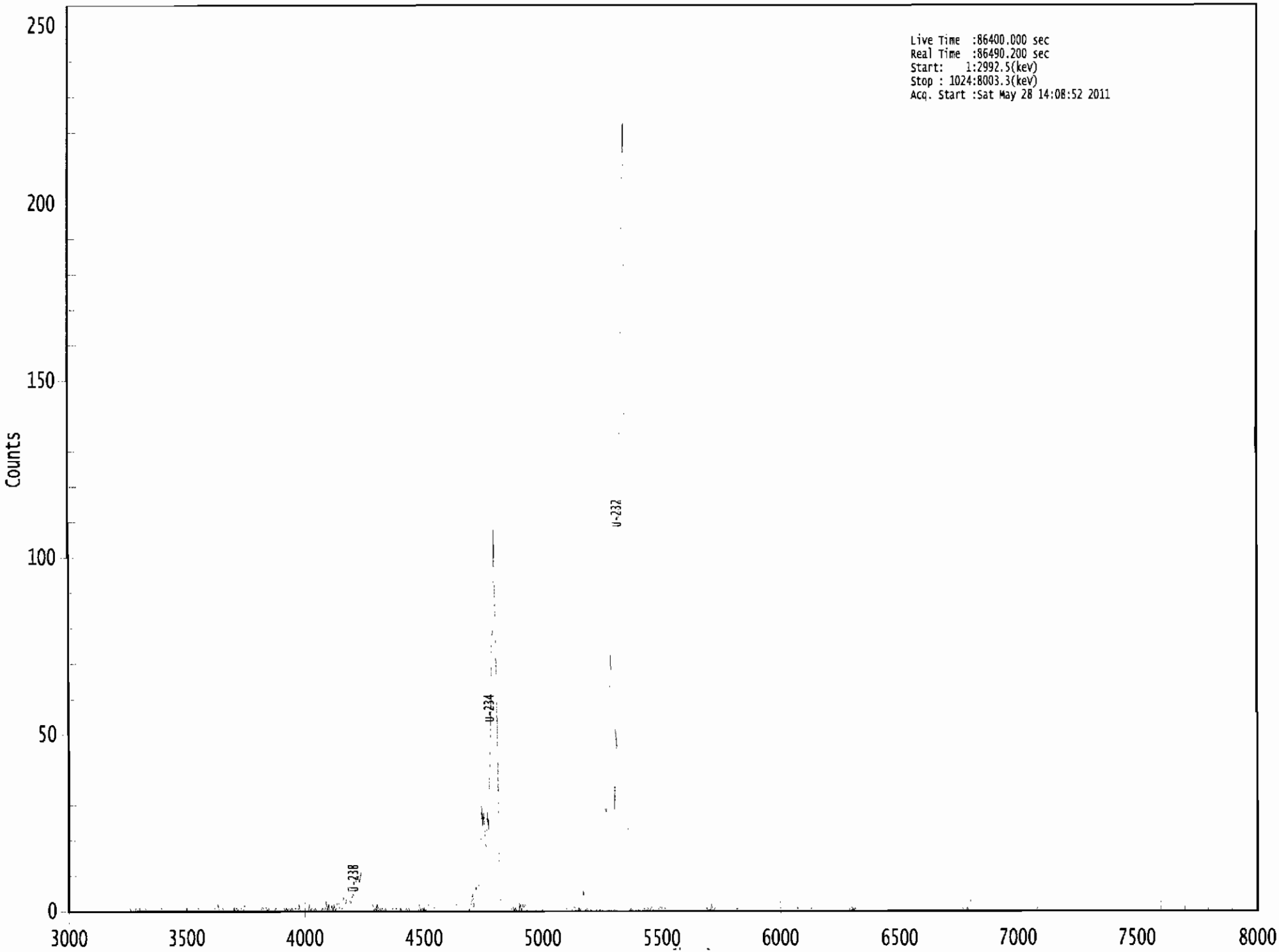
0000012955.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-010
Batch Identification: B11-01984 A
Sample Identification: 11-01984-13
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 6A
Chamber Serial Number: 12045132A
Detector Serial Number: 55816
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:54
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86490.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2190 +/- 0.0045 on 4/19/10 14:26:08
Effective Efficiency: 0.2190 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

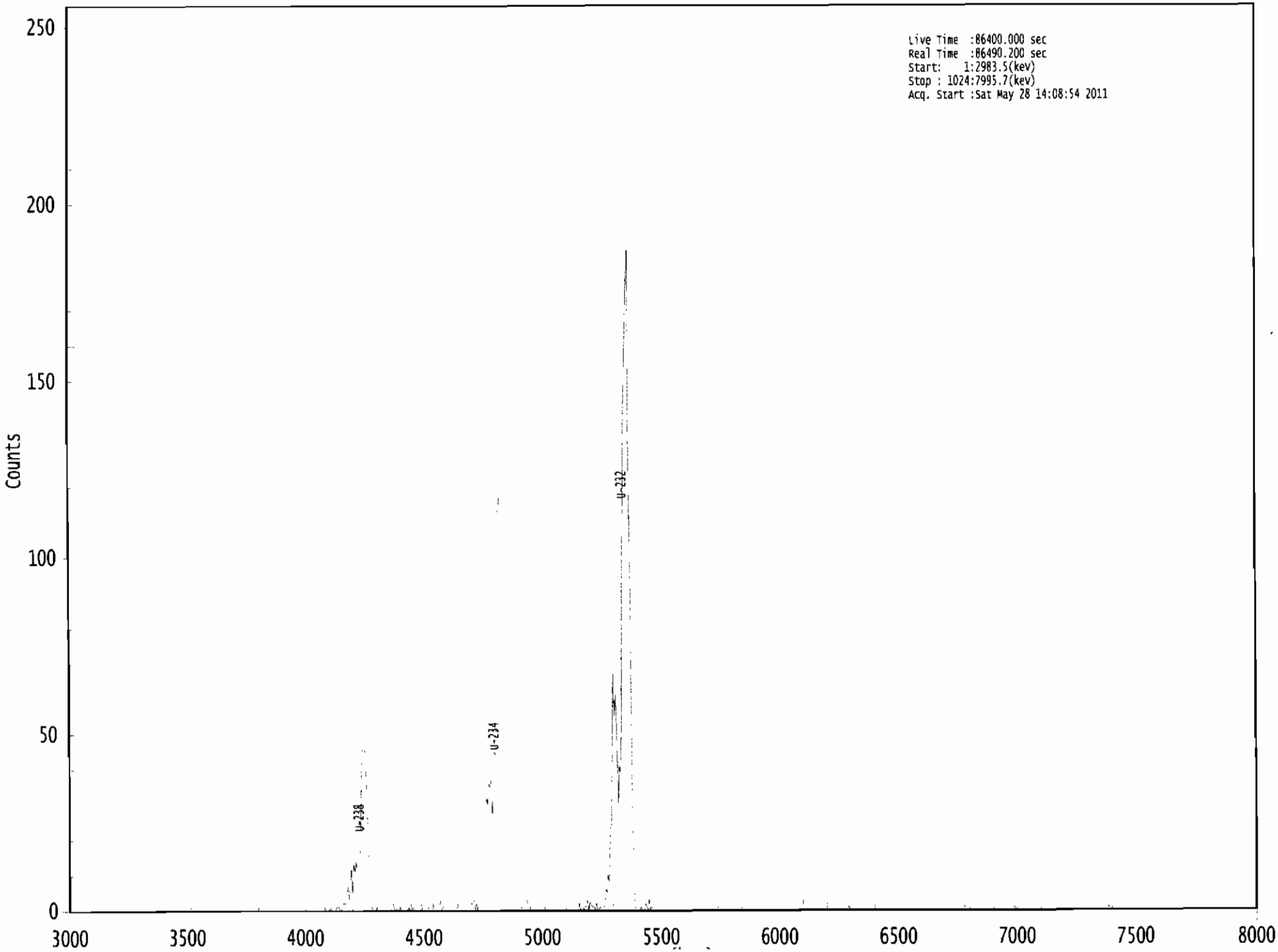
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
U-232	5328.673	1677.00	40.95	0.00	0.00E+000	34
U-234	4788.438	1035.00	32.17	0.00	0.00E+000	29
U-235	4407.052	11.00	3.32	0.00	0.00E+000	7
U-238	4220.586	394.00	19.85	0.00	0.00E+000	29

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	2.3997E+000	3.19	3.8722E-003	2.05
U-234	1.4811E+000	3.73	3.8722E-003	2.05
U-235	1.9418E-002	30.22	4.7769E-003	2.05
U-238	5.6138E-001	5.44	3.8556E-003	2.05

Errors quoted at 1.000 sigma

0000012956.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-011
Batch Identification: B11-01984 A
Sample Identification: 11-01984-14
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 6B
Chamber Serial Number: 12045132B
Detector Serial Number: 55817
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:56
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86490.1 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2172 +/- 0.0045 on 4/19/10 14:26:42
Effective Efficiency: 0.2172 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

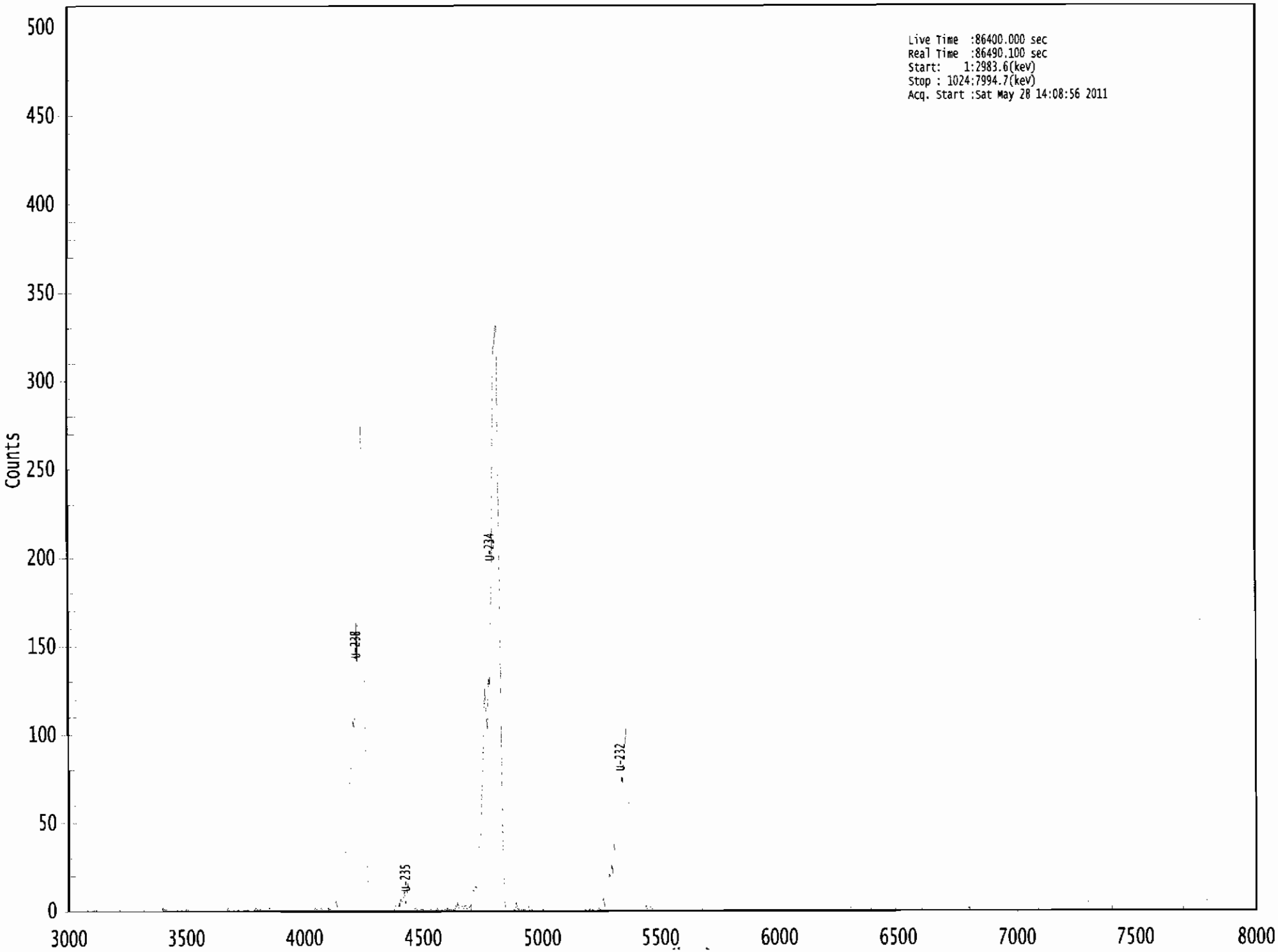
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
U-232	5319.211	1003.00	31.67	0.00	0.00E+000	36
U-234	4778.203	3462.00	58.84	0.00	0.00E+000	38
U-235	4411.621	111.00	10.54	0.00	0.00E+000	19
U-238	4208.378	2551.00	50.51	0.00	0.00E+000	36

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	1.4473E+000	3.77	3.9046E-003	2.05
U-234	4.9954E+000	2.67	3.9046E-003	2.05
U-235	1.9758E-001	9.71	4.8168E-003	2.05
U-238	3.6651E+000	2.85	3.8878E-003	2.05

Errors quoted at 1.000 sigma

0000012957.CNF



ARS INTERNATIONAL

Apex Alpha Instrument Data Transfer Report

#	Report ID	Batch Sample ID	Isotope	Gross Area	Count Mins	BKG Counts	BKG Count Mins	EFF	Analysis Date	Date
1	ApexAlpha	ARS1-B11-01984-01	U-232	2423	1440	0	1440	0.21	05/28/11 14:08	A_2
2	ApexAlpha	ARS1-B11-01984-01	U-234	9650	1440	3	1440	0.21	05/28/11 14:08	A_2
3	ApexAlpha	ARS1-B11-01984-01	U-235	348	1440	1	1440	0.21	05/28/11 14:08	A_2
4	ApexAlpha	ARS1-B11-01984-01	U-238	10054	1440	4	1440	0.21	05/28/11 14:08	A_2
5	ApexAlpha	ARS1-B11-01984-02	U-232	2366	1440	0	1440	0.22	05/28/11 14:09	A_2
6	ApexAlpha	ARS1-B11-01984-02	U-234	9438	1440	1	1440	0.22	05/28/11 14:09	A_2
7	ApexAlpha	ARS1-B11-01984-02	U-235	343	1440	1	1440	0.22	05/28/11 14:09	A_2
8	ApexAlpha	ARS1-B11-01984-02	U-238	9439	1440	4	1440	0.22	05/28/11 14:09	A_2
9	ApexAlpha	ARS1-B11-01984-03	U-232	1986	1440	2	1440	0.22	05/28/11 14:09	A_2
10	ApexAlpha	ARS1-B11-01984-03	U-234	91	1440	10	1440	0.22	05/28/11 14:09	A_2
11	ApexAlpha	ARS1-B11-01984-03	U-235	9	1440	3	1440	0.22	05/28/11 14:09	A_2
12	ApexAlpha	ARS1-B11-01984-03	U-238	109	1440	53	1440	0.22	05/28/11 14:09	A_2
13	ApexAlpha	ARS1-B11-01984-04	U-232	1910	1440	0	1440	0.22	05/28/11 14:09	A_2
14	ApexAlpha	ARS1-B11-01984-04	U-234	846	1440	9	1440	0.22	05/28/11 14:09	A_2
15	ApexAlpha	ARS1-B11-01984-04	U-235	32	1440	1	1440	0.22	05/28/11 14:09	A_2
16	ApexAlpha	ARS1-B11-01984-04	U-238	187	1440	2	1440	0.22	05/28/11 14:09	A_2
17	ApexAlpha	ARS1-B11-01984-05	U-232	2184	1440	3	1440	0.21	05/28/11 14:09	A_2
18	ApexAlpha	ARS1-B11-01984-05	U-234	16307	1440	5	1440	0.21	05/28/11 14:09	A_2
19	ApexAlpha	ARS1-B11-01984-05	U-235	494	1440	0	1440	0.21	05/28/11 14:09	A_2
20	ApexAlpha	ARS1-B11-01984-05	U-238	13978	1440	3	1440	0.21	05/28/11 14:09	A_2
21	ApexAlpha	ARS1-B11-01984-06	U-232	2231	1440	1	1440	0.22	05/28/11 14:09	A_3
22	ApexAlpha	ARS1-B11-01984-06	U-234	16471	1440	6	1440	0.22	05/28/11 14:09	A_3
23	ApexAlpha	ARS1-B11-01984-06	U-235	565	1440	1	1440	0.22	05/28/11 14:09	A_3
24	ApexAlpha	ARS1-B11-01984-06	U-238	14317	1440	2	1440	0.22	05/28/11 14:09	A_3
25	ApexAlpha	ARS1-B11-01984-07	U-232	17	1440	0	1440	0.21	05/28/11 14:09	A_3
26	ApexAlpha	ARS1-B11-01984-07	U-234	126807	1440	11	1440	0.21	05/28/11 14:09	A_3
27	ApexAlpha	ARS1-B11-01984-07	U-235	124711	1440	0	1440	0.21	05/28/11 14:09	A_3
28	ApexAlpha	ARS1-B11-01984-07	U-238	229215	1440	0	1440	0.21	05/28/11 14:09	A_3
29	ApexAlpha	ARS1-B11-01984-08	U-232	1705	1440	2	1440	0.22	05/28/11 14:09	A_3
30	ApexAlpha	ARS1-B11-01984-08	U-234	979	1440	3	1440	0.22	05/28/11 14:09	A_3
31	ApexAlpha	ARS1-B11-01984-08	U-235	53	1440	0	1440	0.22	05/28/11 14:09	A_3
32	ApexAlpha	ARS1-B11-01984-08	U-238	572	1440	6	1440	0.22	05/28/11 14:09	A_3
33	ApexAlpha	ARS1-B11-01984-09	U-232	2223	1440	0	1440	0.22	05/28/11 14:09	A_3
34	ApexAlpha	ARS1-B11-01984-09	U-234	4650	1440	4	1440	0.22	05/28/11 14:09	A_3
35	ApexAlpha	ARS1-B11-01984-09	U-235	148	1440	1	1440	0.22	05/28/11 14:09	A_3
36	ApexAlpha	ARS1-B11-01984-09	U-238	4073	1440	16	1440	0.22	05/28/11 14:09	A_3
37	ApexAlpha	ARS1-B11-01984-10	U-232	2408	1440	1	1440	0.21	05/28/11 14:09	A_3
38	ApexAlpha	ARS1-B11-01984-10	U-234	33815	1440	3	1440	0.21	05/28/11 14:09	A_3
39	ApexAlpha	ARS1-B11-01984-10	U-235	1123	1440	0	1440	0.21	05/28/11 14:09	A_3
40	ApexAlpha	ARS1-B11-01984-10	U-238	30828	1440	3	1440	0.21	05/28/11 14:09	A_3
41	ApexAlpha	ARS1-B11-01984-11	U-232	2382	1440	4	1440	0.22	05/28/11 14:09	A_3
42	ApexAlpha	ARS1-B11-01984-11	U-234	20560	1440	0	1440	0.22	05/28/11 14:09	A_3
43	ApexAlpha	ARS1-B11-01984-11	U-235	637	1440	0	1440	0.22	05/28/11 14:09	A_3
44	ApexAlpha	ARS1-B11-01984-11	U-238	17397	1440	6	1440	0.22	05/28/11 14:09	A_3
45	ApexAlpha	ARS1-B11-01984-12	U-232	1753	1440	1	1440	0.21	05/28/11 14:09	A_3
46	ApexAlpha	ARS1-B11-01984-12	U-234	790	1440	2	1440	0.21	05/28/11 14:09	A_3
47	ApexAlpha	ARS1-B11-01984-12	U-235	12	1440	1	1440	0.21	05/28/11 14:09	A_3
48	ApexAlpha	ARS1-B11-01984-12	U-238	102	1440	10	1440	0.21	05/28/11 14:09	A_3
49	ApexAlpha	ARS1-B11-01984-13	U-232	1677	1440	1	1440	0.22	05/28/11 14:09	A_3
50	ApexAlpha	ARS1-B11-01984-13	U-234	1035	1440	3	1440	0.22	05/28/11 14:09	A_3
51	ApexAlpha	ARS1-B11-01984-13	U-235	11	1440	1	1440	0.22	05/28/11 14:09	A_3
52	ApexAlpha	ARS1-B11-01984-13	U-238	394	1440	6	1440	0.22	05/28/11 14:09	A_3

Apex Alpha Instrument Data Transfer Report

#	Report ID	Batch Sample ID	Isotope	Gross Area	Count Mins	BKG Counts	BKG Count Mins	EFF	Analysis Date	Date
53	ApexAlpha	ARS1-B11-01984-14	U-232	1003	1440	0	1440	0.22	05/28/11 14:09	A_3
54	ApexAlpha	ARS1-B11-01984-14	U-234	3462	1440	17	1440	0.22	05/28/11 14:09	A_3
55	ApexAlpha	ARS1-B11-01984-14	U-235	111	1440	2	1440	0.22	05/28/11 14:09	A_3
56	ApexAlpha	ARS1-B11-01984-14	U-238	2551	1440	14	1440	0.22	05/28/11 14:09	A_3

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPU1s	TPU2s	MDA	DL	CU	CU1s	CU2s	ActivityReportUnits
ARS1-B11-01984-01				2	U-232	4.26451163	0.542661908	0.27686832	0.542661908	0.004769635	0	0.169804294	0.08663484	0.16980429	pCi
ARS1-B11-01984-01				2	U-234	16.96092265	2.077676467	1.060039014	2.077676467	0.018933258	0.007084329	0.33856684	0.17273818	0.33856684	pCi
ARS1-B11-01984-01				2	U-235	0.707154083	0.11345793	0.057886699	0.11345793	0.015004633	0.004740951	0.074619677	0.03807126	0.07461968	pCi
ARS1-B11-01984-01				2	U-238	17.63411999	2.158996106	1.101528625	2.158996106	0.021082907	0.008163918	0.344905101	0.17597199	0.3449051	pCi
ARS1-B11-01984-02				2	U-232	4.27390213	0.544497913	0.277805058	0.544497913	0.004895298	0	0.172215911	0.08786526	0.17221591	pCi
ARS1-B11-01984-02				2	U-234	17.0288408	2.086600919	1.064592305	2.086600919	0.013285929	0.004197899	0.343613481	0.175313	0.34361348	pCi
ARS1-B11-01984-02				2	U-235	0.715327003	0.115133641	0.058741653	0.115133641	0.01539995	0.004865858	0.076035045	0.03879339	0.07603504	pCi
ARS1-B11-01984-02				2	U-238	16.99118113	2.08201029	1.062250148	2.08201029	0.021638364	0.008379007	0.342998903	0.17499944	0.3429989	pCi
ARS1-B11-01984-03				2	U-232	4.273085565	0.549676469	0.280447178	0.549676469	0.020008551	0.007085913	0.188219313	0.09603026	0.18821931	pCi
ARS1-B11-01984-03				2	U-234	0.174271447	0.047325152	0.024145486	0.047325152	0.037486277	0.015827857	0.04237971	0.0216223	0.04237971	pCi
ARS1-B11-01984-03				2	U-235	0.014963041	0.017028575	0.008688049	0.017028575	0.026855718	0.010048706	0.016932274	0.00863892	0.01693227	pCi
ARS1-B11-01984-03				2	U-238	0.120242994	0.055501912	0.028317302	0.055501912	0.078550074	0.036365586	0.053565521	0.02732935	0.05356552	pCi
ARS1-B11-01984-04	ARS1-11-00897	001	MW-1-110419	2	U-232	8.559823635	1.103472695	0.562996273	1.103472695	0.01214509	0	0.383887706	0.19586107	0.38388771	pCi
ARS1-B11-01984-04	ARS1-11-00897	001	MW-1-110419	2	U-234	3.743294543	0.519976977	0.265294376	0.519976977	0.074545174	0.031212654	0.256311252	0.13077105	0.25631125	pCi
ARS1-B11-01984-04	ARS1-11-00897	001	MW-1-110419	2	U-235	0.160700599	0.061513881	0.031384633	0.061513881	0.038167754	0.012059705	0.058367198	0.02977918	0.0583672	pCi
ARS1-B11-01984-04	ARS1-11-00897	001	MW-1-110419	2	U-238	0.825715965	0.156280014	0.079734701	0.156280014	0.041464331	0.014684354	0.120266847	0.06136064	0.12026685	pCi
ARS1-B11-01984-05	ARS1-11-00897	002	MW-2-110421	2	U-232	8.520118959	1.090225603	0.556237553	1.090225603	0.04206861	0.015740971	0.358072077	0.18268984	0.35807208	pCi
ARS1-B11-01984-05	ARS1-11-00897	002	MW-2-110421	2	U-234	63.555318	7.743076092	3.950549027	7.743076092	0.051126099	0.020280418	0.975934532	0.49792578	0.97593453	pCi
ARS1-B11-01984-05	ARS1-11-00897	002	MW-2-110421	2	U-235	2.232365086	0.333988791	0.170402444	0.333988791	0.012246375	0	0.196860153	0.10043885	0.19686015	pCi
ARS1-B11-01984-05	ARS1-11-00897	002	MW-2-110421	2	U-238	54.37424512	6.633271502	3.384322195	6.633271502	0.041899573	0.015677722	0.901709434	0.46005583	0.90170943	pCi
ARS1-B11-01984-06	ARS1-11-00897	003	MW-2-2-110421	2	U-232	8.510310687	1.087572849	0.554884107	1.087572849	0.028098384	0.008878129	0.353381426	0.18029665	0.35338143	pCi
ARS1-B11-01984-06	ARS1-11-00897	003	MW-2-2-110421	2	U-234	62.70805081	7.639257929	3.897580576	7.639257929	0.053727048	0.021702916	0.958201196	0.48887816	0.9582012	pCi
ARS1-B11-01984-06	ARS1-11-00897	003	MW-2-2-110421	2	U-235	2.489819913	0.364592947	0.186016809	0.364592947	0.032503463	0.010269983	0.205851065	0.10502605	0.20585107	pCi
ARS1-B11-01984-06	ARS1-11-00897	003	MW-2-2-110421	2	U-238	54.41057754	6.636238022	3.385835726	6.636238022	0.035310811	0.012505121	0.89146521	0.45482919	0.89146521	pCi
ARS1-B11-01984-07	ARS1-11-00897	004	JPOP41S-110421	2	U-232	8.498867703	4.168638103	2.126856175	4.168638103	1.354819499	0	4.040105253	2.06127819	4.04010525	pCi
ARS1-B11-01984-07	ARS1-11-00897	004	JPOP41S-110421	2	U-234	63261.3878	7653.728603	3904.963573	7653.728603	9.051187994	3.849553898	348.2408251	177.67389	348.240825	pCi
ARS1-B11-01984-07	ARS1-11-00897	004	JPOP41S-110421	2	U-235	72121.57278	8725.834438	4451.956346	8725.834438	1.567219108	0	400.2645977	204.226836	400.284598	pCi
ARS1-B11-01984-07	ARS1-11-00897	004	JPOP41S-110421	2	U-238	114131.786	13801.93429	7041.803207	13801.93429	1.349375652	0	467.2412396	238.388388	467.24124	pCi
ARS1-B11-01984-08	ARS1-11-00897	005	MD-SW-110420	2	U-232	8.493380178	1.103104689	0.562808515	1.103104689	0.046332062	0.016408233	0.403867353	0.20605477	0.40386735	pCi
ARS1-B11-01984-08	ARS1-11-00897	005	MD-SW-110420	2	U-234	4.857633982	0.661914259	0.337711357	0.661914259	0.053597328	0.020054715	0.305693909	0.15596628	0.30569391	pCi
ARS1-B11-01984-08	ARS1-11-00897	005	MD-SW-110420	2	U-235	0.305758192	0.090232489	0.046036984	0.090232489	0.015634051	0	0.082318271	0.04199912	0.08231827	pCi
ARS1-B11-01984-08	ARS1-11-00897	005	MD-SW-110420	2	U-238	2.811394657	0.412599692	0.210510047	0.412599692	0.070070755	0.028304919	0.234059016	0.11941787	0.23405902	pCi
ARS1-B11-01984-09	ARS1-11-00897	006	MW-3-110420	2	U-232	8.492562799	1.085433663	0.553792685	1.085433663	0.010353057	0	0.353040969	0.18012294	0.35304097	pCi
ARS1-B11-01984-09	ARS1-11-00897	006	MW-3-110420	2	U-234	17.71281407	2.200637539	1.122774254	2.200637539	0.045809032	0.017738596	0.509773927	0.26008874	0.50977393	pCi
ARS1-B11-01984-09	ARS1-11-00897	006	MW-3-110420	2	U-235	0.649610379	0.131690214	0.067188885	0.131690214	0.032536918	0.010280554	0.105726736	0.05394221	0.10572674	pCi
ARS1-B11-01984-09	ARS1-11-00897	006	MW-3-110420	2	U-238	15.43632023	1.925623416	0.982460927	1.925623416	0.081123629	0.035406228	0.47687373	0.24330292	0.47687373	pCi
ARS1-B11-01984-10	ARS1-11-00897	007	MW-4-110420	2	U-232	8.485206393	1.08014361	0.551093679	1.08014361	0.025955364	0.008201008	0.339125769	0.17302335	0.33912577	pCi
ARS1-B11-01984-10	ARS1-11-00897	007	MW-4-110420	2	U-234	118.9504898	14.43222612	7.363380675	14.43222612	0.037884673	0.014175452	1.268017962	0.64694794	1.26801796	pCi
ARS1-B11-01984-10	ARS1-11-00897	007	MW-4-110420	2	U-235	4.57933476	0.614861503	0.313704849	0.614861503	0.011050754	0	0.267835775	0.13665091	0.26783578	pCi
ARS1-B11-01984-10	ARS1-11-00897	007	MW-4-110420	2	U-238	108.2253186	13.1358556	6.701967144	13.1358556	0.037808893	0.014147096	1.208302474	0.61648085	1.20830247	pCi
ARS1-B11-01984-11	ARS1-11-00897	008	MW-6-110420	2	U-232	8.484389014	1.080824819	0.551441234	1.080824819	0.042869803	0.016600441	0.341585961	0.17427855	0.34158596	pCi
ARS1-B11-01984-11	ARS1-11-00897	008	MW-6-110420	2	U-234	73.20502395	8.904001859	4.542858091	8.904001859	0.009649106	0	1.000657381	0.51053948	1.00065738	pCi
ARS1-B11-01984-11	ARS1-11-00897	008	MW-6-110420	2	U-235	2.628962984	0.377675274	0.192691466	0.377675274	0.011184442	0	0.20416008	0.10416331	0.20416008	pCi
ARS1-B11-01984-11	ARS1-11-00897	008	MW-6-110420	2	U-238	61.7977617	7.525207984	3.839391829	7.525207984	0.050127911	0.020249053	0.918790131	0.46877048	0.91879013	pCi
ARS1-B11-01984-12	ARS1-11-00897	009	MW-7-110419	2	U-232	8.473996526	1.098435711	0.560426383	1.098435711	0.035611886	0.011252139	0.397031574	0.20256713	0.39703157	pCi
ARS1-B11-01984-12	ARS1-11-00897	009	MW-7-110419	2	U-234	3.80344807	0.531219722	0.271030471	0.531219722	0.044840143	0.015879878	0.266237935	0.13583568	0.26623793	pCi
ARS1-B11-01984-12	ARS1-11-00897	009	MW-7-110419	2	U-235	0.061541945	0.040230791	0.020525914	0.040230791	0.041192612	0.013015457	0.039537234	0.02017206	0.03953723	pCi
ARS1-B11-01984-12	ARS1-11-00897	009	MW-7-110419	2	U-238	0.44316914	0.113369287	0.057841473	0.113369287	0.083929141	0.03543746	0.099918698	0.05097893	0.0999187	pCi
ARS1-B11-01984-13	ARS1-11-00897	010	MW-8-110419	2	U-232	8.478083531	1.102219873	0.562357078	1.102219873	0.0372447	0.011768052	0.406139964	0.20721427	0.40613996	pCi
ARS1-B11-01984-13	ARS1-11-00897	010	MW-8-110419	2	U-234	5.209553086	0.705723914	0.360063221	0.705723914	0.054361188	0.020340532	0.318768588	0.16263703	0.31876859	pCi
ARS1-B11-01984-13	ARS1-11-00897	010	MW-8-110419	2	U-235	0.058512416	0.04035233	0.020587923	0.04035233	0.043081303	0.013612219	0.039727819	0.0202693	0.03972782	pCi
ARS1-B11-01984-13	ARS1-11-00897	010	MW-8-110419	2	U-238	1.954712573	0.307918455	0.157101253	0.307918455	0.071069391	0.028708315	0.197486425	0.10075836	0.19748642	pCi
ARS1-B11-01984-14	ARS1-11-00897	011	MW-MD-02-110420	2	U-232	8.477849986	1.151158637	0.587325835	1.151158637	0.022906255	0	0.524676161	0.26769192	0.52467616	pCi
ARS1-B11-01984-14	ARS1-11-00897	011	MW-MD-02-110420	2	U-234	29.05916125	3.644971824	1.859679502	3.644971824	0.184678196	0.080909443	0.975162819	0.49753205	0.97516282	pCi
ARS1-B11-01984-14	ARS1-11-00897	011	MW-MD-02-110420	2	U-235	1.065731024	0.241017028	0.122967871	0.241017028	0.090831571	0.032167478	0.203711902	0.10393464	0.2037119	pCi
ARS1-B11-01984-14	ARS1-11-00897	011	MW-MD-02-110420	2	U-238	21.35722039	2.713140333	1.384255272	2.713140333	0.169368092	0.073277253	0.835649232	0.42635165	0.83564923	pCi
ARS1-B11-01984-15	ARS1-11-00897	012	MW-MD-110420	2	U-232	8.472945715	1.084270523	0.553199246	1.084270523	0.028695625	0.009066837	0.356336575	0.18180437	0.35633657	pCi
ARS1-B11-01984-15	ARS1-11-00897	012	MW-MD-110420	2	U-234	31.28938758	3.842995218	1.960711846	3.842995218	0.036131561	0.012795784	0.683908576	0.34893295	0.68390858	pCi
ARS1-B11-01984-15	ARS1-11-00897	012	MW-MD-110420	2	U-235	1.000809104	0.179219338	0.091438438	0.179219338	0.033192432	0.010487674	0.132244724	0.0674718	0.13224472	pCi
ARS1-B11-01984-15	ARS1-11-00897	012	MW-MD-110420	2	U-238	22.77285666	2.813555821	1.435487664	2.813555821	0.06762893	0.028555011	0.583719919	0.29781629	0.58371992	pCi

ABatchSampleID	SDG	Fraction	AliquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountMins	BKG_Counts	BKG_CountMins	EFF	ALIQ	SampleCollDate	MidPointCountDate	BP_(
ARS1-B11-01984-01			L		0.835362941	2423	1440	0	1440	0.213413358	1	5/26/2011	5/28/2011	0.08681
ARS1-B11-01984-01			L		0.835362941	9650	1440	3	1440	0.213413358	1	5/26/2011	5/28/2011	0.13664
ARS1-B11-01984-01			L		0.835362941	348	1440	1	1440	0.213413358	1	5/26/2011	5/28/2011	0.01543
ARS1-B11-01984-01			L		0.835362941	10054	1440	4	1440	0.213413358	1	5/26/2011	5/28/2011	0.15885
ARS1-B11-01984-02			L		0.772163715	2366	1440	0	1440	0.224953875	1	5/26/2011	5/28/2011	0.08681
ARS1-B11-01984-02			L		0.772163715	9438	1440	1	1440	0.224953875	1	5/26/2011	5/28/2011	0.13664
ARS1-B11-01984-02			L		0.772163715	343	1440	1	1440	0.224953875	1	5/26/2011	5/28/2011	0.01543
ARS1-B11-01984-02			L		0.772163715	9439	1440	4	1440	0.224953875	1	5/26/2011	5/28/2011	0.15885
ARS1-B11-01984-03			L		0.67503694	1986	1440	2	1440	0.215816796	1	5/26/2011	5/28/2011	0.08681
ARS1-B11-01984-03			L		0.67503694	91	1440	10	1440	0.215816796	1	5/26/2011	5/28/2011	0.13664
ARS1-B11-01984-03			L		0.67503694	9	1440	3	1440	0.215816796	1	5/26/2011	5/28/2011	0.01543
ARS1-B11-01984-03			L		0.67503694	109	1440	53	1440	0.215816796	1	5/26/2011	5/28/2011	0.15885
ARS1-B11-01984-04	ARS1-11-00897	001	L		0.64012516	1910	1440	0	1440	0.218973055	0.5	4/19/2011	5/28/2011	0.17380
ARS1-B11-01984-04	ARS1-11-00897	001	L		0.64012516	846	1440	9	1440	0.218973055	0.5	4/19/2011	5/28/2011	0.27328
ARS1-B11-01984-04	ARS1-11-00897	001	L		0.64012516	32	1440	1	1440	0.218973055	0.5	4/19/2011	5/28/2011	0.03087
ARS1-B11-01984-04	ARS1-11-00897	001	L		0.64012516	187	1440	2	1440	0.218973055	0.5	4/19/2011	5/28/2011	0.31770
ARS1-B11-01984-05	ARS1-11-00897	002	L		0.754744883	2184	1440	3	1440	0.213045776	0.5	4/21/2011	5/28/2011	0.17379
ARS1-B11-01984-05	ARS1-11-00897	002	L		0.754744883	16307	1440	5	1440	0.213045776	0.5	4/21/2011	5/28/2011	0.27328
ARS1-B11-01984-05	ARS1-11-00897	002	L		0.754744883	494	1440	0	1440	0.213045776	0.5	4/21/2011	5/28/2011	0.03087
ARS1-B11-01984-05	ARS1-11-00897	002	L		0.754744883	13978	1440	3	1440	0.213045776	0.5	4/21/2011	5/28/2011	0.31770
ARS1-B11-01984-06	ARS1-11-00897	003	L		0.738012764	2231	1440	1	1440	0.223027632	0.5	4/21/2011	5/28/2011	0.17379
ARS1-B11-01984-06	ARS1-11-00897	003	L		0.738012764	16471	1440	6	1440	0.223027632	0.5	4/21/2011	5/28/2011	0.27328
ARS1-B11-01984-06	ARS1-11-00897	003	L		0.738012764	565	1440	1	1440	0.223027632	0.5	4/21/2011	5/28/2011	0.03087
ARS1-B11-01984-06	ARS1-11-00897	003	L		0.738012764	14317	1440	2	1440	0.223027632	0.5	4/21/2011	5/28/2011	0.31770
ARS1-B11-01984-07	ARS1-11-00897	004	L		0.005988356	17	1440	0	1440	0.209818289	0.5	4/21/2011	5/28/2011	0.17379
ARS1-B11-01984-07	ARS1-11-00897	004	L		0.005988356	126807	1440	11	1440	0.209818289	0.5	4/21/2011	5/28/2011	0.27328
ARS1-B11-01984-07	ARS1-11-00897	004	L		0.005988356	124711	1440	0	1440	0.209818289	0.5	4/21/2011	5/28/2011	0.03087
ARS1-B11-01984-07	ARS1-11-00897	004	L		0.005988356	229215	1440	0	1440	0.209818289	0.5	4/21/2011	5/28/2011	0.31770
ARS1-B11-01984-08	ARS1-11-00897	005	L		0.57103717	1705	1440	2	1440	0.220569149	0.5	4/20/2011	5/28/2011	0.17380
ARS1-B11-01984-08	ARS1-11-00897	005	L		0.57103717	979	1440	3	1440	0.220569149	0.5	4/20/2011	5/28/2011	0.2732
ARS1-B11-01984-08	ARS1-11-00897	005	L		0.57103717	53	1440	0	1440	0.220569149	0.5	4/20/2011	5/28/2011	0.03087
ARS1-B11-01984-08	ARS1-11-00897	005	L		0.57103717	572	1440	6	1440	0.220569149	0.5	4/20/2011	5/28/2011	0.31770
ARS1-B11-01984-09	ARS1-11-00897	006	L		0.750513263	2223	1440	0	1440	0.219087392	0.5	4/20/2011	5/28/2011	0.17380
AR51-B11-01984-09	ARS1-11-00897	006	L		0.750513263	4650	1440	4	1440	0.219087392	0.5	4/20/2011	5/28/2011	0.2732
AR51-B11-01984-09	ARS1-11-00897	006	L		0.750513263	148	1440	1	1440	0.219087392	0.5	4/20/2011	5/28/2011	0.03087
ARS1-B11-01984-09	ARS1-11-00897	006	L		0.750513263	4073	1440	16	1440	0.219087392	0.5	4/20/2011	5/28/2011	0.31770
ARS1-B11-01984-10	ARS1-11-00897	007	L		0.83895983	2408	1440	1	1440	0.212396607	0.5	4/20/2011	5/28/2011	0.17380
ARS1-B11-01984-10	ARS1-11-00897	007	L		0.83895983	33815	1440	3	1440	0.212396607	0.5	4/20/2011	5/28/2011	0.2732
ARS1-B11-01984-10	ARS1-11-00897	007	L		0.83895983	1123	1440	0	1440	0.212396607	0.5	4/20/2011	5/28/2011	0.03087
ARS1-B11-01984-10	ARS1-11-00897	007	L		0.83895983	30828	1440	3	1440	0.212396607	0.5	4/20/2011	5/28/2011	0.31770
ARS1-B11-01984-11	ARS1-11-00897	008	L		0.816073912	2382	1440	4	1440	0.215743065	0.5	4/20/2011	5/28/2011	0.17380
ARS1-B11-01984-11	ARS1-11-00897	008	L		0.816073912	20560	1440	0	1440	0.215743065	0.5	4/20/2011	5/28/2011	0.2732
ARS1-B11-01984-11	ARS1-11-00897	008	L		0.816073912	637	1440	0	1440	0.215743065	0.5	4/20/2011	5/28/2011	0.03087
ARS1-B11-01984-11	ARS1-11-00897	008	L		0.816073912	17397	1440	6	1440	0.215743065	0.5	4/20/2011	5/28/2011	0.31770
ARS1-B11-01984-12	ARS1-11-00897	009	L		0.60908473	1753	1440	1	1440	0.213233352	0.5	4/19/2011	5/28/2011	0.17380
ARS1-B11-01984-12	ARS1-11-00897	009	L		0.60908473	790	1440	2	1440	0.213233352	0.5	4/19/2011	5/28/2011	0.27328
ARS1-B11-01984-12	ARS1-11-00897	009	L		0.60908473	12	1440	1	1440	0.213233352	0.5	4/19/2011	5/28/2011	0.03087
ARS1-B11-01984-12	ARS1-11-00897	009	L		0.60908473	102	1440	10	1440	0.213233352	0.5	4/19/2011	5/28/2011	0.31770
ARS1-B11-01984-13	ARS1-11-00897	010	L		0.566943855	1677	1440	1	1440	0.219039932	0.5	4/19/2011	5/28/2011	0.17380
ARS1-B11-01984-13	ARS1-11-00897	010	L		0.566943855	1035	1440	3	1440	0.219039932	0.5	4/19/2011	5/28/2011	0.27328
ARS1-B11-01984-13	ARS1-11-00897	010	L		0.566943855	11	1440	1	1440	0.219039932	0.5	4/19/2011	5/28/2011	0.03087
ARS1-B11-01984-13	ARS1-11-00897	010	L		0.566943855	394	1440	6	1440	0.219039932	0.5	4/19/2011	5/28/2011	0.31770
ARS1-B11-01984-14	ARS1-11-00897	011	L		0.342121526	1003	1440	0	1440	0.21722503	0.5	4/20/2011	5/28/2011	0.17380
ARS1-B11-01984-14	ARS1-11-00897	011	L		0.342121526	3462	1440	17	1440	0.21722503	0.5	4/20/2011	5/28/2011	0.2732
ARS1-B11-01984-14	ARS1-11-00897	011	L		0.342121526	111	1440	2	1440	0.21722503	0.5	4/20/2011	5/28/2011	0.03087
ARS1-B11-01984-14	ARS1-11-00897	011	L		0.342121526	2551	1440	14	1440	0.21722503	0.5	4/20/2011	5/28/2011	0.31770
ARS1-B11-01984-15	ARS1-11-00897	012	L		0.755888906	2175	1440	1	1440	0.213233352	0.5	4/20/2011	5/29/2011	0.17380
ARS1-B11-01984-15	ARS1-11-00897	012	L		0.755888906	8047	1440	2	1440	0.213233352	0.5	4/20/2011	5/29/2011	0.27328
ARS1-B11-01984-15	ARS1-11-00897	012	L		0.755888906	223	1440	1	1440	0.213233352	0.5	4/20/2011	5/29/2011	0.03087
ARS1-B11-01984-15	ARS1-11-00897	012	L		0.755888906	5877	1440	10	1440	0.213233352	0.5	4/20/2011	5/29/2011	0.31770

ABatchSampleID	SDG	Fraction	BP_MDA	Sb_Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlatingRecovery	InstFileName	DetectorID	InstrumentkeV	NuclideAbd	TracerMeasACT
ARS1-B11-01984-01			0.178027093	0.082712023	2.22	1.96	1.682638889	0	1.682638869	0.98	ApexAlpha	A_2_3B	39.81627655		
ARS1-B11-01984-01			0.277459623	0.13018988	2.22	1.96	6.701388889	0.002083333	6.699305556	0.98	ApexAlpha	A_2_3B	44.50381088		
ARS1-B11-01984-01			0.036332471	0.014709166	2.22	1.96	0.241666667	0.000694444	0.240972222	0.96	ApexAlpha	A_2_3B	47.43571854		
ARS1-B11-01984-01			0.321782483	0.151355023	2.22	1.96	6.981944444	0.002777778	6.979166667	0.98	ApexAlpha	A_2_3B	44.36736298		
ARS1-B11-01984-02			0.178152759	0.082712023	2.22	1.96	1.643055556	0	1.643055556	0.98	ApexAlpha	A_2_4A	38.41609192		
ARS1-B11-01984-02			0.277585153	0.13018988	2.22	1.96	6.554166667	0.000694444	6.553472222	0.98	ApexAlpha	A_2_4A	43.13824081		
ARS1-B11-01984-02			0.036477975	0.014709166	2.22	1.96	0.238194444	0.000694444	0.2375	0.98	ApexAlpha	A_2_4A	14.2139082		
ARS1-B11-01984-02			0.321907762	0.151355023	2.22	1.96	6.554861111	0.002777778	6.552083333	0.98	ApexAlpha	A_2_4A	46.86788177		
ARS1-B11-01984-03			0.179094186	0.082712023	2.22	1.96	1.379166667	0.001388889	1.377777778	0.98	ApexAlpha	A_2_4B	40.27577209		
ARS1-B11-01984-03			0.278525586	0.13018988	2.22	1.96	0.063194444	0.006944444	0.05625	0.98	ApexAlpha	A_2_4B	25.77999306		
ARS1-B11-01984-03			0.037568047	0.014709166	2.22	1.96	0.00625	0.002083333	0.004166667	0.98	ApexAlpha	A_2_4B	6.138093472		
ARS1-B11-01984-03			0.322846314	0.151355023	2.22	1.96	0.075694444	0.036805556	0.038888889	0.98	ApexAlpha	A_2_4B	8.593330383		
ARS1-B11-01984-04	ARS1-11-00897	001	0.359014715	0.082712023	2.22	1.96	1.326388889	0	1.326388889	0.98	ApexAlpha	A_2_5A	29.66066933		
ARS1-B11-01984-04	ARS1-11-00897	001	0.557510068	0.13018986	2.22	1.96	0.5875	0.00625	0.58125	0.98	ApexAlpha	A_2_5A	27.81350517		
ARS1-B11-01984-04	ARS1-11-00897	001	0.075667824	0.014709166	2.22	1.96	0.022222222	0.000694444	0.021527778	0.98	ApexAlpha	A_2_5A	4.889849663		
ARS1-B11-01984-04	ARS1-11-00897	001	0.646150447	0.151355023	2.22	1.96	0.129861111	0.001388889	0.128472222	0.98	ApexAlpha	A_2_5A	16.5469017		
ARS1-B11-01984-05	ARS1-11-00897	002	0.357437183	0.082712023	2.22	1.96	1.516666667	0.002083333	1.514583333	0.98	ApexAlpha	A_2_5B	63.23594666		
ARS1-B11-01984-05	ARS1-11-00897	002	0.555955456	0.13018988	2.22	1.96	11.32430556	0.003472222	11.32083333	0.98	ApexAlpha	A_2_5B	65.6692276		
ARS1-B11-01984-05	ARS1-11-00897	002	0.073865856	0.014709166	2.22	1.96	0.343055556	0	0.343055556	0.98	ApexAlpha	A_2_5B	50.82377243		
ARS1-B11-01984-05	ARS1-11-00897	002	0.644598953	0.151355023	2.22	1.96	9.706944444	0.002083333	9.704861111	0.98	ApexAlpha	A_2_5B	67.47711945		
ARS1-B11-01984-06	ARS1-11-00897	003	0.357192641	0.082712023	2.22	1.96	1.549305556	0.000694444	1.548611111	0.98	ApexAlpha	A_3_1A	48.20111465		
ARS1-B11-01984-06	ARS1-11-00897	003	0.555711409	0.13018988	2.22	1.96	11.43819444	0.004166667	11.4340277B	0.98	ApexAlpha	A_3_1A	58.67838669		
ARS1-B11-01984-06	ARS1-11-00897	003	0.073582977	0.014709166	2.22	1.96	0.392361111	0.000694444	0.391666667	0.98	ApexAlpha	A_3_1A	47.90333176		
ARS1-B11-01984-06	ARS1-11-00897	003	0.644355394	0.151355023	2.22	1.96	9.942361111	0.001388889	9.940972222	0.98	ApexAlpha	A_3_1A	63.52745819		
ARS1-B11-01984-07	ARS1-11-00897	004	1.701670013	0.082712023	2.22	1.96	0.011805556	0	0.011805556	0.98	ApexAlpha	A_3_1B	4.694890308		
ARS1-B11-01984-07	ARS1-11-00897	004	1.897470392	0.13018988	2.22	1.96	88.06041667	0.007638889	88.05277778	0.98	ApexAlpha	A_3_1B	223.4042358		
ARS1-B11-01984-07	ARS1-11-00897	004	1.62883859	0.014709166	2.22	1.96	86.60486111	0	86.60486111	0.98	ApexAlpha	A_3_1B	91.45392809		
ARS1-B11-01984-07	ARS1-11-00897	004	1.983430476	0.151355023	2.22	1.96	159.1770833	0	159.1770833	0.98	ApexAlpha	A_3_1B	103.445076		
ARS1-B11-01984-08	ARS1-11-00897	005	0.360375666	0.082712023	2.22	1.96	1.184027778	0.001388889	1.182638889	0.98	ApexAlpha	A_3_2B	30.2557621		
ARS1-B11-01984-08	ARS1-11-00897	005	0.558878095	0.13018988	2.22	1.96	0.679861111	0.002083333	0.677777778	0.98	ApexAlpha	A_3_2B	29.02689934		
ARS1-B11-01984-08	ARS1-11-00897	005	0.077253532	0.014709166	2.22	1.96	0.036805556	0	0.036805556	0.98	ApexAlpha	A_3_2B	8.558202744		
ARS1-B11-01984-08	ARS1-11-00897	005	0.647515742	0.151355023	2.22	1.96	0.397222222	0.004166667	0.393055556	0.98	ApexAlpha	A_3_2B	30.83281708		
ARS1-B11-01984-09	ARS1-11-00897	006	0.357213127	0.082712023	2.22	1.96	1.54375	0	1.54375	0.98	ApexAlpha	A_3_3A	35.24778366		
ARS1-B11-01984-09	ARS1-11-00897	006	0.555722037	0.13018988	2.22	1.96	3.229166667	0.002777778	3.226388889	0.98	ApexAlpha	A_3_3A	34.71844101		
ARS1-B11-01984-09	ARS1-11-00897	006	0.073595291	0.014709166	2.22	1.96	0.102777778	0.000694444	0.102083333	0.98	ApexAlpha	A_3_3A	33.72981262		
ARS1-B11-01984-09	ARS1-11-00897	006	0.644365997	0.151355023	2.22	1.96	2.828472222	0.011111111	2.817361111	0.98	ApexAlpha	A_3_3A	35.34767532		
ARS1-B11-01984-10	ARS1-11-00897	007	0.35641341B	0.082712023	2.22	1.96	1.672222222	0.000694444	1.671527778	0.98	ApexAlpha	A_3_3B	67.77412415		
ARS1-B11-01984-10	ARS1-11-00897	007	0.554923967	0.13018988	2.22	1.96	23.48263889	0.002083333	23.48055558	0.98	ApexAlpha	A_3_3B	82.13598633		
ARS1-B11-01984-10	ARS1-11-00697	007	0.072670235	0.014709166	2.22	1.96	0.779861111	0	0.779861111	0.96	ApexAlpha	A_3_3B	88.02515411		
ARS1-B11-01984-10	ARS1-11-00897	007	0.643569524	0.151355023	2.22	1.96	21.40833333	0.002083333	21.40625	0.96	ApexAlpha	A_3_3B	84.92006683		
ARS1-B11-01984-11	ARS1-11-00897	008	0.356528991	0.082712023	2.22	1.96	1.654166667	0.002777778	1.651388889	0.98	ApexAlpha	A_3_4B	57.33830643		
ARS1-B11-01984-11	ARS1-11-00897	008	0.555039303	0.13018988	2.22	1.96	14.27777778	0	14.27777778	0.98	ApexAlpha	A_3_4B	66.15758514		
ARS1-B11-01984-11	ARS1-11-00897	008	0.072803923	0.014709166	2.22	1.96	0.442361111	0	0.442361111	0.98	ApexAlpha	A_3_4B	51.39112854		
ARS1-B11-01984-11	ARS1-11-00897	008	0.643684629	0.151355023	2.22	1.96	12.08125	0.004166667	12.07708333	0.98	ApexAlpha	A_3_4B	65.5785675		
ARS1-B11-01984-12	AR51-11-00897	009	0.359977234	0.082712023	2.22	1.96	1.217361111	0.000694444	1.216666667	0.98	ApexAlpha	A_3_5A	27.4553318		
ARS1-B11-01984-12	ARS1-11-00897	009	0.558470588	0.13018988	2.22	1.96	0.548611111	0.001388889	0.547222222	0.98	ApexAlpha	A_3_5A	26.25976372		
ARS1-B11-01984-12	ARS1-11-00897	009	0.076781178	0.014709166	2.22	1.96	0.006333333	0.000694444	0.007638889	0.98	ApexAlpha	A_3_5A	4.898194313		
ARS1-B11-01984-12	ARS1-11-00897	009	0.647109045	0.151355023	2.22	1.96	0.070833333	0.006944444	0.063888889	0.98	ApexAlpha	A_3_5A	29.63407707		
ARS1-B11-01984-13	AR51-11-00897	010	0.360578221	0.082712023	2.22	1.96	1.164583333	0.000694444	1.163888889	0.98	ApexAlpha	A_3_8A	34.43494797		
ARS1-B11-01984-13	AR51-11-00897	010	0.559070327	0.13018988	2.22	1.96	0.71875	0.002083333	0.716666667	0.98	ApexAlpha	A_3_6A	29.59216309		
ARS1-B11-01984-13	ARS1-11-00897	010	0.077476346	0.014709166	2.22	1.96	0.007638889	0.000694444	0.006944444	0.98	ApexAlpha	A_3_6A	7.349233627		
ARS1-B11-01984-13	ARS1-11-00897	010	0.647707584	0.151355023	2.22	1.96	0.273611111	0.004166667	0.269444444	0.98	ApexAlpha	A_3_6A	29.63024139		
ARS1-B11-01984-14	ARS1-11-00897	011	0.369766324	0.062712023	2.22	1.96	0.696527778	0	0.696527778	0.98	ApexAlpha	A_3_6B	36.30580902		
ARS1-B11-01984-14	ARS1-11-00897	011	0.568249509	0.13018988	2.22	1.96	2.404166667	0.011805556	2.392361111	0.98	ApexAlpha	A_3_6B	38.73180934		
ARS1-B11-01984-14	ARS1-11-00897	011	0.088116096	0.014709166	2.22	1.96	0.077083333	0.001388889	0.075694444	0.98	ApexAlpha	A_3_6B	19.59401321		
ARS1-B11-01984-14	ARS1-11-00897	011	0.65686841	0.151355023	2.22	1.96	1.771527778	0.009722222	1.761805556	0.98	ApexAlpha	A_3_6B	36.32271194		
ARS1-B11-01984-15	ARS1-11-00897	012	0.357432346	0.082712023	2.22	1.96	1.510416667	0.000694444	1.509722222	0.98	ApexAlpha	A_3_5A	29.19708081		
ARS1-B11-01984-15	ARS1-11-00897	012	0.555930195	0.13018988	2.22	1.96	5.588194444	0.001388889	5.566805556	0.98	ApexAlpha	A_3_5A	36.52808109		
ARS1-B11-01984-15	ARS1-11-00897	012	0.073836565	0.014709166	2.22	1.96	0.154861111	0.000694444	0.154168667	0.98	ApexAlpha	A_3_5A	45.06338501		
ARS1-B11-01984-15	ARS1-11-00897	012	0.644573733	0.151355023	2.22	1.96	4.08125	0.006944444	4.074305556	0.98	ApexAlpha	A_3_5A	38.45557404		

ABatchSampleID	SDG	Fraction	TracerKnownACT	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	Halflife1	Halflife2	Halflife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	DeltaT1	Delta
ARS1-B11-01984-01				U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	1.949027778	
ARS1-B11-01984-01				U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	1.949027778	
ARS1-B11-01984-01				U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	1.949027778	
ARS1-B11-01984-01				U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	1.949027778	
ARS1-B11-01984-02				U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	1.949722222	
ARS1-B11-01984-02				U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	1.949722222	
ARS1-B11-01984-02				U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	1.949722222	
ARS1-B11-01984-02				U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	1.949722222	
ARS1-B11-01984-03				U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	1.949722222	
ARS1-B11-01984-03				U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	1.949722222	
ARS1-B11-01984-03				U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	1.949722222	
ARS1-B11-01984-03				U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	1.949722222	
ARS1-B11-01984-04	ARS1-11-00897	001		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-04	ARS1-11-00897	001		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-04	ARS1-11-00897	001		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-04	ARS1-11-00897	001		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-05	AR51-11-00897	002		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-05	ARS1-11-00897	002		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-05	ARS1-11-00897	002		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-05	ARS1-11-00897	002		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-06	ARS1-11-00897	003		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-06	ARS1-11-00897	003		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-06	ARS1-11-00897	003		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-06	ARS1-11-00897	003		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-07	ARS1-11-00897	004		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-07	ARS1-11-00897	004		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-07	ARS1-11-00897	004		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-07	ARS1-11-00897	004		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	37.08958333	
ARS1-B11-01984-08	ARS1-11-00897	005		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-08	ARS1-11-00897	005		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-08	ARS1-11-00897	005		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-08	ARS1-11-00897	005		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-09	ARS1-11-00897	006		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-09	ARS1-11-00897	006		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-09	ARS1-11-00897	006		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-09	ARS1-11-00897	006		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-10	ARS1-11-00897	007		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-10	ARS1-11-00897	007		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-10	ARS1-11-00897	007		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-10	ARS1-11-00897	007		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-11	ARS1-11-00897	008		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-11	ARS1-11-00897	008		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-11	ARS1-11-00897	008		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-11	ARS1-11-00897	008		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-12	ARS1-11-00897	009		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-12	ARS1-11-00897	009		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-12	AR51-11-00897	009		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-12	AR51-11-00897	009		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-13	ARS1-11-00897	010		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-13	ARS1-11-00897	010		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-13	AR51-11-00897	010		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-13	ARS1-11-00897	010		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	39.08958333	
ARS1-B11-01984-14	ARS1-11-00897	011		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-14	ARS1-11-00897	011		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-14	ARS1-11-00897	011		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-14	ARS1-11-00897	011		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	38.08958333	
ARS1-B11-01984-15	ARS1-11-00897	012		U-232	6/9/2010			25162.03704			0	0.02	0.05833	0	0	0	39.17013889	
ARS1-B11-01984-15	ARS1-11-00897	012		U-232	6/9/2010			89745370.37			0	0.02	0.05833	0	0	0	39.17013889	
ARS1-B11-01984-15	ARS1-11-00897	012		U-232	6/9/2010			2.5706E+11			0	0.02	0.05833	0	0	0	39.17013889	
ARS1-B11-01984-15	ARS1-11-00897	012		U-232	6/9/2010			1.63194E+12			0	0.02	0.05833	0	0	0	39.17013889	

ABatchSampleID	SDG	Fraction	DeltaT3	DeltaT4	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SysErr	K_Val	K_MDA	AnalysisCode	UserID	ModDate
ARS1-B11-01984-01							0.999946311					0.061663514	0.394567781	568.1776039		ABAILEY	6/2/2011
ARS1-B11-01984-01							0.999999985					0.061663514	0.394984736	568.7780198		ABAILEY	6/2/2011
ARS1-B11-01984-01							1					0.061663514	0.34076339	490.699281		ABAILEY	6/2/2011
ARS1-B11-01984-01							1					0.061663514	0.395776295	569.9178641		ABAILEY	6/2/2011
ARS1-B11-01984-02							0.999946292					0.061663514	0.384439209	553.5924614		ABAILEY	6/2/2011
ARS1-B11-01984-02							0.999999985					0.061663514	0.384845469	554.1774752		ABAILEY	6/2/2011
ARS1-B11-01984-02							1					0.061663514	0.332015986	478.1030194		ABAILEY	6/2/2011
ARS1-B11-01984-02							1					0.061663514	0.385616708	555.2880597		ABAILEY	6/2/2011
ARS1-B11-01984-03							0.999946292					0.061663514	0.322431591	464.3014913		ABAILEY	6/2/2011
ARS1-B11-01984-03							0.999999985					0.061663514	0.322772324	464.792146		ABAILEY	6/2/2011
ARS1-B11-01984-03							1					0.061663514	0.278463903	400.9880198		ABAILEY	6/2/2011
ARS1-B11-01984-03							1					0.061663514	0.323419167	465.7236002		ABAILEY	6/2/2011
ARS1-B11-01984-04	ARS1-11-00897	001					0.998923766					0.061663514	0.154955166	223.1354385	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-04	ARS1-11-00897	001					0.999999698					0.061663514	0.155277655	223.5998237	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-04	ARS1-11-00897	001					1					0.061663514	0.133962026	192.905317	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-04	ARS1-11-00897	001					1					0.061663514	0.15558888	224.0479872	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-05	ARS1-11-00897	002					0.998978802					0.061663514	0.177765515	255.9823414	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-05	ARS1-11-00897	002					0.999999714					0.061663514	0.178125666	256.5009587	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-05	ARS1-11-00897	002					1					0.061663514	0.153673589	221.2899687	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-05	ARS1-11-00897	002					1					0.061663514	0.178482682	257.0150623	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-06	ARS1-11-00897	003					0.998978802					0.061663514	0.18196881	262.0350869	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-06	ARS1-11-00897	003					0.999999714					0.061663514	0.182337477	262.565967	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-06	ARS1-11-00897	003					1					0.061663514	0.157307227	226.5224071	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-06	ARS1-11-00897	003					1					0.061663514	0.182702935	263.0922267	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-07	ARS1-11-00897	004					0.998978802					0.061663514	0.001389074	2.000266458	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-07	ARS1-11-00897	004					0.999999714					0.061663514	0.001391888	2.004318976	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-07	ARS1-11-00897	004					1					0.061663514	0.001200818	1.729177487	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-07	ARS1-11-00897	004					1					0.061663514	0.001394678	2.008336222	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-08	ARS1-11-00897	005					0.998951284					0.061663514	0.139242429	200.5090982	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-08	ARS1-11-00897	005					0.999999706					0.061663514	0.139528375	200.9208606	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-08	ARS1-11-00897	005					1					0.061663514	0.120374716	173.339591	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-08	ARS1-11-00897	005					1					0.061663514	0.139808033	201.3235668	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-09	ARS1-11-00897	006					0.998951284					0.061663514	0.181776695	261.7584412	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-09	ARS1-11-00897	006					0.999999706					0.061663514	0.182149989	262.2959843	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-09	ARS1-11-00897	006					1					0.061663514	0.157145478	226.2894879	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-09	ARS1-11-00897	006					1					0.061663514	0.182515073	262.8217049	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-10	ARS1-11-00897	007					0.998951284					0.061663514	0.196993179	283.6701771	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-10	ARS1-11-00897	007					0.999999706					0.061663514	0.197397721	284.2527178	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-10	ARS1-11-00897	007					1					0.061663514	0.170300088	245.2321262	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-10	ARS1-11-00897	007					1					0.061663514	0.197793365	284.8224463	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-11	ARS1-11-00897	008					0.998951284					0.061663514	0.194638516	280.2794634	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-11	ARS1-11-00897	008					0.999999706					0.061663514	0.195038223	280.855041	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-11	ARS1-11-00897	008					1					0.061663514	0.168264488	242.3008631	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-11	ARS1-11-00897	008					1					0.061663514	0.195429139	281.4179595	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-12	ARS1-11-00897	009					0.998923766					0.061663514	0.143576489	206.7501438	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-12	ARS1-11-00897	009					0.999999698					0.061663514	0.143875297	207.1804283	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-12	ARS1-11-00897	009					1					0.061663514	0.124124918	178.7398823	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-12	ARS1-11-00897	009					1					0.061663514	0.144163668	207.5956822	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-13	ARS1-11-00897	010					0.998923766					0.061663514	0.137282074	197.6861862	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-13	ARS1-11-00897	010					0.999999698					0.061663514	0.137567783	198.097607	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-13	ARS1-11-00897	010					1					0.061663514	0.118683263	170.9038989	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-13	ARS1-11-00897	010					1					0.061663514	0.137843511	198.4946561	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-14	ARS1-11-00897	011					0.998951284					0.061663514	0.08215854	118.3082977	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-14	ARS1-11-00897	011					0.999999706					0.061663514	0.08232726	118.5512538	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-14	ARS1-11-00897	011					1					0.061663514	0.071025843	102.277214	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-14	ARS1-11-00897	011					1					0.061663514	0.082492268	118.7888664	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-15	ARS1-11-00897	012					0.998921549					0.061663514	0.178181505	256.5813677	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-15	ARS1-11-00897	012					0.999999697					0.061663514	0.178552729	257.1159304	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-15	ARS1-11-00897	012					1					0.061663514	0.154042031	221.8205241	ASP-A-024	ABAILEY	6/2/2011
ARS1-B11-01984-15	ARS1-11-00897	012					1					0.061663514	0.178910605	257.6312707	ASP-A-024	ABAILEY	6/2/2011

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-012
Batch Identification: B11-01984 B
Sample Identification: 11-01984-15
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 5A
Chamber Serial Number: 12045131A
Detector Serial Number: 55814
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/29/11 16:05:22
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86566.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2132 +/- 0.0044 on 4/19/10 14:24:55
Effective Efficiency: 0.2132 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

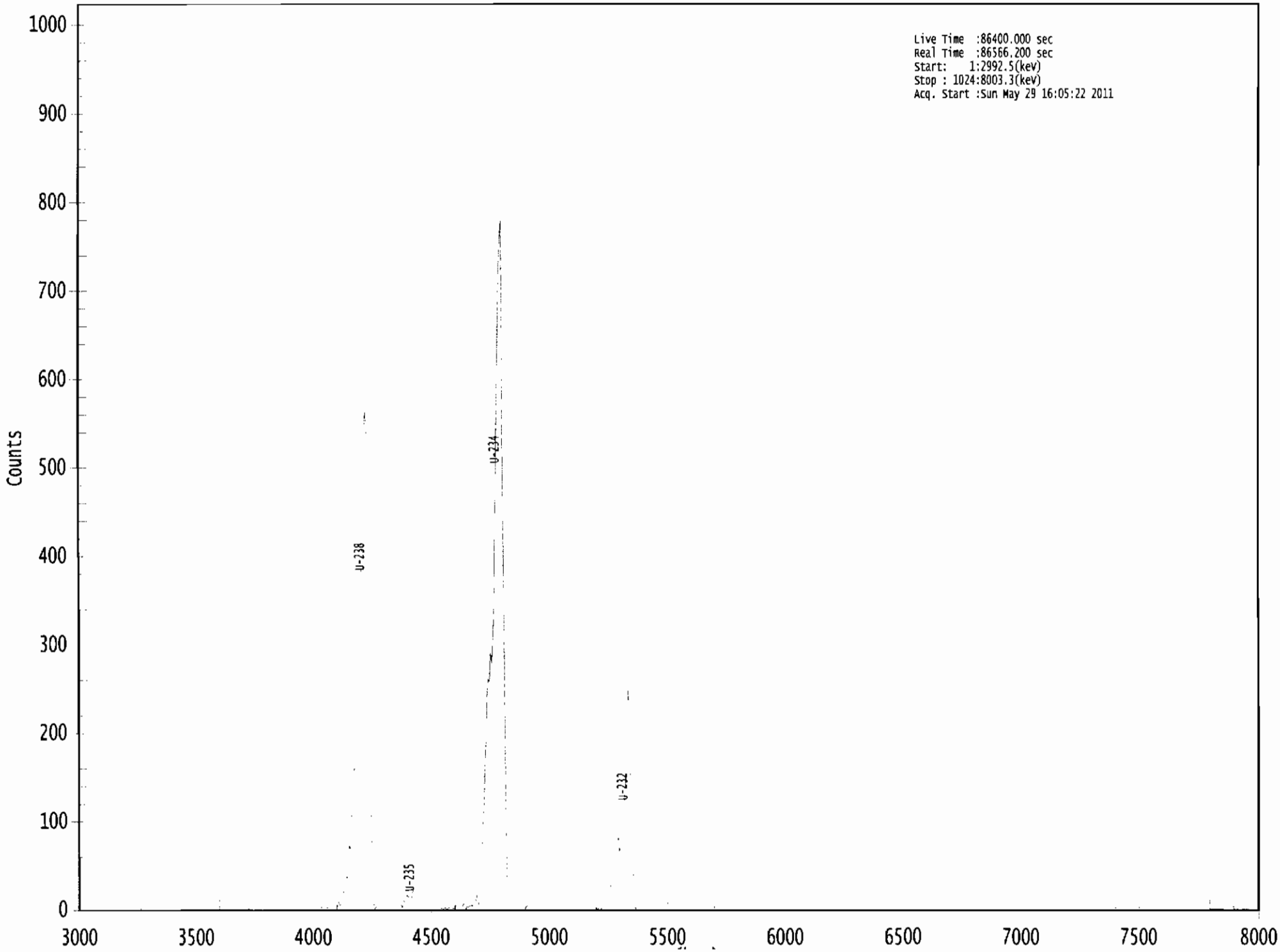
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
U-232	5309.637	2175.00	46.64	0.00	0.00E+000	29
U-234	4769.028	8047.00	89.71	0.00	0.00E+000	38
U-235	4402.291	223.00	14.93	0.00	0.00E+000	45
U-238	4199.892	5877.00	76.66	0.00	0.00E+000	38

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	3.1971E+000	2.97	3.9777E-003	2.06
U-234	1.1829E+001	2.34	3.9777E-003	2.06
U-235	4.0438E-001	7.01	4.9070E-003	2.06
U-238	8.6018E+000	2.44	3.9606E-003	2.06

Errors quoted at 1.000 sigma

0000012958.CNF



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***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-013
Batch Identification: B11-01984 B
Sample Identification: 11-01984-16
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 6A
Chamber Serial Number: 12045132A
Detector Serial Number: 55816
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/29/11 16:05:25
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86566.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2190 +/- 0.0045 on 4/19/10 14:26:08
Effective Efficiency: 0.2190 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

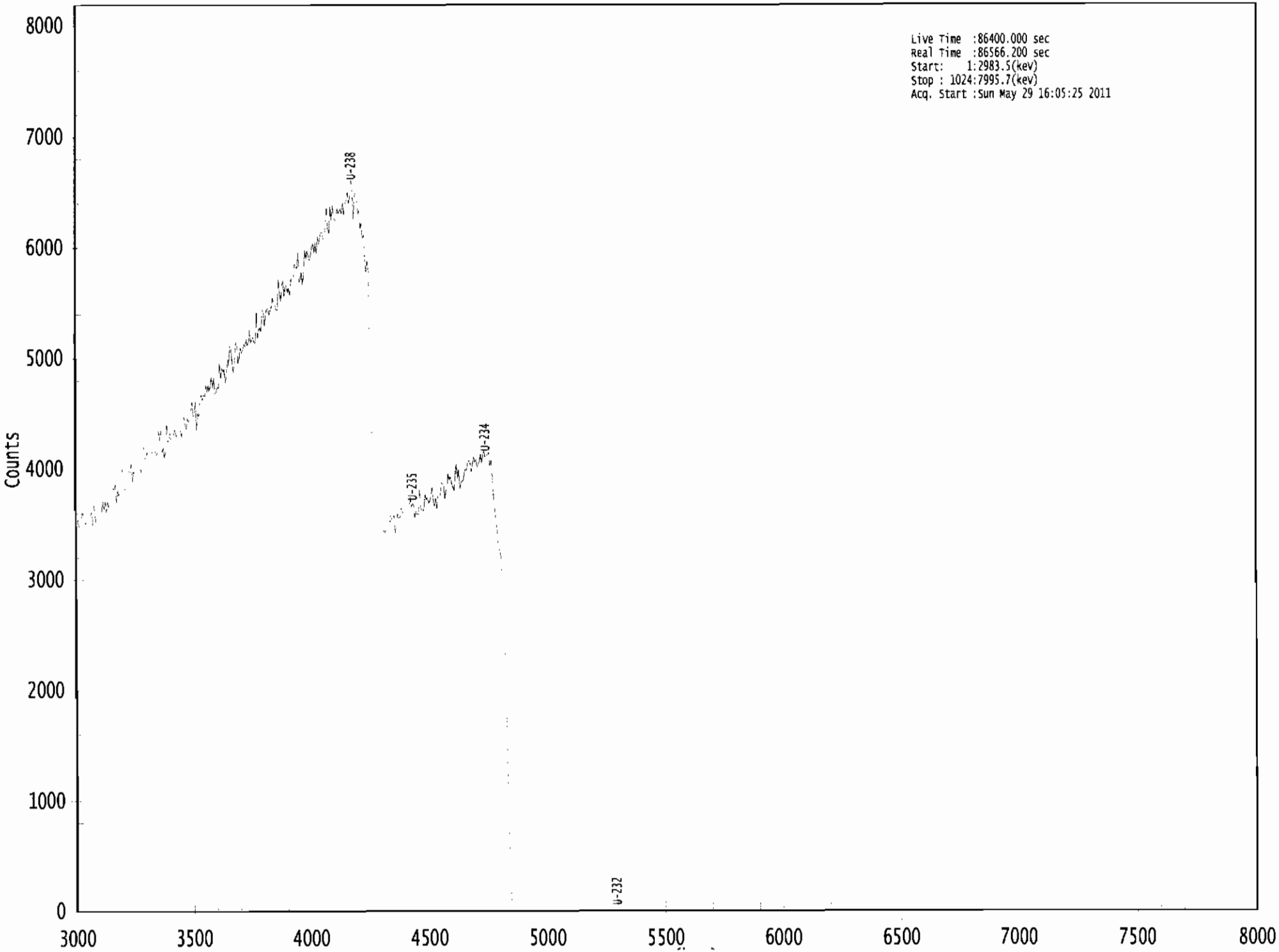
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
U-232	5280.036	29.00	5.39	0.00	0.00E+000	9
U-234	4731.582	122045.0	349.35	0.00	0.00E+000	4
U-235	4422.210	116405.0	341.18	0.00	0.00E+000	8
U-238	4161.894	215481.0	464.20	0.00	0.00E+000	22

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	4.1498E-002	18.68	3.8722E-003	2.05
U-234	1.7464E+002	2.07	3.8722E-003	2.05
U-235	2.0549E+002	2.07	4.7769E-003	2.05
U-238	3.0702E+002	2.06	3.8556E-003	2.05

Errors quoted at 1.000 sigma

0000012899.CNF



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***** A L P H A S P E C T R U M A N A L Y S I S *****
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Sample Description: ARS1-11-00897-024
Batch Identification: B11-01984 B
Sample Identification: 11-01984-17
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 6B
Chamber Serial Number: 12045132B
Detector Serial Number: 55817
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/29/11 16:05:27
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86566.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2172 +/- 0.0045 on 4/19/10 14:26:42
Effective Efficiency: 0.2172 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

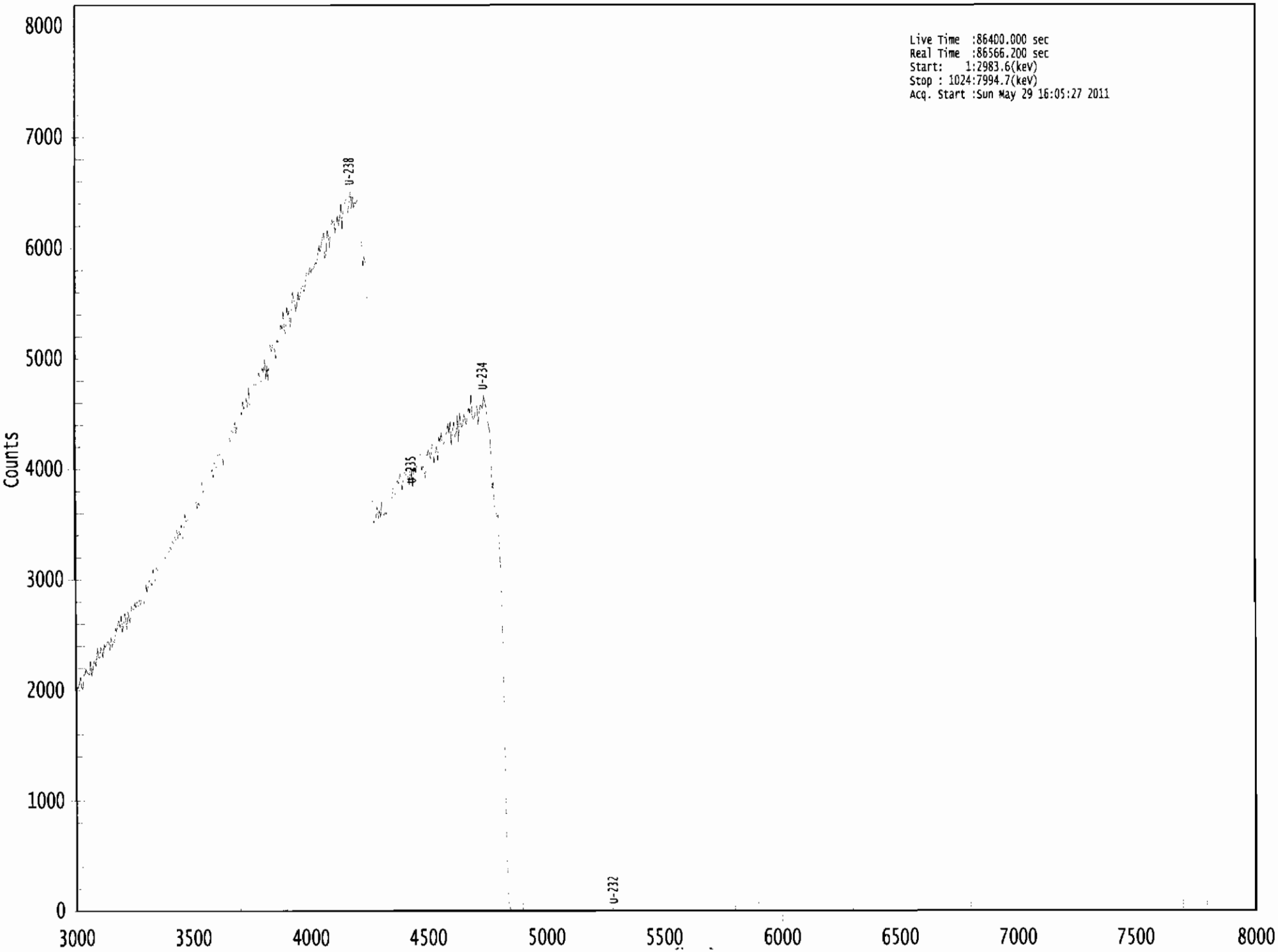
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
U-232	5270.414	298.00	17.26	0.00	0.00E+000	28
U-234	4728.168	129706.0	360.15	0.00	0.00E+000	336
U-235	4422.239	127064.0	356.46	0.00	0.00E+000	4
U-238	4160.917	211436.0	459.82	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	4.2999E-001	6.15	3.9046E-003	2.05
U-234	1.8716E+002	2.07	3.9046E-003	2.05
U-235	2.2618E+002	2.07	4.8168E-003	2.05
U-238	3.0378E+002	2.07	3.8878E-003	2.05

Errors quoted at 1.000 sigma

0000012894.CNF



Batch ID ARS1-11-01984

UCF	2.22	dpm/ pCi
ACF	1	L/ L
CF	1.96	
TPU sys	0.062468	

Tracer ID	S-0241
tracer pCi/g	4.08252
tracer To	6/11/2010

	Isotope	half-life days	Abundance
tracer	U-232	25162.03704	0.997
analyte1	U-238	1.63194E+12	1
analyte2	U-235	2.5706E+11	0.861
analyte3	U-234	89745400	0.998

Sample ID	collection date	aliquot (L)	grams tracer added	U-238 cnts	U-238 bkg cnts	U-235 cnts	U-235 bkg cnts	U-234 cnts	U-234 bkg cnts	U-232 cnts	U-232 bkg cnts	sample time (min)	bkg time (min)	U-232 net CPM	count date	tracer DF	decay corrected tracer dpm	Eff	PE	CR	DF1	DF2	DI
11-01984-15	04/20/11	0.5	1.037	5877	1	223	1	8047	1	2175	1	1440	1440	1.5097	05/29/11	0.99035	9.280	0.2132	0.004	173.4256	1.0000	1.0000	1 0
11-01984-16	04/20/11	0.5	1.037	215481	1	136405	1	122045	1	29	1	1440	1440	0.0194	5/29/11 0:00	0.99035	9.280	0.219	0.005	2.1262	1.0000	1.0000	1 0
11-01984-17	04/21/11	0.5	1.037	211436	1	127064	1	129706	1	298	1	1440	1440	0.2063	5/29/11 0:00	0.99035	9.280	0.2172	0.005	22.7393	1.0000	1.0000	1.0
XXXX	XXXX	xx	xx	xxx	xx	xxx	xx	xxx	xx	xxx	xx	xxxx	xxxx	#VALUE!	XXXX	#VALUE!	#VALUE!	xxxx	xx	#VALUE!	#VALUE!	#VALUE!	#VA
XXXX	XXXX	xx	xx	xxx	xx	xxx	xx	xxx	xx	xxx	xx	xxxx	xxxx	#VALUE!	XXXX	#VALUE!	#VALUE!	xxxx	xx	#VALUE!	#VALUE!	#VALUE!	#VA
XXXX	XXXX	xx	xx	xxx	xx	xxx	xx	xxx	xx	xxx	xx	xxxx	xxxx	#VALUE!	XXXX	#VALUE!	#VALUE!	xxxx	xx	#VALUE!	#VALUE!	#VALUE!	#VA
XXXX	XXXX	xx	xx	xxx	xx	xxx	xx	xxx	xx	xxx	xx	xxxx	xxxx	#VALUE!	XXXX	#VALUE!	#VALUE!	xxxx	xx	#VALUE!	#VALUE!	#VALUE!	#VA
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XXXX	XXXX	xx	xx	xxx	xx	xxx	xx	xxx	xx	xxx	xx	xxxx	xxxx	#VALUE!	XXXX	#VALUE!	#VALUE!	xxxx	xx	#VALUE!	#VALUE!	#VALUE!	#VA
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XXXX	XXXX	xx	xx	xxx	xx	xxx	xx	xxx	xx	xxx	xx	xxxx	xxxx	#VALUE!	XXXX	#VALUE!	#VALUE!	xxxx	xx	#VALUE!	#VALUE!	#VALUE!	#VA

Sample ID	denom. (K)	Y	U-238 activity	U-238 1.96s cnt uncert	U-238 1.96s TPU	U-238 MDC	U-238 DLC	U-235 activity	U-235 1.96s cnt uncert	U-235 1.96s TPU	U-235 MDC	U-235 DLC	U-234 activity	U-234 1.96s cnt uncert	U-234 1.96s TPU	U-234 MDC	U-234 DLC	Reporting Units
11-01984-15	0.18058	76.31%	22.596609	0.577872924	2.826373174	0.028314069	0.008946278	0.991542439	0.131020247	0.178618846	0.032885097	0.010390567	31.00352695	0.677534055	3.855978939	0.028370819	0.008964209	pCi/L
11-01984-16	0.00233	0.96%	64338.356	271.6592909	7882.096117	2.198385199	0.694614576	40367.11811	231.9015202	4947.877614	2.553292914	0.806753283	36513.12596	204.8568208	4475.258988	2.202791444	0.696006799	pCi/L
11-01984-17	0.02467	10.23%	5951.7058	25.36945514	729.1521428	0.20725517	0.065485549	4154.134255	22.84180738	509.1335453	0.240714483	0.076057549	3658.397392	19.91003115	448.3665035	0.207670572	0.065616802	pCi/L
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XXXX	#VALUE!	#######	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	pCi/L
XXXX	#VALUE!	#######	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	pCi/L
XXXX	#VALUE!	#######	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	pCi/L

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01914 - 12	B11-0194	A24B ~~A14B~~ 5-24-11	12773	U	5-24-11 1126		10500
11-01914 -13	↓	A25A ~~A15A~~ 5-24-11	12774	↓	↓		↓
11-01914 -14	↓	A25B	12775	↓	↓		↓
11-01914 -15	↓	A31A	12776	↓	↓		↓
11-01914 -16	↓	A31B	12777	↓	↓		↓ RJH 5-25-11
1-36	Source Check	A11A - A36B	N/A	Source	5-27-11 1820		7200
↓	↓	↓	↓	↓	5-27-11 2055		↓
11-01985 -01	B11-01985	A11A	12900	Th	5-25-11 1410		86400
11-01985 -02	↓	A11B	12901	↓	↓		↓
11-01985 -03	↓	A12A	12902	↓	↓		↓
11-01985 -04	↓	A12B	12928	↓	↓		↓
11-01985 -05	↓	A13A	12929	↓	↓		↓
11-01985 ~~-07~~ -06	↓	A13B	12930	↓	↓		↓
11-01985 -07 5-25-11	↓	A14A	12931	↓	↓		↓
11-01985 ~~-07~~ -08 5-25-11	↓	A14B	12932	↓	↓		↓

Reviewed By: MJM Date: 6-2-11
Initials

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01985-09 ~~10~~	5-28-11 B11-01955	A15A	12933	Th	5-28-11 1410		86400
11-01955 -10 ~~11~~	5-28-11 ↓	A15B	12934	↓	↓		↓
11-01985 -11 ~~12~~	5-28-11 ↓	A16A	12935	↓	↓		↓
11-01985 -12 ~~13~~	5-28-11 ↓	A16B	12936	↓	↓		↓
11-01985 -13 ~~14~~	5-28-11 ↓	A21A	12937	↓	↓		↓
11-01985 -14 ~~15~~	5-28-11 ↓	A21B	12938	↓	↓		↓
11-01955 -15	5-28-11 ↓	A22A	12939	↓	↓		↓
11-01984-01	B11-01984A	A22B	12945	↓	↓		↓
11-01984-02	↓	A24A	12946	↓	↓		↓
11-01984-03	↓	A24B	12947	↓	↓		↓
11-01984-04	↓	A25A	12948	↓	↓		↓
11-01984-05	↓	A25B	12949	↓	↓		↓
11-01984-06	↓	5-28-11 ~~A11~~ A31A	12950	↓	↓		↓
11-01984-07	↓	A31B	12872	↓	↓		↓
11-01984-08	↓	A32B	12951	↓	↓		↓

Reviewed By: YM Date: 6-2-11
Initials

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01984-09	B11-01984 A	A33A	12952	U	5-28-11 1410	[illegible]	86400
11-01984-10	↓	A33B	12953	↓	↓	[illegible]	↓
11-01984-11	↓	A34B	12954	↓	↓	[illegible]	↓
11-01984-12	↓	A35A	12955	↓	↓	[illegible]	↓
11-01984-13	↓	A36A	12956	↓	↓	[illegible]	↓
11-01984-14	↓	A36B	12957	↓	↓	[illegible]	↓
11-01946-01	B11-01946	A11A		Am	5-29-11 1606	[illegible]	↓
11-01946-02	↓	A11B		↓	↓	[illegible]	↓
11-01946-03	↓	A12A		↓	↓	[illegible]	↓
11-01946-04	↓	A12B		↓	↓	[illegible]	↓
11-01946-05	↓	A13A		↓	↓	[illegible]	↓
11-01946-06	↓	A13B		↓	↓	[illegible]	↓
11-01946-07	↓	A14A		↓	↓	[illegible]	↓
11-01946-08	↓	A14B		↓	↓	[illegible]	↓
11-01946-09	↓	A15A		↓	↓	[illegible]	↓

Reviewed By: VHM Date: 6-2-11
Initials

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01946-10	B11-01946	A15B		Am	5-29-11 1600	[illegible]	36400
11-01946-11	↓	A16A		↓	↓	[illegible]	↓
11-01947-01	B11-01947	A21A		Pu	↓	[illegible]	↓
11-01947-02	↓	A21B		↓	↓	[illegible]	↓
11-01947-03	↓	A22A		↓	↓	[illegible]	↓
11-01947-04	↓	A23B		↓	↓	[illegible]	↓
11-01947-05	↓	A24A		↓	↓	[illegible]	↓
11-01947-06	↓	A24B		↓	↓	[illegible]	↓
11-01947-07	↓	A25A		↓	↓	[illegible]	↓
11-01947-08	↓	A25B		↓	↓	[illegible]	↓
11-01947-09	↓	A31A		↓	↓	[illegible]	↓
11-01947-10	↓	A31B		↓	↓	[illegible]	↓
11-01947-11	↓	A32B		↓	↓	[illegible]	↓
11-01984-15	B11-01984 B	A35A	12958	U	↓	[illegible]	↓
11-01984-16	↓	A36A	12899	↓	↓	[illegible]	↓

Reviewed By: YHM Date: 6-2-11
Initials

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01984-17	B11-01984B	A36B	12994	U	5-27-11 1606	[illegible]	86400
11-01926-01	B11-01926	A12A		Pu	5-30-11 2149	[illegible]	↓
11-01926-02	↓	A12B		↓	↓	[illegible]	↓
11-01926-03	↓	A13A		↓	↓	[illegible]	↓
11-01926-04	↓	A13B		↓	↓	[illegible]	↓
11-01926-05	↓	A14A		↓	↓	[illegible]	↓
11-01927-01	B11-01927	A14B		U	↓	[illegible]	↓
11-01927-02	↓	A15A		↓	↓	[illegible]	↓
11-01927-03	↓	A15B		↓	↓	[illegible]	↓
11-01927-04	↓	A16A		↓	↓	[illegible]	↓
11-01927-05	↓	A16B		↓	↓	[illegible]	↓
11-01230-01	B11-01230	A23B		↓	↓	[illegible]	↓
11-01230-02	↓	A24A		↓	↓	[illegible]	↓
11-01230-03	↓	A24B		↓	↓	[illegible]	↓
11-01230-04	↓	A25A		↓	↓	[illegible]	↓

Reviewed By: [illegible] Date: 6-2-11
Initials

Nonconformance Report

NCR #: 1293
Assigned by QAO

Part A: Initiator (Deficiency Identification)

Describe Nonconformance:

The LCS/LCSD Recovery for ARS1-B11-01663 is extremely high at 902%. The acceptable range for LCS/LCSD recovery is 75-125%. The RER, DER and RPD also failed. Tracer Recoveries for ARS1-B11-01663-04, 07, 09, 13-16 are biased low.

ARS1-B11-01663	ARS-026
ARS Batch No.	ARS Procedure No.
Isotopic Uranium	Eichrom ACW-03-15
Analyte(s)	Method
ARS1-11-0897	
ARS SDG(s)	

Heather Wright	Heather Wright	5/10/11
Initiator's Signature	Name (print)	Date

Nonconformance Report

NCR #: 1293
Assigned by QAO

Part B: Responsible Manager (Investigation and Proposed Resolution)

1) **Did this nonconformance affect analytical results?** ○ Yes ◉ No

If Yes:

Identify affected client(s): _____

ARS Sample ID(s) / SDG(s): _____

2) **Is client contact required?** ○ Yes (Part C Signature Required) ◉ No

3) **Cause of Nonconformance:**

Suspect contamination of control samples due to high activity of samples.

4) **Proposed Immediate Resolution** Proposed Completion Date: 06-02-2011

Is retesting of sample required? ◉ Yes ○ No

Has Nonconformance item(s) been tagged Out of Service? ○ Yes ◉ N/A

Immediate Resolution Actions(s): *CAR Required* ○ *Yes* ◉ *No*

Rerun batch

Long Term Action(s):

Jamaal Brown

Person(s) assigned to Implement Resolution

Virgene Mulligan — 06-02-2011

Responsible Manager's Signature — Date

Nonconformance Report

NCR #: 1293
Assigned by QAO

Part C: QAO (Evaluation)

1) Route to Project Manager for Client Notification ☐ **N/A**

Project Manager's Signature — 5/12/11 Date of Notification

2) Notify Regulation Body ☒ **N/A**

QAO's Signature — Date of Notification

3) Execute Immediate Resolution and Establish Completion Date ☐ **N/A**

Virginia Mulligan — 06-02-2011 Completion Date

Responsible Individual's Signature

4) Execute Corrective Action and Establish Completion Date ☒ **N/A**

Responsible Manager's Signature — Completion Date

5) Nonconformance Category (*Select Only One*)

○ PT Results	○ HS&E	○ Equipment
◉ Batch QC Results	○ Contractual	○ Software
○ Instr. QC or Malfunction	○ Procedural	○ Prep
○ Missing or Defective Data	○ Reporting Errors	○ Other

Additional Category Detail (e.g., Blank, LCS, Chemical Yield, Background, Lost Sample, etc?)

Verification

Immediate Resolution Verified Complete: 06-02-2011 Date ☐ **N/A**

Corrective Actions Verified Complete: Date ☒ **N/A**

OAO Comments:

Rerun QC was acceptable. Report rerun results.

Virginia Mulligan — 06-02-2011

QAO's Signature (Indicates NCR Complete) — Date

Nonconformance Report

NCR #: 1293
Assigned by QAO

Part D: Corrective Action Request

Responsible Manager (Investigation, Root Cause, and Proposed Corrective Actions(s))

1) Description of Root Cause Investigation

2) Results of Root Cause Determination

3) Proposed Corrective Action(s) and Preventive Measures
(Include Responsible Individual and Estimated Completion Date for each action)

Responsible Manager's Signature

Date

ARS INTERNATIONAL

QC Results per Analytical Batch

Analytical Batch	ARS1-B11-01663
SDG	ARS1-11-00897
Analysis	Uranium in Water
Analysis Test Method	ARS-026/Eichrom ACW-03-1S
Analysis Code	ASP-A-024
Report Units	pCi/L

Acceptable QC Performance Ranges

QC Sample Type	Performance Items and Ranges		
Laboratory Control Sample	Recovery (%):	> 75	< 125
Matrix Spike	Recovery (%):	> 60	< 140
Duplicate	Replicate Error Ratio (RER):		< 1
	Duplicate Error Ratio (DER):		< 3
	Relative Percent Difference (RPD %):		≤ 25

Laboratory Control Sample

Analysis Date: 04-13-11 19:55 | Analysis Technician: JBROWN

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	Expected Value	LCS Rec (%)	MDC
ARS1-B11-01663-01	LCS	U-238	151.7	18.6	16.8	902	0.013

Duplicate RER/DER/RPD

Analysis Date: 04-13-11 19:55 | Analysis Technician: JBROWN

Analyte	Result LCS	CSU LCS (2s)	Results LCSD	CSU LCSD (2s)	RER	DER	RPD
U-238	151.7	18.6	276.1	33.8	28.85	79.97	58.2

Method Blank

Analysis Date: 04-13-11 19:55, 04-13-11 19:55 | Analysis Technician: JBROWN, JBROWN

Analysis Batch Sample ID	QC Type	Analyte	Results	CSU (2s)	MDC	Qual
ARS1-B11-01663-03	MBL	U-234	0.026	0.023	0.034	U
ARS1-B11-01663-03	MBL	U-235	0.0033	0.0065	0.009	U
ARS1-B11-01663-03	MBL	U-238	0.034	0.024	0.031	

Jamie Armstrong

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

LELAP Certificate# 01949 NELAP Certificate # E87558

ARS INTERNATIONAL	Rerun Report	SDG	ARS1-11-00897
		Analysis	ASP-A-024
		Run	2

Fraction	Client ID	Rerun Reason	Comments	Original Deadline	Rerun Deadline
001	**MW-1-110419**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
002	**MW-2-110421**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
003	**MW-2-2-110421**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
004	**JPOP41S-110421**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
005	**MD-SW-110420**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
006	**MW-3-110420**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
007	**MW-4-110420**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
008	**MW-6-110420**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
009	**MW-7-110419**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
010	**MW-8-110419**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
011	**MW-MD-02-110420**	LC5	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
012	**MW-MD-110420**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11
013	**NPOP20E-110420**	LCS	LCS/LCSD failed extremely high, rerun batch	05/06/11	05/13/11

Analysis Batch Report

Analysis Batch ID **ARS1-B11-01663**

Method **ARS-026** **Analysis** **ASP-A-024** **Matrix** **AQ**

Description **Uranium in Water**

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Client ID	Isotope Group	Lab Deadline
ARS1-B11-01663-01	LCS	B-11684								
ARS1-B11-01663-02	LCSD	B-11685								
ARS1-B11-01663-03	MBL									
ARS1-B11-01663-04	TRG				**ARS1-11-00897**	001	1	MW-1-110419	STD	05/03/11
ARS1-B11-01663-05	TRG				**ARS1-11-00897**	002	1	MW-2-110421	STD	05/03/11
ARS1-B11-01663-06	TRG				**ARS1-11-00897**	003	1	MW-2-2-110421	STD	05/03/11
ARS1-B11-01663-07	TRG				**ARS1-11-00897**	004	1	JPOP41S-110421	STD	05/03/11
ARS1-B11-01663-08	TRG				**ARS1-11-00897**	005	1	MD-SW-110420	STD	05/03/11
ARS1-B11-01663-09	TRG				**ARS1-11-00897**	006	1	MW-3-110420	STD	05/03/11
ARS1-B11-01663-10	TRG				**ARS1-11-00897**	007	1	MW-4-110420	STD	05/03/11
ARS1-B11-01663-11	TRG				**ARS1-11-00897**	008	1	MW-6-110420	STD	05/03/11
ARS1-B11-01663-12	TRG				**ARS1-11-00897**	009	1	MW-7-110419	STD	05/03/11
ARS1-B11-01663-13	TRG				**ARS1-11-00897**	010	1	MW-8-110419	STD	05/03/11
ARS1-B11-01663-14	TRG				**ARS1-11-00897**	011	1	MW-MD-02-110420	STD	05/03/11
ARS1-B11-01663-15	TRG				**ARS1-11-00897**	012	1	MW-MD-110420	STD	05/03/11
ARS1-B11-01663-16	TRG				**ARS1-11-00897**	013	1	NPOP20E-110420	STD	05/03/11

Technical Notes

Batch	ARS1-B11-01663
Analysis Code	ASP-A-024
Procedure No	ARS-026
Matrix	AQ

#	Date	Dept	Batch Technical Notes	User ID
1	05-03-11 16:58	CHEMISTRY	B11-01663-01,02,07,16 all seem to have a film covering the plate. I am unsure what this can be attributed to. As a result tracer recovery/activity could be affected.	JBROWN
2	05-10-11 12:08	COUNTROOM	ARS1-B11-01663-02 (LCSD) U-238 and U-234 not identified as peaks are extremely wide and experience a large amount of tailing. FWHM for U-232/234/238 100keV. ARS1-B11-01663-07 (ARS1-11-00897-004) U-234/238 FWHM > 100keV. U-234 peak centroid lies outside +/- 50keV acceptance range due to excessive peak tailing. All peaks overlap due to excessive tailing. This will affect activity calculations as peaks cannot be differentiated. ARS1-B11-01663-16 (ARS1-11-00897-013) U-234/235 FWHM > 100keV due to excessive peak tailing and overlap. All peaks overlap due to excessive tailing. This will affect activity calculations as peaks cannot be differentiated.	JARMSTRONG

Batch ID ARS1-B11-01663

UCF	2.22	dpm/ pCi
ACF	1	L/ L
CF	1.96	
TPU sys	0.062468	

Tracer ID	S-0241
tracer pCi/g	4 084775
tracer To	06-09-2010

	Isotope	half-life days	Abundance
tracer	U-232	25162.03704	0 997
analyte1	U-238	1 63194E+12	1
analyte2	U-235	2.5706E+11	0 861
analyte3	U-234	89745400	0 998

Sample ID	collection date	aliquot (L)	grams tracer added	U-238 cnts	U-238 bkg cnts	U-235 cnts	U-235 bkg cnts	U-234 cnts	U-234 bkg cnts	U-232 cnts	U-232 bkg cnts	sample time (min)	bkg time (min)	U-232 net CPM	count date	tracer DF	decay corrected tracer dpm	Eff	PE	CR	DF1	DF2	DF3
ARS1-B11-01663-01	05-09-11	1	1 029	83789	1	1970	2	30685	3	2293	0	1440	1440	1 5924	5-9-11 11 03	0.99083	9.218	0.2205	0.98	0 7994	1.0000	1 0000	1 0000
ARS1-B11-01663-02	05-09-11	1	1 03	147622	2	3197	0	46020	4	2223	1	1440	1440	1.5431	5-9-11 11 03	0 99083	9 227	0 2148	0.98	0.7945	1.0000	1 0000	1.0000
ARS1-B11-01663-03	05-09-11	1	1 031	15	3	1	0	13	4	1468	1	1440	1440	1.0188	5-9-11 11.03	0.99083	9 236	0 2232	0 98	0.5043	1 0000	1 0000	1.0000
ARS1-B11-01663-04	04-19-11	0 5	1 022	1123	4	25	1	569	3	602	2	1440	1440	0 4167	5-9-11 11:03	0 99083	9.155	0.2134	0.98	0 2176	1 0000	1 0000	1 0000
ARS1-B11-01663-05	04-21-11	0 5	1.024	10672	3	352	2	11831	3	1435	1	1440	1440	0 9958	5-9-11 11:03	0 99083	9.173	0.225	0.98	0.4923	1.0000	1 0000	1.0000
ARS1-B11-01663-06	04-21-11	0 5	1.024	10914	47	408	4	12688	6	1580	2	1440	1440	1 0958	5-9-11 11:03	0 99083	9 171	0.2158	0 98	0.5649	1 0000	1.0000	1.0000
ARS1-B11-01663-07	04-21-11	0 1	1 009	3465	5	2183	2	1459	4	3	0	1440	1440	0.0021	5-9-11 11:03	0.99083	9.039	0.219	0 98	0.0011	1 0000	1 0000	1 0000
ARS1-B11-01663-08	04-20-11	0.5	1 023	679	1	29	0	1240	2	2495	2	1440	1440	1 7313	5-9-11 11:03	0 99083	9.164	0.213	0.98	0.9050	1 0000	1.0000	1 0000
ARS1-B11-01663-09	04-20-11	0.5	1.025	1253	1	58	0	1442	1	668	1	1440	1440	0 4632	5-9-11 11 03	0 99083	9 182	0.223	0 98	0 2308	1 0000	1.0000	1.0000
ARS1-B11-01663-10	04-20-11	0 5	1.018	26598	5	1074	0	28748	4	2015	1	1440	1440	1 3986	5-9-11 11.03	0.99083	9 119	0 2098	0 98	0 7459	1.0000	1 0000	1.0000
ARS1-B11-01663-11	04-20-11	0 5	1 021	9456	2	361	0	11551	6	1342	2	1440	1440	0 9306	5-9-11 11 03	0.99083	9 146	0.2206	0.98	0 4706	1 0000	1 0000	1 0000
ARS1-B11-01663-12	04-19-11	0.5	1.019	105	11	3	0	527	8	973	0	1440	1440	0 6757	5-9-11 11 03	0.99083	9 128	0.2191	0.98	0.3447	1.0000	1.0000	1 0000
ARS1-B11-01663-13	04-19-11	0 5	1.021	151	6	6	1	526	4	802	2	1440	1440	0.5556	5-9-11 11.03	0.99083	9 146	0 2124	0.98	0.2918	1.0000	1 0000	1.0000
ARS1-B11-01663-14	04-20-11	0 5	1 018	1909	6	73	0	2771	4	799	5	1440	1440	0.5514	5-9-11 11.03	0.99083	9 119	0 2157	0.98	0.2860	1.0000	1.0000	1 0000
ARS1-B11-01663-15	04-20-11	0.5	1 022	1605	3	71	1	2410	7	687	1	1440	1440	0.4764	5-9-11 11:03	0 99083	9 155	0.219	0.98	0 2425	1.0000	1 0000	1.0000
ARS1-B11-01663-16	04-20-11	0.1	1.007	172295	18	92451	1	113017	7	105	1	1440	1440	0.0722	5-9-11 11 03	0 99083	9.021	0 2172	0.98	0 0376	1.0000	1.0000	1.0000

Sample ID	denom. (K)	Y	U-238 activity	U-238 1.96s cnt uncert	U-238 1.96s TPU	U-238 MDC	U-238 DLC	U-235 activity	U-235 1.96s cnt uncert	U-235 1.96s TPU	U-235 MDC	U-235 DLC	U-234 activity	U-234 1.96s cnt uncert	U-234 1.96s TPU	U-234 MDC	U-234 DLC	Reporting Units
ARS1-B11-01663-01	0.38350	78.34%	151.72428	1.027366534	18 60509464	0 013332575	0 004212638	4 138997752	0 183054169	0 538815605	0.019538257	0.006919361	55 67066027	0.622992862	6 844575573	0 019539384	0 007311125	pCi/L
ARS1-B11-01663-02	0 37126	77 86%	276 12155	1 408606388	33.8369036	0.01737684	0.006153908	6.945357142	0 240757229	0 883795374	0 005887369	0	86 24489962	0.788084541	10.58895829	0 022519945	0 008720381	pCi/L
ARS1-B11-01663-03	0 24488	49 42%	0 0340308	0 023582118	0 023947382	0 03053927	0 011426994	0 003293725	0.006455701	0 006468284	0.008925995	0	0 025574223	0 022963626	0.023176125	0.03414308	0.013221199	pCi/L
ARS1-B11-01663-04	0.05052	21.33%	15 382313	0.904502139	2 089306452	0 165171202	0 063959118	0 3831772	0 159562622	0.166316757	0.117551782	0.037142345	7 796102268	0.645676R	1 152403072	0 148330092	0.055501232	pCi/L
ARS1-B11-01663-05	0 12050	48.25%	61 484613	1 16703194	7.617931461	0.062059875	0.023221178	2 342651151	0 246829623	0 378411244	0 062180655	0 022020921	68.30045004	1.231215582	8 452671456	0.062184252	0.021267717	pCi/L
ARS1-B11-01663-06	0 13260	55.36%	56 910781	1 074647522	7 050383609	0 181241663	0.083524659	2 457327806	0.241983865	0 386106287	0 073084367	0 028300403	66 54909452	1 158803292	8.230078838	0.074026261	0.029902736	pCi/L
ARS1-B11-01663-07	0.00005	0.11%	46957.821	1566 941014	5959 090992	177 9768401	70.59886867	34378 29655	1444 143933	4450 032705	146.4348349	51.85905349	19786.28924	1019.482076	2628.352112	163 3970156	63.272101	pCi/L
ARS1-B11-01663-08	0 20970	88.69%	2.2453031	0 169260573	0.322837407	0.02438294	0 007704176	0.111542436	0.040597104	0 042832855	0 010423448	0	4 108047413	0 229209003	0 552742063	0 030826947	0.010917186	pCi/L
ARS1-B11-01663-09	0.05599	22 62%	15 527241	0 860785207	2 086907336	0 091312609	0.028851663	0.8354391	0 215009115	0 238100686	0 039035172	0	17.90702582	0 925227891	2.379715999	0.091495614	0.028909487	pCi/L
ARS1-B11-01663-10	0 17024	73.10%	108.47947	1.304072131	13.34579759	0 053494839	0 021220037	5 088401421	0.304323364	0.693364411	0.012839449	0	117 488934	1 358438121	14.44902464	0 049112554	0.019017817	pCi/L
ARS1-B11-01663-11	0 11293	46.12%	58.133767	1.1721106	7.213603139	0 037125311	0.0202306	2 578201862	0 265961876	0 412773571	0 019354369	0	71.13385224	1 298258035	8.805665145	0.086918816	0 035110654	pCi/L
ARS1-B11-01663-12	0 08216	13 78%	0 7944766	0 178417863	0.203211906	0.15332949	0.065212449	0.029449056	0.033324743	0.031519238	0 026602311	0	4 39531649	0.383933278	0.661067943	0.13440014	0.055724822	pCi/L
ARS1-B11-01663-13	0.06742	28.60%	1.4934672	0.252949355	0 312121313	0 14529781R	0 058692716	0 059812855	0.062033976	0.062464752	0.08807757	0.027829502	5 387257184	0 465683868	0 807424991	0 12400522	0.048018446	pCi/L
ARS1-B11-01663-14	0 06711	28.03%	19.690556	0.887482217	2.569019612	0.145965632	0 058962478	0 877281372	0 201248916	0 228119381	0 032567569	0	28.68784213	1.070474406	3.671961363	0 124575168	0.048239147	pCi/L
ARS1-B11-01663-15	0.05776	23.76%	19 261106	0.944969513	2 540558926	0.129475284	0.048446257	0.977492856	0.232240454	0.261264819	0 102814969	0.032486016	28.94956207	1 160867424	3.729763181	0.180950458	0.074151194	pCi/L
ARS1-B11-01663-16	0 00178	3.69%	67310.894	317.8872814	8247 491314	8 771510841	3 856359065	41952 88419	270.4388835	5143 711327	3.341147945	1 055688542	45025 98129	260 2422994	5518.997813	5 880294031	2.409669625	pCi/L

American Radiation Services
Baton Rouge Laboratory

LCS Report
Analytical Batch: ARS1-B11-01663

BlindID	ABatch	ABatchSampleID	BlindGroup	StdID	Isotope	ExpectedAddition	ExpectedValue	EmptyWt	GrossWt	NetWt	UserID	ModDate	ExpectedValue_CT	MidPointCountDate	KnownValue
B-11684	ARS1-B11-01663	ARS1-B11-01663-01	B-UU238	S-0028	U-238	1	15.7364287	13.516	14.5846	1.0686	VMULLIGAN	04-28-2011	15.7364287	05-09-2011	16.81594771
B-11685	ARS1-B11-01663	ARS1-B11-01663-02	B-UU238	S-0028	U-238	1	15.7364287	13.5378	14.6046	1.0668	VMULLIGAN	04-28-2011	15.7364287	05-09-2011	16.78762214

ARS INTERNATIONAL

UCF Converter

Please select the Original and Final Units, then enter Value to Convert below.

EXIT

Activity Units

Original	Final
aCi	aCi
Bq	Bq
dpm	dpm
fCi	fCi
mBq	mBq
mCi	mCi
nCi	nCi
pCi	pCi
uBq	uBq
uCi	uCi

UCF Multiplier: 4.504505E-01

UCF Divisor: 2.22

Aliquot Units

Original	Final
cc	g
cm2	kg
cm3	L
filter	mg
ft2	mL
ft3	ug
g	
in2	
in3	
L	
m2	
m3	
mL	
swipe	

ACF Multiplier: 1

ACF Divisor: 1

Enter Values to Convert Below

Original Result

9.0682

dpm/g

Converted Result

4.084775E+00

pCi/g

ARS-026

ID_31001_026	ABatch	ABatchSampleID	ClientID	Aliquot	AliquotUnits	UserID	ModDate	IC_ID	BalanceSerialNumber
8846	ARS1-B11-01663	ARS1-B11-01663-01		1	L	JBROWN	05/03/2011 16:50:29		
8847	ARS1-B11-01663	ARS1-B11-01663-02		1	L	JBROWN	05/03/2011 16:50:29		
8848	ARS1-B11-01663	ARS1-B11-01663-03		1	L	JBROWN	05/03/2011 16:50:29		
8849	ARS1-B11-01663	ARS1-B11-01663-04	MW-1-110419	0.5	L	JBROWN	05/03/2011 16:50:29	85962	
8850	ARS1-B11-01663	ARS1-B11-01663-05	MW-2-110421	0.5	L	JBROWN	05/03/2011 16:50:29	85963	
8851	ARS1-B11-01663	ARS1-B11-01663-06	MW-2-2-110421	0.5	L	JBROWN	05/03/2011 16:50:29	85964	
8852	ARS1-B11-01663	ARS1-B11-01663-07	JPOP41S-110421	0.1	L	JBROWN	05/03/2011 16:50:29	85965	
8853	ARS1-B11-01663	ARS1-B11-01663-08	MD-SW-110420	0.5	L	JBROWN	05/03/2011 16:50:29	85966	
8854	ARS1-B11-01663	ARS1-B11-01663-09	MW-3-110420	0.5	L	JBROWN	05/03/2011 16:50:29	85967	
8855	ARS1-B11-01663	ARS1-B11-01663-10	MW-4-110420	0.5	L	JBROWN	05/03/2011 16:50:29	85968	
8856	ARS1-B11-01663	ARS1-B11-01663-11	MW-6-110420	0.5	L	JBROWN	05/03/2011 16:50:29	85969	
8857	ARS1-B11-01663	ARS1-B11-01663-12	MW-7-110419	0.5	L	JBROWN	05/03/2011 16:50:29	85970	
8858	ARS1-B11-01663	ARS1-B11-01663-13	MW-8-110419	0.5	L	JBROWN	05/03/2011 16:50:30	85971	
8859	ARS1-B11-01663	ARS1-B11-01663-14	MW-MD-02-110420	0.5	L	JBROWN	05/03/2011 16:50:30	85972	
8860	ARS1-B11-01663	ARS1-B11-01663-15	MW-MD-110420	0.5	L	JBROWN	05/03/2011 16:50:30	85973	
8861	ARS1-B11-01663	ARS1-B11-01663-16	NPOP20E-110420	0.1	L	JBROWN	05/03/2011 16:50:30	85974	

American Radiation Services
Baton Rouge Laboratory

ARS1-B11-01663

ABatch	ABatchSampleID	ClientID	SampleType	EmptyWt	FilledWt	NetWt	Exp Val	StdID	Isotope	TracerDate	UserID	ModDate	HL days	Ref Date	Cert dpm/g	Curr ACT
ARS1-B11-01663	ARS1-B11-01663-01		LCS	97.051	98.080	1.029	9.333	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-02		LCSD	110.334	111.363	1.030	9.338	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-03		MBL	91.208	92.239	1.031	9.350	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-04	MW-1-110419	TRG	435.803	436.825	1.022	9.269	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-05	MW-2-110421	TRG	291.400	292.424	1.024	9.287	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-06	MW-2-2-110421	TRG	305.284	306.308	1.024	9.287	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-07	JPOP41S-110421	TRG	156.318	157.327	1.009	9.152	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-08	MD-SW-110420	TRG	417.668	418.691	1.023	9.278	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-09	MW-3-110420	TRG	440.132	441.157	1.025	9.296	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-10	MW-4-110420	TRG	377.881	378.899	1.018	9.233	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-11	MW-6-110420	TRG	396.184	397.205	1.021	9.260	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-12	MW-7-110419	TRG	435.912	436.931	1.019	9.242	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-13	MW-8-110419	TRG	469.006	470.027	1.021	9.260	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-14	MW-MD-02-110420	TRG	467.526	468.544	1.018	9.233	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-15	MW-MD-110420	TRG	375.358	376.380	1.022	9.269	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070
ARS1-B11-01663	ARS1-B11-01663-16	NPOP20E-110420	TRG	160.828	161.834	1.007	9.130	S-0241	U-232	5/3/2011	JBROWN	5/3/2011	25162.037	6/9/2010	9.152	9.070

Standards Activity as of: 05-09-11 11:03

Active	Std ID	Isotope	PSCLT	Verification Date	Exp Date	Status	Ref Date	Ref ACT (dpm)	ACT at Date Above (dpm/g)	Halflife (days)	Parent ID	Expended Date	Comments
A	S-0241	U-232	ST	06-11-10	06-11-11	OK	06-09-10	9.1520E+00	0.0682	2.5166E+04	S-0161		[illegible]

5/9/2011 11:03:19

Apex-Alpha™

ASSIGNED SAMPLES REPORT

Date : 5/9/2011
Time : 11:03:19
User : countroom

SAMPLE	CHAMBER	GEOMETRY	DEVICE	CERTIFICATE
11-01721-01	A_1_1A	Shelf 2	Alpha Analyst10139	
11-01721-02	A_1_1B	Shelf 2	Alpha Analyst10139	
11-01721-03	A_1_2A	Shelf 2	Alpha Analyst10139	
11-01721-04	A_1_2B	Shelf 2	Alpha Analyst10139	
11-01721-05	A_1_3A	Shelf 2	Alpha Analyst10139	
11-01721-06	A_1_3B	Shelf 2	Alpha Analyst10139	
11-01721-07	A_1_4A	Shelf 2	Alpha Analyst10139	
11-01721-08	A_1_4B	Shelf 2	Alpha Analyst10139	
11-01721-09	A_1_5A	Shelf 2	Alpha Analyst10139	
11-01721-10	A_1_5B	Shelf 2	Alpha Analyst10139	
11-01721-11	A_1_6A	Shelf 2	Alpha Analyst10139	
11-01663-01	A_2_1A	Shelf 2	Alpha Analyst10139	
11-01663-02	A_2_1B	Shelf 2	Alpha Analyst10139	
11-01663-03	A_2_2A	Shelf 2	Alpha Analyst10139	
11-01663-04	A_2_3B	Shelf 2	Alpha Analyst10139	
11-01663-05	A_2_4A	Shelf 2	Alpha Analyst10139	
11-01663-06	A_2_4B	Shelf 2	Alpha Analyst10139	
11-01663-07	A_2_5A	Shelf 2	Alpha Analyst10139	
11-01663-08	A_2_5B	Shelf 2	Alpha Analyst10139	
11-01663-09	A_3_1A	Shelf 2	Alpha Analyst10139	
11-01663-10	A_3_1B	Shelf 2	Alpha Analyst10139	
11-01663-11	A_3_2B	Shelf 2	Alpha Analyst10139	
11-01663-12	A_3_3A	Shelf 2	Alpha Analyst10139	
11-01663-13	A_3_3B	Shelf 2	Alpha Analyst10139	
11-01663-14	A_3_4B	Shelf 2	Alpha Analyst10139	
11-01663-15	A_3_6A	Shelf 2	Alpha Analyst10139	
11-01663-16	A_3_6B	Shelf 2	Alpha Analyst10139	

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: LCS
Batch Identification: B11-01663
Sample Identification: 11-01663-01
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 2 1A
Chamber Serial Number: 12044979A
Detector Serial Number: 55794
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:00
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86418.8 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2205 +/- 0.0045 on 4/12/10 10:36:04
Effective Efficiency: 0.2205 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

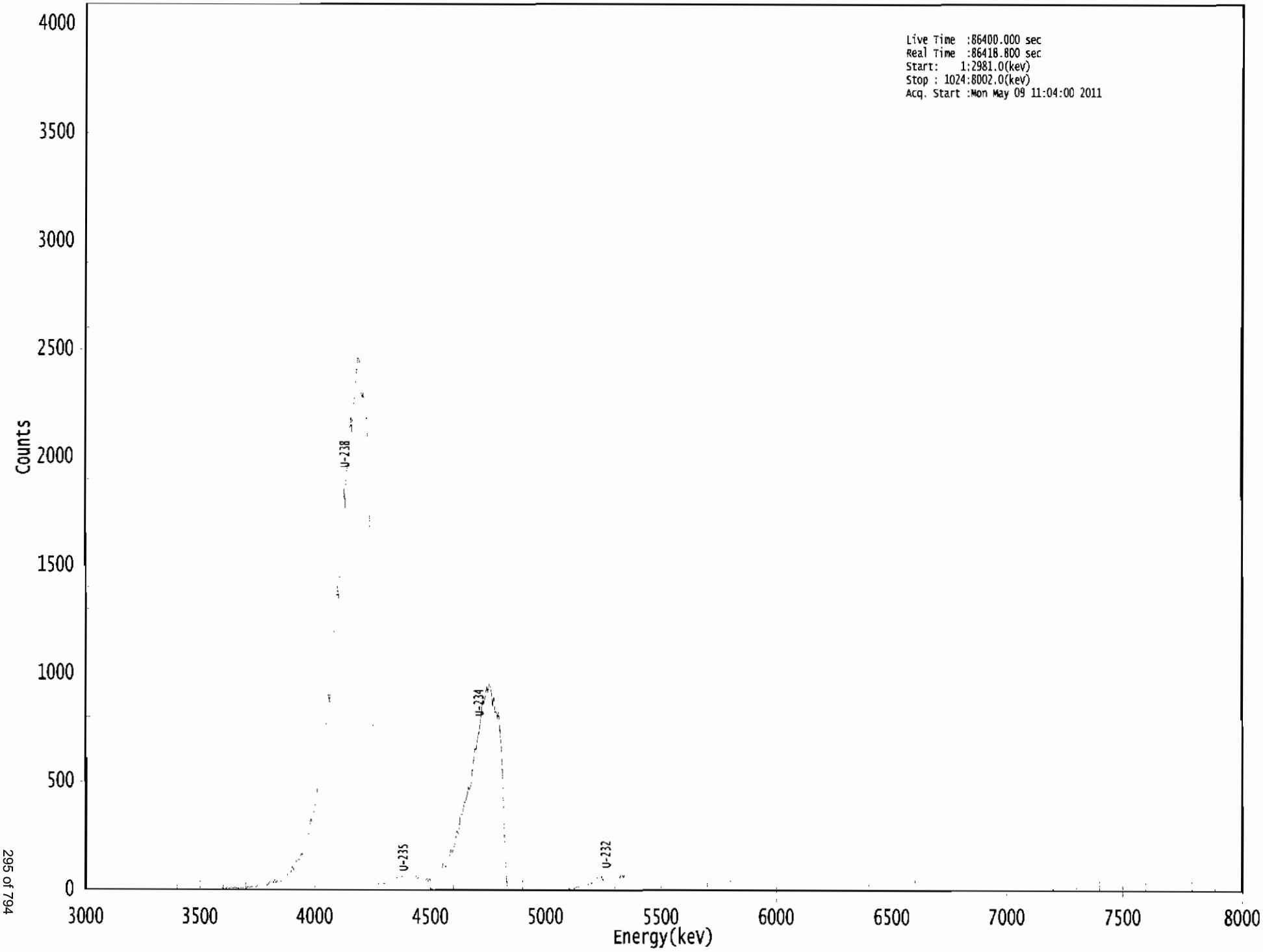
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5247.828	2293.00	47.89	0.00	0.00E+000	119.8
U-234	4697.634	30685.00	175.17	0.00	0.00E+000	141.5
U-235	4369.754	1970.00	44.38	0.00	0.00E+000	147.6
U-238	4120.767	83789.00	289.46	0.00	0.00E+000	156.1

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	3.2592E+000	2.93	3.8462E-003	2.06
U-234	4.3615E+001	2.13	3.8462E-003	2.06
U-235	3.4542E+000	3.05	4.7448E-003	2.06
U-238	1.1858E+002	2.08	3.8297E-003	2.06

Errors quoted at 1.000 sigma

0000012225.CNF



```
***********************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:59

Chamber: A 2 1A
Detector Serial: 55794
Chamber Serial : 12044979A
Type: System Background
Measurement Date: 4/2/2011 16:08:16

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	2.3000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: LCSD
Batch Identification: B11-01663
Sample Identification: 11-01663-02
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 2 1B
Chamber Serial Number: 12044979B
Detector Serial Number: 55795
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:02
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86418.8 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2148 +/- 0.0044 on 4/13/10 09:49:08
Effective Efficiency: 0.2148 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

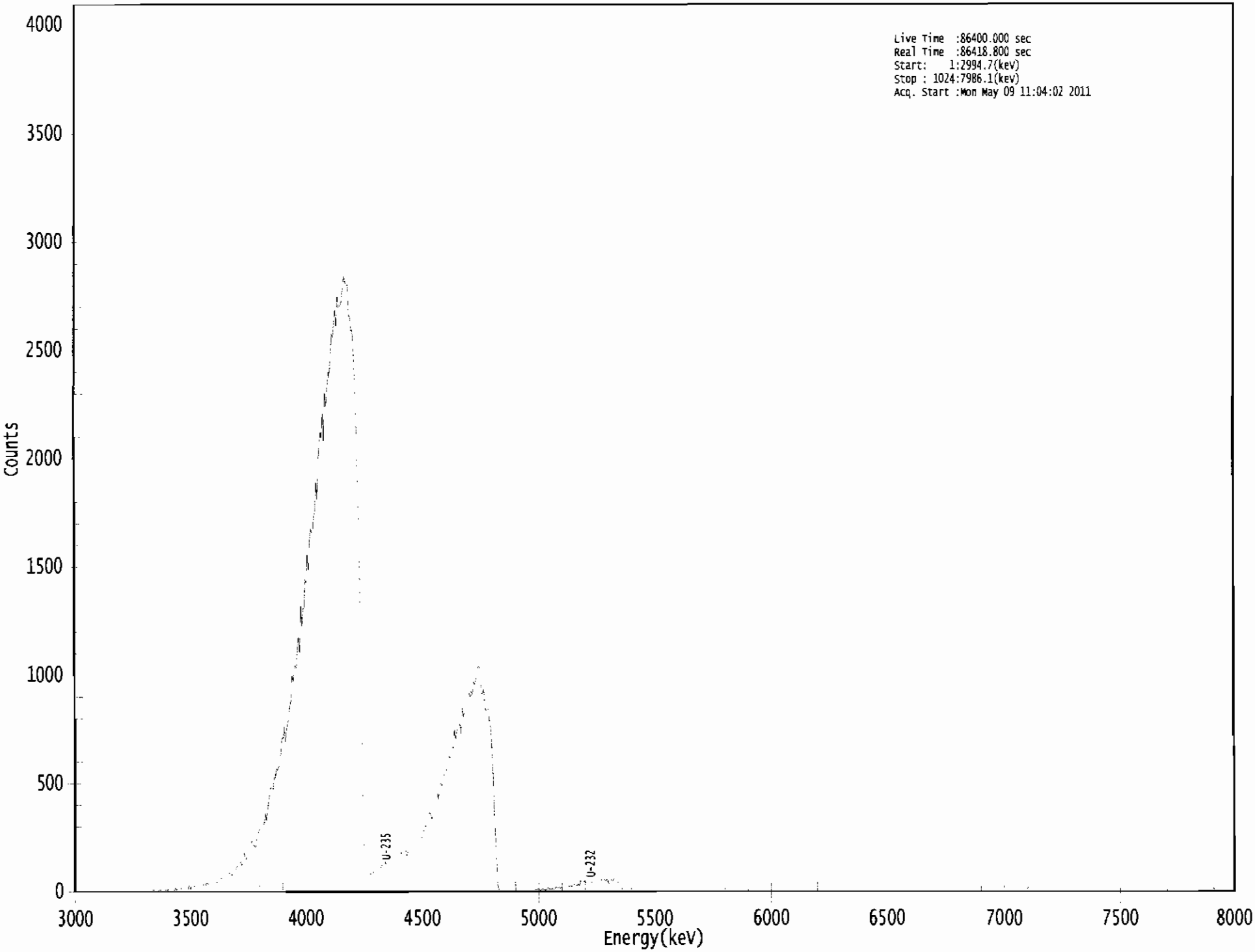
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5226.475	2223.00	47.15	0.00	0.00E+000	174.3
U-235	4346.903	3197.00	56.54	0.00	0.00E+000	92.1
U-238 ~~<not ID'd>~~	4066.491	147622.0	384.22	0.00	0.00E+000	236.8
~~<not ID'd>~~ U-234	4664.680	46020.00	214.52	0.00	0.00E+000	214.4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	3.2443E+000	2.95	3.9492E-003	2.05
U-235	5.7557E+000	2.71	4.8718E-003	2.05

Errors quoted at 1.000 sigma

0000012226.CNF



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***********************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:58

Chamber: A 2 1B
Detector Serial: 55795
Chamber Serial : 12044979B
Type: System Background
Measurement Date: 4/2/2011 16:08:18

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	1.9000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: MBL
Batch Identification: B11-01663
Sample Identification: 11-01663-03
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 2 2A
Chamber Serial Number: 12044980A
Detector Serial Number: 55796
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:04
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86418.7 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2232 +/- 0.0046 on 4/12/10 10:37:23
Effective Efficiency: 0.2232 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

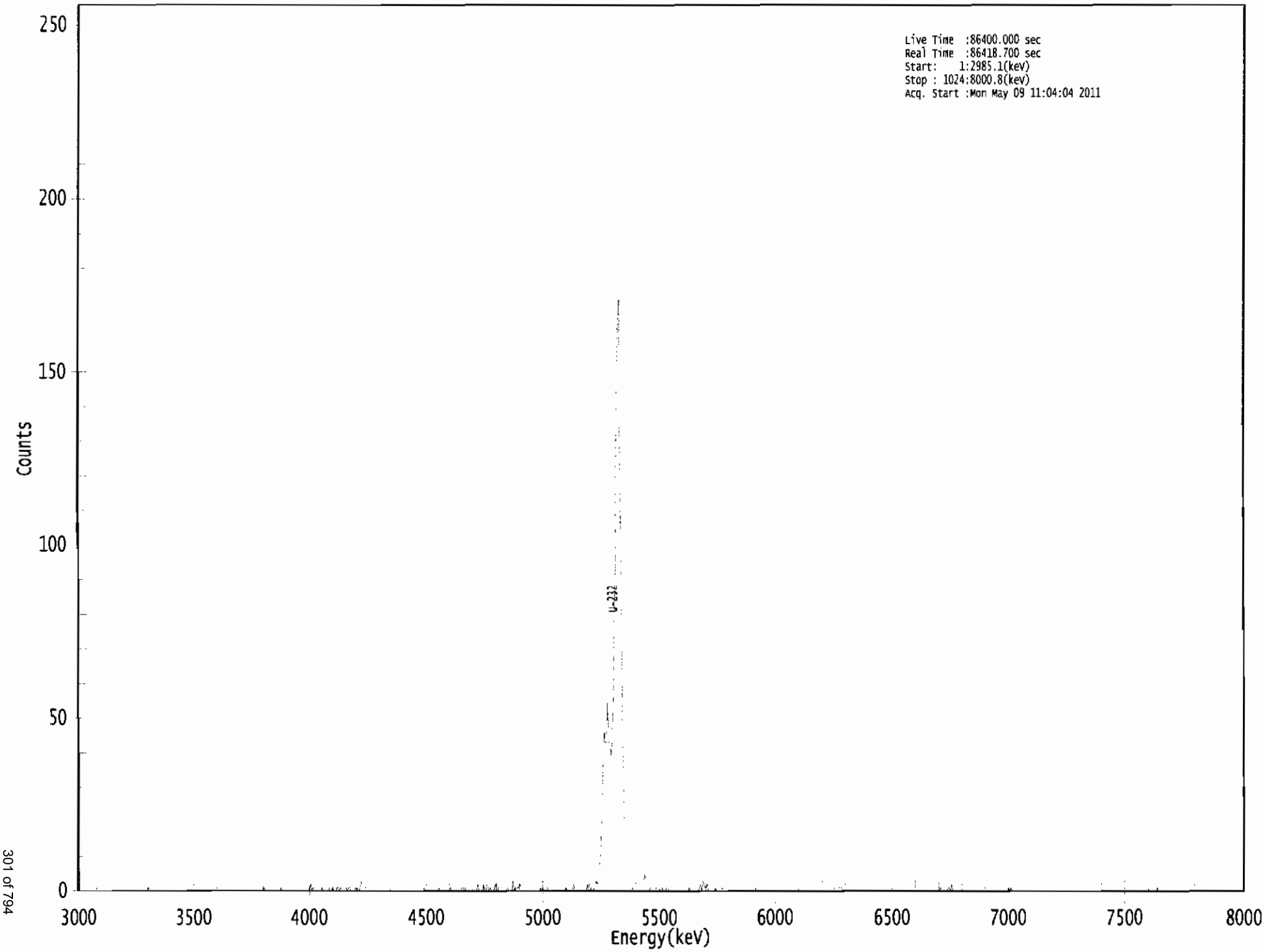
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5295.632	1468.00	38.31	0.00	0.00E+000	28.5
U-234	4753.576	13.00	3.61	0.00	0.00E+000	4.9
U-235	4475.616	1.00	1.00	0.00	0.00E+000	4.9
U-238	4166.729	15.00	3.87	0.00	0.00E+000	6.1

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	2.0616E+000	3.32	3.8003E-003	2.05
U-234	1.8257E-002	27.81	3.8003E-003	2.05
U-235	1.7325E-003	100.02	4.6881E-003	2.05
U-238	2.0975E-002	25.90	3.7840E-003	2.05

Errors quoted at 1.000 sigma

0000012204.CNF



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*********************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E        *****
*********************************************************************
```

Last Results Report printed 5/10/2011 12:45:58

Chamber: A 2 2A
Detector Serial: 55796
Chamber Serial : 12044980A
Type: System Background
Measurement Date: 4/2/2011 16:08:21

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	2.4000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-001
Batch Identification: B11-01663
Sample Identification: 11-01663-04
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 2 3B
Chamber Serial Number: 12044981B
Detector Serial Number: 55799
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:06
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86418.8 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2134 +/- 0.0044 on 5/24/10 08:35:23
Effective Efficiency: 0.2134 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

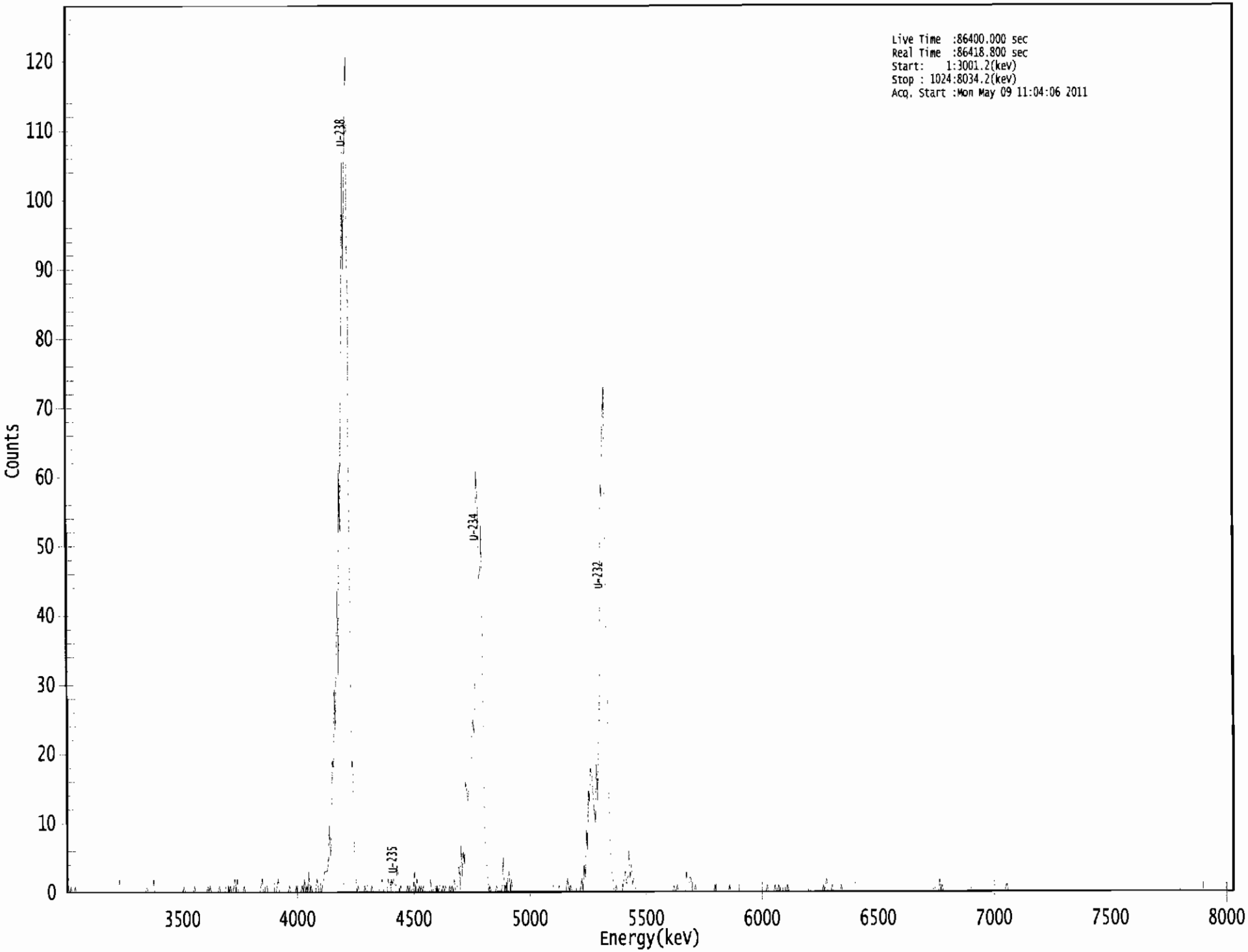
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5308.219	602.00	24.54	0.00	0.00E+000	30.1
U-234	4769.874	569.00	23.85	0.00	0.00E+000	32.5
U-235	4414.557	25.00	5.00	0.00	0.00E+000	8.2
U-238	4200.819	1123.00	33.51	0.00	0.00E+000	35.6

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	8.8416E-001	4.56	3.9743E-003	2.06
U-234	8.3569E-001	4.67	3.9743E-003	2.06
U-235	4.5295E-002	20.11	4.9028E-003	2.06
U-238	1.6423E+000	3.62	3.9573E-003	2.06

Errors quoted at 1.000 sigma

0000012205.CNF



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*************************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E          *****
*************************************************************************
```

Last Results Report printed 5/10/2011 12:45:57

Chamber: A 2 3B
Detector Serial: 55799
Chamber Serial : 12044981B
Type: System Background
Measurement Date: 4/2/2011 16:08:25

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	2.2000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-002
Batch Identification: B11-01663
Sample Identification: 11-01663-05
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 2 4A
Chamber Serial Number: 12044982A
Detector Serial Number: 55800
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:09
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86418.8 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2250 +/- 0.0046 on 4/13/10 09:49:41
Effective Efficiency: 0.2250 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

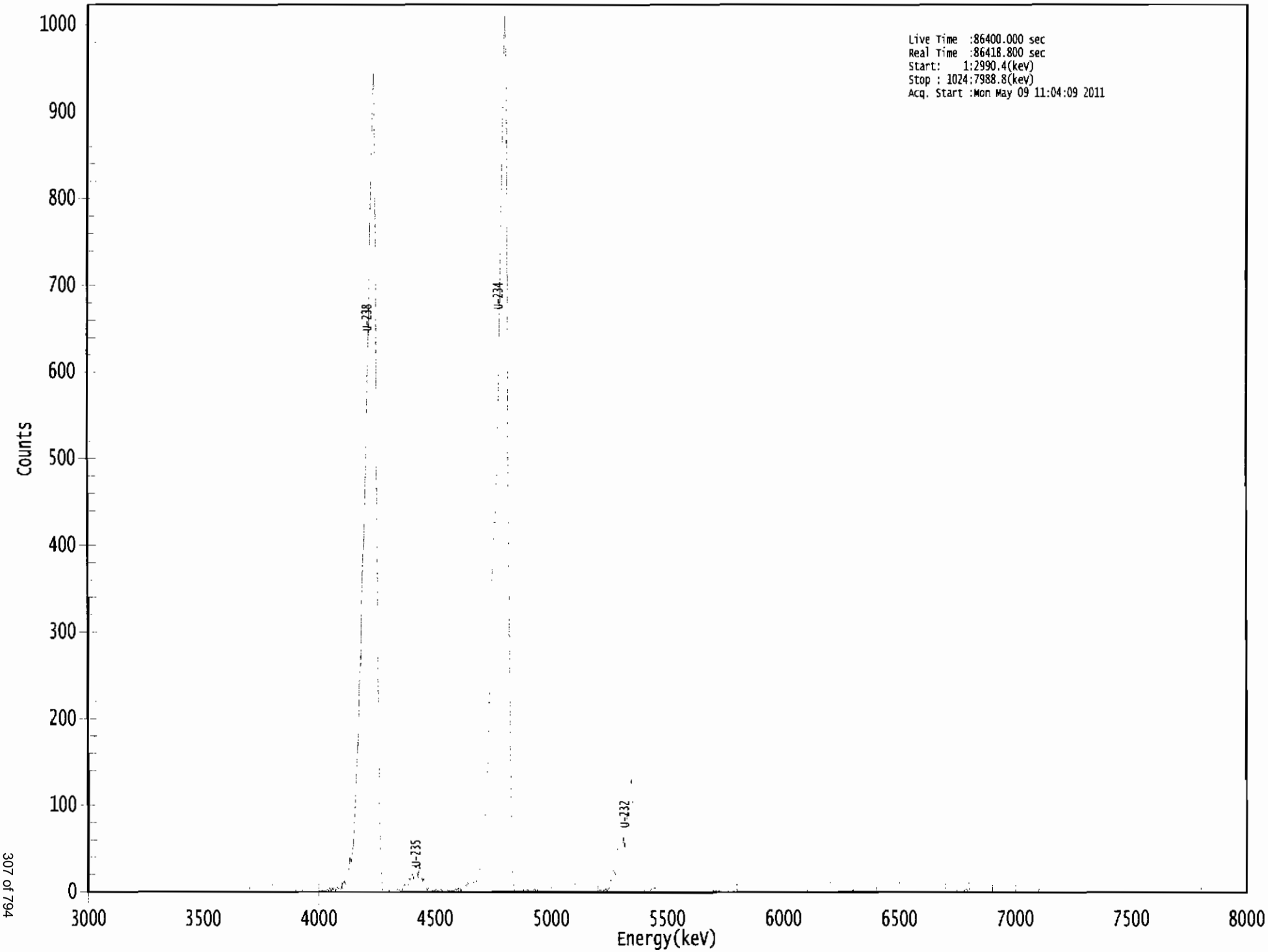
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5312.659	1435.00	37.88	0.00	0.00E+000	37.5
U-234	4774.014	11831.00	108.77	0.00	0.00E+000	45.5
U-235	4410.263	352.00	18.76	0.00	0.00E+000	16.8
U-238	4206.542	10672.00	103.31	0.00	0.00E+000	47.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	1.9995E+000	3.34	3.7704E-003	2.05
U-234	1.6485E+001	2.25	3.7704E-003	2.05
U-235	6.0504E-001	5.71	4.6513E-003	2.05
U-238	1.4806E+001	2.27	3.7543E-003	2.05

Errors quoted at 1.000 sigma

0000012203.CNF



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***********************************************************************
*****          G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
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Last Results Report printed 5/10/2011 12:45:57

Chamber: A 2 4A
Detector Serial: 55800
Chamber Serial : 12044982A
Type: System Background
Measurement Date: 4/2/2011 16:08:26

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	4.1000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	6.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
- LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
- SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
- UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
- BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-003
Batch Identification: B11-01663
Sample Identification: 11-01663-06
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 2 4B
Chamber Serial Number: 12044982B
Detector Serial Number: 55801
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:11
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86418.8 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2158 +/- 0.0044 on 4/13/10 09:50:10
Effective Efficiency: 0.2158 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

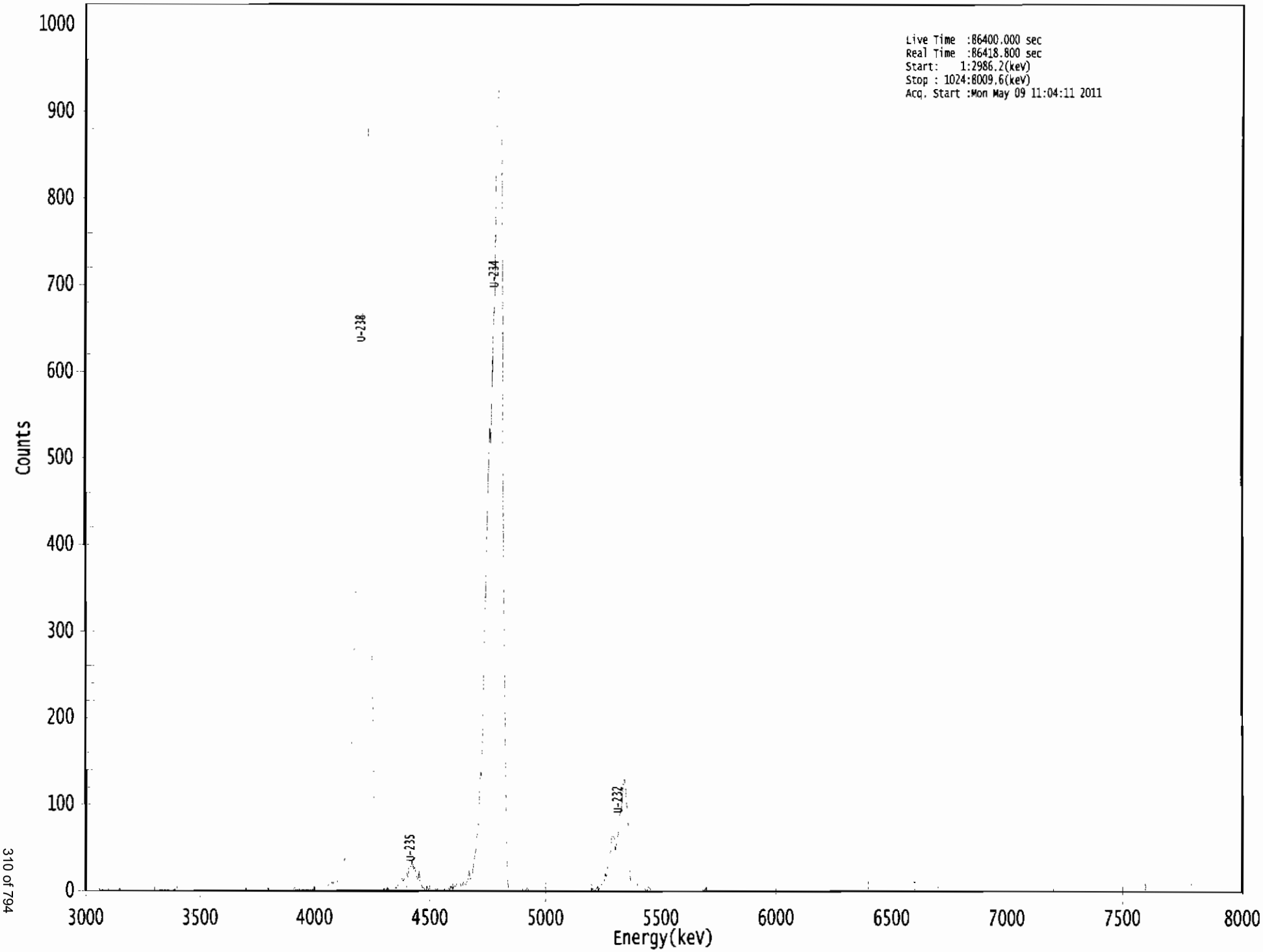
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5306.336	1580.00	39.75	0.00	0.00E+000	45.1
U-234	4766.660	12688.00	112.64	0.00	0.00E+000	63.6
U-235	4404.895	408.00	20.20	0.00	0.00E+000	36.4
U-238	4195.903	10914.00	104.47	0.00	0.00E+000	55.1

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	2.2947E+000	3.25	3.9301E-003	2.05
U-234	1.8427E+001	2.24	3.9301E-003	2.05
U-235	7.3099E-001	5.36	4.8482E-003	2.05
U-238	1.5783E+001	2.27	3.9132E-003	2.05

Errors quoted at 1.000 sigma

0000012206.CNF



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***********************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:56

Chamber: A 2 4B
Detector Serial: 55801
Chamber Serial : 12044982B
Type: System Background
Measurement Date: 4/2/2011 16:08:28

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	2.2400E+002	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	1.1000E+001	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	3.8000E+001	
Boundary Limits: [-1.000E-006, 2.500E+001]		<Ab : : : >
Bkg Counts - U232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	6.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	4.7000E+001	
Boundary Limits: [-1.000E-006, 2.500E+001]		<Ab : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-004
Batch Identification: B11-01663
Sample Identification: 11-01663-07
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 2 5A
Chamber Serial Number: 12044983A
Detector Serial Number: 55802
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:13
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86418.8 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2190 +/- 0.0045 on 4/13/10 20:11:11
Effective Efficiency: 0.2190 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

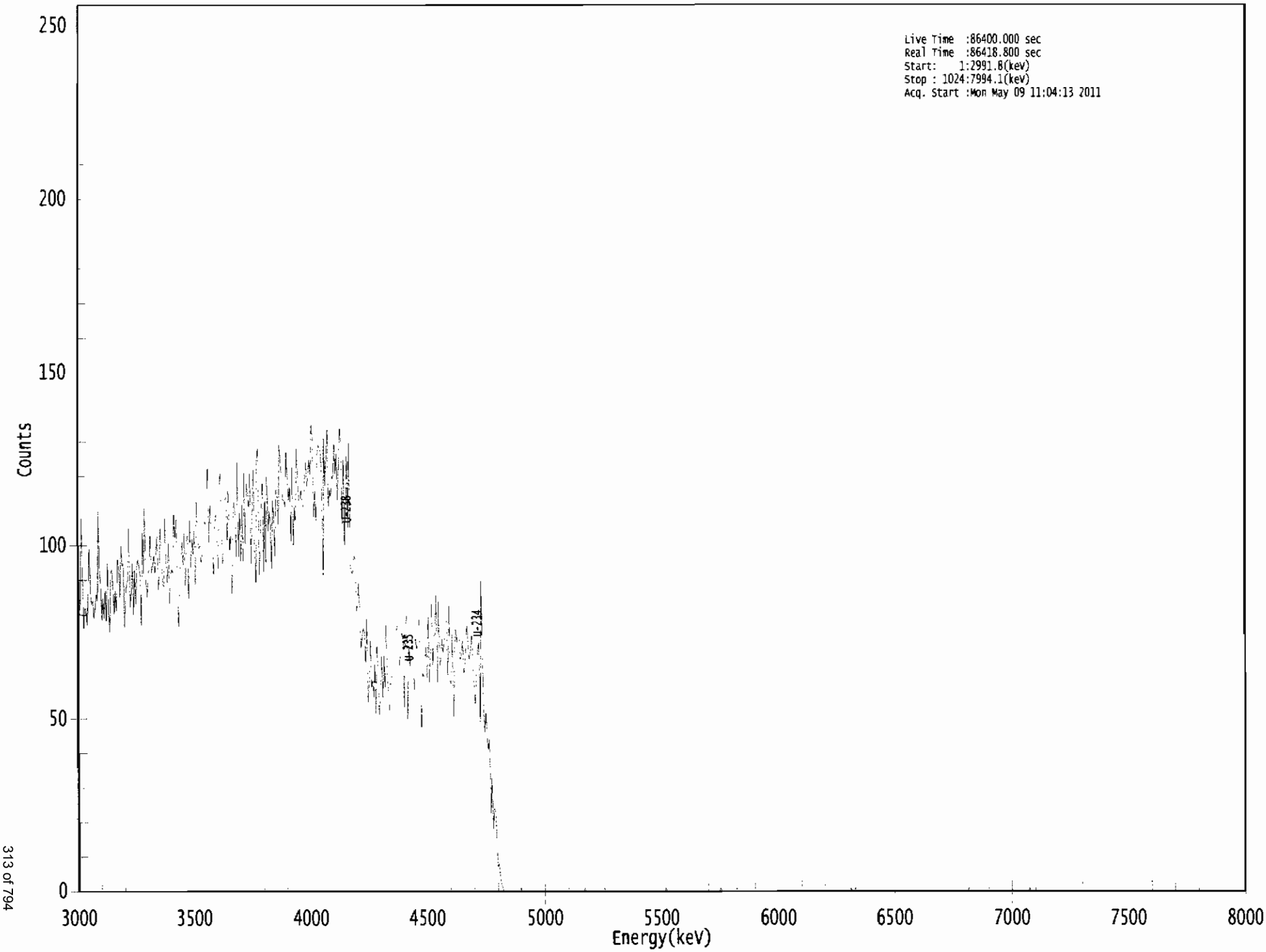
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5296.536	3.00	1.73	0.00	0.00E+000	4.9
U-234	4711.860	1459.00	38.20	0.00	0.00E+000	111.2
U-235	4421.182	2183.00	46.72	0.00	0.00E+000	0.0
U-238	4155.122	3465.00	58.86	0.00	0.00E+000	184.5

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	4.2942E-003	57.77	3.8734E-003	2.06
U-234	2.0884E+000	3.33	3.8734E-003	2.06
U-235	3.8548E+000	2.97	4.7783E-003	2.06
U-238	4.9385E+000	2.67	3.8568E-003	2.06

Errors quoted at 1.000 sigma

0000012202.CNF



```
*************************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E         *****
*************************************************************************
```

Last Results Report printed 5/10/2011 12:45:55

Chamber: A 2 5A
Detector Serial: 55802
Chamber Serial : 12044983A
Type: System Background
Measurement Date: 4/2/2011 16:08:30

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	3.1000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-005
Batch Identification: B11-01663
Sample Identification: 11-01663-08
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 2 5B
Chamber Serial Number: 12044983B
Detector Serial Number: 55803
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:15
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86418.9 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2130 +/- 0.0044 on 4/13/10 20:11:42
Effective Efficiency: 0.2130 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

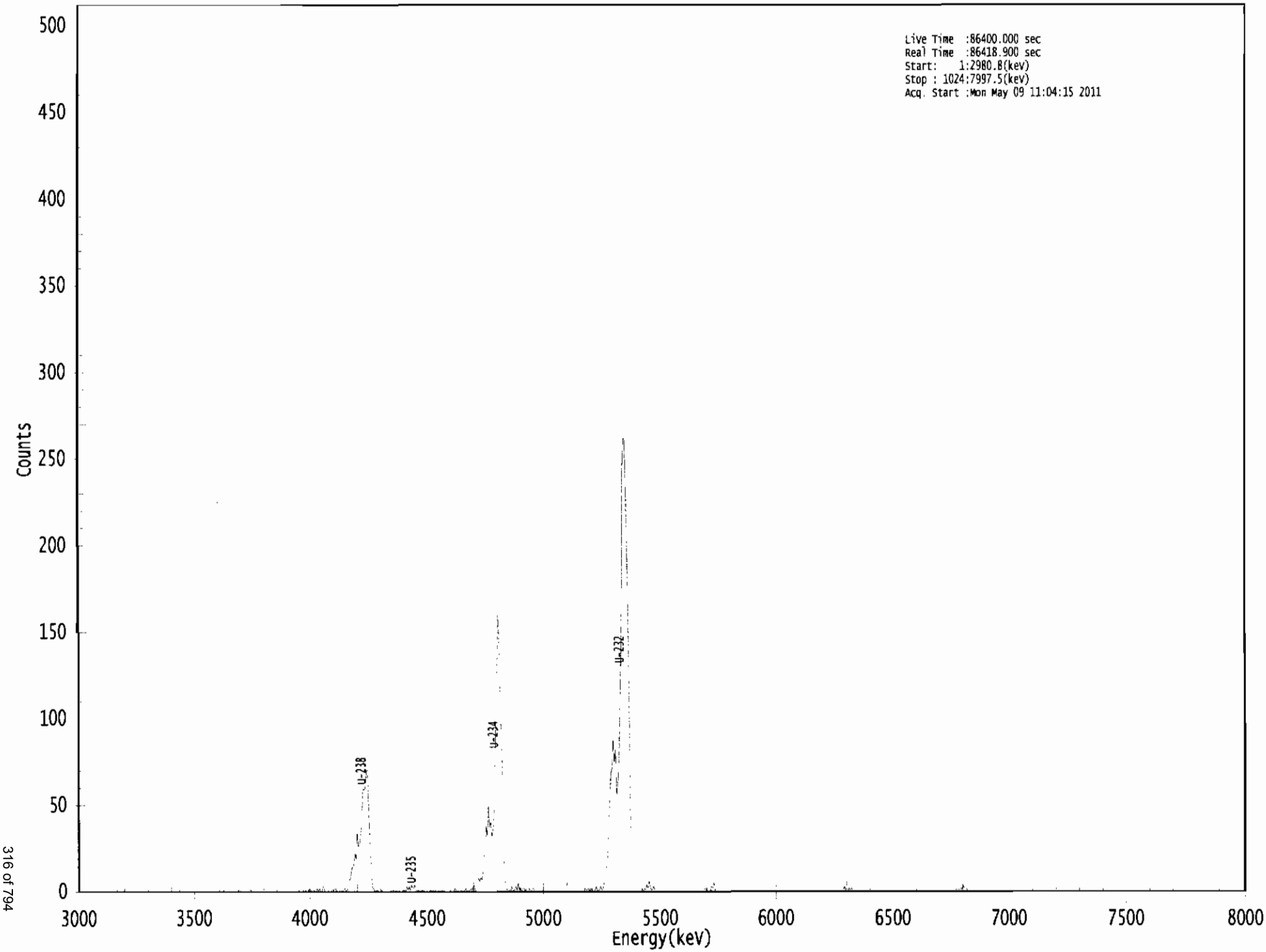
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5316.834	2495.00	49.95	0.00	0.00E+000	33.8
U-234	4776.176	1240.00	35.21	0.00	0.00E+000	28.6
U-235	4416.147	29.00	5.39	0.00	0.00E+000	8.2
U-238	4204.629	679.00	26.06	0.00	0.00E+000	36.1

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	3.6707E+000	2.87	3.9812E-003	2.06
U-234	1.8243E+000	3.51	3.9812E-003	2.06
U-235	5.2633E-002	18.68	4.9113E-003	2.06
U-238	9.9468E-001	4.35	3.9641E-003	2.06

Errors quoted at 1.000 sigma

0000012201.CNF



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***********************************************************************
*****          G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:55

Chamber: A 2 5B
Detector Serial: 55803
Chamber Serial : 12044983B
Type: System Background
Measurement Date: 4/2/2011 16:08:32

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	1.9000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-006
Batch Identification: B11-01663
Sample Identification: 11-01663-09
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 1A
Chamber Serial Number: 12044985A
Detector Serial Number: 55806
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:17
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86455.3 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2230 +/- 0.0046 on 5/28/10 09:42:00
Effective Efficiency: 0.2230 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

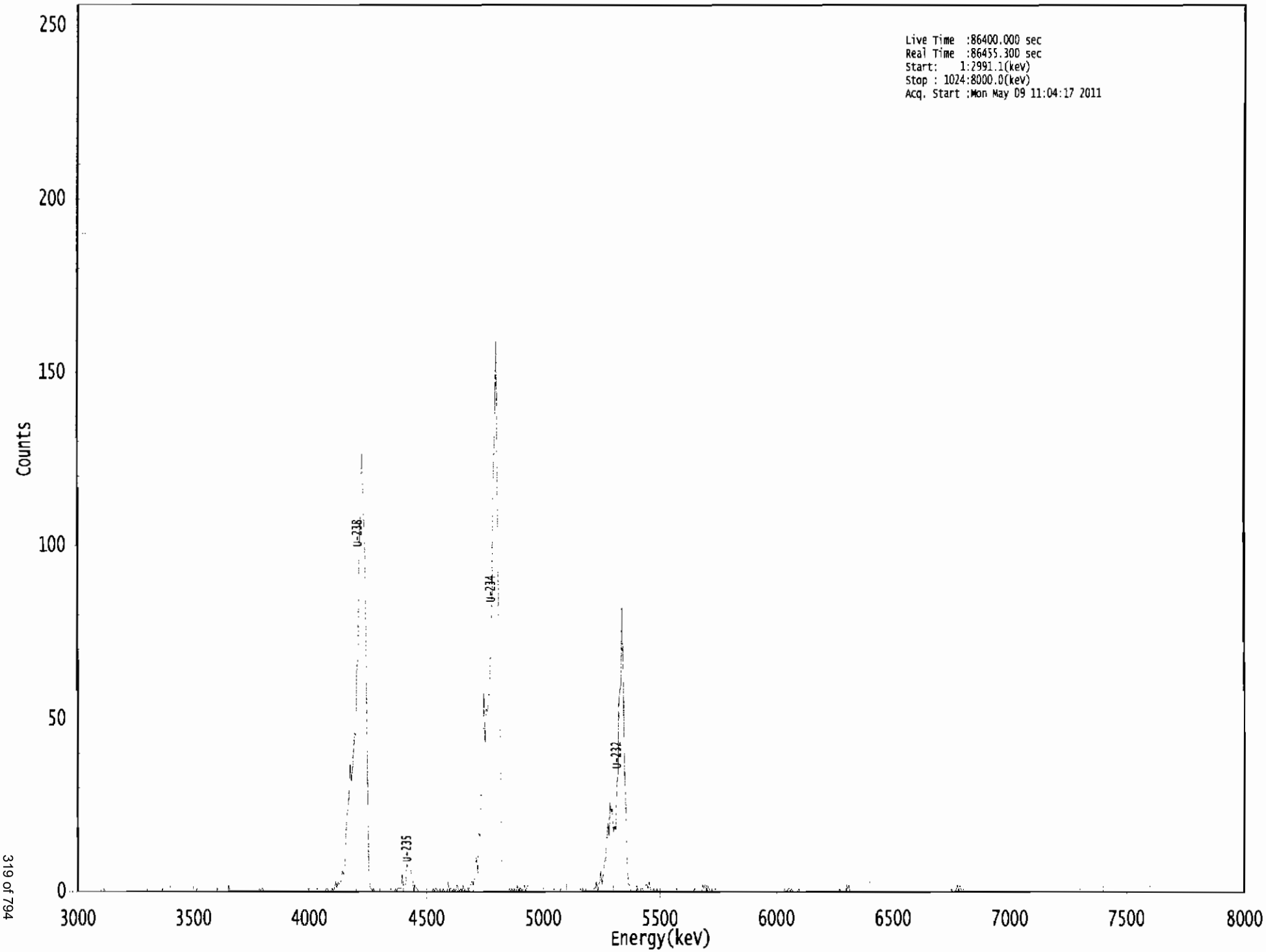
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5310.365	668.00	25.85	0.00	0.00E+000	26.4
U-234	4772.073	1442.00	37.97	0.00	0.00E+000	29.8
U-235	4409.921	58.00	7.62	0.00	0.00E+000	27.7
U-238	4203.011	1253.00	35.40	0.00	0.00E+000	40.4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	9.3880E-001	4.38	3.8030E-003	2.06
U-234	2.0266E+000	3.34	3.8030E-003	2.06
U-235	1.0056E-001	13.29	4.6915E-003	2.06
U-238	1.7534E+000	3.49	3.7867E-003	2.06

Errors quoted at 1.000 sigma

0000012214.CNF



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*************************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E          *****
*************************************************************************
```

Last Results Report printed 5/10/2011 12:45:54

Chamber: A 3 1A
Detector Serial: 55806
Chamber Serial : 12044985A
Type: System Background
Measurement Date: 4/2/2011 16:08:36

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	2.1000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-007
Batch Identification: B11-01663
Sample Identification: 11-01663-10
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 1B
Chamber Serial Number: 12044985B
Detector Serial Number: 55807
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:19
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86455.4 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2098 +/- 0.0043 on 4/18/10 15:12:35
Effective Efficiency: 0.2098 +/- 0.0043

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

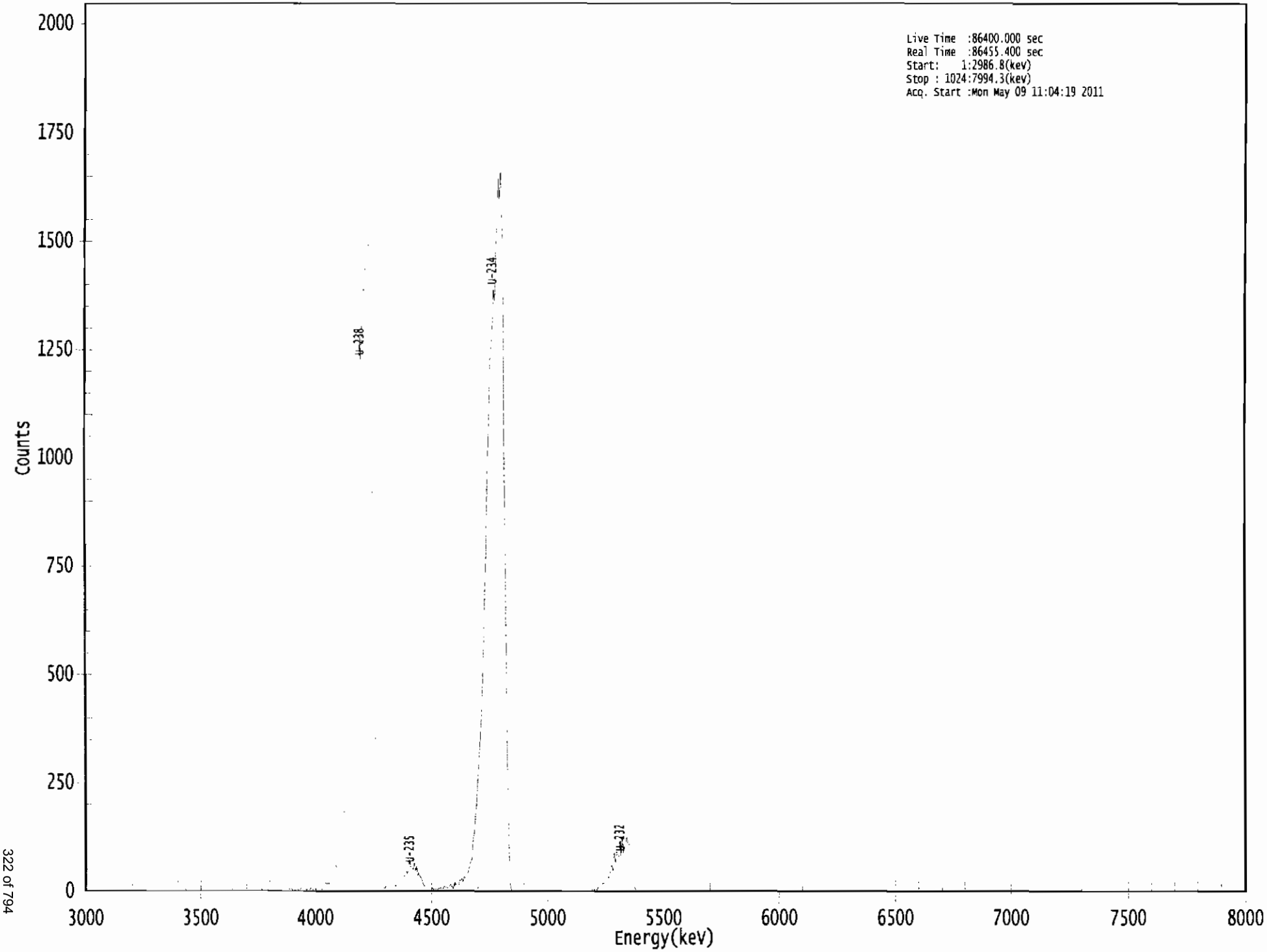
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5300.591	2015.00	44.89	0.00	0.00E+000	77.5
U-234	4758.148	28748.00	169.55	0.00	0.00E+000	80.8
U-235	4394.944	1074.00	32.77	0.00	0.00E+000	53.1
U-238	4187.828	26598.00	163.09	0.00	0.00E+000	80.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	3.0101E+000	3.03	4.0424E-003	2.06
U-234	4.2946E+001	2.14	4.0424E-003	2.06
U-235	1.9792E+000	3.68	4.9868E-003	2.06
U-238	3.9563E+001	2.15	4.0251E-003	2.06

Errors quoted at 1.000 sigma

0000012227.CNF



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***********************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:54

Chamber: A 3 1B
Detector Serial: 55807
Chamber Serial : 12044985B
Type: System Background
Measurement Date: 4/2/2011 16:08:38

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	2.6000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-008
Batch Identification: B11-01663
Sample Identification: 11-01663-11
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 2B
Chamber Serial Number: 12045128B
Detector Serial Number: 55809
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:21
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86455.4 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2206 +/- 0.0045 on 4/18/10 15:13:08
Effective Efficiency: 0.2206 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

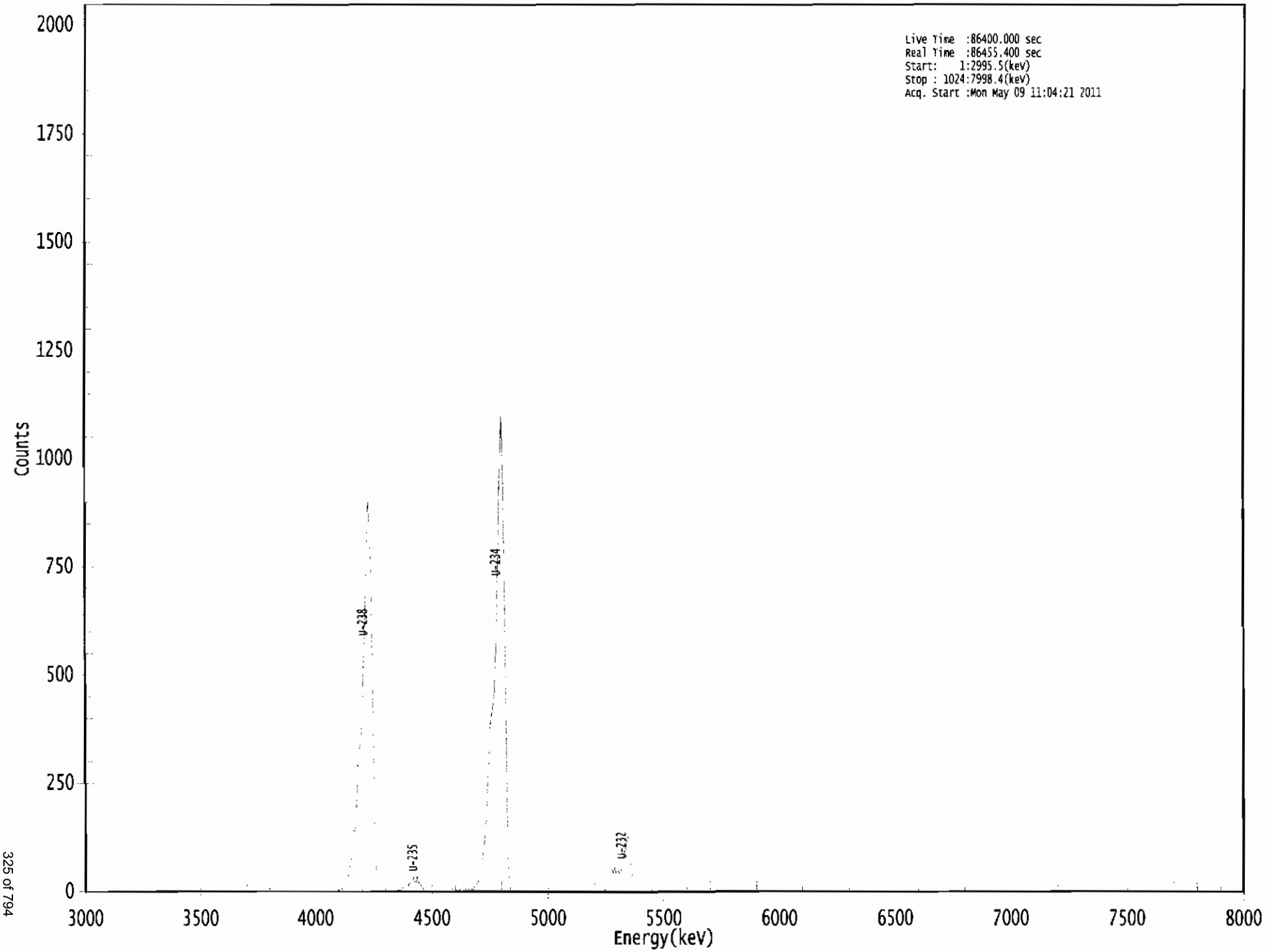
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5318.111	1342.00	36.63	0.00	0.00E+000	34.5
U-234	4779.836	11551.00	107.48	0.00	0.00E+000	40.5
U-235	4416.651	361.00	19.00	0.00	0.00E+000	19.3
U-238	4210.736	9456.00	97.24	0.00	0.00E+000	43.6

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	1.9070E+000	3.42	3.8454E-003	2.05
U-234	1.6415E+001	2.25	3.8454E-003	2.05
U-235	6.3285E-001	5.65	4.7438E-003	2.05
U-238	1.3380E+001	2.30	3.8289E-003	2.05

Errors quoted at 1.000 sigma

0000012215.CNF



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***********************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:53

Chamber: A 3 2B
Detector Serial: 55809
Chamber Serial : 12045128B
Type: System Background
Measurement Date: 4/2/2011 16:08:40

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	2.6000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	8.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	6.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-009
Batch Identification: B11-01663
Sample Identification: 11-01663-12
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 3A
Chamber Serial Number: 12045129A
Detector Serial Number: 55810
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:22
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86455.4 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2191 +/- 0.0045 on 4/18/10 15:15:02
Effective Efficiency: 0.2191 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

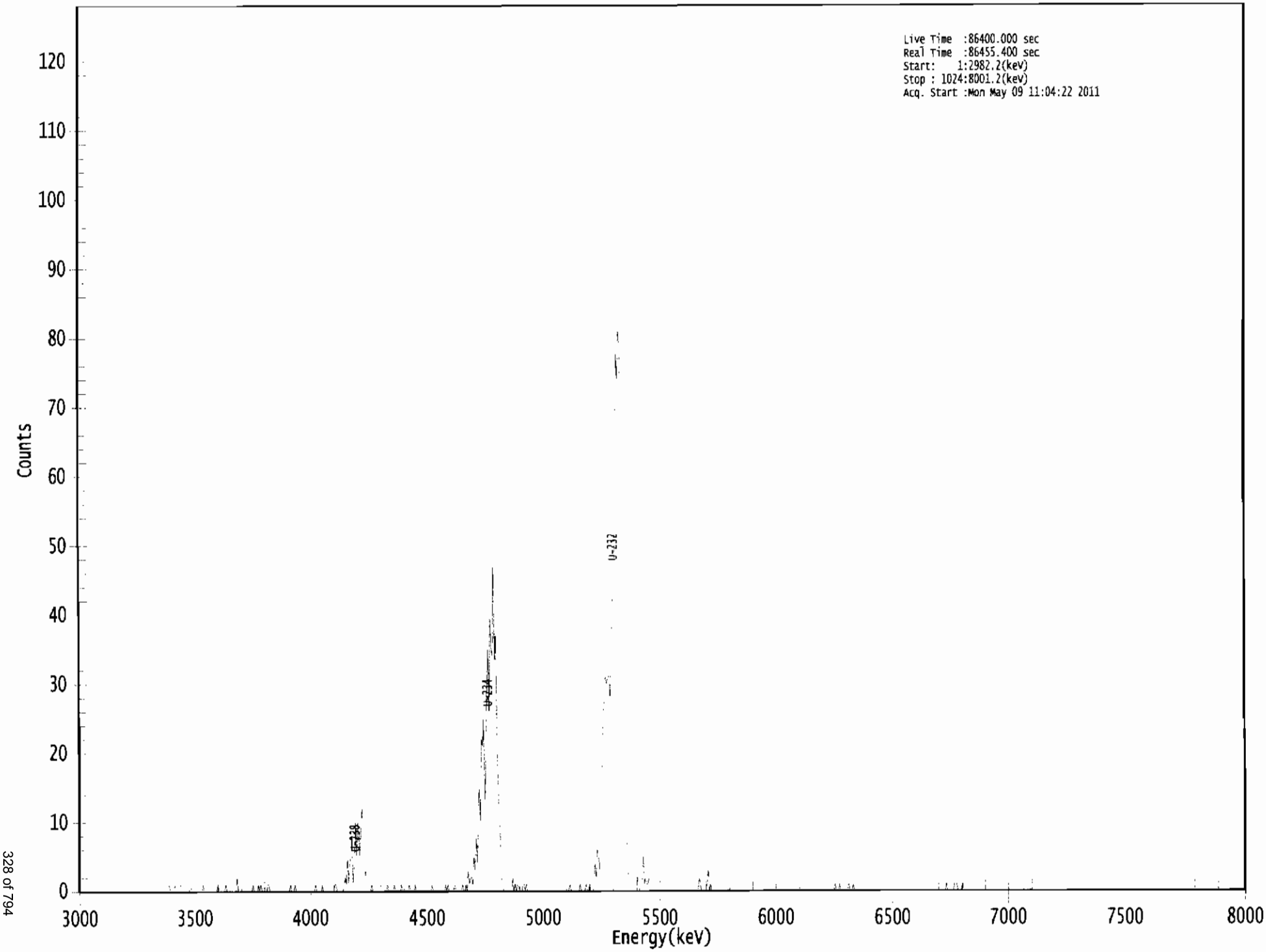
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5292.021	973.00	31.19	0.00	0.00E+000	43.3
U-234	4751.314	527.00	22.96	0.00	0.00E+000	45.9
U-235	4401.699	3.00	1.73	0.00	0.00E+000	4.9
U-238	4179.240	105.00	10.25	0.00	0.00E+000	11.8

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	1.3920E+000	3.81	3.8714E-003	2.06
U-234	7.5396E-001	4.82	3.8714E-003	2.06
U-235	5.2947E-003	57.77	4.7758E-003	2.06
U-238	1.4957E-001	9.97	3.8548E-003	2.06

Errors quoted at 1.000 sigma

0000012216.CNF



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***********************************************************************
*****          G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:53

Chamber: A 3 3A
Detector Serial: 55810
Chamber Serial : 12045129A
Type: System Background
Measurement Date: 4/2/2011 16:08:41

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	5.2000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	9.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	8.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	1.1000E+001	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-010
Batch Identification: B11-01663
Sample Identification: 11-01663-13
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 3B
Chamber Serial Number: 12045129B
Detector Serial Number: 55811
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:24
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86455.4 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2124 +/- 0.0044 on 4/18/10 15:15:32
Effective Efficiency: 0.2124 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

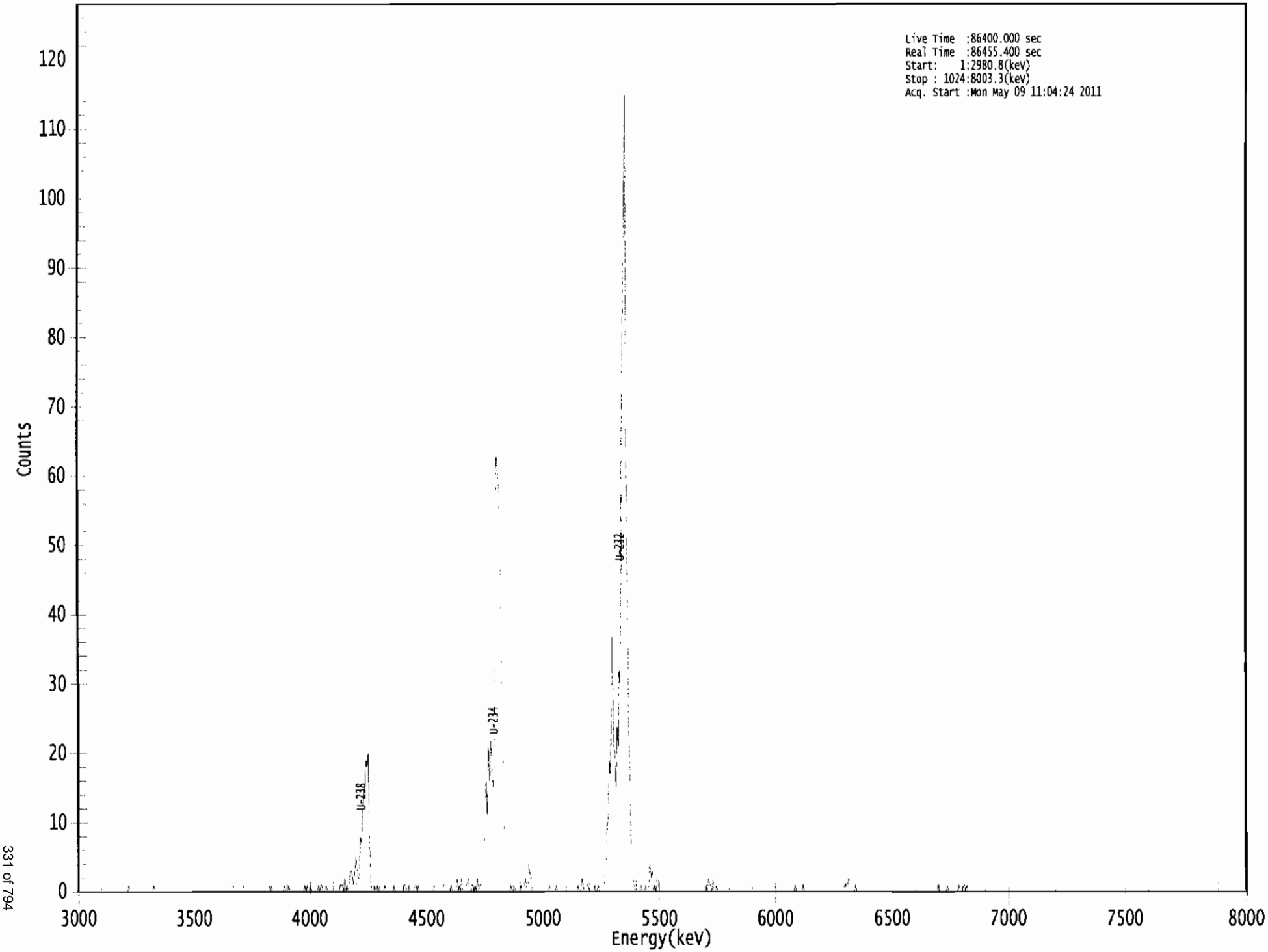
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5320.342	802.00	28.32	0.00	0.00E+000	22.2
U-234	4778.916	526.00	22.93	0.00	0.00E+000	26.3
U-235	4414.385	6.00	2.45	0.00	0.00E+000	9.8
U-238	4209.256	151.00	12.29	0.00	0.00E+000	29.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	1.1835E+000	4.09	3.9934E-003	2.06
U-234	7.7623E-001	4.82	3.9934E-003	2.06
U-235	1.0923E-002	40.88	4.9263E-003	2.06
U-238	2.2188E-001	8.39	3.9762E-003	2.06

Errors quoted at 1.000 sigma

0000012219.CNF



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*************************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E          *****
*************************************************************************
```

Last Results Report printed 5/10/2011 12:45:52

Chamber: A 3 3B
Detector Serial: 55811
Chamber Serial : 12045129B
Type: System Background
Measurement Date: 4/2/2011 16:08:43

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	4.0000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	6.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-011
Batch Identification: B11-01663
Sample Identification: 11-01663-14
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 4B
Chamber Serial Number: 12045130B
Detector Serial Number: 55813
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:26
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86455.4 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2157 +/- 0.0044 on 4/18/10 15:16:34
Effective Efficiency: 0.2157 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

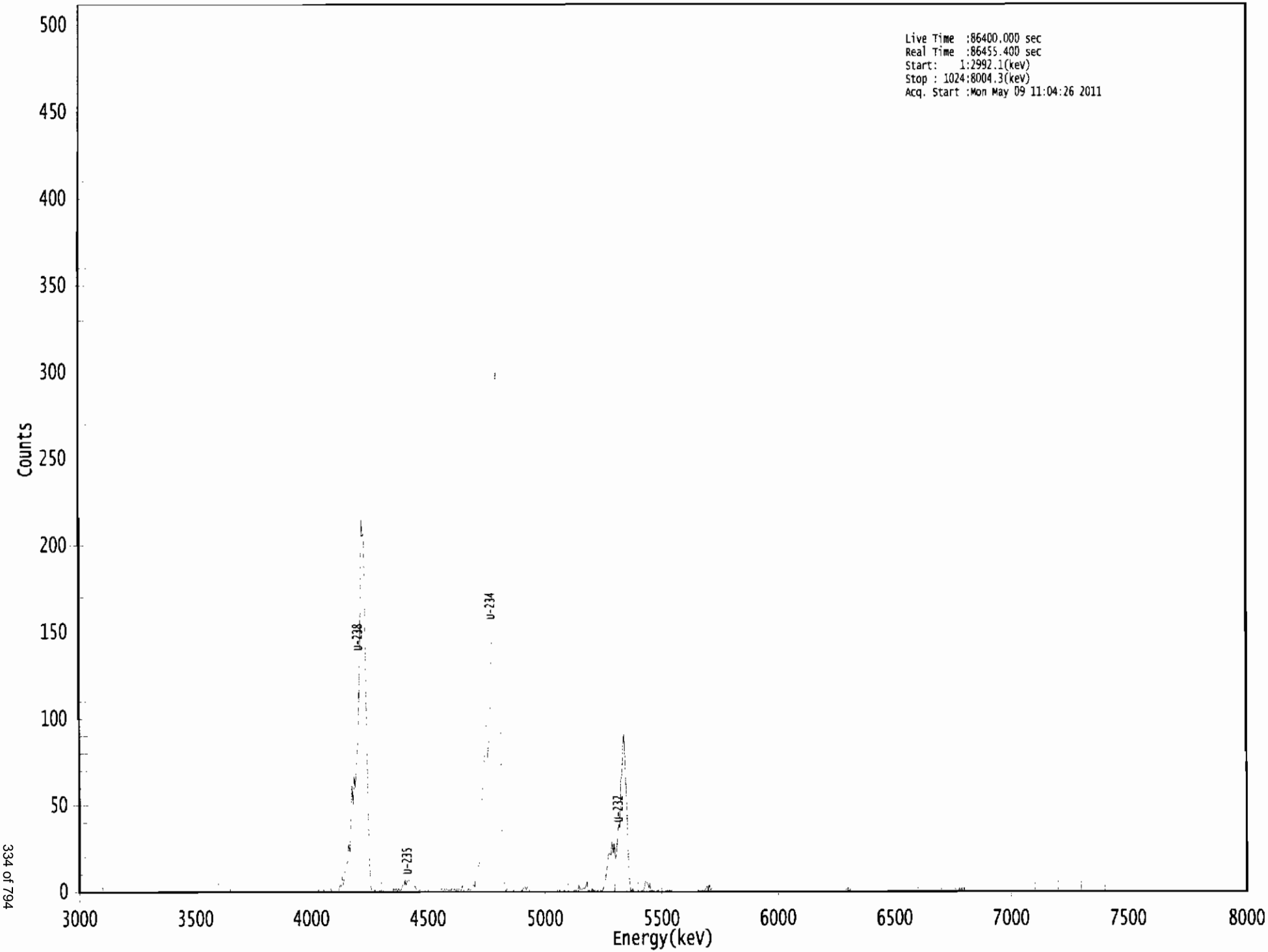
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5314.379	799.00	28.27	0.00	0.00E+000	29.5
U-234	4772.639	2771.00	52.64	0.00	0.00E+000	33.7
U-235	4407.159	73.00	8.54	0.00	0.00E+000	47.8
U-238	4202.801	1909.00	43.69	0.00	0.00E+000	31.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	1.1608E+000	4.09	3.9314E-003	2.05
U-234	4.0258E+000	2.80	3.9314E-003	2.05
U-235	1.3083E-001	11.88	4.8499E-003	2.05
U-238	2.7616E+000	3.08	3.9145E-003	2.05

Errors quoted at 1.000 sigma

0000012218.CNF



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***********************************************************************
*****          G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:52

Chamber: A 3 4B
Detector Serial: 55813
Chamber Serial : 12045130B
Type: System Background
Measurement Date: 4/2/2011 16:08:46

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	5.1000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	7.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	6.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	7.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	5.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	6.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-012
Batch Identification: B11-01663
Sample Identification: 11-01663-15
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 6A
Chamber Serial Number: 12045132A
Detector Serial Number: 55816
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:28
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86455.5 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2190 +/- 0.0045 on 4/19/10 14:26:08
Effective Efficiency: 0.2190 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

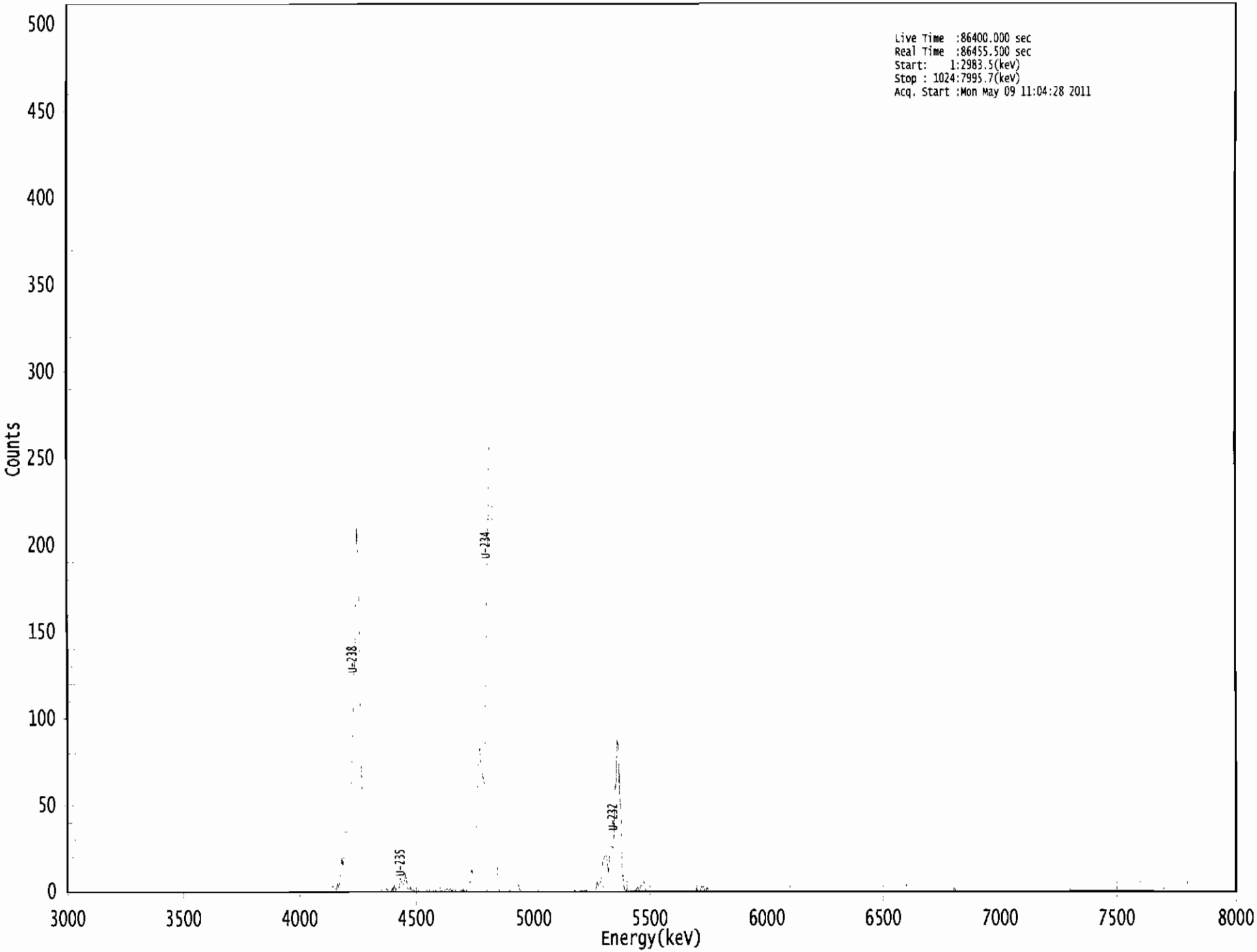
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5330.226	687.00	26.21	0.00	0.00E+000	27.7
U-234	4789.241	2410.00	49.09	0.00	0.00E+000	34.9
U-235	4421.079	71.00	8.43	0.00	0.00E+000	11.9
U-238	4219.899	1605.00	40.06	0.00	0.00E+000	31.0

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	9.8308E-001	4.33	3.8722E-003	2.05
U-234	3.4486E+000	2.89	3.8722E-003	2.05
U-235	1.2533E-001	12.04	4.7769E-003	2.05
U-238	2.2869E+000	3.23	3.8556E-003	2.05

Errors quoted at 1.000 sigma

0000012220.CNF



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*************************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E          *****
*************************************************************************
```

Last Results Report printed 5/10/2011 12:45:51

Chamber: A 3 6A
Detector Serial: 55816
Chamber Serial : 12045132A
Type: System Background
Measurement Date: 4/2/2011 16:08:51

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	2.9000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	7.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-013
Batch Identification: B11-01663
Sample Identification: 11-01663-16
Sample Geometry: Shelf 2
Protocol Description: Uranium - 24 Hrs

Detector Name: A 3 6B
Chamber Serial Number: 12045132B
Detector Serial Number: 55817
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/9/11 11:04:30
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86455.4 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2172 +/- 0.0045 on 4/19/10 14:26:42
Effective Efficiency: 0.2172 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

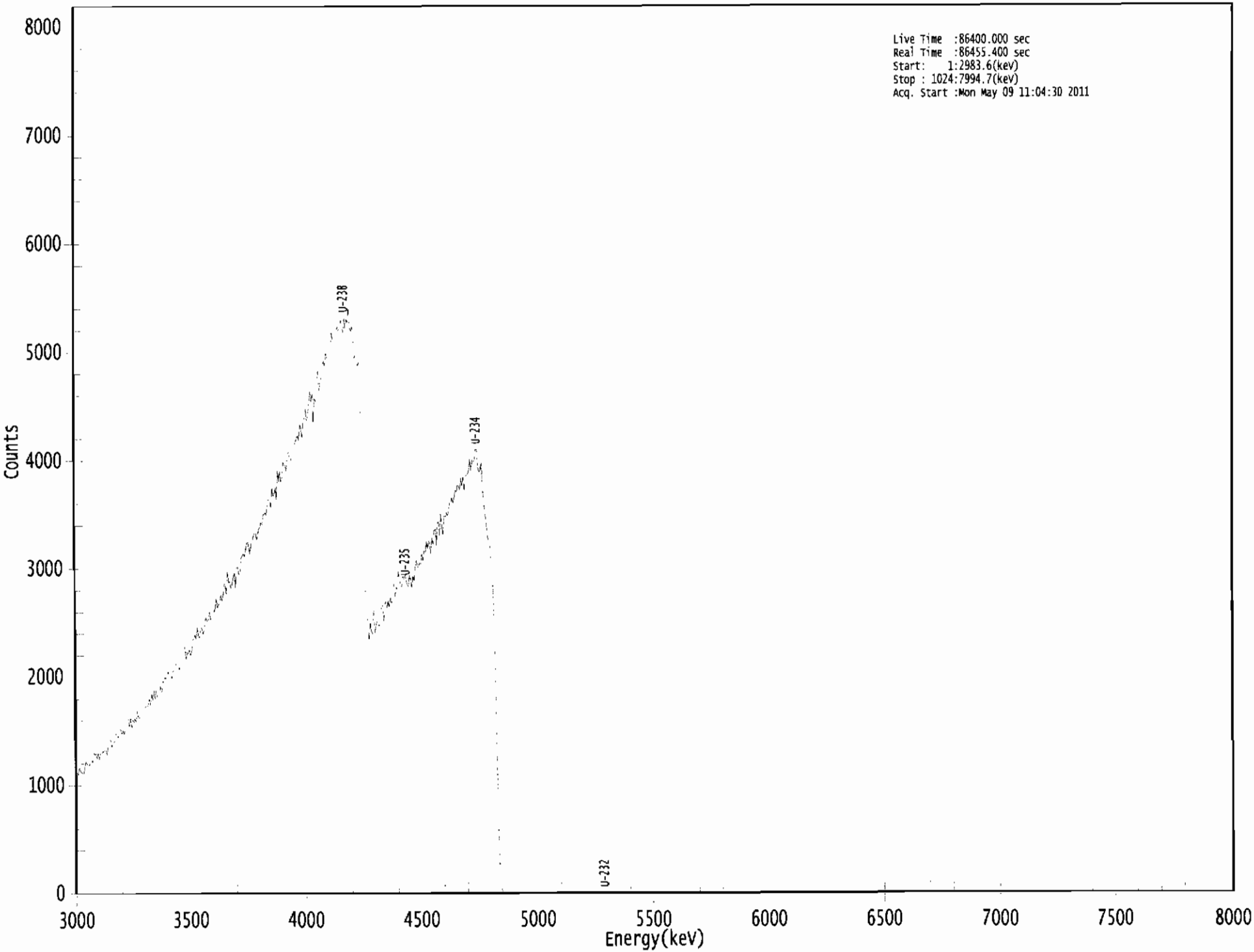
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	5275.072	105.00	10.25	0.00	0.00E+000	4.9
U-234	4730.123	115017.0	339.14	0.00	0.00E+000	217.5
U-235	4422.907	92451.00	304.06	0.00	0.00E+000	167.5
U-238	4161.076	172295.0	415.08	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
U-232	1.5151E-001	9.97	3.9046E-003	2.05
U-234	1.6596E+002	2.08	3.9046E-003	2.05
U-235	1.6457E+002	2.08	4.8168E-003	2.05
U-238	2.4754E+002	2.07	3.8878E-003	2.05

Errors quoted at 1.000 sigma

0000012217.CNF



```
***********************************************************************
*****        G E N I E   Q U A L I T Y   A S S U R A N C E        *****
***********************************************************************
```

Last Results Report printed 5/10/2011 12:45:50

Chamber: A 3 6B
Detector Serial: 55817
Chamber Serial : 12045132B
Type: System Background
Measurement Date: 4/2/2011 16:08:54

Parameter Description	Last Value	Deviation/Flags < LU : SD : UD : BS >
Bkg cpm (3-8 MeV)	5.2000E+001	
Boundary Limits: [-1.000E-006, 4.090E+002]		< : : : >
Bkg Counts - Am241	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Am243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm242	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Cm243	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po209	2.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Po210	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu238	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu239	0.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Pu242	4.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th228	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th229	3.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th230	9.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - Th232	9.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U232	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U234	7.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U235	1.0000E+000	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >
Bkg Counts - U238	1.8000E+001	
Boundary Limits: [-1.000E-006, 2.500E+001]		< : : : >

Flags Key:
LU = Lower/Upper Bounds Test (Ab = Above, Be = Below)
SD = Sample Driven N-Sigma Test (In = Investigate, Ac = Action)
UD = User Driven N-Sigma Test (In = Investigate, Ac = Action)
BS = Measurement Bias Test (In = Investigate, Ac = Action)

Batch ID ARS1-B11-01663

UCF	2.22	dpm/ pCi
ACF	1	L/ L
CF	1.96	
TPU sys	0.062468	

Tracer ID	S-0241
tracer pCi/g	4.084775
tracer To	06-09-2010

	Isotope	half-life days	Abundance
tracer	U-232	25162.03704	0.997
analyte1	U-238	1.63194E+12	1
analyte2	U-235	2.5706E+11	0.861
analyte3	U-234	89245400	0.998

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
9	Sample ID	collection date	aliquot (L)	grams tracer added	U-238 cnts	U-238 bkg cnts	U-235 cnts	U-235 bkg cnts	U-234 cnts	U-234 bkg cnts	U-232 cntr	U-232 bkg cnts	sample time (min)	bkg time (min)	U-232 net CPM	count date	tracer DF	decay corrected tracer dpm	Eff	PE	CR	DF1	DF2	DF3
10	ARS1-B11-01663-01	05-09-11	1	1.029	83789	1	1970	2	30685	3	2293	0	1440	1440	1.5924	5-9-11 11:03	0.99083	9.218	0.2205	0.98	0.7994	1.0000	1.0000	1.0000
11	ARS1-B11-01663-02	05-09-11	1	1.03	147622	2	3197	0	46020	4	2223	1	1440	1440	1.5431	5-9-11 11:03	0.99083	9.227	0.2148	0.98	0.7945	1.0000	1.0000	1.0000
12	ARS1-B11-01663-03	05-09-11	1	1.031	15	3	1	0	13	4	1468	1	1440	1440	1.0188	5-9-11 11:03	0.99083	9.236	0.2232	0.98	0.5043	1.0000	1.0000	1.0000
13	ARS1-B11-01663-04	04-19-11	0.5	1.022	1123	4	25	1	569	3	602	2	1440	1440	0.4167	5-9-11 11:03	0.99083	9.155	0.2134	0.98	0.2176	1.0000	1.0000	1.0000
14	ARS1-B11-01663-05	04-21-11	0.5	1.024	10672	3	352	2	11831	3	1435	1	1440	1440	0.9958	5-9-11 11:03	0.99083	9.173	0.225	0.98	0.4923	1.0000	1.0000	1.0000
15	ARS1-B11-01663-06	04-21-11	0.5	1.024	10914	47	408	4	12688	6	1580	2	1440	1440	1.0958	5-9-11 11:03	0.99083	9.173	0.2158	0.98	0.5649	1.0000	1.0000	1.0000
16	ARS1-B11-01663-07	04-21-11	0.1	1.009	3465	5	2183	2	1459	4	3	0	1440	1440	0.0021	5-9-11 11:03	0.99083	9.039	0.219	0.98	0.0011	1.0000	1.0000	1.0000
17	ARS1-B11-01663-08	04-20-11	0.5	1.023	679	1	29	0	1240	2	2495	2	1440	1440	1.7313	5-9-11 11:03	0.99083	9.164	0.213	0.98	0.9050	1.0000	1.0000	1.0000
18	ARS1-B11-01663-09	04-20-11	0.5	1.025	1253	1	58	0	1442	1	668	1	1440	1440	0.4632	5-9-11 11:03	0.99083	9.182	0.223	0.98	0.2308	1.0000	1.0000	1.0000
19	ARS1-B11-01663-10	04-20-11	0.5	1.018	26598	5	1074	0	28748	4	2015	1	1440	1440	1.3986	5-9-11 11:03	0.99083	9.119	0.2098	0.98	0.7459	1.0000	1.0000	1.0000
20	ARS1-B11-01663-11	04-20-11	0.5	1.021	9456	2	361	0	11551	6	1342	2	1440	1440	0.9306	5-9-11 11:03	0.99083	9.146	0.2206	0.98	0.4706	1.0000	1.0000	1.0000
21	ARS1-B11-01663-12	04-19-11	0.5	1.019	105	11	3	0	527	8	973	0	1440	1440	0.6757	5-9-11 11:03	0.99083	9.128	0.2191	0.98	0.5447	1.0000	1.0000	1.0000
22	ARS1-B11-01663-13	04-19-11	0.5	1.021	151	6	6	1	526	4	802	2	1440	1440	0.5556	5-9-11 11:03	0.99083	9.146	0.2124	0.98	0.2918	1.0000	1.0000	1.0000
23	ARS1-B11-01663-14	04-20-11	0.5	1.018	1909	6	73	0	2771	4	799	5	1440	1440	0.5514	5-9-11 11:03	0.99083	9.119	0.2157	0.98	0.2860	1.0000	1.0000	1.0000
24	ARS1-B11-01663-15	04-20-11	0.5	1.022	1605	3	71	1	2410	7	687	1	1440	1440	0.4764	5-9-11 11:03	0.99083	9.155	0.219	0.98	0.2425	1.0000	1.0000	1.0000
25	ARS1-B11-01663-16	04-20-11	0.1	1.007	172295	18	92451	1	115017	7	105	1	1440	1440	0.0722	5-9-11 11:03	0.99083	9.021	0.2172	0.98	0.0376	1.0000	1.0000	1.0000

	Sample ID	denom. (K)	Y	U-238 activity	U-238 1.96s cnt uncert	U-238 1.96s TPU	U-238 MDC	U-238 DLC	U-235 activity	U-235 1.96s cnt uncert	U-235 1.96s TPU	U-235 MDC	U-235 DLC	U-234 activity	U-234 1.96s cnt uncert	U-234 1.96s TPU	U-234 MDC	U-234 DLC	Reporting Units
27	ARS1-B11-01663-01	0.38350	78.34%	151.72428	1.027366534	18.60509464	0.013332575	0.004212638	4.138997752	0.183054169	0.538815605	0.019538257	0.006919361	55.67066027	0.622992862	6.844575573	0.019539384	0.007311125	pCi/L
28	ARS1-B11-01663-02	0.37126	77.86%	276.12155	1.408606388	33.8369036	0.01737684	0.006153908	6.945357142	0.240757229	0.881795374	0.005887369	0	86.24489962	0.788084541	10.58895829	0.022519945	0.008720381	pCi/L
29	ARS1-B11-01663-03	0.24488	49.42%	0.0340308	0.023582118	0.023947382	0.03053927	0.011426994	0.003293725	0.006455701	0.006468284	0.008925995	0	0.025574223	0.022963626	0.023176125	0.03414508	0.013221199	pCi/L
30	ARS1-B11-01663-04	0.05052	21.33%	15.382313	0.904502119	2.089306452	0.165171202	0.063959118	0.3831772	0.159582622	0.166316757	0.117551782	0.037142345	7.796102268	0.6456768	1.152403072	0.148330092	0.055501232	pCi/L
31	ARS1-B11-01663-05	0.12050	48.25%	61.484613	1.16703194	7.617931461	0.062059875	0.023221178	2.342631151	0.246829623	0.378411244	0.062180655	0.022020921	68.30045004	1.231215582	8.452671456	0.062184252	0.023267717	pCi/L
32	ARS1-B11-01663-06	0.13260	55.36%	56.910781	1.074647522	7.050383609	0.181241663	0.083524659	2.457327806	0.241983865	0.386106287	0.073084367	0.028300403	66.54909452	1.158803292	8.230078838	0.074026261	0.029902736	pCi/L
33	ARS1-B11-01663-07	0.00005	0.11%	46957.821	1566.941014	5959.090992	177.9768401	70.59886867	34178.29655	1444.143933	4450.032705	146.4348349	51.85905349	19786.28924	1019.482076	2628.352112	163.3970156	63.272101	pCi/L
34	ARS1-B11-01663-08	0.20970	88.69%	2.2453031	0.169260573	0.322837407	0.02438294	0.007704176	0.111542436	0.040597304	0.042832855	0.010423448	0	4.108047413	0.229209003	0.552742063	0.030826947	0.010917186	pCi/L
35	ARS1-B11-01663-09	0.05599	22.62%	15.527241	0.860785207	2.086907336	0.091312609	0.028851663	0.8354391	0.215809115	0.238100686	0.039035172	0	17.90702582	0.925227891	2.379715999	0.091495614	0.028909487	pCi/L
36	ARS1-B11-01663-10	0.17024	73.10%	108.47947	1.304072131	13.34579759	0.053494839	0.021220037	5.088401421	0.304323364	0.693364411	0.012839449	0	117.488934	1.358438121	14.44902464	0.049112554	0.019017817	pCi/L
37	ARS1-B11-01663-11	0.11293	46.12%	58.133767	1.1721106	7.213603139	0.057125311	0.0202306	2.578201862	0.265961876	0.412773571	0.019354369	0	71.13385224	1.298258035	8.805665145	0.086918816	0.035110654	pCi/L
38	ARS1-B11-01663-12	0.08216	33.78%	0.7944766	0.178417863	0.203211906	0.15332949	0.065212449	0.029449056	0.033324743	0.033519238	0.026602313	0	4.39531649	0.383933278	0.661067943	0.13440014	0.055724822	pCi/L
39	ARS1-B11-01663-13	0.06742	28.60%	1.4934672	0.252949355	0.312121313	0.145297818	0.058692716	0.059812855	0.062033976	0.062464752	0.08807757	0.027829502	5.387257184	0.465683888	0.807424991	0.12400522	0.048018446	pCi/L
40	ARS1-B11-01663-14	0.06711	28.03%	19.690556	0.887482217	2.569019612	0.145965632	0.058962478	0.877281372	0.201248916	0.228119381	0.032567569	0	28.68784213	1.070474406	3.671961363	0.124575168	0.048239147	pCi/L
41	ARS1-B11-01663-15	0.05776	23.76%	19.261106	0.944969513	2.540558926	0.129475284	0.048446257	0.977492856	0.232240454	0.261264819	0.102814969	0.032489016	28.94956207	1.160867424	3.729763181	0.180950458	0.074151194	pCi/L
42	ARS1-B11-01663-16	0.00178	3.69%	67310.894	317.8872814	8247.491514	8.771510841	3.856339065	41952.88419	270.4388835	5143.711327	3.341147945	1.055688542	45025.98129	260.2422994	5518.997813	5.880294031	2.409669625	pCi/L
43		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S

='U_615'!---

Alpha Spectroscopy Count Log Book – Canberra System

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01721-07	B11-01721	A14A	12212	Th	5-9-11 1105	CJ	86400
11-01721-08	↓	A14B ~~A14~~ CJ 5-9-11	12194	↓	↓	CJ	↓
11-01721-09	↓	A15A	12195	↓	↓	CJ	↓
11-01721-10	↓	A15B	12196	↓	↓	CJ	↓
11-01721-11	↓	A16A	12197	↓	↓	CJ	↓
11-01663-01	B11-01663	A21A	12225	U	↓	CJ	↓
11-01663-02	↓	A21B	12226	↓	↓	CJ	↓
11-01663-03	↓	A22A	12204	↓	↓	CJ	↓
11-01663-04	↓	A22B	12205	↓	↓	CJ	↓
11-01663-05	↓	A24A	12203	↓	↓	CJ	↓
11-01663-06	↓	A24B	12206	↓	↓	CJ	↓
11-01663-07	↓	A25A	12202	↓	↓	CJ	↓
11-01663-08	↓	A25B	12201	↓	↓	CJ	↓
11-01663-09	↓	A31A	12214	↓	↓	CJ	↓
11-01663-10	↓	A31B	12227	↓	↓	CJ	↓

Reviewed By: YSW Date: 5-10-11
Initials

Alpha Spectroscopy Count Log Book – Canberra System

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01663-11	B11-01663	A32B	12215	U	5-9-11 1105	[illegible]	36400
11-01663-12	↓	A33A	12216	↓	↓	[illegible]	↓
11-01663-13	↓	A33B	12219	↓	↓	[illegible]	↓
11-01663-14	↓	A34B	12218	↓	↓	[illegible]	↓
11-01663-15	↓	A36A	12220	↓	↓	[illegible]	↓
11-01663-16	↓	A36B	12217	↓	↓	[illegible]	↓ LSW 5-10-11

Data unavailable LSW 5-10-11

Reviewed By: LSW Date: 5-10-11
Initials

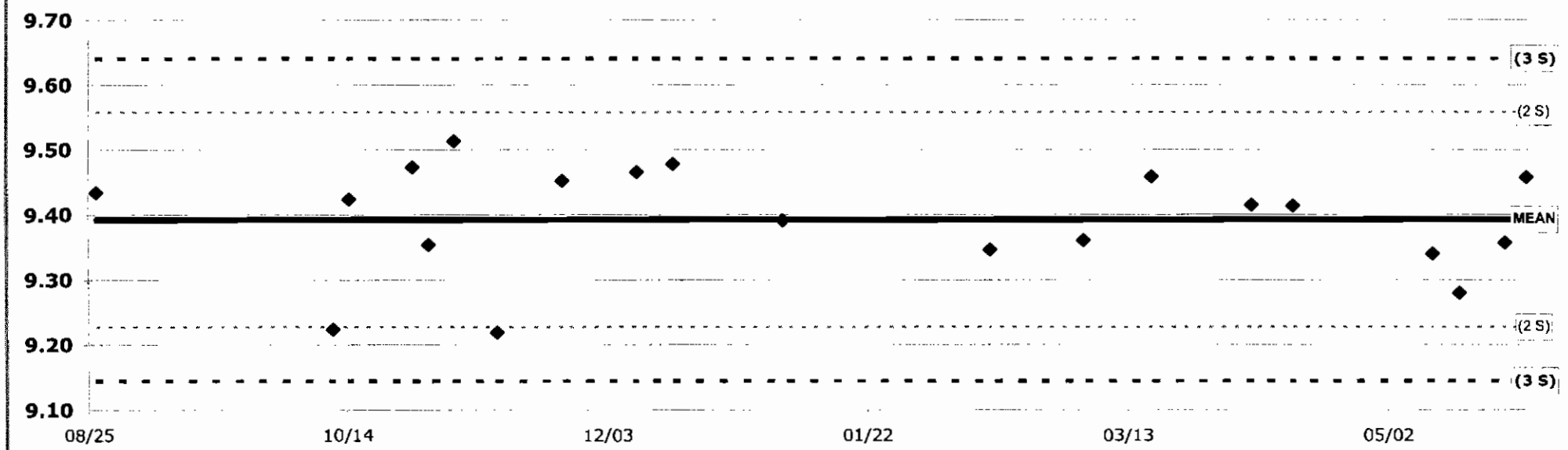
American Radiation Services
Baton Rouge Laboratory

Blank Population Analysis

Population Size	20	Statistical Quality Control(SQC) Rules Analysis	
Last Data Point Value	9.46	One or more points outside of the control limits.	OK
NSD	0.7795	A run of eight points on one side of the center line	OK
Average	9.3928	2 of 3 consecutive points outside the Warning limits but still inside the Ctrl limits	OK
Upper Control Limit (UCL)	9.6409	Four of five consecutive points beyond the 1-sigma limits.	OK
Standard Deviation	0.0827	A trend of seven points in a row upward or downward.	OK
Lower Control Limit (LCL)	9.1447	Several points near a warning or control limit.	OK

Batch ARS1-B11-01984 - BLK Population for Isotope - U-232

Process Date Range: 08/26/10 - 05/28/11

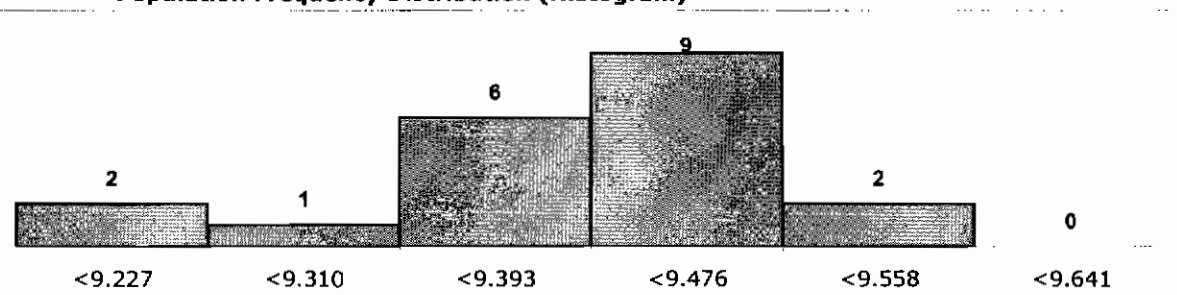


ARS INTERNATIONAL

Statistical Process Control

Bin	Frequency
<9.227	2
<9.310	1
<9.393	6
<9.476	9
<9.558	2
<9.641	0

Population Frequency Distribution (Histogram)



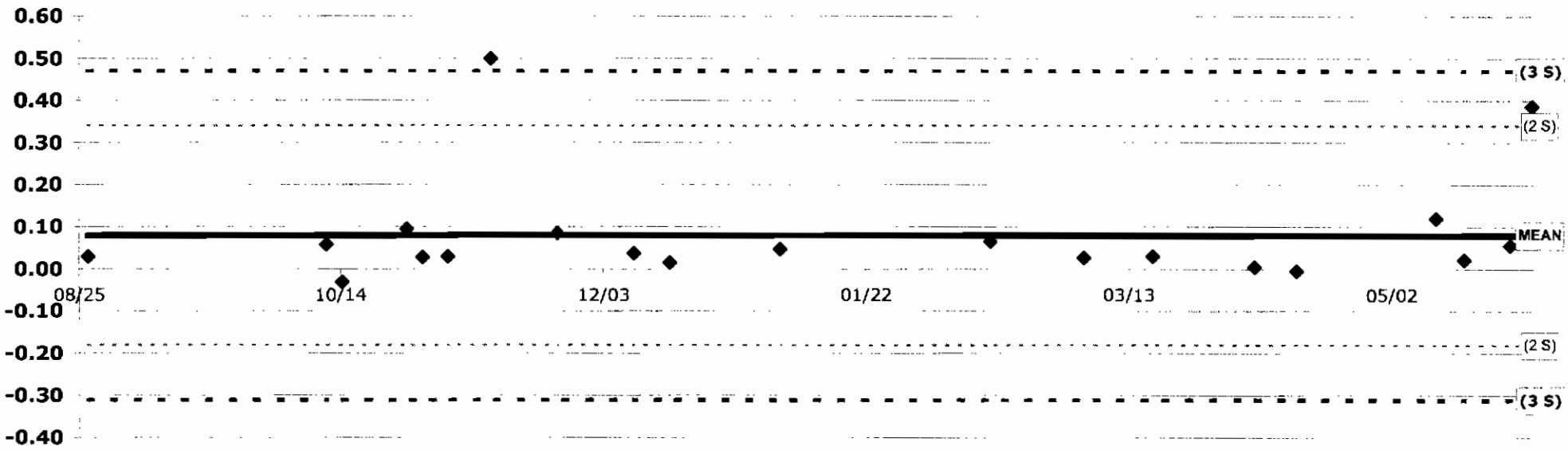
American Radiation Services
Baton Rouge Laboratory

Blank Population Analysis

		Statistical Quality Control(SQC) Rules Analysis	
Population Size	20		
Last Data Point Value	0.39	One or more points outside of the control limits.	OUT OF CONTROL
NSD	2.3522	A run of eight points on one side of the center line	INVESTIGATE
Average	0.0799	2 of 3 consecutive points outside the Warning limits but still inside the Ctrl limits	OK
Upper Control Limit (UCL)	0.4704	Four of five consecutive points beyond the 1-sigma limits.	OK
Standard Deviation	0.1302	A trend of seven points in a row upward or downward.	OK
Lower Control Limit (LCL)	-0.3107	Several points near a warning or control limit.	OK

Batch ARS1-B11-01984 - BLK Population for Isotope - U-234

Process Date Range: 08/26/10 - 05/28/11

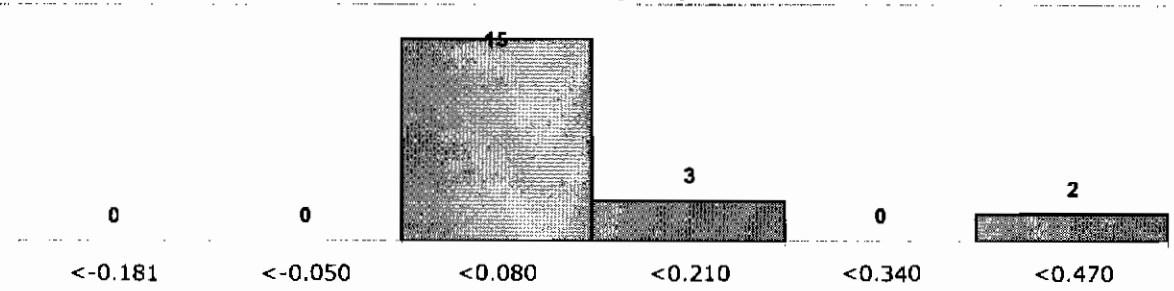


ARS INTERNATIONAL

Statistical Process Control

Bin	Frequency
<-0.181	0
<-0.050	0
<0.080	15
<0.210	3
<0.340	0
<0.470	2

Population Frequency Distribution (Histogram)



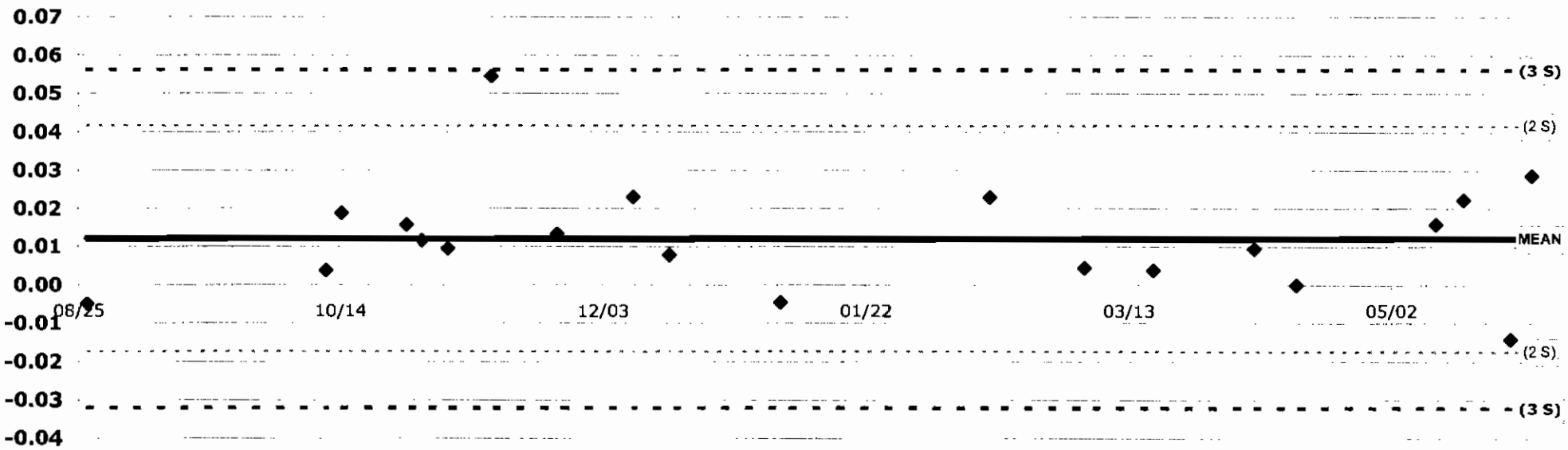
American Radiation Services
Baton Rouge Laboratory

Blank Population Analysis

		Statistical Quality Control(SQC) Rules Analysis	
Population Size	20		
Last Data Point Value	0.03	One or more points outside of the control limits.	OK
NSD	1.1202	A run of eight points on one side of the center line	OK
Average	0.0121	2 of 3 consecutive points outside the Warning limits but still inside the Ctrl limits	OK
Upper Control Limit (UCL)	0.0563	Four of five consecutive points beyond the 1-sigma limits.	OK
Standard Deviation	0.0147	A trend of seven points in a row upward or downward.	OK
Lower Control Limit (LCL)	-0.0320	Several points near a warning or control limit.	OK

Batch ARS1-B11-01984 - BLK Population for Isotope - U-235

Process Date Range: 08/26/10 - 05/28/11

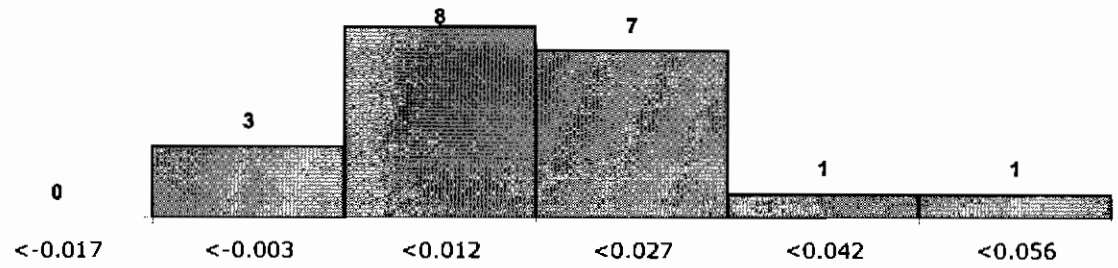


ARS INTERNATIONAL

Statistical Process Control

Bin	Frequency
<-0.017	0
<-0.003	3
<0.012	8
<0.027	7
<0.042	1
<0.056	1

Population Frequency Distribution (Histogram)



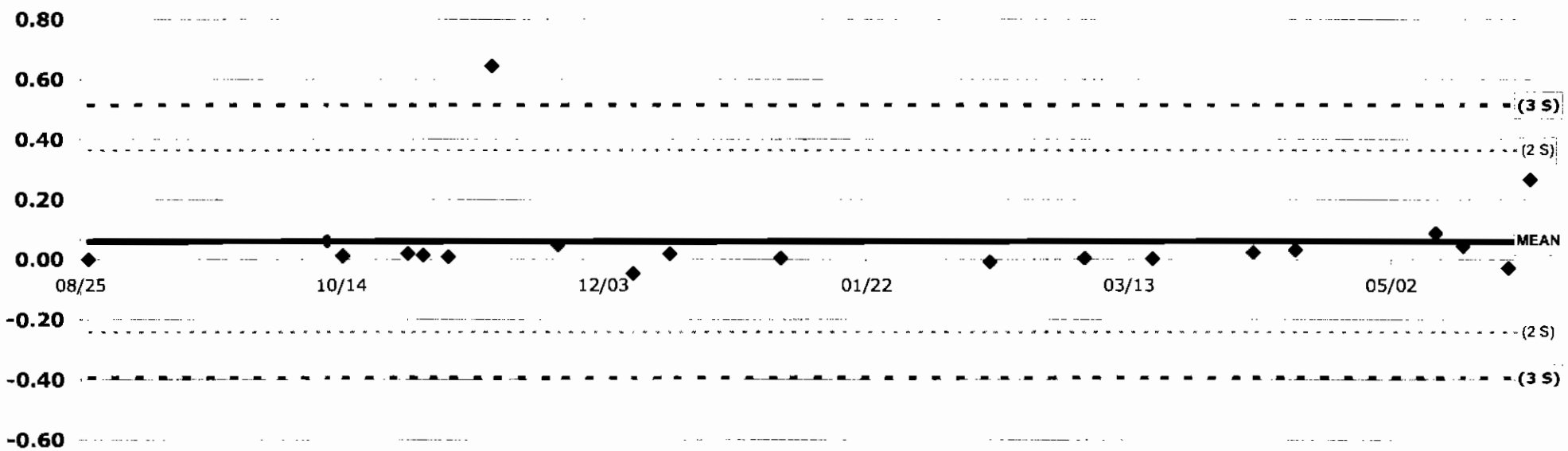
American Radiation Services
Baton Rouge Laboratory

Blank Population Analysis

		Statistical Quality Control(SQC) Rules Analysis	
Population Size	20		
Last Data Point Value	0.27	One or more points outside of the control limits.	OUT OF CONTROL
NSD	1.3610	A run of eight points on one side of the center line	INVESTIGATE
Average	0.0610	2 of 3 consecutive points outside the Warning limits but still inside the Ctrl limits	OK
Upper Control Limit (UCL)	0.5150	Four of five consecutive points beyond the 1-sigma limits.	OK
Standard Deviation	0.1514	A trend of seven points in a row upward or downward.	OK
Lower Control Limit (LCL)	-0.3931	Several points near a warning or control limit.	OK

Batch ARS1-B11-01984 - BLK Population for Isotope - U-238

Process Date Range: 08/26/10 - 05/28/11

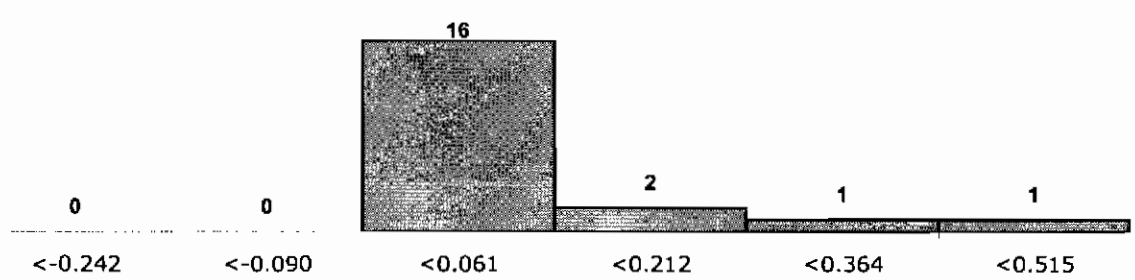


ARS INTERNATIONAL

Statistical Process Control

Bin	Frequency
<-0.242	0
<-0.090	0
<0.061	16
<0.212	2
<0.364	1
<0.515	1

Population Frequency Distribution (Histogram)



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American Radiation Services Analytical Reports

for

Summit Environmental Technologies

Thorium Alpha Spectroscopy Samples

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	3073.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015600
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.003362**	**0.003362**	**OK**
CU	**0.004659**	**0.004659**	**OK**
TPU	**0.004677**	**0.004677**	**OK**
MDA	**0.004555**	**0.004555**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.234865**	**0.234865**	**OK**
BP DL	**0.115403**	**0.115403**	**OK**
DL QSAS			
Gross Count Rate	**0.001389**	**0.001389**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.001389**	**0.001389**	**OK**
Δ t 1 (t2 - t1)	**0.810440**	**0.810440**	**OK**
DF	**0.999196**	**0.999196**	**OK**
Tracer DPM	**11.379151**	**11.379151**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.881920**	**0.881920**	**OK**
Chem Rec Factor	**1.233454**	**1.233454**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.413125**	**0.413125**	**OK**
K MDA	**594.900019**	**594.900019**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	4.88256979
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3355.000000
Count Mins	1440.000000
BKG Counts	14.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	3073.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015600
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**5.589063**	**5.589063**	**OK**
CU	**0.190313**	**0.190313**	**OK**
TPU	**0.701794**	**0.701794**	**OK**
MDA	**0.033657**	**0.033657**	**OK**
DL	**0.014562**	**0.014562**	**OK**
BP MDA	**0.380659**	**0.380659**	**OK**
BP DL	**0.188467**	**0.188467**	**OK**
DL QSAS			
Gross Count Rate	**2.329861**	**2.329861**	**OK**
BKG Count Rate	**0.009722**	**0.009722**	**OK**
Net Count Rate	**2.320139**	**2.320139**	**OK**
Δ t 1 (t2 - t1)	**0.810440**	**0.810440**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.379151**	**11.379151**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.881920**	**0.881920**	**OK**
Chem Rec Factor	**1.233454**	**1.233454**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.415121**	**0.415121**	**OK**
K MDA	**597.774624**	**597.774624**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	40.06654739
Version/Date	2.0 -- 4/20/2006

Reviewed by: SOh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	4.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	3073.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015600
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	-0.001670	-0.001670	OK
CU	0.009817	0.009817	OK
TPU	0.009819	0.009819	OK
MDA	0.021894	0.021894	OK
DL	0.008685	0.008685	OK
BP MDA	0.064883	0.064883	OK
BP DL	0.030244	0.030244	OK
DL QSAS			
Gross Count Rate	0.002778	0.002778	OK
BKG Count Rate	0.003472	0.003472	OK
Net Count Rate	-0.000694	-0.000694	OK
Δ t 1 (t2 - t1)	0.810440	0.810440	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.379151	11.379151	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.881920	0.881920	OK
Chem Rec Factor	1.233454	1.233454	OK
Sys Err	0.061664	0.061664	OK
K	0.415953	0.415953	OK
K MDA	598.972582	598.972582	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	4.88256979
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	3051.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015500
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**-0.001701**	**-0.001701**	**OK**
CU	**0.007454**	**0.007454**	**OK**
TPU	**0.007457**	**0.007457**	**OK**
MDA	**0.018315**	**0.018315**	**OK**
DL	**0.006853**	**0.006853**	**OK**
BP MDA	**0.234919**	**0.234919**	**OK**
BP DL	**0.115403**	**0.115403**	**OK**
DL QSAS			
Gross Count Rate	**0.001389**	**0.001389**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**-0.000694**	**-0.000694**	**OK**
Δ t 1 (t2 - t1)	**0.810440**	**0.810440**	**OK**
DF	**0.999196**	**0.999196**	**OK**
Tracer DPM	**11.378031**	**11.378031**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.963510**	**0.963510**	**OK**
Chem Rec Factor	**1.347566**	**1.347566**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.408321**	**0.408321**	**OK**
K MDA	**587.981888**	**587.981888**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1B
Instr keV	4.88326931
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDi **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3404.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	3051.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015500
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	5.752991	5.752991	OK
CU	0.193692	0.193692	OK
TPU	0.721784	0.721784	OK
MDA	0.022196	0.022196	OK
DL	0.008805	0.008805	OK
BP MDA	0.380712	0.380712	OK
BP DL	0.188467	0.188467	OK
DL QSAS			
Gross Count Rate	2.363889	2.363889	OK
BKG Count Rate	0.003472	0.003472	OK
Net Count Rate	2.360417	2.360417	OK
Δ t 1 (t2 - t1)	0.810440	0.810440	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.378031	11.378031	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.963510	0.963510	OK
Chem Rec Factor	1.347566	1.347566	OK
Sys Err	0.061664	0.061664	OK
K	0.410294	0.410294	OK
K MDA	590.823064	590.823064	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1B
Instr keV	27.36777115
Version/Date	2.0 -- 4/20/2006

Reviewed by: SOh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	3051.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015500
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	-0.001689	-0.001689	OK
CU	0.007403	0.007403	OK
TPU	0.007406	0.007406	OK
MDA	0.018190	0.018190	OK
DL	0.006806	0.006806	OK
BP MDA	0.064936	0.064936	OK
BP DL	0.030244	0.030244	OK
DL QSAS			
Gross Count Rate	0.001389	0.001389	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	-0.000694	-0.000694	OK
Δ t 1 (t2 - t1)	0.810440	0.810440	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.378031	11.378031	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.963510	0.963510	OK
Chem Rec Factor	1.347566	1.347566	OK
Sys Err	0.061664	0.061664	OK
K	0.411116	0.411116	OK
K MDA	592.007090	592.007090	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_18
Instr keV	
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	17.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2847.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014700
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.029089**	**0.029089**	**OK**
CU	**0.015118**	**0.015118**	**OK**
TPU	**0.015521**	**0.015521**	**OK**
MDA	**0.013386**	**0.013386**	**OK**
DL	**0.004229**	**0.004229**	**OK**
BP MDA	**0.235237**	**0.235237**	**OK**
BP DL	**0.115403**	**0.115403**	**OK**
DL QSAS			
Gross Count Rate	**0.011806**	**0.011806**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.011111**	**0.011111**	**OK**
Δ t 1 (t2 - t1)	**0.810440**	**0.810440**	**OK**
DF	**0.999196**	**0.999196**	**OK**
Tracer DPM	**11.369067**	**11.369067**	**OK**
Tracer At	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.800580**	**0.800580**	**OK**
Chem Rec Factor	**1.119693**	**1.119693**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.381975**	**0.381975**	**OK**
K MDA	**550.043283**	**550.043283**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_2A
Instr keV	10.64367199
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	30.000000
Count Mins	1440.000000
BKG Counts	6.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2847.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014700
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.043423**	**0.043423**	**OK**
CU	**0.021277**	**0.021277**	**OK**
TPU	**0.021915**	**0.021915**	**OK**
MDA	**0.025524**	**0.025524**	**OK**
DL	**0.010310**	**0.010310**	**OK**
BP MDA	**0.381029**	**0.381029**	**OK**
BP DL	**0.188467**	**0.188467**	**OK**
DL QSAS			
Gross Count Rate	**0.020833**	**0.020833**	**OK**
BKG Count Rate	**0.004167**	**0.004167**	**OK**
Net Count Rate	**0.016667**	**0.016667**	**OK**
Δ t 1 (t2 - t1)	**0.810440**	**0.810440**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.369067**	**11.369067**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.800580**	**0.800580**	**OK**
Chem Rec Factor	**1.119693**	**1.119693**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.383820**	**0.383820**	**OK**
K MDA	**552.701137**	**552.701137**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_2A
Instr keV	7.859941959
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	15.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-4-11 8:24 AM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2847.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014700
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.023474	0.023474	OK
CU	0.014592	0.014592	OK
TPU	0.014865	0.014865	OK
MDA	0.016775	0.016775	OK
DL	0.005941	0.005941	OK
BP MDA	0.065252	0.065252	OK
BP DL	0.030244	0.030244	OK
DL QSAS			
Gross Count Rate	0.010417	0.010417	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.009028	0.009028	OK
Δ t 1 (t2 - t1)	0.810440	0.810440	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.369067	11.369067	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.800580	0.800580	OK
Chem Rec Factor	1.119693	1.119693	OK
Sys Err	0.061664	0.061664	OK
K	0.384589	0.384589	OK
K MDA	553.808766	553.808766	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_ZA
Instr keV	24.5623188
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	12.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2892.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.022000
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.043964	0.043964	OK
CU	0.024875	0.024875	OK
TPU	0.025436	0.025436	OK
MDA	0.009928	0.009928	OK
DL	0.000000	0.000000	OK
BP MDA	0.477388	0.477388	OK
BP DL	0.234233	0.234233	OK
DL QSAS			
Gross Count Rate	0.008333	0.008333	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.008333	0.008333	OK
Δ t 1 (t2 - t1)	15.661111	15.661111	OK
DF	0.984576	0.984576	OK
Tracer DPM	11.450859	11.450859	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.794701	0.794701	OK
Chem Rec Factor	1.111470	1.111470	OK
Sys Err	0.061664	0.061664	OK
K	0.189550	0.189550	OK
K MDA	272.951707	272.951707	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	001
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-1-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_28
Instr keV	6.518549919
Version/Date	2.0 -- 4/20/2006

Reviewed by: SOR **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	36.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2892.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.022000
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.122151	0.122151	OK
CU	0.043408	0.043408	OK
TPU	0.045850	0.045850	OK
MDA	0.033376	0.033376	OK
DL	0.011820	0.011820	OK
BP MDA	0.761987	0.761987	OK
BP DL	0.376934	0.376934	OK
DL QSAS			
Gross Count Rate	0.025000	0.025000	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.023611	0.023611	OK
Δ t 1 (t2 - t1)	15.661111	15.661111	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.450859	11.450859	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.794701	0.794701	OK
Chem Rec Factor	1.111470	1.111470	OK
Sys Err	0.061664	0.061664	OK
K	0.193294	0.193294	OK
K MDA	278.343190	278.343190	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	001
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-1-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_2B
Instr keV	11.00005245
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDh Date: 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	5.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2892.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.022000
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.007171	0.007171	OK
CU	0.019877	0.019877	OK
TPU	0.019896	0.019896	OK
MDA	0.038612	0.038612	OK
DL	0.014447	0.014447	OK
BP MDA	0.130433	0.130433	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.003472	0.003472	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.001389	0.001389	OK
Δ t 1 (t2 - t1)	15.661111	15.661111	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.450859	11.450859	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.794701	0.794701	OK
Chem Rec Factor	1.111470	1.111470	OK
Sys Err	0.061664	0.061664	OK
K	0.193681	0.193681	OK
K MDA	278.901102	278.901102	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	001
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-1-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_2B
Instr keV	9.777824402
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDK **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212170
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2456.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.018000
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.012825	0.012825	OK
CU	0.014513	0.014513	OK
TPU	0.014596	0.014596	OK
MDA	0.011586	0.011586	OK
DL	0.000000	0.000000	OK
BP MDA	0.478118	0.478118	OK
BP DL	0.233768	0.233768	OK
DL QSAS			
Gross Count Rate	0.002083	0.002083	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.002083	0.002083	OK
Δ t 1 (t2 - t1)	13.661111	13.661111	OK
DF	0.986532	0.986532	OK
Tracer DPM	11.406041	11.406041	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.703374	0.703374	OK
Chem Rec Factor	0.983740	0.983740	OK
Sys Err	0.061664	0.061664	OK
K	0.162440	0.162440	OK
K MDA	233.913072	233.913072	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	002
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-2-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	9.822584152
Version/Date	2.0 -- 4/20/2006

Reviewed by: SOL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	6.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212170
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2456.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.018000
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.004201**	**0.004201**	**OK**
CU	**0.027306**	**0.027306**	**OK**
TPU	**0.027311**	**0.027311**	**OK**
MDA	**0.055086**	**0.055086**	**OK**
DL	**0.021851**	**0.021851**	**OK**
BP MDA	**0.763635**	**0.763635**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.004167**	**0.004167**	**OK**
BKG Count Rate	**0.003472**	**0.003472**	**OK**
Net Count Rate	**0.000694**	**0.000694**	**OK**
Δ t 1 (t2 - t1)	**13.661111**	**13.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.406041**	**11.406041**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.703374**	**0.703374**	**OK**
Chem Rec Factor	**0.983740**	**0.983740**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.165320**	**0.165320**	**OK**
K MDA	**238.060416**	**238.060416**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	002
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-2-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	7.366938114
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	4.000000
Count Mins	1440.000000
BKG Counts	21.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212170
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2456.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.018000
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**-0.071268**	**-0.071268**	**OK**
CU	**0.041084**	**0.041084**	**OK**
TPU	**0.041977**	**0.041977**	**OK**
MDA	**0.100746**	**0.100746**	**OK**
DL	**0.044692**	**0.044692**	**OK**
BP MDA	**0.132078**	**0.132078**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.002778**	**0.002778**	**OK**
BKG Count Rate	**0.014583**	**0.014583**	**OK**
Net Count Rate	**-0.011806**	**-0.011806**	**OK**
Δ t 1 (t2 - t1)	**13.661111**	**13.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer OPM	**11.406041**	**11.406041**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer OF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.703374**	**0.703374**	**OK**
Chem Rec Factor	**0.983740**	**0.983740**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.165651**	**0.165651**	**OK**
K MDA	**238.537573**	**238.537573**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	002
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-2-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	4.911292076
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2486.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.019000
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.008448	0.008448	OK
CU	0.011709	0.011709	OK
TPU	0.011753	0.011753	OK
MDA	0.011447	0.011447	OK
DL	0.000000	0.000000	DK
BP MDA	0.477980	0.477980	OK
BP DL	0.233768	0.233768	OK
DL QSAS			
Gross Count Rate	0.001389	0.001389	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.001389	0.001389	OK
Δ t 1 (t2 - t1)	13.661111	13.661111	OK
DF	0.986532	0.986532	OK
Tracer DPM	11.417246	11.417246	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.732778	0.732778	OK
Chem Rec Factor	1.024864	1.024864	OK
Sys Err	0.061664	0.061664	OK
K	0.164399	0.164399	OK
K MDA	236.734468	236.734468	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	003
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-2-2-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	9.827695847
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDR **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	15.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2486.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.019000
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.041506**	**0.041506**	**OK**
CU	**0.036381**	**0.036381**	**OK**
TPU	**0.036725**	**0.036725**	**OK**
MDA	**0.054430**	**0.054430**	**OK**
DL	**0.021591**	**0.021591**	**OK**
BP MDA	**0.763499**	**0.763499**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.010417**	**0.010417**	**OK**
BKG Count Rate	**0.003472**	**0.003472**	**OK**
Net Count Rate	**0.006944**	**0.006944**	**OK**
Δ t 1 (t2 - t1)	**13.661111**	**13.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.417246**	**11.417246**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.732778**	**0.732778**	**OK**
Chem Rec Factor	**1.024864**	**1.024864**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.167314**	**0.167314**	**OK**
K MDA	**240.931837**	**240.931837**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	003
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-2-2-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	4.913847923
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2486.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.019000
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	-0.004142	-0.004142	OK
CU	0.018154	0.018154	OK
TPU	0.018161	0.018161	OK
MDA	0.044607	0.044607	OK
DL	0.016691	0.016691	OK
BP MDA	0.131942	0.131942	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.001389	0.001389	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	-0.000694	-0.000694	OK
Δ t 1 (t2 - t1)	13.661111	13.661111	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.417246	11.417246	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.732778	0.732778	OK
Chem Rec Factor	1.024864	1.024864	OK
Sys Err	0.061664	0.061664	OK
K	0.167649	0.167649	OK
K MDA	241.414749	241.414749	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	003
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-2-2-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	4.913847923
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDK **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	16.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.100000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2992.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.025000
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.247162	0.247162	OK
CU	0.146807	0.146807	OK
TPU	0.149815	0.149815	OK
MDA	0.164010	0.164010	OK
DL	0.058083	0.058083	OK
BP MDA	2.380508	2.380508	OK
BP DL	1.168840	1.168840	OK
DL QSAS			
Gross Count Rate	0.011111	0.011111	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.009722	0.009722	OK
Δ t 1 (t2 - t1)	13.661111	13.661111	OK
DF	0.986532	0.986532	OK
Tracer DPM	11.484472	11.484472	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.799758	0.799758	OK
Chem Rec Factor	1.118542	1.118542	OK
Sys Err	0.061664	0.061664	OK
K	0.039335	0.039335	OK
K MDA	56.642926	56.642926	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-07
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	004
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	JPOP41S-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_4A
Instr keV	6.138088703
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDR **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	89.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.100000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2992.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.025000
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	1.491833	1.491833	OK
CU	0.326116	0.326116	OK
TPU	0.372640	0.372640	OK
MDA	0.186806	0.186806	OK
DL	0.069898	0.069898	OK
BP MDA	3.808266	3.808266	OK
BP DL	1.884672	1.884672	OK
DL QSAS			
Gross Count Rate	0.061806	0.061806	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.059722	0.059722	OK
Δ t 1 (t2 - t1)	13.661111	13.661111	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.484472	11.484472	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.799758	0.799758	OK
Chem Rec Factor	1.118542	1.118542	OK
Sys Err	0.061664	0.061664	OK
K	0.040033	0.040033	OK
K MDA	57.647221	57.647221	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-07
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	004
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	JPOP41S-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_4A
Instr keV	17.800457
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDR **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	6.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.100000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2992.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.025000
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.086561**	**0.086561**	**OK**
CU	**0.089775**	**0.089775**	**OK**
TPU	**0.090383**	**0.090383**	**OK**
MDA	**0.127466**	**0.127466**	**OK**
DL	**0.040275**	**0.040275**	**OK**
BP MDA	**0.650500**	**0.650500**	**OK**
BP DL	**0.302441**	**0.302441**	**OK**
DL QSAS			
Gross Count Rate	**0.004167**	**0.004167**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.003472**	**0.003472**	**OK**
Δ t 1 (t2 - t1)	**13.661111**	**13.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.484472**	**11.484472**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.799758**	**0.799758**	**OK**
Chem Rec Factor	**1.118542**	**1.118542**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.040113**	**0.040113**	**OK**
K MDA	**57.762767**	**57.762767**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-07
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	004
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	JPOP41S-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_4A
Instr keV	7.365706444
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDK **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2094.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.018000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.043250**	**0.043250**	**OK**
CU	**0.028257**	**0.028257**	**OK**
TPU	**0.028736**	**0.028736**	**OK**
MDA	**0.013023**	**0.013023**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.480019**	**0.480019**	**OK**
BP DL	**0.234000**	**0.234000**	**OK**
DL QSAS			
Gross Count Rate	**0.006250**	**0.006250**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.006250**	**0.006250**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**0.985554**	**0.985554**	**OK**
Tracer DPM	**11.406041**	**11.406041**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.588207**	**0.588207**	**OK**
Chem Rec Factor	**0.822667**	**0.822667**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.144509**	**0.144509**	**OK**
K MDA	**208.092380**	**208.092380**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	005
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MD-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	88.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216447
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2094.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.018000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.418525**	**0.418525**	**OK**
CU	**0.092062**	**0.092062**	**OK**
TPU	**0.105043**	**0.105043**	**OK**
MDA	**0.053024**	**0.053024**	**OK**
DL	**0.019840**	**0.019840**	**OK**
BP MDA	**0.765595**	**0.765595**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.061111**	**0.061111**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.059028**	**0.059028**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.406041**	**11.406041**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.588207**	**0.588207**	**OK**
Chem Rec Factor	**0.822667**	**0.822667**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.141038**	**0.141038**	**OK**
K MDA	**203.094377**	**203.094377**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	005
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MD-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	17.11597824
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	6.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216447
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2094.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.018000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.019656	0.019656	OK
CU	0.027242	0.027242	OK
TPU	0.027345	0.027345	OK
MDA	0.045651	0.045651	OK
DL	0.016167	0.016167	OK
BP MDA	0.134034	0.134034	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.004167	0.004167	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.002778	0.002778	OK
Δ t 1 (t2 - t1)	14.661111	14.661111	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.406041	11.406041	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.588207	0.588207	OK
Chem Rec Factor	0.822667	0.822667	OK
Sys Err	0.061664	0.061664	OK
K	0.141320	0.141320	OK
K MDA	203.501455	203.501455	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	005
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MD-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	9.780558586
Version/Date	2.0 -- 4/20/2006

Reviewed by: SCh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	5.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2628.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015000
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.007968**	**0.007968**	**OK**
CU	**0.022086**	**0.022086**	**OK**
TPU	**0.022107**	**0.022107**	**OK**
MDA	**0.042902**	**0.042902**	**OK**
DL	**0.016053**	**0.016053**	**OK**
BP MDA	**0.477792**	**0.477792**	**OK**
BP DL	**0.234000**	**0.234000**	**OK**
DL QSAS			
Gross Count Rate	**0.003472**	**0.003472**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.001389**	**0.001389**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**0.985554**	**0.985554**	**OK**
Tracer DPM	**11.372428**	**11.372428**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.766225**	**0.766225**	**OK**
Chem Rec Factor	**1.071644**	**1.071644**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.174313**	**0.174313**	**OK**
K MDA	**251.010084**	**251.010084**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-09
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	006
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-3-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5A
Instr keV	4.889725208
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDA **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	168.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2628.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015000
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.645252**	**0.645252**	**OK**
CU	**0.100230**	**0.100230**	**OK**
TPU	**0.126995**	**0.126995**	**OK**
MDA	**0.042113**	**0.042113**	**OK**
DL	**0.015757**	**0.015757**	**OK**
BP MDA	**0.762849**	**0.762849**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.116667**	**0.116667**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.114583**	**0.114583**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.372428**	**11.372428**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.766225**	**0.766225**	**OK**
Chem Rec Factor	**1.071644**	**1.071644**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.177579**	**0.177579**	**OK**
K MDA	**255.714238**	**255.714238**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-09
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	006
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-3-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5A
Instr keV	31.78321457
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDK **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	10.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2628.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015000
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.031222**	**0.031222**	**OK**
CU	**0.026499**	**0.026499**	**OK**
TPU	**0.026766**	**0.026766**	**OK**
MDA	**0.036257**	**0.036257**	**OK**
DL	**0.012840**	**0.012840**	**OK**
BP MDA	**0.131293**	**0.131293**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.006944**	**0.006944**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.005556**	**0.005556**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.372428**	**11.372428**	**OK**
Tracer At	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.766225**	**0.766225**	**OK**
Chem Rec Factor	**1.071644**	**1.071644**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.177935**	**0.177935**	**OK**
K MDA	**256.226786**	**256.226786**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-09
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	006
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-3-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5A
Instr keV	9.779450417
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDK **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2560.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015000
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.000000	0.000000	OK
CU	0.016045	0.016045	OK
TPU	0.016045	0.016045	OK
MDA	0.038024	0.038024	OK
DL	0.013466	0.013466	OK
BP MDA	0.478088	0.478088	OK
BP DL	0.234000	0.234000	OK
DL QSAS			
Gross Count Rate	0.001389	0.001389	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.000000	0.000000	OK
Δ t 1 (t2 - t1)	14.661111	14.661111	OK
DF	0.985554	0.985554	OK
Tracer DPM	11.372428	11.372428	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.762094	0.762094	OK
Chem Rec Factor	1.065865	1.065865	OK
Sys Err	0.061664	0.061664	OK
K	0.169664	0.169664	OK
K MDA	244.316482	244.316482	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	007
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-4-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_SB
Instr keV	4.906514168
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	38.000000
Count Mins	1440.000000
BKG Counts	6.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2560.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015000
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.128568**	**0.128568**	**OK**
CU	**0.052236**	**0.052236**	**OK**
TPU	**0.054498**	**0.054498**	**OK**
MDA	**0.056678**	**0.056678**	**OK**
DL	**0.022895**	**0.022895**	**OK**
BP MDA	**0.763139**	**0.763139**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.026389**	**0.026389**	**OK**
BKG Count Rate	**0.004167**	**0.004167**	**OK**
Net Count Rate	**0.022222**	**0.022222**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.372428**	**11.372428**	**OK**
Tracer At	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.762094**	**0.762094**	**OK**
Chem Rec Factor	**1.065865**	**1.065865**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.172844**	**0.172844**	**OK**
K MDA	**248.895192**	**248.895192**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	007
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-4-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5B
Instr keV	10.42634296
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2560.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015000
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.008019	0.008019	OK
CU	0.015718	0.015718	OK
TPU	0.015748	0.015748	OK
MDA	0.029523	0.029523	OK
DL	0.009328	0.009328	OK
BP MDA	0.131583	0.131583	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.002083	0.002083	OK
BKG Count Rate	0.000694	0.000694	OK
Net Count Rate	0.001389	0.001389	OK
Δ t 1 (t2 - t1)	14.661111	14.661111	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.372428	11.372428	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.762094	0.762094	OK
Chem Rec Factor	1.065865	1.065865	OK
Sys Err	0.061664	0.061664	OK
K	0.173190	0.173190	OK
K MDA	249.394072	249.394072	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	007
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-4-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_58
Instr keV	4.906514168
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDh Date: 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	11.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225003
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2767.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.011000
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.026390**	**0.026390**	**OK**
CU	**0.028618**	**0.028618**	**OK**
TPU	**0.028796**	**0.028796**	**OK**
MDA	**0.045299**	**0.045299**	**OK**
DL	**0.017541**	**0.017541**	**OK**
BP MDA	**0.477213**	**0.477213**	**OK**
BP DL	**0.234000**	**0.234000**	**OK**
DL QSAS			
Gross Count Rate	**0.007639**	**0.007639**	**OK**
BKG Count Rate	**0.002778**	**0.002778**	**OK**
Net Count Rate	**0.004861**	**0.004861**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**0.985554**	**0.985554**	**OK**
Tracer DPM	**11.327611**	**11.327611**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.752864**	**0.752864**	**OK**
Chem Rec Factor	**1.052957**	**1.052957**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.184202**	**0.184202**	**OK**
K MDA	**265.251369**	**265.251369**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	008
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-6-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	4.886059284
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDR **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	186.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225003
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2767.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.011000
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.673519**	**0.673519**	**OK**
CU	**0.099980**	**0.099980**	**OK**
TPU	**0.128927**	**0.128927**	**OK**
MDA	**0.044465**	**0.044465**	**OK**
DL	**0.017218**	**0.017218**	**OK**
BP MDA	**0.762280**	**0.762280**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.129167**	**0.129167**	**OK**
BKG Count Rate	**0.002778**	**0.002778**	**OK**
Net Count Rate	**0.126389**	**0.126389**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.327611**	**11.327611**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.752864**	**0.752864**	**OK**
Chem Rec Factor	**1.052957**	**1.052957**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.187654**	**0.187654**	**OK**
K MDA	**270.222417**	**270.222417**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	008
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-6-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	15.74396896
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	14.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225003
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2767.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.011000
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.040626**	**0.040626**	**OK**
CU	**0.029846**	**0.029846**	**OK**
TPU	**0.030247**	**0.030247**	**OK**
MDA	**0.039772**	**0.039772**	**OK**
DL	**0.014882**	**0.014882**	**OK**
BP MDA	**0.130725**	**0.130725**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.009722**	**0.009722**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.007639**	**0.007639**	**OK**
Δ t 1 (t2 - t1)	**14.661111**	**14.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.327611**	**11.327611**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.752864**	**0.752864**	**OK**
Chem Rec Factor	**1.052957**	**1.052957**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.188031**	**0.188031**	**OK**
K MDA	**270.764045**	**270.764045**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	008
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-6-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	7.329089165
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2643.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.035638	0.035638	OK
CU	0.023284	0.023284	OK
TPU	0.023679	0.023679	OK
MDA	0.010731	0.010731	OK
DL	0.000000	0.000000	OK
BP MDA	0.478191	0.478191	OK
BP DL	0.234233	0.234233	OK
DL QSAS			
Gross Count Rate	0.006250	0.006250	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.006250	0.006250	OK
Δ t 1 (t2 - t1)	15.661111	15.661111	OK
DF	0.984576	0.984576	OK
Tracer DPM	11.361224	11.361224	OK
Tracer Δt	226.642361	226.642361	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.719742	0.719742	OK
Chem Rec Factor	1.006632	1.006632	OK
Sys Err	0.061664	0.061664	OK
K	0.175374	0.175374	OK
K MDA	252.538325	252.538325	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	009
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-7-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_6B
Instr keV	6.124101639
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	127.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2643.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.485387**	**0.485387**	**OK**
CU	**0.086443**	**0.086443**	**OK**
TPU	**0.104469**	**0.104469**	**OK**
MDA	**0.036074**	**0.036074**	**OK**
DL	**0.012775**	**0.012775**	**OK**
BP MDA	**0.762774**	**0.762774**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.088194**	**0.088194**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.086806**	**0.086806**	**OK**
Δ t 1 (t2 - t1)	**15.661111**	**15.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.361224**	**11.361224**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.719742**	**0.719742**	**OK**
Chem Rec Factor	**1.006632**	**1.006632**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.178838**	**0.178838**	**OK**
K MDA	**257.526592**	**257.526592**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	009
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-7-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_6B
Instr keV	14.93114376
Version/Date	2.0 -- 4/20/2006

Reviewed by: SCh **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	10.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:52 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2643.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.038753**	**0.038753**	**OK**
CU	**0.024020**	**0.024020**	**OK**
TPU	**0.024472**	**0.024472**	**OK**
MDA	**0.010502**	**0.010502**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.131219**	**0.131219**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.006944**	**0.006944**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.006944**	**0.006944**	**OK**
Δ t 1 (t2 - t1)	**15.661111**	**15.661111**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.361224**	**11.361224**	**OK**
Tracer Δt	**226.642361**	**226.642361**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.719742**	**0.719742**	**OK**
Chem Rec Factor	**1.006632**	**1.006632**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.179196**	**0.179196**	**OK**
K MDA	**258.042779**	**258.042779**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	009
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-7-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_68
Instr keV	7.348922253
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDA **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2588.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008000
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.004019	0.004019	OK
CU	0.017612	0.017612	OK
TPU	0.017619	0.017619	OK
MDA	0.037332	0.037332	OK
DL	0.013221	0.013221	OK
BP MDA	0.478350	0.478350	OK
BP DL	0.234233	0.234233	OK
DL QSAS			
Gross Count Rate	0.002083	0.002083	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.000694	0.000694	OK
Δ t 1 (t2 - t1)	15.661806	15.661806	OK
DF	0.984575	0.984575	OK
Tracer DPM	11.293998	11.293998	OK
Tracer Δt	226.643056	226.643056	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.721378	0.721378	OK
Chem Rec Factor	1.008920	1.008920	OK
Sys Err	0.061664	0.061664	OK
K	0.172810	0.172810	OK
K MDA	248.847021	248.847021	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-13
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	010
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-8-110419
Instr File Name	ApexAlpha
Instr Detector	A_2_1A
Instr keV	9.816235542
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	241.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2588.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008000
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.937885**	**0.937885**	**OK**
CU	**0.120649**	**0.120649**	**OK**
TPU	**0.165545**	**0.165545**	**OK**
MDA	**0.042437**	**0.042437**	**OK**
DL	**0.015879**	**0.015879**	**OK**
BP MDA	**0.762930**	**0.762930**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.167361**	**0.167361**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.165278**	**0.165278**	**OK**
Δ t 1 (t2 - t1)	**15.661806**	**15.661806**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.293998**	**11.293998**	**OK**
Tracer Δt	**226.643056**	**226.643056**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.721378**	**0.721378**	**OK**
Chem Rec Factor	**1.008920**	**1.008920**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.176224**	**0.176224**	**OK**
K MDA	**253.762550**	**253.762550**	**OK**
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01657		
Batch ID	ARS1-B11-01657-13		
Analysis Code	ASP-A-008		
SDG	ARS1-I1-00897		
Fraction	010		
Client	Summit Environmental Technologies		
Client Profile	Cuyahoga Falls		
Client ID	MW-8-110419		
Instr File Name	ApexAlpha		
Instr Detector	A_2_1A		
Instr keV	42.05364609		
Version/Date	2.0 -- 4/20/2006		

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	5.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2588.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008000
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.011798	0.011798	OK
CU	0.020394	0.020394	OK
TPU	0.020444	0.020444	OK
MDA	0.036536	0.036536	OK
DL	0.012939	0.012939	OK
BP MDA	0.131375	0.131375	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.003472	0.003472	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.002083	0.002083	OK
Δ t 1 (t2 - t1)	15.661806	15.661806	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.293998	11.293998	OK
Tracer Δt	226.643056	226.643056	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.721378	0.721378	OK
Chem Rec Factor	1.008920	1.008920	OK
Sys Err	0.061664	0.061664	OK
K	0.176577	0.176577	OK
K MDA	254.271193	254.271193	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-13
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	010
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-8-110419
Instr File Name	ApexAlpha
Instr Detector	A_2_1A
Instr keV	4.908117771
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDA **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2543.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.001000
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	-0.004057	-0.004057	OK
CU	0.017782	0.017782	OK
TPU	0.017788	0.017788	OK
MDA	0.043692	0.043692	OK
DL	0.016348	0.016348	OK
BP MDA	0.477992	0.477992	OK
BP DL	0.234000	0.234000	OK
DL QSAS			
Gross Count Rate	0.001389	0.001389	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	-0.000694	-0.000694	OK
Δ t 1 (t2 - t1)	14.661806	14.661806	OK
DF	0.985553	0.985553	OK
Tracer DPM	11.215567	11.215567	OK
Tracer Δt	226.643056	226.643056	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.732892	0.732892	OK
Chem Rec Factor	1.025024	1.025024	OK
Sys Err	0.061664	0.061664	OK
K	0.171162	0.171162	OK
K MDA	246.472842	246.472842	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	011
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-MD-02-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_18
Instr keV	4.879087925
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDK **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	175.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2543.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.001000
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.692973**	**0.692973**	**OK**
CU	**0.103557**	**0.103557**	**OK**
TPU	**0.133186**	**0.133186**	**OK**
MDA	**0.029323**	**0.029323**	**OK**
DL	**0.009265**	**0.009265**	**OK**
BP MDA	**0.763044**	**0.763044**	**OK**
BP DL	**0.376934**	**0.376934**	**OK**
DL QSAS			
Gross Count Rate	**0.121528**	**0.121528**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.120833**	**0.120833**	**OK**
Δ t 1 (t2 - t1)	**14.661806**	**14.661806**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.215567**	**11.215567**	**OK**
Tracer Δt	**226.643056**	**226.643056**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.732892**	**0.732892**	**OK**
Chem Rec Factor	**1.025024**	**1.025024**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.174370**	**0.174370**	**OK**
K MDA	**251.092137**	**251.092137**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	011
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-MD-02-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_1B
Instr keV	9.75817585
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDR **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	7.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2543.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.001000
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.023848	0.023848	OK
CU	0.022034	0.022034	OK
TPU	0.022222	0.022222	OK
MDA	0.029264	0.029264	OK
DL	0.009247	0.009247	OK
BP MDA	0.131488	0.131488	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.004861	0.004861	OK
BKG Count Rate	0.000694	0.000694	OK
Net Count Rate	0.004167	0.004167	OK
Δ t 1 (t2 - t1)	14.661806	14.661806	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.215567	11.215567	OK
Tracer Δt	226.643056	226.643056	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.732892	0.732892	OK
Chem Rec Factor	1.025024	1.025024	OK
Sys Err	0.061664	0.061664	OK
K	0.174719	0.174719	OK
K MDA	251.595421	251.595421	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	011
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-MD-02-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_1B
Instr keV	7.318632126
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	4.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2326.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.001000
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.009227	0.009227	OK
CU	0.022150	0.022150	OK
TPU	0.022179	0.022179	OK
MDA	0.042862	0.042862	OK
DL	0.015179	0.015179	OK
BP MDA	0.479500	0.479500	OK
BP DL	0.234000	0.234000	OK
DL QSAS			
Gross Count Rate	0.002778	0.002778	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.001389	0.001389	OK
Δ t 1 (t2 - t1)	14.661806	14.661806	OK
DF	0.985553	0.985553	OK
Tracer DPM	11.215567	11.215567	OK
Tracer Δt	226.643056	226.643056	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.644495	0.644495	OK
Chem Rec Factor	0.901391	0.901391	OK
Sys Err	0.061664	0.061664	OK
K	0.150517	0.150517	OK
K MDA	216.744575	216.744575	OK
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01657		
Batch ID	ARS1-B11-01657-15		
Analysis Code	ASP-A-008		
SDG	ARS1-11-00897		
Fraction	012		
Client	Summit Environmental Technologies		
Client Profile	Cuyahoga Falls		
Client ID	MW-MD-110420		
Instr File Name	ApexAlpha		
Instr Detector	A_2_2A		
Instr keV			
Version/Date	2.0 -- 4/20/2006		

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	201.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.223188
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2326.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.001000
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	26805555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.858538	0.858538	OK
CU	0.122300	0.122300	OK
TPU	0.160387	0.160387	OK
MDA	0.052364	0.052364	OK
DL	0.020277	0.020277	OK
BP MDA	0.764061	0.764061	OK
BP DL	0.376934	0.376934	OK
DL QSAS			
Gross Count Rate	0.139583	0.139583	OK
BKG Count Rate	0.002778	0.002778	OK
Net Count Rate	0.136806	0.136806	OK
Δ t 1 (t2 - t1)	14.661806	14.661806	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.215567	11.215567	OK
Tracer Δt	226.643056	226.643056	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.644495	0.644495	OK
Chem Rec Factor	0.901391	0.901391	OK
Sys Err	0.061664	0.061664	OK
K	0.159347	0.159347	OK
K MDA	229.459888	229.459888	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-15
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	012
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-MD-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_2A
Instr keV	18.86896133
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDR Date: 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.223188
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2326.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.001000
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.008699**	**0.008699**	**OK**
CU	**0.012056**	**0.012056**	**OK**
TPU	**0.012102**	**0.012102**	**OK**
MDA	**0.011787**	**0.011787**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.132503**	**0.132503**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.001389**	**0.001389**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.001389**	**0.001389**	**OK**
Δ t 1 (t2 - t1)	**14.661806**	**14.661806**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.215567**	**11.215567**	**OK**
Tracer Δt	**226.643056**	**226.643056**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.644495**	**0.644495**	**OK**
Chem Rec Factor	**0.901391**	**0.901391**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.159667**	**0.159667**	**OK**
K MDA	**229.919812**	**229.919812**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-15
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	012
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-MD-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_2A
Instr keV	4.902958393
Version/Date	2.0 -- 4/20/2006

Reviewed by: SRL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.213413
Sample Aliquot	0.100000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2619.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.022000
Tracer EFF	0.213413
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.037393	0.037393	OK
CU	0.073290	0.073290	OK
TPU	0.073430	0.073430	OK
MDA	0.137658	0.137658	OK
DL	0.043495	0.043495	OK
BP MDA	2.385650	2.385650	OK
BP DL	1.170002	1.170002	OK
DL QSAS			
Gross Count Rate	0.002083	0.002083	OK
BKG Count Rate	0.000694	0.000694	OK
Net Count Rate	0.001389	0.001389	OK
Δ t 1 (t2 - t1)	14.661806	14.661806	OK
DF	0.985553	0.985553	OK
Tracer DPM	11.450859	11.450859	OK
Tracer Δt	226.643056	226.643056	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.800269	0.800269	OK
Chem Rec Factor	1.119257	1.119257	OK
Sys Err	0.061664	0.061664	OK
K	0.037143	0.037143	OK
K MDA	53.485906	53.485906	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-16
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	013
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	NPOP20E-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_3B
Instr keV	4.919867039
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDA Date: 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	104.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.213413
Sample Aliquot	0.100000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2819.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.022000
Tracer EFF	0.213413
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**1.853608**	**1.853608**	**OK**
CU	**0.372087**	**0.372087**	**OK**
TPU	**0.434324**	**0.434324**	**OK**
MDA	**0.197635**	**0.197635**	**OK**
DL	**0.073950**	**0.073950**	**OK**
BP MDA	**3.810991**	**3.810991**	**OK**
BP DL	**1.884672**	**1.884672**	**OK**
DL QSAS			
Gross Count Rate	**0.072222**	**0.072222**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.070139**	**0.070139**	**OK**
Δ t 1 (t2 - t1)	**14.661806**	**14.661806**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.450859**	**11.450859**	**OK**
Tracer Δt	**226.643056**	**226.643056**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.800269**	**0.800269**	**OK**
Chem Rec Factor	**1.119257**	**1.119257**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.037839**	**0.037839**	**OK**
K MDA	**54.488317**	**54.488317**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-16
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	013
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	NPOP20E-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_3B
Instr keV	8.375487328
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	13.000000
Count Mins	1440.000000
BKG Counts	7.000000
BKG Mins	1440.000000
Instrument Efficiency	0.213413
Sample Aliquot	0.100000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-5-11 3:53 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2819.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.022000
Tracer EFF	0.213413
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.109895**	**0.109895**	**OK**
CU	**0.160545**	**0.160545**	**OK**
TPU	**0.161094**	**0.161094**	**OK**
MDA	**0.275105**	**0.275105**	**OK**
DL	**0.112735**	**0.112735**	**OK**
BP MDA	**0.653219**	**0.653219**	**OK**
BP DL	**0.302441**	**0.302441**	**OK**
DL QSAS			
Gross Count Rate	**0.009028**	**0.009028**	**OK**
BKG Count Rate	**0.004861**	**0.004861**	**OK**
Net Count Rate	**0.004167**	**0.004167**	**OK**
Δ t 1 (t2 - t1)	**14.661806**	**14.661806**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.450859**	**11.450859**	**OK**
Tracer Δt	**226.643056**	**226.643056**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.800269**	**0.800269**	**OK**
Chem Rec Factor	**1.119257**	**1.119257**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.037915**	**0.037915**	**OK**
K MDA	**54.597532**	**54.597532**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01657
Batch ID	ARS1-B11-01657-16
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	013
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	NPOP20E-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_3B
Instr keV	9.839734077
Version/Date	2.0 -- 4/20/2006

Reviewed by: SDL **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2629.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012100
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.017648	0.017648	OK
CU	0.011530	0.011530	OK
TPU	0.011726	0.011726	OK
MDA	0.005314	0.005314	OK
DL	0.000000	0.000000	OK
BP MDA	0.233892	0.233892	OK
BP DL	0.114535	0.114535	OK
DL QSAS			
Gross Count Rate	0.006250	0.006250	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.006250	0.006250	OK
Δ t 1 (t2 - t1)	2.086597	2.086597	OK
DF	0.997931	0.997931	OK
Tracer DPM	11.339936	11.339936	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.756981	0.756981	OK
Chem Rec Factor	1.058714	1.058714	OK
Sys Err	0.061664	0.061664	OK
K	0.354150	0.354150	OK
K MDA	509.975892	509.975892	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	4.88256979
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2973.000000
Count Mins	1440.000000
BKG Counts	14.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2629.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012100
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	5.767024	5.767024	OK
CU	0.208776	0.208776	OK
TPU	0.727601	0.727601	OK
MDA	0.039212	0.039212	OK
DL	0.016965	0.016965	OK
BP MDA	0.370878	0.370878	OK
BP DL	0.183191	0.183191	OK
DL QSAS			
Gross Count Rate	2.064583	2.064583	OK
BKG Count Rate	0.009722	0.009722	OK
Net Count Rate	2.054861	2.054861	OK
Δ t 1 (t2 - t1)	2.086597	2.086597	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.339936	11.339936	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.756981	0.756981	OK
Chem Rec Factor	1.058714	1.058714	OK
Sys Err	0.061664	0.061664	OK
K	0.356312	0.356312	OK
K MDA	513.089608	513.089608	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	40.10710144
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	59.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2629.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012100
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.105034	0.105034	OK
CU	0.030499	0.030499	OK
TPU	0.033035	0.033035	OK
MDA	0.025508	0.025508	OK
DL	0.010118	0.010118	OK
BP MDA	0.065327	0.065327	OK
BP DL	0.030092	0.030092	OK
OL QSAS			
Gross Count Rate	0.040972	0.040972	OK
BKG Count Rate	0.003472	0.003472	OK
Net Count Rate	0.037500	0.037500	OK
Δ t 1 (t2 - t1)	2.086597	2.086597	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.339936	11.339936	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.756981	0.756981	OK
Chem Rec Factor	1.058714	1.058714	OK
Sys Err	0.061664	0.061664	OK
K	0.357026	0.357026	OK
K MDA	514.117870	514.117870	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	7.323854446
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	17.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2603.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008300
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.027772	0.027772	OK
CU	0.017388	0.017388	OK
TPU	0.017709	0.017709	OK
MDA	0.021362	0.021362	OK
DL	0.007993	0.007993	OK
BP MDA	0.233954	0.233954	OK
BP DL	0.114535	0.114535	OK
DL QSAS			
Gross Count Rate	0.011806	0.011806	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.009722	0.009722	OK
Δ t 1 (t2 - t1)	2.086597	2.086597	OK
DF	0.997931	0.997931	OK
Tracer DPM	11.297359	11.297359	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.827103	0.827103	OK
Chem Rec Factor	1.156787	1.156787	OK
Sys Err	0.061664	0.061664	OK
K	0.350070	0.350070	OK
K MDA	504.100470	504.100470	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1B
Instr keV	8.545721054
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3263.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2603.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008300
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	6.423776	6.423776	OK
CU	0.220921	0.220921	OK
TPU	0.807201	0.807201	OK
MDA	0.025857	0.025857	OK
DL	0.010257	0.010257	OK
BP MDA	0.370940	0.370940	OK
BP DL	0.183191	0.183191	OK
DL QSAS			
Gross Count Rate	2.265972	2.265972	OK
BKG Count Rate	0.003472	0.003472	OK
Net Count Rate	2.262500	2.262500	OK
Δ t 1 (t2 - t1)	2.086597	2.086597	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.297359	11.297359	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.827103	0.827103	OK
Chem Rec Factor	1.156787	1.156787	OK
Sys Err	0.061664	0.061664	OK
K	0.352207	0.352207	OK
K MDA	507.178313	507.178313	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1B
Instr keV	38.83237839
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	57.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2603.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008300
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.106258	0.106258	OK
CU	0.029875	0.029875	OK
TPU	0.032518	0.032518	OK
MDA	0.021190	0.021190	OK
DL	0.007929	0.007929	OK
BP MDA	0.065388	0.065388	OK
BP DL	0.030092	0.030092	OK
DL QSAS			
Gross Count Rate	0.039583	0.039583	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.037500	0.037500	OK
Δ t 1 (t2 - t1)	2.086597	2.086597	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.297359	11.297359	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.827103	0.827103	OK
Chem Rec Factor	1.156787	1.156787	OK
Sys Err	0.061664	0.061664	OK
K	0.352913	0.352913	OK
K MDA	508.194729	508.194729	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1B
Instr keV	4.88326931
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Procedure	ARS-031
Variable	**Value**
Counts	3.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2608.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.006200
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.003942**	**0.003942**	**OK**
CU	**0.007727**	**0.007727**	**OK**
TPU	**0.007742**	**0.007742**	**OK**
MDA	**0.014514**	**0.014514**	**OK**
DL	**0.004586**	**0.004586**	**OK**
BP MDA	**0.233920**	**0.233920**	**OK**
BP DL	**0.114535**	**0.114535**	**OK**
DL QSAS			
Gross Count Rate	**0.002083**	**0.002083**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.001389**	**0.001389**	**OK**
Δ t 1 (t2 - t1)	**2.086597**	**2.086597**	**OK**
DF	**0.997931**	**0.997931**	**OK**
Tracer DPM	**11.273830**	**11.273830**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.739306**	**0.739306**	**OK**
Chem Rec Factor	**1.033994**	**1.033994**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.352293**	**0.352293**	**OK**
K MDA	**507.301313**	**507.301313**	**OK**
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01660		
Batch ID	ARS1-B11-01660-03		
Analysis Code			
SDG	QC Sample		
Fraction	N/A QC Sample		
Client	QC Sample		
Client Profile			
Client ID	N/A QC Sample		
Instr File Name	ApexAlpha		
Instr Detector	A_1_2A		
Instr keV	4.912463665		
Version/Date	2.0 -- 4/20/2006		

Reviewed by: dlew **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	148.000000
Count Mins	1440.000000
BKG Counts	6.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2608.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.006200
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.278214**	**0.278214**	**OK**
CU	**0.047655**	**0.047655**	**OK**
TPU	**0.058323**	**0.058323**	**OK**
MDA	**0.027639**	**0.027639**	**OK**
DL	**0.011165**	**0.011165**	**OK**
BP MDA	**0.370906**	**0.370906**	**OK**
BP DL	**0.183191**	**0.183191**	**OK**
DL QSAS			
Gross Count Rate	**0.102778**	**0.102778**	**OK**
BKG Count Rate	**0.004167**	**0.004167**	**OK**
Net Count Rate	**0.098611**	**0.098611**	**OK**
Δ t 1 (t2 - t1)	**2.086597**	**2.086597**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.273830**	**11.273830**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.739306**	**0.739306**	**OK**
Chem Rec Factor	**1.033994**	**1.033994**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.354444**	**0.354444**	**OK**
K MDA	**510.398698**	**510.398698**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_2A
Instr keV	10.43898487
Version/Date	2.0 -- 4/20/2006

Reviewed by: HLW **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	25.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5/4/11 8:27 AM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2608.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.006200
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.044973	0.044973	OK
CU	0.019914	0.019914	OK
TPU	0.020642	0.020642	OK
MDA	0.018165	0.018165	OK
DL	0.006433	0.006433	OK
BP MDA	0.065355	0.065355	OK
BP DL	0.030092	0.030092	OK
DL QSAS			
Gross Count Rate	0.017361	0.017361	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.015972	0.015972	OK
Δ t 1 (t2 - t1)	2.086597	2.086597	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.273830	11.273830	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.739306	0.739306	OK
Chem Rec Factor	1.033994	1.033994	OK
Sys Err	0.061664	0.061664	OK
K	0.355154	0.355154	OK
K MDA	511.421568	511.421568	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_2A
Instr keV	4.912463665
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	933.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.005200
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.033889	0.033889	OK
CU	0.038349	0.038349	OK
TPU	0.038567	0.038567	OK
MDA	0.030613	0.030613	OK
DL	0.000000	0.000000	OK
BP MDA	0.494098	0.494098	OK
BP DL	0.232241	0.232241	OK
OL QSAS			
Gross Count Rate	0.002083	0.002083	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.002083	0.002083	OK
Δ t 1 (t2 - t1)	15.938889	15.938889	OK
DF	0.984304	0.984304	OK
Tracer DPM	11.262626	11.262626	OK
Tracer At	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.257813	0.257813	OK
Chem Rec Factor	0.360578	0.360578	OK
Sys Err	0.061664	0.061664	OK
K	0.061476	0.061476	OK
K MDA	88.525310	88.525310	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	014
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	PR-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_2B
Instr keV	4.888912201
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	144.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	933.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.005200
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**1.572557**	**1.572557**	**OK**
CU	**0.262271**	**0.262271**	**OK**
TPU	**0.323897**	**0.323897**	**OK**
MDA	**0.102881**	**0.102881**	**OK**
DL	**0.036435**	**0.036435**	**OK**
BP MDA	**0.761205**	**0.761205**	**OK**
BP DL	**0.366383**	**0.366383**	**OK**
DL QSAS			
Gross Count Rate	**0.100000**	**0.100000**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.098611**	**0.098611**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.262626**	**11.262626**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.257813**	**0.257813**	**OK**
Chem Rec Factor	**0.360578**	**0.360578**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.062707**	**0.062707**	**OK**
K MDA	**90.298799**	**90.298799**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	014
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	PR-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_2B
Instr keV	6.844477177
Version/Date	2.0 -- 4/20/2006

Reviewed by: HLS **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	11.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	933.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.005200
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.088418**	**0.088418**	**OK**
CU	**0.081053**	**0.081053**	**OK**
TPU	**0.081754**	**0.081754**	**OK**
MDA	**0.119019**	**0.119019**	**OK**
DL	**0.044534**	**0.044534**	**OK**
BP MDA	**0.150063**	**0.150063**	**OK**
BP DL	**0.060185**	**0.060185**	**OK**
DL QSAS			
Gross Count Rate	**0.007639**	**0.007639**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.005556**	**0.005556**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.262626**	**11.262626**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.257813**	**0.257813**	**OK**
Chem Rec Factor	**0.360578**	**0.360578**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.062833**	**0.062833**	**OK**
K MDA	**90.479795**	**90.479795**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	014
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	PR-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_28
Instr keV	4.888912201
Version/Date	2.0 -- 4/20/2006

Reviewed by: KLW **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	7.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	897.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.007000
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.078779**	**0.078779**	**OK**
CU	**0.058360**	**0.058360**	**OK**
TPU	**0.059132**	**0.059132**	**OK**
MDA	**0.030499**	**0.030499**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.493984**	**0.493984**	**OK**
BP DL	**0.232241**	**0.232241**	**OK**
DL QSAS			
Gross Count Rate	**0.004861**	**0.004861**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.004861**	**0.004861**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**0.984304**	**0.984304**	**OK**
Tracer DPM	**11.282793**	**11.282793**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.258777**	**0.258777**	**OK**
Chem Rec Factor	**0.361926**	**0.361926**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.061706**	**0.061706**	**OK**
K MDA	**88.856435**	**88.856435**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	015
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	98.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212170
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	897.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.007000
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	1.061832	1.061832	OK
CU	0.227116	0.227116	OK
TPU	0.260866	0.260866	OK
MDA	0.149729	0.149729	OK
DL	0.059393	0.059393	OK
BP MDA	0.762135	0.762135	OK
BP DL	0.366383	0.366383	OK
DL QSAS			
Gross Count Rate	0.068056	0.068056	OK
BKG Count Rate	0.003472	0.003472	OK
Net Count Rate	0.064583	0.064583	OK
Δ t 1 (t2 - t1)	15.938889	15.938889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.282793	11.282793	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.258777	0.258777	OK
Chem Rec Factor	0.361926	0.361926	OK
Sys Err	0.061664	0.061664	OK
K	0.060823	0.060823	OK
K MDA	87.584480	87.584480	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	015
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	10.43649578
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	28.000000
Count Mins	1440.000000
BKG Counts	21.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212170
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	897.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.007000
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.079763	0.079763	OK
CU	0.156335	0.156335	OK
TPU	0.156632	0.156632	OK
MDA	0.273833	0.273833	OK
DL	0.121477	0.121477	OK
BP MDA	0.150991	0.150991	OK
BP DL	0.060185	0.060185	OK
DL QSAS			
Gross Count Rate	0.019444	0.019444	OK
BKG Count Rate	0.014583	0.014583	OK
Net Count Rate	0.004861	0.004861	OK
Δ t 1 (t2 - t1)	15.938889	15.938889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.282793	11.282793	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.258777	0.258777	OK
Chem Rec Factor	0.361926	0.361926	OK
Sys Err	0.061664	0.061664	OK
K	0.060944	0.060944	OK
K MDA	87.760036	87.760036	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	015
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	4.911292076
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/21/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	594.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.007000
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.052681**	**0.052681**	**OK**
CU	**0.059614**	**0.059614**	**OK**
TPU	**0.059953**	**0.059953**	**OK**
MDA	**0.047589**	**0.047589**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.510614**	**0.510614**	**OK**
BP DL	**0.232011**	**0.232011**	**OK**
DL QSAS			
Gross Count Rate	**0.002083**	**0.002083**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.002083**	**0.002083**	**OK**
Δ t 1 (t2 - t1)	**14.938889**	**14.938889**	**OK**
DF	**0.985282**	**0.985282**	**OK**
Tracer DPM	**11.282793**	**11.282793**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.176493**	**0.176493**	**OK**
Chem Rec Factor	**0.246844**	**0.246844**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.039546**	**0.039546**	**OK**
K MDA	**56.946406**	**56.946406**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	016
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-02-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	4.913847923
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	44.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/21/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	594.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.007000
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.672070**	**0.672070**	**OK**
CU	**0.236431**	**0.236431**	**OK**
TPU	**0.249995**	**0.249995**	**OK**
MDA	**0.225986**	**0.225986**	**OK**
DL	**0.089643**	**0.089643**	**OK**
BP MDA	**0.777894**	**0.777894**	**OK**
BP DL	**0.366383**	**0.366383**	**OK**
DL QSAS			
Gross Count Rate	**0.030556**	**0.030556**	**OK**
BKG Count Rate	**0.003472**	**0.003472**	**OK**
Net Count Rate	**0.027083**	**0.027083**	**OK**
Δ t 1 (t2 - t1)	**14.938889**	**14.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.282793**	**11.282793**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.176493**	**0.176493**	**OK**
Chem Rec Factor	**0.246844**	**0.246844**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.040298**	**0.040298**	**OK**
K MDA	**58.029629**	**58.029629**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	016
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-02-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	6.55179739
Version/Date	2.0 -- 4/20/2006

Reviewed by: HW **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	8.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/21/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	594.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.007000
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.085991**	**0.085991**	**OK**
CU	**0.111798**	**0.111798**	**OK**
TPU	**0.112280**	**0.112280**	**OK**
MDA	**0.185203**	**0.185203**	**OK**
DL	**0.069298**	**0.069298**	**OK**
BP MDA	**0.166718**	**0.166718**	**OK**
BP DL	**0.060185**	**0.060185**	**OK**
DL QSAS			
Gross Count Rate	**0.005556**	**0.005556**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.003472**	**0.003472**	**OK**
Δ t 1 (t2 - t1)	**14.938889**	**14.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.282793**	**11.282793**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.176493**	**0.176493**	**OK**
Chem Rec Factor	**0.246844**	**0.246844**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.040379**	**0.040379**	**OK**
K MDA	**58.145943**	**58.145943**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	016
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-02-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	7.370771885
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2662.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.004000
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.027277**	**0.027277**	**OK**
CU	**0.025331**	**0.025331**	**OK**
TPU	**0.025545**	**0.025545**	**OK**
MDA	**0.036201**	**0.036201**	**OK**
DL	**0.012820**	**0.012820**	**OK**
BP MDA	**0.474046**	**0.474046**	**OK**
BP DL	**0.232241**	**0.232241**	**OK**
DL QSAS			
Gross Count Rate	**0.006250**	**0.006250**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.004861**	**0.004861**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**0.984304**	**0.984304**	**OK**
Tracer DPM	**11.249180**	**11.249180**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.726312**	**0.726312**	**OK**
Chem Rec Factor	**1.015821**	**1.015821**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.178212**	**0.178212**	**OK**
K MDA	**256.624738**	**256.624738**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-07
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	017
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-02-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4A
Instr keV	7.365706444
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	231.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2662.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.004000
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.871007**	**0.871007**	**OK**
CU	**0.114538**	**0.114538**	**OK**
TPU	**0.155566**	**0.155566**	**OK**
MDA	**0.041139**	**0.041139**	**OK**
DL	**0.015393**	**0.015393**	**OK**
BP MDA	**0.741546**	**0.741546**	**OK**
BP DL	**0.366383**	**0.366383**	**OK**
DL QSAS			
Gross Count Rate	**0.160417**	**0.160417**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.158333**	**0.158333**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.249180**	**11.249180**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.726312**	**0.726312**	**OK**
Chem Rec Factor	**1.015821**	**1.015821**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.181782**	**0.181782**	**OK**
K MDA	**261.765880**	**261.765880**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-07
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	017
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-02-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4A
Instr keV	29.46282578
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	30.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2662.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.004000
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.110564	0.110564	OK
CU	0.041606	0.041606	OK
TPU	0.043699	0.043699	OK
MDA	0.028071	0.028071	OK
DL	0.008869	0.008869	OK
BP MDA	0.130443	0.130443	OK
BP DL	0.060185	0.060185	OK
DL QSAS			
Gross Count Rate	0.020833	0.020833	OK
BKG Count Rate	0.000694	0.000694	OK
Net Count Rate	0.020139	0.020139	OK
Δ t 1 (t2 - t1)	15.938889	15.938889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.249180	11.249180	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.726312	0.726312	OK
Chem Rec Factor	1.015821	1.015821	OK
Sys Err	0.061664	0.061664	OK
K	0.182146	0.182146	OK
K MDA	262.290566	262.290566	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-07
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	017
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-02-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4A
Instr keV	4.910470963
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ Date: 6 2 71

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216447
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2578.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.036490	0.036490	OK
CU	0.023840	0.023840	OK
TPU	0.024244	0.024244	OK
MDA	0.010987	0.010987	OK
DL	0.000000	0.000000	OK
BP MDA	0.474473	0.474473	OK
BP DL	0.232241	0.232241	OK
DL QSAS			
Gross Count Rate	0.006250	0.006250	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.006250	0.006250	OK
Δ t 1 (t2 - t1)	15.938889	15.938889	OK
DF	0.984304	0.984304	OK
Tracer DPM	11.338815	11.338815	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.728653	0.728653	OK
Chem Rec Factor	1.019095	1.019095	OK
Sys Err	0.061664	0.061664	OK
K	0.171282	0.171282	OK
K MDA	246.645943	246.645943	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	018
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	4.890279293
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	140.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216447
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2578.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.544543**	**0.544543**	**OK**
CU	**0.093161**	**0.093161**	**OK**
TPU	**0.114063**	**0.114063**	**OK**
MDA	**0.042804**	**0.042804**	**OK**
DL	**0.016016**	**0.016016**	**OK**
BP MDA	**0.741965**	**0.741965**	**OK**
BP DL	**0.366383**	**0.366383**	**OK**
DL QSAS			
Gross Count Rate	**0.097222**	**0.097222**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.095139**	**0.095139**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.338815**	**11.338815**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.728653**	**0.728653**	**OK**
Chem Rec Factor	**1.019095**	**1.019095**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.174713**	**0.174713**	**OK**
K MDA	**251.587173**	**251.587173**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	018
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	9.780558586
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	37.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216447
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2578.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.138839**	**0.138839**	**OK**
CU	**0.048555**	**0.048555**	**OK**
TPU	**0.051372**	**0.051372**	**OK**
MDA	**0.036852**	**0.036852**	**OK**
DL	**0.013051**	**0.013051**	**OK**
BP MDA	**0.130861**	**0.130861**	**OK**
BP DL	**0.060185**	**0.060185**	**OK**
DL QSAS			
Gross Count Rate	**0.025694**	**0.025694**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.024306**	**0.024306**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.338815**	**11.338815**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.728653**	**0.728653**	**OK**
Chem Rec Factor	**1.019095**	**1.019095**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.175064**	**0.175064**	**OK**
K MDA	**252.091457**	**252.091457**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	01B
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	6.112849236
Version/Date	2.0 -- 4/20/2006

Reviewed by: Alex **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	19.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2359.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.071111**	**0.071111**	**OK**
CU	**0.040859**	**0.040859**	**OK**
TPU	**0.041753**	**0.041753**	**OK**
MDA	**0.047861**	**0.047861**	**OK**
DL	**0.017908**	**0.017908**	**OK**
BP MDA	**0.475990**	**0.475990**	**OK**
BP DL	**0.232472**	**0.232472**	**OK**
DL QSAS			
Gross Count Rate	**0.013194**	**0.013194**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.011111**	**0.011111**	**OK**
Δ t 1 (t2 - t1)	**16.938889**	**16.938889**	**OK**
DF	**0.983328**	**0.983328**	**OK**
Tracer DPM	**11.361224**	**11.361224**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.688384**	**0.688384**	**OK**
Chem Rec Factor	**0.962775**	**0.962775**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.156250**	**0.156250**	**OK**
K MDA	**225.000525**	**225.000525**	**OK**
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01660		
Batch ID	ARS1-B11-01660-09		
Analysis Code	ASP-A-008		
SDG	ARS1-11-00897		
Fraction	019		
Client	Summit Environmental Technologies		
Client Profile	Cuyahoga Falls		
Client ID	RM-SW-BG-110419		
Instr File Name	ApexAlpha		
Instr Detector	A_1_5A		
Instr keV	4.889725208		
Version/Date	2.0 -- 4/20/2006		

Reviewed by: HW **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	170.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2359.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.726921**	**0.726921**	**OK**
CU	**0.112215**	**0.112215**	**OK**
TPU	**0.142516**	**0.142516**	**OK**
MDA	**0.046875**	**0.046875**	**OK**
DL	**0.017539**	**0.017539**	**OK**
BP MDA	**0.742990**	**0.742990**	**OK**
BP DL	**0.366383**	**0.366383**	**OK**
DL QSAS			
Gross Count Rate	**0.118056**	**0.118056**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.115972**	**0.115972**	**OK**
Δ t 1 (t2 - t1)	**16.938889**	**16.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.361224**	**11.361224**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.688384**	**0.688384**	**OK**
Chem Rec Factor	**0.962775**	**0.962775**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.159539**	**0.159539**	**OK**
K MDA	**229.736021**	**229.736021**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-09
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	019
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-SW-BG-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_5A
Instr keV	7.843934059
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-21

Procedure	ARS-031
Variable	**Value**
Counts	31.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2359.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.125979	0.125979	OK
CU	0.048912	0.048912	OK
TPU	0.051227	0.051227	OK
MDA	0.040357	0.040357	OK
DL	0.014292	0.014292	OK
BP MDA	0.131884	0.131884	OK
BP DL	0.060185	0.060185	OK
DL QSAS			
Gross Count Rate	0.021528	0.021528	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.020139	0.020139	OK
Δ t 1 (t2 - t1)	16.938889	16.938889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.361224	11.361224	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.688384	0.688384	OK
Chem Rec Factor	0.962775	0.962775	OK
Sys Err	0.061664	0.061664	OK
K	0.159859	0.159859	OK
K MDA	230.196512	230.196512	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-09
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	019
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-SW-BG-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_5A
Instr keV	4.889725208
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	8.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2399.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.010000
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.026114**	**0.026114**	**OK**
CU	**0.026976**	**0.026976**	**OK**
TPU	**0.027160**	**0.027160**	**OK**
MDA	**0.040433**	**0.040433**	**OK**
DL	**0.014319**	**0.014319**	**OK**
BP MDA	**0.475280**	**0.475280**	**OK**
BP DL	**0.232241**	**0.232241**	**OK**
DL QSAS			
Gross Count Rate	**0.005556**	**0.005556**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.004167**	**0.004167**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**0.984304**	**0.984304**	**OK**
Tracer DPM	**11.316407**	**11.316407**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.717607**	**0.717607**	**OK**
Chem Rec Factor	**1.003646**	**1.003646**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.159558**	**0.159558**	**OK**
K MDA	**229.762965**	**229.762965**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	020
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5B
Instr keV	4.906514168
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Procedure	ARS-031
Variable	**Value**
Counts	183.000000
Count Mins	1440.000000
BKG Counts	6.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2399.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.010000
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.755229**	**0.755229**	**OK**
CU	**0.114972**	**0.114972**	**OK**
TPU	**0.146800**	**0.146800**	**OK**
MDA	**0.060192**	**0.060192**	**OK**
DL	**0.024314**	**0.024314**	**OK**
BP MDA	**0.742757**	**0.742757**	**OK**
BP DL	**0.366383**	**0.366383**	**OK**
DL QSAS			
Gross Count Rate	**0.127083**	**0.127083**	**OK**
BKG Count Rate	**0.004167**	**0.004167**	**OK**
Net Count Rate	**0.122917**	**0.122917**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.316407**	**11.316407**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.717607**	**0.717607**	**OK**
Chem Rec Factor	**1.003646**	**1.003646**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.162754**	**0.162754**	**OK**
K MDA	**234.365967**	**234.365967**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	020
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5B
Instr keV	21.26156235
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	19.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2399.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.010000
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.076649**	**0.076649**	**OK**
CU	**0.037326**	**0.037326**	**OK**
TPU	**0.038458**	**0.038458**	**OK**
MDA	**0.031353**	**0.031353**	**OK**
DL	**0.009906**	**0.009906**	**OK**
BP MDA	**0.131651**	**0.131651**	**OK**
BP DL	**0.060185**	**0.060185**	**OK**
DL QSAS			
Gross Count Rate	**0.013194**	**0.013194**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.012500**	**0.012500**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.316407**	**11.316407**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.717607**	**0.717607**	**OK**
Chem Rec Factor	**1.003646**	**1.003646**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.163080**	**0.163080**	**OK**
K MDA	**234.835732**	**234.835732**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	020
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5B
Instr keV	4.906514168
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-21

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	57.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225003
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2428.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.002000
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.226013**	**0.226013**	**OK**
CU	**0.065280**	**0.065280**	**OK**
TPU	**0.070765**	**0.070765**	**OK**
MDA	**0.051239**	**0.051239**	**OK**
DL	**0.019841**	**0.019841**	**OK**
BP MDA	**0.475042**	**0.475042**	**OK**
BP DL	**0.232241**	**0.232241**	**OK**
DL QSAS			
Gross Count Rate	**0.039583**	**0.039583**	**OK**
BKG Count Rate	**0.002778**	**0.002778**	**OK**
Net Count Rate	**0.036806**	**0.036806**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**0.984304**	**0.984304**	**OK**
Tracer DPM	**11.226772**	**11.226772**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.666426**	**0.666426**	**OK**
Chem Rec Factor	**0.932065**	**0.932065**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.162847**	**0.162847**	**OK**
K MDA	**234.499623**	**234.499623**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	021
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	11.6043911
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-21

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2428.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225003
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	2680555.555556
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2428.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.002000
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.256728
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-229		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	10.113654	10.113654	OK
CU	0.403286	0.403286	OK
TPU	1.287151	1.287151	OK
MDA	0.050132	0.050132	OK
DL	0.019413	0.019413	OK
BP MDA	1.086795	1.086795	OK
BP DL	0.538900	0.538900	OK
DL QSAS			
Gross Count Rate	1.686111	1.686111	OK
BKG Count Rate	0.002778	0.002778	OK
Net Count Rate	1.683333	1.683333	OK
Δ t 1 (t2 - t1)	15.938889	15.938889	OK
DF	0.999996	0.999996	OK
Tracer DPM	11.226772	11.226772	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.666426	0.666426	OK
Chem Rec Factor	0.932065	0.932065	OK
Sys Err	0.061664	0.061664	OK
K	0.166442	0.166442	OK
K MDA	239.675980	239.675980	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	021
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	39.12591553
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-21

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	37.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225003
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2428.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.002000
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.141858**	**0.141858**	**OK**
CU	**0.051720**	**0.051720**	**OK**
TPU	**0.054488**	**0.054488**	**OK**
MDA	**0.044931**	**0.044931**	**OK**
DL	**0.016812**	**0.016812**	**OK**
BP MDA	**0.131418**	**0.131418**	**OK**
BP DL	**0.060185**	**0.060185**	**OK**
DL QSAS			
Gross Count Rate	**0.025694**	**0.025694**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.023611**	**0.023611**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.226772**	**11.226772**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.666426**	**0.666426**	**OK**
Chem Rec Factor	**0.932065**	**0.932065**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.166442**	**0.166442**	**OK**
K MDA	**239.676968**	**239.676968**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	021
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	6.107573986
Version/Date	2.0 -- 4/20/2006

Reviewed by: HW **Date:** 6-24

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	25.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- tUCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2487.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.002000
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.104096**	**0.104096**	**OK**
CU	**0.040806**	**0.040806**	**OK**
TPU	**0.042701**	**0.042701**	**OK**
MDA	**0.011284**	**0.011284**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.475230**	**0.475230**	**OK**
BP DL	**0.232472**	**0.232472**	**OK**
DL QSAS			
Gross Count Rate	**0.017361**	**0.017361**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.017361**	**0.017361**	**OK**
Δ t 1 (t2 - t1)	**16.938889**	**16.938889**	**OK**
DF	**0.983328**	**0.983328**	**OK**
Tracer DPM	**11.226772**	**11.226772**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.685339**	**0.685339**	**OK**
Chem Rec Factor	**0.958516**	**0.958516**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.166779**	**0.166779**	**OK**
K MDA	**240.162321**	**240.162321**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	022
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-01-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_68
Instr keV	14.69784451
Version/Date	2.0 -- 4/20/2006

Reviewed by: KW **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	265.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2487.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.002000
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**1.072520**	**1.072520**	**OK**
CU	**0.130605**	**0.130605**	**OK**
TPU	**0.184012**	**0.184012**	**OK**
MDA	**0.037885**	**0.037885**	**OK**
DL	**0.013417**	**0.013417**	**OK**
BP MDA	**0.742245**	**0.742245**	**OK**
BP DL	**0.366383**	**0.366383**	**OK**
DL QSAS			
Gross Count Rate	**0.184028**	**0.184028**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.182639**	**0.182639**	**OK**
Δ t 1 (t2 - t1)	**16.938889**	**16.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.226772**	**11.226772**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.685339**	**0.685339**	**OK**
Chem Rec Factor	**0.958516**	**0.958516**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.170290**	**0.170290**	**OK**
K MDA	**245.216921**	**245.216921**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	022
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-01-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_68
Instr keV	7.144785881
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	27.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2487.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.002000
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.109886**	**0.109886**	**OK**
CU	**0.041449**	**0.041449**	**OK**
TPU	**0.043525**	**0.043525**	**OK**
MDA	**0.011029**	**0.011029**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.131141**	**0.131141**	**OK**
BP DL	**0.060185**	**0.060185**	**OK**
DL QSAS			
Gross Count Rate	**0.018750**	**0.018750**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.018750**	**0.018750**	**OK**
Δ t 1 (t2 - t1)	**16.938889**	**16.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.226772**	**11.226772**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.685339**	**0.685339**	**OK**
Chem Rec Factor	**0.958516**	**0.958516**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.170631**	**0.170631**	**OK**
K MDA	**245.708442**	**245.708442**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	022
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-01-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_68
Instr keV	6.124101639
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-21

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	41.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2507.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.003000
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.161190	0.161190	OK
CU	0.053121	0.053121	OK
TPU	0.056580	0.056580	OK
MDA	0.038396	0.038396	OK
DL	0.013598	0.013598	OK
BP MDA	0.475146	0.475146	OK
BP DL	0.232472	0.232472	OK
DL QSAS			
Gross Count Rate	0.028472	0.028472	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.027083	0.027083	OK
Δ t 1 (t2 - t1)	16.938889	16.938889	OK
DF	0.983328	0.983328	OK
Tracer DPM	11.237976	11.237976	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.702275	0.702275	OK
Chem Rec Factor	0.982203	0.982203	OK
Sys Err	0.061664	0.061664	OK
K	0.168021	0.168021	OK
K MDA	241.950394	241.950394	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-13
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	023
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-BG-041911
Instr File Name	ApexAlpha
Instr Detector	A_2_1A
Instr keV	7.157671928
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	300.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2507.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.003000
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	1.202222	1.202222	OK
CU	0.138104	0.138104	OK
TPU	0.200462	0.200462	OK
MDA	0.043591	0.043591	OK
DL	0.016311	0.016311	OK
BP MDA	0.742164	0.742164	OK
BP DL	0.366383	0.366383	OK
DL QSAS			
Gross Count Rate	0.208333	0.208333	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.206250	0.206250	OK
Δ t 1 (t2 - t1)	16.938889	16.938889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.237976	11.237976	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.702275	0.702275	OK
Chem Rec Factor	0.982203	0.982203	OK
Sys Err	0.061664	0.061664	OK
K	0.171557	0.171557	OK
K MDA	247.042627	247.042627	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-13
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	023
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-BG-041911
Instr File Name	ApexAlpha
Instr Detector	A_2_1A
Instr keV	54.97091675
Version/Date	2.0 -- 4/20/2006

Reviewed by: HW **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	20.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/19/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2507.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.003000
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.072716	0.072716	OK
CU	0.037139	0.037139	OK
TPU	0.038164	0.038164	OK
MDA	0.037530	0.037530	OK
DL	0.013291	0.013291	OK
BP MDA	0.131059	0.131059	OK
BP DL	0.060185	0.060185	OK
DL QSAS			
Gross Count Rate	0.013889	0.013889	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.012500	0.012500	OK
Δ t 1 (t2 - t1)	16.938889	16.938889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.237976	11.237976	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.702275	0.702275	OK
Chem Rec Factor	0.982203	0.982203	OK
Sys Err	0.061664	0.061664	OK
K	0.171901	0.171901	OK
K MDA	247.537808	247.537808	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-13
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	023
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-BG-041911
Instr File Name	ApexAlpha
Instr Detector	A_2_1A
Instr keV	5.726137161
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	23.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/21/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2756.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008000
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	OK

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.075415	0.075415	OK
CU	0.037685	0.037685	OK
TPU	0.038772	0.038772	OK
MDA	0.040607	0.040607	OK
DL	0.015194	0.015194	OK
BP MDA	0.473244	0.473244	OK
BP DL	0.232011	0.232011	OK
DL QSAS			
Gross Count Rate	0.015972	0.015972	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.013889	0.013889	OK
Δ t 1 (t2 - t1)	14.938889	14.938889	OK
DF	0.985282	0.985282	OK
Tracer DPM	11.293998	11.293998	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.788787	0.788787	OK
Chem Rec Factor	1.103199	1.103199	OK
Sys Err	0.061664	0.061664	OK
K	0.184165	0.184165	OK
K MDA	265.197473	265.197473	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	024
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	SPOP35-110421
Instr File Name	ApexAlpha
Instr Detector	A_2_18
Instr keV	7.318632126
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	161.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/21/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2756.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008000
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.592062**	**0.592062**	**OK**
CU	**0.092313**	**0.092313**	**OK**
TPU	**0.116799**	**0.116799**	**OK**
MDA	**0.027245**	**0.027245**	**OK**
DL	**0.008609**	**0.008609**	**OK**
BP MDA	**0.741222**	**0.741222**	**OK**
BP DL	**0.366383**	**0.366383**	**OK**
DL QSAS			
Gross Count Rate	**0.111806**	**0.111806**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.111111**	**0.111111**	**OK**
Δ t 1 (t2 - t1)	**14.938889**	**14.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.293998**	**11.293998**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.788787**	**0.788787**	**OK**
Chem Rec Factor	**1.103199**	**1.103199**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.187668**	**0.187668**	**OK**
K MDA	**270.242006**	**270.242006**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	024
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	SPOP35-110421
Instr File Name	ApexAlpha
Instr Detector	A_2_1B
Instr keV	8.538403511
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	28.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/21/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2756.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.008000
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.099711**	**0.099711**	**OK**
CU	**0.038979**	**0.038979**	**OK**
TPU	**0.040800**	**0.040800**	**OK**
MDA	**0.027191**	**0.027191**	**OK**
DL	**0.008591**	**0.008591**	**OK**
BP MDA	**0.130119**	**0.130119**	**OK**
BP DL	**0.060185**	**0.060185**	**OK**
DL QSAS			
Gross Count Rate	**0.019444**	**0.019444**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.018750**	**0.018750**	**OK**
Δ t 1 (t2 - t1)	**14.938889**	**14.938889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.293998**	**11.293998**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.788787**	**0.788787**	**OK**
Chem Rec Factor	**1.103199**	**1.103199**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.188044**	**0.188044**	**OK**
K MDA	**270.783675**	**270.783675**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	024
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	SPOP35-110421
Instr File Name	ApexAlpha
Instr Detector	A_2_1B
Instr keV	4.879087925
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	5.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.223188
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2523.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.003000
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.108902
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.012318**	**0.012318**	**OK**
CU	**0.021293**	**0.021293**	**OK**
TPU	**0.021345**	**0.021345**	**OK**
MDA	**0.038145**	**0.038145**	**OK**
DL	**0.013509**	**0.013509**	**OK**
BP MDA	**0.474613**	**0.474613**	**OK**
BP DL	**0.232241**	**0.232241**	**OK**
DL QSAS			
Gross Count Rate	**0.003472**	**0.003472**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.002083**	**0.002083**	**OK**
Δ t 1 (t2 - t1)	**15.938889**	**15.938889**	**OK**
DF	**0.984304**	**0.984304**	**OK**
Tracer DPM	**11.237976**	**11.237976**	**OK**
Tracer Δt	**227.920139**	**227.920139**	**OK**
Tracer DF	**0.999941**	**0.999941**	**OK**
Tracer Recovery	**0.697757**	**0.697757**	**OK**
Chem Rec Factor	**0.975883**	**0.975883**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.169128**	**0.169128**	**OK**
K MDA	**243.543679**	**243.543679**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-15
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	025
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-RM-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_2A
Instr keV	4.902958393
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** _____

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	261.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.223188
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2523.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.003000
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.174543
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	1.034527	1.034527	OK
CU	0.128436	0.128436	OK
TPU	0.179246	0.179246	OK
MDA	0.048367	0.048367	OK
DL	0.018729	0.018729	OK
BP MDA	0.742103	0.742103	OK
BP DL	0.366383	0.366383	OK
DL QSAS			
Gross Count Rate	0.181250	0.181250	OK
BKG Count Rate	0.002778	0.002778	OK
Net Count Rate	0.178472	0.178472	OK
Δ t 1 (t2 - t1)	15.938889	15.938889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.237976	11.237976	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.697757	0.697757	OK
Chem Rec Factor	0.975883	0.975883	OK
Sys Err	0.061664	0.061664	OK
K	0.172516	0.172516	OK
K MDA	248.422760	248.422760	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-15
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	025
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-RM-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_2A
Instr keV	17.97751427
Version/Date	2.0 -- 4/20/2006

Reviewed by: JRW **Date:** 6-21

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	26.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.223188
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4/20/11 12:00 PM
Midpoint Count Date (t2)	5/6/11 10:32 AM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2523.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9/20/10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.003000
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028672
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.104451	0.104451	OK
CU	0.040150	0.040150	OK
TPU	0.042088	0.042088	OK
MDA	0.010887	0.010887	OK
DL	0.000000	0.000000	OK
BP MDA	0.130998	0.130998	OK
BP DL	0.060185	0.060185	OK
DL QSAS			
Gross Count Rate	0.018056	0.018056	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.018056	0.018056	OK
Δ t 1 (t2 - t1)	15.938889	15.938889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.237976	11.237976	OK
Tracer Δt	227.920139	227.920139	OK
Tracer DF	0.999941	0.999941	OK
Tracer Recovery	0.697757	0.697757	OK
Chem Rec Factor	0.975883	0.975883	OK
Sys Err	0.061664	0.061664	OK
K	0.172862	0.172862	OK
K MDA	248.920701	248.920701	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01660
Batch ID	ARS1-B11-01660-15
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	025
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-RM-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_2A
Instr keV	4.902958393
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	6.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2864.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.035500
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.011049	0.011049	OK
CU	0.008841	0.008841	OK
TPU	0.008941	0.008941	OK
MDA	0.004990	0.004990	OK
DL	0.000000	0.000000	OK
BP MDA	0.235603	0.235603	OK
BP OL	0.115554	0.115554	OK
DL QSAS			
Gross Count Rate	0.004167	0.004167	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.004167	0.004167	OK
Δ t 1 (t2 - t1)	2.133484	2.133484	OK
DF	0.997885	0.997885	OK
Tracer DPM	11.602118	11.602118	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.806091	0.806091	OK
Chem Rec Factor	1.127399	1.127399	OK
Sys Err	0.061664	0.061664	OK
K	0.377108	0.377108	OK
K MDA	543.035699	543.035699	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	4.88256979
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-1

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3721.000000
Count Mins	1440.000000
BKG Counts	14.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2864.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.035500
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	6.784696	6.784696	OK
CU	0.219235	0.219235	OK
TPU	0.848803	0.848803	OK
MDA	0.036823	0.036823	OK
DL	0.015931	0.015931	OK
BP MDA	0.381085	0.381085	OK
BP DL	0.188467	0.188467	OK
DL QSAS			
Gross Count Rate	2.584028	2.584028	OK
BKG Count Rate	0.009722	0.009722	OK
Net Count Rate	2.574306	2.574306	OK
Δ t 1 (t2 - t1)	2.133484	2.133484	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.602118	11.602118	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.806091	0.806091	OK
Chem Rec Factor	1.127399	1.127399	OK
Sys Err	0.061664	0.061664	OK
K	0.379428	0.379428	OK
K MDA	546.376690	546.376690	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	53.68243408
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	30.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212453
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.056330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2864.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.035500
Tracer EFF	0.212453
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.045664**	**0.045664**	**OK**
CU	**0.021180**	**0.021180**	**OK**
TPU	**0.021887**	**0.021887**	**OK**
MDA	**0.023954**	**0.023954**	**OK**
DL	**0.009502**	**0.009502**	**OK**
BP MDA	**0.065308**	**0.065308**	**OK**
BP DL	**0.030244**	**0.030244**	**OK**
DL QSAS			
Gross Count Rate	**0.020833**	**0.020833**	**OK**
BKG Count Rate	**0.003472**	**0.003472**	**OK**
Net Count Rate	**0.017361**	**0.017361**	**OK**
Δ t 1 (t2 - t1)	**2.133484**	**2.133484**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.602118**	**11.602118**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.806091**	**0.806091**	**OK**
Chem Rec Factor	**1.127399**	**1.127399**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.380189**	**0.380189**	**OK**
K MDA	**547.471663**	**547.471663**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-01
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1A
Instr keV	4.88256979
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	4.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2469.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.024900
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.002127**	**0.002127**	**OK**
CU	**0.011028**	**0.011028**	**OK**
TPU	**0.011031**	**0.011031**	**OK**
MDA	**0.022902**	**0.022902**	**OK**
DL	**0.008569**	**0.008569**	**OK**
BP MDA	**0.236376**	**0.236376**	**OK**
BP DL	**0.115554**	**0.115554**	**OK**
DL QSAS			
Gross Count Rate	**0.002778**	**0.002778**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.000694**	**0.000694**	**OK**
Δ t 1 (t2 - t1)	**2.133484**	**2.133484**	**OK**
DF	**0.997885**	**0.997885**	**OK**
Tracer DPM	**11.483352**	**11.483352**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.771547**	**0.771547**	**OK**
Chem Rec Factor	**1.079086**	**1.079086**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.326541**	**0.326541**	**OK**
K MDA	**470.218378**	**470.218378**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1B
Instr keV	9.76653862
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-21

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3028.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2469.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.024900
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	6.389616	6.389616	OK
CU	0.228154	0.228154	OK
TPU	0.805250	0.805250	OK
MDA	0.027718	0.027718	OK
DL	0.010995	0.010995	OK
BP MDA	0.381853	0.381853	OK
BP DL	0.188467	0.188467	OK
DL QSAS			
Gross Count Rate	2.102778	2.102778	OK
BKG Count Rate	0.003472	0.003472	OK
Net Count Rate	2.099306	2.099306	OK
Δ t 1 (t2 - t1)	2.133484	2.133484	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.483352	11.483352	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.771547	0.771547	OK
Chem Rec Factor	1.079086	1.079086	OK
Sys Err	0.061664	0.061664	OK
K	0.328550	0.328550	OK
K MDA	473.111365	473.111365	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1B
Instr keV	30.33912277
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-21

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	13.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.192201
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2469.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	17.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.024900
Tracer EFF	0.192201
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.021094	0.021094	OK
CU	0.016538	0.016538	OK
TPU	0.016733	0.016733	OK
MDA	0.022716	0.022716	OK
DL	0.008500	0.008500	OK
BP MDA	0.066075	0.066075	OK
BP DL	0.030244	0.030244	OK
DL QSAS			
Gross Count Rate	0.009028	0.009028	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.006944	0.006944	OK
Δ t 1 (t2 - t1)	2.133484	2.133484	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.483352	11.483352	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.771547	0.771547	OK
Chem Rec Factor	1.079086	1.079086	OK
Sys Err	0.061664	0.061664	OK
K	0.329208	0.329208	OK
K MDA	474.059510	474.059510	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-02
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_1B
Instr keV	7.324903965
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	8.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2751.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.026100
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.013338**	**0.013338**	**OK**
CU	**0.011204**	**0.011204**	**OK**
TPU	**0.011319**	**0.011319**	**OK**
MDA	**0.014029**	**0.014029**	**OK**
DL	**0.004433**	**0.004433**	**OK**
BP MDA	**0.235776**	**0.235776**	**OK**
BP DL	**0.115554**	**0.115554**	**OK**
DL QSAS			
Gross Count Rate	**0.005556**	**0.005556**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.004861**	**0.004861**	**OK**
Δ t 1 (t2 - t1)	**2.133472**	**2.133472**	**OK**
DF	**0.997885**	**0.997885**	**OK**
Tracer DPM	**11.496797**	**11.496797**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.764892**	**0.764892**	**OK**
Chem Rec Factor	**1.069778**	**1.069778**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.364468**	**0.364468**	**OK**
K MDA	**524.833449**	**524.833449**	**OK**
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01985		
Batch ID	ARS1-B11-01985-03		
Analysis Code			
SDG	QC Sample		
Fraction	N/A QC Sample		
Client	QC Sample		
Client Profile			
Client ID	N/A QC Sample		
Instr File Name	ApexAlpha		
Instr Detector	A_1_2A		
Instr keV	4.912463665		
Version/Date	2.0 -- 4/20/2006		

Reviewed by: _____ **Date:** 6-2-1

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	80.000000
Count Mins	1440.000000
BKG Counts	6.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2751.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.026100
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.140135	0.140135	OK
CU	0.034421	0.034421	OK
TPU	0.038362	0.038362	OK
MDA	0.026714	0.026714	OK
DL	0.010791	0.010791	OK
BP MDA	0.381257	0.381257	OK
BP DL	0.188467	0.188467	OK
DL QSAS			
Gross Count Rate	0.055556	0.055556	OK
BKG Count Rate	0.004167	0.004167	OK
Net Count Rate	0.051389	0.051389	OK
Δ t 1 (t2 - t1)	2.133472	2.133472	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.496797	11.496797	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.764892	0.764892	OK
Chem Rec Factor	1.069778	1.069778	OK
Sys Err	0.061664	0.061664	OK
K	0.366710	0.366710	OK
K MDA	528.062447	528.062447	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_2A
Instr keV	7.204946995
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	11.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216391
Sample Aliquot	1.000000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	5-26-11 10:55 AM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2751.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	11.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.026100
Tracer EFF	0.216391
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.017009	0.017009	OK
CU	0.013356	0.013356	OK
TPU	0.013513	0.013513	OK
MDA	0.017557	0.017557	OK
DL	0.006218	0.006218	OK
BP MDA	0.065480	0.065480	OK
BP DL	0.030244	0.030244	OK
DL QSAS			
Gross Count Rate	0.007639	0.007639	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.006250	0.006250	OK
Δ t 1 (t2 - t1)	2.133472	2.133472	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.496797	11.496797	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.764892	0.764892	OK
Chem Rec Factor	1.069778	1.069778	OK
Sys Err	0.061664	0.061664	OK
K	0.367445	0.367445	OK
K MDA	529.120716	529.120716	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-03
Analysis Code	
SDG	QC Sample
Fraction	N/A QC Sample
Client	QC Sample
Client Profile	
Client ID	N/A QC Sample
Instr File Name	ApexAlpha
Instr Detector	A_1_2A
Instr keV	4.912463665
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ Date: 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	3.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	666.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.025000
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.049812	0.049812	OK
CU	0.056367	0.056367	OK
TPU	0.056688	0.056688	OK
MDA	0.044997	0.044997	OK
DL	0.000000	0.000000	OK
BP MDA	0.522979	0.522979	OK
BP DL	0.239505	0.239505	OK
DL QSAS			
Gross Count Rate	0.002083	0.002083	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.002083	0.002083	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	0.962901	0.962901	OK
Tracer DPM	11.484472	11.484472	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.179298	0.179298	OK
Chem Rec Factor	0.250766	0.250766	OK
Sys Err	0.061664	0.061664	OK
K	0.041824	0.041824	OK
K MDA	60.226691	60.226691	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	014
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	PR-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_2B
Instr keV	4.888912201
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	15.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	666.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.025000
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.207010	0.207010	OK
CU	0.128685	0.128685	OK
TPU	0.131095	0.131095	OK
MDA	0.147933	0.147933	OK
DL	0.052390	0.052390	OK
BP MDA	0.795405	0.795405	OK
BP DL	0.376935	0.376935	OK
DL QSAS			
Gross Count Rate	0.010417	0.010417	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.009028	0.009028	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	0.999999	0.999999	OK
Tracer DPM	11.484472	11.484472	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.179298	0.179298	OK
Chem Rec Factor	0.250766	0.250766	OK
Sys Err	0.061664	0.061664	OK
K	0.043610	0.043610	OK
K MDA	62.798771	62.798771	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	014
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	PR-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_28
Instr keV	5.703730583
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ Date: 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	2.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.219564
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	666.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	15.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.025000
Tracer EFF	0.219564
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**-0.015892**	**-0.015892**	**OK**
CU	**0.069650**	**0.069650**	**OK**
TPU	**0.069676**	**0.069676**	**OK**
MDA	**0.171138**	**0.171138**	**OK**
DL	**0.064035**	**0.064035**	**OK**
BP MDA	**0.163784**	**0.163784**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.001389**	**0.001389**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**-0.000694**	**-0.000694**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.484472**	**11.484472**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.179298**	**0.179298**	**OK**
Chem Rec Factor	**0.250766**	**0.250766**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.043698**	**0.043698**	**OK**
K MDA	**62.924680**	**62.924680**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-04
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	014
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	PR-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_28
Instr keV	4.888912201
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	7.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212170
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	862.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.017200
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.087618**	**0.087618**	**OK**
CU	**0.064908**	**0.064908**	**OK**
TPU	**0.065766**	**0.065766**	**OK**
MDA	**0.033921**	**0.033921**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.511903**	**0.511903**	**OK**
BP DL	**0.239505**	**0.239505**	**OK**
DL QSAS			
Gross Count Rate	**0.004861**	**0.004861**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.004861**	**0.004861**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**0.962901**	**0.962901**	**OK**
Tracer DPM	**11.397078**	**11.397078**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.246132**	**0.246132**	**OK**
Chem Rec Factor	**0.344240**	**0.344240**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.055481**	**0.055481**	**OK**
K MDA	**79.892562**	**79.892562**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	015
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	4.911292076
Version/Date	2.0 -- 4/20/2006

Reviewed by: HEW **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	49.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212170
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	862.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.017200
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.528183**	**0.528183**	**OK**
CU	**0.172896**	**0.172896**	**OK**
TPU	**0.184304**	**0.184304**	**OK**
MDA	**0.157421**	**0.157421**	**OK**
DL	**0.062445**	**0.062445**	**OK**
BP MDA	**0.784783**	**0.784783**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.034028**	**0.034028**	**OK**
BKG Count Rate	**0.003472**	**0.003472**	**OK**
Net Count Rate	**0.030556**	**0.030556**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.397078**	**11.397078**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.246132**	**0.246132**	**OK**
Chem Rec Factor	**0.344240**	**0.344240**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.057850**	**0.057850**	**OK**
K MDA	**83.304505**	**83.304505**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	015
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	9.822584152
Version/Date	2.0 -- 4/20/2006

Reviewed by: HCW **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	21.000000
BKG Mins	1440.000000
Instrument Efficiency	0.212170
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	862.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.017200
Tracer EFF	0.212170
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	-0.143762	-0.143762	OK
CU	0.128611	0.128611	OK
TPU	0.129779	0.129779	OK
MDA	0.287902	0.287902	OK
DL	0.127718	0.127718	OK
BP MDA	0.153183	0.153183	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.006250	0.006250	OK
BKG Count Rate	0.014583	0.014583	OK
Net Count Rate	-0.008333	-0.008333	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.397078	11.397078	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.246132	0.246132	OK
Chem Rec Factor	0.344240	0.344240	OK
Sys Err	0.061664	0.061664	OK
K	0.057966	0.057966	OK
K MDA	83.471528	83.471528	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-05
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	015
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_3A
Instr keV	4.911292076
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	10.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	4220.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015500
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.025370	0.025370	OK
CU	0.015724	0.015724	OK
TPU	0.016020	0.016020	OK
MDA	0.006875	0.006875	OK
DL	0.000000	0.000000	OK
BP MDA	0.484383	0.484383	OK
BP DL	0.239268	0.239268	OK
DL QSAS			
Gross Count Rate	0.006944	0.006944	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.006944	0.006944	OK
Δ t 1 (t2 - t1)	37.088889	37.088889	OK
DF	0.963857	0.963857	OK
Tracer DPM	11.378031	11.378031	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	1.248809	1.248809	OK
Chem Rec Factor	1.746586	1.746586	OK
Sys Err	0.061664	0.061664	OK
K	0.273731	0.273731	OK
K MDA	394.172756	394.172756	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	016
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-02-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	4.913847923
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ Date: 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	150.000000
Count Mins	1440.000000
BKG Counts	5.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	4220.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015500
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.353143**	**0.353143**	**OK**
CU	**0.059430**	**0.059430**	**OK**
TPU	**0.073168**	**0.073168**	**OK**
MDA	**0.031938**	**0.031938**	**OK**
DL	**0.012669**	**0.012669**	**OK**
BP MDA	**0.758852**	**0.758852**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.104167**	**0.104167**	**OK**
BKG Count Rate	**0.003472**	**0.003472**	**OK**
Net Count Rate	**0.100694**	**0.100694**	**OK**
Δ t 1 (t2 - t1)	**37.088889**	**37.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.378031**	**11.378031**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**1.248809**	**1.248809**	**OK**
Chem Rec Factor	**1.746586**	**1.746586**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.285138**	**0.285138**	**OK**
K MDA	**410.598826**	**410.598826**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	016
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-02-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	41.76770782
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	11.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.206113
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	4220.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.015500
Tracer EFF	0.206113
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.019445	0.019445	OK
CU	0.017825	0.017825	OK
TPU	0.017979	0.017979	OK
MDA	0.026175	0.026175	OK
DL	0.009794	0.009794	OK
BP MDA	0.127304	0.127304	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.007639	0.007639	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.005556	0.005556	OK
Δ t 1 (t2 - t1)	37.088889	37.088889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.378031	11.378031	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	1.248809	1.248809	OK
Chem Rec Factor	1.746586	1.746586	OK
Sys Err	0.061664	0.061664	OK
K	0.285710	0.285710	OK
K MDA	411.422054	411.422054	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-06
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	016
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RB-02-110421
Instr File Name	ApexAlpha
Instr Detector	A_1_3B
Instr keV	4.913847923
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	8.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2756.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014600
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.023327	0.023327	OK
CU	0.024097	0.024097	OK
TPU	0.024262	0.024262	OK
MDA	0.036119	0.036119	OK
DL	0.012791	0.012791	OK
BP MDA	0.488519	0.488519	OK
BP DL	0.239505	0.239505	OK
DL QSAS			
Gross Count Rate	0.005556	0.005556	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.004167	0.004167	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	0.962901	0.962901	OK
Tracer DPM	11.367947	11.367947	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.744146	0.744146	OK
Chem Rec Factor	1.040763	1.040763	OK
Sys Err	0.061664	0.061664	OK
K	0.178617	0.178617	OK
K MDA	257.208578	257.208578	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-07
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	017
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-02-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4A
Instr keV	7.365706444
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	71.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2756.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014600
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.253549	0.253549	OK
CU	0.062867	0.062867	OK
TPU	0.069938	0.069938	OK
MDA	0.040153	0.040153	OK
DL	0.015024	0.015024	OK
BP MDA	0.762356	0.762356	OK
BP DL	0.376935	0.376935	OK
DL QSAS			
Gross Count Rate	0.049306	0.049306	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.047222	0.047222	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	0.999999	0.999999	OK
Tracer DPM	11.367947	11.367947	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.744146	0.744146	OK
Chem Rec Factor	1.040763	1.040763	OK
Sys Err	0.061664	0.061664	OK
K	0.186245	0.186245	OK
K MDA	268.193094	268.193094	OK
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01985		
Batch ID	ARS1-B11-01985-07		
Analysis Code	ASP-A-008		
SDG	ARS1-11-00897		
Fraction	017		
Client	Summit Environmental Technologies		
Client Profile	Cuyahoga Falls		
Client ID	RM-JM-SW-02-110420		
Instr File Name	ApexAlpha		
Instr Detector	A_1_4A		
Instr keV	6.301770687		
Version/Date	2.0 -- 4/20/2006		

Reviewed by: HLS **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	7.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2756.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014600
Tracer EFF	0.225930
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.022327**	**0.022327**	**OK**
CU	**0.020629**	**0.020629**	**OK**
TPU	**0.020805**	**0.020805**	**OK**
MDA	**0.027398**	**0.027398**	**OK**
DL	**0.008657**	**0.008657**	**OK**
BP MDA	**0.130801**	**0.130801**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.004861**	**0.004861**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.004167**	**0.004167**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.367947**	**11.367947**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.744146**	**0.744146**	**OK**
Chem Rec Factor	**1.040763**	**1.040763**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.186619**	**0.186619**	**OK**
K MDA	**268.730813**	**268.730813**	**OK**
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01985		
Batch ID	ARS1-B11-01985-07		
Analysis Code	ASP-A-008		
SDG	ARS1-11-00897		
Fraction	017		
Client	Summit Environmental Technologies		
Client Profile	Cuyahoga Falls		
Client ID	RM-JM-SW-02-110420		
Instr File Name	ApexAlpha		
Instr Detector	A_1_4A		
Instr keV	4.910470963		
Version/Date	2.0 -- 4/20/2006		

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	5.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225930
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2609.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.019655	0.019655	OK
CU	0.017229	0.017229	OK
TPU	0.017392	0.017392	OK
MDA	0.010653	0.010653	OK
DL	0.000000	0.000000	OK
BP MDA	0.488636	0.488636	OK
BP DL	0.239505	0.239505	OK
DL QSAS			
Gross Count Rate	0.003472	0.003472	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.003472	0.003472	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	0.962901	0.962901	OK
Tracer DPM	11.361224	11.361224	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.735975	0.735975	OK
Chem Rec Factor	1.029335	1.029335	OK
Sys Err	0.061664	0.061664	OK
K	0.176656	0.176656	OK
K MDA	254.384327	254.384327	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	018
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ Date: 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	56.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216447
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2609.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.208567**	**0.208567**	**OK**
CU	**0.059245**	**0.059245**	**OK**
TPU	**0.064385**	**0.064385**	**OK**
MDA	**0.042378**	**0.042378**	**OK**
DL	**0.015857**	**0.015857**	**OK**
BP MDA	**0.762916**	**0.762916**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.038889**	**0.038889**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.036806**	**0.036806**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.361224**	**11.361224**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.735975**	**0.735975**	**OK**
Chem Rec Factor	**1.029335**	**1.029335**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.176469**	**0.176469**	**OK**
K MDA	**254.115102**	**254.115102**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	018
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	7.335418701
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	11.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.216447
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2609.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.014000
Tracer EFF	0.216447
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.035346	0.035346	OK
CU	0.027754	0.027754	OK
TPU	0.028081	0.028081	OK
MDA	0.036485	0.036485	OK
DL	0.012921	0.012921	OK
BP MDA	0.131360	0.131360	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.007639	0.007639	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.006250	0.006250	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.361224	11.361224	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.735975	0.735975	OK
Chem Rec Factor	1.029335	1.029335	OK
Sys Err	0.061664	0.061664	OK
K	0.176823	0.176823	OK
K MDA	254.624595	254.624595	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-08
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	018
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_4B
Instr keV	7.335418701
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2727.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013800
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.023572**	**0.023572**	**OK**
CU	**0.026674**	**0.026674**	**OK**
TPU	**0.026826**	**0.026826**	**OK**
MDA	**0.042307**	**0.042307**	**OK**
DL	**0.015830**	**0.015830**	**OK**
BP MDA	**0.489104**	**0.489104**	**OK**
BP DL	**0.239743**	**0.239743**	**OK**
DL QSAS			
Gross Count Rate	**0.006250**	**0.006250**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.004167**	**0.004167**	**OK**
Δ t 1 (t2 - t1)	**39.088889**	**39.088889**	**OK**
DF	**0.961946**	**0.961946**	**OK**
Tracer DPM	**11.358983**	**11.358983**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.796069**	**0.796069**	**OK**
Chem Rec Factor	**1.113383**	**1.113383**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.176764**	**0.176764**	**OK**
K MDA	**254.539764**	**254.539764**	**OK**
Batch Identifiers and Other Related Information			
Batch	ARS1-B11-01985		
Batch ID	ARS1-B11-01985-09		
Analysis Code	ASP-A-008		
SDG	ARS1-11-00897		
Fraction	019		
Client	Summit Environmental Technologies		
Client Profile	Cuyahoga Falls		
Client ID	RM-SW-BG-110419		
Instr File Name	ApexAlpha		
Instr Detector	A_1_5A		
Instr keV	4.889725208		
Version/Date	2.0 -- 4/20/2006		

Reviewed by: _____ **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	58.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2727.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013800
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.207021**	**0.207021**	**OK**
CU	**0.057620**	**0.057620**	**OK**
TPU	**0.062818**	**0.062818**	**OK**
MDA	**0.040534**	**0.040534**	**OK**
DL	**0.015167**	**0.015167**	**OK**
BP MDA	**0.762452**	**0.762452**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.040278**	**0.040278**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.038194**	**0.038194**	**OK**
Δ t 1 (t2 - t1)	**39.088889**	**39.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.358983**	**11.358983**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.796069**	**0.796069**	**OK**
Chem Rec Factor	**1.113383**	**1.113383**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.184496**	**0.184496**	**OK**
K MDA	**265.673860**	**265.673860**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-09
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	019
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-SW-BG-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_5A
Instr keV	10.4314146
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.209210
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2727.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013800
Tracer EFF	0.209210
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.026295**	**0.026295**	**OK**
CU	**0.024419**	**0.024419**	**OK**
TPU	**0.024625**	**0.024625**	**OK**
MDA	**0.034898**	**0.034898**	**OK**
DL	**0.012359**	**0.012359**	**OK**
BP MDA	**0.130897**	**0.130897**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.006250**	**0.006250**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.004861**	**0.004861**	**OK**
Δ t 1 (t2 - t1)	**39.088889**	**39.088889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.358983**	**11.358983**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.796069**	**0.796069**	**OK**
Chem Rec Factor	**1.113383**	**1.113383**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.184866**	**0.184866**	**OK**
K MDA	**266.206534**	**266.206534**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-09
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	019
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RM-SW-BG-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_5A
Instr keV	4.889725208
Version/Date	2.0 -- 4/20/2006

Reviewed by: HW **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	6.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2652.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013200
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.016146**	**0.016146**	**OK**
CU	**0.022377**	**0.022377**	**OK**
TPU	**0.022462**	**0.022462**	**OK**
MDA	**0.037499**	**0.037499**	**OK**
DL	**0.013280**	**0.013280**	**OK**
BP MDA	**0.488921**	**0.488921**	**OK**
BP DL	**0.239505**	**0.239505**	**OK**
DL QSAS			
Gross Count Rate	**0.004167**	**0.004167**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.002778**	**0.002778**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**0.962901**	**0.962901**	**OK**
Tracer DPM	**11.352261**	**11.352261**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.790942**	**0.790942**	**OK**
Chem Rec Factor	**1.106213**	**1.106213**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.172039**	**0.172039**	**OK**
K MDA	**247.736864**	**247.736864**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	020
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_58
Instr keV	4.906514168
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6/7/1

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	73.000000
Count Mins	1440.000000
BKG Counts	6.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2652.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013200
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.259371**	**0.259371**	**OK**
CU	**0.067440**	**0.067440**	**OK**
TPU	**0.074369**	**0.074369**	**OK**
MDA	**0.054611**	**0.054611**	**OK**
DL	**0.022060**	**0.022060**	**OK**
BP MDA	**0.762743**	**0.762743**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.050694**	**0.050694**	**OK**
BKG Count Rate	**0.004167**	**0.004167**	**OK**
Net Count Rate	**0.046528**	**0.046528**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.352261**	**11.352261**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.790942**	**0.790942**	**OK**
Chem Rec Factor	**1.106213**	**1.106213**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.179387**	**0.179387**	**OK**
K MDA	**258.316876**	**258.316876**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	020
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5B
Instr keV	12.67516136
Version/Date	2.0 -- 4/20/2006

Reviewed by: MW **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2652.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	5.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013200
Tracer EFF	0.204735
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.030908	0.030908	OK
CU	0.023946	0.023946	OK
TPU	0.024236	0.024236	OK
MDA	0.028446	0.028446	OK
DL	0.008988	0.008988	OK
BP MDA	0.131187	0.131187	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.006250	0.006250	OK
BKG Count Rate	0.000694	0.000694	OK
Net Count Rate	0.005556	0.005556	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.352261	11.352261	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.790942	0.790942	OK
Chem Rec Factor	1.106213	1.106213	OK
Sys Err	0.061664	0.061664	OK
K	0.179746	0.179746	OK
K MDA	258.834793	258.834793	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-10
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	020
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-01-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_5B
Instr keV	4.906514168
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-1

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	5.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.204735
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2616.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012900
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.004494**	**0.004494**	**OK**
CU	**0.026426**	**0.026426**	**OK**
TPU	**0.026432**	**0.026432**	**OK**
MDA	**0.054001**	**0.054001**	**OK**
DL	**0.020911**	**0.020911**	**OK**
BP MDA	**0.490162**	**0.490162**	**OK**
BP DL	**0.239505**	**0.239505**	**OK**
DL QSAS			
Gross Count Rate	**0.003472**	**0.003472**	**OK**
BKG Count Rate	**0.002778**	**0.002778**	**OK**
Net Count Rate	**0.000694**	**0.000694**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**0.962901**	**0.962901**	**OK**
Tracer DPM	**11.348899**	**11.348899**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.710389**	**0.710389**	**OK**
Chem Rec Factor	**0.993551**	**0.993551**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.154518**	**0.154518**	**OK**
K MDA	**222.506143**	**222.506143**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	021
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	
Version/Date	2.0 -- 4/20/2006

Reviewed by: HW **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	62.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225003
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2616.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012900
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.227472**	**0.227472**	**OK**
CU	**0.062449**	**0.062449**	**OK**
TPU	**0.068233**	**0.068233**	**OK**
MDA	**0.047124**	**0.047124**	**OK**
DL	**0.018248**	**0.018248**	**OK**
BP MDA	**0.762880**	**0.762880**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.043056**	**0.043056**	**OK**
BKG Count Rate	**0.002778**	**0.002778**	**OK**
Net Count Rate	**0.040278**	**0.040278**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.348899**	**11.348899**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.710389**	**0.710389**	**OK**
Chem Rec Factor	**0.993551**	**0.993551**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.177067**	**0.177067**	**OK**
K MDA	**254.976773**	**254.976773**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	021
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	14.25100708
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	15.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.225003
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2616.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	4.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012900
Tracer EFF	0.225003
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.046969	0.046969	OK
CU	0.032548	0.032548	OK
TPU	0.033039	0.033039	OK
MDA	0.042150	0.042150	OK
DL	0.015771	0.015771	OK
BP MDA	0.131324	0.131324	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.010417	0.010417	OK
BKG Count Rate	0.002083	0.002083	OK
Net Count Rate	0.008333	0.008333	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.348899	11.348899	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.710389	0.710389	OK
Chem Rec Factor	0.993551	0.993551	OK
Sys Err	0.061664	0.061664	OK
K	0.177422	0.177422	OK
K MDA	255.487994	255.487994	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-11
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	021
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-JM-SW-110420
Instr File Name	ApexAlpha
Instr Detector	A_1_6A
Instr keV	4.886059284
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	7.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2583.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013100
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.029004**	**0.029004**	**OK**
CU	**0.021487**	**0.021487**	**OK**
TPU	**0.021771**	**0.021771**	**OK**
MDA	**0.011229**	**0.011229**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.489686**	**0.489686**	**OK**
BP DL	**0.239743**	**0.239743**	**OK**
DL QSAS			
Gross Count Rate	**0.004861**	**0.004861**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.004861**	**0.004861**	**OK**
Δ t 1 (t2 - t1)	**39.088889**	**39.088889**	**OK**
DF	**0.961946**	**0.961946**	**OK**
Tracer DPM	**11.351140**	**11.351140**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.704020**	**0.704020**	**OK**
Chem Rec Factor	**0.984643**	**0.984643**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.167600**	**0.167600**	**OK**
K MDA	**241.344002**	**241.344002**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	022
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-01-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_6B
Instr keV	4.899281502
Version/Date	2.0 -- 4/20/2006

Reviewed by: HW **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	128.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2583.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013100
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.500197**	**0.500197**	**OK**
CU	**0.088715**	**0.088715**	**OK**
TPU	**0.107355**	**0.107355**	**OK**
MDA	**0.036880**	**0.036880**	**OK**
DL	**0.013061**	**0.013061**	**OK**
BP MDA	**0.763010**	**0.763010**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.088889**	**0.088889**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.087500**	**0.087500**	**OK**
Δ t 1 (t2 - t1)	**39.088889**	**39.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.351140**	**11.351140**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.704020**	**0.704020**	**OK**
Chem Rec Factor	**0.984643**	**0.984643**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.174931**	**0.174931**	**OK**
K MDA	**251.900888**	**251.900888**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	022
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-01-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_6B
Instr keV	8.340443611
Version/Date	2.0 -- 4/20/2006

Reviewed by: GRW **Date:** 6-7-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	17.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.224300
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2583.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	2.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013100
Tracer EFF	0.224300
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.067352	0.067352	OK
CU	0.032017	0.032017	OK
TPU	0.033036	0.033036	OK
MDA	0.010737	0.010737	OK
DL	0.000000	0.000000	OK
BP MDA	0.131453	0.131453	OK
BP DL	0.060488	0.060488	OK
DL QSAS			
Gross Count Rate	0.011806	0.011806	OK
BKG Count Rate	0.000000	0.000000	OK
Net Count Rate	0.011806	0.011806	OK
Δ t 1 (t2 - t1)	39.088889	39.088889	OK
DF	1.000000	1.000000	OK
Tracer DPM	11.351140	11.351140	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.704020	0.704020	OK
Chem Rec Factor	0.984643	0.984643	OK
Sys Err	0.061664	0.061664	OK
K	0.175282	0.175282	OK
K MDA	252.405947	252.405947	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-12
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	022
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-01-110419
Instr File Name	ApexAlpha
Instr Detector	A_1_6B
Instr keV	4.899281502
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	6.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2383.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013400
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.017964	0.017964	OK
CU	0.024897	0.024897	OK
TPU	0.024991	0.024991	OK
MDA	0.041721	0.041721	OK
DL	0.014775	0.014775	OK
BP MDA	0.490628	0.490628	OK
BP DL	0.239743	0.239743	OK
DL QSAS			
Gross Count Rate	0.004167	0.004167	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.002778	0.002778	OK
Δ t 1 (t2 - t1)	39.088889	39.088889	OK
DF	0.961946	0.961946	OK
Tracer DPM	11.354501	11.354501	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.660679	0.660679	OK
Chem Rec Factor	0.924027	0.924027	OK
Sys Err	0.061664	0.061664	OK
K	0.154632	0.154632	OK
K MDA	222.669984	222.669984	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-13
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	023
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-BG-041911
Instr File Name	ApexAlpha
Instr Detector	A_2_1A
Instr keV	4.908117771
Version/Date	2.0 -- 4/20/2006

Reviewed by: dlw **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	60.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2383.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013400
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.245256**	**0.245256**	**OK**
CU	**0.066938**	**0.066938**	**OK**
TPU	**0.073207**	**0.073207**	**OK**
MDA	**0.046335**	**0.046335**	**OK**
DL	**0.017338**	**0.017338**	**OK**
BP MDA	**0.763912**	**0.763912**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.041667**	**0.041667**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.039583**	**0.039583**	**OK**
Δ t 1 (t2 - t1)	**39.088889**	**39.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.354501**	**11.354501**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.660679**	**0.660679**	**OK**
Chem Rec Factor	**0.924027**	**0.924027**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.161396**	**0.161396**	**OK**
K MDA	**232.410030**	**232.410030**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-13
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	023
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-BG-041911
Instr File Name	ApexAlpha
Instr Detector	A_2_1A
Instr keV	6.441904545
Version/Date	2.0 -- 4/20/2006

Reviewed by: GWO **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	5.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.220520
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-19-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2383.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.013400
Tracer EFF	0.220520
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.012882**	**0.012882**	**OK**
CU	**0.022268**	**0.022268**	**OK**
TPU	**0.022322**	**0.022322**	**OK**
MDA	**0.039892**	**0.039892**	**OK**
DL	**0.014128**	**0.014128**	**OK**
BP MDA	**0.132354**	**0.132354**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.003472**	**0.003472**	**OK**
BKG Count Rate	**0.001389**	**0.001389**	**OK**
Net Count Rate	**0.002083**	**0.002083**	**OK**
Δ t 1 (t2 - t1)	**39.088889**	**39.088889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.354501**	**11.354501**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.660679**	**0.660679**	**OK**
Chem Rec Factor	**0.924027**	**0.924027**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.161719**	**0.161719**	**OK**
K MDA	**232.876010**	**232.876010**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-13
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	023
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	RP-SW-BG-041911
Instr File Name	ApexAlpha
Instr Detector	A_2_1A
Instr keV	4.908117771
Version/Date	2.0 -- 4/20/2006

Reviewed by: SHW **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	36.000000
Count Mins	1440.000000
BKG Counts	3.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2596.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012700
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.135673**	**0.135673**	**OK**
CU	**0.050323**	**0.050323**	**OK**
TPU	**0.052927**	**0.052927**	**OK**
MDA	**0.044274**	**0.044274**	**OK**
DL	**0.016566**	**0.016566**	**OK**
BP MDA	**0.488650**	**0.488650**	**OK**
BP DL	**0.239268**	**0.239268**	**OK**
DL QSAS			
Gross Count Rate	**0.025000**	**0.025000**	**OK**
BKG Count Rate	**0.002083**	**0.002083**	**OK**
Net Count Rate	**0.022917**	**0.022917**	**OK**
Δ t 1 (t2 - t1)	**37.088889**	**37.088889**	**OK**
DF	**0.963857**	**0.963857**	**OK**
Tracer DPM	**11.346658**	**11.346658**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.739534**	**0.739534**	**OK**
Chem Rec Factor	**1.034313**	**1.034313**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.168911**	**0.168911**	**OK**
K MDA	**243.231313**	**243.231313**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	024
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	SPOP35-110421
Instr File Name	ApexAlpha
Instr Detector	A_2_1B
Instr keV	11.46585655
Version/Date	2.0 -- 4/20/2006

Reviewed by: SHW **Date:** 6-2-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	142.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi -- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	5-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2596.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012700
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.556504**	**0.556504**	**OK**
CU	**0.092507**	**0.092507**	**OK**
TPU	**0.114374**	**0.114374**	**OK**
MDA	**0.029060**	**0.029060**	**OK**
DL	**0.009182**	**0.009182**	**OK**
BP MDA	**0.762948**	**0.762948**	**OK**
BP DL	**0.376935**	**0.376935**	**OK**
DL QSAS			
Gross Count Rate	**0.098611**	**0.098611**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.097917**	**0.097917**	**OK**
Δ t 1 (t2 - t1)	**37.088889**	**37.088889**	**OK**
DF	**0.999999**	**0.999999**	**OK**
Tracer DPM	**11.346658**	**11.346658**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.739534**	**0.739534**	**OK**
Chem Rec Factor	**1.034313**	**1.034313**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.175950**	**0.175950**	**OK**
K MDA	**253.367311**	**253.367311**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	024
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	SPOP35-110421
Instr File Name	ApexAlpha
Instr Detector	A_2_1B
Instr keV	31.91736603
Version/Date	2.0 -- 4/20/2006

Reviewed by: HW **Date:** 6-27

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	13.000000
Count Mins	1440.000000
BKG Counts	1.000000
BKG Mins	1440.000000
Instrument Efficiency	0.214772
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-21-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2596.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	1.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.012700
Tracer EFF	0.214772
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
0 **Variables Intact Test**	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.047267**	**0.047267**	**OK**
CU	**0.028887**	**0.028887**	**OK**
TPU	**0.029446**	**0.029446**	**OK**
MDA	**0.029001**	**0.029001**	**OK**
DL	**0.009163**	**0.009163**	**OK**
BP MDA	**0.131391**	**0.131391**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.009028**	**0.009028**	**OK**
BKG Count Rate	**0.000694**	**0.000694**	**OK**
Net Count Rate	**0.008333**	**0.008333**	**OK**
Δ t 1 (t2 - t1)	**37.088889**	**37.088889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.346658**	**11.346658**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.739534**	**0.739534**	**OK**
Chem Rec Factor	**1.034313**	**1.034313**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.176302**	**0.176302**	**OK**
K MDA	**253.875298**	**253.875298**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-14
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	024
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	SPOP35-110421
Instr File Name	ApexAlpha
Instr Detector	A_2_1B
Instr keV	4.879087925
Version/Date	2.0 -- 4/20/2006

Reviewed by: HW **Date:** 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	9.000000
Count Mins	1440.000000
BKG Counts	2.000000
BKG Mins	1440.000000
Instrument Efficiency	0.223188
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.994000
Halflife Days 1 - Result Isotope	698.356481
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2523.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.011100
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.109866
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-228		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.029618	0.029618	OK
CU	0.027505	0.027505	OK
TPU	0.027737	0.027737	OK
MDA	0.039308	0.039308	OK
DL	0.013921	0.013921	OK
BP MDA	0.489449	0.489449	OK
BP DL	0.239505	0.239505	OK
DL QSAS			
Gross Count Rate	0.006250	0.006250	OK
BKG Count Rate	0.001389	0.001389	OK
Net Count Rate	0.004861	0.004861	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	0.962901	0.962901	OK
Tracer DPM	11.328731	11.328731	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.692171	0.692171	OK
Chem Rec Factor	0.968071	0.968071	OK
Sys Err	0.061664	0.061664	OK
K	0.164125	0.164125	OK
K MDA	236.340585	236.340585	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-15
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	025
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-RM-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_2A
Instr keV	4.902958393
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-21

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	120.000000
Count Mins	1440.000000
BKG Counts	4.000000
BKG Mins	1440.000000
Instrument Efficiency	0.223188
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	0.998000
Halflife Days 1 - Result Isotope	27534722.222222
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2523.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.011100
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.179570
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-230		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	0.470714	0.470714	OK
CU	0.088566	0.088566	OK
TPU	0.105264	0.105264	OK
MDA	0.048758	0.048758	OK
DL	0.018880	0.018880	OK
BP MDA	0.763248	0.763248	OK
BP DL	0.376935	0.376935	OK
DL QSAS			
Gross Count Rate	0.083333	0.083333	OK
BKG Count Rate	0.002778	0.002778	OK
Net Count Rate	0.080556	0.080556	OK
Δ t 1 (t2 - t1)	38.088889	38.088889	OK
DF	0.999999	0.999999	OK
Tracer DPM	11.328731	11.328731	OK
Tracer Δt	250.070139	250.070139	OK
Tracer DF	0.999935	0.999935	OK
Tracer Recovery	0.692171	0.692171	OK
Chem Rec Factor	0.968071	0.968071	OK
Sys Err	0.061664	0.061664	OK
K	0.171135	0.171135	OK
K MDA	246.433900	246.433900	OK

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-15
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	025
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-RM-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_2A
Instr keV	9.805916786
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ Date: 6-27-11

Calculation Verification

Procedure	ARS-031
Variable	**Value**
Counts	11.000000
Count Mins	1440.000000
BKG Counts	0.000000
BKG Mins	1440.000000
Instrument Efficiency	0.223188
Sample Aliquot	0.500000
Aliquot Conversion Factor	1.000000
Sample Collection Date (t1)	4-20-11 12:00 PM
Midpoint Count Date (t2)	5-28-11 2:08 PM
Activity Units = pCi --- UCF =	2.2200
CF	1.9600
Nuclide Abundance	1.000000
Halflife Days 1 - Result Isotope	5131944444444.440000
TPUF_Calibration Factor	0.000000
TPUF_Aliquoting Factor	0.020000
TPUF_Yield Factor	0.058330
TPUF_Decay Ingrowth Factor	0.000000
TPUF_Analysis Factor	0.000000
TPUF_Unassigned Factor	0.000000
Tracer ID	S-0246
Tracer Std - Isotope	Th-229
Tracer Counts	2523.000000
Tracer Count Mins	1440.000000
Tracer BKG Counts	3.000000
Tracer BKG Mins	1440.000000
Tracer Ref Date	9-20-10 12:27 PM
Tracer DPM/g	11.2044
Tracer Net Wt Added g	1.011100
Tracer EFF	0.223188
Tracer Plating Rec	0.715000
Tracer Abundance	1.000000
Tracer Halflife Days	2680555.5556
Sb	0.028816
Activity Units	pCi
Aliquot Units	L
Variables Intact Test	**OK**

Isotope	TH-232		
Calculated Values	**Excel**	**VBA**	**V/V**
ACT	**0.044547**	**0.044547**	**OK**
CU	**0.026326**	**0.026326**	**OK**
TPU	**0.026871**	**0.026871**	**OK**
MDA	**0.010975**	**0.010975**	**OK**
DL	**0.000000**	**0.000000**	**OK**
BP MDA	**0.131692**	**0.131692**	**OK**
BP DL	**0.060488**	**0.060488**	**OK**
DL QSAS			
Gross Count Rate	**0.007639**	**0.007639**	**OK**
BKG Count Rate	**0.000000**	**0.000000**	**OK**
Net Count Rate	**0.007639**	**0.007639**	**OK**
Δ t 1 (t2 - t1)	**38.088889**	**38.088889**	**OK**
DF	**1.000000**	**1.000000**	**OK**
Tracer DPM	**11.328731**	**11.328731**	**OK**
Tracer Δt	**250.070139**	**250.070139**	**OK**
Tracer DF	**0.999935**	**0.999935**	**OK**
Tracer Recovery	**0.692171**	**0.692171**	**OK**
Chem Rec Factor	**0.968071**	**0.968071**	**OK**
Sys Err	**0.061664**	**0.061664**	**OK**
K	**0.171478**	**0.171478**	**OK**
K MDA	**246.927992**	**246.927992**	**OK**

Batch Identifiers and Other Related Information	
Batch	ARS1-B11-01985
Batch ID	ARS1-B11-01985-15
Analysis Code	ASP-A-008
SDG	ARS1-11-00897
Fraction	025
Client	Summit Environmental Technologies
Client Profile	Cuyahoga Falls
Client ID	MW-RM-110420
Instr File Name	ApexAlpha
Instr Detector	A_2_2A
Instr keV	4.902958393
Version/Date	2.0 -- 4/20/2006

Reviewed by: _____ **Date:** 6-27

AMERICAN RADIATION SERVICES, INC.

2609 North River Road • Port Allen, Louisiana 70767

1 (800) 401-4277 • Fax (225) 381-2996

American Radiation Services Analytical Reports

for

Summit Environmental Technologies

Thorium Alpha Spectroscopy Laboratory Records

Analysis Batch Report

Analysis Batch ID **ARS1-B11-01657**

Method	ARS-031	Analysis	ASP-A-008	Matrix	AQ
Description	Thorium in Water				

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Client ID	Isotope Group	Lab Deadline
ARS1-B11-01657-01	LCS	B-11678								
ARS1-B11-01657-02	LCSD	B-11679								
ARS1-B11-01657-03	MBL									
ARS1-B11-01657-04	TRG				**ARS1-11-00897**	001	1	MW-1-110419	STD	05/03/11
ARS1-B11-01657-05	TRG				**ARS1-11-00897**	002	1	MW-2-110421	STD	05/03/11
ARS1-B11-01657-06	TRG				**ARS1-11-00897**	003	1	MW-2-2-110421	STD	05/03/11
ARS1-B11-01657-07	TRG				**ARS1-11-00897**	004	1	JPOP41S-110421	STD	05/03/11
ARS1-B11-01657-08	TRG				**ARS1-11-00897**	005	1	MD-SW-110420	STD	05/03/11
ARS1-B11-01657-09	TRG				**ARS1-11-00897**	006	1	MW-3-110420	STD	05/03/11
ARS1-B11-01657-10	TRG				**ARS1-11-00897**	007	1	MW-4-110420	STD	05/03/11
ARS1-B11-01657-11	TRG				**ARS1-11-00897**	008	1	MW-6-110420	STD	05/03/11
ARS1-B11-01657-12	TRG				**ARS1-11-00897**	009	1	MW-7-110419	STD	05/03/11
ARS1-B11-01657-13	TRG				**ARS1-11-00897**	010	1	MW-8-110419	STD	05/03/11
ARS1-B11-01657-14	TRG				**ARS1-11-00897**	011	1	MW-MD-02-110420	STD	05/03/11
ARS1-B11-01657-15	TRG				**ARS1-11-00897**	012	1	MW-MD-110420	STD	05/03/11
ARS1-B11-01657-16	TRG				**ARS1-11-00897**	013	1	NPOP20E-110420	STD	05/03/11

Technical Notes

Batch	**ARS1-B11-01657**
Analysis Code	**ASP-A-008**
Procedure No.	**ARS-031**
Matrix	**AQ**

#	Date	Dept	Batch Technical Notes	User ID
1	05/04/11 11:10	**CHEMISTRY**	B11-01657-03,13,14,15 did not seem to plate well. There is a cloudy film that plated onto the disk. Tracer recovery/activity could be affected.	JBROWN
2	05/06/11 14:52	**COUNTROOM**	The following spectral anomalies were identified in the counting results for this batch. Heavy peak trailing was encountered on the Th-229 peak for B11-01657-07 thru -09 & -11 thru -16. This causes blending of the Th-229 & Th-230 peaks and likely caused false detection of Th-230 counts in each of the samples in question. Also, Th-232 was not identified in B11-01657-02. A small of amount of unidentified isotope was used in place for calculation purposes, but the centroid energy would be low out of acceptable range.	[illegible]
3	05/06/11 16:36	**MGMT**	The method blank for Th-230 failed evaluation criteria for samples ARS1-11-00897-002 and 003. However, review of the data shows that both samples have activities that are less than the MDC and are less than the value of the blank. The results can be reported.	VMULLIGAN

Technical Notes

[redacted]	**ARS1-B11-01657**
[redacted]	**ASP-A-008**
[redacted]	**ARS-031**
[redacted]	**AQ**

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
1	05/04/11 11:10	**CHEMISTRY**	B11-01657-03,13,14,15 did not seem to plate well. There is a cloudy film that plated onto the disk. Tracer recovery/activity could be affected.	JBROWN
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

American Radiation Services
Baton Rouge Laboratory

LCS Report
Analytical Batch: ARS1-B11-01657

BlindID	ABatch	ABatchSampleID	BlindGroup	StdID	Isotope	ExpectedAddition	ExpectedValue	EmptyWt	GrossWt	NetWt	UserID	ModDate	ExpectedValue_CT	MidPointCountDate	KnownValue
B-11678	ARS1-B11-01657	ARS1-B11-01657-01	B-Th230	S-0231	Th-230	1	5.656931968	13.2586	14.2942	1.0356	VMULLIGAN	4/28/2011	5.656930971	5/5/2011	5.858317714
B-11679	ARS1-B11-01657	ARS1-B11-01657-02	B-Th230	S-0231	Th-230	1	5.656931968	13.5466	14.5793	1.0327	VMULLIGAN	4/28/2011	5.656930971	5/5/2011	5.841912614

ARS-031

ID_31001_031	ABatch	ABatchSampleID	ClientID	Aliquot	AliquotUnits	UserID	ModDate	IC_ID
2930	ARS1-B11-01657	ARS1-B11-01657-01		1	L	JBROWN	05/04/2011 08:24:58	
2931	ARS1-B11-01657	ARS1-B11-01657-02		1	L	JBROWN	05/04/2011 08:24:58	
2932	ARS1-B11-01657	ARS1-B11-01657-03		1	L	JBROWN	05/04/2011 08:24:58	
2933	ARS1-B11-01657	ARS1-B11-01657-04	MW-1-110419	0.5	L	JBROWN	05/04/2011 08:24:58	86077
2934	ARS1-B11-01657	ARS1-B11-01657-05	MW-2-110421	0.5	L	JBROWN	05/04/2011 08:24:58	86078
2935	ARS1-B11-01657	ARS1-B11-01657-06	MW-2-2-110421	0.5	L	JBROWN	05/04/2011 08:24:58	86079
2936	ARS1-B11-01657	ARS1-B11-01657-07	JPOP41S-110421	0.1	L	JBROWN	05/04/2011 08:24:59	86080
2937	ARS1-B11-01657	ARS1-B11-01657-08	MD-SW-110420	0.5	L	JBROWN	05/04/2011 08:24:59	86081
2938	ARS1-B11-01657	ARS1-B11-01657-09	MW-3-110420	0.5	L	JBROWN	05/04/2011 08:24:59	86082
2939	ARS1-B11-01657	ARS1-B11-01657-10	MW-4-110420	0.5	L	JBROWN	05/04/2011 08:24:59	86083
2940	ARS1-B11-01657	ARS1-B11-01657-11	MW-6-110420	0.5	L	JBROWN	05/04/2011 08:24:59	86084
2941	ARS1-B11-01657	ARS1-B11-01657-12	MW-7-110419	0.5	L	JBROWN	05/04/2011 08:24:59	86085
2942	ARS1-B11-01657	ARS1-B11-01657-13	MW-8-110419	0.5	L	JBROWN	05/04/2011 08:24:59	86086
2943	ARS1-B11-01657	ARS1-B11-01657-14	MW-MD-02-110420	0.5	L	JBROWN	05/04/2011 08:24:59	86087
2944	ARS1-B11-01657	ARS1-B11-01657-15	MW-MD-110420	0.5	L	JBROWN	05/04/2011 08:25:00	86088
2945	ARS1-B11-01657	ARS1-B11-01657-16	NPOP20E-110420	0.1	L	JBROWN	05/04/2011 08:25:00	86089

ARS1-B11-01657

ABatch	ABatchSampleID	ClientID	SampleType	EmptyWt	FilledWt	NetWt	Exp Val	StdID	Isotope	TracerDate	UserID	ModDate	HL days	Ref Date	Cert dpm/g	Curr ACT
ARS1-B11-01657	ARS1-B11-01657-01		LCS	54.130	55.146	1.016	11.378	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-02		LCSD	62.401	63.416	1.016	11.377	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-03		MBL	78.677	79.692	1.015	11.368	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-04	MW-1-110419	TRG	399.868	400.890	1.022	11.450	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-05	MW-2-110421	TRG	450.683	451.701	1.018	11.405	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-06	MW-2-2-110421	TRG	452.115	453.134	1.019	11.417	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-07	JPOP41S-110421	TRG	199.054	200.079	1.025	11.484	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-08	MD-SW-110420	TRG	454.322	455.340	1.018	11.405	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-09	MW-3-110420	TRG	451.648	452.663	1.015	11.372	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-10	MW-4-110420	TRG	383.457	384.472	1.015	11.372	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-11	MW-6-110420	TRG	446.590	447.601	1.011	11.327	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-12	MW-7-110419	TRG	449.039	450.053	1.014	11.361	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-13	MW-8-110419	TRG	440.146	441.154	1.008	11.293	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-14	MW-MD-02-110420	TRG	441.227	442.228	1.001	11.215	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-15	MW-MD-110420	TRG	456.671	457.672	1.001	11.215	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01657	ARS1-B11-01657-16	NPOP20E-110420	TRG	196.164	197.186	1.022	11.450	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204

Technical Notes

Batch	ARS1-B11-01657
Analysis Code	ASP-A-008
Procedure No	ARS-031
Matrix	AQ

#	Date	Dept	Batch Technical Notes	User
1	05/04/11 11:10	CHEMISTRY	B11-01657-03,13,14,15 did not seem to plate well. There is a cloudy film that plated onto the disk. Tracer recovery/activity could be affected.	JBROWN

5/5/2011 03:51:52

Apex-Alpha™

ASSIGNED SAMPLES REPORT

Date : 5/5/2011
Time : 03:51:52
User : countroom

SAMPLE	CHAMBER	GEOMETRY	DEVICE	CERTIFICATE
11-01657-01	A_1_1A	Shelf 2	Alpha Analyst10139	
11-01657-02	A_1_1B	Shelf 2	Alpha Analyst10139	
11-01657-03	A_1_2A	Shelf 2	Alpha Analyst10139	
11-01657-04	A_1_2B	Shelf 2	Alpha Analyst10139	
11-01657-05	A_1_3A	Shelf 2	Alpha Analyst10139	
11-01657-06	A_1_3B	Shelf 2	Alpha Analyst10139	
11-01657-07	A_1_4A	Shelf 2	Alpha Analyst10139	
11-01657-08	A_1_4B	Shelf 2	Alpha Analyst10139	
11-01657-09	A_1_5A	Shelf 2	Alpha Analyst10139	
11-01657-10	A_1_5B	Shelf 2	Alpha Analyst10139	
11-01657-11	A_1_6A	Shelf 2	Alpha Analyst10139	
11-01657-12	A_1_6B	Shelf 2	Alpha Analyst10139	
11-01657-13	A_2_1A	Shelf 2	Alpha Analyst10139	
11-01657-14	A_2_1B	Shelf 2	Alpha Analyst10139	
11-01657-15	A_2_2A	Shelf 2	Alpha Analyst10139	
11-01657-16	A_2_3B	Shelf 2	Alpha Analyst10139	
11-01647-01	A_2_4A	Shelf 2	Alpha Analyst10139	
11-01647-02	A_2_4B	Shelf 2	Alpha Analyst10139	
11-01647-03	A_2_5A	Shelf 2	Alpha Analyst10139	
11-01647-04	A_2_5B	Shelf 2	Alpha Analyst10139	
11-01647-05	A_3_1A	Shelf 2	Alpha Analyst10139	
11-01647-06	A_3_1B	Shelf 2	Alpha Analyst10139	
11-01647-07	A_3_2B	Shelf 2	Alpha Analyst10139	
11-01647-08	A_3_3A	Shelf 2	Alpha Analyst10139	
11-01647-09	A_3_3B	Shelf 2	Alpha Analyst10139	
11-01647-10	A_3_4B	Shelf 2	Alpha Analyst10139	
11-01647-11	A_3_5A	Shelf 2	Alpha Analyst10139	
11-01647-12	A_3_6A	Shelf 2	Alpha Analyst10139	
11-01647-13	A_3_6B	Shelf 2	Alpha Analyst10139	

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: LCS
Batch Identification: B11-01657
Sample Identification: 11-01657-01
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 1A
Chamber Serial Number: 10043743A
Detector Serial Number: 57895
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:07
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2125 +/- 0.0044 on 4/9/10 20:56:03
Effective Efficiency: 0.2125 +/- 0.0044

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

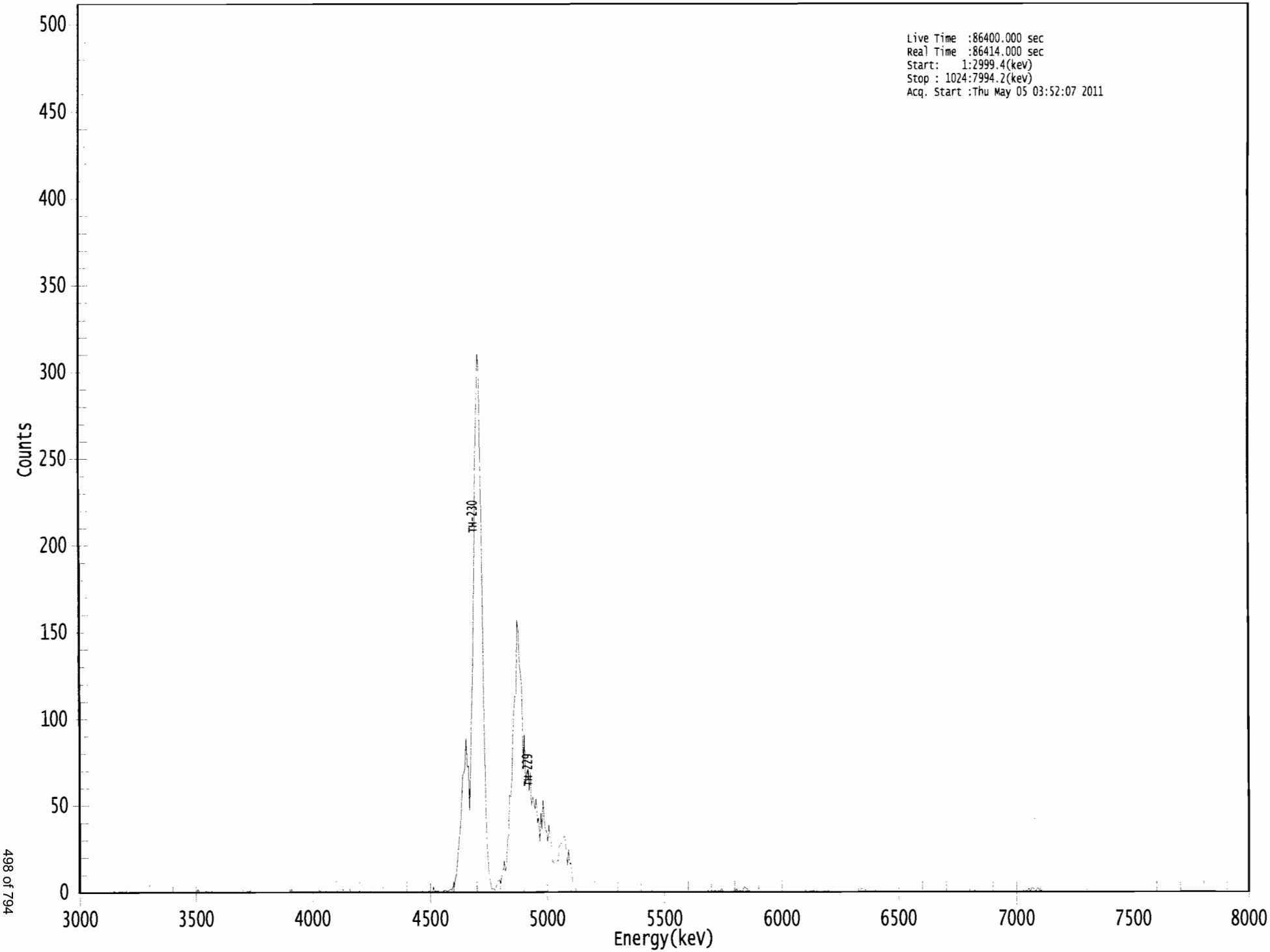
Nuclide	Energy (MeV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5.458	2.00	1.41	0.00	0.00E+000	4.9
TH-229	4.924	3073.00	55.43	0.00	0.00E+000	45.5
TH-230	4.695	3355.00	57.92	0.00	0.00E+000	40.1
TH-232	3.994	4.00	2.00	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	2.9465E-003	70.74	3.9867E-003	2.06
TH-229	4.5465E+000	2.74	4.0035E-003	2.06
TH-230	4.9488E+000	2.69	3.9915E-003	2.06
TH-232	5.8896E-003	50.04	3.9843E-003	2.06

Errors quoted at 1.000 sigma

0000012136.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: LCSD
Batch Identification: B11-01657
Sample Identification: 11-01657-02
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 1B
Chamber Serial Number: 10043743B
Detector Serial Number: 57896
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:09
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1922 +/- 0.0040 on 4/9/10 20:56:53
Effective Efficiency: 0.1922 +/- 0.0040

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

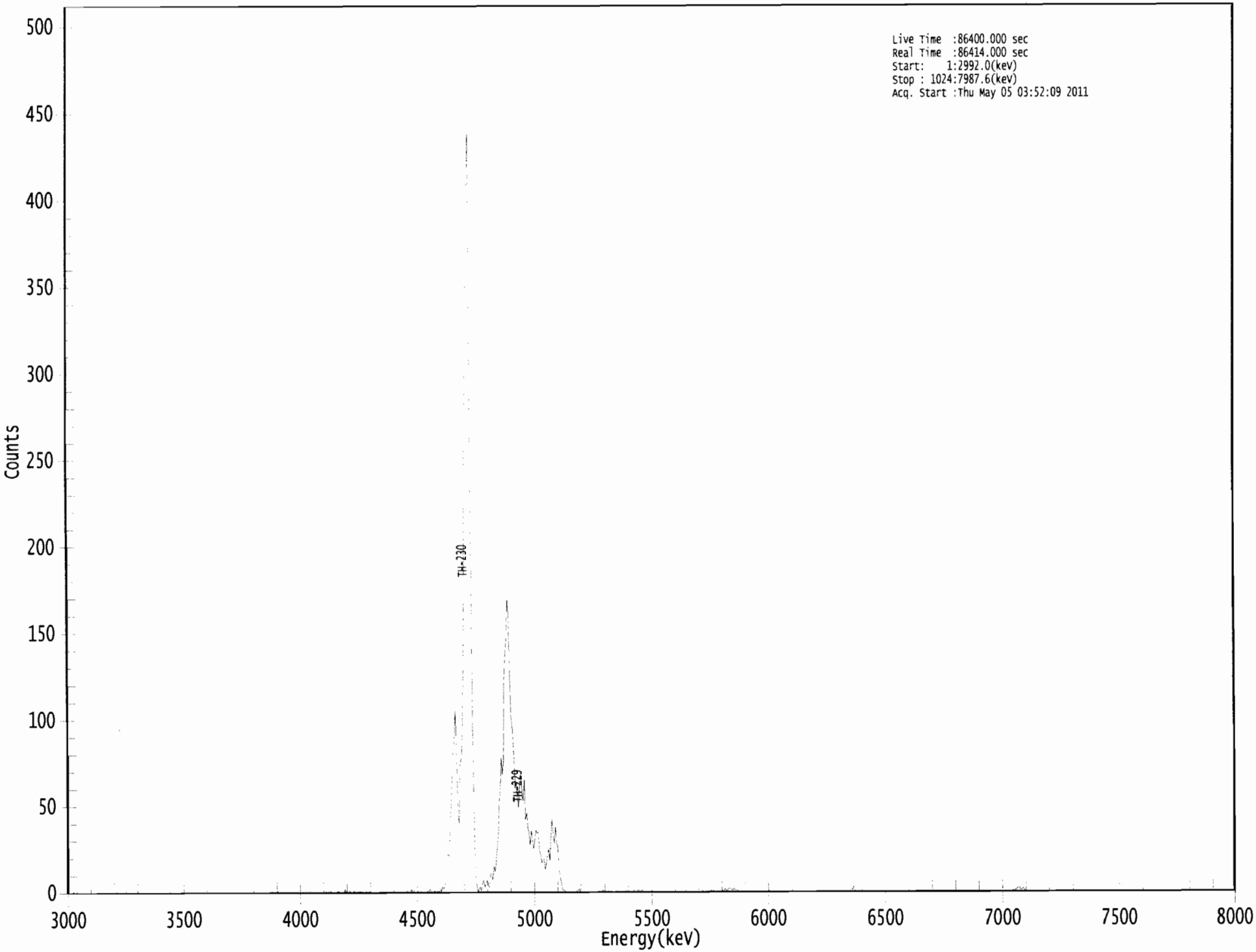
Nuclide	Energy (MeV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5.385	2.00	1.41	0.00	0.00E+000	4.9
TH-229	4.925	3051.00	55.24	0.00	0.00E+000	42.1
TH-230	4.698	3404.00	58.34	0.00	0.00E+000	27.4
<not ID'd>	3.900	2.00	1.41	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	3.2570E-003	70.74	4.4068E-003	2.06
TH-229	4.9895E+000	2.74	4.4254E-003	2.06
TH-230	5.5501E+000	2.68	4.4121E-003	2.06

Errors quoted at 1.000 sigma

0000012137.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: MBL
Batch Identification: B11-01657
Sample Identification: 11-01657-03
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 2A
Chamber Serial Number: 10043744A
Detector Serial Number: 57897
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:10
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2164 +/- 0.0044 on 4/9/10 20:57:28
Effective Efficiency: 0.2164 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

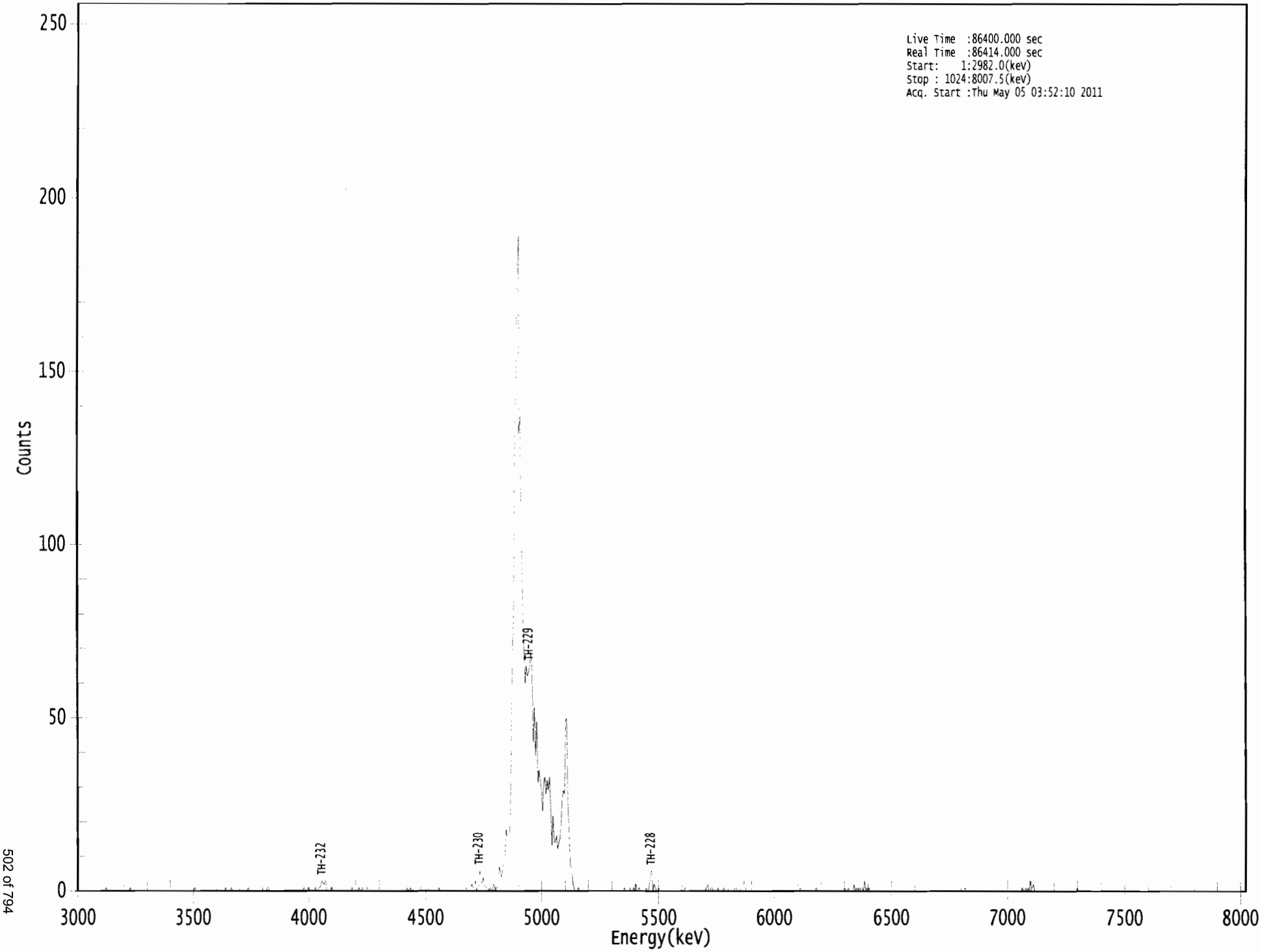
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5450.992	17.00	4.12	0.00	0.00E+000	10.6
TH-229	4930.855	2847.00	53.36	0.00	0.00E+000	34.2
TH-230	4715.654	30.00	5.48	0.00	0.00E+000	7.9
TH-232	4038.881	15.00	3.87	0.00	0.00E+000	24.6

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	2.4590E-002	24.34	3.9142E-003	2.05
TH-229	4.1354E+000	2.78	3.9307E-003	2.05
TH-230	4.3446E-002	18.37	3.9189E-003	2.05
TH-232	2.1684E-002	25.90	3.9118E-003	2.05

Errors quoted at 1.000 sigma

0000012138.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-001
Batch Identification: B11-01657
Sample Identification: 11-01657-04
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 2B
Chamber Serial Number: 10043744B
Detector Serial Number: 57898
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:12
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2196 +/- 0.0045 on 4/9/10 20:58:18
Effective Efficiency: 0.2196 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

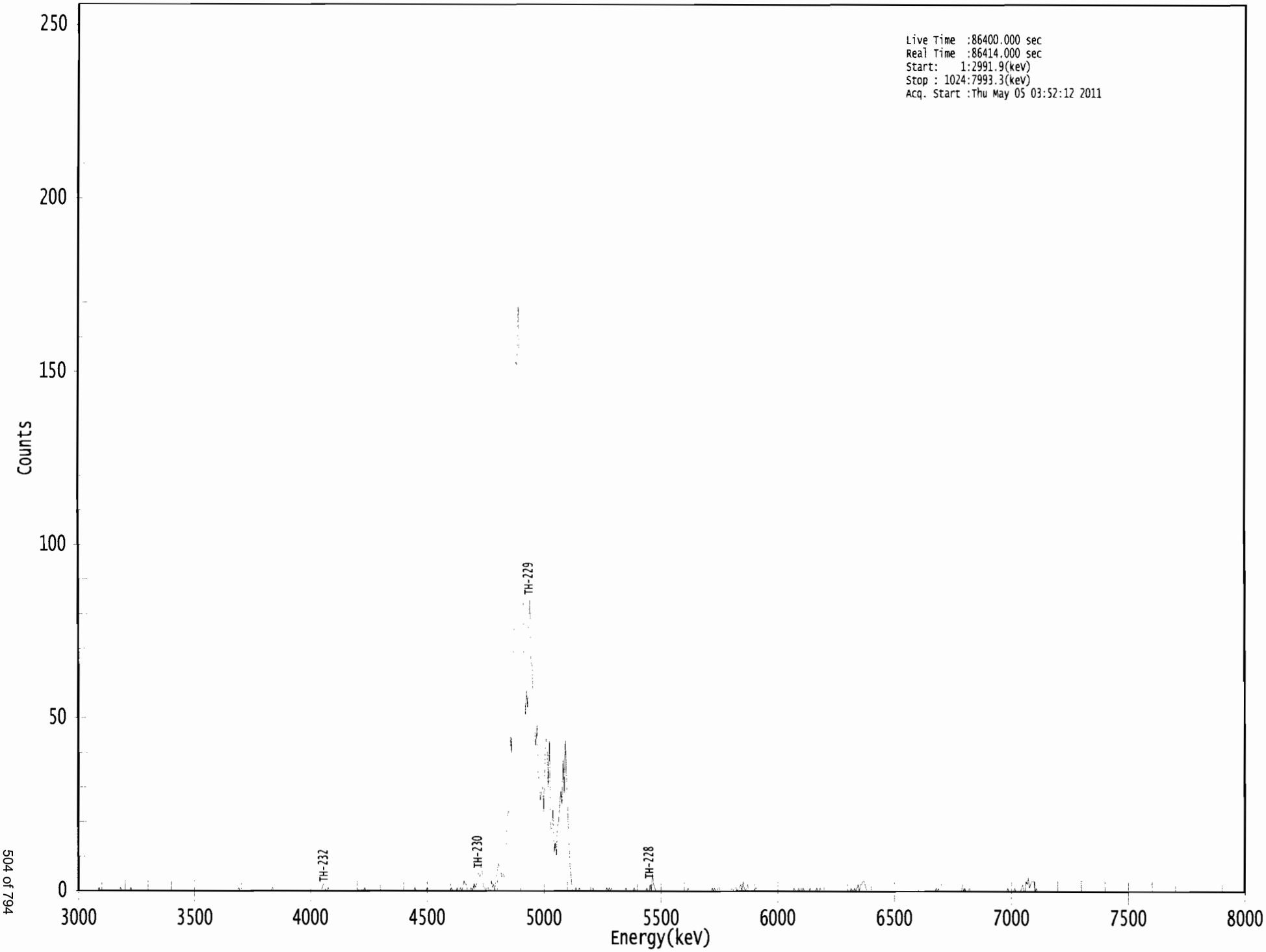
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5447.394	12.00	3.46	0.00	0.00E+000	6.5
TH-229	4931.412	2892.00	53.78	0.00	0.00E+000	37.9
TH-230	4714.464	36.00	6.00	0.00	0.00E+000	11.0
TH-232	4051.854	5.00	2.24	0.00	0.00E+000	9.8

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.7107E-002	28.94	3.8576E-003	2.05
TH-229	4.1401E+000	2.77	3.8739E-003	2.05
TH-230	5.1382E-002	16.79	3.8622E-003	2.05
TH-232	7.1235E-003	44.77	3.8553E-003	2.05

Errors quoted at 1.000 sigma

0000012139.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-002
Batch Identification: B11-01657
Sample Identification: 11-01657-05
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 3A
Chamber Serial Number: 10043745A
Detector Serial Number: 57907
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:14
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2122 +/- 0.0044 on 4/11/10 09:13:21
Effective Efficiency: 0.2122 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

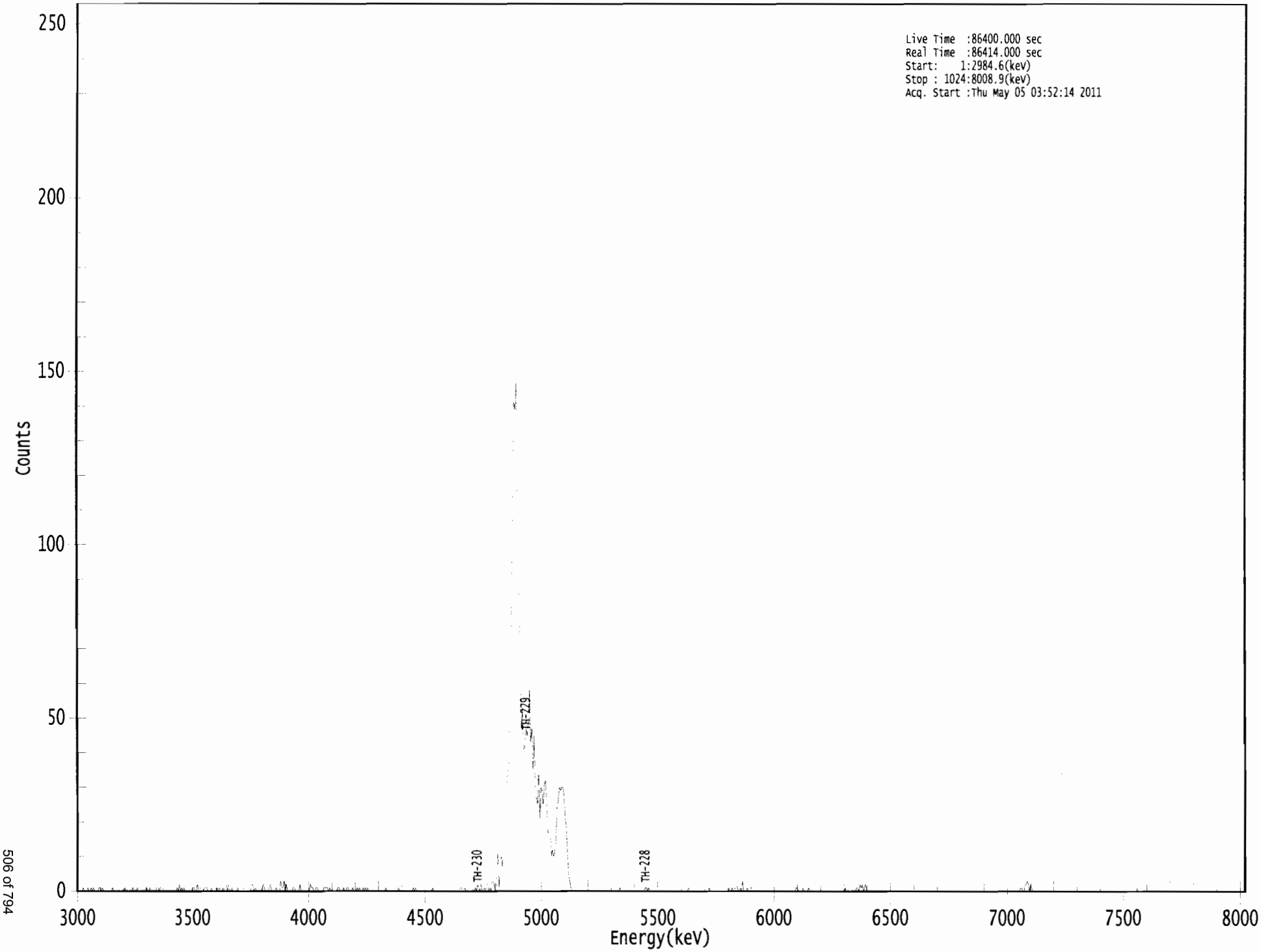
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5436.971	3.00	1.73	0.00	0.00E+000	9.8
TH-229	4923.315	2456.00	49.56	0.00	0.00E+000	37.3
TH-230	4712.555	6.00	2.45	0.00	0.00E+000	7.4
TH-232	3933.706	4.00	2.00	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	4.4257E-003	57.77	3.9920E-003	2.06
TH-229	3.6385E+000	2.88	4.0089E-003	2.06
TH-230	8.8620E-003	40.88	3.9968E-003	2.06
TH-232	5.8974E-003	50.04	3.9896E-003	2.06

Errors quoted at 1.000 sigma

0000012140.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-003
Batch Identification: B11-01657
Sample Identification: 11-01657-06
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 3B
Chamber Serial Number: 10043745B
Detector Serial Number: 57908
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:16
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2061 +/- 0.0042 on 4/11/10 09:13:55
Effective Efficiency: 0.2061 +/- 0.0042

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

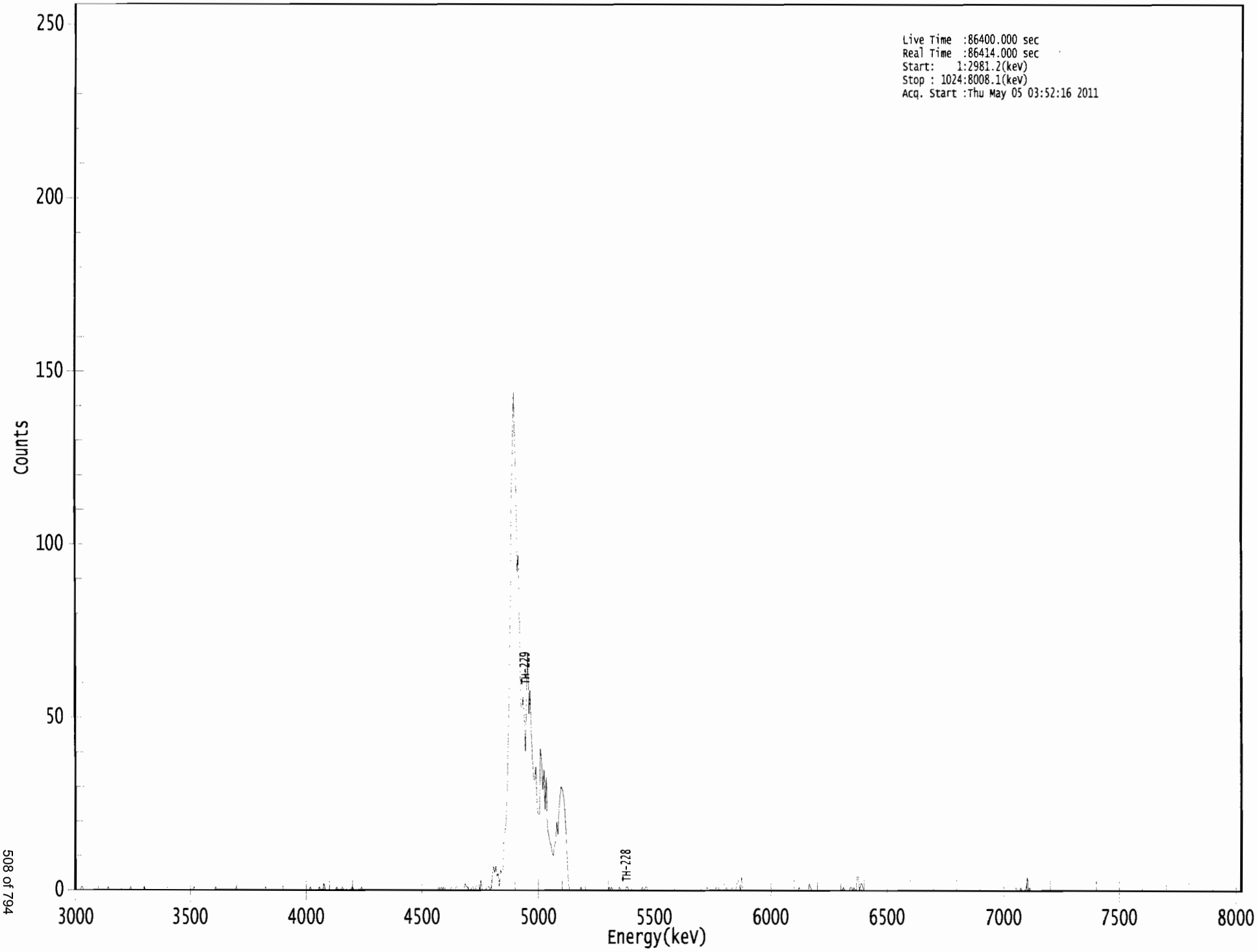
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5361.990	2.00	1.41	0.00	0.00E+000	9.8
TH-229	4930.082	2486.00	49.86	0.00	0.00E+000	41.9
TH-230	4707.302	15.00	3.87	0.00	0.00E+000	4.9
TH-232	4018.053	2.00	1.41	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	3.0372E-003	70.74	4.1093E-003	2.06
TH-229	3.7911E+000	2.87	4.1267E-003	2.06
TH-230	2.2806E-002	25.90	4.1143E-003	2.06
TH-232	3.0353E-003	70.74	4.1069E-003	2.06

Errors quoted at 1.000 sigma

0000012141.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-004
Batch Identification: B11-01657
Sample Identification: 11-01657-07
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 4A
Chamber Serial Number: 10043746A
Detector Serial Number: 57909
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:18
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2259 +/- 0.0046 on 4/11/10 09:14:49
Effective Efficiency: 0.2259 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

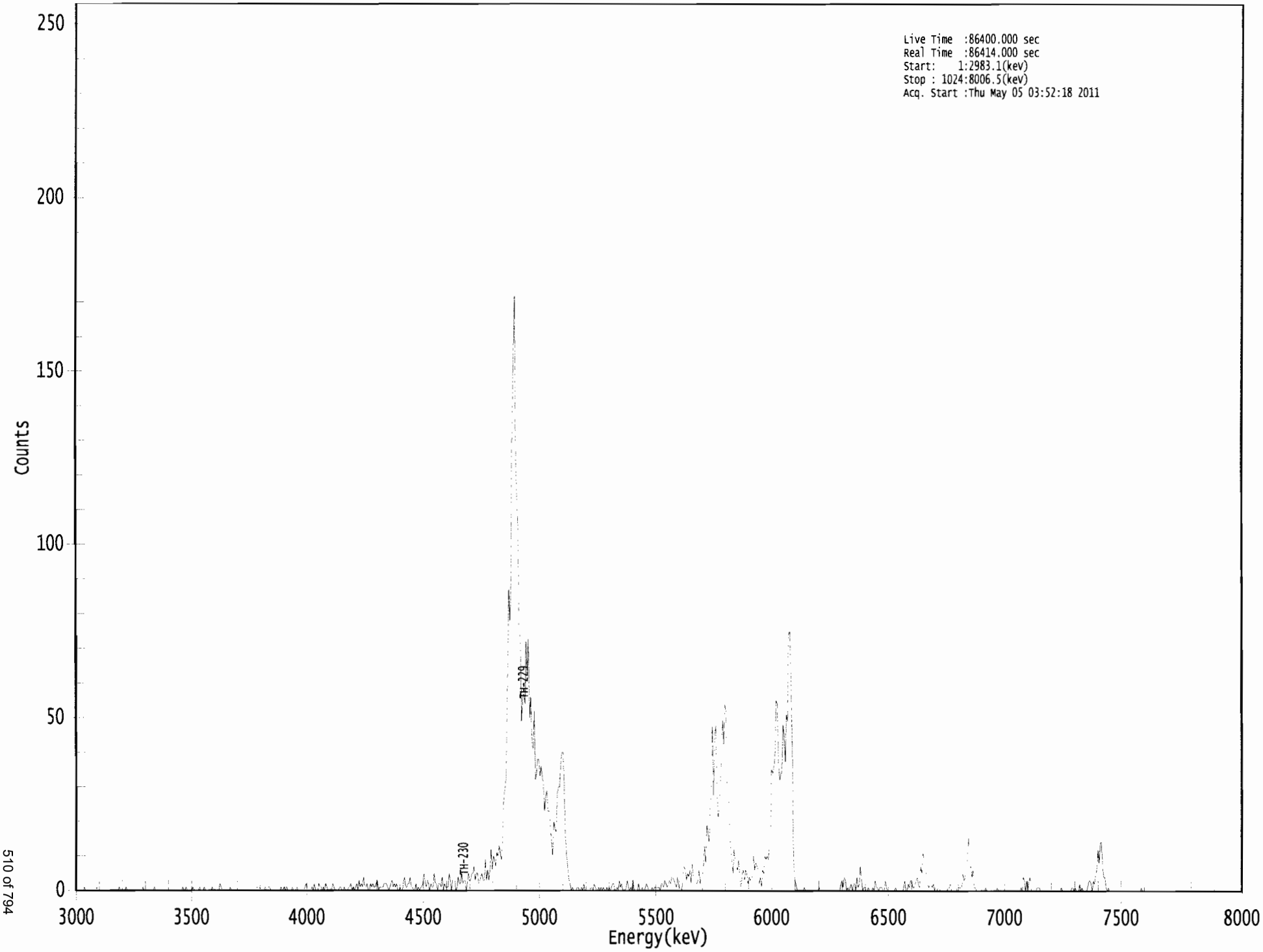
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5351.142	16.00	4.00	0.00	0.00E+000	6.1
TH-229	4923.240	2992.00	54.70	0.00	0.00E+000	34.3
TH-230	4660.738	89.00	9.43	0.00	0.00E+000	17.8
TH-232	3994.625	6.00	2.45	0.00	0.00E+000	7.4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	2.2166E-002	25.08	3.7489E-003	2.05
TH-229	4.1626E+000	2.75	3.7647E-003	2.05
TH-230	1.2345E-001	10.80	3.7534E-003	2.05
TH-232	8.3073E-003	40.88	3.7466E-003	2.05

Errors quoted at 1.000 sigma

0000012142.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-005
Batch Identification: B11-01657
Sample Identification: 11-01657-08
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 4B
Chamber Serial Number: 10043746B
Detector Serial Number: 57910
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:20
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2164 +/- 0.0044 on 4/11/10 09:15:19
Effective Efficiency: 0.2164 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

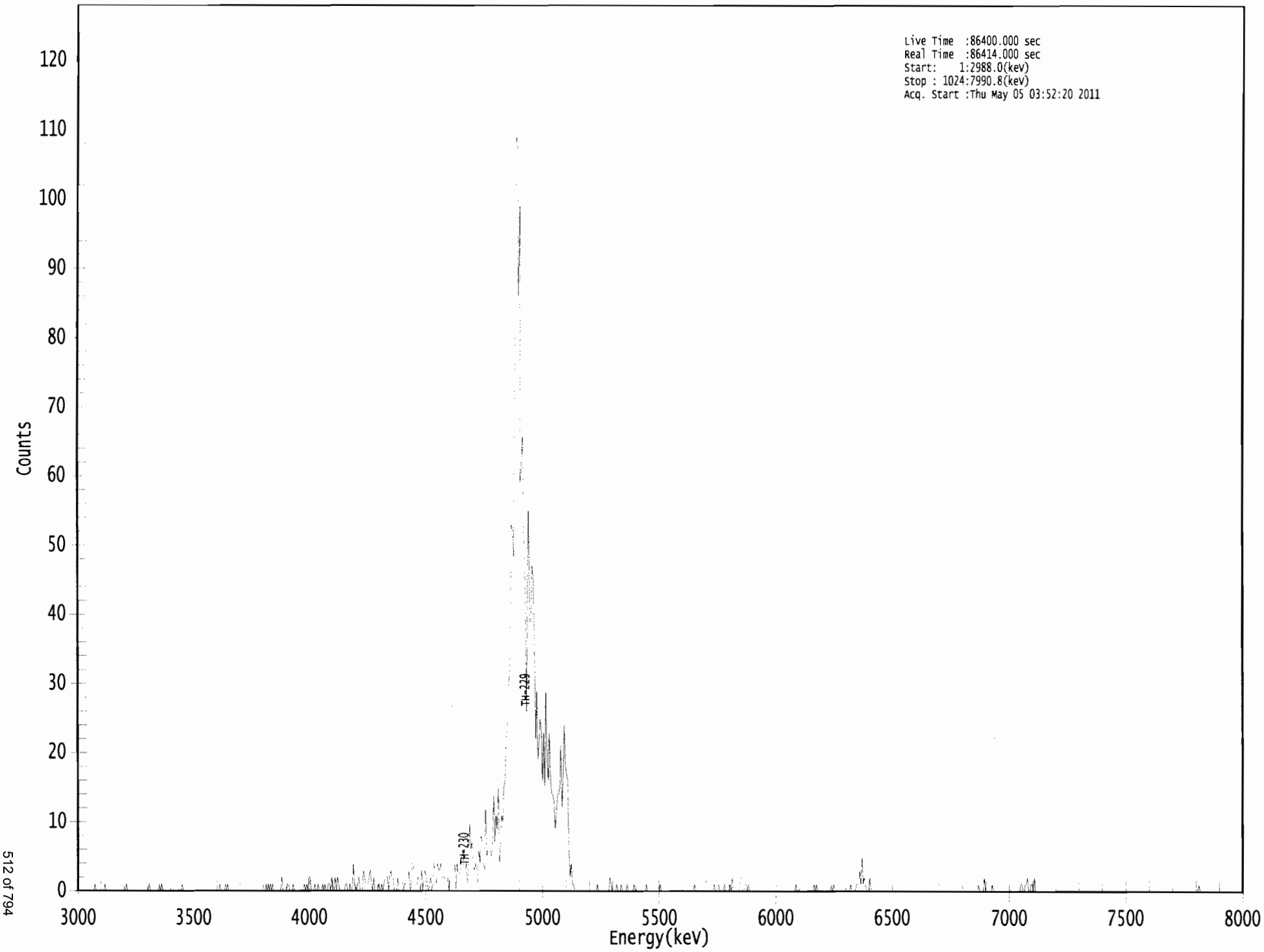
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-229	4918.375	2094.00	45.76	0.00	0.00E+000	41.2
TH-230	4657.560	88.00	9.38	0.00	0.00E+000	17.1
TH-232	3982.386	6.00	2.45	0.00	0.00E+000	9.8
<not ID'd>	5316.889	9.00	3.00	0.00	0.00E+000	7.3

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-229	3.0409E+000	3.00	3.9297E-003	2.05
TH-230	1.2741E-001	10.86	3.9178E-003	2.05
TH-232	8.6713E-003	40.88	3.9108E-003	2.05

Errors quoted at 1.000 sigma

0000012143.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-006
Batch Identification: B11-01657
Sample Identification: 11-01657-09
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 5A
Chamber Serial Number: 10043747A
Detector Serial Number: 57911
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:22
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2092 +/- 0.0043 on 4/11/10 18:32:55
Effective Efficiency: 0.2092 +/- 0.0043

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

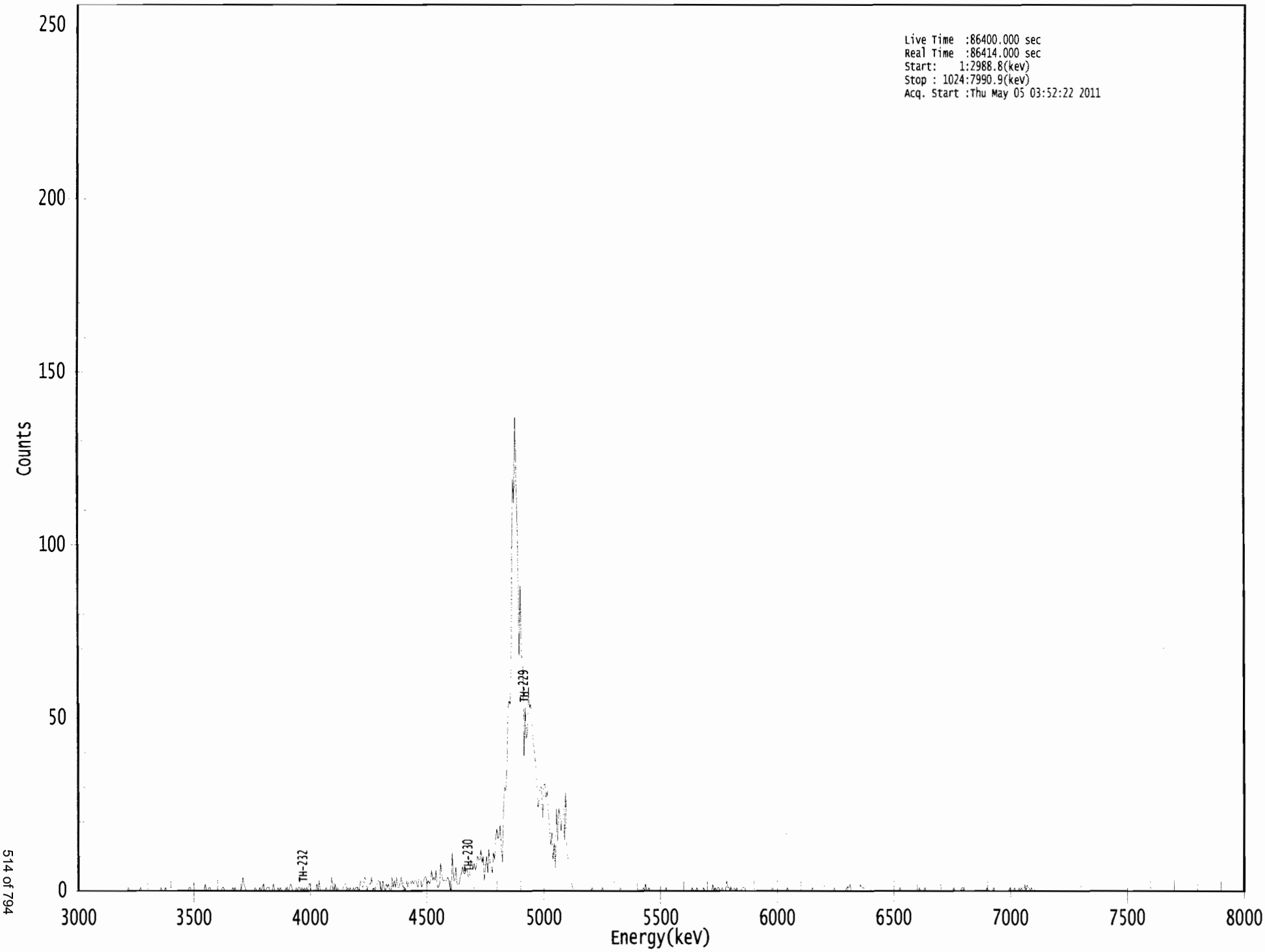
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5403.305	5.00	2.24	0.00	0.00E+000	4.9
TH-229	4908.545	2628.00	51.26	0.00	0.00E+000	33.5
TH-230	4670.824	168.00	12.96	0.00	0.00E+000	31.8
TH-232	3962.792	10.00	3.16	0.00	0.00E+000	9.8

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	7.4805E-003	44.77	4.0485E-003	2.06
TH-229	3.9484E+000	2.84	4.0656E-003	2.06
TH-230	2.5165E-001	7.99	4.0534E-003	2.06
TH-232	1.4952E-002	31.69	4.0461E-003	2.06

Errors quoted at 1.000 sigma

0000012144.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-007
Batch Identification: B11-01657
Sample Identification: 11-01657-10
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 5B
Chamber Serial Number: 10043747B
Detector Serial Number: 57912
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:24
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86413.9 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2047 +/- 0.0042 on 4/11/10 18:33:27
Effective Efficiency: 0.2047 +/- 0.0042

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

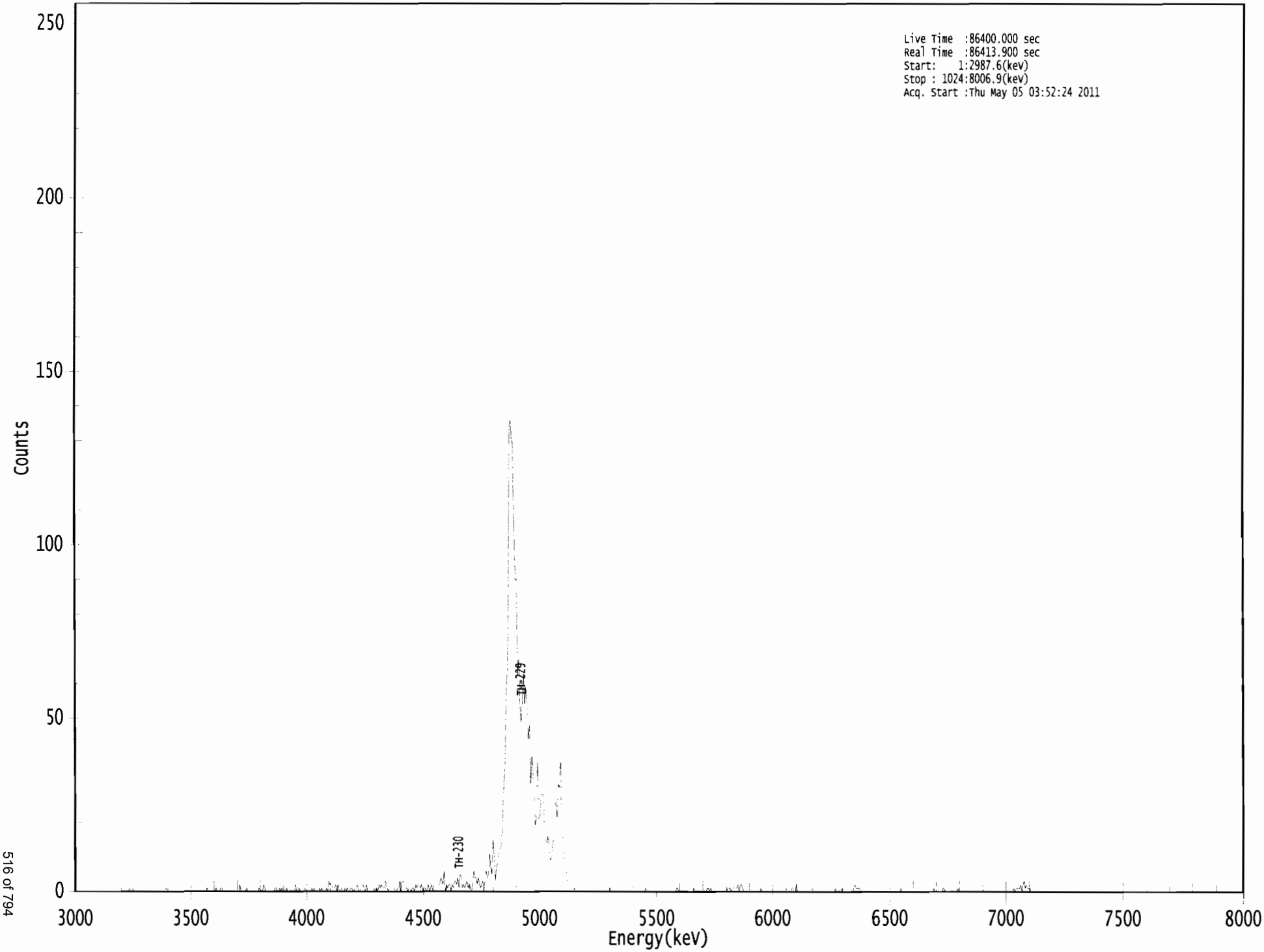
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5364.777	2.00	1.41	0.00	0.00E+000	4.9
TH-229	4916.429	2560.00	50.60	0.00	0.00E+000	42.2
TH-230	4647.780	38.00	6.16	0.00	0.00E+000	10.4
TH-232	4001.584	3.00	1.73	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	3.0576E-003	70.74	4.1370E-003	2.06
TH-229	3.9303E+000	2.85	4.1545E-003	2.06
TH-230	5.8165E-002	16.35	4.1420E-003	2.06
TH-232	4.5837E-003	57.77	4.1345E-003	2.06

Errors quoted at 1.000 sigma

0000012145.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-008
Batch Identification: B11-01657
Sample Identification: 11-01657-11
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 6A
Chamber Serial Number: 10043748A
Detector Serial Number: 57913
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:26
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2250 +/- 0.0046 on 4/11/10 18:33:56
Effective Efficiency: 0.2250 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

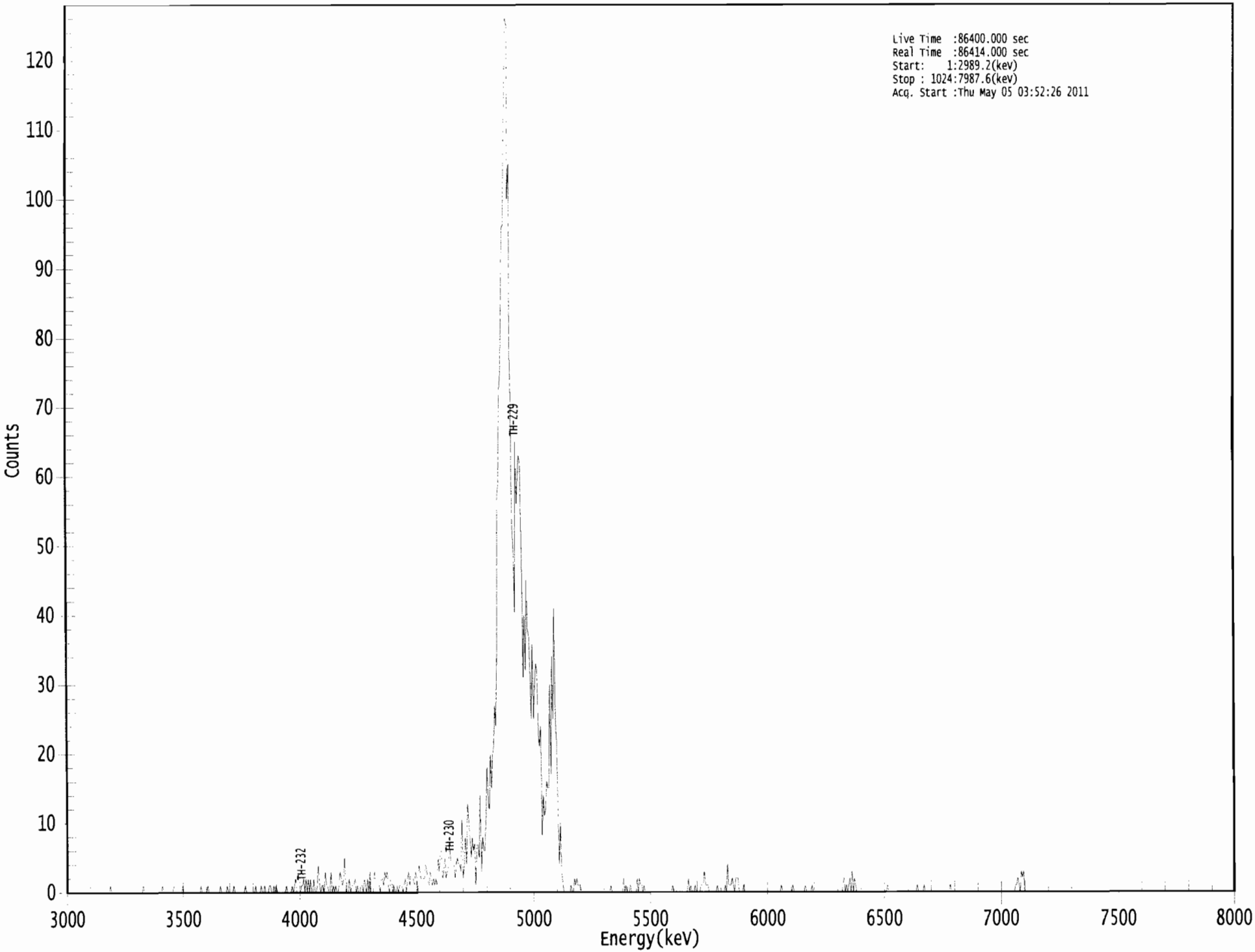
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5422.002	11.00	3.32	0.00	0.00E+000	4.9
TH-229	4917.367	2767.00	52.60	0.00	0.00E+000	54.5
TH-230	4636.605	186.00	13.64	0.00	0.00E+000	15.7
TH-232	4001.650	14.00	3.74	0.00	0.00E+000	7.3

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.5302E-002	30.22	3.7643E-003	2.05
TH-229	3.8654E+000	2.80	3.7802E-003	2.05
TH-230	2.5905E-001	7.61	3.7689E-003	2.05
TH-232	1.9464E-002	26.80	3.7621E-003	2.05

Errors quoted at 1.000 sigma

0000012146.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-009
Batch Identification: B11-01657
Sample Identification: 11-01657-12
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 6B
Chamber Serial Number: 10043748B
Detector Serial Number: 57914
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:28
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86414.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2243 +/- 0.0046 on 4/11/10 18:34:27
Effective Efficiency: 0.2243 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

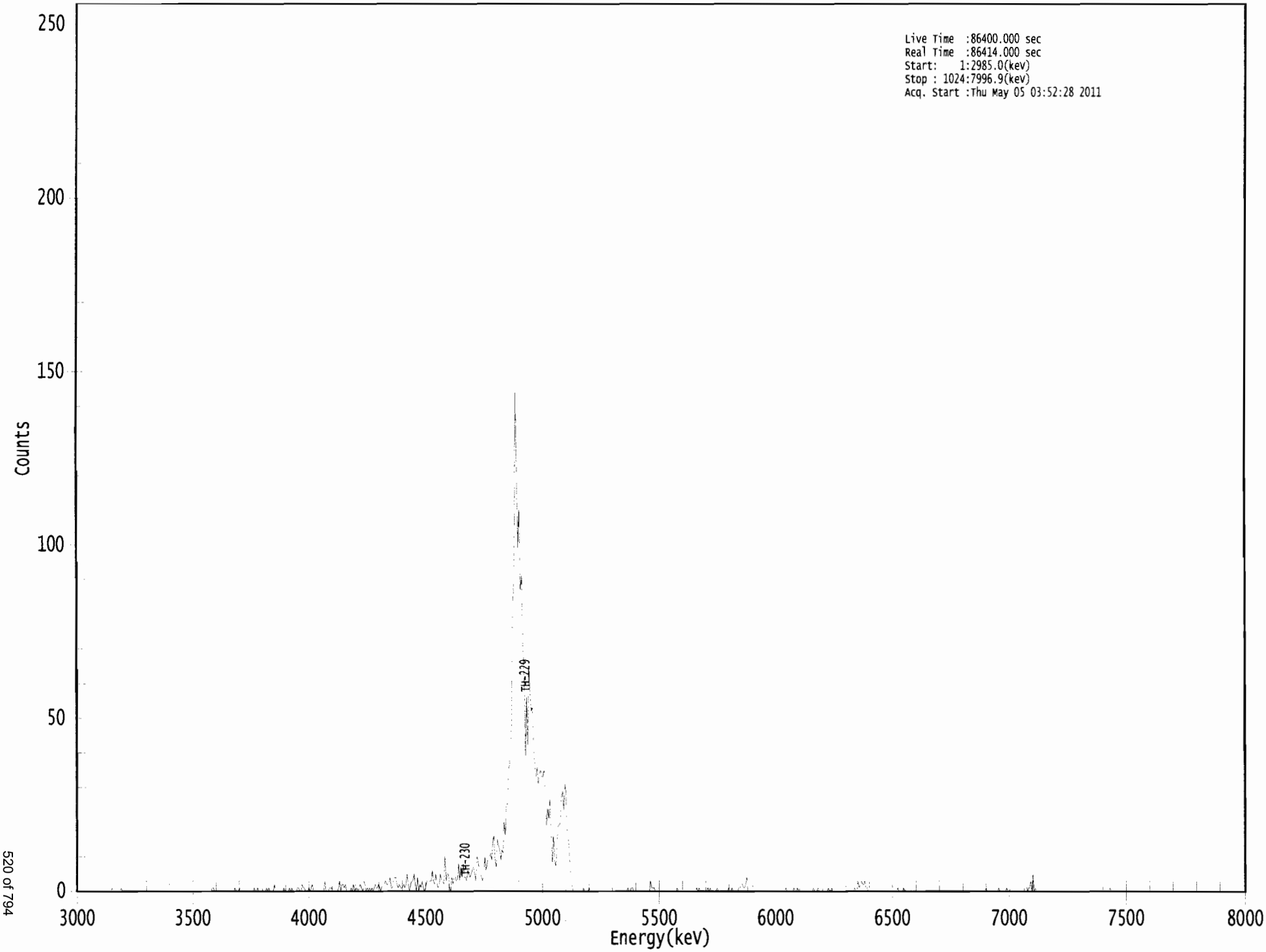
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5423.717	9.00	3.00	0.00	0.00E+000	6.1
TH-229	4917.931	2643.00	51.41	0.00	0.00E+000	45.3
TH-230	4662.562	127.00	11.27	0.00	0.00E+000	14.9
TH-232	3968.739	10.00	3.16	0.00	0.00E+000	7.3

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.2559E-002	33.40	3.7761E-003	2.05
TH-229	3.7038E+000	2.83	3.7921E-003	2.05
TH-230	1.7744E-001	9.11	3.7807E-003	2.05
TH-232	1.3946E-002	31.69	3.7739E-003	2.05

Errors quoted at 1.000 sigma

0000012147.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-010
Batch Identification: B11-01657
Sample Identification: 11-01657-13
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 1A
Chamber Serial Number: 12044979A
Detector Serial Number: 55794
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:30
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.9 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2205 +/- 0.0045 on 4/12/10 10:36:04
Effective Efficiency: 0.2205 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

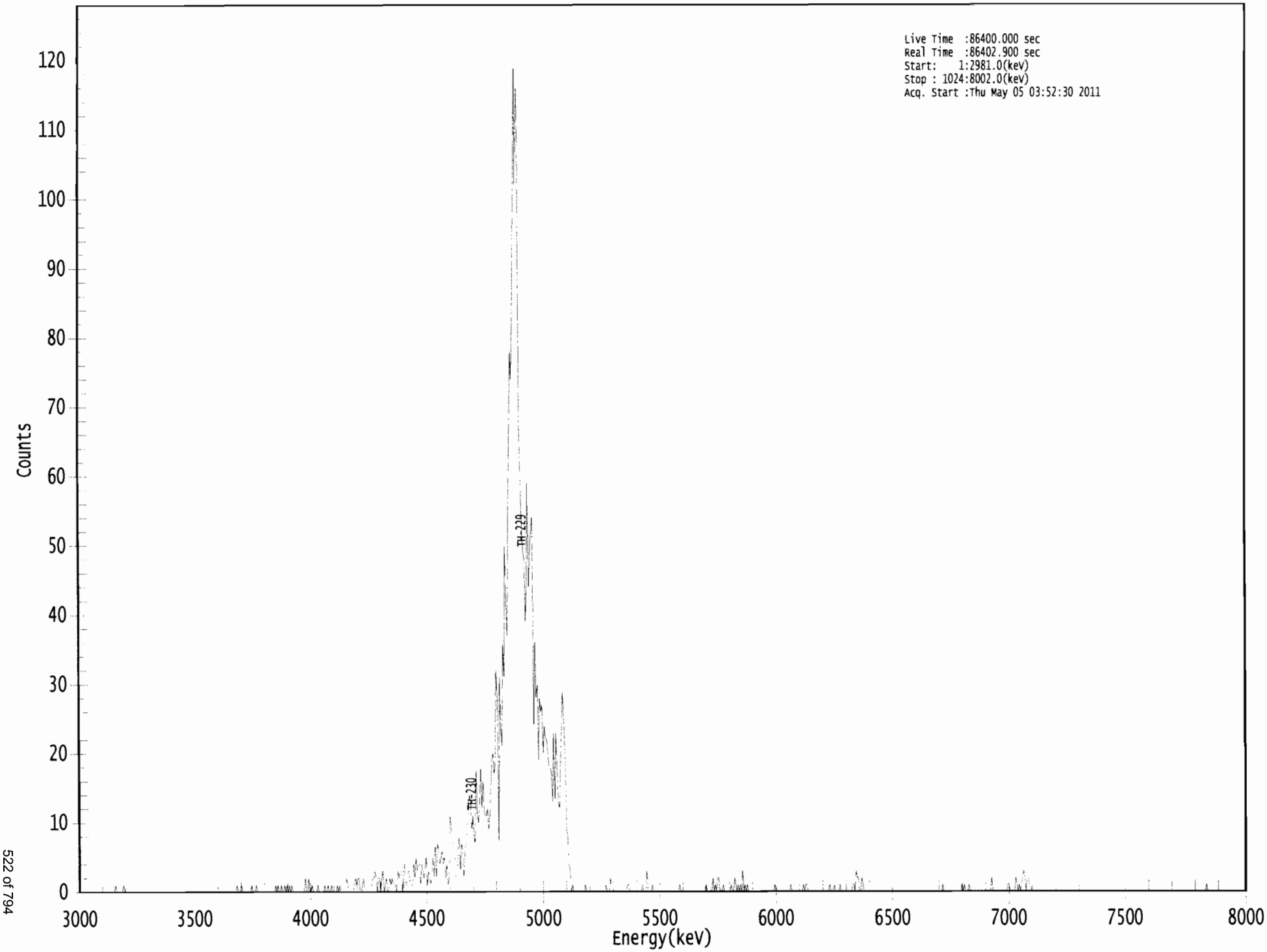
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5364.710	3.00	1.73	0.00	0.00E+000	9.8
TH-229	4898.550	2588.00	50.87	0.00	0.00E+000	51.1
TH-230	4681.247	241.00	15.52	0.00	0.00E+000	42.1
TH-232	3969.496	5.00	2.24	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	4.2581E-003	57.77	3.8409E-003	2.06
TH-229	3.6888E+000	2.84	3.8571E-003	2.06
TH-230	3.4248E-001	6.76	3.8455E-003	2.06
TH-232	7.0926E-003	44.77	3.8386E-003	2.06

Errors quoted at 1.000 sigma

0000012148.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-011
Batch Identification: B11-01657
Sample Identification: 11-01657-14
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 1B
Chamber Serial Number: 12044979B
Detector Serial Number: 55795
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:32
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.9 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2148 +/- 0.0044 on 4/13/10 09:49:08
Effective Efficiency: 0.2148 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

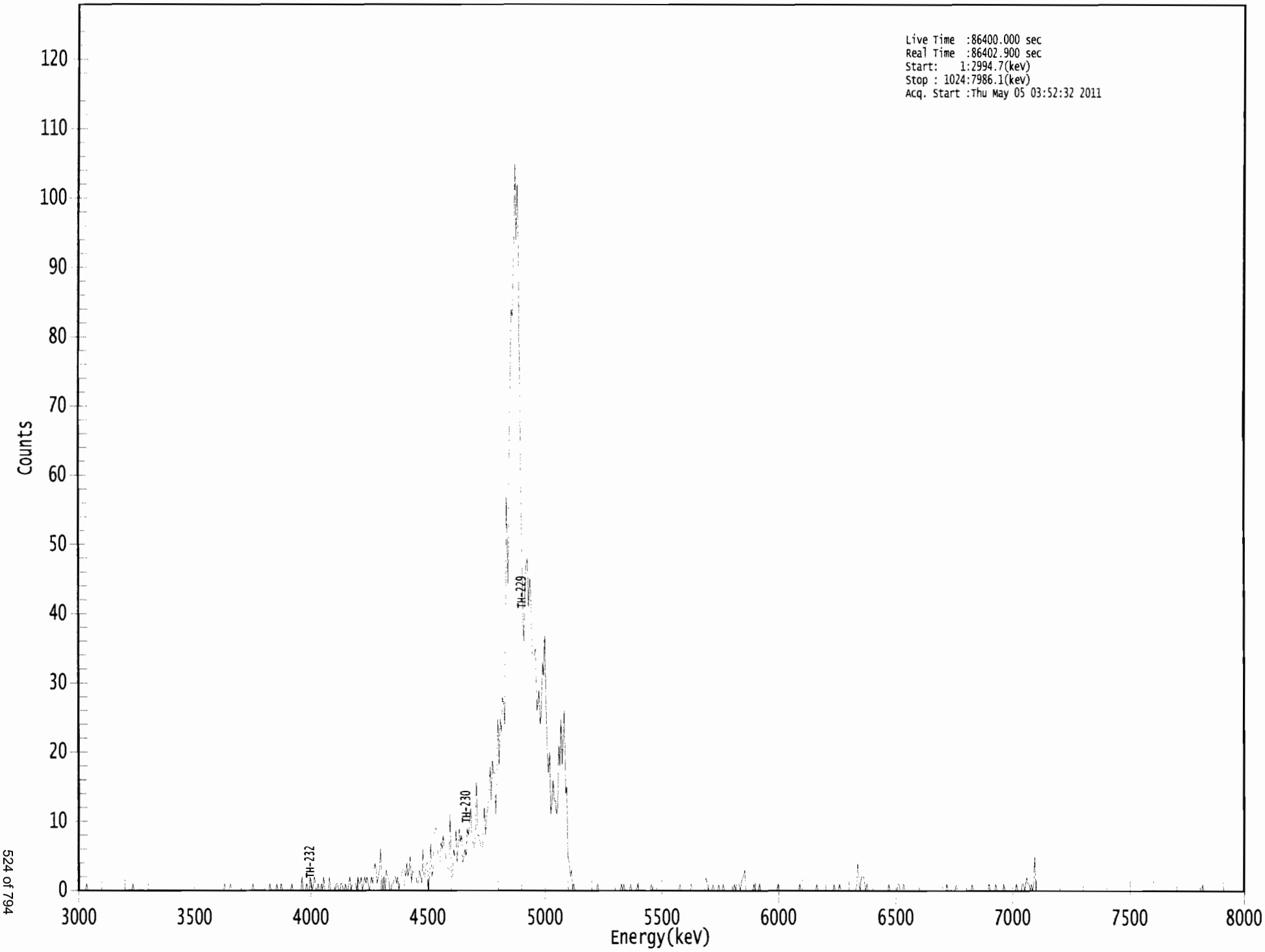
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5375.740	2.00	1.41	0.00	0.00E+000	4.9
TH-229	4901.805	2543.00	50.43	0.00	0.00E+000	54.5
TH-230	4662.808	175.00	13.23	0.00	0.00E+000	9.8
TH-232	3996.352	7.00	2.65	0.00	0.00E+000	7.3

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	2.9147E-003	70.74	3.9437E-003	2.05
TH-229	3.7217E+000	2.86	3.9603E-003	2.05
TH-230	2.5535E-001	7.83	3.9484E-003	2.05
TH-232	1.0195E-002	37.85	3.9413E-003	2.05

Errors quoted at 1.000 sigma

0000012149.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-012
Batch Identification: B11-01657
Sample Identification: 11-01657-15
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 2A
Chamber Serial Number: 12044980A
Detector Serial Number: 55796
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:34
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.9 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2232 +/- 0.0046 on 4/12/10 10:37:23
Effective Efficiency: 0.2232 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

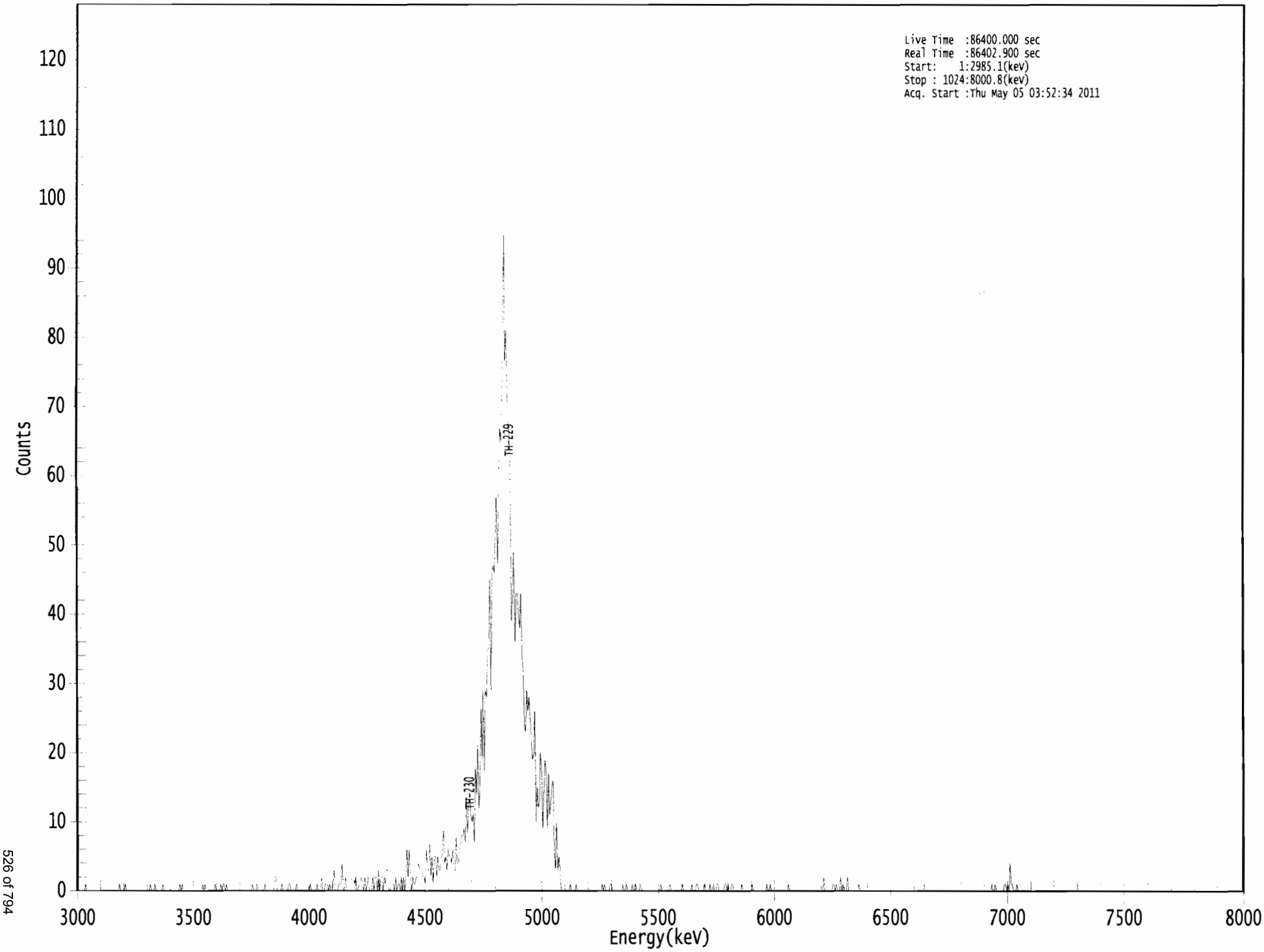
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-229	4853.200	2326.00	48.23	0.00	0.00E+000	56.8
TH-230	4679.345	201.00	14.18	0.00	0.00E+000	18.9
TH-232	3960.805	2.00	1.41	0.00	0.00E+000	4.9
<not ID'd>	5311.570	4.00	2.00	0.00	0.00E+000	9.8

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-229	3.2758E+000	2.92	3.8110E-003	2.05
TH-230	2.8222E-001	7.35	3.7995E-003	2.05
TH-232	2.8031E-003	70.74	3.7927E-003	2.05

Errors quoted at 1.000 sigma

0000012150.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-013
Batch Identification: B11-01657
Sample Identification: 11-01657-16
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 3B
Chamber Serial Number: 12044981B
Detector Serial Number: 55799
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/5/11 03:52:37
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86403.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2134 +/- 0.0044 on 5/24/10 08:35:23
Effective Efficiency: 0.2134 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

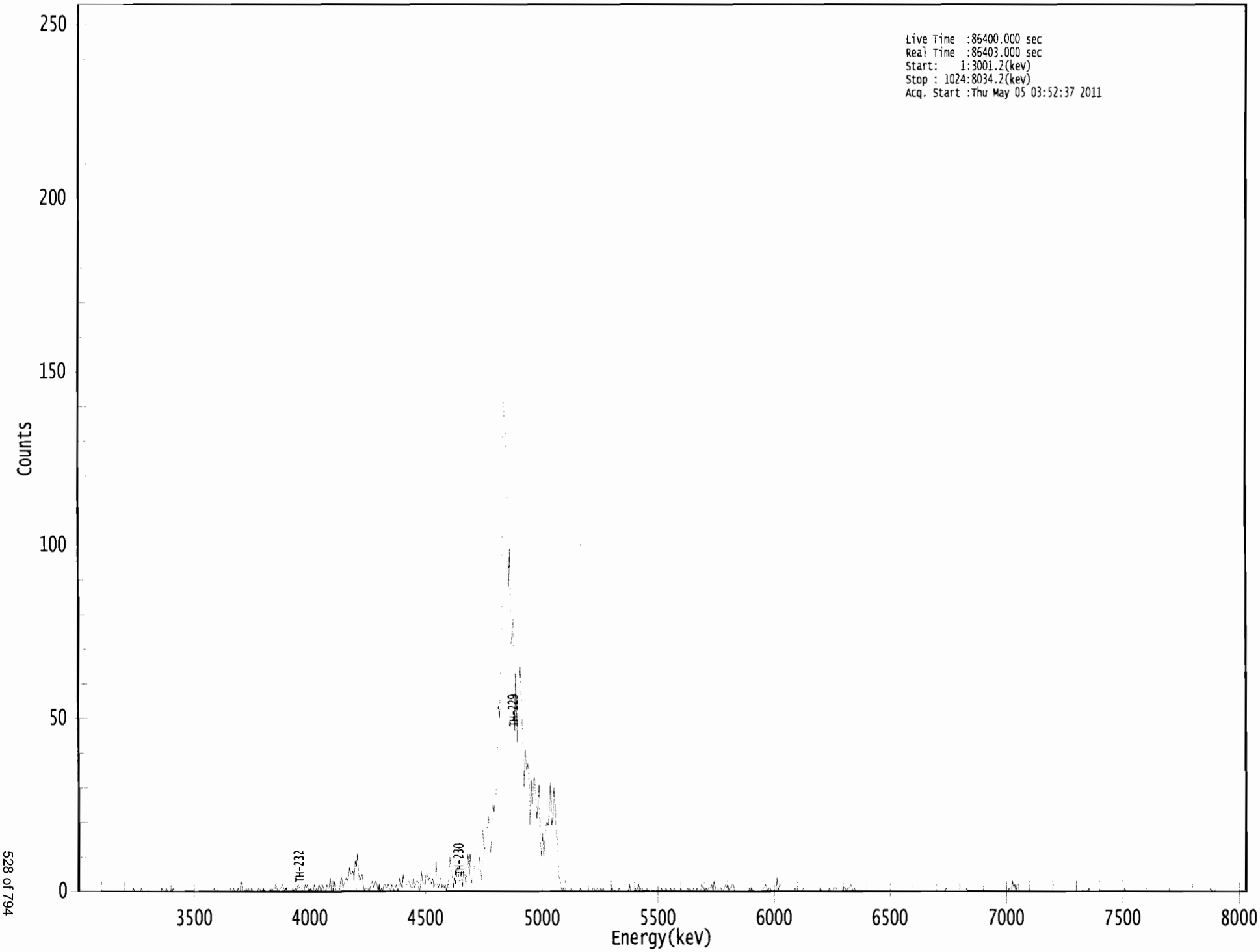
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5362.713	3.00	1.73	0.00	0.00E+000	4.9
TH-229	4884.678	2819.00	53.09	0.00	0.00E+000	41.3
TH-230	4650.752	104.00	10.20	0.00	0.00E+000	8.4
TH-232	3962.822	13.00	3.61	0.00	0.00E+000	9.8

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	4.3999E-003	57.77	3.9688E-003	2.06
TH-229	4.1519E+000	2.79	3.9855E-003	2.06
TH-230	1.5271E-001	10.02	3.9735E-003	2.06
TH-232	1.9055E-002	27.81	3.9664E-003	2.06

Errors quoted at 1.000 sigma

0000012151.CNF



Apex Alpha Instrument Data Transfer Report

#	Report ID	Batch Sample ID	Isotope	Gross Area	Count Mins	BKG Counts	BKG Count Mins	EFF	Analysis Date	Date
1	ApexAlpha	ARS1-B11-01657-01	TH-228	2	1440	0	1440	0.21	05/05/11 03:52	A_1
2	ApexAlpha	ARS1-B11-01657-01	TH-229	3073	1440	3	1440	0.21	05/05/11 03:52	A_1
3	ApexAlpha	ARS1-B11-01657-01	TH-230	3355	1440	14	1440	0.21	05/05/11 03:52	A_1
4	ApexAlpha	ARS1-B11-01657-01	TH-232	4	1440	5	1440	0.21	05/05/11 03:52	A_1
5	ApexAlpha	ARS1-B11-01657-02	TH-228	2	1440	3	1440	0.19	05/05/11 03:52	A_1
6	ApexAlpha	ARS1-B11-01657-02	TH-229	3051	1440	17	1440	0.19	05/05/11 03:52	A_1
7	ApexAlpha	ARS1-B11-01657-02	TH-230	3404	1440	5	1440	0.19	05/05/11 03:52	A_1
8	ApexAlpha	ARS1-B11-01657-02	TH-232	2	1440	3	1440	0.19	05/05/11 03:52	A_1
9	ApexAlpha	ARS1-B11-01657-03	TH-228	17	1440	1	1440	0.22	05/05/11 03:52	A_1
10	ApexAlpha	ARS1-B11-01657-03	TH-229	2847	1440	11	1440	0.22	05/05/11 03:52	A_1
11	ApexAlpha	ARS1-B11-01657-03	TH-230	30	1440	6	1440	0.22	05/05/11 03:52	A_1
12	ApexAlpha	ARS1-B11-01657-03	TH-232	15	1440	2	1440	0.22	05/05/11 03:52	A_1
13	ApexAlpha	ARS1-B11-01657-04	TH-228	12	1440	0	1440	0.22	05/05/11 03:52	A_1
14	ApexAlpha	ARS1-B11-01657-04	TH-229	2892	1440	15	1440	0.22	05/05/11 03:52	A_1
15	ApexAlpha	ARS1-B11-01657-04	TH-230	36	1440	2	1440	0.22	05/05/11 03:52	A_1
16	ApexAlpha	ARS1-B11-01657-04	TH-232	5	1440	3	1440	0.22	05/05/11 03:52	A_1
17	ApexAlpha	ARS1-B11-01657-05	TH-228	3	1440	0	1440	0.21	05/05/11 03:52	A_1
18	ApexAlpha	ARS1-B11-01657-05	TH-229	2456	1440	5	1440	0.21	05/05/11 03:52	A_1
19	ApexAlpha	ARS1-B11-01657-05	TH-230	6	1440	5	1440	0.21	05/05/11 03:52	A_1
20	ApexAlpha	ARS1-B11-01657-05	TH-232	4	1440	21	1440	0.21	05/05/11 03:52	A_1
21	ApexAlpha	ARS1-B11-01657-06	TH-228	2	1440	0	1440	0.21	05/05/11 03:52	A_1
22	ApexAlpha	ARS1-B11-01657-06	TH-229	2486	1440	3	1440	0.21	05/05/11 03:52	A_1
23	ApexAlpha	ARS1-B11-01657-06	TH-230	15	1440	5	1440	0.21	05/05/11 03:52	A_1
24	ApexAlpha	ARS1-B11-01657-06	TH-232	2	1440	3	1440	0.21	05/05/11 03:52	A_1
25	ApexAlpha	ARS1-B11-01657-07	TH-228	16	1440	2	1440	0.23	05/05/11 03:52	A_1
26	ApexAlpha	ARS1-B11-01657-07	TH-229	2992	1440	4	1440	0.23	05/05/11 03:52	A_1
27	ApexAlpha	ARS1-B11-01657-07	TH-230	89	1440	3	1440	0.23	05/05/11 03:52	A_1
28	ApexAlpha	ARS1-B11-01657-07	TH-232	6	1440	1	1440	0.23	05/05/11 03:52	A_1
29	ApexAlpha	ARS1-B11-01657-08	TH-228	9	1440	0	1440	0.23	05/05/11 03:52	A_1
30	ApexAlpha	ARS1-B11-01657-08	TH-229	2094	1440	3	1440	0.22	05/05/11 03:52	A_1
31	ApexAlpha	ARS1-B11-01657-08	TH-230	88	1440	3	1440	0.22	05/05/11 03:52	A_1
32	ApexAlpha	ARS1-B11-01657-08	TH-232	6	1440	2	1440	0.22	05/05/11 03:52	A_1
33	ApexAlpha	ARS1-B11-01657-09	TH-228	5	1440	3	1440	0.21	05/05/11 03:52	A_1
34	ApexAlpha	ARS1-B11-01657-09	TH-229	2628	1440	3	1440	0.21	05/05/11 03:52	A_1
35	ApexAlpha	ARS1-B11-01657-09	TH-230	168	1440	3	1440	0.21	05/05/11 03:52	A_1
36	ApexAlpha	ARS1-B11-01657-09	TH-232	10	1440	2	1440	0.21	05/05/11 03:52	A_1
37	ApexAlpha	ARS1-B11-01657-10	TH-228	2	1440	2	1440	0.20	05/05/11 03:52	A_1
38	ApexAlpha	ARS1-B11-01657-10	TH-229	2560	1440	5	1440	0.20	05/05/11 03:52	A_1
39	ApexAlpha	ARS1-B11-01657-10	TH-230	38	1440	6	1440	0.20	05/05/11 03:52	A_1
40	ApexAlpha	ARS1-B11-01657-10	TH-232	3	1440	1	1440	0.20	05/05/11 03:52	A_1
41	ApexAlpha	ARS1-B11-01657-11	TH-228	11	1440	4	1440	0.23	05/05/11 03:52	A_1
42	ApexAlpha	ARS1-B11-01657-11	TH-229	2767	1440	4	1440	0.23	05/05/11 03:52	A_1
43	ApexAlpha	ARS1-B11-01657-11	TH-230	186	1440	4	1440	0.23	05/05/11 03:52	A_1
44	ApexAlpha	ARS1-B11-01657-11	TH-232	14	1440	3	1440	0.23	05/05/11 03:52	A_1
45	ApexAlpha	ARS1-B11-01657-12	TH-228	9	1440	0	1440	0.22	05/05/11 03:52	A_1
46	ApexAlpha	ARS1-B11-01657-12	TH-229	2643	1440	2	1440	0.22	05/05/11 03:52	A_1
47	ApexAlpha	ARS1-B11-01657-12	TH-230	127	1440	2	1440	0.22	05/05/11 03:52	A_1
48	ApexAlpha	ARS1-B11-01657-12	TH-232	10	1440	0	1440	0.22	05/05/11 03:52	A_1
49	ApexAlpha	ARS1-B11-01657-13	TH-228	3	1440	2	1440	0.22	05/05/11 03:53	A_2
50	ApexAlpha	ARS1-B11-01657-13	TH-229	2588	1440	1	1440	0.22	05/05/11 03:53	A_2
51	ApexAlpha	ARS1-B11-01657-13	TH-230	241	1440	3	1440	0.22	05/05/11 03:53	A_2
52	ApexAlpha	ARS1-B11-01657-13	TH-232	5	1440	2	1440	0.22	05/05/11 03:53	A_2

Apex Alpha Instrument Data Transfer Report

#	Report ID	Batch Sample ID	Isotope	Gross Area	Count Mins	BKG Counts	BKG Count Mins	EFF	Analysis Date	Dete
53	ApexAlpha	ARS1-B11-01657-14	TH-228	2	1440	3	1440	0.21	05/05/11 03:53	A_2
54	ApexAlpha	ARS1-B11-01657-14	TH-229	2543	1440	1	1440	0.21	05/05/11 03:53	A_2
55	ApexAlpha	ARS1-B11-01657-14	TH-230	175	1440	1	1440	0.21	05/05/11 03:53	A_2
56	ApexAlpha	ARS1-B11-01657-14	TH-232	7	1440	1	1440	0.21	05/05/11 03:53	A_2
57	ApexAlpha	ARS1-B11-01657-15	TH-228	4	1440	2	1440	0.21	05/05/11 03:53	A_2
58	ApexAlpha	ARS1-B11-01657-15	TH-229	2326	1440	3	1440	0.22	05/05/11 03:53	A_2
59	ApexAlpha	ARS1-B11-01657-15	TH-230	201	1440	4	1440	0.22	05/05/11 03:53	A_2
60	ApexAlpha	ARS1-B11-01657-15	TH-232	2	1440	0	1440	0.22	05/05/11 03:53	A_2
61	ApexAlpha	ARS1-B11-01657-16	TH-228	3	1440	1	1440	0.21	05/05/11 03:53	A_2
62	ApexAlpha	ARS1-B11-01657-16	TH-229	2819	1440	3	1440	0.21	05/05/11 03:53	A_2
63	ApexAlpha	ARS1-B11-01657-16	TH-230	104	1440	3	1440	0.21	05/05/11 03:53	A_2
64	ApexAlpha	ARS1-B11-01657-16	TH-232	13	1440	7	1440	0.21	05/05/11 03:53	A_2

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPU1s	TPU2s	MDA	DL	CU	CU1s	CU2s	ActivityReportUnits
ARS1-B11-01657-01				1	TH-228	0.003361909	0.004677052	0.002386251	0.004677052	0.004555387	0	0.004659369	0.00237723	0.00465937	pCi
ARS1-B11-01657-01				1	TH-229	5.125444366	0.645501612	0.329337557	0.645501612	0.017978825	0.006727205	0.181485689	0.09259474	0.18148569	pCi
ARS1-B11-01657-01				1	TH-230	5.589062942	0.701794245	0.358058288	0.701794245	0.03365657	0.014561545	0.190313283	0.09709861	0.19031328	pCi
ARS1-B11-01657-01				1	TH-232	-0.001669526	0.009818883	0.005009634	0.009818883	0.02189398	0.008684783	0.00981681	0.00500858	0.00981681	pCi
ARS1-B11-01657-02				1	TH-228	-0.001700733	0.007456623	0.0038044	0.007456623	0.018314886	0.00685295	0.00745379	0.00380295	0.00745379	pCi
ARS1-B11-01657-02				1	TH-229	5.124939694	0.645978873	0.329581057	0.645978873	0.036982389	0.01620237	0.183382096	0.09356229	0.1833821	pCi
ARS1-B11-01657-02				1	TH-230	5.75299139	0.721783724	0.368257002	0.721783724	0.022195974	0.008804576	0.1936922	0.09882255	0.1936922	pCi
ARS1-B11-01657-02				1	TH-232	-0.001689169	0.007405924	0.003778533	0.007405924	0.018190359	0.006806355	0.007403109	0.0037771	0.00740311	pCi
ARS1-B11-01657-03				1	TH-228	0.02908862	0.015521437	0.0079191	0.015521437	0.013385788	0.004229451	0.015118039	0.00771329	0.01511804	pCi
ARS1-B11-01657-03				1	TH-229	5.120902322	0.647188646	0.330198289	0.647188646	0.032757646	0.01393213	0.189202752	0.09653202	0.18920275	pCi
ARS1-B11-01657-03				1	TH-230	0.043423106	0.021915003	0.011181124	0.021915003	0.025523549	0.010310178	0.021277322	0.01085578	0.02127732	pCi
ARS1-B11-01657-03				1	TH-232	0.023473807	0.014865434	0.007584405	0.014865434	0.016774744	0.005940679	0.014592198	0.007445	0.0145922	pCi
ARS1-B11-01657-04	ARS1-11-00897	001	MW-1-110419	1	TH-228	0.043963821	0.025436047	0.012977575	0.025436047	0.009928496	0	0.024874873	0.01269126	0.02487487	pCi
ARS1-B11-01657-04	ARS1-11-00897	001	MW-1-110419	1	TH-229	10.3155263	1.303045779	0.664819275	1.303045779	0.074327982	0.032305618	0.378904808	0.19331878	0.37890481	pCi
ARS1-B11-01657-04	ARS1-11-00897	001	MW-1-110419	1	TH-230	0.122151363	0.045849612	0.023392659	0.045849612	0.033376064	0.011819941	0.043407749	0.02214681	0.04340775	pCi
ARS1-B11-01657-04	ARS1-11-00897	001	MW-1-110419	1	TH-232	0.007171001	0.019895886	0.010150962	0.019895886	0.038611612	0.014447453	0.019877	0.01014133	0.019877	pCi
ARS1-B11-01657-05	ARS1-11-00897	002	MW-2-110421	1	TH-228	0.012825277	0.01459571	0.007446791	0.01459571	0.0115855	0	0.014513167	0.00740468	0.01451317	pCi
ARS1-B11-01657-05	ARS1-11-00897	002	MW-2-110421	1	TH-229	10.27514711	1.307046058	0.666860234	1.307046058	0.054976412	0.021807739	0.407621061	0.20796993	0.40762106	pCi
ARS1-B11-01657-05	ARS1-11-00897	002	MW-2-110421	1	TH-230	0.004200614	0.027311168	0.013934269	0.027311168	0.055086409	0.021851372	0.027306449	0.01393186	0.02730645	pCi
ARS1-B11-01657-05	ARS1-11-00897	002	MW-2-110421	1	TH-232	-0.071267598	0.041976894	0.021416782	0.041976894	0.100745709	0.044692408	0.041083674	0.02096106	0.04108367	pCi
ARS1-B11-01657-06	ARS1-11-00897	003	MW-2-2-110421	1	TH-228	0.008448284	0.011753161	0.005996511	0.011753161	0.011447425	0	0.011708724	0.00597384	0.01170872	pCi
ARS1-B11-01657-06	ARS1-11-00897	003	MW-2-2-110421	1	TH-229	10.28524057	1.307405656	0.667043702	1.307405656	0.044607297	0.016690881	0.405047778	0.20665703	0.40504778	pCi
ARS1-B11-01657-06	ARS1-11-00897	003	MW-2-2-110421	1	TH-230	0.041505515	0.036725398	0.018737448	0.036725398	0.054429891	0.021590948	0.036381188	0.01856183	0.03638119	pCi
ARS1-B11-01657-06	ARS1-11-00897	003	MW-2-2-110421	1	TH-232	-0.004142249	0.018161108	0.009265872	0.018161108	0.044607139	0.016690822	0.018154207	0.00926235	0.01815421	pCi
ARS1-B11-01657-07	ARS1-11-00897	004	JPOP41S-110421	1	TH-228	0.247162371	0.149815317	0.076436386	0.149815317	0.164009888	0.058083157	0.146806959	0.07490151	0.14680696	pCi
ARS1-B11-01657-07	ARS1-11-00897	004	JPOP41S-110421	1	TH-229	51.72900682	6.52203607	3.327569423	6.52203607	0.208015792	0.080549796	1.857293432	0.94759869	1.85729343	pCi
ARS1-B11-01657-07	ARS1-11-00897	004	JPOP41S-110421	1	TH-230	1.491832528	0.372640296	0.1901226	0.372640296	0.186805556	0.069897742	0.326115624	0.16638552	0.32611562	pCi
ARS1-B11-01657-07	ARS1-11-00897	004	JPOP41S-110421	1	TH-232	0.086560951	0.090382867	0.046113708	0.090382867	0.127465546	0.040274756	0.089775349	0.04580375	0.08977535	pCi
ARS1-B11-01657-08	ARS1-11-00897	005	MD-SW-110420	1	TH-228	0.043250022	0.028736107	0.014661279	0.028736107	0.013023062	0	0.028256681	0.01441667	0.02825668	pCi
ARS1-B11-01657-08	ARS1-11-00897	005	MD-SW-110420	1	TH-229	10.27514977	1.317854996	0.672374998	1.317854996	0.052917863	0.019800477	0.441051613	0.22502633	0.44105161	pCi
ARS1-B11-01657-08	ARS1-11-00897	005	MD-SW-110420	1	TH-230	0.418524635	0.105042853	0.053593292	0.105042853	0.053023729	0.01984009	0.092061674	0.04697024	0.09206167	pCi
ARS1-B11-01657-08	ARS1-11-00897	005	MD-SW-110420	1	TH-232	0.019655879	0.027345046	0.013951554	0.027345046	0.045650779	0.016166961	0.027241659	0.01389881	0.02724166	pCi
ARS1-B11-01657-09	ARS1-11-00897	006	MW-3-110420	1	TH-228	0.007967807	0.02210662	0.011278888	0.02210662	0.042901947	0.016052784	0.022085635	0.01126818	0.02208564	pCi
ARS1-B11-01657-09	ARS1-11-00897	006	MW-3-110420	1	TH-229	10.24486937	1.298880923	0.662694348	1.298880923	0.042028635	0.015726014	0.392368029	0.20018777	0.39236803	pCi
ARS1-B11-01657-09	ARS1-11-00897	006	MW-3-110420	1	TH-230	0.645251517	0.126995457	0.064793601	0.126995457	0.042112717	0.015757475	0.100230343	0.05113793	0.10023034	pCi
ARS1-B11-01657-09	ARS1-11-00897	006	MW-3-110420	1	TH-232	0.031222341	0.026765892	0.013656067	0.026765892	0.036256943	0.012840188	0.026498553	0.01351967	0.02649855	pCi
ARS1-B11-01657-10	ARS1-11-00897	007	MW-4-110420	1	TH-228	0	0.016044763	0.008186103	0.016044763	0.038024451	0.01346614	0.016044763	0.0081861	0.01604476	pCi
ARS1-B11-01657-10	ARS1-11-00897	007	MW-4-110420	1	TH-229	10.24486937	1.300602351	0.663572628	1.300602351	0.052583219	0.020858421	0.398029514	0.20307628	0.39802951	pCi
ARS1-B11-01657-10	ARS1-11-00897	007	MW-4-110420	1	TH-230	0.128568173	0.054497743	0.027804971	0.054497743	0.056678051	0.022894967	0.052235518	0.02665077	0.05223552	pCi
ARS1-B11-01657-10	ARS1-11-00897	007	MW-4-110420	1	TH-232	0.008019437	0.015747951	0.008034669	0.015747951	0.029522605	0.009328134	0.015718096	0.00801944	0.0157181	pCi
ARS1-B11-01657-11	ARS1-11-00897	008	MW-6-110420	1	TH-228	0.026390062	0.028795503	0.014691583	0.028795503	0.045298636	0.017540956	0.028618316	0.01460118	0.02861832	pCi
ARS1-B11-01657-11	ARS1-11-00897	008	MW-6-110420	1	TH-229	10.2044955	1.290844708	0.658594239	1.290844708	0.044376538	0.017183893	0.381052651	0.19441462	0.38105265	pCi
ARS1-B11-01657-11	ARS1-11-00897	008	MW-6-110420	1	TH-230	0.673519252	0.128927067	0.065779116	0.128927067	0.044465316	0.01721827	0.099979624	0.05101001	0.09997962	pCi
ARS1-B11-01657-11	ARS1-11-00897	008	MW-6-110420	1	TH-232	0.040625778	0.030247418	0.015432356	0.030247418	0.039771977	0.014881631	0.029846234	0.01522767	0.02984623	pCi
ARS1-B11-01657-12	ARS1-11-00897	009	MW-7-110419	1	TH-228	0.035638155	0.023678643	0.01208094	0.023678643	0.010731044	0	0.023283595	0.01187939	0.02328359	pCi
ARS1-B11-01657-12	ARS1-11-00897	009	MW-7-110419	1	TH-229	10.23477854	1.297197551	0.661835485	1.297197551	0.036001928	0.012749876	0.390642021	0.19930715	0.39064202	pCi
ARS1-B11-01657-12	ARS1-11-00897	009	MW-7-110419	1	TH-230	0.485386768	0.104469291	0.053300659	0.104469291	0.036073945	0.01277538	0.086442804	0.04410347	0.0864428	pCi
ARS1-B11-01657-12	ARS1-11-00897	009	MW-7-110419	1	TH-232	0.038753264	0.02447192	0.012485673	0.02447192	0.010502135	0	0.024019522	0.01225486	0.02401952	pCi
ARS1-B11-01657-13	ARS1-11-00897	010	MW-8-110419	1	TH-228	0.004018533	0.017618693	0.008989129	0.017618693	0.037332173	0.013220974	0.017611998	0.00898571	0.017612	pCi
ARS1-B11-01657-13	ARS1-11-00897	010	MW-8-110419	1	TH-229	10.17421772	1.290697607	0.658519187	1.290697607	0.028956455	0.00914925	0.392217254	0.20011084	0.39221725	pCi
ARS1-B11-01657-13	ARS1-11-00897	010	MW-8-110419	1	TH-230	0.937884647	0.165544887	0.084461677	0.165544887	0.042436606	0.015878665	0.120648924	0.06155557	0.12064892	pCi
ARS1-B11-01657-13	ARS1-11-00897	010	MW-8-110419	1	TH-232	0.011798427	0.02044405	0.010430638	0.02044405	0.036535794	0.012938941	0.020394259	0.01040523	0.02039426	pCi
ARS1-B11-01657-14	ARS1-11-00897	011	MW-MD-02-110420	1	TH-228	-0.004057242	0.017788408	0.009075718	0.017788408	0.043691715	0.016348295	0.017781648	0.00907227	0.01778165	pCi
ARS1-B11-01657-14	ARS1-11-00897	011	MW-MD-02-110420	1	TH-229	10.10356082	1.282782126	0.654480677	1.282782126	0.029264406	0.009246552	0.392928508	0.20047373	0.39292851	pCi
ARS1-B11-01657-14	ARS1-11-00897	011	MW-MD-02-110420	1	TH-230	0.692972714	0.133186381	0.067952235	0.133186381	0.029322952	0.00926505	0.10355696	0.05283518	0.10355696	pCi
ARS1-B11-01657-14	ARS1-11-00897	011	MW-MD-02-110420	1	TH-232	0.023847811	0.022221965	0.011337737	0.022221965	0.029264295	0.009246517	0.022034253	0.01124197	0.02203425	pCi
ARS1-B11-01657-15	ARS1-11-00897	012	MW-MD-110420	1	TH-228	0.009227451	0.022178553	0.011315588	0.022178553	0.042861511	0.015179157	0.022150496	0.01130127	0.0221505	pCi
ARS1-B11-01657-15	ARS1-11-00897	012	MW-MD-110420	1	TH-229	10.10356082	1.288560638	0.657428897	1.288560638	0.046837469	0.017525353	0.411401685	0.20989882	0.41140168	pCi
ARS1-B11-01657-15	ARS1-11-00897	012	MW-MD-110420	1	TH-230	0.858537855	0.160387334	0.081830273	0.160387334	0.052364382	0.020277019	0.122299935	0.06239793	0.12229993	pCi
ARS1-B11-01657-15	ARS1-11-00897	012	MW-MD-110420	1	TH-232	0.008698685	0.012101516	0.006174243	0.012101516	0.011786718	0	0.012055762	0.0061509	0.01205576	pCi

ABatchSampleID	SDG	Fraction	AliquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountMins	BKG_Counts	BKG_CountMins	EFF	ALIQ	SampleCollDate	MidPointCountDate	BP_I
ARS1-B11-01657-01			L		0.881919897	2	1440	0	1440	0.212452739	1	5/4/2011	5/5/2011	0.11375
ARS1-B11-01657-01			L		0.881919897	3073	1440	3	1440	0.212452739	1	5/4/2011	5/5/2011	0.26774
ARS1-B11-01657-01			L		0.881919897	3355	1440	14	1440	0.212452739	1	5/4/2011	5/5/2011	0.14097
ARS1-B11-01657-01			L		0.881919897	4	1440	5	1440	0.212452739	1	5/4/2011	5/5/2011	0.01982
ARS1-B11-01657-02			L		0.96350993	2	1440	3	1440	0.192200825	1	5/4/2011	5/5/2011	0.11375
ARS1-B11-01657-02			L		0.96350993	3051	1440	17	1440	0.192200825	1	5/4/2011	5/5/2011	0.26774
ARS1-B11-01657-02			L		0.96350993	3404	1440	5	1440	0.192200825	1	5/4/2011	5/5/2011	0.14097
ARS1-B11-01657-02			L		0.96350993	2	1440	3	1440	0.192200825	1	5/4/2011	5/5/2011	0.01982
ARS1-B11-01657-03			L		0.800580305	17	1440	1	1440	0.216391131	1	5/4/2011	5/5/2011	0.11375
ARS1-B11-01657-03			L		0.800580305	2847	1440	11	1440	0.216391131	1	5/4/2011	5/5/2011	0.26774
ARS1-B11-01657-03			L		0.800580305	30	1440	6	1440	0.216391131	1	5/4/2011	5/5/2011	0.14097
ARS1-B11-01657-03			L		0.800580305	15	1440	2	1440	0.216391131	1	5/4/2011	5/5/2011	0.01982
ARS1-B11-01657-04	ARS1-11-00897	001	L		0.794700733	12	1440	0	1440	0.219564006	0.5	4/19/2011	5/5/2011	0.23087
ARS1-B11-01657-04	ARS1-11-00897	001	L		0.794700733	2892	1440	15	1440	0.219564006	0.5	4/19/2011	5/5/2011	0.53548
ARS1-B11-01657-04	ARS1-11-00897	001	L		0.794700733	36	1440	2	1440	0.219564006	0.5	4/19/2011	5/5/2011	0.28194
ARS1-B11-01657-04	ARS1-11-00897	001	L		0.794700733	5	1440	3	1440	0.219564006	0.5	4/19/2011	5/5/2011	0.03964
ARS1-B11-01657-05	ARS1-11-00897	002	L		0.703374185	3	1440	0	1440	0.212170452	0.5	4/21/2011	5/5/2011	0.23042
ARS1-B11-01657-05	ARS1-11-00897	002	L		0.703374185	2456	1440	5	1440	0.212170452	0.5	4/21/2011	5/5/2011	0.5354
ARS1-B11-01657-05	ARS1-11-00897	002	L		0.703374185	6	1440	5	1440	0.212170452	0.5	4/21/2011	5/5/2011	0.28194
ARS1-B11-01657-05	ARS1-11-00897	002	L		0.703374185	4	1440	21	1440	0.212170452	0.5	4/21/2011	5/5/2011	0.03964
ARS1-B11-01657-06	ARS1-11-00897	003	L		0.732777571	2	1440	0	1440	0.206113368	0.5	4/21/2011	5/5/2011	0.23042
ARS1-B11-01657-06	ARS1-11-00897	003	L		0.732777571	2486	1440	3	1440	0.206113368	0.5	4/21/2011	5/5/2011	0.5354
ARS1-B11-01657-06	ARS1-11-00897	003	L		0.732777571	15	1440	5	1440	0.206113368	0.5	4/21/2011	5/5/2011	0.28194
ARS1-B11-01657-06	ARS1-11-00897	003	L		0.732777571	2	1440	3	1440	0.206113368	0.5	4/21/2011	5/5/2011	0.03964
ARS1-B11-01657-07	ARS1-11-00897	004	L		0.799757869	16	1440	2	1440	0.22593005	0.1	4/21/2011	5/5/2011	1.15210
ARS1-B11-01657-07	ARS1-11-00897	004	L		0.799757869	2992	1440	4	1440	0.22593005	0.1	4/21/2011	5/5/2011	2.67744
ARS1-B11-01657-07	ARS1-11-00897	004	L		0.799757869	89	1440	3	1440	0.22593005	0.1	4/21/2011	5/5/2011	1.40972
ARS1-B11-01657-07	ARS1-11-00897	004	L		0.799757869	6	1440	1	1440	0.22593005	0.1	4/21/2011	5/5/2011	0.19822
ARS1-B11-01657-08	ARS1-11-00897	005	L		0.588206835	9	1440	0	1440	0.22593005	0.5	4/20/2011	5/5/2011	0.23065
ARS1-B11-01657-08	ARS1-11-00897	005	L		0.588206835	2094	1440	3	1440	0.216447204	0.5	4/20/2011	5/5/2011	0.53548
ARS1-B11-01657-08	ARS1-11-00897	005	L		0.588206835	88	1440	3	1440	0.216447204	0.5	4/20/2011	5/5/2011	0.28194
ARS1-B11-01657-08	ARS1-11-00897	005	L		0.588206835	6	1440	2	1440	0.216447204	0.5	4/20/2011	5/5/2011	0.03964
ARS1-B11-01657-09	ARS1-11-00897	006	L		0.766225173	5	1440	3	1440	0.209210098	0.5	4/20/2011	5/5/2011	0.23065
ARS1-B11-01657-09	ARS1-11-00897	006	L		0.766225173	2628	1440	3	1440	0.209210098	0.5	4/20/2011	5/5/2011	0.53548
ARS1-B11-01657-09	ARS1-11-00897	006	L		0.766225173	168	1440	3	1440	0.209210098	0.5	4/20/2011	5/5/2011	0.28194
ARS1-B11-01657-09	ARS1-11-00897	006	L		0.766225173	10	1440	2	1440	0.209210098	0.5	4/20/2011	5/5/2011	0.03964
ARS1-B11-01657-10	ARS1-11-00897	007	L		0.762093662	2	1440	2	1440	0.2047351	0.5	4/20/2011	5/5/2011	0.23065
ARS1-B11-01657-10	ARS1-11-00897	007	L		0.762093662	2560	1440	5	1440	0.2047351	0.5	4/20/2011	5/5/2011	0.53548
ARS1-B11-01657-10	ARS1-11-00897	007	L		0.762093662	38	1440	6	1440	0.2047351	0.5	4/20/2011	5/5/2011	0.28194
ARS1-B11-01657-10	ARS1-11-00897	007	L		0.762093662	3	1440	1	1440	0.2047351	0.5	4/20/2011	5/5/2011	0.03964
ARS1-B11-01657-11	ARS1-11-00897	008	L		0.752864372	11	1440	4	1440	0.225003242	0.5	4/20/2011	5/5/2011	0.23065
ARS1-B11-01657-11	ARS1-11-00897	008	L		0.752864372	2767	1440	4	1440	0.225003242	0.5	4/20/2011	5/5/2011	0.53548
ARS1-B11-01657-11	ARS1-11-00897	008	L		0.752864372	186	1440	4	1440	0.225003242	0.5	4/20/2011	5/5/2011	0.28194
ARS1-B11-01657-11	ARS1-11-00897	008	L		0.752864372	14	1440	3	1440	0.225003242	0.5	4/20/2011	5/5/2011	0.03964
ARS1-B11-01657-12	ARS1-11-00897	009	L		0.719742063	9	1440	0	1440	0.224300042	0.5	4/19/2011	5/5/2011	0.23087
ARS1-B11-01657-12	ARS1-11-00897	009	L		0.719742063	2643	1440	2	1440	0.224300042	0.5	4/19/2011	5/5/2011	0.53548
ARS1-B11-01657-12	ARS1-11-00897	009	L		0.719742063	127	1440	2	1440	0.224300042	0.5	4/19/2011	5/5/2011	0.28194
ARS1-B11-01657-12	ARS1-11-00897	009	L		0.719742063	10	1440	0	1440	0.224300042	0.5	4/19/2011	5/5/2011	0.03964
ARS1-B11-01657-13	ARS1-11-00897	010	L		0.721378018	3	1440	2	1440	0.220520407	0.5	4/19/2011	5/5/2011	0.23087
ARS1-B11-01657-13	ARS1-11-00897	010	L		0.721378018	2588	1440	1	1440	0.220520407	0.5	4/19/2011	5/5/2011	0.53548
ARS1-B11-01657-13	ARS1-11-00897	010	L		0.721378018	241	1440	3	1440	0.220520407	0.5	4/19/2011	5/5/2011	0.28194
ARS1-B11-01657-13	ARS1-11-00897	010	L		0.721378018	5	1440	2	1440	0.220520407	0.5	4/19/2011	5/5/2011	0.03964
ARS1-B11-01657-14	ARS1-11-00897	011	L		0.732892371	2	1440	3	1440	0.214771703	0.5	4/20/2011	5/5/2011	0.23065
ARS1-B11-01657-14	ARS1-11-00897	011	L		0.732892371	2543	1440	1	1440	0.214771703	0.5	4/20/2011	5/5/2011	0.53548
ARS1-B11-01657-14	ARS1-11-00897	011	L		0.732892371	175	1440	1	1440	0.214771703	0.5	4/20/2011	5/5/2011	0.28194
ARS1-B11-01657-14	ARS1-11-00897	011	L		0.732892371	7	1440	1	1440	0.214771703	0.5	4/20/2011	5/5/2011	0.03964
ARS1-B11-01657-15	ARS1-11-00897	012	L		0.64449472	4	1440	2	1440	0.214771703	0.5	4/20/2011	5/5/2011	0.23065
ARS1-B11-01657-15	ARS1-11-00897	012	L		0.64449472	2326	1440	3	1440	0.22318837	0.5	4/20/2011	5/5/2011	0.53548
ARS1-B11-01657-15	ARS1-11-00897	012	L		0.64449472	201	1440	4	1440	0.22318837	0.5	4/20/2011	5/5/2011	0.28194
ARS1-B11-01657-15	ARS1-11-00897	012	L		0.64449472	2	1440	0	1440	0.22318837	0.5	4/20/2011	5/5/2011	0.03964

ABatchSampleID	SDG	Fraction	BP_MDA	Sb_Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlatingRecovery	InstFileName	DetectorID	InstrumentkeV	NuclideAbd	TracerMeasACT
ARS1-B11-01657-01			0.23156818	0.108293155	2.22	1.96	0.001388889	0	0.001388889	0.715	ApexAlpha	A_1_1A	4.88256979		
ARS1-B11-01657-01			0.538862212	0.255103153	2.22	1.96	2.134027778	0.002083333	2.131944444	0.715	ApexAlpha	A_1_1A	45.49444962		
ARS1-B11-01657-01			0.285873133	0.134316992	2.22	1.96	2.329861111	0.009722222	2.320138889	0.715	ApexAlpha	A_1_1A	40.06654739		
ARS1-B11-01657-01			0.044084012	0.018886518	2.22	1.96	0.002777778	0.003472222	-0.000694444	0.715	ApexAlpha	A_1_1A	4.88256979		
ARS1-B11-01657-02			0.231621778	0.108293155	2.22	1.96	0.001388889	0.002083333	-0.000694444	0.715	ApexAlpha	A_1_1B	4.88326931		
ARS1-B11-01657-02			0.538915446	0.255103153	2.22	1.96	2.11875	0.011805556	2.106944444	0.715	ApexAlpha	A_1_1B	42.06732941		
ARS1-B11-01657-02			0.285926474	0.134316992	2.22	1.96	2.363888889	0.003472222	2.360416667	0.715	ApexAlpha	A_1_1B	27.36777115		
ARS1-B11-01657-02			0.044137246	0.018886518	2.22	1.96	0.001388889	0.002083333	-0.000694444	0.715	ApexAlpha	A_1_1B			
ARS1-B11-01657-03			0.231939677	0.108293155	2.22	1.96	0.011805556	0.000694444	0.011111111	0.715	ApexAlpha	A_1_2A	10.64367199		
ARS1-B11-01657-03			0.539231184	0.255103153	2.22	1.96	1.977083333	0.007638889	1.969444444	0.715	ApexAlpha	A_1_2A	34.18570709		
ARS1-B11-01657-03			0.286242845	0.134316992	2.22	1.96	0.020833333	0.004166667	0.016666667	0.715	ApexAlpha	A_1_2A	7.859941959		
ARS1-B11-01657-03			0.044452984	0.018886518	2.22	1.96	0.010416667	0.001388889	0.009027778	0.715	ApexAlpha	A_1_2A	24.5623188		
ARS1-B11-01657-04	ARS1-11-00897	001	0.470695935	0.108293155	2.22	1.96	0.008333333	0	0.008333333	0.715	ApexAlpha	A_1_2B	6.518549919		
ARS1-B11-01657-04	ARS1-11-00897	001	1.078396444	0.255103153	2.22	1.96	2.008333333	0.010416667	1.997916667	0.715	ApexAlpha	A_1_2B	37.85322571		
ARS1-B11-01657-04	ARS1-11-00897	001	0.572415697	0.134316992	2.22	1.96	0.025	0.001388889	0.023611111	0.715	ApexAlpha	A_1_2B	11.00005245		
ARS1-B11-01657-04	ARS1-11-00897	001	0.088835902	0.018886518	2.22	1.96	0.003472222	0.002083333	0.001388889	0.715	ApexAlpha	A_1_2B	9.777824402		
ARS1-B11-01657-05	ARS1-11-00897	002	0.471439186	0.108293155	2.22	1.96	0.002083333	0	0.002083333	0.715	ApexAlpha	A_1_3A	9.822584152		
ARS1-B11-01657-05	ARS1-11-00897	002	1.08004008	0.255103153	2.22	1.96	1.705555556	0.003472222	1.702083333	0.715	ApexAlpha	A_1_3A	37.28762054		
ARS1-B11-01657-05	ARS1-11-00897	002	0.574063151	0.134316992	2.22	1.96	0.004166667	0.003472222	0.000694444	0.715	ApexAlpha	A_1_3A	7.366938114		
ARS1-B11-01657-05	ARS1-11-00897	002	0.09048009	0.018886518	2.22	1.96	0.002777778	0.014583333	-0.011805556	0.715	ApexAlpha	A_1_3A	4.911292076		
ARS1-B11-01657-06	ARS1-11-00897	003	0.47130111	0.108293155	2.22	1.96	0.001388889	0	0.001388889	0.715	ApexAlpha	A_1_3B	9.827695847		
ARS1-B11-01657-06	ARS1-11-00897	003	1.07990468	0.255103153	2.22	1.96	1.726388889	0.002083333	1.724305556	0.715	ApexAlpha	A_1_3B	41.94086456		
ARS1-B11-01657-06	ARS1-11-00897	003	0.573927481	0.134316992	2.22	1.96	0.010416667	0.003472222	0.006944444	0.715	ApexAlpha	A_1_3B	4.913847923		
ARS1-B11-01657-06	ARS1-11-00897	003	0.090344691	0.018886518	2.22	1.96	0.001388889	0.002083333	-0.000694444	0.715	ApexAlpha	A_1_3B	4.913847923		
ARS1-B11-01657-07	ARS1-11-00897	004	2.347112	0.108293155	2.22	1.96	0.011111111	0.001388889	0.009722222	0.715	ApexAlpha	A_1_4A	6.138088703		
ARS1-B11-01657-07	ARS1-11-00897	004	5.39031193	0.255103153	2.22	1.96	2.077777778	0.002777778	2.075	0.715	ApexAlpha	A_1_4A	34.26769638		
ARS1-B11-01657-07	ARS1-11-00897	004	2.860407504	0.134316992	2.22	1.96	0.061805556	0.002083333	0.059722222	0.715	ApexAlpha	A_1_4A	17.800457		
ARS1-B11-01657-07	ARS1-11-00897	004	0.442512015	0.018886518	2.22	1.96	0.004166667	0.000694444	0.003472222	0.715	ApexAlpha	A_1_4A	7.365706444		
ARS1-B11-01657-08	ARS1-11-00897	005	0.473333398	0.108293155	2.22	1.96	0.00625	0	0.00625	0.715	ApexAlpha	A_1_4B			
ARS1-B11-01657-08	ARS1-11-00897	005	1.081996331	0.255103153	2.22	1.96	1.454166667	0.002083333	1.452083333	0.715	ApexAlpha	A_1_4B	41.15888977		
ARS1-B11-01657-08	ARS1-11-00897	005	0.576023051	0.134316992	2.22	1.96	0.061111111	0.002083333	0.059027778	0.715	ApexAlpha	A_1_4B	17.11597824		
ARS1-B11-01657-08	ARS1-11-00897	005	0.092436054	0.018886518	2.22	1.96	0.004166667	0.001388889	0.002777778	0.715	ApexAlpha	A_1_4B	9.780558586		
ARS1-B11-01657-09	ARS1-11-00897	006	0.471106714	0.108293155	2.22	1.96	0.003472222	0.002083333	0.001388889	0.715	ApexAlpha	A_1_5A	4.889725208		
ARS1-B11-01657-09	ARS1-11-00897	006	1.07925603	0.255103153	2.22	1.96	1.825	0.002083333	1.822916667	0.715	ApexAlpha	A_1_5A	33.5205307		
ARS1-B11-01657-09	ARS1-11-00897	006	0.573277268	0.134316992	2.22	1.96	0.116666667	0.002083333	0.114583333	0.715	ApexAlpha	A_1_5A	31.78321457		
ARS1-B11-01657-09	ARS1-11-00897	006	0.089695764	0.018886518	2.22	1.96	0.006944444	0.001388889	0.005555556	0.715	ApexAlpha	A_1_5A	9.779450417		
ARS1-B11-01657-10	ARS1-11-00897	007	0.471402506	0.108293155	2.22	1.96	0.001388889	0.001388889	0	0.715	ApexAlpha	A_1_5B	4.906514168		
ARS1-B11-01657-10	ARS1-11-00897	007	1.0795458	0.255103153	2.22	1.96	1.777777778	0.003472222	1.774305556	0.715	ApexAlpha	A_1_5B	42.21513748		
ARS1-B11-01657-10	ARS1-11-00897	007	0.573567618	0.134316992	2.22	1.96	0.026388889	0.004166667	0.022222222	0.715	ApexAlpha	A_1_5B	10.42634296		
ARS1-B11-01657-10	ARS1-11-00897	007	0.089985533	0.018886518	2.22	1.96	0.002083333	0.000694444	0.001388889	0.715	ApexAlpha	A_1_5B	4.906514168		
ARS1-B11-01657-11	ARS1-11-00897	008	0.470527059	0.108293155	2.22	1.96	0.007638889	0.002777778	0.004861111	0.715	ApexAlpha	A_1_6A	4.886059284		
ARS1-B11-01657-11	ARS1-11-00897	008	1.078688175	0.255103153	2.22	1.96	1.921527778	0.002777778	1.91875	0.715	ApexAlpha	A_1_6A	54.52222061		
ARS1-B11-01657-11	ARS1-11-00897	008	0.572708276	0.134316992	2.22	1.96	0.129166667	0.002777778	0.126388889	0.715	ApexAlpha	A_1_6A	15.74396896		
ARS1-B11-01657-11	ARS1-11-00897	008	0.08912791	0.018886518	2.22	1.96	0.009722222	0.002083333	0.007638889	0.715	ApexAlpha	A_1_6A	7.329089165		
ARS1-B11-01657-12	ARS1-11-00897	009	0.471498483	0.108293155	2.22	1.96	0.00625	0	0.00625	0.715	ApexAlpha	A_1_6B	6.124101639		
ARS1-B11-01657-12	ARS1-11-00897	009	1.079181876	0.255103153	2.22	1.96	1.835416667	0.001388889	1.834027778	0.715	ApexAlpha	A_1_6B	45.33320236		
ARS1-B11-01657-12	ARS1-11-00897	009	0.5732027	0.134316992	2.22	1.96	0.088194444	0.001388889	0.086805556	0.715	ApexAlpha	A_1_6B	14.93114376		
ARS1-B11-01657-12	ARS1-11-00897	009	0.089621331	0.018886518	2.22	1.96	0.006944444	0	0.006944444	0.715	ApexAlpha	A_1_6B	7.348922253		
ARS1-B11-01657-13	ARS1-11-00897	010	0.471657981	0.108293155	2.22	1.96	0.002083333	0.001388889	0.000694444	0.715	ApexAlpha	A_2_1A	9.816235542		
ARS1-B11-01657-13	ARS1-11-00897	010	1.079337654	0.255103153	2.22	1.96	1.797222222	0.000694444	1.796527778	0.715	ApexAlpha	A_2_1A	51.05318832		
ARS1-B11-01657-13	ARS1-11-00897	010	0.57335879	0.134316992	2.22	1.96	0.167361111	0.002083333	0.165277778	0.715	ApexAlpha	A_2_1A	42.05364609		
ARS1-B11-01657-13	ARS1-11-00897	010	0.089777108	0.018886518	2.22	1.96	0.003472222	0.001388889	0.002083333	0.715	ApexAlpha	A_2_1A	4.908117771		
ARS1-B11-01657-14	ARS1-11-00897	011	0.471305779	0.108293155	2.22	1.96	0.001388889	0.002083333	-0.000694444	0.715	ApexAlpha	A_2_1B	4.879087925		
ARS1-B11-01657-14	ARS1-11-00897	011	1.079450724	0.255103153	2.22	1.96	1.765972222	0.000694444	1.765277778	0.715	ApexAlpha	A_2_1B	54.46378708		
ARS1-B11-01657-14	ARS1-11-00897	011	0.573472351	0.134316992	2.22	1.96	0.121527778	0.000694444	0.120833333	0.715	ApexAlpha	A_2_1B	9.75817585		
ARS1-B11-01657-14	ARS1-11-00897	011	0.089890457	0.018886518	2.22	1.96	0.004861111	0.000694444	0.004166667	0.715	ApexAlpha	A_2_1B	7.318632126		
ARS1-B11-01657-15	ARS1-11-00897	012	0.472813849	0.108293155	2.22	1.96	0.002777778	0.001388889	0.001388889	0.715	ApexAlpha	A_2_2A			
ARS1-B11-01657-15	ARS1-11-00897	012	1.080466185	0.255103153	2.22	1.96	1.615277778	0.002083333	1.613194444	0.715	ApexAlpha	A_2_2A	56.75115204		
ARS1-B11-01657-15	ARS1-11-00897	012	0.574489844	0.134316992	2.22	1.96	0.139583333	0.002777778	0.136805556	0.715	ApexAlpha	A_2_2A	18.86896133		
ARS1-B11-01657-15	ARS1-11-00897	012	0.090905914	0.018886518	2.22	1.96	0.001388889	0	0.001388889	0.715	ApexAlpha	A_2_2A	4.902958393		

ABatchSampleID	SDG	Fraction	TracerKnownACT	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	Halflife1	Halflife2	Halflife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	DeltaT1	Delta
ARS1-B11-01657-01				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-01				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-01				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-01				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-02				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-02				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-02				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-02				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-03				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-03				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-03				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-03				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	0.810439815	
ARS1-B11-01657-04	ARS1-11-00897	001		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.66111111	
ARS1-B11-01657-04	ARS1-11-00897	001		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.66111111	
ARS1-B11-01657-04	ARS1-11-00897	001		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.66111111	
ARS1-B11-01657-04	ARS1-11-00897	001		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.66111111	
ARS1-B11-01657-05	ARS1-11-00897	002		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-05	ARS1-11-00897	002		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-05	ARS1-11-00897	002		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-05	ARS1-11-00897	002		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-06	ARS1-11-00897	003		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-06	ARS1-11-00897	003		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-06	ARS1-11-00897	003		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-06	ARS1-11-00897	003		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-07	ARS1-11-00897	004		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-07	ARS1-11-00897	004		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-07	ARS1-11-00897	004		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-07	ARS1-11-00897	004		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	13.66111111	
ARS1-B11-01657-08	ARS1-11-00897	005		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-08	ARS1-11-00897	005		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-08	ARS1-11-00897	005		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-08	ARS1-11-00897	005		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-09	ARS1-11-00897	006		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-09	ARS1-11-00897	006		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-09	ARS1-11-00897	006		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-09	ARS1-11-00897	006		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-10	ARS1-11-00897	007		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-10	ARS1-11-00897	007		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-10	ARS1-11-00897	007		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-10	ARS1-11-00897	007		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-11	ARS1-11-00897	008		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-11	ARS1-11-00897	008		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-11	ARS1-11-00897	008		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-11	ARS1-11-00897	008		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.66111111	
ARS1-B11-01657-12	ARS1-11-00897	009		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.66111111	
ARS1-B11-01657-12	ARS1-11-00897	009		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.66111111	
ARS1-B11-01657-12	ARS1-11-00897	009		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.66111111	
ARS1-B11-01657-12	ARS1-11-00897	009		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.66111111	
ARS1-B11-01657-13	ARS1-11-00897	010		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.66180556	
ARS1-B11-01657-13	ARS1-11-00897	010		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.66180556	
ARS1-B11-01657-13	ARS1-11-00897	010		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.66180556	
ARS1-B11-01657-13	ARS1-11-00897	010		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.66180556	
ARS1-B11-01657-14	ARS1-11-00897	011		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-14	ARS1-11-00897	011		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-14	ARS1-11-00897	011		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-14	ARS1-11-00897	011		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-15	ARS1-11-00897	012		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-15	ARS1-11-00897	012		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-15	ARS1-11-00897	012		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-15	ARS1-11-00897	012		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.66180556	

ABatchSampleID	SDG	Fraction	DeltaT3	DeltaT4	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SysErr	K_Val	K_MDA	AnalysisCode	UserID	ModDate
ARS1-B11-01657-01							0.999195929					0.061663514	0.413125013	594.9000193		ABAILEY	5/6/2011
ARS1-B11-01657-01							0.99999979					0.061663514	0.415953094	598.972456		ABAILEY	5/6/2011
ARS1-B11-01657-01							0.99999998					0.061663514	0.415121267	597.7746242		ABAILEY	5/6/2011
ARS1-B11-01657-01							1					0.061663514	0.415953182	598.9725816		ABAILEY	5/6/2011
ARS1-B11-01657-02							0.999195929					0.061663514	0.408320756	587.981888		ABAILEY	5/6/2011
ARS1-B11-01657-02							0.99999979					0.061663514	0.411115949	592.0069661		ABAILEY	5/6/2011
ARS1-B11-01657-02							0.99999998					0.061663514	0.410293794	590.823064		ABAILEY	5/6/2011
ARS1-B11-01657-02							1					0.061663514	0.411116035	592.0070902		ABAILEY	5/6/2011
ARS1-B11-01657-03							0.999195929					0.061663514	0.381974502	550.0432834		ABAILEY	5/6/2011
ARS1-B11-01657-03							0.99999979					0.061663514	0.38458934	553.8086497		ABAILEY	5/6/2011
ARS1-B11-01657-03							0.99999998					0.061663514	0.383820234	552.701137		ABAILEY	5/6/2011
ARS1-B11-01657-03							1					0.061663514	0.384589421	553.8087658		ABAILEY	5/6/2011
ARS1-B11-01657-04	ARS1-11-00897	001					0.9845759					0.061663514	0.189549797	272.9517074	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-04	ARS1-11-00897	001					0.99999595					0.061663514	0.193680536	278.8999723	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-04	ARS1-11-00897	001					0.999999606					0.061663514	0.193293882	278.3431898	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-04	ARS1-11-00897	001					1					0.061663514	0.193681321	278.9011017	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-05	ARS1-11-00897	002					0.986532304					0.061663514	0.162439633	233.9130718	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-05	ARS1-11-00897	002					0.999996467					0.061663514	0.165650507	238.5367308	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-05	ARS1-11-00897	002					0.999999656					0.061663514	0.165319734	238.0604164	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-05	ARS1-11-00897	002					1					0.061663514	0.165651093	238.5375734	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-06	ARS1-11-00897	003					0.986532304					0.061663514	0.164398936	236.7344679	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-06	ARS1-11-00897	003					0.999996467					0.061663514	0.167648539	241.4138961	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-06	ARS1-11-00897	003					0.999999656					0.061663514	0.167313775	240.9318366	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-06	ARS1-11-00897	003					1					0.061663514	0.167649131	241.4147489	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-07	ARS1-11-00897	004					0.986532304					0.061663514	0.039335366	56.64292637	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-07	ARS1-11-00897	004					0.999996467					0.061663514	0.040112891	57.76256271	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-07	ARS1-11-00897	004					0.999999656					0.061663514	0.040032793	57.6472214	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-07	ARS1-11-00897	004					1					0.061663514	0.040113032	57.76276675	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-08	ARS1-11-00897	005					0.985553617					0.061663514	0.144508597	208.0923796	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-08	ARS1-11-00897	005					0.999996209					0.061663514	0.141319919	203.5006834	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-08	ARS1-11-00897	005					0.999999631					0.061663514	0.141037762	203.0943771	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-08	ARS1-11-00897	005					1					0.061663514	0.141320455	203.5014549	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-09	ARS1-11-00897	006					0.985553617					0.061663514	0.174312559	251.0100843	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-09	ARS1-11-00897	006					0.999996209					0.061663514	0.177934594	256.2258147	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-09	ARS1-11-00897	006					0.999999631					0.061663514	0.177579332	255.7142382	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-09	ARS1-11-00897	006					1					0.061663514	0.177935268	256.2267861	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-10	ARS1-11-00897	007					0.985553617					0.061663514	0.169664224	244.3164821	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-10	ARS1-11-00897	007					0.999996209					0.061663514	0.173189671	249.3931263	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-10	ARS1-11-00897	007					0.999999631					0.061663514	0.172843883	248.8951918	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-10	ARS1-11-00897	007					1					0.061663514	0.173190328	249.3940718	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-11	ARS1-11-00897	008					0.985553617					0.061663514	0.184202339	265.2513686	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-11	ARS1-11-00897	008					0.999996209					0.061663514	0.188029874	270.7630182	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-11	ARS1-11-00897	008					0.999999631					0.061663514	0.187654456	270.2224169	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-11	ARS1-11-00897	008					1					0.061663514	0.188030587	270.7640447	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-12	ARS1-11-00897	009					0.98457S9					0.061663514	0.175373837	252.5383249	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-12	ARS1-11-00897	009					0.99999595					0.061663514	0.179195648	258.0417337	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-12	ARS1-11-00897	009					0.999999606					0.061663514	0.178837911	257.5265916	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-12	ARS1-11-00897	009					1					0.061663514	0.179196374	258.0427787	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-13	ARS1-11-00897	010					0.984575221					0.061663514	0.172810431	248.8470212	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-13	ARS1-11-00897	010					0.99999595					0.061663514	0.176576502	254.2701631	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-13	ARS1-11-00897	010					0.999999606					0.061663514	0.176223993	253.7625504	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-13	ARS1-11-00897	010					1					0.061663514	0.176577217	254.2711928	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-14	ARS1-11-00897	011					0.985552937					0.061663514	0.171161696	246.4728424	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-14	ARS1-11-00897	011					0.999996209					0.061663514	0.17471838	251.594467	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-14	ARS1-11-00897	011					0.999999631					0.061663514	0.17436954	251.0921374	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-14	ARS1-11-00897	011					1					0.061663514	0.174719042	251.5954209	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-15	ARS1-11-00897	012					0.985552937					0.061663514	0.150517066	216.7445751	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-15	ARS1-11-00897	012					0.999996209					0.061663514	0.159665931	229.9189405	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-15	ARS1-11-00897	012					0.999999631					0.061663514	0.159347144	229.4598879	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-15	ARS1-11-00897	012					1					0.061663514	0.159666536	229.9198122	ASP-A-008	ABAILEY	5/6/2011

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPU1s	TPU2s	MDA	DL	CU	CU1s	CU2s	ActivityReportUnits
ARS1-B11-01657-16	ARS1-11-00897	013	NPOP20E-110420	1	TH-228	0.037393028	0.073429543	0.037464052	0.073429543	0.137657996	0.043495221	0.073290336	0.03739303	0.07329034	pCi
ARS1-B11-01657-16	ARS1-11-00897	013	NPOP20E-110420	1	TH-229	51.57761818	6.518882171	3.325960291	6.518882171	0.197240821	0.073802345	1.907054956	0.97298722	1.90705496	pCi
ARS1-B11-01657-16	ARS1-11-00897	013	NPOP20E-110420	1	TH-230	1.853608356	0.434323989	0.221593872	0.434323989	0.197635416	0.073949992	0.372087058	0.18984034	0.37208706	pCi
ARS1-B11-01657-16	ARS1-11-00897	013	NPOP20E-110420	1	TH-232	0.109895077	0.161093943	0.082190787	0.161093943	0.275104976	0.112734516	0.16054547	0.08191095	0.16054547	pCi

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	AliquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountMins	BKG_Counts	BKG_CountMins	EFF	ALIQ	SampleCollDate	MidPointCountDate	BP_I
ARS1-B11-01657-16	ARS1-11-00897	013	L		0.800268917	3	1440	1	1440	0.213413358	0.1	4/20/2011	5/5/2011	1.1532
ARS1-B11-01657-16	ARS1-11-00897	013	L		0.800268917	2819	1440	3	1440	0.213413358	0.1	4/20/2011	5/5/2011	2.67744
ARS1-B11-01657-16	ARS1-11-00897	013	L		0.800268917	104	1440	3	1440	0.213413358	0.1	4/20/2011	5/5/2011	1.4097
ARS1-B11-01657-16	ARS1-11-00897	013	L		0.800268917	13	1440	7	1440	0.213413358	0.1	4/20/2011	5/5/2011	0.19822

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	BP_MDA	Sb_Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlatingRecovery	InstFileName	DetectorID	InstrumentkeV	NuclideAbd	TracerMeasACT
ARS1-B11-01657-16	ARS1-11-00897	013	2.352220817	0.108293155	2.22	1.96	0.002083333	0.000694444	0.001388889	0.715	ApexAlpha	A_2_3B	4.919867039		
ARS1-B11-01657-16	ARS1-11-00897	013	5.393033243	0.255103153	2.22	1.96	1.957638889	0.002083333	1.955555556	0.715	ApexAlpha	A_2_3B	41.25119019		
ARS1-B11-01657-16	ARS1-11-00897	013	2.863132935	0.134316992	2.22	1.96	0.072222222	0.002083333	0.070138889	0.715	ApexAlpha	A_2_3B	8.375487328		
ARS1-B11-01657-16	ARS1-11-00897	013	0.445231923	0.018886518	2.22	1.96	0.009027778	0.004861111	0.004166667	0.715	ApexAlpha	A_2_3B	9.839734077		

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	TracerKnownACT	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	Halflife1	Halflife2	Halflife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	DeltaT1	Delta
ARS1-B11-01657-16	ARS1-11-00897	013		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-16	ARS1-11-00897	013		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-16	ARS1-11-00897	013		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.66180556	
ARS1-B11-01657-16	ARS1-11-00897	013		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.66180556	

Batch Result Verification Report

ABatchSampleID	SDG	Fraction	DeltaT3	DeltaT4	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SysErr	K_Val	K_MDA	AnalysisCode	UserID	ModDate
ARS1-B11-01657-16	ARS1-11-00897	013					0.985552937					0.061663514	0.03714299	53.48590581	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-16	ARS1-11-00897	013					0.999996209					0.061663514	0.037914809	54.59732534	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-16	ARS1-11-00897	013					0.999999631					0.061663514	0.037839109	54.48831716	ASP-A-008	ABAILEY	5/6/2011
ARS1-B11-01657-16	ARS1-11-00897	013					1					0.061663514	0.037914953	54.59753233	ASP-A-008	ABAILEY	5/6/2011

Alpha Spectroscopy Count Log Book – Canberra System

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01597-01	Bil-01597	A12A	12033	Am	4-28-11 1115	[illegible]	86400
11-01597-02	↓	A12B	12034	↓	↓	[illegible]	↓
11-01597-03	↓	A13A	12036	↓	↓	[illegible]	↓
11-01597-04	↓	A13B	12037	↓	↓	[illegible]	↓
11-01597-05	↓	A14A	12038	↓	↓	[illegible]	↓
11-01597-06	↓	A14B	12030	↓	↓	[illegible]	↓
11-01597-07	↓	A15A	12032	↓	↓	[illegible]	↓
11-01597-08	↓	A15B	12035	↓	↓	[illegible]	↓
11-01597-09	↓	A21A	12031	↓	↓	[illegible]	↓
11-01597-10	↓	A22A	12029	↓	↓	[illegible]	↓ LSW 5-3-11
1-36	Source Check	A11A - A36B	N/A	Source	5-4-11 1755	[illegible]	7200
↓	↓	↓	↓	↓	5-4-11 2110	[illegible]	↓
11-01657-01	Bil-01657	A11A	12136	Th	5-5-11 0353	[illegible]	86400
11-01657-02	↓	A11B	12137	↓	↓	[illegible]	↓
11-01657-03	↓	A21A	12138	↓	↓	[illegible]	↓

Reviewed By: LSW Initials Date: 5-10-11

Alpha Spectroscopy Count Log Book – Canberra System

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01657-04	B11-01657	A12B	12139	Th	5-5-11 0353	CB	86400
11-01657-05	↓	A13A	12140	↓	↓	CB	↓
11-01657-06	↓	A13B	12141	↓	↓	CB	↓
11-01657-07	↓	A14A ~~A12~~ CB 5-5-11	~~12143~~ 12142 CB 5-6-11	↓	↓	CB	↓
11-01657-08	↓	A14B	12143	↓	↓	CB	↓
11-01657-09	↓	A15A	12144	↓	↓	CB	↓
11-01657-10	↓	A15B	12145	↓	↓	CB	↓
11-01657-11	↓	A16A	12146	↓	↓	CB	↓
11-01657-12	↓	A16B	12147	↓	↓	CB	↓
11-01657-13	↓	CB 5-5-11 A21A ~~A21B~~	12148	↓	↓	CB	↓
11-01657-14	↓	CB 5-5-11 A21B ~~A22A~~	12149	↓	↓	CB	↓
11-01657-15	↓	A22A	12150	↓	↓	CB	↓
11-01657-16	↓	A23B	12151	↓	↓	CB	↓
11-01647-01	B11-01647	A24A	12152	↓	↓	CB	↓
11-01647-02	↓	A24B	12154	↓	↓	CB	↓

Reviewed By: LSW Initials Date: 5-10-11

Nonconformance Report

NCR #: 1292
Assigned by QAO

Part A: Initiator (Deficiency Identification)

Describe Nonconformance:

Method blank for TH-232 is biased high and did not pass method blank evaluation. ARS1-11-00897-014, 015, 016 Tracer recoveries are biased low at 26%, 26%, and 18%.

ARS1-B11-01660	ARS-031
ARS Batch No.	ARS Procedure No.
Isotopic Thorium	Eichrom ACW-10
Analyte(s)	Method
ARS1-11-0897	
ARS SDG(s)	

Heather Wright	Heather Wright	5/10/11
Initiator's Signature	Name (print)	Date

Nonconformance Report

NCR #: 1292
Assigned by QAO

Part B: Responsible Manager (Investigation and Proposed Resolution)

1) Did this nonconformance affect analytical results? ○ Yes ◉ No

If Yes:

Identify affected client(s): _____

ARS Sample ID(s) / SDG(s): _____

2) Is client contact required? ○ Yes (Part C Signature Required) ◉ No

3) Cause of Nonconformance:

Suspected matrix interference

4) Proposed Immediate Resolution Proposed Completion Date: 06-02-2011

Is retesting of sample required? ○ Yes ◉ No

Has Nonconformance item(s) been tagged Out of Service? ○ Yes ◉ N/A

Immediate Resolution Actions(s): *CAR Required* ○ *Yes* ◉ *No*

Rerun samples.

Long Term Action(s):

Jamaal Brown

Person(s) assigned to Implement Resolution

Virginia Mulligan — 06-02-2011

Responsible Manager's Signature — Date

Nonconformance Report

NCR #: 1292
Assigned by QAO

Part C: QAO (Evaluation)

1) Route to Project Manager for Client Notification ☐ **N/A**

Project Manager's Signature — 5/12/11 Date of Notification

2) Notify Regulation Body ☐ **N/A**

QAO's Signature — Date of Notification

3) Execute Immediate Resolution and Establish Completion Date ☐ **N/A**

Responsible Individual's Signature — 06-02-2011 Completion Date

4) Execute Corrective Action and Establish Completion Date ☐ **N/A**

Responsible Manager's Signature — Completion Date

5) Nonconformance Category (*Select Only One*)

○ PT Results	○ HS&E	○ Equipment
◉ Batch QC Results	○ Contractual	○ Software
○ Instr. QC or Malfunction	○ Procedural	○ Prep
○ Missing or Defective Data	○ Reporting Errors	○ Other

Additional Category Detail (e.g., Blank, LCS, Chemical Yield, Background, Lost Sample, etc?)

Verification

Immediate Resolution Verified Complete: 06-02-2011 Date ☒ **N/A**

Corrective Actions Verified Complete: Date ☐ **N/A**

OAO Comments:

Rerun results confirmed matrix interference.

QAO's Signature (Indicates NCR Complete) — 06-02-2011 Date

Nonconformance Report

NCR #: 1292
Assigned by QAO

Part D: Corrective Action Request

Responsible Manager (Investigation, Root Cause, and Proposed Corrective Actions(s))

1) Description of Root Cause Investigation

2) Results of Root Cause Determination

3) Proposed Corrective Action(s) and Preventive Measures
(Include Responsible Individual and Estimated Completion Date for each action)

Responsible Manager's Signature

Date

ARS INTERNATIONAL	Rerun Report	SDG	ARS1-11-00897
		Analysis	ASP-A-008
		Run	2

Fraction	Client ID	Rerun Reason	Comments	Original Deadline	Rerun Deadline
014	**PR-SW-01-110420**	Tracer Recovery	TR biased low, rerun batch	05/06/11	05/13/11
015	**RB-01-110420**	Tracer Recovery	TR biased low, rerun batch	05/06/11	05/13/11
016	**RB-02-110421**	Tracer Recovery	TR biased low, rerun batch	05/06/11	05/13/11
017	**RM-JM-SW-02-110420**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11
018	**RM-JM-SW-110420**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11
019	**RM-SW-BG-110419**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11
020	**RP-JM-SW-01-110420**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11
021	**RP-JM-SW-110420**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11
022	**RP-SW-01-110419**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11
023	**RP-SW-BG-041911**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11
024	**SPOP35-110421**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11
025	**MW-RM-110420**	Blank	MB failed evaluation, rerun batch	05/06/11	05/13/11

Analysis Batch Report

Analysis Batch ID **ARS1-B11-01660**

Method	ARS-031	Analysis	ASP-A-008	Matrix	AQ
Description	Thorium in Water				

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Client ID	Isotope Group	Lab Deadline
ARS1-B11-01660-01	LCS	B-11680								
ARS1-B11-01660-02	LCSD	B-11681								
ARS1-B11-01660-03	MBL									
ARS1-B11-01660-04	TRG				**ARS1-11-00897**	014	1	PR-SW-01-110420	STD	05/03/11
ARS1-B11-01660-05	TRG				**ARS1-11-00897**	015	1	RB-01-110420	STD	05/03/11
ARS1-B11-01660-06	TRG				**ARS1-11-00897**	016	1	RB-02-110421	STD	05/03/11
ARS1-B11-01660-07	TRG				**ARS1-11-00897**	017	1	RM-JM-SW-02-110420	STD	05/03/11
ARS1-B11-01660-08	TRG				**ARS1-11-00897**	018	1	RM-JM-SW-110420	STD	05/03/11
ARS1-B11-01660-09	TRG				**ARS1-11-00897**	019	1	RM-SW-BG-110419	STD	05/03/11
ARS1-B11-01660-10	TRG				**ARS1-11-00897**	020	1	RP-JM-SW-01-110420	STD	05/03/11
ARS1-B11-01660-11	TRG				**ARS1-11-00897**	021	1	RP-JM-SW-110420	STD	05/03/11
ARS1-B11-01660-12	TRG				**ARS1-11-00897**	022	1	RP-SW-01-110419	STD	05/03/11
ARS1-B11-01660-13	TRG				**ARS1-11-00897**	023	1	RP-SW-BG-041911	STD	05/03/11
ARS1-B11-01660-14	TRG				**ARS1-11-00897**	024	1	SPOP35-110421	STD	05/03/11
ARS1-B11-01660-15	TRG				**ARS1-11-00897**	025	1	MW-RM-110420	STD	05/03/11

Technical Notes

Batch	ARS1-B11-01660
Analysis Code	ASP-A-008
Procedure No	ARS-031
Matrix	AQ

#	Date	Dept	Batch Technical Notes	User ID
1	05/04/11 12:39	CHEMISTRY	B11-01660-04,05 did not seem to plate well, there is a whitish film covering the disk. Tracer recovery/activity could be affected.	JBROWN
2	05/10/11 12:22	COUNTROOM	ARS1-B11-01660-04 (ARS1-11-00897-014) fell outside the tracer acceptance range biased low at 25.7813107%. ARS1-B11-01660-05 (ARS1-11-00897-015) fell outside the tracer acceptance range biased low at 25.8777444%. ARS1-B11-01660-06 (ARS1-11-00897-016) fell outside the tracer acceptance range biased low at 17.6493122%. ARS1-B11-01660-03 (MBL) Th-230/232 failed method blank requirements according to ARS-014 rev4 sections 6.1.2.3.2.2. and 6.1.2.3.2.3.	JARMSTRONG

American Radiation Services
Baton Rouge Laboratory

LCS Report
Analytical Batch: ARS1-B11-01660

BlindID	ABatch	ABatchSampleID	BlindGroup	StdID	Isotope	ExpectedAddition	ExpectedValue	EmptyWt	GrossWt	NetWt	UserID	ModDate	ExpectedValue_CT	MidPointCountDate	KnownValue
B-11680	ARS1-B11-01660	ARS1-B11-01660-01	B-Th230	S-0231	Th-230	1	5.656931968	13.3199	14.3495	1.0296	VMULLIGAN	4/28/2011	5.656930829	5/6/2011	5.824375981
B-11681	ARS1-B11-01660	ARS1-B11-01660-02	B-Th230	S-0231	Th-230	1	5.656931968	13.3817	14.4106	1.0289	VMULLIGAN	4/28/2011	5.656930829	5/6/2011	5.82041613

ABatchSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPU1s	TPU2s	MDA	DL	CU	CU1s	CU2s	ActivityReportUnits
ARS1-B11-01660-01				1	TH-228	0.017647893	0.011725583	0.005982441	0.011725583	0.005313977	0	0.011529957	0.00588263	0.01152996	pCi
ARS1-B11-01660-01				1	TH-229	5.107780859	0.64757132	0.330393531	0.64757132	0.020946222	0.007837527	0.195585452	0.0997885	0.19558545	pCi
ARS1-B11-01660-01				1	TH-230	5.767023842	0.727601398	0.371225203	0.727601398	0.039211559	0.016964915	0.208775948	0.10651834	0.20877595	pCi
ARS1-B11-01660-01				1	TH-232	0.105034279	0.033035278	0.016854734	0.033035278	0.025507562	0.010118199	0.030498843	0.01556063	0.03049884	pCi
ARS1-B11-01660-02				1	TH-228	0.027772241	0.017709182	0.009035297	0.017709182	0.02136245	0.007993269	0.017388174	0.00887152	0.01738817	pCi
ARS1-B11-01660-02				1	TH-229	5.08860334	0.645918496	0.329550253	0.645918496	0.043081603	0.018874499	0.197413476	0.10072116	0.19741348	pCi
ARS1-B11-01660-02				1	TH-230	6.423776248	0.807200709	0.411837096	0.807200709	0.025856574	0.010256643	0.220920705	0.11271465	0.22092071	pCi
ARS1-B11-01660-02				1	TH-232	0.106258481	0.032517964	0.016590798	0.032517964	0.021190344	0.007928871	0.029874562	0.01524212	0.02987456	pCi
ARS1-B11-01660-03				1	TH-228	0.00394243	0.00774184	0.003949918	0.00774184	0.014513589	0.004585798	0.007727163	0.00394243	0.00772716	pCi
ARS1-B11-01660-03				1	TH-229	5.078005237	0.644307295	0.328728211	0.644307295	0.035472649	0.015086845	0.196130446	0.10006655	0.19613045	pCi
ARS1-B11-01660-03				1	TH-230	0.278213876	0.058323471	0.029756873	0.058323471	0.02763897	0.011164698	0.047654824	0.02431369	0.04765482	pCi
ARS1-B11-01660-03				1	TH-232	0.044972683	0.020642479	0.010531877	0.020642479	0.018165053	0.006433049	0.019914019	0.01016021	0.01991402	pCi
ARS1-B11-01660-04	ARS1-11-00897	014	PR-SW-01-110420	1	TH-228	0.033888613	0.03856668	0.019676878	0.03856668	0.030612714	0	0.038348576	0.0195656	0.03834858	pCi
ARS1-B11-01660-04	ARS1-11-00897	014	PR-SW-01-110420	1	TH-229	10.14595339	1.395898953	0.712193343	1.395898953	0.229113666	0.099581052	0.66697633	0.34029405	0.66697633	pCi
ARS1-B11-01660-04	ARS1-11-00897	014	PR-SW-01-110420	1	TH-230	1.572556901	0.323896523	0.165253328	0.323896523	0.102880659	0.036434593	0.262271152	0.13381181	0.26227115	pCi
ARS1-B11-01660-04	ARS1-11-00897	014	PR-SW-01-110420	1	TH-232	0.08841753	0.081754295	0.041711375	0.081754295	0.119019072	0.044533817	0.081052886	0.04135351	0.08105289	pCi
ARS1-B11-01660-05	ARS1-11-00897	015	RB-01-110420	1	TH-228	0.078778763	0.059131701	0.030169235	0.059131701	0.030498635	0	0.058360124	0.02977557	0.05836012	pCi
ARS1-B11-01660-05	ARS1-11-00897	015	RB-01-110420	1	TH-229	10.16412163	1.399635544	0.714099767	1.399635544	0.149429606	0.05927491	0.670755649	0.34222227	0.67075565	pCi
ARS1-B11-01660-05	ARS1-11-00897	015	RB-01-110420	1	TH-230	1.061831954	0.260866101	0.13309495	0.260866101	0.149728507	0.059393476	0.227115893	0.11587546	0.22711589	pCi
ARS1-B11-01660-05	ARS1-11-00897	015	RB-01-110420	1	TH-232	0.079762958	0.156632339	0.079914459	0.156632339	0.273833491	0.121476916	0.156335397	0.07976296	0.1563354	pCi
ARS1-B11-01660-06	ARS1-11-00897	016	RB-02-110421	1	TH-228	0.052681112	0.059953341	0.030588439	0.059953341	0.047588605	0	0.05961429	0.03041545	0.05961429	pCi
ARS1-B11-01660-06	ARS1-11-00897	016	RB-02-110421	1	TH-229	10.164119	1.478989962	0.754586715	1.478989962	0.185204028	0.069298493	0.82361737	0.42021294	0.82361737	pCi
ARS1-B11-01660-06	ARS1-11-00897	016	RB-02-110421	1	TH-230	0.672070467	0.249994757	0.127548345	0.249994757	0.225986167	0.089642943	0.236430944	0.12062803	0.23643094	pCi
ARS1-B11-01660-06	ARS1-11-00897	016	RB-02-110421	1	TH-232	0.085990522	0.11227976	0.057285592	0.11227976	0.185203313	0.069298225	0.111797733	0.05703966	0.11179773	pCi
ARS1-B11-01660-07	ARS1-11-00897	017	RM-JM-SW-02-110420	1	TH-228	0.027277183	0.025544718	0.013033019	0.025544718	0.036200719	0.012820276	0.025331091	0.01292403	0.02533109	pCi
ARS1-B11-01660-07	ARS1-11-00897	017	RM-JM-SW-02-110420	1	TH-229	10.13384122	1.284118217	0.655162355	1.284118217	0.045810167	0.017739036	0.385838236	0.19685624	0.38583824	pCi
ARS1-B11-01660-07	ARS1-11-00897	017	RM-JM-SW-02-110420	1	TH-230	0.871007328	0.155566342	0.079370583	0.155566342	0.041139133	0.015393185	0.11453836	0.05843794	0.11453836	pCi
ARS1-B11-01660-07	ARS1-11-00897	017	RM-JM-SW-02-110420	1	TH-232	0.110564403	0.043699105	0.022295462	0.043699105	0.028071016	0.008869481	0.041605835	0.02122747	0.04160584	pCi
ARS1-B11-01660-08	ARS1-11-00897	018	RM-JM-SW-110420	1	TH-228	0.036489552	0.024244327	0.012369555	0.024244327	0.01098741	0	0.023839841	0.01216318	0.02383984	pCi
ARS1-B11-01660-08	ARS1-11-00897	018	RM-JM-SW-110420	1	TH-229	10.21458896	1.296191371	0.661322128	1.296191371	0.04271809	0.01598399	0.394996944	0.20152905	0.39499694	pCi
ARS1-B11-01660-08	ARS1-11-00897	018	RM-JM-SW-110420	1	TH-230	0.544542865	0.11406347	0.058195648	0.11406347	0.042803539	0.016015962	0.093161312	0.04753128	0.09316131	pCi
ARS1-B11-01660-08	ARS1-11-00897	018	RM-JM-SW-110420	1	TH-232	0.138838501	0.051372357	0.026210386	0.051372357	0.036851705	0.013050819	0.048554585	0.02477275	0.04855459	pCi
ARS1-B11-01660-09	ARS1-11-00897	019	RM-SW-BG-110419	1	TH-228	0.071110945	0.041752769	0.021302433	0.041752769	0.047861316	0.01790845	0.040858638	0.02084624	0.04085864	pCi
ARS1-B11-01660-09	ARS1-11-00897	019	RM-SW-BG-110419	1	TH-229	10.23477854	1.304360991	0.665490301	1.304360991	0.046781197	0.017504298	0.413808285	0.21112668	0.41380829	pCi
ARS1-B11-01660-09	ARS1-11-00897	019	RM-SW-BG-110419	1	TH-230	0.72692127	0.142516111	0.072712301	0.142516111	0.046874762	0.017539307	0.112214771	0.05725243	0.11221477	pCi
ARS1-B11-01660-09	ARS1-11-00897	019	RM-SW-BG-110419	1	TH-232	0.12597932	0.051226947	0.026136198	0.051226947	0.040356824	0.014292137	0.048911874	0.02495504	0.04891187	pCi
ARS1-B11-01660-10	ARS1-11-00897	020	RP-JM-SW-01-110420	1	TH-228	0.026113869	0.02715991	0.013857097	0.02715991	0.040432974	0.014319105	0.026975906	0.01376322	0.02697591	pCi
ARS1-B11-01660-10	ARS1-11-00897	020	RP-JM-SW-01-110420	1	TH-229	10.19440203	1.298281753	0.662388649	1.298281753	0.055843067	0.022151519	0.409223828	0.20878767	0.40922383	pCi
ARS1-B11-01660-10	ARS1-11-00897	020	RP-JM-SW-01-110420	1	TH-230	0.755229107	0.146799651	0.074897781	0.146799651	0.060191736	0.024314312	0.11497209	0.05865923	0.11497209	pCi
ARS1-B11-01660-10	ARS1-11-00897	020	RP-JM-SW-01-110420	1	TH-232	0.076649323	0.038458034	0.019621446	0.038458034	0.031352821	0.00990642	0.037325608	0.01904368	0.03732561	pCi
ARS1-B11-01660-11	ARS1-11-00897	021	RP-JM-SW-110420	1	TH-228	0.226013156	0.070764538	0.036104356	0.070764538	0.051238996	0.019841237	0.065279804	0.03330602	0.0652798	pCi
ARS1-B11-01660-11	ARS1-11-00897	021	RP-JM-SW-110420	1	TH-229	10.11365429	1.287151002	0.656709695	1.287151002	0.050132371	0.01941272	0.403286185	0.20575826	0.40328619	pCi
ARS1-B11-01660-11	ARS1-11-00897	021	RP-JM-SW-110420	1	TH-230	0.702348426	0.137923086	0.070368921	0.137923086	0.05023265	0.019451551	0.108706556	0.05546253	0.10870656	pCi
ARS1-B11-01660-11	ARS1-11-00897	021	RP-JM-SW-110420	1	TH-232	0.141857603	0.054487834	0.027799915	0.054487834	0.044930564	0.016811839	0.051720149	0.02638783	0.05172015	pCi
ARS1-B11-01660-12	ARS1-11-00897	022	RP-SW-01-110419	1	TH-228	0.104096263	0.042701203	0.021786328	0.042701203	0.011284035	0	0.040805735	0.02081925	0.04080573	pCi
ARS1-B11-01660-12	ARS1-11-00897	022	RP-SW-01-110419	1	TH-229	10.1136569	1.285495568	0.655865086	1.285495568	0.037809204	0.013389912	0.397970007	0.20304592	0.39797001	pCi
ARS1-B11-01660-12	ARS1-11-00897	022	RP-SW-01-110419	1	TH-230	1.072519788	0.1840122	0.093883776	0.1840122	0.037884824	0.013416692	0.13060544	0.06663543	0.13060544	pCi
ARS1-B11-01660-12	ARS1-11-00897	022	RP-SW-01-110419	1	TH-232	0.109886334	0.043525079	0.022206673	0.043525079	0.011029332	0	0.041449364	0.02114763	0.04144936	pCi
ARS1-B11-01660-13	ARS1-11-00897	023	RP-SW-BG-041911	1	TH-228	0.161190066	0.056580388	0.028867545	0.056580388	0.0383963	0.013597829	0.053120722	0.02710241	0.05312072	pCi
ARS1-B11-01660-13	ARS1-11-00897	023	RP-SW-BG-041911	1	TH-229	10.12375037	1.286212087	0.656230657	1.286212087	0.029744122	0.009398126	0.396533788	0.20231316	0.39653379	pCi
ARS1-B11-01660-13	ARS1-11-00897	023	RP-SW-BG-041911	1	TH-230	1.202221671	0.200462106	0.102276585	0.200462106	0.043590944	0.016310588	0.138103755	0.0704611	0.13810376	pCi
ARS1-B11-01660-13	ARS1-11-00897	023	RP-SW-BG-041911	1	TH-232	0.072716165	0.038164325	0.019471594	0.038164325	0.037529621	0.013290899	0.037138629	0.01894828	0.03713863	pCi
ARS1-B11-01660-14	ARS1-11-00897	024	SPOP35-110421	1	TH-228	0.0754155	0.038772021	0.019781644	0.038772021	0.040606802	0.015194001	0.03768542	0.01922726	0.03768542	pCi
ARS1-B11-01660-14	ARS1-11-00897	024	SPOP35-110421	1	TH-229	10.17421246	1.287055154	0.656660793	1.287055154	0.027190676	0.008591324	0.380061304	0.19390883	0.3800613	pCi
ARS1-B11-01660-14	ARS1-11-00897	024	SPOP35-110421	1	TH-230	0.592061916	0.116798949	0.059591301	0.116798949	0.027245071	0.008608511	0.092312545	0.04709824	0.09231254	pCi
ARS1-B11-01660-14	ARS1-11-00897	024	SPOP35-110421	1	TH-232	0.09971059	0.040799559	0.020816102	0.040799559	0.027190571	0.008591291	0.03897917	0.01988733	0.03897917	pCi
ARS1-B11-01660-15	ARS1-11-00897	025	MW-RM-110420	1	TH-228	0.012318119	0.021344561	0.010890082	0.021344561	0.038145108	0.01350887	0.021292577	0.01086356	0.02129258	pCi
ARS1-B11-01660-15	ARS1-11-00897	025	MW-RM-110420	1	TH-229	10.12374776	1.285968288	0.656106269	1.285968288	0.043262234	0.016187594	0.395743253	0.20190982	0.39574325	pCi
ARS1-B11-01660-15	ARS1-11-00897	025	MW-RM-110420	1	TH-230	1.034526789	0.179246269	0.091452178	0.179246269	0.048367248	0.018729212	0.128436253	0.0655287	0.12843625	pCi
ARS1-B11-01660-15	ARS1-11-00897	025	MW-RM-110420	1	TH-232	0.104450935	0.042087519	0.021473224	0.042087519	0.010887001	0	0.040149647	0.02048451	0.04014965	pCi

ABatchSampleID	SDG	Fraction	AliquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountMins	BKG_Counts	BKG_CountMins	EFF	ALIQ	SampleCollDate	MidPointCountDate	BP_DL
ARS1-B11-01660-01			L		0.756980858	9	1440	0	1440	0.212452739	1	5/4/2011	5/6/2011	0.114534927
ARS1-B11-01660-01			L		0.756980858	2629	1440	3	1440	0.212452739	1	5/4/2011	5/6/2011	0.269449184
ARS1-B11-01660-01			L		0.756980858	2973	1440	14	1440	0.212452739	1	5/4/2011	5/6/2011	0.183191481
ARS1-B11-01660-01			L		0.756980858	59	1440	5	1440	0.212452739	1	5/4/2011	5/6/2011	0.030092434
ARS1-B11-01660-02			L		0.827102709	17	1440	3	1440	0.192200825	1	5/4/2011	5/6/2011	0.114534927
ARS1-B11-01660-02			L		0.827102709	2603	1440	17	1440	0.192200825	1	5/4/2011	5/6/2011	0.269449184
ARS1-B11-01660-02			L		0.827102709	3263	1440	5	1440	0.192200825	1	5/4/2011	5/6/2011	0.183191481
ARS1-B11-01660-02			L		0.827102709	57	1440	3	1440	0.192200825	1	5/4/2011	5/6/2011	0.030092434
ARS1-B11-01660-03			L		0.739305804	3	1440	1	1440	0.216391131	1	5/4/2011	5/6/2011	0.114534927
ARS1-B11-01660-03			L		0.739305804	2608	1440	11	1440	0.216391131	1	5/4/2011	5/6/2011	0.269449184
ARS1-B11-01660-03			L		0.739305804	148	1440	6	1440	0.216391131	1	5/4/2011	5/6/2011	0.183191481
ARS1-B11-01660-03			L		0.739305804	25	1440	2	1440	0.216391131	1	5/4/2011	5/6/2011	0.030092434
ARS1-B11-01660-04	ARS1-11-00897	014	L		0.257813107	3	1440	0	1440	0.219564006	0.5	4/20/2011	5/6/2011	0.232241077
ARS1-B11-01660-04	ARS1-11-00897	014	L		0.257813107	933	1440	15	1440	0.219564006	0.5	4/20/2011	5/6/2011	0.538900299
ARS1-B11-01660-04	ARS1-11-00897	014	L		0.257813107	144	1440	2	1440	0.219564006	0.5	4/20/2011	5/6/2011	0.366383089
ARS1-B11-01660-04	ARS1-11-00897	014	L		0.257813107	11	1440	3	1440	0.219564006	0.5	4/20/2011	5/6/2011	0.060184868
ARS1-B11-01660-05	ARS1-11-00897	015	L		0.258777444	7	1440	0	1440	0.219564006	0.5	4/20/2011	5/6/2011	0.232241077
ARS1-B11-01660-05	ARS1-11-00897	015	L		0.258777444	897	1440	5	1440	0.212170452	0.5	4/20/2011	5/6/2011	0.538900299
ARS1-B11-01660-05	ARS1-11-00897	015	L		0.258777444	98	1440	5	1440	0.212170452	0.5	4/20/2011	5/6/2011	0.366383089
ARS1-B11-01660-05	ARS1-11-00897	015	L		0.258777444	28	1440	21	1440	0.212170452	0.5	4/20/2011	5/6/2011	0.060184868
ARS1-B11-01660-06	ARS1-11-00897	016	L		0.176493122	3	1440	0	1440	0.206113368	0.5	4/21/2011	5/6/2011	0.232010683
ARS1-B11-01660-06	ARS1-11-00897	016	L		0.176493122	594	1440	3	1440	0.206113368	0.5	4/21/2011	5/6/2011	0.538900159
ARS1-B11-01660-06	ARS1-11-00897	016	L		0.176493122	44	1440	5	1440	0.206113368	0.5	4/21/2011	5/6/2011	0.36638308
ARS1-B11-01660-06	ARS1-11-00897	016	L		0.176493122	8	1440	3	1440	0.206113368	0.5	4/21/2011	5/6/2011	0.060184868
ARS1-B11-01660-07	ARS1-11-00897	017	L		0.72631197	9	1440	2	1440	0.22593005	0.5	4/20/2011	5/6/2011	0.232241077
ARS1-B11-01660-07	ARS1-11-00897	017	L		0.72631197	2662	1440	4	1440	0.22593005	0.5	4/20/2011	5/6/2011	0.538900299
ARS1-B11-01660-07	ARS1-11-00897	017	L		0.72631197	231	1440	3	1440	0.22593005	0.5	4/20/2011	5/6/2011	0.366383089
ARS1-B11-01660-07	ARS1-11-00897	017	L		0.72631197	30	1440	1	1440	0.22593005	0.5	4/20/2011	5/6/2011	0.060184868
ARS1-B11-01660-08	ARS1-11-00897	018	L		0.728652864	9	1440	0	1440	0.216447204	0.5	4/20/2011	5/6/2011	0.232241077
ARS1-B11-01660-08	ARS1-11-00897	018	L		0.728652864	2578	1440	3	1440	0.216447204	0.5	4/20/2011	5/6/2011	0.538900299
ARS1-B11-01660-08	ARS1-11-00897	018	L		0.728652864	140	1440	3	1440	0.216447204	0.5	4/20/2011	5/6/2011	0.366383089
ARS1-B11-01660-08	ARS1-11-00897	018	L		0.728652864	37	1440	2	1440	0.216447204	0.5	4/20/2011	5/6/2011	0.060184868
ARS1-B11-01660-09	ARS1-11-00897	019	L		0.688383774	19	1440	3	1440	0.209210098	0.5	4/19/2011	5/6/2011	0.232471701
ARS1-B11-01660-09	ARS1-11-00897	019	L		0.688383774	2359	1440	3	1440	0.209210098	0.5	4/19/2011	5/6/2011	0.538900438
ARS1-B11-01660-09	ARS1-11-00897	019	L		0.688383774	170	1440	3	1440	0.209210098	0.5	4/19/2011	5/6/2011	0.366383098
ARS1-B11-01660-09	ARS1-11-00897	019	L		0.688383774	31	1440	2	1440	0.209210098	0.5	4/19/2011	5/6/2011	0.060184868
ARS1-B11-01660-10	ARS1-11-00897	020	L		0.717606565	8	1440	2	1440	0.2047351	0.5	4/20/2011	5/6/2011	0.232241077
ARS1-B11-01660-10	ARS1-11-00897	020	L		0.717606565	2399	1440	5	1440	0.2047351	0.5	4/20/2011	5/6/2011	0.538900299
ARS1-B11-01660-10	ARS1-11-00897	020	L		0.717606565	183	1440	6	1440	0.2047351	0.5	4/20/2011	5/6/2011	0.366383089
ARS1-B11-01660-10	ARS1-11-00897	020	L		0.717606565	19	1440	1	1440	0.2047351	0.5	4/20/2011	5/6/2011	0.060184868
ARS1-B11-01660-11	ARS1-11-00897	021	L		0.666426186	57	1440	4	1440	0.225003242	0.5	4/20/2011	5/6/2011	0.232241077
ARS1-B11-01660-11	ARS1-11-00897	021	L		0.666426186	2428	1440	4	1440	0.225003242	0.5	4/20/2011	5/6/2011	0.538900299
ARS1-B11-01660-11	ARS1-11-00897	021	L		0.666426186	172	1440	4	1440	0.225003242	0.5	4/20/2011	5/6/2011	0.366383089
ARS1-B11-01660-11	ARS1-11-00897	021	L		0.666426186	37	1440	3	1440	0.225003242	0.5	4/20/2011	5/6/2011	0.060184868
ARS1-B11-01660-12	ARS1-11-00897	022	L		0.685338695	25	1440	0	1440	0.224300042	0.5	4/19/2011	5/6/2011	0.232471701
ARS1-B11-01660-12	ARS1-11-00897	022	L		0.685338695	2487	1440	2	1440	0.224300042	0.5	4/19/2011	5/6/2011	0.538900438
ARS1-B11-01660-12	ARS1-11-00897	022	L		0.685338695	265	1440	2	1440	0.224300042	0.5	4/19/2011	5/6/2011	0.366383098
ARS1-B11-01660-12	ARS1-11-00897	022	L		0.685338695	27	1440	0	1440	0.224300042	0.5	4/19/2011	5/6/2011	0.060184868
ARS1-B11-01660-13	ARS1-11-00897	023	L		0.702275123	41	1440	2	1440	0.220520407	0.5	4/19/2011	5/6/2011	0.232471701
ARS1-B11-01660-13	ARS1-11-00897	023	L		0.702275123	2507	1440	1	1440	0.220520407	0.5	4/19/2011	5/6/2011	0.538900438
ARS1-B11-01660-13	ARS1-11-00897	023	L		0.702275123	300	1440	3	1440	0.220520407	0.5	4/19/2011	5/6/2011	0.366383098
ARS1-B11-01660-13	ARS1-11-00897	023	L		0.702275123	20	1440	2	1440	0.220520407	0.5	4/19/2011	5/6/2011	0.060184868
ARS1-B11-01660-14	ARS1-11-00897	024	L		0.788787368	23	1440	3	1440	0.214771703	0.5	4/21/2011	5/6/2011	0.232010683
ARS1-B11-01660-14	ARS1-11-00897	024	L		0.788787368	2756	1440	1	1440	0.214771703	0.5	4/21/2011	5/6/2011	0.538900159
ARS1-B11-01660-14	ARS1-11-00897	024	L		0.788787368	161	1440	1	1440	0.214771703	0.5	4/21/2011	5/6/2011	0.36638308
ARS1-B11-01660-14	ARS1-11-00897	024	L		0.788787368	28	1440	1	1440	0.214771703	0.5	4/21/2011	5/6/2011	0.060184868
ARS1-B11-01660-15	ARS1-11-00897	025	L		0.697756648	5	1440	2	1440	0.22318837	0.5	4/20/2011	5/6/2011	0.232241077
ARS1-B11-01660-15	ARS1-11-00897	025	L		0.697756648	2523	1440	3	1440	0.22318837	0.5	4/20/2011	5/6/2011	0.538900299
ARS1-B11-01660-15	ARS1-11-00897	025	L		0.697756648	261	1440	4	1440	0.22318837	0.5	4/20/2011	5/6/2011	0.366383089
ARS1-B11-01660-15	ARS1-11-00897	025	L		0.697756648	26	1440	0	1440	0.22318837	0.5	4/20/2011	5/6/2011	0.060184868

ABatchSampleID	SDG	Fraction	BP_MDA	Sb_Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlatingRecovery	InstFileName	DetectorID	InstrumentkeV	NuclideAbd	TracerMeasACT
ARS1-B11-01660-01			0.233892265	0.108901926	2.22	1.96	0.00625	0	0.00625	0.715	ApexAlpha	A_1_1A	4.88256979		
ARS1-B11-01660-01			0.543013102	0.256728269	2.22	1.96	1.825694444	0.002083333	1.823611111	0.715	ApexAlpha	A_1_1A	52.26568985		
ARS1-B11-01660-01			0.37087846	0.174542947	2.22	1.96	2.064583333	0.009722222	2.054861111	0.715	ApexAlpha	A_1_1A	40.10710144		
ARS1-B11-01660-01			0.065326881	0.028671761	2.22	1.96	0.040972222	0.003472222	0.0375	0.715	ApexAlpha	A_1_1A	7.323854446		
ARS1-B11-01660-02			0.2339542	0.108901926	2.22	1.96	0.011805556	0.002083333	0.009722222	0.715	ApexAlpha	A_1_1B	8.545721054		
ARS1-B11-01660-02			0.543074538	0.256728269	2.22	1.96	1.807638889	0.011805556	1.795833333	0.715	ApexAlpha	A_1_1B	43.44945145		
ARS1-B11-01660-02			0.37094002	0.174542947	2.22	1.96	2.265972222	0.003472222	2.2625	0.715	ApexAlpha	A_1_1B	38.83237839		
ARS1-B11-01660-02			0.065388318	0.028671761	2.22	1.96	0.039583333	0.002083333	0.0375	0.715	ApexAlpha	A_1_1B	4.88326931		
ARS1-B11-01660-03			0.233920281	0.108901926	2.22	1.96	0.002083333	0.000694444	0.001388889	0.715	ApexAlpha	A_1_2A	4.912463665		
ARS1-B11-01660-03			0.543040892	0.256728269	2.22	1.96	1.811111111	0.007638889	1.803472222	0.715	ApexAlpha	A_1_2A	43.99287033		
ARS1-B11-01660-03			0.370906307	0.174542947	2.22	1.96	0.102777778	0.004166667	0.098611111	0.715	ApexAlpha	A_1_2A	10.43898487		
ARS1-B11-01660-03			0.065354671	0.028671761	2.22	1.96	0.017361111	0.001388889	0.015972222	0.715	ApexAlpha	A_1_2A	4.912463665		
ARS1-B11-01660-04	ARS1-11-00897	014	0.494098126	0.108901926	2.22	1.96	0.002083333	0	0.002083333	0.715	ApexAlpha	A_1_2B	4.888912201		
ARS1-B11-01660-04	ARS1-11-00897	014	1.105439282	0.256728269	2.22	1.96	0.647916667	0.010416667	0.6375	0.715	ApexAlpha	A_1_2B	76.282547		
ARS1-B11-01660-04	ARS1-11-00897	014	0.761205192	0.174542947	2.22	1.96	0.1	0.001388889	0.098611111	0.715	ApexAlpha	A_1_2B	6.844477177		
ARS1-B11-01660-04	ARS1-11-00897	014	0.15006287	0.028671761	2.22	1.96	0.007638889	0.002083333	0.005555556	0.715	ApexAlpha	A_1_2B	4.888912201		
ARS1-B11-01660-05	ARS1-11-00897	015	0.493984047	0.108901926	2.22	1.96	0.004861111	0	0.004861111	0.715	ApexAlpha	A_1_3A			
ARS1-B11-01660-05	ARS1-11-00897	015	1.106367507	0.256728269	2.22	1.96	0.622916667	0.003472222	0.619444444	0.715	ApexAlpha	A_1_3A	36.34356308		
ARS1-B11-01660-05	ARS1-11-00897	015	0.762135273	0.174542947	2.22	1.96	0.068055556	0.003472222	0.064583333	0.715	ApexAlpha	A_1_3A	10.43649578		
ARS1-B11-01660-05	ARS1-11-00897	015	0.150991091	0.028671761	2.22	1.96	0.019444444	0.014583333	0.004861111	0.715	ApexAlpha	A_1_3A	4.911292076		
ARS1-B11-01660-06	ARS1-11-00897	016	0.510614217	0.108901926	2.22	1.96	0.002083333	0	0.002083333	0.715	ApexAlpha	A_1_3B	4.913847923		
ARS1-B11-01660-06	ARS1-11-00897	016	1.122094485	0.256728269	2.22	1.96	0.4125	0.002083333	0.410416667	0.715	ApexAlpha	A_1_3B	27.0051651		
ARS1-B11-01660-06	ARS1-11-00897	016	0.777893981	0.174542947	2.22	1.96	0.030555556	0.003472222	0.027083333	0.715	ApexAlpha	A_1_3B	6.55179739		
ARS1-B11-01660-06	ARS1-11-00897	016	0.166718295	0.028671761	2.22	1.96	0.005555556	0.002083333	0.003472222	0.715	ApexAlpha	A_1_3B	7.370771885		
ARS1-B11-01660-07	ARS1-11-00897	017	0.474045579	0.108901926	2.22	1.96	0.00625	0.001388889	0.004861111	0.715	ApexAlpha	A_1_4A	7.365706444		
ARS1-B11-01660-07	ARS1-11-00897	017	1.085819816	0.256728269	2.22	1.96	1.848611111	0.002777778	1.845833333	0.715	ApexAlpha	A_1_4A	46.89792252		
ARS1-B11-01660-07	ARS1-11-00897	017	0.741546481	0.174542947	2.22	1.96	0.160416667	0.002083333	0.158333333	0.715	ApexAlpha	A_1_4A	29.46282578		
ARS1-B11-01660-07	ARS1-11-00897	017	0.130443485	0.028671761	2.22	1.96	0.020833333	0.000694444	0.020138889	0.715	ApexAlpha	A_1_4A	4.910470963		
ARS1-B11-01660-08	ARS1-11-00897	018	0.474472822	0.108901926	2.22	1.96	0.00625	0	0.00625	0.715	ApexAlpha	A_1_4B	4.890279293		
ARS1-B11-01660-08	ARS1-11-00897	018	1.086237831	0.256728269	2.22	1.96	1.790277778	0.002083333	1.788194444	0.715	ApexAlpha	A_1_4B	39.68317795		
ARS1-B11-01660-08	ARS1-11-00897	018	0.741965333	0.174542947	2.22	1.96	0.097222222	0.002083333	0.095138889	0.715	ApexAlpha	A_1_4B	9.780558586		
ARS1-B11-01660-08	ARS1-11-00897	018	0.130861499	0.028671761	2.22	1.96	0.025694444	0.001388889	0.024305556	0.715	ApexAlpha	A_1_4B	6.112849236		
ARS1-B11-01660-09	ARS1-11-00897	019	0.475990085	0.108901926	2.22	1.96	0.013194444	0.002083333	0.011111111	0.715	ApexAlpha	A_1_5A	4.889725208		
ARS1-B11-01660-09	ARS1-11-00897	019	1.0872606	0.256728269	2.22	1.96	1.638194444	0.002083333	1.636111111	0.715	ApexAlpha	A_1_5A	38.71032333		
ARS1-B11-01660-09	ARS1-11-00897	019	0.742989885	0.174542947	2.22	1.96	0.118055556	0.002083333	0.115972222	0.715	ApexAlpha	A_1_5A	7.843934059		
ARS1-B11-01660-09	ARS1-11-00897	019	0.131883982	0.028671761	2.22	1.96	0.021527778	0.001388889	0.020138889	0.715	ApexAlpha	A_1_5A	4.889725208		
ARS1-B11-01660-10	ARS1-11-00897	020	0.475280176	0.108901926	2.22	1.96	0.005555556	0.001388889	0.004166667	0.715	ApexAlpha	A_1_5B	4.906514168		
ARS1-B11-01660-10	ARS1-11-00897	020	1.087027749	0.256728269	2.22	1.96	1.665972222	0.003472222	1.6625	0.715	ApexAlpha	A_1_5B	35.01397705		
ARS1-B11-01660-10	ARS1-11-00897	020	0.742756831	0.174542947	2.22	1.96	0.127083333	0.004166667	0.122916667	0.715	ApexAlpha	A_1_5B	21.26156235		
ARS1-B11-01660-10	ARS1-11-00897	020	0.131651414	0.028671761	2.22	1.96	0.013194444	0.000694444	0.0125	0.715	ApexAlpha	A_1_5B	4.906514168		
ARS1-B11-01660-11	ARS1-11-00897	021	0.475041934	0.108901926	2.22	1.96	0.039583333	0.002777778	0.036805556	0.715	ApexAlpha	A_1_6A	11.6043911		
ARS1-B11-01660-11	ARS1-11-00897	021	1.086794652	0.256728269	2.22	1.96	1.686111111	0.002777778	1.683333333	0.715	ApexAlpha	A_1_6A	39.12591553		
ARS1-B11-01660-11	ARS1-11-00897	021	0.742523268	0.174542947	2.22	1.96	0.119444444	0.002777778	0.116666667	0.715	ApexAlpha	A_1_6A	12.11335564		
ARS1-B11-01660-11	ARS1-11-00897	021	0.131418317	0.028671761	2.22	1.96	0.025694444	0.002083333	0.023611111	0.715	ApexAlpha	A_1_6A	6.107573986		
ARS1-B11-01660-12	ARS1-11-00897	022	0.475229703	0.108901926	2.22	1.96	0.017361111	0	0.017361111	0.715	ApexAlpha	A_1_6B	14.69784451		
ARS1-B11-01660-12	ARS1-11-00897	022	1.086517379	0.256728269	2.22	1.96	1.727083333	0.001388889	1.725694444	0.715	ApexAlpha	A_1_6B	35.83957291		
ARS1-B11-01660-12	ARS1-11-00897	022	0.742245177	0.174542947	2.22	1.96	0.184027778	0.001388889	0.182638889	0.715	ApexAlpha	A_1_6B	7.144785881		
ARS1-B11-01660-12	ARS1-11-00897	022	0.131140764	0.028671761	2.22	1.96	0.01875	0	0.01875	0.715	ApexAlpha	A_1_6B	6.124101639		
ARS1-B11-01660-13	ARS1-11-00897	023	0.475146312	0.108901926	2.22	1.96	0.028472222	0.001388889	0.027083333	0.715	ApexAlpha	A_2_1A	7.157671928		
ARS1-B11-01660-13	ARS1-11-00897	023	1.086435869	0.256728269	2.22	1.96	1.740972222	0.000694444	1.740277778	0.715	ApexAlpha	A_2_1A	53.07657623		
ARS1-B11-01660-13	ARS1-11-00897	023	0.742163504	0.174542947	2.22	1.96	0.208333333	0.002083333	0.20625	0.715	ApexAlpha	A_2_1A	54.97091675		
ARS1-B11-01660-13	ARS1-11-00897	023	0.131059255	0.028671761	2.22	1.96	0.013888889	0.001388889	0.0125	0.715	ApexAlpha	A_2_1A	5.726137161		
ARS1-B11-01660-14	ARS1-11-00897	024	0.473244412	0.108901926	2.22	1.96	0.015972222	0.002083333	0.013888889	0.715	ApexAlpha	A_2_1B	7.318632126		
ARS1-B11-01660-14	ARS1-11-00897	024	1.08549547	0.256728269	2.22	1.96	1.913888889	0.000694444	1.913194444	0.715	ApexAlpha	A_2_1B	36.90681458		
ARS1-B11-01660-14	ARS1-11-00897	024	0.741221749	0.174542947	2.22	1.96	0.111805556	0.000694444	0.111111111	0.715	ApexAlpha	A_2_1B	8.538403511		
ARS1-B11-01660-14	ARS1-11-00897	024	0.130119421	0.028671761	2.22	1.96	0.019444444	0.000694444	0.01875	0.715	ApexAlpha	A_2_1B	4.879087925		
ARS1-B11-01660-15	ARS1-11-00897	025	0.474612779	0.108901926	2.22	1.96	0.003472222	0.001388889	0.002083333	0.715	ApexAlpha	A_2_2A	4.902958393		
ARS1-B11-01660-15	ARS1-11-00897	025	1.086374766	0.256728269	2.22	1.96	1.752083333	0.002083333	1.75	0.715	ApexAlpha	A_2_2A	47.46408081		
ARS1-B11-01660-15	ARS1-11-00897	025	0.742102542	0.174542947	2.22	1.96	0.18125	0.002777778	0.178472222	0.715	ApexAlpha	A_2_2A	17.97751427		
ARS1-B11-01660-15	ARS1-11-00897	025	0.130998433	0.028671761	2.22	1.96	0.018055556	0	0.018055556	0.715	ApexAlpha	A_2_2A	4.902958393		

ABatchSampleID	SDG	Fraction	TracerKnownACT	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	Halflife1	Halflife2	Halflife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	DeltaT1	DeltaT2
ARS1-B11-01660-01				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-01				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-01				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-01				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-02				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-02				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-02				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-02				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-03				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-03				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-03				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-03				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	2.086597222	
ARS1-B11-01660-04	ARS1-11-00897	014		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-04	ARS1-11-00897	014		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-04	ARS1-11-00897	014		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-04	ARS1-11-00897	014		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-05	ARS1-11-00897	015		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-05	ARS1-11-00897	015		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-05	ARS1-11-00897	015		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-05	ARS1-11-00897	015		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-06	ARS1-11-00897	016		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.93888889	
ARS1-B11-01660-06	ARS1-11-00897	016		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.93888889	
ARS1-B11-01660-06	ARS1-11-00897	016		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.93888889	
ARS1-B11-01660-06	ARS1-11-00897	016		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.93888889	
ARS1-B11-01660-07	ARS1-11-00897	017		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-07	ARS1-11-00897	017		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-07	ARS1-11-00897	017		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-07	ARS1-11-00897	017		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-08	ARS1-11-00897	018		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-08	ARS1-11-00897	018		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-08	ARS1-11-00897	018		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-08	ARS1-11-00897	018		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-09	ARS1-11-00897	019		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-09	ARS1-11-00897	019		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-09	ARS1-11-00897	019		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-09	ARS1-11-00897	019		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-10	ARS1-11-00897	020		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-10	ARS1-11-00897	020		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-10	ARS1-11-00897	020		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-10	ARS1-11-00897	020		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-11	ARS1-11-00897	021		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-11	ARS1-11-00897	021		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-11	ARS1-11-00897	021		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-11	ARS1-11-00897	021		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-12	ARS1-11-00897	022		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-12	ARS1-11-00897	022		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-12	ARS1-11-00897	022		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-12	ARS1-11-00897	022		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-13	ARS1-11-00897	023		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-13	ARS1-11-00897	023		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-13	ARS1-11-00897	023		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-13	ARS1-11-00897	023		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	16.93888889	
ARS1-B11-01660-14	ARS1-11-00897	024		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	14.93888889	
ARS1-B11-01660-14	ARS1-11-00897	024		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	14.93888889	
ARS1-B11-01660-14	ARS1-11-00897	024		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	14.93888889	
ARS1-B11-01660-14	ARS1-11-00897	024		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	14.93888889	
ARS1-B11-01660-15	ARS1-11-00897	025		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-15	ARS1-11-00897	025		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-15	ARS1-11-00897	025		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	15.93888889	
ARS1-B11-01660-15	ARS1-11-00897	025		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	15.93888889	

ABatchSampleID	SDG	Fraction	DeltaT3	DeltaT4	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SysErr	K_Val	K_MDA	AnalysisCode	UserID	ModDate
ARS1-B11-01660-01							0.997931111					0.061663514	0.354149925	509.9758919		JARMSTRONG	5/10/2011
ARS1-B11-01660-01							0.99999946					0.061663514	0.357026106	514.1175928		JARMSTRONG	5/10/2011
ARS1-B11-01660-01							0.999999947					0.061663514	0.356312227	513.0896076		JARMSTRONG	5/10/2011
ARS1-B11-01660-01							1					0.061663514	0.357026299	514.1178702		JARMSTRONG	5/10/2011
ARS1-B11-01660-02							0.997931111					0.061663514	0.350069771	504.1004703		JARMSTRONG	5/10/2011
ARS1-B11-01660-02							0.99999946					0.061663514	0.352912816	508.1944548		JARMSTRONG	5/10/2011
ARS1-B11-01660-02							0.999999947					0.061663514	0.352207162	507.1783129		JARMSTRONG	5/10/2011
ARS1-B11-01660-02							1					0.061663514	0.352913006	508.194729		JARMSTRONG	5/10/2011
ARS1-B11-01660-03							0.997931111					0.061663514	0.352292578	507.3013125		JARMSTRONG	5/10/2011
ARS1-B11-01660-03							0.99999946					0.061663514	0.355153675	511.4212922		JARMSTRONG	5/10/2011
ARS1-B11-01660-03							0.999999947					0.061663514	0.35444354	510.3986982		JARMSTRONG	5/10/2011
ARS1-B11-01660-03							1					0.061663514	0.355153867	511.4215681		JARMSTRONG	5/10/2011
ARS1-B11-01660-04	ARS1-11-00897	014					0.984304484					0.061663514	0.06147591	88.52531004	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-04	ARS1-11-00897	014					0.999995878					0.061663514	0.062832932	90.4794222	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-04	ARS1-11-00897	014					0.999999599					0.061663514	0.0627075	90.2987993	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-04	ARS1-11-00897	014					1					0.061663514	0.062833191	90.47979512	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-05	ARS1-11-00897	015					0.984304484					0.061663514	0.061705857	88.85643462	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-05	ARS1-11-00897	015					0.999995878					0.061663514	0.060944218	87.75967396	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-05	ARS1-11-00897	015					0.999999599					0.061663514	0.060822556	87.58448045	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-05	ARS1-11-00897	015					1					0.061663514	0.060944469	87.76003566	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-06	ARS1-11-00897	016					0.985281931					0.061663514	0.039546115	56.94640604	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-06	ARS1-11-00897	016					0.999996137					0.061663514	0.040378971	58.1457183	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-06	ARS1-11-00897	016					0.999999624					0.061663514	0.040298354	58.0296292	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-06	ARS1-11-00897	016					1					0.061663514	0.040379127	58.14594291	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-07	ARS1-11-00897	017					0.984304484					0.061663514	0.178211624	256.624738	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-07	ARS1-11-00897	017					0.999995878					0.061663514	0.182145476	262.2894854	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-07	ARS1-11-00897	017					0.999999599					0.061663514	0.181781861	261.7658803	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-07	ARS1-11-00897	017					1					0.061663514	0.182146227	262.2905665	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-08	ARS1-11-00897	018					0.984304484					0.061663514	0.171281905	246.6459429	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-08	ARS1-11-00897	018					0.999995878					0.061663514	0.17506279	252.0904179	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-08	ARS1-11-00897	018					0.999999599					0.061663514	0.174713315	251.587173	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-08	ARS1-11-00897	018					1					0.061663514	0.175063512	252.0914569	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-09	ARS1-11-00897	019					0.983328007					0.061663514	0.156250365	225.000525	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-09	ARS1-11-00897	019					0.99999562					0.061663514	0.159857989	230.1955035	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-09	ARS1-11-00897	019					0.999999574					0.061663514	0.159538903	229.7360208	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-09	ARS1-11-00897	019					1					0.061663514	0.159858689	230.1965118	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-10	ARS1-11-00897	020					0.984304484					0.061663514	0.159557615	229.7629653	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-10	ARS1-11-00897	020					0.999995878					0.061663514	0.163079698	234.8347645	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-10	ARS1-11-00897	020					0.999999599					0.061663514	0.162754144	234.3659669	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-10	ARS1-11-00897	020					1					0.061663514	0.16308037	234.8357324	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-11	ARS1-11-00897	021					0.984304484					0.061663514	0.162846961	234.4996232	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-11	ARS1-11-00897	021					0.999995878					0.061663514	0.166441653	239.6759797	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-11	ARS1-11-00897	021					0.999999599					0.061663514	0.166109387	239.1975176	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-11	ARS1-11-00897	021					1					0.061663514	0.166442339	239.6769675	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-12	ARS1-11-00897	022					0.983328007					0.061663514	0.166779389	240.1623209	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-12	ARS1-11-00897	022					0.99999562					0.061663514	0.170630115	245.7073661	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-12	ARS1-11-00897	022					0.999999574					0.061663514	0.170289528	245.2169209	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-12	ARS1-11-00897	022					1					0.061663514	0.170630863	245.7084424	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-13	ARS1-11-00897	023					0.983328007					0.061663514	0.168021107	241.9503941	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-13	ARS1-11-00897	023					0.99999562					0.061663514	0.171900503	247.5367238	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-13	ARS1-11-00897	023					0.999999574					0.061663514	0.17155738	247.0426271	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-13	ARS1-11-00897	023					1					0.061663514	0.171901256	247.537808	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-14	ARS1-11-00897	024					0.985281931					0.061663514	0.184164912	265.1974728	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-14	ARS1-11-00897	024					0.999996137					0.061663514	0.188043492	270.7826291	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-14	ARS1-11-00897	024					0.999999624					0.061663514	0.18766806	270.2420062	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-14	ARS1-11-00897	024					1					0.061663514	0.188044219	270.7836752	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-15	ARS1-11-00897	025					0.984304484					0.061663514	0.169127555	243.5436794	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-15	ARS1-11-00897	025					0.999995878					0.061663514	0.172860885	248.9196749	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-15	ARS1-11-00897	025					0.999999599					0.061663514	0.172515805	248.4227597	ASP-A-008	JARMSTRONG	5/10/2011
ARS1-B11-01660-15	ARS1-11-00897	025					1					0.061663514	0.172861598	248.9207008	ASP-A-008	JARMSTRONG	5/10/2011

ARS-031

ID_31001_031	ABatch	ABatchSampleID	ClientID	Aliquot	AliquotUnits	UserID	ModDate	IC_ID
2946	ARS1-B11-01660	ARS1-B11-01660-01		1	L	JBROWN	05/04/2011 08:27:18	
2947	ARS1-B11-01660	ARS1-B11-01660-02		1	L	JBROWN	05/04/2011 08:27:18	
2948	ARS1-B11-01660	ARS1-B11-01660-03		1	L	JBROWN	05/04/2011 08:27:18	
2949	ARS1-B11-01660	ARS1-B11-01660-04	PR-SW-01-110420	0.5	L	JBROWN	05/04/2011 08:27:18	86090
2950	ARS1-B11-01660	ARS1-B11-01660-05	RB-01-110420	0.5	L	JBROWN	05/04/2011 08:27:18	86090
2951	ARS1-B11-01660	ARS1-B11-01660-06	RB-02-110421	0.5	L	JBROWN	05/04/2011 08:27:18	86090
2952	ARS1-B11-01660	ARS1-B11-01660-07	RM-JM-SW-02-110420	0.5	L	JBROWN	05/04/2011 08:27:19	86090
2953	ARS1-B11-01660	ARS1-B11-01660-08	RM-JM-SW-110420	0.5	L	JBROWN	05/04/2011 08:27:19	86090
2954	ARS1-B11-01660	ARS1-B11-01660-09	RM-SW-BG-110419	0.5	L	JBROWN	05/04/2011 08:27:19	86090
2955	ARS1-B11-01660	ARS1-B11-01660-10	RP-JM-SW-01-110420	0.5	L	JBROWN	05/04/2011 08:27:19	86090
2956	ARS1-B11-01660	ARS1-B11-01660-11	RP-JM-SW-110420	0.5	L	JBROWN	05/04/2011 08:27:19	86090
2957	ARS1-B11-01660	ARS1-B11-01660-12	RP-SW-01-110419	0.5	L	JBROWN	05/04/2011 08:27:19	86090
2958	ARS1-B11-01660	ARS1-B11-01660-13	RP-SW-BG-041911	0.5	L	JBROWN	05/04/2011 08:27:19	86090
2959	ARS1-B11-01660	ARS1-B11-01660-14	SPOP35-110421	0.5	L	JBROWN	05/04/2011 08:27:19	86090
2960	ARS1-B11-01660	ARS1-B11-01660-15	MW-RM-110420	0.5	L	JBROWN	05/04/2011 08:27:19	86090

ARS1-B11-01660

ABatch	ABatchSampleID	ClientID	SampleType	EmptyWt	FilledWt	NetWt	Exp Val	StdID	Isotope	TracerDate	UserID	ModDate	HL days	Ref Date	Cert dpm/g	Curr ACT
ARS1-B11-01660	ARS1-B11-01660-01		LCS	62.980	63.992	1.012	11.339	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-02		LCSD	56.626	57.634	1.008	11.297	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-03		MBL	78.452	79.458	1.006	11.273	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-04	PR-SW-01-110420	TRG	437.838	438.843	1.005	11.262	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-05	RB-01-110420	TRG	437.786	438.793	1.007	11.282	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-06	RB-02-110421	TRG	418.830	419.837	1.007	11.282	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-07	RM-JM-SW-02-110420	TRG	417.684	418.688	1.004	11.249	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-08	RM-JM-SW-110420	TRG	398.216	399.228	1.012	11.338	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-09	RM-SW-BG-110419	TRG	438.208	439.222	1.014	11.361	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-10	RP-JM-SW-01-110420	TRG	430.844	431.854	1.010	11.316	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-11	RP-JM-SW-110420	TRG	377.144	378.146	1.002	11.226	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-12	RP-SW-01-110419	TRG	384.098	385.100	1.002	11.226	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-13	RP-SW-BG-041911	TRG	412.015	413.018	1.003	11.237	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-14	SPOP35-110421	TRG	429.712	430.720	1.008	11.293	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01660	ARS1-B11-01660-15	MW-RM-110420	TRG	428.181	429.184	1.003	11.237	S-0246	Th-229	5/4/2011	JBROWN	5/4/2011	2680555.556	9/20/2010	11.204	11.204

5/6/2011 10:31:43

Apex-Alpha™

ASSIGNED SAMPLES REPORT

Date : 5/6/2011
Time : 10:31:43
User : countroom

SAMPLE	CHAMBER	GEOMETRY	DEVICE	CERTIFICATE
11-01660-01	A_1_1A	Shelf 2	Alpha Analyst10139	
11-01660-02	A_1_1B	Shelf 2	Alpha Analyst10139	
11-01660-03	A_1_2A	Shelf 2	Alpha Analyst10139	
11-01660-04	A_1_2B	Shelf 2	Alpha Analyst10139	
11-01660-05	A_1_3A	Shelf 2	Alpha Analyst10139	
11-01660-06	A_1_3B	Shelf 2	Alpha Analyst10139	
11-01660-07	A_1_4A	Shelf 2	Alpha Analyst10139	
11-01660-08	A_1_4B	Shelf 2	Alpha Analyst10139	
11-01660-09	A_1_5A	Shelf 2	Alpha Analyst10139	
11-01660-10	A_1_5B	Shelf 2	Alpha Analyst10139	
11-01660-11	A_1_6A	Shelf 2	Alpha Analyst10139	
11-01660-12	A_1_6B	Shelf 2	Alpha Analyst10139	
11-01660-13	A_2_1A	Shelf 2	Alpha Analyst10139	
11-01660-14	A_2_1B	Shelf 2	Alpha Analyst10139	
11-01660-15	A_2_2A	Shelf 2	Alpha Analyst10139	
11-01648-01	A_2_3B	Shelf 2	Alpha Analyst10139	
11-01648-02	A_2_4A	Shelf 2	Alpha Analyst10139	
11-01648-03	A_2_4B	Shelf 2	Alpha Analyst10139	
11-01648-04	A_2_5A	Shelf 2	Alpha Analyst10139	
11-01648-05	A_2_5B	Shelf 2	Alpha Analyst10139	
11-01648-06	A_3_1A	Shelf 2	Alpha Analyst10139	
11-01648-07	A_3_1B	Shelf 2	Alpha Analyst10139	
11-01648-08	A_3_2B	Shelf 2	Alpha Analyst10139	
11-01648-09	A_3_3A	Shelf 2	Alpha Analyst10139	
11-01648-10	A_3_3B	Shelf 2	Alpha Analyst10139	
11-01648-11	A_3_4B	Shelf 2	Alpha Analyst10139	
11-01648-12	A_3_5A	Shelf 2	Alpha Analyst10139	
11-01648-13	A_3_6A	Shelf 2	Alpha Analyst10139	

Apex Alpha Instrument Data Transfer Report

#	Report ID	Batch Sample ID	Isotope	Gross Area	Count Mins	BKG Counts	BKG Count Mins	EFF	Analysis Date	Detector
1	ApexAlpha	ARS1-B11-01660-01	TH-228	9	1440	0	1440	0.21	05/06/11 10:32	A_1_1A
2	ApexAlpha	ARS1-B11-01660-01	TH-229	2629	1440	3	1440	0.21	05/06/11 10:32	A_1_1A
3	ApexAlpha	ARS1-B11-01660-01	TH-230	2973	1440	14	1440	0.21	05/06/11 10:32	A_1_1A
4	ApexAlpha	ARS1-B11-01660-01	TH-232	59	1440	5	1440	0.21	05/06/11 10:32	A_1_1A
5	ApexAlpha	ARS1-B11-01660-02	TH-228	17	1440	3	1440	0.19	05/06/11 10:32	A_1_1B
6	ApexAlpha	ARS1-B11-01660-02	TH-229	2603	1440	17	1440	0.19	05/06/11 10:32	A_1_1B
7	ApexAlpha	ARS1-B11-01660-02	TH-230	3263	1440	5	1440	0.19	05/06/11 10:32	A_1_1B
8	ApexAlpha	ARS1-B11-01660-02	TH-232	57	1440	3	1440	0.19	05/06/11 10:32	A_1_1B
9	ApexAlpha	ARS1-B11-01660-03	TH-228	3	1440	1	1440	0.22	05/06/11 10:32	A_1_2A
10	ApexAlpha	ARS1-B11-01660-03	TH-229	2608	1440	11	1440	0.22	05/06/11 10:32	A_1_2A
11	ApexAlpha	ARS1-B11-01660-03	TH-230	148	1440	6	1440	0.22	05/06/11 10:32	A_1_2A
12	ApexAlpha	ARS1-B11-01660-03	TH-232	25	1440	2	1440	0.22	05/06/11 10:32	A_1_2A
13	ApexAlpha	ARS1-B11-01660-04	TH-228	3	1440	0	1440	0.22	05/06/11 10:32	A_1_2B
14	ApexAlpha	ARS1-B11-01660-04	TH-229	933	1440	15	1440	0.22	05/06/11 10:32	A_1_2B
15	ApexAlpha	ARS1-B11-01660-04	TH-230	144	1440	2	1440	0.22	05/06/11 10:32	A_1_2B
16	ApexAlpha	ARS1-B11-01660-04	TH-232	11	1440	3	1440	0.22	05/06/11 10:32	A_1_2B
17	ApexAlpha	ARS1-B11-01660-05	TH-228	7	1440	0	1440	0.22	05/06/11 10:32	A_1_3A
18	ApexAlpha	ARS1-B11-01660-05	TH-229	897	1440	5	1440	0.21	05/06/11 10:32	A_1_3A
19	ApexAlpha	ARS1-B11-01660-05	TH-230	98	1440	5	1440	0.21	05/06/11 10:32	A_1_3A
20	ApexAlpha	ARS1-B11-01660-05	TH-232	28	1440	21	1440	0.21	05/06/11 10:32	A_1_3A
21	ApexAlpha	ARS1-B11-01660-06	TH-228	3	1440	0	1440	0.21	05/06/11 10:32	A_1_3B
22	ApexAlpha	ARS1-B11-01660-06	TH-229	594	1440	3	1440	0.21	05/06/11 10:32	A_1_3B
23	ApexAlpha	ARS1-B11-01660-06	TH-230	44	1440	5	1440	0.21	05/06/11 10:32	A_1_3B
24	ApexAlpha	ARS1-B11-01660-06	TH-232	8	1440	3	1440	0.21	05/06/11 10:32	A_1_3B
25	ApexAlpha	ARS1-B11-01660-07	TH-228	9	1440	2	1440	0.23	05/06/11 10:32	A_1_4A
26	ApexAlpha	ARS1-B11-01660-07	TH-229	2662	1440	4	1440	0.23	05/06/11 10:32	A_1_4A
27	ApexAlpha	ARS1-B11-01660-07	TH-230	231	1440	3	1440	0.23	05/06/11 10:32	A_1_4A
28	ApexAlpha	ARS1-B11-01660-07	TH-232	30	1440	1	1440	0.23	05/06/11 10:32	A_1_4A
29	ApexAlpha	ARS1-B11-01660-08	TH-228	9	1440	0	1440	0.22	05/06/11 10:32	A_1_4B
30	ApexAlpha	ARS1-B11-01660-08	TH-229	2578	1440	3	1440	0.22	05/06/11 10:32	A_1_4B
31	ApexAlpha	ARS1-B11-01660-08	TH-230	140	1440	3	1440	0.22	05/06/11 10:32	A_1_4B
32	ApexAlpha	ARS1-B11-01660-08	TH-232	37	1440	2	1440	0.22	05/06/11 10:32	A_1_4B
33	ApexAlpha	ARS1-B11-01660-09	TH-228	19	1440	3	1440	0.21	05/06/11 10:32	A_1_5A
34	ApexAlpha	ARS1-B11-01660-09	TH-229	2359	1440	3	1440	0.21	05/06/11 10:32	A_1_5A
35	ApexAlpha	ARS1-B11-01660-09	TH-230	170	1440	3	1440	0.21	05/06/11 10:32	A_1_5A
36	ApexAlpha	ARS1-B11-01660-09	TH-232	31	1440	2	1440	0.21	05/06/11 10:32	A_1_5A
37	ApexAlpha	ARS1-B11-01660-10	TH-228	8	1440	2	1440	0.20	05/06/11 10:32	A_1_5B
38	ApexAlpha	ARS1-B11-01660-10	TH-229	2399	1440	5	1440	0.20	05/06/11 10:32	A_1_5B
39	ApexAlpha	ARS1-B11-01660-10	TH-230	183	1440	6	1440	0.20	05/06/11 10:32	A_1_5B
40	ApexAlpha	ARS1-B11-01660-10	TH-232	19	1440	1	1440	0.20	05/06/11 10:32	A_1_5B
41	ApexAlpha	ARS1-B11-01660-11	TH-228	57	1440	4	1440	0.23	05/06/11 10:32	A_1_6A
42	ApexAlpha	ARS1-B11-01660-11	TH-229	2428	1440	4	1440	0.23	05/06/11 10:32	A_1_6A
43	ApexAlpha	ARS1-B11-01660-11	TH-230	172	1440	4	1440	0.23	05/06/11 10:32	A_1_6A
44	ApexAlpha	ARS1-B11-01660-11	TH-232	37	1440	3	1440	0.23	05/06/11 10:32	A_1_6A
45	ApexAlpha	ARS1-B11-01660-12	TH-228	25	1440	0	1440	0.22	05/06/11 10:32	A_1_6B
46	ApexAlpha	ARS1-B11-01660-12	TH-229	2487	1440	2	1440	0.22	05/06/11 10:32	A_1_6B
47	ApexAlpha	ARS1-B11-01660-12	TH-230	265	1440	2	1440	0.22	05/06/11 10:32	A_1_6B
48	ApexAlpha	ARS1-B11-01660-12	TH-232	27	1440	0	1440	0.22	05/06/11 10:32	A_1_6B
49	ApexAlpha	ARS1-B11-01660-13	TH-228	41	1440	2	1440	0.22	05/06/11 10:32	A_2_1A
50	ApexAlpha	ARS1-B11-01660-13	TH-229	2507	1440	1	1440	0.22	05/06/11 10:32	A_2_1A
51	ApexAlpha	ARS1-B11-01660-13	TH-230	300	1440	3	1440	0.22	05/06/11 10:32	A_2_1A
52	ApexAlpha	ARS1-B11-01660-13	TH-232	20	1440	2	1440	0.22	05/06/11 10:32	A_2_1A

Apex Alpha Instrument Data Transfer Report

#	Report ID	Batch Sample ID	Isotope	Gross Area	Count Mins	BKG Counts	BKG Count Mins	EFF	Analysis Date	Detector
53	ApexAlpha	ARS1-B11-01660-14	TH-228	23	1440	3	1440	0.21	05/06/11 10:32	A_2_1B
54	ApexAlpha	ARS1-B11-01660-14	TH-229	2756	1440	1	1440	0.21	05/06/11 10:32	A_2_1B
55	ApexAlpha	ARS1-B11-01660-14	TH-230	161	1440	1	1440	0.21	05/06/11 10:32	A_2_1B
56	ApexAlpha	ARS1-B11-01660-14	TH-232	28	1440	1	1440	0.21	05/06/11 10:32	A_2_1B
57	ApexAlpha	ARS1-B11-01660-15	TH-228	5	1440	2	1440	0.22	05/06/11 10:32	A_2_2A
58	ApexAlpha	ARS1-B11-01660-15	TH-229	2523	1440	3	1440	0.22	05/06/11 10:32	A_2_2A
59	ApexAlpha	ARS1-B11-01660-15	TH-230	261	1440	4	1440	0.22	05/06/11 10:32	A_2_2A
60	ApexAlpha	ARS1-B11-01660-15	TH-232	26	1440	0	1440	0.22	05/06/11 10:32	A_2_2A

ALPHA SPECTRUM ANALYSIS

Sample Description: LCS
Batch Identification: B11-01660
Sample Identification: 11-01660-01
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 1A
Chamber Serial Number: 10043743A
Detector Serial Number: 57895
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:31:57
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2125 +/- 0.0044 on 4/9/10 20:56:03
Effective Efficiency: 0.2125 +/- 0.0044

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

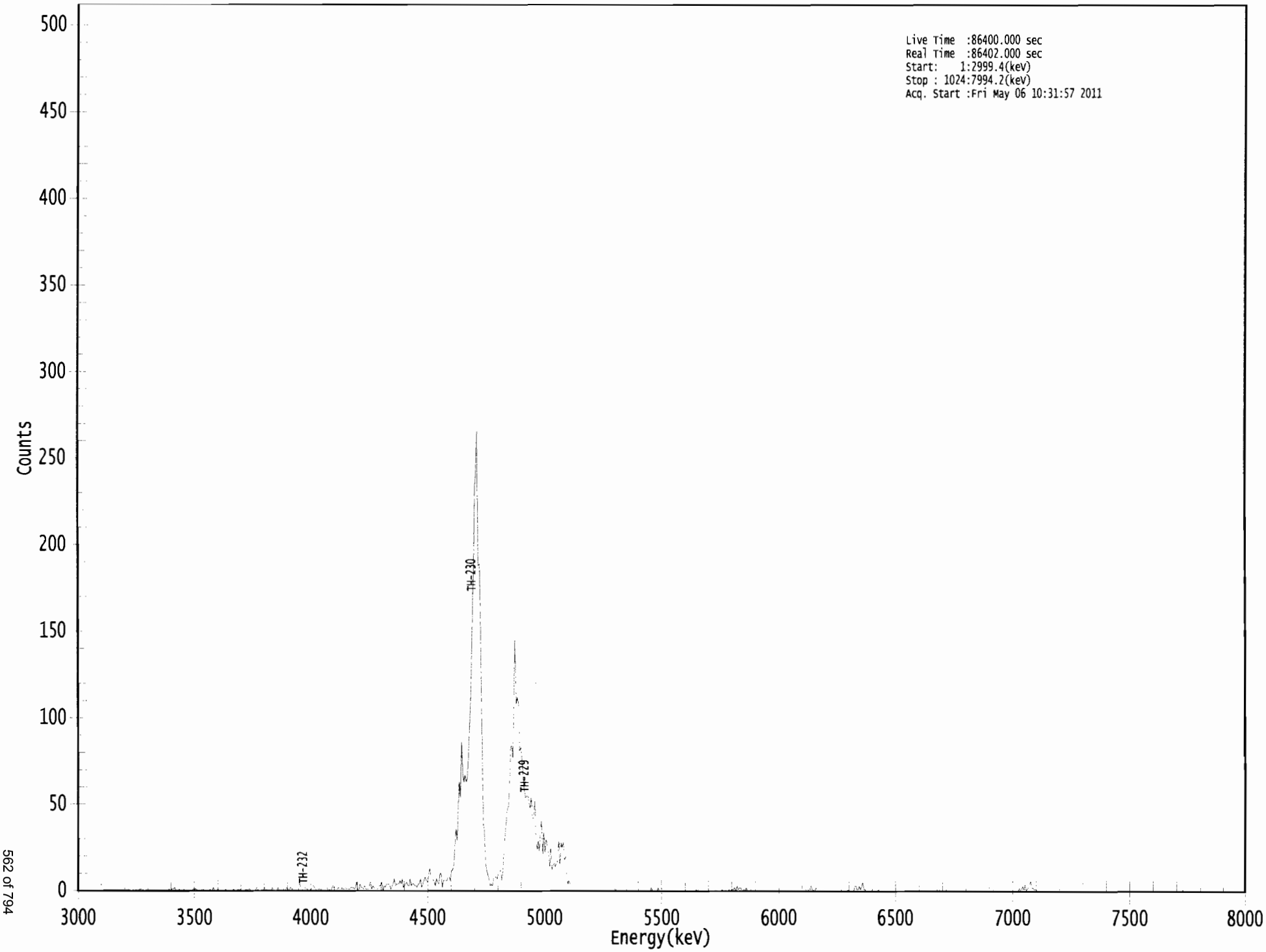
Nuclide	Energy (MeV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5.342	9.00	3.00	0.00	0.00E+000	4.9
TH-229	4.920	2629.00	51.27	0.00	0.00E+000	52.3
TH-230	4.691	2973.00	54.53	0.00	0.00E+000	40.1
TH-232	3.973	59.00	7.68	0.00	0.00E+000	7.3

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.3259E-002	33.40	3.9867E-003	2.06
TH-229	3.8896E+000	2.84	4.0035E-003	2.06
TH-230	4.3853E+000	2.76	3.9915E-003	2.06
TH-232	8.6871E-002	13.18	3.9843E-003	2.06

Errors quoted at 1.000 sigma

0000012169.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: LCSD
Batch Identification: B11-01660
Sample Identification: 11-01660-02
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 1B
Chamber Serial Number: 10043743B
Detector Serial Number: 57896
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:31:58
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1922 +/- 0.0040 on 4/9/10 20:56:53
Effective Efficiency: 0.1922 +/- 0.0040

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

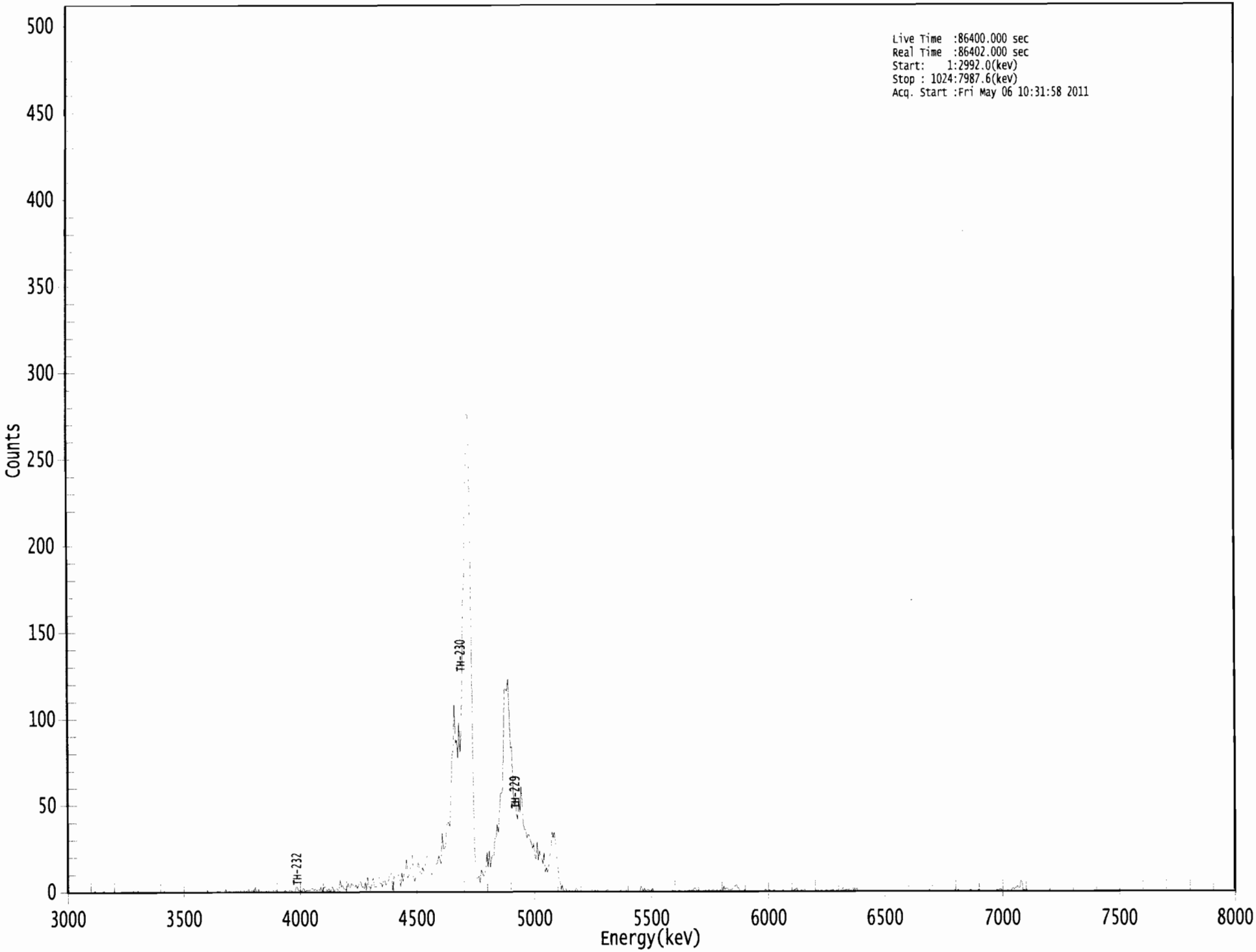
Nuclide	Energy (MeV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5.391	17.00	4.12	0.00	0.00E+000	8.5
TH-229	4.917	2603.00	51.02	0.00	0.00E+000	43.4
TH-230	4.686	3263.00	57.12	0.00	0.00E+000	38.8
TH-232	3.984	57.00	7.55	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	2.7685E-002	24.34	4.4068E-003	2.06
TH-229	4.2569E+000	2.84	4.4254E-003	2.06
TH-230	5.3202E+000	2.70	4.4121E-003	2.06
TH-232	9.2769E-002	13.40	4.4041E-003	2.06

Errors quoted at 1.000 sigma

0000012193.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: MBL
Batch Identification: B11-01660
Sample Identification: 11-01660-03
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 2A
Chamber Serial Number: 10043744A
Detector Serial Number: 57897
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:00
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2164 +/- 0.0044 on 4/9/10 20:57:28
Effective Efficiency: 0.2164 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

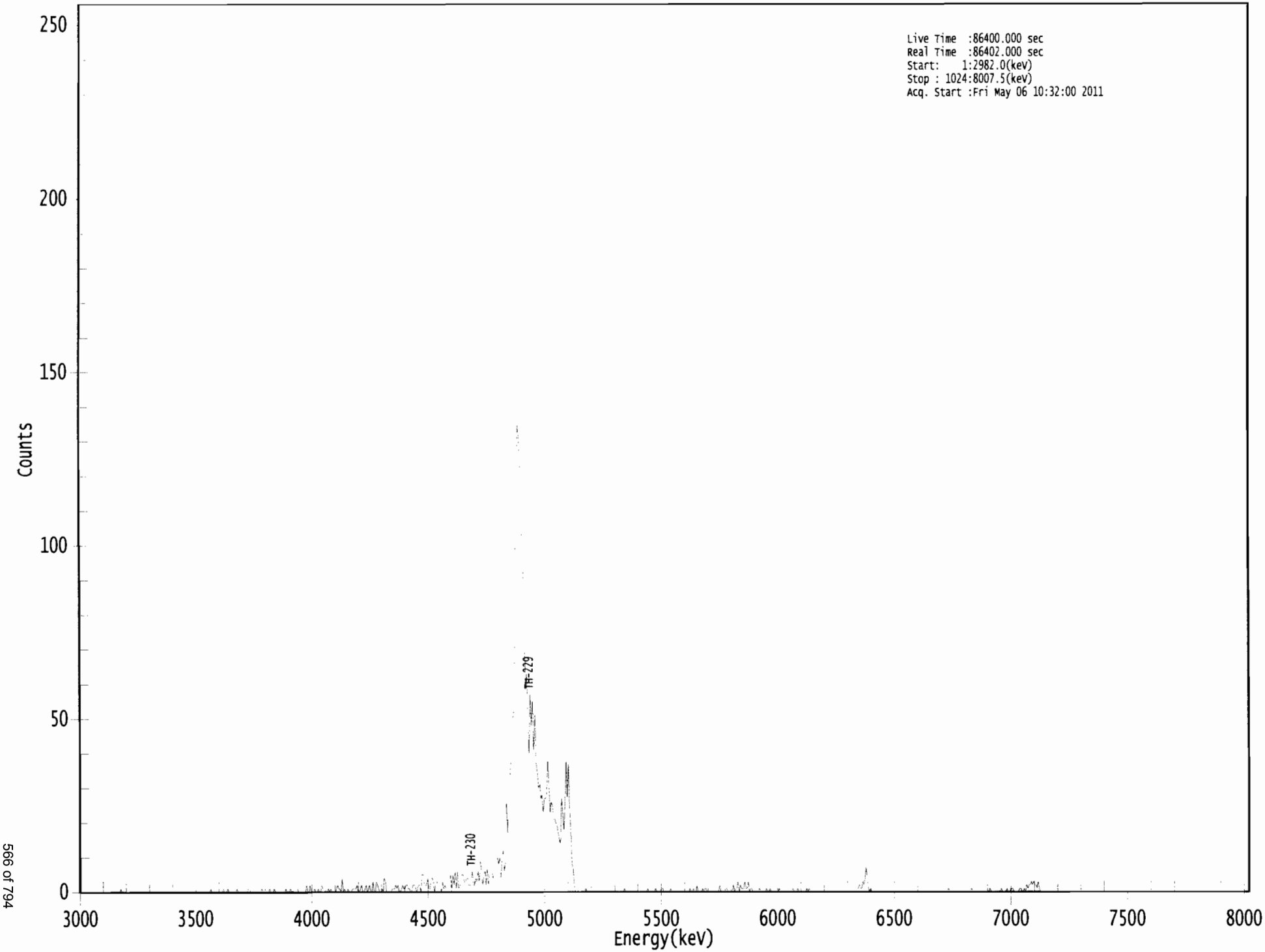
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5402.253	3.00	1.73	0.00	0.00E+000	4.9
TH-229	4923.254	2608.00	51.07	0.00	0.00E+000	44.0
TH-230	4674.323	148.00	12.17	0.00	0.00E+000	10.4
TH-232	3981.634	25.00	5.00	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	4.3394E-003	57.77	3.9142E-003	2.05
TH-229	3.7883E+000	2.84	3.9307E-003	2.05
TH-230	2.1433E-001	8.47	3.9189E-003	2.05
TH-232	3.6140E-002	20.11	3.9118E-003	2.05

Errors quoted at 1.000 sigma

0000012192.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-014
Batch Identification: B11-01660
Sample Identification: 11-01660-04
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 2B
Chamber Serial Number: 10043744B
Detector Serial Number: 57898
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:01
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2196 +/- 0.0045 on 4/9/10 20:58:18
Effective Efficiency: 0.2196 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

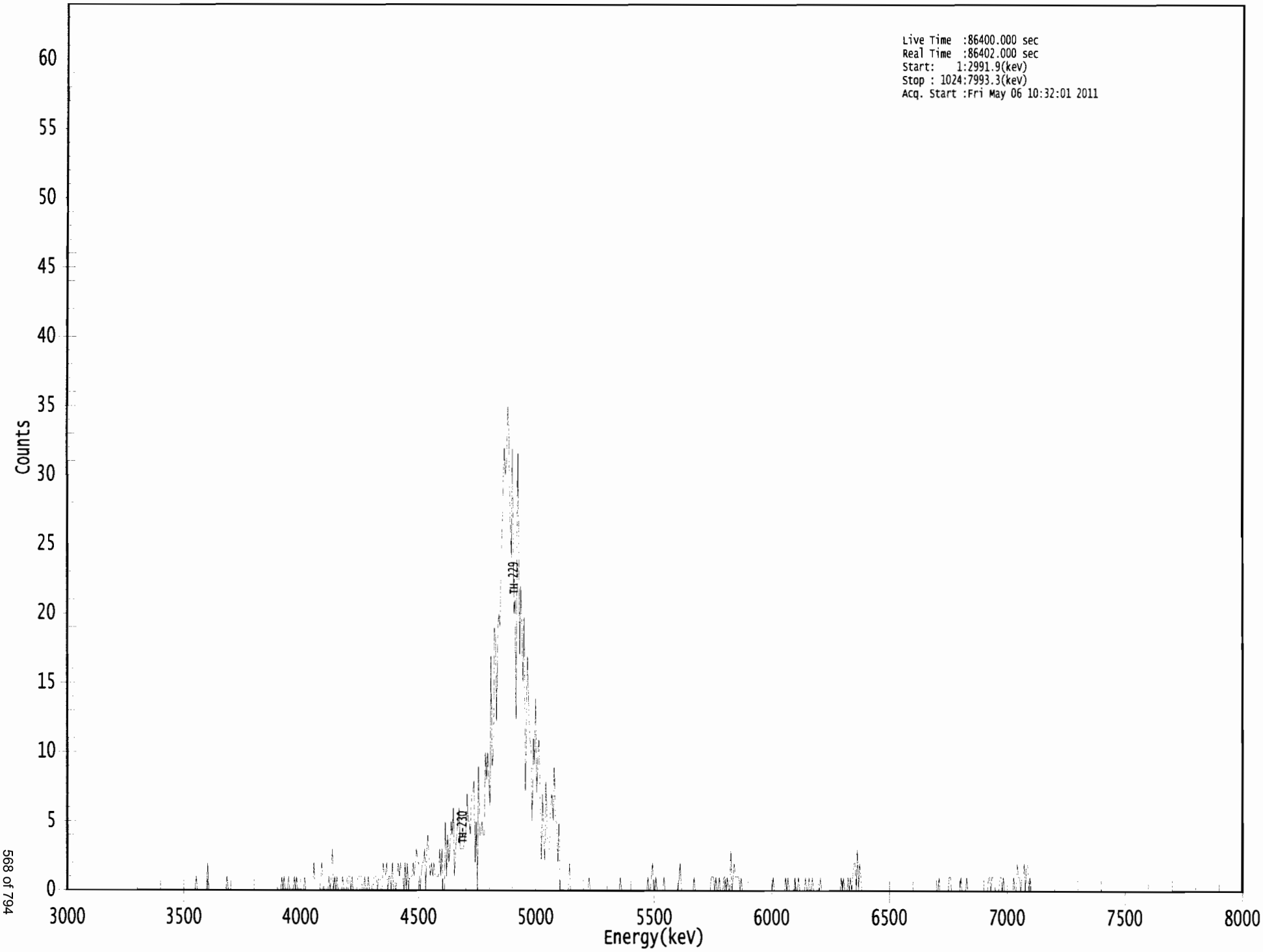
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5343.504	3.00	1.73	0.00	0.00E+000	4.9
TH-229	4901.490	933.00	30.55	0.00	0.00E+000	76.3
TH-230	4681.565	144.00	12.00	0.00	0.00E+000	6.8
TH-232	4005.275	11.00	3.32	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	4.2767E-003	57.77	3.8576E-003	2.05
TH-229	1.3357E+000	3.86	3.8739E-003	2.05
TH-230	2.0553E-001	8.58	3.8622E-003	2.05
TH-232	1.5672E-002	30.22	3.8553E-003	2.05

Errors quoted at 1.000 sigma

0000012191.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-015
Batch Identification: B11-01660
Sample Identification: 11-01660-05
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 3A
Chamber Serial Number: 10043745A
Detector Serial Number: 57907
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:02
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2122 +/- 0.0044 on 4/11/10 09:13:21
Effective Efficiency: 0.2122 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

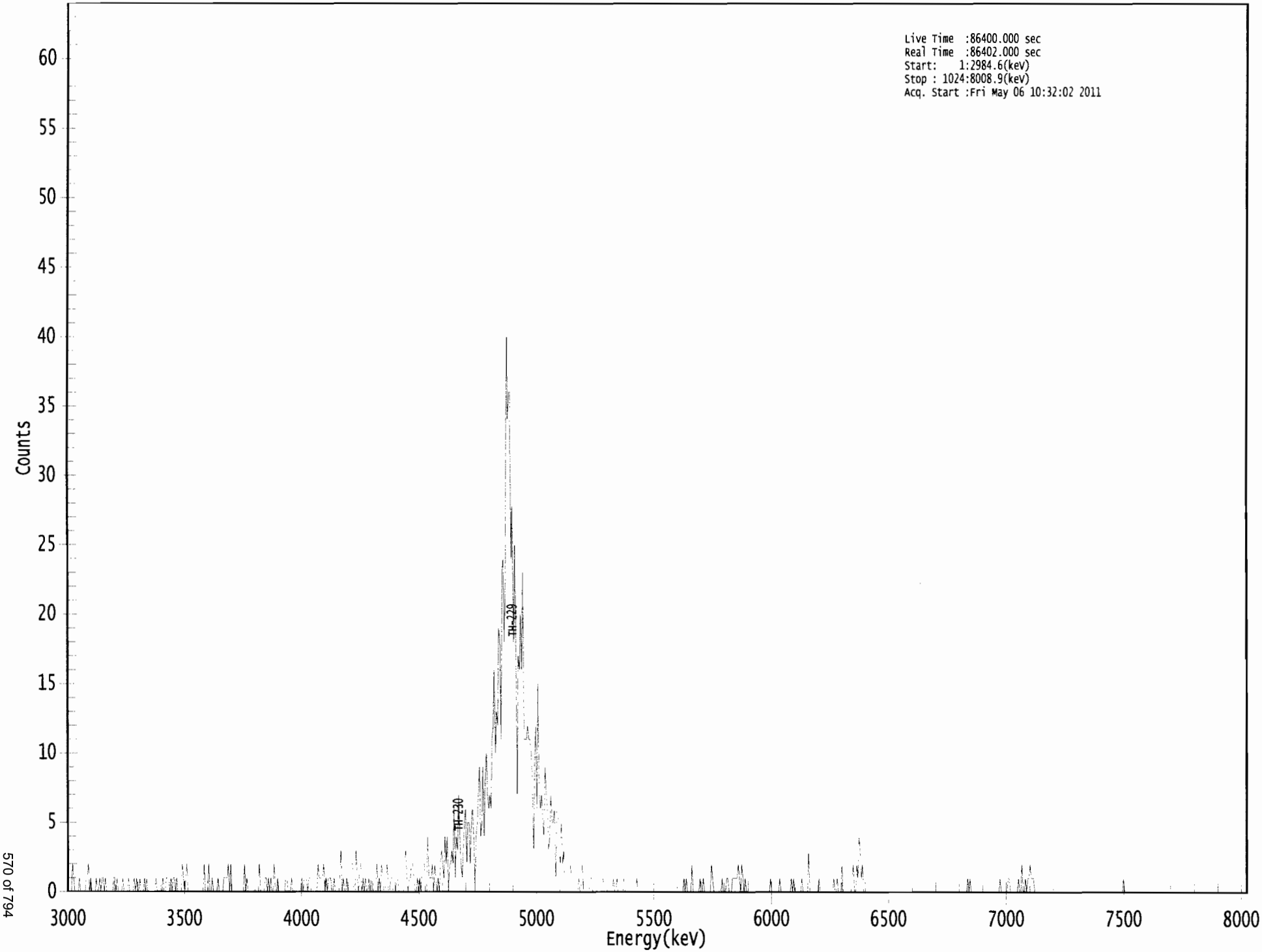
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-229	4891.713	897.00	29.95	0.00	0.00E+000	36.3
TH-230	4657.345	98.00	9.90	0.00	0.00E+000	10.4
TH-232	3968.962	28.00	5.29	0.00	0.00E+000	4.9
~~<not ID'd>~~ Th-228 5101	5301.326	7.00	2.65	0.00	0.00E+000	9.8

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-229	1.3289E+000	3.92	4.0089E-003	2.06
TH-230	1.4475E-001	10.31	3.9968E-003	2.06
TH-232	4.1282E-002	19.01	3.9896E-003	2.06

Errors quoted at 1.000 sigma

0000012221.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-016
Batch Identification: B11-01660
Sample Identification: 11-01660-06
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 3B
Chamber Serial Number: 10043745B
Detector Serial Number: 57908
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:04
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2061 +/- 0.0042 on 4/11/10 09:13:55
Effective Efficiency: 0.2061 +/- 0.0042

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

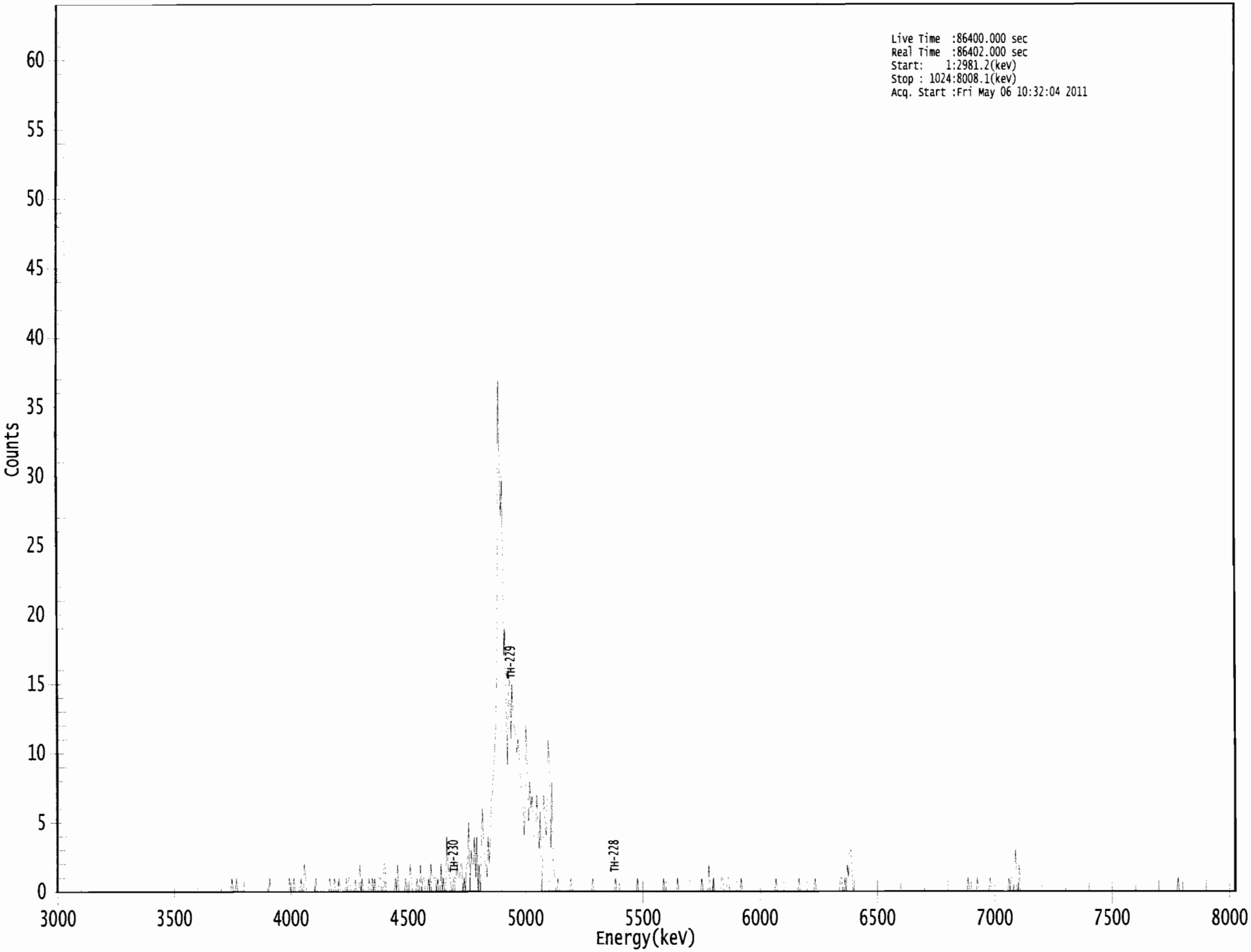
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5362.809	3.00	1.73	0.00	0.00E+000	4.9
TH-229	4927.289	594.00	24.37	0.00	0.00E+000	27.0
TH-230	4681.534	44.00	6.63	0.00	0.00E+000	6.6
TH-232	4010.682	8.00	2.83	0.00	0.00E+000	7.4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	4.5558E-003	57.77	4.1093E-003	2.06
TH-229	9.0585E-001	4.59	4.1267E-003	2.06
TH-230	6.6898E-002	15.22	4.1143E-003	2.06
TH-232	1.2141E-002	35.42	4.1069E-003	2.06

Errors quoted at 1.000 sigma

0000012182.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-017
Batch Identification: B11-01660
Sample Identification: 11-01660-07
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 4A
Chamber Serial Number: 10043746A
Detector Serial Number: 57909
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:05
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2259 +/- 0.0046 on 4/11/10 09:14:49
Effective Efficiency: 0.2259 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

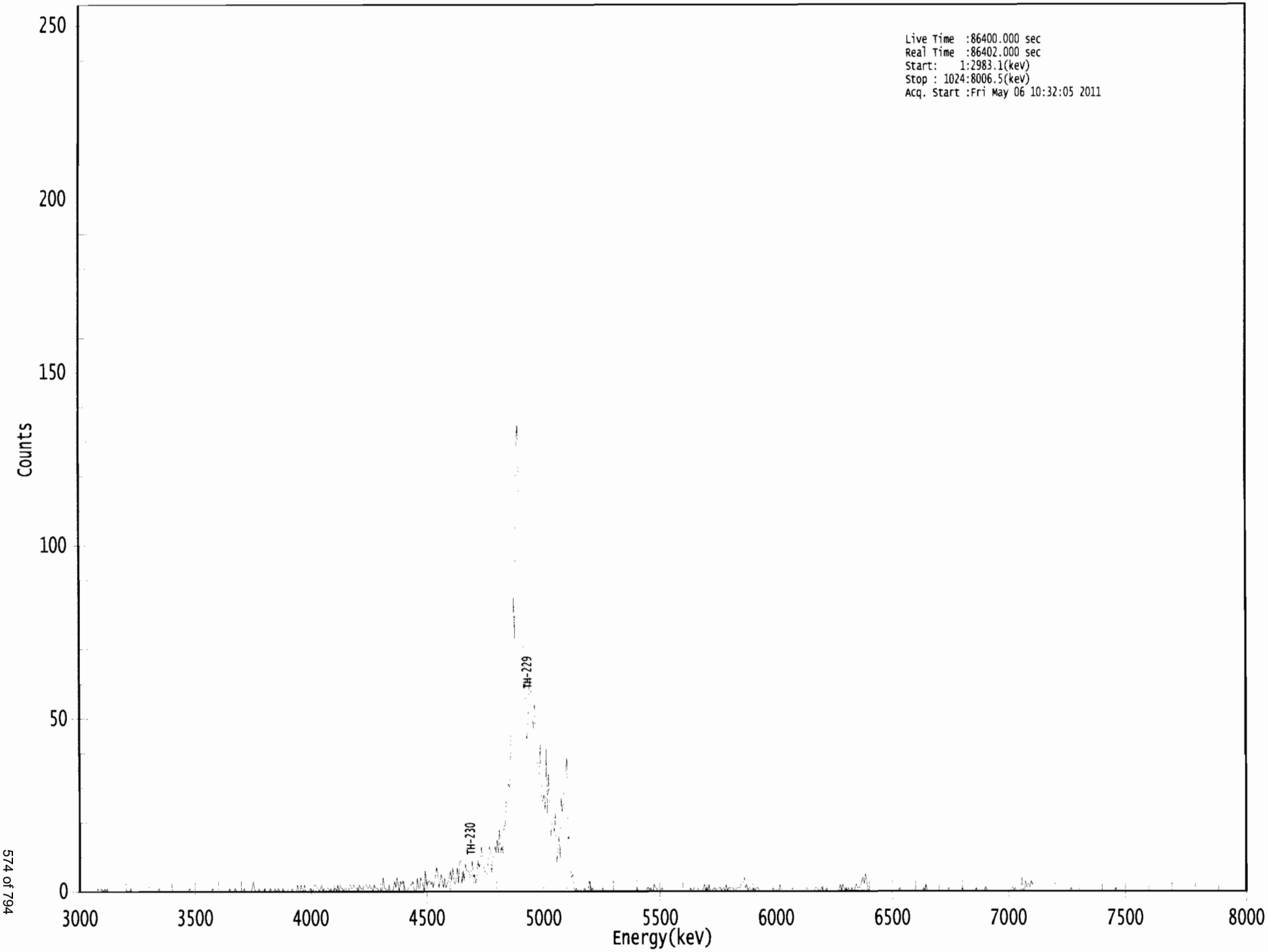
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5419.207	9.00	3.00	0.00	0.00E+000	7.4
TH-229	4921.298	2662.00	51.59	0.00	0.00E+000	46.9
TH-230	4678.689	231.00	15.20	0.00	0.00E+000	29.5
TH-232	3985.295	30.00	5.48	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.2468E-002	33.40	3.7489E-003	2.05
TH-229	3.7035E+000	2.82	3.7647E-003	2.05
TH-230	3.2041E-001	6.89	3.7534E-003	2.05
TH-232	4.1537E-002	18.37	3.7466E-003	2.05

Errors quoted at 1.000 sigma

0000012181.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-018
Batch Identification: B11-01660
Sample Identification: 11-01660-08
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 4B
Chamber Serial Number: 10043746B
Detector Serial Number: 57910
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:07
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2164 +/- 0.0044 on 4/11/10 09:15:19
Effective Efficiency: 0.2164 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

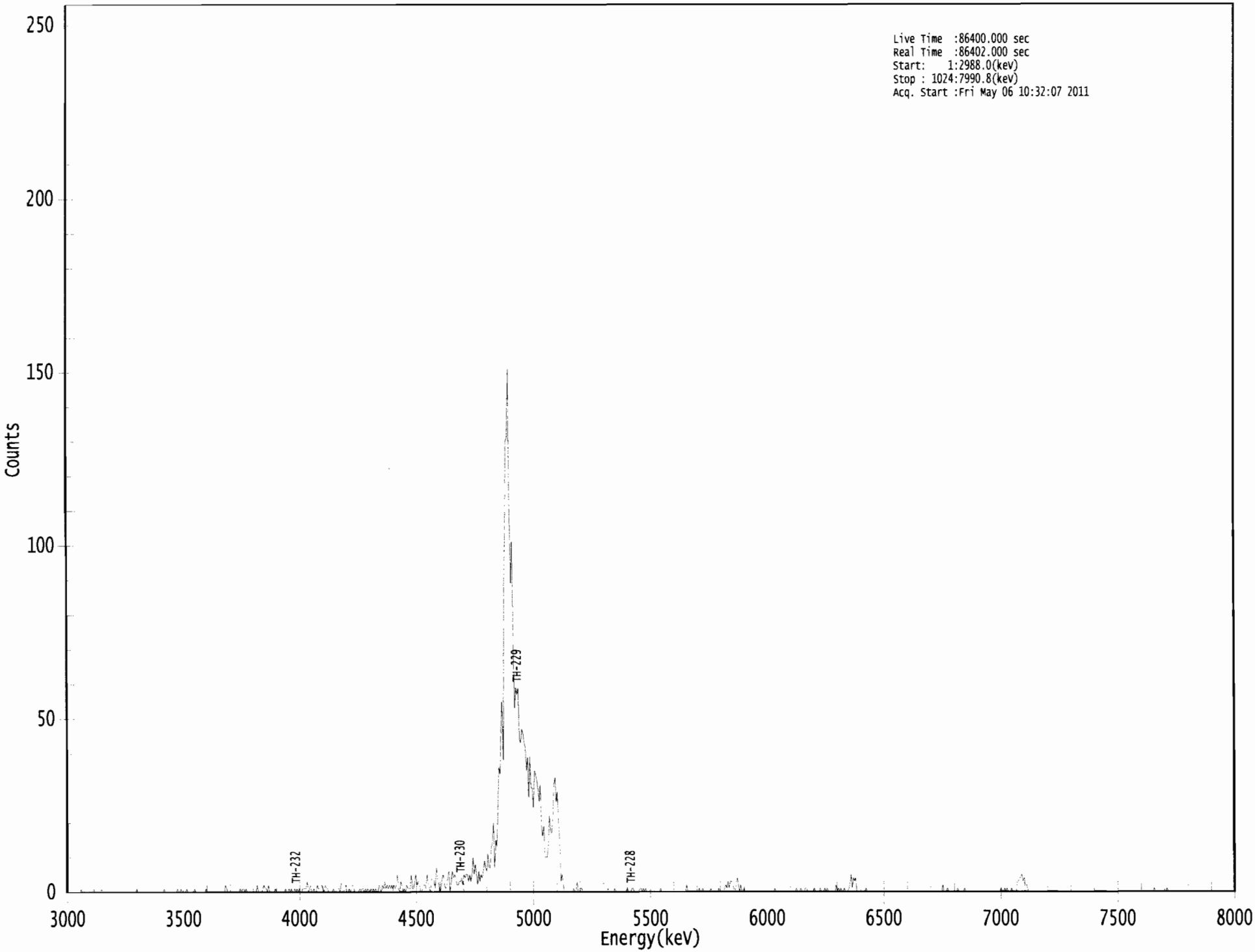
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5407.631	9.00	3.00	0.00	0.00E+000	4.9
TH-229	4926.246	2578.00	50.77	0.00	0.00E+000	39.7
TH-230	4679.193	140.00	11.83	0.00	0.00E+000	9.8
TH-232	3977.452	37.00	6.08	0.00	0.00E+000	6.1

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.3015E-002	33.40	3.9131E-003	2.05
TH-229	3.7437E+000	2.85	3.9297E-003	2.05
TH-230	2.0269E-001	8.70	3.9178E-003	2.05
TH-232	5.3473E-002	16.57	3.9108E-003	2.05

Errors quoted at 1.000 sigma

0000012186.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-019
Batch Identification: B11-01660
Sample Identification: 11-01660-09
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 5A
Chamber Serial Number: 10043747A
Detector Serial Number: 57911
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:08
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2092 +/- 0.0043 on 4/11/10 18:32:55
Effective Efficiency: 0.2092 +/- 0.0043

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

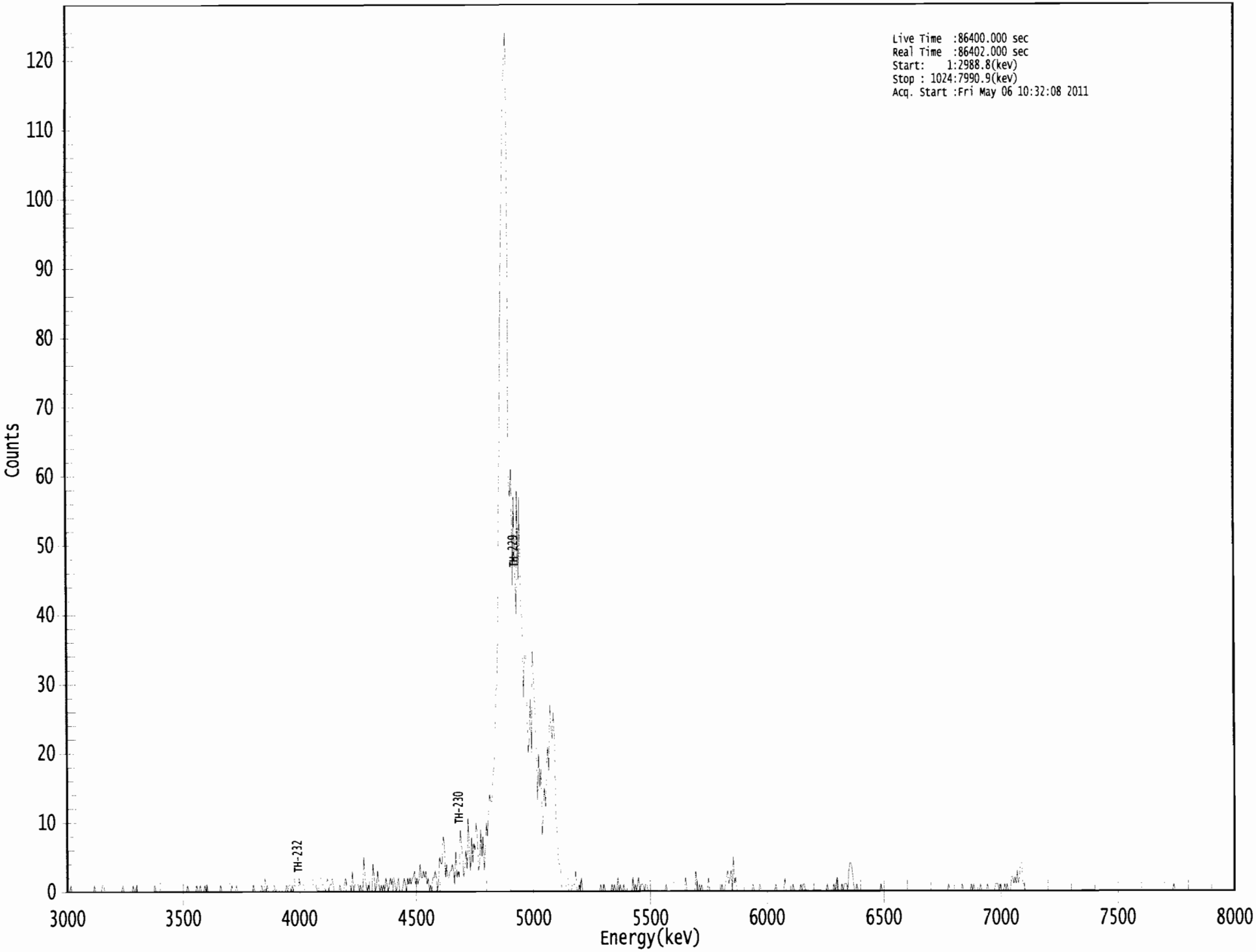
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5396.305	19.00	4.36	0.00	0.00E+000	4.9
TH-229	4915.903	2359.00	48.57	0.00	0.00E+000	38.7
TH-230	4677.124	170.00	13.04	0.00	0.00E+000	7.8
TH-232	3984.528	31.00	5.57	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	2.8426E-002	23.03	4.0485E-003	2.06
TH-229	3.5442E+000	2.91	4.0656E-003	2.06
TH-230	2.5464E-001	7.94	4.0534E-003	2.06
TH-232	4.6351E-002	18.08	4.0461E-003	2.06

Errors quoted at 1.000 sigma

0000012187.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-020
Batch Identification: B11-01660
Sample Identification: 11-01660-10
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 5B
Chamber Serial Number: 10043747B
Detector Serial Number: 57912
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:10
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2047 +/- 0.0042 on 4/11/10 18:33:27
Effective Efficiency: 0.2047 +/- 0.0042

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

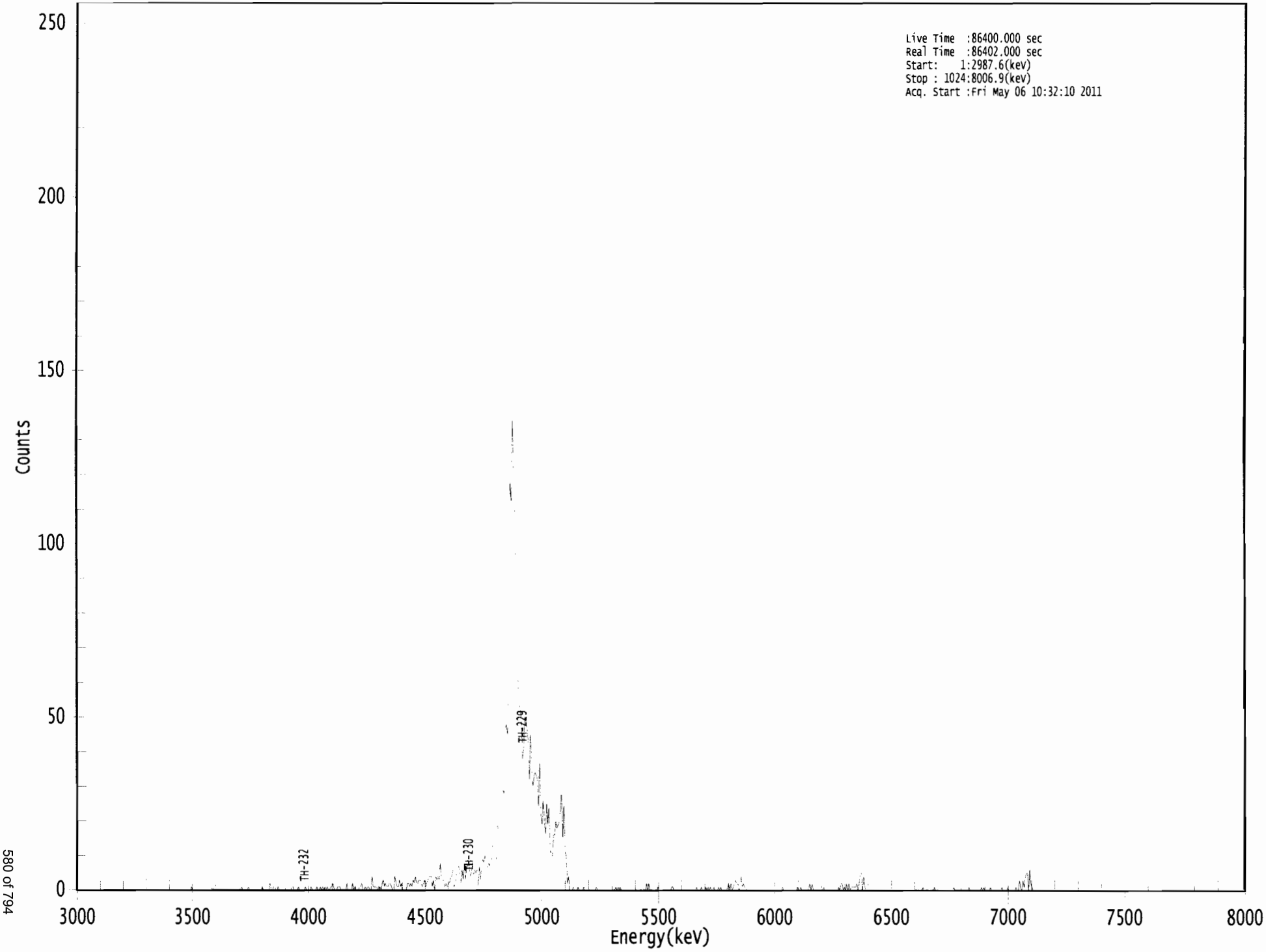
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5365.391	8.00	2.83	0.00	0.00E+000	4.9
TH-229	4911.221	2399.00	48.98	0.00	0.00E+000	35.0
TH-230	4678.361	183.00	13.53	0.00	0.00E+000	21.3
TH-232	3974.297	19.00	4.36	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.2230E-002	35.42	4.1370E-003	2.06
TH-229	3.6831E+000	2.90	4.1545E-003	2.06
TH-230	2.8011E-001	7.67	4.1420E-003	2.06
TH-232	2.9030E-002	23.03	4.1345E-003	2.06

Errors quoted at 1.000 sigma

0000012173.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-021
Batch Identification: B11-01660
Sample Identification: 11-01660-11
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 6A
Chamber Serial Number: 10043748A
Detector Serial Number: 57913
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:11
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2250 +/- 0.0046 on 4/11/10 18:33:56
Effective Efficiency: 0.2250 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

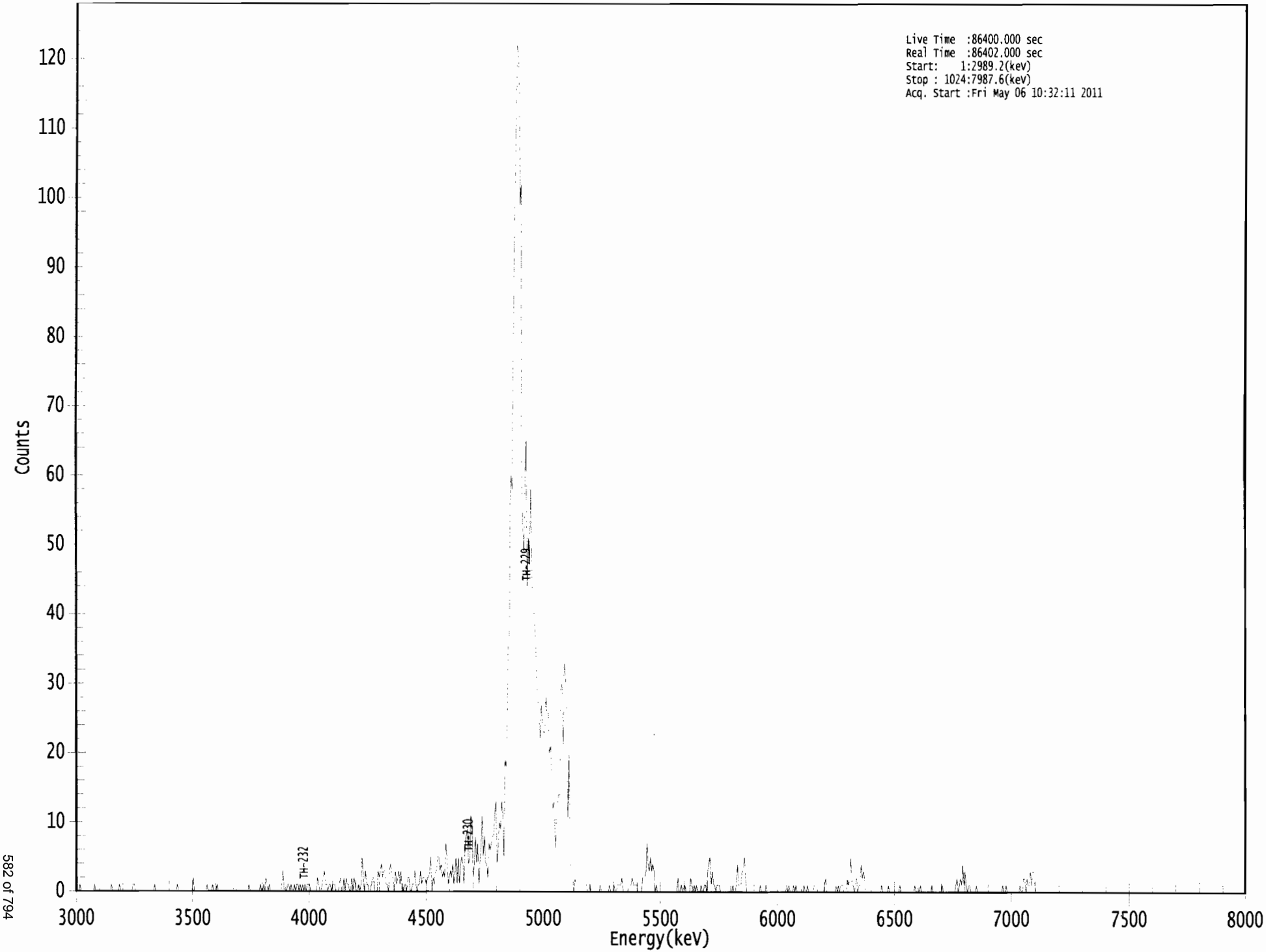
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5406.845	57.00	7.55	0.00	0.00E+000	11.6
TH-229	4924.193	2428.00	49.27	0.00	0.00E+000	39.1
TH-230	4676.640	172.00	13.11	0.00	0.00E+000	12.1
TH-232	3968.909	37.00	6.08	0.00	0.00E+000	6.1

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	7.9292E-002	13.40	3.7643E-003	2.05
TH-229	3.3918E+000	2.89	3.7802E-003	2.05
TH-230	2.3956E-001	7.90	3.7689E-003	2.05
TH-232	5.1440E-002	16.57	3.7621E-003	2.05

Errors quoted at 1.000 sigma

0000012185.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-022
Batch Identification: B11-01660
Sample Identification: 11-01660-12
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 6B
Chamber Serial Number: 10043748B
Detector Serial Number: 57914
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:13
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.0 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2243 +/- 0.0046 on 4/11/10 18:34:27
Effective Efficiency: 0.2243 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

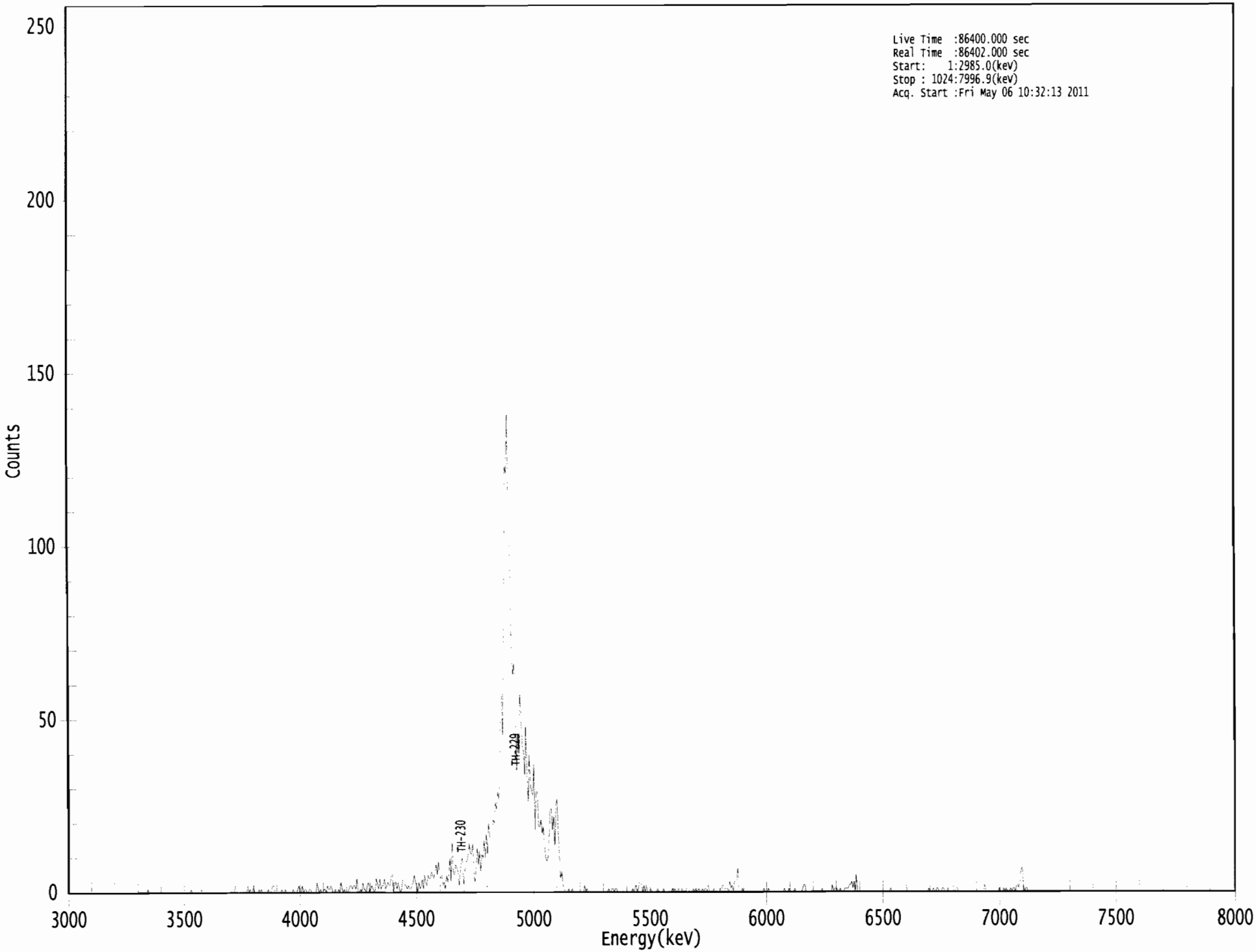
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5391.098	25.00	5.00	0.00	0.00E+000	14.7
TH-229	4917.146	2487.00	49.87	0.00	0.00E+000	35.8
TH-230	4678.895	265.00	16.28	0.00	0.00E+000	7.1
TH-232	3965.545	27.00	5.20	0.00	0.00E+000	6.1

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	3.4886E-002	20.11	3.7761E-003	2.05
TH-229	3.4851E+000	2.87	3.7921E-003	2.05
TH-230	3.7024E-001	6.48	3.7807E-003	2.05
TH-232	3.7655E-002	19.35	3.7739E-003	2.05

Errors quoted at 1.000 sigma

0000012177.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-023
Batch Identification: B11-01660
Sample Identification: 11-01660-13
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 1A
Chamber Serial Number: 12044979A
Detector Serial Number: 55794
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:16
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86403.8 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2205 +/- 0.0045 on 4/12/10 10:36:04
Effective Efficiency: 0.2205 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

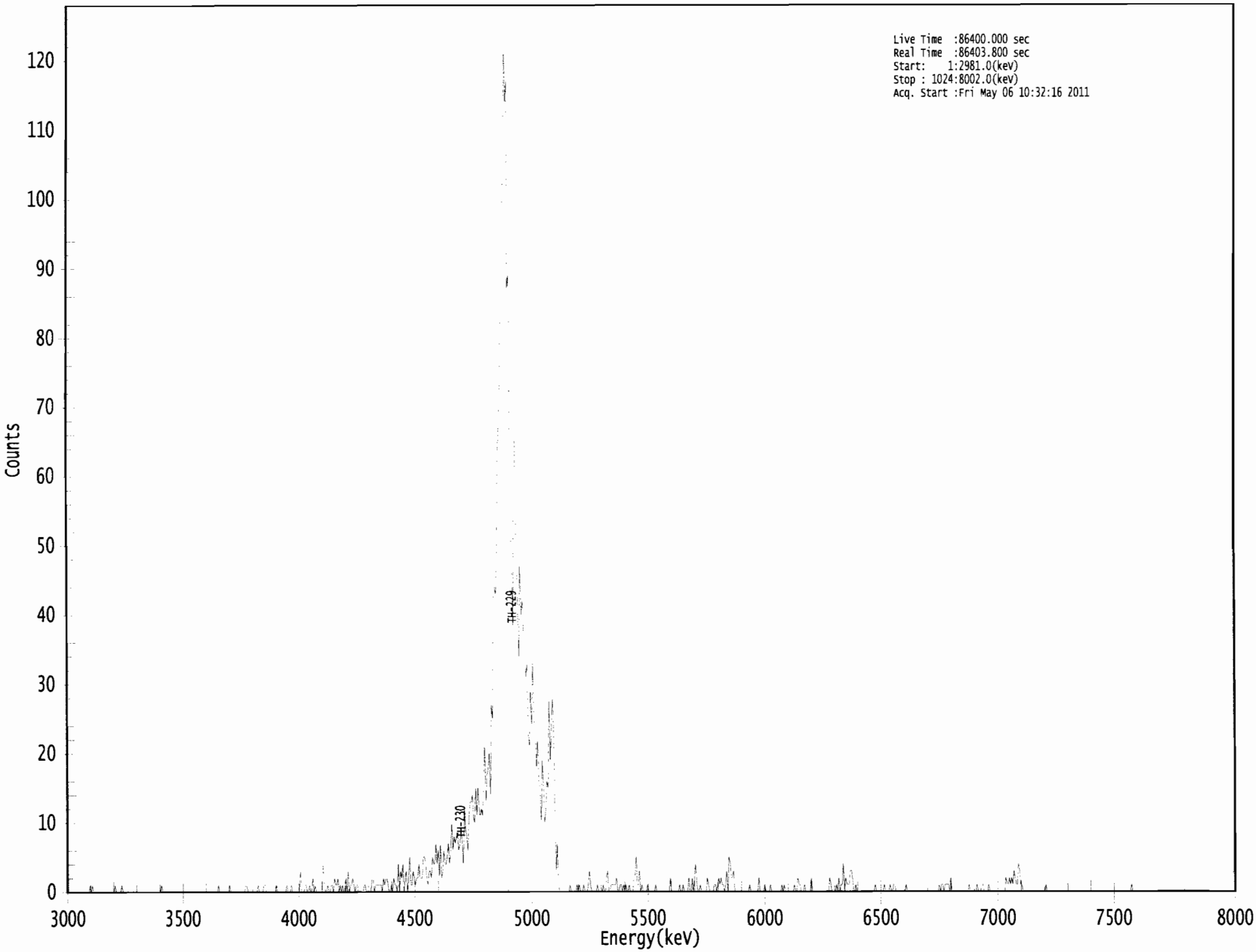
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5357.488	41.00	6.40	0.00	0.00E+000	7.2
TH-229	4905.780	2507.00	50.07	0.00	0.00E+000	53.1
TH-230	4686.556	300.00	17.32	0.00	0.00E+000	55.0
TH-232	3990.110	20.00	4.47	0.00	0.00E+000	5.7

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	5.8194E-002	15.75	3.8409E-003	2.06
TH-229	3.5734E+000	2.87	3.8571E-003	2.06
TH-230	4.2632E-001	6.13	3.8455E-003	2.06
TH-232	2.8370E-002	22.46	3.8386E-003	2.06

Errors quoted at 1.000 sigma

0000012189.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-024
Batch Identification: B11-01660
Sample Identification: 11-01660-14
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 1B
Chamber Serial Number: 12044979B
Detector Serial Number: 55795
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:18
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86403.8 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2148 +/- 0.0044 on 4/13/10 09:49:08
Effective Efficiency: 0.2148 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

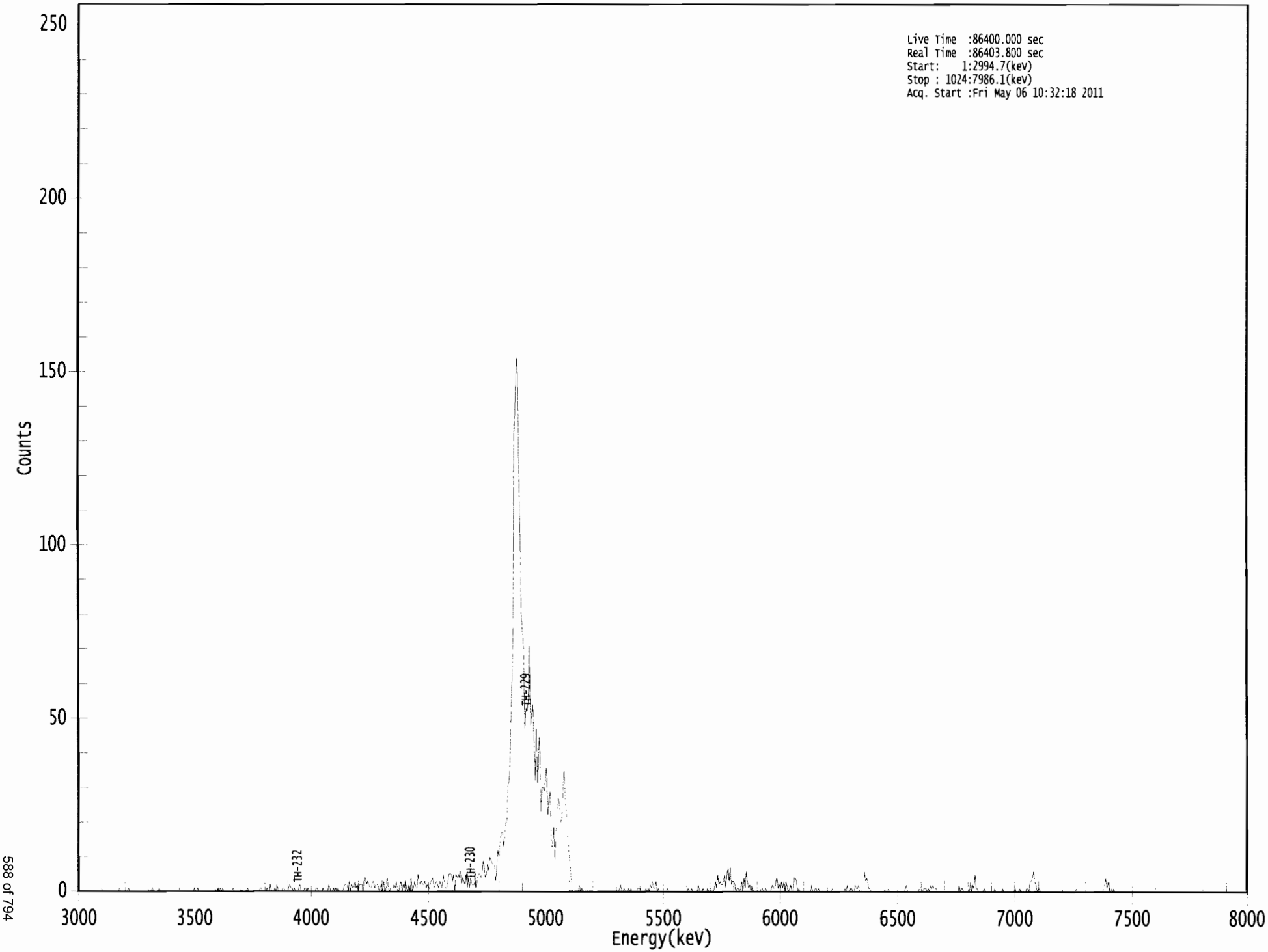
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5409.894	23.00	4.80	0.00	0.00E+000	7.3
TH-229	4919.175	2756.00	52.50	0.00	0.00E+000	36.9
TH-230	4676.122	161.00	12.69	0.00	0.00E+000	8.5
TH-232	3942.682	28.00	5.29	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	3.3519E-002	20.95	3.9437E-003	2.05
TH-229	4.0334E+000	2.80	3.9603E-003	2.05
TH-230	2.3492E-001	8.14	3.9484E-003	2.05
TH-232	4.0782E-002	19.01	3.9413E-003	2.05

Errors quoted at 1.000 sigma

0000012180.CNF



ALPHA SPECTRUM ANALYSIS

Sample Description: ARS1-11-00897-025
Batch Identification: B11-01660
Sample Identification: 11-01660-15
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 2A
Chamber Serial Number: 12044980A
Detector Serial Number: 55796
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/6/11 10:32:20
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86403.7 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2232 +/- 0.0046 on 4/12/10 10:37:23
Effective Efficiency: 0.2232 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

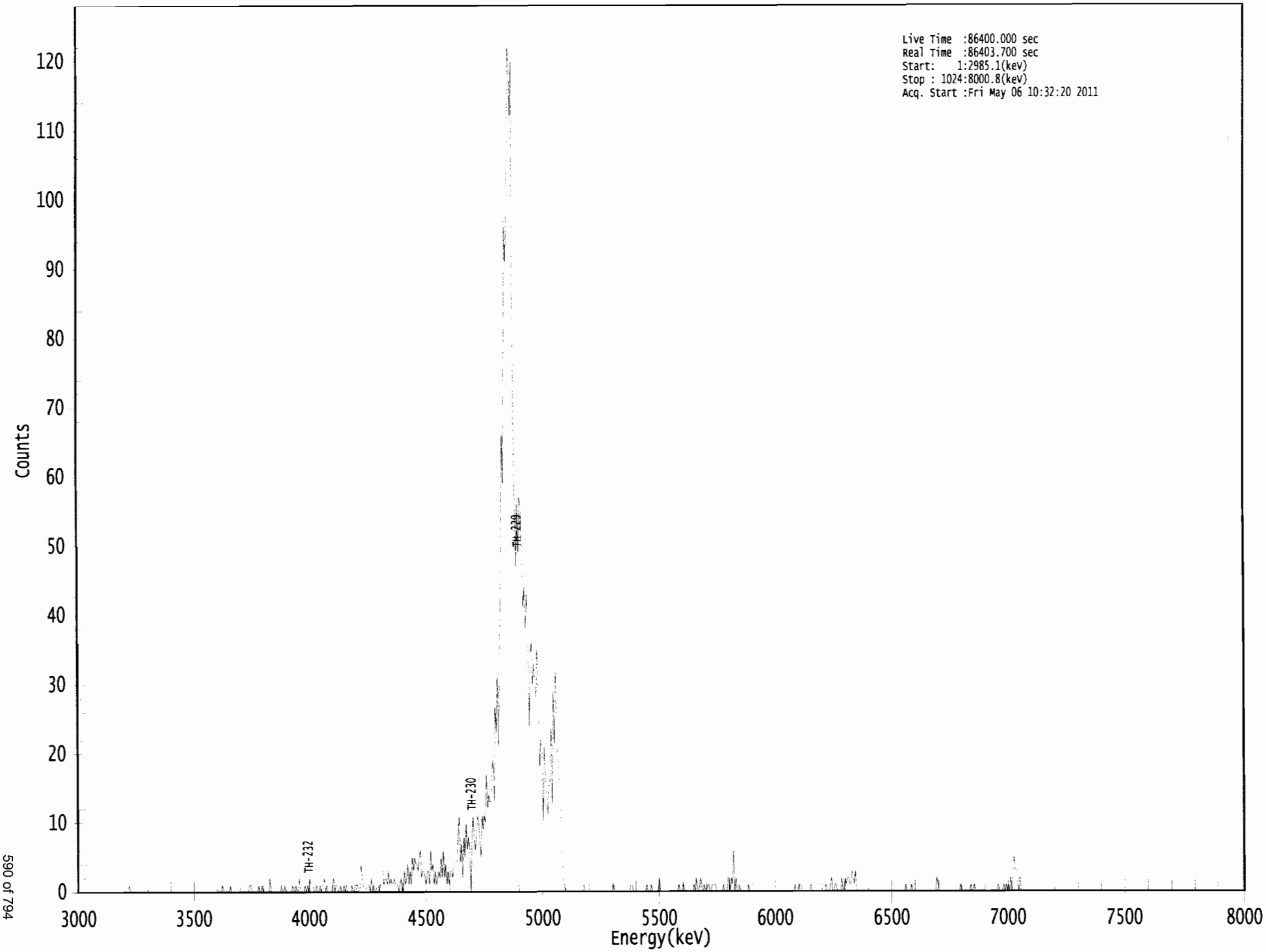
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
TH-228	5380.702	5.00	2.24	0.00	0.00E+000	4.9
TH-229	4889.361	2523.00	50.23	0.00	0.00E+000	47.5
TH-230	4687.101	261.00	16.16	0.00	0.00E+000	18.0
TH-232	3985.697	26.00	5.10	0.00	0.00E+000	4.9

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	7.0120E-003	44.77	3.7949E-003	2.05
TH-229	3.5532E+000	2.86	3.8110E-003	2.05
TH-230	3.6647E-001	6.52	3.7995E-003	2.05
TH-232	3.6441E-002	19.72	3.7927E-003	2.05

Errors quoted at 1.000 sigma

0000012190.CNF



Alpha Spectroscopy Count Log Book – Canberra System

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01647-03	B11-01647	A25A	12155	Th	5-5-11 0353	[illegible]	86400
11-01647-04	↓	A25B	12156	↓	↓	[illegible]	↓
11-01647-05	↓	A31A	12157	↓	↓	[illegible]	↓
11-01647-06	↓	A31B	12158	↓	↓	[illegible]	↓
11-01647-07	↓	A32B	12159	↓	↓	[illegible]	↓
11-01647-08	↓	A33A	12160	↓	↓	[illegible]	↓
11-01647-09	↓	A33B	12161	↓	↓	[illegible]	↓
11-01647-10	↓	A34B	12162	↓	↓	[illegible]	↓
11-01647-11	↓	A35A	12163	↓	↓	[illegible]	↓
11-01647-12	↓	A36A	12164	↓	↓	[illegible]	↓
11-01647-13	↓	A36B	12165	↓	↓	[illegible]	↓
11-01660-01	B11-01660	A11A	12169	↓	5-6-11 1033	[illegible]	↓
11-01660-02	↓	A11B	12193	↓	↓	[illegible]	↓
11-01660-03	↓	A12A	12192	↓	↓	[illegible]	↓
11-01660-04	↓	A12B	12191	↓	↓	[illegible]	↓

Reviewed By: LSW Date: 5-10-11
Initials

Alpha Spectroscopy Count Log Book – Canberra System

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01660-05	B11-01660	A13A	12221	Th	3-6-11 1033	[illegible]	86400
11-01660-06	↓	A13B	12182	↓	↓	[illegible]	↓
11-01660-07	↓	A14A	12181	↓	↓	[illegible]	↓
11-01660-08	↓	A14B	12186	↓	↓	[illegible]	↓
11-01660-09	↓	A15A	12187	↓	↓	[illegible]	↓
11-01660-10	↓	A15B	12173	↓	↓	[illegible]	↓
11-01660-11	↓	A16A	12185	↓	↓	[illegible]	↓
11-01660-12	↓	A16B	12177	↓	↓	[illegible]	↓
11-01660-13	↓	A21A	12189	↓	↓	[illegible]	↓
11-01660-14	↓	A21B	12180	↓	↓	[illegible]	↓
11-01660-15	↓	A22A	12190	↓	↓	[illegible]	↓
11-01648-01	B11-01648	A23B	12222	U	↓	[illegible]	↓
11-01648-02	↓	A24A	12188	↓	↓	[illegible]	↓
11-01648-03	↓	A24B	12176	↓	↓	[illegible]	↓
11-01648-04	↓	A25A	12183	↓	↓	[illegible]	↓

Reviewed By: LSW Initials Date: 5-10-11 (10) LSW 5-10-11

Analysis Batch Report

Analysis Batch ID **ARS1-B11-01985**

Method	ARS-031	Analysis	ASP-A-008	Matrix	AQ
Description	Thorium in Water				

ABatch Sample ID	Type	Blind Iso1	Blind Iso2	Blind Iso3	SDG	FR	Run	Client ID	Isotope Group	Lab Deadline
ARS1-B11-01985-01	LCS	B-09934								
ARS1-B11-01985-02	LCSD	B-09933								
ARS1-B11-01985-03	MBL									
ARS1-B11-01985-04	TRG				**ARS1-11-00897**	014	2	PR-SW-01-110420	STD	05/03/11
ARS1-B11-01985-05	TRG				**ARS1-11-00897**	015	2	RB-01-110420	STD	05/03/11
ARS1-B11-01985-06	TRG				**ARS1-11-00897**	016	2	RB-02-110421	STD	05/03/11
ARS1-B11-01985-07	TRG				**ARS1-11-00897**	017	2	RM-JM-SW-02-110420	STD	05/03/11
ARS1-B11-01985-08	TRG				**ARS1-11-00897**	018	2	RM-JM-SW-110420	STD	05/03/11
ARS1-B11-01985-09	TRG				**ARS1-11-00897**	019	2	RM-SW-BG-110419	STD	05/03/11
ARS1-B11-01985-10	TRG				**ARS1-11-00897**	020	2	RP-JM-SW-01-110420	STD	05/03/11
ARS1-B11-01985-11	TRG				**ARS1-11-00897**	021	2	RP-JM-SW-110420	STD	05/03/11
ARS1-B11-01985-12	TRG				**ARS1-11-00897**	022	2	RP-SW-01-110419	STD	05/03/11
ARS1-B11-01985-13	TRG				**ARS1-11-00897**	023	2	RP-SW-BG-041911	STD	05/03/11
ARS1-B11-01985-14	TRG				**ARS1-11-00897**	024	2	SPOP35-110421	STD	05/03/11
ARS1-B11-01985-15	TRG				**ARS1-11-00897**	025	2	MW-RM-110420	STD	05/03/11

Technical Notes

Batch	ARS1-B11-01985
Analysis Code	ASP-A-008
Procedure No	ARS-031
Matrix	AQ

#	Date	Dept	Batch Technical Notes	User ID
1	06/02/11 15:54	REPORTING	The tracer recovery for ARS1-B11-01985-04, and 05 are biased low; however, after management review the data is being released as valid.	HWRIGHT
2	06/02/11 15:59	REPORTING	The method blank is biased high; however, method blank evaluation was performed per procedure and results are being released as valid.	HWRIGHT

LCS Report
Analytical Batch: ARS1-B11-01985

BlindID	ABatch	ABatchSampleID	BlindGroup	StdID	Isotope	ExpectedAddition	ExpectedValue	EmptyWt	GrossWt	NetWt	UserID	ModDate	ExpectedValue_CT	MidPointCountDate	KnownValue
B-09933	ARS1-B11-01985	ARS1-B11-01985-02	B-Th230	S-0231	Th-230	1	5.65698594	13.2439	14.2557	1.0118	WSTICKLE	4/14/2010	5.656927696	5/28/2011	5.723679443
B-09934	ARS1-B11-01985	ARS1-B11-01985-01	B-Th230	S-0231	Th-230	1	5.65698594	13.2092	14.2333	1.0241	WSTICKLE	4/14/2010	5.656927696	5/28/2011	5.793259653

ARS1-B11-01985

ABatch	ABatchSampleID	ClientID	SampleType	EmptyWt	FilledWt	NetWt	Exp Val	StdID	Isotope	TracerDate	UserID	ModDate	HL days	Ref Date	Cert dpm/g	Curr ACT
ARS1-B11-01985	ARS1-B11-01985-01		LCS	88.905	89.941	1.036	11.601	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-02		LCSD	83.563	84.588	1.025	11.483	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-03		MBL	64.308	65.334	1.026	11.496	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-04	PR-SW-01-110420	TRG	1.819	2.844	1.025	11.484	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-05	RB-01-110420	TRG	1.833	2.850	1.017	11.396	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-06	RB-02-110421	TRG	1.829	2.844	1.016	11.377	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-07	RM-JM-SW-02-110420	TRG	1.814	2.828	1.015	11.367	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-08	RM-JM-SW-110420	TRG	1.816	2.830	1.014	11.361	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-09	RM-SW-BG-110419	TRG	1.799	2.813	1.014	11.358	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-10	RP-JM-SW-01-110420	TRG	1.742	2.756	1.013	11.352	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-11	RP-JM-SW-110420	TRG	1.797	2.810	1.013	11.348	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-12	RP-SW-01-110419	TRG	1.796	2.809	1.013	11.350	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-13	RP-SW-BG-041911	TRG	1.797	2.811	1.013	11.354	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-14	SPOP35-110421	TRG	1.775	2.788	1.013	11.346	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204
ARS1-B11-01985	ARS1-B11-01985-15	MW-RM-110420	TRG	1.799	2.810	1.011	11.328	S-0246	Th-229	5/24/2011	JBROWN	5/24/2011	2680555.556	9/20/2010	11.204	11.204

ARS-031

ID_31001_031	ABatch	ABatchSampleID	ClientID	Aliquot	AliquotUnits	UserID	ModDate	IC_ID
3044	ARS1-B11-01985	ARS1-B11-01985-01		1	L	JBROWN	05/26/2011 10:55:47	
3045	ARS1-B11-01985	ARS1-B11-01985-02		1	L	JBROWN	05/26/2011 10:55:47	
3046	ARS1-B11-01985	ARS1-B11-01985-03		1	L	JBROWN	05/26/2011 10:55:48	
3047	ARS1-B11-01985	ARS1-B11-01985-04	PR-SW-01-110420	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3048	ARS1-B11-01985	ARS1-B11-01985-05	RB-01-110420	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3049	ARS1-B11-01985	ARS1-B11-01985-06	RB-02-110421	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3050	ARS1-B11-01985	ARS1-B11-01985-07	RM-JM-SW-02-110420	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3051	ARS1-B11-01985	ARS1-B11-01985-08	RM-JM-SW-110420	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3052	ARS1-B11-01985	ARS1-B11-01985-09	RM-SW-BG-110419	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3053	ARS1-B11-01985	ARS1-B11-01985-10	RP-JM-SW-01-110420	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3054	ARS1-B11-01985	ARS1-B11-01985-11	RP-JM-SW-110420	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3055	ARS1-B11-01985	ARS1-B11-01985-12	RP-SW-01-110419	0.5	L	JBROWN	05/26/2011 10:55:48	87857
3056	ARS1-B11-01985	ARS1-B11-01985-13	RP-SW-BG-041911	0.5	L	JBROWN	05/26/2011 10:55:49	87857
3057	ARS1-B11-01985	ARS1-B11-01985-14	SPOP35-110421	0.5	L	JBROWN	05/26/2011 10:55:49	87857
3058	ARS1-B11-01985	ARS1-B11-01985-15	MW-RM-110420	0.5	L	JBROWN	05/26/2011 10:55:49	87857

ABatchSampleID	SDG	Fraction	ClientID	Run	Isotope	ACT	TPU	TPU1s	TPU2s	MDA	DL	CU	CU1s	CU2s	ActivityReportUnits
ARS1-B11-01985-01				2	TH-228	0.011048997	0.008941322	0.004561899	0.008941322	0.004990464	0	0.008841039	0.00451073	0.00884104	pCi
ARS1-B11-01985-01				2	TH-229	5.225844136	0.660047501	0.336758929	0.660047501	0.019670109	0.007360039	0.191693997	0.09780306	0.191694	pCi
ARS1-B11-01985-01				2	TH-230	6.784696469	0.848803069	0.43306279	0.848803069	0.036822661	0.015931356	0.219234658	0.11185442	0.21923466	pCi
ARS1-B11-01985-01				2	TH-232	0.045664464	0.021887376	0.011167029	0.021887376	0.023953557	0.009501764	0.021180122	0.01080618	0.02118012	pCi
ARS1-B11-01985-02				2	TH-228	0.002126671	0.011031217	0.005628172	0.011031217	0.022901745	0.008569233	0.011028222	0.00562664	0.01102822	pCi
ARS1-B11-01985-02				2	TH-229	5.172349256	0.658245261	0.335839419	0.658245261	0.046183746	0.02023358	0.206145572	0.10517631	0.20614557	pCi
ARS1-B11-01985-02				2	TH-230	6.389616106	0.805250126	0.410841901	0.805250126	0.027718407	0.010995184	0.228154425	0.11640532	0.22815442	pCi
ARS1-B11-01985-02				2	TH-232	0.021094398	0.016733367	0.008537432	0.016733367	0.02271618	0.008499799	0.016538008	0.00843776	0.01653801	pCi
ARS1-B11-01985-03				2	TH-228	0.013337565	0.011318928	0.005774963	0.011318928	0.01402876	0.004432609	0.011203554	0.0057161	0.01120355	pCi
ARS1-B11-01985-03				2	TH-229	5.17840528	0.655442895	0.33440964	0.655442895	0.034286085	0.014582189	0.194676434	0.09932471	0.19467643	pCi
ARS1-B11-01985-03				2	TH-230	0.140134941	0.03836197	0.019572434	0.03836197	0.026714443	0.010791237	0.034420725	0.01756159	0.03442072	pCi
ARS1-B11-01985-03				2	TH-232	0.017009351	0.013513181	0.00689448	0.013513181	0.01755743	0.006217863	0.013355895	0.00681423	0.01335589	pCi
ARS1-B11-01985-04	ARS1-11-00897	014	PR-SW-01-110420	2	TH-228	0.049811802	0.056687945	0.028922421	0.056687945	0.044996661	0	0.056367361	0.02875886	0.05636736	pCi
ARS1-B11-01985-04	ARS1-11-00897	014	PR-SW-01-110420	2	TH-229	10.34580404	1.491385293	0.760910864	1.491385293	0.329445874	0.143189044	0.812854636	0.41472175	0.81285464	pCi
ARS1-B11-01985-04	ARS1-11-00897	014	PR-SW-01-110420	2	TH-230	0.207010421	0.131095042	0.066885226	0.131095042	0.147932832	0.052389561	0.128685433	0.06565583	0.12868543	pCi
ARS1-B11-01985-04	ARS1-11-00897	014	PR-SW-01-110420	2	TH-232	-0.015892016	0.069676308	0.035549137	0.069676308	0.171138275	0.064035456	0.069649829	0.03553563	0.06964983	pCi
ARS1-B11-01985-05	ARS1-11-00897	015	RB-01-110420	2	TH-228	0.087617669	0.065766225	0.033554196	0.065766225	0.033920555	0	0.064908077	0.03311637	0.06490808	pCi
ARS1-B11-01985-05	ARS1-11-00897	015	RB-01-110420	2	TH-229	10.26707499	1.420503788	0.724746831	1.420503788	0.157107734	0.062320627	0.691403434	0.35275685	0.69140343	pCi
ARS1-B11-01985-05	ARS1-11-00897	015	RB-01-110420	2	TH-230	0.528182717	0.184304229	0.09403277	0.184304229	0.15742118	0.062444963	0.172895807	0.08821215	0.17289581	pCi
ARS1-B11-01985-05	ARS1-11-00897	015	RB-01-110420	2	TH-232	-0.143761594	0.129779428	0.066213994	0.129779428	0.287902203	0.127718022	0.128611065	0.06561789	0.12861106	pCi
ARS1-B11-01985-06	ARS1-11-00897	016	RB-02-110421	2	TH-228	0.025369587	0.016020392	0.008173669	0.016020392	0.006875158	0	0.015724233	0.00802257	0.01572423	pCi
ARS1-B11-01985-06	ARS1-11-00897	016	RB-02-110421	2	TH-229	10.24991345	1.276907738	0.65148354	1.276907738	0.026174884	0.009793955	0.309587352	0.15795273	0.30958735	pCi
ARS1-B11-01985-06	ARS1-11-00897	016	RB-02-110421	2	TH-230	0.353142753	0.073168084	0.037330655	0.073168084	0.031938458	0.012669171	0.059429793	0.03032132	0.05942979	pCi
ARS1-B11-01985-06	ARS1-11-00897	016	RB-02-110421	2	TH-232	0.019444752	0.017979376	0.009173151	0.017979376	0.026174633	0.009793862	0.017825122	0.00909445	0.01782512	pCi
ARS1-B11-01985-07	ARS1-11-00897	017	RM-JM-SW-02-110420	2	TH-228	0.023327371	0.024261794	0.012378466	0.024261794	0.036118547	0.012791175	0.024097424	0.0122946	0.02409742	pCi
ARS1-B11-01985-07	ARS1-11-00897	017	RM-JM-SW-02-110420	2	TH-229	10.24083198	1.29566743	0.661054811	1.29566743	0.044712564	0.017314012	0.383175227	0.19549756	0.38317523	pCi
ARS1-B11-01985-07	ARS1-11-00897	017	RM-JM-SW-02-110420	2	TH-230	0.253548661	0.069938148	0.035682728	0.069938148	0.040153238	0.015024289	0.062867232	0.03207512	0.06286723	pCi
ARS1-B11-01985-07	ARS1-11-00897	017	RM-JM-SW-02-110420	2	TH-232	0.022327175	0.020805	0.010614796	0.020805	0.027398282	0.008656921	0.020629258	0.01052513	0.02062926	pCi
ARS1-B11-01985-08	ARS1-11-00897	018	RM-JM-SW-110420	2	TH-228	0.019655299	0.017391633	0.008873282	0.017391633	0.010653172	0	0.017228629	0.00879012	0.01722863	pCi
ARS1-B11-01985-08	ARS1-11-00897	018	RM-JM-SW-110420	2	TH-229	10.2347759	1.298033814	0.66226215	1.298033814	0.042293351	0.015825063	0.393411077	0.20071994	0.39341108	pCi
ARS1-B11-01985-08	ARS1-11-00897	018	RM-JM-SW-110420	2	TH-230	0.208566904	0.064384674	0.032849324	0.064384674	0.04237773	0.015856636	0.059244986	0.03022703	0.05924499	pCi
ARS1-B11-01985-08	ARS1-11-00897	018	RM-JM-SW-110420	2	TH-232	0.035346153	0.028080964	0.014327022	0.028080964	0.036485085	0.012920983	0.027754116	0.01416026	0.02775412	pCi
ARS1-B11-01985-09	ARS1-11-00897	019	RM-SW-BG-110419	2	TH-228	0.023571956	0.026825886	0.013686676	0.026825886	0.042307029	0.015830181	0.026674179	0.01360927	0.02667418	pCi
ARS1-B11-01985-09	ARS1-11-00897	019	RM-SW-BG-110419	2	TH-229	10.23275985	1.295187806	0.660810105	1.295187806	0.04045329	0.015136561	0.384700786	0.19627591	0.38470079	pCi
ARS1-B11-01985-09	ARS1-11-00897	019	RM-SW-BG-110419	2	TH-230	0.207020744	0.062817828	0.032049912	0.062817828	0.040533989	0.015166756	0.057619855	0.02939789	0.05761986	pCi
ARS1-B11-01985-09	ARS1-11-00897	019	RM-SW-BG-110419	2	TH-232	0.026295373	0.024625266	0.012563911	0.024625266	0.034897716	0.012358825	0.024419328	0.01245884	0.02441933	pCi
ARS1-B11-01985-10	ARS1-11-00897	020	RP-JM-SW-01-110420	2	TH-228	0.016146164	0.022462368	0.011460392	0.022462368	0.037499466	0.01328022	0.022377441	0.01141706	0.02237744	pCi
ARS1-B11-01985-10	ARS1-11-00897	020	RP-JM-SW-01-110420	2	TH-229	10.22670112	1.296173082	0.661312797	1.296173082	0.05066561	0.020097754	0.390331384	0.19914867	0.39033138	pCi
ARS1-B11-01985-10	ARS1-11-00897	020	RP-JM-SW-01-110420	2	TH-230	0.259371362	0.074369482	0.037943613	0.074369482	0.054610812	0.02205991	0.067439888	0.03440811	0.06743989	pCi
ARS1-B11-01985-10	ARS1-11-00897	020	RP-JM-SW-01-110420	2	TH-232	0.030907746	0.024235639	0.012365122	0.024235639	0.028445799	0.0089879	0.023946024	0.01221736	0.02394602	pCi
ARS1-B11-01985-11	ARS1-11-00897	021	RP-JM-SW-110420	2	TH-228	0.004494258	0.026431818	0.013485622	0.026431818	0.05400087	0.020910715	0.026426237	0.01348277	0.02642624	pCi
ARS1-B11-01985-11	ARS1-11-00897	021	RP-JM-SW-110420	2	TH-229	10.22367308	1.296533965	0.661496921	1.296533965	0.047030169	0.018211456	0.392681552	0.20034773	0.39268155	pCi
ARS1-B11-01985-11	ARS1-11-00897	021	RP-JM-SW-110420	2	TH-230	0.2274717	0.068232991	0.03481275	0.068232991	0.047123999	0.01824779	0.062449277	0.03186188	0.06244928	pCi
ARS1-B11-01985-11	ARS1-11-00897	021	RP-JM-SW-110420	2	TH-232	0.046968939	0.033039143	0.016856706	0.033039143	0.042150009	0.015771428	0.032547814	0.01660603	0.03254781	pCi
ARS1-B11-01985-12	ARS1-11-00897	022	RP-SW-01-110419	2	TH-228	0.029004243	0.021770718	0.011107509	0.021770718	0.011228785	0	0.021486644	0.01096257	0.02148664	pCi
ARS1-B11-01985-12	ARS1-11-00897	022	RP-SW-01-110419	2	TH-229	10.22569442	1.297413738	0.661945785	1.297413738	0.036806161	0.01303469	0.394812733	0.20143507	0.39481273	pCi
ARS1-B11-01985-12	ARS1-11-00897	022	RP-SW-01-110419	2	TH-230	0.500196729	0.107354906	0.054772911	0.107354906	0.036879584	0.013060692	0.088715203	0.04526286	0.0887152	pCi
ARS1-B11-01985-12	ARS1-11-00897	022	RP-SW-01-110419	2	TH-232	0.06735182	0.03303562	0.016854908	0.03303562	0.010736673	0	0.032017023	0.01633522	0.03201702	pCi
ARS1-B11-01985-13	ARS1-11-00897	023	RP-SW-BG-041911	2	TH-228	0.017963804	0.02499105	0.012750535	0.02499105	0.041720935	0.014775229	0.024896562	0.01270233	0.02489656	pCi
ARS1-B11-01985-13	ARS1-11-00897	023	RP-SW-BG-041911	2	TH-229	10.22872246	1.302762383	0.664674685	1.302762383	0.031616984	0.009989886	0.410949858	0.20966829	0.41094986	pCi
ARS1-B11-01985-13	ARS1-11-00897	023	RP-SW-BG-041911	2	TH-230	0.245256197	0.073207276	0.037350651	0.073207276	0.046335441	0.017337507	0.066937807	0.03415194	0.06693781	pCi
ARS1-B11-01985-13	ARS1-11-00897	023	RP-SW-BG-041911	2	TH-232	0.012882392	0.02232232	0.011388939	0.02232232	0.039892473	0.01412769	0.022267955	0.0113612	0.02226796	pCi
ARS1-B11-01985-14	ARS1-11-00897	024	SPOP35-110421	2	TH-228	0.135673321	0.052927416	0.027003784	0.052927416	0.044273992	0.016566167	0.050323274	0.02567514	0.05032327	pCi
ARS1-B11-01985-14	ARS1-11-00897	024	SPOP35-110421	2	TH-229	10.22165175	1.296530341	0.661495072	1.296530341	0.029001771	0.009163568	0.393437511	0.20073342	0.39343751	pCi
ARS1-B11-01985-14	ARS1-11-00897	024	SPOP35-110421	2	TH-230	0.556504307	0.114373627	0.058353891	0.114373627	0.029059639	0.009181853	0.092506768	0.04719733	0.09250677	pCi
ARS1-B11-01985-14	ARS1-11-00897	024	SPOP35-110421	2	TH-232	0.0472673	0.029446282	0.015023613	0.029446282	0.029001493	0.00916348	0.028886814	0.01473817	0.02888681	pCi
ARS1-B11-01985-15	ARS1-11-00897	025	MW-RM-110420	2	TH-228	0.029618273	0.027737118	0.014151591	0.027737118	0.03930768	0.013920588	0.027505156	0.01403324	0.02750516	pCi
ARS1-B11-01985-15	ARS1-11-00897	025	MW-RM-110420	2	TH-229	10.20550484	1.296353475	0.661404834	1.296353475	0.04361161	0.016318321	0.398939186	0.2035404	0.39893919	pCi
ARS1-B11-01985-15	ARS1-11-00897	025	MW-RM-110420	2	TH-230	0.47071446	0.105263843	0.053706042	0.105263843	0.048757599	0.018880368	0.088565884	0.04518668	0.08856588	pCi
ARS1-B11-01985-15	ARS1-11-00897	025	MW-RM-110420	2	TH-232	0.0445474	0.026870747	0.013709565	0.026870747	0.010974859	0	0.026325831	0.01343155	0.02632583	pCi

ABatchSampleID	SDG	Fraction	AliquotReportUnits	ChemRecovery	TracerRecovery	SampleCounts	SampleCountMins	BKG_Counts	BKG_CountMins	EFF	ALIQ	SampleCollDate	MidPointCountDate	BP_DL
ARS1-B11-01985-01			L		0.806090574	6	1440	0	1440	0.212452739	1	5/26/2011	5/28/2011	0.1155543
ARS1-B11-01985-01			L		0.806090574	2864	1440	3	1440	0.212452739	1	5/26/2011	5/28/2011	0.196581488
ARS1-B11-01985-01			L		0.806090574	3721	1440	14	1440	0.212452739	1	5/26/2011	5/28/2011	0.188467166
ARS1-B11-01985-01			L		0.806090574	30	1440	5	1440	0.212452739	1	5/26/2011	5/28/2011	0.030244075
ARS1-B11-01985-02			L		0.771546579	4	1440	3	1440	0.192200825	1	5/26/2011	5/28/2011	0.1155543
ARS1-B11-01985-02			L		0.771546579	2469	1440	17	1440	0.192200825	1	5/26/2011	5/28/2011	0.196581488
ARS1-B11-01985-02			L		0.771546579	3028	1440	5	1440	0.192200825	1	5/26/2011	5/28/2011	0.188467166
ARS1-B11-01985-02			L		0.771546579	13	1440	3	1440	0.192200825	1	5/26/2011	5/28/2011	0.030244075
ARS1-B11-01985-03			L		0.764891512	8	1440	1	1440	0.216391131	1	5/26/2011	5/28/2011	0.115554299
ARS1-B11-01985-03			L		0.764891512	2751	1440	11	1440	0.216391131	1	5/26/2011	5/28/2011	0.196581488
ARS1-B11-01985-03			L		0.764891512	80	1440	6	1440	0.216391131	1	5/26/2011	5/28/2011	0.188467166
ARS1-B11-01985-03			L		0.764891512	11	1440	2	1440	0.216391131	1	5/26/2011	5/28/2011	0.030244075
ARS1-B11-01985-04	ARS1-11-00897	014	L		0.179297569	3	1440	0	1440	0.219564006	0.5	4/20/2011	5/28/2011	0.239505153
ARS1-B11-01985-04	ARS1-11-00897	014	L		0.179297569	666	1440	15	1440	0.219564006	0.5	4/20/2011	5/28/2011	0.393166631
ARS1-B11-01985-04	ARS1-11-00897	014	L		0.179297569	15	1440	2	1440	0.219564006	0.5	4/20/2011	5/28/2011	0.376934673
ARS1-B11-01985-04	ARS1-11-00897	014	L		0.179297569	2	1440	3	1440	0.219564006	0.5	4/20/2011	5/28/2011	0.06048815
ARS1-B11-01985-05	ARS1-11-00897	015	L		0.24613195	7	1440	0	1440	0.212170452	0.5	4/20/2011	5/28/2011	0.239505153
ARS1-B11-01985-05	ARS1-11-00897	015	L		0.24613195	862	1440	5	1440	0.212170452	0.5	4/20/2011	5/28/2011	0.393166631
ARS1-B11-01985-05	ARS1-11-00897	015	L		0.24613195	49	1440	5	1440	0.212170452	0.5	4/20/2011	5/28/2011	0.376934673
ARS1-B11-01985-05	ARS1-11-00897	015	L		0.24613195	9	1440	21	1440	0.212170452	0.5	4/20/2011	5/28/2011	0.06048815
ARS1-B11-01985-06	ARS1-11-00897	016	L		1.24880876	10	1440	0	1440	0.206113368	0.5	4/21/2011	5/28/2011	0.239267553
ARS1-B11-01985-06	ARS1-11-00897	016	L		1.24880876	4220	1440	3	1440	0.206113368	0.5	4/21/2011	5/28/2011	0.393166529
ARS1-B11-01985-06	ARS1-11-00897	016	L		1.24880876	150	1440	5	1440	0.206113368	0.5	4/21/2011	5/28/2011	0.376934663
ARS1-B11-01985-06	ARS1-11-00897	016	L		1.24880876	11	1440	3	1440	0.206113368	0.5	4/21/2011	5/28/2011	0.06048815
ARS1-B11-01985-07	ARS1-11-00897	017	L		0.744145735	8	1440	2	1440	0.22593005	0.5	4/20/2011	5/28/2011	0.239505153
ARS1-B11-01985-07	ARS1-11-00897	017	L		0.744145735	2756	1440	4	1440	0.22593005	0.5	4/20/2011	5/28/2011	0.393166631
ARS1-B11-01985-07	ARS1-11-00897	017	L		0.744145735	71	1440	3	1440	0.22593005	0.5	4/20/2011	5/28/2011	0.376934673
ARS1-B11-01985-07	ARS1-11-00897	017	L		0.744145735	7	1440	1	1440	0.22593005	0.5	4/20/2011	5/28/2011	0.06048815
ARS1-B11-01985-08	ARS1-11-00897	018	L		0.735974724	5	1440	0	1440	0.22593005	0.5	4/20/2011	5/28/2011	0.239505153
ARS1-B11-01985-08	ARS1-11-00897	018	L		0.735974724	2609	1440	3	1440	0.216447204	0.5	4/20/2011	5/28/2011	0.393166631
ARS1-B11-01985-08	ARS1-11-00897	018	L		0.735974724	56	1440	3	1440	0.216447204	0.5	4/20/2011	5/28/2011	0.376934673
ARS1-B11-01985-08	ARS1-11-00897	018	L		0.735974724	11	1440	2	1440	0.216447204	0.5	4/20/2011	5/28/2011	0.06048815
ARS1-B11-01985-09	ARS1-11-00897	019	L		0.79606879	9	1440	3	1440	0.209210098	0.5	4/19/2011	5/28/2011	0.23974299
ARS1-B11-01985-09	ARS1-11-00897	019	L		0.79606879	2727	1440	3	1440	0.209210098	0.5	4/19/2011	5/28/2011	0.393166733
ARS1-B11-01985-09	ARS1-11-00897	019	L		0.79606879	58	1440	3	1440	0.209210098	0.5	4/19/2011	5/28/2011	0.376934682
ARS1-B11-01985-09	ARS1-11-00897	019	L		0.79606879	9	1440	2	1440	0.209210098	0.5	4/19/2011	5/28/2011	0.06048815
ARS1-B11-01985-10	ARS1-11-00897	020	L		0.790942438	6	1440	2	1440	0.2047351	0.5	4/20/2011	5/28/2011	0.239505153
ARS1-B11-01985-10	ARS1-11-00897	020	L		0.790942438	2652	1440	5	1440	0.2047351	0.5	4/20/2011	5/28/2011	0.393166631
ARS1-B11-01985-10	ARS1-11-00897	020	L		0.790942438	73	1440	6	1440	0.2047351	0.5	4/20/2011	5/28/2011	0.376934673
ARS1-B11-01985-10	ARS1-11-00897	020	L		0.790942438	9	1440	1	1440	0.2047351	0.5	4/20/2011	5/28/2011	0.06048815
ARS1-B11-01985-11	ARS1-11-00897	021	L		0.710389034	5	1440	4	1440	0.2047351	0.5	4/20/2011	5/28/2011	0.239505153
ARS1-B11-01985-11	ARS1-11-00897	021	L		0.710389034	2616	1440	4	1440	0.225003242	0.5	4/20/2011	5/28/2011	0.393166631
ARS1-B11-01985-11	ARS1-11-00897	021	L		0.710389034	62	1440	4	1440	0.225003242	0.5	4/20/2011	5/28/2011	0.376934673
ARS1-B11-01985-11	ARS1-11-00897	021	L		0.710389034	15	1440	3	1440	0.225003242	0.5	4/20/2011	5/28/2011	0.06048815
ARS1-B11-01985-12	ARS1-11-00897	022	L		0.704019614	7	1440	0	1440	0.224300042	0.5	4/19/2011	5/28/2011	0.23974299
ARS1-B11-01985-12	ARS1-11-00897	022	L		0.704019614	2583	1440	2	1440	0.224300042	0.5	4/19/2011	5/28/2011	0.393166733
ARS1-B11-01985-12	ARS1-11-00897	022	L		0.704019614	128	1440	2	1440	0.224300042	0.5	4/19/2011	5/28/2011	0.376934682
ARS1-B11-01985-12	ARS1-11-00897	022	L		0.704019614	17	1440	0	1440	0.224300042	0.5	4/19/2011	5/28/2011	0.06048815
ARS1-B11-01985-13	ARS1-11-00897	023	L		0.660678989	6	1440	2	1440	0.220520407	0.5	4/19/2011	5/28/2011	0.23974299
ARS1-B11-01985-13	ARS1-11-00897	023	L		0.660678989	2383	1440	1	1440	0.220520407	0.5	4/19/2011	5/28/2011	0.393166733
ARS1-B11-01985-13	ARS1-11-00897	023	L		0.660678989	60	1440	3	1440	0.220520407	0.5	4/19/2011	5/28/2011	0.376934682
ARS1-B11-01985-13	ARS1-11-00897	023	L		0.660678989	5	1440	2	1440	0.220520407	0.5	4/19/2011	5/28/2011	0.06048815
ARS1-B11-01985-14	ARS1-11-00897	024	L		0.739533608	36	1440	3	1440	0.214771703	0.5	4/21/2011	5/28/2011	0.239267553
ARS1-B11-01985-14	ARS1-11-00897	024	L		0.739533608	2596	1440	1	1440	0.214771703	0.5	4/21/2011	5/28/2011	0.393166529
ARS1-B11-01985-14	ARS1-11-00897	024	L		0.739533608	142	1440	1	1440	0.214771703	0.5	4/21/2011	5/28/2011	0.376934663
ARS1-B11-01985-14	ARS1-11-00897	024	L		0.739533608	13	1440	1	1440	0.214771703	0.5	4/21/2011	5/28/2011	0.06048815
ARS1-B11-01985-15	ARS1-11-00897	025	L		0.69217083	9	1440	2	1440	0.22318837	0.5	4/20/2011	5/28/2011	0.239505153
ARS1-B11-01985-15	ARS1-11-00897	025	L		0.69217083	2523	1440	3	1440	0.22318837	0.5	4/20/2011	5/28/2011	0.393166631
ARS1-B11-01985-15	ARS1-11-00897	025	L		0.69217083	120	1440	4	1440	0.22318837	0.5	4/20/2011	5/28/2011	0.376934673
ARS1-B11-01985-15	ARS1-11-00897	025	L		0.69217083	11	1440	0	1440	0.22318837	0.5	4/20/2011	5/28/2011	0.06048815

ABatchSampleID	SDG	Fraction	BP_MDA	Sb_Val	UCF	CF	GrossCountRate	BKGCountRate	NetCountRate	PlatingRecovery	InstFileName	DetectorID	InstrumentkeV	NuclideAbd	TracerMeasACT
ARS1-B11-01985-01			0.235603123	0.109866052	2.22	1.96	0.004166667	0	0.004166667	0.715	ApexAlpha	A_1_1A	4.88256979		
ARS1-B11-01985-01			0.397269309	0.187300713	2.22	1.96	1.988888889	0.002083333	1.986805556	0.715	ApexAlpha	A_1_1A	75.69419098		
ARS1-B11-01985-01			0.381085408	0.179569565	2.22	1.96	2.584027778	0.009722222	2.574305556	0.715	ApexAlpha	A_1_1A	53.68243408		
ARS1-B11-01985-01			0.065308375	0.028816243	2.22	1.96	0.020833333	0.003472222	0.017361111	0.715	ApexAlpha	A_1_1A	4.88256979		
ARS1-B11-01985-02			0.236375939	0.109866052	2.22	1.96	0.002777778	0.002083333	0.000694444	0.715	ApexAlpha	A_1_1B	9.76653862		
ARS1-B11-01985-02			0.398035863	0.187300713	2.22	1.96	1.714583333	0.011805556	1.702777778	0.715	ApexAlpha	A_1_1B	45.17024231		
ARS1-B11-01985-02			0.381853498	0.179569565	2.22	1.96	2.102777778	0.003472222	2.099305556	0.715	ApexAlpha	A_1_1B	30.33912277		
ARS1-B11-01985-02			0.066074929	0.028816243	2.22	1.96	0.009027778	0.002083333	0.006944444	0.715	ApexAlpha	A_1_1B	7.324903965		
ARS1-B11-01985-03			0.2357762	0.109866052	2.22	1.96	0.005555556	0.000694444	0.004861111	0.715	ApexAlpha	A_1_2A	4.912463665		
ARS1-B11-01985-03			0.397440986	0.187300713	2.22	1.96	1.910416667	0.007638889	1.902777778	0.715	ApexAlpha	A_1_2A	49.25256729		
ARS1-B11-01985-03			0.381257428	0.179569565	2.22	1.96	0.055555556	0.004166667	0.051388889	0.715	ApexAlpha	A_1_2A	7.204946995		
ARS1-B11-01985-03			0.065480052	0.028816243	2.22	1.96	0.007638889	0.001388889	0.00625	0.715	ApexAlpha	A_1_2A	4.912463665		
ARS1-B11-01985-04	ARS1-11-00897	014	0.522979049	0.109866052	2.22	1.96	0.002083333	0	0.002083333	0.715	ApexAlpha	A_1_2B	4.888912201		
ARS1-B11-01985-04	ARS1-11-00897	014	0.827713638	0.187300713	2.22	1.96	0.4625	0.010416667	0.452083333	0.715	ApexAlpha	A_1_2B	28.79026031		
ARS1-B11-01985-04	ARS1-11-00897	014	0.795405311	0.179569565	2.22	1.96	0.010416667	0.001388889	0.009027778	0.715	ApexAlpha	A_1_2B	5.703730583		
ARS1-B11-01985-04	ARS1-11-00897	014	0.163784056	0.028816243	2.22	1.96	0.001388889	0.002083333	-0.000694444	0.715	ApexAlpha	A_1_2B	4.888912201		
ARS1-B11-01985-05	ARS1-11-00897	015	0.511902942	0.109866052	2.22	1.96	0.004861111	0	0.004861111	0.715	ApexAlpha	A_1_3A	4.911292076		
ARS1-B11-01985-05	ARS1-11-00897	015	0.817112331	0.187300713	2.22	1.96	0.598611111	0.003472222	0.595138889	0.715	ApexAlpha	A_1_3A	49.31755829		
ARS1-B11-01985-05	ARS1-11-00897	015	0.784782854	0.179569565	2.22	1.96	0.034027778	0.003472222	0.030555556	0.715	ApexAlpha	A_1_3A	9.822584152		
ARS1-B11-01985-05	ARS1-11-00897	015	0.153182854	0.028816243	2.22	1.96	0.00625	0.014583333	-0.008333333	0.715	ApexAlpha	A_1_3A	4.911292076		
ARS1-B11-01985-06	ARS1-11-00897	016	0.484383364	0.109866052	2.22	1.96	0.006944444	0	0.006944444	0.715	ApexAlpha	A_1_3B	4.913847923		
ARS1-B11-01985-06	ARS1-11-00897	016	0.791232622	0.187300713	2.22	1.96	2.930555556	0.002083333	2.928472222	0.715	ApexAlpha	A_1_3B	50.81935883		
ARS1-B11-01985-06	ARS1-11-00897	016	0.758851697	0.179569565	2.22	1.96	0.104166667	0.003472222	0.100694444	0.715	ApexAlpha	A_1_3B	41.76770782		
ARS1-B11-01985-06	ARS1-11-00897	016	0.127303604	0.028816243	2.22	1.96	0.007638889	0.002083333	0.005555556	0.715	ApexAlpha	A_1_3B	4.913847923		
ARS1-B11-01985-07	ARS1-11-00897	017	0.488518854	0.109866052	2.22	1.96	0.005555556	0.001388889	0.004166667	0.715	ApexAlpha	A_1_4A	7.365706444		
ARS1-B11-01985-07	ARS1-11-00897	017	0.794730392	0.187300713	2.22	1.96	1.913888889	0.002777778	1.911111111	0.715	ApexAlpha	A_1_4A	45.73434448		
ARS1-B11-01985-07	ARS1-11-00897	017	0.76235626	0.179569565	2.22	1.96	0.049305556	0.002083333	0.047222222	0.715	ApexAlpha	A_1_4A	6.301770687		
ARS1-B11-01985-07	ARS1-11-00897	017	0.130801135	0.028816243	2.22	1.96	0.004861111	0.000694444	0.004166667	0.715	ApexAlpha	A_1_4A	4.910470963		
ARS1-B11-01985-08	ARS1-11-00897	018	0.488635559	0.109866052	2.22	1.96	0.003472222	0	0.003472222	0.715	ApexAlpha	A_1_4B			
ARS1-B11-01985-08	ARS1-11-00897	018	0.795289076	0.187300713	2.22	1.96	1.811805556	0.002083333	1.809722222	0.715	ApexAlpha	A_1_4B	50.13162994		
ARS1-B11-01985-08	ARS1-11-00897	018	0.762916059	0.179569565	2.22	1.96	0.038888889	0.002083333	0.036805556	0.715	ApexAlpha	A_1_4B	7.335418701		
ARS1-B11-01985-08	ARS1-11-00897	018	0.131359814	0.028816243	2.22	1.96	0.007638889	0.001388889	0.00625	0.715	ApexAlpha	A_1_4B	7.335418701		
ARS1-B11-01985-09	ARS1-11-00897	019	0.489103706	0.109866052	2.22	1.96	0.00625	0.002083333	0.004166667	0.715	ApexAlpha	A_1_5A	4.889725208		
ARS1-B11-01985-09	ARS1-11-00897	019	0.794826223	0.187300713	2.22	1.96	1.89375	0.002083333	1.891666667	0.715	ApexAlpha	A_1_5A	43.27672195		
ARS1-B11-01985-09	ARS1-11-00897	019	0.762452096	0.179569565	2.22	1.96	0.040277778	0.002083333	0.038194444	0.715	ApexAlpha	A_1_5A	10.4314146		
ARS1-B11-01985-09	ARS1-11-00897	019	0.13089676	0.028816243	2.22	1.96	0.00625	0.001388889	0.004861111	0.715	ApexAlpha	A_1_5A	4.889725208		
ARS1-B11-01985-10	ARS1-11-00897	020	0.488921413	0.109866052	2.22	1.96	0.004166667	0.001388889	0.002777778	0.715	ApexAlpha	A_1_5B	4.906514168		
ARS1-B11-01985-10	ARS1-11-00897	020	0.795115953	0.187300713	2.22	1.96	1.841666667	0.003472222	1.838194444	0.715	ApexAlpha	A_1_5B	62.37139511		
ARS1-B11-01985-10	ARS1-11-00897	020	0.762742591	0.179569565	2.22	1.96	0.050694444	0.004166667	0.046527778	0.715	ApexAlpha	A_1_5B	12.67516136		
ARS1-B11-01985-10	ARS1-11-00897	020	0.131186693	0.028816243	2.22	1.96	0.00625	0.000694444	0.005555556	0.715	ApexAlpha	A_1_5B	4.906514168		
ARS1-B11-01985-11	ARS1-11-00897	021	0.490161826	0.109866052	2.22	1.96	0.003472222	0.002777778	0.000694444	0.715	ApexAlpha	A_1_6A			
ARS1-B11-01985-11	ARS1-11-00897	021	0.795253108	0.187300713	2.22	1.96	1.816666667	0.002777778	1.813888889	0.715	ApexAlpha	A_1_6A	43.58675385		
ARS1-B11-01985-11	ARS1-11-00897	021	0.762880019	0.179569565	2.22	1.96	0.043055556	0.002777778	0.040277778	0.715	ApexAlpha	A_1_6A	14.25100708		
ARS1-B11-01985-11	ARS1-11-00897	021	0.131323846	0.028816243	2.22	1.96	0.010416667	0.002083333	0.008333333	0.715	ApexAlpha	A_1_6A	4.886059284		
ARS1-B11-01985-12	ARS1-11-00897	022	0.489685825	0.109866052	2.22	1.96	0.004861111	0	0.004861111	0.715	ApexAlpha	A_1_6B	4.899281502		
ARS1-B11-01985-12	ARS1-11-00897	022	0.795382835	0.187300713	2.22	1.96	1.79375	0.001388889	1.792361111	0.715	ApexAlpha	A_1_6B	48.9505806		
ARS1-B11-01985-12	ARS1-11-00897	022	0.763009819	0.179569565	2.22	1.96	0.088888889	0.001388889	0.0875	0.715	ApexAlpha	A_1_6B	8.340443611		
ARS1-B11-01985-12	ARS1-11-00897	022	0.131453367	0.028816243	2.22	1.96	0.011805556	0	0.011805556	0.715	ApexAlpha	A_1_6B	4.899281502		
ARS1-B11-01985-13	ARS1-11-00897	023	0.490627517	0.109866052	2.22	1.96	0.004166667	0.001388889	0.002777778	0.715	ApexAlpha	A_2_1A	4.908117771		
ARS1-B11-01985-13	ARS1-11-00897	023	0.796283266	0.187300713	2.22	1.96	1.654861111	0.000694444	1.654166667	0.715	ApexAlpha	A_2_1A	57.21987915		
ARS1-B11-01985-13	ARS1-11-00897	023	0.763912045	0.179569565	2.22	1.96	0.041666667	0.002083333	0.039583333	0.715	ApexAlpha	A_2_1A	6.441904545		
ARS1-B11-01985-13	ARS1-11-00897	023	0.132353788	0.028816243	2.22	1.96	0.003472222	0.001388889	0.002083333	0.715	ApexAlpha	A_2_1A	4.908117771		
ARS1-B11-01985-14	ARS1-11-00897	024	0.488649863	0.109866052	2.22	1.96	0.025	0.002083333	0.022916667	0.715	ApexAlpha	A_2_1B	11.46585655		
ARS1-B11-01985-14	ARS1-11-00897	024	0.795320283	0.187300713	2.22	1.96	1.802777778	0.000694444	1.802083333	0.715	ApexAlpha	A_2_1B	70.95007324		
ARS1-B11-01985-14	ARS1-11-00897	024	0.762947515	0.179569565	2.22	1.96	0.098611111	0.000694444	0.097916667	0.715	ApexAlpha	A_2_1B	31.91736603		
ARS1-B11-01985-14	ARS1-11-00897	024	0.131391226	0.028816243	2.22	1.96	0.009027778	0.000694444	0.008333333	0.715	ApexAlpha	A_2_1B	4.879087925		
ARS1-B11-01985-15	ARS1-11-00897	025	0.48944889	0.109866052	2.22	1.96	0.00625	0.001388889	0.004861111	0.715	ApexAlpha	A_2_2A	4.902958393		
ARS1-B11-01985-15	ARS1-11-00897	025	0.795620819	0.187300713	2.22	1.96	1.752083333	0.002083333	1.75	0.715	ApexAlpha	A_2_2A	59.61180496		
ARS1-B11-01985-15	ARS1-11-00897	025	0.763248464	0.179569565	2.22	1.96	0.083333333	0.002777778	0.080555556	0.715	ApexAlpha	A_2_2A	9.805916786		
ARS1-B11-01985-15	ARS1-11-00897	025	0.131691554	0.028816243	2.22	1.96	0.007638889	0	0.007638889	0.715	ApexAlpha	A_2_2A	4.902958393		

ABatchSampleID	SDG	Fraction	TracerKnownACT	TracerIsotope	TracerRefDate	TracerRefACT	TracerKnown	Halflife1	Halflife2	Halflife3	TPUF_1	TPUF_2	TPUF_3	TPUF_4	TPUF_5	TPUF_6	DeltaT1	DeltaT2
ARS1-B11-01985-01				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	2.133483796	
ARS1-B11-01985-01				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	2.133483796	
ARS1-B11-01985-01				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	2.133483796	
ARS1-B11-01985-01				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	2.133483796	
ARS1-B11-01985-02				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	2.133483796	
ARS1-B11-01985-02				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	2.133483796	
ARS1-B11-01985-02				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	2.133483796	
ARS1-B11-01985-02				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	2.133483796	
ARS1-B11-01985-03				TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	2.133472222	
ARS1-B11-01985-03				TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	2.133472222	
ARS1-B11-01985-03				TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	2.133472222	
ARS1-B11-01985-03				TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	2.133472222	
ARS1-B11-01985-04	ARS1-11-00897	014		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-04	ARS1-11-00897	014		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-04	ARS1-11-00897	014		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-04	ARS1-11-00897	014		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-05	ARS1-11-00897	015		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-05	ARS1-11-00897	015		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-05	ARS1-11-00897	015		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-05	ARS1-11-00897	015		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-06	ARS1-11-00897	016		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	37.08888889	
ARS1-B11-01985-06	ARS1-11-00897	016		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	37.08888889	
ARS1-B11-01985-06	ARS1-11-00897	016		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	37.08888889	
ARS1-B11-01985-06	ARS1-11-00897	016		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	37.08888889	
ARS1-B11-01985-07	ARS1-11-00897	017		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-07	ARS1-11-00897	017		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-07	ARS1-11-00897	017		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-07	ARS1-11-00897	017		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-08	ARS1-11-00897	018		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-08	ARS1-11-00897	018		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-08	ARS1-11-00897	018		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-08	ARS1-11-00897	018		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-09	ARS1-11-00897	019		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-09	ARS1-11-00897	019		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-09	ARS1-11-00897	019		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-09	ARS1-11-00897	019		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-10	ARS1-11-00897	020		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-10	ARS1-11-00897	020		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-10	ARS1-11-00897	020		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-10	ARS1-11-00897	020		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-11	ARS1-11-00897	021		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-11	ARS1-11-00897	021		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-11	ARS1-11-00897	021		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-11	ARS1-11-00897	021		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-12	ARS1-11-00897	022		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-12	ARS1-11-00897	022		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-12	ARS1-11-00897	022		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-12	ARS1-11-00897	022		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-13	ARS1-11-00897	023		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-13	ARS1-11-00897	023		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-13	ARS1-11-00897	023		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-13	ARS1-11-00897	023		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	39.08888889	
ARS1-B11-01985-14	ARS1-11-00897	024		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	37.08888889	
ARS1-B11-01985-14	ARS1-11-00897	024		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	37.08888889	
ARS1-B11-01985-14	ARS1-11-00897	024		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	37.08888889	
ARS1-B11-01985-14	ARS1-11-00897	024		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	37.08888889	
ARS1-B11-01985-15	ARS1-11-00897	025		TH-229	9/20/2010			698.3564815			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-15	ARS1-11-00897	025		TH-229	9/20/2010			2680555.556			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-15	ARS1-11-00897	025		TH-229	9/20/2010			27534722.22			0	0.02	0.05833	0	0	0	38.08888889	
ARS1-B11-01985-15	ARS1-11-00897	025		TH-229	9/20/2010			5.13194E+12			0	0.02	0.05833	0	0	0	38.08888889	

ABatchSampleID	SDG	Fraction	DeltaT3	DeltaT4	DeltaT5	DeltaT6	DF1	DF2	DF3	IF1	IF2	SysErr	K_Val	K_MDA	AnalysisCode	UserID	ModDate
ARS1-B11-01985-01							0.997884671					0.061663514	0.377108124	543.0356987		VMULLIGAN	6/2/2011
ARS1-B11-01985-01							0.999999448					0.061663514	0.380188445	547.4713608		VMULLIGAN	6/2/2011
ARS1-B11-01985-01							0.999999946					0.061663514	0.379428257	546.3766901		VMULLIGAN	6/2/2011
ARS1-B11-01985-01							1					0.061663514	0.380188655	547.4716628		VMULLIGAN	6/2/2011
ARS1-B11-01985-02							0.997884671					0.061663514	0.32654054	470.2183777		VMULLIGAN	6/2/2011
ARS1-B11-01985-02							0.999999448					0.061663514	0.329207811	474.0592483		VMULLIGAN	6/2/2011
ARS1-B11-01985-02							0.999999946					0.061663514	0.328549559	473.1113654		VMULLIGAN	6/2/2011
ARS1-B11-01985-02							1					0.061663514	0.329207993	474.0595098		VMULLIGAN	6/2/2011
ARS1-B11-01985-03							0.997884683					0.061663514	0.364467673	524.8334494		VMULLIGAN	6/2/2011
ARS1-B11-01985-03							0.999999448					0.061663514	0.367444739	529.1204245		VMULLIGAN	6/2/2011
ARS1-B11-01985-03							0.999999946					0.061663514	0.366710032	528.0624466		VMULLIGAN	6/2/2011
ARS1-B11-01985-03							1					0.061663514	0.367444942	529.1207164		VMULLIGAN	6/2/2011
ARS1-B11-01985-04	ARS1-11-00897	014					0.96290091					0.061663514	0.041824091	60.22669055	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-04	ARS1-11-00897	014					0.999990151					0.061663514	0.043697264	62.92406057	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-04	ARS1-11-00897	014					0.999999041					0.061663514	0.043610257	62.79877075	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-04	ARS1-11-00897	014					1					0.061663514	0.043697695	62.92468032	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-05	ARS1-11-00897	015					0.96290091					0.061663514	0.055480946	79.89256169	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-05	ARS1-11-00897	015					0.999990151					0.061663514	0.057965768	83.47070617	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-05	ARS1-11-00897	015					0.999999041					0.061663514	0.057850351	83.30450536	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-05	ARS1-11-00897	015					1					0.061663514	0.057966339	83.47152829	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-06	ARS1-11-00897	016					0.963857103					0.061663514	0.273731081	394.1727565	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-06	ARS1-11-00897	016					0.999990409					0.061663514	0.28570702	411.4181082	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-06	ARS1-11-00897	016					0.999999066					0.061663514	0.285138074	410.5988265	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-06	ARS1-11-00897	016					1					0.061663514	0.28570976	411.4220539	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-07	ARS1-11-00897	017					0.96290091					0.061663514	0.178617068	257.2085777	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-07	ARS1-11-00897	017					0.999990151					0.061663514	0.186616782	268.7281664	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-07	ARS1-11-00897	017					0.999999041					0.061663514	0.186245204	268.1930944	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-07	ARS1-11-00897	017					1					0.061663514	0.18661862	268.7308132	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-08	ARS1-11-00897	018					0.96290091					0.061663514	0.176655783	254.384327	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-08	ARS1-11-00897	018					0.999990151					0.061663514	0.176820894	254.6220871	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-08	ARS1-11-00897	018					0.999999041					0.061663514	0.176468821	254.1151021	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-08	ARS1-11-00897	018					1					0.061663514	0.176822635	254.6245949	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-09	ARS1-11-00897	019					0.961945666					0.061663514	0.176763725	254.5397643	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-09	ARS1-11-00897	019					0.999989892					0.061663514	0.18486378	266.2038433	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-09	ARS1-11-00897	019					0.999999016					0.061663514	0.184495736	265.6738596	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-09	ARS1-11-00897	019					1					0.061663514	0.184865649	266.2065341	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-10	ARS1-11-00897	020					0.96290091					0.061663514	0.172039489	247.7368644	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-10	ARS1-11-00897	020					0.999990151					0.061663514	0.179744614	258.8322439	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-10	ARS1-11-00897	020					0.999999041					0.061663514	0.179386719	258.316876	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-10	ARS1-11-00897	020					1					0.061663514	0.179746384	258.8347932	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-11	ARS1-11-00897	021					0.96290091					0.061663514	0.154518155	222.5061435	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-11	ARS1-11-00897	021					0.999990151					0.061663514	0.177420471	255.4854775	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-11	ARS1-11-00897	021					0.999999041					0.061663514	0.177067204	254.9767734	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-11	ARS1-11-00897	021					1					0.061663514	0.177422218	255.4879939	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-12	ARS1-11-00897	022					0.961945666					0.061663514	0.167600002	241.3440023	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-12	ARS1-11-00897	022					0.999989892					0.061663514	0.175280136	252.4033962	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-12	ARS1-11-00897	022					0.999999016					0.061663514	0.174931172	251.9008876	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-12	ARS1-11-00897	022					1					0.061663514	0.175281908	252.4059474	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-13	ARS1-11-00897	023					0.961945666					0.061663514	0.154631934	222.6699843	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-13	ARS1-11-00897	023					0.999989892					0.061663514	0.161717817	232.8736564	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-13	ARS1-11-00897	023					0.999999016					0.061663514	0.161395854	232.4100295	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-13	ARS1-11-00897	023					1					0.061663514	0.161719452	232.8760102	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-14	ARS1-11-00897	024					0.963857103					0.061663514	0.168910634	243.2313125	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-14	ARS1-11-00897	024					0.999990409					0.061663514	0.1763006	253.8728636	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-14	ARS1-11-00897	024					0.999999066					0.061663514	0.175949522	253.3673113	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-14	ARS1-11-00897	024					1					0.061663514	0.176302291	253.8752984	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-15	ARS1-11-00897	025					0.96290091					0.061663514	0.164125406	236.3405852	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-15	ARS1-11-00897	025					0.999990151					0.061663514	0.171476083	246.9255602	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-15	ARS1-11-00897	025					0.999999041					0.061663514	0.171134653	246.4338999	ASP-A-008	VMULLIGAN	6/2/2011
ARS1-B11-01985-15	ARS1-11-00897	025					1					0.061663514	0.171477772	246.9279922	ASP-A-008	VMULLIGAN	6/2/2011

Apex Alpha Instrument Data Transfer Report

#	Report ID	Batch Sample ID	Isotope	Gross Area	Count Mins	BKG Counts	BKG Count Mins	EFF	Analysis Date	Detector
1	ApexAlpha	ARS1-B11-01985-01	TH-228	6	1440	0	1440	0.21	05/28/11 14:08	A_1_1A
2	ApexAlpha	ARS1-B11-01985-01	TH-229	2864	1440	3	1440	0.21	05/28/11 14:08	A_1_1A
3	ApexAlpha	ARS1-B11-01985-01	TH-230	3721	1440	14	1440	0.21	05/28/11 14:08	A_1_1A
4	ApexAlpha	ARS1-B11-01985-01	TH-232	30	1440	5	1440	0.21	05/28/11 14:08	A_1_1A
5	ApexAlpha	ARS1-B11-01985-02	TH-228	4	1440	3	1440	0.19	05/28/11 14:08	A_1_1B
6	ApexAlpha	ARS1-B11-01985-02	TH-229	2469	1440	17	1440	0.19	05/28/11 14:08	A_1_1B
7	ApexAlpha	ARS1-B11-01985-02	TH-230	3028	1440	5	1440	0.19	05/28/11 14:08	A_1_1B
8	ApexAlpha	ARS1-B11-01985-02	TH-232	13	1440	3	1440	0.19	05/28/11 14:08	A_1_1B
9	ApexAlpha	ARS1-B11-01985-03	TH-228	8	1440	1	1440	0.22	05/28/11 14:08	A_1_2A
10	ApexAlpha	ARS1-B11-01985-03	TH-229	2751	1440	11	1440	0.22	05/28/11 14:08	A_1_2A
11	ApexAlpha	ARS1-B11-01985-03	TH-230	80	1440	6	1440	0.22	05/28/11 14:08	A_1_2A
12	ApexAlpha	ARS1-B11-01985-03	TH-232	11	1440	2	1440	0.22	05/28/11 14:08	A_1_2A
13	ApexAlpha	ARS1-B11-01985-04	TH-228	3	1440	0	1440	0.22	05/28/11 14:08	A_1_2B
14	ApexAlpha	ARS1-B11-01985-04	TH-229	666	1440	15	1440	0.22	05/28/11 14:08	A_1_2B
15	ApexAlpha	ARS1-B11-01985-04	TH-230	15	1440	2	1440	0.22	05/28/11 14:08	A_1_2B
16	ApexAlpha	ARS1-B11-01985-04	TH-232	2	1440	3	1440	0.22	05/28/11 14:08	A_1_2B
17	ApexAlpha	ARS1-B11-01985-05	TH-228	7	1440	0	1440	0.21	05/28/11 14:08	A_1_3A
18	ApexAlpha	ARS1-B11-01985-05	TH-229	862	1440	5	1440	0.21	05/28/11 14:08	A_1_3A
19	ApexAlpha	ARS1-B11-01985-05	TH-230	49	1440	5	1440	0.21	05/28/11 14:08	A_1_3A
20	ApexAlpha	ARS1-B11-01985-05	TH-232	9	1440	21	1440	0.21	05/28/11 14:08	A_1_3A
21	ApexAlpha	ARS1-B11-01985-06	TH-228	10	1440	0	1440	0.21	05/28/11 14:08	A_1_3B
22	ApexAlpha	ARS1-B11-01985-06	TH-229	4220	1440	3	1440	0.21	05/28/11 14:08	A_1_3B
23	ApexAlpha	ARS1-B11-01985-06	TH-230	150	1440	5	1440	0.21	05/28/11 14:08	A_1_3B
24	ApexAlpha	ARS1-B11-01985-06	TH-232	11	1440	3	1440	0.21	05/28/11 14:08	A_1_3B
25	ApexAlpha	ARS1-B11-01985-07	TH-228	8	1440	2	1440	0.23	05/28/11 14:08	A_1_4A
26	ApexAlpha	ARS1-B11-01985-07	TH-229	2756	1440	4	1440	0.23	05/28/11 14:08	A_1_4A
27	ApexAlpha	ARS1-B11-01985-07	TH-230	71	1440	3	1440	0.23	05/28/11 14:08	A_1_4A
28	ApexAlpha	ARS1-B11-01985-07	TH-232	7	1440	1	1440	0.23	05/28/11 14:08	A_1_4A
29	ApexAlpha	ARS1-B11-01985-08	TH-228	5	1440	0	1440	0.23	05/28/11 14:08	A_1_4B
30	ApexAlpha	ARS1-B11-01985-08	TH-229	2609	1440	3	1440	0.22	05/28/11 14:08	A_1_4B
31	ApexAlpha	ARS1-B11-01985-08	TH-230	56	1440	3	1440	0.22	05/28/11 14:08	A_1_4B
32	ApexAlpha	ARS1-B11-01985-08	TH-232	11	1440	2	1440	0.22	05/28/11 14:08	A_1_4B
33	ApexAlpha	ARS1-B11-01985-09	TH-228	9	1440	3	1440	0.21	05/28/11 14:08	A_1_5A
34	ApexAlpha	ARS1-B11-01985-09	TH-229	2727	1440	3	1440	0.21	05/28/11 14:08	A_1_5A
35	ApexAlpha	ARS1-B11-01985-09	TH-230	58	1440	3	1440	0.21	05/28/11 14:08	A_1_5A
36	ApexAlpha	ARS1-B11-01985-09	TH-232	9	1440	2	1440	0.21	05/28/11 14:08	A_1_5A
37	ApexAlpha	ARS1-B11-01985-10	TH-228	6	1440	2	1440	0.20	05/28/11 14:08	A_1_5B
38	ApexAlpha	ARS1-B11-01985-10	TH-229	2652	1440	5	1440	0.20	05/28/11 14:08	A_1_5B
39	ApexAlpha	ARS1-B11-01985-10	TH-230	73	1440	6	1440	0.20	05/28/11 14:08	A_1_5B
40	ApexAlpha	ARS1-B11-01985-10	TH-232	9	1440	1	1440	0.20	05/28/11 14:08	A_1_5B
41	ApexAlpha	ARS1-B11-01985-11	TH-228	5	1440	4	1440	0.20	05/28/11 14:08	A_1_6A
42	ApexAlpha	ARS1-B11-01985-11	TH-229	2616	1440	4	1440	0.23	05/28/11 14:08	A_1_6A
43	ApexAlpha	ARS1-B11-01985-11	TH-230	62	1440	4	1440	0.23	05/28/11 14:08	A_1_6A
44	ApexAlpha	ARS1-B11-01985-11	TH-232	15	1440	3	1440	0.23	05/28/11 14:08	A_1_6A
45	ApexAlpha	ARS1-B11-01985-12	TH-228	7	1440	0	1440	0.22	05/28/11 14:08	A_1_6B
46	ApexAlpha	ARS1-B11-01985-12	TH-229	2583	1440	2	1440	0.22	05/28/11 14:08	A_1_6B
47	ApexAlpha	ARS1-B11-01985-12	TH-230	128	1440	2	1440	0.22	05/28/11 14:08	A_1_6B
48	ApexAlpha	ARS1-B11-01985-12	TH-232	17	1440	0	1440	0.22	05/28/11 14:08	A_1_6B
49	ApexAlpha	ARS1-B11-01985-13	TH-228	6	1440	2	1440	0.22	05/28/11 14:08	A_2_1A
50	ApexAlpha	ARS1-B11-01985-13	TH-229	2383	1440	1	1440	0.22	05/28/11 14:08	A_2_1A
51	ApexAlpha	ARS1-B11-01985-13	TH-230	60	1440	3	1440	0.22	05/28/11 14:08	A_2_1A
52	ApexAlpha	ARS1-B11-01985-13	TH-232	5	1440	2	1440	0.22	05/28/11 14:08	A_2_1A

Apex Alpha Instrument Data Transfer Report

#	Report ID	Batch Sample ID	Isotope	Gross Area	Count Mins	BKG Counts	BKG Count Mins	EFF	Analysis Date	Detector
53	ApexAlpha	ARS1-B11-01985-14	TH-228	36	1440	3	1440	0.21	05/28/11 14:08	A_2_1B
54	ApexAlpha	ARS1-B11-01985-14	TH-229	2596	1440	1	1440	0.21	05/28/11 14:08	A_2_1B
55	ApexAlpha	ARS1-B11-01985-14	TH-230	142	1440	1	1440	0.21	05/28/11 14:08	A_2_1B
56	ApexAlpha	ARS1-B11-01985-14	TH-232	13	1440	1	1440	0.21	05/28/11 14:08	A_2_1B
57	ApexAlpha	ARS1-B11-01985-15	TH-228	9	1440	2	1440	0.22	05/28/11 14:08	A_2_2A
58	ApexAlpha	ARS1-B11-01985-15	TH-229	2523	1440	3	1440	0.22	05/28/11 14:08	A_2_2A
59	ApexAlpha	ARS1-B11-01985-15	TH-230	120	1440	4	1440	0.22	05/28/11 14:08	A_2_2A
60	ApexAlpha	ARS1-B11-01985-15	TH-232	11	1440	0	1440	0.22	05/28/11 14:08	A_2_2A

5/28/2011 14:07:41

Apex-Alpha™

ASSIGNED SAMPLES REPORT

Date : 5/28/2011
Time : 14:07:41
User : countroom

SAMPLE	CHAMBER	GEOMETRY	DEVICE	CERTIFICATE
11-01985-01	A_1_1A	Shelf 2	Alpha Analyst10139	
11-01985-02	A_1_1B	Shelf 2	Alpha Analyst10139	
11-01985-03	A_1_2A	Shelf 2	Alpha Analyst10139	
11-01985-04	A_1_2B	Shelf 2	Alpha Analyst10139	
11-01985-05	A_1_3A	Shelf 2	Alpha Analyst10139	
11-01985-06	A_1_3B	Shelf 2	Alpha Analyst10139	
11-01985-07	A_1_4A	Shelf 2	Alpha Analyst10139	
11-01985-08	A_1_4B	Shelf 2	Alpha Analyst10139	
11-01985-09	A_1_5A	Shelf 2	Alpha Analyst10139	
11-01985-10	A_1_5B	Shelf 2	Alpha Analyst10139	
11-01985-11	A_1_6A	Shelf 2	Alpha Analyst10139	
11-01985-12	A_1_6B	Shelf 2	Alpha Analyst10139	
11-01985-13	A_2_1A	Shelf 2	Alpha Analyst10139	
11-01985-14	A_2_1B	Shelf 2	Alpha Analyst10139	
11-01985-15	A_2_2A	Shelf 2	Alpha Analyst10139	
11-01984-01	A_2_3B	Shelf 2	Alpha Analyst10139	
11-01984-02	A_2_4A	Shelf 2	Alpha Analyst10139	
11-01984-03	A_2_4B	Shelf 2	Alpha Analyst10139	
11-01984-04	A_2_5A	Shelf 2	Alpha Analyst10139	
11-01984-05	A_2_5B	Shelf 2	Alpha Analyst10139	
11-01984-06	A_3_1A	Shelf 2	Alpha Analyst10139	
11-01984-07	A_3_1B	Shelf 2	Alpha Analyst10139	
11-01984-08	A_3_2B	Shelf 2	Alpha Analyst10139	
11-01984-09	A_3_3A	Shelf 2	Alpha Analyst10139	
11-01984-10	A_3_3B	Shelf 2	Alpha Analyst10139	
11-01984-11	A_3_4B	Shelf 2	Alpha Analyst10139	
11-01984-12	A_3_5A	Shelf 2	Alpha Analyst10139	
11-01984-13	A_3_6A	Shelf 2	Alpha Analyst10139	
11-01984-14	A_3_6B	Shelf 2	Alpha Analyst10139	

****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: LCS
Batch Identification: B11-01985
Sample Identification: 11-01985-01
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 1A
Chamber Serial Number: 10043743A
Detector Serial Number: 57895
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:00
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2125 +/- 0.0044 on 4/9/10 20:56:03
Effective Efficiency: 0.2125 +/- 0.0044

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

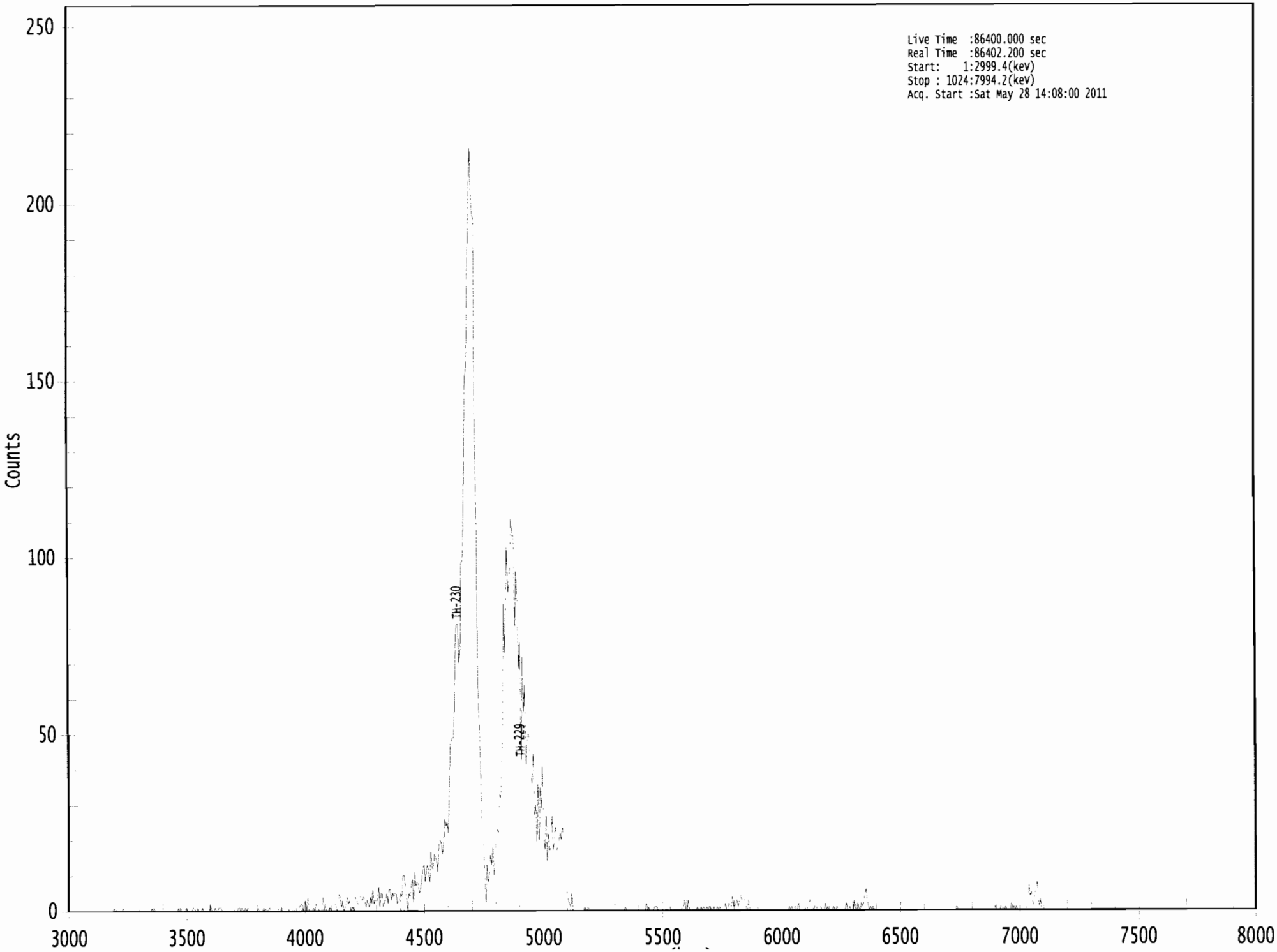
Nuclide	Energy (MeV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5.452	6.00	2.45	0.00	0.00E+000	4
TH-229	4.907	2864.00	53.52	0.00	0.00E+000	75
TH-230	4.645	3721.00	61.00	0.00	0.00E+000	53
TH-232	3.958	30.00	5.48	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	8.8396E-003	40.88	3.9867E-003	2.06
TH-229	4.2373E+000	2.78	4.0035E-003	2.06
TH-230	5.4886E+000	2.63	3.9915E-003	2.06
TH-232	4.4172E-002	18.37	3.9843E-003	2.06

Errors quoted at 1.000 sigma

0000012900.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: LCSD
Batch Identification: B11-01985
Sample Identification: 11-01985-02
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 1B
Chamber Serial Number: 10043743B
Detector Serial Number: 57896
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:01
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1922 +/- 0.0040 on 4/9/10 20:56:53
Effective Efficiency: 0.1922 +/- 0.0040

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

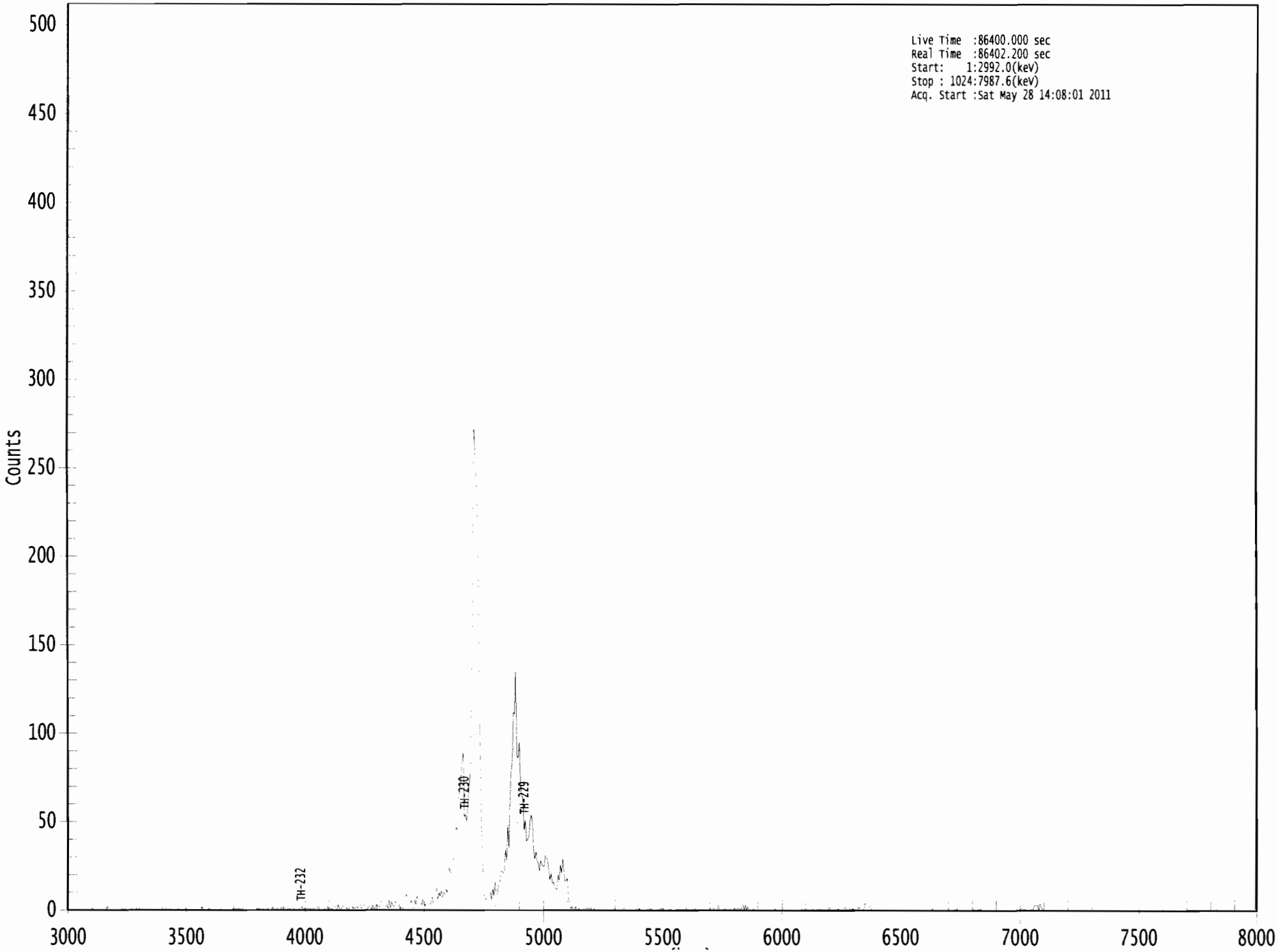
Nuclide	Energy (MeV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5.358	4.00	2.00	0.00	0.00E+000	9
TH-229	4.915	2469.00	49.69	0.00	0.00E+000	45
TH-230	4.667	3028.00	55.03	0.00	0.00E+000	30
TH-232	3.980	13.00	3.61	0.00	0.00E+000	7

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	6.5140E-003	50.04	4.4068E-003	2.06
TH-229	4.0378E+000	2.88	4.4254E-003	2.06
TH-230	4.9371E+000	2.75	4.4121E-003	2.06
TH-232	2.1158E-002	27.81	4.4041E-003	2.06

Errors quoted at 1.000 sigma

0000012901.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: MBL
Batch Identification: B11-01985
Sample Identification: 11-01985-03
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 2A
Chamber Serial Number: 10043744A
Detector Serial Number: 57897
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:03
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2164 +/- 0.0044 on 4/9/10 20:57:28
Effective Efficiency: 0.2164 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

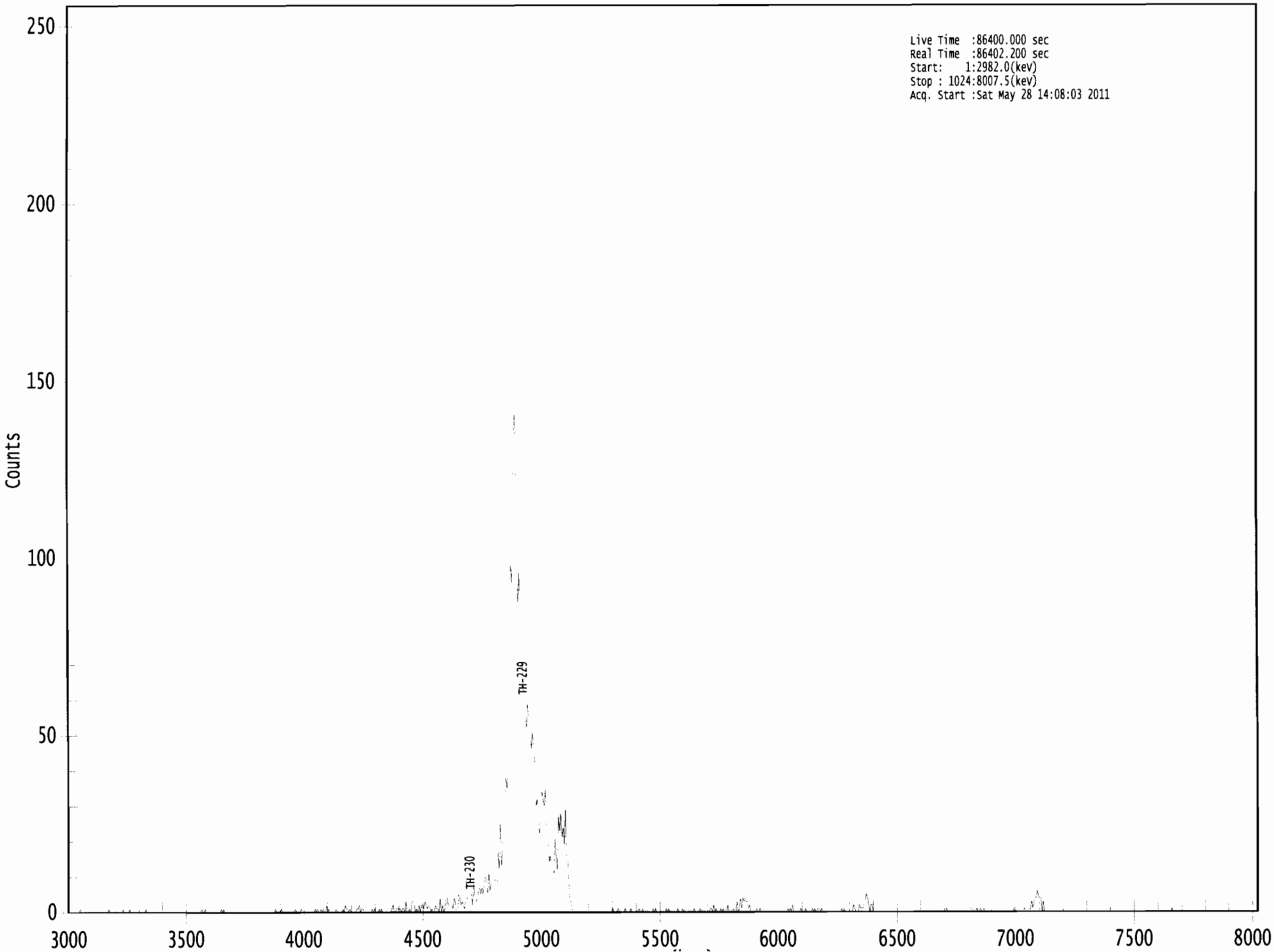
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5375.030	8.00	2.83	0.00	0.00E+000	4
TH-229	4913.485	2751.00	52.45	0.00	0.00E+000	49
TH-230	4684.890	80.00	8.94	0.00	0.00E+000	7
TH-232	4007.858	11.00	3.32	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.1572E-002	35.41	3.9142E-003	2.05
TH-229	3.9960E+000	2.80	3.9307E-003	2.05
TH-230	1.1586E-001	11.37	3.9189E-003	2.05
TH-232	1.5901E-002	30.22	3.9118E-003	2.05

Errors quoted at 1.000 sigma

0000012902.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-014
Batch Identification: B11-01985
Sample Identification: 11-01985-04
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 2B
Chamber Serial Number: 10043744B
Detector Serial Number: 57898
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:05
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2196 +/- 0.0045 on 4/9/10 20:58:18
Effective Efficiency: 0.2196 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

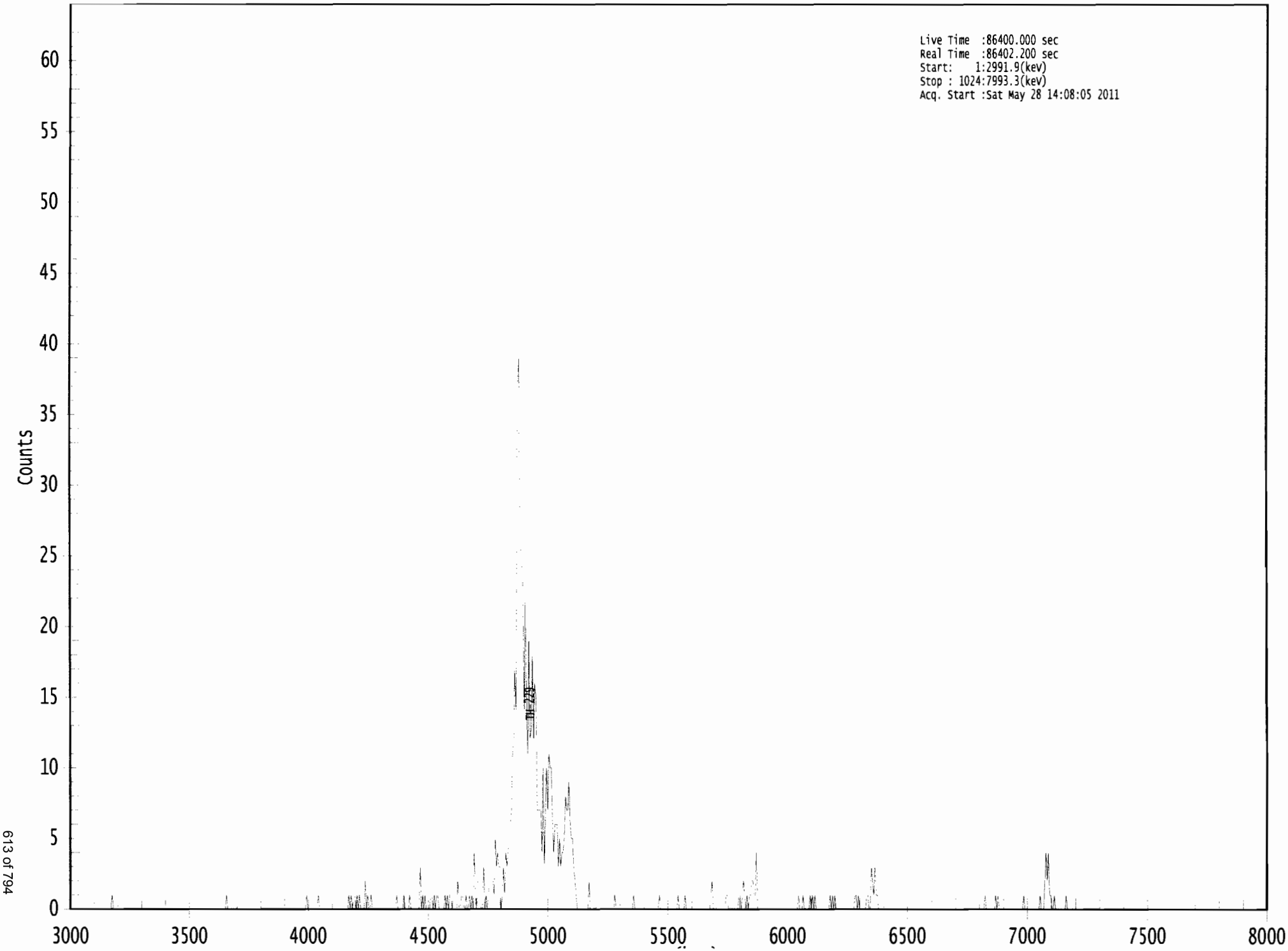
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5358.171	3.00	1.73	0.00	0.00E+000	4
TH-229	4920.774	666.00	25.81	0.00	0.00E+000	28
TH-230	4678.938	15.00	3.87	0.00	0.00E+000	5
TH-232	4008.831	2.00	1.41	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	4.2767E-003	57.77	3.8576E-003	2.05
TH-229	9.5343E-001	4.39	3.8739E-003	2.05
TH-230	2.1409E-002	25.90	3.8622E-003	2.05
TH-232	2.8494E-003	70.74	3.8553E-003	2.05

Errors quoted at 1.000 sigma

0000012928.CNF



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*************************************************************************
*****            A L P H A   S P E C T R U M   A N A L Y S I S
*************************************************************************
```

Sample Description: ARS1-11-00897-015
Batch Identification: B11-01985
Sample Identification: 11-01985-05
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 3A
Chamber Serial Number: 10043745A
Detector Serial Number: 57907
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:06
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2122 +/- 0.0044 on 4/11/10 09:13:21
Effective Efficiency: 0.2122 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

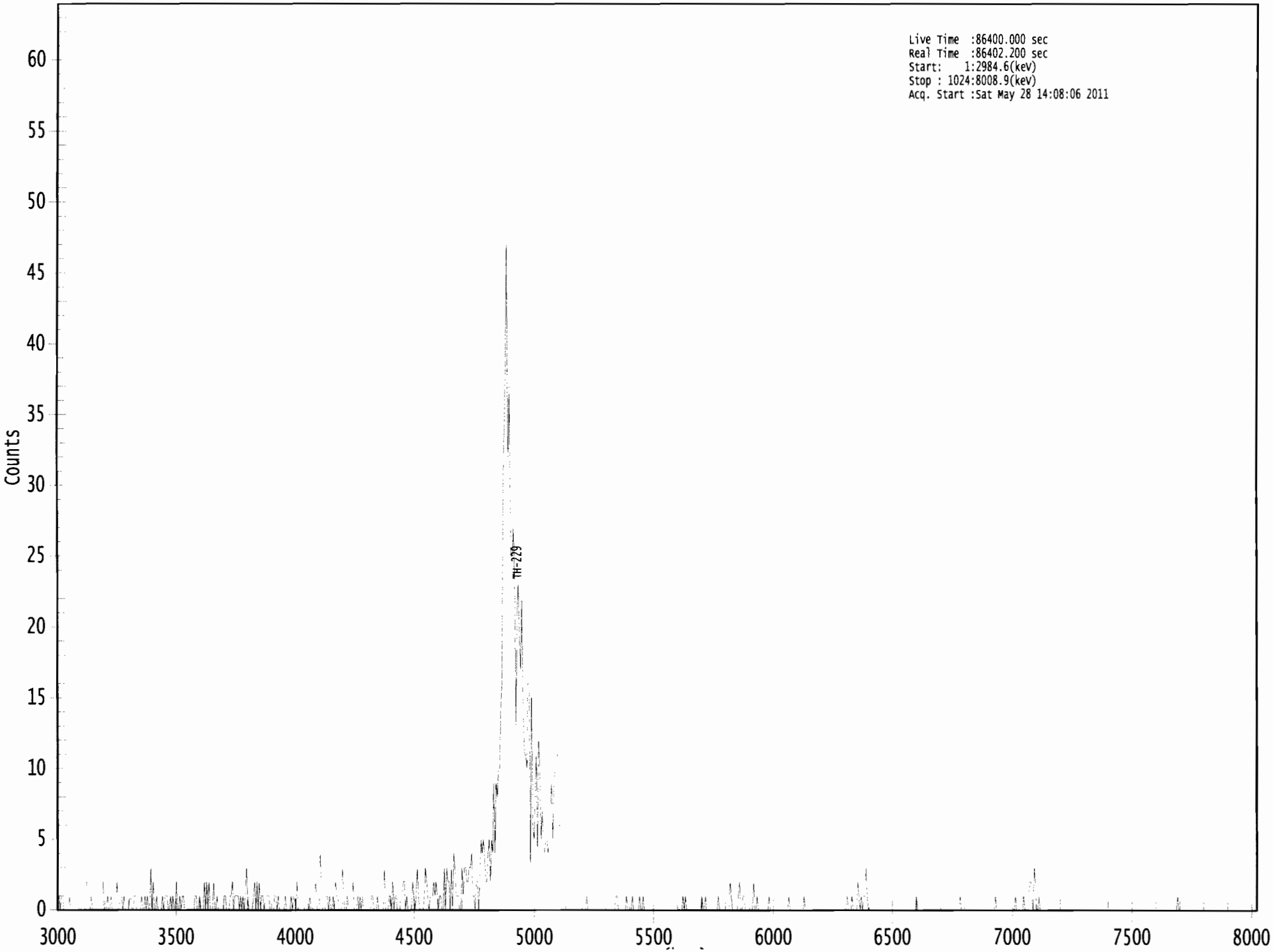
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5356.753	7.00	2.65	0.00	0.00E+000	4
TH-229	4918.377	862.00	29.36	0.00	0.00E+000	49
TH-230	4674.785	49.00	7.00	0.00	0.00E+000	9
TH-232	3951.578	9.00	3.00	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.0327E-002	37.85	3.9920E-003	2.06
TH-229	1.2770E+000	3.98	4.0089E-003	2.06
TH-230	7.2373E-002	14.43	3.9968E-003	2.06
TH-232	1.3269E-002	33.40	3.9896E-003	2.06

Errors quoted at 1.000 sigma

0000012929.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-016
Batch Identification: B11-01985
Sample Identification: 11-01985-06
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 3B
Chamber Serial Number: 10043745B
Detector Serial Number: 57908
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:08
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2061 +/- 0.0042 on 4/11/10 09:13:55
Effective Efficiency: 0.2061 +/- 0.0042

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

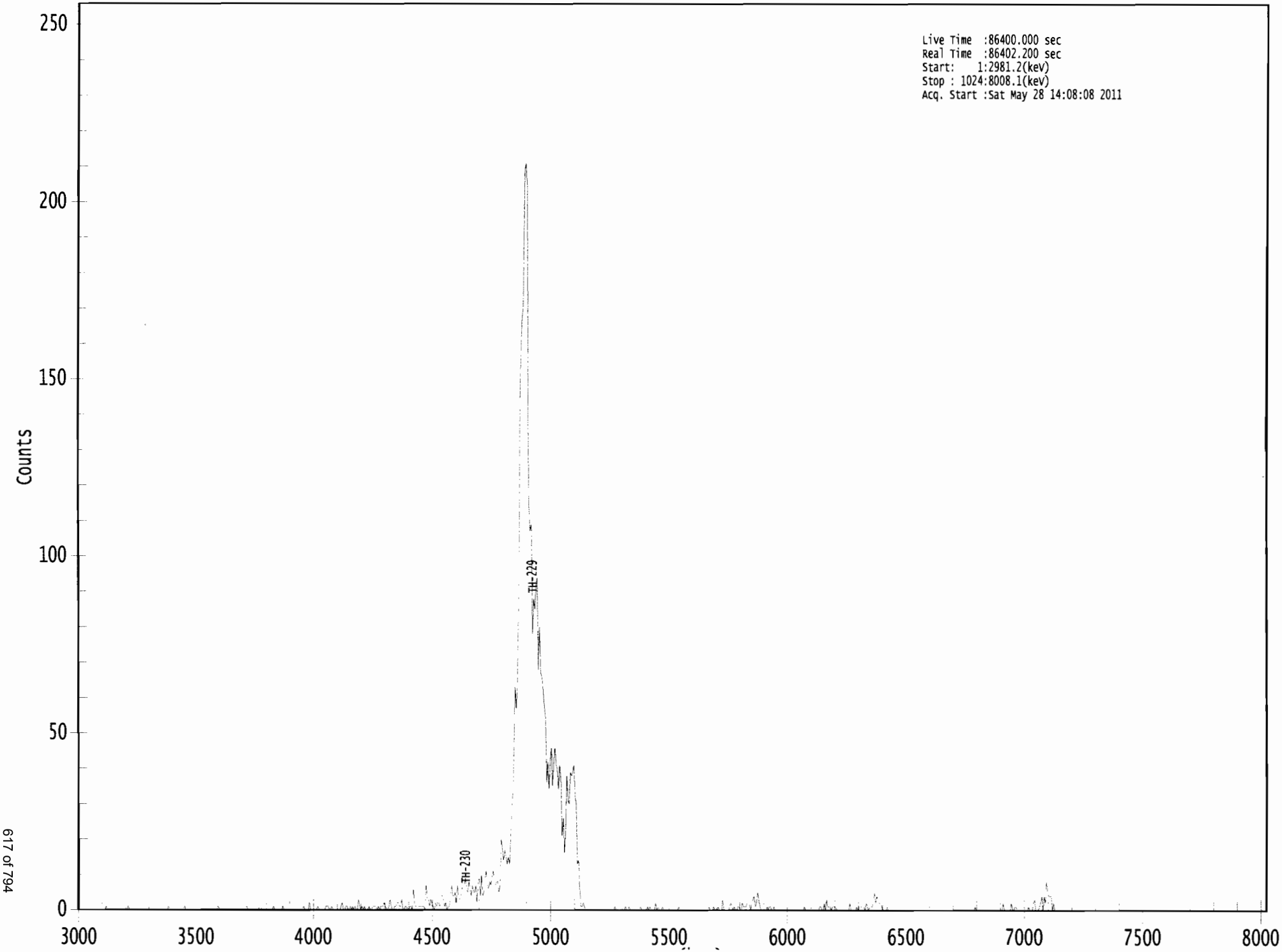
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5373.784	10.00	3.16	0.00	0.00E+000	4
TH-229	4912.381	4220.00	64.96	0.00	0.00E+000	50
TH-230	4625.241	150.00	12.25	0.00	0.00E+000	41
TH-232	3981.422	11.00	3.32	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.5186E-002	31.69	4.1093E-003	2.06
TH-229	6.4355E+000	2.57	4.1267E-003	2.06
TH-230	2.2806E-001	8.42	4.1143E-003	2.06
TH-232	1.6694E-002	30.22	4.1069E-003	2.06

Errors quoted at 1.000 sigma

0000012930.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-017
Batch Identification: B11-01985
Sample Identification: 11-01985-07
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 4A
Chamber Serial Number: 10043746A
Detector Serial Number: 57909
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:09
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2259 +/- 0.0046 on 4/11/10 09:14:49
Effective Efficiency: 0.2259 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

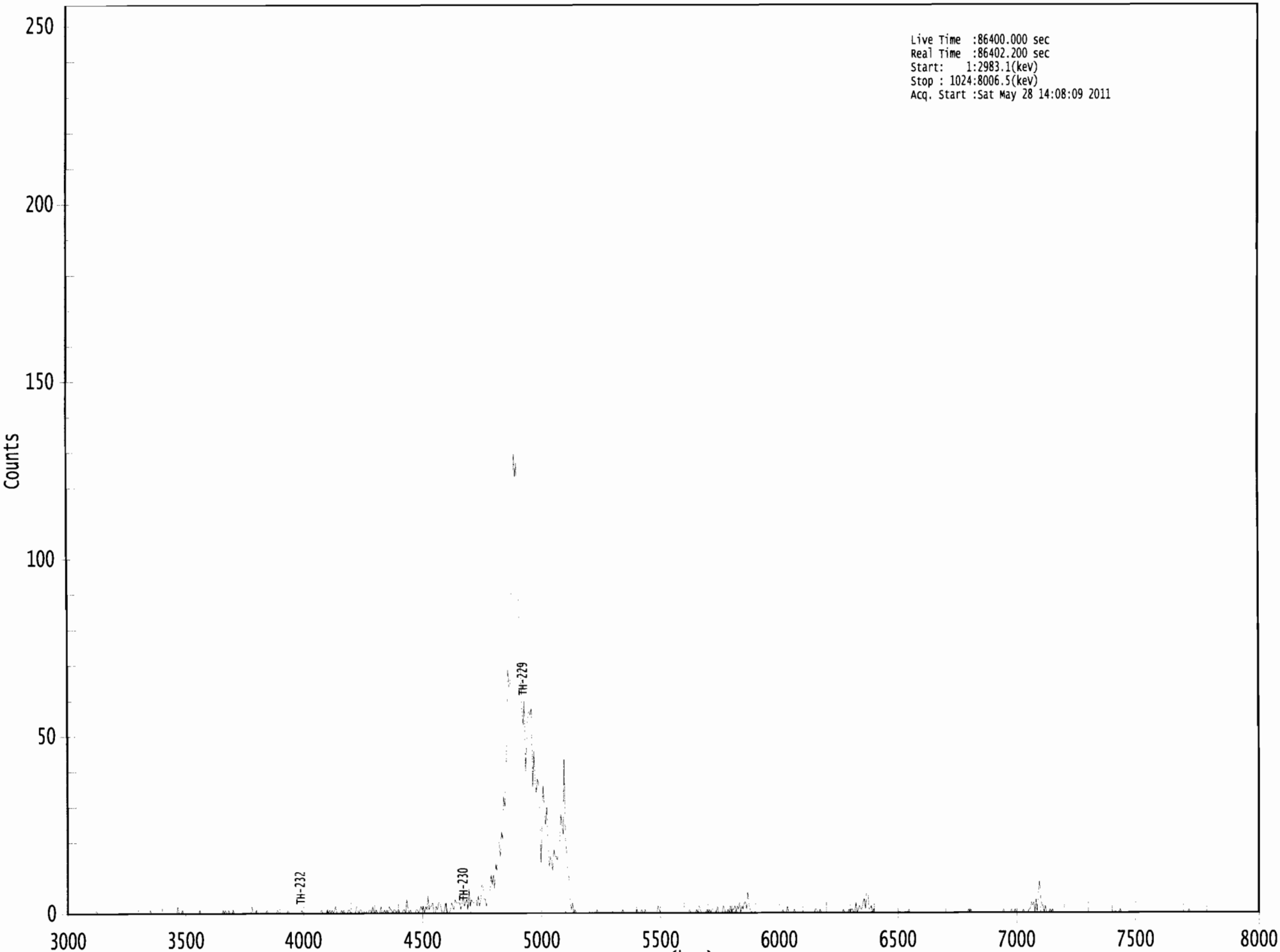
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5396.564	8.00	2.83	0.00	0.00E+000	7
TH-229	4912.485	2756.00	52.50	0.00	0.00E+000	45
TH-230	4659.820	71.00	8.43	0.00	0.00E+000	6
TH-232	3974.983	7.00	2.65	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.1083E-002	35.41	3.7489E-003	2.05
TH-229	3.8342E+000	2.80	3.7647E-003	2.05
TH-230	9.8481E-002	12.04	3.7534E-003	2.05
TH-232	9.6919E-003	37.85	3.7466E-003	2.05

Errors quoted at 1.000 sigma

0000012931.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S
****

Sample Description: ARS1-11-00897-018
Batch Identification: B11-01985
Sample Identification: 11-01985-08
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 4B
Chamber Serial Number: 10043746B
Detector Serial Number: 57910
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:12
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2164 +/- 0.0044 on 4/11/10 09:15:19
Effective Efficiency: 0.2164 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

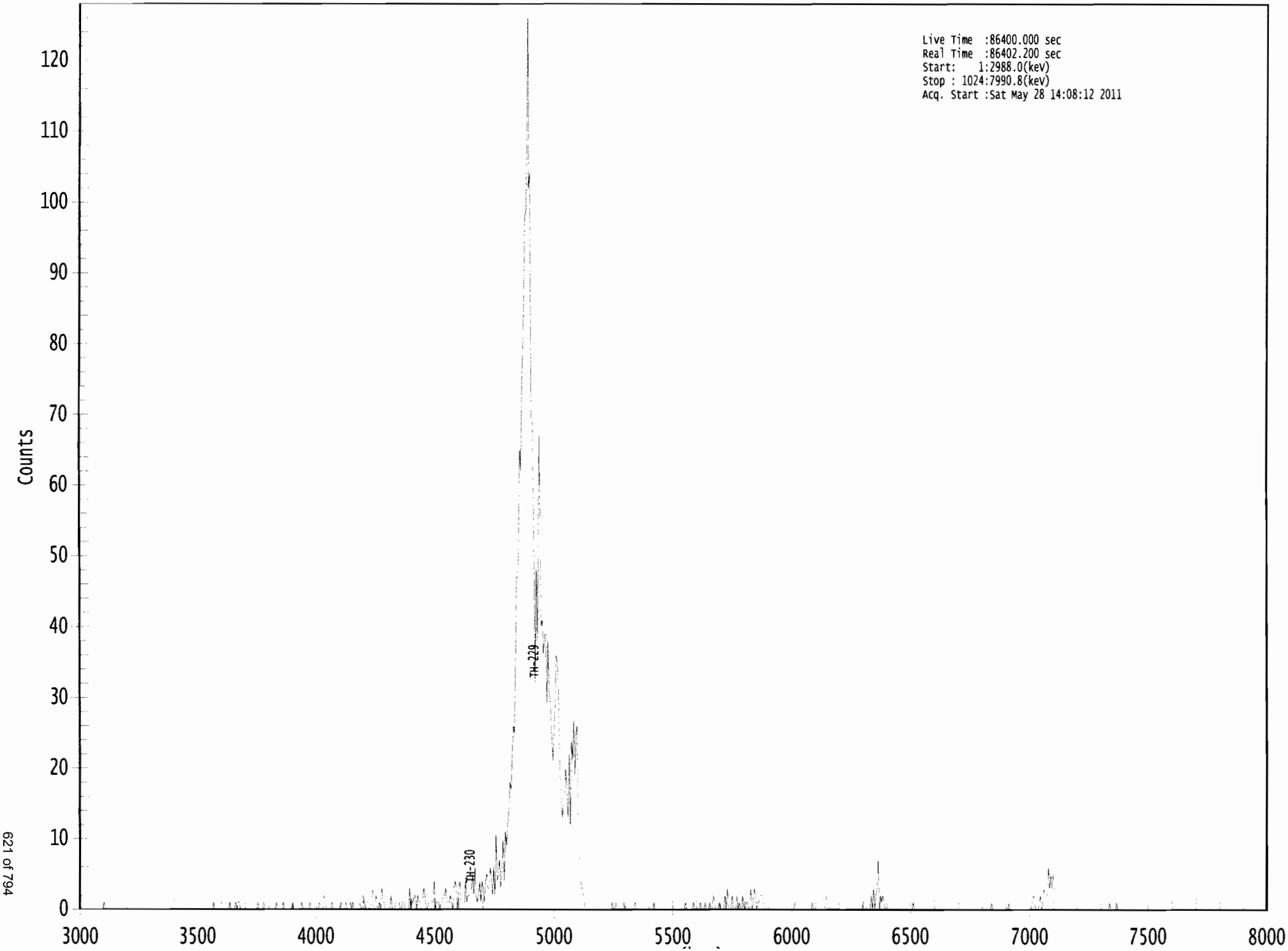
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-229	4910.063	2609.00	51.08	0.00	0.00E+000	50
TH-230	4643.214	56.00	7.48	0.00	0.00E+000	7
TH-232	3968.753	11.00	3.32	0.00	0.00E+000	7
<not ID'd>	5300.153	5.00	2.24	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-229	3.7888E+000	2.84	3.9297E-003	2.05
TH-230	8.1078E-002	13.52	3.9178E-003	2.05
TH-232	1.5897E-002	30.22	3.9108E-003	2.05

Errors quoted at 1.000 sigma

0000012932.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-019
Batch Identification: B11-01985
Sample Identification: 11-01985-09
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 5A
Chamber Serial Number: 10043747A
Detector Serial Number: 57911
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:14
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2092 +/- 0.0043 on 4/11/10 18:32:55
Effective Efficiency: 0.2092 +/- 0.0043

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

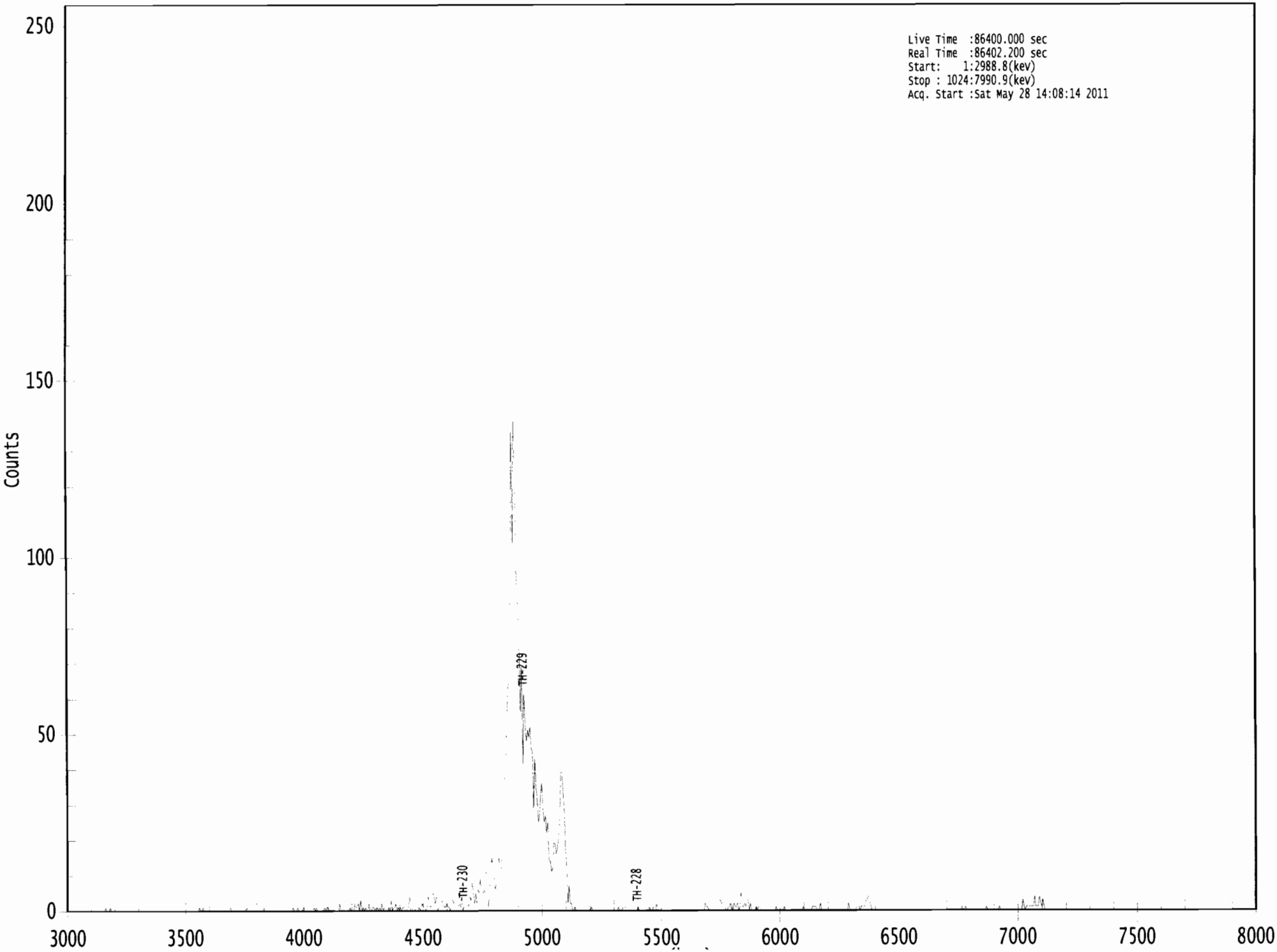
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5390.701	9.00	3.00	0.00	0.00E+000	4
TH-229	4914.125	2727.00	52.22	0.00	0.00E+000	43
TH-230	4659.949	58.00	7.62	0.00	0.00E+000	10
TH-232	4003.105	9.00	3.00	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.3465E-002	33.40	4.0485E-003	2.06
TH-229	4.0971E+000	2.81	4.0656E-003	2.06
TH-230	8.6879E-002	13.29	4.0534E-003	2.06
TH-232	1.3457E-002	33.40	4.0461E-003	2.06

Errors quoted at 1.000 sigma

0000012933.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-020
Batch Identification: B11-01985
Sample Identification: 11-01985-10
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 5B
Chamber Serial Number: 10043747B
Detector Serial Number: 57912
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:15
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2047 +/- 0.0042 on 4/11/10 18:33:27
Effective Efficiency: 0.2047 +/- 0.0042

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

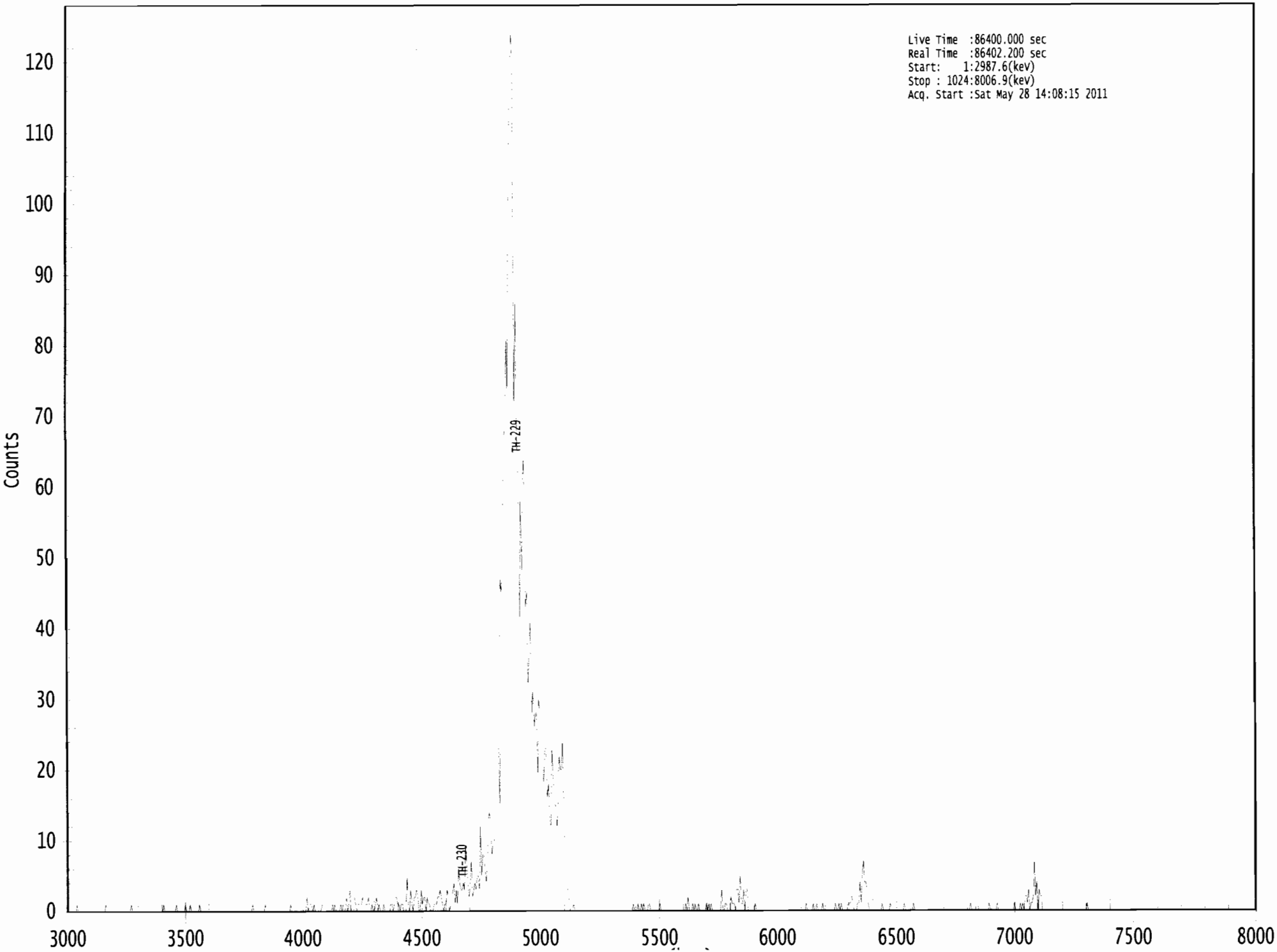
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5415.478	6.00	2.45	0.00	0.00E+000	4
TH-229	4902.732	2652.00	51.50	0.00	0.00E+000	62
TH-230	4660.155	73.00	8.54	0.00	0.00E+000	12
TH-232	3991.226	9.00	3.00	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	9.1728E-003	40.88	4.1370E-003	2.06
TH-229	4.0715E+000	2.83	4.1545E-003	2.06
TH-230	1.1174E-001	11.88	4.1420E-003	2.06
TH-232	1.3751E-002	33.40	4.1345E-003	2.06

Errors quoted at 1.000 sigma

0000012934.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-021
Batch Identification: B11-01985
Sample Identification: 11-01985-11
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 6A
Chamber Serial Number: 10043748A
Detector Serial Number: 57913
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:17
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2250 +/- 0.0046 on 4/11/10 18:33:56
Effective Efficiency: 0.2250 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

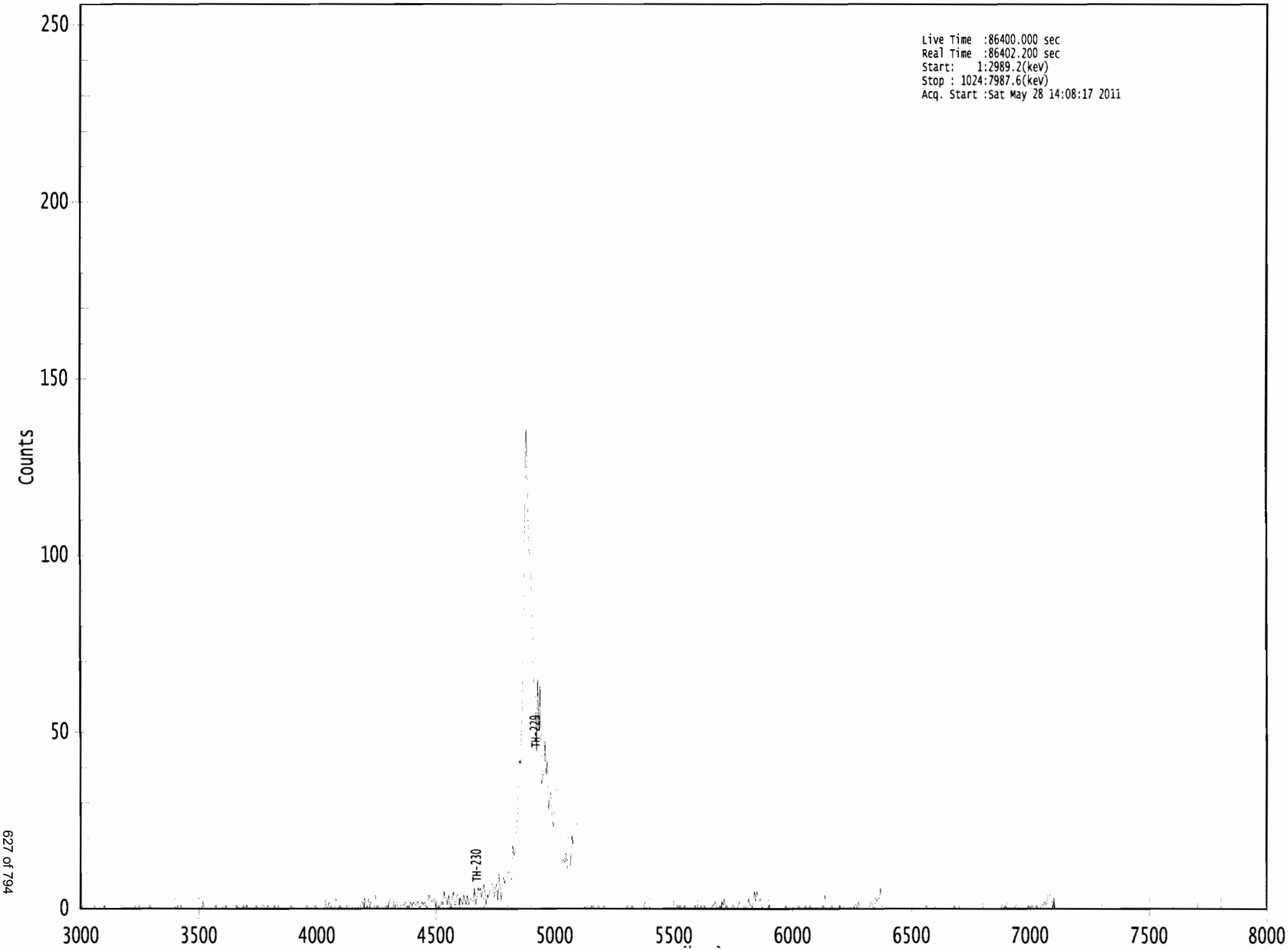
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-229	4914.471	2616.00	51.15	0.00	0.00E+000	43
TH-230	4663.925	62.00	7.87	0.00	0.00E+000	14
TH-232	3995.717	15.00	3.87	0.00	0.00E+000	4
<not ID'd>	5309.089	5.00	2.24	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-229	3.6545E+000	2.83	3.7802E-003	2.05
TH-230	8.6351E-002	12.86	3.7689E-003	2.05
TH-232	2.0854E-002	25.90	3.7621E-003	2.05

Errors quoted at 1.000 sigma

0000012935.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S
****

Sample Description: ARS1-11-00897-022
Batch Identification: B11-01985
Sample Identification: 11-01985-12
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 1 6B
Chamber Serial Number: 10043748B
Detector Serial Number: 57914
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:20
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86402.2 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2243 +/- 0.0046 on 4/11/10 18:34:27
Effective Efficiency: 0.2243 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

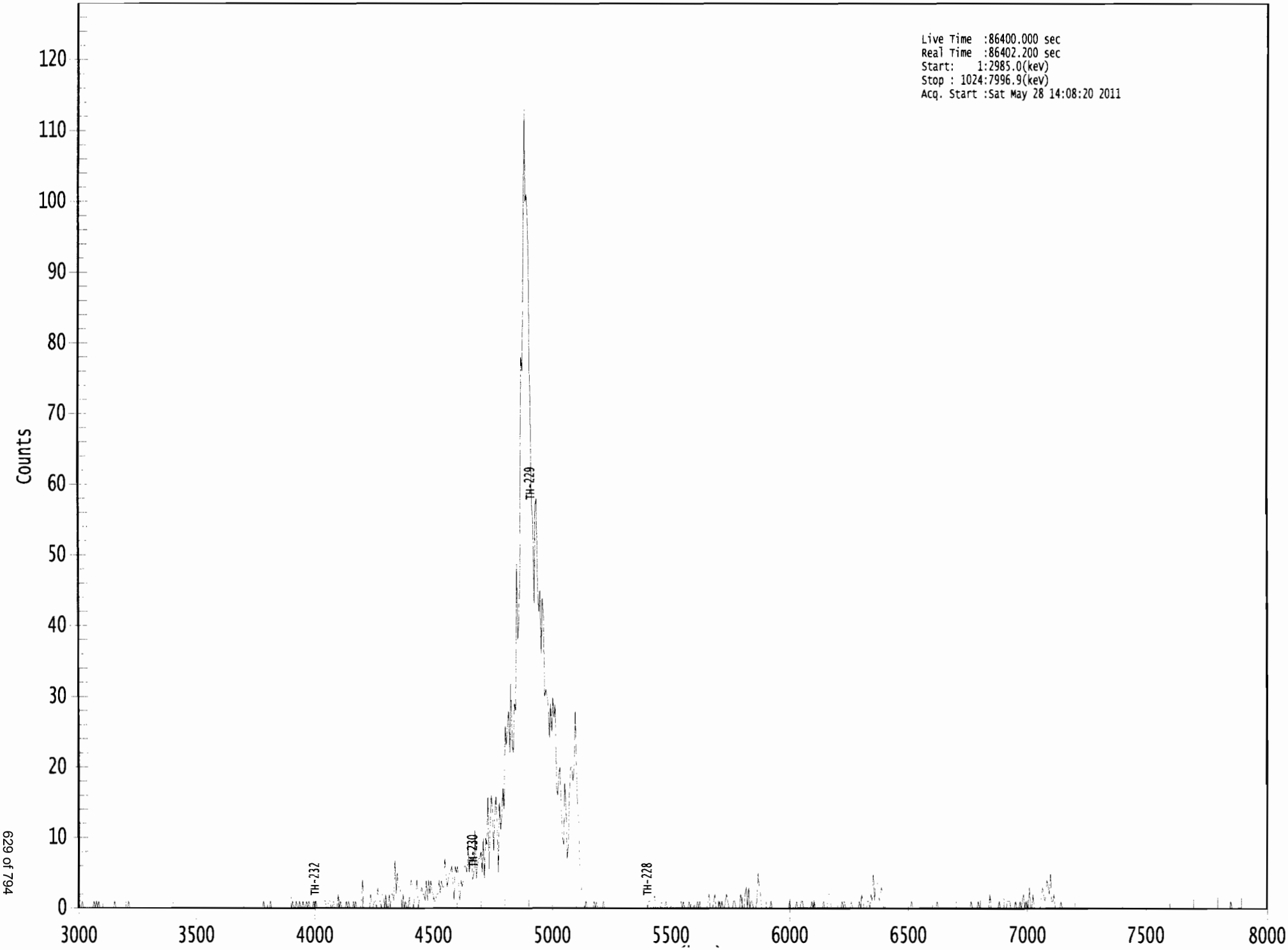
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5389.111	7.00	2.65	0.00	0.00E+000	4
TH-229	4899.987	2583.00	50.82	0.00	0.00E+000	49
TH-230	4653.819	128.00	11.31	0.00	0.00E+000	8
TH-232	3987.875	17.00	4.12	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	9.7682E-003	37.85	3.7761E-003	2.05
TH-229	3.6197E+000	2.84	3.7921E-003	2.05
TH-230	1.7883E-001	9.07	3.7807E-003	2.05
TH-232	2.3709E-002	24.34	3.7739E-003	2.05

Errors quoted at 1.000 sigma

0000012936.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-023
Batch Identification: B11-01985
Sample Identification: 11-01985-13
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 1A
Chamber Serial Number: 12044979A
Detector Serial Number: 55794
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:22
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86405.6 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2205 +/- 0.0045 on 4/12/10 10:36:04
Effective Efficiency: 0.2205 +/- 0.0045

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

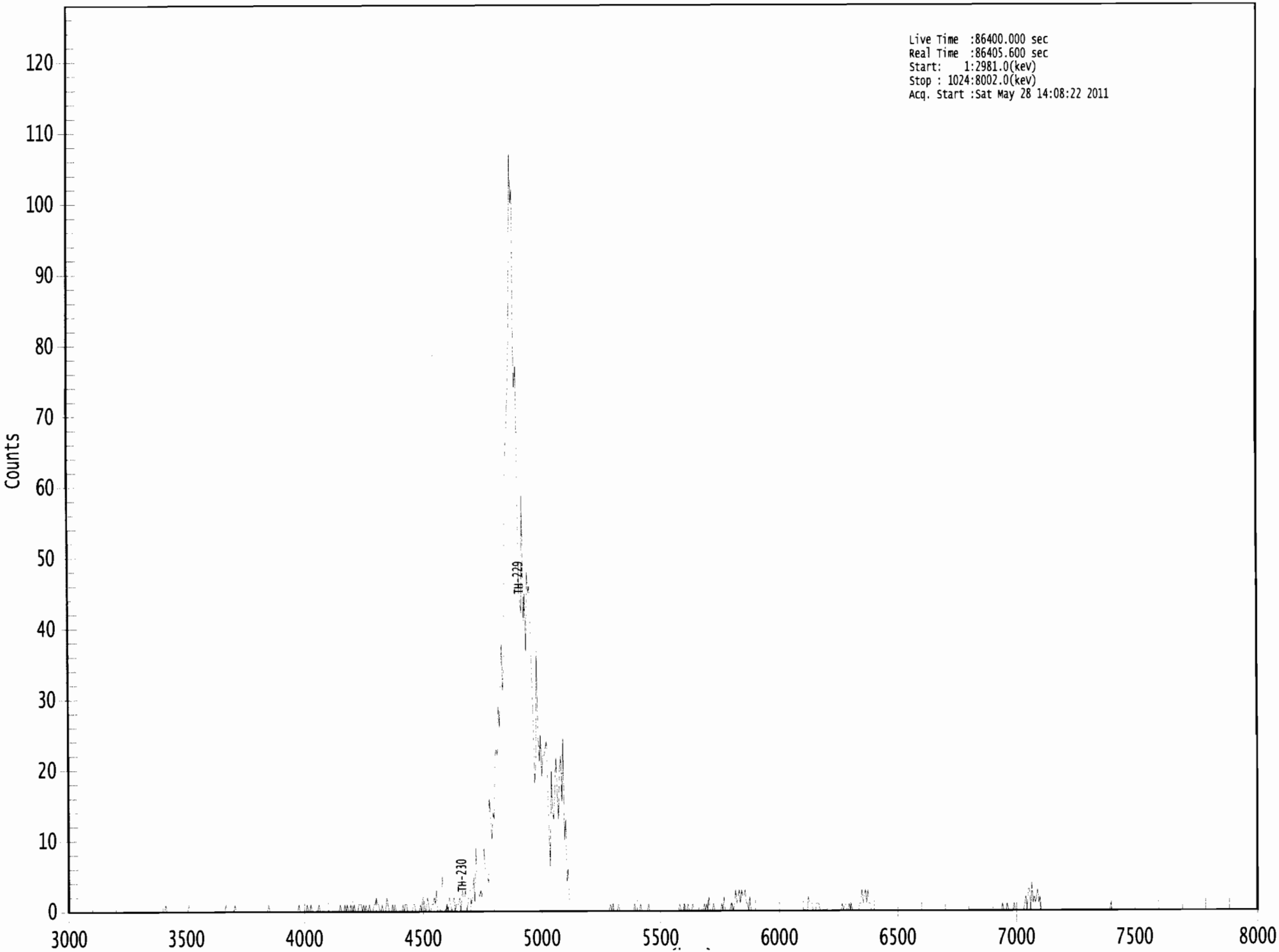
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5340.988	6.00	2.45	0.00	0.00E+000	4
TH-229	4897.015	2383.00	48.82	0.00	0.00E+000	57
TH-230	4648.289	60.00	7.75	0.00	0.00E+000	6
TH-232	3965.570	5.00	2.24	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	8.5162E-003	40.88	3.8409E-003	2.06
TH-229	3.3966E+000	2.90	3.8571E-003	2.06
TH-230	8.5265E-002	13.07	3.8455E-003	2.06
TH-232	7.0926E-003	44.77	3.8386E-003	2.06

Errors quoted at 1.000 sigma

0000012937.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-024
Batch Identification: B11-01985
Sample Identification: 11-01985-14
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 1B
Chamber Serial Number: 12044979B
Detector Serial Number: 55795
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:24
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86405.6 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2148 +/- 0.0044 on 4/13/10 09:49:08
Effective Efficiency: 0.2148 +/- 0.0044

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

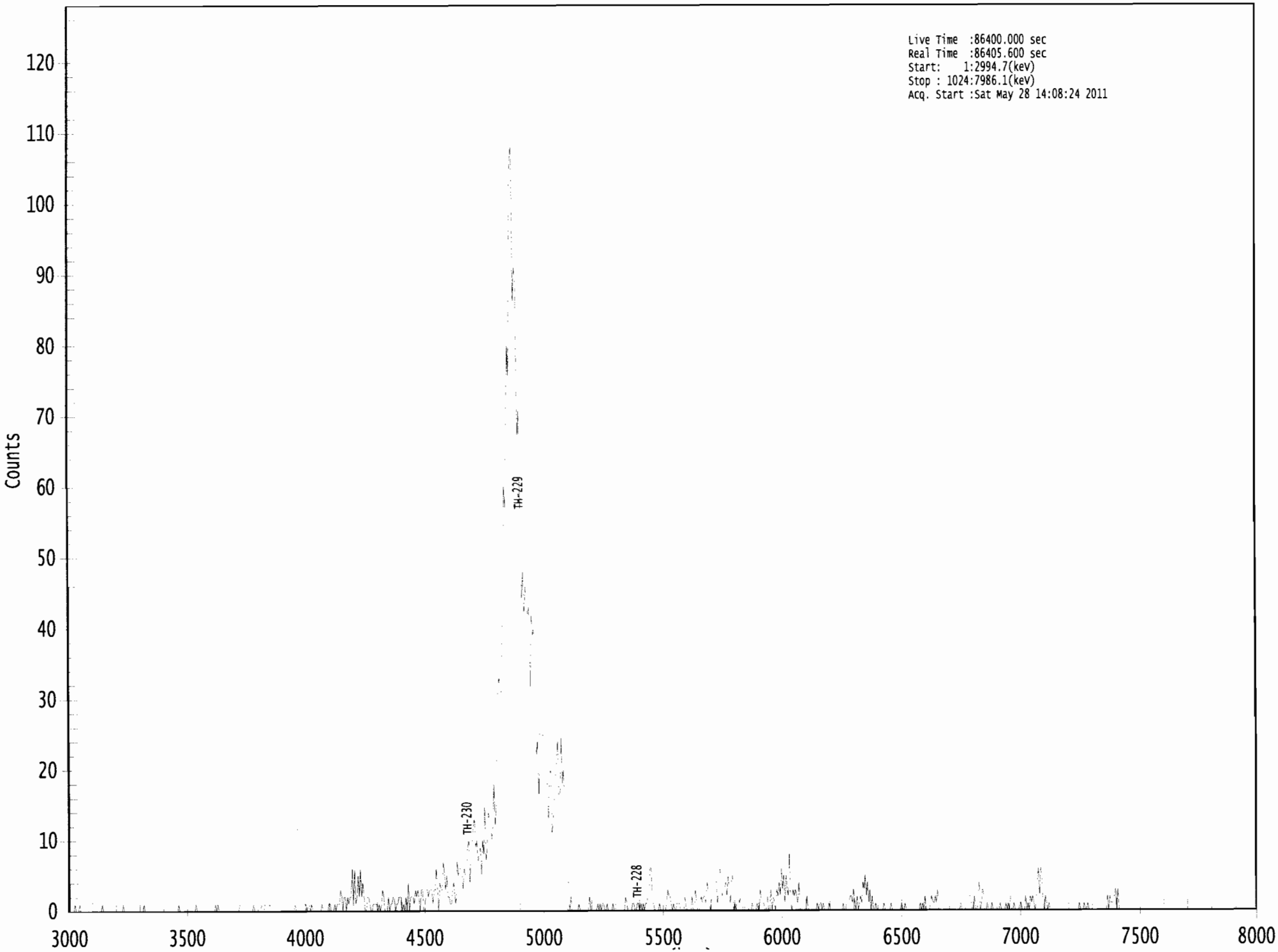
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5390.648	36.00	6.00	0.00	0.00E+000	11
TH-229	4900.298	2596.00	50.95	0.00	0.00E+000	71
TH-230	4678.649	142.00	11.92	0.00	0.00E+000	31
TH-232	3975.817	13.00	3.61	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	5.2465E-002	16.79	3.9437E-003	2.05
TH-229	3.7993E+000	2.84	3.9603E-003	2.05
TH-230	2.0719E-001	8.64	3.9484E-003	2.05
TH-232	1.8934E-002	27.81	3.9413E-003	2.05

Errors quoted at 1.000 sigma

0000012938.CNF



****
***** A L P H A S P E C T R U M A N A L Y S I S *****
****

Sample Description: ARS1-11-00897-025
Batch Identification: B11-01985
Sample Identification: 11-01985-15
Sample Geometry: Shelf 2
Protocol Description: Thorium - 24 Hrs

Detector Name: A 2 2A
Chamber Serial Number: 12044980A
Detector Serial Number: 55796
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000012
Env. Background File: <not performed>
Reagent Blank File: <not performed>

Sample Size: 1.000 units
Sample Date/Time:
Acquisition Date/Time: 5/28/11 14:08:27
Acquisition Live Time: 86400.0 seconds
Acquisition Real Time: 86405.6 seconds

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2232 +/- 0.0046 on 4/12/10 10:37:23
Effective Efficiency: 0.2232 +/- 0.0046

Peak Match Tolerance: 100.000 keV

PEAK AREA REPORT

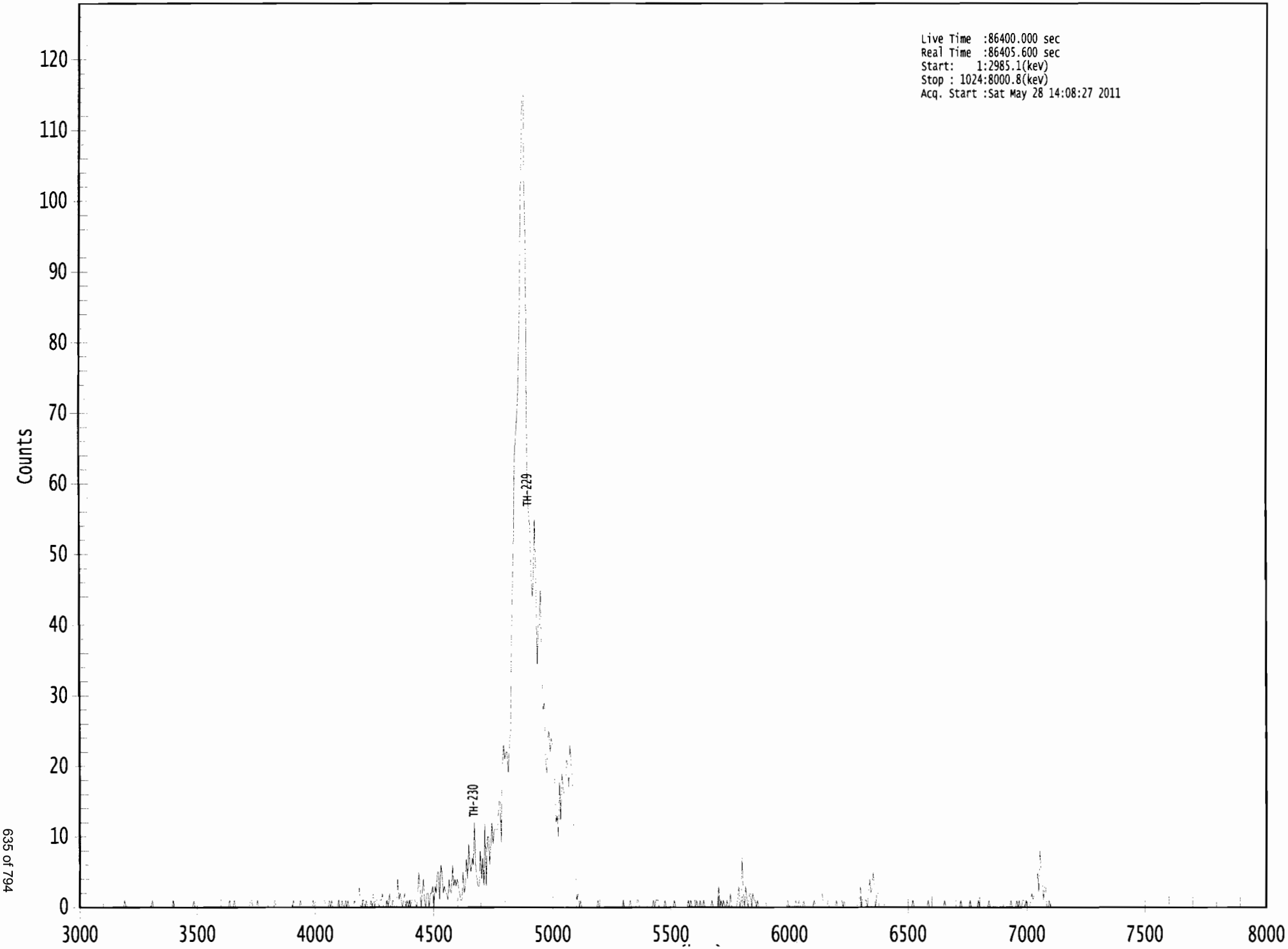
Nuclide	Energy (keV)	Gross Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWH (ke
TH-228	5382.663	9.00	3.00	0.00	0.00E+000	4
TH-229	4888.813	2523.00	50.23	0.00	0.00E+000	59
TH-230	4658.251	120.00	10.95	0.00	0.00E+000	9
TH-232	3994.680	11.00	3.32	0.00	0.00E+000	4

NUCLIDE ACTIVITY REPORT

Nuclide	Activity (pCi/units)	Activity Error %	MDA (pCi/units)	MDA Error %
TH-228	1.2622E-002	33.40	3.7949E-003	2.05
TH-229	3.5532E+000	2.86	3.8110E-003	2.05
TH-230	1.6849E-001	9.36	3.7995E-003	2.05
TH-232	1.5417E-002	30.22	3.7927E-003	2.05

Errors quoted at 1.000 sigma

0000012939.CNF



Alpha Spectroscopy Count Log Book – Canberra System

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01914 - 12	B11-0194	A24B ~~A14B~~ 5-24-11	12773	U	5-27-11 1126		10500
11-01914 -13	↓	A25A ~~A15A~~ 5-24-11	12774	↓	↓		↓
11-01914 -14	↓	A25B	12775	↓	↓		↓
11-01914 -15	↓	A31A	12776	↓	↓		↓
11-01914 -16	↓	A31B	12777	↓	↓		↓ LSW 5-25-11
1-36	Source Check	A11A - A36B	N/A	Source	5-27-11 1820		7200
↓	↓	↓	↓	↓	5-27-11 2055		↓
11-01985 -01	B11-01985	A11A	12900	Th	5-28-11 1410		86400
11-01985 -02	↓	A11B	12901	↓	↓		↓
11-01985 -03	↓	A12A		↓	↓		↓
11-01985 -04	↓	A12B		↓	↓		↓
11-01985 -05	↓	A13A		↓	↓		↓
11-01985 ~~-07~~ -06 5-28-11	↓	A13B		↓	↓		↓
11-01985 -01	↓	A14A		↓	↓		↓
11-01985 ~~-07~~ -08 5-28-11	↓	A14B		↓	↓		↓

Data unavailable LSW 6-02-11

Reviewed By: LSW Date: 6-02-11
Initials

Alpha Spectroscopy Count Log Book – Canberra System

Sample Number	Batch Number	Chamber Number	Spectrum Number	Type of Analysis	Analysis Date and Time	Analyst Initials	Count Time (seconds)
11-01985-09 ~~10~~	5-28-11 B11-01985	A15A	Data unavailable LSW 6-02-11	Th	5 28-11 1410		86400
11-01985 -10 ~~11~~	5-28-11 ↓	A15B		↓	↓		↓
11-01985 11 ~~12~~	5-28-11 ↓	A16A		↓	↓		↓
11-01985 -12 ~~13~~	5-28-11 ↓	A16B		↓	↓		↓
11-01985 -13 ~~14~~	5-28-11 ↓	A21A		↓	↓		↓
11-01985 -14 ~~15~~	5-28-11 ↓	A21B		↓	↓		↓
11-01985 -15	5-28-11 ↓	A22A		↓	↓		↓
11-01984 -01	B11-01984A	A23B		↓	↓		↓
11-01984 -02	↓	A24A		↓	↓		↓
11-01984 -03	↓	A24B		↓	↓		↓
11-01984 -04	↓	A25A		↓	↓		↓
11-01984 -05	↓	A25B		↓	↓		↓
11-01984 -06	↓	5-28-11 ~~A11~~ A31A		↓	↓		↓
11-01984 -07	↓	A31B		↓	↓		↓
11-01984 -08	↓	A32B		↓	↓		↓

Reviewed By: LSW Initials Date: 6-02-11

AMERICAN RADIATION SERVICES, INC.

2609 North River Road • Port Allen, Louisiana 70767

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American Radiation Services Analytical Reports

for

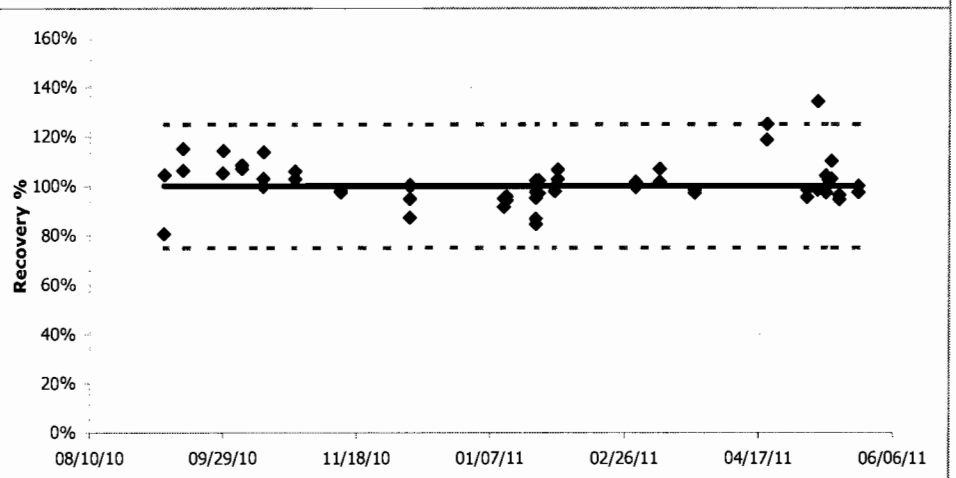
Summit Environmental Technologies

Thorium Alpha Spectroscopy Control Charts

American Radiation Services
Baton Rouge Laboratory

QC Chart

Th LCS



Average	STDEV	n	UCL	LCL
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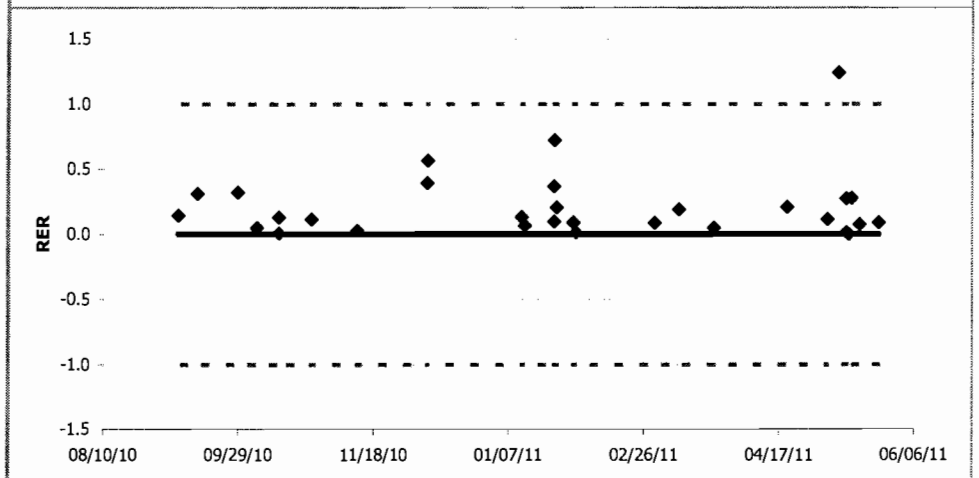
Th RER



		n	UCL	LCL
		30	1.0000	-1.0000

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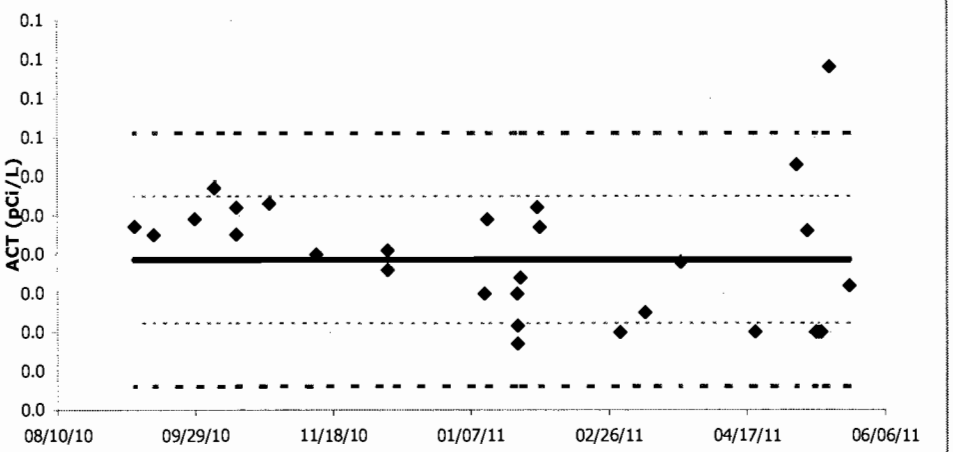

Average	STDEV	n	UCL	LCL
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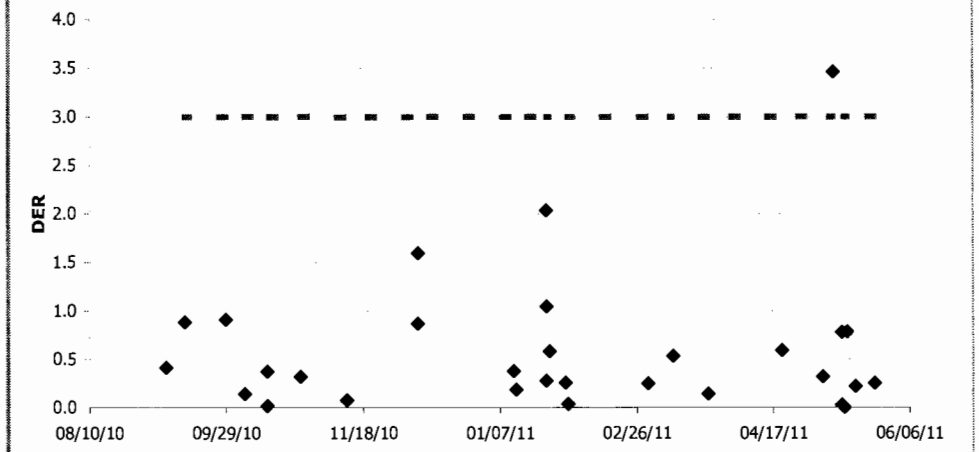
Th DER



		n	UCL	
		30	3.0000	

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American Radiation Services Analytical Reports

for

Summit Environmental Technologies

Alpha Spectroscopy Calibration Information

STD ID: S-0028

ARS INTERNATIONAL

Add/Edit *Secondary Stds*

Planning	
Planning Comments	Dilute working standard for LCS/MS from primary solution S-0028
Target dpm/g (on dil. date)	35
Target Final volume mL	2000
Appx mass g of Parent Sol'n	4.820936645
Appx vol ml of Parent Sol'n	4.578287412
Expected Addition for Analysis g	1

Standards Preparation / Dilution	
Secondary Solution #	S-0028
Dilution Date (New Ref Date)	10/26/2005 00:00
Ampoule, Empty (g)	0
Ampoule /Solution Gross (g)	5.067
Net Wt Removed (g)	5.067
Transfer Container, empty (g)	0
Container Plus Solution (g)	5.067
Net Wt Transferred (g)	5.067
DPM Xferred on 10/26/2005 00:00	73572.83991
Diluent/matrix	1M HNO3
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	
Dilution Empty Container Mass (g)	1
Dilution Full Cont g (if measured)	2107
Dilution Final Volume ml (if measured)	2000
Final Dilution Density (g/mL)	1.053
Final Dilution Measured Mass g	2106
Comments	
Final Dilution dpm/g	34.93487175
Final Dil New Ref Date/Time	10/26/2005 00:00

Parent Standard Data

Parent Solution Reference #	NIST SRM 4321C			
Parent Solution #	S-0063			
Parent Principal Radionuclide	U-238	Half Life (Days)	1631944444444.4400000	
Parent Reference Date	08/01/1997 12:00			
Parent Certified Act	14520	Certi Act/Vol Units	dpm	g
Parent Cert Act Uncert 1 Sigma	0.003			
Parent Sp. Gravity G/Ml	1.053			
Parent Supplier	NIST			
Parent Date Recvd	01/02/00			
Parent Received By	Unknown			
Parent Cert Exp Date				
Parent Matrix	1.0 M HNO3			
Certified dpm/g At Ref Date	14520			
Certified dpm/g on 10/26/2005 00:00	14519.99998			
Parent Comments	S-0028 Entered from dilution record on 4/6/2006 RTS			
Parent Tech	B Steffens			
Is_Primary	FALSE			
Is_LCS	TRUE			
Is_Tracer	FALSE			
Is_Calib	FALSE			

S-0028	
U-238	Verified 6/9/10
S	Expires 6/9/11
Manufactuer	NIST
Sol Matrix	1.0 M HNO3
Ref No	NIST SRM 4321C
Tech	B Steffens
Parent ID	S-0063

ARS INTERNATIONAL

RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY

ARS INTERNATIONAL

QUALITY CONTROL PROGRAM

AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS

ANNUAL ACTIVITY VERIFICATION

VERIFICATION DATE: 6/9/2010 3:27 *date counted*
STANDARD REFERENCE #: S-0028

Principal Radionuclide		Half Life, Years		Half Life, Days
U-238	*ENTER -->*		*OR -->*	1.6320E+12
		4.468E+09		1.6320E+12

Radionuclide: U-238 — Dilution Reference Date: 10/26/2005 0:00

Dilution Activity	15.74	pCi per gram ===> dpm/g	34.93
Verif. Date Decay Corrected	15.74	pCi per gram ===> dpm/g	34.93

Minimum of 3 Required

Trial ID	Sample Counts	Count Time (min)	Detector	Efficiency	Bkg. (cpm)	Net Weight	Decay Corrected Activity Result (dpm/g)	Decay Corrected Activity Result (pCi/g)
S-0241-V1	5696.00	720	A2 1A	0.2205	0.00	1.088	32.98	14.85
S-0241-V2	5721.00	720	A2 2A	0.2232	0.00	1.075	33.12	14.92
S-0241-V4	5880.00	720	A2 4A	0.2250	0.00	1.076	33.73	15.19

	Average	33.27	14.99
	Two Sigma Uncertainty	0.79	0.36
10% Max *PASS*	Standard Deviation percent of known concentration	1.15%	1.15%
	Target Activity	34.93	15.74
5% Max *PASS*	% Diff	-4.75%	-4.75%

Verification Expiration Date: June 9, 2011

Prepared & Counted By: [signature] — Date: 6/9/2010 3:27

Verified & Approved By: Virginia Mulligan — Date: 10-26-10 1545

QC Approval: [signature] — Date: 10-26-10 / 15:48

STD ID: S-0221

ARS INTERNATIONAL

Add/Edit *Secondary Stds*

Planning	
Planning Comments	NT1B Am-241
Target dpm/g (on dil. date)	
Target Final volume mL	
Appx mass g of Parent Sol'n	0
Appx vol ml of Parent Sol'n	
Expected Addition for Analysis g	1

Standards Preparation / Dilution	
Secondary Solution #	S-0221
Dilution Date (New Ref Date)	08/19/2009 12:00
Ampoule, Empty (g)	
Ampoule /Solution Gross (g)	
Net Wt Removed (g)	
Transfer Container, empty (g)	0
Container Plus Solution (g)	1
Net Wt Transferred (g)	1
DPM Xferred on 08/19/2009 12:00	26.725
Diluent/matrix	
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	
Dilution Empty Container Mass (g)	1
Dilution Full Cont g (if measured)	2
Dilution Final Volume ml (if measured)	
Final Dilution Density (g/mL)	
Final Dilution Measured Mass g	1
Comments	NT1b Am-241 LCS standard. Activity determined by averaging 7 standard verifications. Standard was originally diluted by a now unknown tech. No dilution records exist. -BJS 8/19/09
Final Dilution dpm/g	26.725
Final Dil New Ref Date/Time	08/19/2009 12:00

Parent Standard Data

Parent Solution Reference #	NT1b		
Parent Solution #	S-0220		
Parent Principal Radionuclide	Am-241	Half Life (Days)	157870.3703704
Parent Reference Date	08/19/2009 12:00		
Parent Certified Act	26.725	Certl Act/Vol Units	dpm / g
Parent Cert Act Uncert 1 Sigma			
Parent Sp. Gravity G/Ml			
Parent Supplier			
Parent Date Recvd			
Parent Received By			
Parent Cert Exp Date			
Parent Matrix			
Certified dpm/g At Ref Date	26.725		
Certified dpm/g on 08/19/2009 12:00	26.725		
Parent Comments			
Parent Tech	B Steffens		
Is_Primary	TRUE		
Is_LCS	TRUE		
Is_Tracer	FALSE		
Is_Calib	FALSE		

ORIGINAL

QUALITY CONTROL PROGRAM

AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS

ACTIVITY VERIFICATION

NT1b Am-241 Unknown Am-241 Standard
S-0185 Am-243 Tracer **Expires:** 7/17/2010

Am-241 Net	Am-243 Net	gram 243	Am-243 dpm/g	dpm added	Am-241 in test source	grams Am-241 added	Am-241 dpm/g
7740	3319	1.0084	10.98001285	11.07224495	25.821	0.9976	25.88290111
2153	882	1.0053	10.98001285	11.03820691	26.945	0.9954	27.06925723
7690	3141	1.008	10.98001285	11.06785295	27.097	0.9919	27.31831406
4481	1914	1.0073	10.98001285	11.06016694	25.894	0.9862	26.25606836
5010	2049	1.0067	10.98001285	11.05357893	27.027	0.9803	27.57018509
7850	3313	1.004	10.98001285	11.0239329	26.121	0.9923	26.32338832
6936	2908	1.0061	10.98001285	11.04699092	26.349	0.9884	26.65790051
				Average	26.465	Average	26.725
				Standard Dev	0.5505994	Standard Dev	0.616399877
				Average/stdev	2.08%	Average/stdev	2.306%

Performed by: Jamaal Brown Date: 7/17/2009

Reviewed by: Eugene Mulligan Date: 8-19-09

QA Approval: [illegible] Date: 8-19-09

ORIGINAL

STD ID: S-0024

ARS INTERNATIONAL

Add/Edit *Secondary Stds*

Planning	
Planning Comments	S-0024 Dilute working level control standard from SRM 4330B
Target dpm/g (on dil. date)	11.72
Target Final volume mL	1000
Appx mass g of Parent Sol'n	4.978764745
Appx vol ml of Parent Sol'n	4.522038824
Expected Addition for Analysis g	1

Standards Preparation / Dilution	
Secondary Solution #	S-0024
Dilution Date (New Ref Date)	10/26/2005 00:00
Ampoule, Empty (g)	0
Ampoule /Solution Gross (g)	5.357
Net Wt Removed (g)	5.357
Transfer Container, empty (g)	0
Container Plus Solution (g)	5.357
Net Wt Transferred (g)	5.357
DPM Xferred on 10/26/2005 00:00	12610.36486
Diluent/matrix	3M HNO3
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	
Dilution Empty Container Mass (g)	1
Dilution Full Cont g (if measured)	1106
Dilution Final Volume ml (if measured)	1000
Final Dilution Density (g/mL)	1.105
Final Dilution Measured Mass g	1105
Comments	
Final Dilution dpm/g	11.4120949
Final Dil New Ref Date/Time	10/26/2005 00:00

Parent Standard Data

Parent Solution Reference #	NIST SRM 4330B		
Parent Solution #	S-0073		
Parent Principal Radionuclide	Pu-239	Half Life (Days)	8806712.9629630
Parent Reference Date	11/15/1999 00:00		
Parent Certified Act	2354.4	Certi Act/Vol Units	dpm / g
Parent Cert Act Uncert 1 Sigma	0.0034		
Parent Sp. Gravity G/Ml	1.101		
Parent Supplier	NIST		
Parent Date Recvd	01/02/00		
Parent Received By	Unknown		
Parent Cert Exp Date			
Parent Matrix	3.1M HNO3		
Certified dpm/g At Ref Date	2354.4		
Certified dpm/g on 10/26/2005 00:00	2353.997548		
Parent Comments	S-0024 Information entered from dilution records		
Parent Tech	B Steffens		
Is_Primary	FALSE		
Is_LCS	TRUE		
Is_Tracer	FALSE		
Is_Calib	FALSE		

S-0024	
Pu-239	Verified 10/6/10
S	Expires 10/6/11
Manufactuer	NIST
Sol Matrix	3.1M HNO3
Ref No	NIST SRM 4330B
Tech	B Steffens
Parent ID	S-0073

ARS INTERNATIONAL

RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY

S-0024	
Pu-239	Verified 10/6/10
S	Expires 10/6/11
Manufactuer	NIST
Sol Matrix	3.1M HNO3
Ref No	NIST SRM 4330B
Tech	B Steffens
Parent ID	S-0073

ARS INTERNATIONAL

RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY

ARS AMERICAN RADIATION SERVICES, INC.

QUALITY CONTROL PROGRAM

AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS

ACTIVITY VERIFICATION

Pu Standard Verification 10/6/2010

S-0223 Pu-242
S-0024 Pu-239

Pu239 counts	Pu242 counts	gram 242	Pu-242 dpm/g	dpm added	Pu-239 in test source	grams 239 added	Pu-239/g	target	
1578	1079	1.109	7.6699	8.505919	12.440	1.107	11.23723	11.41	98.5%
1705	1173	1.098	7.6699	8.42155	12.241	1.099	11.13835	11.41	97.6%
812	547	1.096	7.6699	8.40621	12.479	1.09	11.44834	11.41	100.3%
1601	1085	1.099	7.6699	8.42922	12.438	1.09	11.41097	11.41	100.0%
1747	1188	1.096	7.6699	8.40621	12.362	1.092	11.3202	11.41	99.2%
						12.392	11.311	bias	1.2%
						0.094343	0.12668	stdev	1.4%
						0.007613	1.120%	rsd	1.4%

10-6-10

10-6-10

Eugene Mulligan 10-11-10

STD ID: S-0231

Add/Edit Secondary Stds

Planning	
Planning Comments	Create a Th-230 LCS stock solution.
Target dpm/g (on dil. date)	12.5
Target Final volume mL	1000
Appx mass g of Parent Sol'n	2.657312886
Appx vol ml of Parent Sol'n	
Expected Addition for Analysis g	1

Standards Preparation / Dilution	
Secondary Solution #	S-0231
Dilution Date (New Ref Date)	02/19/2010 14:44
Ampoule, Empty (g)	
Ampoule /Solution Gross (g)	
Net Wt Removed (g)	
Transfer Container, empty (g)	13.115
Container Plus Solution (g)	15.824
Net Wt Transferred (g)	2.709
DPM Xferred on 02/19/2010 14:44	12743.13619
Diluent/matrix	0.5M HNO3
Diluent Density Cont, empty (g)	
Test Mass of 5 ml of Diluent (g)	
Diluent Density Test - (g/mL)	
Dilution Empty Container Mass (g)	303.59
Dilution Full Cont g (if measured)	1318.29
Dilution Final Volume ml (if measured)	1000
Final Dilution Density (g/mL)	1.0147
Final Dilution Measured Mass g	1014.7
Comments	Primary Th-230 LCS standard. Dilution performed as stated above by B Steffens on 2/19/10. -BJS 2/19/10
Final Dilution dpm/g	12.55852586
Final Dil New Ref Date/Time	02/19/2010 14:44

Parent Standard Data

Parent Solution Reference #	75861-526			
Parent Solution #	S-0172			
Parent Principal Radionuclide	Th-230	Half Life (Days)	27534722.2222222	
Parent Reference Date	02/05/2008 12:00			
Parent Certified Act	4704.088304	Certi Act/Vol Units	dpm	g
Parent Cert Act Uncert 1 Sigma	0.02			
Parent Sp. Gravity G/Ml				
Parent Supplier	Analytics			
Parent Date Recvd	09/11/07			
Parent Received By	S Clayton			
Parent Cert Exp Date				
Parent Matrix	0.5M HNO3			
Certified dpm/g At Ref Date	4704.088304			
Certified dpm/g on 02/19/2010 14:44	4704.00007			
Parent Comments	Intermediate level Th-230 standard for use in creating LCS stock solutions. Dilution performed as stated above by B Steffens on 2/5/08. -BJS 2/5/08			
Parent Tech	B Steffens			
Is_Primary	FALSE			
Is_LCS	FALSE			
Is_Tracer	FALSE			
Is_Calib	FALSE			

S-0231		
Th-230	Verified	10/18/10
SL	Expires	10/18/11
Manufactuer	Analytics	
Sol Matrix	0.5M HNO3	
Ref No	75861-526	
Tech	B Steffens	
Parent ID	S-0172	

RADIOACTIVE STANDARDS -- BATON ROUGE LABORATORY

QUALITY CONTROL PROGRAM

AMERICAN RADIATION SERVICES
RADIOACTIVE REFERENCE SOLUTIONS

ACTIVITY VERIFICATION

S-0246 Th-229
S-0231 Th-230 LCS

Expires: 10/15/2011

Th-230 Net	Th-229 Net	gram 229	Th-229 dpm/g	dpm added	Th-230 in test source	grams Th-230 added	Th-230 dpm/g
3508	3097	1.0226	11.204	11.4572104	12.978	1.0226	12.69087246
3519	3099	1.0244	11.204	11.4773776	13.033	1.0256	12.70756525
3660	3346	1.0227	11.204	11.4583308	12.534	1.0251	12.22672858
3370	2999	1.0231	11.204	11.4628124	12.881	1.025	12.56668574
3626	3363	1.0243	11.204	11.4762572	12.374	1.0254	12.06723839

Average	12.760	Average	12.452
Standard Dev	0.29021346	Standard Dev	0.289099902
Average/stdev	2.27%	Average/stdev	2.322%

Performed by: Brian Steffens/Jamaal Brown Date: 10/15/2010

Reviewed by: Virginia Mullegan Date: 10-18-10

QA Approval: [illegible] Date: 10-18-10 / 1601

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

COPY

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62919A-526

Mixed Alpha Source on Stainless Steel Disk

This standard radionuclide source was prepared by electro-deposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: January 18, 2002 12:00 EST

Total Activity: 482.5 dpm
Expanded Uncertainty (dpm [k=3]): 16.0

ISOTOPE:	U-238	U-234	Pu-239	Am-241
ACTIVITY (DPM):	120.9	117.5	119.7	119.3
HALF-LIFE:	4.468 E9 y	2.455 E5 y	2.41 E4 y	4.322 E2 y
EXPANDED UNCERTAINTY DPM (k=3):	5.2	5.1	5.2	5.2
ENERGY RANGE (keV):	3900-4290	4640-4980	4950-5260	5260-5590

Impurities: U-235 <4.7 dpm.
Disk diameter: 19.3 mm; disk thickness: 0.75 mm; diameter of active area: 16 mm.

P O Number: 01-0192, Item 2

SOURCE CALIBRATED BY: _____, for
Daniel M. Montgomery, Radiochemist

Q A APPROVED: _____ 1/23/02

ANALYTICS

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Atlanta, Georgia 30318 • U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70719-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 507
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	122	2.455 E5 y	4	4580-4860
Pu-239	127	2.41 E4 y	4	4950-5240
Am-241	127	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈5.3 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: D. M. Montgomery, Radiochemist

Q A APPROVED: 05-19-2005

ANALYTICS

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Atlanta, Georgia 30318 • U.S.A

Phone (404) 352-8677
Fax (404) 352-2837

COPY

CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70720-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 509
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	123	2.455 E5 y	4	4580-4860
Pu-239	128	2.41 E4 y	4	4950-5240
Am-241	127	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈4.9 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: D. M. Montgomery, Radiochemist

Q A APPROVED: 05-19-2005

ANALYTICS

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Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

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CERTIFICATE OF CALIBRATION
Standard Radionuclide Source

70721-526

19.3 mm Diameter x 0.75 mm Thick Stainless Steel Disk

This standard radionuclide source was prepared by electrodeposition of a mixture of alpha emitters onto a stainless steel disk. Total alpha activity was determined with a ZnS scintillation detector. Radionuclide activities were calculated from the total activity and the fraction of activity for each radionuclide determined by alpha spectroscopy.

Analytics maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Regulatory Guide 4.15, Rev. 1.

CALIBRATION DATE: May 10, 2005 12:00 EST

TOTAL ACTIVITY (dpm): 509
EXPANDED UNCERTAINTY (dpm [k=2]): 15
ENERGY RANGE (keV): 3700-7950

ISOTOPE	ACTIVITY (dpm)	HALF-LIFE	EXPANDED UNCERTAINTY (dpm [k=2])	ENERGY RANGE (keV)
U-238	125	4.468 E9 y	4	3900-4290
U-234	125	2.455 E5 y	4	4580-4860
Pu-239	127	2.41 E4 y	4	4950-5240
Am-241	125	4.322 E2 y	4	5275-6690

Impurities: U-235 ≈5.0 dpm

Diameter of active area: 16 mm.

CAUTION: Active material deposited on the unmarked surface. Handle carefully to prevent scratching or damaging the active surface of this source (i.e., use Teflon coated forceps). Store in the container provided when not in use.

PO NUMBER 05-0248, Item 1

SOURCE CALIBRATED BY: D. M. Montgomery, Radiochemist

Q A APPROVED: 05-19-2005

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:04:14 05/25/10

Analyst: jarmstrong
Detector: 219 - A1

Calibration

Energy Calibration: A1 Calib 6-19-09
Description:

Analysis Date: 06/22/09 08:31:32
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 62919A-526
Prepared by: Analytics
Description:

Certification Date: 01/18/02 11:00:28

Acquisition

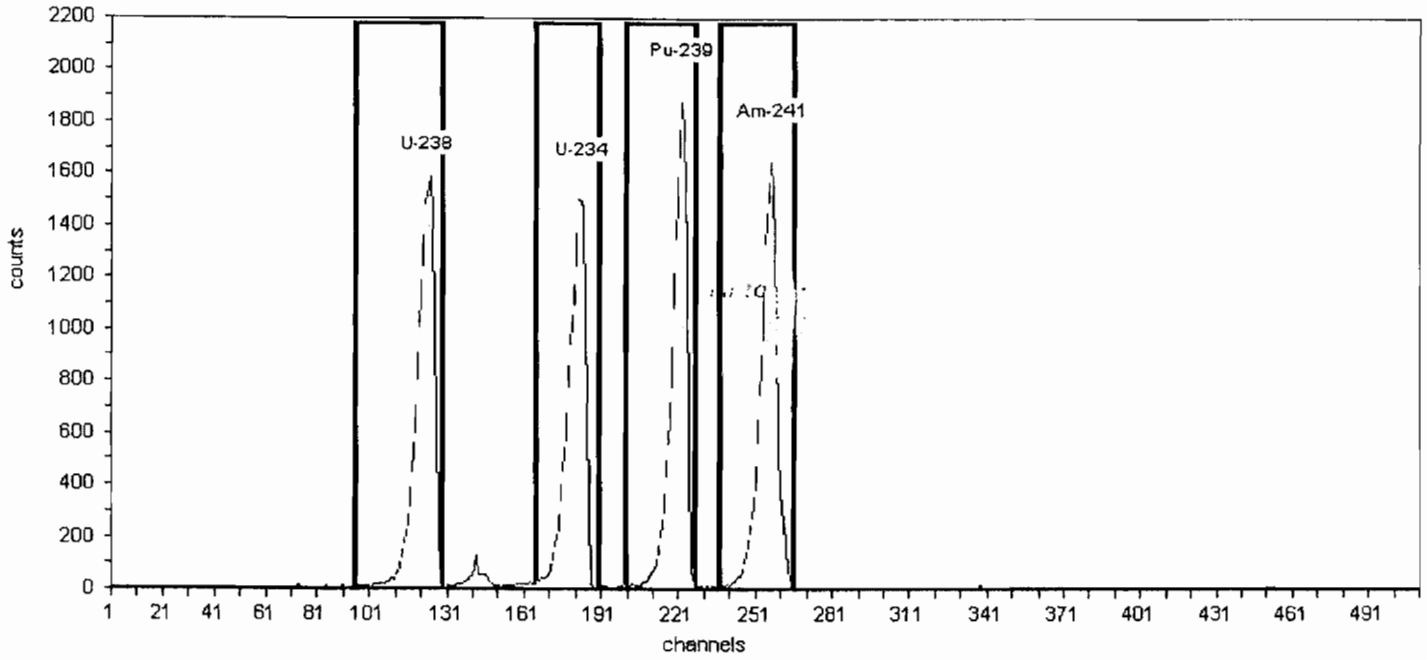
Detector: 219 - A1 , SN: 72012
Acquisition Start Date: 06/19/09 08:47:05

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: A1 Calib 6-19-09

Energy Calibration Equation:
Gain = 9.6386 keV / Ch
Offset = 3,011.65 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.60% +/- 1.09% TPU(2 sigma)



Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Am-241	257	5.49	237	266	12,131.00	28.88
Am-241	257	5.49	237	266	12,131.00	28.88
Am-241	257	5.49	237	266	12,131.00	28.88
Am-241	257	5.49	237	266	12,131.00	28.88
Am-241	257	5.49	237	266	12,131.00	28.88
Am-241	257	5.49	237	266	12,131.00	28.88
Am-241	257	5.49	237	266	12,131.00	28.88
Am-241	257	5.49	237	266	12,131.00	28.88
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-238	123	4.20	95	129	12,626.00	30.06
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
U-234	183	4.78	165	190	12,040.00	28.67
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59
Pu-239	222	5.16	200	227	12,426.00	29.59

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:04:22 05/25/10

Analyst: jarmstrong
Detector: 219 - A2

Calibration

Energy Calibration: A2 Calib 6-19-09
Description:

Analysis Date: 06/22/09 19:53:02
Calibration Type: Energy

Source Info

Certificate ID: 70719-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

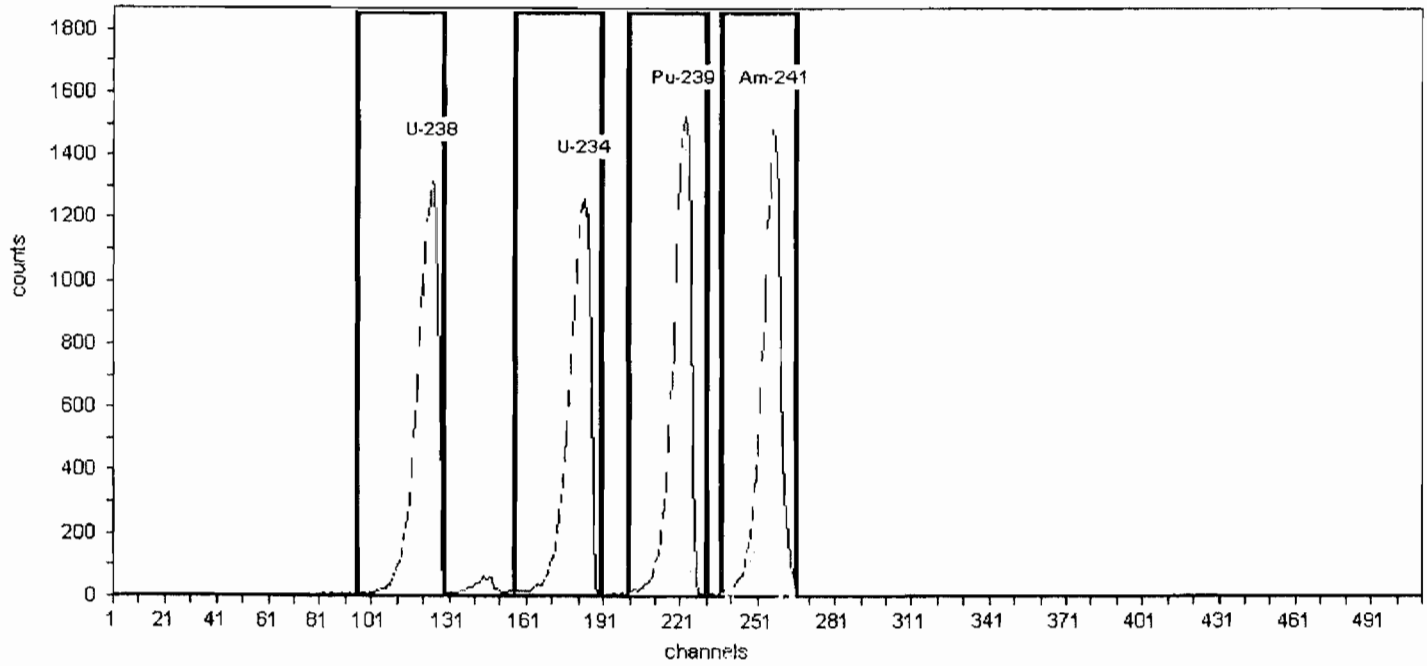
Detector: 219 - A2 , SN: 72013
Acquisition Start Date: 06/19/09 08:47:34

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: A2 Calib 6-19-09

Energy Calibration Equation:
Gain = 9.7102 keV / Ch
Offset = 2,995.18 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.76% +/- 0.79% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	124	4.20	95	129	12,526.00	29.82
U-234	183	4.78	156	190	12,105.00	28.82
Pu-239	222	5.16	200	231	12,769.00	30.40
Am-241	257	5.49	237	266	12,391.00	29.50

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:04:28 05/25/10

Analyst: jarmstrong
Detector: 219 - A3

Calibration

Energy Calibration: A3 Calib 6-20-08
Description:

Analysis Date: 06/20/08 15:48:31
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 70720-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

Detector: 219 - A3 , SN: 72014
Acquisition Start Date: 06/20/08 07:18:58

Live Time: 420.00 min.
Real Time: 420.05 min.

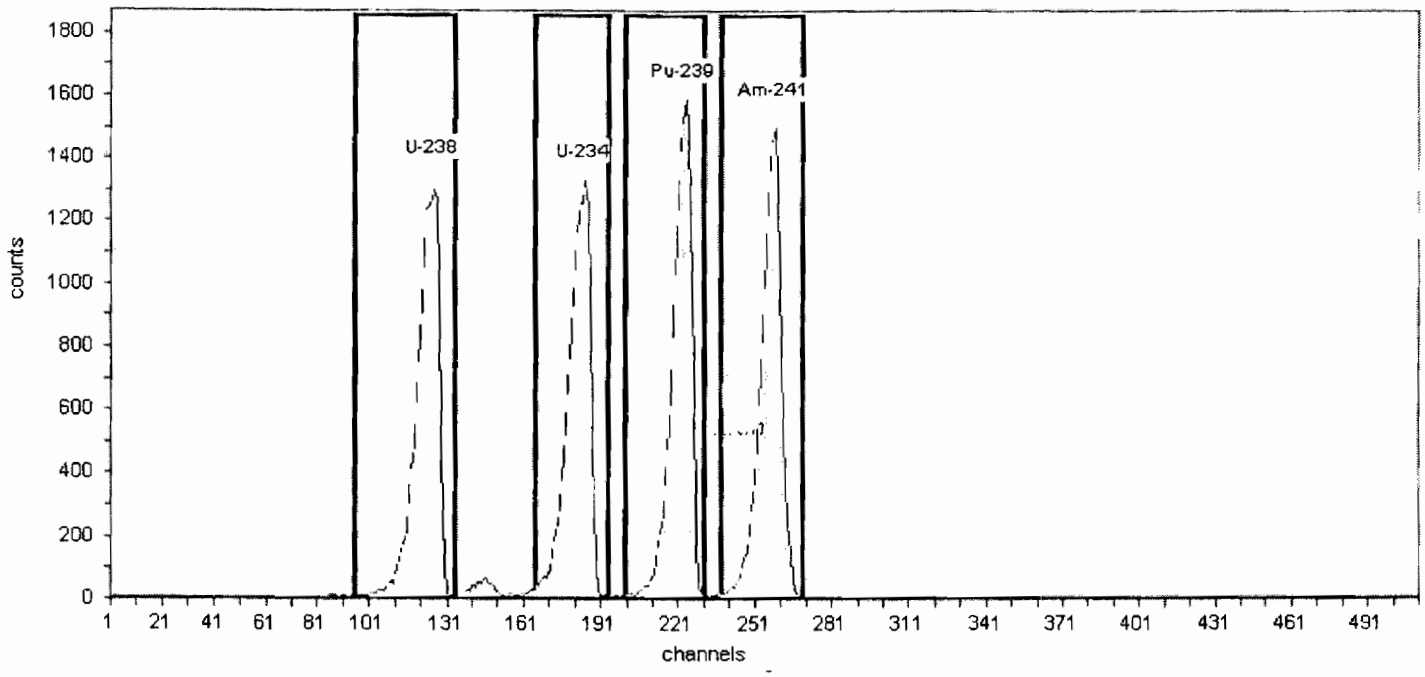
Efficiency Calibration Name: A3 Calib 6-20-08

Energy Calibration Equation:
Gain = 9.7102 keV / Ch

Offset = 2,985.47 keV

Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.69% +/- 0.85% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	125	4.20	95	134	13,321.00	31.72
U-234	184	4.78	165	194	13,318.00	31.71
Pu-239	223	5.16	200	231	13,580.00	32.33
Am-241	258	5.49	238	270	13,611.00	32.41

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 219 - A4

09:04:35 05/25/10

Calibration

Energy Calibration: A4 Calib 6-19-09
Description:

Analysis Date: 06/22/09 19:53:40
Calibration Type: Energy

Source Info

Certificate ID: 70721-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

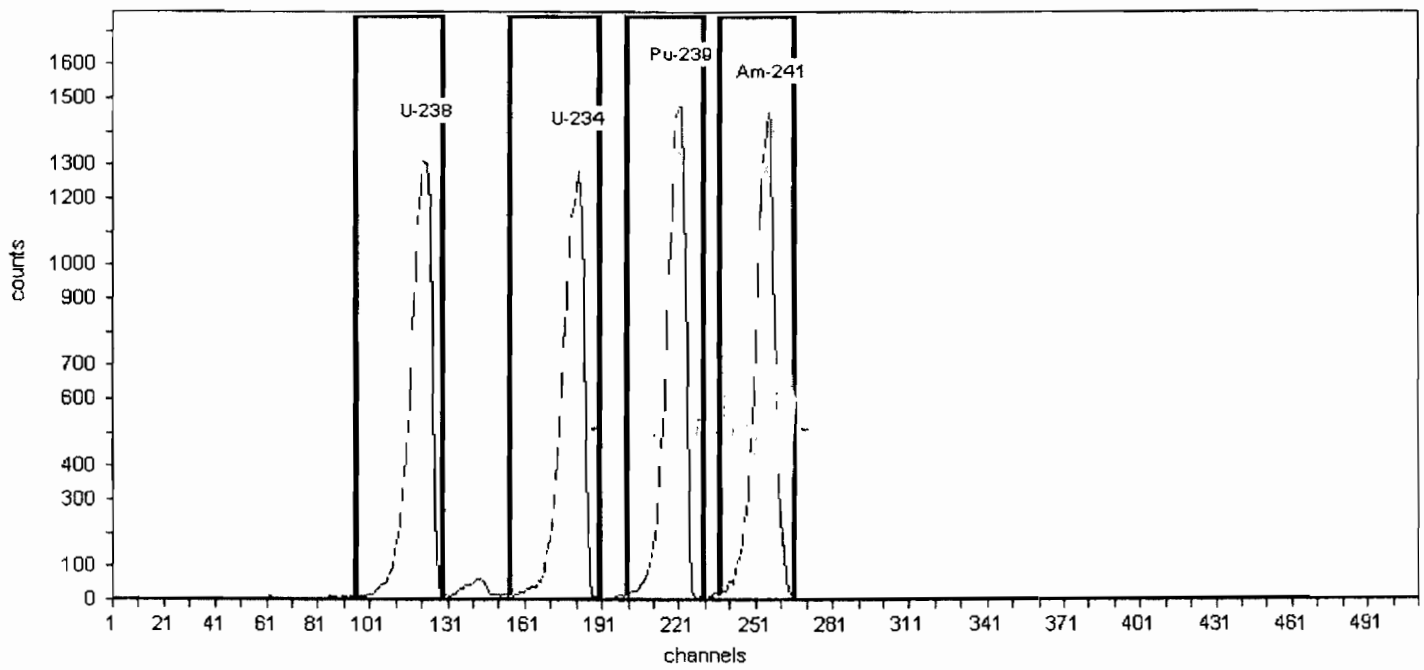
Detector: 219 - A4 , SN: 72015
Acquisition Start Date: 06/19/09 08:47:51

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: A4 Calib 6-19-09

Energy Calibration Equation:
Gain = 9.6250 keV / Ch
Offset = 3,016.73 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.50% +/- 0.81% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	12,895.00	30.70
U-234	182	4.78	155	190	12,484.00	29.72
Pu-239	222	5.16	200	230	13,039.00	31.05
Am-241	257	5.49	237	266	12,978.00	30.90

AlphaVision v5.3 **Alpha Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:04:41 05/25/10

Analyst: jarmstrong
Detector: 219 - A5

Calibration

Energy Calibration: A5 Calib 6-22-09
Description:

Analysis Date: 06/22/09 19:54:05
Calibration Type: Efficiency

Source Info

Certificate ID: 62919A-526
Prepared by: Analytics
Description:

Certification Date: 01/18/02 11:00:28

Acquisition

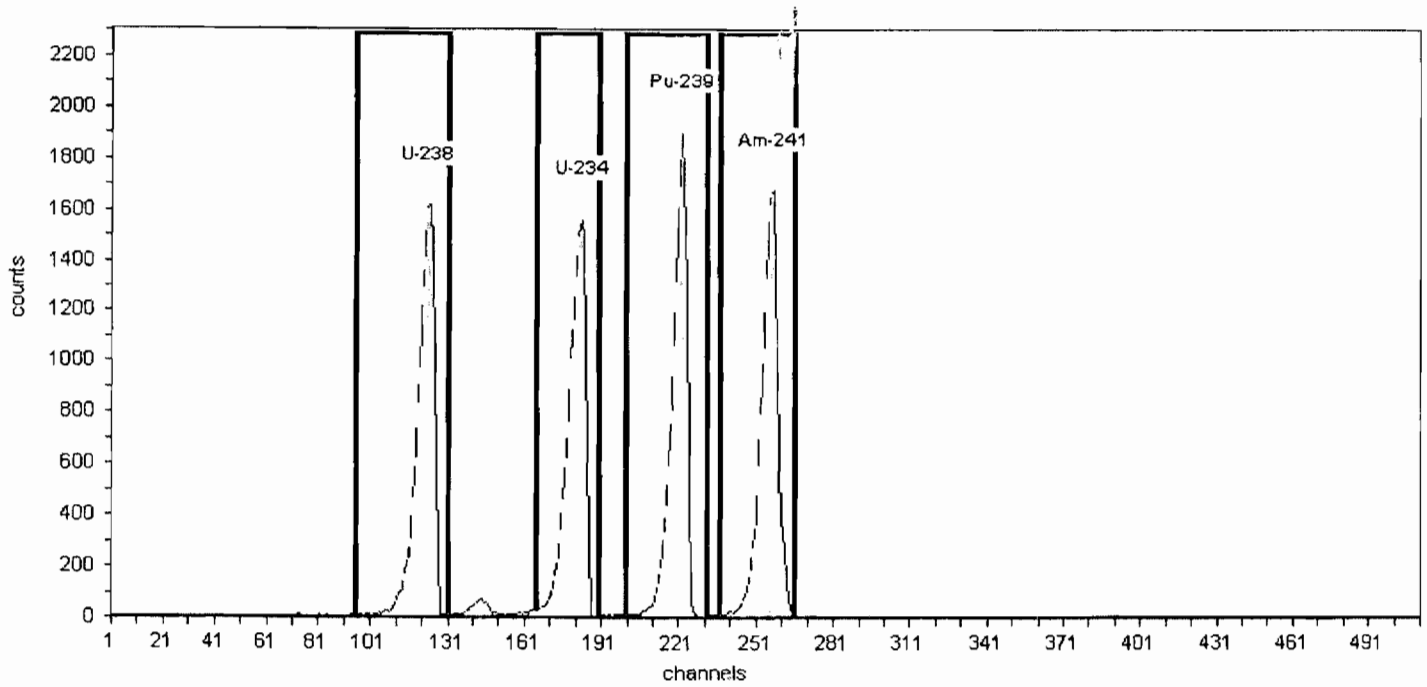
Detector: 219 - A5 , SN: 72016
Acquisition Start Date: 06/22/09 08:33:05

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: A5 Calib 6-22-09

Energy Calibration Equation:
Gain = 9.6386 keV / Ch
Offset = 3,011.65 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.13% +/- 1 11% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	131	12,727.00	30.30
U-234	183	4.78	165	190	12,460.00	29.67
Pu-239	222	5.16	200	232	12,486.00	29.73
Am-241	257	5.49	237	266	12,545.00	29.87

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:04:47 05/25/10

Analyst: jarmstrong
Detector: 219 - A6

Calibration

Energy Calibration: A6 Calib 6-22-09
Description:

Analysis Date: 06/22/09 19:54:40
Calibration Type: Energy

Source Info

Certificate ID: 70719-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

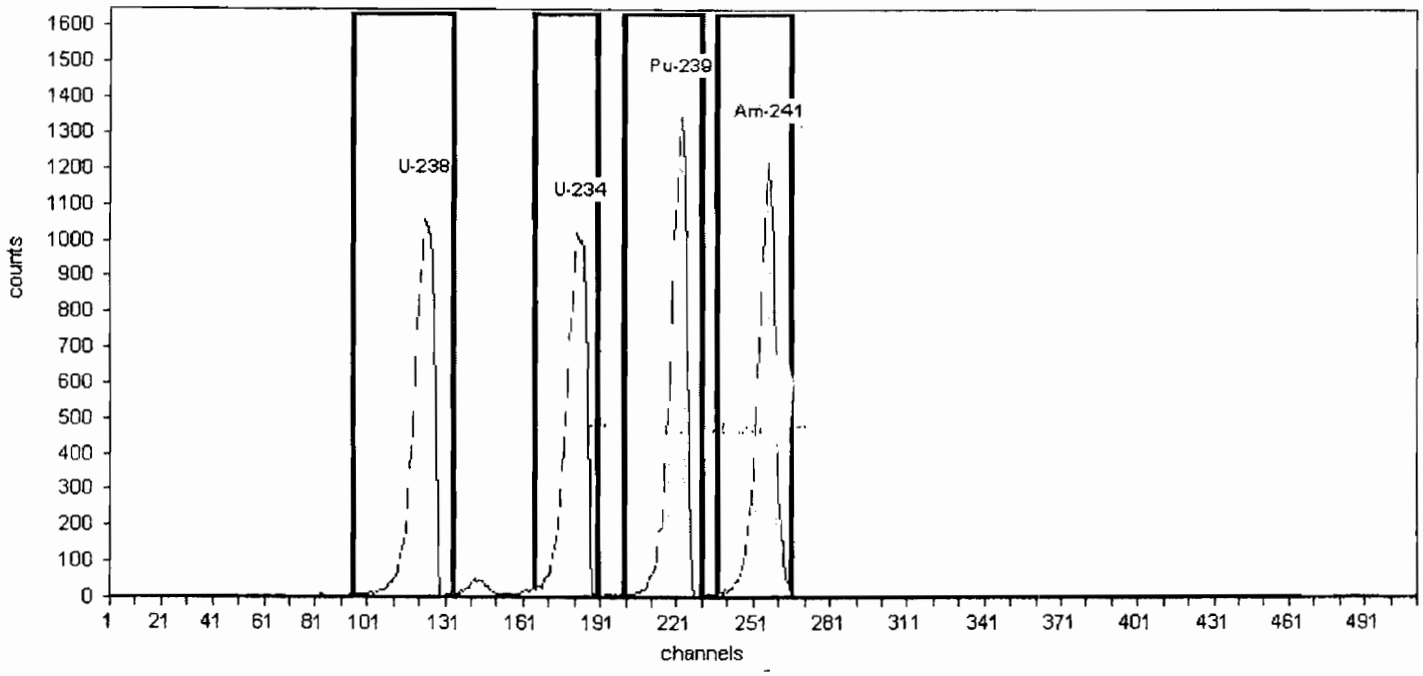
Detector: 219 - A6 , SN: 72017
Acquisition Start Date: 06/22/09 08:33:16

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: A6 Calib 6-22-09

Energy Calibration Equation:
Gain = 9.6133 keV / Ch
Offset = 3,014.21 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 18.49% +/- 0.62% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	134	9,662.00	23.00
U-234	183	4.78	165	190	9,573.00	22.79
Pu-239	223	5.16	200	231	9,994.00	23.80
Am-241	257	5.49	237	266	9,634.00	22.94

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 219 - A7

09:04:54 05/25/10

Calibration

Energy Calibration: A7 Calib 6-22-09
Description:

Analysis Date: 06/22/09 19:55:28
Calibration Type: Energy

Source Info

Certificate ID: 70720-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

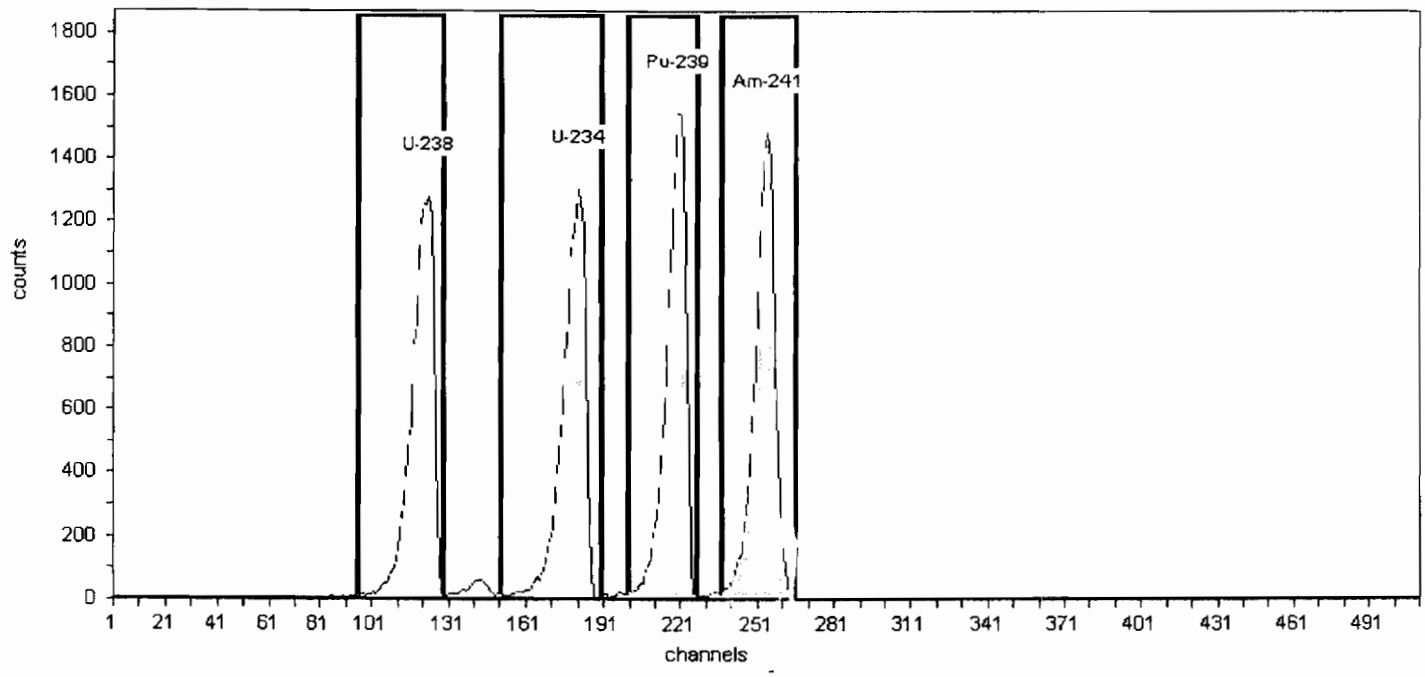
Detector: 219 - A7 , SN: 72018
Acquisition Start Date: 06/22/09 08:33:41

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: A7 Calib 6-22-09

Energy Calibration Equation:
Gain = 9.7824 keV / Ch
Offset = 2,998.11 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.30% +/- 0.83% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	13,243.00	31.53
U-234	181	4.78	151	190	12,904.00	30.72
Pu-239	220	5.16	200	227	13,703.00	32.63
Am-241	255	5.49	237	266	13,284.00	31.63

AlphaVision v5.3 **Alpha Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:05:00 05/25/10

Analyst: jarmstrong
Detector: 219 - A8

Calibration

Energy Calibration: A8 Calib 6-19-08
Description:

Analysis Date: 06/20/08 07:06:56
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 70721-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

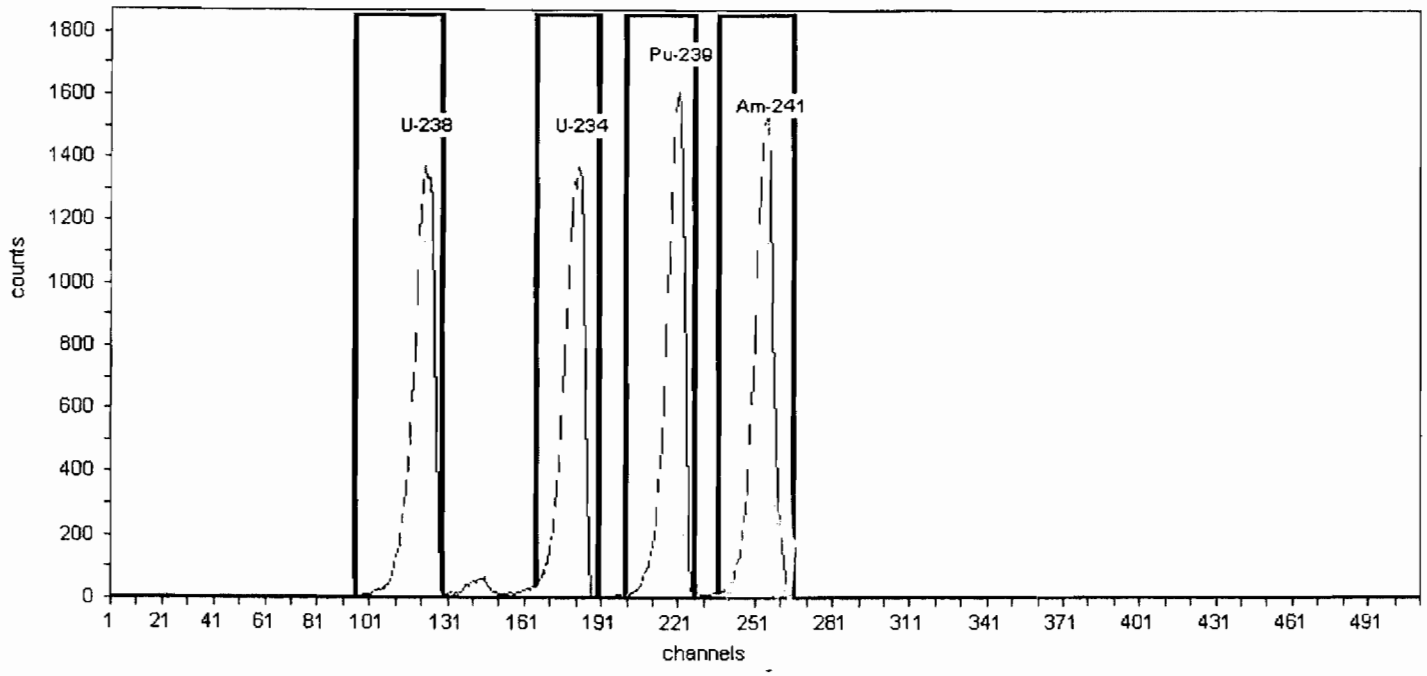
Detector: 219 - A8 , SN: 72019
Acquisition Start Date: 06/19/08 15:32:40

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: A8 Calib 6-19-08

Energy Calibration Equation:
Gain = 9.6386 keV / Ch
Offset = 3,011.65 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.04% +/- 0.83% TPU(2 sigma)



Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	13,216.00	31.47
U-234	183	4.78	165	190	12,857.00	30.61
Pu-239	222	5.16	200	227	13,437.00	31.99
Am-241	257	5.49	237	266	13,271.00	31.60

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:05:08 05/25/10

Analyst: jarmstrong
Detector: 262 - B1

Calibration

Energy Calibration: B1 Calib 4-27-09
Description:

Analysis Date: 04/28/09 08:09:33
Calibration Type: Energy

Source Info

Certificate ID: 62919A-526
Prepared by: Analytics
Description:

Certification Date: 01/18/02 11:00:28

Acquisition

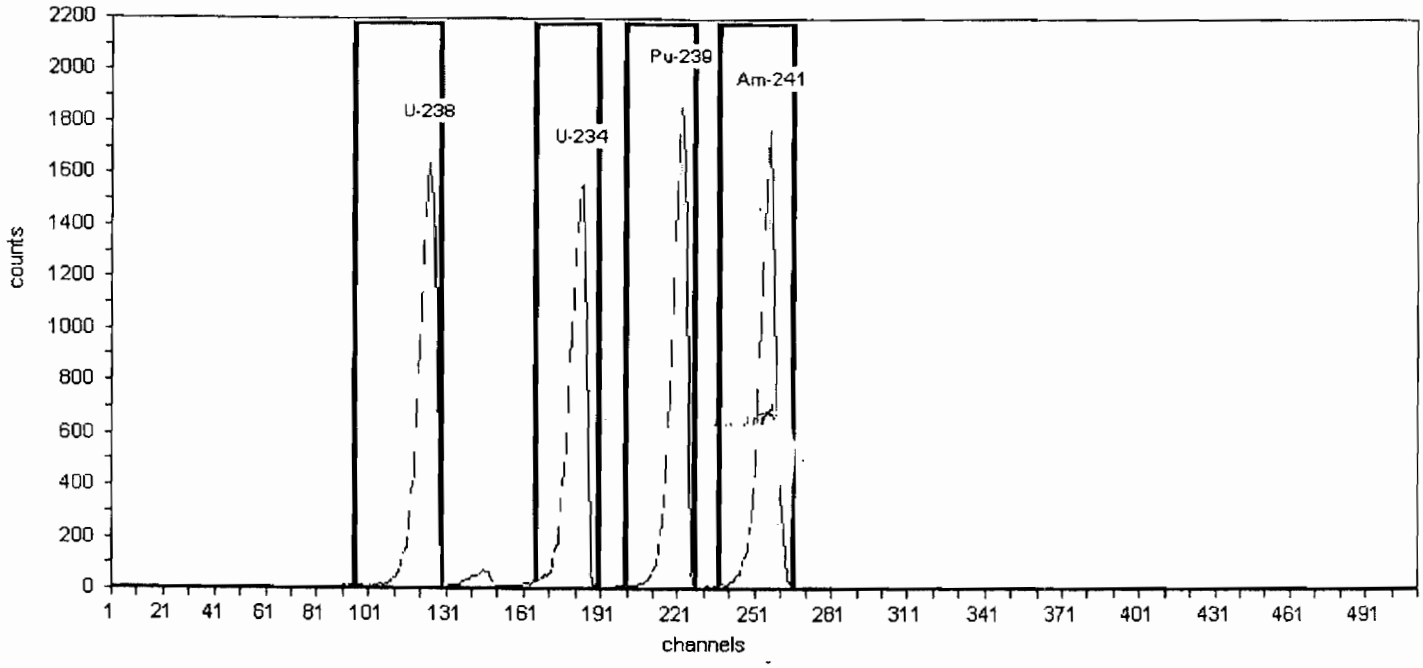
Detector: 262 - B1 , SN: 59507
Acquisition Start Date: 04/27/09 13:53:03

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: B1 Calib 4-27-09

Energy Calibration Equation:
Gain = 9.7102 keV / Ch
Offset = 2,995.18 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.08% +/- 1.11% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	124	4.20	95	129	12,880.00	30.67
U-234	183	4.78	165	190	12,186.00	29.01
Pu-239	222	5.16	200	227	12,629.00	30.07
Am-241	257	5.49	237	266	12,486.00	29.73

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 262 - B2

09:05:14 05/25/10

Calibration

Energy Calibration: B2 04-27-09 Calib
Description:

Analysis Date: 04/28/09 08:08:25
Calibration Type: Energy

Source Info

Certificate ID: 70719-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

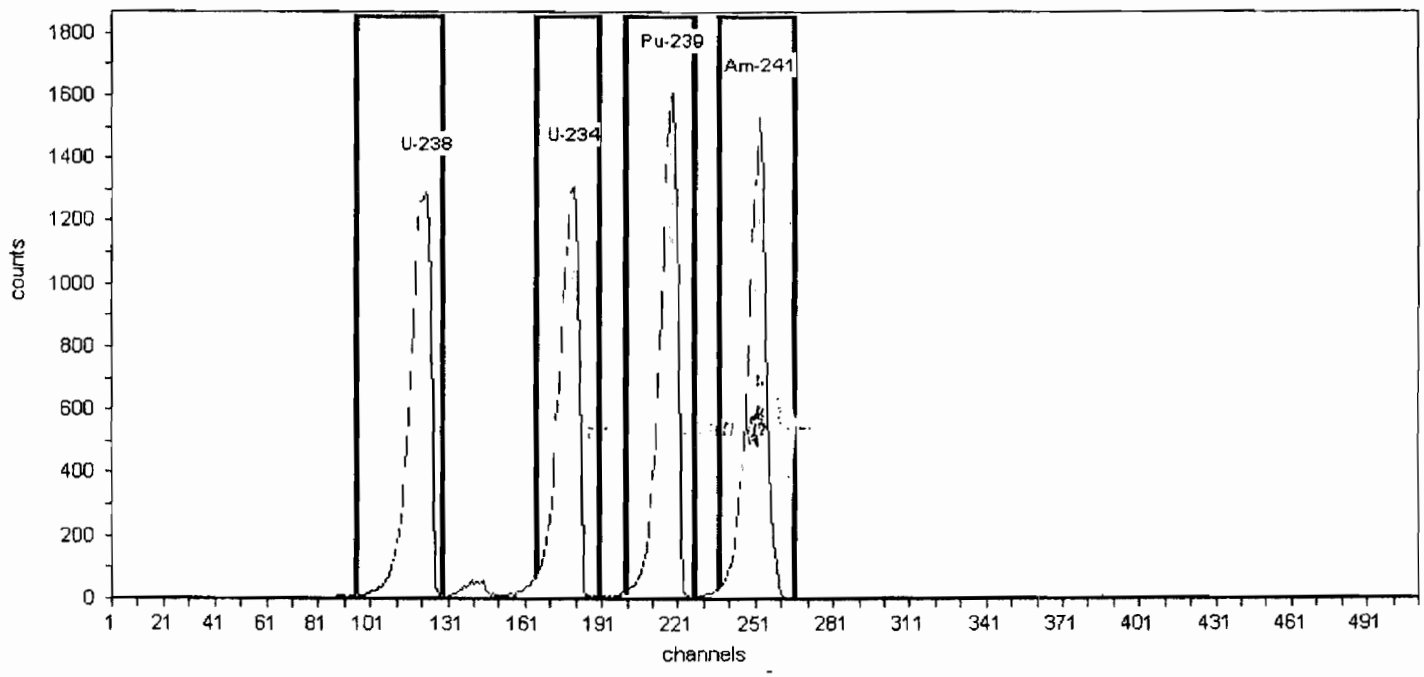
Detector: 262 - B2 , SN: 59505
Acquisition Start Date: 04/27/09 14:02:40

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: B2 04-27-09 Calib

Energy Calibration Equation:
Gain = 9.9186 keV / Ch
Offset = 2,981.49 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.61% +/- 0.78% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	12,452.00	29.65
U-234	180	4.78	165	190	11,963.00	28.48
Pu-239	219	5.16	200	227	12,967.00	30.87
Am-241	253	5.49	237	266	12,271.00	29.22

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:05:19 05/25/10

Analyst: jarmstrong
Detector: 262 - B3

Calibration

Energy Calibration: B3 Calib 4-27-09
Description:

Analysis Date: 04/28/09 08:07:04
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 70720-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

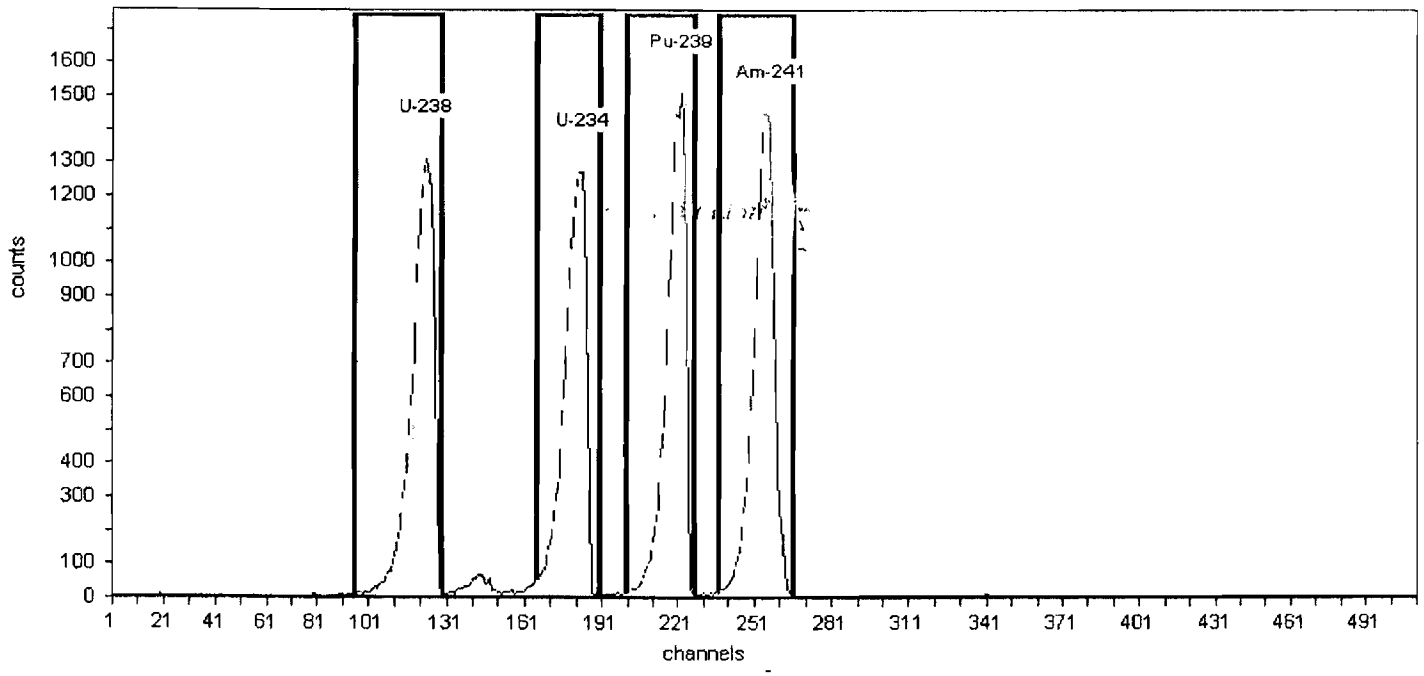
Detector: 262 - B3 , SN: 59503
Acquisition Start Date: 04/27/09 13:54:55

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: B3 Calib 4-27-09

Energy Calibration Equation:
Gain = 9.6386 keV / Ch
Offset = 3,011.65 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.85% +/- 0.82% TPU(2 sigma)



Method: Manual (ROI)
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	13,095.00	31.18
U-234	183	4.78	165	190	12,752.00	30.36
Pu-239	222	5.16	200	227	13,311.00	31.69
Am-241	257	5.49	237	266	13,296.00	31.66

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 262 - B4

09:05:25 05/25/10

Calibration

Energy Calibration: B4 Calib 6-5-09
Description:

Analysis Date: 06/05/09 23:21:51
Calibration Type: Efficiency

Source Info

Certificate ID: 70721-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

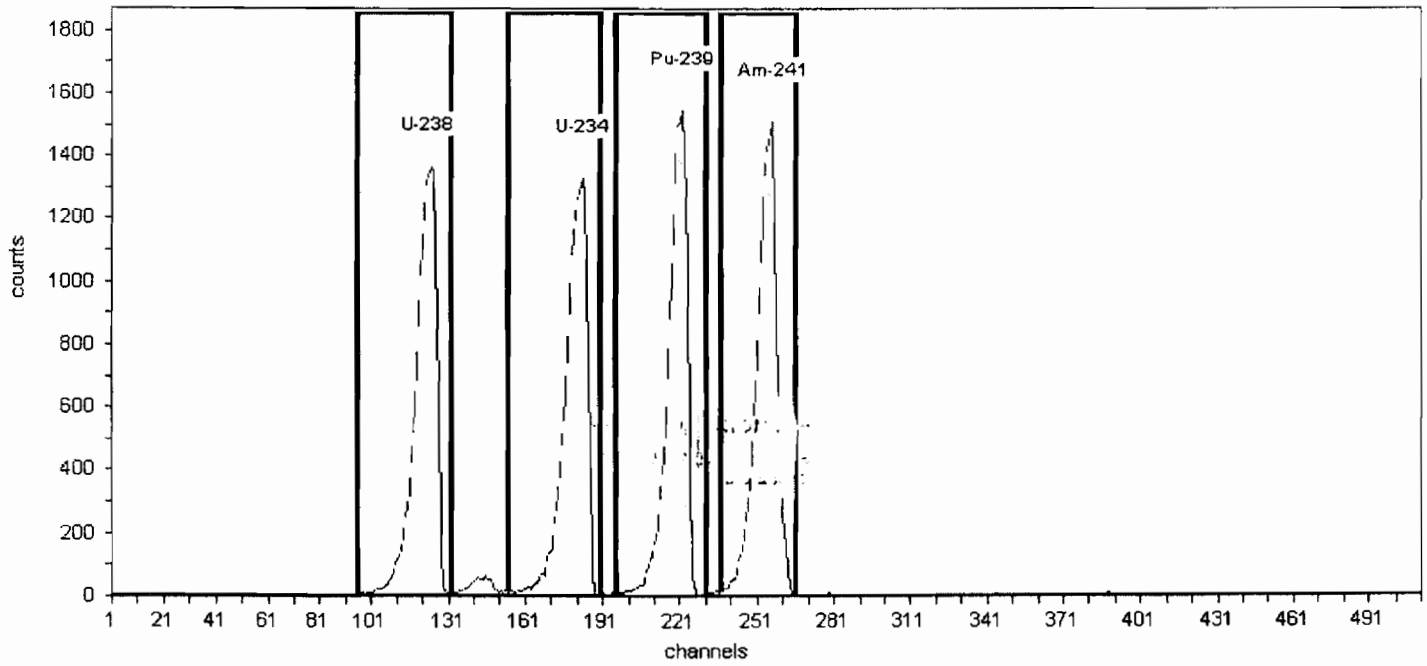
Detector: 262 - B4 , SN: 40018T3
Acquisition Start Date: 06/05/09 15:58:41

Live Time: 420.00 min.
Real Time: 420.03 min.

Efficiency Calibration Name: B4 Calib 6-5-09

Energy Calibration Equation:
Gain = 9.6386 keV / Ch
Offset = 3,011.65 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.48% +/- 0.84% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	132	13,339.00	31.76
U-234	183	4.78	154	190	13,146.00	31.30
Pu-239	222	5.16	196	231	13,600.00	32.38
Am-241	257	5.49	237	266	13,331.00	31.74

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:05:31 05/25/10

Analyst: jarmstrong
Detector: 262 - B5

Calibration

Energy Calibration: B5 Calib 4-24-09
Description:

Analysis Date: 04/27/09 08:01:24
Calibration Type: Energy

Source Info

Certificate ID: 62919A-526
Prepared by: Analytics
Description:

Certification Date: 01/18/02 11:00:28

Acquisition

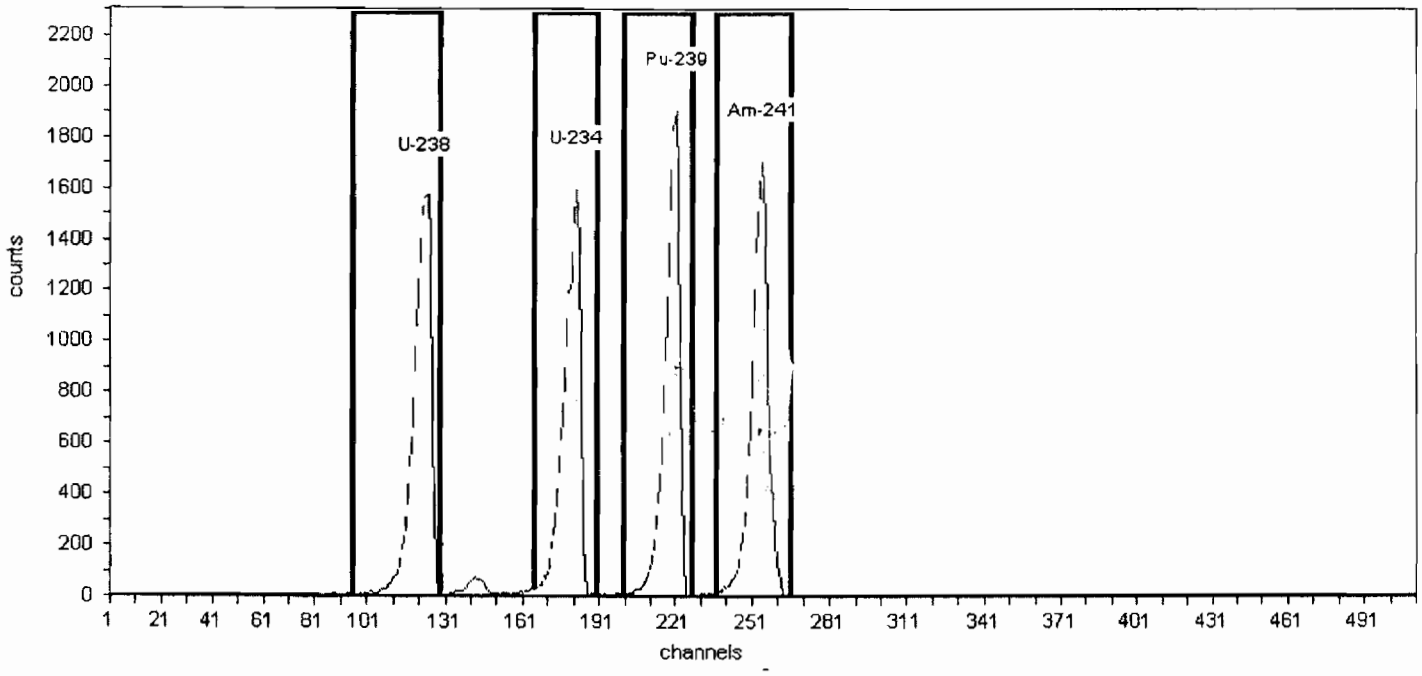
Detector: 262 - B5 , SN: 72020
Acquisition Start Date: 04/24/09 10:36:11

Live Time: 420.00 min.
Real Time: 420.02 min.

Efficiency Calibration Name: B5 Calib 4-24-09

Energy Calibration Equation:
Gain = 9.7709 keV / Ch
Offset = 2,995.45 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.61% +/- 1.09% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	12,502.00	29.77
U-234	182	4.78	165	190	12,048.00	28.69
Pu-239	221	5.16	200	227	12,539.00	29.85
Am-241	255	5.49	237	266	12,147.00	28.92

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 262 - B6

09:05:37 05/25/10

Calibration

Energy Calibration: B6 Calib 4-28-09
Description:

Analysis Date: 04/28/09 16:42:13
Calibration Type: Energy

Source Info

Certificate ID: 70719-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

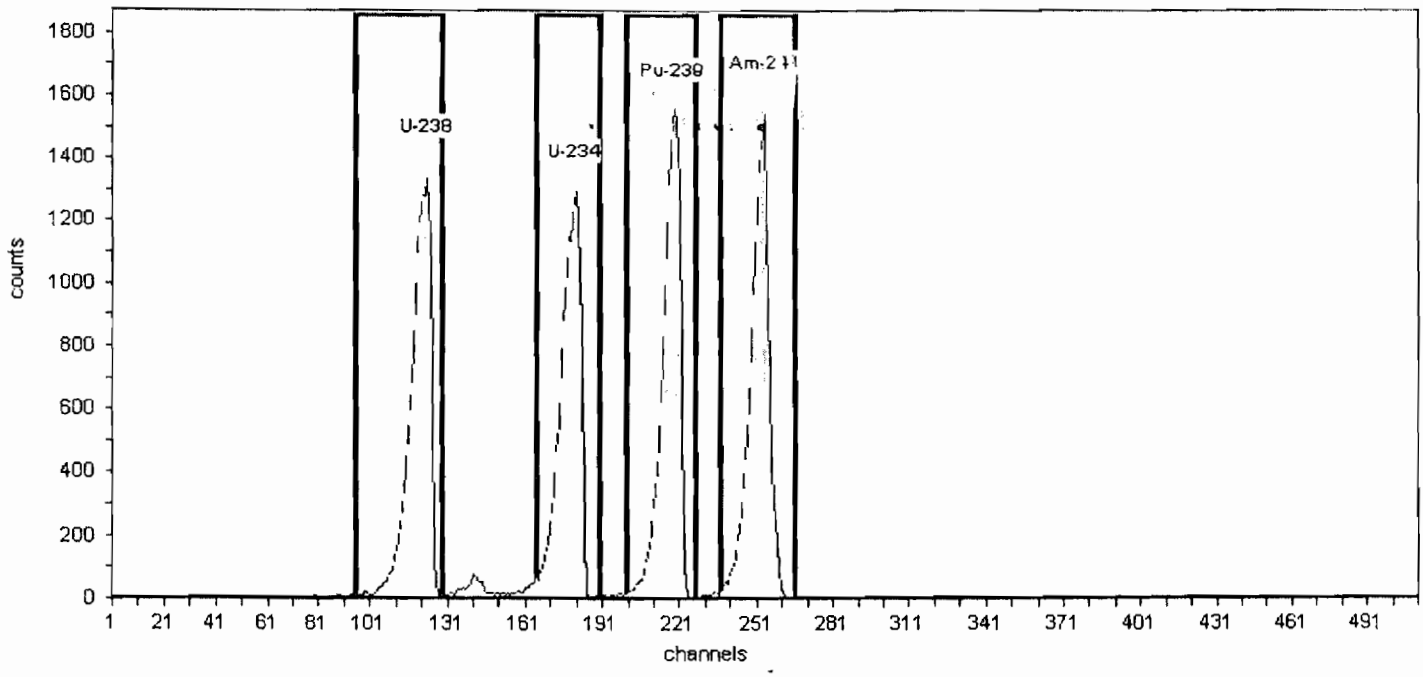
Detector: 262 - B6 , SN: 59508
Acquisition Start Date: 04/28/09 09:22:57

Live Time: 420.00 min.
Real Time: 420.08 min.

Efficiency Calibration Name: B6 Calib 4-28-09

Energy Calibration Equation:
Gain = 9.8800 keV / Ch
Offset = 2,988.98 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 23.42% +/- 0.78% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	12,277.00	29.23
U-234	180	4.78	165	190	11,973.00	28.51
Pu-239	218	5.16	200	227	12,584.00	29.96
Am-241	254	5.49	237	266	12,400.00	29.52

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 262 - B7

09:05:43 05/25/10

Calibration

Energy Calibration: B7 Calib 4-28-09
Description:

Analysis Date: 04/29/09 09:01:54
Calibration Type: Efficiency

Source Info

Certificate ID: 70720-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

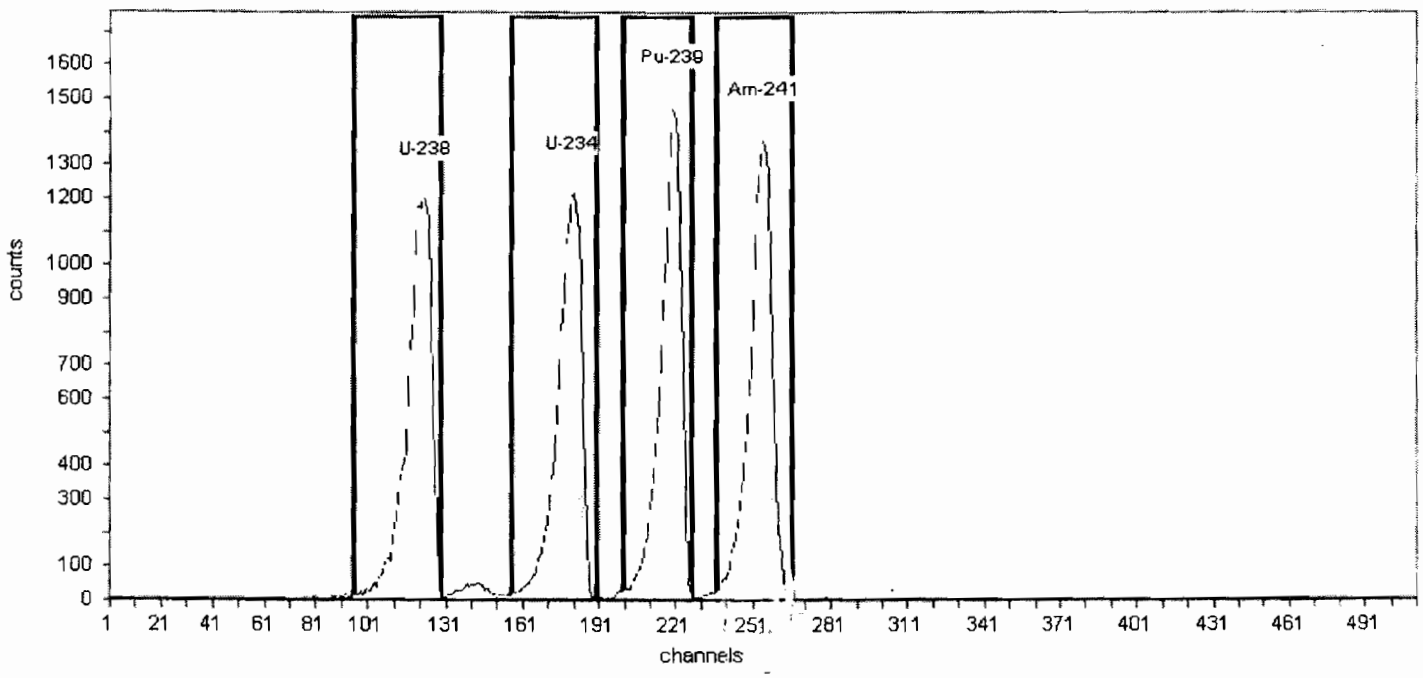
Detector: 262 - B7 , SN: 38-131EE2
Acquisition Start Date: 04/28/09 09:24:06

Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: B7 Calib 4-28-09

Energy Calibration Equation:
Gain = 9.7669 keV / Ch
Offset = 3,003.56 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.79% +/- 0.85% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	13,378.00	31.85
U-234	180	4.78	156	190	13,288.00	31.64
Pu-239	220	5.16	200	227	13,861.00	33.00
Am-241	255	5.49	237	266	13,605.00	32.39

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:05:49 05/25/10

Analyst: jarmstrong
Detector: 262 - B8

Calibration

Energy Calibration: B8 Calib 4-28-09
Description:

Analysis Date: 04/29/09 09:02:36
Calibration Type: Energy

Source Info

Certificate ID: 70721-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

Detector: 262 - B8 , SN: 72011
Acquisition Start Date: 04/28/09 09:24:34

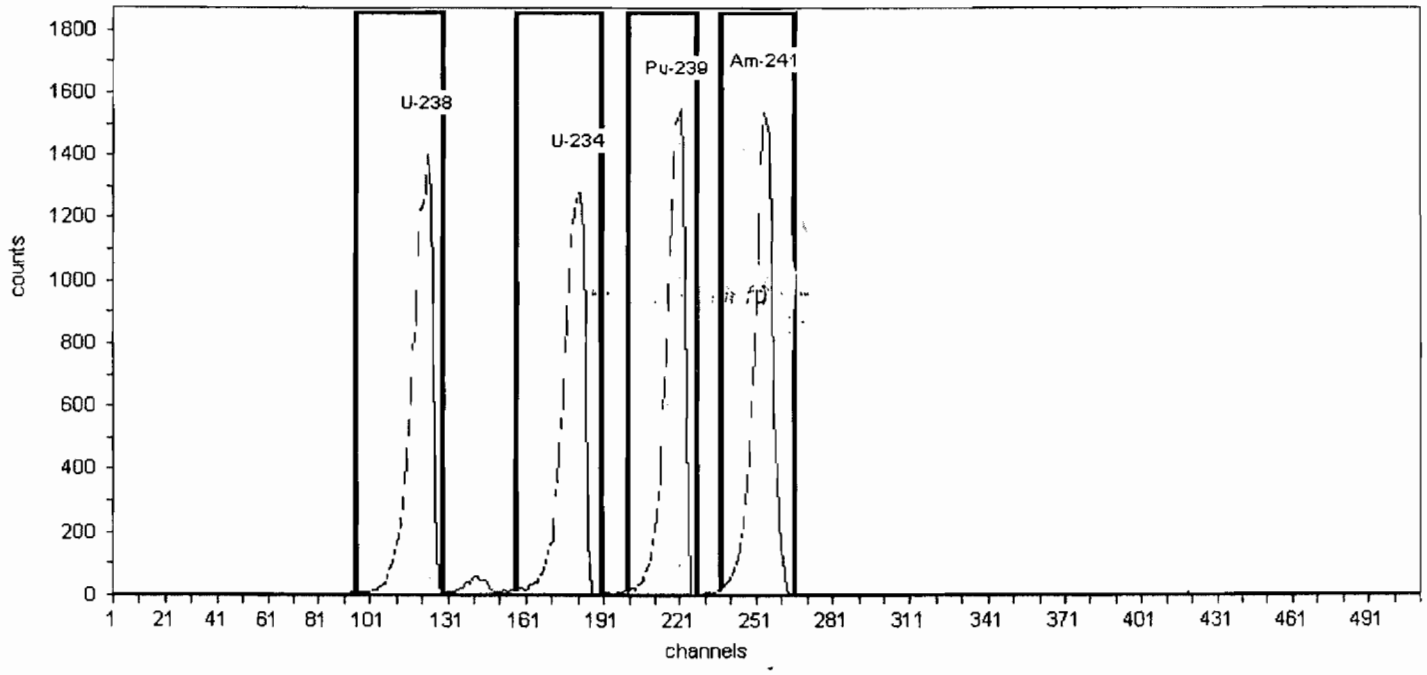
Live Time: 420.00 min.
Real Time: 420.07 min.

Efficiency Calibration Name: B8 Calib 4-28-09

Energy Calibration Equation:
Gain = 9.8444 keV / Ch

Offset = 2,988.48 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.74% +/- 0.82% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	13,050.00	31.07
U-234	181	4.78	157	190	12,511.00	29.79
Pu-239	220	5.16	200	227	13,252.00	31 55
Am-241	254	5.49	237	266	13,140.00	31 29

AlphaVision v5.3 **Alpha Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 263 - C1

09:05:56 05/25/10

Calibration

Energy Calibration: C1 Calib 8-25-09
Description:

Analysis Date: 08/26/09 10:45:34
Calibration Type: Energy

Source Info

Certificate ID: 62919A-526
Prepared by: Analytics
Description:

Certification Date: 01/18/02 11:00:28

Acquisition

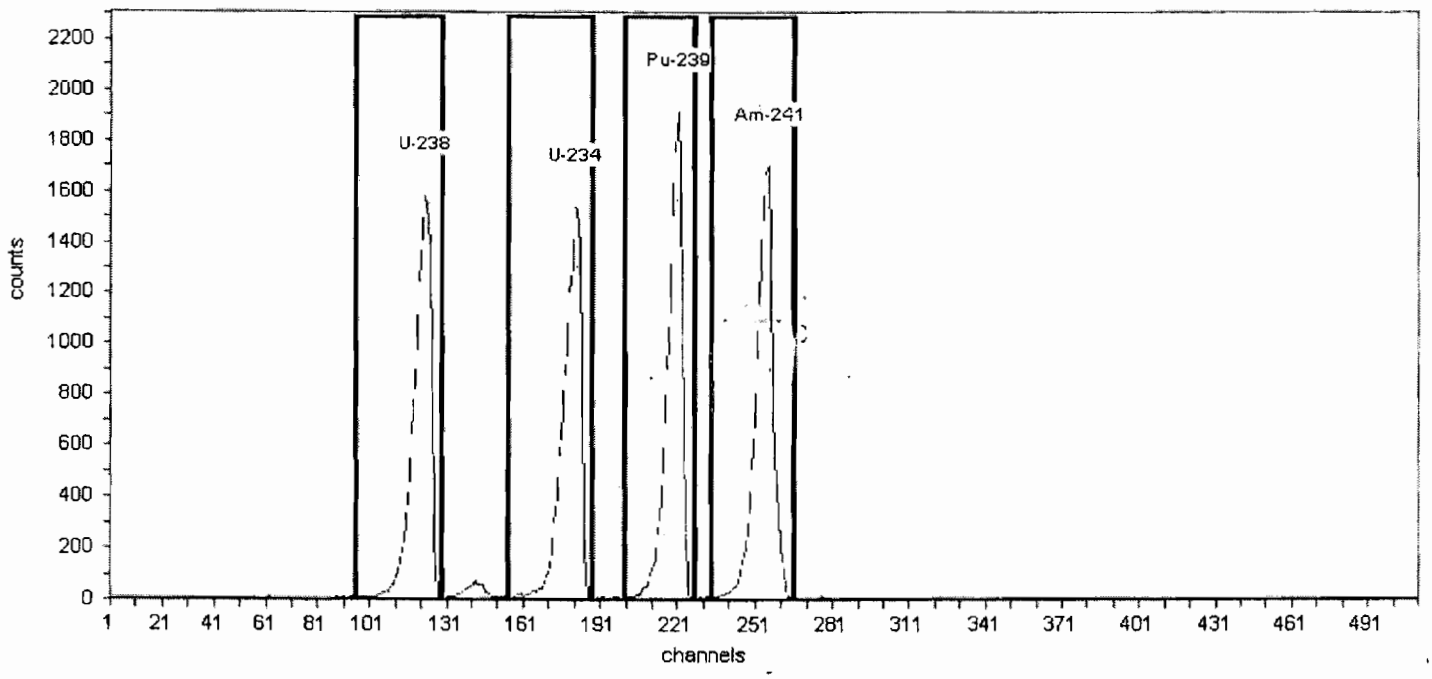
Detector: 263 - C1 , SN: 59504
Acquisition Start Date: 08/25/09 10:44:06

Live Time: 420.00 min.
Real Time: 420.08 min.

Efficiency Calibration Name: C1 Calib 8-25-09

Energy Calibration Equation:
Gain = 9.6250 keV / Ch
Offset = 3,026.36 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.04% +/- 1.11% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	122	4.20	95	129	12,494.00	29.75
U-234	181	4.78	155	188	12,307.00	29.30
Pu-239	221	5.16	200	227	12,591.00	29.98
Am-241	256	5.49	234	266	12,569.00	29.93

AlphaVision v5.3 **Alpha Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 263 - C2

09:06:01 05/25/10

Calibration

Energy Calibration: C2 Calib 8-26-09
Description:

Analysis Date: 08/27/09 14:02:25
Calibration Type: Energy

Source Info

Certificate ID: 70719-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

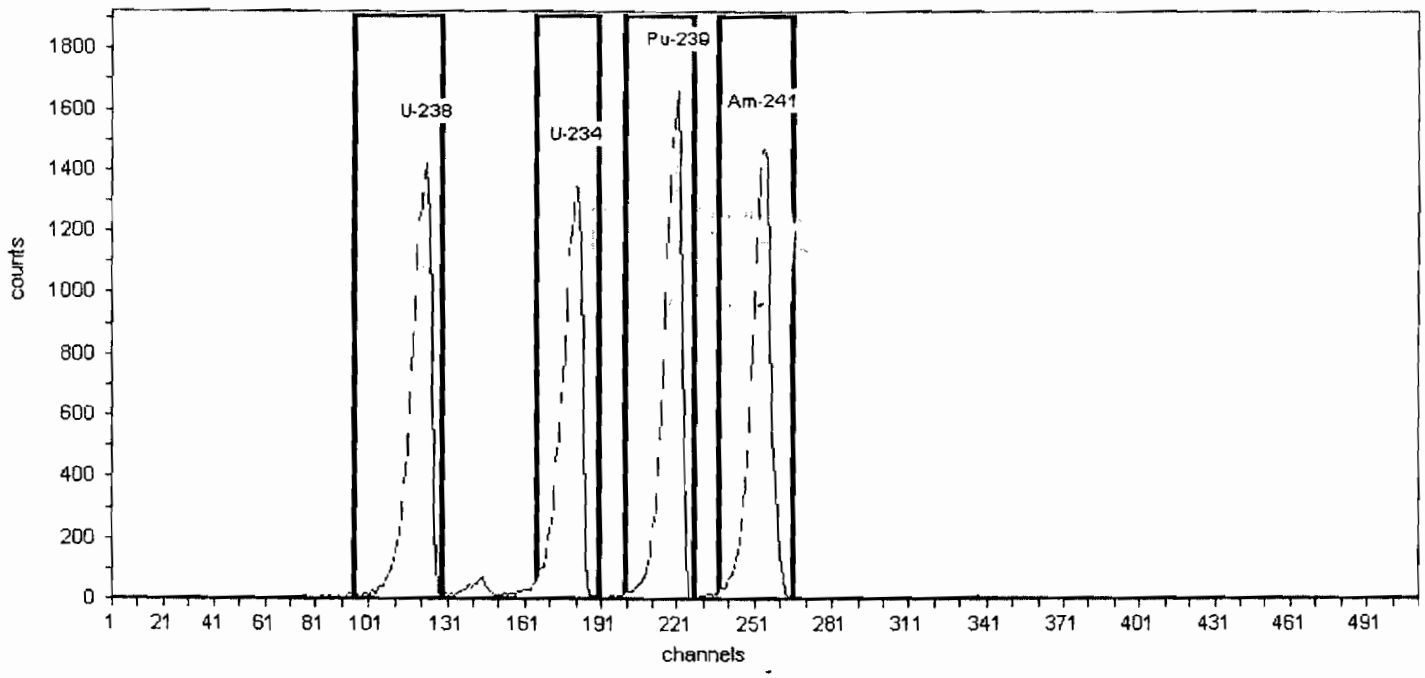
Detector: 263 - C2 , SN: 43351
Acquisition Start Date: 08/26/09 17:48:06

Live Time: 420.00 min.
Real Time: 420.02 min.

Efficiency Calibration Name: C2 Calib 8-26-09

Energy Calibration Equation:
Gain = 9.8175 keV / Ch
Offset = 2,991.27 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 24.61% +/- 0.82% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	13,022.00	31.00
U-234	181	4.78	165	190	12,619.00	30.05
Pu-239	221	5.16	200	227	13,156.00	31.32
Am-241	254	5.49	237	266	12,938.00	30.80

AlphaVision v5.3 **Alpha Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 263 - C3

09:06:07 05/25/10

Calibration

Energy Calibration: C3 Calib 8-25-09
Description:

Analysis Date: 08/26/09 10:49:59
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 70720-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

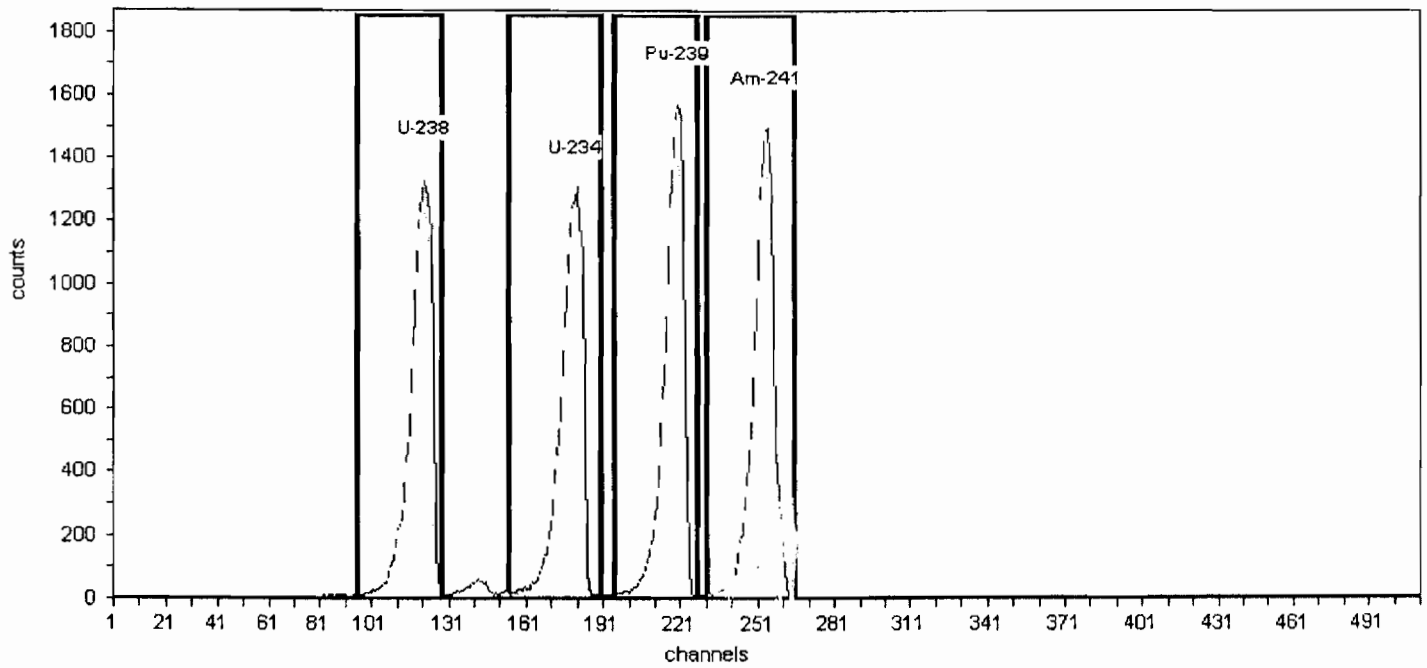
Detector: 263 - C3 , SN: 43349
Acquisition Start Date: 08/25/09 10:44:38

Live Time: 420.00 min.
Real Time: 420.08 min.

Efficiency Calibration Name: C3 Calib 8-25-09

Energy Calibration Equation:
Gain = 9.6846 keV / Ch
Offset = 3,026.83 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.32% +/- 0.83% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	121	4.20	95	128	13,244.00	31.53
U-234	180	4.78	154	190	12,852.00	30.60
Pu-239	220	5.16	195	227	13,642.00	32.48
Am-241	254	5.49	231	265	13,317.00	31.71

AlphaVision v5.3

Alpha Spectroscopy Calibration Report

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:06:13 05/25/10

Analyst: jarmstrong
Detector: 263 - C4

Calibration

Energy Calibration: C4 Calib 8-25-09
Description:

Analysis Date: 08/26/09 10:51:48
Calibration Type: Energy

Source Info

Certificate ID: 70721-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

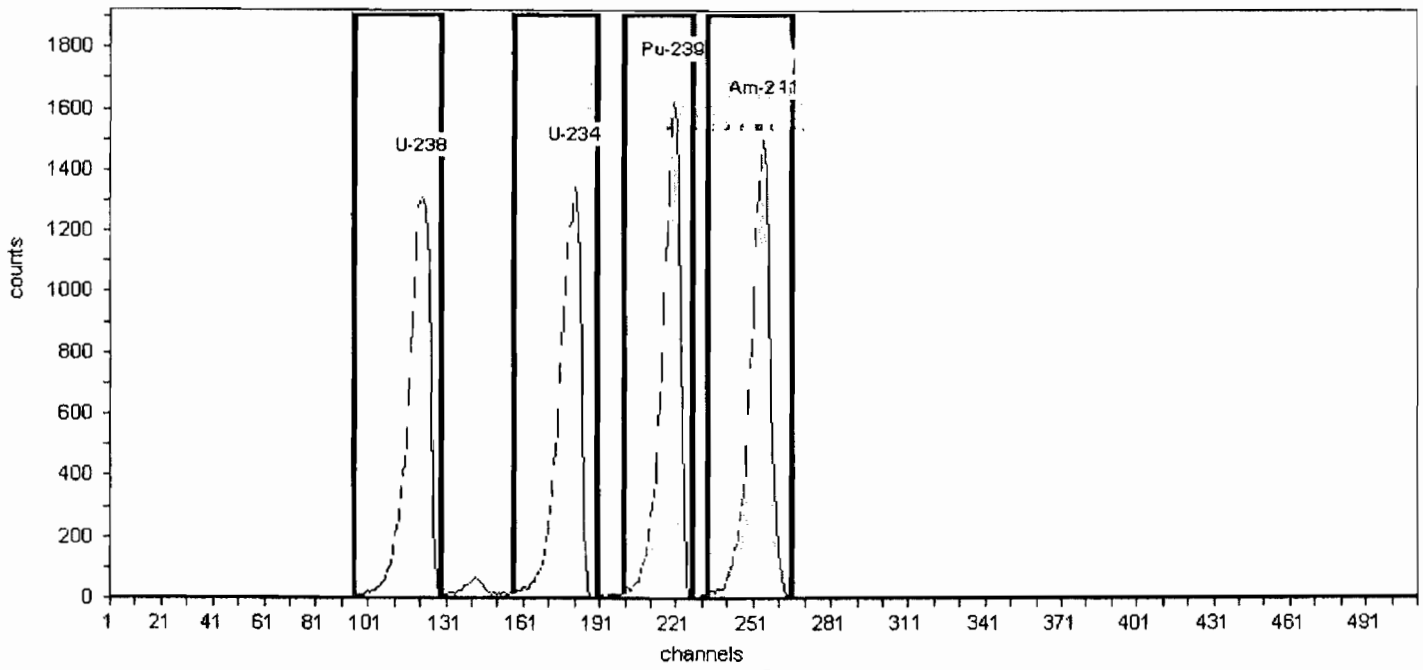
Detector: 263 - C4 , SN: 40-018HH5
Acquisition Start Date: 08/25/09 10:44:52

Live Time: 420.00 min.
Real Time: 420.09 min.

Efficiency Calibration Name: C4 Calib 8-25-09

Energy Calibration Equation:
Gain = 9.6386 keV / Ch
Offset = 3,030.93 keV
Quadratic = 0.0000 keV / Ch²

Efficiency: 25.23% +/- 0.83% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	121	4.20	95	129	13,061.00	31.10
U-234	181	4.78	157	190	13,064.00	31.10
Pu-239	220	5.16	200	227	13,554.00	32.27
Am-241	255	5.49	233	266	13,236.00	31.51

AlphaVision v5.3

Alpha-Spectroscopy Calibration Report

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:06:19 05/25/10

Analyst: jarmstrong
Detector: 263 - C5

Calibration

Energy Calibration: C5 Calib 8-26-09
Description:

Analysis Date: 08/26/09 17:41:10
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 62919A-526
Prepared by: Analytics
Description:

Certification Date: 01/18/02 11:00:28

Acquisition

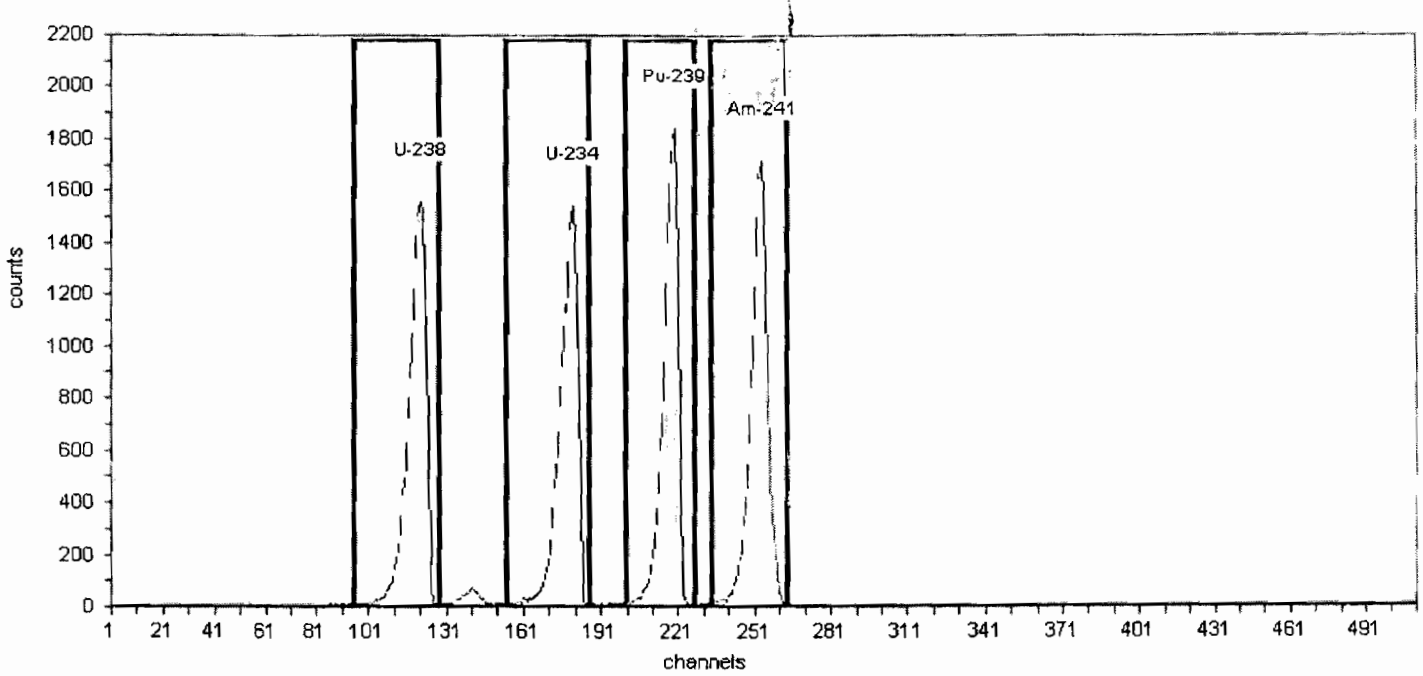
Detector: 263 - C5 , SN: 43348
Acquisition Start Date: 08/26/09 10:38:56

Live Time: 420.00 min.
Real Time: 420.08 min.

Efficiency Calibration Name: C5 Calib 8-26-09

Energy Calibration Equation:
Gain = 9.6846 keV / Ch
Offset = 3,026.83 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.97% +/- 1.11% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	121	4.20	95	128	12,657.00	30.14
U-234	180	4.78	154	186	12,084.00	28.77
Pu-239	220	5.16	200	227	12,532.00	29.84
Am-241	254	5.49	234	264	12,510.00	29.79

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830
09:06:32 05/25/10

Analyst: jarmstrong
Detector: 263 - C6

Calibration

Energy Calibration: C6 Calib 8-26-09
Description:

Analysis Date: 08/26/09 17:42:15
Calibration Type: Energy

Source Info

Certificate ID: 70719-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

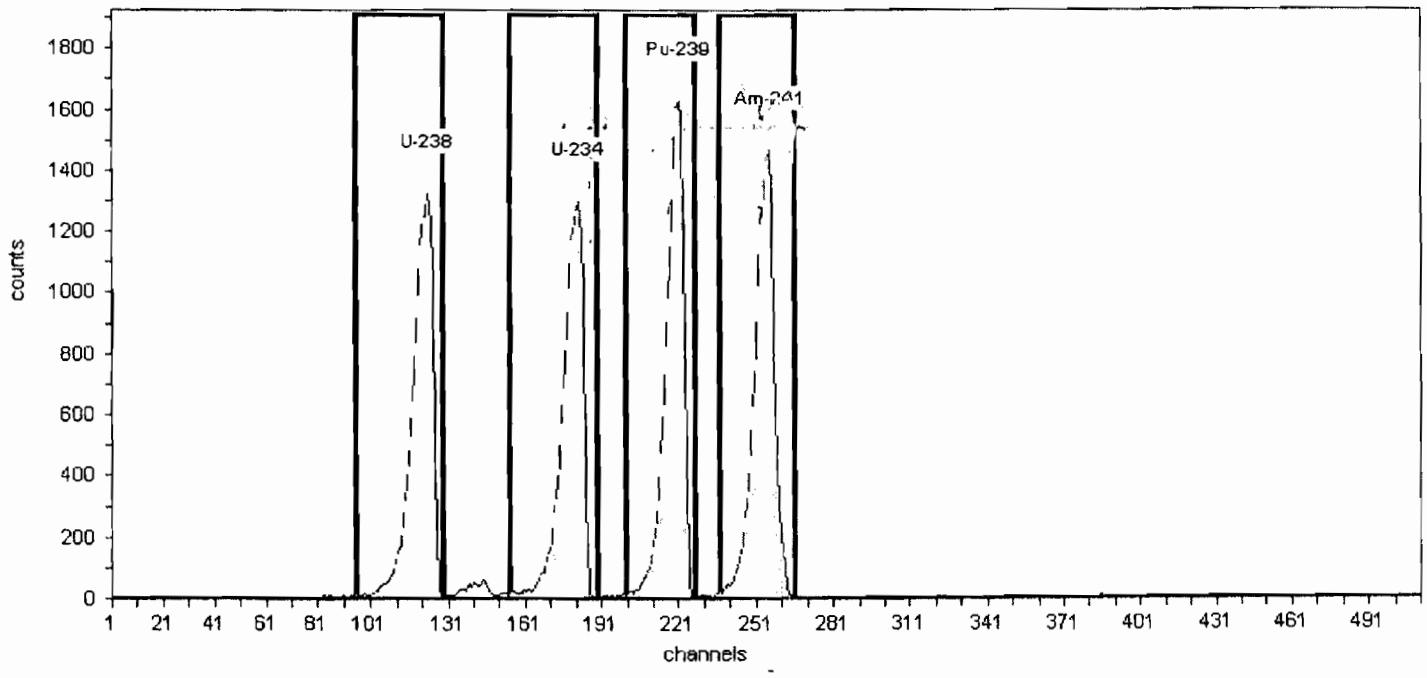
Detector: 263 - C6 , SN: 43352
Acquisition Start Date: 08/26/09 10:39:10

Live Time: 420.00 min.
Real Time: 420.08 min.

Efficiency Calibration Name: C6 Calib 8-26-09

Energy Calibration Equation:
Gain = 9.7102 keV / Ch
Offset = 3,004.89 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 24.36% +/- 0.81% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	123	4.20	95	129	12,556.00	29.90
U-234	182	4.78	155	189	12,408.00	29.54
Pu-239	221	5.16	200	227	13,232.00	31.50
Am-241	256	5.49	237	266	12,849.00	30.59

AlphaVision v5.3 **Alpha-Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 263 - C7

09:06:38 05/25/10

Calibration

Energy Calibration: C7 Calib 08-26-09
Description:

Analysis Date: 08/27/09 14:03:10
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 70720-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

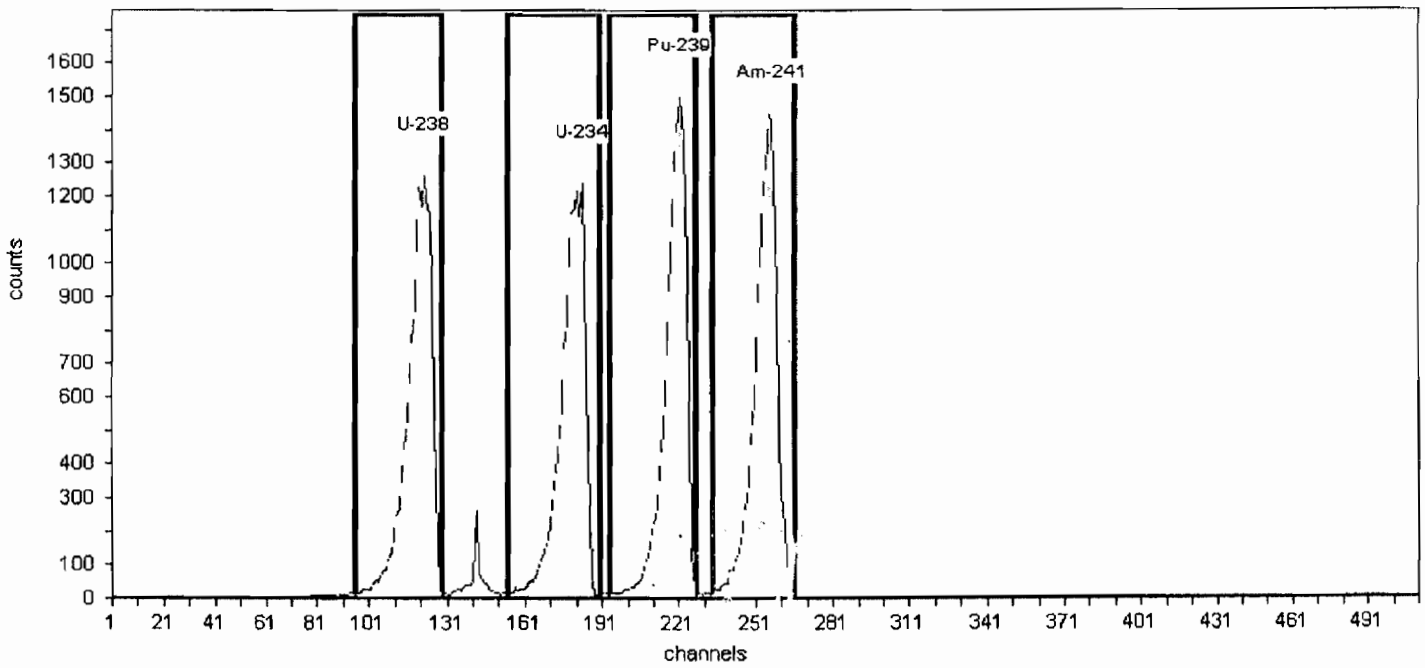
Detector: 263 - C7 , SN: 38-131EE5
Acquisition Start Date: 08/26/09 17:47:54

Live Time: 420.00 min.
Real Time: 420.04 min.

Efficiency Calibration Name: C7 Calib 08-26-09

Energy Calibration Equation:
Gain = 9.5915 keV / Ch
Offset = 3,025.68 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 26.11% +/- 0.86% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	122	4.20	95	129	13,659.00	32.52
U-234	183	4.78	154	190	13,168.00	31.35
Pu-239	221	5.16	194	227	14,078.00	33.52
Am-241	257	5.49	234	266	13,782.00	32.81

AlphaVision v5.3 **Alpha Spectroscopy Calibration Report**

ORTEC
801 S. Illinois Ave.
Oak Ridge, TN 37830

Analyst: jarmstrong
Detector: 263 - C8

09:06:46 05/25/10

Calibration

Energy Calibration: C8 Calib 8-26-09
Description:

Analysis Date: 08/26/09 17:44:25
Calibration Type: Energy And Efficiency

Source Info

Certificate ID: 70721-526
Prepared by: Analytics
Description:

Certification Date: 05/10/05 11:00:00

Acquisition

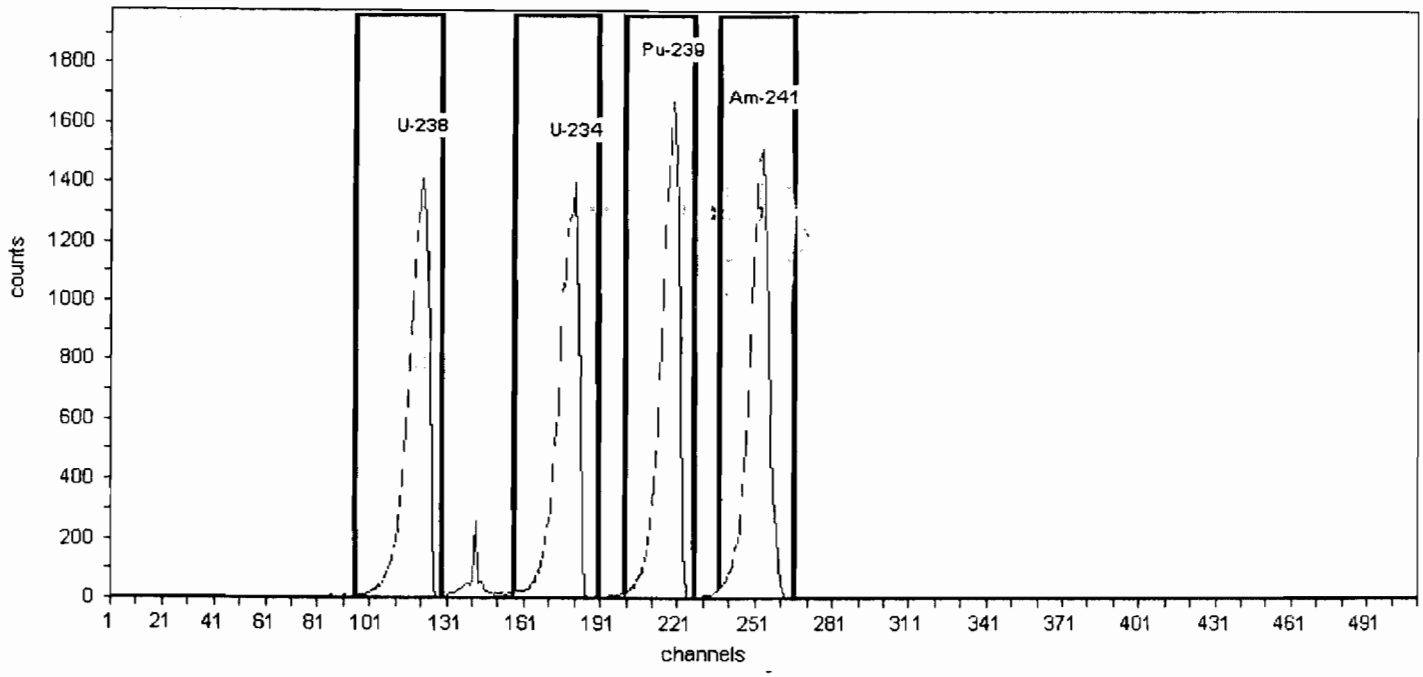
Detector: 263 - C8 , SN: 59506
Acquisition Start Date: 08/26/09 10:42:36

Live Time: 420.00 min.
Real Time: 420.08 min.

Efficiency Calibration Name: C8 Calib 8-26-09

Energy Calibration Equation:
Gain = 9.7233 keV / Ch
Offset = 3,019.34 keV
Quadratic = 0.0000 keV / Ch^2

Efficiency: 25.04% +/- 0.83% TPU(2 sigma)



Method: Interactive ROI
Algorithm: Linear

Initial Calibration: Yes
Shelf: 1

Nuclide Activity Summary

Nuclide	Peak Channel	Peak Energy MeV	ROI Start Channel	ROI End Channel	Gross Counts	Net Count Rate (cpm)
U-238	121	4.20	95	129	13,133.00	31.27
U-234	181	4.78	157	190	12,768.00	30 40
Pu-239	219	5.16	200	227	13,467.00	32 06
Am-241	254	5.49	237	266	13,176.00	31.37

Alpha Calibration Report 2/24/2011 11:37:29

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008038.cn
Detector Name: A_1_1A
Chamber Serial Number: 10043743A
Detector Serial Number: 57895
Geometry Description: Shelf 2

Energy Calibration: 4/9/2010 20:07:25 by Countroom
Shape Calibration: 4/9/2010 20:07:25 by Countroom
Efficiency Calibration: 4/9/2010 20:56:03 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.994 MeV + 4.8826E-003*ch
FWHM = 5.7654E-002 MeV
Low Tail = 1.6117E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	247.40	0.1602	12.16	0.4148	3.34	0.3168
4.775	364.50	0.1651	11.24	0.4134	2.51	0.2370
5.157	442.28	0.0962	10.40	0.2462	2.72	0.1765
5.486	510.34	0.0604	12.45	0.1619	4.66	0.2048

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2125
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1281E-001	8.76E-003
4.775	2.0826E-001	8.58E-003
5.157	2.1141E-001	8.70E-003
5.486	2.1776E-001	8.96E-003

Alpha Calibration Report 2/24/2011 11:37:39

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008039.cn
Detector Name: A_1_1B
Chamber Serial Number: 10043743B
Detector Serial Number: 57896
Geometry Description: Shelf 2

Energy Calibration: 4/9/2010 20:07:23 by Countroom
Shape Calibration: 4/9/2010 20:07:23 by Countroom
Efficiency Calibration: 4/9/2010 20:56:53 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.987 MeV + 4.8833E-003*ch
FWHM = 6.0195E-002 MeV
Low Tail = 1.4244E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.48	0.2084	14.04	0.5381	3.84	0.4115
4.775	365.76	0.2480	12.68	0.6162	2.72	0.3372
5.157	443.89	0.1604	10.72	0.3957	2.27	0.2129
5.486	511.75	0.1078	12.59	0.2771	3.35	0.2043

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.1922
Uncertainty: +/- 0.0040

Energy (MeV)	Efficiency	Error
4.198	1.9170E-001	7.90E-003
4.775	1.9452E-001	8.02E-003
5.157	1.9294E-001	7.95E-003
5.486	1.8977E-001	7.82E-003

Alpha Calibration Report 2/24/2011 11:37:45

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008040.cn
Detector Name: A_1_2A
Chamber Serial Number: 10043744A
Detector Serial Number: 57897
Geometry Description: Shelf 2

Energy Calibration: 4/9/2010 20:07:21 by Countroom
Shape Calibration: 4/9/2010 20:07:21 by Countroom
Efficiency Calibration: 4/9/2010 20:57:28 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.977 MeV + 4.9125E-003*ch
FWHM = 5.6717E-002 MeV
Low Tail = 1.1572E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.85	0.2425	12.69	0.6064	2.82	0.3470
4.775	366.26	0.2711	10.35	0.6342	1.63	0.2370
5.157	443.16	0.1640	10.35	0.4064	2.17	0.2143
5.486	510.85	0.1463	12.55	0.3761	3.37	0.2785

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2164
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1893E-001	8.99E-003
4.775	2.1235E-001	8.73E-003
5.157	2.1768E-001	8.94E-003
5.486	2.1681E-001	8.91E-003

Alpha Calibration Report 2/24/2011 11:37:52

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008041.cn
Detector Name: A_1_2B
Chamber Serial Number: 10043744B
Detector Serial Number: 57898
Geometry Description: Shelf 2

Energy Calibration: 4/9/2010 20:07:19 by Countroom
Shape Calibration: 4/9/2010 20:07:19 by Countroom
Efficiency Calibration: 4/9/2010 20:58:18 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.987 MeV + 4.8889E-003*ch
FWHM = 5.9682E-002 MeV
Low Tail = 1.3980E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.38	0.2286	12.68	0.5722	2.91	0.3425
4.775	365.30	0.2707	12.25	0.6691	2.61	0.3646
5.157	443.34	0.1612	10.52	0.4021	2.30	0.2238
5.486	511.25	0.1282	13.21	0.3346	3.90	0.2863

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2196
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.2324E-001	9.16E-003
4.775	2.1019E-001	8.64E-003
5.157	2.2270E-001	9.14E-003
5.486	2.2328E-001	9.17E-003

Alpha Calibration Report 2/24/2011 11:37:58

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008046.cn
Detector Name: A_1_3A
Chamber Serial Number: 10043745A
Detector Serial Number: 57907
Geometry Description: Shelf 2

Energy Calibration: 4/10/2010 04:25:21 by Countroom
Shape Calibration: 4/10/2010 04:25:21 by Countroom
Efficiency Calibration: 4/11/2010 09:13:21 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.980 MeV + 4.9113E-003*ch
FWHM = 4.9657E-002 MeV
Low Tail = 1.0633E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.68	0.1668	9.38	0.4059	1.80	0.1915
4.775	365.32	0.2136	9.66	0.5138	1.80	0.2335
5.157	442.69	0.1250	9.10	0.3121	2.07	0.1844
5.486	510.49	0.1062	11.42	0.2816	3.77	0.2876

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2122
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1425E-001	8.81E-003
4.775	2.1233E-001	8.74E-003
5.157	2.0801E-001	8.57E-003
5.486	2.1434E-001	8.82E-003

Alpha Calibration Report 2/24/2011 11:38:04

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008047.cn
Detector Name: A_1_3B
Chamber Serial Number: 10043745B
Detector Serial Number: 57908
Geometry Description: Shelf 2

Energy Calibration: 4/10/2010 04:25:19 by Countroom
Shape Calibration: 4/10/2010 04:25:19 by Countroom
Efficiency Calibration: 4/11/2010 09:13:55 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.976 MeV + 4.9138E-003*ch
FWHM = 5.5624E-002 MeV
Low Tail = 1.1330E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.30	0.2335	10.97	0.5638	2.06	0.2590
4.775	365.46	0.2546	11.48	0.6198	2.25	0.3011
5.157	443.37	0.1808	9.78	0.4378	1.88	0.2079
5.486	510.82	0.1427	12.50	0.3680	3.42	0.2808

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2061
Uncertainty: +/- 0.0042

Energy (MeV)	Efficiency	Error
4.198	2.0722E-001	8.52E-003
4.775	2.0660E-001	8.50E-003
5.157	2.0655E-001	8.49E-003
5.486	2.0413E-001	8.40E-003

Alpha Calibration Report 2/24/2011 11:38:10

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008048.cn
Detector Name: A_1_4A
Chamber Serial Number: 10043746A
Detector Serial Number: 57909
Geometry Description: Shelf 2

Energy Calibration: 4/10/2010 04:25:18 by Countroom
Shape Calibration: 4/10/2010 04:25:18 by Countroom
Efficiency Calibration: 4/11/2010 09:14:49 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.978 MeV + 4.9105E-003*ch
FWHM = 6.1770E-002 MeV
Low Tail = 1.4252E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.64	0.2563	13.20	0.6451	3.14	0.4035
4.775	365.77	0.3055	11.78	0.7376	2.24	0.3424
5.157	443.45	0.1886	10.35	0.4610	2.09	0.2324
5.486	510.66	0.1040	13.37	0.2745	4.27	0.2665

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2259
Uncertainty: +/- 0.0046

Energy (MeV)	Efficiency	Error
4.198	2.2669E-001	9.30E-003
4.775	2.2972E-001	9.43E-003
5.157	2.2620E-001	9.28E-003
5.486	2.2142E-001	9.09E-003

Alpha Calibration Report 2/24/2011 11:38:16

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008049.cn
Detector Name: A_1_4B
Chamber Serial Number: 10043746B
Detector Serial Number: 57910
Geometry Description: Shelf 2

Energy Calibration: 4/10/2010 04:25:17 by Countroom
Shape Calibration: 4/10/2010 04:25:17 by Countroom
Efficiency Calibration: 4/11/2010 09:15:19 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.983 MeV + 4.8903E-003*ch
FWHM = 6.1459E-002 MeV
Low Tail = 1.4881E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.90	0.2617	14.07	0.6789	3.91	0.5283
4.775	366.20	0.2507	12.28	0.6192	2.63	0.3381
5.157	444.23	0.1492	10.51	0.3722	2.31	0.2086
5.486	511.79	0.1047	13.52	0.2778	4.49	0.2876

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2164
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1779E-001	8.95E-003
4.775	2.1023E-001	8.64E-003
5.157	2.1880E-001	8.98E-003
5.486	2.1948E-001	9.02E-003

Alpha Calibration Report 2/24/2011 11:38:22

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008054.cn
Detector Name: A_1_5A
Chamber Serial Number: 10043747A
Detector Serial Number: 57911
Geometry Description: Shelf 2

Energy Calibration: 4/11/2010 17:28:41 by Countroom
Shape Calibration: 4/11/2010 17:28:41 by Countroom
Efficiency Calibration: 4/11/2010 18:32:55 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.984 MeV + 4.8897E-003*ch
FWHM = 5.1623E-002 MeV
Low Tail = 1.1344E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.03	0.1877	10.55	0.4664	2.32	0.2634
4.775	366.42	0.1888	9.07	0.4492	1.54	0.1819
5.157	443.58	0.1267	9.77	0.3224	2.42	0.2140
5.486	511.89	0.0975	11.56	0.2593	3.85	0.2678

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2092
Uncertainty: +/- 0.0043

Energy (MeV)	Efficiency	Error
4.198	2.0798E-001	8.56E-003
4.775	2.0844E-001	8.59E-003
5.157	2.1016E-001	8.65E-003
5.486	2.1030E-001	8.66E-003

Alpha Calibration Report 2/24/2011 11:38:28

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008055.cn
Detector Name: A_1_5B
Chamber Serial Number: 10043747B
Detector Serial Number: 57912
Geometry Description: Shelf 2

Energy Calibration: 4/11/2010 17:28:40 by Countroom
Shape Calibration: 4/11/2010 17:28:40 by Countroom
Efficiency Calibration: 4/11/2010 18:33:27 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.983 MeV + 4.9065E-003*ch
FWHM = 5.5961E-002 MeV
Low Tail = 1.1378E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.00	0.2314	12.16	0.5731	2.64	0.3181
4.775	365.10	0.2336	10.43	0.5549	1.79	0.2285
5.157	442.90	0.1554	9.44	0.3765	1.77	0.1730
5.486	510.17	0.1051	12.51	0.2737	3.62	0.2274

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2047
Uncertainty: +/- 0.0042

Energy (MeV)	Efficiency	Error
4.198	2.0623E-001	8.48E-003
4.775	2.0457E-001	8.42E-003
5.157	2.0543E-001	8.45E-003
5.486	2.0278E-001	8.34E-003

Alpha Calibration Report 2/24/2011 11:38:34

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008056.cn
Detector Name: A_1_6A
Chamber Serial Number: 10043748A
Detector Serial Number: 57913
Geometry Description: Shelf 2

Energy Calibration: 4/11/2010 17:28:38 by Countroom
Shape Calibration: 4/11/2010 17:28:38 by Countroom
Efficiency Calibration: 4/11/2010 18:33:56 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.984 MeV + 4.8861E-003*ch
FWHM = 6.0193E-002 MeV
Low Tail = 1.5559E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.33	0.2342	13.18	0.5906	3.12	0.3682
4.775	365.93	0.2966	12.72	0.7289	2.64	0.3815
5.157	443.99	0.1659	10.60	0.4080	2.18	0.2105
5.486	511.96	0.0547	12.36	0.0752	3.28	0.0580

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2250
Uncertainty: +/- 0.0046

Energy (MeV)	Efficiency	Error
4.198	2.2625E-001	9.28E-003
4.775	2.2317E-001	9.17E-003
5.157	2.2747E-001	9.33E-003
5.486	2.2324E-001	9.16E-003

Alpha Calibration Report 2/24/2011 11:38:41

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008057.cn
Detector Name: A_1_6B
Chamber Serial Number: 10043748B
Detector Serial Number: 57914
Geometry Description: Shelf 2

Energy Calibration: 4/11/2010 17:28:37 by Countroom
Shape Calibration: 4/11/2010 17:28:37 by Countroom
Efficiency Calibration: 4/11/2010 18:34:27 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.980 MeV + 4.8993E-003*ch
FWHM = 5.9778E-002 MeV
Low Tail = 1.3391E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.58	0.2586	11.58	0.6258	2.21	0.2944
4.775	365.94	0.2326	11.57	0.5651	2.25	0.2726
5.157	443.70	0.1830	10.72	0.4510	2.27	0.2424
5.486	511.53	0.1042	13.00	0.2724	3.85	0.2333

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2243
Uncertainty: +/- 0.0046

Energy (MeV)	Efficiency	Error
4.198	2.2589E-001	9.27E-003
4.775	2.2008E-001	9.04E-003
5.157	2.2431E-001	9.20E-003
5.486	2.2718E-001	9.32E-003

Alpha Calibration Report 2/24/2011 11:38:46

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008062.cn
Detector Name: A_2_1A
Chamber Serial Number: 12044979A
Detector Serial Number: 55794
Geometry Description: Shelf 2

Energy Calibration: 4/12/2010 01:36:29 by Countroom
Shape Calibration: 4/12/2010 01:36:29 by Countroom
Efficiency Calibration: 4/12/2010 10:36:04 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.976 MeV + 4.9081E-003*ch
FWHM = 4.9742E-002 MeV
Low Tail = 1.1055E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.76	0.1868	10.25	0.4602	2.16	0.2460
4.775	366.46	0.1968	9.22	0.4711	1.63	0.2009
5.157	443.65	0.1188	8.63	0.2934	1.80	0.1541
5.486	511.43	0.0731	10.91	0.1914	3.25	0.1667

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2205
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.2008E-001	9.05E-003
4.775	2.1744E-001	8.95E-003
5.157	2.2335E-001	9.18E-003
5.486	2.2138E-001	9.10E-003

Alpha Calibration Report 2/24/2011 11:38:53

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008081.cn
Detector Name: A_2_1B
Chamber Serial Number: 12044979B
Detector Serial Number: 55795
Geometry Description: Shelf 2

Energy Calibration: 4/13/2010 02:51:58 by Countroom
Shape Calibration: 4/13/2010 02:51:58 by Countroom
Efficiency Calibration: 4/13/2010 09:49:08 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.990 MeV + 4.8791E-003*ch
FWHM = 5.7970E-002 MeV
Low Tail = 1.2280E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.13	0.2401	11.49	0.5867	2.28	0.2902
4.775	365.58	0.2491	10.98	0.5966	1.98	0.2617
5.157	443.76	0.1754	10.10	0.4278	1.99	0.2095
5.486	511.60	0.1069	12.93	0.2797	3.84	0.2418

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2148
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1391E-001	8.79E-003
4.775	2.1624E-001	8.89E-003
5.157	2.1645E-001	8.89E-003
5.486	2.1258E-001	8.74E-003

Alpha Calibration Report 2/24/2011 11:38:59

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008064.cn
Detector Name: A_2_2A
Chamber Serial Number: 12044980A
Detector Serial Number: 55796
Geometry Description: Shelf 2

Energy Calibration: 4/12/2010 02:27:31 by Countroom
Shape Calibration: 4/12/2010 02:27:31 by Countroom
Efficiency Calibration: 4/12/2010 10:37:23 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.980 MeV + 4.9030E-003*ch
FWHM = 6.3766E-002 MeV
Low Tail = 1.5838E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.81	0.2348	14.09	0.6039	3.74	0.4427
4.775	365.84	0.2834	12.45	0.6928	2.54	0.3502
5.157	443.48	0.1886	11.05	0.4709	2.43	0.2654
5.486	511.07	0.1062	13.55	0.2794	4.12	0.2494

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2232
Uncertainty: +/- 0.0046

Energy (MeV)	Efficiency	Error
4.198	2.2518E-001	9.24E-003
4.775	2.2476E-001	9.23E-003
5.157	2.2219E-001	9.12E-003
5.486	2.2075E-001	9.06E-003

Alpha Calibration Report 2/24/2011 11:39:06

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008065.cn
Detector Name: A_2_2B
Chamber Serial Number: 12044980B
Detector Serial Number: 55797
Geometry Description: Shelf 2

Energy Calibration: 4/12/2010 02:27:35 by Countroom
Shape Calibration: 4/12/2010 02:27:35 by Countroom
Efficiency Calibration: 4/12/2010 10:38:36 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 3.011 MeV + 4.8460E-003*ch
FWHM = 5.9319E-002 MeV
Low Tail = 1.3484E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	245.56	0.2490	12.77	0.6251	2.97	0.3816
4.775	363.41	0.2480	12.22	0.6095	2.48	0.3112
5.157	442.44	0.1779	10.28	0.4331	2.05	0.2150
5.486	510.65	0.1089	12.98	0.2848	3.83	0.2444

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2199
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.2099E-001	9.07E-003
4.775	2.1343E-001	8.77E-003
5.157	2.2116E-001	9.08E-003
5.486	2.2441E-001	9.21E-003

Alpha Calibration Report 2/24/2011 11:39:12

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008513.cn
Detector Name: A_2_3A
Chamber Serial Number: 12044981A
Detector Serial Number: 55798
Geometry Description: Shelf 2

Energy Calibration: 5/21/2010 18:14:32 by test
Shape Calibration: 5/21/2010 18:14:32 by test
Efficiency Calibration: 5/24/2010 08:34:35 by test
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 3.000 MeV + 4.9151E-003*ch
FWHM = 5.0565E-002 MeV
Low Tail = 1.1431E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	244.76	0.1645	10.27	0.4056	2.18	0.2184
4.775	360.70	0.1879	10.29	0.4605	2.12	0.2386
5.157	438.31	0.1171	8.95	0.2888	1.92	0.1570
5.486	506.04	0.0918	11.22	0.2412	3.48	0.2225

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2188
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.2301E-001	9.16E-003
4.775	2.1742E-001	8.95E-003
5.157	2.1724E-001	8.93E-003
5.486	2.1778E-001	8.96E-003

Alpha Calibration Report 2/24/2011 11:39:18

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008514.cn
Detector Name: A_2_3B
Chamber Serial Number: 12044981B
Detector Serial Number: 55799
Geometry Description: Shelf 2

Energy Calibration: 5/21/2010 18:14:43 by test
Shape Calibration: 5/21/2010 18:14:43 by test
Efficiency Calibration: 5/24/2010 08:35:23 by test
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.996 MeV + 4.9199E-003*ch
FWHM = 6.0350E-002 MeV
Low Tail = 1.3732E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	244.47	0.2346	12.48	0.5854	2.81	0.3415
4.775	361.87	0.2679	10.34	0.6327	1.68	0.2451
5.157	438.44	0.2013	10.93	0.5045	2.44	0.2902
5.486	506.05	0.0939	12.84	0.2457	3.82	0.2132

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2134
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1364E-001	8.78E-003
4.775	2.1437E-001	8.82E-003
5.157	2.1494E-001	8.83E-003
5.486	2.1081E-001	8.67E-003

Alpha Calibration Report 2/24/2011 11:39:24

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008082.cn
Detector Name: A_2_4A
Chamber Serial Number: 12044982A
Detector Serial Number: 55800
Geometry Description: Shelf 2

Energy Calibration: 4/12/2010 17:41:27 by Countroom
Shape Calibration: 4/12/2010 17:41:27 by Countroom
Efficiency Calibration: 4/13/2010 09:49:41 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.986 MeV + 4.8860E-003*ch
FWHM = 5.8711E-002 MeV
Low Tail = 1.3220E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.15	0.2425	13.53	0.6145	3.28	0.3958
4.775	365.66	0.2464	12.84	0.6125	2.81	0.3416
5.157	443.85	0.1716	10.82	0.4211	2.23	0.2182
5.486	511.92	0.1374	12.09	0.3502	3.00	0.2332

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2250
Uncertainty: +/- 0.0046

Energy (MeV)	Efficiency	Error
4.198	2.2869E-001	9.38E-003
4.775	2.2368E-001	9.19E-003
5.157	2.2797E-001	9.35E-003
5.486	2.1992E-001	9.03E-003

Alpha Calibration Report 2/24/2011 11:39:31

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008083.cn
Detector Name: A_2_4B
Chamber Serial Number: 12044982B
Detector Serial Number: 55801
Geometry Description: Shelf 2

Energy Calibration: 4/12/2010 18:36:12 by Countroom
Shape Calibration: 4/12/2010 18:36:12 by Countroom
Efficiency Calibration: 4/13/2010 09:50:10 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.981 MeV + 4.9105E-003*ch
FWHM = 5.8244E-002 MeV
Low Tail = 1.2717E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.52	0.2488	11.80	0.6090	2.37	0.3057
4.775	364.69	0.2607	11.99	0.6416	2.50	0.3371
5.157	442.73	0.1745	9.87	0.4254	1.94	0.2077
5.486	510.10	0.1153	12.83	0.2994	3.67	0.2441

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2158
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1617E-001	8.88E-003
4.775	2.1332E-001	8.77E-003
5.157	2.1771E-001	8.94E-003
5.486	2.1616E-001	8.88E-003

Alpha Calibration Report 2/24/2011 11:39:38

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008088.cn
Detector Name: A_2_5A
Chamber Serial Number: 12044983A
Detector Serial Number: 55802
Geometry Description: Shelf 2

Energy Calibration: 4/13/2010 16:52:15 by Countroom
Shape Calibration: 4/13/2010 16:52:15 by Countroom
Efficiency Calibration: 4/13/2010 20:11:11 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.987 MeV + 4.8898E-003*ch
FWHM = 5.1736E-002 MeV
Low Tail = 1.2152E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.63	0.1859	10.71	0.4630	2.38	0.2641
4.775	365.38	0.2055	10.17	0.4991	1.99	0.2421
5.157	443.10	0.1211	9.07	0.3014	1.98	0.1674
5.486	511.16	0.0784	11.34	0.2072	3.69	0.2066

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2190
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.1858E-001	8.99E-003
4.775	2.1889E-001	9.01E-003
5.157	2.1963E-001	9.03E-003
5.486	2.1880E-001	9.00E-003

Alpha Calibration Report 2/24/2011 11:39:44

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008089.cn
Detector Name: A_2_5B
Chamber Serial Number: 12044983B
Detector Serial Number: 55803
Geometry Description: Shelf 2

Energy Calibration: 4/13/2010 16:52:14 by Countroom
Shape Calibration: 4/13/2010 16:52:14 by Countroom
Efficiency Calibration: 4/13/2010 20:11:42 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.976 MeV + 4.9039E-003*ch
FWHM = 5.8829E-002 MeV
Low Tail = 1.3010E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.40	0.2267	12.61	0.5701	2.97	0.3535
4.775	367.36	0.2642	10.23	0.6193	1.63	0.2332
5.157	444.10	0.1664	10.91	0.4173	2.54	0.2540
5.486	511.90	0.1109	12.75	0.2902	3.77	0.2487

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2130
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1648E-001	8.89E-003
4.775	2.1009E-001	8.64E-003
5.157	2.1299E-001	8.75E-003
5.486	2.1281E-001	8.75E-003

Alpha Calibration Report 2/24/2011 11:39:51

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008090.cn
Detector Name: A_2_6A
Chamber Serial Number: 12044984A
Detector Serial Number: 55804
Geometry Description: Shelf 2

Energy Calibration: 4/13/2010 16:52:12 by Countroom
Shape Calibration: 4/13/2010 16:52:12 by Countroom
Efficiency Calibration: 4/13/2010 20:12:14 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.982 MeV + 4.8867E-003*ch
FWHM = 5.9367E-002 MeV
Low Tail = 1.3752E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.66	0.2446	13.42	0.6146	3.15	0.3794
4.775	366.64	0.2589	12.30	0.6338	2.46	0.3176
5.157	444.54	0.1646	10.92	0.4079	2.35	0.2232
5.486	512.52	0.1137	12.46	0.2921	3.28	0.2115

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2248
Uncertainty: +/- 0.0046

Energy (MeV)	Efficiency	Error
4.198	2.2815E-001	9.36E-003
4.775	2.2302E-001	9.16E-003
5.157	2.2375E-001	9.18E-003
5.486	2.2430E-001	9.21E-003

Alpha Calibration Report 2/24/2011 11:39:57

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008091.cn
Detector Name: A_2_6B
Chamber Serial Number: 12044984B
Detector Serial Number: 55805
Geometry Description: Shelf 2

Energy Calibration: 4/13/2010 16:52:11 by Countroom
Shape Calibration: 4/13/2010 16:52:11 by Countroom
Efficiency Calibration: 4/13/2010 20:12:47 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.978 MeV + 4.9004E-003*ch
FWHM = 5.9702E-002 MeV
Low Tail = 1.3766E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.50	0.2280	12.37	0.5676	2.74	0.3234
4.775	366.12	0.2513	12.00	0.6168	2.48	0.3224
5.157	444.25	0.1908	10.31	0.4656	2.04	0.2291
5.486	511.77	0.1173	12.83	0.2756	3.82	0.2345

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2190
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.1924E-001	9.00E-003
4.775	2.1227E-001	8.73E-003
5.157	2.2292E-001	9.15E-003
5.486	2.2201E-001	9.12E-003

Alpha Calibration Report 2/24/2011 11:40:03

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008606.cn
Detector Name: A_3_1A
Chamber Serial Number: 12044985A
Detector Serial Number: 55806
Geometry Description: Shelf 2

Energy Calibration: 5/27/2010 20:44:58 by Countroom
Shape Calibration: 5/27/2010 20:44:58 by Countroom
Efficiency Calibration: 5/28/2010 09:42:00 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.986 MeV + 4.8963E-003*ch
FWHM = 5.1530E-002 MeV
Low Tail = 1.1820E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.64	0.1886	10.14	0.4606	2.04	0.2318
4.775	364.96	0.1742	10.03	0.4269	1.96	0.2064
5.157	442.69	0.1168	9.14	0.2914	2.07	0.1714
5.486	510.66	0.0817	11.49	0.2153	3.55	0.1979

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2230
Uncertainty: +/- 0.0046

Energy (MeV)	Efficiency	Error
4.198	2.2559E-001	9.27E-003
4.775	2.2125E-001	9.10E-003
5.157	2.2375E-001	9.20E-003
5.486	2.2163E-001	9.11E-003

Alpha Calibration Report 2/24/2011 11:40:09

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008118.cn
Detector Name: A_3_1B
Chamber Serial Number: 12044985B
Detector Serial Number: 55807
Geometry Description: Shelf 2

Energy Calibration: 4/17/2010 21:22:33 by Countroom
Shape Calibration: 4/17/2010 21:22:33 by Countroom
Efficiency Calibration: 4/18/2010 15:12:35 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.982 MeV + 4.8949E-003*ch
FWHM = 5.7620E-002 MeV
Low Tail = 1.3849E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.74	0.2496	11.82	0.6117	2.41	0.3138
4.775	365.89	0.2311	12.04	0.5674	2.49	0.2956
5.157	443.62	0.1523	10.86	0.3836	2.52	0.2320
5.486	511.66	0.0972	12.10	0.2516	3.37	0.1967

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2098
Uncertainty: +/- 0.0043

Energy (MeV)	Efficiency	Error
4.198	2.0756E-001	8.54E-003
4.775	2.1337E-001	8.78E-003
5.157	2.1269E-001	8.74E-003
5.486	2.0603E-001	8.47E-003

Alpha Calibration Report 2/24/2011 11:40:15

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008604.cn
Detector Name: A_3_2A
Chamber Serial Number: 12045128A
Detector Serial Number: 55808
Geometry Description: Shelf 2

Energy Calibration: 1/18/2010 20:52:22 by jarmstrong
Shape Calibration: 1/18/2010 20:52:22 by jarmstrong
Efficiency Calibration: 1/19/2010 08:12:58 by jarmstrong
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 3000.0 MeV + 1.0000E+000*ch
FWHM = 2.5000E+001 MeV
Low Tail = <none>

No Calibration Peaks Available

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2190
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4198.000	2.2118E-001	9.08E-003
4774.600	2.1766E-001	8.94E-003
5156.590	2.1978E-001	9.02E-003
5485.560	2.1738E-001	8.93E-003

Alpha Calibration Report 2/24/2011 11:40:21

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008119.cn
Detector Name: A_3_2B
Chamber Serial Number: 12045128B
Detector Serial Number: 55809
Geometry Description: Shelf 2

Energy Calibration: 4/17/2010 21:22:30 by Countroom
Shape Calibration: 4/17/2010 21:22:30 by Countroom
Efficiency Calibration: 4/18/2010 15:13:08 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.991 MeV + 4.8904E-003*ch
FWHM = 6.0011E-002 MeV
Low Tail = 1.4919E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	247.97	0.2466	12.24	0.6094	2.62	0.3322
4.775	364.48	0.2355	12.21	0.5822	2.56	0.3092
5.157	442.22	0.1694	11.22	0.4266	2.66	0.2669
5.486	510.31	0.0963	12.65	0.2515	3.72	0.2148

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2206
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.2004E-001	9.04E-003
4.775	2.1576E-001	8.87E-003
5.157	2.2461E-001	9.22E-003
5.486	2.2225E-001	9.13E-003

Alpha Calibration Report 2/24/2011 11:40:27

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008120.cn
Detector Name: A_3_3A
Chamber Serial Number: 12045129A
Detector Serial Number: 55810
Geometry Description: Shelf 2

Energy Calibration: 4/14/2010 05:15:02 by Countroom
Shape Calibration: 4/14/2010 05:15:02 by Countroom
Efficiency Calibration: 4/18/2010 15:15:02 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.977 MeV + 4.9062E-003*ch
FWHM = 4.7685E-002 MeV
Low Tail = 9.7367E-003 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	250.04	0.1885	9.26	0.4499	1.65	0.1940
4.775	366.49	0.1784	8.93	0.4236	1.47	0.1648
5.157	443.27	0.1141	9.36	0.2888	2.20	0.1780
5.486	511.73	0.1045	10.52	0.2699	2.82	0.1986

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2191
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.2191E-001	9.12E-003
4.775	2.1993E-001	9.05E-003
5.157	2.1684E-001	8.92E-003
5.486	2.1781E-001	8.96E-003

Alpha Calibration Report 2/24/2011 11:40:33

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008121.cn
Detector Name: A_3_3B
Chamber Serial Number: 12045129B
Detector Serial Number: 55811
Geometry Description: Shelf 2

Energy Calibration: 4/14/2010 05:15:00 by Countroom
Shape Calibration: 4/14/2010 05:15:00 by Countroom
Efficiency Calibration: 4/18/2010 15:15:32 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.976 MeV + 4.9096E-003*ch
FWHM = 6.0051E-002 MeV
Low Tail = 1.3852E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.47	0.2276	12.49	0.5651	2.72	0.3155
4.775	366.25	0.2738	11.44	0.6610	2.12	0.2993
5.157	443.67	0.1748	10.87	0.4363	2.44	0.2529
5.486	511.33	0.1177	13.00	0.3078	3.89	0.2685

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2124
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.0994E-001	8.63E-003
4.775	2.1591E-001	8.88E-003
5.157	2.1585E-001	8.87E-003
5.486	2.0831E-001	8.57E-003

Alpha Calibration Report 2/24/2011 11:40:39

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008122.cn
Detector Name: A_3_4A
Chamber Serial Number: 12045130A
Detector Serial Number: 55812
Geometry Description: Shelf 2

Energy Calibration: 4/14/2010 05:15:06 by Countroom
Shape Calibration: 4/14/2010 05:15:06 by Countroom
Efficiency Calibration: 4/18/2010 15:16:03 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.981 MeV + 4.8980E-003*ch
FWHM = 6.0307E-002 MeV
Low Tail = 1.4323E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.33	0.2520	13.47	0.6414	3.30	0.4209
4.775	365.80	0.2208	12.61	0.5526	2.81	0.3165
5.157	443.80	0.1783	10.83	0.4416	2.36	0.2462
5.486	511.51	0.1340	12.77	0.3474	3.51	0.2656

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2175
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.2013E-001	9.04E-003
4.775	2.1787E-001	8.95E-003
5.157	2.1707E-001	8.91E-003
5.486	2.1512E-001	8.84E-003

Alpha Calibration Report 2/24/2011 11:40:45

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008123.cn
Detector Name: A_3_4B
Chamber Serial Number: 12045130B
Detector Serial Number: 55813
Geometry Description: Shelf 2

Energy Calibration: 4/14/2010 05:15:04 by Countroom
Shape Calibration: 4/14/2010 05:15:04 by Countroom
Efficiency Calibration: 4/18/2010 15:16:34 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.987 MeV + 4.8996E-003*ch
FWHM = 5.6621E-002 MeV
Low Tail = 1.1136E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	247.86	0.2586	11.05	0.6231	2.02	0.2804
4.775	364.84	0.2305	10.28	0.5453	1.69	0.2133
5.157	441.99	0.1954	10.82	0.4837	2.34	0.2666
5.486	510.19	0.1447	12.78	0.3748	3.58	0.2953

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2157
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1478E-001	8.83E-003
4.775	2.1077E-001	8.67E-003
5.157	2.1735E-001	8.93E-003
5.486	2.2054E-001	9.06E-003

Alpha Calibration Report 2/24/2011 11:40:51

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008128.cn
Detector Name: A_3_5A
Chamber Serial Number: 12045131A
Detector Serial Number: 55814
Geometry Description: Shelf 2

Energy Calibration: 4/18/2010 21:27:20 by Countroom
Shape Calibration: 4/18/2010 21:27:20 by Countroom
Efficiency Calibration: 4/19/2010 14:24:55 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\62919A-526

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.988 MeV + 4.8982E-003*ch
FWHM = 4.9981E-002 MeV
Low Tail = 1.1096E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	248.09	0.1948	9.77	0.4737	1.89	0.2270
4.775	364.86	0.2099	9.21	0.4985	1.58	0.2054
5.157	441.94	0.1346	9.21	0.3388	2.15	0.2077
5.486	510.20	0.0864	10.96	0.2270	3.27	0.1967

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2132
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1535E-001	8.86E-003
4.775	2.0935E-001	8.62E-003
5.157	2.1408E-001	8.81E-003
5.486	2.1435E-001	8.82E-003

Alpha Calibration Report 2/24/2011 11:40:57

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008129.cn
Detector Name: A_3_5B
Chamber Serial Number: 12045131B
Detector Serial Number: 55815
Geometry Description: Shelf 2

Energy Calibration: 4/18/2010 21:27:25 by Countroom
Shape Calibration: 4/18/2010 21:27:25 by Countroom
Efficiency Calibration: 4/19/2010 14:25:36 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70719-526.

----- ENERGY / SHAPE CALIBRATION -----

Version: Alpha Encal v1.1
Energy = 2.982 MeV + 4.8985E-003*ch
FWHM = 5.8445E-002 MeV
Low Tail = 1.3560E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.00	0.2268	12.27	0.5634	2.69	0.3172
4.775	365.90	0.2588	11.35	0.6258	2.14	0.2903
5.157	443.33	0.1537	10.86	0.3853	2.47	0.2265
5.486	511.30	0.1131	12.59	0.2935	3.54	0.2339

----- EFFICIENCY CALIBRATION -----

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2140
Uncertainty: +/- 0.0044

Energy (MeV)	Efficiency	Error
4.198	2.1312E-001	8.76E-003
4.775	2.1696E-001	8.92E-003
5.157	2.1443E-001	8.81E-003
5.486	2.1155E-001	8.69E-003

Alpha Calibration Report 2/24/2011 11:41:03

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008130.cn
Detector Name: A_3_6A
Chamber Serial Number: 12045132A
Detector Serial Number: 55816
Geometry Description: Shelf 2

Energy Calibration: 4/18/2010 21:27:23 by Countroom
Shape Calibration: 4/18/2010 21:27:23 by Countroom
Efficiency Calibration: 4/19/2010 14:26:08 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70720-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.979 MeV + 4.8995E-003*ch
FWHM = 6.2078E-002 MeV
Low Tail = 1.4874E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.35	0.2328	13.64	0.5925	3.36	0.3892
4.775	366.38	0.2533	12.14	0.6200	2.40	0.3050
5.157	444.09	0.1968	11.15	0.4862	2.36	0.2620
5.486	511.76	0.1039	13.04	0.2715	3.77	0.2251

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2190
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.1813E-001	8.96E-003
4.775	2.1835E-001	8.97E-003
5.157	2.2364E-001	9.18E-003
5.486	2.1629E-001	8.88E-003

Alpha Calibration Report 2/24/2011 11:41:09

Apex-Alpha™

Sample Description:
Spectrum File: C:\Canberra\ApexAlpha\Root\Data\0000008131.cn
Detector Name: A_3_6B
Chamber Serial Number: 12045132B
Detector Serial Number: 55817
Geometry Description: Shelf 2

Energy Calibration: 4/18/2010 21:27:22 by Countroom
Shape Calibration: 4/18/2010 21:27:22 by Countroom
Efficiency Calibration: 4/19/2010 14:26:42 by Countroom
Certificate: C:\Canberra\ApexAlpha\Root\Certificates\70721-526.

ENERGY / SHAPE CALIBRATION

Version: Alpha Encal v1.1
Energy = 2.979 MeV + 4.8985E-003*ch
FWHM = 6.0932E-002 MeV
Low Tail = 1.3842E-002 MeV

Energy (MeV)	Centroid Channel	Centroid error	FWHM (ch)	FWHM error	TAIL (ch)	TAIL error
4.198	249.20	0.1818	12.79	0.4608	3.09	0.2952
4.775	366.43	0.2257	11.55	0.5494	2.25	0.2646
5.157	444.34	0.1747	10.42	0.4286	2.12	0.2186
5.486	511.85	0.1064	13.40	0.2798	4.12	0.2551

EFFICIENCY CALIBRATION

Version: Alpha Efcal v1.0
Avg Efficiency: 0.2172
Uncertainty: +/- 0.0045

Energy (MeV)	Efficiency	Error
4.198	2.1581E-001	8.87E-003
4.775	2.1427E-001	8.81E-003
5.157	2.2020E-001	9.04E-003
5.486	2.1881E-001	8.99E-003

AMERICAN RADIATION SERVICES, INC.

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American Radiation Services Analytical Reports

for

Summit Environmental Technologies

Folder Duplicate

Report Compilation Checklist

ARS SDG: 11-00897 **Client Name:** Summit Environ. **Sample Matrix:** AQ

LEVEL 1 COMPONENTS	1st Reviewer	
1) Cover Page Complete and Accurate (see ARS-059)?	~~Yes~~ No N/A	
2) Technical Review Checklist(s) Complete and Accurate?	~~Yes~~ No N/A	
3) Case Narrative Complete and Accurate (see ARS-059)?	~~Yes~~ No N/A	
4) Form 1s Present for all Samples and Tests?	~~Yes~~ No N/A	
5) Client Specific Components are Present and Complete?	~~Yes~~ No N/A	

LEVEL 2 COMPONENTS	1st Reviewer	
6) Batch Quality Control Report is Present and Accurate?	~~Yes~~ No N/A	
7) DQO Report is Present and Accurate?	~~Yes~~ No N/A	
8) Client Specific Batch QC Components are Present and Complete?	~~Yes~~ No N/A	

LEVEL 3 COMPONENTS	1st Reviewer	
9) Efficiencies are Present?	~~Yes~~ No N/A	
10) Calibrations are Present?	~~Yes~~ No N/A	
11) Backgrounds are Present?	~~Yes~~ No N/A	
12) Spectrum Analysis is Present?	~~Yes~~ No N/A	
13) Spectral Plots are Present?	~~Yes~~ No N/A	
14) Plateaus are Present?	~~Yes~~ No N/A	
15) Control Charts are Present?	~~Yes~~ No N/A	
16) Other:	~~Yes~~ No N/A	

LEVEL 4 COMPONENTS	1st Reviewer	
17) Preparation Raw Data Present, Signed and Complete?	~~Yes~~ No N/A	
18) Instrument Raw Data Present and Complete?	~~Yes~~ No N/A	
19) Calibration Certificates Present?	~~Yes~~ No N/A	
20) Copies of Log Book Pages Present?	~~Yes~~ No N/A	
21) Sample Receiving Documentation Present?	~~Yes~~ No N/A	
22) LIMS Reports Present?	~~Yes~~ No N/A	
23) Applicable Correspondence Present?	~~Yes~~ No N/A	
24) Other:	~~Yes~~ No N/A	

Matthew Wright 6-2-11 — Report Generator Signature — Date

MHM 6-2-11 — Management Review Signature — Date

ARS-059
07/03/2009

Alpha Spec
Technical Review Checklist

ARS SDG ARS1-11-00897

Sample Matrix: AQ **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup

ARS Prep. Batch ID(s):	**Batch A:**	**Batch B:**	**Batch C:**
	B11-01984	NA	NA
Test(s):	ASP-A-024	NA	NA

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review			Lab Supervisor		
1) 100% of Manual Transcriptions Verified?	Yes	No	N/A	Yes	No	N/A
2) 100% of Manual Calculations Verified?	Yes	No	N/A	Yes	No	N/A
3) Tracers Added Before Muffling, Digestion, or Chem. Sep.?	Yes	No	N/A	Yes	No	N/A
4) QC and Samples are Aliquoted / Traced?	Yes	No	N/A	Yes	No	N/A
5) Deviations from procedure are documented and verified?	Yes	No	N/A	Yes	No	N/A

6) Sample Prep Anomaly? ☐ **No** ☐ **Yes** (See Tech Notes) **NCR #** (If initiated): _____

Tamara Brown 5-27-11 — **Chemist Signature** **Date**

[illegible] 5-27-11 — **Verifier Signature** **Date**

B. ANALYSIS REVIEW

	Analyst Review			QA Officer Review		
1) Calibrations/Backgrounds Valid and Current?	Yes	No	N/A	Yes	No	N/A
2) Source Checks Completed and Acceptable?	Yes	No	N/A	Yes	No	N/A
3) Background Checks Complete and Acceptable?	Yes	No	N/A	Yes	No	N/A

VHM 6-2-11 — **Quality Assurance Officer Signature** **Date**

	Analyst Review			Lab Supervisor		
4) 100% of Manually entered Parameters Verified Accurate?	Yes	No	N/A	Yes	No	N/A
5) Appropriate QC samples initiated at required frequency?	Yes	No	N/A	Yes	No	N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)						
a) All Centroids +/- 50 keV for each sample and QC sample?	Yes	No	N/A	Yes	No	N/A
b) FWHM <100 kEV for each sample and QC sample?	Yes	No	N/A	Yes	No	N/A
c) All specific peaks are with in the regions of interest (ROI's) ?	Yes	No	N/A	Yes	No	N/A
d) Spectrum shows no visual indication of interferences?	Yes	No	N/A	Yes	No	N/A

7) Analysis Anomaly? ☐ **No** ☑ **Yes** (See Comments) **NCR #** (If initiated): _____

[illegible] 6-2-11 — **Analyst Signature** **Date**

[illegible] 6-2-11 — **Laboratory Supervisor Signature** **Date**

Batch A: B11-01984

Alpha Spec
Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review			QA Officer Review		
1) RDL Criteria are Met?	~~Yes~~	No	N/A	~~Yes~~	No	N/A
2) Activity + 3xCSU a Negative Number?	Yes	~~No~~	N/A	Yes	~~No~~	N/A
3) Method Blank Criteria Met?	~~Yes~~	No	N/A	~~Yes~~	No	N/A
4) LCS/LCD Criteria Met?	~~Yes~~	No	N/A	~~Yes~~	No	N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	~~Yes~~	No	N/A	~~Yes~~	No	N/A
6) Tracer yield results meet acceptance criteria?	~~Yes~~	No	N/A	~~Yes~~	No	N/A

7) Batch QC Anomaly? ☑ No ☐ Yes (See Comments) NCR # (If initiated): _____

Project Manager Signature	Date	Quality Assurance Officer Signature	Date
N/A		VHM	6-2-11

GENERAL COMMENTS

REFER TO BATCH TECHNICAL NOTES. 6-2-11

Alpha Spec
Technical Review Checklist

ARS SDG ARS1-11-00897

Sample Matrix: AQ **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup

ARS Prep. Batch ID(s): **Batch A:** B11-01660 **Batch B:** NA **Batch C:** NA

Test(s): ASP-A-008 NA NA

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review			Lab Supervisor		
1) 100% of Manual Transcriptions Verified?	Yes	No	N/A	Yes	No	N/A
2) 100% of Manual Calculations Verified?	Yes	No	N/A	Yes	No	N/A
3) Tracers Added Before Muffling, Digestion, or Chem. Sep.?	Yes	No	N/A	Yes	No	N/A
4) QC and Samples are Aliquoted / Traced?	Yes	No	N/A	Yes	No	N/A
5) Deviations from procedure are documented and verified?	Yes	No	N/A	Yes	No	N/A

6) Sample Prep Anomaly? ☐ **No** ☑ **Yes** (See Tech Notes) **NCR #** (If initiated): _____

Chemist Signature: [signature] Date: 5-4-11 Verifier Signature: [signature] Date: 5-4-11

B. ANALYSIS REVIEW

	Analyst Review			QA Officer Review		
1) Calibrations/Backgrounds Valid and Current?	Yes	No	N/A	Yes	No	N/A
2) Source Checks Completed and Acceptable?	Yes	No	N/A	Yes	No	N/A
3) Background Checks Complete and Acceptable?	Yes	No	N/A	Yes	No	N/A

Quality Assurance Officer Signature: [signature] Date: 6-2-11

	Analyst Review			Lab Supervisor		
4) 100% of Manually entered Parameters Verified Accurate?	Yes	No	N/A	Yes	No	N/A
5) Appropriate QC samples initiated at required frequency?	Yes	No	N/A	Yes	No	N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)						
a) All Centroids +/- 50 keV for each sample and QC sample?	Yes	No	N/A	Yes	No	N/A
b) FWHM <100 kEV for each sample and QC sample?	Yes	No	N/A	Yes	No	N/A
c) All specific peaks are with in the regions of interest (ROI's) ?	Yes	No	N/A	Yes	No	N/A
d) Spectrum shows no visual indication of interferences?	Yes	No	N/A	Yes	No	N/A

7) Analysis Anomaly? ☑ **No** ☐ **Yes** (See Comments) **NCR #** (If initiated): _____

Analyst Signature: [signature] Date: 5-10-11 Laboratory Supervisor Signature: [signature] Date: 5-10-11

Batch A: B11-01660

Alpha Spec
Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review	QA Officer Review
1) RDL Criteria are Met?	Yes No N/A	Yes No ~~N/A~~
2) Activity + 3xCSU a Negative Number?	Yes No N/A	Yes ~~No~~ N/A
3) Method Blank Criteria Met?	Yes No N/A	Yes ~~No~~ N/A
4) LCS/LCD Criteria Met?	Yes No N/A	~~Yes~~ No N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes No N/A	~~Yes~~ No N/A
6) Tracer yield results meet acceptance criteria?	Yes No N/A	Yes ~~No~~ N/A

7) Batch QC Anomaly? ☐ No ☑ Yes (See Comments) NCR # (If initiated): _____

Project Manager Signature: [signature] Date: 5-10-11

Quality Assurance Officer Signature: [signature] Date: 6-2-11

GENERAL COMMENTS

Alpha Spec
Technical Review Checklist

ARS SDG ARS1-11-00897

Sample Matrix: AQ **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup

ARS Prep. Batch ID(s):	**Batch A:**	**Batch B:**	**Batch C:**
	B11-01985	NA	NA
Test(s):	ASP-A-008	NA	NA

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review			Lab Supervisor		
1) 100% of Manual Transcriptions Verified?	Yes	No	N/A	Yes	No	N/A
2) 100% of Manual Calculations Verified?	Yes	No	N/A	Yes	No	N/A
3) Tracers Added Before Muffling, Digestion, or Chem. Sep.?	Yes	No	N/A	Yes	No	N/A
4) QC and Samples are Aliquoted / Traced?	Yes	No	N/A	Yes	No	N/A
5) Deviations from procedure are documented and verified?	Yes	No	N/A	Yes	No	N/A

6) Sample Prep Anomaly? ☑ **No** ☐ **Yes** (See Tech Notes) **NCR #** (If initiated): _____

Jamaal Brown 5-26-11 — **Chemist Signature** **Date**

[illegible] 5-26-11 — **Verifier Signature** **Date**

B. ANALYSIS REVIEW

	Analyst Review			QA Officer Review		
1) Calibrations/Backgrounds Valid and Current?	Yes	No	N/A	Yes	No	N/A
2) Source Checks Completed and Acceptable?	Yes	No	N/A	Yes	No	N/A
3) Background Checks Complete and Acceptable?	Yes	No	N/A	Yes	No	N/A

_____ **Quality Assurance Officer Signature** **Date**

	Analyst Review			Lab Supervisor		
4) 100% of Manually entered Parameters Verified Accurate?	Yes	No	N/A	Yes	No	N/A
5) Appropriate QC samples initiated at required frequency?	Yes	No	N/A	Yes	No	N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)						
a) All Centroids +/- 50 keV for each sample and QC sample?	Yes	No	N/A	Yes	No	N/A
b) FWHM <100 kEV for each sample and QC sample?	Yes	No	N/A	Yes	No	N/A
c) All specific peaks are with in the regions of interest (ROI's) ?	Yes	No	N/A	Yes	No	N/A
d) Spectrum shows no visual indication of interferences?	Yes	No	N/A	Yes	No	N/A

7) Analysis Anomaly? ☑ **No** ☐ **Yes** (See Comments) **NCR #** (If initiated): _____

[illegible] 6-2-11 — **Analyst Signature** **Date**

VJM 6-2-11 — **Laboratory Supervisor Signature** **Date**

Batch A: B11-01985

Alpha Spec
Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review			QA Officer Review		
1) RDL Criteria are Met?	Yes	No	N/A	Yes	No	N/A
2) Activity + 3xCSU a Negative Number?	Yes	No	N/A	Yes	No	N/A
3) Method Blank Criteria Met?	Yes	No	N/A	Yes	No	N/A
4) LCS/LCD Criteria Met?	Yes	No	N/A	Yes	No	N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes	No	N/A	Yes	No	N/A
6) Tracer yield results meet acceptance criteria?	Yes	No	N/A	Yes	No	N/A

7) Batch QC Anomaly? ☐ No ☑ Yes (See Comments) NCR # (If initiated):

Project Manager Signature Date 6-2-11

Quality Assurance Officer Signature Date

GENERAL COMMENTS

Alpha Spec
Technical Review Checklist

ARS SDG ARS1-11-00897

Sample Matrix: AQ **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup

ARS Prep. Batch ID(s):	**Batch A:** B11-01664	**Batch B:** NA	**Batch C:** NA
Test(s):	ASP-A-024	NA	NA

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review			Lab Supervisor		
1) 100% of Manual Transcriptions Verified?	✓Yes	No	N/A	✓Yes	No	N/A
2) 100% of Manual Calculations Verified?	Yes	No	✓N/A	Yes	No	✓N/A
3) Tracers Added Before Muffling, Digestion, or Chem. Sep.?	✓Yes	No	N/A	✓Yes	No	N/A
4) QC and Samples are Aliquoted / Traced?	✓Yes	No	N/A	✓Yes	No	N/A
5) Deviations from procedure are documented and verified?	Yes	No	✓N/A	Yes	No	✓N/A

6) Sample Prep Anomaly? ☐ **No** ☑ **Yes** (See Tech Notes) **NCR #** (If initiated): _____

Jamaal Brown 5-3-11 — **Chemist Signature** **Date**

Jerry D Blake 5-3-2011 — **Verifier Signature** **Date**

B. ANALYSIS REVIEW

	Analyst Review			QA Officer Review		
1) Calibrations/Backgrounds Valid and Current?	✓Yes	No	N/A	Yes	No	N/A
2) Source Checks Completed and Acceptable?	✓Yes	No	N/A	Yes	No	N/A
3) Background Checks Complete and Acceptable?	Yes	No	✓N/A	Yes	No	N/A

_____ **Quality Assurance Officer Signature** **Date**

	Analyst Review			Lab Supervisor		
4) 100% of Manually entered Parameters Verified Accurate?	✓Yes	No	N/A	Yes	No	N/A
5) Appropriate QC samples initiated at required frequency?	✓Yes	No	N/A	Yes	No	N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)						
a) All Centroids +/- 50 keV for each sample and QC sample?	Yes	✓No	N/A	Yes	No	N/A
b) FWHM <100 kEV for each sample and QC sample?	✓Yes	No	N/A	Yes	No	N/A
c) All specific peaks are with in the regions of interest (ROI's) ?	✓Yes	No	N/A	Yes	No	N/A
d) Spectrum shows no visual indication of interferences?	Yes	✓No	N/A	Yes	No	N/A

7) Analysis Anomaly? ☐ **No** ☑ **Yes** (See Comments) **NCR #** (If initiated): _____

Aya C. Baik 5-11-11 — **Analyst Signature** **Date**

[illegible] 5-11-11 — **Laboratory Supervisor Signature** **Date**

Batch A: B11-01664

Alpha Spec
Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review	QA Officer Review
1) RDL Criteria are Met?	Yes No N/A	Yes No N/A
2) Activity + 3xCSU a Negative Number?	Yes No N/A	Yes No N/A
3) Method Blank Criteria Met?	Yes No N/A	Yes No N/A
4) LCS/LCD Criteria Met?	Yes No N/A	Yes No N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes No N/A	Yes No N/A
6) Tracer yield results meet acceptance criteria?	Yes No N/A	Yes No N/A
7) Batch QC Anomaly? ☐ No ☑ Yes (See Comments) NCR # (If initiated):		
Jennifer Wright 6-2-11 Project Manager Signature Date	Quality Assurance Officer Signature Date	

GENERAL COMMENTS

REFER TO BATCH TECHNICAL NOTES. 5-11-11

Sample ARS1-11-00897-24 FWHM for U-235, 238 is > 100 Kev. 5-11-11

Alpha Spec
Technical Review Checklist

ARS SDG ARS1-11-00897

Sample Matrix: AQ **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup

ARS Prep. Batch ID(s): **Batch A:** B11-01657 **Batch B:** NA **Batch C:** NA

Test(s): ASP-A-008 NA NA

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review	Lab Supervisor
1) 100% of Manual Transcriptions Verified?	Yes ✓ No N/A	Yes ✓ No N/A
2) 100% of Manual Calculations Verified?	Yes No N/A ✓	Yes No N/A ✓
3) Tracers Added Before Muffling, Digestion, or Chem. Sep.?	Yes ✓ No N/A	Yes ✓ No N/A
4) QC and Samples are Aliquoted / Traced?	Yes ✓ No N/A	Yes ✓ No N/A
5) Deviations from procedure are documented and verified?	Yes No N/A ✓	Yes No N/A ✓

6) Sample Prep Anomaly? ☐ **No** ☑ **Yes** (See Tech Notes) **NCR #** (If initiated): _____

Tamara L Brown 5-4-11 — **Chemist Signature** **Date**

[illegible] 5-4-11 — **Verifier Signature** **Date**

B. ANALYSIS REVIEW

	Analyst Review	QA Officer Review
1) Calibrations/Backgrounds Valid and Current?	Yes ✓ No N/A	Yes No N/A
2) Source Checks Completed and Acceptable?	Yes ✓ No N/A	Yes No N/A
3) Background Checks Complete and Acceptable?	Yes No N/A ✓	Yes No N/A

[illegible] 5-6-11 — **Quality Assurance Officer Signature** **Date**

	Analyst Review	Lab Supervisor
4) 100% of Manually entered Parameters Verified Accurate?	Yes ✓ No N/A	Yes No N/A
5) Appropriate QC samples initiated at required frequency?	Yes ✓ No N/A	Yes No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)		
a) All Centroids +/- 50 keV for each sample and QC sample?	Yes No ✓ N/A	Yes No N/A
b) FWHM <100 kEV for each sample and QC sample?	Yes ✓ No N/A	Yes No N/A
c) All specific peaks are with in the regions of interest (ROI's) ?	Yes ✓ No N/A	Yes No N/A
d) Spectrum shows no visual indication of interferences?	Yes No ✓ N/A	Yes No N/A

7) Analysis Anomaly? ☐ **No** ☑ **Yes** (See Comments) **NCR #** (If initiated): _____

[illegible] 5-6-11 — **Analyst Signature** **Date**

[illegible] 5-6-11 — **Laboratory Supervisor Signature** **Date**

Batch A: B11-01657

Alpha Spec
Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review	QA Officer Review
1) RDL Criteria are Met?	Yes No N/A	Yes No N/A
2) Activity + 3xCSU a Negative Number?	Yes No N/A	Yes No N/A
3) Method Blank Criteria Met?	Yes No N/A	Yes No N/A
4) LCS/LCD Criteria Met?	Yes No N/A	Yes No N/A
5) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes No N/A	Yes No N/A
6) Tracer yield results meet acceptance criteria?	Yes No N/A	Yes No N/A

7) Batch QC Anomaly? ☐ No ☑ Yes (See Comments) NCR # (If initiated): _____

Project Manager Signature: Heather Wright Date: 5-6-11

Quality Assurance Officer Signature: [illegible] Date:

GENERAL COMMENTS

REFER TO BATCH TECHNICAL NOTES. [illegible] 5-6-11

GPC
Technical Review Checklist

ARS SDG ARS1-11-00897

Sample Matrix: AQ **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup MS MSD

ARS Prep. Batch ID(s):	**Batch A:** ARS1-B11-01631	**Batch B:** NA	**Batch C:** NA
Test(s):	GPC-A-001	NA	NA

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review	Verifier Review
1) 100% of Manual Transcriptions Verified?	Yes No N/A	Yes No N/A
2) 100% of Manual Calculations Verified?	Yes No N/A	Yes No N/A
3) QC and Samples are Aliquoted / Traced?	Yes No N/A	Yes No N/A
4) Carriers/Tracers Added Before Muffling, Digestion, or Chem. Sep.?	Yes No N/A	Yes No N/A
5) Residue Mass is within Acceptance Limits?	Yes No N/A	Yes No N/A
6) Gravimetric Yield is within Acceptance Limits?	Yes No N/A	Yes No N/A
7) Deviations from procedure have been documented and verified?	Yes No N/A	Yes No N/A

8) Sample Prep Anomaly? ☒ No ☐ Yes (See Tech Notes) NCR # (If initiated): _____

Chemist Signature 4-28-11 Date — Verifier Signature 4-28-11 Date

B. ANALYSIS REVIEW

	Analyst Review	QA Officer Review
1) Calibrations/Backgrounds Valid and Current?	Yes No N/A	Yes No N/A
2) Source Checks Completed and Acceptable?	Yes No N/A	Yes No N/A
3) Background Checks Complete and Acceptable?	Yes No N/A	Yes No N/A

Quality Assurance Officer Signature Date

	Analyst Review	Lab Supervisor
4) 100% of Manually entered Parameters Verified Accurate?	Yes No N/A	Yes No N/A
5) Appropriate QC samples initiated at required frequency?	Yes No N/A	Yes No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)		
a) Physical Configuration of Sample equivalent to Calibration?	Yes No N/A	Yes No N/A
b) Ref. Nuclude for GAB Appropriate Requirements?	Yes No N/A	Yes No N/A

7) Analysis Anomaly? ☑ No ☐ Yes (See Comments) NCR # (If initiated): _____

Analyst Signature 6-2-11 Date — Laboratory Supervisor Signature Date

Batch A: ARS1-B11-01631

GPC
Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review	QA Officer Review
1) RDL Criteria are Met?	Yes No ~~N/A~~	Yes No N/A
2) Activity + 3xCSU a Negative Number?	Yes No ~~N/A~~	Yes No N/A
3) Residue Mass for Gross A/B and Gross B Meet Acceptance Criteria?	Yes No ~~N/A~~	Yes No N/A
4) Method Blank Criterion Met?	Yes No ~~N/A~~	Yes No N/A
5) LCS/LCD Criteria Met?	Yes No ~~N/A~~	Yes No N/A
6) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes No ~~N/A~~	Yes No N/A
7) MS/MSD Criteria Met?	Yes No ~~N/A~~	Yes No N/A
8) Carrier Chemical Yield within Accepance Limits?	Yes No ~~N/A~~	

9) Batch QC Anomaly? ☑ No ☐ Yes (See Tech Notes) NCR # (If initiated): _____

Project Mgr. Signature: Michelle Wright Date: 6-2-11

Quality Assurance Officer _____ Date _____

GENERAL COMMENTS

GPC
Technical Review Checklist

ARS SDG ARS1-11-00897

Sample Matrix: AQ **Aliquot** (Circle One) : Dry As Received Filtered Other: _____

Required QC Samples (Circle all that apply): Blank LCS LCSD Sample Dup MS MSD

ARS Prep. Batch ID(s): **Batch A:** ARS1-B11-01621 **Batch B:** NA **Batch C:** NA

Test(s): GPC-A-001 NA NA

A. RADIOCHEMICAL PREPARATION REVIEW

	Chemist Review	Verifier Review
1) 100% of Manual Transcriptions Verified?	~~Yes~~ No N/A	~~Yes~~ No N/A
2) 100% of Manual Calculations Verified?	Yes No ~~N/A~~	Yes No ~~N/A~~
3) QC and Samples are Aliquoted / Traced?	~~Yes~~ No N/A	~~Yes~~ No N/A
4) Carriers/Tracers Added Before Muffling, Digestion, or Chem. Sep.?	Yes No ~~N/A~~	Yes No ~~N/A~~
5) Residue Mass is within Acceptance Limits?	~~Yes~~ No N/A	~~Yes~~ No N/A
6) Gravimetric Yield is within Acceptance Limits?	Yes No ~~N/A~~	Yes No ~~N/A~~
7) Deviations from procedure have been documented and verified?	Yes No ~~N/A~~	Yes No ~~N/A~~

8) Sample Prep Anomaly? ☒ No ☐ Yes (See Tech Notes) NCR # (If initiated): _____

4-28-11 — Chemist Signature Date

4-28-11 — Verifier Signature Date

B. ANALYSIS REVIEW

	Analyst Review	QA Officer Review
1) Calibrations/Backgrounds Valid and Current?	~~Yes~~ No N/A	Yes No N/A
2) Source Checks Completed and Acceptable?	~~Yes~~ No N/A	Yes No N/A
3) Background Checks Complete and Acceptable?	~~Yes~~ No N/A	Yes No N/A

Quality Assurance Officer Signature Date

	Analyst Review	Lab Supervisor
4) 100% of Manually entered Parameters Verified Accurate?	~~Yes~~ No N/A	Yes No N/A
5) Appropriate QC samples initiated at required frequency?	~~Yes~~ No N/A	Yes No N/A
6) Test/Sample Specific Parameters (See ARS-059 for details)		
a) Physical Configuration of Sample equivalent to Calibration?	~~Yes~~ No N/A	Yes No N/A
b) Ref. Nuclude for GAB Appropriate Requirements?	~~Yes~~ No N/A	Yes No N/A

7) Analysis Anomaly? ☒ No ☐ Yes (See Comments) NCR # (If initiated): _____

6-2-11 — Analyst Signature Date

Laboratory Supervisor Signature Date

Batch A: ARS1-B11-01621

ARS AMERICAN RADIATION SERVICES, INC.

GPC
Technical Review Checklist

C. BATCH QC VALIDATION

	Proj. Mgr. Review	QA Officer Review
1) RDL Criteria are Met?	Yes No ~~N/A~~	Yes No N/A
2) Activity + 3xCSU a Negative Number?	Yes No ~~N/A~~	Yes No N/A
3) Residue Mass for Gross A/B and Gross B Meet Acceptance Criteria?	Yes No ~~N/A~~	Yes No N/A
4) Method Blank Criterion Met?	Yes No ~~N/A~~	Yes No N/A
5) LCS/LCD Criteria Met?	Yes No ~~N/A~~	Yes No N/A
6) Duplicate (Sample Duplicate, LCSD, MSD) Criteria Met?	Yes No ~~N/A~~	Yes No N/A
7) MS/MSD Criteria Met?	Yes No ~~N/A~~	Yes No N/A
8) Carrier Chemical Yield within Accepance Limits?	Yes No ~~N/A~~	

9) Batch QC Anomaly? ☑ No ☐ Yes (See Tech Notes) NCR # (If initiated): _____

Heather Wright 6-2-11

Project Mgr. Signature Date Quality Assurance Officer Date

GENERAL COMMENTS

SDG Technical Notes

SDG

ARS1-11-00897

#	Analysis Code	Batch/SDG	Date	Technician	Batch Technical Notes	Dept
1	ASP-A-008	ARS1-B11-01657	05/04/11 11:10	JBROWN	B11-01657-03,13,14,15 did not seem to plate well. There is a cloudy film that plated onto the disk. Tracer recovery/activity could be affected.	CHEMISTRY
2	ASP-A-008	ARS1-B11-01660	05/04/11 12:39	JBROWN	B11-01660-04,05 did not seem to plate well, there is a whitish film covering the disk. Tracer recovery/activity could be affected.	CHEMISTRY
3	ASP-A-008	ARS1-B11-01657	05/06/11 14:52	ABAILEY	The following spectral anomalies were identified in the counting results for this batch: Heavy peak trailing was encountered on the Th-229 peak for B11-01657-07 thru -09 & -11 thru -16. This causes blending of the Th-229 & Th-230 peaks and likely caused false detection of Th-230 counts in each of the samples in question. Also, Th-232 was not identified in B11-01657-02. A small of amount of unidentified isotope was used in place for calculation purposes, but the centroid energy would be low out of acceptable range.	COUNTROOM
4	ASP-A-008	ARS1-B11-01657	05/06/11 16:36	VMULLIGAN	The method blank for Th-230 failed evaluation criteria for samples ARS1-11-00897-002 and 003. However, review of the data shows that both samples have activities that are less than the MDC and are less than the value of the blank. The results can be reported.	MGMT
5	ASP-A-008	ARS1-B11-01660	05/10/11 12:22	JARMSTRONG	ARS1-B11-01660-04 (ARS1-11-00897-014) fell outside the tracer acceptance range biased low at 25.7813107%. ARS1-B11-01660-05 (ARS1-11-00897-015) fell outside the tracer acceptance range biased low at 25.8777444%. ARS1-B11-01660-06 (ARS1-11-00897-016) fell outside the tracer acceptance range biased low at 17.6493122%. ARS1-B11-01660-03 (MBL) Th-230/232 failed method blank requirements according to ARS-014 rev4 sections 6.1.2.3.2.2. and 6.1.2.3.2.3.	COUNTROOM
6	ASP-A-008	ARS1-B11-01985	06/02/11 15:54	HWRIGHT	The tracer recovery for ARS1-B11-01985-04, and 05 are biased low; however, after management review the data is being released as valid.	REPORTING
7	ASP-A-008	ARS1-B11-01985	06/02/11 15:59	HWRIGHT	The method blank is biased high; however, method blank evaluation was performed per procedure and results are being released as valid.	REPORTING
8	ASP-A-024	ARS1-B11-01664	05/03/11 16:56	JBROWN	B11-01664-14 had a black film that plated onto the disk, I am unsure what this can be attributed to. As a result tracer recovery/activity could be affected.	CHEMISTRY
9	ASP-A-024	ARS1-B11-01663	05/03/11 16:58	JBROWN	B11-01663-01,02,07,16 all seem to have a film covering the plate. I am unsure what this can be attributed to. As a result tracer recovery/activity could be affected.	CHEMISTRY

ARS INTERNATIONAL

SDG

ARS1-11-00897

#	Analysis Code	Batch/SDG	Date	Technician	Batch Technical Notes	Dept
10	ASP-A-024	ARS1-B11-01663	05/10/11 12:08	JARMSTRONG	ARS1-B11-01663-02 (LCSD) U-238 and U-234 not identified as peaks are extremely wide and experience a large amount of tailing. FWHM for U-232/234/238 100keV. ARS1-B11-01663-07 (ARS1-11-00897-004) U-234/238 FWHM > 100keV. U-234 peak centroid lies outside +/- 50keV acceptance range due to excessive peak tailing. All peaks overlap due to excessive tailing. This will affect activity calculations as peaks cannot be differentiated. ARS1-B11-01663-16 (ARS1-11-00897-013) U-234/235 FWHM > 100keV due to excessive peak tailing and overlap. All peaks overlap due to excessive tailing. This will affect activity calculations as peaks cannot be differentiated.	COUNTROOM
11	ASP-A-024	ARS1-B11-01664	05/11/11 16:39	ABAILEY	The following spectral anomalies were identified in the counting results for this batch: The identified U-235 centroid energy for B11-01664-06 (ARS1-11-00897-016) is high out of acceptable range. Also, B11-01664-14 (ARS1-11-00897-024) sample spectrum shows gross peak trailing and attenuation, so much so that individual analytes cannot be readily or confidently identified. A check recount of the sample was conducted on another detector verified to be accurate. The results confirm the original count. ARS laboratory supervision is informed and the sample must be rerun.	COUNTROOM
12	ASP-A-024	ARS1-B11-01664	05/11/11 17:03	HWRIGHT	The Method Blank for U-234 and U-238 is elevated; however, method blank evaluation was performed per procedure and the QC is being released as valid.	MGMT
13	ASP-A-024	ARS1-B11-01984	05/27/11 12:27	JBROWN	B11-01984-07,16,17 did not plate well, there is a black film covering the entire plate. Tracer recovery/activity could be affected as a result.	CHEMISTRY
14	ASP-A-024	ARS1-B11-01664	06/02/11 16:08	HWRIGHT	Tracer recovery for ARS1-B11-01664-14 is biased low; however, after management review the results are being released as valid.	REPORTING

DQO Report for SDG

ARS1-11-00897

Analysis Code	Group	Isotope	Activity Units	Aliquot Units	ProcedureNo	RDL	LCS_LL	LCS_UL	MS_LL	MS_UL	RadY_LL	RadY_UL	GravY_LL	GravY_LL	RER	RPD	DiltionReq	RoughPrepReq	BlankCorrectionMDA	BlankCorrectionAll	CountTimeReq	AliquotRequired
ASP-A-008	STD	TH-228	pCi	L	ARS-031	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		
ASP-A-008	STD	TH-230	pCi	L	ARS-031	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		
ASP-A-008	STD	TH-232	pCi	L	ARS-031	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		
ASP-A-024	STD	U-234	pCi	L	ARS-026	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		
ASP-A-024	STD	U-235	pCi	L	ARS-026	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		
ASP-A-024	STD	U-238	pCi	L	ARS-026	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		
GPC-A-001	STD	GROSS ALPHA	pCi	L	ARS-002	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		
GPC-A-001	STD	GROSS BETA	pCi	L	ARS-002	0.00E+00	75	125	60	140	30	110	40	110	1.00	25	FALSE	FALSE	FALSE	FALSE		

SDG Report - Samples and Containers

SDG Specific Data

SDG	ARS1-11-00897	TAT Days	7	Project Type	Environmental
Sample Count	25 Rpt Level 2	Date Received	4/27/2011	COC Number	6-042211-001353-0001
Client	Summit Environmental Technologies	Client Deadline	5/6/2011	PO Number	
Client Code	493	Internal Deadline	5/5/2011	Job Number	
Profile Number	PN-00556	Lab Deadline	5/3/2011	Job Location	SITE 0603
Comments	LEVEL IV DELIVERABLE				

Samples and Containers (➔) Checked In Thus Far

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
001	MW-1-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85410	1	1000.00		5	0	30	13		N	N/A				
	85411	2	1000.00		5	0	30	14		N	N/A				
	85412	3	1000.00		5	0	30	14		N	N/A				
	85413	4	1000.00		5	0	30	14		N	N/A				
	85414	5	1000.00		5	0	30	14		N	N/A				
	85415	6	1000.00		5	0	30	14		N	N/A				
002	MW-2-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85416	1	1000.00		5	0	30	15		N	N/A				
	85417	2	1000.00		5	0	30	14		N	N/A				
003	MW-2-2-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85418	1	1000.00		5	0	35	15		N	N/A				
	85419	2	1000.00		5	0	35	15		N	N/A				
004	JPOP41S-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85420	1	1000.00		5	0	30	16		N	N/A				
	85421	2	1000.00		5	0	30	16		N	N/A				
005	MD-SW-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85422	1	1000.00		5	0	35	14		N	N/A				
	85423	2	1000.00		5	0	35	14		N	N/A				
006	MW-3-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85424	1	1000.00		5	0	30	15		N	N/A				
	85425	2	1000.00		5	0	30	14		N	N/A				
007	MW-4-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85426	1	1000.00		5	0	30	14		N	N/A				
	85427	2	1000.00		5	0	30	14		N	N/A				
008	MW-6-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85428	1	1000.00		5	0	35	15		N	N/A				
	85429	2	1000.00		5	0	30	15		N	N/A				
009	MW-7-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							

SDG Report - Samples and Containers

SDG Specific Data

SDG	ARS1-11-00897	TAT Days	7	Project Type	Environmental
Sample Count	25 Rpt Level 2	Date Received	4/27/2011	COC Number	6-042211-001353-0001
Client	Summit Environmental Technologies	Client Deadline	5/6/2011	PO Number	
Client Code	493	Internal Deadline	5/5/2011	Job Number	
Profile Number	PN-00556	Lab Deadline	5/3/2011	Job Location	SITE 0603
Comments	LEVEL IV DELIVERABLE				

Samples and Containers (➔) Checked In Thus Far

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85430	1	1000.00		5	0	20	14		N	N/A				
	85431	2	1000.00		5	0	20	14		N	N/A				
010	MW-8-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85432	1	1000.00		5	0	25	13		N	N/A				
	85433	2	1000.00		5	0	25	13		N	N/A				
011	MW-MD-02-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85434	1	1000.00		5	0	20	13		N	N/A				
	85435	2	1000.00		5	0	20	13		N	N/A				
012	MW-MD-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85436	1	1000.00		5	0	30	14		N	N/A				
	85437	2	1000.00		5	0	30	14		N	N/A				
013	NPOP20E-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85438	1	1000.00		5	0	30	14		N	N/A				
	85439	2	1000.00		5	0	30	15		N	N/A				
014	PR-SW-01-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85440	1	1000.00		5	0	30	15		N	N/A				
	85441	2	1000.00		5	0	30	14		N	N/A				
015	RB-01-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85442	1	1000.00		5	0	35	14		N	N/A				
	85443	2	1000.00		5	0	30	14		N	N/A				
016	RB-02-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85444	1	1000.00		5	0	30	14		N	N/A				
	85445	2	1000.00		5	0	25	13		N	N/A				
017	RM-JM-SW-02-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85446	1	1000.00		5	0	30	14		N	N/A				
	85447	2	1000.00		5	0	30	14		N	N/A				
018	RM-JM-SW-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
➔	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol

SDG Report - Samples and Containers

SDG Specific Data

SDG	ARS1-11-00897	TAT Days	7	Project Type	Environmental
Sample Count	25 Rpt Level 2	Date Received	4/27/2011	COC Number	6-042211-001353-0001
Client	Summit Environmental Technologies	Client Deadline	5/6/2011	PO Number	
Client Code	493	Internal Deadline	5/5/2011	Job Number	
Profile Number	PN-00556	Lab Deadline	5/3/2011	Job Location	SITE 0603
Comments	LEVEL IV DELIVERABLE				

Samples and Containers (→) Checked In Thus Far

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
	85448	1	1000.00		5	0	30	13		N	N/A				
	85449	2	1000.00		5	0	30	13		N	N/A				
019	RM-SW-BG-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85450	1	1000.00		5	0	30	13		N	N/A				
	85451	2	1000.00		5	0	30	13		N	N/A				
020	RP-JM-SW-01-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85452	1	1000.00		5	0	35	13		N	N/A				
	85453	2	1000.00		5	0	30	14		N	N/A				
021	RP-JM-SW-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85454	1	1000.00		5	0	30	14		N	N/A				
	85455	2	1000.00		5	0	30	13		N	N/A				
022	RP-SW-01-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85456	1	1000.00		5	0	35	13		N	N/A				
	85457	2	1000.00		5	0	35	13		N	N/A				
023	RP-SW-BG-041911	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85458	1	1000.00		5	0	35	14		N	N/A				
	85459	2	1000.00		5	0	35	14		N	N/A				
024	SPOP35-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85460	1	1000.00		5	0	30	15		N	N/A				
	85461	2	1000.00		5	0	30	13		N	N/A				
025	MW-RM-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85462	1	1000.00		5	0	30	13		N	N/A				
	85463	2	1000.00		5	0	30	13		N	N/A				

SDG Report - Analysis Assignments

Temp SDG	ARS1-11-00897	Sample Count	25
Client	Summit Environmental Technologies	Analysis Count	3-75

Samples Count Totals per Analysis

Analysis Code	Analysis Description	Samples Count
ASP-A-008	Thorium in (Water [Aqueous, AQ])	25
ASP-A-024	Uranium (233, 234U, 235U, 238U) in (Water [Aqueous, AQ])	25
GPC-A-001	Gross Alpha/Beta in (Water [Aqueous, AQ])	25

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
001	ASP-A-008	X
001	ASP-A-024	X
001	GPC-A-001	X
002	ASP-A-008	X
002	ASP-A-024	X
002	GPC-A-001	X
003	ASP-A-008	X
003	ASP-A-024	X
003	GPC-A-001	X
004	ASP-A-008	X
004	ASP-A-024	X
004	GPC-A-001	X
005	ASP-A-008	X
005	ASP-A-024	X
005	GPC-A-001	X
006	ASP-A-008	X
006	ASP-A-024	X
006	GPC-A-001	X
007	ASP-A-008	X
007	ASP-A-024	X
007	GPC-A-001	X
008	ASP-A-008	X
008	ASP-A-024	X
008	GPC-A-001	X
009	ASP-A-008	X
009	ASP-A-024	X
009	GPC-A-001	X
010	ASP-A-008	X
010	ASP-A-024	X
010	GPC-A-001	X
011	ASP-A-008	X
011	ASP-A-024	X
011	GPC-A-001	X
012	ASP-A-008	X
012	ASP-A-024	X
012	GPC-A-001	X
013	ASP-A-008	X
013	ASP-A-024	X
013	GPC-A-001	X
014	ASP-A-008	X
014	ASP-A-024	X
014	GPC-A-001	X
015	ASP-A-008	X
015	ASP-A-024	X
015	GPC-A-001	X
016	ASP-A-008	X
016	ASP-A-024	X
016	GPC-A-001	X
017	ASP-A-008	X
017	ASP-A-024	X
017	GPC-A-001	X
018	ASP-A-008	X
018	ASP-A-024	X
018	GPC-A-001	X
019	ASP-A-008	X
019	ASP-A-024	X

SDG Report - Analysis Assignments

Temp SDG	ARS1-11-00897	Sample Count	25
Client	Summit Environmental Technologies	Analysis Count	3-75

Samples Count Totals per Analysis

Analysis Code	Analysis Description	Samples Count

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
019	GPC-A-001	X
020	ASP-A-008	X
020	ASP-A-024	X
020	GPC-A-001	X
021	ASP-A-008	X
021	ASP-A-024	X
021	GPC-A-001	X
022	ASP-A-008	X
022	ASP-A-024	X
022	GPC-A-001	X
023	ASP-A-008	X
023	ASP-A-024	X
023	GPC-A-001	X
024	ASP-A-008	X
024	ASP-A-024	X
024	GPC-A-001	X
025	ASP-A-008	X
025	ASP-A-024	X
025	GPC-A-001	X

SDG Report - Samples and Containers

SDG Specific Data

SDG	ARS1-11-00897			TAT Days	7	Project Type	Environmental
Sample Count	25	Rpt Level	2	Date Received	4/27/2011	COC Number	6-042211-001353-0001
Client	Summit Environmental Technologies			Client Deadline	5/6/2011	PO Number	
Client Code	493			Internal Deadline	5/5/2011	Job Number	
Profile Number	PN-00556			Lab Deadline	5/3/2011	Job Location	SITE 0603
Comments	LEVEL IV DELIVERABLE						

Samples and Containers (→) Checked In Thus Far

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
001	MW-1-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85410	1	1000.00		5	0	30	13		N	N/A				
	85411	2	1000.00		5	0	30	14		N	N/A				
	85412	3	1000.00		5	0	30	14		N	N/A				
	85413	4	1000.00		5	0	30	14		N	N/A				
	85414	5	1000.00		5	0	30	14		N	N/A				
	85415	6	1000.00		5	0	30	14		N	N/A				
002	MW-2-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85416	1	1000.00		5	0	30	15		N	N/A				
	85417	2	1000.00		5	0	30	14		N	N/A				
003	MW-2-2-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85418	1	1000.00		5	0	35	15		N	N/A				
	85419	2	1000.00		5	0	35	15		N	N/A				
004	JPOP41S-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85420	1	1000.00		5	0	30	16		N	N/A				
	85421	2	1000.00		5	0	30	16		N	N/A				
005	MD-SW-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85422	1	1000.00		5	0	35	14		N	N/A				
	85423	2	1000.00		5	0	35	14		N	N/A				
006	MW-3-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85424	1	1000.00		5	0	30	15		N	N/A				
	85425	2	1000.00		5	0	30	14		N	N/A				
007	MW-4-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85426	1	1000.00		5	0	30	14		N	N/A				
	85427	2	1000.00		5	0	30	14		N	N/A				
008	MW-6-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85428	1	1000.00		5	0	35	15		N	N/A				
	85429	2	1000.00		5	0	30	15		N	N/A				
009	MW-7-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							

SDG Report - Samples and Containers

SDG Specific Data

SDG	ARS1-11-00897	TAT Days	7	Project Type	Environmental
Sample Count	25 Rpt Level 2	Date Received	4/27/2011	COC Number	6-042211-001353-0001
Client	Summit Environmental Technologies	Client Deadline	5/6/2011	PO Number	
Client Code	493	Internal Deadline	5/5/2011	Job Number	
Profile Number	PN-00556	Lab Deadline	5/3/2011	Job Location	SITE 0603
Comments	LEVEL IV DELIVERABLE				

Samples and Containers (→) Checked In Thus Far

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85430	1	1000.00		5	0	20	14		N	N/A				
	85431	2	1000.00		5	0	20	14		N	N/A				
010	MW-8-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85432	1	1000.00		5	0	25	13		N	N/A				
	85433	2	1000.00		5	0	25	13		N	N/A				
011	MW-MD-02-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85434	1	1000.00		5	0	20	13		N	N/A				
	85435	2	1000.00		5	0	20	13		N	N/A				
012	MW-MD-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85436	1	1000.00		5	0	30	14		N	N/A				
	85437	2	1000.00		5	0	30	14		N	N/A				
013	NPOP20E-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85438	1	1000.00		5	0	30	14		N	N/A				
	85439	2	1000.00		5	0	30	15		N	N/A				
014	PR-SW-01-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85440	1	1000.00		5	0	30	15		N	N/A				
	85441	2	1000.00		5	0	30	14		N	N/A				
015	RB-01-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85442	1	1000.00		5	0	35	14		N	N/A				
	85443	2	1000.00		5	0	30	14		N	N/A				
016	RB-02-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85444	1	1000.00		5	0	30	14		N	N/A				
	85445	2	1000.00		5	0	25	13		N	N/A				
017	RM-JM-SW-02-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85446	1	1000.00		5	0	30	14		N	N/A				
	85447	2	1000.00		5	0	30	14		N	N/A				
018	RM-JM-SW-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol

SDG Report - Samples and Containers

SDG Specific Data

SDG	ARS1-11-00897	TAT Days	7	Project Type	Environmental
Sample Count	25 Rpt Level 2	Date Received	4/27/2011	COC Number	6-042211-001353-0001
Client	Summit Environmental Technologies	Client Deadline	5/6/2011	PO Number	
Client Code	493	Internal Deadline	5/5/2011	Job Number	
Profile Number	PN-00556	Lab Deadline	5/3/2011	Job Location	SITE 0603
Comments	LEVEL IV DELIVERABLE				

Samples and Containers (→) Checked In Thus Far

FR	ClientID	Matrix	SampleStartDate	SampleEndDate	Disp	Hold	Arch	Storage	X	Units	Y	Units	Z	Units	Comments
	85448	1	1000.00		5	0	30	13		N	N/A				
	85449	2	1000.00		5	0	30	13		N	N/A				
019	RM-SW-BG-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85450	1	1000.00		5	0	30	13		N	N/A				
	85451	2	1000.00		5	0	30	13		N	N/A				
020	RP-JM-SW-01-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85452	1	1000.00		5	0	35	13		N	N/A				
	85453	2	1000.00		5	0	30	14		N	N/A				
021	RP-JM-SW-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85454	1	1000.00		5	0	30	14		N	N/A				
	85455	2	1000.00		5	0	30	13		N	N/A				
022	RP-SW-01-110419	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85456	1	1000.00		5	0	35	13		N	N/A				
	85457	2	1000.00		5	0	35	13		N	N/A				
023	RP-SW-BG-041911	AQ	04/19/11 12:00 PM	04/19/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85458	1	1000.00		5	0	35	14		N	N/A				
	85459	2	1000.00		5	0	35	14		N	N/A				
024	SPOP35-110421	AQ	04/21/11 12:00 PM	04/21/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85460	1	1000.00		5	0	30	15		N	N/A				
	85461	2	1000.00		5	0	30	13		N	N/A				
025	MW-RM-110420	AQ	04/20/11 12:00 PM	04/20/11 12:00 PM	H	30	5	C1							
→	IC_ID	Cnt	Volume_mL	Wt_g	pH_Orig	pH_Final	CPM	uR_Hr	Storage	VOA	Head Sp	AF Units	AF Rate	AF Mins	AF Total Vol
	85462	1	1000.00		5	0	30	13		N	N/A				
	85463	2	1000.00		5	0	30	13		N	N/A				

SDG Report - Analysis Assignments

Temp SDG	ARS1-11-00897	Sample Count	25
Client	Summit Environmental Technologies	Analysis Count	2-50

Samples Count Totals per Analysis

Analysis Code	Analysis Description	Samples Count
ASP-A-008	Thorium in (Water [Aqueous, AQ])	25
ASP-A-024	Uranium (233, 234U, 235U, 238U) in (Water [Aqueous, AQ])	25

Analyses Assigned Per Fraction

Fraction	Analysis Code	X = Assigned
001	ASP-A-008	X
001	ASP-A-024	X
002	ASP-A-008	X
002	ASP-A-024	X
003	ASP-A-008	X
003	ASP-A-024	X
004	ASP-A-008	X
004	ASP-A-024	X
005	ASP-A-008	X
005	ASP-A-024	X
006	ASP-A-008	X
006	ASP-A-024	X
007	ASP-A-008	X
007	ASP-A-024	X
008	ASP-A-008	X
008	ASP-A-024	X
009	ASP-A-008	X
009	ASP-A-024	X
010	ASP-A-008	X
010	ASP-A-024	X
011	ASP-A-008	X
011	ASP-A-024	X
012	ASP-A-008	X
012	ASP-A-024	X
013	ASP-A-008	X
013	ASP-A-024	X
014	ASP-A-008	X
014	ASP-A-024	X
015	ASP-A-008	X
015	ASP-A-024	X
016	ASP-A-008	X
016	ASP-A-024	X
017	ASP-A-008	X
017	ASP-A-024	X
018	ASP-A-008	X
018	ASP-A-024	X
019	ASP-A-008	X
019	ASP-A-024	X
020	ASP-A-008	X
020	ASP-A-024	X
021	ASP-A-008	X
021	ASP-A-024	X
022	ASP-A-008	X
022	ASP-A-024	X
023	ASP-A-008	X
023	ASP-A-024	X
024	ASP-A-008	X
024	ASP-A-024	X
025	ASP-A-008	X
025	ASP-A-024	X

ARS FILE TRACKING SHEET

SDG: ARS1-11-00897

Task	Date / Time	Initials
Date & Time Samples Received	04-27-11/12:30	CWB
ICOC Initiated / Storage Location: C1	04-28-11/09:55	CWB
Technical Checks Performed	See Batch	
Report Written / EDD Generated: 6-2-11 / Final (Date/Time)	6-2-11 /	AW
Initials: prelim	5-6-11/1629	AW
Quality Assurance Checks Performed on Report	Prelim 5-6-11 1638	Prelim
Management Check Performed on Report		
Preliminary Report Sent	5-6-11/1649	AW
Report E-mailed		
Report Faxed		
Report Reviewed		
Report Mailed		
Invoice Completed Invoice #:_____		
Report Imaged		

SPECIAL REQUIREMENTS

Requirement	Yes	No
3 Hour Rush		✓
24 Hour Rush		✓
48 Hour Rush		✓
Special Invoicing *see notes* Mgmt. Approval:_____		✓

NOTES: A second preliminary put together including Uranium data 5-12-11/1511 AW Prelim. II sent 5-12-11/1618 AW

ARS-062
04/23/2010

COMPANY NAME: Summit **SDG:** ARS1-1120897

SHIPPING CONTAINER

Good Condition	☑ Yes	☐ No
Radioactive	☐ Yes	☑ No
UN2910	☐ Yes	☑ No
Sec. Seals	☐ Yes	☑ No
Seals Intact	☐ Yes ☐ No	☑ N/A
Air Bill	☐ Yes	☑ No

COC PRESENT WITH SAMPLES

COC	☑ Yes	☐ No

SAMPLE CONTAINER(S)

Good Condition	☑ Yes	☐ No
Sec. Seals	☐ Yes	☑ No
Seal Intact	☐ Yes ☐ No	☑ N/A
Marked Radioactive	☐ Yes	☑ No

Samples Rcv 25

Matrix [AF , AQ , BI , FE , LT , SI , SO , UR , VG]

External and Internal Surveys

Exposure Rate Meter:	M3 242861	Serial No.:	M44-2 PR2042266	Calibration Due Date:	4-20-12
Count Rate Meter:	M2 154859	Serial No.:	M44-9 PR184559	Calibration Due Date:	4-20-12

Background Exposure Rate (µR/hr)	22	Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd)	13	µR/hr
Background Count Rate (cpm)	70	Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd)	20	cpm
		Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd)	20	cpm

Sample Label/Comments/Notes	pH Orig	pH Final	Mark if Preserve	Acid Lot #	Weight(g) / Volume(mL)	µR/hr	cpm
	pH ≤ 2 is Acceptable					Acceptance Limits <500 µR/hr	<100 cpm/cm²
MW-1-110419 1of6	5	0	✓	20900673	1000 mL	13	30
↓ 2of6	5	0	✓	↓	↓	14	30
↓ 3of6	5	0	✓	↓	↓	14	30
↓ 4of6	5	0	✓	↓	↓	14	30
↓ 5of6	5	0	✓	↓	↓	14	30
↓ 6of6	5	0	✓	↓	↓	14	30
MW-2-110421	5	0	✓	↓	↓	15	30
↓	5	0	✓	↓	↓	14	30
MW-2-2-110421	5	0	✓	↓	↓	15	35
↓	5	0	✓	↓	↓	15	35
JPOP41S-110421	5	0	✓	↓	↓	16	30
↓	5	0	✓	↓	↓	16	30
MD-SW-110420	5	0	✓	↓	↓	14	35
↓	5	0	✓	↓	↓	14	35
MW-3-110420	5	0	✓	↓	↓	15	30
↓ CW04-2811	5	0	✓	↓	↓	14	30
MW-4-110420	5	0	✓	↓	↓	14	30
↓	5	0	✓	↓	↓	14	30
MW-6-110420	5	0	✓	↓	↓	15	35

Surveyors' Name: [signature] Date/Time Surveyed: 4-28-11/07.30

COMPANY NAME: Summit

SDG: ARS/1/100897

SHIPPING CONTAINER

Good Condition	☑ Yes	☐ No
Radioactive	☐ Yes	☑ No
UN2910	☐ Yes	☑ No
Sec. Seals	☐ Yes	☑ No
Seals Intact	☐ Yes ☐ No	☑ N/A
Air Bill	☐ Yes	☑ No

COC PRESENT WITH SAMPLES

COC	☑ Yes	☐ No

SAMPLE CONTAINER(S)

Good Condition	☑ Yes	☐ No
Sec. Seals	☐ Yes	☑ No
Seal Intact	☐ Yes ☐ No	☑ N/A
Marked Radioactive	☐ Yes	☑ No

Samples Rcv 25

Matrix [AF , AQ , BI , FE , LT , SI , SO , UR , VG]

External and Internal Surveys

Exposure Rate Meter:	M3 242861	Serial No.:	M44-2 PR204266	Calibration Due Date:	4-20-12
Count Rate Meter:	M2 154859	Serial No.:	M44-9 PR184559	Calibration Due Date:	4-20-12

Background Exposure Rate (µR/hr)	22	Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd)	13	µR/hr
Background Count Rate (cpm)	70	Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd)	20	cpm
		Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd)	20	cpm

Sample Label/Comments/Notes	pH Orig (pH ≤ 2 is Acceptable)	pH Final	Mark if Preserve	Acid Lot #	Weight(g) / Volume(ml)	µR/hr (Acceptance Limits <500 µR/hr)	cpm (Acceptance Limits <100 cpm/cm²)
MW-6-110420	5	0	✓	R0G0065	1000mL	15	30
MW-7-110419	5	0	✓	↓	↓	14	20
↓	5	0	✓	↓	↓	14	20
MW-8-110419	5	0	✓	↓	↓	13	25
↓	5	0	✓	↓	↓	13	25
MW-MD-02-110420	5	0	✓	↓	↓	13	20
↓	5	0	✓	↓	↓	13	20
MW-MD-110420	5	0	✓	↓	↓	14	30
↓	5	0	✓	↓	↓	14	30
NPOP20E-110420	5	0	✓	↓	↓	14	30
↓	5	0	✓	↓	↓	15	30
PR-SW-01-110420	5	0	✓	↓	↓	15	30
↓	5	0	✓	↓	↓	14	30
RB-01-110420	5	0	✓	↓	↓	14	35
↓	5	0	✓	↓	↓	14	30
RB-02-110421	5	0	✓	↓	↓	14	30
↓	5	0	✓	↓	↓	13	25
RM-JM-SW-02-110420	5	0	✓	↓	↓	14	30
↓	5	0	✓	↓	↓	14	30

Surveyors Name: [signature]

Date/Time Surveyed: 4-28-11 / 07:30

COMPANY NAME: Summit **SDG:** ARS1711-00897

SHIPPING CONTAINER

Good Condition	☑ Yes	☐ No
Radioactive	☐ Yes	☑ No
UN2910	☐ Yes	☑ No
Sec. Seals	☐ Yes	☑ No
Seals Intact	☐ Yes ☐ No	☑ N/A
Air Bill	☐ Yes	☑ No

COC PRESENT WITH SAMPLES

COC	☑ Yes	☐ No

SAMPLE CONTAINER(S)

Good Condition	☑ Yes	☐ No
Sec. Seals	☐ Yes	☑ No
Seal Intact	☐ Yes ☐ No	☑ N/A
Marked Radioactive	☐ Yes	☑ No

Samples Rcv 25

Matrix [AF , AQ , BI , FE , LT , SI , SO , UR , VG]

External and Internal Surveys

Exposure Rate Meter:	M3 242861	Serial No.:	MUH-2 PR2042266	Calibration Due Date:	4-2012
Count Rate Meter:	M2154859	Serial No.:	MUH-9 PR184559	Calibration Due Date:	4-20-12
Background Exposure Rate (µR/hr)	22	Max. Exposure Rate on Shipping Containers Externals (Plus Bkgd)	13	µR/hr	
Background Count Rate (cpm)	70	Max. Removable Count Rate on Shipping Containers Externals (Plus Bkgd)	20	cpm	
		Max. Removable Count Rate on Shipping Containers Internals (Plus Bkgd)	20	cpm	

Sample Label/Comments/Notes	pH Orig (pH ≤ 2 is Acceptable)	pH Final	Mark if Preserve	Acid Lot #	Weight(g) / Volume(mL)	µR/hr (Acceptance Limits <500 µR/hr)	cpm (Acceptance Limits <100 cpm/cm²)
RM-JM-SW-110420	5	0	✓	R09001675	1000 mL	13	30
↓	5	0	✓	↓	↓	13	30
RM-SW-BG-110419	5	0	✓	↓	↓	13	30
↓	5	0	✓	↓	↓	13	30
RP-JM-SW-01-110420	5	0	✓	↓	↓	13	35
↓	5	0	✓	↓	↓	14	30
RP-JM-SW-110420	5	0	✓	↓	↓	14	30
↓	5	0	✓	↓	↓	13	30
RP-SW01-110419	5	0	✓	↓	↓	13	35
↓	5	0	✓	↓	↓	13	35
RP-SW-BG-041911	5	0	✓	↓	↓	14	35
↓	5	0	✓	↓	↓	14	35
SPOP35-110421	5	0	✓	↓	↓	15	30
↓	5	0	✓	↓	↓	13	30
MW-RM-110420	5	0	✓	↓	↓	13	30
↓	5	0	✓	↓	↓	13	30

Surveyors' Name: [signature] Date/Time Surveyed: 4-28-11 / 07:30

DISCREPANT SAMPLE RECEIPT REPORT

For Sample Receiving Use

SDG: _____ **Receipt Date/Time:** 4/27/11 / 16:24 **Matrix:** AQ

Client Name: SUMMIT

Problem Description:

Client has Sample ID-MW-RM ~~11020~~ 110420 (04-20-11 @09:34) present but its not listed on COC. CWB 4-27-11

For Project Manager Use

Client Notified (Y | N): Y **Date/Time Client Notified:** 4-27-11 / 1600

Client/PM Resolution:

Email sent to Client regarding discrepancy. Isotopic thorium should be done on these samples not Gamma Spec. The extra sample not listed on the chain should be added per Elvin Chavez. 4-28-11/0845 QLW

Client Notified that TAT Starts from Resolution of DSRR (Y | N): ~~Y~~ N 4-28-11 QLW

Date/Time DSRR Resolved: 4-28-11 / 0845 **PM Initials:** QLW

For Sample Receiving Use

Action Taken:

Heather Added sample to COC and check-in as normal.

Signature: _____ **Date/Time:** 4-28-11 / 09:03

Sample Custodian

Heather Wright

From: Heather Wright
Sent: Wednesday, May 11, 2011 5:15 PM
To: Jamaal Brown
Cc: Project Managers
Subject: SLDA water samples(ARS1-11-00897)
Signed By: HWright@amrad.com

I've initiated reruns for the following Summit samples:
ARS1-B11-01664-14 (low tracer recovery)
ARS1-B11-01663-01 through -16 (LCS/LCSD failed extremely high at 908%, RER, DER, RPD failed)
ARS1-B11-01660-01 through -15 (tracer recovery low, method blank failed)

Sincerely,

Heather Wright
Project Manager
hwright@amrad.com
ProjectManagers@amrad.com

ARS INTERNATIONAL

225.381.2991 Office
225.381.2996 FAX

Please be advised that the information contained in this email message, including all attached documents or files, is privileged and confidential and is intended only for the use of the individual or individuals addressed. Any other use, dissemination, distribution or copying of this communication is strictly prohibited. If you are not the intended recipient, please delete this message and notify me of incorrect delivery by immediate reply.

Let us know how we're doing! Please visit our website and complete our customer survey http://www.amrad.com/CustomerSurvey.html

2609 North River Road, Port Allen, Louisiana 70767

(800) 401-4277 -- FAX (225) 381-2996

Preliminary

American Radiation Services, Inc.

Laboratory Analysis Report

ARS1-11-00897

Prepared for:

Summit Environmental Technologies

Dara Gilger
3310 Win St
Cuyahoga Falls, OH 44223

dgilger@settek.com
echavez@summitlabs.com

Phone: 330-253-8211
Fax: 330-253-4489

Project Manager Review

Management Review

Notes: American Radiation Services, Inc. assumes no liability for the use or interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

Contact Person: Questions regarding this analytical report should be addressed to:

Project Manager

ProjectManagers@amrad.com

Phone: 225.381.2991
Fax: 225.381.2996

LELAP Cert# 01949 **NELAP Cert# E87558**

ARS INTERNATIONAL

2609 North River Road, Port Allen, Louisiana 70767

1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group:	ARS1-11-00897	**Request or PO Number:**	N/A
Client Sample ID:	MW-1-110419	**ARS Sample ID:**	ARS1-11-00897-001
Sample Collection Date:	04/19/11	**Date Received:**	04/27/11
Sample Matrix:	Aqueous	**Report Date:**	05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
TH-228	0.044	0.025	0.010	0.000		pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	79%
TH-230	0.122	0.046	0.033	0.012		pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	79%
TH-232	0.007	0.020	0.039	0.014	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	79%

NOTES:

Project Manager Review

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ARS Sample Delivery Group:	ARS1-11-00897	**Request or PO Number:**	N/A
Client Sample ID:	MW-2-110421	**ARS Sample ID:**	ARS1-11-00897-002
Sample Collection Date:	04/21/11	**Date Received:**	04/27/11
Sample Matrix:	Aqueous	**Report Date:**	05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
TH-228	0.013	0.015	0.012	0.000		pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	70%
TH-230	0.004	0.027	0.055	0.022	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	70%
TH-232	-0.071	0.042	0.101	0.045	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	70%

NOTES:

Project Manager Review

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ARS Sample Delivery Group:	ARS1-11-00897	**Request or PO Number:**	N/A
Client Sample ID:	MW-2-2-110421	**ARS Sample ID:**	ARS1-11-00897-003
Sample Collection Date:	04/21/11	**Date Received:**	04/27/11
Sample Matrix:	Aqueous	**Report Date:**	05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
TH-228	0.008	0.012	0.011	0.000	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	73%
TH-230	0.042	0.037	0.054	0.022	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	73%
TH-232	-0.004	0.018	0.045	0.017	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	73%

NOTES:

Project Manager Review

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ARS Sample Delivery Group:	ARS1-11-00897	**Request or PO Number:**	N/A
Client Sample ID:	JPOP41S-110421	**ARS Sample ID:**	ARS1-11-00897-004
Sample Collection Date:	04/21/11	**Date Received:**	04/27/11
Sample Matrix:	Aqueous	**Report Date:**	05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
TH-228	0.247	0.150	0.164	0.058		pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	80%
TH-230	1.492	0.373	0.187	0.070		pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	80%
TH-232	0.087	0.090	0.127	0.040	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	80%

NOTES:

Project Manager Review

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1 (800) 401-4277 FAX (225) 381-2996

ARS Sample Delivery Group:	ARS1-11-00897	**Request or PO Number:**	N/A
Client Sample ID:	MD-SW-110420	**ARS Sample ID:**	ARS1-11-00897-005
Sample Collection Date:	04/20/11	**Date Received:**	04/27/11
Sample Matrix:	Aqueous	**Report Date:**	05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
TH-228	0.043	0.029	0.013	0.000		pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	59%
TH-230	0.419	0.105	0.053	0.020		pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	59%
TH-232	0.020	0.027	0.046	0.016	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	59%

NOTES:

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ARS Sample Delivery Group:	ARS1-11-00897	**Request or PO Number:**	N/A
Client Sample ID:	MW-3-110420	**ARS Sample ID:**	ARS1-11-00897-006
Sample Collection Date:	04/20/11	**Date Received:**	04/27/11
Sample Matrix:	Aqueous	**Report Date:**	05/06/11

Analysis Description	Analysis Results	Analysis Error +/- 2 s	MDC	DLC	Qual	Analysis Units	Analysis Test Method	Analysis Date/Time	Analysis Technician	Tracer/Chem Recovery
TH-228	0.008	0.022	0.043	0.016	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	77%
TH-230	0.645	0.127	0.042	0.016		pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	77%
TH-232	0.031	0.027	0.036	0.013	U	pCi/L	ARS-031/Eichrom ACW-10	05/05/11 03:52	JB	77%

NOTES:

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