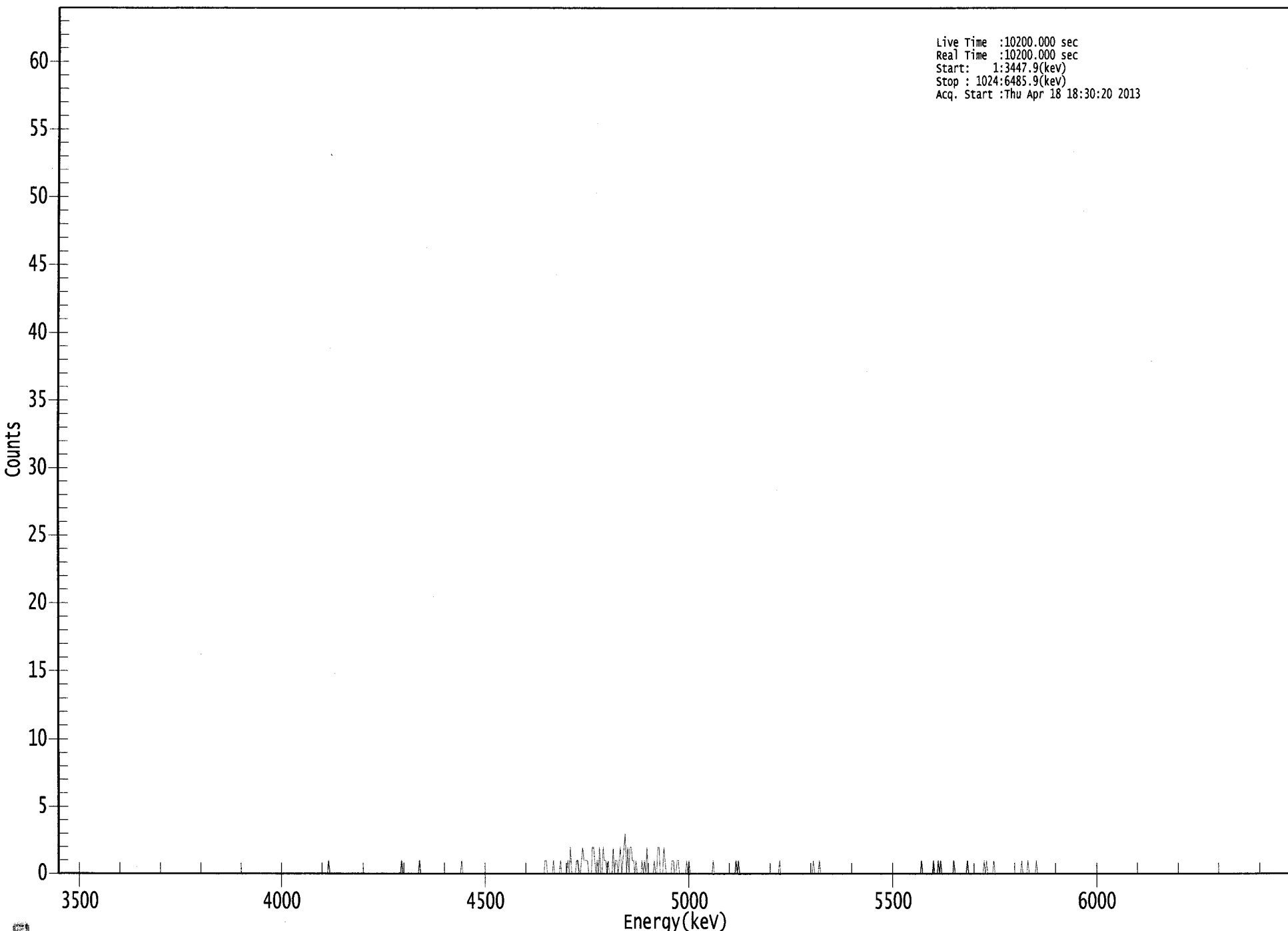
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.978	5850.00*	2.25E-001 +/- 1.94E-001	1.61E-001 +/- 4.11E-002
TH-228	0.932	5400.00*	1.08E-001 +/- 1.33E-001	1.59E-001 +/- 4.07E-002
TH-229	0.996	4872.00*	2.36E+000 +/- 6.04E-001	1.80E-001 +/- 4.61E-002
TH-230	0.999	4672.00*	3.38E-001 +/- 2.49E-001	2.25E-001 +/- 5.77E-002
TH-232	0.987	3997.00*	-1.91E-002 +/- 7.68E-002	1.97E-001 +/- 5.04E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055833.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3447.9(kev)
Stop : 1024:6485.9(kev)
Acq. Start :Thu Apr 18 18:30:20 2013



0322

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: 12

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	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	1	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	1	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	1	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	1
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: 12

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	1	1	0	0
409:	0	0	0	1	0	0	0	0
417:	0	1	0	0	0	0	0	1
425:	0	2	0	0	0	0	1	1
433:	0	0	1	2	1	1	1	1
441:	0	0	0	2	2	1	0	1
449:	0	2	0	0	2	1	1	0
457:	1	0	0	0	2	0	1	1
465:	0	1	2	0	1	2	3	0
473:	2	0	2	2	1	1	0	1
481:	0	0	0	0	1	0	1	0
489:	2	0	0	0	0	0	1	0
497:	0	2	2	0	0	0	2	1
505:	0	0	0	0	0	1	1	0
513:	0	1	1	0	0	0	0	0
521:	0	1	0	1	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	1
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	1	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	0	0	0	0
593:	0	0	0	0	0	0	1	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	1	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	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	1	0	0	0	0
721:	0	0	0	0	0	1	0	0
729:	0	1	0	1	0	0	0	0
737:	0	0	0	0	0	0	1	0
745:	0	0	0	0	0	0	0	0
753:	0	1	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	1
769:	0	1	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	1	0

801: 0 0 0 1 0 0 0 0

Sample Title: 12

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



C
4/18/13

Sample Description: D-12 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 13
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:21 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: 0.1857 +/- 0.0156
 Counting Efficiency: 0.1789 +/- 0.0031 on 12/16/2012 5:49:23 PM
 Chem. Recovery Factor: 1.0378 +/- 0.0892

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	2.83	120.53	0.17	0.00E+000	3.0
TH-228	5.297	-0.17	1169.4	0.17	0.00E+000	0.0
TH-229 T	4.869	163.83	15.32	0.17	0.00E+000	5.2
TH-230	4.637	18.00	47.46	0.00	0.00E+000	3.7
TH-232	3.948	-0.34	592.90	0.34	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

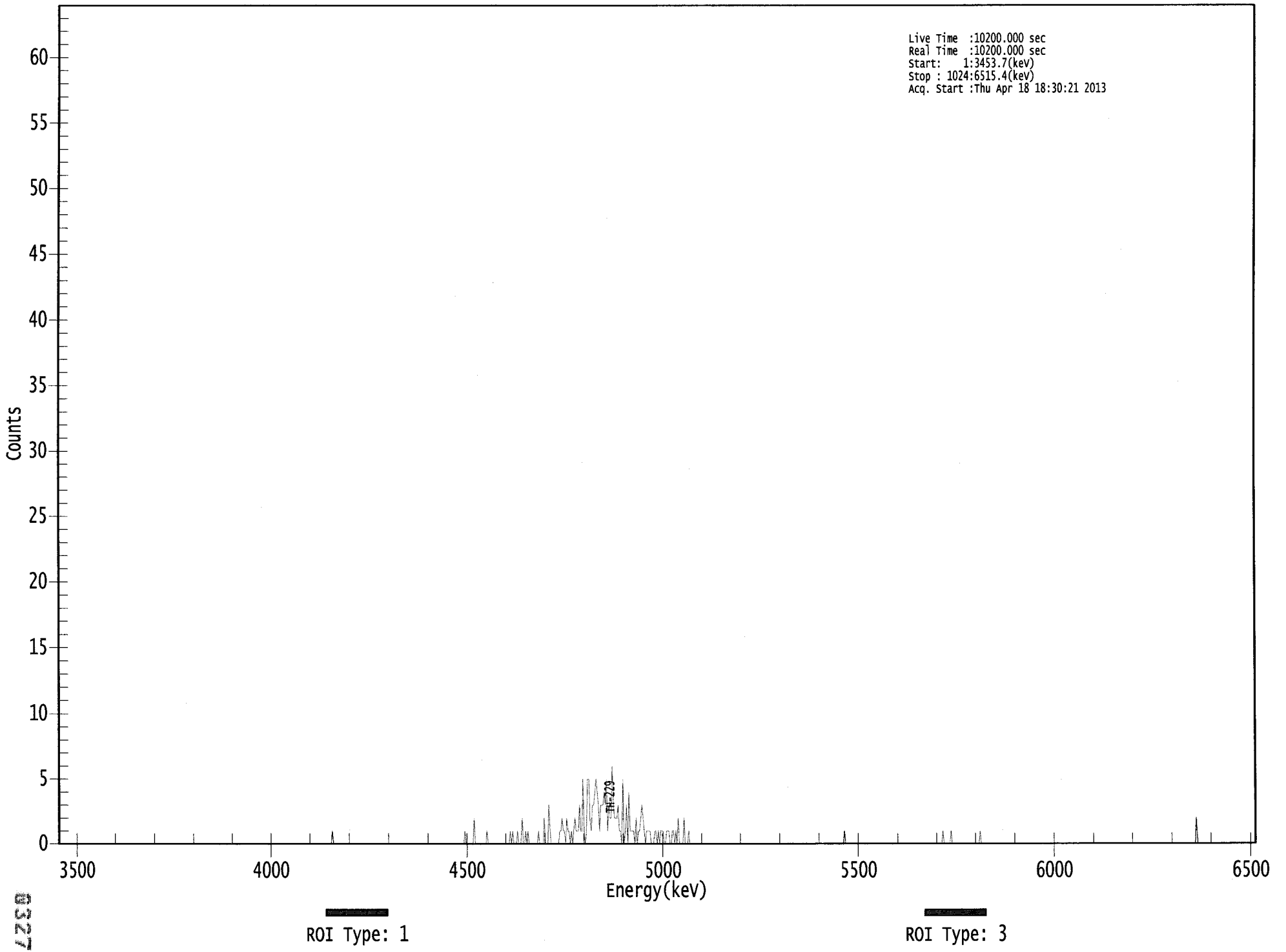
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.954	5850.00*	4.15E-002 +/- 5.04E-002	6.12E-002 +/- 1.01E-002
TH-228	0.946	5400.00*	-2.46E-003 +/- 2.88E-002	6.04E-002 +/- 9.96E-003
TH-229	1.000	4872.00*	2.35E+000 +/- 3.87E-001	5.98E-002 +/- 9.86E-003
TH-230	0.994	4672.00*	2.57E-001 +/- 1.29E-001	8.57E-002 +/- 1.41E-002
TH-232	0.987	3997.00*	-4.85E-003 +/- 2.88E-002	6.82E-002 +/- 1.12E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055834.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3453.7(kev)
Stop : 1024:6515.4(kev)
Acq. Start :Thu Apr 18 18:30:21 2013



0327

 ***** 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	1	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	1	0	0	0
353:	0	0	0	0	2	0	0	0
361:	0	0	0	0	0	0	0	1

369: 0 0 0 0 0 0 0 0 0

Sample Title: 13

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	0	0	1	0	1	0	0
393:	0	1	0	0	0	2	0	0
401:	1	0	1	0	0	0	0	0
409:	0	0	0	1	0	0	0	0
417:	2	0	0	0	3	1	0	0
425:	0	0	0	0	0	1	1	2
433:	1	1	0	2	1	1	0	1
441:	0	1	2	1	1	1	3	1
449:	1	5	1	0	1	5	5	2
457:	1	3	3	4	5	4	3	1
465:	3	3	3	4	3	5	1	3
473:	2	2	6	3	2	2	2	3
481:	1	1	0	5	0	1	3	0
489:	4	1	1	1	1	0	2	0
497:	1	1	2	3	2	1	0	1
505:	1	1	1	0	0	0	1	1
513:	0	1	0	1	1	1	0	0
521:	1	1	1	0	0	1	1	0
529:	1	0	2	0	0	0	0	2
537:	0	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	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	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	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	1	0	0	0
761:	0	0	0	1	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	1	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0

Sample Title: 13

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	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	2	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



C
4/19/13

Sample Description: PZ-111-SD TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 14
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:23 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: 0.1521 +/- 0.0140
 Counting Efficiency: 0.1822 +/- 0.0032 on 12/16/2012 5:49:21 PM
 Chem. Recovery Factor: 0.8349 +/- 0.0782

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	5.873	-0.17	1169.4	0.17	0.00E+000	0.0
TH-228	5.397	2.83	120.53	0.17	0.00E+000	2.9
TH-229 T	4.869	133.66	16.98	0.34	0.00E+000	17.7
TH-230	4.636	7.66	72.63	0.34	0.00E+000	2.9
TH-232	3.949	0.00	1960.0	0.00	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

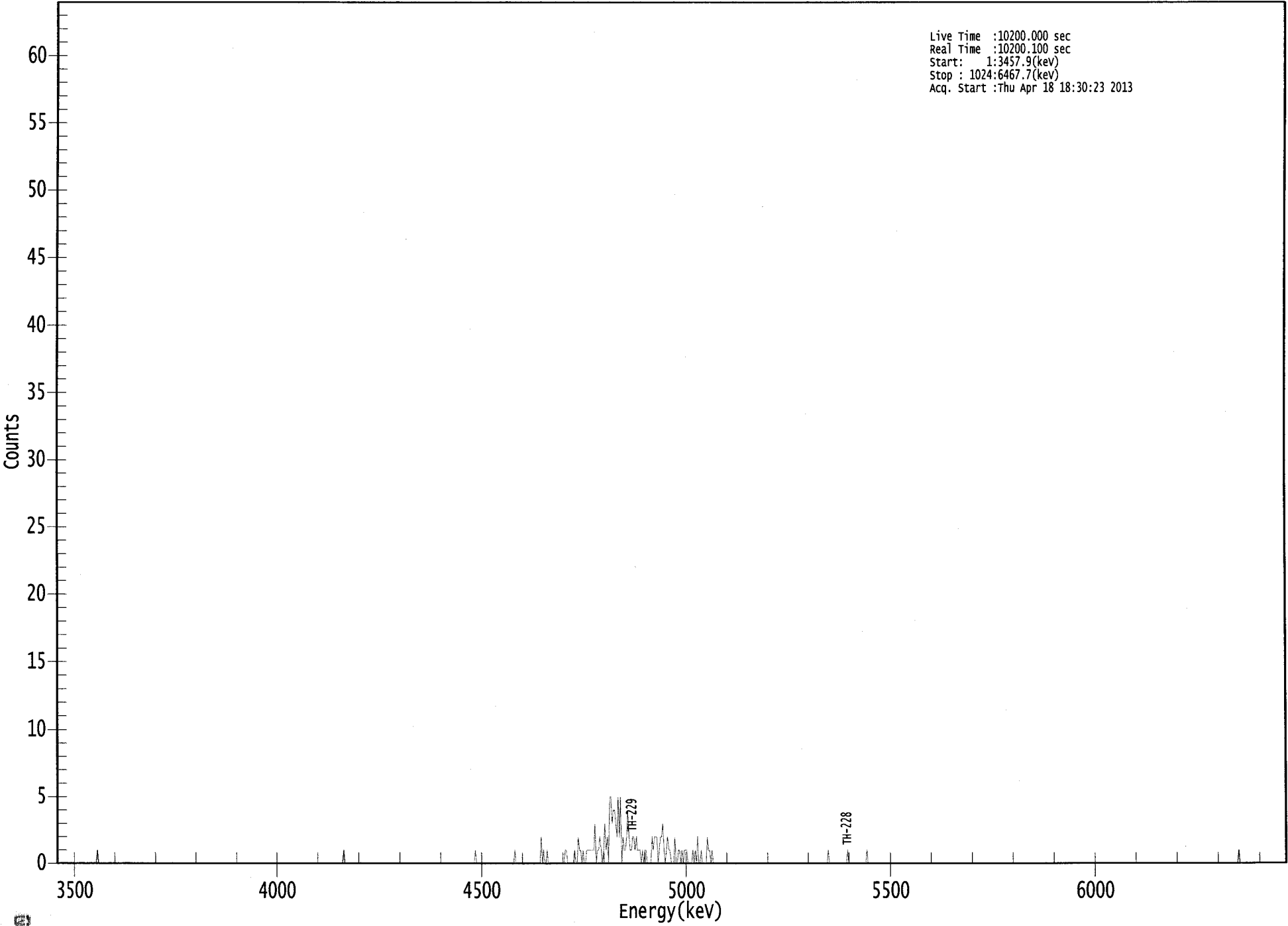
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.997	5850.00*	-3.04E-003 +/- 3.56E-002	7.47E-002 +/- 1.35E-002
TH-228	1.000	5400.00*	5.00E-002 +/- 6.10E-002	7.38E-002 +/- 1.33E-002
TH-229	1.000	4872.00*	2.34E+000 +/- 4.22E-001	8.37E-002 +/- 1.51E-002
TH-230	0.993	4672.00*	1.34E-001 +/- 1.00E-001	8.34E-002 +/- 1.50E-002
TH-232	0.988	3997.00*	0.00E+000 +/- 4.83E-002	1.04E-001 +/- 1.88E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055839.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3457.9(kev)
Stop : 1024:6467.7(kev)
Acq. Start :Thu Apr 18 18:30:23 2013



ROI Type: 1

ROI Type: 3

0552

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

Sample Title: 14

Elapsed Live time: 10200

Elapsed Real Time: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	1	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:	1	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	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 0 0 0 0 0

Sample Title: 14

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	1	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	2	0	1	0
409:	0	1	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	1	1	0	0	0	0	0	0
433:	1	0	0	2	1	1	0	1
441:	0	0	1	1	1	1	1	1
449:	1	3	0	1	1	2	1	0
457:	1	3	1	2	0	5	5	3
465:	4	4	3	2	5	2	5	0
473:	2	1	1	2	4	2	1	1
481:	2	2	1	2	1	1	1	0
489:	1	0	1	1	0	0	0	0
497:	2	1	2	2	2	0	1	2
505:	2	3	1	0	1	2	1	1
513:	0	0	0	2	0	0	1	1
521:	0	1	0	1	1	1	0	0
529:	0	0	1	0	1	0	2	0
537:	0	1	0	0	0	0	2	1
545:	1	0	1	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	1	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	1	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	1	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	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	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	0	0	0	0	0	0	0



C
4/15/13

Sample Description: PZ-111-SD DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 15
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/18/2013 6:30:25 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: 0.1083 +/- 0.0116
 Counting Efficiency: 0.1680 +/- 0.0030 on 12/16/2012 5:49:20 PM
 Chem. Recovery Factor: 0.6447 +/- 0.0698

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	5.00	96.02	0.00	0.00E+000	3.0
TH-228	5.312	0.49	416.98	0.51	0.00E+000	3.0
TH-229 T	4.834	95.83	20.04	0.17	0.00E+000	5.9
TH-230	4.660	18.49	46.31	0.51	0.00E+000	5.9
TH-232	3.949	-0.17	1169.4	0.17	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

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

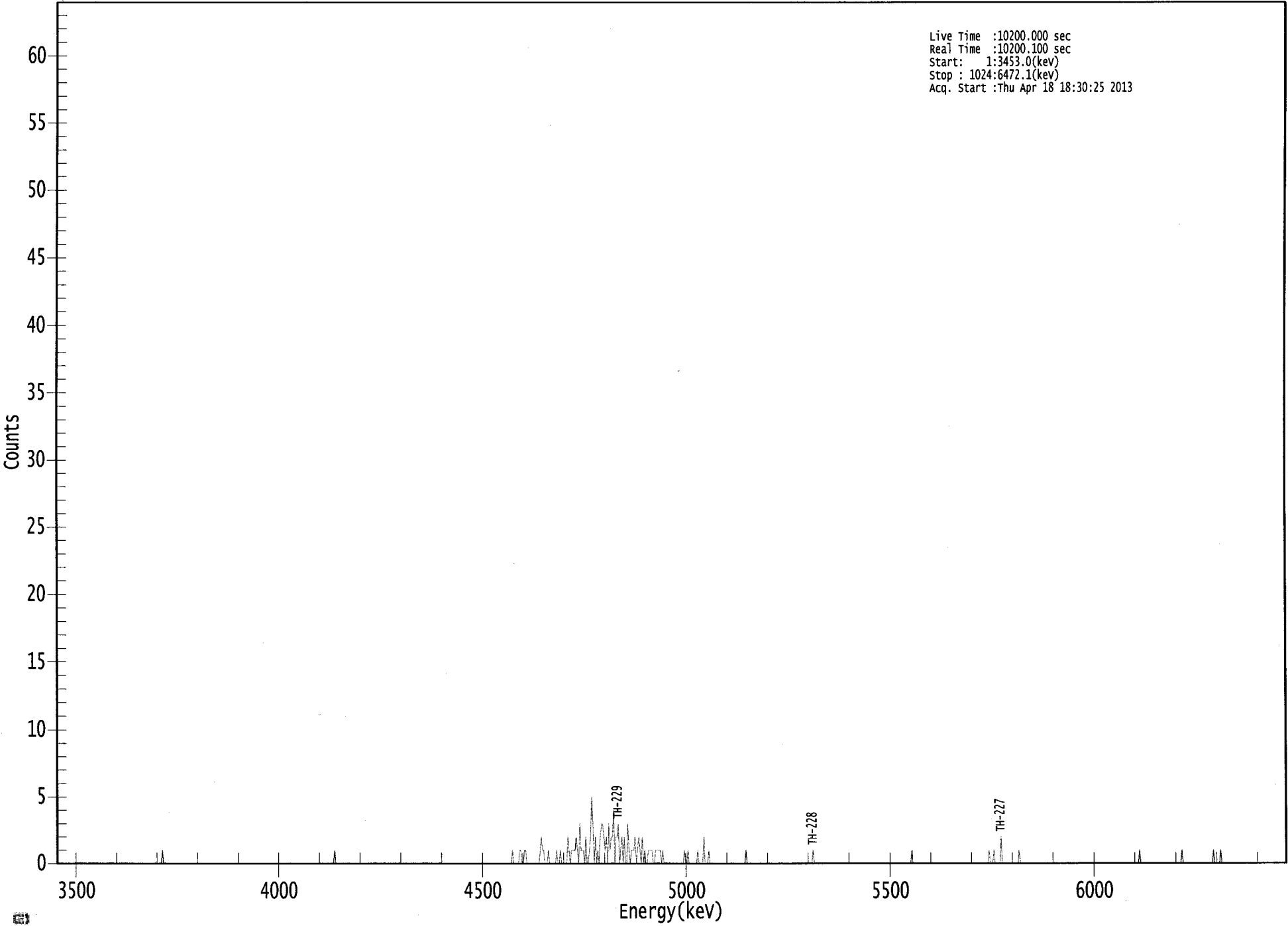
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.969	5850.00*	1.26E-001 +/- 1.23E-001	1.51E-001 +/- 3.16E-002
TH-228	0.961	5400.00*	1.22E-002 +/- 5.08E-002	1.30E-001 +/- 2.73E-002
TH-229	0.992	4872.00*	2.36E+000 +/- 4.93E-001	1.03E-001 +/- 2.15E-002
TH-230	0.999	4672.00*	4.53E-001 +/- 2.30E-001	1.29E-001 +/- 2.69E-002
TH-232	0.988	3997.00*	-4.16E-003 +/- 4.87E-002	1.02E-001 +/- 2.14E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055840.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3453.0(kev)
Stop : 1024:6472.1(kev)
Acq. Start :Thu Apr 18 18:30:25 2013



0337

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:	1	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:	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	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: 15

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	1	0	0	0
385:	0	0	1	1	0	0	1	1
393:	0	0	0	0	0	0	0	0
401:	0	0	0	1	2	1	1	0
409:	0	0	1	0	0	0	0	0
417:	0	1	0	0	1	0	0	0
425:	0	0	2	1	0	1	1	1
433:	1	2	1	0	3	1	1	1
441:	0	2	0	0	1	2	5	3
449:	0	2	0	1	0	2	3	3
457:	2	1	2	0	3	1	2	2
465:	4	0	2	2	3	0	1	2
473:	0	2	0	0	3	1	0	1
481:	1	1	2	0	1	2	1	0
489:	2	0	1	0	0	1	1	1
497:	1	0	0	1	1	1	1	1
505:	0	1	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	1	0	0	1	0
529:	0	0	0	0	0	0	1	0
537:	0	0	0	2	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	0	0	0	0	1	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	1	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:	1	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:	1	0	0	0	1	0	0	0
785:	0	0	2	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 1 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	1	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:	1	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	1	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



C
4/19/13

Sample Description: PZ-304-AI TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 16
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/19/2013 5:58:57 AM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1543 +/- 0.0141
 Counting Efficiency: 0.1746 +/- 0.0033 on 12/15/2012 11:26:47 AM
 Chem. Recovery Factor: 0.8835 +/- 0.0825

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	5.779	1.13	315.93	1.87	0.00E+000	3.0
TH-228	5.418	0.77	542.87	3.23	0.00E+000	3.0
TH-229 T	4.856	136.64	16.86	1.36	0.00E+000	4.5
TH-230	4.659	23.66	40.63	0.34	0.00E+000	3.0
TH-232	3.856	0.66	305.43	0.34	0.00E+000	3.0

T = Tracer Peak used for Effective Efficiency

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

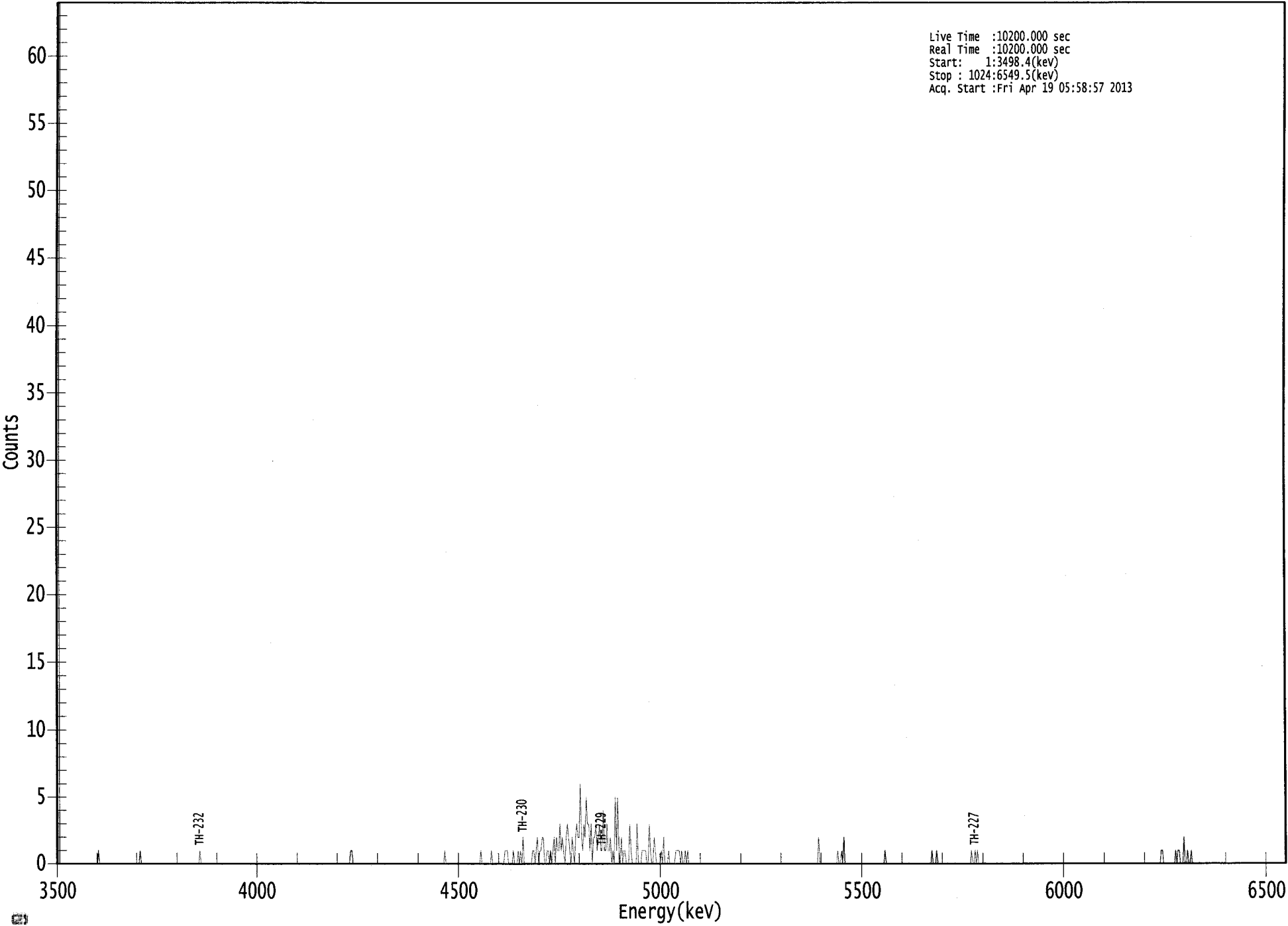
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.974	5850.00*	1.99E-002 +/- 6.31E-002	1.34E-001 +/- 2.39E-002
TH-228	0.998	5400.00*	1.34E-002 +/- 7.30E-002	1.59E-001 +/- 2.85E-002
TH-229	0.999	4872.00*	2.36E+000 +/- 4.23E-001	1.18E-001 +/- 2.12E-002
TH-230	0.999	4672.00*	4.07E-001 +/- 1.81E-001	8.23E-002 +/- 1.47E-002
TH-232	0.902	3997.00*	1.13E-002 +/- 3.47E-002	8.21E-002 +/- 1.47E-002

AG
 4/19/13

US EPA ARCHIVE DOCUMENT

0000055878.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3498.4(kev)
Stop : 1024:6549.5(kev)
Acq. Start :Fri Apr 19 05:58:57 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: 16

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	1	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	1	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:	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	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	1	1
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	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	1	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	1	0	0	0	0	0
361:	0	0	0	1	0	0	0	0

369: 0 0 0 0 0 0 1 1

Sample Title: 16

Channel	1	2	3	4	5	6	7	8
377:	1	0	0	0	0	1	0	0
385:	0	1	0	1	0	2	0	0
393:	0	0	0	0	0	1	1	0
401:	1	2	0	1	1	2	2	0
409:	0	1	1	0	1	0	1	2
417:	0	2	1	1	3	1	2	1
425:	0	2	3	2	1	0	2	1
433:	0	2	3	2	2	6	2	1
441:	3	2	5	3	3	1	3	0
449:	2	2	3	1	2	3	1	1
457:	4	1	1	3	1	1	2	0
465:	1	0	5	1	5	1	0	2
473:	0	1	1	0	0	0	3	1
481:	0	0	0	0	3	0	0	0
489:	1	1	1	1	0	0	3	1
497:	0	0	2	1	0	0	0	0
505:	1	0	2	0	0	0	1	0
513:	0	0	0	0	1	1	1	1
521:	0	1	0	0	1	0	1	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	2	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	1	0	0	1	0
657:	2	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	1	0	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	1	0	0	1	0	1
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: 16

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



C
4/19/13

Sample Description: PZ-304-AI DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 17
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/19/2013 5:58:58 AM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.230 mL
 Effective Efficiency: 0.1905 +/- 0.0159
 Counting Efficiency: 0.1940 +/- 0.0036 on 12/15/2012 11:26:46 AM
 Chem. Recovery Factor: 0.9819 +/- 0.0840

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	5.878	4.15	107.12	0.85	0.00E+000	2.9
TH-228	5.433	-2.08	154.66	4.08	0.00E+000	2.9
TH-229 T	4.861	167.64	15.21	1.36	0.00E+000	10.2
TH-230	4.650	11.13	64.27	1.87	0.00E+000	2.9
TH-232	3.888	0.32	646.91	0.68	0.00E+000	2.9

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

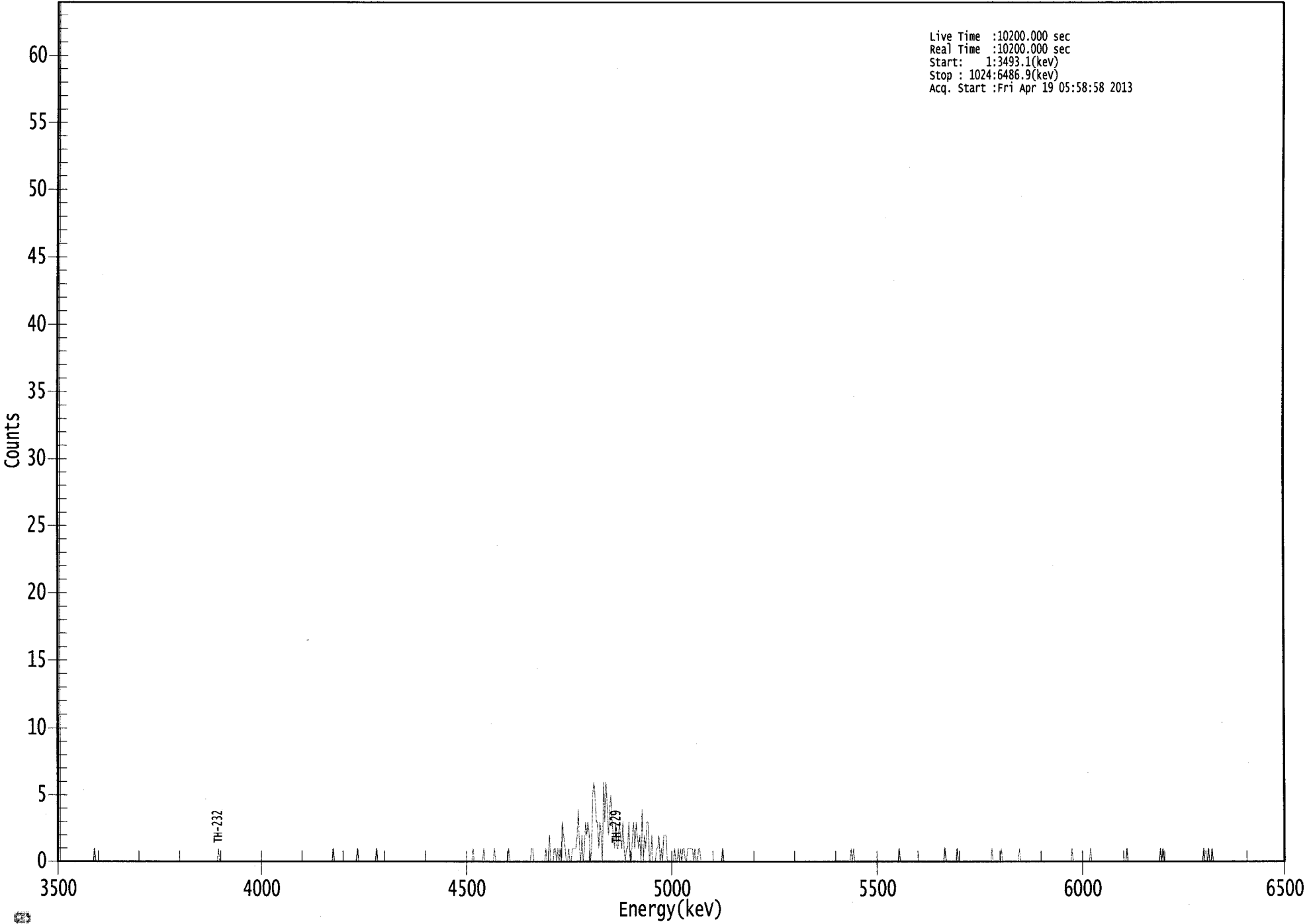
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.996	5850.00*	5.93E-002 +/- 6.42E-002	8.55E-002 +/- 1.40E-002
TH-228	0.994	5400.00*	-2.94E-002 +/- 4.57E-002	1.40E-001 +/- 2.29E-002
TH-229	0.999	4872.00*	2.34E+000 +/- 3.84E-001	9.58E-002 +/- 1.57E-002
TH-230	0.997	4672.00*	1.55E-001 +/- 1.03E-001	1.06E-001 +/- 1.73E-002
TH-232	0.940	3997.00*	4.45E-003 +/- 2.88E-002	7.85E-002 +/- 1.28E-002

AG
 4/19/13

US EPA ARCHIVE DOCUMENT

000055879.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3493.1(kev)
Stop : 1024:6486.9(kev)
Acq. Start :Fri Apr 19 05:58:58 2013



0347

ROI Type: 1

ROI Type: 3

 ***** SPECTRAL DATA REPORT *****

Sample Title: 17

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	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	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	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	1
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	1	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	1	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	1	0	0	0	0
353:	0	0	0	0	1	0	0	0
361:	0	0	0	0	0	1	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 17

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	1	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	1	1	0	0
401:	0	0	0	0	0	0	0	0
409:	1	0	0	2	0	0	0	1
417:	1	0	1	0	1	0	3	2
425:	1	0	0	1	0	0	1	1
433:	1	1	2	4	1	0	2	0
441:	1	3	2	3	2	0	1	5
449:	6	5	3	3	1	3	2	0
457:	6	3	6	4	2	4	5	3
465:	2	1	3	1	1	3	2	1
473:	3	1	0	1	1	3	0	0
481:	2	3	1	3	2	1	2	0
489:	4	0	2	1	3	3	0	0
497:	2	0	0	0	1	1	2	0
505:	1	0	2	2	2	0	0	0
513:	0	0	0	1	0	0	1	0
521:	1	0	1	1	0	0	1	1
529:	1	1	1	0	1	0	0	1
537:	1	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	1	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	0	0	0
657:	0	0	0	0	0	0	1	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	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	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	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	1	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 1 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	1	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	1	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	1
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	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	1	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	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



C
4/19/13

Sample Description: I-11 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 18
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/19/2013 5:58:53 AM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.231 mL
 Effective Efficiency: 0.1939 +/- 0.0161
 Counting Efficiency: 0.1967 +/- 0.0036 on 12/15/2012 11:26:40 AM
 Chem. Recovery Factor: 0.9855 +/- 0.0838

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	5.825	2.13	191.21	1.87	0.00E+000	2.9
TH-228	5.403	0.58	810.43	4.42	0.00E+000	2.9
TH-229 T	4.868	170.96	15.09	2.04	0.00E+000	5.1
TH-230	4.634	13.79	57.52	2.21	0.00E+000	2.9
TH-232	3.876	1.66	169.38	0.34	0.00E+000	2.9

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

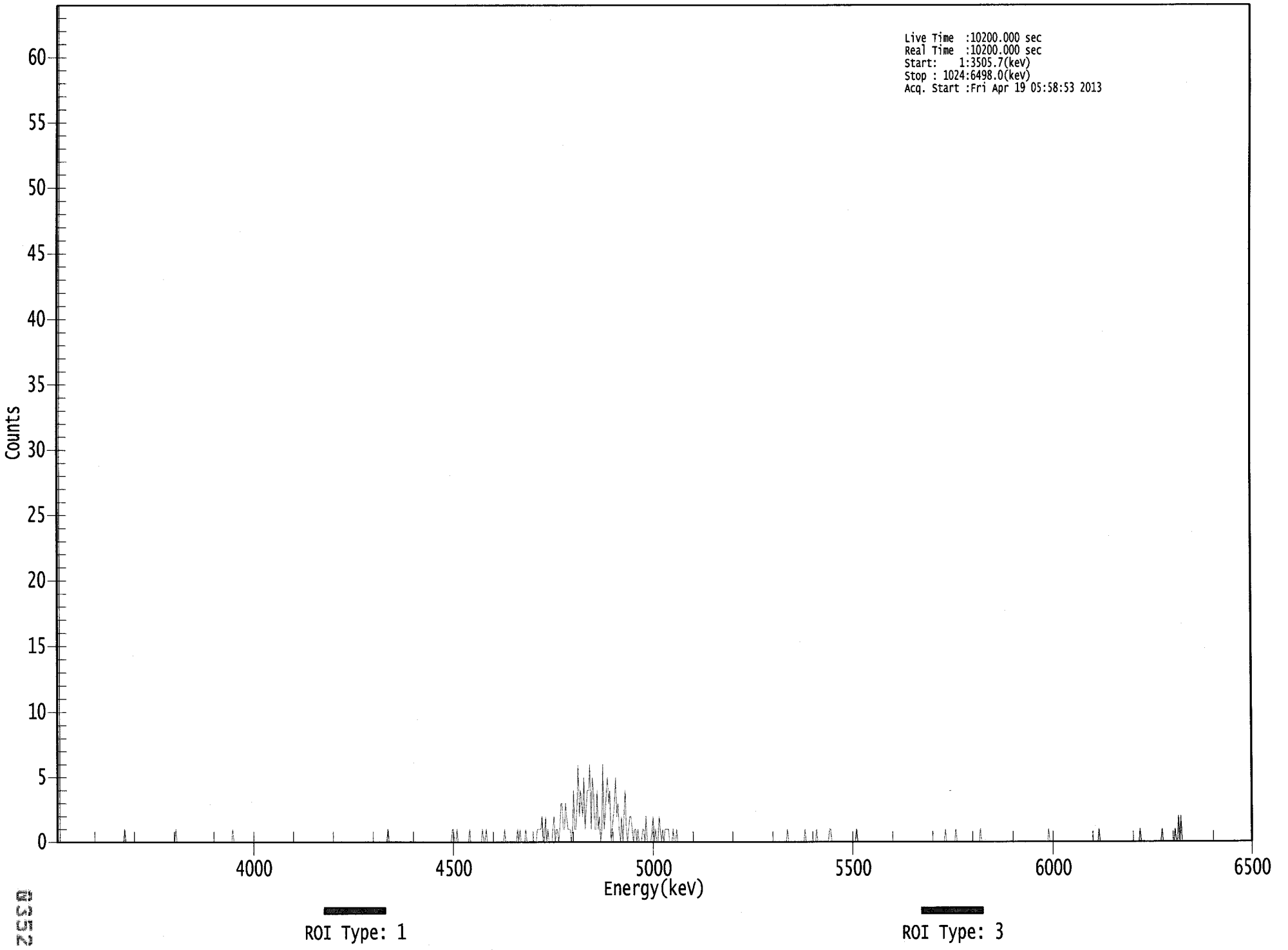
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.997	5850.00*	2.99E-002 +/- 5.74E-002	1.06E-001 +/- 1.73E-002
TH-228	1.000	5400.00*	8.05E-003 +/- 6.53E-002	1.41E-001 +/- 2.30E-002
TH-229	1.000	4872.00*	2.35E+000 +/- 3.82E-001	1.07E-001 +/- 1.74E-002
TH-230	0.993	4672.00*	1.89E-001 +/- 1.13E-001	1.09E-001 +/- 1.78E-002
TH-232	0.926	3997.00*	2.27E-002 +/- 3.86E-002	6.53E-002 +/- 1.06E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055875.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3505.7(kev)
Stop : 1024:6498.0(kev)
Acq. Start :Fri Apr 19 05:58:53 2013



 ***** 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	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	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	1
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	1	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	1	1	0	0	1
345:	0	0	0	0	0	0	0	0
353:	0	0	1	0	0	0	0	0
361:	0	0	0	0	0	1	0	0

369: 1 0 0 0 0 0 0 0

Sample Title: 18

Channel	1	2	3	4	5	6	7	8
377:	0	0	0	0	0	0	0	0
385:	1	0	0	0	0	0	0	0
393:	0	0	0	1	0	1	0	0
401:	0	0	1	0	0	0	0	0
409:	0	0	0	0	1	1	1	1
417:	2	0	0	2	0	1	0	0
425:	0	1	2	0	1	1	0	1
433:	3	3	1	1	3	2	1	1
441:	1	0	1	4	1	1	3	6
449:	2	4	3	2	5	1	3	4
457:	4	6	1	5	4	1	1	4
465:	1	2	0	1	6	1	2	4
473:	5	3	4	0	1	2	3	5
481:	2	3	1	0	2	0	2	4
489:	1	0	1	2	2	1	0	1
497:	1	0	1	0	0	0	1	1
505:	0	2	0	0	0	0	1	2
513:	0	1	0	0	2	1	0	1
521:	0	1	1	1	1	0	0	0
529:	1	0	0	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	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	1	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	1	0	0	0	0	0	0
649:	0	0	0	1	0	0	0	0
657:	0	0	0	0	0	0	1	1
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	1	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	1	0	0	0	0	0	0
769:	0	0	1	0	0	0	0	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: 0 0 0 0 0 0 0 0

Sample Title: 18

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



C
4/19/13

Sample Description: I-11 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-TH
 Sample Identification: 19
 Sample Geometry: Shelf 2
 Procedure Description: Th iso

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

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Sample Date/Time: 4/4/2013 7:20:55 AM
 Acquisition Date/Time: 4/19/2013 5:58:54 AM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Tracer Certificate: Th229_TH-18A
 Tracer Quantity: 0.232 mL
 Effective Efficiency: 0.1710 +/- 0.0149
 Counting Efficiency: 0.1973 +/- 0.0042 on 12/15/2012 11:28:06 AM
 Chem. Recovery Factor: 0.8667 +/- 0.0777

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	5.785	2.81	142.99	1.19	0.00E+000	2.7
TH-228	5.360	2.28	200.92	2.72	0.00E+000	2.7
TH-229 T	4.866	151.32	15.98	0.68	0.00E+000	3.6
TH-230	4.654	31.66	35.05	0.34	0.00E+000	3.3
TH-232	3.900	1.98	176.34	1.02	0.00E+000	2.7

T = Tracer Peak used for Effective Efficiency

 NUCLIDE ANALYSIS RESULTS

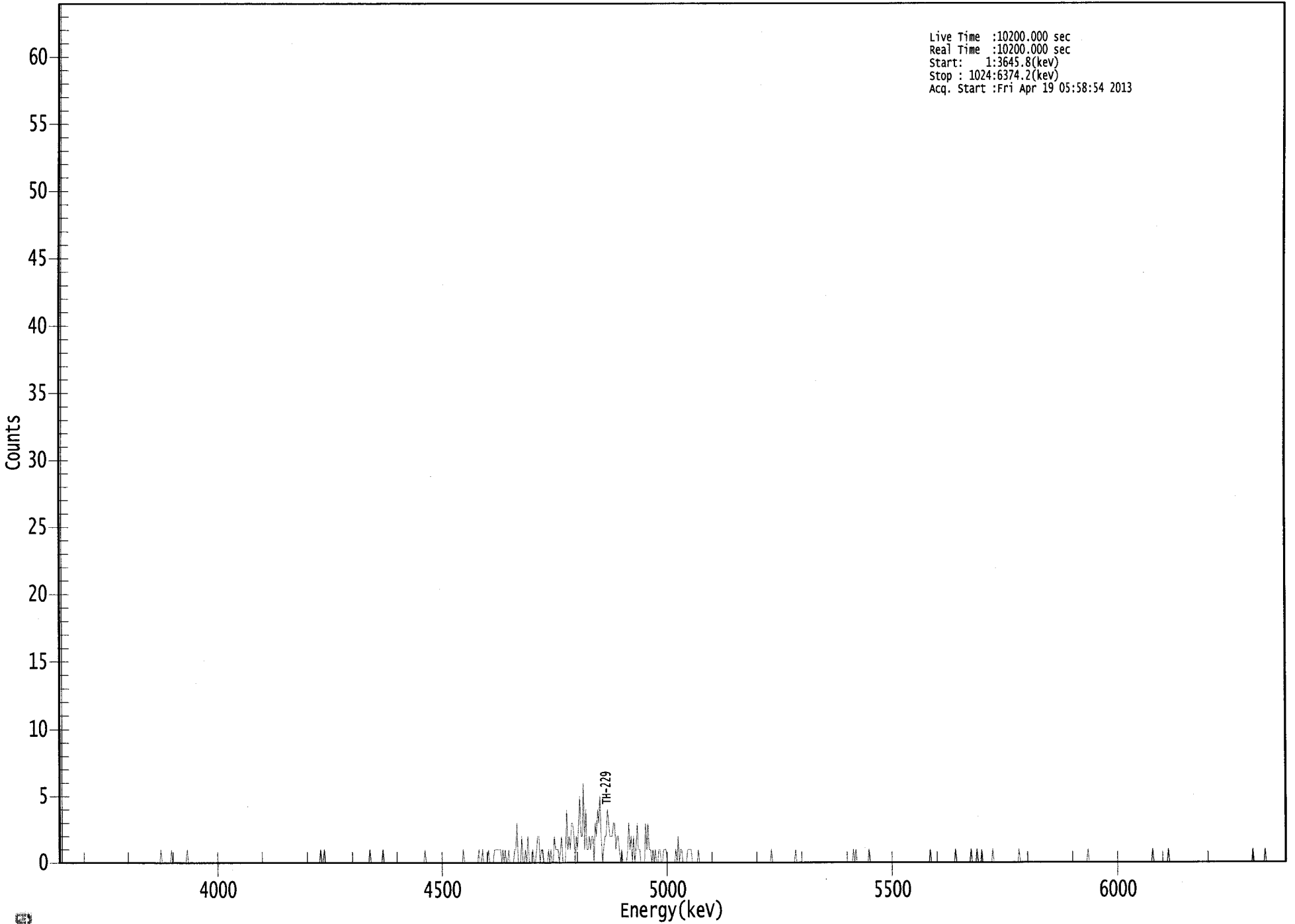
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
TH-227	0.978	5850.00*	4.47E-002 +/- 6.44E-002	1.05E-001 +/- 1.79E-002
TH-228	0.992	5400.00*	3.59E-002 +/- 7.23E-002	1.35E-001 +/- 2.31E-002
TH-229	1.000	4872.00*	2.36E+000 +/- 4.03E-001	8.78E-002 +/- 1.50E-002
TH-230	0.998	4672.00*	4.91E-001 +/- 1.92E-001	7.42E-002 +/- 1.27E-002
TH-232	0.952	3997.00*	3.07E-002 +/- 5.44E-002	9.76E-002 +/- 1.67E-002

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055876.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3645.8(kev)
Stop : 1024:6374.2(kev)
Acq. Start :Fri Apr 19 05:58:54 2013



ROI Type: 1

ROI Type: 3

0357

 ***** 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:	0	0	0	0	0	1	0	0
89:	0	0	0	0	0	0	1	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	1	0	0	1	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	1	0	0	0
265:	0	0	0	0	0	0	0	1
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	1	0	0	0	0	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	1
353:	0	0	1	0	0	0	0	1
361:	0	0	0	0	1	1	1	1

369: 1 1 0 1 0 1 0 0

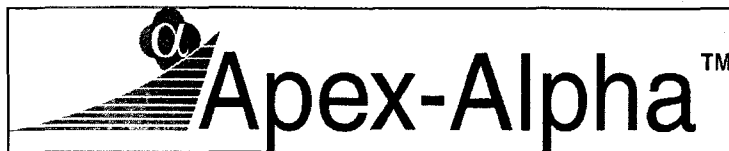
Sample Title: 19

Channel	1	2	3	4	5	6	7	8	9
377:	1	0	0	0	0	1	1	3	
385:	0	0	0	2	0	0	1	0	
393:	2	0	0	0	1	0	0	1	
401:	2	2	0	1	1	0	0	0	
409:	0	1	0	1	0	0	2	1	
417:	1	1	0	1	2	0	0	0	
425:	4	1	2	1	3	3	2	0	
433:	2	1	3	5	2	2	6	1	
441:	4	1	1	2	1	2	2	0	
449:	3	2	4	3	5	2	0	1	
457:	2	2	4	3	2	2	2	3	
465:	3	1	2	2	1	0	1	0	
473:	0	0	0	1	3	1	2	0	
481:	2	0	1	3	1	1	0	0	
489:	0	0	3	1	3	1	1	0	
497:	1	0	1	0	0	1	1	0	
505:	0	1	1	1	0	0	0	0	
513:	0	0	0	1	0	2	0	1	
521:	1	0	0	0	0	1	1	1	
529:	1	0	0	0	0	0	1	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	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	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	1	
665:	0	1	0	0	0	0	0	0	
673:	0	0	0	0	1	0	0	0	
681:	0	0	0	0	0	0	0	0	
689:	0	0	0	0	0	0	0	0	
697:	0	0	0	0	0	0	0	0	
705:	0	0	0	0	0	0	0	0	
713:	0	0	0	0	0	0	0	0	
721:	0	0	0	0	0	0	0	1	
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	1	0	0	0	0	1	0	
769:	0	0	1	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	0	

801: 0 1 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	1	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	1	0	0	0	0	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	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	1	0	0	0	0
1001:	0	0	0	0	0	1	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 : 4/18/2013
Time : 5:36:57 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 001	21f	ALL	Not Done	
Alpha 002	21f	ALL	Not Done	
Alpha 003	21f	ALL	Passed	4/18/2013 5:16:12 AM
Alpha 004	21f	ALL	Passed	4/18/2013 5:16:13 AM
Alpha 005	21f	ALL	Not Done	
Alpha 006	21f	ALL	Not Done	
Alpha 007	21f	ALL	Not Done	
Alpha 008	21f	ALL	Not Done	
Alpha 009	21f	ALL	Not Done	
Alpha 010	21f	ALL	Passed	4/18/2013 5:16:14 AM
Alpha 011	21f	ALL	Passed	4/18/2013 5:16:15 AM
Alpha 012	21f	ALL	Not Done	
Alpha 013	21f	ALL	Passed	4/18/2013 5:16:15 AM
Alpha 014	21f	ALL	Passed	4/18/2013 5:16:16 AM
Alpha 015	21f	ALL	Not Done	
Alpha 016	21f	ALL	Not Done	
Alpha 017	AIM730	ALL	Not Done	
Alpha 018	AIM730	ALL	Passed	4/18/2013 5:16:17 AM
Alpha 019	AIM730	ALL	Not Done	
Alpha 020	AIM730	ALL	Not Done	
Alpha 021	AIM730	ALL	Not Done	
Alpha 022	AIM730	ALL	Passed	4/18/2013 5:16:18 AM
Alpha 023	AIM730	ALL	Not Done	
Alpha 024	AIM730	ALL	Passed	4/18/2013 5:16:18 AM
Alpha 025	AIM730	ALL	Passed	4/18/2013 5:16:19 AM
Alpha 026	AIM730	ALL	Not Done	
Alpha 027	AIM730	ALL	Passed	4/18/2013 5:16:20 AM
Alpha 028	AIM730	ALL	Not Done	
Alpha 029	AIM730	ALL	Passed	4/18/2013 5:16:21 AM
Alpha 030	AIM730	ALL	Not Done	
Alpha 031	AIM730	ALL	Not Done	
Alpha 032	AIM730	ALL	Not Done	
Alpha 033	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:22 AM
Alpha 034	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:23 AM
Alpha 035	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:25 AM
Alpha 036	Alpha Analyst100DC	ALL	Not Done	
Alpha 037	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:26 AM
Alpha 038	Alpha Analyst100DC	ALL	Not Done	
Alpha 039	Alpha Analyst100DC	ALL	Not Done	
Alpha 040	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:28 AM
Alpha 041	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:29 AM
Alpha 042	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:31 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 043	Alpha Analyst100DC	ALL	Not Done	
Alpha 044	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:32 AM
Alpha 045	Alpha Analyst100DC	ALL	Not Done	
Alpha 046	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:34 AM
Alpha 047	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:36 AM
Alpha 048	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:37 AM

APPROVED BY: _____ *e*

APPROVAL DATE: _____ *4/18/13*

US EPA ARCHIVE DOCUMENT




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

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***** LIBRARY LISTING REPORT *****
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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	13-04050	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	PZ-111-SD TOT	38	04/04/13 13:52	1.5000E+00
Lab Deadline	4/30/2013	04	TRG	S-8 TOT	40	04/04/13 11:32	1.5000E+00
Client	Engineering Management Support, Inc.	05	TRG	S-8 DIS	40	04/04/13 11:32	1.5000E+00
Project	West Lake OU-1	06	TRG	D-13 TOT	47	04/04/13 11:55	1.5000E+00
Report Level	4	07	TRG	D-13 DIS	47	04/04/13 11:55	1.5000E+00
Activity Units	pCi	08	TRG	PZ-304-AS TOT	44	04/04/13 12:56	1.5000E+00
Aliquot Units	I	09	TRG	PZ-304-AS DIS	44	04/04/13 12:56	1.5000E+00
Matrix	WA	10	TRG	PZ-303-AS TOT	46	04/04/13 13:00	1.5000E+00
Method	EPA 903.0 Modified	11	TRG	PZ-303-AS DIS	46	04/04/13 13:00	1.5000E+00
Instrument Type	Alpha Spectroscopy	12	TRG	D-12 TOT	45	04/04/13 13:50	1.5000E+00
Radiometric Tracer	Ba-133	13	TRG	D-12 DIS	45	04/04/13 13:50	1.5000E+00
Radiometric Sol#	Ba-6a	14	DO	PZ-111-SD TOT	38	04/04/13 13:52	1.5000E+00
Tracer Act (dpm/g)	1011.425	15	TRG	PZ-111-SD DIS	38	04/04/13 13:52	1.5000E+00
Carrier		16	TRG	PZ-304-AI TOT	43	04/04/13 14:08	1.5000E+00
Carrier Conc (mg/ml)		17	TRG	PZ-304-AI DIS	43	04/04/13 14:08	1.5000E+00
		18	TRG	I-11 TOT	35	04/04/13 14:40	1.5000E+00
		19	TRG	I-11 DIS	35	04/04/13 14:40	1.5000E+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	0.9100	920.4	385.6	93.01		0.0232	0.0290	0.0058		93.01	2.08	1.00
02	MBL	0.9083	918.7	411.2	99.37		0.0227	0.0291	0.0064		99.37	2.31	1.00
03	DUP	0.9046	914.9	392.3	95.19		0.0227	0.0294	0.0067		95.19	2.40	1.00
04	TRG	0.9050	915.3	404.0	97.98		0.0227	0.0300	0.0073		97.98	2.58	1.00
05	TRG	0.9029	913.2	388.4	94.42		0.0230	0.0299	0.0069		94.42	2.47	1.00
06	TRG	0.9022	912.5	377.7	91.89		0.0226	0.0304	0.0078		91.89	2.72	1.00
07	TRG	0.9013	911.6	421.3	102.60		0.0227	0.0302	0.0075		102.60	2.64	1.00
08	TRG	0.9031	913.4	367.1	89.22		0.0226	0.0332	0.0106		89.22	3.47	1.00
09	TRG	0.9016	911.9	414.2	100.84		0.0227	0.0324	0.0097		100.84	3.20	1.00
10	TRG	0.9011	911.4	290.1	70.66		0.0230	0.0288	0.0058		70.66	2.08	1.00
11	TRG	0.8995	909.8	338.1	82.50		0.0229	0.0287	0.0058		82.50	2.08	1.00
12	TRG	0.9012	911.5	385.3	93.84		0.0231	0.0311	0.0080		93.84	2.77	1.00
13	TRG	0.9010	911.3	360.1	87.72		0.0229	0.0304	0.0075		87.72	2.64	1.00
14	DO	0.9002	910.5	406.1	99.02		0.0228	0.0295	0.0067		99.02	2.40	1.00
15	TRG	0.8995	909.8	393.4	96.00		0.0227	0.0295	0.0068		96.00	2.44	1.00
16	TRG	0.8986	908.9	401.6	98.09		0.0229	0.0375	0.0146		98.09	6.02	1.00
17	TRG	0.9004	910.7	399.2	97.31		0.0226	0.0314	0.0088		97.31	2.96	1.00
18	TRG	0.9002	910.5	374.4	91.29		0.0229	0.0309	0.0080		91.29	2.77	1.00
19	TRG	0.8993	909.6	393.0	95.92		0.0227	0.0311	0.0084		95.92	2.87	1.00

0503

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

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
02	MBL			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
03	DUP			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
04	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
05	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
06	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
07	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
08	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
09	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
10	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
11	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
12	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
13	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
14	DO			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
15	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
16	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
17	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
18	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		
19	TRG			04/12/13 12:32	JBARNARD	04/17/13 16:05	LWALKER		

* 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.

0509

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-Ra226-1

	
Run	1
Analysis Code	Ra226
Eberline Services Work Order	13-04050
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-226	LCS	LCS	pCi/l	9.90E+00	1.16E+00	1.95E-01	1.03E+01	96.15	OK		OK	
02	RA-226	MBL	BLANK	pCi/l	1.84E-02	4.40E-02	9.24E-02					OK	OK
03	RA-226	DUP	PZ-111-SD TOT	pCi/l	1.36E+00	3.61E-01	1.17E-01				INV	OK	
04	RA-226	TRG	S-8 TOT	pCi/l	4.52E-01	2.18E-01	1.47E-01					OK	
05	RA-226	TRG	S-8 DIS	pCi/l	4.54E-01	2.09E-01	1.16E-01					OK	
06	RA-226	TRG	D-13 TOT	pCi/l	1.20E+00	3.59E-01	1.94E-01					OK	
07	RA-226	TRG	D-13 DIS	pCi/l	9.22E-01	3.03E-01	1.33E-01					OK	
08	RA-226	TRG	PZ-304-AS TOT	pCi/l	1.34E+00	4.39E-01	2.17E-01					OK	
09	RA-226	TRG	PZ-304-AS DIS	pCi/l	4.74E-01	2.48E-01	1.89E-01					OK	
10	RA-226	TRG	PZ-303-AS TOT	pCi/l	1.38E+00	3.95E-01	1.50E-01					OK	
11	RA-226	TRG	PZ-303-AS DIS	pCi/l	4.37E-01	2.15E-01	1.39E-01					OK	
12	RA-226	TRG	D-12 TOT	pCi/l	9.65E-01	3.39E-01	1.68E-01					OK	
13	RA-226	TRG	D-12 DIS	pCi/l	1.90E-01	1.74E-01	2.45E-01					OK	
14	RA-226	DO	PZ-111-SD TOT	pCi/l	9.05E-01	2.90E-01	2.02E-01					OK	
15	RA-226	TRG	PZ-111-SD DIS	pCi/l	1.17E+00	3.25E-01	1.19E-01					OK	
16	RA-226	TRG	PZ-304-AI TOT	pCi/l	1.23E+00	4.37E-01	2.43E-01					OK	
17	RA-226	TRG	PZ-304-AI DIS	pCi/l	6.24E-01	2.83E-01	2.44E-01					OK	
18	RA-226	TRG	I-11 TOT	pCi/l	1.02E+00	3.58E-01	2.35E-01					OK	
19	RA-226	TRG	I-11 DIS	pCi/l	1.24E+00	4.15E-01	2.27E-01					OK	

0259

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-Ra226-1

Run	1
Analysis Code	Ra226
Eberline Services Work Order	13-04050
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-226	LCS	04/09/13 00:00	1.00E+00	93.01	0.00	93.01		4/17/2013 16:05	
02	RA-226	MBL	04/09/13 00:00	1.50E+00	99.37	0.00	99.37		4/17/2013 16:05	
03	RA-226	DUP	04/04/13 13:52	1.50E+00	95.19	0.00	95.19		4/17/2013 16:05	
04	RA-226	TRG	04/04/13 11:32	1.50E+00	97.98	0.00	97.98		4/17/2013 16:05	
05	RA-226	TRG	04/04/13 11:32	1.50E+00	94.42	0.00	94.42		4/17/2013 16:05	
06	RA-226	TRG	04/04/13 11:55	1.50E+00	91.89	0.00	91.89		4/17/2013 16:05	
07	RA-226	TRG	04/04/13 11:55	1.50E+00	100.00	0.00	102.60		4/17/2013 16:05	
08	RA-226	TRG	04/04/13 12:56	1.50E+00	89.22	0.00	89.22		4/17/2013 16:05	
09	RA-226	TRG	04/04/13 12:56	1.50E+00	100.00	0.00	100.84		4/17/2013 16:05	
10	RA-226	TRG	04/04/13 13:00	1.50E+00	70.66	0.00	70.66		4/17/2013 16:05	
11	RA-226	TRG	04/04/13 13:00	1.50E+00	82.50	0.00	82.50		4/17/2013 16:05	
12	RA-226	TRG	04/04/13 13:50	1.50E+00	93.84	0.00	93.84		4/17/2013 16:05	
13	RA-226	TRG	04/04/13 13:50	1.50E+00	87.72	0.00	87.72		4/17/2013 16:05	
14	RA-226	DO	04/04/13 13:52	1.50E+00	99.02	0.00	99.02		4/17/2013 16:05	
15	RA-226	TRG	04/04/13 13:52	1.50E+00	96.00	0.00	96.00		4/17/2013 16:05	
16	RA-226	TRG	04/04/13 14:08	1.50E+00	98.09	0.00	98.09		4/17/2013 16:05	
17	RA-226	TRG	04/04/13 14:08	1.50E+00	97.31	0.00	97.31		4/17/2013 16:05	
18	RA-226	TRG	04/04/13 14:40	1.50E+00	91.29	0.00	91.29		4/17/2013 16:05	
19	RA-226	TRG	04/04/13 14:40	1.50E+00	95.92	0.00	95.92		4/17/2013 16:05	

13-04050

252

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	0.9100	920.3968	385.6000	93.01	2.08	1.00
02	MBL	BLANK	04/09/13 00:00	1.5000	0.9083	918.6773	411.2000	99.37	2.31	1.00
03	DUP	PZ-111-SD TOT	04/04/13 13:52	1.5000	0.9046	914.9351	392.3000	95.19	2.40	1.00
04	TRG	S-8 TOT	04/04/13 11:32	1.5000	0.9050	915.3396	404.0000	97.98	2.58	1.00
05	TRG	S-8 DIS	04/04/13 11:32	1.5000	0.9029	913.2156	388.4000	94.42	2.47	1.00
06	TRG	D-13 TOT	04/04/13 11:55	1.5000	0.9022	912.5076	377.7000	91.89	2.72	1.00
07	TRG	D-13 DIS	04/04/13 11:55	1.5000	0.9013	911.5974	421.3000	102.60	2.64	1.00
08	TRG	PZ-304-AS TOT	04/04/13 12:56	1.5000	0.9031	913.4179	367.1000	89.22	3.47	1.00
09	TRG	PZ-304-AS DIS	04/04/13 12:56	1.5000	0.9016	911.9008	414.2000	100.84	3.20	1.00
10	TRG	PZ-303-AS TOT	04/04/13 13:00	1.5000	0.9011	911.3951	290.1000	70.66	2.08	1.00
11	TRG	PZ-303-AS DIS	04/04/13 13:00	1.5000	0.8995	909.7768	338.1000	82.50	2.08	1.00
12	TRG	D-12 TOT	04/04/13 13:50	1.5000	0.9012	911.4962	385.3000	93.84	2.77	1.00
13	TRG	D-12 DIS	04/04/13 13:50	1.5000	0.9010	911.2939	360.1000	87.72	2.64	1.00
14	DO	PZ-111-SD TOT	04/04/13 13:52	1.5000	0.9002	910.4848	406.1000	99.02	2.40	1.00
15	TRG	PZ-111-SD DIS	04/04/13 13:52	1.5000	0.8995	909.7768	393.4000	96.00	2.44	1.00
16	TRG	PZ-304-AI TOT	04/04/13 14:08	1.5000	0.8986	908.8665	401.6000	98.09	6.02 4.90	1.00
17	TRG	PZ-304-AI DIS	04/04/13 14:08	1.5000	0.9004	910.6871	399.2000	97.31	2.96	1.00
18	TRG	I-11 TOT	04/04/13 14:40	1.5000	0.9002	910.4848	374.4000	91.29	2.77	1.00
19	TRG	I-11 DIS	04/04/13 14:40	1.5000	0.8993	909.5745	393.0000	95.92	2.87	1.00

3349

5-14

18-22

0373

Internal Work Order					Run	Analysis Code			Date	Technician		Technician Initials		Witness Initials		
13-04050					1	Ra226			4/12/2013 12:29	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	4/12/2013	0.500	0.5189				10.30	0.474	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	1011.425	4/12/2013	0.9100	1.0000	<u>.9100</u>									
02	Ba-133	Ba-6a	1011.425	4/12/2013	0.9083	1.0000	0.9083 g					0.5189 g				
03	Ba-133	Ba-6a	1011.425	4/12/2013	0.9046	1.0000	-0.9046 g					0.5151 g				
04	Ba-133	Ba-6a	1011.425	4/12/2013	0.9050	1.0000	-0.9050 g									
05	Ba-133	Ba-6a	1011.425	4/12/2013	0.9029	1.0000	-0.9029 g									
06	Ba-133	Ba-6a	1011.425	4/12/2013	0.9022	1.0000	-0.9022 g									
07	Ba-133	Ba-6a	1011.425	4/12/2013	0.9013	1.0000	-0.9013 g									
08	Ba-133	Ba-6a	1011.425	4/12/2013	0.9031	1.0000	-0.9031 g									
09	Ba-133	Ba-6a	1011.425	4/12/2013	0.9016	1.0000	-0.9016 g									
10	Ba-133	Ba-6a	1011.425	4/12/2013	0.9011	1.0000	-0.9011 g									
11	Ba-133	Ba-6a	1011.425	4/12/2013	0.8995	1.0000	-0.8995 g									
12	Ba-133	Ba-6a	1011.425	4/12/2013	0.9012	1.0000	-0.9012 g									
13	Ba-133	Ba-6a	1011.425	4/12/2013	0.9010	1.0000	-0.9010 g									
14	Ba-133	Ba-6a	1011.425	4/12/2013	0.9002	1.0000										
15	Ba-133	Ba-6a	1011.425	4/12/2013	0.8995	1.0000	-0.9002 g									
16	Ba-133	Ba-6a	1011.425	4/12/2013	0.8986	1.0000	-0.8995 g									
17	Ba-133	Ba-6a	1011.425	4/12/2013	0.9004	1.0000	-0.8986 g									
18	Ba-133	Ba-6a	1011.425	4/12/2013	0.9002	1.0000	-0.9004 g									
19	Ba-133	Ba-6a	1011.425	4/12/2013	0.8993	1.0000	<u>.9002</u>									
							-0.8993 g									

0374

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
13-04050	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	PZ-111-SD TOT	DUP					1.5000E+00	1.5000E+00				
04	S-8 TOT	TRG					1.5000E+00	1.5000E+00				
05	S-8 DIS	TRG					1.5000E+00	1.5000E+00				
06	D-13 TOT	TRG					1.5000E+00	1.5000E+00				
07	D-13 DIS	TRG					1.5000E+00	1.5000E+00				
08	PZ-304-AS TOT	TRG					1.5000E+00	1.5000E+00				
09	PZ-304-AS DIS	TRG					1.5000E+00	1.5000E+00				
10	PZ-303-AS TOT	TRG					1.5000E+00	1.5000E+00				
11	PZ-303-AS DIS	TRG					1.5000E+00	1.5000E+00				
12	D-12 TOT	TRG					1.5000E+00	1.5000E+00				
13	D-12 DIS	TRG					1.5000E+00	1.5000E+00				
14	PZ-111-SD TOT	DO					1.5000E+00	1.5000E+00				
15	PZ-111-SD DIS	TRG					1.5000E+00	1.5000E+00				
16	PZ-304-AI TOT	TRG					1.5000E+00	1.5000E+00				
17	PZ-304-AI DIS	TRG					1.5000E+00	1.5000E+00				
18	I-11 TOT	TRG					1.5000E+00	1.5000E+00				
19	I-11 DIS	TRG					1.5000E+00	1.5000E+00				

Comments	
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0375

Technician: _____



Date: _____

4/12/13

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
13-04050	1	Ra226			LWALKER

TRetec Fraction	Engineering Management Support, Inc. Client ID	Sample Type	Carrier Data	Filter Data			Gravimetric
			Carrier Added (ml)	Filter Tare (g)	Filter Final (g)	Filter Net (g)	% Recovery
01	LCS	LCS		0.0232	0.0290	0.0058	
02	BLANK	MBL		0.0227	0.0291	0.0064	
03	DUP	DUP		0.0227	0.0294	0.0067	
04	S-8 TOT	TRG		0.0227	0.0300	0.0073	
05	S-8 DIS	TRG		0.0230	0.0299	0.0069	
06	D-13 TOT	TRG		0.0226	0.0304	0.0078	
07	D-13 DIS	TRG		0.0227	0.0302	0.0075	
08	PZ-304-AS TOT	TRG		0.0226	0.0332	0.0106	
09	PZ-304-AS DIS	TRG		0.0227	0.0324	0.0097	
10	PZ-303-AS TOT	TRG		0.0230	0.0288	0.0058	
11	PZ-303-AS DIS	TRG		0.0229	0.0287	0.0058	
12	D-12 TOT	TRG		0.0231	0.0311	0.0080	
13	D-12 DIS	TRG		0.0229	0.0304	0.0075	
14	PZ-111-SD TOT	DO		0.0228	0.0295	0.0067	
15	PZ-111-SD DIS	TRG		0.0227	0.0295	0.0068	
16	PZ-304-AI TOT	TRG		0.0229	0.0375	0.0146	
17	PZ-304-AI DIS	TRG		0.0226	0.0314	0.0088	
18	I-11 TOT	TRG		0.0229	0.0309	0.0080	
19	I-11 DIS	TRG		0.0227	0.0311	0.0084	

Technician:

J. Walker

Date:

4, 17, 13



Sample Description: SPIKE
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 01
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_033
 Chamber Serial Number: 04026479A
 Detector Serial Number: 91132
 Env. Background: System Bkgd 54582
 Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.080E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:24 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9301 +/- 0.0000
 Counting Efficiency: 0.1825 +/- 0.0032 on 12/16/2012 5:49:18 PM
 Effective Efficiency: 0.1697 +/- 0.0030

Control Certificate Name: Ra226_Ra-5b
 Chem. Recov. of Control: RA-226 0.462229 +/- 0.031001
 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	5.529	526.32	8.55	0.68	0.00E+000	4.0
RA-226	4.703	305.00	11.24	0.00	0.00E+000	6.2

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

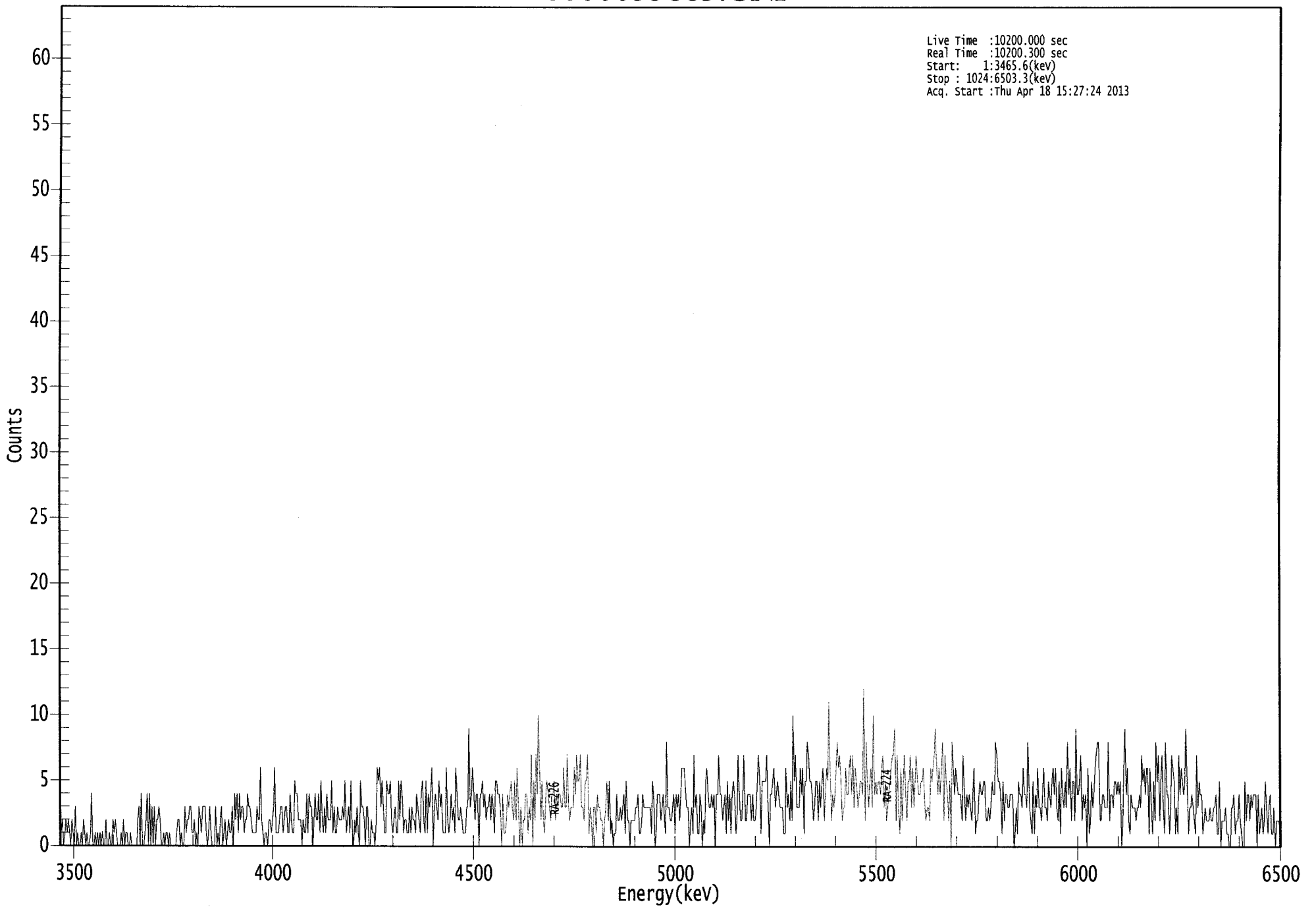
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.969	5685.50*	1.79E+001 +/- 1.24E+002	1.92E-001 +/- 1.33E+000
RA-226	0.991	4785.00*	9.90E+000 +/- 1.16E+000	1.95E-001 +/- 6.70E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055883.CNF

Live Time :10200.000 sec
Real Time :10200.300 sec
Start: 1:3465.6(keV)
Stop : 1024:6503.3(keV)
Acq. Start :Thu Apr 18 15:27:24 2013



0378

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: 10200

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

369: 5 4 4 3 0 4 1 1

Sample Title: 01

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

801: 0 1 3 1 5 4 4 3

Sample Title: 01

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



C
4/19/13

Sample Description: BLANK
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 02
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_034
 Chamber Serial Number: 04026479B
 Detector Serial Number: 91136
 Env. Background: System Bkgd 54583
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.310E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/18/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:25 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9937 +/- 0.0000
 Counting Efficiency: 0.1856 +/- 0.0032 on 12/16/2012 5:49:43 PM
 Effective Efficiency: 0.1844 +/- 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	5.440	1.00	277.19	0.00	0.00E+000	3.0
RA-226	4.500	0.83	239.53	0.17	0.00E+000	3.0

 NUCLIDE ANALYSIS RESULTS

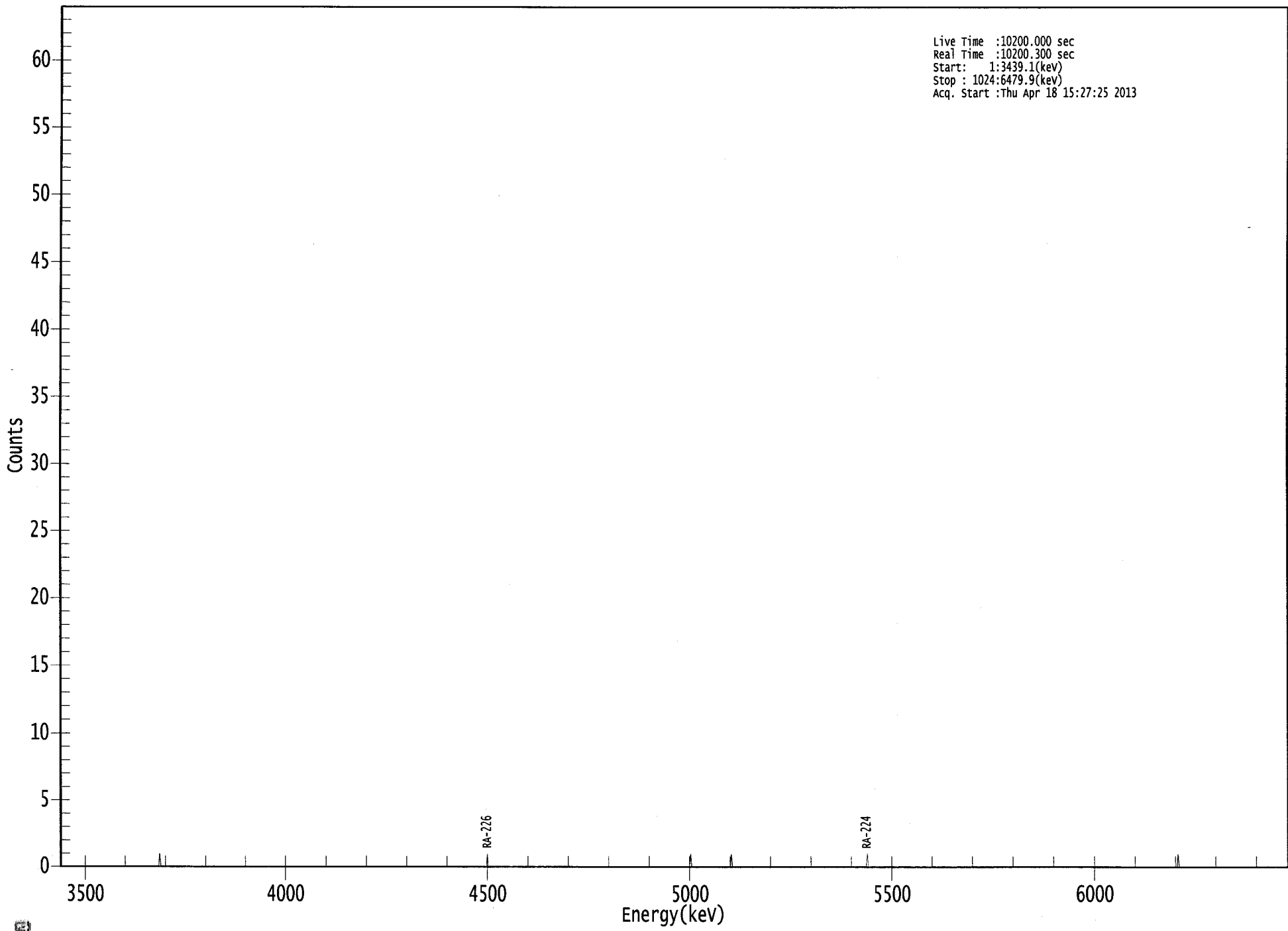
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.924	5685.50*	2.32E-002 +/- 1.73E-001	1.39E-001 +/- 9.62E-001
RA-226	0.900	4785.00*	1.84E-002 +/- 4.40E-002	9.24E-002 +/- 3.15E-003

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4/19/13

US EPA ARCHIVE DOCUMENT

0000055809.CNF

Live Time :10200.000 sec
Real Time :10200.300 sec
Start: 1:3439.1(keV)
Stop : 1024:6479.9(keV)
Acq. Start :Thu Apr 18 15:27:25 2013



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

369: 0 0 0 0 0 0 0 0

Sample Title: 02

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	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	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	1	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:	1	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	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	1	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0 0

Sample Title: 02

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	1	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	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



C
4/15/17

Sample Description: PZ-111-SD TOT-DUP
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 03
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_035
 Chamber Serial Number: 04026477A
 Detector Serial Number: 58771
 Env. Background: System Bkgd 54584
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.400E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:27 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9519 +/- 0.0000
 Counting Efficiency: 0.1826 +/- 0.0032 on 12/16/2012 5:49:42 PM
 Effective Efficiency: 0.1738 +/- 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	8.32	71.13	0.68	0.00E+000	2.9
RA-226	4.604	55.66	26.37	0.34	0.00E+000	2.9

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

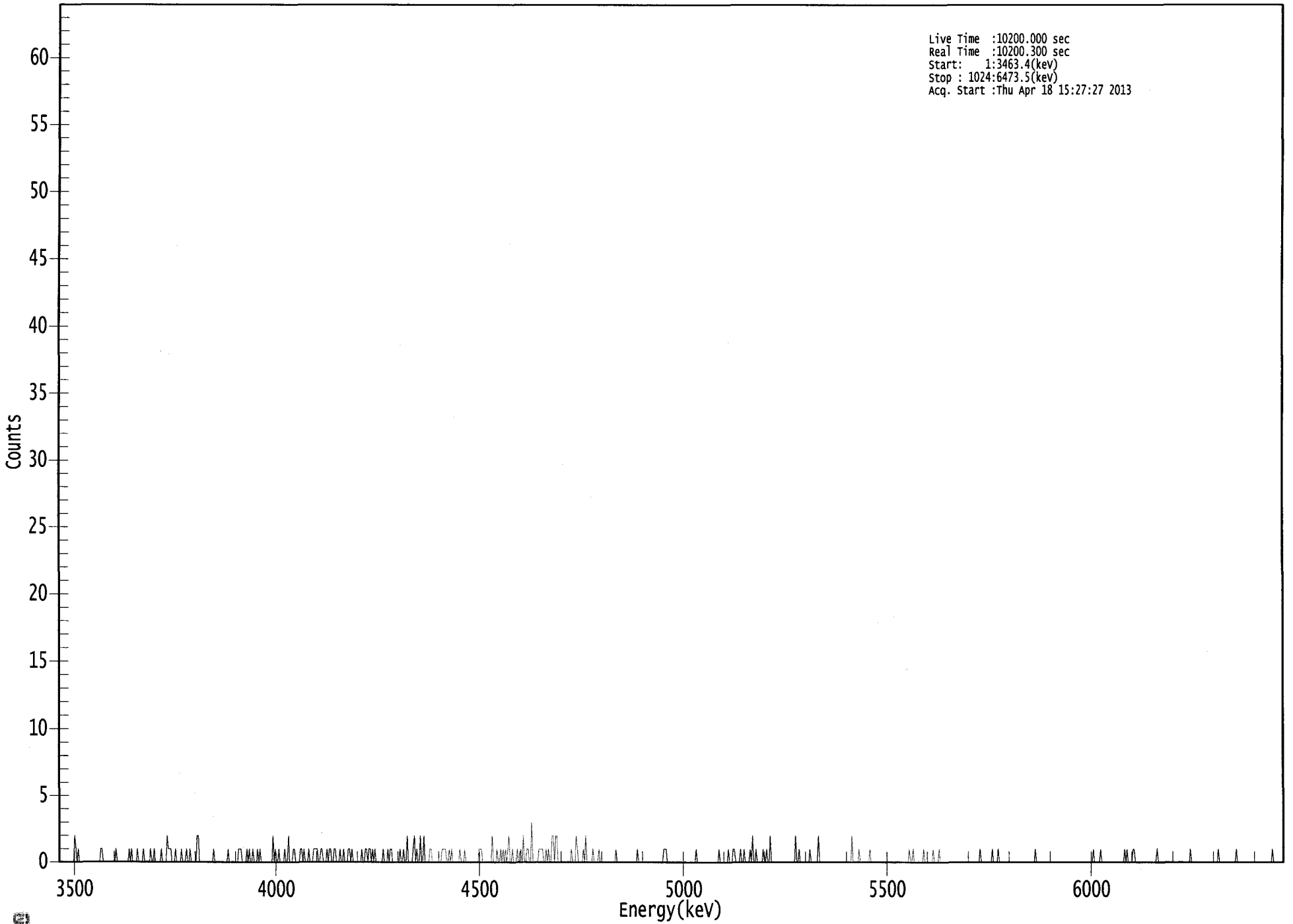
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.964	5685.50*	2.57E-001 +/- 6.48E+001	1.74E-001 +/- 4.39E+001
RA-226	0.958	4785.00*	1.36E+000 +/- 3.61E-001	1.17E-001 +/- 3.99E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055810.CNF

Live Time :10200.000 sec
Real Time :10200.300 sec
Start: 1:3463.4(keV)
Stop : 1024:6473.5(keV)
Acq. Start :Thu Apr 18 15:27:27 2013



5300

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

369: 0 0 1 0 1 0 1 0

Sample Title: 03

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

801: 0 0 0 0 0 0 0 0

Sample Title: 03

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	1	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:	1	0	0	0	0	0	1	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	1	0	1	0	0	0
897:	0	1	1	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	1	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	1	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:	1	0	0	0	0	0	0	0
977:	0	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	1	0	0
1017:	0	0	0	0	0	0	0	0



C
4/19/13

Sample Description: S-8 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 04
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.580E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:29 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9798 +/- 0.0000
 Counting Efficiency: 0.1783 +/- 0.0033 on 1/26/2013 3:28:25 PM
 Effective Efficiency: 0.1747 +/- 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	5.491	15.83	49.57	0.17	0.00E+000	2.9
RA-226	4.643	17.32	48.17	0.68	0.00E+000	2.9

 NUCLIDE ANALYSIS RESULTS

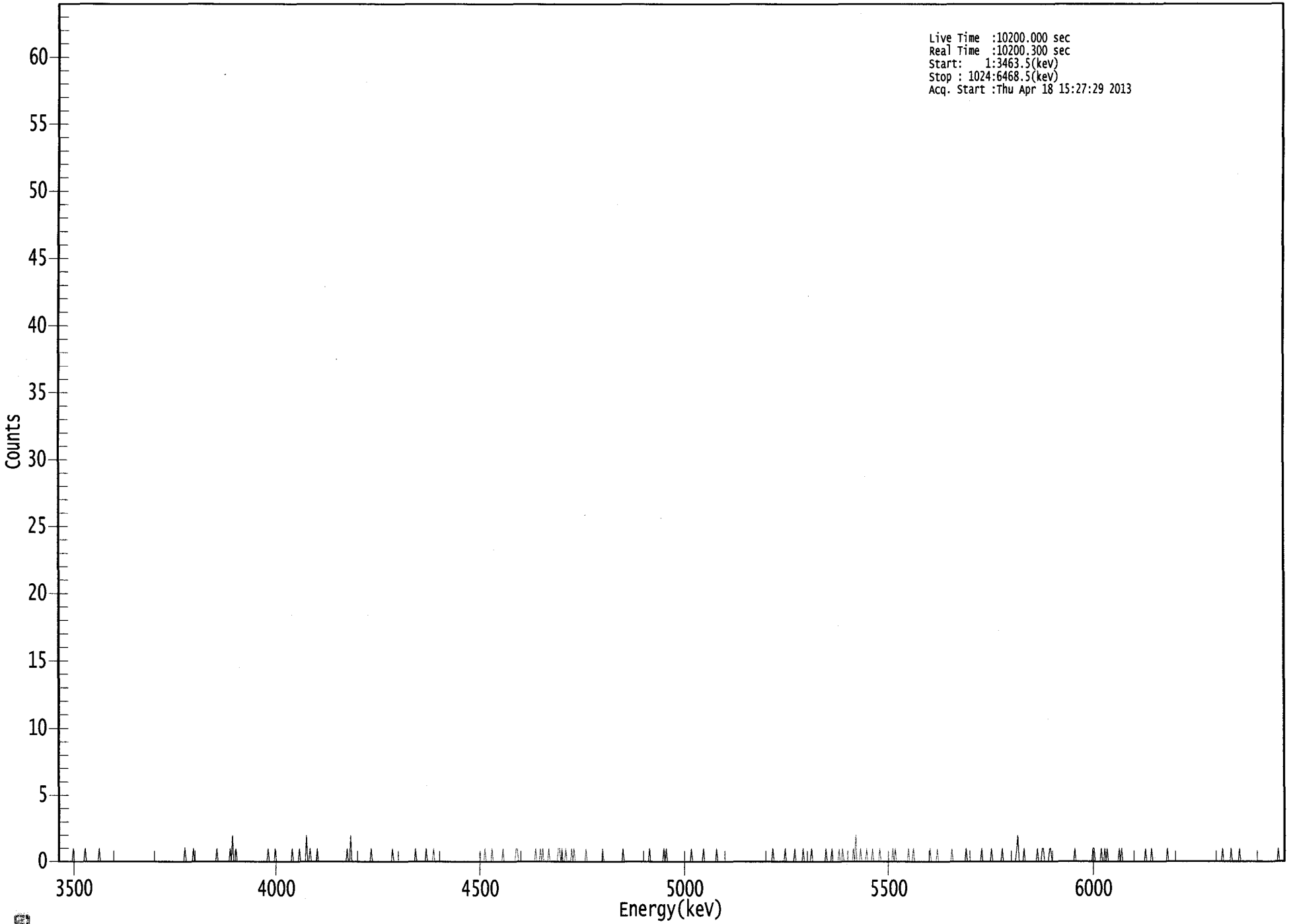
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.951	5685.50*	5.22E-001 +/- 1.32E+002	1.38E-001 +/- 3.47E+001
RA-226	0.974	4785.00*	4.52E-001 +/- 2.18E-001	1.47E-001 +/- 5.36E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055811.CNF

Live Time :10200.000 sec
Real Time :10200.300 sec
Start: 1:3463.5(kev)
Stop : 1024:6468.5(kev)
Acq. Start :Thu Apr 18 15:27:29 2013



GE
CA
CA
CA
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:	0	0	0	0	0	0	0	0
9:	0	0	0	0	1	0	0	0
17:	0	0	0	0	0	0	1	0
25:	0	0	0	0	0	0	0	0
33:	0	0	1	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	1	0	0	0	0	0
113:	0	1	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	1	0	0
137:	0	0	0	0	0	0	0	0
145:	1	0	2	0	0	1	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	1	0	0	0	0	0	1	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	1	0	0	0
201:	0	0	1	0	0	0	0	0
209:	2	0	0	1	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	1	0	0	2	0	0
249:	0	0	0	0	0	0	0	0
257:	0	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:	1	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	1	0	0	0	0
305:	0	0	0	0	1	0	0	0
313:	0	0	1	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	1	0	0	0	0

369: 0 0 0 0 1 0 0 0

Sample Title: 04

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

801: 1 2 0 0 0 0 1 0

Sample Title: 04

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	1	0	0	0	1	1	0
825:	0	0	0	1	1	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	0	0	0
857:	0	0	0	0	0	0	0	1
865:	1	0	0	0	0	0	1	0
873:	0	1	0	1	0	0	0	0
881:	0	0	0	0	0	1	0	1
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	1	0	0	0	0
913:	1	0	0	0	0	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	0	0	0
969:	0	0	0	1	0	0	0	0
977:	0	0	1	0	0	0	0	0
985:	0	1	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



C
4/19/13

Sample Description: S-8 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 05
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_040
 Chamber Serial Number: 06027396B
 Detector Serial Number: 91135
 Env. Background: System Bkgd 54586
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.470E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:30 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9442 +/- 0.0000
 Counting Efficiency: 0.1900 +/- 0.0033 on 12/16/2012 5:49:33 PM
 Effective Efficiency: 0.1794 +/- 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	5.474	12.83	55.14	0.17	0.00E+000	3.0
RA-226	4.575	18.66	45.85	0.34	0.00E+000	3.0

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

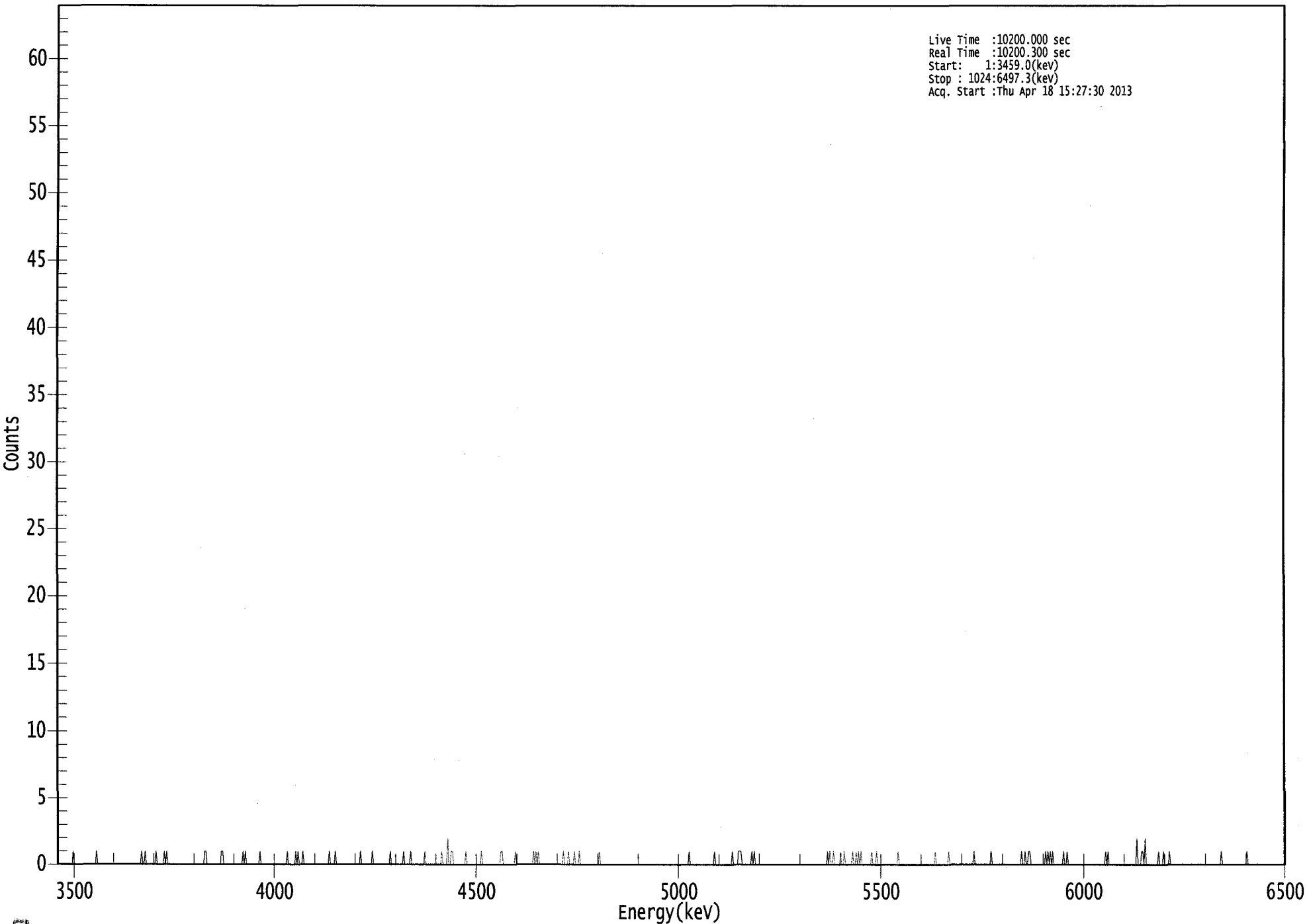
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.943	5685.50*	3.95E-001 +/- 9.96E+001	1.28E-001 +/- 3.24E+001
RA-226	0.944	4785.00*	4.54E-001 +/- 2.09E-001	1.16E-001 +/- 3.95E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055812.CNF

Live Time :10200.000 sec
Real Time :10200.300 sec
Start: 1:3459.0(kev)
Stop : 1024:6497.3(kev)
Acq. Start :Thu Apr 18 15:27:30 2013



0559
0559
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:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	1	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	1	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	1
73:	0	0	1	0	0	0	0	0
81:	0	0	0	1	0	0	0	0
89:	0	0	1	0	1	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	1	1	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	1	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	1	0	1	0
161:	0	0	0	0	0	0	0	0
169:	0	0	1	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	1	0	0	0	0	0	0
201:	1	0	1	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	1	0	0	0
233:	0	1	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	1	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	1
281:	0	0	0	0	0	0	0	0
289:	0	0	1	0	0	0	0	0
297:	1	0	0	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	1	0	0	0	0	2
329:	0	0	1	1	0	0	0	0
337:	0	0	0	0	0	0	1	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	1	0	0	0	0
361:	0	0	0	0	0	0	0	0

369: 0 0 0 1 1 0 0 0

Sample Title: 05

Channel	-----	-----	-----	-----	-----	-----	-----	-----
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	1	0
401:	1	0	1	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	1	0	0	0	0
433:	1	0	0	0	1	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	1	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:	1	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	1	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	1	0	0	0
569:	0	1	1	1	0	0	0	0
577:	0	0	0	0	1	0	1	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	1	0	1	0	0
649:	1	0	0	0	0	0	1	0
657:	0	1	0	0	0	0	0	0
665:	1	0	0	1	0	1	0	1
673:	0	0	0	0	0	0	0	0
681:	1	0	0	0	1	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:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	1	0	0
737:	0	0	0	0	0	0	0	0
745:	1	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	1	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	1	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 1 0 0 1

Sample Title: 05

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	1	1	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	1	0	1	0	1	0	1	0
833:	0	0	0	0	0	0	0	1
841:	0	0	1	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	1	0	1	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	2	0	0	0
905:	1	1	0	2	0	0	0	0
913:	0	0	0	0	0	0	1	0
921:	0	0	1	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	1	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	1
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



4119113

Sample Description: D-13 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 06
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_041
 Chamber Serial Number: 05026930A
 Detector Serial Number: 91087
 Env. Background: System Bkgd 54587
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.720E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:32 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9189 +/- 0.0000
 Counting Efficiency: 0.1978 +/- 0.0034 on 12/16/2012 5:49:31 PM
 Effective Efficiency: 0.1818 +/- 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	5.544	39.66	31.28	0.34	0.00E+000	6.0
RA-226	4.575	45.30	29.75	1.70	0.00E+000	3.7

 NUCLIDE ANALYSIS RESULTS

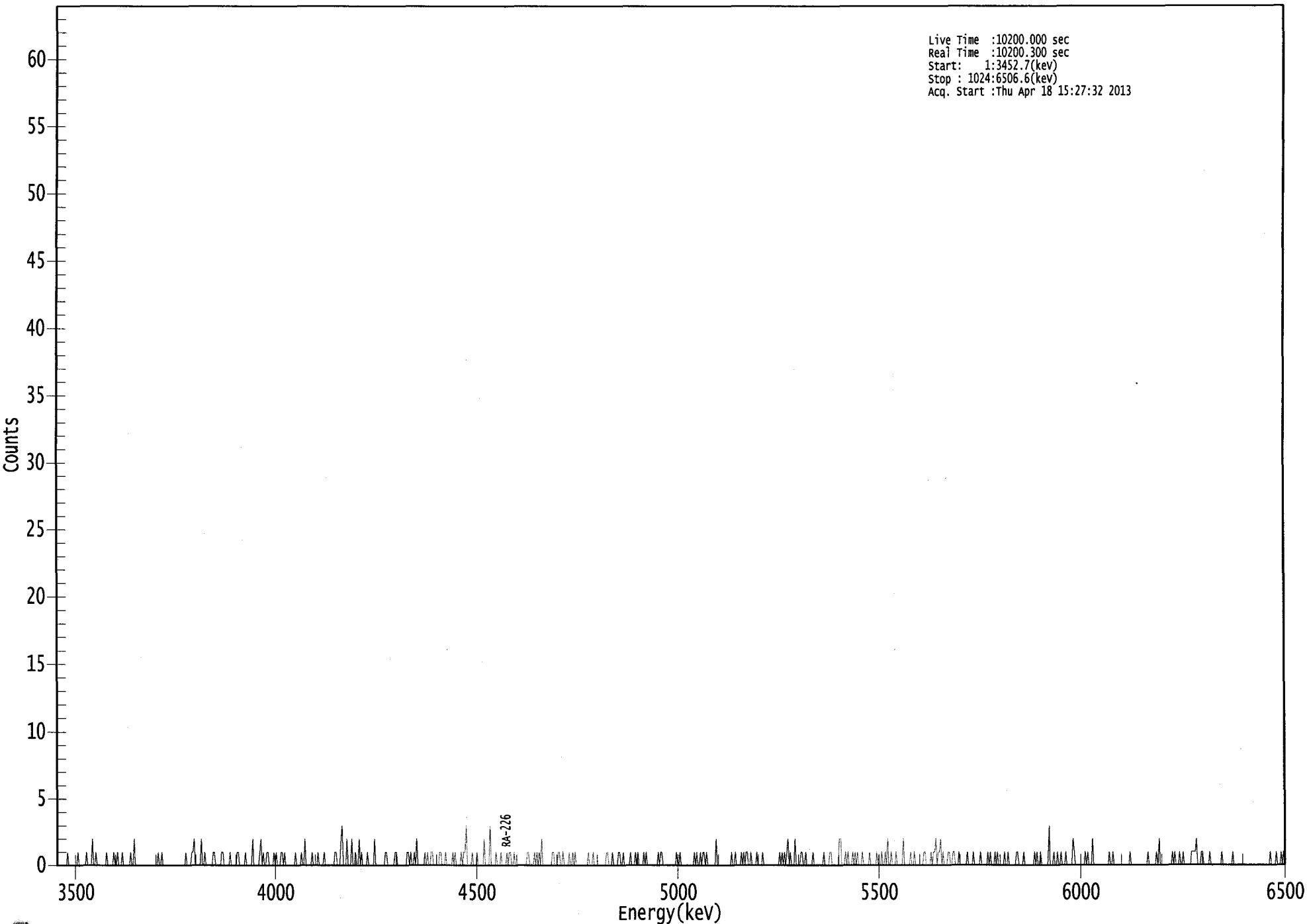
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.974	5685.50*	1.33E+000 +/- 3.34E+002	1.60E-001 +/- 4.03E+001
RA-226	0.944	4785.00*	1.20E+000 +/- 3.59E-001	1.94E-001 +/- 6.57E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055813.CNF

Live Time :10200.000 sec
Real Time :10200.300 sec
Start: 1:3452.7(kev)
Stop : 1024:6506.6(kev)
Acq. Start :Thu Apr 18 15:27:32 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:	0	0	0	0	0	0	0	0
9:	0	1	0	0	0	0	0	0
17:	0	0	1	0	0	0	0	0
25:	0	1	0	0	0	0	2	0
33:	0	1	0	0	0	0	0	0
41:	0	0	1	0	0	0	0	0
49:	1	0	0	1	0	0	0	1
57:	0	0	0	0	0	0	1	0
65:	0	2	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	1	0	0
89:	1	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	1	0	0	0
113:	0	1	1	2	0	0	0	0
121:	0	2	0	0	1	0	0	0
129:	0	0	0	1	1	0	0	0
137:	0	0	1	1	0	0	0	0
145:	0	1	0	0	0	0	0	1
153:	1	0	0	0	0	0	1	0
161:	0	0	0	0	2	0	0	0
169:	0	0	1	2	0	1	0	0
177:	1	1	0	0	0	0	1	0
185:	1	0	0	0	1	1	0	1
193:	0	0	0	0	0	0	0	0
201:	1	0	0	0	0	1	0	0
209:	2	0	0	0	0	0	1	0
217:	0	0	0	1	0	0	0	0
225:	1	0	0	0	0	0	0	0
233:	0	1	1	0	0	0	2	3
241:	0	0	0	2	0	0	0	2
249:	0	0	1	0	0	2	0	1
257:	0	0	0	0	1	0	0	0
265:	0	0	2	0	0	0	0	0
273:	0	0	0	1	1	0	0	0
281:	0	0	0	1	1	0	0	0
289:	0	0	0	0	0	1	1	0
297:	1	0	0	1	0	2	0	0
305:	0	0	0	0	1	0	1	0
313:	0	1	1	0	0	0	0	0
321:	1	1	0	0	0	1	0	0
329:	0	0	0	1	0	1	0	0
337:	0	0	1	0	1	1	3	0
345:	0	0	0	1	0	0	0	1
353:	0	0	0	0	0	2	0	0
361:	0	0	3	0	0	0	0	1

369: 0 0 0 1 0 0 0 0

Sample Title: 06

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

801: 1 1 0 0 0 0 1 0

Sample Title: 06

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	1
817:	0	1	0	0	1	0	0	0
825:	0	0	0	3	0	0	0	1
833:	0	0	1	0	0	1	0	0
841:	0	1	0	0	0	0	0	2
849:	1	0	0	0	0	0	0	0
857:	0	1	0	1	0	0	0	2
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	1	0	0
881:	1	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	1	0	0
913:	0	0	0	0	1	0	2	0
921:	0	0	0	0	0	0	0	0
929:	0	1	0	1	0	0	0	1
937:	0	0	1	0	0	0	0	0
945:	0	1	1	1	1	2	0	0
953:	0	1	1	0	0	0	0	0
961:	1	0	0	0	0	0	0	0
969:	0	0	1	0	0	0	0	0
977:	0	0	0	1	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	1	0	0	0	0	1
1017:	0	0	0	1	0	1	0	0



C
4/18/12

Sample Description: D-13 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 07
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.640E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:33 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
 Counting Efficiency: 0.1846 +/- 0.0032 on 12/16/2012 5:49:29 PM
 Effective Efficiency: 0.1846 +/- 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	5.505	9.98	65.65	1.02	0.00E+000	3.0
RA-226	4.584	36.49	32.71	0.51	0.00E+000	3.0

 NUCLIDE ANALYSIS RESULTS

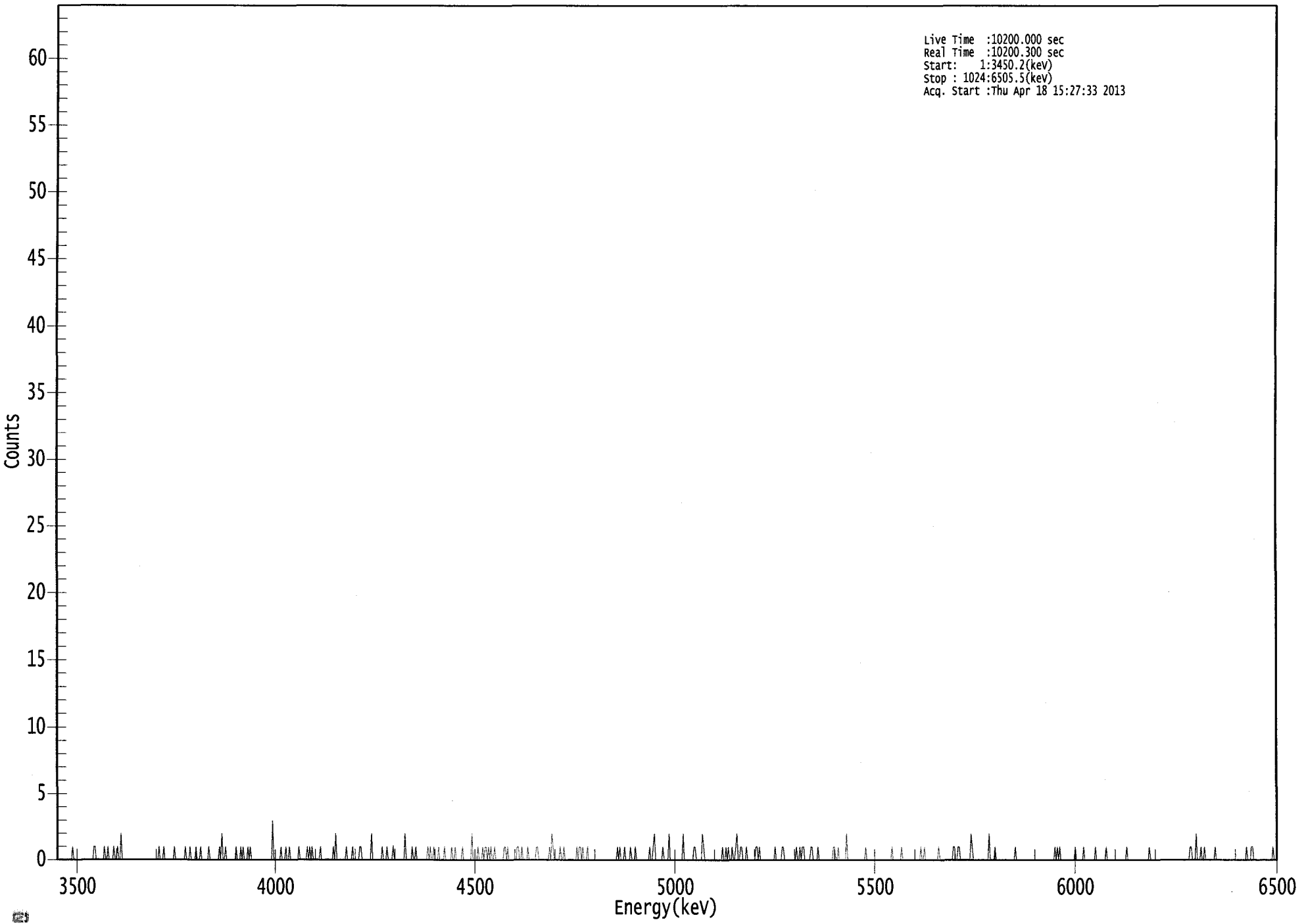
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.958	5685.50*	3.19E-001 +/- 8.05E+001	2.01E-001 +/- 5.08E+001
RA-226	0.948	4785.00*	9.22E-001 +/- 3.03E-001	1.33E-001 +/- 4.52E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055814.CNF

Live Time :10200.000 sec
Real Time :10200.300 sec
Start: 1:3450.2(kev)
Stop : 1024:6505.5(kev)
Acq. Start :Thu Apr 18 15:27:33 2013



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

369: 1 0 0 0 0 0 0 0 0

Sample Title: 07

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

801: 0 0 0 0 1 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	1	0	1
841:	0	1	0	0	0	0	0	0
849:	0	0	0	0	0	0	1	0
857:	0	0	0	0	0	1	0	0
865:	0	0	0	0	0	0	0	1
873:	0	0	0	0	0	0	0	0
881:	1	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	1	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	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	1	1
953:	0	0	0	2	0	0	0	1
961:	0	0	1	0	0	0	0	0
969:	0	0	0	1	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	1	0	0
1001:	0	1	1	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	1	0	0	0	0



C
4/15/13

Sample Description: PZ-304-AS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 08
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 3.470E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:35 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8922 +/- 0.0000
 Counting Efficiency: 0.1902 +/- 0.0033 on 12/16/2012 5:49:26 PM
 Effective Efficiency: 0.1697 +/- 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	5.513	17.66	47.16	0.34	0.00E+000	4.5
RA-226	4.594	37.00	32.65	0.00	0.00E+000	3.0

 NUCLIDE ANALYSIS RESULTS

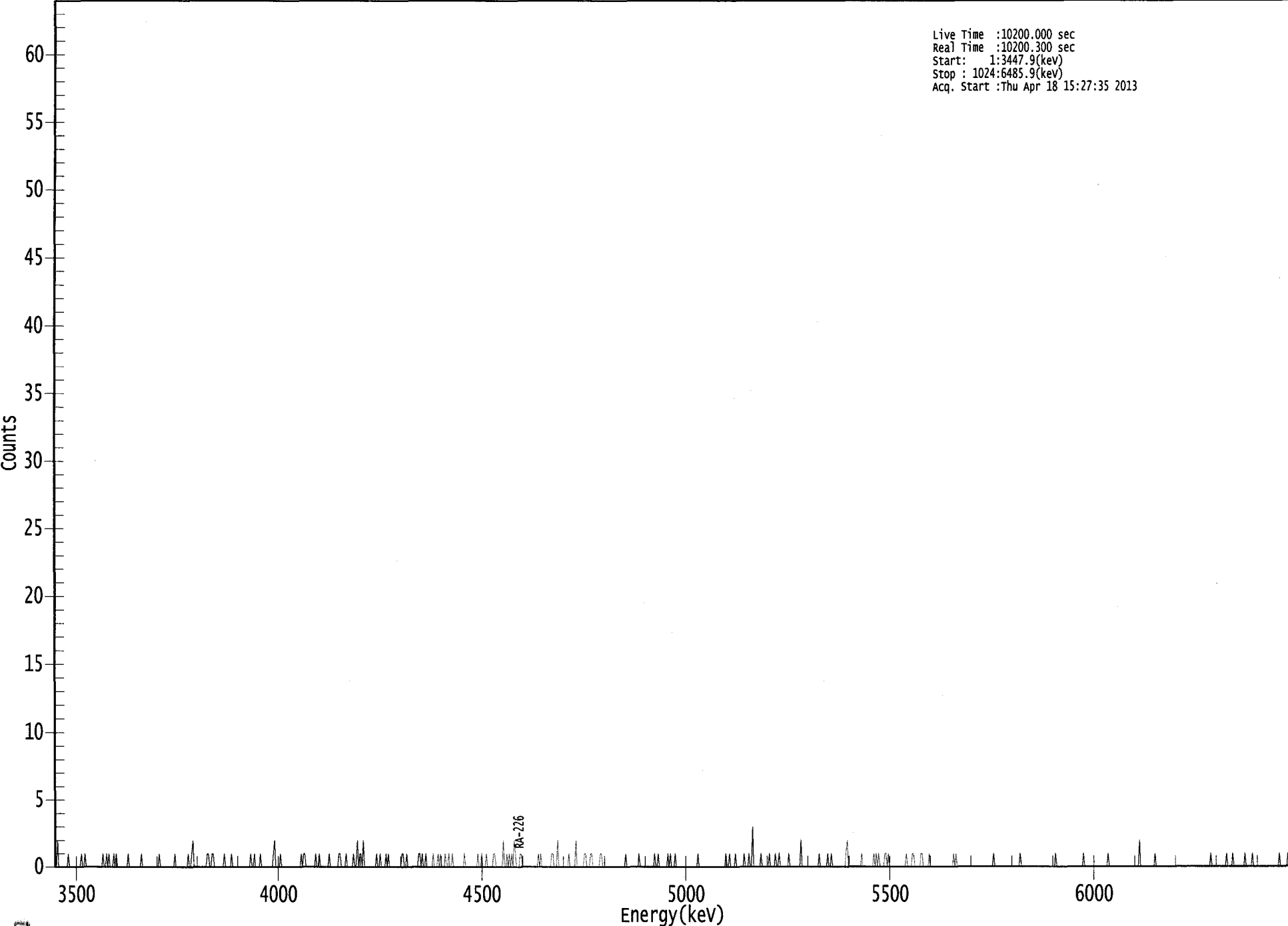
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.961	5685.50*	8.07E-001 +/- 2.04E+002	2.18E-001 +/- 5.51E+001
RA-226	0.954	4785.00*	1.34E+000 +/- 4.39E-001	2.17E-001 +/- 7.40E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055815.CNF

Live Time :10200.000 sec
Real Time :10200.300 sec
Start: 1:3447.9(keV)
Stop : 1024:6485.9(keV)
Acq. Start :Thu Apr 18 15:27:35 2013



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: 10200

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

369: 0 0 0 0 2 0 0 1

Sample Title: 08

Channel	1	2	3	4	5	6	7	8
377:	0	1	0	1	0	2	1	0
385:	0	0	1	1	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	1	0	1	0	0	0	0
409:	0	0	0	0	1	1	0	0
417:	0	2	0	0	0	0	0	0
425:	0	0	1	0	0	0	0	0
433:	2	0	0	0	0	0	0	1
441:	1	0	0	0	1	1	0	0
449:	0	0	0	0	1	1	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	1	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	1	0	0	1	0	0	0
505:	0	0	0	0	1	0	1	0
513:	0	0	1	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	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	1	0	0	1
561:	0	0	0	0	1	0	0	0
569:	0	0	0	1	0	0	0	1
577:	0	0	3	0	0	0	0	0
585:	0	1	0	0	0	0	0	0
593:	1	0	0	0	0	1	0	0
601:	1	0	0	0	0	0	0	0
609:	1	0	0	0	0	0	0	0
617:	0	0	2	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	1	0	0	0	0	0	0
641:	1	0	0	1	0	0	0	0
649:	0	0	0	0	0	0	0	1
657:	2	0	0	0	0	0	0	0
665:	0	0	0	0	1	0	0	0
673:	0	0	0	0	0	0	1	0
681:	1	0	1	0	0	0	0	1
689:	1	0	1	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	1	0	0	0	0	1	1
713:	0	0	0	0	0	1	1	0
721:	0	0	0	0	1	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	1	0	1	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	1	0	0	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: 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	1	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	1	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	1
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	2	0	0	0	0	0	0
905:	0	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	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	1	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	1	0	0	0	0	1	0
977:	0	0	0	0	0	0	0	0
985:	1	0	0	0	0	0	1	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	1	0	0	0
1017:	0	0	0	1	0	0	0	0



C
4/18/13

Sample Description: PZ-304-AS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 09
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 3.200E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:37 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
 Counting Efficiency: 0.1789 +/- 0.0031 on 12/16/2012 5:49:23 PM
 Effective Efficiency: 0.1789 +/- 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	5.582	3.00	130.67	0.00	0.00E+000	3.0
RA-226	4.591	15.00	52.27	0.00	0.00E+000	3.0

 NUCLIDE ANALYSIS RESULTS

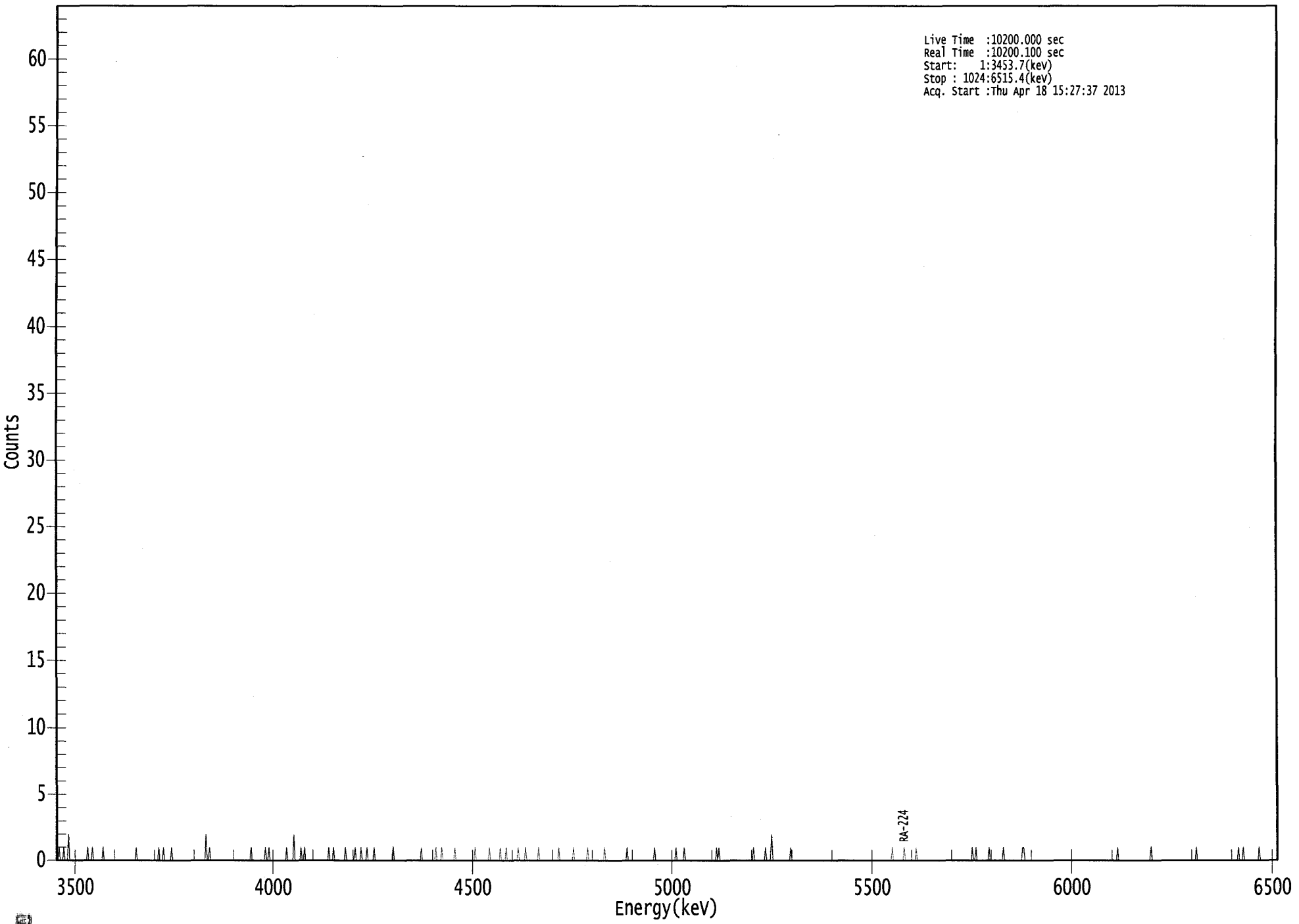
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.986	5685.50*	1.20E-001 +/- 3.02E+001	2.40E-001 +/- 6.05E+001
RA-226	0.952	4785.00*	4.74E-001 +/- 2.48E-001	1.89E-001 +/- 6.52E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055807.CNF

Live Time :10200.000 sec
Real Time :10200.100 sec
Start: 1:3453.7(kev)
Stop : 1024:6515.4(kev)
Acq. Start :Thu Apr 18 15:27:37 2013



0118
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: 10200

Channel	-----	-----	-----	-----	-----	-----	-----	-----
1:	0	0	1	0	0	0	1	0
9:	0	0	2	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	1	0	0	0	1	0
33:	0	0	0	0	0	0	0	1
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	1	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	1	0
89:	0	0	1	0	0	0	0	0
97:	0	1	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	2	0
129:	0	1	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:	1	0	0	1	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	1	0	0	0	0	0
201:	2	0	0	0	0	0	1	0
209:	0	1	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	1	0	0
233:	0	1	0	0	0	0	0	0
241:	0	0	0	1	0	0	0	0
249:	0	0	0	1	0	0	0	0
257:	1	0	0	0	0	1	0	0
265:	0	0	0	1	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	1	0	0	0	0
313:	0	0	0	0	0	0	0	1
321:	0	0	0	0	1	0	0	0
329:	0	0	0	0	0	0	0	1
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	1	0	0	0	0	0	0	0
361:	0	0	0	0	1	0	0	0

369: 0 0 0 0 0 1 0 0

Sample Title: 09

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	1	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:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	1	0
425:	0	0	0	0	0	0	0	0
433:	0	0	1	0	0	0	0	0
441:	0	0	0	0	0	0	1	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	1	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	1
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	1	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	0	1
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	1	0	1	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	1	0	0	0	0	0	0
593:	0	0	0	1	0	0	0	0
601:	2	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	1	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	1	0	0
705:	0	0	0	0	0	0	0	1
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	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	1	0	0	1	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	0

801: 0 0 0 0 0 0 0 0

Sample Title: 09

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	1	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	1	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	1	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	1	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	1	0
993:	0	0	1	0	0	0	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
4/18/13

Sample Description: PZ-303-AS TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 10
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_047
 Chamber Serial Number: 02030596A
 Detector Serial Number: 91086
 Env. Background: System Bkgd 54591
 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: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:39 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.7066 +/- 0.0000
 Counting Efficiency: 0.1822 +/- 0.0032 on 12/16/2012 5:49:21 PM
 Effective Efficiency: 0.1287 +/- 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	5.528	60.66	25.25	0.34	0.00E+000	2.9
RA-226	4.596	48.49	28.32	0.51	0.00E+000	4.4

 NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.968	5685.50*	2.19E+000 +/- 5.53E+002	1.73E-001 +/- 4.36E+001
RA-226	0.954	4785.00*	1.38E+000 +/- 3.95E-001	1.50E-001 +/- 5.14E-003

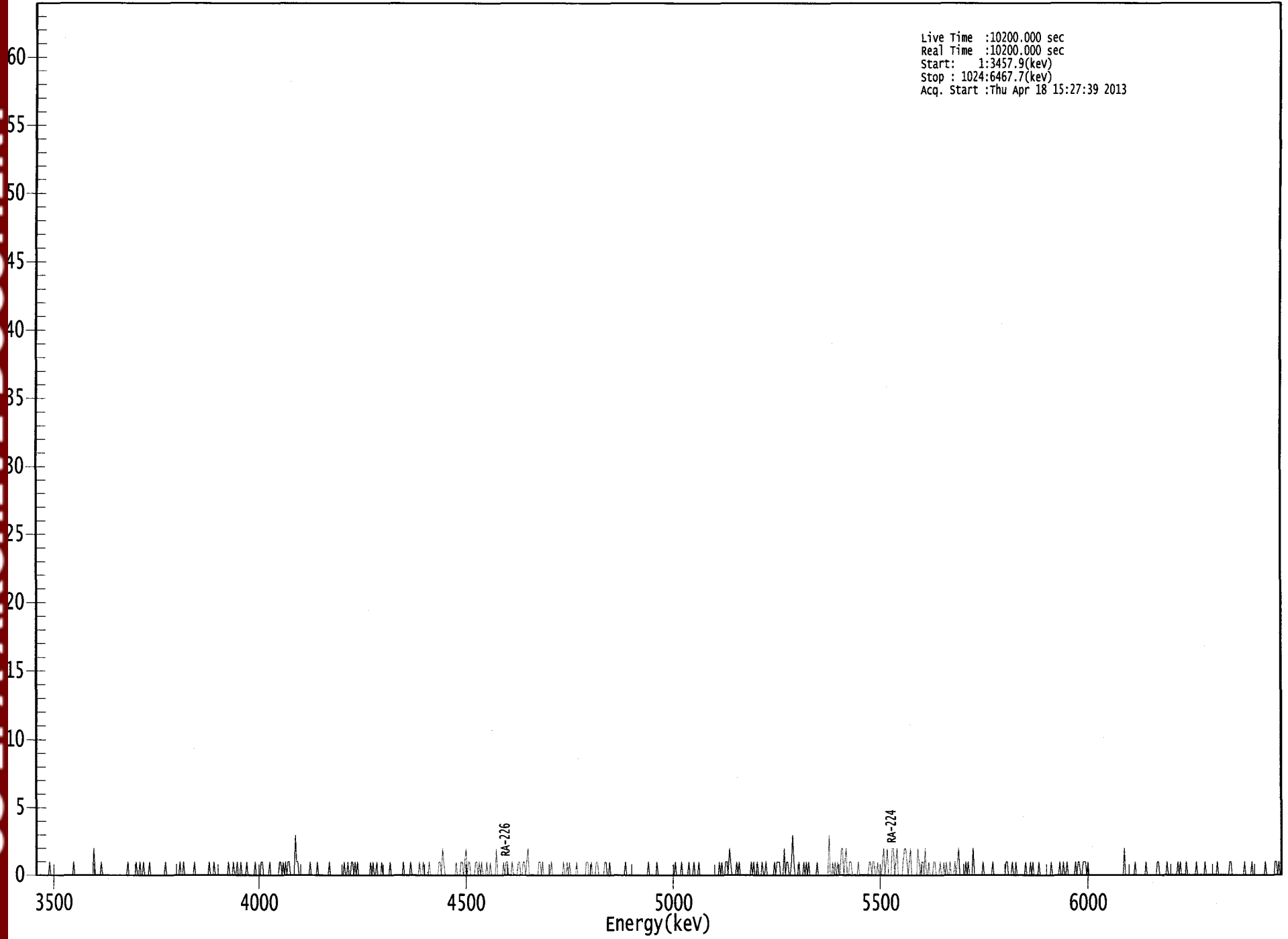
AG
 4/19/13

US EPA ARCHIVE DOCUMENT

0000055816.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3457.9(kev)
Stop : 1024:6467.7(kev)
Acq. Start :Thu Apr 18 15:27:39 2013

US EPA ARCHIVE DOCUMENT



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: 10200

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

369: 0 0 0 1 0 0 1 0

Sample Title: 10

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

801: 0 0 1 0 0 1 0 0

Sample Title: 10

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



C
4/19/17

Sample Description: PZ-303-AS DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 11
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_048
 Chamber Serial Number: 02030596B
 Detector Serial Number: 83111
 Env. Background: System Bkgd 54592
 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: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 3:27:40 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8250 +/- 0.0000
 Counting Efficiency: 0.1680 +/- 0.0030 on 12/16/2012 5:49:20 PM
 Effective Efficiency: 0.1386 +/- 0.0024

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	5.486	6.83	76.08	0.17	0.00E+000	3.0
RA-226	4.600	16.49	49.13	0.51	0.00E+000	3.0

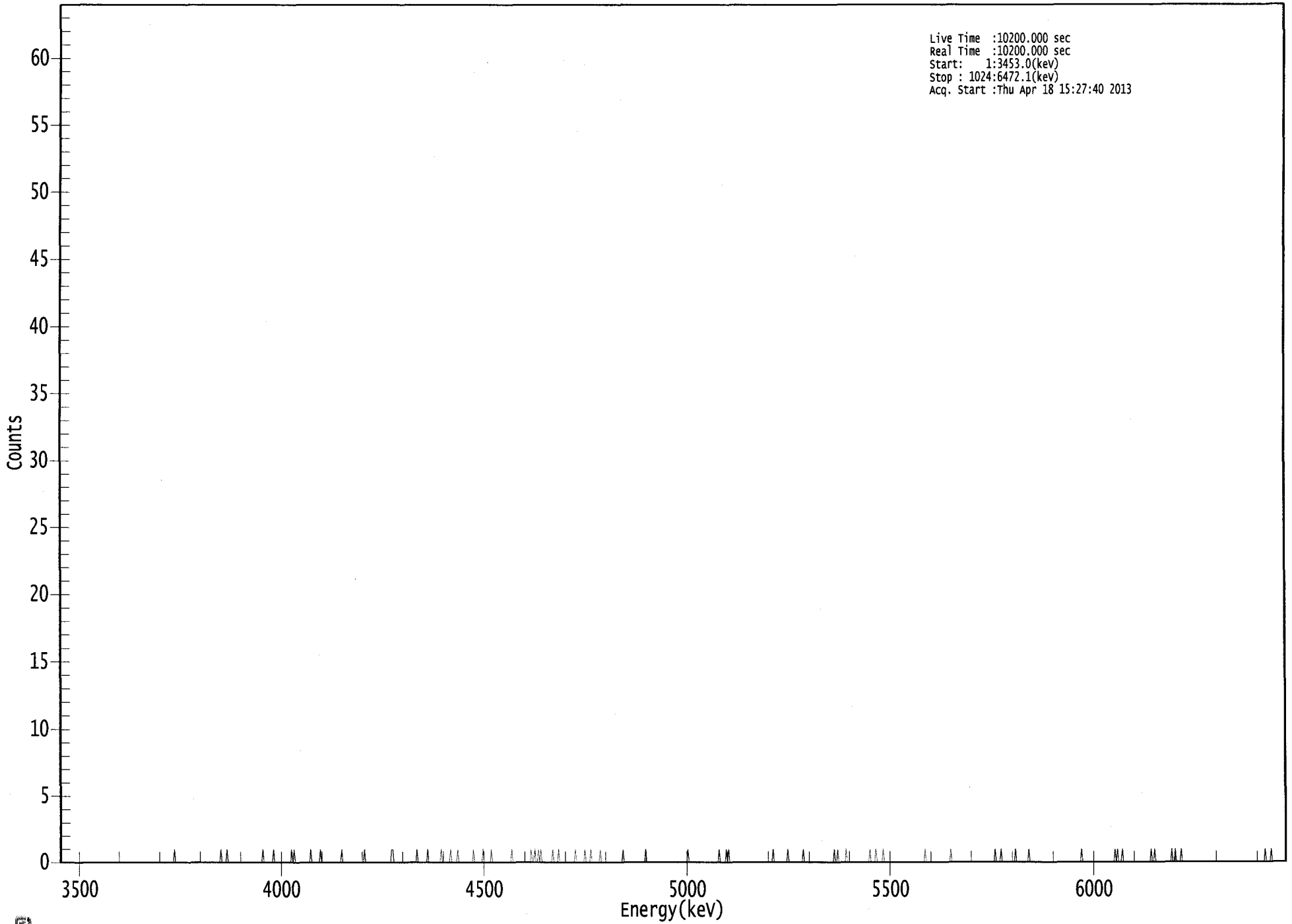
 NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.949	5685.50*	2.29E-001 +/- 5.78E+001	1.40E-001 +/- 3.53E+001
RA-226	0.956	4785.00*	4.37E-001 +/- 2.15E-001	1.39E-001 +/- 4.82E-003

AG
4/19/13

0000055817.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3453.0(kev)
Stop : 1024:6472.1(kev)
Acq. Start :Thu Apr 18 15:27:40 2013



0429

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: 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:	1	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	1
137:	0	0	0	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	1	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	1	0	1	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	1	0	0	0	0	0
217:	0	0	1	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	1	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	1
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	1	1
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	1	0	0	0	0
305:	0	0	0	0	1	0	0	0
313:	0	0	0	0	0	0	0	1
321:	0	0	0	0	0	0	0	1
329:	0	0	0	0	0	1	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	1	0	0	0	0	0
353:	0	0	1	0	0	0	0	0
361:	0	1	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 11

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	1	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	1	0	0	1	0	0
401:	1	0	1	0	0	0	0	0
409:	0	0	0	0	1	0	0	0
417:	0	1	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	1
433:	0	0	0	0	0	0	0	1
441:	0	0	0	0	1	0	0	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	1
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	1	0	0	0	0	0
497:	0	0	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	1	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	1
553:	0	0	0	0	0	1	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	1	0	0	0
601:	0	0	0	0	0	0	0	0
609:	1	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	0	0
641:	0	0	0	0	0	0	0	1
649:	0	0	1	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	1	0	0
681:	0	0	1	0	0	0	0	0
689:	1	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:	1	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	1	0	0
785:	0	0	1	0	0	0	0	0
793:	0	0	0	0	0	0	1	0

801: 0 0 0 0 0 0 0 0

Sample Title: 11

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	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	1	0	1	0	0	0	1
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	1
913:	0	0	1	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	1	0	0	1	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	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	1	0	0
1009:	0	0	1	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



C/1/15/11

Sample Description: D-12 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 12
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_003
 Chamber Serial Number:
 Detector Serial Number: 3
 Env. Background: System Bkgd 54570
 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: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 6:28:51 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9384 +/- 0.0000
 Counting Efficiency: 0.1746 +/- 0.0033 on 12/15/2012 11:26:47 AM
 Effective Efficiency: 0.1639 +/- 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	5.534	13.24	64.20	4.76	0.00E+000	4.5
RA-226	4.615	32.32	34.90	0.68	0.00E+000	3.0

 NUCLIDE ANALYSIS RESULTS

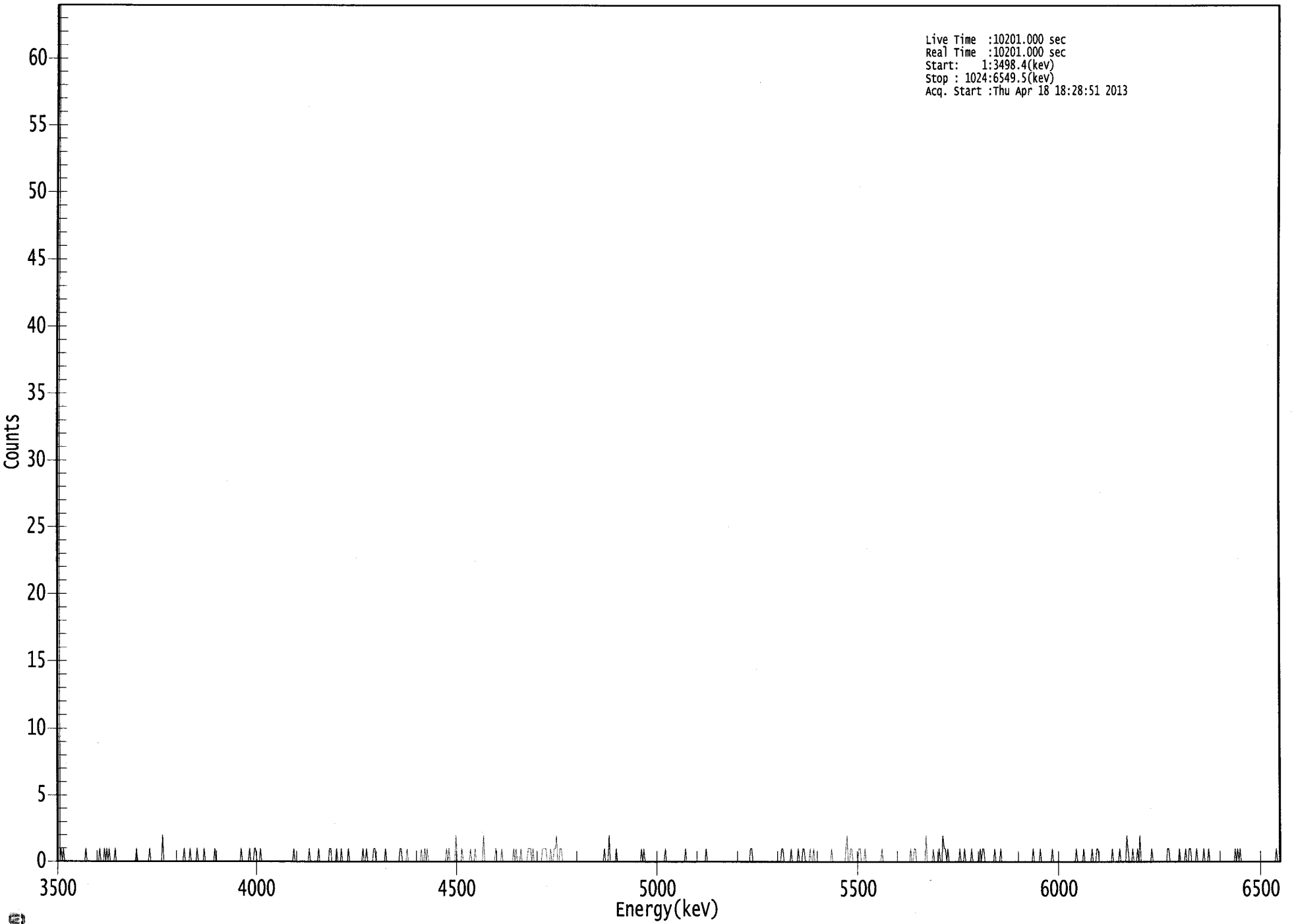
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.970	5685.50*	5.12E-001 +/- 1.46E+002	4.05E-001 +/- 1.15E+002
RA-226	0.963	4785.00*	9.65E-001 +/- 3.39E-001	1.68E-001 +/- 6.17E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055822.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3498.4(kev)
Stop : 1024:6549.5(kev)
Acq. Start :Thu Apr 18 18:28:51 2013



0433
5570
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: 10201

Elapsed Real Time: 10201

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

369: 1 0 0 0 0 1 0 0

Sample Title: 12

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	1
385:	0	1	0	0	0	1	0	0
393:	0	0	0	1	1	1	0	1
401:	0	0	0	0	0	0	0	1
409:	1	1	1	0	0	0	1	0
417:	0	1	1	2	0	0	1	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	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	1	0	0	0	2
465:	0	0	0	0	0	1	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	1	0	1	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	1
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	1	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	1	1	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:	1	0	0	0	0	0	0	1
617:	0	0	0	0	0	1	0	0
625:	0	1	1	0	0	0	0	1
633:	0	0	1	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	1	0	0	0	0	0	0
657:	0	0	0	0	0	1	2	0
665:	0	1	1	0	0	0	0	0
673:	1	1	0	0	0	1	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	1	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	1	0	0	1	1
721:	0	0	0	0	0	0	0	0
729:	2	0	0	0	0	0	1	0
737:	0	0	0	1	0	0	2	1
745:	1	0	1	0	0	0	0	0
753:	0	0	0	0	1	0	0	0
761:	1	0	0	0	0	0	1	0
769:	0	0	0	0	0	1	0	1
777:	1	0	0	0	0	0	0	0
785:	0	1	0	0	0	0	1	0
793:	0	0	0	0	0	0	0	0

801: 0 0 0 0 0 0 0 0

Sample Title: 12

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	1	0	0	0	0	0	1
825:	0	0	0	0	0	0	0	0
833:	0	1	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	1	0	0	0	0
865:	0	0	1	0	0	0	1	1
873:	0	0	0	0	0	0	0	0
881:	0	0	0	1	0	0	0	0
889:	0	1	0	0	0	0	0	2
897:	1	0	0	0	1	0	0	0
905:	1	0	2	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	1	1	0	0	0	0	0
937:	0	0	0	1	0	0	0	0
945:	1	0	0	1	1	0	0	0
953:	0	1	0	0	0	0	0	1
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	0
985:	0	1	0	1	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	0	1	0	0	0	0



C
4/15/17

Sample Description: D-12 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 13
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.640E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 6:28:52 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8772 +/- 0.0000
 Counting Efficiency: 0.1940 +/- 0.0036 on 12/15/2012 11:26:46 AM
 Effective Efficiency: 0.1702 +/- 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	5.501	5.43	111.89	3.57	0.00E+000	2.9
RA-226	4.547	6.94	91.61	3.06	0.00E+000	2.9

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

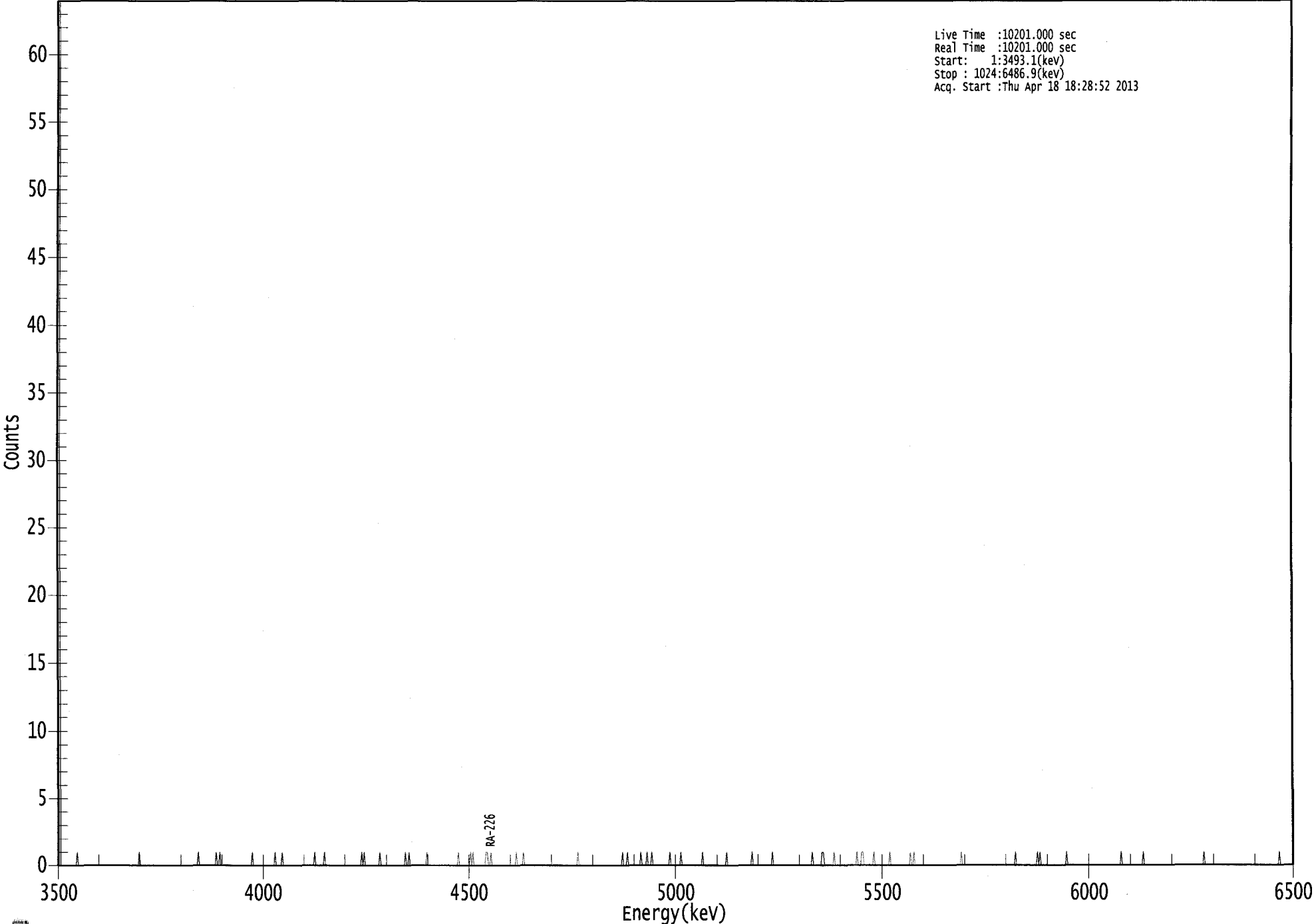
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.956	5685.50*	1.93E-001 +/- 5.49E+001	3.35E-001 +/- 9.54E+001
RA-226	0.929	4785.00*	1.90E-001 +/- 1.74E-001	2.45E-001 +/- 8.81E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055823.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3493.1(kev)
Stop : 1024:6486.9(kev)
Acq. Start :Thu Apr 18 18:28:52 2013



0570
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: 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:	1	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	1	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	1	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	1	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	1	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	1	0	0
185:	0	0	0	1	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	1	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	1	0	1
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	1	0	0	1	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	1	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	1	0	0
337:	0	0	0	0	0	0	0	1
345:	0	1	0	0	0	0	0	0
353:	0	0	0	0	1	1	0	0
361:	1	0	0	0	0	0	0	0

369: 0 0 0 0 0 0 0 0 0

Sample Title: 13

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	1	0	0
385:	0	0	0	1	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:	1	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	1	0	0
473:	0	1	0	0	0	0	0	0
481:	0	0	0	0	1	0	0	0
489:	0	1	0	0	0	1	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	1	0	0	0
513:	0	0	0	0	0	1	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	1
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	1	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	1	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	1	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	1	0	0	0	0	0
633:	0	0	1	1	0	0	0	0
641:	0	0	0	0	1	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	1
665:	0	0	0	1	1	0	0	0
673:	0	0	0	0	0	1	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	1	0	0	1	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	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	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: 13

Channel								
809:	0	0	0	0	1	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	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	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	1	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	1	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	1	0	0	0	0
1017:	0	0	0	0	0	0	0	0



C
4/19/13

Sample Description: PZ-111-SD TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 14
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.400E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 6:28:46 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9902 +/- 0.0000
 Counting Efficiency: 0.1967 +/- 0.0036 on 12/15/2012 11:26:40 AM
 Effective Efficiency: 0.1948 +/- 0.0036

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	15.43	56.25	3.57	0.00E+000	2.9
RA-226	4.579	41.60	31.81	3.40	0.00E+000	2.9

 NUCLIDE ANALYSIS RESULTS

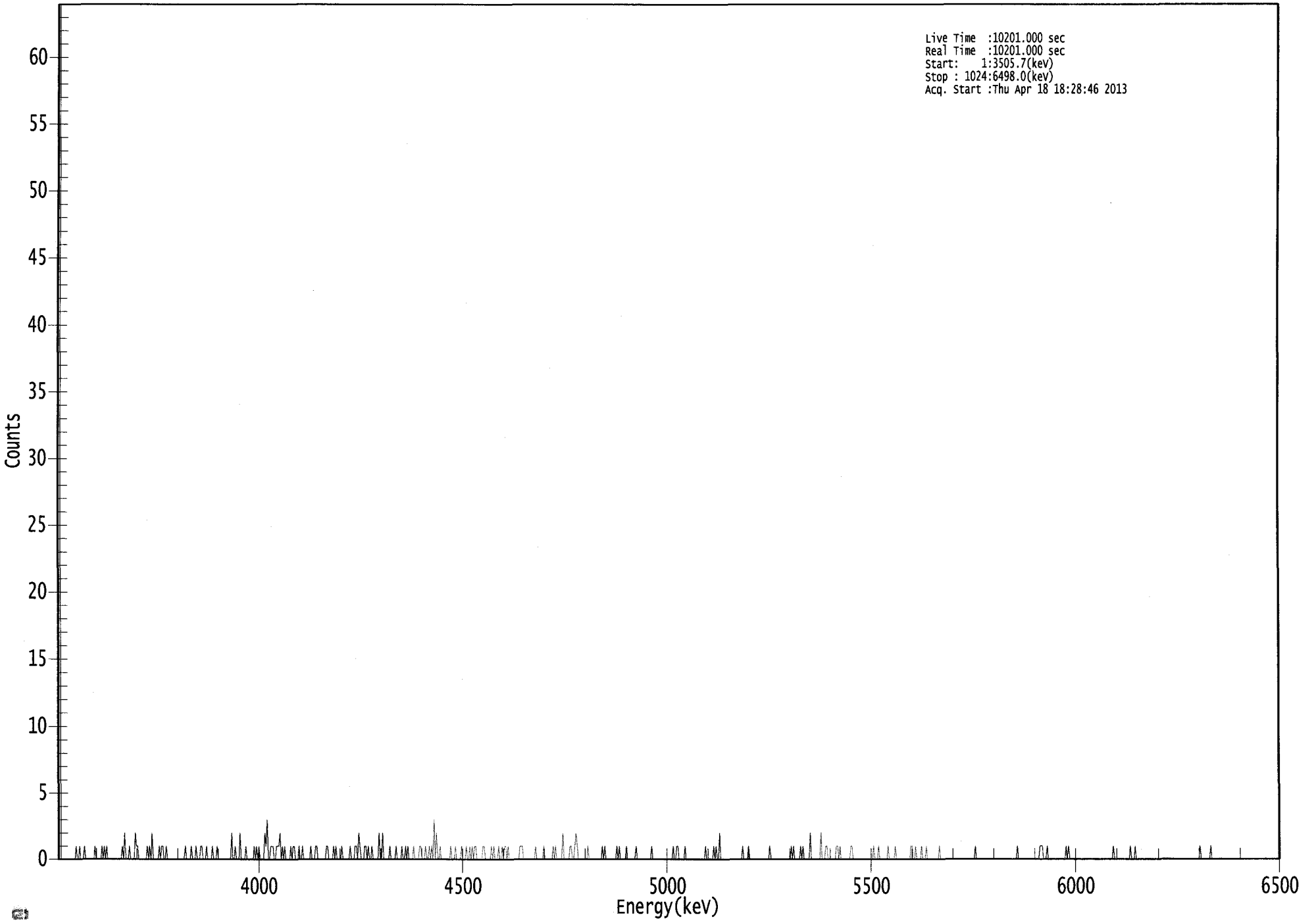
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.957	5685.50*	4.35E-001 +/- 1.24E+002	2.66E-001 +/- 7.57E+001
RA-226	0.946	4785.00*	9.05E-001 +/- 2.90E-001	2.02E-001 +/- 7.21E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055818.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3505.7(kev)
Stop : 1024:6498.0(kev)
Acq. Start :Thu Apr 18 18:28:46 2013



000055818

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: 10201

Elapsed Real Time: 10201

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

369: 0 0 1 0 0 1 0 1

Sample Title: 14

Channel	1	2	3	4	5	6	7	8
377:	1	0	1	0	0	0	0	0
385:	0	0	0	0	1	1	1	0
393:	0	0	0	0	0	0	0	0
401:	0	1	0	0	0	0	0	0
409:	1	0	0	0	0	0	0	0
417:	1	0	1	0	0	0	0	0
425:	2	0	0	0	0	0	1	1
433:	0	0	1	2	1	0	0	0
441:	0	0	0	0	0	1	0	0
449:	0	0	0	0	0	0	0	0
457:	0	1	0	1	0	0	0	0
465:	0	0	0	0	0	1	0	1
473:	0	0	0	0	0	1	0	0
481:	0	0	0	0	0	1	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	1	0	0	1
521:	1	0	0	0	0	0	1	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	1
545:	0	0	0	0	0	0	1	0
553:	1	0	0	2	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	1	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	1	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	1
617:	0	1	0	0	0	0	0	1
625:	0	1	0	0	0	0	0	2
633:	0	0	0	0	0	0	0	0
641:	2	0	0	0	1	1	0	0
649:	0	0	0	0	0	1	1	0
657:	1	0	0	0	0	0	0	0
665:	0	1	1	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	1	0	0	0
689:	1	0	0	0	0	0	0	0
697:	1	0	0	0	0	0	1	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	1	1	0	0	1
721:	0	0	0	0	1	0	0	0
729:	1	0	0	0	0	0	0	0
737:	0	0	0	1	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 1 0 0 0

Sample Title: 14

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	1
825:	1	1	0	0	0	1	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	1	0	1
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	1	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	1	0	0	0	1	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	1	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	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
4/19/13

Sample Description: PZ-111-SD DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 15
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.440E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 6:28:48 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9600 +/- 0.0000
 Counting Efficiency: 0.1973 +/- 0.0042 on 12/15/2012 11:28:06 AM
 Effective Efficiency: 0.1894 +/- 0.0040

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	5.546	5.43	111.89	3.57	0.00E+000	2.7
RA-226	4.565	51.49	27.47	0.51	0.00E+000	2.7

 NUCLIDE ANALYSIS RESULTS

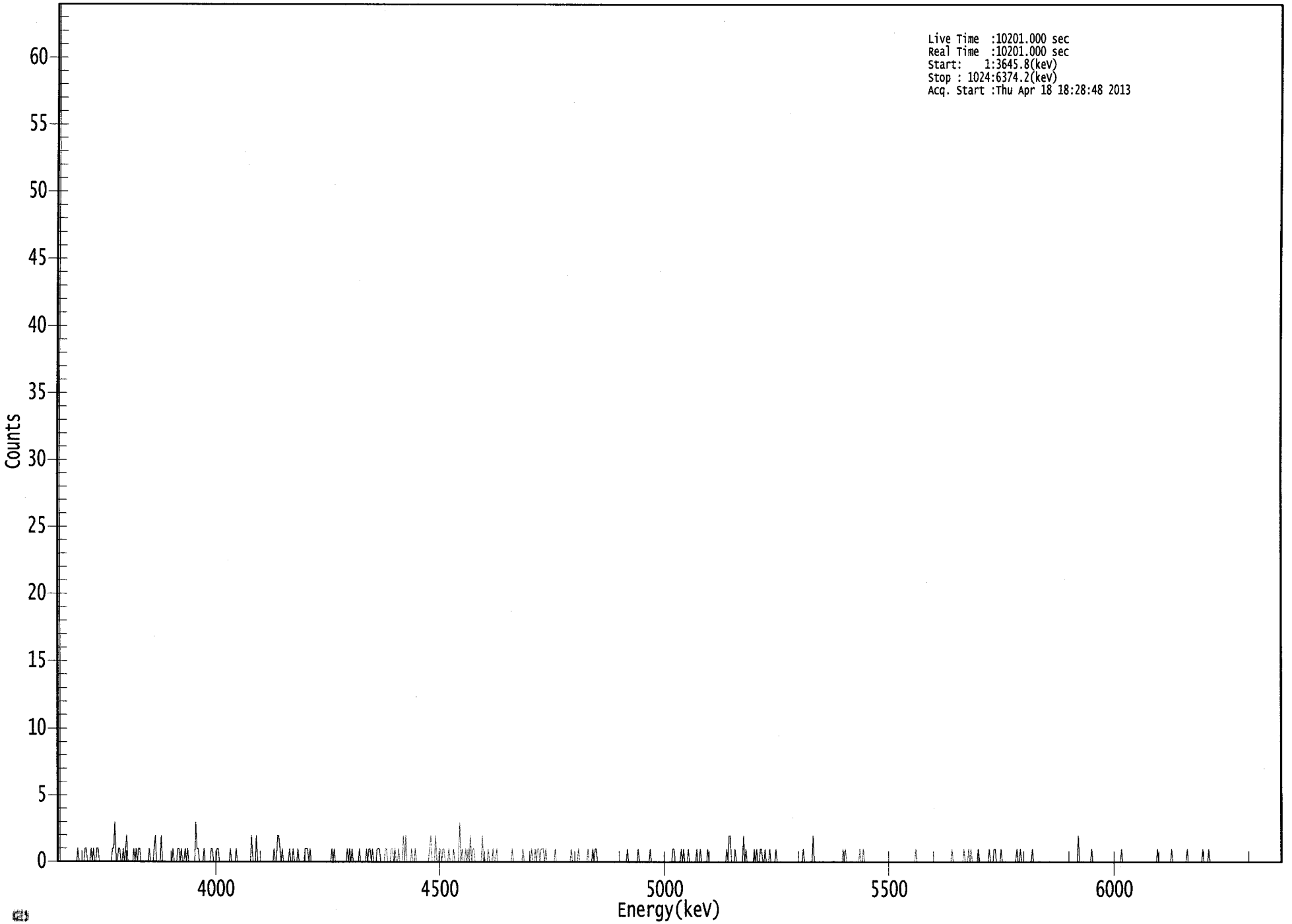
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.974	5685.50*	1.60E-001 +/- 4.56E+001	2.78E-001 +/- 7.92E+001
RA-226	0.939	4785.00*	1.17E+000 +/- 3.25E-001	1.19E-001 +/- 4.93E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055819.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3645.8(kev)
Stop : 1024:6374.2(kev)
Acq. Start :Thu Apr 18 18:28:48 2013



0770
0770

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

369: 1 0 0 0 0 0 0 0 0

Sample Title: 15

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

801: 0 0 1 0 0 1 0 0

Sample Title: 15

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	0	0	1
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	2	0	0
857:	0	0	0	0	0	0	0	0
865:	1	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	1	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	1
921:	0	0	0	0	0	0	0	0
929:	0	0	0	1	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	1	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



C
4/19/13

Sample Description: PZ-304-AI TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 16
 Sample Geometry: Shelf 2
 Procedure Description: Ra

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

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 4.000E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 6:28:49 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9809 +/- 0.0000
 Counting Efficiency: 0.1869 +/- 0.0035 on 12/15/2012 11:26:45 AM
 Effective Efficiency: 0.1833 +/- 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	5.533	6.92	96.86	4.08	0.00E+000	2.8
RA-226	4.547	31.98	35.30	1.02	0.00E+000	2.8

 NUCLIDE ANALYSIS RESULTS

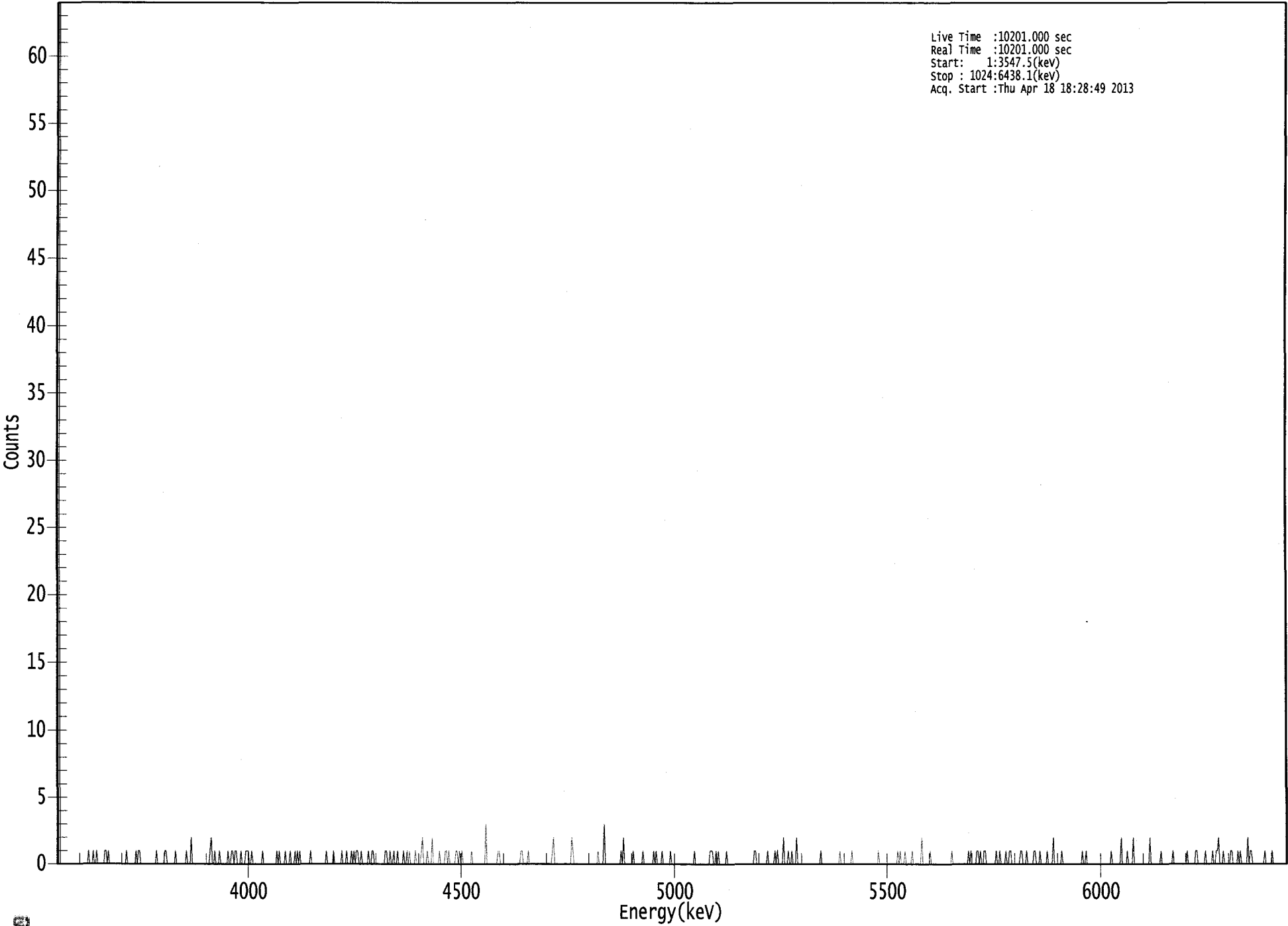
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.970	5685.50*	3.45E-001 +/- 9.84E+001	4.94E-001 +/- 1.41E+002
RA-226	0.929	4785.00*	1.23E+000 +/- 4.37E-001	2.43E-001 +/- 8.80E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055820.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3547.5(kev)
Stop : 1024:6438.1(kev)
Acq. Start :Thu Apr 18 18:28:49 2013



0453
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: 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	1	0
33:	0	1	0	0	0	0	0	0
41:	1	1	0	1	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	1	0	1	1	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	1	0	0	0	0
89:	0	0	1	1	0	0	0	0
97:	0	0	0	1	0	0	0	0
105:	0	0	0	0	1	0	0	0
113:	2	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	1	2	0	0	1	0	0	0
137:	1	0	0	0	0	0	0	1
145:	0	0	1	1	0	1	1	0
153:	0	0	1	0	0	0	1	1
161:	1	0	0	1	0	0	0	0
169:	0	0	0	0	1	0	0	0
177:	0	0	0	0	0	0	0	0
185:	1	0	1	0	0	0	0	1
193:	0	0	0	1	0	0	0	1
201:	0	1	0	1	0	0	0	0
209:	0	0	0	0	1	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	1	0	0	0	0	0	1
233:	0	0	0	0	0	0	1	0
241:	0	0	1	0	0	0	1	0
249:	1	0	1	1	0	0	1	0
257:	0	0	0	0	1	0	0	1
265:	1	0	0	0	0	0	0	0
273:	0	0	1	1	0	0	1	0
281:	0	1	0	0	1	0	0	0
289:	0	1	0	0	1	0	1	0
297:	0	0	0	1	0	0	0	0
305:	1	2	0	0	0	1	0	0
313:	0	2	0	0	0	0	0	1
321:	0	0	0	0	1	1	0	1
329:	0	0	0	0	0	1	1	0
337:	1	0	1	0	0	0	0	0
345:	0	0	1	0	0	0	0	0
353:	0	0	0	0	0	0	3	0
361:	0	0	0	0	0	0	0	0

369: 1 1 0 0 0 0 0 0

Sample Title: 16

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

801: 0 0 1 1 0 0 0 1

Sample Title: 16

Channel	-----	-----	-----	-----	-----	-----	-----	-----
809:	0	0	0	0	0	1	1	0
817:	0	0	1	0	0	0	0	0
825:	1	0	0	0	0	2	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	1	0	0
857:	1	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	2	0	0
889:	0	0	1	0	0	0	0	2
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	2	0	0
913:	0	0	0	0	0	0	1	0
921:	0	0	0	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	1	1	0	0	0
953:	0	0	0	1	0	0	0	0
961:	0	1	0	0	1	1	2	0
969:	0	0	1	0	0	0	0	0
977:	1	1	0	0	0	0	1	0
985:	1	0	0	0	0	0	2	0
993:	1	1	0	0	0	0	0	0
1001:	0	0	0	0	1	0	0	0
1009:	0	0	1	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0



C
4/19/13

Sample Description: PZ-304-AI DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 17
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_014
 Chamber Serial Number:
 Detector Serial Number: 14
 Env. Background: System Bkgd 54575
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.960E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 6:28:50 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9731 +/- 0.0000
 Counting Efficiency: 0.1846 +/- 0.0034 on 12/15/2012 11:26:44 AM
 Effective Efficiency: 0.1796 +/- 0.0033

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	5.507	11.77	65.67	3.23	0.00E+000	2.9
RA-226	4.602	21.45	45.17	2.55	0.00E+000	4.4

 NUCLIDE ANALYSIS RESULTS

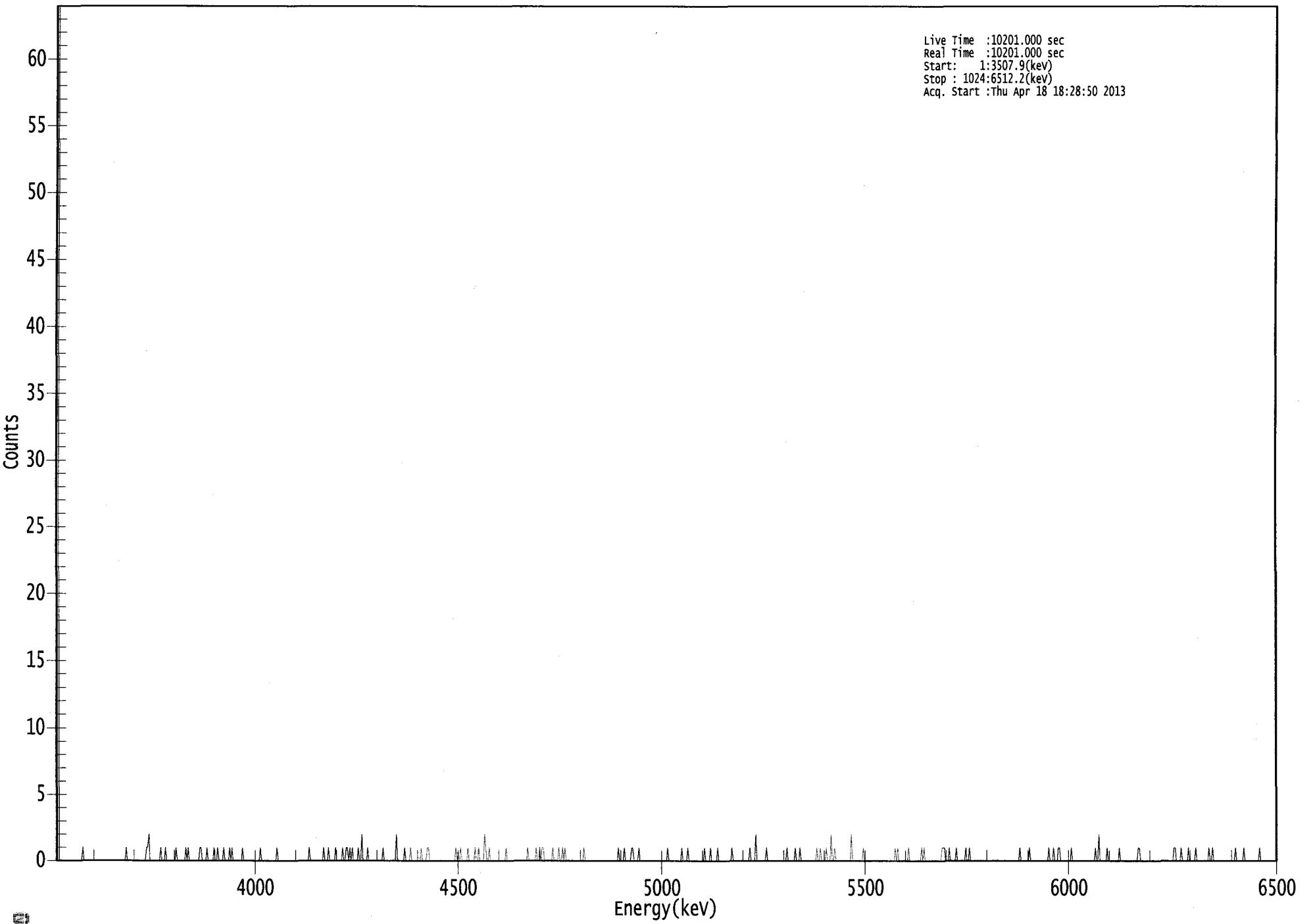
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.959	5685.50*	4.44E-001 +/- 1.26E+002	3.43E-001 +/- 9.78E+001
RA-226	0.957	4785.00*	6.24E-001 +/- 2.83E-001	2.44E-001 +/- 8.88E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055821.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3507.9(kev)
Stop : 1024:6512.2(kev)
Acq. Start :Thu Apr 18 18:28:50 2013



0459

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: 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	1	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	1	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	1	1	2	0
81:	0	0	0	0	0	0	0	0
89:	1	0	0	0	1	0	0	0
97:	0	0	0	0	0	1	0	0
105:	0	0	0	0	0	1	0	1
113:	0	0	0	0	0	0	0	0
121:	0	1	1	0	0	0	0	1
129:	0	0	0	0	0	1	0	0
137:	1	0	0	0	0	1	0	0
145:	0	0	1	0	1	0	0	0
153:	0	0	0	0	0	1	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	1	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	1	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	1	0	0
217:	0	0	0	0	0	0	0	0
225:	0	1	0	0	0	1	0	0
233:	0	0	0	1	0	0	0	0
241:	0	1	0	0	1	1	0	1
249:	0	1	0	0	0	0	1	0
257:	0	2	0	0	0	0	1	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	1	0	0	0	0
281:	0	0	0	0	0	0	2	0
289:	0	0	0	0	0	1	0	0
297:	0	0	1	0	0	0	0	0
305:	0	0	0	1	0	0	0	0
313:	1	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:	1	0	0	0	1	0	0	0
345:	0	0	1	0	0	0	0	0
353:	1	0	0	1	0	0	0	0
361:	2	1	0	0	1	0	0	0

369: 0 0 0 0 0 0 0 0

Sample Title: 17

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	1	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	1	0	0	0
401:	0	0	0	1	0	0	1	0
409:	1	1	0	0	0	0	0	0
417:	0	1	0	0	0	0	1	0
425:	0	1	0	1	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	1	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	1	0	0	0	0	1	0	0
481:	0	0	0	1	1	0	0	0
489:	0	1	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	1	0	0
529:	0	0	1	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	1	0	0	0	0	1	0	0
553:	0	0	0	1	0	0	0	0
561:	0	0	0	0	0	0	0	1
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	1	0
585:	0	0	0	2	0	0	0	0
593:	0	0	0	0	1	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	1	0	0	0
625:	1	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	1	0
641:	0	1	0	0	0	0	1	0
649:	0	0	2	0	0	1	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	2	0	0	0	0
673:	0	0	0	0	0	1	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:	1	0	1	0	0	0	0	0
713:	0	0	0	1	0	0	0	0
721:	0	0	0	0	0	0	1	0
729:	1	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	1
745:	1	1	0	0	0	1	0	0
753:	0	0	0	1	0	0	0	0
761:	0	0	0	1	0	0	1	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: 17

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



C
4/19/17

Sample Description: I-11 TOT
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 18
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_018
 Chamber Serial Number:
 Detector Serial Number: 18
 Env. Background: System Bkgd 54576
 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: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 6:29:13 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9129 +/- 0.0000
 Counting Efficiency: 0.1776 +/- 0.0033 on 12/15/2012 1:57:26 PM
 Effective Efficiency: 0.1622 +/- 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	5.527	17.94	50.68	3.06	0.00E+000	3.1
RA-226	4.617	33.96	34.80	2.04	0.00E+000	3.1

 NUCLIDE ANALYSIS RESULTS

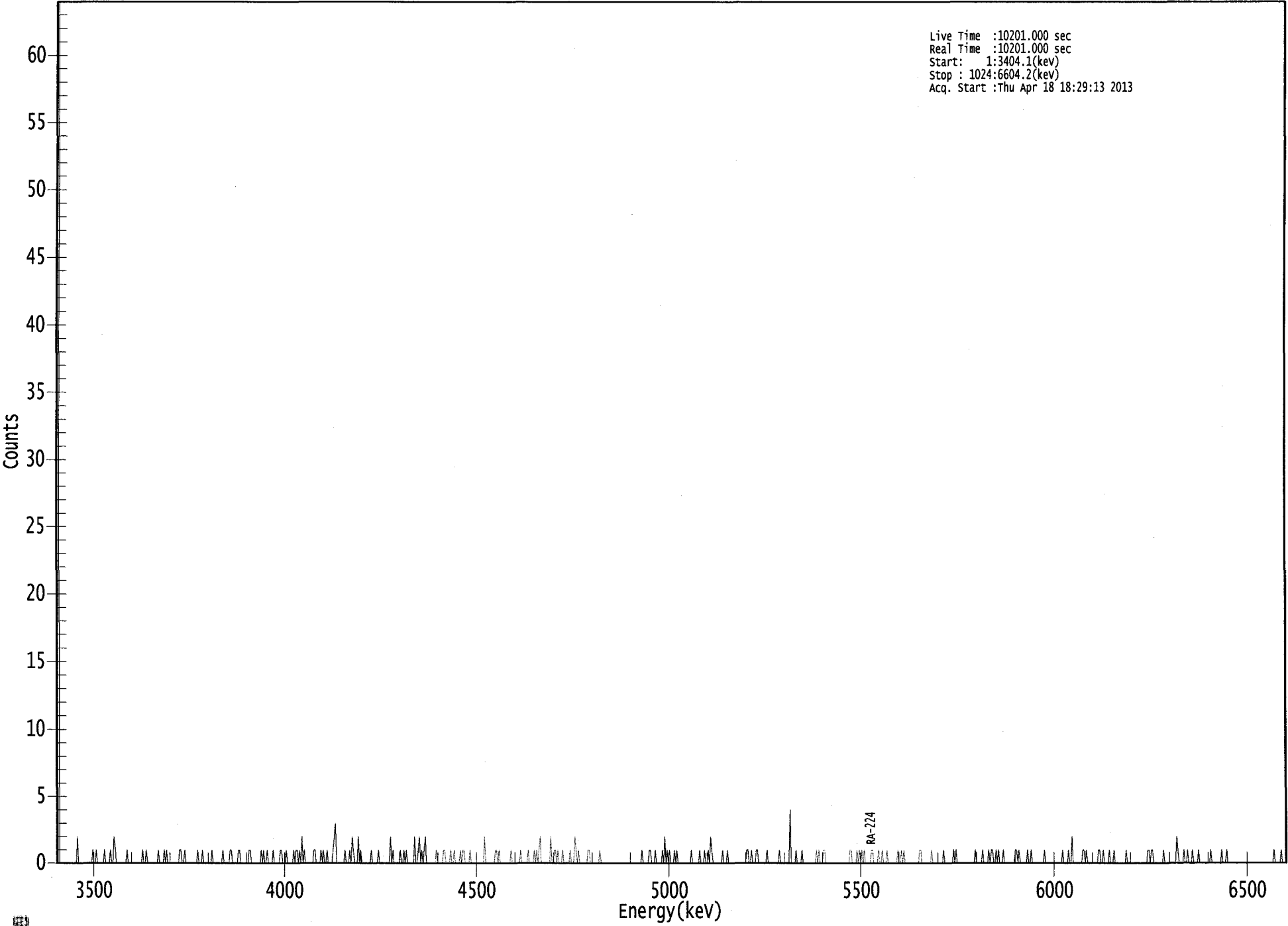
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.967	5685.50*	7.01E-001 +/- 2.00E+002	3.49E-001 +/- 9.95E+001
RA-226	0.964	4785.00*	1.02E+000 +/- 3.58E-001	2.35E-001 +/- 8.56E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

0000055824.CNF

Live Time :10201.000 sec
Real Time :10201.000 sec
Start: 1:3404.1(kev)
Stop : 1024:6604.2(kev)
Acq. Start :Thu Apr 18 18:29:13 2013



0463
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: 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	2	0	0	0	0	0	0
25:	0	0	0	0	0	0	1	0
33:	0	1	0	0	0	0	0	0
41:	1	0	0	0	0	1	0	0
49:	2	1	0	0	0	0	0	0
57:	0	0	0	1	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	1	0	0	1	0	0	0	0
81:	0	0	0	0	0	1	0	0
89:	0	0	1	0	1	0	0	0
97:	0	0	0	0	0	0	0	1
105:	1	0	0	1	0	0	0	0
113:	0	0	0	0	0	0	1	0
121:	0	0	1	0	0	0	0	0
129:	0	0	1	0	0	0	0	0
137:	0	0	0	1	0	0	0	0
145:	0	1	1	0	0	0	0	0
153:	1	1	0	0	0	0	0	0
161:	0	1	1	0	0	0	0	0
169:	0	0	0	1	0	1	0	0
177:	1	0	0	0	0	1	0	0
185:	0	0	0	1	1	0	0	0
193:	1	0	0	0	0	0	1	0
201:	1	1	0	1	0	2	0	1
209:	0	0	0	0	0	0	0	1
217:	1	0	0	0	0	1	0	1
225:	0	0	1	0	0	0	0	1
233:	2	3	0	0	0	0	0	0
241:	0	1	0	0	0	1	0	2
249:	1	0	0	0	2	0	1	0
257:	0	0	0	0	0	0	0	1
265:	0	0	0	0	0	1	0	0
273:	0	0	0	0	0	0	0	2
281:	0	1	0	0	0	0	0	1
289:	0	0	1	0	1	0	0	0
297:	0	0	0	2	0	0	1	2
305:	0	1	0	1	2	0	0	0
313:	0	0	0	0	0	1	0	0
321:	0	0	0	1	1	0	0	0
329:	0	1	0	0	1	0	0	0
337:	0	1	0	1	1	0	0	0
345:	0	1	0	0	0	0	0	0
353:	0	0	0	0	0	2	0	0
361:	0	0	0	0	0	0	1	1

369: 0 1 0 0 0 0 0 0

Sample Title: 18

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

801: 0 1 0 0 0 0 0 0

Sample Title: 18

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



C
4/19/13

Sample Description: I-11 DIS
 Spectrum File: \\OR-ALPHA1\Canberra\ApexAlpha\Root\Data\00000558
 Batch Identification: 1304050A-RA
 Sample Identification: 19
 Sample Geometry: Shelf 2
 Procedure Description: Ra

Detector Name: Alpha_022
 Chamber Serial Number:
 Detector Serial Number: 22
 Env. Background: System Bkgd 54577
 Reagent Blank: <not performed>

Sample Size: 1.500E+000 +/- 0.000E+000 liter
 Generic Mult. Factor: 2.870E+000 Generic Div. Factor: 1.000E+000
 Sample Date/Time: 4/17/2013 4:05:54 PM
 Acquisition Date/Time: 4/18/2013 6:29:14 PM
 Acquisition Live Time: 170.0 minutes
 Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9592 +/- 0.0000
 Counting Efficiency: 0.1531 +/- 0.0029 on 12/15/2012 1:57:26 PM
 Effective Efficiency: 0.1469 +/- 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	5.533	9.45	73.13	2.55	0.00E+000	3.1
RA-226	4.605	35.81	33.38	1.19	0.00E+000	3.1

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

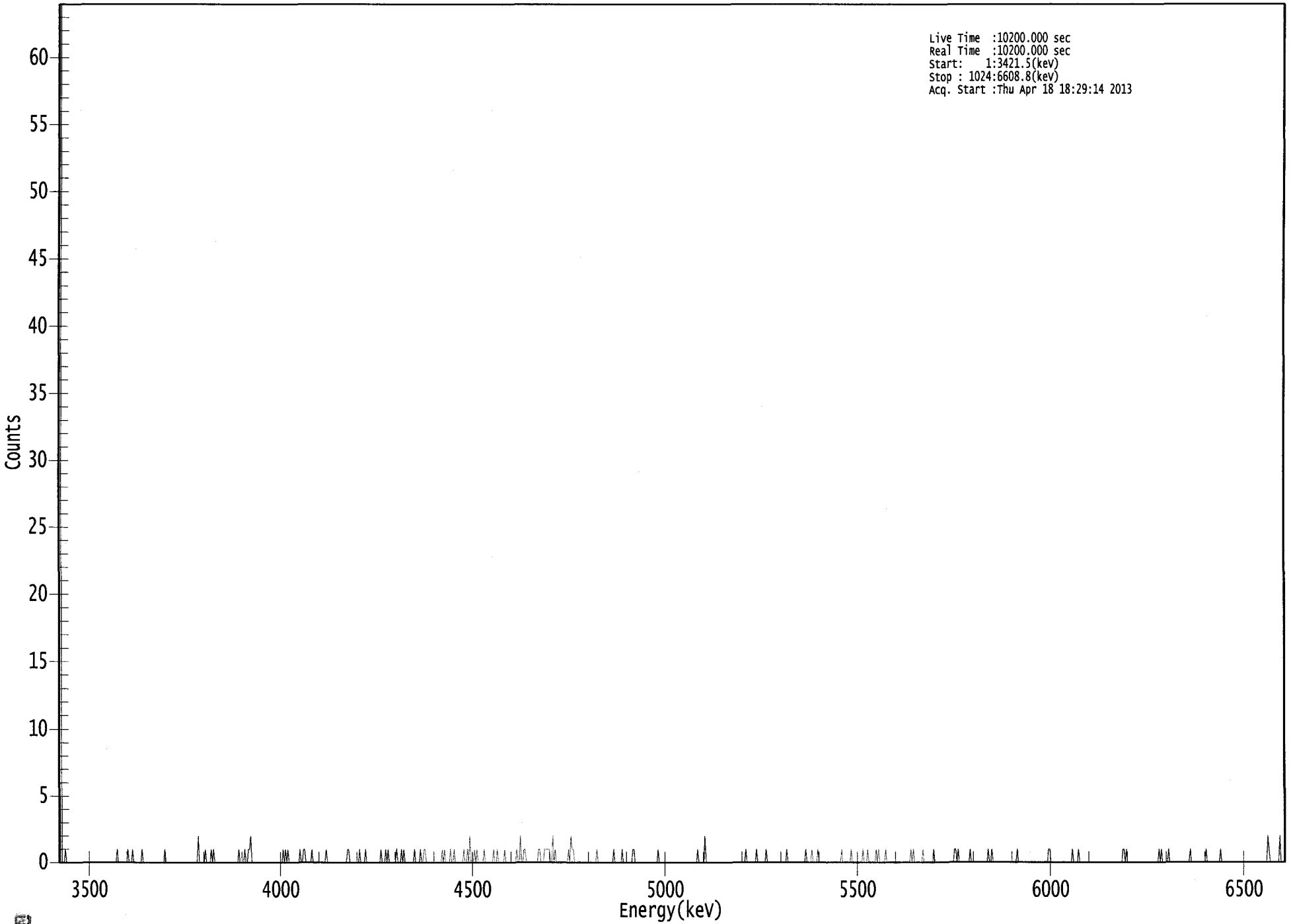
Nuclide	Id Conf.	Energy (keV)	Activity (pCi/liter)	MDA (pCi/liter)
RA-224	0.970	5685.50*	4.22E-001 +/- 1.20E+002	3.75E-001 +/- 1.07E+002
RA-226	0.958	4785.00*	1.24E+000 +/- 4.15E-001	2.27E-001 +/- 8.49E-003

AG
4/19/13

US EPA ARCHIVE DOCUMENT

000055825.CNF

Live Time :10200.000 sec
Real Time :10200.000 sec
Start: 1:3421.5(kev)
Stop : 1024:6608.8(kev)
Acq. Start :Thu Apr 18 18:29:14 2013



0468

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	0	0	0	1	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	1	0	0	0	0	0	0
57:	0	0	1	0	0	0	1	0
65:	0	0	0	0	0	0	1	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	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	2	0	0
121:	0	0	0	1	0	0	0	0
129:	1	0	1	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	1
153:	0	0	0	0	1	0	0	1
161:	1	2	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	1	0
193:	1	0	0	0	0	0	0	0
201:	0	0	1	0	0	1	1	0
209:	0	0	0	0	1	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	1	1	0	0	0	0
249:	0	0	0	0	1	0	0	0
257:	0	1	0	0	0	0	0	0
265:	0	0	0	0	0	0	1	0
273:	0	0	1	0	1	0	0	0
281:	0	0	0	1	0	0	0	1
289:	0	1	0	0	0	0	0	0
297:	0	0	1	0	0	0	0	1
305:	0	0	1	1	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	1	0	1	0	0	0	0
329:	1	0	0	1	0	0	0	0
337:	0	0	0	1	0	0	1	0
345:	2	0	0	0	1	0	1	0
353:	0	0	0	0	1	0	0	0
361:	0	0	0	0	1	0	0	1

369: 0 0 0 0 0 1 0 0

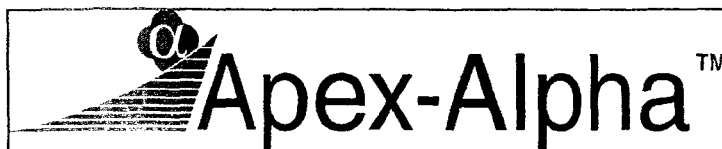
Sample Title: 19

Channel	-----	-----	-----	-----	-----	-----	-----	-----
377:	0	0	0	0	0	0	0	1
385:	0	0	2	0	0	1	1	0
393:	0	0	0	0	0	0	0	0
401:	0	1	1	0	0	0	1	1
409:	1	1	1	0	0	2	0	1
417:	0	0	0	0	0	0	0	0
425:	0	0	1	0	2	1	1	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	1	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	1	0	0	0	0	0	0	1
473:	0	0	0	0	0	0	0	0
481:	1	1	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	1	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	1	0
537:	0	0	0	0	2	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	1	0
577:	0	0	0	0	0	0	0	1
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	0	0
609:	1	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	1	0	0	0	0	1	0	0
633:	0	0	1	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	1	0
665:	0	0	0	0	0	0	0	0
673:	1	0	0	0	1	0	0	0
681:	0	0	0	1	0	1	0	0
689:	0	0	0	1	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	1	0	1	0	0	0	0	0
721:	0	0	1	0	0	0	0	0
729:	0	0	0	1	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	1	1	0	1
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	1	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801: 1 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	1	1	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	1	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:	1	1	0	1	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	1	0
921:	1	0	0	0	0	0	1	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	1	0	0
961:	0	0	0	0	0	0	0	0
969:	0	1	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:	2	1	0	0	0	0	0	0
1017:	0	0	2	0	0	0	0	0



QA SUMMARY REPORT
Review Of QA Results - Pulser Check

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

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 001	21f	ALL	Not Done	
Alpha 002	21f	ALL	Not Done	
Alpha 003	21f	ALL	Passed	4/18/2013 5:16:12 AM
Alpha 004	21f	ALL	Passed	4/18/2013 5:16:13 AM
Alpha 005	21f	ALL	Not Done	
Alpha 006	21f	ALL	Not Done	
Alpha 007	21f	ALL	Not Done	
Alpha 008	21f	ALL	Not Done	
Alpha 009	21f	ALL	Not Done	
Alpha 010	21f	ALL	Passed	4/18/2013 5:16:14 AM
Alpha 011	21f	ALL	Passed	4/18/2013 5:16:15 AM
Alpha 012	21f	ALL	Not Done	
Alpha 013	21f	ALL	Passed	4/18/2013 5:16:15 AM
Alpha 014	21f	ALL	Passed	4/18/2013 5:16:16 AM
Alpha 015	21f	ALL	Not Done	
Alpha 016	21f	ALL	Not Done	
Alpha 017	AIM730	ALL	Not Done	
Alpha 018	AIM730	ALL	Passed	4/18/2013 5:16:17 AM
Alpha 019	AIM730	ALL	Not Done	
Alpha 020	AIM730	ALL	Not Done	
Alpha 021	AIM730	ALL	Not Done	
Alpha 022	AIM730	ALL	Passed	4/18/2013 5:16:18 AM
Alpha 023	AIM730	ALL	Not Done	
Alpha 024	AIM730	ALL	Passed	4/18/2013 5:16:18 AM
Alpha 025	AIM730	ALL	Passed	4/18/2013 5:16:19 AM
Alpha 026	AIM730	ALL	Not Done	
Alpha 027	AIM730	ALL	Passed	4/18/2013 5:16:20 AM
Alpha 028	AIM730	ALL	Not Done	
Alpha 029	AIM730	ALL	Passed	4/18/2013 5:16:21 AM
Alpha 030	AIM730	ALL	Not Done	
Alpha 031	AIM730	ALL	Not Done	
Alpha 032	AIM730	ALL	Not Done	
Alpha 033	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:22 AM
Alpha 034	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:23 AM
Alpha 035	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:25 AM
Alpha 036	Alpha Analyst100DC	ALL	Not Done	
Alpha 037	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:26 AM
Alpha 038	Alpha Analyst100DC	ALL	Not Done	
Alpha 039	Alpha Analyst100DC	ALL	Not Done	
Alpha 040	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:28 AM
Alpha 041	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:29 AM
Alpha 042	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:31 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha 043	Alpha Analyst100DC	ALL	Not Done	
Alpha 044	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:32 AM
Alpha 045	Alpha Analyst100DC	ALL	Not Done	
Alpha 046	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:34 AM
Alpha 047	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:36 AM
Alpha 048	Alpha Analyst100DC	ALL	Passed	4/18/2013 5:16:37 AM

APPROVED BY: _____

APPROVAL DATE: 4/18/13

US EPA ARCHIVE DOCUMENT

***** 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	13-04050					
Analysis Code	Ra228					
Run	1					
Date Received	4/9/2013					
Lab Deadline	4/30/2013					
Client	Engineering Management Support, Inc.					
Project	West Lake OU-1					
Report Level	4					
Activity Units	pCi					
Aliquot Units	1					
Matrix	WA					
Method	EPA 904.0 Modified					
Instrument Type	Alpha/Beta GPC					
Radiometric Tracer	Ba-133					
Radiometric Sol#	Ba-6a					
Tracer Act (dpm/g)	1011.425					
Carrier	Yttrium					
Carrier Conc (mg/ml)	34					
Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot	
01	LCS	LCS		04/09/13 00:00	1.0000E+00	
02	MBL	BLANK		04/09/13 00:00	1.5000E+00	
03	DUP	PZ-111-SD TOT	38	04/04/13 13:52	1.5000E+00	
04	TRG	S-8 TOT	40	04/04/13 11:32	1.5000E+00	
05	TRG	S-8 DIS	40	04/04/13 11:32	1.5000E+00	
06	TRG	D-13 TOT	47	04/04/13 11:55	1.5000E+00	
07	TRG	D-13 DIS	47	04/04/13 11:55	1.5000E+00	
08	TRG	PZ-304-AS TOT	44	04/04/13 12:56	1.5000E+00	
09	TRG	PZ-304-AS DIS	44	04/04/13 12:56	1.5000E+00	
10	TRG	PZ-303-AS TOT	46	04/04/13 13:00	1.5000E+00	
11	TRG	PZ-303-AS DIS	46	04/04/13 13:00	1.5000E+00	
12	TRG	D-12 TOT	45	04/04/13 13:50	1.5000E+00	
13	TRG	D-12 DIS	45	04/04/13 13:50	1.5000E+00	
14	DO	PZ-111-SD TOT	38	04/04/13 13:52	1.5000E+00	
15	TRG	PZ-111-SD DIS	38	04/04/13 13:52	1.5000E+00	
16	TRG	PZ-304-AI TOT	43	04/04/13 14:08	1.5000E+00	
17	TRG	PZ-304-AI DIS	43	04/04/13 14:08	1.5000E+00	
18	TRG	I-11 TOT	35	04/04/13 14:40	1.5000E+00	
19	TRG	I-11 DIS	35	04/04/13 14:40	1.5000E+00	

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	0.9100	920.4	385.6	93.01	2.000	0.0910	0.1497	0.0587	86.32	80.29	1.00	1.00
02	MBL	0.9083	918.7	411.2	99.37	2.000	0.0913	0.1480	0.0567	83.38	82.85	1.00	1.00
03	DUP	0.9046	914.9	392.3	95.19	2.000	0.0928	0.1494	0.0566	83.24	79.23	1.00	1.00
04	TRG	0.9050	915.3	404.0	97.98	2.000	0.0907	0.1472	0.0565	83.09	81.41	1.00	1.00
05	TRG	0.9029	913.2	388.4	94.42	2.000	0.0913	0.1483	0.0570	83.82	79.15	1.00	1.00
06	TRG	0.9022	912.5	377.7	91.89	2.000	0.0929	0.1510	0.0581	85.44	78.51	1.00	1.00
07	TRG	0.9013	911.6	421.3	102.60	2.000	0.0931	0.1498	0.0567	83.38	85.55	1.00	1.00
08	TRG	0.9031	913.4	367.1	89.22	2.000	0.0911	0.1491	0.0580	85.29	76.10	1.00	1.00
09	TRG	0.9016	911.9	414.2	100.84	2.000	0.0912	0.1487	0.0575	84.56	85.27	1.00	1.00
10	TRG	0.9011	911.4	290.1	70.66	2.000	0.0909	0.1484	0.0575	84.56	59.75	1.00	1.00
11	TRG	0.8995	909.8	338.1	82.50	2.000	0.0910	0.1474	0.0564	82.94	68.43	1.00	1.00
12	TRG	0.9012	911.5	385.3	93.84	2.000	0.0929	0.1506	0.0577	84.85	79.63	1.00	1.00
13	TRG	0.9010	911.3	360.1	87.72	2.000	0.0910	0.1490	0.0580	85.29	74.82	1.00	1.00
14	DO	0.9002	910.5	406.1	99.02	2.000	0.0909	0.1474	0.0565	83.09	82.27	1.00	1.00
15	TRG	0.8995	909.8	393.4	96.00	2.000	0.0927	0.1495	0.0568	83.53	80.18	1.00	1.00
16	TRG	0.8986	908.9	401.6	98.09	2.000	0.0912	0.1478	0.0566	83.24	81.65	1.00	1.00
17	TRG	0.9004	910.7	399.2	97.31	2.000	0.0912	0.1483	0.0571	83.97	81.71	1.00	1.00
18	TRG	0.9002	910.5	374.4	91.29	2.000	0.0930	0.1493	0.0563	82.79	75.58	1.00	1.00
19	TRG	0.8993	909.6	393.0	95.92	2.000	0.0919	0.1508	0.0589	86.62	83.08	1.00	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.

0477

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
02	MBL			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
03	DUP			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
04	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
05	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
06	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
07	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
08	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
09	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
10	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
11	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
12	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
13	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
14	DO			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
15	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
16	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
17	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
18	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH
19	TRG			04/12/13 12:33	JBARNARD	04/17/13 16:05	LWALKER	04/26/13 05:28	TSMITH

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

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-Ra228-1

Run	1
Analysis Code	Ra228
Eberline Services Work Order	13-04050
Client	Engineering Management Support, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-228	LCS	LCS	pCi/l	8.63E+00	9.82E-01	1.31E+00	9.07E+00	95.09	OK		OK	
02	RA-228	MBL	BLANK	pCi/l	7.74E-01	4.15E-01	7.97E-01					OK	OK
03	RA-228	DUP	PZ-111-SD TOT	pCi/l	1.07E+00	4.30E-01	7.93E-01				NA	OK	
04	RA-228	TRG	S-8 TOT	pCi/l	1.18E+00	4.27E-01	7.74E-01					OK	
05	RA-228	TRG	S-8 DIS	pCi/l	9.97E-01	4.35E-01	8.14E-01					OK	
06	RA-228	TRG	D-13 TOT	pCi/l	2.52E+00	5.89E-01	1.01E+00					OK	
07	RA-228	TRG	D-13 DIS	pCi/l	1.22E+00	4.68E-01	8.73E-01					OK	
08	RA-228	TRG	PZ-304-AS TOT	pCi/l	1.76E+00	5.27E-01	9.37E-01					OK	
09	RA-228	TRG	PZ-304-AS DIS	pCi/l	9.60E-01	3.91E-01	7.15E-01					OK	
10	RA-228	TRG	PZ-303-AS TOT	pCi/l	1.61E+00	7.18E-01	1.37E+00					OK	
11	RA-228	TRG	PZ-303-AS DIS	pCi/l	7.83E-01	5.71E-01	1.14E+00					OK	
12	RA-228	TRG	D-12 TOT	pCi/l	5.64E-01	5.03E-01	1.01E+00					OK	
13	RA-228	TRG	D-12 DIS	pCi/l	1.37E+00	4.78E-01	8.63E-01					OK	
14	RA-228	DO	PZ-111-SD TOT	pCi/l	2.57E-01	4.48E-01	9.30E-01					OK	
15	RA-228	TRG	PZ-111-SD DIS	pCi/l	9.32E-01	4.37E-01	8.22E-01					OK	
16	RA-228	TRG	PZ-304-AI TOT	pCi/l	1.96E+00	4.68E-01	7.69E-01					OK	
17	RA-228	TRG	PZ-304-AI DIS	pCi/l	1.23E+00	4.49E-01	8.14E-01					OK	
18	RA-228	TRG	I-11 TOT	pCi/l	2.37E+00	6.32E-01	1.08E+00					OK	
19	RA-228	TRG	I-11 DIS	pCi/l	8.83E-01	6.12E-01	1.21E+00					OK	

5270

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-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	93.01	86.32	80.29	1.00	4/17/2013 16:05	4/26/2013 5:28
02	RA-228	MBL	04/09/13 00:00	1.50E+00	99.37	83.38	82.85	1.00	4/17/2013 16:05	4/26/2013 5:28
03	RA-228	DUP	04/04/13 13:52	1.50E+00	95.19	83.24	79.23	1.00	4/17/2013 16:05	4/26/2013 5:28
04	RA-228	TRG	04/04/13 11:32	1.50E+00	97.98	83.09	81.41	1.00	4/17/2013 16:05	4/26/2013 5:28
05	RA-228	TRG	04/04/13 11:32	1.50E+00	94.42	83.82	79.15	1.00	4/17/2013 16:05	4/26/2013 5:28
06	RA-228	TRG	04/04/13 11:55	1.50E+00	91.89	85.44	78.51	1.00	4/17/2013 16:05	4/26/2013 5:28
07	RA-228	TRG	04/04/13 11:55	1.50E+00	102.60	83.38	85.55	1.00	4/17/2013 16:05	4/26/2013 5:28
08	RA-228	TRG	04/04/13 12:56	1.50E+00	89.22	85.29	76.10	1.00	4/17/2013 16:05	4/26/2013 5:28
09	RA-228	TRG	04/04/13 12:56	1.50E+00	100.84	84.56	85.27	1.00	4/17/2013 16:05	4/26/2013 5:28
10	RA-228	TRG	04/04/13 13:00	1.50E+00	70.66	84.56	59.75	1.00	4/17/2013 16:05	4/26/2013 5:28
11	RA-228	TRG	04/04/13 13:00	1.50E+00	82.50	82.94	68.43	1.00	4/17/2013 16:05	4/26/2013 5:28
12	RA-228	TRG	04/04/13 13:50	1.50E+00	93.84	84.85	79.63	1.00	4/17/2013 16:05	4/26/2013 5:28
13	RA-228	TRG	04/04/13 13:50	1.50E+00	87.72	85.29	74.82	1.00	4/17/2013 16:05	4/26/2013 5:28
14	RA-228	DO	04/04/13 13:52	1.50E+00	99.02	83.09	82.27	1.00	4/17/2013 16:05	4/26/2013 5:28
15	RA-228	TRG	04/04/13 13:52	1.50E+00	96.00	83.53	80.18	1.00	4/17/2013 16:05	4/26/2013 5:28
16	RA-228	TRG	04/04/13 14:08	1.50E+00	98.09	83.24	81.65	1.00	4/17/2013 16:05	4/26/2013 5:28
17	RA-228	TRG	04/04/13 14:08	1.50E+00	97.31	83.97	81.71	1.00	4/17/2013 16:05	4/26/2013 5:28
18	RA-228	TRG	04/04/13 14:40	1.50E+00	91.29	82.79	75.58	1.00	4/17/2013 16:05	4/26/2013 5:28
19	RA-228	TRG	04/04/13 14:40	1.50E+00	95.92	86.62	83.08	1.00	4/17/2013 16:05	4/26/2013 5:28



Run 1

Analysis Code Ra228

Eberline Services Work Order 13-04050

Client Engineering Management Support, Inc.

0870

Preliminary Data Report & Analytical Calculations
Work Order: 13-04050-Ra228-1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Half-life (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	04/26/13 09:41		LB4110R	B1	120	639	1.283333333	0.4754
02	RA-228	MBL	04/26/13 09:41		LB4110R	B2	120	196	1.083333333	0.4658
03	RA-228	DUP	04/26/13 09:41		LB4110R	B3	120	208	1	0.4713
04	RA-228	TRG	04/26/13 09:41		LB4110R	B4	120	225	1.033333333	0.4773
05	RA-228	TRG	04/26/13 09:41		LB4110R	C1	120	208	1.05	0.4705
06	RA-228	TRG	04/26/13 09:41		LB4110R	C3	120	390	1.566666667	0.4614
07	RA-228	TRG	04/26/13 09:41		LB4110R	C4	120	281	1.433333333	0.4714
08	RA-228	TRG	04/26/13 09:46		LB4110A	C1	120	287	1.25	0.4667
09	RA-228	TRG	04/26/13 09:46		LB4110A	C2	120	186	0.866666667	0.4578
10	RA-228	TRG	04/26/13 09:46		LB4110A	C3	120	303	1.7	0.4699
11	RA-228	TRG	04/26/13 09:46		LB4110A	C4	120	237	1.516666667	0.4692
12	RA-228	TRG	04/26/13 09:46		LB4110A	D2	120	242	1.633333333	0.4682
13	RA-228	TRG	04/26/13 09:46		LB4110A	D4	120	232	1.05	0.4741
14	RA-228	DO	04/26/13 10:13		LB4110R	A1	120	185	1.366666667	0.4776
15	RA-228	TRG	04/26/13 10:13		LB4110R	A2	120	189	0.966666667	0.4699
16	RA-228	TRG	04/26/13 10:13		LB4110R	A3	120	270	0.916666667	0.4809
17	RA-228	TRG	04/26/13 10:13		LB4110R	A4	120	219	1	0.4732
18	RA-228	TRG	04/26/13 11:47		LB4110R	C1	120	273	1.05	0.4705
19	RA-228	TRG	04/26/13 11:47		LB4110R	C3	120	247	1.566666667	0.4614

	
Run	1
Analysis Code	Ra228
Eberline Services Work Order	13-04050
Client	Engineering Management Support, Inc.

1870

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	0.9100	920.3968	385.6000	93.01	1.00	1.00
02	MBL	BLANK	04/09/13 00:00	1.5000	0.9083	918.6773	411.2000	99.37	1.00	1.00
03	DUP	PZ-111-SD TOT	04/04/13 13:52	1.5000	0.9046	914.9351	392.3000	95.19	1.00	1.00
04	TRG	S-8 TOT	04/04/13 11:32	1.5000	0.9050	915.3396	404.0000	97.98	1.00	1.00
05	TRG	S-8 DIS	04/04/13 11:32	1.5000	0.9029	913.2156	388.4000	94.42	1.00	1.00
06	TRG	D-13 TOT	04/04/13 11:55	1.5000	0.9022	912.5076	377.7000	91.89	1.00	1.00
07	TRG	D-13 DIS	04/04/13 11:55	1.5000	0.9013	911.5974	421.3000	102.60	1.00	1.00
08	TRG	PZ-304-AS TOT	04/04/13 12:56	1.5000	0.9031	913.4179	367.1000	89.22	1.00	1.00
09	TRG	PZ-304-AS DIS	04/04/13 12:56	1.5000	0.9016	911.9008	414.2000	100.84	1.00	1.00
10	TRG	PZ-303-AS TOT	04/04/13 13:00	1.5000	0.9011	911.3951	290.1000	70.66	1.00	1.00
11	TRG	PZ-303-AS DIS	04/04/13 13:00	1.5000	0.8995	909.7768	338.1000	82.50	1.00	1.00
12	TRG	D-12 TOT	04/04/13 13:50	1.5000	0.9012	911.4962	385.3000	93.84	1.00	1.00
13	TRG	D-12 DIS	04/04/13 13:50	1.5000	0.9010	911.2939	360.1000	87.72	1.00	1.00
14	DO	PZ-111-SD TOT	04/04/13 13:52	1.5000	0.9002	910.4848	406.1000	99.02	1.00	1.00
15	TRG	PZ-111-SD DIS	04/04/13 13:52	1.5000	0.8995	909.7768	393.4000	96.00	1.00	1.00
16	TRG	PZ-304-AI TOT	04/04/13 14:08	1.5000	0.8986	908.8665	401.6000	98.09	1.00	1.00
17	TRG	PZ-304-AI DIS	04/04/13 14:08	1.5000	0.9004	910.6871	399.2000	97.31	1.00	1.00
18	TRG	I-11 TOT	04/04/13 14:40	1.5000	0.9002	910.4848	374.4000	91.29	1.00	1.00
19	TRG	I-11 DIS	04/04/13 14:40	1.5000	0.8993	909.5745	393.0000	95.92	1.00	1.00


Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
13-04050	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	PZ-111-SD TOT	DUP					1.5000E+00	1.5000E+00				
04	S-8 TOT	TRG					1.5000E+00	1.5000E+00				
05	S-8 DIS	TRG					1.5000E+00	1.5000E+00				
06	D-13 TOT	TRG					1.5000E+00	1.5000E+00				
07	D-13 DIS	TRG					1.5000E+00	1.5000E+00				
08	PZ-304-AS TOT	TRG					1.5000E+00	1.5000E+00				
09	PZ-304-AS DIS	TRG					1.5000E+00	1.5000E+00				
10	PZ-303-AS TOT	TRG					1.5000E+00	1.5000E+00				
11	PZ-303-AS DIS	TRG					1.5000E+00	1.5000E+00				
12	D-12 TOT	TRG					1.5000E+00	1.5000E+00				
13	D-12 DIS	TRG					1.5000E+00	1.5000E+00				
14	PZ-111-SD TOT	DO					1.5000E+00	1.5000E+00				
15	PZ-111-SD DIS	TRG					1.5000E+00	1.5000E+00				
16	PZ-304-AI TOT	TRG					1.5000E+00	1.5000E+00				
17	PZ-304-AI DIS	TRG					1.5000E+00	1.5000E+00				
18	I-11 TOT	TRG					1.5000E+00	1.5000E+00				
19	I-11 DIS	TRG					1.5000E+00	1.5000E+00				

Comments

Technician: _____

 Date: 4/12/13

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
13-04050	1	Ra228	Yttirum	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	0.0910	0.1497	0.0587	86.32
02	BLANK	MBL	2.0000	0.0913	0.1480	0.0567	83.38
03	DUP	DUP	2.0000	0.0928	0.1494	0.0566	83.24
04	S-8 TOT	TRG	2.0000	0.0907	0.1472	0.0565	83.09
05	S-8 DIS	TRG	2.0000	0.0913	0.1483	0.0570	83.82
06	D-13 TOT	TRG	2.0000	0.0929	0.1510	0.0581	85.44
07	D-13 DIS	TRG	2.0000	0.0931	0.1498	0.0567	83.38
08	PZ-304-AS TOT	TRG	2.0000	0.0911	0.1491	0.0580	85.29
09	PZ-304-AS DIS	TRG	2.0000	0.0912	0.1487	0.0575	84.56
10	PZ-303-AS TOT	TRG	2.0000	0.0909	0.1484	0.0575	84.56
11	PZ-303-AS DIS	TRG	2.0000	0.0910	0.1474	0.0564	82.94
12	D-12 TOT	TRG	2.0000	0.0929	0.1506	0.0577	84.85
13	D-12 DIS	TRG	2.0000	0.0910	0.1490	0.0580	85.29
14	PZ-111-SD TOT	DO	2.0000	0.0909	0.1474	0.0565	83.09
15	PZ-111-SD DIS	TRG	2.0000	0.0927	0.1495	0.0568	83.53
16	PZ-304-AI TOT	TRG	2.0000	0.0912	0.1478	0.0566	83.24
17	PZ-304-AI DIS	TRG	2.0000	0.0912	0.1483	0.0571	83.97
18	I-11 TOT	TRG	2.0000	0.0930	0.1493	0.0563	82.79
19	I-11 DIS	TRG	2.0000	0.0919	0.1508	0.0589	86.62

Technician: _____



Date: 4 26 13

(R)
4/26/13
103

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1304050-05	17	208	120	1400	4/26/13 11:41
C3	1304050-06	30	390	120	1400	4/26/13 11:41
C4	1304050-07	15	281	120	1400	4/26/13 11:41
B1	1304050-01	31	639	120	1400	4/26/13 11:41
B2	1304050-02	9	196	120	1400	4/26/13 11:41
B3	1304050-03	13	208	120	1400	4/26/13 11:41
B4	1304050-04	13	225	120	1400	4/26/13 11:41

C
4/26/13
R

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
A1	1304050-14	13	185	120	1400	4/26/13 12:13
A2	1304050-15	15	189	120	1400	4/26/13 12:13
A3	1304050-16	13	270	120	1400	4/26/13 12:13
A4	1304050-17	21	219	120	1400	4/26/13 12:13

②
4/26/13
ICB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1304050-18	11	273	120	1400	4/26/13 13:47
C3	1304050-19	12	247	120	1400	4/26/13 13:47

(A)
4/26/13
ICB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1304050-08	19	287	120	1400	4/26/13 11:46
C2	1304050-09	9	186	120	1400	4/26/13 11:46
C3	1304050-10	24	303	120	1400	4/26/13 11:46
C4	1304050-11	17	237	120	1400	4/26/13 11:46
D2	1304050-12	16	242	120	1400	4/26/13 11:46
D4	1304050-13	16	232	120	1400	4/26/13 11:46

GPC Detector Report
(ALL Backgrounds)

C
417467

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	4/26/2013	6.67E-02	P	-2.19E+01	2.95E-01	2.25E+01
LB4110A - A2	Alpha	11/18/2007	4/26/2013	5.00E-02	P	-1.86E+01	2.63E-01	1.91E+01
LB4110A - A3	Alpha	11/18/2007	4/26/2013	1.67E-02	P	-1.81E+01	2.25E-01	1.85E+01
LB4110A - A4	Alpha	11/18/2007	4/26/2013	1.33E-01	P	-1.92E+01	2.46E-01	1.97E+01
LB4110A - B1	Alpha	11/18/2007	4/26/2013	6.67E-02	P	-9.90E-02	7.52E-02	2.49E-01
LB4110A - B2	Alpha	11/18/2007	4/26/2013	3.33E-02	P	-7.96E-02	7.27E-02	2.25E-01
LB4110A - B3	Alpha	11/18/2007	4/26/2013	3.33E-02	P	-6.39E-02	5.32E-02	1.70E-01
LB4110A - B4	Alpha	11/18/2007	4/26/2013	3.33E-02	P	-1.44E-01	7.91E-02	3.02E-01
LB4110A - C1	Alpha	11/18/2007	4/26/2013	5.00E-02	P	-1.53E-01	8.92E-02	3.31E-01
LB4110A - C2	Alpha	11/18/2007	4/26/2013	1.67E-02	P	-1.80E-01	8.84E-02	3.57E-01
LB4110A - C3	Alpha	11/18/2007	4/26/2013	5.00E-02	P	-1.76E-01	1.01E-01	3.79E-01
LB4110A - C4	Alpha	11/18/2007	4/26/2013	1.17E-01	P	-6.28E-02	6.89E-02	2.01E-01
LB4110A - D1	Alpha	11/18/2007	4/26/2013	5.00E-02	P	-5.35E-02	8.43E-02	2.22E-01
LB4110A - D2	Alpha	11/18/2007	4/26/2013	1.00E-01	P	-7.04E-02	6.03E-02	1.91E-01
LB4110A - D3	Alpha	11/18/2007	4/26/2013	2.00E-01	F	-4.76E-02	7.20E-02	1.92E-01
LB4110A - D4	Alpha	11/18/2007	4/26/2013	0.00E+00	P	-5.75E-02	7.09E-02	1.99E-01
LB4110R - A1	Alpha	11/24/2006	4/26/2013	8.33E-02	P	-1.01E-01	1.01E-01	3.03E-01
LB4110R - A2	Alpha	11/24/2006	4/26/2013	3.33E-02	P	-9.05E-02	7.74E-02	2.45E-01
LB4110R - A3	Alpha	11/24/2006	4/26/2013	1.67E-02	P	-7.39E-02	7.68E-02	2.27E-01
LB4110R - A4	Alpha	11/24/2006	4/26/2013	3.33E-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	4/26/2013	8.33E-02	P	-7.81E-02	7.44E-02	2.27E-01
LB4110R - C2	Alpha	11/24/2006	4/26/2013	3.33E-02	P	-7.53E-02	7.24E-02	2.20E-01
LB4110R - C3	Alpha	11/24/2006	4/26/2013	3.33E-02	P	-8.93E-02	8.48E-02	2.59E-01
LB4110R - C4	Alpha	11/24/2006	4/26/2013	5.00E-02	P	-6.22E-02	8.22E-02	2.27E-01
LB4110R - D1	Alpha	11/24/2006	4/26/2013	0.00E+00	P	-9.88E-02	7.34E-02	2.46E-01
LB4110R - D2	Alpha	11/24/2006	4/26/2013	0.00E+00	P	-7.28E-02	7.28E-02	2.18E-01
LB4110R - D3	Alpha	11/24/2006	4/26/2013	0.00E+00	P	-7.81E-02	7.26E-02	2.23E-01
LB4110R - D4	Alpha	11/24/2006	4/26/2013	0.00E+00	P	-6.94E-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
4/26/13

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	4/26/2013	8.80E+00	P	-2.97E+02	7.62E+00	3.12E+02
LB4110A - A2	Beta	11/18/2007	4/26/2013	3.22E+00	P	-3.12E+01	2.53E+00	3.63E+01
LB4110A - A3	Beta	11/18/2007	4/26/2013	1.03E+00	P	-5.14E+01	2.66E+00	5.68E+01
LB4110A - A4	Beta	11/18/2007	4/26/2013	7.80E+00	P	-3.35E+01	3.00E+00	3.95E+01
LB4110A - B1	Beta	11/18/2007	4/26/2013	2.27E+00	P	-9.49E+00	3.21E+00	1.59E+01
LB4110A - B2	Beta	11/18/2007	4/26/2013	1.20E+00	P	-7.57E+00	1.98E+00	1.15E+01
LB4110A - B3	Beta	11/18/2007	4/26/2013	2.35E+00	W	1.83E-01	1.36E+00	2.53E+00
LB4110A - B4	Beta	11/18/2007	4/26/2013	9.67E-01	P	-7.63E+00	1.97E+00	1.16E+01
LB4110A - C1	Beta	11/18/2007	4/26/2013	1.25E+00	P	-5.52E+00	2.16E+00	9.84E+00
LB4110A - C2	Beta	11/18/2007	4/26/2013	8.67E-01	P	3.80E-01	1.27E+00	2.16E+00
LB4110A - C3	Beta	11/18/2007	4/26/2013	1.70E+00	P	4.68E-01	1.47E+00	2.47E+00
LB4110A - C4	Beta	11/18/2007	4/26/2013	1.52E+00	P	-1.78E+00	2.14E+00	6.06E+00
LB4110A - D1	Beta	11/18/2007	4/26/2013	2.87E+00	P	-2.39E+00	2.58E+00	7.55E+00
LB4110A - D2	Beta	11/18/2007	4/26/2013	1.63E+00	P	-6.50E-01	1.56E+00	3.77E+00
LB4110A - D3	Beta	11/18/2007	4/26/2013	5.35E+00	P	1.22E+00	4.47E+00	7.72E+00
LB4110A - D4	Beta	11/18/2007	4/26/2013	1.05E+00	P	-4.30E-01	1.37E+00	3.17E+00
LB4110R - A1	Beta	11/24/2006	4/26/2013	1.37E+00	P	-6.21E+01	3.79E+00	6.97E+01
LB4110R - A2	Beta	11/24/2006	4/26/2013	9.67E-01	P	-4.94E+01	2.06E+00	5.35E+01
LB4110R - A3	Beta	11/24/2006	4/26/2013	9.17E-01	P	-4.57E+01	2.80E+00	5.13E+01
LB4110R - A4	Beta	11/24/2006	4/26/2013	1.00E+00	P	-4.56E+01	2.03E+00	4.97E+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	4/26/2013	1.05E+00	P	-4.79E+01	3.04E+00	5.39E+01
LB4110R - C2	Beta	11/24/2006	4/26/2013	1.67E+00	P	-4.79E+01	2.76E+00	5.34E+01
LB4110R - C3	Beta	11/24/2006	4/26/2013	1.57E+00	P	-4.83E+01	2.56E+00	5.35E+01
LB4110R - C4	Beta	11/24/2006	4/26/2013	1.43E+00	P	-5.45E+01	2.99E+00	6.05E+01
LB4110R - D1	Beta	11/24/2006	4/26/2013	0.00E+00	P	-4.52E+01	5.81E+00	5.68E+01
LB4110R - D2	Beta	11/24/2006	4/26/2013	0.00E+00	P	-4.88E+01	1.96E+00	5.27E+01
LB4110R - D3	Beta	11/24/2006	4/26/2013	0.00E+00	P	-5.21E+01	5.78E+00	6.36E+01
LB4110R - D4	Beta	11/24/2006	4/26/2013	0.00E+00	P	-4.85E+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

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	4/26/2013	0.2446	P	-0.0196	0.2145	0.4486
LB4110A - A2	Alpha	11/18/2007	4/26/2013	0.2092	P	-0.0570	0.1723	0.4017
LB4110A - A3	Alpha	11/18/2007	4/26/2013	0.2078	P	-0.0807	0.1611	0.4029
LB4110A - A4	Alpha	11/18/2007	4/26/2013	0.2215	P	-0.0591	0.1801	0.4193
LB4110A - B1	Alpha	11/18/2007	4/26/2013	0.2218	P	0.1943	0.2247	0.2551
LB4110A - B2	Alpha	11/18/2007	4/26/2013	0.2133	P	0.1930	0.2219	0.2507
LB4110A - B3	Alpha	11/18/2007	4/26/2013	0.2414	P	0.1290	0.2326	0.3362
LB4110A - B4	Alpha	11/18/2007	4/26/2013	0.2356	P	0.2090	0.2368	0.2645
LB4110A - C1	Alpha	11/18/2007	4/26/2013	0.2195	P	0.1973	0.2209	0.2444
LB4110A - C2	Alpha	11/18/2007	4/26/2013	0.2282	P	0.1965	0.2252	0.2539
LB4110A - C3	Alpha	11/18/2007	4/26/2013	0.2499	P	0.2227	0.2494	0.2760
LB4110A - C4	Alpha	11/18/2007	4/26/2013	0.2252	P	0.1965	0.2258	0.2551
LB4110A - D1	Alpha	11/18/2007	4/26/2013	0.2200	P	0.2037	0.2335	0.2633
LB4110A - D2	Alpha	11/18/2007	4/26/2013	0.2450	P	0.2279	0.2585	0.2891
LB4110A - D3	Alpha	11/18/2007	4/26/2013	0.2565	P	0.2315	0.2640	0.2964
LB4110A - D4	Alpha	11/18/2007	4/26/2013	0.1831	P	0.1652	0.2000	0.2347
LB4110R - A1	Alpha	11/24/2006	4/26/2013	0.2397	P	0.2030	0.2389	0.2748
LB4110R - A2	Alpha	11/24/2006	4/26/2013	0.2163	P	0.1899	0.2207	0.2515
LB4110R - A3	Alpha	11/24/2006	4/26/2013	0.2149	P	0.1963	0.2249	0.2535
LB4110R - A4	Alpha	11/24/2006	4/26/2013	0.2404	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	4/26/2013	0.2109	P	0.1861	0.2153	0.2446
LB4110R - C2	Alpha	11/24/2006	4/26/2013	0.2223	P	0.1963	0.2249	0.2534
LB4110R - C3	Alpha	11/24/2006	4/26/2013	0.2349	P	0.2063	0.2398	0.2732
LB4110R - C4	Alpha	11/24/2006	4/26/2013	0.2055	P	0.1860	0.2230	0.2601
LB4110R - D1	Alpha	11/24/2006	4/26/2013	0.0000	F	0.0435	0.2085	0.3734
LB4110R - D2	Alpha	11/24/2006	4/26/2013	0.0000	F	0.0503	0.2370	0.4238
LB4110R - D3	Alpha	11/24/2006	4/26/2013	0.0000	F	0.0495	0.2329	0.4163
LB4110R - D4	Alpha	11/24/2006	4/26/2013	0.0000	F	0.0381	0.1877	0.3373
LB5100 - 1	Alpha	7/10/2006	10/26/2007	0.3368	P	0.3332	0.3455	0.3578

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GPC Detector Report
(ALL Efficiencies)

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Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	4/26/2013	0.5474	P	0.2024	0.5629	0.9233
LB4110A - A2	Beta	11/18/2007	4/26/2013	0.4815	P	0.1531	0.4631	0.7732
LB4110A - A3	Beta	11/18/2007	4/26/2013	0.4774	P	0.0803	0.4570	0.8336
LB4110A - A4	Beta	11/18/2007	4/26/2013	0.5214	P	0.1327	0.4875	0.8424
LB4110A - B1	Beta	11/18/2007	4/26/2013	0.5252	P	0.4643	0.5308	0.5973
LB4110A - B2	Beta	11/18/2007	4/26/2013	0.5233	P	0.4639	0.5277	0.5916
LB4110A - B3	Beta	11/18/2007	4/26/2013	0.5328	P	0.3184	0.5321	0.7457
LB4110A - B4	Beta	11/18/2007	4/26/2013	0.5448	P	0.4922	0.5547	0.6172
LB4110A - C1	Beta	11/18/2007	4/26/2013	0.4956	P	0.4500	0.5027	0.5554
LB4110A - C2	Beta	11/18/2007	4/26/2013	0.4977	P	0.4278	0.5012	0.5746
LB4110A - C3	Beta	11/18/2007	4/26/2013	0.5932	P	0.5275	0.5901	0.6527
LB4110A - C4	Beta	11/18/2007	4/26/2013	0.5131	P	0.4567	0.5251	0.5936
LB4110A - D1	Beta	11/18/2007	4/26/2013	0.5206	P	0.4801	0.5545	0.6289
LB4110A - D2	Beta	11/18/2007	4/26/2013	0.5484	P	0.4908	0.5891	0.6873
LB4110A - D3	Beta	11/18/2007	4/26/2013	0.6096	P	0.5367	0.6156	0.6946
LB4110A - D4	Beta	11/18/2007	4/26/2013	0.4374	P	0.3867	0.4737	0.5607
LB4110R - A1	Beta	11/24/2006	4/26/2013	0.5668	P	0.4811	0.5680	0.6548
LB4110R - A2	Beta	11/24/2006	4/26/2013	0.5097	P	0.4207	0.5089	0.5971
LB4110R - A3	Beta	11/24/2006	4/26/2013	0.5213	P	0.4579	0.5399	0.6218
LB4110R - A4	Beta	11/24/2006	4/26/2013	0.5976	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	4/26/2013	0.4673	P	0.4245	0.5035	0.5825
LB4110R - C2	Beta	11/24/2006	4/26/2013	0.5170	P	0.4503	0.5293	0.6084
LB4110R - C3	Beta	11/24/2006	4/26/2013	0.5590	P	0.4812	0.5714	0.6616
LB4110R - C4	Beta	11/24/2006	4/26/2013	0.4981	P	0.4326	0.5267	0.6208
LB4110R - D1	Beta	11/24/2006	4/26/2013	0.0000	F	0.1031	0.4985	0.8939
LB4110R - D2	Beta	11/24/2006	4/26/2013	0.0000	F	0.1166	0.5601	1.0037
LB4110R - D3	Beta	11/24/2006	4/26/2013	0.0000	F	0.1132	0.5440	0.9748
LB4110R - D4	Beta	11/24/2006	4/26/2013	0.0000	F	0.0896	0.4478	0.8060
LB5100 - 1	Beta	7/10/2006	10/26/2007	0.4428	F	0.4555	0.4731	0.4906

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Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	4/25/2013	6.67E-02	P	-2.19E+01	2.95E-01	2.25E+01
LB4110A - A2	Alpha	11/18/2007	4/25/2013	1.00E-01	P	-1.86E+01	2.63E-01	1.91E+01
LB4110A - A3	Alpha	11/18/2007	4/25/2013	5.00E-02	P	-1.81E+01	2.25E-01	1.85E+01
LB4110A - A4	Alpha	11/18/2007	4/25/2013	3.33E-02	P	-1.92E+01	2.46E-01	1.97E+01
LB4110A - B1	Alpha	11/18/2007	4/25/2013	8.33E-02	P	-9.91E-02	7.52E-02	2.49E-01
LB4110A - B2	Alpha	11/18/2007	4/25/2013	1.17E-01	P	-7.96E-02	7.27E-02	2.25E-01
LB4110A - B3	Alpha	11/18/2007	4/25/2013	8.33E-02	P	-6.40E-02	5.32E-02	1.70E-01
LB4110A - B4	Alpha	11/18/2007	4/25/2013	3.33E-02	P	-1.44E-01	7.91E-02	3.02E-01
LB4110A - C1	Alpha	11/18/2007	4/25/2013	1.50E-01	P	-1.53E-01	8.92E-02	3.32E-01
LB4110A - C2	Alpha	11/18/2007	4/25/2013	5.00E-02	P	-1.80E-01	8.85E-02	3.57E-01
LB4110A - C3	Alpha	11/18/2007	4/25/2013	3.33E-02	P	-1.77E-01	1.01E-01	3.79E-01
LB4110A - C4	Alpha	11/18/2007	4/25/2013	1.33E-01	P	-6.29E-02	6.89E-02	2.01E-01
LB4110A - D1	Alpha	11/18/2007	4/25/2013	8.33E-02	P	-5.35E-02	8.43E-02	2.22E-01
LB4110A - D2	Alpha	11/18/2007	4/25/2013	1.17E-01	P	-7.04E-02	6.03E-02	1.91E-01
LB4110A - D3	Alpha	11/18/2007	4/25/2013	1.67E-01	W	-4.74E-02	7.20E-02	1.91E-01
LB4110A - D4	Alpha	11/18/2007	4/25/2013	5.00E-02	P	-5.74E-02	7.09E-02	1.99E-01
LB4110R - A1	Alpha	11/24/2006	4/25/2013	1.17E-01	P	-1.01E-01	1.01E-01	3.03E-01
LB4110R - A2	Alpha	11/24/2006	4/25/2013	5.00E-02	P	-9.05E-02	7.74E-02	2.45E-01
LB4110R - A3	Alpha	11/24/2006	4/25/2013	1.17E-01	P	-7.39E-02	7.68E-02	2.27E-01
LB4110R - A4	Alpha	11/24/2006	4/25/2013	3.33E-02	P	-5.31E-02	7.18E-02	1.97E-01
LB4110R - B1	Alpha	11/24/2006	4/25/2013	3.33E-02	P	-9.61E-02	6.21E-02	2.20E-01
LB4110R - B2	Alpha	11/24/2006	4/25/2013	3.33E-02	P	-6.96E-02	6.44E-02	1.98E-01
LB4110R - B3	Alpha	11/24/2006	4/25/2013	5.00E-02	P	-6.55E-02	7.00E-02	2.05E-01
LB4110R - B4	Alpha	11/24/2006	4/25/2013	1.67E-02	P	-6.47E-02	7.08E-02	2.06E-01
LB4110R - C1	Alpha	11/24/2006	4/25/2013	3.33E-02	P	-7.81E-02	7.44E-02	2.27E-01
LB4110R - C2	Alpha	11/24/2006	4/25/2013	1.67E-02	P	-7.53E-02	7.24E-02	2.20E-01
LB4110R - C3	Alpha	11/24/2006	4/25/2013	1.67E-02	P	-8.93E-02	8.48E-02	2.59E-01
LB4110R - C4	Alpha	11/24/2006	4/25/2013	0.00E+00	P	-6.22E-02	8.22E-02	2.27E-01
LB4110R - D1	Alpha	11/24/2006	4/25/2013	0.00E+00	P	-9.88E-02	7.34E-02	2.46E-01
LB4110R - D2	Alpha	11/24/2006	4/25/2013	0.00E+00	P	-7.27E-02	7.28E-02	2.18E-01
LB4110R - D3	Alpha	11/24/2006	4/25/2013	0.00E+00	P	-7.81E-02	7.26E-02	2.23E-01
LB4110R - D4	Alpha	11/24/2006	4/25/2013	0.00E+00	P	-6.93E-02	7.76E-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)

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Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	4/25/2013	8.73E+00	P	-2.97E+02	7.62E+00	3.12E+02
LB4110A - A2	Beta	11/18/2007	4/25/2013	3.93E+00	P	-3.12E+01	2.53E+00	3.63E+01
LB4110A - A3	Beta	11/18/2007	4/25/2013	1.47E+00	P	-5.15E+01	2.66E+00	5.68E+01
LB4110A - A4	Beta	11/18/2007	4/25/2013	8.55E+00	P	-3.35E+01	2.99E+00	3.95E+01
LB4110A - B1	Beta	11/18/2007	4/25/2013	2.77E+00	P	-9.49E+00	3.21E+00	1.59E+01
LB4110A - B2	Beta	11/18/2007	4/25/2013	2.32E+00	P	-7.57E+00	1.98E+00	1.15E+01
LB4110A - B3	Beta	11/18/2007	4/25/2013	1.57E+00	P	1.84E-01	1.36E+00	2.53E+00
LB4110A - B4	Beta	11/18/2007	4/25/2013	1.30E+00	P	-7.63E+00	1.97E+00	1.16E+01
LB4110A - C1	Beta	11/18/2007	4/25/2013	2.57E+00	P	-5.52E+00	2.16E+00	9.84E+00
LB4110A - C2	Beta	11/18/2007	4/25/2013	1.12E+00	P	3.80E-01	1.27E+00	2.16E+00
LB4110A - C3	Beta	11/18/2007	4/25/2013	1.28E+00	P	4.68E-01	1.47E+00	2.47E+00
LB4110A - C4	Beta	11/18/2007	4/25/2013	1.43E+00	P	-1.78E+00	2.14E+00	6.06E+00
LB4110A - D1	Beta	11/18/2007	4/25/2013	2.92E+00	P	-2.39E+00	2.58E+00	7.55E+00
LB4110A - D2	Beta	11/18/2007	4/25/2013	1.55E+00	P	-6.51E-01	1.56E+00	3.78E+00
LB4110A - D3	Beta	11/18/2007	4/25/2013	4.93E+00	P	1.22E+00	4.47E+00	7.72E+00
LB4110A - D4	Beta	11/18/2007	4/25/2013	1.05E+00	P	-4.30E-01	1.37E+00	3.18E+00
LB4110R - A1	Beta	11/24/2006	4/25/2013	1.08E+00	P	-6.22E+01	3.79E+00	6.97E+01
LB4110R - A2	Beta	11/24/2006	4/25/2013	1.15E+00	P	-4.94E+01	2.06E+00	5.35E+01
LB4110R - A3	Beta	11/24/2006	4/25/2013	1.50E+00	P	-4.57E+01	2.81E+00	5.13E+01
LB4110R - A4	Beta	11/24/2006	4/25/2013	1.23E+00	P	-4.56E+01	2.03E+00	4.97E+01
LB4110R - B1	Beta	11/24/2006	4/25/2013	1.45E+00	P	-4.80E+01	2.05E+00	5.21E+01
LB4110R - B2	Beta	11/24/2006	4/25/2013	1.18E+00	P	-4.80E+01	2.09E+00	5.21E+01
LB4110R - B3	Beta	11/24/2006	4/25/2013	1.10E+00	P	-4.77E+01	2.71E+00	5.32E+01
LB4110R - B4	Beta	11/24/2006	4/25/2013	9.50E-01	P	-4.81E+01	1.96E+00	5.20E+01
LB4110R - C1	Beta	11/24/2006	4/25/2013	1.17E+00	P	-4.79E+01	3.04E+00	5.40E+01
LB4110R - C2	Beta	11/24/2006	4/25/2013	1.77E+00	P	-4.79E+01	2.76E+00	5.34E+01
LB4110R - C3	Beta	11/24/2006	4/25/2013	2.22E+00	P	-4.84E+01	2.56E+00	5.35E+01
LB4110R - C4	Beta	11/24/2006	4/25/2013	1.47E+00	P	-5.45E+01	2.99E+00	6.05E+01
LB4110R - D1	Beta	11/24/2006	4/25/2013	0.00E+00	P	-4.52E+01	5.81E+00	5.69E+01
LB4110R - D2	Beta	11/24/2006	4/25/2013	0.00E+00	P	-4.88E+01	1.96E+00	5.27E+01
LB4110R - D3	Beta	11/24/2006	4/25/2013	0.00E+00	P	-5.21E+01	5.78E+00	6.37E+01
LB4110R - D4	Beta	11/24/2006	4/25/2013	0.00E+00	P	-4.85E+01	2.34E+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)

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	4/25/2013	0.2476	P	-0.0197	0.2145	0.4487
LB4110A - A2	Alpha	11/18/2007	4/25/2013	0.2108	P	-0.0571	0.1723	0.4018
LB4110A - A3	Alpha	11/18/2007	4/25/2013	0.2100	P	-0.0808	0.1611	0.4030
LB4110A - A4	Alpha	11/18/2007	4/25/2013	0.2191	P	-0.0592	0.1801	0.4194
LB4110A - B1	Alpha	11/18/2007	4/25/2013	0.2104	P	0.1943	0.2247	0.2551
LB4110A - B2	Alpha	11/18/2007	4/25/2013	0.2096	P	0.1930	0.2219	0.2507
LB4110A - B3	Alpha	11/18/2007	4/25/2013	0.2405	P	0.1289	0.2326	0.3362
LB4110A - B4	Alpha	11/18/2007	4/25/2013	0.2279	P	0.2090	0.2368	0.2645
LB4110A - C1	Alpha	11/18/2007	4/25/2013	0.2173	P	0.1973	0.2209	0.2444
LB4110A - C2	Alpha	11/18/2007	4/25/2013	0.2222	P	0.1965	0.2252	0.2539
LB4110A - C3	Alpha	11/18/2007	4/25/2013	0.2567	P	0.2227	0.2494	0.2760
LB4110A - C4	Alpha	11/18/2007	4/25/2013	0.2254	P	0.1965	0.2258	0.2551
LB4110A - D1	Alpha	11/18/2007	4/25/2013	0.2225	P	0.2037	0.2335	0.2633
LB4110A - D2	Alpha	11/18/2007	4/25/2013	0.2448	P	0.2279	0.2585	0.2891
LB4110A - D3	Alpha	11/18/2007	4/25/2013	0.2523	P	0.2315	0.2640	0.2964
LB4110A - D4	Alpha	11/18/2007	4/25/2013	0.1772	P	0.1653	0.2000	0.2347
LB4110R - A1	Alpha	11/24/2006	4/25/2013	0.2426	P	0.2030	0.2389	0.2748
LB4110R - A2	Alpha	11/24/2006	4/25/2013	0.2132	P	0.1899	0.2207	0.2515
LB4110R - A3	Alpha	11/24/2006	4/25/2013	0.2206	P	0.1963	0.2249	0.2535
LB4110R - A4	Alpha	11/24/2006	4/25/2013	0.2407	P	0.2159	0.2457	0.2756
LB4110R - B1	Alpha	11/24/2006	4/25/2013	0.2226	P	0.1877	0.2261	0.2646
LB4110R - B2	Alpha	11/24/2006	4/25/2013	0.2126	P	0.1801	0.2176	0.2551
LB4110R - B3	Alpha	11/24/2006	4/25/2013	0.2472	P	0.2066	0.2440	0.2814
LB4110R - B4	Alpha	11/24/2006	4/25/2013	0.2220	P	0.1938	0.2321	0.2703
LB4110R - C1	Alpha	11/24/2006	4/25/2013	0.2118	P	0.1861	0.2153	0.2446
LB4110R - C2	Alpha	11/24/2006	4/25/2013	0.2187	P	0.1963	0.2249	0.2534
LB4110R - C3	Alpha	11/24/2006	4/25/2013	0.2369	P	0.2063	0.2398	0.2732
LB4110R - C4	Alpha	11/24/2006	4/25/2013	0.2092	P	0.1860	0.2230	0.2601
LB4110R - D1	Alpha	11/24/2006	4/25/2013	0.0000	F	0.0441	0.2086	0.3730
LB4110R - D2	Alpha	11/24/2006	4/25/2013	0.0000	F	0.0510	0.2372	0.4234
LB4110R - D3	Alpha	11/24/2006	4/25/2013	0.0000	F	0.0501	0.2330	0.4159
LB4110R - D4	Alpha	11/24/2006	4/25/2013	0.0000	F	0.0386	0.1878	0.3369
LB5100 - 1	Alpha	7/10/2006	10/26/2007	0.3368	P	0.3332	0.3455	0.3578

4/25/13

GPC Detector Report
(ALL Efficiencies)

C
4/25/13

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	4/25/2013	0.5511	P	0.2023	0.5629	0.9235
LB4110A - A2	Beta	11/18/2007	4/25/2013	0.4824	P	0.1530	0.4631	0.7732
LB4110A - A3	Beta	11/18/2007	4/25/2013	0.4760	P	0.0802	0.4569	0.8337
LB4110A - A4	Beta	11/18/2007	4/25/2013	0.5219	P	0.1325	0.4875	0.8425
LB4110A - B1	Beta	11/18/2007	4/25/2013	0.5007	P	0.4643	0.5308	0.5973
LB4110A - B2	Beta	11/18/2007	4/25/2013	0.5128	P	0.4639	0.5277	0.5916
LB4110A - B3	Beta	11/18/2007	4/25/2013	0.5346	P	0.3183	0.5321	0.7458
LB4110A - B4	Beta	11/18/2007	4/25/2013	0.5370	P	0.4922	0.5547	0.6173
LB4110A - C1	Beta	11/18/2007	4/25/2013	0.5074	P	0.4500	0.5027	0.5554
LB4110A - C2	Beta	11/18/2007	4/25/2013	0.4904	P	0.4277	0.5012	0.5746
LB4110A - C3	Beta	11/18/2007	4/25/2013	0.5969	P	0.5274	0.5901	0.6527
LB4110A - C4	Beta	11/18/2007	4/25/2013	0.5253	P	0.4567	0.5251	0.5936
LB4110A - D1	Beta	11/18/2007	4/25/2013	0.5206	P	0.4801	0.5545	0.6289
LB4110A - D2	Beta	11/18/2007	4/25/2013	0.5481	P	0.4909	0.5891	0.6873
LB4110A - D3	Beta	11/18/2007	4/25/2013	0.5883	P	0.5367	0.6156	0.6946
LB4110A - D4	Beta	11/18/2007	4/25/2013	0.4297	P	0.3868	0.4737	0.5607
LB4110R - A1	Beta	11/24/2006	4/25/2013	0.5592	P	0.4811	0.5680	0.6549
LB4110R - A2	Beta	11/24/2006	4/25/2013	0.5119	P	0.4206	0.5089	0.5972
LB4110R - A3	Beta	11/24/2006	4/25/2013	0.5265	P	0.4579	0.5399	0.6218
LB4110R - A4	Beta	11/24/2006	4/25/2013	0.5968	P	0.5097	0.5917	0.6737
LB4110R - B1	Beta	11/24/2006	4/25/2013	0.5224	P	0.4533	0.5428	0.6324
LB4110R - B2	Beta	11/24/2006	4/25/2013	0.5145	P	0.4311	0.5203	0.6096
LB4110R - B3	Beta	11/24/2006	4/25/2013	0.5983	P	0.5013	0.5912	0.6812
LB4110R - B4	Beta	11/24/2006	4/25/2013	0.5266	P	0.4624	0.5502	0.6380
LB4110R - C1	Beta	11/24/2006	4/25/2013	0.4667	P	0.4245	0.5035	0.5825
LB4110R - C2	Beta	11/24/2006	4/25/2013	0.5114	P	0.4502	0.5293	0.6085
LB4110R - C3	Beta	11/24/2006	4/25/2013	0.5552	P	0.4812	0.5714	0.6616
LB4110R - C4	Beta	11/24/2006	4/25/2013	0.4960	P	0.4326	0.5267	0.6209
LB4110R - D1	Beta	11/24/2006	4/25/2013	0.0000	F	0.1045	0.4988	0.8930
LB4110R - D2	Beta	11/24/2006	4/25/2013	0.0000	F	0.1182	0.5605	1.0027
LB4110R - D3	Beta	11/24/2006	4/25/2013	0.0000	F	0.1148	0.5443	0.9739
LB4110R - D4	Beta	11/24/2006	4/25/2013	0.0000	F	0.0908	0.4481	0.8053
LB5100 - 1	Beta	7/10/2006	10/26/2007	0.4428	F	0.4555	0.4731	0.4906

0497

SECTION XII
BARIUM-133 ANALYTICAL TRACER DATA

C
4/18/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405001_GE1_BAFIL_190616.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : SPIKE
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 06:59:44
 Sample ID : 1304050-01 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE1 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.29 0.0%
 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	2	30.88	2213	87	1.42	31.11	26	15	2.46E+00	2.2	2.07E+01
2	2	35.03	515	52	1.68	35.27	26	15	5.72E-01	5.2	
3	0	53.06	84	114	2.16	53.29	49	9	9.38E-02	25.3	
4	2	61.91	270	67	1.73	62.14	58	13	3.00E-01	7.8	4.34E+00
5	2	65.73	119	76	1.74	65.96	58	13	1.32E-01	16.0	
6	2	78.07	20	39	1.76	78.30	77	10	2.21E-02	43.0	1.33E+02
7	2	81.08	832	53	1.60	81.31	77	10	9.24E-01	3.7	
8	2	83.62	36	45	1.61	83.85	77	10	4.04E-02	83.8	
9	0	92.51	45	92	1.48	92.74	90	7	4.95E-02	38.8	
10	2	111.99	233	57	1.72	112.22	106	16	2.59E-01	8.1	7.60E-01
11	2	116.03	48	52	1.81	116.25	106	16	5.35E-02	27.9	
12	0	161.80	33	93	2.22	162.03	158	9	3.65E-02	55.6	
13	0	185.39	11	54	1.15	185.62	185	5	1.21E-02	105.6	
14	0	238.96	30	53	1.19	239.18	236	7	3.35E-02	43.9	
15	0	276.75	58	31	1.21	276.96	273	8	6.39E-02	21.5	
16	4	303.10	198	20	1.81	303.31	298	14	2.20E-01	7.6	4.16E+00
17	4	307.55	31	24	2.12	307.76	298	14	3.43E-02	32.3	
18	2	333.75	85	13	1.69	333.97	328	20	9.42E-02	12.7	9.32E-01
19	2	338.67	31	15	2.03	338.88	328	20	3.46E-02	26.9	
20	0	356.21	554	16	1.94	356.42	351	9	6.15E-01	4.4	
21	0	365.10	16	22	1.88	365.31	361	8	1.80E-02	55.8	
22	0	372.99	8	8	1.91	373.20	372	4	8.98E-03	59.3	
23	0	378.53	13	24	1.87	378.74	376	7	1.39E-02	66.8	
24	2	384.01	131	22	1.55	384.21	382	9	1.45E-01	11.1	4.36E+01
25	2	386.89	248	57	1.92	387.10	382	9	2.76E-01	8.5	
26	0	392.04	46	26	2.58	392.24	391	8	5.06E-02	30.4	
27	3	414.95	49	24	2.29	415.16	411	13	5.43E-02	21.5	5.58E+00
28	3	418.36	27	12	2.30	418.57	411	13	3.01E-02	40.7	
29	0	437.64	96	23	1.96	437.85	433	11	1.06E-01	14.3	
30	0	469.18	22	12	1.82	469.38	465	10	2.43E-02	36.9	
31	0	511.24	22	9	3.38	511.44	506	11	2.50E-02	32.6	
32	0	583.39	12	0	1.67	583.58	581	7	1.33E-02	28.9	
33	0	614.64	6	0	1.98	614.83	613	5	6.67E-03	40.8	
34	0	970.40	8	2	1.38	970.56	968	6	9.17E-03	42.4	

Summary of Nuclide Activity

Sample ID : 1304050-01

Acquisition date : 18-APR-2013 06:59:44

Total number of lines in spectrum 34
 Number of unidentified lines 30
 Number of lines tentatively identified by NID 4 11.76%

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	3.856E+02	3.856E+02	0.712E+02	18.45		
Total Activity :			3.856E+02	3.856E+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	3.638E+02	3.638E+02	0.597E+02	16.40		
Total Activity :			3.638E+02	3.638E+02				

Grand Total Activity : 7.494E+02 7.494E+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*	1.963E+01	3.856E+02	3.856E+02	18.45	OK
	302.84	17.80	4.915E+00	6.804E+02	6.804E+02	32.97	OK
	356.01	60.00	6.963E+00	3.981E+02	3.981E+02	17.57	OK

Final Mean for 3 Valid Peaks = 3.856E+02 +/- 7.116E+01 (18.45%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	5.865E+01	3.638E+02	3.638E+02	16.40	OK

Final Mean for 1 Valid Peaks = 3.638E+02 +/- 5.968E+01 (16.40%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.856E+02	7.116E+01	1.944E+01	3.191E+00	19.839
TH-234	3.638E+02	5.968E+01	5.828E+01	1.867E+00	6.242

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-3.109E+00		1.353E+01	2.084E+01	6.508E+00	-0.149
CD-109	3.587E+01		1.458E+02	2.122E+02	2.745E+01	0.169
PA-231	0.000E+00		0.000E+00	1.933E-01	3.632E-03	0.000
PA-234	9.002E+00		1.717E+00	3.529E+00	6.631E-02	2.551
NP-237	1.865E+01		4.023E+01	6.039E+01	7.353E+00	0.309
AM-241	1.052E+01		3.558E+00	6.733E+00	1.579E-01	1.562

Handwritten mark

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405002_GE1_BAFIL_190619.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : BLANK
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 07:18:16
 Sample ID : 1304050-02 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE1 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.28 0.0%
 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	30.88	2077	64	1.39	31.12	27	13	2.31E+00	2.2	1.11E+01
2	3	35.13	569	49	1.66	35.36	27	13	6.32E-01	4.7	
3	0	53.20	83	78	2.45	53.44	50	8	9.25E-02	21.2	
4	1	61.88	250	78	1.58	62.11	58	13	2.78E-01	8.5	3.41E+00
5	1	65.76	103	96	1.58	65.99	58	13	1.14E-01	16.9	
6	0	81.27	887	126	1.91	81.50	76	11	9.85E-01	4.2	
7	0	92.92	49	96	1.08	93.15	90	7	5.45E-02	35.9	
8	3	112.08	212	61	1.99	112.31	108	16	2.36E-01	9.0	2.40E+00
9	3	116.88	52	46	2.00	117.11	108	16	5.82E-02	28.2	
10	0	142.92	21	70	1.14	143.14	139	7	2.33E-02	69.6	
11	1	242.76	20	32	1.77	242.98	238	20	2.28E-02	42.5	1.01E+00
12	1	249.64	15	23	1.78	249.85	238	20	1.64E-02	58.8	
13	1	253.80	15	18	1.78	254.02	238	20	1.63E-02	56.7	
14	0	277.04	55	25	1.15	277.26	274	7	6.10E-02	20.2	
15	2	303.08	145	18	1.63	303.30	299	11	1.61E-01	9.2	6.51E+00
16	2	306.92	23	21	2.00	307.14	299	11	2.58E-02	49.2	
17	0	334.08	52	43	1.22	334.29	331	6	5.74E-02	22.7	
18	0	338.58	19	23	1.67	338.79	337	4	2.14E-02	38.2	
19	3	351.79	16	3	1.69	352.00	351	10	1.79E-02	13.3	2.76E+00
20	3	356.31	551	12	1.58	356.52	351	10	6.13E-01	4.4	
21	0	365.45	9	19	1.23	365.66	362	6	1.04E-02	79.6	
22	0	377.72	8	13	2.60	377.93	375	6	8.89E-03	78.1	
23	1	383.96	138	10	1.88	384.17	380	16	1.54E-01	9.6	1.95E+01
24	1	386.93	257	6	1.88	387.14	380	16	2.86E-01	7.7	
25	1	391.62	59	1	1.88	391.83	380	16	6.53E-02	16.2	
26	1	411.93	11	8	1.89	412.13	410	15	1.21E-02	44.9	4.00E+00
27	1	414.97	47	11	1.89	415.17	410	15	5.26E-02	19.1	
28	1	417.97	26	10	1.90	418.17	410	15	2.88E-02	37.9	
29	1	421.62	15	9	1.90	421.83	410	15	1.71E-02	49.1	
30	0	437.28	120	2	1.94	437.49	435	6	1.34E-01	9.3	
31	0	458.43	11	2	1.57	458.64	455	8	1.20E-02	38.1	
32	0	467.75	30	5	1.77	467.95	463	9	3.28E-02	22.5	
33	4	507.98	6	2	1.95	508.18	506	10	6.24E-03	50.3	8.68E-01
34	4	511.24	26	2	2.60	511.44	506	10	2.86E-02	24.9	
35	0	788.99	6	0	2.74	789.17	786	6	6.67E-03	40.8	

Summary of Nuclide Activity

Sample ID : 1304050-02

Acquisition date : 18-APR-2013 07:18:16

Total number of lines in spectrum 35
 Number of unidentified lines 31
 Number of lines tentatively identified by NID 4 11.43%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	4.111E+02	4.112E+02	0.774E+02	18.83	
Total Activity :			4.111E+02	4.112E+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	3.368E+02	3.368E+02	0.597E+02	17.73	
Total Activity :			3.368E+02	3.368E+02			

Grand Total Activity : 7.479E+02 7.479E+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*	1.963E+01	4.111E+02	4.112E+02	18.83	OK
	302.84	17.80	4.915E+00	4.966E+02	4.966E+02	34.59	OK
	356.01	60.00	6.963E+00	3.963E+02	3.963E+02	17.49	OK

Final Mean for 3 Valid Peaks = 4.112E+02 +/- 7.744E+01 (18.83%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	5.865E+01	3.368E+02	3.368E+02	17.73	OK

Final Mean for 1 Valid Peaks = 3.368E+02 +/- 5.972E+01 (17.73%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.112E+02	7.744E+01	1.638E+01	2.689E+00	25.096
TH-234	3.368E+02	5.972E+01	5.776E+01	1.851E+00	5.831

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-3.647E+00		1.371E+01	2.098E+01	6.550E+00	-0.174
CD-109	3.300E+01		1.361E+02	1.995E+02	2.581E+01	0.165
PA-231	0.000E+00		0.000E+00	1.933E-01	3.632E-03	0.000
PA-234	8.224E+00		1.614E+00	3.408E+00	6.404E-02	2.414
NP-237	8.409E+00		4.107E+01	5.936E+01	7.227E+00	0.142
AM-241	9.522E+00		3.471E+00	6.529E+00	1.532E-01	1.458

C
4/18/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405003_GE1_BAFIL_190622.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-111-SD TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 07:39:51
 Sample ID : 1304050-03 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE1 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.27 0.0%
 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	28.22	64	58	1.83	28.45	27	12	7.07E-02	19.4	9.39E+01
2	3	30.93	1996	65	1.36	31.16	27	12	2.22E+00	2.3	
3	3	34.95	589	72	1.85	35.18	27	12	6.55E-01	5.9	
4	0	53.46	74	84	2.86	53.69	50	9	8.26E-02	25.0	
5	6	61.96	269	70	1.86	62.19	58	15	2.99E-01	7.8	4.78E+00
6	6	66.04	140	77	2.05	66.27	58	15	1.55E-01	14.0	
7	4	81.30	846	73	1.63	81.53	77	14	9.40E-01	3.7	9.76E+00
8	4	85.08	18	46	1.77	85.31	77	14	2.00E-02	73.4	
9	0	93.31	62	67	1.43	93.54	90	7	6.90E-02	25.4	
10	2	112.09	233	48	1.81	112.31	107	14	2.59E-01	7.9	2.74E+00
11	2	116.46	42	33	1.82	116.68	107	14	4.63E-02	30.0	
12	0	223.19	21	56	2.29	223.41	220	8	2.36E-02	64.1	
13	0	277.31	40	53	1.53	277.53	273	10	4.39E-02	37.9	
14	3	303.00	133	19	1.63	303.22	300	14	1.48E-01	9.8	2.99E+00
15	3	307.24	21	32	2.21	307.45	300	14	2.31E-02	57.9	
16	1	333.83	88	15	1.68	334.05	330	18	9.73E-02	12.6	1.43E+00
17	1	337.96	23	18	1.84	338.17	330	18	2.54E-02	41.2	
18	0	356.32	569	17	1.91	356.53	353	9	6.32E-01	4.4	
19	0	365.87	7	25	1.07	366.08	363	7	7.31E-03	128.8	
20	0	377.57	17	7	2.95	377.78	376	5	1.92E-02	33.5	
21	2	384.02	148	7	2.06	384.22	381	16	1.65E-01	8.7	1.17E+01
22	2	387.14	227	9	1.71	387.35	381	16	2.53E-01	7.4	
23	2	391.63	49	12	1.76	391.84	381	16	5.46E-02	18.5	
24	2	414.81	53	12	2.08	415.02	411	15	5.86E-02	17.1	3.83E+00
25	2	418.16	25	12	2.09	418.36	411	15	2.79E-02	39.7	
26	2	421.43	11	12	2.09	421.64	411	15	1.20E-02	68.9	
27	0	437.34	103	7	1.92	437.55	434	8	1.14E-01	10.9	
28	0	446.08	9	14	1.65	446.29	442	9	1.01E-02	80.2	
29	0	468.28	27	6	1.89	468.48	465	6	2.99E-02	24.1	
30	0	511.09	21	8	1.96	511.29	505	10	2.36E-02	32.5	
31	0	558.97	6	0	2.74	559.17	556	6	6.67E-03	40.8	
32	0	609.51	20	0	3.97	609.70	607	7	2.22E-02	22.4	

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	3.923E+02	3.923E+02	0.723E+02	18.43	
NP-237	2.14E+06Y	1.00	2.794E+01	2.794E+01	4.114E+01	147.27	
Total Activity :			4.202E+02	4.202E+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	3.627E+02	3.627E+02	0.597E+02	16.46	
Total Activity :			3.627E+02	3.627E+02			

Grand Total Activity : 7.829E+02 7.829E+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*	1.963E+01	3.923E+02	3.923E+02	18.43	OK
	302.84	17.80	4.915E+00	4.559E+02	4.559E+02	35.25	OK
	356.01	60.00	6.963E+00	4.090E+02	4.090E+02	17.52	OK

Final Mean for 3 Valid Peaks = 3.923E+02+/- 7.230E+01 (18.43%)

NP-237	86.50	12.60*	1.532E+01	2.794E+01	2.794E+01	147.27	OK
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Final Mean for 1 Valid Peaks = 2.794E+01+/- 4.114E+01 (147.27%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	5.865E+01	3.627E+02	3.627E+02	16.46	OK

Final Mean for 1 Valid Peaks = 3.627E+02+/- 5.970E+01 (16.46%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.923E+02	7.230E+01	1.793E+01	2.943E+00	21.879
TH-234	3.627E+02	5.970E+01	5.617E+01	1.800E+00	6.457
NP-237	2.794E+01	4.114E+01	6.027E+01	7.338E+00	0.464

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-6.051E+00		1.292E+01	1.910E+01	5.962E+00	-0.317
CD-109	-4.504E+01		1.332E+02	2.036E+02	2.634E+01	-0.221
PA-231	0.000E+00		0.000E+00	1.933E-01	3.632E-03	0.000
PA-234	8.937E+00		1.688E+00	3.549E+00	6.669E-02	2.518
AM-241	8.111E+00		3.240E+00	6.097E+00	1.430E-01	1.330

4/18/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405004_GE1_BAFIL_190625.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : S-8 TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 07:58:25
 Sample ID : 1304050-04 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE1 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.27 0.0%
 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	10	29.93	160	166	3.07	30.16	26	14	1.77E-01	31.9	1.86E+01
2	10	30.89	1940	71	1.38	31.13	26	14	2.16E+00	2.4	
3	10	35.14	535	46	1.69	35.38	26	14	5.94E-01	4.9	
4	0	52.83	79	94	3.20	53.06	49	8	8.75E-02	24.1	
5	2	61.80	244	63	1.73	62.03	58	12	2.71E-01	8.4	5.74E+00
6	2	65.86	107	84	1.74	66.09	58	12	1.19E-01	17.3	
7	0	81.30	871	100	1.94	81.53	79	9	9.68E-01	4.0	
8	0	92.10	59	94	1.20	92.33	88	8	6.53E-02	31.4	
9	0	111.79	166	136	1.72	112.02	108	8	1.84E-01	14.5	
10	0	160.77	25	64	2.45	161.00	159	6	2.76E-02	54.3	
11	0	209.26	34	33	3.51	209.48	207	6	3.79E-02	32.0	
12	1	272.95	10	14	1.80	273.16	271	10	1.07E-02	54.9	1.76E+00
13	1	276.62	58	16	1.80	276.84	271	10	6.41E-02	17.0	
14	3	303.05	154	20	1.59	303.27	299	12	1.71E-01	8.9	5.70E+00
15	3	307.43	18	31	2.21	307.64	299	12	1.99E-02	67.6	
16	0	312.40	17	12	1.11	312.62	311	6	1.91E-02	42.6	
17	2	333.80	66	19	2.03	334.01	330	11	7.32E-02	16.6	1.28E+00
18	2	337.91	20	21	2.03	338.12	330	11	2.24E-02	47.2	
19	3	351.62	11	6	1.85	351.83	351	17	1.18E-02	34.2	1.98E+01
20	3	356.38	645	11	1.83	356.59	351	17	7.17E-01	3.9	
21	3	364.77	22	9	2.05	364.98	351	17	2.44E-02	32.9	
22	3	383.66	101	18	1.87	383.87	381	10	1.12E-01	14.0	1.80E+01
23	3	387.17	234	36	1.73	387.38	381	10	2.60E-01	7.8	
24	2	414.85	58	2	2.08	415.05	412	18	6.47E-02	14.2	2.68E+00
25	2	418.11	39	5	2.09	418.31	412	18	4.38E-02	25.3	
26	2	421.73	12	8	2.09	421.93	412	18	1.33E-02	53.4	
27	0	437.40	115	4	1.70	437.60	434	8	1.28E-01	9.8	
28	2	467.75	25	2	2.12	467.95	464	14	2.82E-02	23.4	8.50E-01
29	2	472.57	13	1	2.12	472.77	464	14	1.41E-02	34.6	
30	0	492.64	7	1	1.54	492.84	490	6	7.50E-03	47.4	
31	0	511.89	22	7	2.65	512.09	507	10	2.50E-02	30.7	
32	0	561.84	6	2	1.51	562.04	559	6	7.15E-03	49.7	

Summary of Nuclide Activity

Sample ID : 1304050-04

Acquisition date : 18-APR-2013 07:58:25

Total number of lines in spectrum 32
 Number of unidentified lines 28
 Number of lines tentatively identified by NID 4 12.50%

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	4.039E+02	4.040E+02	0.755E+02	18.68		
Total Activity :			4.039E+02	4.040E+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	3.285E+02	3.285E+02	0.577E+02	17.57		
Total Activity :			3.285E+02	3.285E+02				

Grand Total Activity : 7.325E+02 7.325E+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*	1.963E+01	4.039E+02	4.040E+02	18.68	OK
	302.84	17.80	4.915E+00	5.284E+02	5.284E+02	34.24	OK
	356.01	60.00	6.963E+00	4.637E+02	4.637E+02	17.02	OK

Final Mean for 3 Valid Peaks = 4.040E+02 +/- 7.546E+01 (18.68%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	5.865E+01	3.285E+02	3.285E+02	17.57	OK

Final Mean for 1 Valid Peaks = 3.285E+02 +/- 5.771E+01 (17.57%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.040E+02	7.546E+01	1.930E+01	3.168E+00	20.934
TH-234	3.285E+02	5.771E+01	5.828E+01	1.867E+00	5.638

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.020E+01		1.393E+01	2.152E+01	6.719E+00	-0.474
CD-109	5.800E+01		1.414E+02	2.114E+02	2.735E+01	0.274
PA-231	0.000E+00		0.000E+00	1.933E-01	3.632E-03	0.000
PA-234	8.385E+00		1.653E+00	3.408E+00	6.405E-02	2.460
NP-237	2.201E+01		3.967E+01	6.037E+01	7.350E+00	0.365
AM-241	9.415E+00		3.485E+00	6.537E+00	1.534E-01	1.440

4/18/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405005_GE1_BAFIL_190629.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : S-8 DIS
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:16:43
 Sample ID : 1304050-05 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE1 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.28 0.0%
 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	4	30.88	2035	87	1.46	31.11	26	14	2.26E+00	2.3	1.63E+01
2	4	35.10	487	68	1.51	35.33	26	14	5.41E-01	5.4	
3	0	53.05	99	111	2.20	53.28	48	10	1.10E-01	22.4	
4	5	61.84	295	72	2.06	62.07	58	12	3.27E-01	7.4	1.15E+01
5	5	65.99	117	95	1.95	66.22	58	12	1.30E-01	16.8	
6	0	81.20	838	124	1.91	81.43	77	10	9.31E-01	4.3	
7	0	92.99	43	95	1.09	93.22	89	8	4.80E-02	42.0	
8	2	111.94	235	46	1.81	112.17	107	13	2.61E-01	7.9	4.72E+00
9	2	116.46	43	37	1.82	116.68	107	13	4.76E-02	29.2	
10	0	143.37	27	65	4.23	143.59	139	8	3.03E-02	54.3	
11	0	201.84	22	69	1.09	202.06	198	7	2.45E-02	66.7	
12	10	272.64	13	10	3.37	272.86	271	14	1.42E-02	43.6	2.79E+00
13	10	276.46	62	16	2.27	276.67	271	14	6.92E-02	17.3	
14	10	281.47	17	14	2.88	281.68	271	14	1.87E-02	48.8	
15	0	296.96	21	24	2.99	297.17	290	10	2.34E-02	49.2	
16	10	302.87	51	12	2.20	303.09	300	11	5.63E-02	28.6	1.87E+01
17	10	307.68	37	22	2.36	307.89	300	11	4.14E-02	31.8	
18	0	311.93	22	14	1.36	312.14	311	5	2.47E-02	33.3	
19	1	333.96	84	13	1.84	334.17	330	12	9.37E-02	13.1	2.09E+00
20	1	338.62	22	10	1.84	338.83	330	12	2.44E-02	34.7	
21	0	343.60	18	16	1.09	343.81	342	6	1.96E-02	42.6	
22	3	351.23	13	3	2.24	351.44	351	9	1.44E-02	12.8	7.06E+00
23	3	356.26	562	12	1.48	356.47	351	9	6.24E-01	4.3	
24	0	364.83	20	11	1.32	365.04	362	6	2.17E-02	35.9	
25	1	383.81	144	13	1.88	384.02	380	18	1.60E-01	9.2	1.28E+01
26	1	386.96	199	8	1.88	387.17	380	18	2.21E-01	9.3	
27	1	391.62	44	4	1.88	391.83	380	18	4.87E-02	19.8	
28	1	414.62	51	11	1.89	414.83	410	15	5.67E-02	16.8	2.74E+00
29	1	417.97	22	10	1.90	418.17	410	15	2.48E-02	42.9	
30	0	436.98	105	4	1.93	437.19	431	10	1.17E-01	10.5	
31	0	469.00	25	12	1.56	469.20	464	8	2.78E-02	31.2	
32	0	511.05	27	2	2.64	511.25	507	8	3.01E-02	21.2	
33	0	609.76	9	1	1.13	609.96	607	5	9.89E-03	38.2	

Summary of Nuclide Activity

Sample ID : 1304050-05

Acquisition date : 18-APR-2013 08:16:43

Total number of lines in spectrum 33
 Number of unidentified lines 29
 Number of lines tentatively identified by NID 4 12.12%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.884E+02	3.884E+02	0.735E+02	18.92	
Total Activity :			3.884E+02	3.884E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	3.971E+02	3.971E+02	0.622E+02	15.67	
Total Activity :			3.971E+02	3.971E+02			

Grand Total Activity : 7.855E+02 7.855E+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*	1.963E+01	3.884E+02	3.884E+02	18.92	OK
	302.84	17.80	4.915E+00	1.741E+02	1.741E+02	64.26	OK
	356.01	60.00	6.963E+00	4.038E+02	4.038E+02	17.40	OK

Final Mean for 3 Valid Peaks = 3.884E+02 +/- 7.350E+01 (18.92%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	5.865E+01	3.971E+02	3.971E+02	15.67	OK

Final Mean for 1 Valid Peaks = 3.971E+02 +/- 6.223E+01 (15.67%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.884E+02	7.350E+01	1.872E+01	3.074E+00	20.743
TH-234	3.971E+02	6.223E+01	5.930E+01	1.900E+00	6.697

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	5.327E-01		1.383E+01	2.208E+01	6.892E+00	0.024
CD-109	-1.484E+01		1.538E+02	2.118E+02	2.740E+01	-0.070
PA-231	0.000E+00		0.000E+00	1.933E-01	3.632E-03	0.000
PA-234	9.149E+00		1.758E+00	3.587E+00	6.740E-02	2.551
NP-237	1.923E+00		4.300E+01	6.050E+01	7.366E+00	0.032
AM-241	7.886E+00		3.429E+00	6.310E+00	1.480E-01	1.250

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4/18/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405006_GE1_BAFIL_190632.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : D-13 TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:33:35
 Sample ID : 1304050-06 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE1 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.27 0.0%
 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	28.17	40	141	1.83	28.40	26	17	4.44E-02	52.5	3.67E+01
2	3	30.93	2029	90	1.35	31.16	26	17	2.25E+00	2.3	
3	3	34.90	565	85	1.85	35.14	26	17	6.28E-01	6.3	
4	0	53.26	75	71	2.54	53.49	50	8	8.36E-02	22.5	
5	2	61.93	245	50	1.73	62.16	58	18	2.73E-01	7.9	2.25E+00
6	2	66.01	129	52	1.74	66.24	58	18	1.44E-01	12.8	
7	2	70.80	35	54	1.75	71.03	58	18	3.92E-02	36.5	
8	4	76.86	18	33	1.60	77.09	76	12	2.01E-02	47.3	1.83E+01
9	4	81.33	815	64	1.63	81.56	76	12	9.05E-01	3.7	
10	0	92.68	62	72	1.38	92.91	90	7	6.89E-02	26.0	
11	0	102.93	17	76	1.70	103.15	100	7	1.92E-02	87.4	
12	0	112.36	275	117	1.91	112.59	107	12	3.06E-01	9.9	
13	0	143.41	22	88	2.90	143.64	140	8	2.44E-02	76.9	
14	0	186.65	18	68	2.31	186.87	184	6	2.00E-02	76.5	
15	0	222.78	29	48	4.17	223.00	219	9	3.19E-02	47.2	
16	0	262.24	7	51	7.46	262.46	252	12	7.38E-03	223.4	
17	0	276.74	56	22	1.20	276.95	274	6	6.21E-02	18.9	
18	1	302.92	174	19	1.61	303.13	298	16	1.93E-01	8.1	7.03E+00
19	1	307.62	20	18	1.82	307.83	298	16	2.21E-02	40.3	
20	0	333.97	56	55	1.48	334.18	330	7	6.20E-02	22.2	
21	0	356.37	514	39	1.90	356.58	353	8	5.71E-01	4.9	
22	1	364.92	19	21	1.86	365.13	362	11	2.07E-02	42.0	3.09E+00
23	1	368.71	12	21	1.87	368.92	362	11	1.29E-02	67.8	
24	1	376.93	19	20	1.87	377.14	374	21	2.12E-02	36.2	1.25E+01
25	1	386.70	204	10	1.88	386.90	374	21	2.27E-01	9.1	
26	1	391.62	54	1	1.88	391.83	374	21	5.97E-02	17.8	
27	3	415.02	37	7	2.29	415.23	411	16	4.13E-02	24.1	1.53E+00
28	3	418.21	29	6	2.12	418.41	411	16	3.27E-02	30.8	
29	3	422.37	19	7	2.30	422.57	411	16	2.07E-02	38.9	
30	0	437.23	94	4	1.98	437.44	434	7	1.04E-01	10.9	
31	0	468.60	18	8	2.12	468.80	466	6	2.03E-02	33.4	
32	0	511.60	23	7	2.49	511.80	508	9	2.60E-02	30.3	
33	0	600.61	10	0	2.99	600.80	597	8	1.11E-02	31.6	
34	0	969.17	6	0	1.92	969.33	966	6	6.67E-03	40.8	

Total number of lines in spectrum 34
 Number of unidentified lines 30
 Number of lines tentatively identified by NID 4 11.76%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	3.777E+02	3.777E+02	0.697E+02	18.45	
Total Activity :			3.777E+02	3.777E+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	3.307E+02	3.307E+02	0.549E+02	16.59	
Total Activity :			3.307E+02	3.307E+02			

Grand Total Activity : 7.084E+02 7.084E+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*	1.963E+01	3.777E+02	3.777E+02	18.45	OK
	302.84	17.80	4.915E+00	5.971E+02	5.971E+02	33.39	OK
	356.01	60.00	6.963E+00	3.694E+02	3.694E+02	18.06	OK

Final Mean for 3 Valid Peaks = 3.777E+02 +/- 6.968E+01 (18.45%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	5.865E+01	3.307E+02	3.307E+02	16.59	OK

Final Mean for 1 Valid Peaks = 3.307E+02 +/- 5.487E+01 (16.59%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.777E+02	6.968E+01	1.813E+01	2.976E+00	20.831
TH-234	3.307E+02	5.487E+01	3.924E+01	1.257E+00	8.428

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	9.752E+00		1.353E+01	2.294E+01	7.163E+00	0.425
CD-109	-3.620E+01		1.523E+02	2.051E+02	2.653E+01	-0.176
PA-231	0.000E+00		0.000E+00	1.933E-01	3.632E-03	0.000
PA-234	7.002E+00		1.687E+00	3.340E+00	6.277E-02	2.096
NP-237	-5.423E+00		4.405E+01	6.035E+01	7.348E+00	-0.090
AM-241	1.171E+01		3.098E+00	6.115E+00	1.435E-01	1.915

C 111817

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405007_GE2_BAFIL_190620.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : D-13 DIS
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 07:18:49
 Sample ID : 1304050-07 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE2 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.30 0.0%
 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	2	30.92	1829	151	1.35	31.04	27	13	2.03E+00	2.5	2.17E+00
2	2	35.11	513	116	1.47	35.22	27	13	5.70E-01	5.4	
3	0	52.64	65	67	2.58	52.76	50	6	7.19E-02	23.6	
4	2	61.74	241	77	1.60	61.85	57	13	2.68E-01	8.6	2.20E+00
5	2	65.81	74	79	1.61	65.93	57	13	8.27E-02	21.8	
6	4	81.01	833	49	1.47	81.12	76	22	9.25E-01	3.7	1.93E+00
7	4	92.97	41	64	2.02	93.08	76	22	4.58E-02	36.4	
8	0	111.64	148	133	1.29	111.76	108	7	1.65E-01	14.3	
9	0	116.46	47	47	1.33	116.58	115	5	5.19E-02	27.3	
10	0	185.15	32	53	1.29	185.26	182	6	3.56E-02	40.5	
11	0	191.01	23	51	2.76	191.12	189	6	2.61E-02	51.9	
12	0	277.42	50	50	1.83	277.53	273	11	5.52E-02	31.0	
13	0	296.00	27	15	3.68	296.11	291	10	3.00E-02	33.0	
14	0	302.50	138	52	1.16	302.61	300	7	1.53E-01	12.0	
15	0	307.47	19	37	1.69	307.58	306	6	2.13E-02	54.8	
16	0	332.73	48	64	1.55	332.83	328	10	5.31E-02	35.4	
17	2	351.89	14	15	1.66	352.00	351	12	1.58E-02	38.3	9.54E+00
18	2	355.99	510	17	1.46	356.10	351	12	5.66E-01	4.6	
19	1	383.72	125	16	1.86	383.83	380	15	1.39E-01	10.7	1.32E+01
20	1	386.99	190	14	1.79	387.10	380	15	2.11E-01	9.0	
21	1	390.86	65	15	1.83	390.96	380	15	7.17E-02	16.8	
22	0	416.58	68	20	4.42	416.69	410	14	7.51E-02	18.8	
23	1	436.92	107	3	1.74	437.03	433	15	1.19E-01	9.9	9.72E-01
24	1	441.90	6	3	1.73	442.00	433	15	7.14E-03	58.5	
25	0	468.36	36	10	3.07	468.46	461	14	3.95E-02	25.6	
26	0	511.24	20	10	2.03	511.34	506	10	2.22E-02	37.1	
27	0	674.00	5	3	2.60	674.10	670	6	5.69E-03	69.0	

Total number of lines in spectrum 27
 Number of unidentified lines 23
 Number of lines tentatively identified by NID 4 14.81%

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	4.213E+02	4.213E+02	0.799E+02	18.95		
Total Activity :			4.213E+02	4.213E+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	8.271E+02	8.271E+02	1.613E+02	19.51		
Total Activity :			8.271E+02	8.271E+02				

Grand Total Activity : 1.248E+03 1.248E+03

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*	1.799E+01	4.213E+02	4.213E+02	18.95	OK
	302.84	17.80	7.560E+00	3.076E+02	3.076E+02	38.32	OK
	356.01	60.00	7.170E+00	3.557E+02	3.557E+02	17.69	OK

Final Mean for 3 Valid Peaks = 4.213E+02 +/- 7.986E+01 (18.95%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.305E+01	8.271E+02	8.271E+02	19.51	OK

Final Mean for 1 Valid Peaks = 8.271E+02 +/- 1.613E+02 (19.51%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.213E+02	7.986E+01	2.023E+01	3.444E+00	20.827
TH-234	8.271E+02	1.613E+02	1.492E+02	1.233E+01	5.544

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-8.488E-02		4.943E+00	8.113E+00	1.246E+00	-0.010
CD-109	-5.091E+01		1.070E+02	1.795E+02	2.060E+01	-0.284
PA-231	3.277E+01		5.615E+00	1.060E+01	2.018E-01	3.092
PA-234	3.053E+00		1.833E+00	3.451E+00	7.119E-02	0.885
NP-237	-1.209E+01		3.124E+01	5.291E+01	5.973E+00	-0.228
AM-241	2.919E+01		1.133E+01	2.107E+01	1.630E+00	1.386

C
4/18/17

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405008_GE2_BAFIL_190623.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-304-AS TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 07:40:28
 Sample ID : 1304050-08 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE2 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.29 0.0%
 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	28.11	38	182	1.66	28.23	26	17	4.18E-02	66.2	1.03E+01
2	3	30.96	1870	133	1.37	31.07	26	17	2.08E+00	2.5	
3	3	35.05	471	144	1.68	35.17	26	17	5.23E-01	6.1	
4	0	53.38	62	101	1.99	53.49	50	9	6.86E-02	31.8	
5	4	61.75	207	68	1.61	61.87	58	15	2.30E-01	9.1	1.67E+00
6	4	65.94	127	54	1.79	66.05	58	15	1.41E-01	13.3	
7	0	81.02	726	107	1.35	81.13	77	7	8.06E-01	4.4	
8	0	111.78	155	113	1.29	111.89	110	6	1.72E-01	13.4	
9	0	130.56	10	89	2.40	130.67	126	8	1.15E-02	2159.5	
10	0	240.76	11	48	1.59	240.87	238	7	1.25E-02	2103.1	
11	2	276.64	64	15	1.93	276.75	272	13	7.06E-02	16.2	3.10E+00
12	2	281.07	15	17	1.94	281.18	272	13	1.68E-02	52.3	
13	3	302.82	150	21	1.54	302.93	299	16	1.67E-01	9.3	1.50E+00
14	3	307.43	19	18	2.16	307.54	299	16	2.09E-02	54.6	
15	0	333.89	51	63	1.69	334.00	330	9	5.71E-02	30.8	
16	1	351.94	16	6	1.83	352.05	350	13	1.75E-02	28.1	1.36E+00
17	1	355.95	496	8	1.50	356.06	350	13	5.52E-01	4.5	
18	1	383.72	136	1	1.86	383.83	380	15	1.51E-01	9.6	4.90E+00
19	1	386.94	185	4	1.86	387.04	380	15	2.05E-01	9.1	
20	1	391.06	37	6	1.86	391.17	380	15	4.16E-02	24.3	
21	0	437.07	80	0	1.97	437.17	434	8	8.89E-02	11.2	
22	4	467.03	13	5	2.12	467.14	461	14	1.45E-02	41.7	7.85E-01
23	4	470.71	8	2	2.57	470.81	461	14	8.73E-03	80.5	
24	0	510.81	27	5	2.57	510.92	508	8	3.00E-02	23.4	
25	0	556.99	14	2	1.97	557.10	552	9	1.52E-02	33.6	
26	0	608.34	18	0	1.96	608.44	604	8	2.00E-02	23.6	

Summary of Nuclide Activity

Sample ID : 1304050-08

Acquisition date : 18-APR-2013 07:40:28

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	3.671E+02	3.671E+02	0.719E+02	19.58		
Total Activity :			3.671E+02	3.671E+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	7.111E+02	7.111E+02	1.444E+02	20.31		
Total Activity :			7.111E+02	7.111E+02				

Grand Total Activity : 1.078E+03 1.078E+03

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*	1.799E+01	3.671E+02	3.671E+02	19.58	OK
	302.84	17.80	7.560E+00	3.356E+02	3.356E+02	35.26	OK
	356.01	60.00	7.170E+00	3.466E+02	3.466E+02	17.62	OK

Final Mean for 3 Valid Peaks = 3.671E+02+/- 7.189E+01 (19.58%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.305E+01	7.111E+02	7.111E+02	20.31	OK

Final Mean for 1 Valid Peaks = 7.111E+02+/- 1.444E+02 (20.31%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.671E+02	7.189E+01	2.082E+01	3.545E+00	17.634
TH-234	7.111E+02	1.444E+02	1.325E+02	1.095E+01	5.366

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-4.473E+00		6.266E+00	9.156E+00	1.406E+00	-0.489
CD-109	-4.240E+01		1.139E+02	1.926E+02	2.212E+01	-0.220
PA-231	2.829E+01		5.457E+00	1.027E+01	1.956E-01	2.755
PA-234	1.673E+00		1.801E+00	3.113E+00	6.421E-02	0.537
NP-237	-2.233E+01		3.532E+01	5.317E+01	6.003E+00	-0.420
AM-241	2.553E+01		9.885E+00	1.889E+01	1.462E+00	1.352

C
4/18/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405009_GE2_BAFIL_190626.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-304-AS DIS
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 07:59:21
 Sample ID : 1304050-09 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE2 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.29 0.0%
 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	4	30.94	1984	129	1.35	31.06	26	13	2.20E+00	2.4	2.68E+00
2	4	35.20	515	136	1.59	35.32	26	13	5.73E-01	5.6	
3	0	52.36	89	76	2.22	52.47	49	8	9.84E-02	20.2	
4	2	61.65	225	50	1.60	61.76	57	12	2.50E-01	8.6	3.14E+00
5	2	65.94	96	62	1.61	66.05	57	12	1.06E-01	15.8	
6	1	80.99	819	53	1.50	81.10	77	10	9.10E-01	3.7	7.85E+00
7	1	83.75	16	44	1.50	83.86	77	10	1.80E-02	114.4	
8	0	92.03	44	95	1.40	92.15	88	9	4.90E-02	42.5	
9	0	111.84	183	98	1.36	111.95	108	7	2.03E-01	11.6	
10	0	116.79	56	48	2.73	116.91	115	6	6.22E-02	24.3	
11	0	162.19	20	78	2.05	162.31	157	8	2.26E-02	78.4	
12	0	185.93	30	71	1.25	186.04	182	8	3.37E-02	51.2	
13	0	276.41	55	25	1.86	276.52	273	9	6.09E-02	21.3	
14	1	302.82	135	20	1.63	302.93	299	12	1.50E-01	10.0	2.84E+00
15	1	306.99	38	24	1.79	307.10	299	12	4.20E-02	27.8	
16	0	333.87	54	32	1.73	333.98	330	7	6.00E-02	21.3	
17	0	356.03	496	54	1.34	356.13	352	8	5.51E-01	5.2	
18	0	377.20	9	13	1.77	377.30	374	6	1.03E-02	68.2	
19	1	383.75	113	15	1.86	383.86	380	14	1.26E-01	12.3	1.91E+00
20	1	386.87	181	9	1.86	386.98	380	14	2.01E-01	9.4	
21	1	390.81	49	4	1.86	390.92	380	14	5.42E-02	20.5	
22	2	412.07	10	1	1.88	412.17	411	20	1.09E-02	26.5	1.84E+00
23	2	414.88	43	4	2.07	414.98	411	20	4.80E-02	19.0	
24	2	418.25	22	5	2.08	418.36	411	20	2.42E-02	39.1	
25	2	424.53	9	6	2.08	424.64	411	20	1.00E-02	60.6	
26	0	436.89	92	7	1.45	437.00	432	10	1.02E-01	11.9	
27	1	464.07	8	3	1.92	464.17	463	9	8.70E-03	38.3	4.97E+00
28	1	467.90	16	13	1.93	468.01	463	9	1.78E-02	39.0	
29	0	510.44	33	5	3.13	510.55	505	10	3.67E-02	21.5	
30	0	539.04	6	2	2.89	539.14	535	7	7.01E-03	52.7	
31	0	608.15	6	3	1.18	608.25	606	6	6.42E-03	63.6	
32	0	728.79	6	5	1.44	728.89	724	7	6.52E-03	76.6	
33	0	925.91	11	0	2.48	926.00	922	8	1.22E-02	30.2	

Total number of lines in spectrum 33
 Number of unidentified lines 29
 Number of lines tentatively identified by NID 4 12.12%

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	4.142E+02	4.142E+02	0.787E+02	19.00	
Total Activity :			4.142E+02	4.142E+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	7.708E+02	7.708E+02	1.507E+02	19.55	
Total Activity :			7.708E+02	7.708E+02			

Grand Total Activity : 1.185E+03 1.185E+03

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*	1.799E+01	4.142E+02	4.142E+02	19.00	OK
	302.84	17.80	7.560E+00	3.016E+02	3.016E+02	35.94	OK
	356.01	60.00	7.170E+00	3.464E+02	3.464E+02	18.34	OK

Final Mean for 3 Valid Peaks = 4.142E+02+/- 7.869E+01 (19.00%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.305E+01	7.708E+02	7.708E+02	19.55	OK

Final Mean for 1 Valid Peaks = 7.708E+02+/- 1.507E+02 (19.55%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.142E+02	7.869E+01	1.957E+01	3.332E+00	21.165
TH-234	7.708E+02	1.507E+02	1.283E+02	1.061E+01	6.006

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.237E+00		4.893E+00	8.563E+00	1.315E+00	0.261
CD-109	4.899E+01		1.080E+02	1.681E+02	1.930E+01	0.292
PA-231	3.320E+01		5.512E+00	1.045E+01	1.989E-01	3.178
PA-234	3.211E+00		1.808E+00	3.266E+00	6.737E-02	0.983
NP-237	9.219E+00		3.083E+01	4.704E+01	5.311E+00	0.196
AM-241	3.187E+01		1.051E+01	2.023E+01	1.565E+00	1.576

C
4/18/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405010_GE2_BAFIL_190630.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-303-AS TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:17:20
 Sample ID : 1304050-10 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE2 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.25 0.0%
 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	30.94	1439	110	1.39	31.05	27	14	1.60E+00	2.8	3.50E+00
2	3	35.19	409	104	1.62	35.30	27	14	4.54E-01	6.3	
3	0	52.91	54	57	2.01	53.03	50	7	5.96E-02	27.0	
4	0	61.40	139	99	1.53	61.51	58	7	1.54E-01	14.6	
5	0	80.96	573	97	1.26	81.07	77	7	6.37E-01	5.1	
6	0	92.42	14	70	1.11	92.53	91	6	1.54E-02	99.5	
7	2	111.73	137	34	1.71	111.85	107	13	1.52E-01	11.3	4.76E+00
8	2	116.59	37	27	1.71	116.70	107	13	4.07E-02	29.7	
9	0	162.65	66	82	7.61	162.76	156	13	7.34E-02	31.1	
10	0	185.56	38	90	1.89	185.67	181	11	4.24E-02	50.4	
11	0	238.48	12	54	3.44	238.59	234	8	1.29E-02	114.7	
12	0	276.25	49	32	2.13	276.36	271	10	5.42E-02	26.1	
13	4	303.16	98	21	1.94	303.27	297	17	1.09E-01	12.8	3.08E+00
14	4	307.32	20	13	2.38	307.43	297	17	2.23E-02	50.0	
15	0	334.29	30	32	1.71	334.40	331	7	3.35E-02	34.9	
16	0	339.02	9	19	1.78	339.13	337	6	1.02E-02	82.1	
17	1	352.06	17	5	1.83	352.17	350	12	1.84E-02	26.0	1.07E+00
18	1	356.02	370	10	1.64	356.13	350	12	4.11E-01	5.4	
19	1	383.72	88	17	1.86	383.83	381	15	9.74E-02	13.0	9.77E+00
20	1	387.06	137	9	1.86	387.17	381	15	1.52E-01	10.8	
21	1	390.93	30	1	1.86	391.04	381	15	3.35E-02	29.4	
22	0	414.92	29	29	2.09	415.02	411	10	3.23E-02	38.8	
23	1	432.89	6	1	1.73	433.00	432	10	7.17E-03	3.9	5.12E-01
24	1	436.89	65	1	1.77	437.00	432	10	7.25E-02	12.6	
25	0	468.06	9	13	1.02	468.16	467	6	1.04E-02	65.8	
26	0	510.88	22	2	2.62	510.98	506	10	2.41E-02	25.4	
27	0	601.73	6	0	2.74	601.83	599	6	6.67E-03	40.8	
28	0	610.13	14	6	3.01	610.23	606	10	1.60E-02	39.6	

Total number of lines in spectrum 28
 Number of unidentified lines 24
 Number of lines tentatively identified by NID 4 14.29%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	2.901E+02	2.901E+02	0.586E+02	20.21	
Total Activity :			2.901E+02	2.901E+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	4.759E+02	4.759E+02	1.460E+02	30.68	
AM-241	432.20Y	1.00	4.717E+01	4.717E+01	1.441E+01	30.54	
Total Activity :			5.231E+02	5.231E+02			

Grand Total Activity : 8.131E+02 8.132E+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*	1.799E+01	2.901E+02	2.901E+02	20.21	OK
	302.84	17.80	7.560E+00	2.191E+02	2.192E+02	39.43	OK
	356.01	60.00	7.170E+00	2.584E+02	2.584E+02	18.56	OK

Final Mean for 3 Valid Peaks = 2.901E+02 +/- 5.862E+01 (20.21%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.305E+01	4.759E+02	4.759E+02	30.68	OK

Final Mean for 1 Valid Peaks = 4.759E+02 +/- 1.460E+02 (30.68%)

AM-241	59.54	35.90*	2.461E+01	4.717E+01	4.717E+01	30.54	OK
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Final Mean for 1 Valid Peaks = 4.717E+01 +/- 1.441E+01 (30.54%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	2.901E+02	5.862E+01	1.993E+01	3.393E+00	14.558
TH-234	4.759E+02	1.460E+02	1.836E+02	1.517E+01	2.592
AM-241	4.717E+01	1.441E+01	1.716E+01	1.328E+00	2.749

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	5.158E+00		4.132E+00	8.154E+00	1.252E+00	0.633
CD-109	-4.089E+01		1.100E+02	1.714E+02	1.968E+01	-0.239
PA-231	3.030E+01		5.393E+00	1.021E+01	1.945E-01	2.968
PA-234	3.036E+00		1.622E+00	3.124E+00	6.443E-02	0.972
NP-237	-5.578E+01		4.270E+01	4.859E+01	5.486E+00	-1.148

C
4/18/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405011_GE2_BAFIL_190633.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-303-AS DIS
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:34:11
 Sample ID : 1304050-11 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE2 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.28 0.0%
 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	2	30.89	1756	124	1.37	31.01	26	15	1.95E+00	2.5	2.83E+00
2	2	35.15	398	137	1.53	35.27	26	15	4.43E-01	6.9	
3	0	52.89	40	73	1.73	53.00	50	6	4.50E-02	36.9	
4	0	61.43	168	105	1.49	61.55	59	6	1.87E-01	12.3	
5	0	65.92	57	99	1.42	66.03	65	6	6.33E-02	31.2	
6	0	81.00	668	88	1.33	81.11	77	7	7.42E-01	4.5	
7	0	91.46	45	90	2.91	91.58	88	8	4.97E-02	39.6	
8	0	112.00	133	83	1.38	112.11	108	7	1.48E-01	14.4	
9	0	185.56	34	39	1.01	185.68	182	6	3.79E-02	33.7	
10	0	276.43	53	34	1.68	276.54	273	8	5.86E-02	23.6	
11	1	302.83	136	11	1.52	302.94	299	18	1.51E-01	9.2	1.61E+00
12	1	306.97	29	13	1.79	307.08	299	18	3.27E-02	29.4	
13	1	311.05	9	14	1.79	311.15	299	18	9.67E-03	77.1	
14	0	333.61	59	22	1.86	333.72	330	7	6.54E-02	18.7	
15	1	351.94	14	3	1.83	352.05	350	10	1.55E-02	28.5	2.25E+00
16	1	355.95	457	7	1.54	356.06	350	10	5.08E-01	4.7	
17	0	365.19	16	21	1.36	365.29	361	8	1.80E-02	55.5	
18	6	383.80	129	14	1.91	383.90	380	16	1.43E-01	10.6	8.52E+00
19	6	386.79	164	15	1.59	386.90	380	16	1.82E-01	8.8	
20	6	390.93	37	30	2.93	391.03	380	16	4.15E-02	42.4	
21	0	414.54	13	16	2.52	414.64	411	6	1.41E-02	57.9	
22	0	437.09	70	14	1.36	437.19	433	7	7.73E-02	15.0	
23	0	468.33	19	6	1.32	468.43	465	6	2.12E-02	30.5	
24	0	511.27	30	6	3.62	511.37	507	12	3.33E-02	26.5	
25	0	609.18	15	4	1.11	609.28	606	7	1.61E-02	33.9	

Total number of lines in spectrum 25
 Number of unidentified lines 21
 Number of lines tentatively identified by NID 4 16.00%

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	3.381E+02	3.381E+02	0.665E+02	19.67		
Total Activity :			3.381E+02	3.381E+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	5.765E+02	5.765E+02	1.511E+02	26.21		
AM-241	432.20Y	1.00	5.715E+01	5.715E+01	1.489E+01	26.05		
Total Activity :			6.337E+02	6.337E+02				

Grand Total Activity : 9.718E+02 9.718E+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*	1.799E+01	3.381E+02	3.381E+02	19.67	OK
	302.84	17.80	7.560E+00	3.038E+02	3.038E+02	35.15	OK
	356.01	60.00	7.170E+00	3.191E+02	3.192E+02	17.87	OK

Final Mean for 3 Valid Peaks = 3.381E+02 +/- 6.652E+01 (19.67%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.305E+01	5.765E+02	5.765E+02	26.21	OK

Final Mean for 1 Valid Peaks = 5.765E+02 +/- 1.511E+02 (26.21%)

AM-241	59.54	35.90*	2.461E+01	5.715E+01	5.715E+01	26.05	OK
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Final Mean for 1 Valid Peaks = 5.715E+01 +/- 1.489E+01 (26.05%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.381E+02	6.652E+01	1.867E+01	3.179E+00	18.112
TH-234	5.765E+02	1.511E+02	1.551E+02	1.282E+01	3.717
AM-241	5.715E+01	1.489E+01	1.269E+01	9.820E-01	4.504

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.588E-01		5.076E+00	8.928E+00	1.371E+00	-0.018
CD-109	2.095E+01		1.056E+02	1.764E+02	2.025E+01	0.119
PA-231	3.192E+01		5.751E+00	1.079E+01	2.056E-01	2.957
PA-234	3.451E+00		1.917E+00	3.441E+00	7.098E-02	1.003
NP-237	1.346E+01		3.354E+01	5.138E+01	5.801E+00	0.262

C
4/18/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405012_GE2_BAFIL_190636.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : D-12 TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:53:09
 Sample ID : 1304050-12 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE2 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.28 0.0%
 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	30.90	1982	114	1.38	31.01	26	17	2.20E+00	2.4	8.22E+00
2	1	35.01	454	82	1.39	35.13	26	17	5.05E-01	5.9	
3	1	61.75	169	56	1.46	61.87	59	11	1.88E-01	10.6	5.98E+00
4	1	65.75	60	59	1.47	65.87	59	11	6.67E-02	23.2	
5	1	80.91	761	43	1.50	81.03	76	11	8.46E-01	4.0	1.35E+01
6	1	83.75	28	41	1.50	83.86	76	11	3.09E-02	64.7	
7	0	93.77	26	53	1.57	93.88	92	5	2.94E-02	46.4	
8	0	102.10	20	43	2.02	102.21	100	5	2.18E-02	55.4	
9	0	111.84	160	122	1.19	111.96	108	8	1.77E-01	14.4	
10	0	241.14	14	67	3.74	241.25	235	9	1.54E-02	110.4	
11	0	277.11	66	35	2.09	277.22	272	11	7.34E-02	21.4	
12	1	302.94	120	17	1.51	303.05	299	15	1.33E-01	10.3	2.91E+00
13	1	307.05	41	14	1.79	307.16	299	15	4.59E-02	22.7	
14	1	333.73	73	10	1.81	333.84	331	11	8.10E-02	13.8	3.60E+00
15	1	338.01	18	17	1.82	338.12	331	11	1.98E-02	42.6	
16	0	356.03	470	34	1.38	356.14	352	8	5.22E-01	5.1	
17	0	368.29	17	19	6.52	368.40	361	12	1.92E-02	57.5	
18	0	376.63	19	7	1.89	376.74	373	7	2.14E-02	32.2	
19	7	383.77	138	7	2.12	383.87	380	15	1.54E-01	9.7	7.10E+00
20	7	386.82	186	2	1.50	386.92	380	15	2.07E-01	7.9	
21	7	391.09	47	1	2.79	391.20	380	15	5.23E-02	30.7	
22	2	414.25	27	16	2.07	414.36	411	10	3.03E-02	29.9	4.78E+00
23	2	417.98	25	13	2.08	418.09	411	10	2.74E-02	34.7	
24	1	433.72	13	1	1.90	433.83	433	11	1.48E-02	23.2	5.92E+00
25	1	437.00	94	9	1.90	437.11	433	11	1.05E-01	11.4	
26	0	468.25	13	17	1.93	468.35	464	8	1.44E-02	60.9	
27	0	510.44	39	8	4.68	510.55	505	11	4.32E-02	21.5	
28	0	609.48	7	8	2.08	609.58	606	6	8.00E-03	74.1	

Summary of Nuclide Activity

Sample ID : 1304050-12

Acquisition date : 18-APR-2013 08:53:09

Total number of lines in spectrum 28
 Number of unidentified lines 24
 Number of lines tentatively identified by NID 4 14.29%

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	3.853E+02	3.853E+02	0.740E+02	19.20		
Total Activity :			3.853E+02	3.853E+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	5.802E+02	5.802E+02	1.343E+02	23.14		
Total Activity :			5.802E+02	5.802E+02				

Grand Total Activity : 9.655E+02 9.655E+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*	1.799E+01	3.853E+02	3.853E+02	19.20	OK
	302.84	17.80	7.560E+00	2.672E+02	2.673E+02	36.35	OK
	356.01	60.00	7.170E+00	3.281E+02	3.281E+02	18.25	OK

Final Mean for 3 Valid Peaks = 3.853E+02 +/- 7.396E+01 (19.20%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.305E+01	5.802E+02	5.802E+02	23.14	OK

Final Mean for 1 Valid Peaks = 5.802E+02 +/- 1.343E+02 (23.14%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.853E+02	7.396E+01	1.883E+01	3.206E+00	20.460
TH-234	5.802E+02	1.343E+02	1.424E+02	1.177E+01	4.075

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.883E+00		5.359E+00	9.057E+00	1.391E+00	-0.208
CD-109	-5.019E+00		1.261E+02	1.798E+02	2.064E+01	-0.028
PA-231	2.786E+01		5.447E+00	1.025E+01	1.951E-01	2.719
PA-234	3.003E+00		1.855E+00	3.315E+00	6.837E-02	0.906
NP-237	-1.988E+01		3.246E+01	4.898E+01	5.530E+00	-0.406
AM-241	2.301E+01		1.009E+01	1.892E+01	1.464E+00	1.216

c
4/18/13

Configuration : DKA100: [GAMMA.SCUSR.ARCHIVE] SMP_130405013_GE3_BAFIL_190624.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : D-12 DIS
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 07:41:12
 Sample ID : 1304050-13 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE3 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:04.26 0.5%
 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	30.82	2068	99	1.41	31.14	26	15	2.30E+00	2.3	8.86E+00
2	3	35.04	481	100	1.67	35.36	26	15	5.34E-01	5.6	
3	0	52.70	55	94	2.14	53.02	50	6	6.07E-02	31.2	
4	1	61.74	245	98	1.51	62.06	57	13	2.72E-01	8.9	5.34E-01
5	1	65.75	105	94	1.52	66.07	57	13	1.17E-01	17.3	
6	1	80.82	751	66	1.54	81.14	76	11	8.35E-01	4.1	1.29E+01
7	1	83.68	30	43	1.41	84.00	76	11	3.36E-02	68.4	
8	0	93.71	40	67	2.38	94.03	91	6	4.43E-02	36.6	
9	2	111.77	225	74	1.68	112.09	108	13	2.50E-01	8.7	2.24E+00
10	2	116.45	62	54	1.76	116.76	108	13	6.89E-02	24.0	
11	0	161.01	16	77	1.86	161.32	158	7	1.83E-02	91.5	
12	0	241.59	33	90	10.14	241.90	234	14	3.67E-02	63.6	
13	0	276.65	66	20	1.25	276.96	274	7	7.39E-02	16.5	
14	2	302.78	151	18	1.50	303.08	298	13	1.68E-01	9.1	1.17E+00
15	2	307.35	28	21	1.99	307.66	298	13	3.13E-02	32.6	
16	0	333.74	73	33	1.24	334.04	330	7	8.12E-02	17.5	
17	3	351.34	13	5	2.03	351.65	351	10	1.44E-02	31.0	1.72E+00
18	3	356.02	469	13	1.49	356.32	351	10	5.21E-01	4.7	
19	2	383.59	105	4	1.82	383.90	381	15	1.16E-01	10.8	5.53E+00
20	2	386.93	193	9	2.03	387.23	381	15	2.15E-01	9.1	
21	2	391.06	45	14	2.06	391.36	381	15	4.98E-02	26.8	
22	0	415.13	25	25	1.23	415.43	412	6	2.79E-02	36.9	
23	0	436.90	99	11	1.68	437.20	432	9	1.09E-01	11.8	
24	0	467.77	14	5	2.10	468.07	464	7	1.57E-02	37.6	
25	0	487.45	12	0	1.66	487.75	484	8	1.33E-02	28.9	
26	0	502.76	7	2	1.88	503.05	499	7	8.09E-03	47.7	
27	0	511.10	12	11	1.26	511.40	508	7	1.36E-02	52.4	

Summary of Nuclide Activity

Sample ID : 1304050-13

Acquisition date : 18-APR-2013 07:41:12

Total number of lines in spectrum 27
 Number of unidentified lines 23
 Number of lines tentatively identified by NID 4 14.81%

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	3.600E+02	3.601E+02	0.642E+02	17.84	
Total Activity :			3.600E+02	3.601E+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	7.299E+02	7.299E+02	1.390E+02	19.04	
Total Activity :			7.299E+02	7.299E+02			

Grand Total Activity : 1.090E+03 1.090E+03

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	%Error	
BA-133	81.00	33.00*	1.899E+01	3.600E+02	3.601E+02	17.84	OK
	302.84	17.80	6.222E+00	4.088E+02	4.089E+02	27.47	OK
	356.01	60.00	5.860E+00	4.008E+02	4.008E+02	16.57	OK

Final Mean for 3 Valid Peaks = 3.601E+02+/- 6.425E+01 (17.84%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected Decay Corr		2-Sigma	Status
				pCi/filter	pCi/filter	%Error	
TH-234	63.29	3.80*	2.648E+01	7.299E+02	7.299E+02	19.04	OK

Final Mean for 1 Valid Peaks = 7.299E+02+/- 1.390E+02 (19.04%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.601E+02	6.425E+01	1.900E+01	2.906E+00	18.948
TH-234	7.299E+02	1.390E+02	1.340E+02	7.200E+00	5.445

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-2.428E+00		6.877E+00	1.052E+01	1.202E+00	-0.231
CD-109	6.269E+01		1.239E+02	1.885E+02	1.554E+01	0.333
PA-231	3.333E+00		1.606E+00	3.301E+00	4.695E-02	1.010
PA-234	3.332E+00		1.436E+00	2.716E+00	3.863E-02	1.227
NP-237	7.191E+00		3.757E+01	5.459E+01	4.413E+00	0.132
AM-241	3.149E+01		1.026E+01	1.936E+01	9.519E-01	1.627

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4/18/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405014_GE3_BAFIL_190627.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-111-SD TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 07:59:55
 Sample ID : 1304050-14 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE3 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:04.04 0.4%
 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	27.95	50	76	1.57	28.27	27	14	5.55E-02	26.3	1.54E+01
2	3	30.80	1978	85	1.39	31.12	27	14	2.20E+00	2.3	
3	3	34.85	459	78	1.75	35.17	27	14	5.10E-01	5.7	
4	0	52.84	76	114	1.82	53.16	49	8	8.46E-02	26.9	
5	0	61.49	191	155	1.33	61.81	58	7	2.12E-01	13.1	
6	0	65.96	105	93	1.61	66.27	65	5	1.16E-01	17.5	
7	2	80.97	847	77	1.48	81.29	77	11	9.41E-01	3.7	4.36E+00
8	2	84.71	16	91	1.70	85.03	77	11	1.78E-02	141.4	
9	0	92.40	38	99	1.51	92.72	90	7	4.22E-02	46.3	
10	0	111.66	239	116	1.44	111.97	107	8	2.65E-01	10.2	
11	0	276.66	62	54	1.83	276.97	271	12	6.85E-02	27.1	
12	3	302.82	126	13	1.55	303.12	299	17	1.40E-01	9.8	3.41E+00
13	3	307.21	23	18	2.19	307.51	299	17	2.53E-02	45.5	
14	3	311.50	11	18	2.19	311.80	299	17	1.22E-02	71.4	
15	2	333.69	67	13	2.01	333.99	330	12	7.49E-02	15.0	4.22E-01
16	2	337.79	30	10	2.02	338.10	330	12	3.35E-02	28.9	
17	0	356.13	444	25	1.83	356.43	353	8	4.94E-01	5.2	
18	6	383.60	78	17	1.89	383.90	381	14	8.71E-02	15.9	1.16E+01
19	6	386.92	179	12	1.65	387.23	381	14	1.99E-01	8.5	
20	6	390.15	51	20	3.02	390.45	381	14	5.70E-02	33.7	
21	5	414.30	31	21	2.23	414.60	410	22	3.41E-02	30.7	1.94E+00
22	5	418.73	26	24	2.60	419.04	410	22	2.87E-02	43.5	
23	0	437.17	85	19	1.83	437.48	433	9	9.41E-02	14.4	
24	0	467.55	22	8	1.19	467.85	465	7	2.50E-02	28.9	
25	0	511.20	18	11	2.31	511.50	507	11	2.00E-02	42.8	

Summary of Nuclide Activity

Sample ID : 1304050-14

Acquisition date : 18-APR-2013 07:59:55

Total number of lines in spectrum 25
 Number of unidentified lines 20
 Number of lines tentatively identified by NID 5 20.00%

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	4.061E+02	4.061E+02	0.709E+02	17.47	
NP-237	2.14E+06Y	1.00	2.183E+01	2.183E+01	6.174E+01	282.84	
Total Activity :			4.279E+02	4.279E+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	5.699E+02	5.699E+02	1.536E+02	26.96	
AM-241	432.20Y	1.00	5.522E+01	5.522E+01	1.484E+01	26.87	
Total Activity :			6.252E+02	6.252E+02			

Grand Total Activity : 1.053E+03 1.053E+03

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*	1.899E+01	4.061E+02	4.061E+02	17.47	OK
	302.84	17.80	6.222E+00	3.408E+02	3.408E+02	28.38	OK
	356.01	60.00	5.860E+00	3.794E+02	3.794E+02	17.11	OK

Final Mean for 3 Valid Peaks = 4.061E+02 +/- 7.094E+01 (17.47%)

NP-237	86.50	12.60*	1.749E+01	2.183E+01	2.183E+01	282.84	OK
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Final Mean for 1 Valid Peaks = 2.183E+01 +/- 6.174E+01 (282.84%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.648E+01	5.699E+02	5.699E+02	26.96	OK

Final Mean for 1 Valid Peaks = 5.699E+02 +/- 1.536E+02 (26.96%)

AM-241	59.54	35.90*	2.893E+01	5.522E+01	5.522E+01	26.87	OK
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Final Mean for 1 Valid Peaks = 5.522E+01 +/- 1.484E+01 (26.87%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.061E+02	7.094E+01	2.096E+01	3.206E+00	19.375
TH-234	5.699E+02	1.536E+02	1.624E+02	8.720E+00	3.510
NP-237	2.183E+01	6.174E+01	6.051E+01	4.891E+00	0.361
AM-241	5.522E+01	1.484E+01	1.384E+01	6.805E-01	3.990

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	7.452E-01		6.072E+00	1.068E+01	1.220E+00	0.070
CD-109	-3.186E+01		1.394E+02	1.901E+02	1.567E+01	-0.168
PA-231	9.370E-01		1.545E+00	2.912E+00	4.141E-02	0.322
PA-234	3.410E+00		1.478E+00	2.888E+00	4.108E-02	1.180

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4/18/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405015_GE3_BAFIL_190631.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-111-SD DIS
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:18:04
 Sample ID : 1304050-15 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE3 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:03.88 0.4%
 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	4	30.79	1974	96	1.39	31.11	26	14	2.19E+00	2.4	3.02E+00
2	4	35.02	487	89	1.51	35.34	26	14	5.42E-01	5.5	
3	0	52.01	64	123	1.66	52.33	49	7	7.10E-02	31.5	
4	1	61.63	236	93	1.51	61.95	57	14	2.62E-01	9.2	4.09E+00
5	1	65.82	87	101	1.52	66.14	57	14	9.67E-02	20.7	
6	1	80.82	821	80	1.54	81.14	76	12	9.12E-01	3.9	1.43E+01
7	1	83.68	27	55	1.41	84.00	76	12	3.02E-02	77.2	
8	0	92.06	35	99	1.08	92.38	89	7	3.93E-02	49.5	
9	0	111.40	136	212	1.33	111.71	108	8	1.51E-01	20.4	
10	0	116.35	59	78	1.65	116.67	115	6	6.61E-02	27.5	
11	0	276.97	55	40	1.46	277.28	272	9	6.07E-02	25.0	
12	0	287.54	18	19	2.51	287.85	285	7	2.03E-02	46.0	
13	0	294.67	14	24	2.09	294.98	292	7	1.59E-02	62.7	
14	3	302.76	160	16	1.46	303.07	299	17	1.78E-01	8.5	1.53E+00
15	3	306.97	23	23	2.19	307.28	299	17	2.51E-02	49.7	
16	3	333.82	82	14	1.88	334.12	328	16	9.11E-02	13.4	1.95E+00
17	3	338.23	24	15	2.22	338.53	328	16	2.65E-02	39.5	
18	0	355.97	490	30	1.66	356.27	351	10	5.44E-01	5.0	
19	0	369.95	10	17	1.51	370.26	367	7	1.09E-02	75.3	
20	0	376.38	23	22	4.16	376.68	373	8	2.52E-02	41.6	
21	5	383.81	101	7	1.55	384.12	382	13	1.12E-01	11.9	1.42E+00
22	5	386.85	214	6	1.88	387.15	382	13	2.38E-01	8.3	
23	5	391.21	70	4	2.21	391.51	382	13	7.82E-02	17.1	
24	1	414.53	46	5	1.89	414.83	412	18	5.06E-02	17.0	1.91E+00
25	1	417.87	40	4	1.90	418.17	412	18	4.49E-02	21.5	
26	1	421.87	13	3	1.90	422.17	412	18	1.50E-02	43.1	
27	0	436.87	102	7	1.67	437.17	432	10	1.13E-01	11.1	
28	1	467.88	31	0	1.93	468.18	464	14	3.48E-02	18.3	9.99E-01
29	1	471.88	6	0	1.94	472.18	464	14	6.16E-03	72.2	
30	0	510.82	15	4	1.44	511.12	508	8	1.62E-02	35.6	

Summary of Nuclide Activity

Sample ID : 1304050-15

Acquisition date : 18-APR-2013 08:18:04

Total number of lines in spectrum 30
 Number of unidentified lines 26
 Number of lines tentatively identified by NID 4 13.33%

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	3.934E+02	3.934E+02	0.694E+02	17.63	
Total Activity :			3.934E+02	3.934E+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	7.033E+02	7.033E+02	1.374E+02	19.54	
Total Activity :			7.033E+02	7.033E+02			

Grand Total Activity : 1.097E+03 1.097E+03

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*	1.899E+01	3.934E+02	3.934E+02	17.63	OK		
	302.84	17.80	6.222E+00	4.347E+02	4.347E+02	26.69	OK		
	356.01	60.00	5.860E+00	4.183E+02	4.184E+02	16.89	OK		

Final Mean for 3 Valid Peaks = 3.934E+02+/- 6.936E+01 (17.63%)

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*	2.648E+01	7.033E+02	7.033E+02	19.54	OK		

Final Mean for 1 Valid Peaks = 7.033E+02+/- 1.374E+02 (19.54%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.934E+02	6.936E+01	1.996E+01	3.053E+00	19.709
TH-234	7.033E+02	1.374E+02	1.402E+02	7.530E+00	5.017

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.301E+00		6.787E+00	1.061E+01	1.212E+00	-0.123
CD-109	9.644E+01		1.169E+02	1.866E+02	1.539E+01	0.517
PA-231	2.686E+00		1.580E+00	3.188E+00	4.534E-02	0.843
PA-234	2.722E+00		1.473E+00	2.701E+00	3.842E-02	1.008
NP-237	3.214E+01		3.411E+01	5.513E+01	4.456E+00	0.583
AM-241	2.763E+01		1.032E+01	1.911E+01	9.395E-01	1.446

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Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405016_GE3_BAFIL_190634.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-304-AI TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:34:48
 Sample ID : 1304050-16 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE3 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:04.25 0.5%
 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	4	30.75	1991	90	1.44	31.07	27	14	2.21E+00	2.3	9.46E+00
2	4	35.01	515	86	1.57	35.33	27	14	5.73E-01	5.3	
3	0	52.24	58	127	2.57	52.56	50	7	6.49E-02	34.4	
4	3	61.73	282	94	1.82	62.05	58	12	3.13E-01	7.8	6.29E+00
5	3	65.62	124	107	1.83	65.94	58	12	1.38E-01	17.3	
6	3	77.81	28	58	1.86	78.13	76	12	3.08E-02	42.5	8.87E+00
7	3	81.02	838	73	1.56	81.34	76	12	9.31E-01	3.8	
8	3	84.51	27	87	1.87	84.83	76	12	2.96E-02	86.9	
9	0	92.31	33	114	1.38	92.62	89	8	3.64E-02	59.7	
10	0	99.60	17	122	1.89	99.92	98	8	1.85E-02	117.4	
11	3	111.88	213	75	1.60	112.19	107	14	2.37E-01	9.1	5.08E-01
12	3	115.89	63	76	1.93	116.21	107	14	7.00E-02	29.3	
13	0	223.96	38	66	3.60	224.27	220	9	4.27E-02	41.2	
14	0	276.33	72	32	1.59	276.64	272	8	8.00E-02	18.0	
15	1	302.86	134	13	1.80	303.16	300	11	1.49E-01	9.6	2.99E+00
16	1	307.53	23	19	1.81	307.84	300	11	2.51E-02	37.8	
17	0	324.33	25	11	2.19	324.64	321	9	2.80E-02	31.1	
18	3	333.67	89	7	1.74	333.98	330	15	9.87E-02	12.1	1.87E+00
19	3	338.14	17	16	2.22	338.45	330	15	1.83E-02	52.2	
20	0	356.01	468	31	1.84	356.32	351	9	5.20E-01	5.1	
21	1	383.59	142	15	1.87	383.89	380	17	1.58E-01	9.7	7.67E+00
22	1	386.87	215	9	1.86	387.17	380	17	2.38E-01	8.7	
23	1	390.87	42	4	1.88	391.17	380	17	4.64E-02	27.5	
24	3	417.53	25	9	1.90	417.83	413	16	2.79E-02	35.5	3.08E+00
25	3	421.13	11	8	2.30	421.43	413	16	1.17E-02	74.6	
26	0	436.94	97	7	1.72	437.24	433	9	1.08E-01	11.3	
27	0	468.16	30	11	1.67	468.46	463	9	3.30E-02	27.5	
28	0	511.42	21	2	2.44	511.72	507	9	2.31E-02	25.5	
29	0	610.16	6	3	1.75	610.45	607	5	6.11E-03	60.6	

Summary of Nuclide Activity

Sample ID : 1304050-16

Acquisition date : 18-APR-2013 08:34:48

Total number of lines in spectrum 29
 Number of unidentified lines 24
 Number of lines tentatively identified by NID 5 17.24%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
BA-133	10.50Y	1.00	4.015E+02	4.016E+02	0.703E+02	17.50	
NP-237	2.14E+06Y	1.00	3.624E+01	3.624E+01	6.309E+01	174.07	
Total Activity :			4.378E+02	4.378E+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	8.412E+02	8.412E+02	1.435E+02	17.05	
Total Activity :			8.412E+02	8.412E+02			

Grand Total Activity : 1.279E+03 1.279E+03

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*	1.899E+01	4.015E+02	4.016E+02	17.50	OK
	302.84	17.80	6.222E+00	3.625E+02	3.626E+02	28.12	OK
	356.01	60.00	5.860E+00	3.999E+02	3.999E+02	17.03	OK

Final Mean for 3 Valid Peaks = 4.016E+02+/- 7.027E+01 (17.50%)

NP-237	86.50	12.60*	1.749E+01	3.624E+01	3.624E+01	174.07	OK
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Final Mean for 1 Valid Peaks = 3.624E+01+/- 6.309E+01 (174.07%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.648E+01	8.412E+02	8.412E+02	17.05	OK

Final Mean for 1 Valid Peaks = 8.412E+02+/- 1.435E+02 (17.05%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.016E+02	7.027E+01	1.977E+01	3.024E+00	20.309
TH-234	8.412E+02	1.435E+02	1.361E+02	7.311E+00	6.180
NP-237	3.624E+01	6.309E+01	6.199E+01	5.011E+00	0.585

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	3.722E+00		6.868E+00	1.163E+01	1.328E+00	0.320
CD-109	-9.035E+01		1.481E+02	1.905E+02	1.571E+01	-0.474
PA-231	1.162E+00		1.554E+00	2.956E+00	4.205E-02	0.393
PA-234	3.520E+00		1.430E+00	2.827E+00	4.021E-02	1.245
AM-241	3.638E+01		1.070E+01	2.029E+01	9.977E-01	1.793

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Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405017_GE3_BAFIL_190637.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : PZ-304-AI DIS
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:53:41
 Sample ID : 1304050-17 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE3 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:03.47 0.4%
 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	2	30.76	2034	74	1.46	31.08	26	15	2.26E+00	2.3	2.10E+01
2	2	34.96	482	55	1.59	35.28	26	15	5.36E-01	5.4	
3	0	52.54	52	115	2.97	52.86	50	7	5.74E-02	37.0	
4	1	61.74	250	98	1.51	62.06	58	13	2.78E-01	8.8	3.14E+00
5	1	65.54	92	111	1.52	65.86	58	13	1.02E-01	20.1	
6	0	80.97	833	150	1.72	81.28	78	8	9.25E-01	4.3	
7	0	92.72	19	62	1.35	93.03	92	5	2.14E-02	65.9	
8	0	101.64	38	108	1.26	101.96	99	7	4.17E-02	48.6	
9	4	111.81	231	71	2.12	112.12	107	15	2.57E-01	8.8	2.68E+00
10	4	116.01	45	47	2.13	116.33	107	15	4.96E-02	38.2	
11	0	160.70	31	76	1.22	161.01	157	8	3.49E-02	51.2	
12	0	238.10	17	49	1.34	238.41	235	8	1.93E-02	73.4	
13	0	276.42	64	30	1.40	276.72	273	8	7.13E-02	19.3	
14	3	302.77	149	19	1.59	303.07	299	12	1.65E-01	8.8	1.50E+01
15	3	307.24	16	30	2.19	307.54	299	12	1.81E-02	69.3	
16	5	333.68	81	13	1.70	333.99	328	21	8.99E-02	13.1	1.34E+00
17	5	338.64	28	15	2.68	338.94	328	21	3.15E-02	35.9	
18	0	356.00	494	6	1.86	356.30	352	8	5.49E-01	4.6	
19	0	376.52	24	15	1.36	376.82	374	7	2.71E-02	32.7	
20	3	383.76	102	20	2.11	384.06	381	16	1.13E-01	12.6	5.53E+00
21	3	387.00	205	15	1.81	387.31	381	16	2.28E-01	7.8	
22	3	391.22	45	16	2.13	391.53	381	16	5.02E-02	28.1	
23	0	415.23	31	38	1.19	415.53	413	7	3.43E-02	37.4	
24	0	437.07	102	14	1.73	437.37	433	9	1.14E-01	11.8	
25	0	468.11	25	14	1.35	468.41	464	8	2.78E-02	32.7	
26	0	608.72	14	2	4.00	609.02	605	8	1.57E-02	31.7	

Summary of Nuclide Activity

Sample ID : 1304050-17

Acquisition date : 18-APR-2013 08:53:41

Total number of lines in spectrum 26
 Number of unidentified lines 22
 Number of lines tentatively identified by NID 4 15.38%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean	Wtd Mean	Decay Corr	2-Sigma	Flags
			Uncorrected	Decay Corr			
BA-133	10.50Y	1.00	3.992E+02	3.992E+02	0.718E+02	17.98	
Total Activity :			3.992E+02	3.992E+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	7.474E+02	7.474E+02	1.412E+02	18.90	
Total Activity :			7.474E+02	7.474E+02			

Grand Total Activity : 1.147E+03 1.147E+03

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*	1.899E+01	3.992E+02	3.992E+02	17.98	OK
	302.84	17.80	6.222E+00	4.030E+02	4.030E+02	27.04	OK
	356.01	60.00	5.860E+00	4.220E+02	4.221E+02	16.43	OK

Final Mean for 3 Valid Peaks = 3.992E+02+/- 7.179E+01 (17.98%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	2.648E+01	7.474E+02	7.474E+02	18.90	OK

Final Mean for 1 Valid Peaks = 7.474E+02+/- 1.412E+02 (18.90%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.992E+02	7.179E+01	2.042E+01	3.123E+00	19.548
TH-234	7.474E+02	1.412E+02	1.432E+02	7.689E+00	5.221

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-2.537E+00		5.671E+00	8.598E+00	9.823E-01	-0.295
CD-109	-1.209E+02		1.503E+02	1.875E+02	1.546E+01	-0.645
PA-231	1.390E+00		1.599E+00	3.056E+00	4.346E-02	0.455
PA-234	3.797E+00		1.599E+00	2.976E+00	4.233E-02	1.276
NP-237	7.035E+00		3.609E+01	5.882E+01	4.755E+00	0.120
AM-241	2.629E+01		1.038E+01	1.908E+01	9.382E-01	1.378

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Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405018_GE1_BAFIL_190635.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : I-11 TOT
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 08:52:32
 Sample ID : 1304050-18 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE1 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.27 0.0%
 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	2	30.89	2008	60	1.45	31.12	27	17	2.23E+00	2.3	1.16E+01
2	2	35.06	460	38	1.68	35.29	27	17	5.11E-01	5.4	
3	0	52.68	55	87	2.87	52.91	50	8	6.09E-02	32.6	
4	1	61.91	202	73	1.58	62.14	58	13	2.24E-01	10.0	6.32E+00
5	1	65.63	105	91	1.58	65.86	58	13	1.16E-01	18.0	
6	5	81.32	807	79	1.59	81.54	76	12	8.97E-01	3.8	2.09E+01
7	5	84.62	19	77	2.13	84.84	76	12	2.11E-02	131.7	
8	1	89.92	15	32	1.62	90.15	89	11	1.63E-02	55.7	3.53E+00
9	1	92.92	33	53	1.62	93.15	89	11	3.69E-02	37.5	
10	4	112.13	237	37	1.71	112.36	109	13	2.63E-01	7.5	4.86E+00
11	4	116.20	56	47	2.20	116.43	109	13	6.18E-02	31.0	
12	0	160.57	26	66	1.12	160.79	158	6	2.91E-02	53.7	
13	0	277.06	57	35	1.43	277.27	274	8	6.30E-02	22.6	
14	0	303.22	121	38	1.42	303.43	300	7	1.35E-01	12.3	
15	3	333.79	63	20	1.79	334.01	328	15	7.02E-02	16.8	3.98E+00
16	3	338.37	19	33	2.23	338.58	328	15	2.12E-02	54.6	
17	3	351.79	15	2	1.69	352.00	351	11	1.69E-02	7.9	3.50E+00
18	3	356.32	549	7	1.50	356.53	351	11	6.10E-01	4.3	
19	2	383.83	169	11	2.06	384.03	380	18	1.87E-01	8.2	9.34E+00
20	2	387.14	222	7	1.72	387.35	380	18	2.47E-01	7.5	
21	2	391.15	47	7	2.07	391.36	380	18	5.26E-02	27.3	
22	3	414.97	48	11	2.29	415.18	412	14	5.38E-02	19.9	6.80E+00
23	3	418.36	35	11	2.01	418.57	412	14	3.87E-02	25.6	
24	3	422.60	13	14	2.30	422.81	412	14	1.43E-02	62.3	
25	0	437.28	97	12	1.90	437.48	434	9	1.08E-01	11.9	
26	0	468.87	15	10	1.59	469.07	464	8	1.67E-02	44.7	
27	0	511.25	19	7	1.43	511.45	507	9	2.12E-02	33.6	
28	0	570.30	8	0	2.70	570.50	567	7	8.89E-03	35.4	
29	0	610.27	8	7	1.32	610.47	606	6	8.56E-03	66.5	
30	0	632.48	7	1	1.26	632.68	630	5	7.50E-03	45.8	
31	0	693.21	6	1	2.53	693.40	691	5	6.59E-03	49.4	

Total number of lines in spectrum 31
 Number of unidentified lines 25
 Number of lines tentatively identified by NID 6 19.35%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr 2-Sigma Error	2-Sigma	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
CD-109	464.00D	1.00	8.218E+01	8.223E+01	9.228E+01	112.23	
BA-133	10.50Y	1.00	3.744E+02	3.744E+02	0.693E+02	18.52	
NP-237	2.14E+06Y	1.00	2.960E+01	2.960E+01	7.803E+01	263.62	
Total Activity :			4.862E+02	4.863E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean		Decay Corr 2-Sigma Error	2-Sigma	Flags
			Uncorrected pCi/filter	Decay Corr pCi/filter			
TH-234	4.47E+09Y	1.00	2.722E+02	2.722E+02	0.563E+02	20.67	
Total Activity :			2.722E+02	2.722E+02			

Grand Total Activity : 7.584E+02 7.585E+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*	1.439E+01	8.218E+01	8.223E+01	112.23	OK

Final Mean for 1 Valid Peaks = 8.223E+01+/- 9.228E+01 (112.23%)

BA-133	81.00	33.00*	1.963E+01	3.744E+02	3.744E+02	18.52	OK
	302.84	17.80	4.915E+00	4.169E+02	4.169E+02	38.22	OK
	356.01	60.00	6.963E+00	3.946E+02	3.947E+02	17.38	OK

Final Mean for 3 Valid Peaks = 3.744E+02+/- 6.935E+01 (18.52%)

NP-237	86.50	12.60*	1.532E+01	2.960E+01	2.960E+01	263.62	OK
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Final Mean for 1 Valid Peaks = 2.960E+01+/- 7.803E+01 (263.62%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	5.865E+01	2.722E+02	2.722E+02	20.67	OK

Final Mean for 1 Valid Peaks = 2.722E+02+/- 5.626E+01 (20.67%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CD-109	8.223E+01	9.228E+01	2.126E+02	2.750E+01	0.387
BA-133	3.744E+02	6.935E+01	1.892E+01	3.105E+00	19.794
TH-234	2.722E+02	5.626E+01	5.564E+01	1.783E+00	4.893
NP-237	2.960E+01	7.803E+01	5.888E+01	7.169E+00	0.503

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-2.127E+00		1.317E+01	2.054E+01	6.413E+00	-0.104
PA-231	0.000E+00		0.000E+00	1.933E-01	3.632E-03	0.000
PA-234	8.655E+00		1.632E+00	3.459E+00	6.499E-02	2.503
AM-241	8.289E+00		3.298E+00	6.189E+00	1.452E-01	1.339

C
4/18/13

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_130405019_GE1_BAFIL_190638.CN
 Analyses by : PEAK V16.9 PEAKEFF V2.2
 Client ID : I-11 DIS
 Deposition Date :
 Sample Date : 18-APR-2013 00:00:00 Acquisition date : 18-APR-2013 09:10:55
 Sample ID : 1304050-19 Sample Quantity : 1.00000E+00 filter
 Sample type : FILTER Sample Geometry : 0
 Detector name : GE1 Detector Geometry: BAFIL
 Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:00.28 0.0%
 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	2	30.91	2021	71	1.38	31.14	27	12	2.25E+00	2.3	1.52E+01
2	2	35.05	545	58	1.68	35.28	27	12	6.05E-01	4.9	
3	4	53.11	67	66	2.08	53.34	50	25	7.42E-02	23.3	3.51E+00
4	4	62.00	285	56	1.83	62.23	50	25	3.17E-01	7.1	
5	4	65.91	130	68	2.11	66.14	50	25	1.44E-01	15.1	
6	4	69.15	17	69	2.11	69.38	50	25	1.88E-02	102.3	
7	0	81.24	847	146	1.94	81.47	76	11	9.42E-01	4.4	
8	0	93.07	46	115	1.79	93.30	89	9	5.16E-02	44.4	
9	1	111.84	203	53	1.64	112.07	109	11	2.26E-01	9.0	4.04E+00
10	1	116.62	50	51	1.65	116.85	109	11	5.59E-02	26.7	
11	0	277.09	48	48	1.15	277.30	273	8	5.38E-02	28.6	
12	1	302.92	158	18	1.59	303.14	300	12	1.76E-01	8.7	6.93E+00
13	1	307.62	23	27	1.82	307.83	300	12	2.57E-02	38.0	
14	1	333.86	84	11	1.84	334.07	330	19	9.38E-02	12.8	1.32E+00
15	1	337.72	24	13	1.84	337.93	330	19	2.69E-02	36.5	
16	1	342.96	10	14	1.85	343.17	330	19	1.09E-02	65.0	
17	0	356.22	590	9	1.95	356.43	351	9	6.56E-01	4.2	
18	1	383.92	158	16	1.88	384.13	381	19	1.76E-01	8.9	1.34E+01
19	1	386.96	261	10	1.88	387.17	381	19	2.89E-01	7.8	
20	1	391.64	55	4	1.88	391.85	381	19	6.06E-02	17.2	
21	1	414.75	33	23	1.89	414.96	410	16	3.65E-02	28.3	5.87E+00
22	1	417.62	10	22	1.90	417.83	410	16	1.07E-02	105.4	
23	0	437.30	129	8	1.85	437.51	434	9	1.43E-01	9.7	
24	4	467.98	16	12	2.57	468.19	463	12	1.82E-02	45.3	2.49E+00
25	4	471.79	6	9	2.57	472.00	463	12	6.94E-03	91.3	
26	0	511.68	20	10	3.28	511.88	507	8	2.23E-02	35.2	
27	0	608.98	7	2	1.88	609.17	606	6	7.22E-03	49.3	

Total number of lines in spectrum 27
 Number of unidentified lines 23
 Number of lines tentatively identified by NID 4 14.81%

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	3.929E+02	3.930E+02	0.749E+02	19.06		
Total Activity :			3.929E+02	3.930E+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	3.839E+02	3.839E+02	0.578E+02	15.07		
Total Activity :			3.839E+02	3.839E+02				

Grand Total Activity : 7.768E+02 7.768E+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*	1.963E+01	3.929E+02	3.930E+02	19.06	OK
	302.84	17.80	4.915E+00	5.432E+02	5.433E+02	34.03	OK
	356.01	60.00	6.963E+00	4.241E+02	4.241E+02	17.34	OK

Final Mean for 3 Valid Peaks = 3.930E+02+/- 7.488E+01 (19.06%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	5.865E+01	3.839E+02	3.839E+02	15.07	OK

Final Mean for 1 Valid Peaks = 3.839E+02+/- 5.784E+01 (15.07%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.930E+02	7.488E+01	1.813E+01	2.976E+00	21.673
TH-234	3.839E+02	5.784E+01	5.398E+01	1.730E+00	7.111

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

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	1.430E+01		1.284E+01	2.232E+01	6.969E+00	0.641
CD-109	-2.562E+01		1.587E+02	2.161E+02	2.795E+01	-0.119
PA-231	0.000E+00		0.000E+00	1.933E-01	3.632E-03	0.000
PA-234	7.078E+00		1.614E+00	3.333E+00	6.263E-02	2.124
NP-237	7.937E+00		4.499E+01	6.422E+01	7.818E+00	0.124
AM-241	1.035E+01		3.371E+00	6.489E+00	1.522E-01	1.594